

# Keysight Wireless Test Set

This help file provides documentation for the following products:  
E6640A EXM Wireless Test Set

V9071B  
GSM/EDGE  
Measurement  
Application User's &  
Programmer's  
Reference

## Notices

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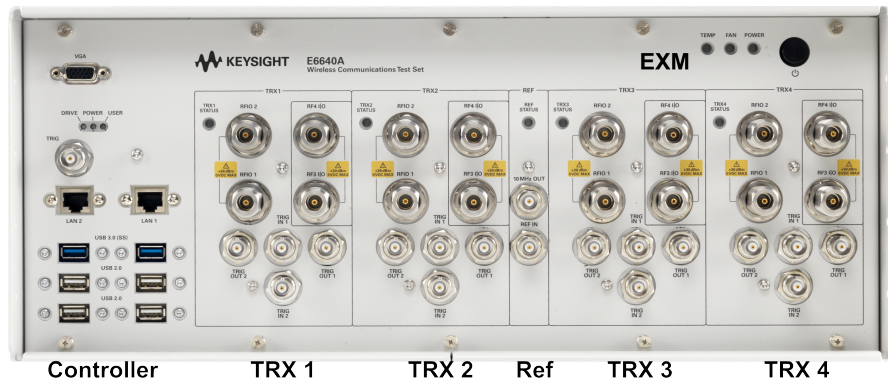
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## 1 About the Test Set

The X-Series E6640A EXM Wireless Test Set is a one-box tester consisting of instruments loaded into a M9018A PXI mainframe with a front impact cover. The mainframe has a common PC controller (located on the far left) and M9300A PXI Frequency Reference (located in the center of the rack). The test set has one to four Keysight M9430A TRX (transmit/receive) instruments installed.

Each TRX includes a signal analyzer and a signal source, both of which interface with the front panel of the test set through an input/output matrix, and is run by its own instance of the XSA firmware application (a fully loaded test set shows four independent XSA windows on its monitor display).

The E6640A can be configured to test cellular products with a standard 40 MHz of analysis bandwidth. It could also be configured to test Wireless products with 80 or 160 MHz of analysis bandwidth. If your requirement is to test both, the TRX instruments can be configured to test both products.



## Installing Application Software

If you want to install a measurement application after your initial hardware purchase, you need only to license it. All of the available applications are loaded in your test set at the time of purchase.

Thus, when you purchase a new application, you will receive an entitlement certificate that you can use to obtain a license key for that application. To activate the new measurement application, enter the license key that you obtain into the test set.

For the latest information on Keysight X-series measurement applications and upgrade kits, visit the following internet URL.

<http://www.keysight.com/find/e6640a>

### Viewing a License Key

Measurement applications that you purchased with your instrument have been installed and activated at the factory before shipment. The instrument requires a unique License Key for every measurement application purchased. The license key is a hexadecimal string that is specific to your measurement application, instrument model number and serial number. It enables you to install, or reactivate, that particular application.

Press **System, Show, System** to display the measurement applications that are currently licensed in your analyzer.

Go to the following location to view the license keys for the installed measurement applications:

C:\Program Files\Agilent\Licensing

You may want to keep a copy of your license key in a secure location. To do this, you can print out a copy of the display showing the license numbers. If you should lose your license key, call your nearest Keysight Technologies service or sales office for assistance.

### Obtaining and Installing a License Key

If you purchase an additional application that requires installation, you will receive an "Entitlement Certificate", which may be redeemed for a license key for one instrument. To obtain your license key, follow the instructions that accompany the certificate.

Installing a license key for the selected application can be done automatically using a USB memory device. To do this, you copy the license file to the USB memory device, at the root level. Follow the instructions that come with your software installation kit.

Installing a license key can also be done manually using the built-in license management application, which may be found via the instrument front panel keys at **System, Licensing. . .**, or on-disk at:

C:\Programming Files\Agilent\Licensing

You can also use these procedures to reinstall a license key that has been accidentally deleted, or lost due to a memory failure.

### Updating Measurement Application Software

All the software applications were loaded at the time of original instrument manufacture. It is a good idea to regularly update your software with the latest available version. This helps to ensure that you receive

any improvements and expanded functionality.

Because the software was loaded at the initial purchase, further additional measurement applications may now be available. If the application you are interested in licensing is not available, you will need to do a software update. (To display a list of installed applications, press **System, Show, System.**)

Check the appropriate page of the Keysight web site for the latest available software versions, according to the name of your instrument, as follows:

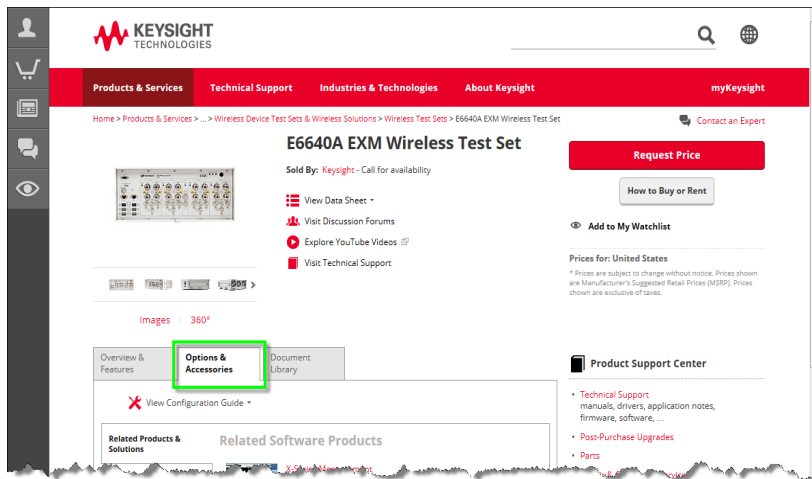
[http://www.keysight.com/find/E6640A\\_software](http://www.keysight.com/find/E6640A_software)

You can load the updated software package into the analyzer either from a USB drive or directly from the internet. An automatic loading program is included with the files.

## EXM Options and Accessories

You can view an online list of available Options and Accessories for your instrument as follows:

1. Browse to one of the following URLs, according to the product name of your analyzer:  
[www.keysight.com/find/e6640a](http://www.keysight.com/find/e6640a)
2. The home page for your instrument appears (in some cases, you may see an initial splash screen containing a button named View the Webpage, which you should click to display the home page).
3. Locate the **Options & Accessories** tab, as highlighted in the example below, which shows the home page for the E6640A.



4. Click the **Options & Accessories** tab, to display a list of available options and accessories for your instrument.

## Front-Panel Features

The instrument Front-panel features are fully detailed in the section "Front-Panel Features" (under the chapter "Front and Rear Panel Features") of the document:

Latest available on line document: [E6640A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the link above to open the PDF document.

## Display Annotations

Display Annotations are fully detailed under the chapter "Front and Rear Panel Features" of the document:

Latest available on line document: [E6640A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the links above to open the PDF document.



## Rear-Panel Features

The instrument's Rear-panel features are fully detailed in the section "Rear-Panel Features" (under the chapter "Front and Rear Panel Features") of the document:

Latest available on line document: [E6640A Getting Started Guide](#)

Embedded PDF installed with the latest firmware revision:

If you are viewing this information as a Help file in the instrument, then you can click on the link above to open the PDF document.

## Window Control Keys

The instrument provides three virtual-front-panel keys or four menu items for controlling windows.

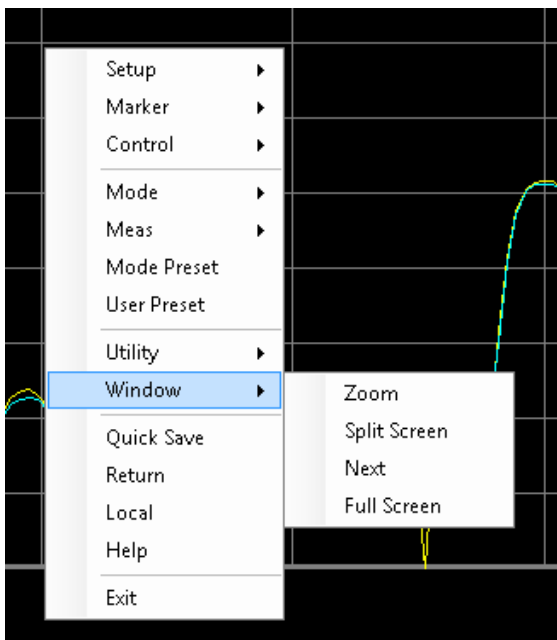
### Virtual Front Panel

The virtual-front-panel keys are Multi Window, Zoom, and Next Window. These are all “immediate action” keys.



### Windows Control Menu

The menu items are Zoom, Split Screen, Next [Window], and Full screen. These are all “immediate action” menu selections. Zoom and Full Screen are toggle functions.



## Multi-Window



The Multi Window front-panel key will toggle you back and forth between the Normal View and the last Multi Window View (Zone Span, Trace Zoom or Spectrogram) that you were in, when using the Swept SA measurement of the Spectrum Analyzer Mode. It remembers which View you were in through a Preset. This “previous view” is set to Zone Span on a Restore Mode Defaults.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Zoom

Zoom is a toggle function. Pressing this key once increases the size of the selected window. Pressing the key again returns the window to the original size.

When Zoom is on for a window, that window will get the entire primary display area. The zoomed window, since it is the selected window, is outlined in green.

Zoom is local to each Measurement. Each Measurement remembers its Zoom state. The Zoom state of each Measurement is part of the Mode’s state.

**NOTE**

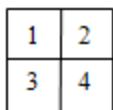
Data acquisition and processing for the other windows continues while a window is zoomed, as does all SCPI communication with the other windows.

<b>Remote Command</b>	:DISPlay:WINDow:FORMat:ZOOM
<b>Remote Command</b>	:DISPlay:WINDow:FORMat:TILE
<b>Example</b>	:DISP:WIND:FORM:ZOOM sets zoomed :DISP:WIND:FORM:TILE sets un-zoomed
<b>Preset</b>	TILE
<b>Initial S/W Revision</b>	Prior to A.02.00

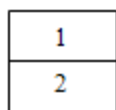
## Next Window

Selects the next window of the current view. When the Next Window key is pressed, the next window in the order of precedence becomes selected. If the selected window was zoomed, the next window will also be zoomed.

The window numbers are as follows. Note that these numbers also determine the order of precedence (that is, Next Window goes from 1 to 2, then 2 to 3, etc.):



**Four window display**



**Two window display**

**RTSA measurements:**

Only two windows are available in the Spectrogram view under the Spectrum measurement and up to three windows are available in the Power vs. Time measurement, depending on the view set up.

<b>Remote Command</b>	<code>:DISPlay:WINDow[:SElect] &lt;number&gt;</code> <code>:DISPlay:WINDow[:SElect]?</code>
<b>Example</b>	<code>:DISP:WIND 1</code>
<b>Preset</b>	1
<b>Min</b>	1
<b>Max</b>	If <number> is greater than the number of windows, limit to <number of windows>
<b>Initial S/W Revision</b>	Prior to A.02.00

One and only one window is always selected. The selected window has the focus; this means that all window-specific key presses apply only to that window. You can tell which window is selected by the thick green border around it. If a window is not selected, its boundary is gray.

If a window in a multi-window display is zoomed it is still outlined in green. If there is only one window, the green outline is not used. This allows the user to distinguish between a zoomed window and a display with only one window.

The selected window is local to each Measurement. Each Measurement remembers which window is selected. The selected window for each Measurement is remembered in Mode state.

**NOTE**

When this key is pressed in Help Mode, it toggles focus between the table of contents window and the topic pane window.

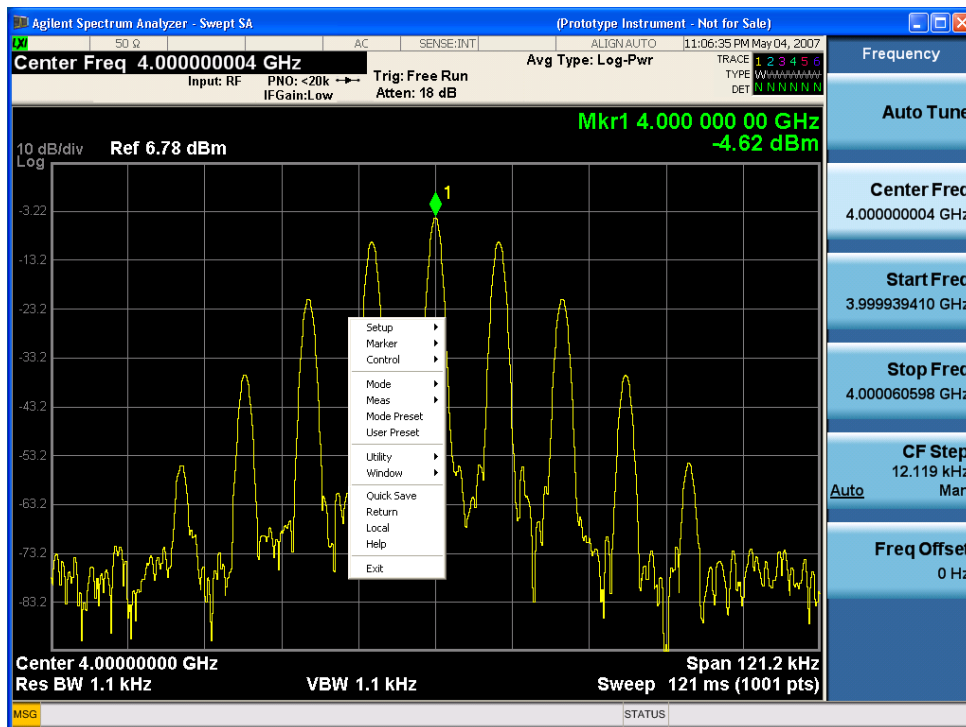
## Mouse and Keyboard Control

If you do not have access to the instrument front-panel, there are several ways that a mouse and PC Keyboard can give you access to functions normally accessed using the front-panel keys.

For instrument lacking a physical front panel display, you can watch the instrument display via external monitor or remote desktop connection

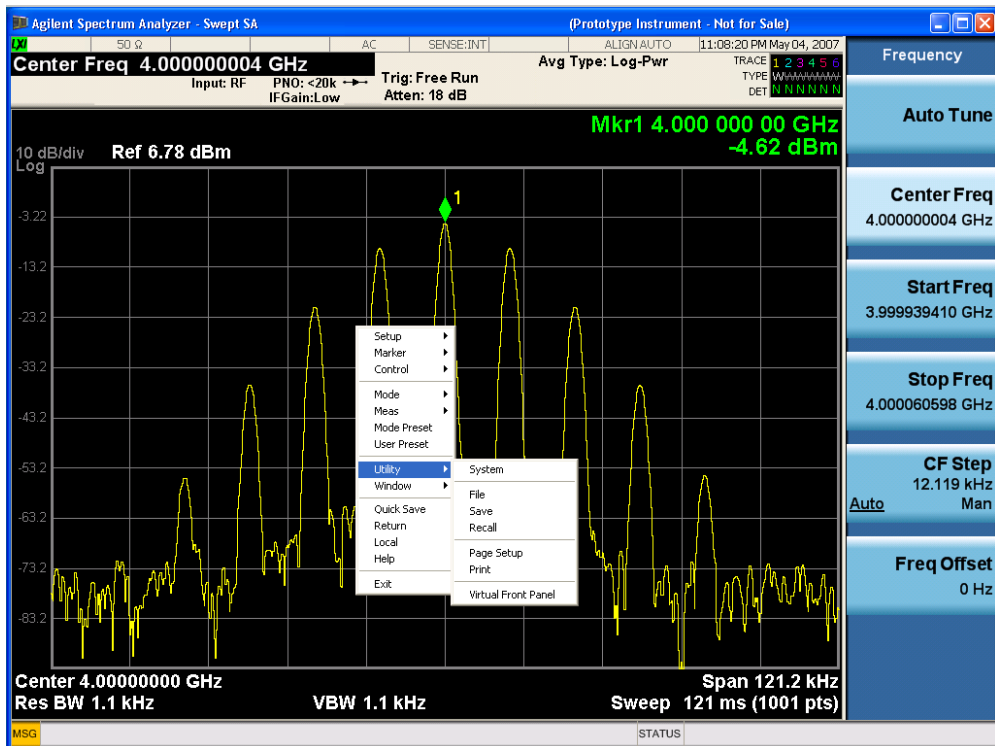
### Right-Click

If you plug in a mouse and right-click on the analyzer screen, a menu will appear as below:



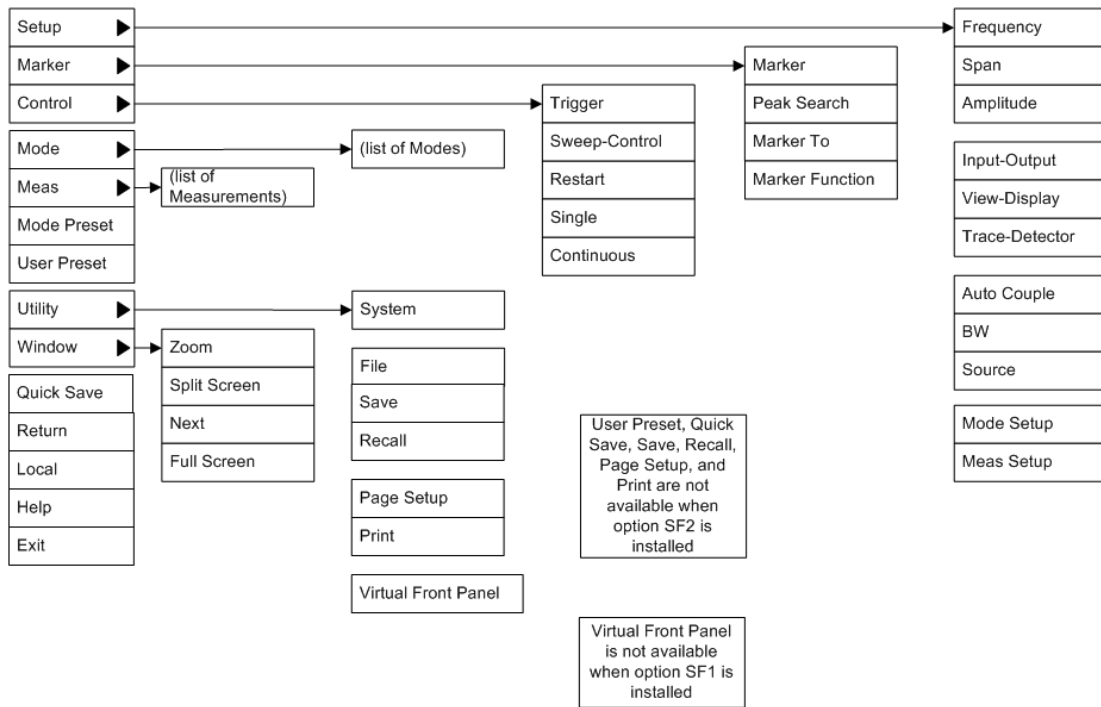
Placing the mouse on one of the rows marked with a right arrow symbol will cause that row to expand, as for example below where the mouse is hovered over the “Utility” row:

1 About the Test Set  
 Mouse and Keyboard Control



This method can be used to access any of the front-panel keys by using a mouse; as for example if you are accessing the instrument through Remote Desktop.

The array of keys thus available is shown below:



## PC Keyboard

If you have a PC keyboard plugged in (or via Remote Desktop), certain key codes on the PC keyboard map to front-panel keys on the GPSA front panel. These key codes are shown below:

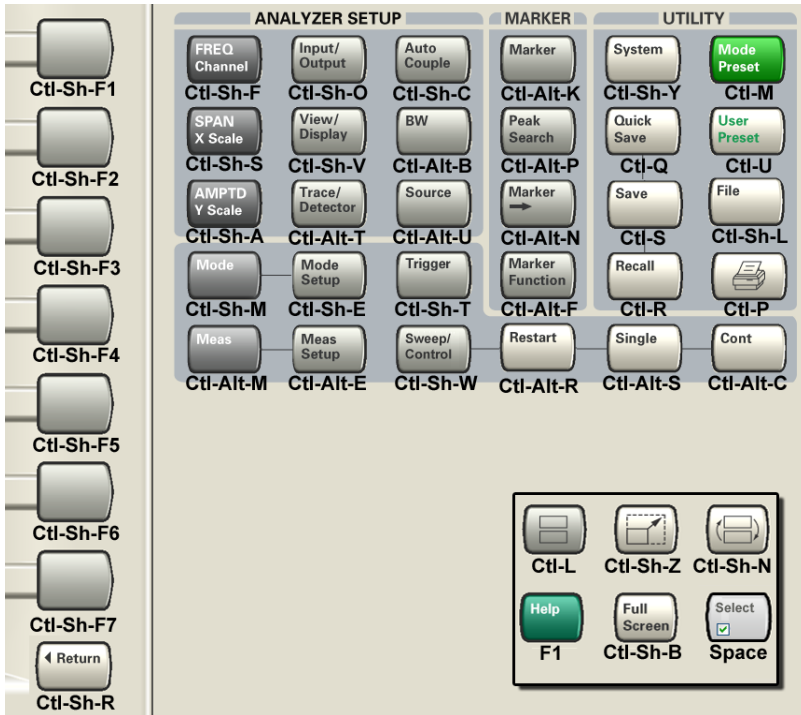
Front-panel key	Key code
Frequency	CTRL+SHIFT+F
Span	CTRL+SHIFT+S
Amplitude	CTRL+SHIFT+A
Input/Output	CTRL+SHIFT+O
View/Display	CTRL+SHIFT+V
Trace/Detector	CTRL+ALT+T
Auto Couple	CTRL+SHIFT+C
Bandwidth	CTRL+ALT+B
Source	CTRL+ALT-U
Marker	CTRL+ALT+K
Peak Search	CTRL+ALT+P
Marker To	CTRL+ALT+N
Marker Function	CTRL+ALT+F
System	CTRL+SHIFT+Y
Quick Save	CTRL+Q
Save	CTRL+S
Recall	CTRL+R
Mode Preset	CTRL+M
User Preset	CTRL+U
Print	CTRL+P
File	CTRL+SHIFT+L
Mode	CTRL+SHIFT+M
Measure	CTRL+ALT+M
Mode Setup	CTRL+SHIFT+E
Meas Setup	CTRL+ALT+E
Trigger	CTRL+SHIFT+T
Sweep/Control	CTRL+SHIFT+W
Restart	CTRL+ALT+R
Single	CTRL+ALT+S
Cont	CTRL+ALT+C
Zoom	CTRL+SHIFT+Z
Next Window	CTRL+SHIFT+N
Split Screen	CTRL+L

1 About the Test Set  
 Mouse and Keyboard Control

<b>Front-panel key</b>	<b>Key code</b>
Full Screen	CTRL+SHIFT+B
Return	CTRL+SHIFT+R
Mute	Mute
Inc Audio	Volume Up
Dec Audio	Volume Down
Help	F1
Control	CTRL
Alt	ALT
Enter	Return
Cancel	Esc
Del	Delete
Backspace	Backspace
Select	Space
Up Arrow	Up
Down Arrow	Down
Left Arrow	Left
Right Arrow	Right
Menu key 1	CTRL+SHIFT+F1
Menu key 2	CTRL+SHIFT+F2
Menu key 3	CTRL+SHIFT+F3
Menu key 4	CTRL+SHIFT+F4
Menu key 5	CTRL+SHIFT+F5
Menu key 6	CTRL+SHIFT+F6
Menu key 7	CTRL+SHIFT+F7
Backspace	BACKSPACE
Enter	ENTER
Tab	Tab
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0



This is a pictorial view of the table:



## Instrument Security & Memory Volatility

If you are using the instrument in a secure environment, you may need details of how to clear or sanitize its memory, in compliance with published security standards of the United States Department of Defense, or other similar authorities.

For X-Series test sets, this information is contained in the document "Security Features and Document of Volatility". This document is not included in the instrument on-disk library, but it may be downloaded from the Keysight web site.

To obtain a copy of the document, click on or browse to the following URL:

<http://www.keysight.com/find/security>

To locate and download the document, select Model Number, for example "E6607A", then click "Submit". Then, follow the on-screen instructions to download the file.

(Undefined variable: Primary.ProductName)  
GSM/EDGE Measurement Application Reference

## 2 About the GSM/EDGE Measurement Application

This document provides information on using the GSM/EDGE Measurement Application in the Keysight X series Wireless Communications Test Set.

## What Does GSM/EDGE Application Do?

This Mode includes five measurements:

- EDGE Power vs. Time
- EDGE EVM
- EDGE RF Output Spectrum
- GMSK Phase & Frequency
- Burst Power

### 3 Programming the Test Set

This section provides introductory information about the programming documentation included with your product.

"What Programming Information is Available?" on page 70

"STATus Subsystem " on page 98

"Common Commands" on page 138

## What Programming Information is Available?

The X-Series Documentation can be accessed through the Additional Documentation page in the instrument Help system. It can also be found online at: <http://www.keysight.com/find/exm>.

The following resources are available to help you create programs for automating your X-Series measurements:

Resource	Description
X-Series Programmer's Guide	Provides general SCPI programming information on the following topics: <ul style="list-style-type: none"><li>• Programming the X-Series Applications</li><li>• Programming fundamentals</li><li>• Programming examples</li></ul> Note that SCPI command descriptions for measurement applications are not in this book, but are in the User's and Programmer's Reference.
User's and Programmer's Reference manuals	Describes all front-panel keys and softkeys, including SCPI commands for a measurement application. Note that: <ul style="list-style-type: none"><li>• Each measurement application has its own User's and Programmer's Reference.</li><li>• The content in this manual is duplicated in the analyzer's Help (the Help that you see for a key is identical to what you see in this manual).</li></ul>
Embedded Help in your instrument	Describes all front-panel keys and softkeys, including SCPI commands, for a measurement application. Note that the content that you see in Help when you press a key is identical to what you see in the User's and Programmer's Reference.
X-Series Getting Started Guide	Provides valuable sections related to programming including: <ul style="list-style-type: none"><li>• Licensing New Measurement Application Software - After Initial Purchase</li><li>• Configuring instrument LAN Hostname, IP Address, and Gateway Address</li><li>• Using the Windows XP Remote Desktop to connect to the instrument remotely</li><li>• Using the Embedded Web Server Telnet connection to communicate SCPI</li></ul> This printed document is shipped with the instrument.
Keysight Application Notes	Printable PDF versions of pertinent application notes.
Keysight VISA User's Guide	Describes the Keysight Virtual Instrument Software Architecture (VISA) library and shows how to use it to develop I/O applications and instrument drivers on Windows PCs.

## List of SCPI Commands

```

*CAL?
*CLS
*ESE <integer>
*ESE?
*ESR?
*IDN?
*OPC
*OPC?
*OPT?
*RCL <register#>
*RST
*SAV <register#>
*SRE <integer>
*SRE?
*STB?
*TRG
*TST?
*WAI
ABORT
CALCulate:BPOWer:MARKer:AOff
CALCulate:BPOWer:MARKer[1]|2|...12:FUNctIon:RESult?
CALCulate:BPOWer:MARKer[1]|2|...12:MODE
CALCulate:BPOWer:MARKer[1]|2|...12:TRACe
CALCulate:BPOWer:MARKer[1]|2|...12:X:POSition
CALCulate:BPOWer:MARKer[1]|2|...12:Y?
CALCulate:CLIMits:FAIL?
CALCulate:DATA<n>:COMPRESS? BLOCK | CFIT | MAXimum | MINimum | MEAN |
DMEan | RMS | RMSCuBEd | SAMPLe | SDEVIation | PPHase[, <soffset>[,
<length>[, <roffset>[, <rlimit>]]]]
CALCulate:DATA[n]?
CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>, <excursion>[, AMPLitude |
FREQuency | TIME[, ALL | GTDLIne | LTDLine]]
CALCulate:DATA[1]|2|...|6:PEAKs? <threshold>, <excursion>[, AMPLitude |
FREQuency | TIME]
CALCulate:EEVM:LIMit:BTS:EXTRemE:EVMP95 <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:EVMP95?
CALCulate:EEVM:LIMit:BTS:EXTRemE:FERRor <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:FERRor?
CALCulate:EEVM:LIMit:BTS:EXTRemE:IQOOffset <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:IQOOffset?
CALCulate:EEVM:LIMit:BTS:EXTRemE:PEVM <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:PEVM?
CALCulate:EEVM:LIMit:BTS:EXTRemE:PPERror GMSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:PPERror? GMSK
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM?
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate QPSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate QAM16, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate QAM32, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate? QAM32

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate? QAM16
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate QAM16, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate QAM32, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK2, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK1, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK1
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK2
CALCulate:EEVM:LIMit:BTS:EXTRemE:RPError GMSK, <real>
CALCulate:EEVM:LIMit:BTS:EXTRemE:RPError? GMSK
CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95 <real>
CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95?
CALCulate:EEVM:LIMit:BTS:NORMal:FError <real>
CALCulate:EEVM:LIMit:BTS:NORMal:FError?
CALCulate:EEVM:LIMit:BTS:NORMal:IQOffset <real>
CALCulate:EEVM:LIMit:BTS:NORMal:IQOffset?
CALCulate:EEVM:LIMit:BTS:NORMal:PEVM <real>
CALCulate:EEVM:LIMit:BTS:NORMal:PEVM?
CALCulate:EEVM:LIMit:BTS:NORMal:PPERror GMSK, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:PPERror? GMSK
CALCulate:EEVM:LIMit:BTS:NORMal:REVM <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM?
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM32, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QPSK, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM16, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM16
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM32
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK1, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM32, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK2, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM16, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK2
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK1
CALCulate:EEVM:LIMit:BTS:NORMal:RPError GMSK, <real>
CALCulate:EEVM:LIMit:BTS:NORMal:RPError? GMSK
CALCulate:EEVM:LIMit:MBTS:EXTRemE:FError <real>
CALCulate:EEVM:LIMit:MBTS:EXTRemE:FError?
CALCulate:EEVM:LIMit:MBTS:NORMal:FError <real>
CALCulate:EEVM:LIMit:MBTS:NORMal:FError?
CALCulate:EEVM:LIMit:MS:EXTRemE:EVMP95 <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:EVMP95?
CALCulate:EEVM:LIMit:MS:EXTRemE:FError <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:FError?
CALCulate:EEVM:LIMit:MS:EXTRemE:IQOffset <real>
```



```

CALCulate:EEVM:LIMit:MS:EXTRemE:IQOOffset?
CALCulate:EEVM:LIMit:MS:EXTRemE:PEVM <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:PEVM?
CALCulate:EEVM:LIMit:MS:EXTRemE:PPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:PPERror? GMSK
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM?
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate QPSK, <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate? QAM16
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate? QAM32
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:NSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:NSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:MS:EXTRemE:RPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:EXTRemE:RPERror? GMSK
CALCulate:EEVM:LIMit:MS:NORMal:EVMP95 <real>
CALCulate:EEVM:LIMit:MS:NORMal:EVMP95?
CALCulate:EEVM:LIMit:MS:NORMal:FERRor <real>
CALCulate:EEVM:LIMit:MS:NORMal:FERRor?
CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset <real>
CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset?
CALCulate:EEVM:LIMit:MS:NORMal:PEVM <real>
CALCulate:EEVM:LIMit:MS:NORMal:PEVM?
CALCulate:EEVM:LIMit:MS:NORMal:PPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:NORMal:PPERror? GMSK
CALCulate:EEVM:LIMit:MS:NORMal:REVM <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM?
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QPSK, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QPSK
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM16
CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM32
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM16, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM32, <real>
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM32
CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM16
CALCulate:EEVM:LIMit:MS:NORMal:RPERror GMSK, <real>
CALCulate:EEVM:LIMit:MS:NORMal:RPERror? GMSK
CALCulate:EEVM:LIMit:PBTS:EXTRemE:FERRor <real>
CALCulate:EEVM:LIMit:PBTS:EXTRemE:FERRor?
CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor <real>
CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor?
CALCulate:EEVM:LIMit:TEST[:STATe] OFF | ON | 0 | 1
CALCulate:EEVM:LIMit:TEST[:STATe]?
CALCulate:EEVM:LIMit:TYPE NORMal | EXTRemE
CALCulate:EEVM:LIMit:TYPE?
CALCulate:EEVM:MARKer:AOff
CALCulate:EEVM:MARKer:COUPle[:STATe] ON | OFF | 1 | 0

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
CALCulate:EEVM:MARKer:COUple[:STATE]?
CALCulate:EEVM:MARKer[1]|2|...4:FUNCTion:RESult?
CALCulate:EEVM:MARKer[1]|2|...12:MAXimum
CALCulate:EEVM:MARKer[1]|2|...12:MINimum
CALCulate:EEVM:MARKer[1]|2|...12:MODE POSition | DELTa | OFF
CALCulate:EEVM:MARKer[1]|2|...12:MODE?
CALCulate:EEVM:MARKer[1]|2|...12:REFerence <integer>
CALCulate:EEVM:MARKer[1]|2|...12:REFerence?
CALCulate:EEVM:MARKer[1]|2|...12:STATE OFF | ON | 0 | 1
CALCulate:EEVM:MARKer[1]|2|...12:STATE?
CALCulate:EEVM:MARKer[1]|2|...12:TRACe POLar | MERRor | PERRor | EVM |
MAXMerror | MINMerror | MAXPerror | MINPerror | MAXEvm | MINEvm
CALCulate:EEVM:MARKer[1]|2|...12:TRACe?
CALCulate:EEVM:MARKer[1]|2|...12:X <real>
CALCulate:EEVM:MARKer[1]|2|...12:X?
CALCulate:EEVM:MARKer[1]|2|...12:X:POSition <integer>
CALCulate:EEVM:MARKer[1]|2|...12:X:POSition?
CALCulate:EEVM:MARKer[1]|2|...12:Y?
CALCulate:EORFspectr:MARKer:AOFF
CALCulate:EORFspectr:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:EORFspectr:MARKer:COUple[:STATE]?
CALCulate:EORFspectr:MARKer[1]|2|...4:FUNCTion:RESult?
CALCulate:EORFspectr:MARKer[1]|2|...12:MAXimum
CALCulate:EORFspectr:MARKer[1]|2|...12:MINimum
CALCulate:EORFspectr:MARKer[1]|2|...12:MODE POSition | DELTa | OFF
CALCulate:EORFspectr:MARKer[1]|2|...12:MODE?
CALCulate:EORFspectr:MARKer[1]|2|...12:REFerence <integer>
CALCulate:EORFspectr:MARKer[1]|2|...12:REFerence?
CALCulate:EORFspectr:MARKer[1]|2|...12:STATE OFF | ON | 0 | 1
CALCulate:EORFspectr:MARKer[1]|2|...12:STATE?
CALCulate:EORFspectr:MARKer[1]|2|...12:TRACe RFEMod | RFESwitching |
SPEMod | LIMMod
CALCulate:EORFspectr:MARKer[1]|2|...12:TRACe?
CALCulate:EORFspectr:MARKer[1]|2|...12:X <real>
CALCulate:EORFspectr:MARKer[1]|2|...12:X?
CALCulate:EORFspectr:MARKer[1]|2|...12:X:POSition <integer>
CALCulate:EORFspectr:MARKer[1]|2|...12:X:POSition?
CALCulate:EORFspectr:MARKer[1]|2|...12:Y?
CALCulate:EPVTime:LIMit:TEST[:STATE] OFF | ON | 0 | 1
CALCulate:EPVTime:LIMit:TEST[:STATE]?
CALCulate:EPVTime:MARKer:AOFF
CALCulate:EPVTime:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:EPVTime:MARKer:COUple[:STATE]?
CALCulate:EPVTime:MARKer[1]|2|...|4:FUNCTion:RESult?
CALCulate:EPVTime:MARKer[1]|2|...|12:MAXimum
CALCulate:EPVTime:MARKer[1]|2|...|12:MINimum
CALCulate:EPVTime:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF
CALCulate:EPVTime:MARKer[1]|2|...|12:MODE?
CALCulate:EPVTime:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:EPVTime:MARKer[1]|2|...|12:REFerence?
CALCulate:EPVTime:MARKer[1]|2|...|12:STATE OFF | ON | 0 | 1
CALCulate:EPVTime:MARKer[1]|2|...|12:STATE?
```

```

CALCulate:EPVTime:MARKer[1]|2|...|12:TRACe RFENvelope | UMASk | LMASk |
MAXRfenvelop | MINRfenvelop
CALCulate:EPVTime:MARKer[1]|2|...|12:TRACe?
CALCulate:EPVTime:MARKer[1]|2|...|12:X <real>
CALCulate:EPVTime:MARKer[1]|2|...|12:X?
CALCulate:EPVTime:MARKer[1]|2|...|12:X:POSition <integer>
CALCulate:EPVTime:MARKer[1]|2|...|12:X:POSition?
CALCulate:EPVTime:MARKer[1]|2|...|12:Y?
CALCulate:FPOWER:POWER[1,2,...,999]?
CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure
CALCulate:FPOWER:POWER[1,2,...,999]:DEFine "configurationstring"
CALCulate:FPOWER:POWER[1,2,...,999]:DEFine?
CALCulate:FPOWER:POWER[1,2,...,999]:FETCh?
CALCulate:FPOWER:POWER[1,2,...,999]:INITiate
CALCulate:FPOWER:POWER[1,2,...,999]:READ?
CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
CALCulate:FPOWER:POWER[1,2,...,999]:RESet
CALCulate:PFError:LIMit:BTS:FERRor <real>
CALCulate:PFError:LIMit:BTS:FERRor?
CALCulate:PFError:LIMit:BTS:PPHase <real>
CALCulate:PFError:LIMit:BTS:PPHase?
CALCulate:PFError:LIMit:BTS:RPHase <real>
CALCulate:PFError:LIMit:BTS:RPHase?
CALCulate:PFError:LIMit:MBTS:FERRor <real>
CALCulate:PFError:LIMit:MBTS:FERRor?
CALCulate:PFError:LIMit:MS:FERRor <real>
CALCulate:PFError:LIMit:MS:FERRor?
CALCulate:PFError:LIMit:MS:PPHase <real>
CALCulate:PFError:LIMit:MS:PPHase?
CALCulate:PFError:LIMit:MS:RPHase <real>
CALCulate:PFError:LIMit:MS:RPHase?
CALCulate:PFError:LIMit:PBTS:FERRor <real>
CALCulate:PFError:LIMit:PBTS:FERRor?
CALCulate:PFError:LIMit:TEST[:STATe] OFF | ON | 0 | 1
CALCulate:PFError:LIMit:TEST[:STATe]?
CALCulate:PFError:MARKer:AOFF
CALCulate:PFError:MARKer:COUple[:STATe] ON | OFF | 1 | 0
CALCulate:PFError:MARKer:COUple[:STATe]?
CALCulate:PFError:MARKer[1]|2|...|4:FUNCTion:RESult?
CALCulate:PFError:MARKer[1]|2|...|12:MAXimum
CALCulate:PFError:MARKer[1]|2|...|12:MODE POSition | DELTa | OFF
CALCulate:PFError:MARKer[1]|2|...|12:MODE?
CALCulate:PFError:MARKer[1]|2|...|12:REFerence <integer>
CALCulate:PFError:MARKer[1]|2|...|12:REFerence?
CALCulate:PFError:MARKer[1]|2|...|12:TRACe PERRor | PFError | RFENvelope |
POLar
CALCulate:PFError:MARKer[1]|2|...|12:TRACe?
CALCulate:PFError:MARKer[1]|2|...|12:X <real>
CALCulate:PFError:MARKer[1]|2|...|12:X?
CALCulate:PFError:MARKer[1]|2|...|12:X:POSition <integer>
CALCulate:PFError:MARKer[1]|2|...|12:X:POSition?
CALCulate:PFError:MARKer[1]|2|...|12:Y?

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
CALCulate:TXPower:MARKer:AOff
CALCulate:TXPower:MARKer:COUple[:STATE] ON | OFF | 1 | 0
CALCulate:TXPower:MARKer:COUple[:STATE]?
CALCulate:TXPower:MARKer[1]|2|...12:FUNcTION:RESult?
CALCulate:TXPower:MARKer[1]|2|...12:MAXimum
CALCulate:TXPower:MARKer[1]|2|...12:MODE POSition | DELTa | OFF
CALCulate:TXPower:MARKer[1]|2|...12:MODE?
CALCulate:TXPower:MARKer[1]|2|...12:REFerence <integer>
CALCulate:TXPower:MARKer[1]|2|...12:REFerence?
CALCulate:TXPower:MARKer[1]|2|...12:TRACe RFENvelope | MAXHold | MINHold
CALCulate:TXPower:MARKer[1]|2|...12:TRACe?
CALCulate:TXPower:MARKer[1]|2|...12:X:POSition <real>
CALCulate:TXPower:MARKer[1]|2|...12:X:POSition?
CALCulate:TXPower:MARKer[1]|2|...12:Y?
CALibration[:ALL]
CALibration[:ALL]?
CALibration[:ALL]:NPENding
CALibration:EXPIred?
CALibration:IF
CALibration:IF?
CALibration:IF:NPENding
CALibration:INTernal:SOURce[:ALL]
CALibration:INTernal:SOURce[:ALL]?
CALibration:INTernal:SOURce[:ALL]:NPENding
CALibration:NRF
CALibration:NRF?
CALibration:NRF:NPENding
CALibration:RF
CALibration:RF?
CALibration:RF:NPENding
CALibration:TEMPerature:CURRent?
CALibration:TEMPerature:LALL?
CALibration:TEMPerature:LIF?
CALibration:TEMPerature:LRF?
CALibration:TEMPerature:SOURce:LALL?
CALibration:TIME:LALL?
CALibration:TIME:LIF?
CALibration:TIME:LRF?
CALibration:TIME:SOURce:LALL?
CONF FSC
CONFigure?
CONFigure:EEVM
CONFigure:EEVM
CONFigure:EEVM:NDEFault
CONFigure:EORFspectr
CONFigure:EORFspectr
CONFigure:EORFspectr:NDEFault
CONFigure:EPVTime
CONFigure:EPVTime
CONFigure:EPVTime:NDEFault
CONFigure:PFError
CONFigure:PFError
CONFigure:PFError:NDEFault
```

```

CONFigure:TXPower
CONFigure:TXPower|BPOWer
CONFigure:TXPower|BPOWer:NDEFault
COUple ALL | NONE
DISPlay:<measurement>:ANNOtation:TITLe:DATA <string>
DISPlay:<measurement>:ANNOtation:TITLe:DATA?
DISPlay:ACTivefunc[:STATE] ON | OFF | 1 | 0
DISPlay:ACTivefunc[:STATE]?
DISPlay:ANNOtation:MBAR[:STATE] OFF | ON | 0 | 1
DISPlay:ANNOtation:MBAR[:STATE]?
DISPlay:ANNOtation:SCREen[:STATE] OFF | ON | 0 | 1
DISPlay:ANNOtation:SCREen[:STATE]?
DISPlay:EEVM:SDERotation[:STATE] OFF | ON | 0 | 1
DISPlay:EEVM:SDERotation[:STATE]?
DISPlay:EEVM:SDOTs[:STATE] OFF | ON | 0 | 1
DISPlay:EEVM:SDOTs[:STATE]?
DISPlay:EEVM:TEXT:TFUNit SEConD | SYMBol
DISPlay:EEVM:TEXT:TFUNit?
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATE] ON | OFF | 1 | 0
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATE]?
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATE] ON | OFF | 1 | 0
DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATE]?
DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar VC | VECTor | CONStln
DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar?
DISPlay:EORFSpectr:VIEW:NSElect <integer>
DISPlay:EORFSpectr:VIEW:NSElect?
DISPlay:EORFSpectr:VIEW[:SElect] RSUMmary | CINFormation
DISPlay:EORFSpectr:VIEW[:SElect]?
DISPlay:EPVTime:LIMit:MASK OFF | ON | 0 | 1
DISPlay:EPVTime:LIMit:MASK?
DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATE] ON | OFF | 1 | 0
DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATE]?
DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATE] ON | OFF | 1 | 0
DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATE]?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:COUple 0 | 1 | OFF |
ON
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALE]:COUple 0 | 1 | OFF | ON
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALE]:COUple?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:COUple?
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALE]:PDIVision <time>
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:PDIVision <time>
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:PDIVision?
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALE]:PDIVision?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:RLEVel <time>
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALE]:RLEVel <time>
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALE]:RLEVel?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:RLEVel?
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALE]:RPOSition LEFT | CENTer
| RIGHT
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:RPOSition LEFT |
CENTer | RIGHT
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:X[:SCALE]:RPOSition?

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:X[:SCALe]:RPOSition?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 | 1 | OFF |
ON
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle 0 | 1 | OFF | ON
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:COUPle?
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTer
| BOTTom
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition TOP | CENTer |
BOTTom
DISPlay:EPVTime:VIEW[1]|3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:EPVTime:VIEW2:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?
DISPlay:PFERror:BDOTs[:STATe] ON | OFF | 1 | 0
DISPlay:PFERror:BDOTs[:STATe]?
DISPlay:PFERror:VIEW:NSElect <integer>
DISPlay:PFERror:VIEW:NSElect?
DISPlay:PFERror:VIEW[:SElect] POLar | ERRor | DBITs
DISPlay:PFERror:VIEW[:SElect]?
DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar VC | VECTor | CONSTln
DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle ON | OFF | 1
| 0
DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:COUPle?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision <real>
DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision <time>
DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:PDIVision?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel <real>
DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel <time>
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:X[:SCALe]:RLEVel?
DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition LEFT |
CENTer | RIGHT
DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:X[:SCALe]:RPOSition?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle ON | OFF | 1 |
0
DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:COUPle?
DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision <real>
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:PDIVision?
DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RLEVel?
```

```

DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:RLEVel?
DISPlay:PFERror:VIEW[1]:WINDow[1]|2|3:TRACe:Y[:SCALe]:RPOSition TOP |
CENTer | BOTTOm
DISPlay:PFERror:VIEW[1]:WINDow[1]|2:TRACe:Y[:SCALe]:RPOSition?
DISPlay:TXPower:BARGraph[:STATe] ON | OFF | 1 | 0
DISPlay:TXPower:BARGraph[:STATe]?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON | OFF | 1 | 0
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON | OFF | 1 | 0
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0 | 1 | OFF | ON
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT | CENTer
| RIGHT
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0 | 1 | OFF | ON
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision <rel_ampl>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real>
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP | CENTer |
BOTTOm
DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
DISPlay:WINDow[1]:ANNOtation[:ALL] OFF | ON | 0 | 1
DISPlay:WINDow[1]:ANNOtation[:ALL]?
DISPlay:WINDow:FORMat:TILE
DISPlay:WINDow:FORMat:ZOOM
DISPlay:WINDow[:SElect] <number>
DISPlay:WINDow[:SElect]?
DISPlay:WINDow[1]:TRACe:GRATICule:GRID[:STATe] OFF | ON | 0 | 1
DISPlay:WINDow[1]:TRACe:GRATICule:GRID[:STATe]?
FEED:RF:PORT:OUTP RFIO1
FETCh:EEVM[n]?
FETCh:EORFspectr[n]?
FETCh:EPVTime[n]?
FETCh:PFERror[n]?
FETCh:TXPower|BPOWer[n]?
FORMat:BORDER NORMAl | SWAPped
FORMat:Border?
FORMat[:TRACe][:DATA] ASCii | INTeger, 32 | REAL, 32 | REAL, 64
FORMat[:TRACe][:DATA]?
GLOBal:DEFault
GLOBal:FREQUency:CENTer[:STATe] 1 | 0 | ON | OFF
GLOBal:FREQUency:CENTer[:STATe]?
HCOpy:ABORT
HCOpy[:IMMediate]
INITiate:CONTinuous OFF | ON | 0 | 1

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
INITiate:CONTinuous?
INITiate:EEVM
INITiate:EORFspectr
INITiate:EPVTime
INITiate[:IMMediate]
INITiate:PAUSE
INITiate:PFERror
INITiate:REStart
INITiate:RESume
INITiate:TXPower|BPOWer
INPut<1|2>:TYPE INPUT1 | INPUT2
INPut<1|2>:TYPE?
INPut[1]|2:LISN:FILTer:HPAS[:STATe] ON | OFF
INPut[1]|2:LISN:FILTer:HPAS[:STATe]?
INPut[1]|2:LISN:PEARth GROunded | FLOating
INPut[1]|2:LISN:PEARth?
INPut[1]|2:LISN:PHASe L1 | L2 | L3 | N
INPut[1]|2:LISN:PHASe?
INPut[1]|2:LISN[:TYPE] FOURphase | ESH2Z5 | ENV216 | OFF
INPut[1]|2:LISN[:TYPE]?
INPut:MIXer EXTernal | INTernal
INPut:MIXer?
INST:NSEL 105
INST:NSEL 102
INSTrument:CATalog?
INSTrument:COUPle:DEFault
INSTrument:COUPle:FREQuency:CENTer ALL | NONE
INSTrument:COUPle:FREQuency:CENTer?
INSTrument:DEFault
INSTrument:NSElect <integer>
INSTrument:NSElect?
INSTrument[:SElect] RECeiver
INSTrument[:SElect] SANalyzer
INSTrument[:SElect] 'SA' | 'PNOISE' | 'EDGE' | 'GSM' | 'BASIC'
INSTrument[:SElect] SA | RTSA | SEQAN | EMI | BASIC | WCDMA | EDGE GSM |
WIMAXOFDMA | VSA | PNOISE | NFIGure | ADEMOD | BTooth | TDSCDMA | CDMA2K |
CDMA1XEV | LTE | LTETDD | LTEAFDD | LTEATDD | MSR | DVB | DTMB | DCATV |
ISDBT | CMMB | WLAN | CWLAN | CWIMAXOFDM | WIMAXFIXED | IDEN | RLC |
SCPILC | VSA89601
INSTrument[:SElect] GSM
INSTrument[:SElect]?
INST:SEL LTE
INST:SEL SCPILC
INST:SEL EMI
INST:SEL LTETDD
MEASure:EEVM[n]?
MEASure:EORFspectr[n]?
MEASure:EPVTime[n]?
MEASure:PFERror[n]?
MEASure:TXPower|BPOWer[n]?
MMEMory:CATalog? [<directory_name>]
MMEMory:CDIRectory [<directory_name>]
```



```

MMEMory:CDIRectory?
MMEMory:COpy <string>, <string>[, <string>, <string>]
MMEMory:COpy:DEvice <source_string>, <dest_string>
MMEMory:DATA <file_name>, <data>
MMEMory:DATA? <file_name>
MMEMory:DELeTe <file_name>[, <directory_name>]
MMEMory:HEADer:ID? "<filename>"
MMEMory:LOAD:SEQuences:| SLISt | ALISt | SAALISt | "MySequence.txt"
MMEMory:LOAD:STATE <filename>
MMEMory:LOAD:STATE 1, <filename>
MMEMory:MDIRectory <directory_name>
MMEMory:MOVE <string>, <string>[, <string>, <string>]
MMEMory:RDIRectory <directory_name>
MMEMory:REGISter:STATE:LABEL <regnumber>, "label"
MMEMory:REGISter:STATE:LABEL? <regnumber>
MMEMory:STORE:RESuLts <string>
MMEMory:STORE:RESuLts:MTABLE|PTABLE|SPECTrogram <filename>
MMEMory:STORE:SCReen <filename>
MMEMory:STORE:SCReen:THEME TDColor | TDMonochrome | FCOLor | FMONochrome
MMEMory:STORE:SCReen:THEME?
MMEMory:STORE:STATE 1, <filename>
MMEMory:STORE:STATE <filename>
MMEM:STOR:SEQuences:| SLISt | ALISt | SAALISt | SStep"MySequence.txt"
OUTPut:ANALog OFF | SVIDeo | LOGVideo | LINVideo | DAUDio
OUTPut:ANALog?
OUTPut:ANALog:AUTO OFF | ON | 0 | 1
OUTPut:ANALog:AUTO?
OUTPut[:EXtErnal][:STATE] ON | OFF | 1 | 0
OUTPut[:EXtErnal][:STATE]?
OUTPut:MODulation[:STATE] ON | OFF | 1 | 0
OUTPut:MODulation[:STATE]?
READ:EEVM[n]?
READ:EORFspectr[n]?
READ:EPVTime[n]?
READ:PFERror[n]?
READ:TXPower|BPOWer[n]?
[:SENSE]:<measurement>:TRIGger:SOURce IF
[:SENSE]:<measurement>:TRIGger:SOURce
[:SENSE]:ACPR:TRIGger:SOURce
[:SENSE]:BPOWer:AVERAge:COUNT
[:SENSE]:BPOWer:AVERAge:TCONtrol
[:SENSE]:BPOWer:AVERAge:TYPE
[:SENSE]:BPOWer:METhod
[:SENSE]:BPOWer:THReshold
[:SENSE]:CHANnel:ARFCn|RFCHannel <integer>
[:SENSE]:CHANnel:ARFCn|RFCHannel?
[:SENSE]:CHANnel:ARFCn|RFCHannel:BOTTom
[:SENSE]:CHANnel:ARFCn|RFCHannel:MIDdle
[:SENSE]:CHANnel:ARFCn|RFCHannel:TOP
[:SENSE]:CHANnel:BURSt NORMAL | SYNC | ACCeSS | HSRate | MIXed
[:SENSE]:CHANnel:BURSt?
[:SENSE]:CHANnel:CARRier:BASE:CLASs SC | MC
[:SENSE]:CHANnel:CARRier:BASE:CLASs?

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
[:SENSe]:CHANnel:CARRier:BASE:CLASSs:AUTO ON | OFF | 1 | 0
[:SENSe]:CHANnel:CARRier:BASE:CLASSs:AUTO?
[:SENSe]:CHANnel:CARRier:COUNT <integer>
[:SENSe]:CHANnel:CARRier:COUNT?
[:SENSe]:CHANnel:CARRier:FALLocation
[:SENSe]:CHANnel:CARRier:FALLocation?
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:ABPoint <integer>
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:ABPoint?
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation <freq>
[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?
[:SENSe]:CHANnel:CARRier:LIST:COUple OFF | ON | 0 | 1, ...
[:SENSe]:CHANnel:CARRier:LIST:COUple?
[:SENSe]:CHANnel:CARRier:LIST:INTerval <freq>, ...
[:SENSe]:CHANnel:CARRier:LIST:INTerval?
[:SENSe]:CHANnel:CARRier:LIST:PPResent YES | NO, ...
[:SENSe]:CHANnel:CARRier:LIST:PPResent?
[:SENSe]:CHANnel:CARRier:RCARRier <integer>
[:SENSe]:CHANnel:CARRier:RCARRier?
[:SENSe]:CHANnel:SLOT <integer>
[:SENSe]:CHANnel:SLOT?
[:SENSe]:CHANnel:SLOT:AUTO OFF | ON | 0 | 1
[:SENSe]:CHANnel:SLOT:AUTO?
[:SENSe]:CHANnel:TSCode <integer>
[:SENSe]:CHANnel:TSCode?
[:SENSe]:CHANnel:TSCode:AUTO OFF | ON | 0 | 1
[:SENSe]:CHANnel:TSCode:AUTO?
[:SENSe]:CORRection:BTS[:RF]:GAIN <rel_ampl>
[:SENSe]:CORRection:BTS[:RF]:GAIN?
[:SENSe]:CORRection:BTS[:RF]:LOSS <rel_ampl>
[:SENSe]:CORRection:BTS[:RF]:LOSS?
[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude] 50 | 75
[:SENSe]:CORRection:IMPedance[:INPut][:MAGNitude]?
[:SENSe]:CORRection:MS[:RF]:GAIN <rel_ampl>
[:SENSe]:CORRection:MS[:RF]:GAIN?
[:SENSe]:CORRection:MS[:RF]:LOSS <rel_ampl>
[:SENSe]:CORRection:MS[:RF]:LOSS?
[:SENSe]:CORRection:OFFSet[:MAGNitude]
[:SENSe]:CORRection:SA[:RF]:GAIN <rel_ampl>
[:SENSe]:CORRection:SA[:RF]:GAIN?
[:SENSe]:EEVM:AVERAge:COUNT <integer>
[:SENSe]:EEVM:AVERAge:COUNT?
[:SENSe]:EEVM:AVERAge[:STATE] OFF | ON | 0 | 1
[:SENSe]:EEVM:AVERAge[:STATE]?
[:SENSe]:EEVM:AVERAge:TCONtrol EXPonential | REPeat
[:SENSe]:EEVM:AVERAge:TCONtrol?
[:SENSe]:EEVM:BSYNc:PMODulation:ALIGNment OFF | ON | 0 | 1
[:SENSe]:EEVM:BSYNc:PMODulation:ALIGNment?
[:SENSe]:EEVM:BSYNc:SOURce TSEquence | RFBurst | PMODulation | NONE
[:SENSe]:EEVM:BSYNc:SOURce?
[:SENSe]:EEVM:DROop OFF | ON | 0 | 1
[:SENSe]:EEVM:DROop?
[:SENSe]:EEVM:FERRor:TRANge WIDE | NORMAl
[:SENSe]:EEVM:FERRor:TRANge?
```

```

[:SENSE]:EEVM:SDOTs[:STATE]
[:SENSE]:EORFspectr:AVERage:COUNT <integer>
[:SENSE]:EORFspectr:AVERage:COUNT?
[:SENSE]:EORFspectr:AVERage:FAST[:STATE] OFF | ON | 0 | 1
[:SENSE]:EORFspectr:AVERage:FAST[:STATE]?
[:SENSE]:EORFspectr:AVERage:MODulation:TYPE LOG | RMS
[:SENSE]:EORFspectr:AVERage:MODulation:TYPE?
[:SENSE]:EORFspectr:AVERage:MODulation:TYPE:LOG[:BTS]
[:SENSE]:EORFspectr:AVERage:MODulation:TYPE:LOG[:BTS]?
[:SENSE]:EORFspectr:AVERage:MODulation:TYPE:LOG:MS
[:SENSE]:EORFspectr:AVERage:MODulation:TYPE:LOG:MS?
[:SENSE]:EORFspectr:AVERage[:STATE] OFF | ON | 0 | 1
[:SENSE]:EORFspectr:AVERage[:STATE]?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier <freq>
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier:AUTO OFF |
ON | 0 | 1
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:CARRier:AUTO?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe <freq>
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:CLOSe?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR[1] <freq>
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:FAR[1]?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:IM:FAR2
<freq>
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:MODulation:OFFSet:IM:FAR2?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier <freq>
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe <freq>
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR <freq>
[:SENSE]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:FAR?
[:SENSE]:EORFspectr:BFRequency <freq>
[:SENSE]:EORFspectr:BFRequency?
[:SENSE]:EORFspectr:BWIDth[:RESolution]:MODulation:CARRier
[:SENSE]:EORFspectr:BWIDth[:RESolution]:MODulation:OFFSet:CLOSe
[:SENSE]:EORFspectr:BWIDth[:RESolution]:MODulation:OFFSet:FAR
[:SENSE]:EORFspectr:BWIDth[:RESolution]:SWITching:CARRier
[:SENSE]:EORFspectr:BWIDth[:RESolution]:SWITching:OFFSet:CLOSe
[:SENSE]:EORFspectr:BWIDth[:RESolution]:SWITching:OFFSet:FAR
[:SENSE]:EORFspectr:CARRier:PREFerence:TYPE REF | MAX
[:SENSE]:EORFspectr:CARRier:PREFerence:TYPE?
[:SENSE]:EORFspectr:DETEctor:SWITching:FAST[:STATE] ON | OFF | 1 | 0
[:SENSE]:EORFspectr:DETEctor:SWITching:FAST[:STATE]?
[:SENSE]:EORFspectr:IMPorder <integer>
[:SENSE]:EORFspectr:IMPorder?
[:SENSE]:EORFspectr:LIST:MODulation:APPLy RELative|BOTH|ABSolute, ...
[:SENSE]:EORFspectr:LIST:MODulation:APPLy?
[:SENSE]:EORFspectr:LIST:MODulation:BANDwidth <freq>, ...
[:SENSE]:EORFspectr:LIST:MODulation:BANDwidth?
[:SENSE]:EORFspectr:LIST:MODulation:BWIDth
[:SENSE]:EORFspectr:LIST:MODulation[:FREquency] <freq>, ...
[:SENSE]:EORFspectr:LIST:MODulation[:FREquency]?
[:SENSE]:EORFspectr:LIST:MODulation:LOFFset:ABSolute <rel_ampl>, ...

```

```
[ :SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute?
[ :SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier] <rel_ampl>, ...
[ :SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier]?
[ :SENSe]:EORFspectr:LIST:MODulation:STATE OFF|ON|0|1, ...
[ :SENSe]:EORFspectr:LIST:MODulation:STATE?
[ :SENSe]:EORFspectr:LIST:SELEct CUSTom | SHORt | STANdard | LCUSTom
[ :SENSe]:EORFspectr:LIST:SELEct?
[ :SENSe]:EORFspectr:LIST:SWITching:APPLy RELative|BOTH|ABSolute, ...
[ :SENSe]:EORFspectr:LIST:SWITching:APPLy?
[ :SENSe]:EORFspectr:LIST:SWITching:BANDwidth <freq>, ...
[ :SENSe]:EORFspectr:LIST:SWITching:BANDwidth?
[ :SENSe]:EORFspectr:LIST:SWITching:BWIDth
[ :SENSe]:EORFspectr:LIST:SWITching[:FREQuency] <freq>, ...
[ :SENSe]:EORFspectr:LIST:SWITching[:FREQuency]?
[ :SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute <rel_ampl>, ...
[ :SENSe]:EORFspectr:LIST:SWITching:LOFFset:ABSolute?
[ :SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, ...
[ :SENSe]:EORFspectr:LIST:SWITching:LOFFset[:RCARrier]?
[ :SENSe]:EORFspectr:LIST:SWITching:STATE OFF|ON|0|1, ...
[ :SENSe]:EORFspectr:LIST:SWITching:STATE?
[ :SENSe]:EORFspectr:MCARrier:BE XTension <freq>
[ :SENSe]:EORFspectr:MCARrier:BE XTension?
[ :SENSe]:EORFspectr:MCARrier:LCUSTom:LIST:COFREquency <freq>, ...
[ :SENSe]:EORFspectr:MCARrier:LCUSTom:LIST:COFREquency?
[ :SENSe]:EORFspectr:MCARrier:LEXCeption:LIST:FREQuency <freq>, ...
[ :SENSe]:EORFspectr:MCARrier:LEXCeption:LIST:FREQuency?
[ :SENSe]:EORFspectr:MCARrier:LEXCeption:RULE FIXEd | CUSTom
[ :SENSe]:EORFspectr:MCARrier:LEXCeption:RULE?
[ :SENSe]:EORFspectr:MCARrier:LEXCeption[:STATE] OFF | ON | 0 | 1
[ :SENSe]:EORFspectr:MCARrier:LEXCeption[:STATE]?
[ :SENSe]:EORFspectr:MEASure MULTiple | SINGLE | SWEPT
[ :SENSe]:EORFspectr:MEASure?
[ :SENSe]:EORFspectr:MODulation:RPOWER <ampl>
[ :SENSe]:EORFspectr:MODulation:RPOWER?
[ :SENSe]:EORFspectr:MODulation:RPOWER:AUTO[:STATE] OFF | ON | 0 | 1
[ :SENSe]:EORFspectr:MODulation:RPOWER:AUTO[:STATE]?
[ :SENSe]:EORFspectr:NCONTiguous:REGion INNER | OUTER
[ :SENSe]:EORFspectr:NCONTiguous:REGion?
[ :SENSe]:EORFspectr:OFREquency <freq>
[ :SENSe]:EORFspectr:OFREquency?
[ :SENSe]:EORFspectr:REFerence:AVERage[:AUTO] ON | OFF | 1 | 0
[ :SENSe]:EORFspectr:REFerence:AVERage[:AUTO]?
[ :SENSe]:EORFspectr:REFerence:AVERage:COUNT <integer>
[ :SENSe]:EORFspectr:REFerence:AVERage:COUNT?
[ :SENSe]:EORFspectr:SWITching:RPOWER
[ :SENSe]:EORFspectr:SWITching:RPOWER <ampl>
[ :SENSe]:EORFspectr:SWITching:RPOWER:AUTO[:STATE] OFF | ON | 0 | 1
[ :SENSe]:EORFspectr:SWITching:RPOWER:AUTO[:STATE]?
[ :SENSe]:EORFspectr:SWITching:RPOWER:TYPE AVERage | MAXHold
[ :SENSe]:EORFspectr:SWITching:RPOWER:TYPE?
[ :SENSe]:EORFspectr:TYPE MODulation | MSWitching | SWITching |
FFModulation
[ :SENSe]:EORFspectr:TYPE?
```

```

[:SENSE]:EORFspectr:TYPE:MODulation[:METHod] DIScrete | SWEEp
[:SENSE]:EORFspectr:TYPE:MODulation[:METHod]?
[:SENSE]:EORFspectr:WBNoise ON | OFF | 1 | 0
[:SENSE]:EORFspectr:WBNoise?
[:SENSE]:EPVTime:AVERAge:COUNT <integer>
[:SENSE]:EPVTime:AVERAge:COUNT?
[:SENSE]:EPVTime:AVERAge[:STATe] OFF | ON | 0 | 1
[:SENSE]:EPVTime:AVERAge[:STATe]?
[:SENSE]:EPVTime:AVERAge:TCONtrol EXponential | REPEAT
[:SENSE]:EPVTime:AVERAge:TCONtrol?
[:SENSE]:EPVTime:AVERAge:TYPE LOG | RMS | MAXimum | MINimum | MXMinimum
[:SENSE]:EPVTime:AVERAge:TYPE?
[:SENSE]:EPVTime:BANDwidth[:RESolution] <bandwidth>
[:SENSE]:EPVTime:BANDwidth[:RESolution]?
[:SENSE]:EPVTime:BANDwidth[:RESolution]:TYPE FLATtop | GAUSSian
[:SENSE]:EPVTime:BANDwidth[:RESolution]:TYPE?
[:SENSE]:EPVTime:BSYnc:SLENgth EVEN | INTeger
[:SENSE]:EPVTime:BSYnc:SLENgth?
[:SENSE]:EPVTime:BSYnc:SOURce TSEquence | RFBurst | NONE
[:SENSE]:EPVTime:BSYnc:SOURce?
[:SENSE]:EPVTime:BWIDth[:RESolution]
[:SENSE]:EPVTime:BWIDth[:RESolution]:TYPE
[:SENSE]:EPVTime:LIMit:TEST
[:SENSE]:EPVTime:MASK:CUSTom[:TYPE] FASLot | AASlots
[:SENSE]:EPVTime:MASK:CUSTom[:TYPE]?
[:SENSE]:EPVTime:MASK:LIST:LOWer:ABSolute <real>, ...
[:SENSE]:EPVTime:MASK:LIST:LOWer:ABSolute?
[:SENSE]:EPVTime:MASK:LIST:LOWer:POINTs?
[:SENSE]:EPVTime:MASK:LIST:LOWer:RELative <rel_ampl>, ...
[:SENSE]:EPVTime:MASK:LIST:LOWer:RELative?
[:SENSE]:EPVTime:MASK:LIST:LOWer:TIME <seconds>, ...
[:SENSE]:EPVTime:MASK:LIST:LOWer:TIME?
[:SENSE]:EPVTime:MASK:LIST:UPPer:ABSolute <real>, ...
[:SENSE]:EPVTime:MASK:LIST:UPPer:ABSolute?
[:SENSE]:EPVTime:MASK:LIST:UPPer:POINTs?
[:SENSE]:EPVTime:MASK:LIST:UPPer:RELative <rel_ampl>, ...
[:SENSE]:EPVTime:MASK:LIST:UPPer:RELative?
[:SENSE]:EPVTime:MASK:LIST:UPPer:TIME <seconds>, ...
[:SENSE]:EPVTime:MASK:LIST:UPPer:TIME?
[:SENSE]:EPVTime:MASK:RPOWER <ampl>
[:SENSE]:EPVTime:MASK:RPOWER?
[:SENSE]:EPVTime:MASK:RPOWER:AUTO[:STATe] OFF | ON | 0 | 1
[:SENSE]:EPVTime:MASK:RPOWER:AUTO[:STATe]?
[:SENSE]:EPVTime:MASK:RPOWER:OFFSet <rel_ampl>
[:SENSE]:EPVTime:MASK:RPOWER:OFFSet?
[:SENSE]:EPVTime:MASK:RPOWER:TYPE UPART | MAMble | ESTimated | TBITS
[:SENSE]:EPVTime:MASK:RPOWER:TYPE?
[:SENSE]:EPVTime:MASK:SElect STANDard | CUSTom
[:SENSE]:EPVTime:MASK:SElect?
[:SENSE]:EPVTime:MASK[:UPART]:LOWer:HSRate QAM16 | QAM32, <rel_ampl>
[:SENSE]:EPVTime:MASK[:UPART]:LOWer:HSRate? QAM16 | QAM32
[:SENSE]:EPVTime:MASK[:UPART]:LOWer:NORMAL QAM16 | QAM32, <rel_ampl>
[:SENSE]:EPVTime:MASK[:UPART]:LOWer:NORMAL? QAM16 | QAM32

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
[ :SENSe]:EPVTime:MTIME
[ :SENSe]:EPVTime:PCLevel
[ :SENSe]:EPVTime:SWEEp:TIME <integer>
[ :SENSe]:EPVTime:SWEEp:TIME?
[ :SENSe]:FEED RF | AIQ | EMIXer
[ :SENSe]:FEED IQ | IONLy | QONLy
[ :SENSe]:FEED AREFERENCE
[ :SENSe]:FEED?
[ :SENSe]:FEED?
[ :SENSe]:FEED:RF:PORT[:INPut] RFIN | RFIN2 | RFIO1 | RFIO2 | RFIO3 | RFIO4
[ :SENSe]:FEED:RF:PORT[:INPut]?
[ :SENSe]:FEED:RF:PORT:OUTPut RFOut | RFIO1 | RFIO2 | GPSout | GNSSout |
RFIO3 | RFIO4
[ :SENSe]:FEED:RF:PORT:OUTPut?
[ :SENSe]:FREQuency:CENTer <freq>
[ :SENSe]:FREQuency:CENTer?
[ :SENSe]:FREQuency:EMIXer:CENTer <freq>
[ :SENSe]:FREQuency:EMIXer:CENTer?
[ :SENSe]:FREQuency:IQ:CENTer <freq>
[ :SENSe]:FREQuency:IQ:CENTer?
[ :SENSe]:FREQuency:RF:CENTer <freq>
[ :SENSe]:FREQuency:RF:CENTer?
[ :SENSe]:HDUPlex:PORT:INPut RFIO3 | RFIO4
[ :SENSe]:HDUPlex:PORT:OUTPut RFIO3 | RFIO4
[ :SENSe]:PFError:AVERAge:COUNT <integer>
[ :SENSe]:PFError:AVERAge:COUNT?
[ :SENSe]:PFError:AVERAge[:STATe] OFF | ON | 0 | 1
[ :SENSe]:PFError:AVERAge[:STATe]?
[ :SENSe]:PFError:AVERAge:TCONtrol EXPonential | REPeat
[ :SENSe]:PFError:AVERAge:TCONtrol?
[ :SENSe]:PFError:AVERAge:TYPE MEAN | MAXimum
[ :SENSe]:PFError:AVERAge:TYPE?
[ :SENSe]:PFError:BSYNc:SOURce RFBurst | TSEquence
[ :SENSe]:PFError:BSYNc:SOURce?
[ :SENSe]:POWER[:RF]:RANGe <real>
[ :SENSe]:POWER[:RF]:RANGe?
[ :SENSe]:POWER[:RF]:RANGe:MIXer:OFFSet <real>
[ :SENSe]:POWER[:RF]:RANGe:MIXer:OFFSet?
[ :SENSe]:POWER[:RF]:RANGe:OPTimize IMMEDIATE
[ :SENSe]:POWER[:RF]:RANGe:OPTimize:ATTenuation OFF | ON | ELECTrical |
COMBined
[ :SENSe]:POWER[:RF]:RANGe:OPTimize:ATTenuation?
[ :SENSe]:POWER[:RF]:RANGe:PARatio <real>
[ :SENSe]:POWER[:RF]:RANGe:PARatio?
[ :SENSe]:PVTime:PCLevel
[ :SENSe]:RADIO:CARRIER:HOP OFF | ON | 0 | 1
[ :SENSe]:RADIO:CARRIER:HOP?
[ :SENSe]:RADIO:CARRIER:NUMBER SINGLE | MULTiple
[ :SENSe]:RADIO:CARRIER:NUMBER?
[ :SENSe]:RADIO:CARRIER:NUMBER:AUTO ON | OFF | 1 | 0
[ :SENSe]:RADIO:CARRIER:NUMBER:AUTO?
[ :SENSe]:RADIO:CARRIER[:TYPE] ?
[ :SENSe]:RADIO:CARRIER[:TYPE] BURSt | CONTinuous
```

```

[:SENSe]:RADio:DEVIce BTS | MS
[:SENSe]:RADio:DEVIce?
[:SENSe]:RADio:DEVIce:BASE[:TYPE] NORMAl | MICRo | MICR1 | MICR2 | MICR3 |
PICO | PICO1
[:SENSe]:RADio:DEVIce:BASE[:TYPE]?
[:SENSe]:RADio:PCLevel <integer>
[:SENSe]:RADio:PCLevel?
[:SENSe]:RADio:PCLevel:AUTO 0 | 1 | OFF | ON
[:SENSe]:RADio:PCLevel:AUTO?
[:SENSe]:RADio:PSHape NARRow | WIDE
[:SENSe]:RADio:PSHape?
[:SENSe]:RADio:STANdard:BAND PGSM | EGSM | RGSM | DCS1800 | PCS1900 |
GSM450 | GSM480 | GSM700 | GSM850 | TGSM810
[:SENSe]:RADio:STANdard:BAND?
[:SENSe]:ROSCillator:EXTErnal:FREQuency <freq>
[:SENSe]:ROSCillator:EXTErnal:FREQuency?
[:SENSe]:ROSCillator:SOURce INTernal | EXTErnal
[:SENSe]:ROSCillator:SOURce?
[:SENSe]:ROSCillator:SOURce:TYPE INTernal | EXTErnal | SENSE | PULSE
[:SENSe]:ROSCillator:SOURce:TYPE?
[:SENSe]:SYNC:ALIGnment GSM | HBIT
[:SENSe]:SYNC:ALIGnment?
[:SENSe]:SYNC:BURSt:RFAMplitude:DELay <time>
[:SENSe]:SYNC:BURSt:RFAMplitude:DELay?
[:SENSe]:SYNC:BURSt:STHReshold <rel_ampl>
[:SENSe]:SYNC:BURSt:STHReshold?
[:SENSe]:SYNC:CONFIgure:METHod FORCe | DISCARD
[:SENSe]:SYNC:CONFIgure:METHod?
[:SENSe]:SYNC:HSRate:MODulation QPSK | QAM16 | QAM32
[:SENSe]:SYNC:HSRate:MODulation?
[:SENSe]:SYNC:HSRate:MODulation:AUTO ON | OFF | 1 | 0
[:SENSe]:SYNC:HSRate:MODulation:AUTO?
[:SENSe]:SYNC:NORMal:MODulation GMSK | EPSK | QAM16 | QAM32 | AQPSK
[:SENSe]:SYNC:NORMal:MODulation?
[:SENSe]:SYNC:NORMal:MODulation:AQPSk:ALPHa:ARCTan <real>
[:SENSe]:SYNC:NORMal:MODulation:AQPSk:ALPHa:ARCTan?
[:SENSe]:SYNC:NORMal:MODulation:AQPSk:ALPHa:SCPIr <real>
[:SENSe]:SYNC:NORMal:MODulation:AQPSk:ALPHa:SCPIr?
[:SENSe]:SYNC:NORMal:MODulation:AUTO ON | OFF | 1 | 0
[:SENSe]:SYNC:NORMal:MODulation:AUTO?
[:SENSe]:SYNC:NORMal:MODulation:AUTO:AQPSk INCLude | EXCLude
[:SENSe]:SYNC:NORMal:MODulation:AUTO:AQPSk?
[:SENSe]:TXPower:AVERAge:COUNT <integer>
[:SENSe]:TXPower:AVERAge:COUNT?
[:SENSe]:TXPower:AVERAge[:STATE] OFF | ON | 0 | 1
[:SENSe]:TXPower:AVERAge[:STATE]?
[:SENSe]:TXPower:AVERAge:TCONtrol EXPOnential | REPEat
[:SENSe]:TXPower:AVERAge:TCONtrol?
[:SENSe]:TXPower:AVERAge:TYPE LOG | MAXimum | MINimum | RMS
[:SENSe]:TXPower:AVERAge:TYPE?
[:SENSe]:TXPower:BANDwidth[:RESolution] <bandwidth>
[:SENSe]:TXPower:BANDwidth[:RESolution]?
[:SENSe]:TXPower:BANDwidth:TYPE GAUSSian | FLATtop

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
[ :SENSe]:TXPower:BANDwidth:TYPE?
[ :SENSe]:TXPower:BURSt:AUTO ON | OFF | 1 | 0
[ :SENSe]:TXPower:BURSt:AUTO?
[ :SENSe]:TXPower:BURSt:WIDTh <time>
[ :SENSe]:TXPower:BURSt:WIDTh?
[ :SENSe]:TXPower:BWIDth[:RESolution]
[ :SENSe]:TXPower:BWIDth:TYPE
[ :SENSe]:TXPower:METHod THReshold | BWIDth
[ :SENSe]:TXPower:METHod?
[ :SENSe]:TXPower:SWEEp:TIME <integer>
[ :SENSe]:TXPower:SWEEp:TIME?
[ :SENSe]:TXPower:THReshold <real>
[ :SENSe]:TXPower:THReshold?
[ :SENSe]:TXPower:THReshold:TYPE ABSolute | RELative
[ :SENSe]:TXPower:THReshold:TYPE?
SOURce:AM[:DEPTh][:LINear]
SOURce:AM[:DEPTh][:LINear]?
SOURce:AM:INTernal:FREQuency
SOURce:AM:INTernal:FREQuency?
SOURce:AM:STATe
SOURce:AM:STATe?
SOURce:FM[:DEViation]
SOURce:FM[:DEViation]?
SOURce:FM:INTernal:FREQuency
SOURce:FM:INTernal:FREQuency?
SOURce:FM:STATe
SOURce:FM:STATe?
SOURce:FREQuency:CHANnels:BAND NONE | PGSM | EGSM | RGSM | DCS1800 |
PCS1900 | TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX |
BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS | JAPAN |
KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 | IMTEXT |
PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | BAND1 | BAND2 | BAND3 |
BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11 | BAND12 | BAND13
| BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21 | BAND24 | BAND25 |
BAND26 | BAND27 | BAND28 | BAND31 | BAND33 | BAND34 | BAND35 | BAND36 |
BAND37 | BAND38 | BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BAND44 |
BANDA | BANDB | BANDC | BANDD | BANDE | BANDF
SOURce:FREQuency:CHANnels:BAND?
SOURce:FREQuency:CHANnels:NUMBer <int>
SOURce:FREQuency:CHANnels:NUMBer?
SOURce:FREQuency[:CW] <freq>
SOURce:FREQuency[:CW]?
SOURce:FREQuency:OFFSet <freq>
SOURce:FREQuency:OFFSet?
SOURce:FREQuency:REFerence <freq>
SOURce:FREQuency:REFerence?
SOURce:FREQuency:REFerence:SET
SOURce:FREQuency:REFerence:STATe OFF | ON | 0 | 1
SOURce:FREQuency:REFerence:STATe?
SOURce:LIST:INITiation:ARMed?
SOURce:LIST:NUMBer:STEPS <integer>
```



```

SOURCE:LIST:NUMBER:STEPS?
SOURCE:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ...
SOURCE:LIST:SETup:AMPLitude?
SOURCE:LIST:SETup:CLEar
SOURCE:LIST:SETup:CNFRequency <double>, <double>, <double>, ...
SOURCE:LIST:SETup:CNFRequency?
SOURCE:LIST:SETup:DURation:TYPE <enum>, <enum>, <enum>, ...
SOURCE:LIST:SETup:DURation:TYPE?
SOURCE:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ...
SOURCE:LIST:SETup:INPut:TRIGger?
SOURCE:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ...
SOURCE:LIST:SETup:OUTPut:TRIGger ?
SOURCE:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...
SOURCE:LIST:SETup:RADio:BAND?
SOURCE:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ...
SOURCE:LIST:SETup:RADio:BAND:LINK?
SOURCE:LIST:SETup:TOCount <time/int>, <time/int>, <time/int>, ...
SOURCE:LIST:SETup:TOCount?
SOURCE:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ...
SOURCE:LIST:SETup:TRANSition:TIME?
SOURCE:LIST:SETup:WAVeform <string>, <string>, <string>, ...
SOURCE:LIST:SETup:WAVeform?
SOURCE:LIST[:STATE] ON | OFF | 1 | 0
SOURCE:LIST[:STATE]?
SOURCE:LIST:STEP[1]|2|...|4..1000:SETup IMMEDIATE | INTERNAL | KEY | BUS |
EXTERNAL2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900 | TGSM810
| GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII | BANDIII | BANDIV |
BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX | BANDXI | BANDXII |
BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS | JAPAN | KOREAN | NMT |
IMT2K | UPPER | SECOND | PAMR400 | PAMR800 | IMTEXT | PCS1DOT9G | AWS |
US2DOT5G | PUBLIC | LOWER | NONE | BAND1 | BAND2 | BAND3 | BAND4 | BAND5 |
BAND6 | BAND7 | BAND8 | BAND10 | BAND11 | BAND12 | BAND13 | BAND14 |
BAND17 | BAND18 | BAND19 | BAND20 | BAND21 | BAND24 | BAND25 | BAND26 |
BAND33 | BAND34 | BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 |
BAND41 | BAND42 | BAND43 | BANDA | BANDB | BANDC | BANDD | BANDE | BANDF,
DOWN | UP, <freq>, <ampl>, <string>, TIME | COUNT | CONTinuous, <time>, ON
| OFF | 1 | 0, [<int>],
SOURCE:LIST:STEP[1]|2|...|4..1000:SETup?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:AMPLitude <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:AMPLitude?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:CNFRequency?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TCOUNT <double>
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TCOUNT?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TYPE TIME | COUNT |
CONTinuous | CABort
SOURCE:LIST:STEP[1]|2|3..1000:SETup:DURation:TYPE?
SOURCE:LIST:STEP[1]|2|3..1000:SETup:INPut:TRIGger IMMEDIATE | INTERNAL |
EXTERNAL2 | KEY | BUS | EXTERNAL4
SOURCE:LIST:STEP[1]|2|3..1000:SETup:INPut:TRIGger?

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
SOURce:LIST:STEP[1]|2|3...1000:SETup:OUTPut:TRIGger
SOURce:LIST:STEP[1]|2|3...1000:SETup:OUTPut:TRIGger ON | OFF | 1 | 0
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND NONE | PGSM | EGSM | RGSM
| DCS1800 | PCS1900 | TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI
| BANDII | BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX
| BANDX | BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS
| JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11 |
BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21 |
BAND24 | BAND25 | BAND26 | BAND27 | BAND28 | BAND31 | BAND33 | BAND34 |
BAND35 | BAND36 | BAND37 | BAND38 | BAND39 | BAND40 | BAND41 | BAND42 |
BAND43 | BAND44 | BANDA | BANDB | BANDC | BANDD | BANDE | BANDF
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND?
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND:LINK DOWN | UP
SOURce:LIST:STEP[1]|2|3...1000:SETup:RADio:BAND:LINK?
SOURce:LIST:STEP[1]|2|3...1000:SETup:TRANSition:TIME <time>
SOURce:LIST:STEP[1]|2|3...1000:SETup:TRANSition:TIME?
SOURce:LIST:STEP[1]|2|3...1000:SETup:WAVEform <string>
SOURce:LIST:STEP[1]|2|3...1000:SETup:WAVEform?
SOURce:LIST:TRIGger[:IMMediate]
SOURce:LIST:TRIGger:INITiate[:IMMediate]
SOURce:LIST:TRIGgerout:TYpe BEGinningofstep | DATamarker
SOURce:PM[:DEVIation]
SOURce:PM[:DEVIation]?
SOURce:PM:INTernal:FREQuency
SOURce:PM:INTernal:FREQuency?
SOURce:PM:STATe
SOURce:PM:STATe?
SOURce:POWER[:LEVel][:IMMediate][:AMPLitude] <ampl>
SOURce:POWER[:LEVel][:IMMediate][:AMPLitude]?
SOURce:POWER[:LEVel][:IMMediate]:OFFSet <rel_ampl>
SOURce:POWER[:LEVel][:IMMediate]:OFFSet?
SOURce:POWER:REFerence <ampl>
SOURce:POWER:REFerence?
SOURce:POWER:REFerence:STATe OFF | ON | 0 | 1
SOURce:POWER:REFerence:STATe?
SOURce:PRESet
SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq>
SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
SOURce:RADio:ARB:CATalog?
SOURce:RADio:ARB:DEFault:DIRectory <string>
SOURce:RADio:ARB:DEFault:DIRectory?
SOURce:RADio:ARB:DELeTe <string>
SOURce:RADio:ARB:DELeTe:ALL
SOURce:RADio:ARB:FCATalog?
SOURce:RADio:ARB:HEADer:CLEar
SOURce:RADio:ARB:HEADer:SAVE
SOURce:RADio:ARB:LOAD <string>
SOURce:RADio:ARB:LOAD:ALL <string>
SOURce:RADio:ARB:MDESTination:ALCHold NONE | M1 | M2 | M3 | M4
SOURce:RADio:ARB:MDESTination:ALCHold?
```

```

SOURCE:RADIO:ARB:MDESTINATION:PULSE NONE | M1 | M2 | M3 | M4
SOURCE:RADIO:ARB:MDESTINATION:PULSE?
SOURCE:RADIO:ARB:MPLICENSED:NAME:LOCKED?
SOURCE:RADIO:ARB:MPLICENSED:UID:LOCKED?
SOURCE:RADIO:ARB:MPOLARITY:MARKER4 POSITIVE | NEGATIVE
SOURCE:RADIO:ARB:MPOLARITY:MARKER3 POSITIVE | NEGATIVE
SOURCE:RADIO:ARB:MPOLARITY:MARKER1 POSITIVE | NEGATIVE
SOURCE:RADIO:ARB:MPOLARITY:MARKER2 POSITIVE | NEGATIVE
SOURCE:RADIO:ARB:MPOLARITY:MARKER4?
SOURCE:RADIO:ARB:MPOLARITY:MARKER3?
SOURCE:RADIO:ARB:MPOLARITY:MARKER2?
SOURCE:RADIO:ARB:MPOLARITY:MARKER1?
SOURCE:RADIO:ARB:RETRIGGER ON | OFF | IMMEDIATE
SOURCE:RADIO:ARB:RETRIGGER?
SOURCE:RADIO:ARB:RSCALING <real>
SOURCE:RADIO:ARB:RSCALING?
SOURCE:RADIO:ARB:SCLOCK:RATE <freq>
SOURCE:RADIO:ARB:SCLOCK:RATE?
SOURCE:RADIO:ARB:SEQUENCE[:MWAVEFORM] <filename>, <waveform1>, <reps>,
NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 |
M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>,
NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 |
M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, }...
SOURCE:RADIO:ARB:SEQUENCE[:MWAVEFORM]? <filename>
SOURCE:RADIO:ARB[:STATE] ON | OFF | 1 | 0
SOURCE:RADIO:ARB[:STATE]?
SOURCE:RADIO:ARB:TRIGGER:INITIATE
SOURCE:RADIO:ARB:TRIGGER[:SOURCE] KEY | BUS | EXTERNAL2
SOURCE:RADIO:ARB:TRIGGER[:SOURCE]?
SOURCE:RADIO:ARB:TRIGGER:TYPE CONTINUOUS | SINGLE | ADVANCEGATE
SOURCE:RADIO:ARB:TRIGGER:TYPE?
SOURCE:RADIO:ARB:TRIGGER:TYPE:CONTINUOUS[:TYPE] FREE | TRIGGER | RESET
SOURCE:RADIO:ARB:TRIGGER:TYPE:CONTINUOUS[:TYPE]?
SOURCE:RADIO:ARB:TRIGGER:TYPE:ADVANCE[:TYPE] SINGLE | CONTINUOUS
SOURCE:RADIO:ARB:TRIGGER:TYPE:ADVANCE[:TYPE]?
SOURCE:RADIO:ARB:WAVEFORM <string>
SOURCE:RADIO:ARB:WAVEFORM?
SOURCE:RADIO:BAND:LINK DOWN | UP
SOURCE:RADIO:BAND:LINK?
SOURCE:RADIO:DEVICE BTS | MS
SOURCE:RADIO:DEVICE?
STATUS:OPERATION:CONDITION?
STATUS:OPERATION:ENABLE <integer>
STATUS:OPERATION:ENABLE?
STATUS:OPERATION[:EVENT]?
STATUS:OPERATION:NTRANSITION <integer>
STATUS:OPERATION:NTRANSITION?
STATUS:OPERATION:PTRANSITION <integer>
STATUS:OPERATION:PTRANSITION?
STATUS:PRESET
STATUS:QUESTIONABLE:CALIBRATION:CONDITION?
STATUS:QUESTIONABLE:CALIBRATION:ENABLE <integer>

```

STATUS:QUESTIONABLE:CALIBRATION:ENABLE?  
STATUS:QUESTIONABLE:CALIBRATION[:EVENT]?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE:CONDITION?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE:ENABLE <integer>  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE:ENABLE?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE[:EVENT]?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE:NTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE:NTRANSITION?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE:PTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:FAILURE:PTRANSITION?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED:CONDITION?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED:ENABLE <integer>  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED:ENABLE?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED[:EVENT]?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED:NTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED:NTRANSITION?  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED:PTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:EXTENDED:NEEDED:PTRANSITION?  
STATUS:QUESTIONABLE:CALIBRATION:NTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:NTRANSITION?  
STATUS:QUESTIONABLE:CALIBRATION:PTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:PTRANSITION?  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED:CONDITION?  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED:ENABLE <integer>  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED:ENABLE?  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED[:EVENT]?  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED:NTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED:NTRANSITION?  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED:PTRANSITION <integer>  
STATUS:QUESTIONABLE:CALIBRATION:SKIPPED:PTRANSITION?  
STATUS:QUESTIONABLE:CONDITION?  
STATUS:QUESTIONABLE:ENABLE <integer>  
STATUS:QUESTIONABLE:ENABLE?  
STATUS:QUESTIONABLE[:EVENT]?  
STATUS:QUESTIONABLE:FREQUENCY:CONDITION?  
STATUS:QUESTIONABLE:FREQUENCY:ENABLE <integer>  
STATUS:QUESTIONABLE:FREQUENCY:ENABLE?  
STATUS:QUESTIONABLE:FREQUENCY[:EVENT]?  
STATUS:QUESTIONABLE:FREQUENCY:NTRANSITION <integer>  
STATUS:QUESTIONABLE:FREQUENCY:NTRANSITION?  
STATUS:QUESTIONABLE:FREQUENCY:PTRANSITION <integer>  
STATUS:QUESTIONABLE:FREQUENCY:PTRANSITION?  
STATUS:QUESTIONABLE:INTEGRITY:CONDITION?  
STATUS:QUESTIONABLE:INTEGRITY:ENABLE <integer>  
STATUS:QUESTIONABLE:INTEGRITY:ENABLE?  
STATUS:QUESTIONABLE:INTEGRITY[:EVENT]?  
STATUS:QUESTIONABLE:INTEGRITY:NTRANSITION <integer>  
STATUS:QUESTIONABLE:INTEGRITY:NTRANSITION?  
STATUS:QUESTIONABLE:INTEGRITY:PTRANSITION <integer>  
STATUS:QUESTIONABLE:INTEGRITY:PTRANSITION?  
STATUS:QUESTIONABLE:INTEGRITY:SIGNAL:CONDITION?  
STATUS:QUESTIONABLE:INTEGRITY:SIGNAL:ENABLE <integer>  
STATUS:QUESTIONABLE:INTEGRITY:SIGNAL:ENABLE?

```

STATUS:QUESTIONABLE:INTEGRITY:SIGNAl[:EVENT]?
STATUS:QUESTIONABLE:INTEGRITY:SIGNAl:NTRansition <integer>
STATUS:QUESTIONABLE:INTEGRITY:SIGNAl:NTRansition?
STATUS:QUESTIONABLE:INTEGRITY:SIGNAl:PTRansition <integer>
STATUS:QUESTIONABLE:INTEGRITY:SIGNAl:PTRansition?
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated:CONDition?
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated:ENABle
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated:ENABle?
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated[:EVENT]?
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated:NTRansition <integer>
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated:NTRansition?
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated:PTRansition <integer>
STATUS:QUESTIONABLE:INTEGRITY:UNCalibrated:PTRansition?
STATUS:QUESTIONABLE:NTRansition <integer>
STATUS:QUESTIONABLE:NTRansition?
STATUS:QUESTIONABLE:POWER:CONDition?
STATUS:QUESTIONABLE:POWER:ENABle <integer>
STATUS:QUESTIONABLE:POWER:ENABle?
STATUS:QUESTIONABLE:POWER[:EVENT]?
STATUS:QUESTIONABLE:POWER:NTRansition <integer>
STATUS:QUESTIONABLE:POWER:NTRansition?
STATUS:QUESTIONABLE:POWER:PTRansition <integer>
STATUS:QUESTIONABLE:POWER:PTRansition?>
STATUS:QUESTIONABLE:PTRansition <integer>
STATUS:QUESTIONABLE:PTRansition?
STATUS:QUESTIONABLE:TEMPerature:CONDition?
STATUS:QUESTIONABLE:TEMPerature:ENABle <integer>
STATUS:QUESTIONABLE:TEMPerature:ENABle?
STATUS:QUESTIONABLE:TEMPerature[:EVENT]?
STATUS:QUESTIONABLE:TEMPerature:NTRansition <integer>
STATUS:QUESTIONABLE:TEMPerature:NTRansition?
STATUS:QUESTIONABLE:TEMPerature:PTRansition <integer>
STATUS:QUESTIONABLE:TEMPerature:PTRansition?
SYSTEM:APPLication:CATalog[:NAME]?
SYSTEM:APPLication:CATalog[:NAME]:COUNT?
SYSTEM:APPLication:CATalog:OPTion? <model>
SYSTEM:APPLication:CATalog:REVision? <model>
SYSTEM:APPLication[:CURRent][:NAME]?
SYSTEM:APPLication[:CURRent]:OPTion?
SYSTEM:APPLication[:CURRent]:REVision?
SYSTEM:COMMunicate:LAN:SCPI:HISLip:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:HISLip:ENABle?
SYSTEM:COMMunicate:LAN:SCPI:SICL:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:SICL:ENABle?
SYSTEM:COMMunicate:LAN:SCPI:SOCKet:CONTRol?
SYSTEM:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:SOCKet:ENABle?
SYSTEM:COMMunicate:LAN:SCPI:TELNet:ENABle OFF | ON | 0 | 1
SYSTEM:COMMunicate:LAN:SCPI:TELNet:ENABle?
SYSTEM:CONFigure[:SYSTEM]?
SYSTEM:CSYSTEM?
SYSTEM:DATE "<year>, <month>, <day>"
SYSTEM:DATE?

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
SYSTem:DEfault [ALL] | ALIGn | INPut | MISC | MODes | PON
SYSTem:ERRor[:NEXT]?
SYSTem:ERRor:OVERload[:STATE] 0 | 1 | OFF | ON
SYSTem:ERRor:PUP?
SYSTem:ERRor:VERBoSe OFF | ON | 0 | 1
SYSTem:ERRor:VERBoSe?
SYSTem:HELP:HEADers?
SYSTem:HID?
SYSTem:IDN <string>
SYSTem:IDN?
SYSTem:KLOCK OFF | ON | 0 | 1
SYSTem:KLOCK?
SYSTem:LIcense[:FPACK]:WAVEform:ADD <string>
SYSTem:LIcense[:FPACK]:WAVEform:CLEAr <int>
SYSTem:LIcense[:FPACK]:WAVEform:FREE?
SYSTem:LIcense[:FPACK]:WAVEform:LOCK <int>
SYSTem:LIcense[:FPACK]:WAVEform:NAME? <int>
SYSTem:LIcense[:FPACK]:WAVEform:REPLace <int>, <string>
SYSTem:LIcense[:FPACK]:WAVEform:STATUs? <int>
SYSTem:LIcense[:FPACK]:WAVEform:UID? <int>
SYSTem:LIcense[:FPACK]:WAVEform:USED?
SYSTem:LKEY <"OptionInfo">, <"LicenseInfo">
SYSTem:LKEY? <"OptionInfo">
SYSTem:LKEY:DELeTe <"OptionInfo">, <"LicenseInfo">
SYSTem:LKEY:LIST?
SYSTem:LKEY:WAVEform:ADD <string>
SYSTem:LKEY:WAVEform:CLEAr <int>
SYSTem:LKEY:WAVEform:FREE?
SYSTem:LKEY:WAVEform:LOCK <int>
SYSTem:LKEY:WAVEform:NAME? <int>
SYSTem:LKEY:WAVEform:REPLace <int>, <string>
SYSTem:LKEY:WAVEform:STATUs? <int>
SYSTem:LKEY:WAVEform:UID? <int>
SYSTem:LKEY:WAVEform:USED?
SYSTem:MODule:DEfault "<mnemonic>"
SYSTem:MODule:DEfault?
SYSTem:MODule:ENABle "<mnemonic>", 0 | 1
SYSTem:MODule:ENABle? "<mnemonic>"
SYSTem:MODule:INDex?
SYSTem:MODule:LIST?
SYSTem:MODule:MNEMonic?
SYSTem:MODule:MODEl?
SYSTem:MODule:NAME?
SYSTem:MODule:SERial?
SYSTem:OPTions?
SYSTem:PDOWn [NORMal | FORCe]
SYSTem:PON:APPLication:LLISt <stringofINSTRument:SElectnames>
SYSTem:PON:APPLication:LLISt?
SYSTem:PON:APPLication:VMEMory[:AVAIlable]?
SYSTem:PON:APPLication:VMEMory:TOTAL?
SYSTem:PON:APPLication:VMEMory:USED?
SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTRument:SElectname>
```

```

SYSTEM:PON:MODE SA | BASIC | ADEMOD | NFIGURE | PNOISE | CDMA2K | TDSCDMA
| VSA | VSA89601 | WCDMA | WIMAXOFDMA
SYSTEM:PON:MODE?
SYSTEM:PON:TIME?
SYSTEM:PON:TYPE PRESet
SYSTEM:PON:TYPE MODE | USER | LAST
SYSTEM:PON:TYPE?
SYSTEM:PRESet
SYSTEM:PRESet:TYPE FACTory | MODE | USER
SYSTEM:PRESet:TYPE?
SYSTEM:PRESet:USER
SYSTEM:PRESet:USER:ALL
SYSTEM:PRESet:USER:SAVE
SYSTEM:PRINT:THEME TDColor | TDMonochrome | FCOlor | FMONochrome
SYSTEM:PRINT:THEME?
SYSTEM:PUP:PROcEss
SYSTEM:SECurity:USB:WPRotect[:ENABLE] ON | OFF | 0 | 1
SYSTEM:SECurity:USB:WPRotect[:ENABLE]?
SYSTEM:SHOW OFF | ERRor | SYSTem | HARDware | LXI | HWStatistics |
ALIGNment | SOFTware | CAPplication
SYSTEM:SHOW?
SYSTEM:TEST:WCTS:[ALL]
SYSTEM:TEST:WCTS:FEC
SYSTEM:TEST:WCTS:FEC:RESult?
SYSTEM:TEST:WCTS:SHOW:RESult FEC
SYSTEM:TIME "<hour>, <minute>, <second>"
SYSTEM:TIME?
SYSTEM:VERSIon?
TRIGger:<measurement>[:SEQuence]:IQ:SOURce EXTErnal1 | EXTErnal2 |
IMMEdiate | IQMag | IDEMod | QDEMod | IINPut | QINPut | AIQMag
TRIGger:<measurement>[:SEQuence]:IQ:SOURce?
TRIGger:<measurement>[:SEQuence]:RF:SOURce EXTErnal1 | EXTErnal2 |
IMMEdiate | LINE | FRAME | RFBurst | VIDEo | IF | ALARm | LAN | TV
TRIGger:<measurement>[:SEQuence]:RF:SOURce?
TRIGger:<measurement>[:SEQuence]:SOURce EXTErnal1 | EXTErnal2 | IMMEdiate
| LINE | FRAME | RFBurst | VIDEo | IF | ALARm | LAN | IQMag | IDEMod |
QDEMod | IINPut | QINPut | AIQMag | TV
TRIGger:<measurement>[:SEQuence]:SOURce?
TRIGger[:SEQuence]:ATRigger <time>
TRIGger[:SEQuence]:ATRigger?
TRIGger[:SEQuence]:ATRigger:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:ATRigger:STATe?
TRIGger[:SEQuence]:DELay <time>
TRIGger[:SEQuence]:DELay?
TRIGger[:SEQuence]:DELay:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:DELay:STATe?
TRIGger[:SEQuence]:EXTErnal:DELay
TRIGger[:SEQuence]:EXTErnal2:DELay <time>
TRIGger[:SEQuence]:EXTErnal1:DELay <time>
TRIGger[:SEQuence]:EXTErnal2:DELay?
TRIGger[:SEQuence]:EXTErnal1:DELay?
TRIGger[:SEQuence]:EXTErnal1:DELay:COMPensation OFF | ON | 0 | 1

```

### 3 Programming the Test Set

#### List of SCPI Commands

```
TRIGger[:SEquence]:EXternal2:DElay:COMPensation OFF | ON | 0 | 1
TRIGger[:SEquence]:EXternal2:DElay:COMPensation?
TRIGger[:SEquence]:EXternal1:DElay:COMPensation?
TRIGger[:SEquence]:EXternal2:DElay:STATe OFF | ON | 0 | 1
TRIGger[:SEquence]:EXternal1:DElay:STATe OFF | ON | 0 | 1
TRIGger[:SEquence]:EXternal2:DElay:STATe?
TRIGger[:SEquence]:EXternal1:DElay:STATe?
TRIGger[:SEquence]:EXternal:LEVel
TRIGger[:SEquence]:EXternal2:LEVel
TRIGger[:SEquence]:EXternal1:LEVel <level>
TRIGger[:SEquence]:EXternal1:LEVel?
TRIGger[:SEquence]:EXternal2:LEVel?
TRIGger[:SEquence]:EXternal:SLOPe
TRIGger[:SEquence]:EXternal2:SLOPe POSitive | NEGative
TRIGger[:SEquence]:EXternal1:SLOPe POSitive | NEGative
TRIGger[:SEquence]:EXternal1:SLOPe?
TRIGger[:SEquence]:EXternal2:SLOPe?
TRIGger[:SEquence]:FRAME:ADJust <time>
TRIGger[:SEquence]:FRAME:DElay <time>
TRIGger[:SEquence]:FRAME:DElay?
TRIGger[:SEquence]:FRAME:DElay:STATe OFF | ON | 0 | 1
TRIGger[:SEquence]:FRAME:DElay:STATe?
TRIGger[:SEquence]:FRAME:EXternal2:LEVel
TRIGger[:SEquence]:FRAME:EXternal1:LEVel
TRIGger[:SEquence]:FRAME:EXternal1:SLOPe
TRIGger[:SEquence]:FRAME:EXternal2:SLOPe
TRIGger[:SEquence]:FRAME:OFFSet <time>
TRIGger[:SEquence]:FRAME:OFFSet?
TRIGger[:SEquence]:FRAME:OFFSet:DISPlay:RESet
TRIGger[:SEquence]:FRAME:PERiod <time>
TRIGger[:SEquence]:FRAME:PERiod?
TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute
TRIGger[:SEquence]:FRAME:RFBurst:SLOPe
TRIGger[:SEquence]:FRAME:SYNC EXternal
TRIGger[:SEquence]:FRAME:SYNC EXternal1 | EXternal2 | RFBurst | OFF
TRIGger[:SEquence]:FRAME:SYNC?
TRIGger[:SEquence]:HOLDoFF <time>
TRIGger[:SEquence]:HOLDoFF?
TRIGger[:SEquence]:HOLDoFF:STATe OFF | ON | 0 | 1
TRIGger[:SEquence]:HOLDoFF:STATe?
TRIGger[:SEquence]:HOLDoFF:TYPE NORMAl | ABOVE | BELow
TRIGger[:SEquence]:HOLDoFF:TYPE?
TRIGger[:SEquence]:IF:LEVel
TRIGger[:SEquence]:IF:LEVel?
TRIGger[:SEquence]:IF:SLOPe NEGative | POSitive
TRIGger[:SEquence]:IF:SLOPe?
TRIGger[:SEquence]:OFFSet <time>
TRIGger[:SEquence]:OFFSet?
TRIGger[:SEquence]:OFFSet:STATe OFF | ON | 0 | 1
TRIGger[:SEquence]:OFFSet:STATe?
TRIGger[:SEquence]:RFBurst:DElay <time>
TRIGger[:SEquence]:RFBurst:DElay?
TRIGger[:SEquence]:RFBurst:DElay:STATe OFF | ON | 0 | 1
```



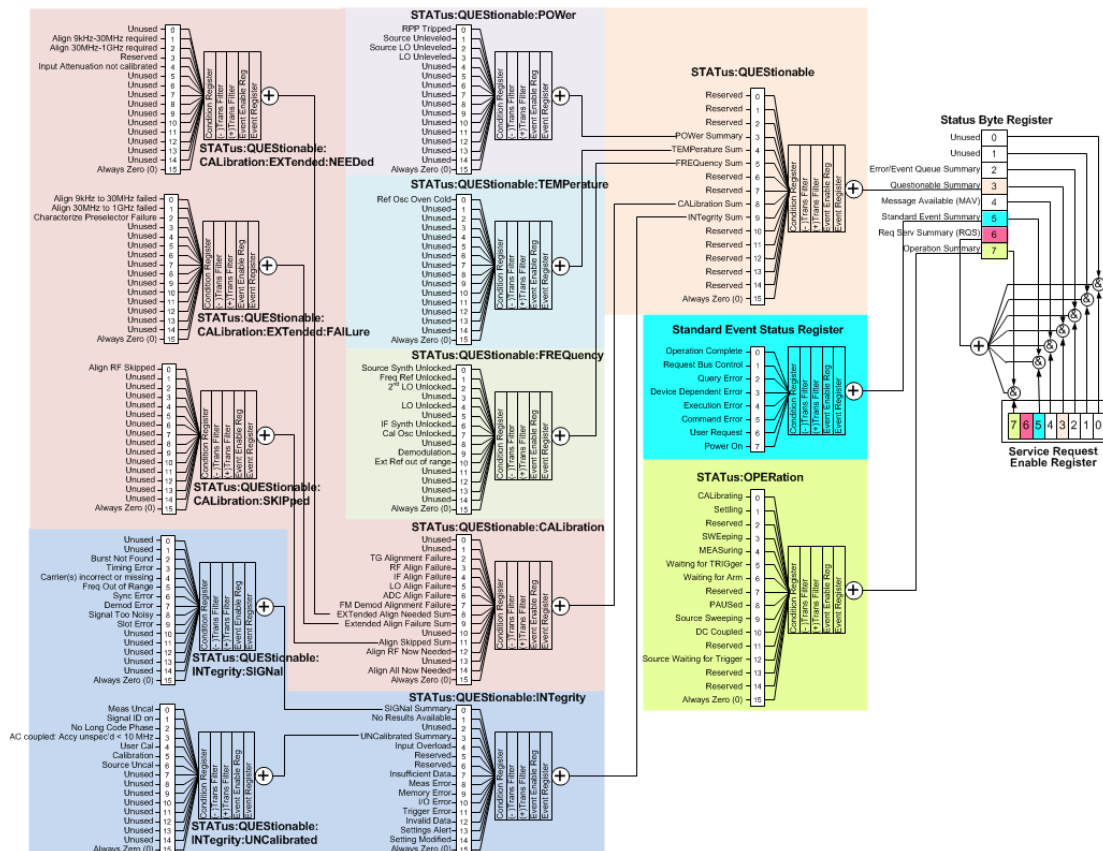
```

TRIGger[:SEQuence]:RFBurst:DELAy:STATe?
TRIGger[:SEQuence]:RFBurst:LEVel
TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute <ampl>
TRIGger[:SEQuence]:RFBurst:LEVel:ABSolute?
TRIGger[:SEQuence]:RFBurst:LEVel:RELative <rel_ampl>
TRIGger[:SEQuence]:RFBurst:LEVel:RELative?
TRIGger[:SEQuence]:RFBurst:LEVel:TYPE ABSolute | RELative
TRIGger[:SEQuence]:RFBurst:LEVel:TYPE?
TRIGger[:SEQuence]:RFBurst:SLOPe POSitive | NEGative
TRIGger[:SEQuence]:RFBurst:SLOPe?
TRIGger[:SEQuence]:SLOPe POSitive | NEGative
TRIGger[:SEQuence]:SLOPe?
TRIGger[:SEQuence]:SOURCe EXTernal
TRIGger[:SEQuence]:VIDeo:DELAy <time>
TRIGger[:SEQuence]:VIDeo:DELAy?
TRIGger[:SEQuence]:VIDeo:DELAy:STATe OFF | ON | 0 | 1
TRIGger[:SEQuence]:VIDeo:DELAy:STATe?
TRIGger[:SEQuence]:VIDeo:LEVel <ampl>
TRIGger[:SEQuence]:VIDeo:LEVel?
TRIGger[:SEQuence]:VIDeo:SLOPe POSitive | NEGative
TRIGger[:SEQuence]:VIDeo:SLOPe?
TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut HSWP | MEASuring | MAIN | GATE
| GTRigger | OEVEN | SPOint | SSweep | SSETtled | S1Marker | S2Marker |
S3Marker | S4Marker | OFF
TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut?
TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut:POLarity POSitive | NEGative
TRIGger|TRIGger1|TRIGger2[:SEQuence]:OUTPut:POLarity?

```

## STATus Subsystem

The following diagram shows the entire Status Register Subsystem implementation of the X Series instruments.



### Detailed Description

The STATus subsystem remote commands set and query the status hardware registers. This system of registers monitors various events and conditions in the instrument. Software written to control the instrument may need to monitor some of these events and conditions.

**NOTE**

All status register commands are sequential. Most commands can be started immediately and will overlap with any existing commands that are already running. This is not true of status commands. All the commands in the spectrum analyzer are assumed to be overlapped unless a command description specifically says that it is sequential.

### What Are Status Registers

The status system contains multiple registers that are arranged in a hierarchical order. The lower-level status registers propagate their data to the higher-level registers in the data structures by means of summary bits. The status byte register is at the top of the hierarchy and contains general status information for the instrument's events and conditions. All other individual registers are used to determine the specific events or conditions. For a diagram of the registers and their interconnections, see above.

The operation and questionable status registers are sets of registers that monitor the overall instrument condition. They are accessed with the STATus:OPERation and STATus:QUEStionable commands in the STATus command subsystem. Each register set is made up of five registers:

- Condition Register—It reports the real-time state of the signals monitored by this register set. There is no latching or buffering for a condition register.
- Positive Transition Register—This filter register controls which signals will set a bit in the event register when the signal makes a low to high transition (when the condition bit changes from 0 to 1).
- Negative Transition Register—This filter register controls which signals will set a bit in the event register when the signal makes a high to low transition (when the condition bit changes from 1 to 0).
- Event Register—It latches any signal state changes, in the way specified by the filter registers. Bits in the event register are never cleared by signal state changes. Event registers are cleared when read. They are also cleared by \*CLS and by presetting the instrument.
- Event Enable Register—It controls which of the bits, being set in the event register, will be summarized as a single output for the register set. Summary bits are then used by the next higher register.

The STATus:QUEStionable registers report abnormal operating conditions. The status register hierarchy is:

1. The summary outputs from the six STATus:QUEStionable:<keyword> detail registers are inputs to the STATus:QUEStionable register.
2. The summary output from the STATus:QUEStionable register is an input to the Status Byte Register. See the overall system in Figure at the beginning of this section.

The STATus:OPERation register set has no summarized inputs. The inputs to the STATus:OPERation:CONDition register indicate the real time state of the instrument. The STATus:OPERation:EVENT register summary output is an input to the Status Byte Register.

## What Are Status Register SCPI Commands

Most monitoring of the instrument conditions is done at the highest level using the IEEE common commands indicated below. Complete command descriptions are available in the IEEE commands section at the beginning of the language reference. Individual status registers can be set and queried using the commands in the STATus subsystem of the language reference.

- \*CLS (clear status) clears the status byte by emptying the error queue and clearing all the event registers.
- \*ESE, \*ESE? (event status enable) sets and queries the bits in the enable register part of the standard event status register.
- \*ESR? (event status register) queries and clears the event register part of the standard event status register.
- \*OPC, \*OPC? (operation complete) sets the standard event status register to monitor the completion of all commands. The query stops any new commands from being processed until the current processing is complete, then returns a '1'.
- \*PSC, \*PSC? (power-on state clear) sets the power-on state so that it clears the service request enable register and the event status enable register at power on.
- \*SRE, \*SRE? (service request enable) sets and queries the value of the service request enable register.

- \*STB? (status byte) queries the value of the status byte register without erasing its contents.

## How to Use the Status Registers

A program often needs to be able to detect and manage error conditions or changes in instrument status. There are two methods you can use to programmatically access the information in status registers:

- The polling method
- The service request (SRQ) method

In the polling method, the instrument has a passive role. It only tells the controller that conditions have changed when the controller asks the right question. In the SRQ method, the instrument takes a more active role. It tells the controller when there has been a condition change without the controller asking. Either method allows you to monitor one or more conditions.

The polling method works well if you do not need to know about changes the moment they occur. The SRQ method should be used if you must know immediately when a condition changes. To detect a change using the polling method, the program must repeatedly read the registers.

Use the SRQ method when:

- you need time-critical notification of changes
- you are monitoring more than one device which supports SRQs
- you need to have the controller do something else while waiting
- you can't afford the performance penalty inherent to polling

Use polling when:

- your programming language/development environment does not support SRQ interrupts
- you want to write a simple, single-purpose program and don't want the added complexity of setting up an SRQ handler
- To monitor a condition:
  - a. Determine which register contains the bit that reports the condition.
  - b. Send the unique SCPI query that reads that register.
  - c. Examine the bit to see if the condition has changed.

You can monitor conditions in different ways.

- Check the current instrument hardware and firmware status.

Do this by querying the condition registers which continuously monitor status. These registers represent the current state of the instrument. Bits in a condition register are updated in real time. When the condition monitored by a particular bit becomes true, the bit is set to 1. When the condition becomes false, the bit is reset to 0.

- Monitor a particular condition (bit).

You can enable a particular bit(s), using the event enable register. The instrument will then monitor that particular condition(s). If the bit becomes true (0 to 1 transition) in the event register, it will stay set until the

event register is cleared. Querying the event register allows you to detect that this condition occurred even if the condition no longer exists. The event register can only be cleared by querying it or sending the \*CLS command.

- Monitor a particular type of change in a condition (bit).
  - The transition registers are preset to register if the condition goes from 0 to 1 (false to true, or a positive transition).
  - This can be changed so the selected condition is detected if the bit goes from 1 to 0 (true to false, or a negative transition).
  - It can also be set for both types of transitions occurring.
  - Or it can be set for neither transition. If both transition registers are set to 0 for a particular bit position, that bit will not be set in the event register for either type of change.

### Using a Status Register

Each bit in a register is represented by a numerical value based on its location. See figure below. This number is sent with the command to enable a particular bit. If you want to enable more than one bit, you would send the sum of all the bits that you want to monitor.

Figure: Status Register Bit Values

<b>Decimal Value</b>																	
		32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1
<b>Bit Number</b>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	

STATus:OPERation:ENABLE < num >  
STATus:OPERation:ENABLE?

### Standard Operation Event Enable Register

ck730a

Bit 15 is not used to report status.

Example 1:

1. To enable bit 0 and bit 6 of standard event status register, you would send the command \*ESE 65 because  $1 + 64 = 65$ .
2. The results of a query are evaluated in a similar way. If the \*STB? command returns a decimal value of 140, ( $140 = 128 + 8 + 4$ ) then bit 7 is true, bit 3 is true and bit 2 is true.

Example 2:

1. Suppose you want to know if an Auto-trigger Timeout occurs, but you only cared about that specific condition. So you would want to know what was happening with bit 10 in the Status Questionable Integrity register, and not about any other bits.

2. It's usually a good idea to start by clearing all the status registers with \*CLS.
3. Sending the STAT:QUES:INT:ENAB 1024 command lets you monitor only bit 10 events, instead of the default monitoring all the bits in the register. The register default is for positive transition events (0 to 1 transition). That is, when an auto-trigger timeout occurs. If instead, you wanted to know when the Auto-trigger timeout condition is cleared, then you would set the STAT:QUES:INT:PTR 0 and the STAT:QUES:INT:NTR 32767.
4. So now the only output from the Status Questionable Integrity register will come from a bit 10 positive transition. That output goes to the Integrity Sum bit 9 of the Status Questionable register.
5. You can do a similar thing with this register to only look at bit 9 using, STAT:QUES:ENAB 512.
6. The Status Questionable register output goes to the "Status Questionable Summary" bit 3 of the Status Byte Register. The output from this register can be enabled using the \*SRE 8 command.
7. Finally, you would use the serial polling functionality available for the particular bus/software that you are using to monitor the Status Byte Register. (You could also use \*STB? to poll the Status Byte Register.)

### Using the Service Request (SRQ) Method

Your language, bus, and programming environment must be able to support SRQ interrupts. (For example, BASIC used with VXI-11.3 (GPIB over LAN). When you monitor a condition with the SRQ method, you must:

1. Determine which bit monitors the condition.
2. Determine how that bit reports to the request service (RQS) bit of the status byte.
3. Send SCPI commands to enable the bit that monitors the condition and to enable the summary bits that report the condition to the RQS bit.
4. Enable the controller to respond to service requests.

When the condition changes, the instrument sets its RQS bit. The controller is informed of the change as soon as it occurs. As a result, the time the controller would otherwise have used to monitor the condition can be used to perform other tasks. Your program determines how the controller responds to the SRQ.

### Generating a Service Request

To use the SRQ method, you must understand how service requests are generated. Bit 6 of the status byte register is the request service (RQS) bit. The \*SRE command is used to configure the RQS bit to report changes in instrument status. When such a change occurs, the RQS bit is set. It is cleared when the status byte register is queried using \*SRE? (with a serial poll.) It can be queried without erasing the contents with \*STB?.

When a register set causes a summary bit in the status byte to change from 0 to 1, the instrument can initiate the service request (SRQ) process. However, the process is only initiated if both of the following conditions are true:

- The corresponding bit of the service request enable register is also set to 1.
- The instrument does not have a service request pending. (A service request is considered to be pending between the time the instrument's SRQ process is initiated and the time the controller reads the status byte register.)

The SRQ process sets the SRQ true. It also sets the status byte's request service (RQS) bit to 1. Both actions are necessary to inform the controller that the instrument requires service. Setting the SRQ line only informs the controller that some device on the bus requires service. Setting the RQS bit allows the controller to determine which instrument requires service.

If your program enables the controller to detect and respond to service requests, it should instruct the controller to perform a serial poll when the SRQ is set true. Each device on the bus returns the contents of its status byte register in response to this poll. The device whose RQS bit is set to 1 is the device that requested service.

When you read the instrument's status byte register with a serial poll, the RQS bit is reset to 0. Other bits in the register are not affected.

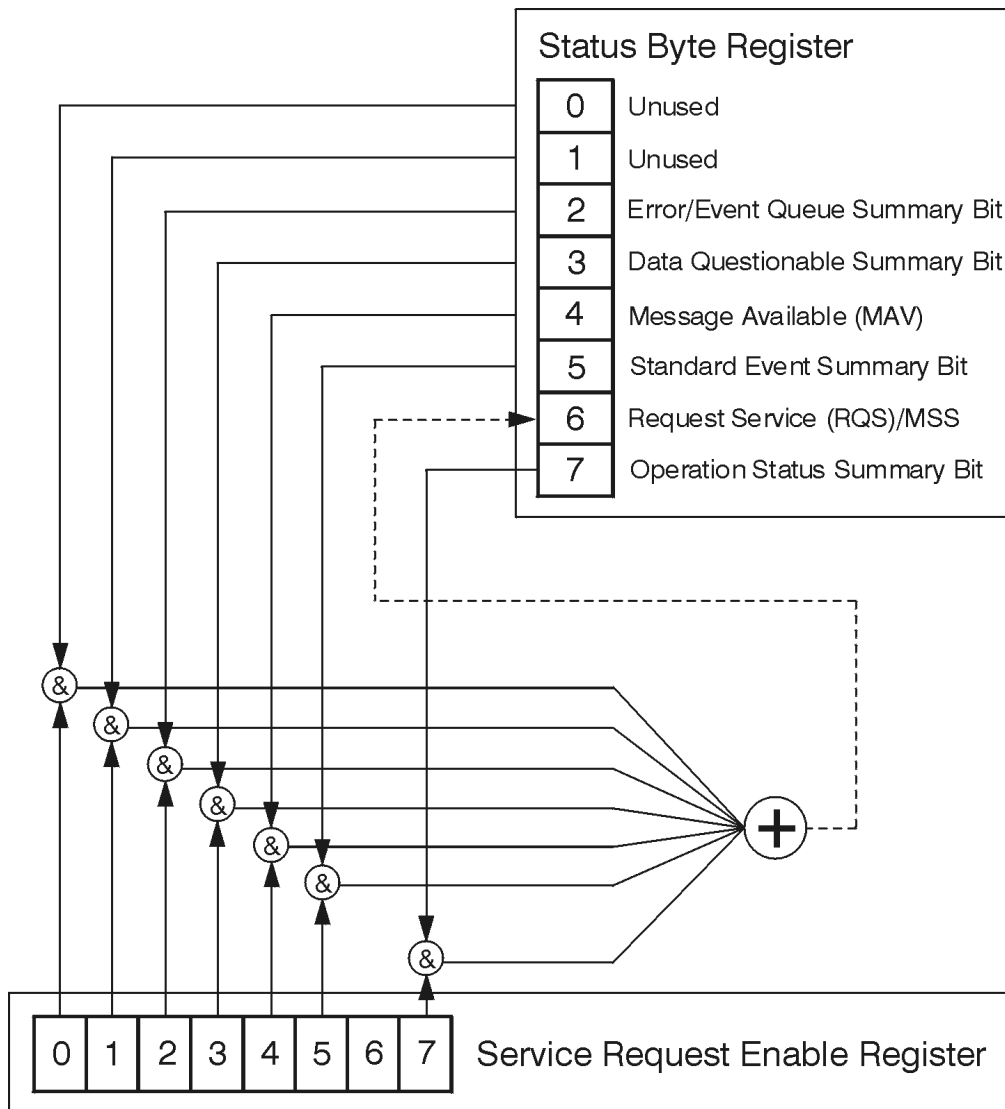
If the status register is configured to SRQ on end-of-measurement and the measurement is in continuous mode, then restarting a measurement (INIT command) can cause the measuring bit to pulse low. This causes an SRQ when you have not actually reached the "end-of-measurement" condition. To avoid this:

1. Set INITiate:CONTinuous off.
2. Set/enable the status registers.
3. Restart the measurement (send INIT).

### **Status Register System**

The hardware status registers are combined to form the instrument status system. Specific status bits are assigned to monitor various aspects of the instrument operation and status. See the diagram of the status system above for information about the bit assignments and status register interconnections.

### The Status Byte Register



ck776a

The RQS bit is read and reset by a serial poll. The same bit position (MSS) is read, non-destructively by the \*STB? command. If you serial poll bit 6 it is read as RQS, but if you send \*STB it reads bit 6 as MSS. For more information refer to IEEE 488.2 standards, section 11.



<b>Bit Number</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>	

\*STB?

**Status Byte Register**

ck725a

Bit	Description
0, 1	These bits are always set to 0.
2	A 1 in this bit position indicates that the SCPI error queue is not empty which means that it contains at least one error message.
3	A 1 in this bit position indicates that the data questionable summary bit has been set. The data questionable event register can then be read to determine the specific condition that caused this bit to be set.
4	A 1 in this bit position indicates that the instrument has data ready in the output queue. There are no lower status groups that provide input to this bit.
5	A 1 in this bit position indicates that the standard event summary bit has been set. The standard event status register can then be read to determine the specific event that caused this bit to be set.
6	A 1 in this bit position indicates that the instrument has at least one reason to report a status change. This bit is also called the master summary status bit (MSS).
7	A 1 in this bit position indicates that the standard operation summary bit has been set. The standard operation event register can then be read to determine the specific condition that caused this bit to be set.

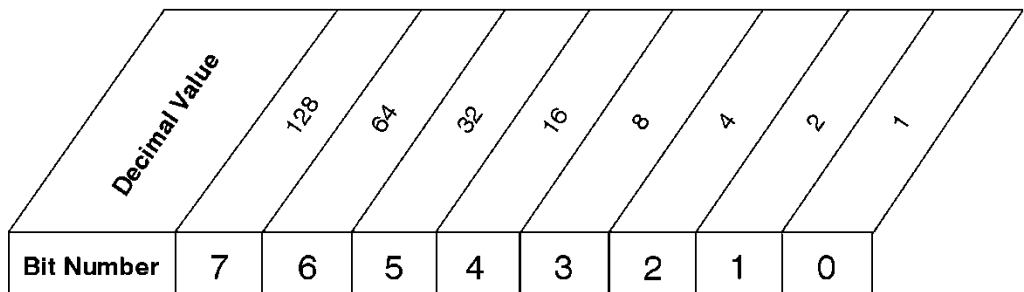
To query the status byte register, send the command \*STB?. The response will be the decimal sum of the bits which are set to 1. For example, if bit number 7 and bit number 3 are set to 1, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned. The \*STB command does not clear the status register.

In addition to the status byte register, the status byte group also contains the service request enable register. This register lets you choose which bits in the status byte register will trigger a service request.

Send the \*SRE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable plus the decimal value of bit 6. For example, assume that you want to enable bit 7 so that whenever the standard operation status register summary bit is set to 1 it will trigger a service request. Send the command \*SRE 192 (because 192 = 128 + 64). You must always add 64 (the numeric value of RQS

bit 6) to your numeric sum when you enable any bits for a service request. The command \*SRE? returns the decimal value of the sum of the bits previously enabled with the \*SRE <integer> command.

The service request enable register presets to zeros (0).

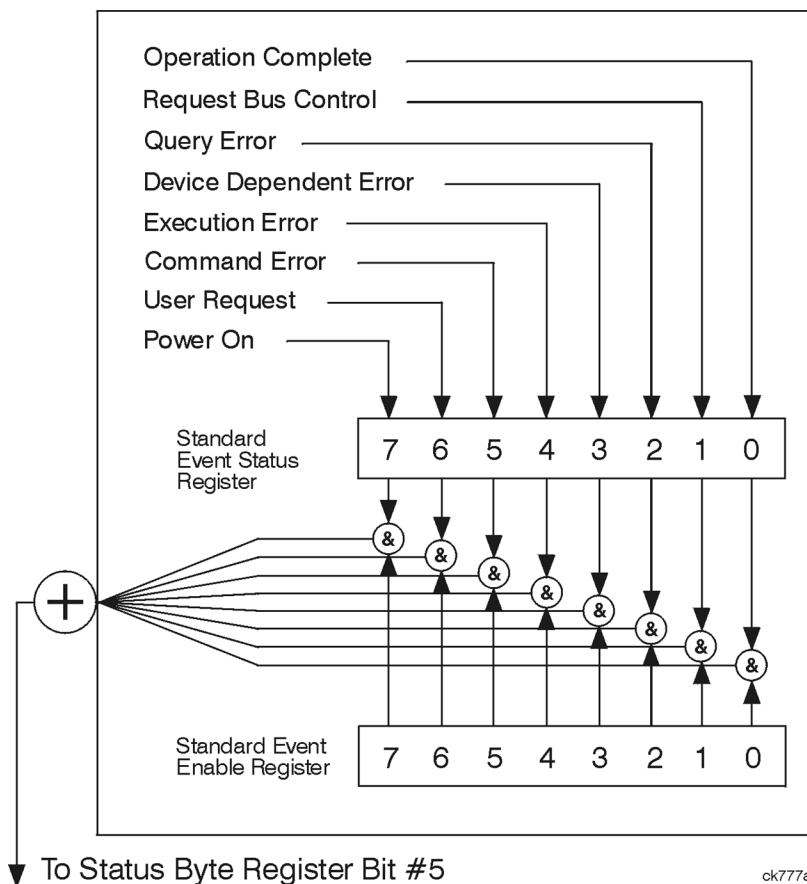


\*SRE <num>  
 \*SRE?

**Service Request Enable Register**

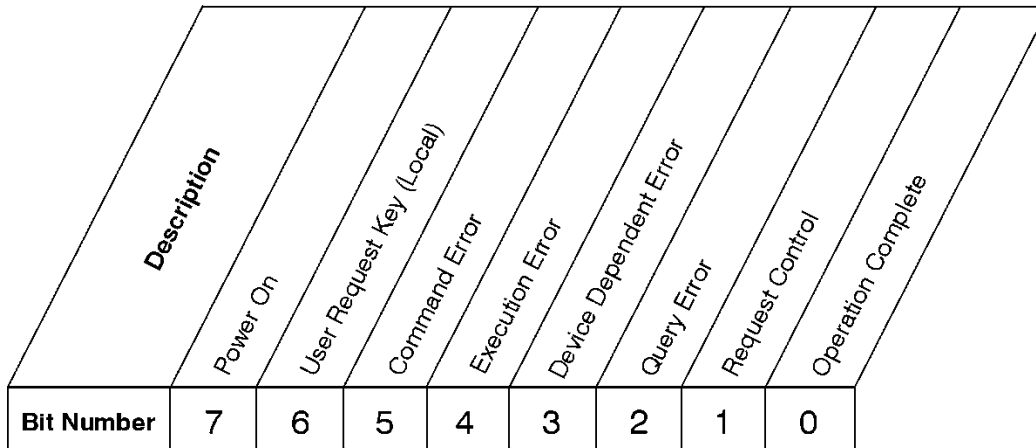
ck726a

**Standard Event Status Register**



ck777a

The standard event status register contains the following bits:



\*ESR?

**Standard Event Status Register**

ck727a

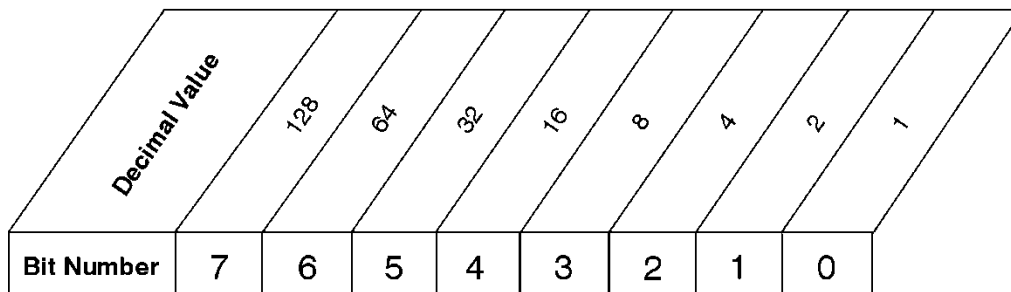
Bit	Description
0	A 1 in this bit position indicates that all pending operations were completed following execution of the *OPC command.
1	This bit is for GPIB handshaking to request control. Currently it is set to 0 because there are no implementations where the spectrum analyzer controls another instrument.
2	A 1 in this bit position indicates that a query error has occurred. Query errors have SCPI error numbers from -499 to -400.
3	A 1 in this bit position indicates that a device dependent error has occurred. Device dependent errors have SCPI error numbers from -399 to -300 and 1 to 32767.
4	A 1 in this bit position indicates that an execution error has occurred. Execution errors have SCPI error numbers from -299 to -200.
5	A 1 in this bit position indicates that a command error has occurred. Command errors have SCPI error numbers from -199 to -100.
6	A 1 in this bit position indicates that the LOCAL key has been pressed. This is true even if the instrument is in local lockout mode.
7	A 1 in this bit position indicates that the instrument has been turned off and then on.

The standard event status register is used to determine the specific event that set bit 5 in the status byte register. To query the standard event status register, send the command \*ESR?. The response will be the decimal sum of the bits which are enabled (set to 1). For example, if bit number 7 and bit number 3 are enabled, the decimal sum of the 2 bits is 128 plus 8. So the decimal value 136 is returned.

In addition to the standard event status register, the standard event status group also contains a standard event status enable register. This register lets you choose which bits in the standard event status register will set the summary bit (bit 5 of the status byte register) to 1. Send the \*ESE <integer> command where <integer> is the sum of the decimal values of the bits you want to enable. For example, to enable bit 7 and bit 6 so that whenever either of those bits is set to 1, the standard event status summary bit of the status

byte register will be set to 1, send the command \*ESE 192 (128 + 64). The command \*ESE? returns the decimal value of the sum of the bits previously enabled with the \*ESE <integer> command.

The standard event status enable register presets to zeros (0).



\*ESE <num>  
 \*ESE?

### Standard Event Status Enable Register

ck728a

### Operation and Questionable Status Registers

The operation and questionable status registers are registers that monitor the overall instrument condition. They are accessed with the STATus:OPERation and STATus:QUEStionable commands in the STATus command subsystem. See the figure at the beginning of this chapter.

#### Operation Status Register

The operation status register monitors the current instrument measurement state. It checks to see if the instrument is calibrating, sweeping, or waiting for a trigger. For more information see the \*OPC? command located in the IEEE Common Commands section.

Bit	Condition	Operation
0	Calibrating	The instrument is busy executing its Align Now process
3	Sweeping	The instrument is busy taking a sweep.
4	Measuring	The instrument is busy making a measurement. Measurements often require multiple sweeps. They are initiated by keys under the MEASURE key or with the MEASure group of commands. The bit is valid for most X-Series Modes.
5	Waiting for trigger	The instrument is waiting for the trigger conditions to be met, then it will trigger a sweep or measurement.

#### Questionable Status Register

The questionable status register monitors the instrument's condition to see if anything questionable has happened to it. It is looking for anything that might cause an error or a bad measurement like a hardware problem, an out of calibration situation, or a unusual signal. All the bits are summary bits from lower-level event registers.

Bit	Condition	Operation
-----	-----------	-----------

3	Power summary	The instrument hardware has detected a power unlevelled condition.
4	Temperature summary	The instrument is still warming up.
5	Frequency summary	The instrument hardware has detected an unlocked condition or a problem with the external frequency reference.
8	Calibration summary	The instrument has detected a hardware problem while doing the automatic internal alignment process.
9	Integrity summary	The instrument has detected a questionable measurement condition such as: bad timing, bad signal/data, timeout problem, signal overload, or "meas uncal".

## STATus Subsystem Command Descriptions

The STATus subsystem controls the SCPI-defined instrument status reporting structures. Each status register has a set of five commands used for querying or masking that particular register.

Numeric values for bit patterns can be entered using decimal or hexadecimal representations. (i.e. 0 to 32767 is equivalent to #H0 to #H7FFF. It is also equal to all ones, 111111111111111) See the SCPI Basics information about using bit patterns for variable parameters.

### Operation Register

"Operation Condition Query" on page 109

"Operation Enable" on page 110

"Operation Event Query" on page 110

"Operation Negative Transition" on page 110

"Operation Positive Transition" on page 111

### Operation Condition Query

This query returns the decimal value of the sum of the bits in the Status Operation Condition register.

#### NOTE

The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:OPERation:CONDition?
<b>Example</b>	STAT:OPER:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Operation Enable

This command determines which bits in the Operation Event register, will set the Operation Status Summary bit (bit 7) in the Status Byte Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

**NOTE**

The preset condition is to have all bits in this enable register set to 0. To have any Operation Events reported to the Status Byte Register, one or more bits need to be set to 1.

Mode	All
<b>Remote Command</b>	:STATus:OPERation:ENABle <integer> :STATus:OPERation:ENABle?
<b>Example</b>	STAT:OPER:ENAB 1 Sets the register so that Align Now operation will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Operation Event Query

This query returns the decimal value of the sum of the bits in the Operation Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:OPERation[:EVENT]?
<b>Example</b>	STAT:OPER?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Operation Negative Transition

This command determines which bits in the Operation Condition register will set the corresponding bit in the Operation Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:OPERation:NTRansition <integer> :STATus:OPERation:NTRansition?
<b>Example</b>	STAT:OPER:NTR 1 Align Now operation complete will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Operation Positive Transition

This command determines which bits in the Operation Condition register will set the corresponding bit in the Operation Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:OPERation:PTRansition <integer> :STATus:OPERation:PTRansition?
<b>Example</b>	STAT:OPER:PTR 1 Align Now operation beginning will be reported to the Status Byte Register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Preset the Status Byte

Sets bits in most of the enable and transition registers to their default state. It presets all the Transition Filters, Enable Registers, and the Error/Event Queue Enable. It has no effect on Event Registers, Error/Event QUEUE, IEEE 488.2 ESE, and SRE Registers as described in IEEE Standard 488.2–1992, IEEE Standard Codes, Formats, Protocols, and Common Commands for Use with ANSI/IEEE Std 488.1–1987. New York, NY, 1992.

<b>Remote Command</b>	:STATus:PRESet
<b>Example</b>	STAT:PREs
Initial S/W Revision	Prior to A.02.00

## Questionable Register

"Questionable Condition " on page 112

"Questionable Enable " on page 112

"Questionable Event Query " on page 113

"Questionable Negative Transition " on page 113

"Questionable Positive Transition" on page 113

### Questionable Condition

This query returns the decimal value of the sum of the bits in the Questionable Condition register.

**NOTE** The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:CONDition?
<b>Example</b>	STAT:QUES:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Enable

This command determines which bits in the Questionable Event register will set the Questionable Status Summary bit (bit3) in the Status Byte Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

**NOTE** The preset condition is all bits in this enable register set to 0. To have any Questionable Events reported to the Status Byte Register, one or more bits need to be set to 1. The Status Byte Event Register should be queried after each measurement to check the Questionable Status Summary (bit 3). If it is equal to 1, a condition during the test may have made the test results invalid. If it is equal to 0, this indicates that no hardware problem or measurement problem was detected by the analyzer.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:ENABle <integer> :STATus:QUEStionable:ENABle?
<b>Example</b>	STAT:OPER:PTR 1 Align Now operation beginning will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00



### Questionable Event Query

This query returns the decimal value of the sum of the bits in the Questionable Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable[:EVENT]?
<b>Example</b>	STAT:QUES?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Negative Transition

This command determines which bits in the Questionable Condition register will set the corresponding bit in the Questionable Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:NTRansition <integer> :STATus:QUESTionable:NTRansition?
<b>Example</b>	STAT:QUES:NTR 16 Temperature summary 'questionable cleared' will be reported to the Status Byte Register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Positive Transition

This command determines which bits in the Questionable Condition register will set the corresponding bit in the Questionable Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
------	-----

<b>Remote Command</b>	:STATus:QUEStionable:PTRansition <integer> :STATus:QUEStionable:PTRansition?
<b>Example</b>	STAT:QUES:PTR 16 Temperature summary 'questionable asserted' will be reported to the Status Byte Register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Register

"Questionable Calibration Condition " on page 114

"Questionable Calibration Enable " on page 114

"Questionable Calibration Event Query " on page 115

"Questionable Calibration Negative Transition " on page 115

"Questionable Calibration Positive Transition " on page 116

### Questionable Calibration Condition

This query returns the decimal value of the sum of the bits in the Questionable Calibration Condition register.

**NOTE** The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:CALibration:CONDition?
<b>Example</b>	STAT:QUES:CAL:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Enable

This command determines which bits in the Questionable Calibration Condition Register will set bits in the Questionable Calibration Event register, which also sets the Calibration Summary bit (bit 8) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:ENABle <integer> :STATus:QUESTionable:CALibration:ENABle?
<b>Example</b>	STAT:QUES:CAL:ENAB 16384 Can be used to query if an alignment is needed, if you have turned off the automatic alignment process.
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration[:EVENT]?
<b>Example</b>	STAT:QUES:CAL?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Negative Transition

This command determines which bits in the Questionable Calibration Condition register will set the corresponding bit in the Questionable Calibration Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:NTRansition <integer> :STATus:QUESTionable:CALibration:NTRansition?
<b>Example</b>	STAT:QUES:CAL:NTR 16384 Alignment is not required.
Preset	0
Min	0

Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Positive Transition

This command determines which bits in the Questionable Calibration Condition register will set the corresponding bit in the Questionable Calibration Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:PTRansition <integer> :STATus:QUESTionable:CALibration:PTRansition?
<b>Example</b>	STAT:QUES:CAL:PTR 16384 Alignment is required.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Skipped Register

"Questionable Calibration Skipped Condition " on page 116

"Questionable Calibration Skipped Enable " on page 117

"Questionable Calibration Skipped Event Query " on page 117

"Questionable Calibration Skipped Negative Transition " on page 118

"Questionable Calibration Skipped Positive Transition " on page 118

### Questionable Calibration Skipped Condition

This query returns the decimal value of the sum of the bits in the Questionable Calibration Skipped Condition register.

**NOTE** The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:SKIpped:CONDition?

<b>Example</b>	STAT:QUES:CAL:SKIP:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Skipped Enable

This command determines which bits in the Questionable Calibration Skipped Condition Register will set bits in the Questionable Calibration Skipped Event register, which also sets bit 11 of the Questionable Calibration Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:SKIPped:ENABle <integer> :STATus:QUESTionable:CALibration:SKIPped:ENABle?
<b>Example</b>	STAT:QUES:CAL:SKIP:ENAB 1 Can be used to query if an EMI alignment skipped condition is detected
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Skipped Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:SKIPped[:EVENT]?
<b>Example</b>	STAT:QUES:CAL:SKIP?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Skipped Negative Transition

This command determines which bits in the Questionable Calibration Skipped Condition register will set the corresponding bit in the Questionable Calibration Skipped Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:CALibration:SKIpped:NTRansition <integer> :STATus:QUEStionable:CALibration:SKIpped:NTRansition?
<b>Example</b>	STAT:QUES:CAL:SKIP:NTR 1 Align RF skipped is not required.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Skipped Positive Transition

This command determines which bits in the Questionable Calibration Skipped Condition register will set the corresponding bit in the Questionable Calibration Skipped Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:CALibration:SKIpped:PTRansition <integer> :STATus:QUEStionable:CALibration:SKIpped:PTRansition?
<b>Example</b>	STAT:QUES:CAL:SKIP:PTR 1 Align RF skipped is required.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Failure Register

"Questionable Calibration Extended Failure Condition " on page 119

"Questionable Calibration Extended Failure Enable " on page 119

"Questionable Calibration Extended Failure Event Query " on page 119

"Questionable Calibration Extended Failure Negative Transition " on page 120

"Questionable Calibration Extended Failure Positive Transition " on page 120

### Questionable Calibration Extended Failure Condition

This query returns the decimal value of the sum of the bits in the Questionable Calibration Extended Failure Condition register.

**NOTE** The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:CALibration:EXTended:FAILure:CONDition?
<b>Example</b>	STAT:QUES:CAL:EXT:FAIL:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Failure Enable

This command determines which bits in the Questionable Calibration Extended Failure Condition Register will set bits in the Questionable Calibration Extended Failure Event register, which also sets bit 9 of the Questionable Calibration Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:CALibration:EXTended:FAILure:ENABle <integer> :STATus:QUEStionable:CALibration:EXTended:FAILure:ENABle?
<b>Example</b>	STAT:QUES:CAL:EXT:FAIL:ENAB 1 Can be used to query if an EMI conducted alignment is needed.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Failure Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Extended Failure Event register.

**NOTE** The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:EXTended:FAILure[:EVENT]?
<b>Example</b>	STAT:QUES:CAL:EXT:FAIL?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Failure Negative Transition

This command determines which bits in the Questionable Calibration Extended Failure Condition register will set the corresponding bit in the Questionable Calibration Extended Failure Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:EXTended:FAILure:NTRansition <integer> :STATus:QUESTionable:CALibration:EXTended:FAILure:NTRansition?
<b>Example</b>	STAT:QUES:CAL:EXT:FAIL:NTR 1 EMI conducted align failure is not required.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Failure Positive Transition

This command determines which bits in the Questionable Calibration Extended Failure Condition register will set the corresponding bit in the Questionable Calibration Extended Failure Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:EXTended:FAILure:PTRansition <integer> :STATus:QUESTionable:CALibration:EXTended:FAILure:PTRansition?
<b>Example</b>	STAT:QUES:CAL:EXT:FAIL:PTR 1 EMI conducted align failure is required.
Preset	32767
Min	0
Max	32767



Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Needed Register

"Questionable Calibration Extended Needed Condition " on page 121

"Questionable Calibration Extended Needed Enable " on page 121

"Questionable Calibration Extended Needed Event Query " on page 122

"Questionable Calibration Extended Needed Negative Transition " on page 122

"Questionable Calibration Extended Needed Positive Transition " on page 123

### Questionable Calibration Extended Needed Condition

This query returns the decimal value of the sum of the bits in the Questionable Calibration Extended Needed Condition register.

**NOTE**

The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:EXTended:NEEDed:CONDition?
<b>Example</b>	STAT:QUES:CAL:EXT:NEED:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Needed Enable

This command determines which bits in the Questionable Calibration Extended Needed Condition Register will set bits in the Questionable Calibration Extended Needed Event register, which also sets bit 14 of the Questionable Calibration Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:EXTended:NEEDed:ENABle <integer> :STATus:QUESTionable:CALibration:EXTended:NEEDed:ENABle?
<b>Example</b>	STAT:QUES:CAL:EXT:NEED:ENAB 2 Can be used to query if an EMI conducted alignment is needed.
Preset	32767
Min	0

Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Needed Event Query

This query returns the decimal value of the sum of the bits in the Questionable Calibration Extended Needed Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:EXTended:NEEDed[:EVENT]?
<b>Example</b>	STAT:QUES:CAL:EXT:NEED?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Needed Negative Transition

This command determines which bits in the Questionable Calibration Extended Needed Condition register will set the corresponding bit in the Questionable Calibration Extended Needed Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:CALibration:EXTended:NEEDed:NTRansition <integer> :STATus:QUESTionable:CALibration:EXTended:NEEDed:NTRansition?
<b>Example</b>	STAT:QUES:CAL:EXT:NEED:NTR 2 Align EMI conducted is not required.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Calibration Extended Needed Positive Transition

This command determines which bits in the Questionable Calibration Extended Needed Condition register will set the corresponding bit in the Questionable Calibration Extended Needed Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:CALibration:EXTended:NEEDED:PTRansition <integer> :STATus:QUEStionable:CALibration:EXTended:NEEDED:PTRansition?
<b>Example</b>	STAT:QUES:CAL:EXT:NEED:PTR 2 Align EMI conducted is required.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Frequency Register

"Questionable Frequency Condition " on page 123

"Questionable Frequency Enable " on page 124

"Questionable Frequency Event Query " on page 124

"Questionable Frequency Negative Transition " on page 124

"Questionable Frequency Positive Transition " on page 125

### Questionable Frequency Condition

This query returns the decimal value of the sum of the bits in the Questionable Frequency Condition register.

**NOTE** The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:FREQuency:CONDition?
<b>Example</b>	STAT:QUES:FREQ:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Frequency Enable

This command determines which bits in the Questionable Frequency Condition Register will set bits in the Questionable Frequency Event register, which also sets the Frequency Summary bit (bit 5) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:FREQuency:ENABle <integer> :STATus:QUEStionable:FREQuency:ENABle?
<b>Example</b>	STAT:QUES:FREQ:ENAB 2 Frequency Reference Unlocked will be reported to the Frequency Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Frequency Event Query

This query returns the decimal value of the sum of the bits in the Questionable Frequency Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:FREQuency[:EVENT]?
<b>Example</b>	STAT:QUES:FREQ?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Frequency Negative Transition

This command determines which bits in the Questionable Frequency Condition register will set the corresponding bit in the Questionable Frequency Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
------	-----

<b>Remote Command</b>	:STATus:QUESTionable:FREQuency:NTRansition <integer> :STATus:QUESTionable:FREQuency:NTRansition?
<b>Example</b>	STAT:QUES:FREQ:NTR 2 Frequency Reference 'regained lock' will be reported to the Frequency Summary of the Status Questionable register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Frequency Positive Transition

This command determines which bits in the Questionable Frequency Condition register will set the corresponding bit in the Questionable Frequency Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:FREQuency:PTRansition <integer> :STATus:QUESTionable:FREQuency:PTRansition?
<b>Example</b>	STAT:QUES:FREQ:PTR 2 Frequency Reference 'became unlocked' will be reported to the Frequency Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Register

"Questionable Integrity Condition " on page 125

"Questionable Integrity Enable " on page 126

"Questionable Integrity Event Query " on page 126

"Questionable Integrity Negative Transition " on page 127

"Questionable Integrity Positive Transition " on page 127

### Questionable Integrity Condition

This query returns the decimal value of the sum of the bits in the Questionable Integrity Condition register.

**NOTE** The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:INTEgrity:CONDition?
<b>Example</b>	STAT:QUES:INT:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Enable

This command determines which bits in the Questionable Integrity Condition Register will set bits in the Questionable Integrity Event register, which also sets the Integrity Summary bit (bit 9) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:INTEgrity:ENABle <integer> :STATus:QUESTionable:INTEgrity:ENABle?
<b>Example</b>	STAT:QUES:INT:ENAB 8 Measurement Uncalibrated Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Event Query

This query returns the decimal value of the sum of the bits in the Questionable Integrity Event register.

**NOTE** The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:INTEgrity[:EVENT]?
<b>Example</b>	STAT:QUES:INT?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Negative Transition

This command determines which bits in the Questionable Integrity Condition register will set the corresponding bit in the Questionable Integrity Event register when the condition register bit has a negative transition (1 to 0)

The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:NTRansition <integer> :STATus:QUEStionable:INTEgrity:NTRansition?
<b>Example</b>	STAT:QUES:INT:NTR 8 Measurement 'regained calibration' Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Positive Transition

This command determines which bits in the Questionable Integrity Condition register will set the corresponding bit in the Questionable Integrity Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:PTRansition <integer> :STATus:QUEStionable:INTEgrity:PTRansition?
<b>Example</b>	STAT:QUES:INT:PTR 8 Measurement 'became uncalibrated' Summary will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Signal Register

"Questionable Integrity Signal Condition" on page 128

"Questionable Integrity Signal Enable" on page 128

"Questionable Integrity Signal Event Query" on page 129

"Questionable Integrity Signal Negative Transition" on page 129

"Questionable Integrity Signal Positive Transition" on page 129

### Questionable Integrity Signal Condition

This query returns the decimal value of the sum of the bits in the Questionable Integrity Signal Condition register.

**NOTE**

The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:INTEgrity:SIGNal:CONDition?
<b>Example</b>	STAT:QUES:INT:SIGN:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Signal Enable

This command determines which bits in the Questionable Integrity Signal Condition Register will set bits in the Questionable Integrity Signal Event register, which also sets the Integrity Summary bit (bit 9) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:INTEgrity:SIGNal:ENABle <integer> :STATus:QUESTionable:INTEgrity:SIGNal:ENABle?
<b>Example</b>	STAT:QUES:INT:SIGN:ENAB 4 Burst Not Found will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00



### Questionable Integrity Signal Event Query

This query returns the decimal value of the sum of the bits in the Questionable Integrity Signal Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:INTEgrity:SIGNal[:EVENT]?
<b>Example</b>	STAT:QUES:INT:SIGN?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Signal Negative Transition

This command determines which bits in the Questionable Integrity Signal Condition register will set the corresponding bit in the Questionable Integrity Signal Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:INTEgrity:SIGNal:NTRansition <integer> :STATus:QUESTionable:INTEgrity:SIGNal:NTRansition?
<b>Example</b>	STAT:QUES:INT:SIGN:NTR 4 Burst found will be reported to the Integrity Summary of the Status Questionable register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Signal Positive Transition

This command determines which bits in the Questionable Integrity Signal Condition register will set the corresponding bit in the Questionable Integrity Signal Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:SIGNal:PTRansition <integer> :STATus:QUEStionable:INTEgrity:SIGNal:PTRansition?
<b>Example</b>	STAT:QUES:INT:SIGN:PTR 4 Burst not found will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Uncalibrated Register

"Questionable Integrity Uncalibrated Condition " on page 130

"Questionable Integrity Uncalibrated Enable " on page 130

"Questionable Integrity Uncalibrated Event Query " on page 131

"Questionable Integrity Uncalibrated Negative Transition " on page 131

"Questionable Integrity Uncalibrated Positive Transition " on page 132

### Questionable Integrity Uncalibrated Condition

This query returns the decimal value of the sum of the bits in the Questionable Integrity Uncalibrated Condition register.

**NOTE**

The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:UNCalibrated:CONDition?
<b>Example</b>	STAT:QUES:INT:UNC:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Uncalibrated Enable

This command determines which bits in the Questionable Integrity Uncalibrated Condition Register will set bits in the Questionable Integrity Uncalibrated Event register, which also sets the Data Uncalibrated Summary bit (bit 3) in the Questionable Integrity Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:UNCalibrated:ENABle :STATus:QUEStionable:INTEgrity:UNCalibrated:ENABle?
<b>Example</b>	STAT:QUES:INT:UNC:ENAB 1 Oversweep (Meas Uncal) will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Uncalibrated Event Query

This query returns the decimal value of the sum of the bits in the Questionable Integrity Uncalibrated Event register.

#### NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:UNCalibrated[:EVENT]?
<b>Example</b>	STAT:QUES:INT:UNC?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Uncalibrated Negative Transition

This command determines which bits in the Questionable Integrity Uncalibrated Condition register will set the corresponding bit in the Questionable Integrity Uncalibrated Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:UNCalibrated:NTRansition <integer> :STATus:QUEStionable:INTEgrity:UNCalibrated:NTRansition?
<b>Example</b>	STAT:QUES:INT:UNC:NTR 1 Oversweep cleared will be reported to the Integrity Summary of the Status Questionable register.

Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Integrity Uncalibrated Positive Transition

This command determines which bits in the Questionable Integrity Uncalibrated Condition register will set the corresponding bit in the Questionable Integrity Uncalibrated Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:INTEgrity:UNCalibrated:PTRansition <integer> :STATus:QUEStionable:INTEgrity:UNCalibrated:PTRansition?
<b>Example</b>	STAT:QUES:INT:UNC:PTR 1 Oversweep (Meas Uncal) occurred will be reported to the Integrity Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Power Register

"Questionable Power Condition " on page 132

"Questionable Power Enable " on page 133

"Questionable Power Event Query " on page 133

"Questionable Power Negative Transition " on page 134

"Questionable Power Positive Transition " on page 134

### Questionable Power Condition

This query returns the decimal value of the sum of the bits in the Questionable Power Condition register.

**NOTE**

The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:POWer:CONDition?
<b>Example</b>	STAT:QUES:POW:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Power Enable

This command determines which bits in the Questionable Power Condition Register will set bits in the Questionable Power Event register, which also sets the Power Summary bit (bit 3) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:POWer:ENABle <integer> :STATus:QUESTionable:POWer:ENABle?
<b>Example</b>	STAT:QUES:POW:ENAB 32 50 MHz Input Pwr too High for Cal will be reported to the Power Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Power Event Query

This query returns the decimal value of the sum of the bits in the Questionable Power Event register.

#### NOTE

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:POWer[:EVENT]?
<b>Example</b>	STAT:QUES:POW?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Power Negative Transition

This command determines which bits in the Questionable Power Condition register will set the corresponding bit in the Questionable Power Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:POWer:NTRansition <integer> :STATus:QUESTionable:POWer:NTRansition?
<b>Example</b>	STAT:QUES:POW:NTR 32 50 MHz Input Power became OK for Cal will be reported to the Power Summary of the Status Questionable register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Power Positive Transition

This command determines which bits in the Questionable Power Condition register will set the corresponding bit in the Questionable Power Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:POWer:PTRansition <integer> :STATus:QUESTionable:POWer:PTRansition?>
<b>Example</b>	STAT:QUES:POW:PTR 32 50 MHz Input Power became too high for Cal will be reported to the Power Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Temperature Register

"Questionable Temperature Condition" on page 135

"Questionable Temperature Enable" on page 135

"Questionable Temperature Event Query" on page 135

"Questionable Temperature Negative Transition" on page 136

"Questionable Temperature Positive Transition" on page 136

### Questionable Temperature Condition

This query returns the decimal value of the sum of the bits in the Questionable Temperature Condition register.

**NOTE**

The data in this register is continuously updated and reflects the current conditions.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:TEMPerature:CONDition?
<b>Example</b>	STAT:QUES:TEMP:COND?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Temperature Enable

This command determines which bits in the Questionable Temperature Condition Register will set bits in the Questionable Temperature Event register, which also sets the Temperature Summary bit (bit 4) in the Questionable Register. The variable <integer> is the sum of the decimal values of the bits you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUEStionable:TEMPerature:ENABle <integer> :STATus:QUEStionable:TEMPerature:ENABle?
<b>Example</b>	STAT:QUES:TEMP:ENAB 1 Reference Oscillator Oven Cold will be reported to the Temperature Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Temperature Event Query

This query returns the decimal value of the sum of the bits in the Questionable Temperature Event register.

**NOTE**

The register requires that the associated PTR or NTR filters be set before a condition register bit can set a bit in the event register. The data in this register is latched until it is queried. Once queried, the register is cleared

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:TEMPerature[:EVENT]?
<b>Example</b>	STAT:QUES:TEMP?
Preset	0
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Temperature Negative Transition

This command determines which bits in the Questionable Temperature Condition register will set the corresponding bit in the Questionable Temperature Event register when the condition register bit has a negative transition (1 to 0). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:TEMPerature:NTRansition <integer> :STATus:QUESTionable:TEMPerature:NTRansition?
<b>Example</b>	STAT:QUES:TEMP:NTR 1 Reference Oscillator Oven not cold will be reported to the Temperature Summary of the Status Questionable register.
Preset	0
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

### Questionable Temperature Positive Transition

This command determines which bits in the Questionable Temperature Condition register will set the corresponding bit in the Questionable Temperature Event register when the condition register bit has a positive transition (0 to 1). The variable <integer> is the sum of the decimal values of the bits that you want to enable.

Mode	All
<b>Remote Command</b>	:STATus:QUESTionable:TEMPerature:PTRansition <integer> :STATus:QUESTionable:TEMPerature:PTRansition?
<b>Example</b>	STAT:QUES:TEMP:PTR 1 Reference Oscillator Oven became cold will be reported to the



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	Temperature Summary of the Status Questionable register.
Preset	32767
Min	0
Max	32767
Status Bits/OPC dependencies	Sequential command
Initial S/W Revision	Prior to A.02.00

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## Common Commands

- "All (Daily use)" on page 244
- "Clear Status " on page 140
- "Standard Event Status Enable " on page 141
- "Standard Event Status Register Query " on page 141
- "Identification Query " on page 142
- "Operation Complete " on page 142
- "Query Instrument Options " on page 143
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- "Service Request Enable " on page 145
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### All (Daily use)

Immediately executes an alignment of all subsystems which includes both the source and the analyzer in the TRX module. The "All" alignment is sufficient to maintain specified performance, provided that (1) the TRX's internal temperature has not drifted more than +/-5 degree C since the previous alignment, and (2) no more than 8 hours have elapsed since the previous "All" alignment., and (3) no more than 1 week has elapsed since these three alignments have all been run: IF, RF, and Source, and (4) a 45 minute warm-up period between power-up of the TRX and invoking the "All" alignment. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the Restart key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message "Align skipped: 50 MHz interference" or "Align skipped: 4.8 GHz interference" is generated. In addition the Error Condition message "Align Now, RF required" is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or \*CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of Align Now, All will clear the "Align Now, All required" Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register

Align Now, All can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORT SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to Normal, instead of executing Align Now, All. When the Auto Align process transitions to Normal, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

**NOTE**

In EXM, Source ARB play will be turned off and the source states will not be restored after Align Now, All.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration[:ALL] :CALibration[:ALL]?
Example	:CAL
Notes	:CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORT command. Successful completion will clear bit 14 in the Status Questionable Calibration register. An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required. An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.
Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature. If Align RF component succeeded, initializes the time for the Last Align Now, RF Time. If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature.
Status Bits/OPC dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Mode	All
<b>Remote Command</b>	*CAL?
<b>Example</b>	*CAL?
Notes	*CAL? returns 0 if successful *CAL? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? See additional remarks described with :CALibration[:ALL]? Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings
Initial S/W Revision	Prior to A.02.00

Mode	All
<b>Remote Command</b>	:CALibration[:ALL]:NPENding
<b>Example</b>	CAL:NPEN
Notes	:CALibration[:ALL]:NPENding is the same as :CALibration[:ALL] including all conditions, status register bits, except this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1) :CALibration:ALL:NPENding (Start a calibration) 2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared ) 3):STATus:QUEStionable:CALibration:CONDition? (Check if there are any errors/failures in previous calibration procedure
Initial S/W Revision	X.14.20

## Clear Status

Clears the status byte register. It does this by emptying the error queue and clearing all bits in all of the event registers. The status byte register summarizes the states of the other registers. It is also responsible for generating service requests.

Key Path	No equivalent key. Related key System, Show Errors, Clear Error Queue
<b>Remote Command</b>	*CLS
<b>Example</b>	*CLS Clears the error queue and the Status Byte Register.
Notes	For related commands, see the SYSTem:ERRor[:NEXT]? command. See also the STATus:PRESet command and all commands in the STATus subsystem.
Status Bits/OPC dependencies	Resets all bits in all event registers to 0, which resets all the status byte register bits to 0 also.
Backwards Compatibility Notes	In general the status bits used in the X-Series status system will be backwards compatible with ESA and PSA. However, note that all conditions will generate events that go into the event log, and some

	will also generate status bits.
Initial S/W Revision	Prior to A.02.00

## Standard Event Status Enable

Selects the desired bits from the standard event status enable register. This register monitors I/O errors and synchronization conditions such as operation complete, request control, query error, device dependent error, status execution error, command error, and power on. The selected bits are OR'd to become a summary bit (bit 5) in the byte register which can be queried.

The query returns the state of the standard event status enable register.

Key Path	No equivalent key. Related key System, Show Errors, Clear Error Queue
Remote Command	*ESE <integer> *ESE?
Example	*ESE 36 Enables the Standard Event Status Register to monitor query and command errors (bits 2 and 5). *ESE? Returns a 36 indicating that the query and command status bits are enabled.
Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	255
State Saved	Not saved in state.
Min	0
Max	255
Status Bits/OPC dependencies	Event Enable Register of the Standard Event Status Register.
Initial S/W Revision	Prior to A.02.00

## Standard Event Status Register Query

Queries and clears the standard event status event register. (This is a destructive read.) The value returned is a hexadecimal number that reflects the current state (0/1) of all the bits in the register.

Remote Command	*ESR?
Example	*ESR? Returns a 1 if there is either a query or command error, otherwise it returns a zero.
Notes	For related commands, see the STATus subsystem commands.
Preset	0
Min	0
Max	255
Status Bits/OPC dependencies	Standard Event Status Register (bits 0 - 7).
Initial S/W Revision	Prior to A.02.00

## Identification Query

Returns a string of instrument identification information. The string will contain the model number, serial number, and firmware revision.

The response is organized into four fields separated by commas. The field definitions are as follows:

- Manufacturer
- Model
- Serial number
- Firmware version

<b>Key Path</b>	No equivalent key. See related key System, Show System.
<b>Remote Command</b>	*IDN?
<b>Example</b>	*IDN? Returns instrument identification information, such as: Keysight Technologies, E6640A, US01020004, E.14.50
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	x.14.50

## Operation Complete

The \*OPC command sets bit 0 in the standard event status register (SER) to “1” when pending operations have finished, that is when all overlapped commands are complete. It does not hold off subsequent operations. You can determine when the overlapped commands have completed either by polling the OPC bit in SER, or by setting up the status system such that a service request (SRQ) is asserted when the OPC bit is set.

The \*OPC? query returns a “1” after all the current overlapped commands are complete. So it holds off subsequent commands until the “1” is returned, then the program continues. This query can be used to synchronize events of other instruments on the external bus.

<b>Remote Command</b>	*OPC *OPC?
<b>Example</b>	INIT:CONT 0 Selects single sweeping. INIT:IMM Initiates a sweep. *OPC? Holds off any further commands until the sweep is complete.
<b>Status Bits/OPC dependencies</b>	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from. *OPC is an overlapped command, but *OPC? is sequential.
<b>Backwards Compatibility Notes</b>	1. The ESA/PSA/VSA products do not meet all the requirements for the *OPC command specified by IEEE 488.2. This is corrected for X-Series. This will sometimes cause behavior that is not backward compatible, but it will work as customers expect.

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2. Commands such as, \*OPC/\*OPC?/\*WAI/\*RST used to be global. They considered front panel operation in conjunction with the GPIB functionality. Now they are evaluated on a per channel basis. That is, the various rear panel remote ports and the front panel i/o are all considered separately. Only the functionality initiated on the port where the \*OPC was sent, is considered for its operation.

3. \*OPC used to hold off until the operation bits were cleared. Now it holds off until all overlapping commands are completed. Also, earlier instruments did not wait for completion of all processes, only the ones identified here (in the STATus:OPERation register):

Calibrating: monitored by PSA, ESA, VSA (E4406A)

Sweeping: monitored by PSA, ESA, VSA (E4406A)

Waiting for Trigger: monitored by PSA, ESA, VSA (E4406A)

Measuring: monitored by PSA and ESA (but not in all Modes).

Paused: monitored by VSA (E4406A).

Printing: monitored by VSA (E4406A).

Mass memory busy: monitored by VSA (E4406A).

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Initial S/W Revision	Prior to A.02.00
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## Query Instrument Options

Returns a string of all the installed instrument options. It is a comma separated list with quotes, such as: "503,P03,PFR".

To be IEEE compliant, this command should return an arbitrary ascii variable that would not begin and end with quotes. But the quotes are needed to be backward compatible with previous SA products and software. So, the actual implementation will use arbitrary ascii. But quotes will be sent as the first and last ascii characters that are sent with the comma-separated option list.

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<b>Remote Command</b>	*OPT?
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Initial S/W Revision	Prior to A.02.00
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## Recall Instrument State

This command recalls the instrument state from the specified instrument memory register.

- If the state being loaded has a newer firmware revision than the revision of the instrument, no state is recalled and an error is reported
- If the state being loaded has an equal firmware revision than the revision of the instrument, the state will be loaded.
- If the state being loaded has an older firmware revision than the revision of the instrument, the instrument will only load the parts of the state that apply to the older revision.

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<b>Remote Command</b>	*RCL <register #>
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<b>Example</b>	*RCL 7 Recalls the instrument state that is currently stored in register 7.
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Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Recall Registers.
Min	0
Max	127
Status Bits/OPC dependencies	The command is sequential.
Initial S/W Revision	Prior to A.02.00

### \*RST (Remote Command Only)

\*RST is equivalent to :SYST:PRES::INIT:CONT OFF, which is a Mode Preset in the Single measurement state. This remote command is preferred over Mode Preset remote command - :SYST:PRES, as optimal remote programming occurs with the instrument in the single measurement state.

<b>Remote Command</b>	*RST
<b>Example</b>	*RST
Notes	Sequential Clears all pending OPC bits and the Status Byte is set to 0.
Couplings	A *RST will cause the currently running measurement to be aborted and cause the default measurement to be active. *RST gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In legacy analyzers *RST did not set the analyzer to Single, but in the X-Series it does, for compliance with the IEEE 488.2 specification.  In the X-Series, *RST does not do a *CLS (clear the status bits and the error queue). In legacy analyzers, *RST used to do the equivalent of SYSTem:PRESet, *CLS and INITiate:CONTinuous OFF. But to be 488.2 compliant, *RST in the X-Series does not do a *CLS.
Initial S/W Revision	Prior to A.02.00

### Save Instrument State

This command saves the current instrument state and mode to the specified instrument memory register.

<b>Remote Command</b>	*SAV <register #>
<b>Example</b>	*SAV 9 Saves the instrument state in register 9.
Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Save Registers.
Min	0
Max	127
Status Bits/OPC dependencies	The command is sequential.
Initial S/W Revision	Prior to A.02.00



## Service Request Enable

This command enables the desired bits of the service request enable register.

The query returns the value of the register, indicating which bits are currently enabled.

<b>Remote Command</b>	*SRE <integer> *SRE?
<b>Example</b>	*SRE 22 Enables bits 1, 2, and 4 in the service request enable register.
Notes	For related commands, see the STATus subsystem and SYSTem:ERRor[:NEXT]? commands.
Preset	0
Min	0
Max	255
Status Bits/OPC dependencies	Service Request Enable Register (all bits, 0 - 7).
Initial S/W Revision	Prior to A.02.00

## Status Byte Query

Returns the value of the status byte register without erasing its contents.

<b>Remote Command</b>	*STB?
<b>Example</b>	*STB? Returns a decimal value for the bits in the status byte register. For example, if a 16 is returned, it indicates that bit 5 is set and one of the conditions monitored in the standard event status register is set.
Notes	See related command *CLS.
Status Bits/OPC dependencies	Status Byte Register (all bits, 0 - 7).
Initial S/W Revision	Prior to A.02.00

## Trigger

This command triggers the instrument. Use the :TRIGger[:SEquence]:SOURce command to select the trigger source.

Key Path	No equivalent key. See related keys Single and Restart.
<b>Remote Command</b>	*TRG
<b>Example</b>	*TRG Triggers the instrument to take a sweep or start a measurement, depending on the current instrument settings.
Notes	See related command :INITiate:IMMEDIATE.
Initial S/W Revision	Prior to A.02.00

## Self Test Query

This query performs the internal self-test routines and returns a number indicating the success of the testing. A zero is returned if the test is successful, 1 if it fails.

<b>Remote Command</b>	*TST?
<b>Example</b>	*TST? Runs the self-test routines and returns 0=passed, 1=some part failed.
<b>Initial S/W Revision</b>	Prior to A.02.00

## Wait-to-Continue

This command causes the instrument to wait until all overlapped commands are completed before executing any additional commands. There is no query form for the command.

<b>Remote Command</b>	*WAI
<b>Example</b>	INIT:CONT OFF; INIT;*WAI Sets the instrument to single sweep. Starts a sweep and waits for its completion.
<b>Status Bits/OPC dependencies</b>	Not global to all remote ports or front panel. *OPC only considers operation that was initiated on the same port as the *OPC command was issued from.
<b>Initial S/W Revision</b>	Prior to A.02.00

(Undefined variable: Primary.ProductName)  
GSM/EDGE Measurement Application Reference

## 4 Input/Output Functions

## Input/Output

The Input/Output features are common across multiple Modes and Measurements. These common features are described in this section. See the Measurement description for information on features that are unique.

The Input/Output key accesses the keys that control the Input/Output parameters of the instrument. In general, these are functions associated with external connections to the analyzer, either to the inputs or the outputs. Since these connections tend to be fairly stable within a given setup, in general, the input/output settings do not change when you Preset the analyzer.

Other functions related to the input/output connections, but which tend to change on a measurement by measurement basis, can be found under the Trigger and AMPTD Y Scale keys. In addition, some of the digital I/O bus configurations can be found under the System key.

**NOTE**

The functions in the Input/Output menu are "global" (common) to all Modes (applications). But individual Input/Output functions only appear in a Mode if they apply to that Mode. Functions that apply to a Mode but not to all measurements in the Mode may be grayed-out in some measurements.

["Input/Output variables - Preset behavior" on page 149](#)

The Input Port selection is the first menu under the Input/Output key:

Key Path	Front-panel key
<b>Remote Command</b>	<code>[ :SENSe ] :FEED RF   AIQ   EMIXer</code> <code>[ :SENSe ] :FEED?</code>
<b>Example</b>	<code>:FEED RF</code> <code>:FEED?</code>
<b>Couplings</b>	The <code>[ :SENSe ] :FEED RF</code> command turns the calibrator OFF
<b>Preset</b>	This setting is unaffected by a Preset or power cycle. It survives a Mode Preset and mode changes. It is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	<code>[ :SENSe ] :FEED AREFERENCE</code> In the PSA the calibrator was one of the inputs and selected using the AREF parameter to the same <code>:FEED</code> command that switched the inputs. In the X-Series it is controlled in a separate menu and overrides the input selection. For code compatibility the <code>[ :SENSe ] :FEED AREFERENCE</code> command is provided, and is aliased to <code>[ :SENSe ] :FEED :AREF REF50</code> , which causes the input to be switched to the 50 MHz calibrator. The <code>[ :SENSe ] :FEED RF</code> command switches the input back to the RF port and turns the calibrator OFF, thus providing full compatibility with the PSA calibrator function. Note that after sending this, the query <code>[ :SENSe ] :FEED?</code> will NOT return "AREF" but instead the currently selected input.
<b>Backwards Compatibility SCPI</b>	<code>[ :SENSe ] :FEED IQ   IONLy   QONLy</code> <code>[ :SENSe ] :FEED?</code> The parameters <code>IQ   IONLy   QONLy</code> are supported for backwards compatibility with the E44406A. <code>[ :SENSe ] :FEED IQ</code> aliases to <code>[ :SENSe ] :FEED :IQ :TYPE IQ</code> <code>[ :SENSe ] :FEED IONLy</code> aliases to <code>[ :SENSe ] :FEED :IQ :TYPE IONLy</code>

	<p>[;SENSe]:FEED QONLy aliases to [;SENSe]:FEED:IQ:TYPE QONLy</p> <p>The query [;SENSe]:FEED? will always returns AIQ whatever the type of legacy parameters IQ   IONLy   QONLy has been used.</p>
Backwards Compatibility Notes	<p>Most of the settings in the X-Series Input/Output system, including External Gain, Amplitude Corrections settings and data, etc., are shared by all modes and are not changed by a mode switch. Furthermore, most variables in the Input/Output system key are not affected by Mode Preset. Both of these behaviors represent a departure from legacy behavior.</p> <p>In the X-Series. Input/Output settings are reset by using the "Restore Input/Output Defaults" function. They can also be reset to their default values through the System-&gt;Restore System Defaults-&gt; In/Out Config key or through the System -&gt;Restore System Defaults -&gt; All key (and corresponding SCPI).</p> <p>While this matches most use cases better, it does create some code compatibility issues. For example, Amplitude Corrections are no longer turned off by a Mode Preset, but instead by using the "Restore Input/Output Defaults" key/SCPI.</p> <p>Although Input/Output settings are not part of each Mode's State, they are saved in the Save State files, so that all of the instrument settings can be recalled with Recall State, as in legacy instruments.</p>
Initial S/W Revision	Prior to A.02.00
<b>Remote Command</b>	<p>:INPut:MIXer EXTernal INTernal</p> <p>:INPut:MIXer?</p>
<b>Example</b>	<p>INP:MIX INT</p> <p>INP:MIX?</p>
Notes	<p>In legacy analyzers you choose between the Internal mixer or an External Mixer. In the X-Series, the External Mixer is one of the choices for the Input and is selected using the FEED command (:SENSe:FEED EXTMIxer).</p> <p>For compatibility, the INPut:MIXer EXTernal INTernal legacy command is mapped as follows:</p> <ol style="list-style-type: none"> <li>1. When INPut:MIXer EXTernal is received, SENSe:FEED EMIXer is executed.</li> <li>2. When INPut:MIXer INTernal is received, SENSe:FEED RF is executed.</li> <li>3. When INPut:MIXer? is received, the response will be INT if any input other than the external mixer is selected and EXT if the external mixer is selected</li> </ol>
Preset	INT
Backwards Compatibility Notes	<p>PSA supports the following SCPI Command :</p> <p>:INPut:MIXer:TYPE PRESelected UNPReselect</p> <p>:INPut:MIXer:TYPE?</p> <p>PXA does not support the :INPut:MIXer:TYPE command.</p>
Initial S/W Revision	A.08.01

## Input/Output variables - Preset behavior

Virtually all the input/output settings are NOT a part of mode preset. They can be set to their default value

by one of the three ways:

- by using the Restore Input/Output Defaults key on the first page of the input/output menu,
- by using the System->Restore System Defaults->Input/Output Settings or,
- by using the System -> Restore System Defaults->All. Also, they survive a Preset and a Power cycle.

A very few of the Input/Output settings do respond to a Mode Preset; for example, if the Calibrator is on it turns off on a Preset, and if DC coupling is in effect it switches to AC on a Preset. These exceptions are made in the interest of reliability and usability, which overrides the need for absolute consistency. Exceptions are noted in the SCPI table for the excepted functions.

## RF Input

Selects the front-panel RF input port to be the analyzer signal input. If RF is already selected, pressing this key accesses the RF input setup functions.

<b>Key Path</b>	<b>Input/Output</b>
<b>Example</b>	[:SENSe]:FEED RF
<b>Couplings</b>	The act of connecting the U7227A USB Preamplifier to one of the analyzer's USB ports will cause the Input to automatically switch to the RF Input. If the RF Calibrator is on, it is turned off. Subsequently disconnecting the USB Preamp from USB does not change the Input selection nor restore the previous selection.
<b>Readback</b>	The RF input port, RF coupling, and current input impedance settings appear on this key as: "XX, YY, ZZ" where XX is RF, RF2, RFIO1, RFIO2, depending on what input is selected (only appears on analyzers with multiple RF inputs) YY is AC or DC ZZ is 50Ω or 75Ω
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	A.14.00

## Input Z Correction

Sets the input impedance for unit conversions. This affects the results when the y-axis unit is voltage or current units (dBmV, dBμV, dBμA, V, A), but not when it is power units (dBm, W). The impedance you select is for computational purposes only, since the actual impedance is set by internal hardware to 50 ohms. Setting the computational input impedance to 75 ohms is useful when using a 75 ohm to 50 ohm adapter to measure a 75 ohm device on an analyzer with a 50 ohm input impedance.

There are a variety of ways to make 50 to 75 ohm transitions, such as impedance transformers or minimum loss pads. The choice of the solution that is best for your measurement situation requires balancing the amount of loss that you can tolerate with the amount of measurement frequency range that you need. If you are using one of these pads/adaptors with the Input Z Corr function, you might also want to use the Ext Gain key. This function is used to set a correction value to compensate for the gain (loss) through your pad. This correction factor is applied to the displayed measurement values.

Key Path	Input/Output, RF Input
Remote Command	[ :SENSe ] :CORRection:IMPedance [ :INPut ] [ :MAGNitude ] 50   75 [ :SENSe ] :CORRection:IMPedance [ :INPut ] [ :MAGNitude ] ?
Example	CORR:IMP 75 sets the input impedance correction to 75 ohms. CORR:IMP?
Preset	This is unaffected by a Preset but is set to 50 ohms on a "Restore Input/Output Defaults" or "Restore System Defaults->All" Some instruments/options may have 75 ohms available.
State Saved	Saved in instrument state
Readback	50 $\Omega$ or 75 $\Omega$ . Current setting reads back to the RF key.
Initial S/W Revision	Prior to A.02.00

## RF Input Port

Specifies the RF input port used. The RF Input Port key only appears on units with multiple inputs, and lets you switch between the two inputs.

Switching from the RF input port to one of the RFIO ports, on units that have them, changes the receiver performance of the instrument.

Key Path	Input/Output, RF Input
Remote Command	[ :SENSe ] :FEED:RF:PORT [ :INPut ] RFIN   RFIN2   RFIO1   RFIO2   RFIO3   RFIO4 [ :SENSe ] :FEED:RF:PORT [ :INPut ] ?
Example	:FEED:RF:PORT RFIN
Dependencies	This key only appears in models that support multiple inputs. If the SCPI command is sent with unsupported parameters in any other model, an error is generated, -221.1900, "Settings conflict;option not installed" When any input is selected in a measurement that does not support it, the "No result; Meas invalid with this input" error condition occurs, and the measurement returns invalid data when queried.
Preset	This is unaffected by Mode Preset but is set to RF on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved	Saved in instrument state
Readback	The current RF Input Port selected is read back to this key
Backwards Compatibility SCPI	INPut<1 2>:TYPE INPUT1   INPUT2 INPut<1 2>:TYPE? Included for R&S ESU compatibility. In the MXE, the INPUT1 parameter is aliased to RFIN and the INPUT2 parameter is aliased to RFIN2
Initial S/W Revision	A.05.01
Modified at S/W Revision	A.14.00

## RF Input

Specifies using the main RF port for the current measurement

Key Path	Input/Output, RF Input, RF Input Port
Example	:FEED:RF:PORT RFIN
Notes	On E6640A with hardware M9430A, if RF Input is selected as RF Input Port, you need to choose the settings in the Half Duplex Config menu to determine which port (RFIO3 or RFIO4) will be used. On E6640A with hardware M9431A, this setting is not supported. If the SCPI command is sent with this setting, an error is generated, -221, "Settings conflict;option not installed"
ReadBack	RF Input
Initial S/W Revision	A.05.01
Modified at S/W Revision	A.14.00

## RFIO1

Specifies using the RFIO 1 port for the current measurement

Key Path	Input/Output, RF Input, RF Input Port
Example	:FEED:RF:PORT RFIO1
Dependencies	RFIO1 is not available inE6607C. If Multiport Adapter is ON, Select RF Input to RFIO1, an error message is generated: "-221, Settings conflict; RFIO1 or RFIO2 Port unavailable when Multiport Adapter is ON".
ReadBack	RFIO 1
Initial S/W Revision	A.05.01

## RFIO2

Specifies using the RFIO 2 port for the current measurement

Key Path	Input/Output, RF Input, RF Input Port
Example	:FEED:RF:PORT RFIO2
Dependencies	RFIO2 is not available inE6607C. If Multiport Adapter is ON, Select RF Input to RFIO2, an error message is generated: "-221, Settings conflict; RFIO1 or RFIO2 Port unavailable when Multiport Adapter is ON".
ReadBack	RFIO 2
Initial S/W Revision	A.05.01



## External Gain

Compensates for gain or loss in the measurement system outside the spectrum analyzer. The External Gain is subtracted from the amplitude readout (or the loss is added to the amplitude readout). So, the displayed signal level represents the signal level at the output of the device-under-test, which can be the input of an external device that provides gain or loss.

Entering an External Gain value does not affect the Reference Level, therefore the trace position on screen changes, as do all of the values represented by the trace data. Thus, the values of exported trace data, queried trace data, marker amplitudes, trace data used in calculations such as N dB points, trace math, peak threshold, etc., are all affected by External Gain. Changing the External Gain, even on a trace that is not updating, will immediately change all of the above, without new data needing to be taken.

### NOTE

Changing the External Gain causes the analyzer to immediately stop the current sweep and prepare to begin a new sweep. The data will not change until the trace data updates because the offset is applied to the data as it is taken. If a trace is exported with a nonzero External Gain, the exported data will contain the trace data with the offset applied.

In the Spectrum Analyzer mode, a Preamp is the common external device providing gain or loss. In a measurement application mode like GSM or W-CDMA, the gain or loss could be from a BTS (Base Transceiver Station) or an MS (Mobile Station). So in the Spectrum Analyzer mode MS and BTS would be grayed out and the only choice would be Ext Preamp. Similarly in some of the digital communications applications, Ext Preamp will be grayed out and you would have a choice of MS or BTS.

Key Path	Input/Output
Couplings	The Ext Preamp, MS, and BS keys may be grayed out depending on which measurement is currently selected. If any of the grayed out keys are pressed, or the equivalent SCPI command is sent, an advisory message is generated.
Readback	1-of-N selection   [variable]
Initial S/W Revision	Prior to A.02.00

## Ext Preamp

This function is similar to the reference level offset function. Both affect the displayed signal level. Ref Lvl Offset is a mathematical offset only, no analyzer configuration is affected. Ext Preamp gain is used when determining the auto-coupled value of the Attenuator. The External Gain value and the Maximum Mixer Level settings are both part of the automatic setting equation for the RF attenuation setting. (10 dB of Attenuation is added for every 10 dB of External Gain.)

Note that the Ref Lvl Offset and Maximum Mixer Level are described in the Amplitude section. They are reset by the instrument Preset. The External Preamp Gain is reset by the "Restore Input/Output Defaults" or "Restore System Defaults->All functions. . The External Gain is subtracted from the amplitude readout so that the displayed signal level represents the signal level at the output of the device-under-test, which is the input of the external device that is providing gain or loss.

["More Information" on page 154](#)

Key Path	Input/Output, External Gain
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<b>Remote Command</b>	<code>[ :SENSe ] :CORRection:SA[:RF]:GAIN &lt;rel_ampl&gt;</code> <code>[ :SENSe ] :CORRection:SA[:RF]:GAIN?</code>
<b>Example</b>	CORR:SA:GAIN 10 sets the Ext Gain value to 10 dB CORR:SA:GAIN -10 sets the Ext Gain value to -10 dB (that is, an attenuation of 10 dB)
<b>Notes</b>	Does not auto return.
<b>Dependencies</b>	The reference level limits are determined in part by the External Gain/Atten, Max Mixer Level, and RF Atten. This key is grayed out in Modes that do not support External Gain
<b>Preset</b>	This is unaffected by Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
<b>State Saved</b>	Saved in instrument state
<b>Min</b>	-120 dB
<b>Max</b>	120 dB
<b>Readback</b>	Preamp Gain, <Ext Gain value> dB
<b>Backwards Compatibility SCPI</b>	<code>[ :SENSe ] :CORRection:OFFSet[:MAGNitude]</code> The legacy "Ext Preamp Gain" key is now called "Ext Gain" and the sub-menu has choices of Ext Preamp   MS   BTS for backwards compatibility.
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	A.14.00

## More Information

The U7227A USB Preamplifier is an accessory for the X-Series Signal Analyzer that provides gain externally, and whose gain settings are automatically loaded into the analyzer over USB whenever it is connected to one of the analyzer's USB ports.

While the USB Preamplifier is plugged into one of the analyzer's USB ports, the analyzer will consider it to be in the signal path of the RF Input and will apply the calibration data from the USB Preamp to measurements taken at the RF Input (on 2 input boxes, it will be considered to be in the signal path of RF Input 1; it is not supported for RF Input 2).

The USB Preamplifier contains its own cal data. This includes a noise trace suitable for use with NFE, for those models which support NFE. The act of connecting the Preamp to USB will cause the cal data to be downloaded from the preamp. When this happens an informational message is provided saying "Cal data loaded from USB Preamp". The analyzer will then automatically apply the calibration factors loaded from the Preamp in any measurement that supports the USB Preamp.

The External Preamp Gain setting may still be used, even though it is not required for the USB Preamp (since the USB Preamp supplies its own gain data to the analyzer which is applied automatically). Connecting the USB Preamp does not change the External Preamp Gain setting, however unless you have another gain or attenuation element in the signal path, the appropriate setting for External Preamp Gain is 0 dB.

Overload detection and reporting will apply when the USB preamplifier is connected to USB. The USB Preamplifier has its own overload detector which reports overloads to the instrument over USB. This generates an error condition, "Input Overload;USB Preamp."

If, while the USB Preamp is connected to USB, a measurement is selected that does not support the USB preamplifier, the "No result; Meas invalid with Preamp" error condition is generated.

## MS

Sets an external gain/attenuation value for MS (Mobile Station) tests.

Key Path	Input/Output, External Gain
<b>Remote Command</b>	<code>[ :SENSe ] :CORRection:MS[:RF]:GAIN &lt;rel_ampl&gt;</code> <code>[ :SENSe ] :CORRection:MS[:RF]:GAIN?</code>
<b>Example</b>	CORR:MS:GAIN 10 sets the Ext Gain value to 10 dB CORR:MS:GAIN -10 sets the Ext Gain value to -10 dB (that is, a loss of 10 dB.)
Notes	Does not auto return.
Dependencies	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten This key is grayed out in modes that do not support MS.
Preset	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	-100 dB
Max	100 dB
Readback	MS, <Ext Gain value> dB
Initial S/W Revision	Prior to A.02.00

<b>Remote Command</b>	<code>[ :SENSe ] :CORRection:MS[:RF]:LOSS &lt;rel_ampl&gt;</code> <code>[ :SENSe ] :CORRection:MS[:RF]:LOSS?</code>
<b>Example</b>	CORR:MS:LOSS 10 sets the Ext Gain value to -10 dB, and subsequently querying :LOSS will give 10 dB CORR:MS:LOSS -10 sets the Ext Gain value to 10 dB, and subsequently querying :LOSS will give -10 dB
Notes	A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. Anytime :LOSS is set it sets :GAIN to the negative value of the parameter sent. Anytime :LOSS is queried it gives the negative of :GAIN
Preset	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min	100 dB
Max	-100 dB
Initial S/W Revision	Prior to A.02.00

## BTS

Sets an external attenuation value for BTS (Base Transceiver Station) tests.

Key Path	Input/Output, External Gain
Remote Command	<code>[ :SENSe]:CORRection:BTS[:RF]:GAIN &lt;rel_ampl&gt;</code> <code>[ :SENSe]:CORRection:BTS[:RF]:GAIN?</code>
Example	<code>CORR:BTS:GAIN 10</code> sets the Ext Gain value to 10 dB <code>CORR:BTS:GAIN -10</code> sets the Ext Gain value to -10 dB (that is, a loss of 10 dB.)
Notes	Does not auto return.
Dependencies	The reference level limits are determined in part by the External Gain, Max Mixer Level, RF Atten This key is grayed out in modes that do not support BTS.
Preset	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state.
Min	-100 dB
Max	100 dB
Readback	BTS, <Ext Gain value> dB
Initial S/W Revision	Prior to A.02.00

Remote Command	<code>[ :SENSe]:CORRection:BTS[:RF]:LOSS &lt;rel_ampl&gt;</code> <code>[ :SENSe]:CORRection:BTS[:RF]:LOSS?</code>
Example	<code>CORR:BTS:LOSS 10</code> sets the Ext Gain value to -10 dB, and subsequently querying :LOSS will give 10 dB <code>CORR:BTS:LOSS -10</code> sets the Ext Gain value to 10 dB, and subsequently querying :LOSS will give -10 dB
Notes	A positive value of <rel_ampl> in the above command means a loss and a negative value indicates a gain. Anytime :LOSS is set it sets :GAIN to the negative value of the parameter sent. Anytime :LOSS is queried it gives the negative of :GAIN
Preset	This is unaffected by a Preset but is set to 0 dB on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min	100 dB
Max	-100 dB
Initial S/W Revision	Prior to A.02.00

## Restore Input/Output Defaults

This selection causes the group of settings and data associated with the Input/Output key to be a reset to their default values. In addition, when a Source is installed, licensed and selected, Restore Input/Output defaults will initiate a Source Preset.

This level of Restore System Defaults does not affect any other system settings or mode settings and does not cause a mode switch. All the features described in this section are reset using this key, including Input Corrections and Data (described in the Corrections section).

Key Path	Input/Output
<b>Example</b>	:SYST:DEF INP presets all the Input/Output variables to their factory default values.
Notes	Refer to the Utility Functions for information about Restore System Defaults and the complete description of the :SYSTem:DEFAult INPut: command.
Initial S/W Revision	Prior to A.02.00

## Freq Ref In

Specifies the frequency reference as being the internal reference at the rear panel input labeled EXT REF IN, a 1 pulse per second signal at the EXT REF IN input,, external reference or sensing the presence of a signal at the EXT REF IN input.

When the frequency reference is set to internal, the internal 10 MHz reference is used even if an external reference is connected.

When the frequency reference is set to external, the instrument will use the external reference. However, if there is no external signal present, or it is not within the proper amplitude range, a condition error message is generated. When the external signal becomes valid, the error is cleared.

When the frequency reference is set to Pulse, the instrument expects a 1 pulse per second signal at the EXT REF IN input. The instrument uses this signal to adjust the frequency of the internal reference.

If Sense is selected, the instrument checks whether a signal is present at the external reference connector. If it senses a signal within 5 ppm of the External Ref Freq (as set on the External Ref Freq softkey), it will automatically switch to the external reference. If it senses a 1 pulse per second signal, it enters Pulse mode, wherein the signal is used to adjust the internal reference. When no signal is present, it automatically switches to the internal reference. No message is generated as the reference switches between pulse, external and internal. The monitoring of the external reference occurs approximately on 1 millisecond intervals, and never occurs in the middle of a measurement acquisition, only at the end of the measurement (end of the request).

If for any reason the instrument's frequency reference is not able to obtain lock, Status bit 1 in the Questionable Frequency register will be true and a condition error message is generated. When lock is regained, Status bit 1 in the Questionable Frequency register will be cleared and the condition error will be cleared.

If an external frequency reference is being used, you must enter the frequency of the external reference if it is not exactly 10 MHz. The External Ref Freq key is provided for this purpose.

NOTE:

A common frequency reference module serves all instrument instances, but only one instance of the software application can change the reference input type (INT or EXT or SENSE). The software application allowed to change the reference input is called the controlling instance; by default, the left most instrument instance is the controlling instance. This can be changed in the config file "E66XXModules.config" located under the folder E:\Agilent\Instrument. For the non-controlling instance (s) the reference input types (in SCPI commands, and in the Virtual Front Panel menus ) are blanked and unavailable for use.

Key Path	Input/Output
<b>Remote Command</b>	<code>[ :SENSe ] :ROSCillator :SOURce :TYPE INTernal   EXTernal   SENSe   PULSe</code> <code>[ :SENSe ] :ROSCillator :SOURce :TYPE ?</code>
Dependencies	The PULSe parameter, and support of the 1 pps signal at the EXT REF IN input, are not available in firmware prior to A.13.00. They are also not available in some model numbers. If not available, the Pulse key will be blank, and sending the PULSe parameter via SCPI will generate an error:
Preset	This is unaffected by a Preset but is set to SENSe on a "Restore Input/Output Defaults" or "Restore System Defaults->All".
State Saved	Saved in instrument state.
Status Bits/OPC dependencies	STATus:QUEStionable:FREQuency bit 1 set if unlocked. Note: The status bit is not set for non-controlling instances. To determine if the frequency reference is unlocked, the controlling instance must be queried.
Backwards Compatibility Notes	Freq Ref In was not saved in state in the legacy instruments. It is a part of state in the X-Series.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

<b>Remote Command</b>	<code>[ :SENSe ] :ROSCillator :SOURce ?</code>
Notes	The query <code>[SENSe]:ROSCillator:SOURce?</code> returns the current switch setting. This means: <ol style="list-style-type: none"> <li>1. If it was set to SENSe but there is no external reference nor 1 pps signal so the instrument is actually using the internal reference, then this query returns INTernal and not SENSe.</li> <li>2. If it was set to SENSe and there is an external reference present, the query returns EXTernal and not SENSe.</li> <li>3. If it was set to SENSe and there is a 1 pps signal present, the query returns PULSe and not SENSe.</li> <li>4. If it was set to EXTernal, then the query returns "EXTernal"</li> <li>5. If it was set to INTernal, then the query returns "INTernal".</li> <li>6. If it was set to PULSe, then the query returns "PULSe"</li> </ol> Note: The SCPI query always returns "INTernal" for non-controlling instances.
Preset	SENSe
Backwards Compatibility Notes	The query <code>[ :SENSe ] :ROSCillator :SOURce ?</code> was a query-only command in ESA which always returned whichever reference the instrument was using. The instrument automatically switched to the ext ref if it was present. In PSA (which had no sensing) the command <code>[ :SENSe ] :ROSCillator :SOURce</code> set the reference (INT or EXT), so again its query returned the actual routing. Thus the query form of this command is 100% backwards compatible with both instruments.
Initial S/W Revision	Prior to A.02.00

<b>Remote Command</b>	<code>[:SENSe]:ROSCillator:SOURce INTernal EXTernal</code>
Notes	For PSA compatibility the command form is provided and is directly mapped to <code>[:SENSe]:ROSCillator:SOURce:TYPE</code> Note: The SCPI command does nothing for non-controlling instances.
Initial S/W Revision	Prior to A.02.00

## Sense

If Sense is selected, the instrument checks whether a signal is present at the external reference connector. If it senses a signal within 5 ppm of the External Ref Freq (as set on the External Ref Freq softkey), it will use this signal as an External Reference. If it senses a 1 pulse per second signal, it will use this signal to adjust the internal reference by adjusting the User setting of the Timebase DAC. When no signal is present, it automatically switches to the internal reference.

Key Path	Input/Output, Freq Ref In
<b>Example</b>	<code>:ROSC:SOUR:TYPE SENS</code>
Couplings	If set to SENSE and the analyzer senses a 1 pulse per second signal, it sets the System, Alignments, Timebase DAC setting to "User". This setting survives Preset and Power Cycle but is set to "Calibrated" on a System, Restore Defaults, Align or a System, Restore Defaults, All
Readback	Sense
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

## Internal

The internal reference is used. A 1 pps signal at the EXT REF IN port, or a signal there between 1 and 50 MHz, will cause a warning triangle to appear in the settings panel next to the word "INTERNAL", but will otherwise be ignored.

Key Path	Input/Output, Freq Ref In
<b>Example</b>	<code>:ROSC:SOUR:TYPE INT</code>
Readback	Internal
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

## External

The external reference is used.

Key Path	Input/Output, Freq Ref In
<b>Example</b>	:ROSC:SOUR:TYPE EXT
Readback	External
Initial S/W Revision	Prior to A.02.00

## Ext Ref Freq

This key tells the analyzer the frequency of the external reference. When the external reference is in use (either because the reference has been switched to External or because the Reference has been switched to Sense and there is a valid external reference present) this information is used by the analyzer to determine the internal settings needed to lock to that particular external reference signal.

For the instrument to stay locked, the value entered must be within 5 ppm of the actual external reference frequency. So it is important to get it close, or you risk an unlock condition.

Note that this value only affects the instrument's ability to lock. It does not affect any calculations or measurement results. See "Freq Offset" in the Frequency section for information on how to offset frequency values.

Key Path	Input/Output, Freq Ref In
<b>Remote Command</b>	[ :SENSe ] :ROSCillator:EXTernal:FREQuency <freq> [ :SENSe ] :ROSCillator:EXTernal:FREQuency?
<b>Example</b>	ROSC:EXT:FREQ 20 MHz sets the external reference frequency to 20 MHz, but does not select the external reference. ROSC:SOUR:TYPE EXT selects the external reference.
Dependencies	Still available with Internal or Pulse selected, to allow setup for when External is in use. However, the setting has no effect if the Internal Reference is in use (Freq Ref In set to Internal, Pulse, or SENSE:INT or SENSE:PULSE).
Preset	This is unaffected by a Preset but is set to 10 MHz on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
Min	1 MHz
Max	50 MHz
Default Unit	Hz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00



## RF Output & Test Set Config

The RF Output & Test Set Config key allows you to set the RF Output Port and multiport adapter unit which is connected to the instrument by USB for download of calibration data and additional control.

This menu also allows you to set Trigger Config which is used to set the input/output type of the 4 Bi-directional Trigger ports.

Key Path	Input/Output
Preset	All settings under this key are returned to their default state when Restore Input/Output Defaults is pressed.
State Saved	Saved in State
Initial S/W Revision	A.09.49

## RF Output

Specifies the RF Output Port used.

Switching from the RF Output port to one of the RFIO ports changes the transmitter performance of the instrument.

Key Path	Input/Output, RF Output & Test Set Config
<b>Remote Command</b>	[ :SENSe ] :FEED:RF:PORT:OUTPut RFOut   RFIO1   RFIO2   GPSout   GNSSout   RFIO3   RFIO4  [ :SENSe ] :FEED:RF:PORT:OUTPut?
Example	:FEED:RF:PORT:OUTP RFIO1
Preset	This is unaffected by Mode Preset but is set to RFOut on a "Restore Input/Output Defaults" or "Restore System Defaults -> All"
State Saved	Saved in State
Readback	The current RF Output Port selected is read back to this key
Initial S/W Revision	A.05.01
Modified at S/W Revision	A.14.00

## RF Output

The RF port that will be used for the current output.

Key Path	Input/Output, RF Output & Test Set Config, RF Output
Example	:FEED:RF:PORT:OUTP RFO
Notes	On E6640A with hardware M9430A, if RF Output is selected as RF Output Port, you need to choose the settings in the Half Duplex Config menu to determine which port (RFIO3 or RFIO4) will be used. On E6640A with hardware M9431A, this setting is not supported. If the SCPI command is sent with this setting, an error is generated, -221, "Settings conflict;option not installed"

ReadBack	RF Output
Initial S/W Revision	A.05.01
Modified at S/W Revision	A.14.00

## RFIO1

The RF port that will be used for the current output

Key Path	Input/Output, RF Output & Test Set Config, RF Output
Example	:FEED:RF:PORT:OUTP RFIO1
Dependencies	Not available in E6607C.
ReadBack	RFIO1
Initial S/W Revision	A.05.01

## RFIO2

The RF port that will be used for the current output

Key Path	Input/Output, RF Output & Test Set Config, RF Output
Example	:FEED:RF:PORT:OUTP RFIO2
Dependencies	Not available in E6607C.
ReadBack	RFIO2
Initial S/W Revision	A.05.01

## HalfDuplex Config

The HalfDuplex Config key allows you to set "RF Input" of RF Input Port menu and "RF Output" of RF Output Port menu, which will correspond to RFIO3 and RFIO4.

Key Path	Input/Output, RF Output & Test Set Config
Dependencies	This menu is available on E6640A with hardware M9430A. It's not available on E6640A with hardware M9431A.
State Saved	Saved in State
Initial S/W Revision	A.14.00

## RF Input

Specify the RF Input port from RFIO3 and RFIO4.

Key Path	Input/Output, RF Output & Test Set Config, HalfDuplex Config
<b>Remote Command</b>	[ :SENSe ] :HDUPlex:PORT:INPut RFIO3 RFIO4
<b>Example</b>	:HDUPlex:PORT:INPut RFIO3 :HDUPlex:PORT:INPut?
Dependencies	If RFIO3 is selected as “RF Output”, then “RF Input” will be set to RFIO4 automatically. And if RFIO4 is selected as “RF Output”, “RF Input” will be set to RFIO3 automatically.
Preset	RFIO3
State Saved	Saved in State
Initial S/W Revision	A.14.00

## RF Output

Specify the RF Output port from RFIO3 and RFIO4.

Key Path	Input/Output, RF Output & Test Set Config, HalfDuplex Config
<b>Remote Command</b>	[ :SENSe ] :HDUPlex:PORT:OUTPut RFIO3 RFIO4
<b>Example</b>	:HDUPlex:PORT:OUTPut RFIO3 :HDUPlex:PORT:OUTPut?
Dependencies	If RFIO3 is selected as “RF Input”, then “RF Output” will be set to RFIO4 automatically. And if RFIO4 is selected as “RF Input”, “RF Output” will be set to RFIO3 automatically.
Preset	RFIO4
State Saved	Saved in State
Initial S/W Revision	A.14.00

## Output Config

Accesses keys that configure various output settings, like the frequency reference output, trigger output and analog output.

Key Path	Input/Output
Backwards Compatibility Notes	In ESA there was not a user interface to enable the Video Output (Analog Output), Trigger Output, or Gate Output. In the X-Series each of these physical connectors requires configuration, thus the user interface has been added for X-Series, along with the potential for an output you think is always on to be switched off.
Initial S/W Revision	Prior to A.02.00

## Trig Out

Select the type of output signal that will be output from the Trig 1 Out, or Trig 2 Out connectors.

<b>Key Path</b>	Input/Output, Output Config
<b>Remote Command</b>	:TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut HSWP   MEASuring   MAIN   GATE   GTRigger   OEVen   SPOint   SSweep   SSETtled   S1Marker   S2Marker   S3Marker   S4Marker   OFF  :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut?
<b>Example</b>	TRIG:OUTP HSWP TRIG2:OUTP GATE
<b>Dependencies</b>	The second Trigger output (Trig 2 Out) does not appear in all models; in models that do not support it, the Trig 2 Out key is blanked, and sending the SCPI command for this output generates an error, "Hardware missing; Not available for this model number" In models that do not support the Trigger 2 output, this error is returned if trying to set Trig 2 Out and a query of Trig 2 Out returns OFF.
<b>Preset</b>	Trigger 1: Sweeping (HSWP) Trigger 2: Gate This is unaffected by a Preset but is preset to the above values on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
<b>State Saved</b>	Saved in instrument state
<b>Initial S/W Revision</b>	Prior to A.02.00

## Polarity

Sets the output to the Trig 1 Out, or Trig 2 Out, connector to trigger on either the positive or negative polarity.

<b>Key Path</b>	Input/Output, Output Config, Trig 1/2 Output
<b>Remote Command</b>	:TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut:POLarity POSitive   NEGative  :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut:POLarity?
<b>Example</b>	TRIG1:OUTP:POL POS
<b>Preset</b>	This is unaffected by a Preset but is set to POSitive on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
<b>State Saved</b>	Saved in instrument state
<b>Initial S/W Revision</b>	Prior to A.02.00

## Off

Selects no signal to be output to the Trig 1 Out, or Trig 2 Out, connector.

<b>Key Path</b>	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	TRIG1:OUTP OFF

Readback	Off
Initial S/W Revision	Prior to A.02.00

### Sweeping (HSWP)

Selects the Sweeping Trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector when a measurement is made. This signal has historically been known as "HSWP" (High = Sweeping), and is 5 V TTL level with 50 ohm output impedance.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	TRIG1:OUTP HSWP
Readback	Sweeping
Initial S/W Revision	Prior to A.02.00

### Measuring

Selects the Measuring trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector. This signal is true while the Measuring status bit is true.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	TRIG1:OUTP MEAS
Readback	Measuring
Initial S/W Revision	Prior to A.02.00

### Main Trigger

Selects the current instrument trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	TRIG1:OUTP MAIN
Readback	Main Trigger
Initial S/W Revision	Prior to A.02.00

### Gate Trigger

Selects the gate trigger signal to be output to the Trig 1 Out, or Trig 2 Out, connector. This is the source of the gate timing, not the actual gate signal.

Key Path	Input/Output, Output Config, Trig 1/2 Output
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<b>Example</b>	TRIG1:OUTP GTR
Readback	Gate Trigger
Initial S/W Revision	Prior to A.02.00

### Gate

Selects the gate signal to be output to the Trig 1 Out, or Trig 2 Out, connector. The gate signal has been delayed and its length determined by delay and length settings. When the polarity is positive, a high on the Trig 1 Out, or Trig 2 Out, represents the time the gate is configured to pass the signal.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	TRIG1:OUTP GATE
Readback	Gate
Initial S/W Revision	Prior to A.02.00

### Odd/Even Trace Point

Selects either the odd or even trace points as the signal to be output to the Trig 1 Out, or Trig 2 Out, connector when performing swept spectrum analysis. When the polarity is positive, this output goes high during the time the analyzer is sweeping past the first point (Point 0) and every other following trace point. The opposite is true if the polarity is negative.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	TRIG1:OUTP OEV
Readback	Odd/Even
Initial S/W Revision	Prior to A.02.00

### Trig Out

Select the type of output signal that will be output from the Trig 1 Out, or Trig 2 Out connectors.

Key Path	Input/Output, Output Config
<b>Remote Command</b>	:TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut HSWP   MEASuring   MAIN   GATE   GTRigger   OEVEN   SPOINT   SSweep   SSETtled   S1Marker   S2Marker   S3Marker   S4Marker   OFF  :TRIGger TRIGger1 TRIGger2[:SEquence]:OUTPut?
<b>Example</b>	TRIG:OUTP HSWP TRIG2:OUTP GATE
Dependencies	The second Trigger output (Trig 2 Out) does not appear in all models; in models that do not support it, the Trig 2 Out key is blanked, and sending the SCPI command for this output generates an error, "Hardware missing; Not available for this model number" In models that do not support the Trigger

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2 output, this error is returned if trying to set Trig 2 Out and a query of Trig 2 Out returns OFF.

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Preset	Trigger 1: Sweeping (HSWP) Trigger 2: Gate This is unaffected by a Preset but is preset to the above values on a "Restore Input/Output Defaults" or "Restore System Defaults->All"
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## Off

Selects no signal to be output to the Trig 1 Out, or Trig 2 Out, connector.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	TRIG1:OUTP OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

## Source Marker 1

Trigger output at marker 1 in current playing Waveform file.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	:TRIG1:OUTP S1M
ReadBack	Marker 1
Initial S/W Revision	A.05.01

## Source Marker 2

Trigger output at marker 2 in current playing Waveform file.

Key Path	Input/Output, Output Config, Trig 1/2 Output
<b>Example</b>	:TRIG1:OUTP S2M
ReadBack	Marker 2
Initial S/W Revision	A.05.01

## Source Marker 3

Trigger output at marker 3 in current playing Waveform file.

Key Path	Input/Output, Output Config, Trig 1/2 Output
Example	:TRIG1:OUTP S3M
ReadBack	Marker 3
Initial S/W Revision	A.05.01

### Source Marker 4

Trigger output at marker 4 in current playing Waveform file.

Key Path	Input/Output, Output Config, Trig 1/2 Output
Example	:TRIG1:OUTP S4M
ReadBack	Marker 4
Initial S/W Revision	A.05.01

### Analog Out

This menu lets you control which signal is fed to the “Analog Out” connector on the analyzer rear panel.

See ["More Information" on page 168](#)

Key Path	Input/Output, Output Config
<b>Remote Command</b>	:OUTPut:ANALog OFF SVIDeo LOGVIdIo LINVIdIo DAUDIo :OUTPut:ANALog?
Example	OUTP:ANAL SVIDeo ! causes the analog output type to be Screen Video
Preset	This is unaffected by Preset but is set to DAUDIo on a "Restore Input/Output Defaults" or "Restore System Defaults->All
Preset	OFF
State Saved	Saved in Input/Output State
Readback line	1-of-N selection [variable]
Backwards Compatibility Notes	Prior to A.04.00, OFF was the default functionality except when in the Analog Demod application or with Tune and Listen, in which case it was DAUDIo, and there was no selection menu. So for backwards compatibility with earlier X-Series firmware versions, Auto (:OUTP:ANAL:AUTO ON) will duplicate the prior behavior.  The DNWB and SANalyzer parameters, which were legal in PSA but perform no function in the X-Series, are accepted without error.
Initial S/W Revision	A.04.00

### More Information

The table below gives the range for each output.



<b>Analog Out</b>	<b>Nominal Range exc. (10% overrange)</b>	<b>Scale Factor</b>	<b>Notes</b>
Off	0 V		
Screen Video	0 – 1 V open circuit	10%/division	8566 compatible
Log Video	0 – 1 V terminated	1/(192.66 dB/V)	dB referenced to mixer level, 1V out for –10 dBm at the mixer.
Linear Video	0 – 1 V terminated	100%/V	Linear referenced to Ref Level, 1 V out for RF envelope at the Ref Level.
Demod Audio	(varies with analyzer setting)		

### Auto

Selects the Auto state for the Analog Output menu. In this state, the Analog Output will automatically be set to the most sensible setting for the current mode or measurement.

If you make a selection manually from the Analog Out menu, this selection will remain in force until you change it (or re-select Auto), even if you go to a mode or measurement for which the selected output does not apply.

<b>Key Path</b>	Input/Output, Output Config, Analog Out
<b>Remote Command</b>	OUTPut:ANALog:AUTO OFF ON 0 1 OUTPut:ANALog:AUTO?
<b>Example</b>	OUTP:ANAL:AUTO ON
<b>Preset</b>	ON
<b>State Saved</b>	Saved in Input/Output State
<b>Initial S/W Revision</b>	A.04.00

### Off

Turns off the analog output.

<b>Key Path</b>	Input/Output, Output Config, Analog Out
<b>Example</b>	OUTP:ANAL OFF ! causes the analog output to be off
<b>Readback Text</b>	Off
<b>Initial S/W Revision</b>	A.04.00

## LISN Control

Enables you to access LISN related functions. LISN control is only available with option LSN indicating that the LISN IO board is installed. This is a remote query command only.

### V-network (Remote Command Only)

Enables you to select the V-network that is controlled via the AUX IO port.

<b>Remote Command</b>	INPut [1]   2:LISN[:TYPE] FOURphase ESH2Z5  ENV216   OFF INPut [1]   2:LISN[:TYPE] ?
<b>Example</b>	:INP:LISN FOUR
<b>Notes</b>	FOURPhase and ESH2-Z5 R&S ESH2-Z5 (four phases and protective earth are controllable) ENV216 R&S ENV216 (two phases and highpass are controllable) OFF Remote control deactivated This query will return :- FOUR when ESH2-Z5 is selected.
<b>Preset</b>	Set to off on a "Restore Input/Output Defaults"
<b>State Saved</b>	Saved in instrument state
<b>Initial S/W Revision</b>	A.14.50

### Phase (Remote Command Only)

This command enables you to select the phase of the V-network that is used, which is controlled via the AUX IO port. The permissible selection depends on the selected V-network.

<b>Remote Command</b>	INPut [1]   2:LISN:PHASe L1 L2 L3 N INPut [1]   2:LISN:PHASe ?
<b>Example</b>	:INP:LISN:PHAS L1
<b>Couplings</b>	L2, L3 keys are grayed out when ENV216 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a "-224, Illegal parameter value; must apply ESH2Z5 to make this phase available" warning.
<b>Preset</b>	Set to N on a "Restore Input/Output Defaults"
<b>State Saved</b>	Saved in instrument state
<b>Range</b>	Phase N Phase L1 Phase L2 Phase L3 Only one phase can be selected.
<b>Initial S/W Revision</b>	A.14.50

## 150 kHz Highpass (Remote Command Only)

Controls highpass setting on the V-network.

<b>Remote Command</b>	INPut [1]   2:LISN:FILTer:HPAS[:STATe] ON OFF INPut [1]   2:LISN:FILTer:HPAS[:STATe] ?
<b>Example</b>	:INP:LISN:FILT:HPAS ON
Dependencies	Only available for ENV216 V-network . This key is grayed out when a V-network that is not ENV216 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflicts; LISN function not available” warning.
Preset	Set to off on a "Restore Input/Output Defaults"
State Saved	Saved in instrument state
Range	ON OFF
Initial S/W Revision	A.14.50

## Protective Earth (Remote Command Only)

Enables you to set the Protective Earth setting that is controlled via the AUX IO port.

<b>Remote Command</b>	INPut [1]   2:LISN:PEARth GROunded FLOating INPut [1]   2:LISN:PEARth ?
<b>Example</b>	:INP:LISN:PEAR GRO
Dependencies	Only available for ESH2Z5. This key is grayed out when a v-network other than ESH2Z5 is selected. If the grayed out key is pressed, an advisory message is generated. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict; LISN function not available” warning.
Preset	Set to GRO on a "Restore Input/Output Defaults"
State Saved	Saved in instrument state
Range	GRO FLO
Initial S/W Revision	A.14.50



(Undefined variable: Primary.ProductName)  
GSM/EDGE Measurement Application Reference

## 5 Mode Functions

## Mode

The Mode key allows you to select the available measurement applications or “Modes”. Modes are a collection of measurement capabilities packaged together to provide an instrument personality that is specific to your measurement needs. Each application software product is ordered separately by Model Number and must be licensed to be available. Once an instrument mode is selected, only the commands that are valid for that mode can be executed.

**NOTE**

Key operation can be different between modes. The information displayed in Help is about the current mode.

To access Help for a different Mode you must first exit Help (by pressing the Cancel (Esc) key). Then select the desired mode and re-access Help.

For more information on Modes, preloading Modes, and memory requirements for Modes, see ["More Information" on page 175](#)

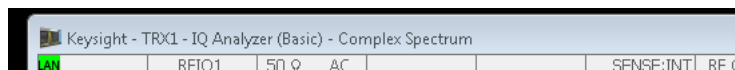
Key Path	Front-panel key
<b>Remote Command</b>	:INSTrument[:SElect] SA   RTSA   SEQAN   EMI   BASIC   WCDMA   EDGE GSM   WIMAX OFDMA   VSA   PNOISE   NFIGure   ADEMOD   BTooth   TDSCDMA   CDMA2K   CDMA1XEV   LTE   LTE TDD   LTE AFDD   LTE ATDD   MSR   DVB   DTMB   DCATV   ISDBT   CM MB   WLAN   CWLAN   CWIMAX OFDM   WIMAX FIXED   IDEN   RLC   SCPI LC   VSA89601  :INSTrument[:SElect]?
<b>Example</b>	:INST SA
<b>Notes</b>	The available parameters are dependent upon installed and licensed applications resident in the instrument. Parameters given here are an example, specific parameters are in the individual Application.  A list of the valid mode choices is returned with the INST:CAT? Query.
<b>Preset</b>	This is unaffected by a Preset but is set on a “Restore System Defaults->All” to: SEQAN
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	:INSTrument[:SElect] GSM provided for backwards compatibility. Mapped to EDGE GSM.
<b>Backwards Compatibility SCPI</b>	:INSTrument[:SElect] SANalyzer provided for ESU compatibility. When this command is received, the analyzer aliases it to the following: INST:SEL SCPI LC  This results in the analyzer being placed in SCPI Language Compatibility Mode, in order to emulate the ESU Spectrum Analyzer Mode.
<b>Backwards Compatibility SCPI</b>	:INSTrument[:SElect] RECeiver provided for ESU compatibility. When this command is received, the analyzer aliases it to the following: :INST:SEL EMI

	:CONF FSC
	This results in the analyzer being placed in the EMI Receiver Mode, running the Frequency Scan measurement, in order to emulate the ESU Receiver Mode.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.13.00

<b>Example</b>	:INST 'SA'
Notes	The query is not a quoted string. It is an enumeration as indicated in the Instrument Select table above.  The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.
<b>Backwards Compatibility SCPI</b>	:INSTrument[:SElect] 'SA'   'PNOISE'   'EDGE'   'GSM'   'BASIC'
Initial S/W Revision	Prior to A.02.00

## More Information

The Mode name appears on the banner after the word “Keysight” followed by the Measurement Title. For example, for the IQ Analyzer mode with the Complex Spectrum measurement running:



It is possible to specify the order in which the Modes appear in the Mode menu, using the Configure Applications utility (System, Power On, Configure Applications). It is also possible, using the same utility, to specify a subset of the available applications to load into memory at startup time, which can significantly decrease the startup time of the analyzer. During runtime, if an application that is not loaded into memory is selected (by either pressing that applications Mode key or sending that applications :INST:SEL command over SCPI), there will be a pause while the Application is loaded. During this pause a message box that says “Loading application, please wait...” is displayed.

Each application (Mode) that runs in the X-Series signal analyzers consumes virtual memory. The various applications consume varying amounts of virtual memory, and as more applications run, the memory consumption increases. Once an application is run, some of its memory remains allocated even when it is not running, and is not released until the analyzer program (xSA.exe) is shut down.

Keysight characterizes each Mode and assigns a memory usage quantity based on a conservative estimate. There is a limited amount of virtual memory available to applications (note that this is virtual memory and is independent of how much physical RAM is in the instrument). The instrument keeps track of how much memory is being used by all loaded applications – which includes those that preloaded at startup, and all of those that have been run since startup.

When you request a Mode that is not currently loaded, the instrument looks up the memory estimate for that Mode, and adds it to the residual total for all currently loaded Modes. If there is not enough virtual memory to load the Mode, a dialog box and menu will appear that gives you four options:

1. Close and restart the analyzer program without changing your configured preloads. This may free up enough memory to load the requested Mode, depending on your configured preloads
2. Clear out all preloads and close and restart the analyzer program with only the requested application preloaded, and with that application running. This choice is guaranteed to allow you to run the requested application; but you will lose your previously configured preloads. In addition, there may be little or no room for other applications, depending on the size of the requested application.
3. Bring up the Configure Applications utility in order to reconfigure the preloaded apps to make room for the applications you want to run (this will then require restarting the analyzer program with your new configuration). This is the recommended choice because it gives you full flexibility to select exactly what you want.
4. Exit the dialog box without doing anything, which means you will be unable to load the application you requested.

In each case except 4, this will cause the analyzer software to close, and you will lose all unsaved traces and results.

If you attempt to load a mode via SCPI that will exceed memory capacity, the Mode does not load and an error message is returned:

```
-225,"Out of memory;Insufficient resources to load Mode (mode name)"
```

where "mode name" is the SCPI parameter for the Mode in question, for example, SA for Spectrum Analyzer Mode.

## Sequence Analyzer

Selects the Sequence Analyzer mode for sequenced measurements. Depending on licensed applications there may be a number of different measurements available in this mode. These measurements are all done on IQ captured data and can be set up to calculated on any part of the capture.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
Example	INST:SEL SEQAN INST:NSEL 400
Initial S/W Revision	A.05.01

## IQ Analyzer (Basic)

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths when compared with a similar measurement in the Signal Analysis Mode using the Swept SA measurement. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.



Key Path	Mode
<b>Example</b>	INST:SEL BASIC INST:NSEL 8
Initial S/W Revision	Prior to A.02.00

### W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL WCDMA INST:NSEL 9
Initial S/W Revision	Prior to A.02.00

### GSM/EDGE/EDGE Evo

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL EDGE GSM INST:NSEL 13
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

### Analog Demod

Selects the Analog Demod mode for making measurements of AM, FM and phase modulated signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL ADEMOM INST:NSEL 234
Initial S/W Revision	Prior to A.02.00

## Bluetooth

Selects the Bluetooth mode for Bluetooth specific measurements. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL BT INST:NSEL 228
Initial S/W Revision	A.06.01

## TD-SCDMA with HSPA/8PSK

Selects the TD-SCDMA mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL TDSCDMA INST:NSEL 211
Initial S/W Revision	Prior to A.02.00

## cdma2000

Selects the cdma2000 mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL CDMA2K INST:NSEL 10
Initial S/W Revision	Prior to A.02.00

## 1xEV-DO

Selects the 1xEV-DO mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL CDMA1XEV INST:NSEL 15
Initial S/W Revision	Prior to A.02.00

## WLAN

Selects the WLAN mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL WLAN INST:NSEL 217
Initial S/W Revision	A.09.491

## LTE-Advanced FDD

As LTE-Advanced FDD and LTE modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE and LTE-Advanced FDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL LTEAFDD INST:NSEL 107
Notes	When the N9080A/80B-1FP exists, the display mode name is LTE. When the N9080A/80B-1FP and N9080B-2FP all exist, the display mode name is LTE FDD & LTE-A FDD.
<b>Backwards Compatibility SCPI</b>	INST:SEL LTE INST:NSEL 102
Initial S/W Revision	A.14.00
Modified at S/W Revision	A.14.50

## LTE-Advanced TDD

As LTE-Advanced TDD and LTE TDD modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE TDD and LTE-Advanced TDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL LTEATDD INST:NSEL 108
Notes	When the N9082A/82B-1FP exists, the display mode name is LTE TDD. When the N9082A/82B-1FP and N9082B-2FP all exist, the display mode name is LTE TDD & LTE-A TDD.
<b>Backwards Compatibility SCPI</b>	INST:SEL LTETDD INST:NSEL 105
Initial S/W Revision	A.14.00
Modified at S/W Revision	A.14.50

## 802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL WIMAXOFDMA INST:NSEL 75
Initial S/W Revision	Prior to A.02.00

## Application Mode Number Selection (Remote Command Only)

Select the measurement mode by its mode number. The actual available choices depend upon which applications are installed in your instrument. The modes appear in this table in the same order they appear in the Mode menu (if the order is not changed by the Configure Applications utility found in the System, Power On menu). See "[Detailed List of Modes](#)" on page 185 for Mode details.

The Mode Number is the parameter for use with the :INSTrument:NSElect command. The Mode Parameter is the parameter for use with the :INSTrument[:SElect] command.

Mode	Mode Number	Mode Parameter
------	-------------	----------------

Sequence Analyzer	400	SEQAN
I/Q Analyzer (Basic)	8	BASIC
WCDMA with HSPA+	9	WCDMA
GSM/EDGE/EDGE Evo	13	EDGE GSM
Analog Demod	234	ADEMOD
Bluetooth	228	BTtooth
TD-SCDMA with HSPA/8PSK	211	TDSCDMA
cdma2000	10	CDMA2K
1xEV-DO	15	CDMA1XEV
LTE	102	LTE
LTE TDD	105	LTETDD
LTE-Advanced FDD	107	LTEAFDD
LTE-Advanced TDD	108	LTEATDD
WLAN	217	WLAN
802.16 OFDM (Fixed WiMAX)	104	WIMAXFIXED

<b>Remote Command</b>	:INSTRument:NSElect <integer> :INSTRument:NSElect?
<b>Example</b>	:INST:NSEL 1
<b>Notes</b>	SA mode is 1 The command must be sequential: i.e. continued parsing of commands cannot proceed until the instrument select is complete and the resultant SCPI trees are available.
<b>Preset</b>	Not affected by Preset. Set to default mode (1 for SA mode) following Restore System Defaults.
<b>State Saved</b>	Saved in instrument state
<b>Initial S/W Revision</b>	Prior to A.02.00

### Application Mode Catalog Query (Remote Command Only)

Returns a string containing a comma separated list of names of all the installed and licensed measurement modes (applications). These names can only be used with the :INSTRument[:SElect] command.

<b>Remote Command</b>	:INSTRument:CATalog?
<b>Example</b>	:INST:CAT?
<b>Notes</b>	Query returns a quoted string of the installed and licensed modes separated with a comma. Example: "SA,PNOISE,WCDMA"

Backwards Compatibility Notes	VSA (E4406A) :INSTrument:CATalog? returned a list of installed INSTrument:SELEct items as a comma separated list of string values: "BASIC", "GSM", "EDGEgSM", "CDMA", "NADC", "PDC", "WCDMA", "CDMA2K", "CDMA1XEV", "IDEN", "WIDEN", "WLAN", "SERVICE" X-Series uses the ESA/PSA compatible query of a string contain comma separated values: "SA,PNOISE,NFIGURE,BASIC,CDMA,CDMA2K,WCDMA,CDMA1XEV,EDGEgSM,GSM,NADC,PDC,TDSCDMA,DMODULATION,WLAN"
Initial S/W Revision	Prior to A.02.00

### Application Identification (Remote Commands Only)

Each entry in the Mode Menu will have a Model Number and associated information: Version, and Options. This information is displayed in the Show System screen. The corresponding SCPI remote commands are defined here.

["Current Application Model " on page 182](#)

["Current Application Revision" on page 182](#)

["Current Application Options" on page 183](#)

#### Current Application Model

Returns a string that is the Model Number of the currently selected application (mode).

<b>Remote Command</b>	:SYSTem:APPLication[:CURRent] [:NAME] ?
<b>Example</b>	:SYST:APPL?
<b>Notes</b>	Query returns a quoted string that is the Model Number of the currently selected application (Mode). Example: "N9060A" String length is 6 characters.
<b>Preset</b>	Not affected by Preset
<b>State Saved</b>	Not saved in state, the value will be the selected application when a Save is done.
<b>Initial S/W Revision</b>	Prior to A.02.00

#### Current Application Revision

Returns a string that is the Revision of the currently selected application (mode).

<b>Remote Command</b>	:SYSTem:APPLication[:CURRent] :REVIision?
<b>Example</b>	:SYST:APPL:REV?
<b>Notes</b>	Query returns a quoted string that is the Revision of the currently selected application (Mode). Example:

	"1.0.0.0" String length is a maximum of 23 characters. (each numeral can be an integer + 3 decimal points)
Preset	Not affected by a Preset
State Saved	Not saved in state, the value will be the selected application when a Save is done.
Initial S/W Revision	Prior to A.02.00

### Current Application Options

Returns a string that is the Options list of the currently selected application (Mode).

<b>Remote Command</b>	:SYSTem:APPLication[:CURRent]:OPTion?
<b>Example</b>	:SYST:APPL:OPT?
Notes	Query returns a quoted string that is the Option list of the currently selected application (Mode). The format is the name as the *OPT? or SYSTem:OPTion command: a comma separated list of option identifiers. Example: "1FP,2FP" String length is a maximum of 255 characters.
Preset	Not affected by a Preset
State Saved	Not saved in state per se, the value will be the selected application when a Save is invoked.
Initial S/W Revision	Prior to A.02.00

### Application Identification Catalog (Remote Commands Only)

A catalog of the installed and licensed applications (Modes) can be queried for their identification.

["Application Catalog Number of Entries" on page 183](#)

["Application Catalog Model Numbers" on page 184](#)

["Application Catalog Revision" on page 184](#)

["Application Catalog Options" on page 184](#)

### Application Catalog Number of Entries

Returns the number of installed and licensed applications (Modes).

<b>Remote Command</b>	:SYSTem:APPLication:CATalog[:NAME]:COUNT?
<b>Example</b>	:SYST:APPL:CAT:COUN?
Preset	Not affected by Preset
State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Application Catalog Model Numbers

Returns a list of Model Numbers for the installed and licensed applications (Modes).

<b>Remote Command</b>	:SYSTem:APPLication:CATalog[:NAME]?
<b>Example</b>	:SYST:APPL:CAT?
<b>Notes</b>	Returned value is a quoted string of a comma separated list of Model Numbers. Example, if SAMS and Phase Noise are installed and licensed: "N9060A,N9068A" String length is COUNT * 7 - 1. (7 = Model Number length + 1 for comma. -1 = no comma for the 1st entry.)
<b>Preset</b>	Not affected by a Preset
<b>State Saved</b>	Not saved in instrument state.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Application Catalog Revision

Returns the Revision of the provided Model Number.

<b>Remote Command</b>	:SYSTem:APPLication:CATalog:REvision? <model>
<b>Example</b>	:SYST:APPL:CAT:REV? 'N9060A'
<b>Notes</b>	Returned value is a quoted string of revision for the provided Model Number. The revision will be a null-string ("") if the provided Model Number is not installed and licensed. Example, if SAMS is installed and licensed: "1.0.0.0"
<b>Preset</b>	Not affected by a Preset.
<b>State Saved</b>	Not saved in instrument state.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Application Catalog Options

Returns a list of Options for the provided Model Number

<b>Remote Command</b>	:SYSTem:APPLication:CATalog:OPTion? <model>
<b>Example</b>	:SYST:APPL:CAT:OPT? 'N9060A'
<b>Notes</b>	Returned value is a quoted string of a comma separated list of Options, in the same format as *OPT? or :SYSTem:OPTion?. If the provided Model Number is not installed and licensed a null-string ("") will be returned. Example, if SAMS is installed and licensed: "2FP" String length is a maximum of 255 characters.
<b>Preset</b>	Not affected by a Preset



State Saved	Not saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Detailed List of Modes

This section contains an alphabetical list of Modes available in the X-Series, along with a brief description of each Mode.

Note that with the exception of the 89601 VSA, only licensed applications appear in the Mode menu. The 89601 will always appear, because it's licensing is handled differently.

### 1xEV-DO

Selects the 1xEV-DO mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL CDMA1XEV INST:NSEL 15
Initial S/W Revision	Prior to A.02.00

### 802.16 OFDMA (WiMAX/WiBro)

Selects the OFDMA mode for general purpose measurements of WiMAX signals. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL WIMAXOFDMA INST:NSEL 75
Initial S/W Revision	Prior to A.02.00

### 89601 VSA

Selecting the 89601 VSA mode will start the 89600 VSA software. The 89600 VSA software is powerful, PC-based software, offering the industry's most sophisticated general purpose and standards specific signal evaluation and troubleshooting tools for R&D engineers. Even for proprietary and non-standard signals in SATCOM or MILCOM applications, you can make signal quality measurements with customized IQ constellation. Reach deeper into signals, gather more data on signal problems, and gain greater insight.

- Over 35 general-purpose analog and digital demodulators ranging from 2FSK to 4096QAM
- Flexible and custom IQ and OFDM signal analysis for single carrier
- Standards specific modulation analysis including:
  - Cellular: GSM/EDGE, cdma2000, W-CDMA, TD-SCDMA, LTE(FDD/TDD),
  - LTE-Advanced and more
  - Wireless networking: 802.11a/b/g, 802.11n, 802.ac, 802.16 WiMAX (fixed/mobile), WiSUN (MR-FSK PHY)
  - RFID
  - Digital satellite video and other satellite signals, radar, LMDS
  - Up to 400K bin FFT, for the highest resolution spectrum analysis
  - A full suite of time domain analysis tools, including signal capture and playback, time gating, and CCDF measurements
  - 20 simultaneous trace displays and the industry's most complete set of marker functions
  - Easy-to-use Microsoft ® Windows ® graphical user interface

For more information see the Agilent 89600 Series VSA web site at [www.agilent.com/find/89600vsa](http://www.agilent.com/find/89600vsa)

To learn more about how to use the 89600 VSA running in the X-Series, after the 89600 VSA software is running, open the 89600 VSA Help and open the "About Agilent X-Series Signal Analyzer with 89600 VSA Software" help topic.

Key Path	Mode
<b>Example</b>	INST:SEL VSA89601 INST:NSEL 101
Initial S/W Revision	Prior to A.02.00

### Analog Demod

Selects the Analog Demod mode for making measurements of AM, FM and phase modulated signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL ADEMOM INST:NSEL 234
Initial S/W Revision	Prior to A.02.00

## Bluetooth

Selects the Bluetooth mode for Bluetooth specific measurements. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL BT INST:NSEL 228
Initial S/W Revision	A.06.01

## cdma2000

Selects the cdma2000 mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL CDMA2K INST:NSEL 10
Initial S/W Revision	Prior to A.02.00

## GSM/EDGE/EDGE Evo

Selects the GSM with EDGE mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL EDGE GSM INST:NSEL 13
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## IQ Analyzer (Basic)

The IQ Analyzer Mode makes general purpose frequency domain and time domain measurements. These measurements often use alternate hardware signal paths when compared with a similar measurement in

the Signal Analysis Mode using the Swept SA measurement. These frequency domain and time domain measurements can be used to output I/Q data results when measuring complex modulated digital signals.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL BASIC INST:NSEL 8
Initial S/W Revision	Prior to A.02.00

### LTE

Selects the LTE mode for general purpose measurements of signals following the LTE FDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL LTE INST:NSEL 102
Initial S/W Revision	Prior to A.02.00

### LTE TDD

Selects the LTE TDD mode for general purpose measurements of signals following the LTE TDD standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL LTETDD INST:NSEL 105
Initial S/W Revision	A.03.00

### LTE-Advanced FDD

As LTE-Advanced FDD and LTE modes are converged into one single application, the single softkey under Mode menu is designed to select the converged mode. The display mode of the LTE and LTE-Advanced FDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL LTEAFDD INST:NSEL 107
Notes	When the N9080A/80B-1FP exists, the display mode name is LTE. When the N9080A/80B-1FP and N9080B-2FP all exist, the display mode name is LTE FDD & LTE-A FDD.
<b>Backwards Compatibility SCPI</b>	INST:SEL LTE INST:NSEL 102
Initial S/W Revision	A.14.00
Modified at S/W Revision	A.14.50

### LTE-Advanced TDD

As LTE-Advanced TDD and LTE TDD modes are converged into one single application, the single softkey under Mode menu is designed to select the covered mode. The display mode of the LTE TDD and LTE-Advanced TDD are distinguished by the licenses.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL LTEATDD INST:NSEL 108
Notes	When the N9082A/82B-1FP exists, the display mode name is LTE TDD. When the N9082A/82B-1FP and N9082B-2FP all exist, the display mode name is LTE TDD & LTE-A TDD.
<b>Backwards Compatibility SCPI</b>	INST:SEL LTETDD INST:NSEL 105
Initial S/W Revision	A.14.00
Modified at S/W Revision	A.14.50

### Sequence Analyzer

Selects the Sequence Analyzer mode for sequenced measurements. Depending on licensed applications there may be a number of different measurements available in this mode. These measurements are all done on IQ captured data and can be set up to calculated on any part of the capture.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

Key Path	Mode
<b>Example</b>	INST:SEL SEQAN

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	INST:NSEL 400
Initial S/W Revision	A.05.01

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### TD-SCDMA with HSPA/8PSK

Selects the TD-SCDMA mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

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Key Path	Mode
<b>Example</b>	INST:SEL TDSCDMA INST:NSEL 211
Initial S/W Revision	Prior to A.02.00

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### W-CDMA with HSPA+

Selects the W-CDMA with HSPA+ mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

---

Key Path	Mode
<b>Example</b>	INST:SEL WCDMA INST:NSEL 9
Initial S/W Revision	Prior to A.02.00

---

### WLAN

Selects the WLAN mode for general purpose measurements of signals following this standard. There are several measurements available in this mode.

If you are using the Help feature, this mode must be currently active to access its detailed information. If it is not active, exit the Help feature (Esc key), select the mode, and re-access Help.

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Key Path	Mode
<b>Example</b>	INST:SEL WLAN INST:NSEL 217
Initial S/W Revision	A.09.491

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## Global Settings

Opens a menu that allows you to switch certain Meas Global parameters to a Mode Global state. These switches apply to all Modes that support global settings. No matter what Mode you are in when you set the “Global Center Frequency” switch to on, it applies to all Modes that support Global Settings.

Key Path	Mode Setup
Initial S/W Revision	Prior to A.02.00

## Global Center Freq

The software maintains a Mode Global value called “Global Center Freq”.

When the Global Center Freq key is switched to On in any mode, the current mode’s center frequency is copied into the Global Center Frequency, and from then on all modes that support global settings use the Global Center Frequency. So you can switch between any of these modes and the Center Freq will remain unchanged.

Adjusting the Center Freq of any mode which supports Global Settings, while Global Center Freq is On, will modify the Global Center Frequency.

When Global Center Freq is turned Off, the Center Freq of the current mode is unchanged, but now the Center Freq of each mode is once again independent.

When Mode Preset is pressed while Global Center Freq is On, the Global Center Freq is preset to the preset Center Freq of the current mode.

This function is reset to Off when the Restore Defaults key is pressed in the Global Settings menu, or when System, Restore Defaults, All Modes is pressed.

Key Path	Mode Setup, Global Settings
Scope	Mode Global
<b>Remote Command</b>	:INSTrument:COUPle:FREQuency:CENTer ALL NONE :INSTrument:COUPle:FREQuency:CENTer?
<b>Example</b>	INST:COUP:FREQ:CENT ALL INST:COUP:FREQ:CENT?
Preset	Set to Off on Global Settings, Restore Defaults and System, Restore Defaults, All Modes
Range	On Off
Initial S/W Revision	Prior to A.02.00

<b>Remote Command</b>	:GLOBal:FREQuency:CENTer[:STATe] 1 0 ON OFF :GLOBal:FREQuency:CENTer[:STATe]?
Preset	Off
Initial S/W Revision	Prior to A.02.00

## Restore Defaults

This key resets all of the functions in the Global Settings menu to Off. This also occurs when System, Restore Defaults, All Modes is pressed.

<b>Key Path</b>	Mode Setup, Global Settings
<b>Remote Command</b>	:INSTrument:COUPle:DEFault
<b>Example</b>	INST:COUP:DEF
<b>Backwards Compatibility SCPI</b>	:GLOBal:DEFault
<b>Initial S/W Revision</b>	Prior to A.02.00



## Mode Setup

Opens a menu of keys that allows you to specify parameters of the mode.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Radio

Accesses the Radio setup menu.

Key Path	Mode Setup
Initial S/W Revision	Prior to A.02.00

## Band

Selects the standard variant that applies to the radio to be tested.

Key	SCPI	Band
P-GSM	PGSM	Primary GSM in the 900 MHz band
E-GSM	EGSM	Extended GSM in the 900 MHz band
R-GSM	RGSM	Railway GSM in the 900 MHz band
DCS 1800	DCS1800	DSC1800 band; also known as GSM-1800
PCS 1900	PCS1900	PCS1900 band; also known as GSM-1900
GSM 450	GSM450	GSM450 band
GSM 480	GSM480	GSM480 band
GSM 700	GSM700	GSM700 band
GSM 850	GSM850	GSM850 band, for IS-136HS
T-GSM 810	TGSM810	T-GSM 810 band

Key Path	Mode Setup, Radio
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe]:RADio:STANdard:BAND PGSM   EGSM   RGSM   DCS1800   PCS1900   GSM450   GSM480   GSM700   GSM850   TGSM810 [ :SENSe]:RADio:STANdard:BAND?
<b>Example</b>	RAD:STAN:BAND PGSM RAD:STAN:BAND?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	PGSM
State Saved	Saved in instrument state.
Range	P-GSM E-GSM R-GSM DCS 1800 PCS 1900 GSM 450 GSM 480 GSM 700 GSM 850 T-GSM 810
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

## Device

Selects the type of radio device to be tested.

BTS - Base station transmitter test

MS - Mobile station transmitter test

Key Path	Mode Setup, Radio
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :RADio:DEvice BTS MS [ :SENSe ] :RADio:DEvice?
<b>Example</b>	RAD:DEV BTS RAD:DEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	MS
State Saved	Saved in instrument state.
Range	BTS MS For E6640A, the Radio Device is restricted to MS only, BTS is not selectable.
Initial S/W Revision	Prior to A.02.00

## BTS Type

Selects the type of base station to be tested.

Key	SCPI	Type
Normal	NORMal	Normal BTS.
Micro1	MICR1 MICRo	Micro 1 BTS. Note: SCPI enumeration 'MICRo' is kept for backward compatibility. It is equivalent to 'MICR1'.
Micro2	MICR2	Micro 2 BTS.

Micro3	MICR3	Micro 3 BTS.
Pico1	PICO1 PICO	Pico 1 BTS. Note: SCPI enumeration 'PICO' is kept for backward compatibility. It's equivalent to 'PICO1'.

Key Path	Mode Setup, Radio
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :RADio:DEVIce:BASE [ :TYPE ] NORMal   MICRo   MICR1   MICR2   MICR3   PICO   PICO1</code> <code>[ :SENSe ] :RADio:DEVIce:BASE [ :TYPE ] ?</code>
<b>Example</b>	<code>RAD:DEV:BASE PICO1</code> <code>RAD:DEV:BASE?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Normal Micro1 Micro2 Micro3 Pico1
Initial S/W Revision	Prior to A.02.00

## Freq Hopping

Turns the carrier hopping mode on and off. If frequency hopping is turned on, the instrument ignores the bursts when the frequency is hopped off the selected channel frequency. Thus, only valid data is included in the results.

This parameter applies only to the following measurements:

- GSMK/EDGE Transmit Power measurement
- GSMK/EDGE Power vs. Time measurement
- GSMK/EDGE Output RF Spectrum measurement
- GSMK Phase & Frequency Error measurement
- EDGE EVM measurement

Key Path	Mode Setup, Radio
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :RADio:CARRier:HOP OFF ON 0 1</code> <code>[ :SENSe ] :RADio:CARRier:HOP?</code>

<b>Example</b>	RAD:CARR:HOP ON RAD:CARR:HOP?
Notes	This functionality does not affect Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Carrier

Selects the type of RF carrier on the device to be tested. You need to select 'Cont' if all 8 slots are active in the frame and the carrier has no gaps between the slots.

Key	SCPI	Description
Burst	BURSt	For single or multi slotted burst carrier signal.
Cont	CONTInuous	For continuous multi slot carrier signal.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

The GMSK/EDGE Power vs. Time measurement does not support full continuous multi-slot signals (no gap between two adjacent slots).

EDGE EVM will skip burst search for Multi-Slot signals.

Key Path	Mode Setup, Radio
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :RADio:CARRier [ :TYPE ] BURSt CONTInuous [ :SENSe ] :RADio:CARRier [ :TYPE ] ?
<b>Example</b>	RAD:CARR BURS RAD:CARR?
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	BURSt

State Saved	Saved in instrument state.
Range	Burst Cont
Initial S/W Revision	Prior to A.02.00

## Pwr Ctrl Lvl (PCL)

Allows you to choose the power control level (PCL) of the transmitter.

Selection	SCPI	Description
AutoRange	ON 1	PCL is determined by the measured carrier power level, and is used to determine the test limits.  Since PCL is an integer number, the value is determined by the nearest Target Carrier Power level. For example, if the measured carrier power level is +35.9 dBm in a GSM 400 system, the nearest Target Carrier Power is 35 dBm, so the PCL will be set to 4. If the measured carrier power level is just the center between Target Carrier Power like 34.0 dBm, the PCL will be determined by the higher Target Carrier Power (in this case, 35 dBm, PCL:4).
Man	OFF 0	User defined PCL is used to determine the test limits.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement

This parameter applies only when the selected "Device" on page 194 is MS.

Target Carrier Power [dBm]	Power Control Level
39	2
37	3
35	4
33	5
31	6
29	7
27	8
25	9
23	10
21	11
19	12
17	13

Target Carrier Power [dBm]	Power Control Level
15	14
13	15
11	16
9	17
7	18
5	19

Power Control Level for GSM 400, GSM 900, GSM 850 and GSM 700

Target Carrier Power [dBm]	Power Control Level
36	29
34	30
32	31
30	0
28	1
26	2
24	3
22	4
20	5
18	6
16	7
14	8
12	9
10	10
8	11
6	12
4	13
2	14
0	15

Power Control Level for DCS 1800

Target Carrier Power [dBm]	Power Control Level
33	30
32	31

Target Carrier Power [dBm]	Power Control Level
30	0
28	1
26	2
24	3
22	4
20	5
18	6
16	7
14	8
12	9
10	10
8	11
6	12
4	13
2	14
0	15

## Power Control Level for PCS 1900

Key Path	Mode Setup, Radio
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[:SENSe]:RADio:PCLevel <integer> [:SENSe]:RADio:PCLevel? [:SENSe]:RADio:PCLevel:AUTO 0 1 OFF ON [:SENSe]:RADio:PCLevel:AUTO?
<b>Example</b>	RAD:PCL 3 RAD:PCL? RAD:PCL:AUTO ON RAD:PCL:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Applicable only for Power vs. Time and Output RF Spectrum measurements. Unavailable unless selected "Device" on page 194 is MS.
Preset	1 ON
State Saved	Saved in instrument state.

Min	0
Max	40
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] : EPVTime : PCLevel
	[ :SENSe ] : PVTime : PCLevel
Initial S/W Revision	Prior to A.02.00

## Demod

Accesses the Demod setup menu.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] : CHANnel : SLOT <integer> [ :SENSe ] : CHANnel : SLOT? [ :SENSe ] : CHANnel : SLOT : AUTO OFF   ON   0   1 [ :SENSe ] : CHANnel : SLOT : AUTO?
<b>Example</b>	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0 OFF
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00



## Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when the N9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when the N9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK				
			16QAM				
			32QAM				
			AQPSK				
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A		
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)		
GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No			
EDGE EVM measurement	No	No	No	Yes	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes	Yes

Key Path                      Mode Setup, Demod FREQ Channel

Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :BURSt NORMal   SYNC   ACCess   HSRate   MIXed [ :SENSe ] :CHANnel :BURSt ?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH)   Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC

Selection	SCPI	Description
		numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.
Key Path		Mode Setup, Demod FREQ Channel
Mode		GSM
Scope		Meas Global
Remote Command		[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example		CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes		You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset		0 ON
State Saved		Saved in instrument state.
Min		0
Max		7
Initial S/W Revision		Prior to A.02.00

## Mod Scheme

This functionality applies only to the following measurements.

- EDGE EVM measurement
- EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement

When Mod Scheme is set to Auto, the measurements automatically determines which Modulation Scheme the input signal is using.

Key Path	Mode Setup, Demod
Initial S/W Revision	A.02.00

### Normal - NB

Selects the Modulation Scheme (modulation type) for Normal Burst that the analyzer will search for when Auto mode is selected. In manual mode, you may select the desired modulation type from the list.

Key Path	Mode Setup, Demod, Mod Scheme
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe]:SYNC:NORMal:MODulation:AUTO ON OFF 1 0</code> <code>[ :SENSe]:SYNC:NORMal:MODulation:AUTO?</code>
<b>Example</b>	<code>SYNC:NORM:MOD:AUTO 1</code> <code>SYNC:NORM:MOD:AUTO?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Couplings	ON automatically changes to OFF when GMSK, 8PSK, 16QAM, 32QAM or AQPSK is selected.
Preset	ON
State Saved	Saved in instrument state.
Readback Text	EDGE NB: AutoDet
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.06.00

Key Path	Mode Setup, Demod, Mod Scheme, Normal - NB
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe]:SYNC:NORMal:MODulation GMSK EPSK QAM16 QAM32 AQPSK</code> <code>[ :SENSe]:SYNC:NORMal:MODulation?</code>
<b>Example</b>	<code>SYNC:NORM:MOD GMSK</code> <code>SYNC:NORM:MOD?</code>
Notes	You must be in the GSM mode to use this command. Use <code>:INSTRument:SElect</code> to set the mode.
Dependencies	16QAM, 32QAM and AQPSK are available only when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, illegal parameter value error is returned.
Preset	EPSK
State Saved	Saved in instrument state.
Range	GMSK 8PSK 16QAM 32QAM AQPSK
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.06.00

**HSR - HB**

Selects the Modulation Scheme (modulation type) for HSR Burst that the analyzer will search for when Auto mode is selected. In manual mode, you may select the desired modulation type from the list.

Key Path	Mode Setup, Demod, Mod Scheme
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :SYNC:HSRate:MODulation:AUTO ON OFF 1 0</code> <code>[ :SENSe ] :SYNC:HSRate:MODulation:AUTO?</code>
<b>Example</b>	<code>SYNC:HSR:MOD:AUTO 1</code> <code>SYNC:HSR:MOD:AUTO?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned.
Couplings	ON automatically changes to OFF when QPSK, 16QAM or 32QAM is selected.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	A.02.00

Key Path	Mode Setup, Demod, Mod Scheme, HSR - HB
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :SYNC:HSRate:MODulation QPSK QAM16 QAM32</code> <code>[ :SENSe ] :SYNC:HSRate:MODulation?</code>
<b>Example</b>	<code>SYNC:HSR:MOD QAM32</code> <code>SYNC:HSR:MOD?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned.
Preset	QAM16
State Saved	Saved in instrument state.
Range	QPSK 16QAM 32QAM
Initial S/W Revision	A.02.00

**Config Manual Sync Method**

Selects the behavior type of synchronization and measurement for the Mod Scheme selected in NB or HB. This method is applicable in EDGE EVM and EDGE Power vs Time when Burst Sync is set to Training

Sequence (by default).

- **Force Selected Method on All Slots:** In EDGE Power vs Time, the selected Mod Scheme is forced to use the synchronization method regardless of the input signal format. In EDGE EVM, the Mod Scheme is forced to use the demodulation method in addition to (as well as) the synchronization method. When the selected Mod Scheme does not match the input signal format (for example, if the selected Mode Scheme is 8PSK and the input signal format is 16QAM), a large EVM number or sync error may be observed.
- **Discard Non-Matching Slots:** Performs auto synchronization and picks up the value when the detected Mod Scheme matches the manually selected Mod Scheme. For example, if a signal that contains 8PSK, 16QAM and 32QAM formats is fed and the selected Mod Scheme is 16QAM, the analyzer will report measurement results of 16QAM only.

<b>Key Path</b>	Mode Setup, Demod, Mod Scheme
<b>Mode</b>	GSM
<b>Remote Command</b>	[[:SENSE]:SYNC:CONFigure:METhod FORCe DISCard [:SENSe]:SYNC:CONFigure:METhod?
<b>Example</b>	SYNC:CONF:METH FORC SYNC:CONF:METH?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned.  Grayed out when the license is installed and both of Mod Scheme Normal and HSR are set to AutoDet.
<b>Preset</b>	DISC
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	Force Selected Method on All Slots Discard Non-Matching Slots
<b>Readback Text</b>	Force Method Discard Mismatch
<b>Initial S/W Revision</b>	A.02.00

### AQPSK AutoDet

Selects whether to include auto modulation scheme detection of AQPSK or not. When Include, AQPSK is detectable when Burst Type is either Normal or Mixed and when EDGE Modulation Scheme Auto Detection for Normal Burst is enabled.

Auto detection of AQPSK requires some calculation time and excluding it may speed up EDGE EVM and PVT measurements. When Alpha of AQPSK is close to 0 or 90 degrees, it is like a normal burst GMSK. In this case, the auto mod scheme detection algorithm may not work very well and AQPSK could be identified as GMSK or 8PSK.

Key	SCPI	Description
Include	ON	Include AQPSK in auto detectable mod schemes of normal bursts.
Exclude	OFF	Exclude AQPSK in auto detectable mod schemes of normal bursts.

This parameter applies only to the following measurements:

- EDGE EVM measurement
- EDGE Power vs. Time measurement

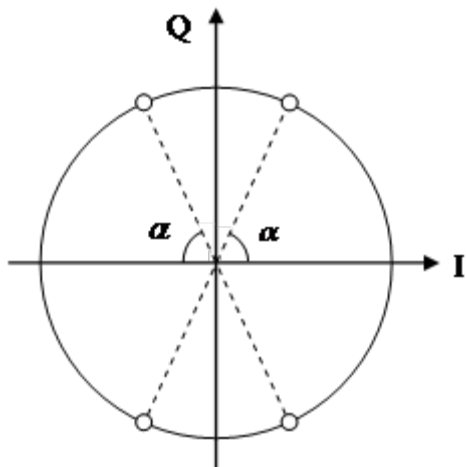
Key Path	Mode Setup, Demod
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :SYNC:NORMal:MODulation:AUTO:AQPSk INCLude EXCLude [ :SENSe ] :SYNC:NORMal:MODulation:AUTO:AQPSk?
<b>Example</b>	SYNC:NORM:MOD:AUTO:AQPS INCL SYNC:NORM:MOD:AUTO:AQPS?
Notes	This key appears only when N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned. The “AQPSK AutoDet” key is in the Mode Setup menu, but only EDGE EVM and EDGE PVT measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Unavailable when Modulation Scheme Auto Detection for Normal Burst is off and Modulation Scheme for Normal Burst is set to AQPSK.
Preset	EXCLude
State Saved	Saved in instrument state.
Range	Include Exclude
Initial S/W Revision	A.06.00

## AQPSK SCPIR

Allows you to set Subchannel Power Imbalance Ratio (SCPIR) of AQPSK. SCPIR is defined in 3GPP TS 45.004 as

$$SCPIR = 20 \times \log_{10}(\tan(\alpha)) \text{ dB}$$

Symbol state IQ points of AQPSK is determined by  $\alpha$  in the equation above as depicted in the following figure.



Key Path	Mode Setup, Demod, Mod Scheme
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[[:SENSE]:SYNC:NORMAL:MODulation:AQPSk:ALPHA:SCPIr &lt;real&gt;</code> <code>[[:SENSE]:SYNC:NORMAL:MODulation:AQPSk:ALPHA:SCPIr?</code>
<b>Example</b>	<code>SYNC:NORM:MOD:AQPS:ALPH:SCP 10.0</code> <code>SYNC:NORM:MOD:AQPS:ALPH:SCP?</code>
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode. This key appears only when the N9071A-3FP license is installed. When it is unlicensed and this SCPI command is sent, a setting conflict error is returned.
Couplings	Change <code>[[:SENSE]:SYNC:NORMAL:MODulation:AQPSk:ALPHA:ARCTan</code> to <code>10SCPIR/20</code> .
Preset	0.0
State Saved	Saved in instrument state.
Min	-10.0
Max	10.0
Default Unit	dB
Initial S/W Revision	A.07.00

#### AQPSK Alpha SCPI for Backward Compatibility

Mode	EDGE GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[[:SENSE]:SYNC:NORMAL:MODulation:AQPSk:ALPHA:ARCTan &lt;real&gt;</code> <code>[[:SENSE]:SYNC:NORMAL:MODulation:AQPSk:ALPHA:ARCTan?</code>
<b>Example</b>	<code>SYNC:NORM:MOD:AQPS:ALPH:ARCT 3.0</code> <code>SYNC:NORM:MOD:AQPS:ALPH:ARCT?</code>



Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode. This key is obsolete since AQPSK Alpha is set by SCPIR. This SCPI command is available only when the N9071A-3FP license is installed. When it is unlicensed and this SCPI command is sent, a setting conflict error is returned.
Couplings	Change [:SENSe]:SYNC:NORMal:MODulation:AQPSk:ALPHa:SCPIr to $20\log_{10}(\tan(\alpha))$ .
Preset	1.0
State Saved	Saved in instrument state.
Min	0.316227766 = 10-10/20
Max	3.162277660 = 1010/20
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.07.00

### Burst Search Threshold

Sets the relative power threshold from the peak power, which is used by the burst alignment algorithm to determine the burst rising edge and falling edge.

Key Path	Mode Setup, Demod
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[:SENSe]:SYNC:BURSt:STHReshold <rel_ampl> [:SENSe]:SYNC:BURSt:STHReshold?
<b>Example</b>	SYNC:BURS:STHR -20 SYNC:BURS:STHR?
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	-30
State Saved	Saved in instrument state.
Min	-200
Max	-0.01
Initial S/W Revision	Prior to A.02.00

### HSR Pulse Shaping Filter

Selects the pulse shaping filter for higher symbol rate (HSR) signals. This menu key is available only when the N9071A-3FP license is installed.

This functionality applies only to the following measurements:

- EDGE EVM measurement
- EDGE Power vs. Time measurement
- GMSK/EDGE Output RF Spectrum measurement

Key	SCPI	Filter Option
Narrow	NARRow	Use the Spectrally Narrow Pulse Shaping Filter.
Wide	WIDE	Use the Spectrally Wide Pulse Shaping Filter.

Key Path	Mode Setup, Demod
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :RADio :PSHape NARRow WIDE [ :SENSe ] :RADio :PSHape?
<b>Example</b>	RAD:PSH WIDE RAD:PSH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error is returned.
Preset	NARRow
State Saved	Saved in instrument state.
Range	Narrow Wide
Initial S/W Revision	A.02.00

## Burst Align

Selects the sync alignment to be either to the GSM standard or the standard offset by 1/2 bit behind.

Key	SCPI	Description
GSM	GSM	Uses the burst alignment as defined in the GSM specifications.
1/2 Bit Offset	HBIT	Shifts the burst alignment by 1/2 bit, which corresponds to an earlier interpretation of the GSM standard. This selection applies to the Power vs. Time and the Phase and Frequency Error measurements.

Key Path	Mode Setup, Demod
Mode	GSM
Scope	Meas Global

<b>Remote Command</b>	<code>[ :SENSe ] :SYNC:ALIGnment GSM HBIT</code> <code>[ :SENSe ] :SYNC:ALIGnment?</code>
<b>Example</b>	SYNC:ALIG HBIT SYNC:ALIG?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
<b>Preset</b>	GSM
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	GSM   1/2 Bit Offset
<b>Initial S/W Revision</b>	Prior to A.02.00

## Carrier BPF

Selects whether to use the carrier bandpass filter.

<b>Key Path</b>	FREQ Channel, Multi Carrier SetupMode Setup, Demod
<b>Mode</b>	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :RADio:CARRier:NUMBer:AUTO ON OFF 1 0</code> <code>[ :SENSe ] :RADio:CARRier:NUMBer:AUTO?</code>
<b>Example</b>	RAD:CARR:NUMB:AUTO 1 RAD:CARR:NUMB:AUTO?
<b>Dependencies</b>	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
<b>Couplings</b>	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
<b>Preset</b>	ON
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	Auto Man
<b>Initial S/W Revision</b>	A.06.00

## Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

<b>BPF Type</b>	<b>Description</b>
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GSM Phase & Frequency Error measurement
- EDGE EVM measurement
- GSM Power vs. Time
- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPF Mode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :RADio :CARRier :NUMBer SINGLE   MULTiple [ :SENSe ] :RADio :CARRier :NUMBer ?
Example	RAD:CARR:NUMB SING RAD:CARR:NUMB ?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## RF Sync Delay

Adjusts the “T0” point which has been measured in each measurement. This adjustment does not apply if the Burst Sync key (in each measurement’s Meas Setup menu) is set to None.

This parameter applies only to the GSM/EDGE Power vs. Time measurement.

Key Path	Mode Setup, Demod
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :SYNC :BURSt :RFAMplitude :DELay <time> [ :SENSe ] :SYNC :BURSt :RFAMplitude :DELay ?
Example	SYNC:BURS:RFAM:DEL -10us SYNC:BURS:RFAM:DEL ?
Notes	This functionality does not affect Combined GSM/EDGE measurement. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Preset	0
State Saved	Saved in instrument state.
Min	-5 ms
Max	5 ms
Default Unit	ms
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Carrier BPF

This functionality is the same as the Carrier BPF key in the FREQ/Channel menu. See "[Carrier BPF](#)" on [page 1565](#) for details.

Key Path	Mode Setup, Demod
Initial S/W Revision	Prior to A.02.00

## Restore Mode Defaults

Resets the state for the currently active mode by resetting the mode persistent settings to their factory default values, clearing mode data and by performing a Mode Preset. This function will never cause a mode switch. This function performs a full preset for the currently active mode; whereas, Mode Preset performs a partial preset. Restore Mode Defaults does not affect any system settings. System settings are reset by the Restore System Defaults function. This function does reset mode data; as well as settings.

Key Path	Mode Setup
<b>Remote Command</b>	:INSTRument:DEFault
<b>Example</b>	:INST:DEF
Notes	Clears all pending OPC bits. The Status Byte is set to 0. A message comes up saying: "If you are sure, press key again".
Couplings	A Restore Mode Defaults will cause the currently running measurement to be aborted and causes the default measurement to be active. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

## Preset Type (Remote Command Only)

As stated in the Backward Compatibility section, to be compatible with ESA/PSA the PRESet:TYPE command will be implemented as a no-op.

Mode	All
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<b>Remote Command</b>	:SYSTem:PRESet:TYPE FACTory MODE USER :SYSTem:PRESet:TYPE?
<b>Example</b>	:SYST:PRES:TYPE FACT
Notes	This command is supported for backward compatibility only. It is a no-op which does not change the behavior of any preset operation.
Preset	This is unaffected by Preset but is set to Mode on a "Restore System Defaults->All"
State Saved	No
Initial S/W Revision	Prior to A.02.00

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(Undefined variable: Primary.ProductName)  
GSM/EDGE Measurement Application Reference

## 6 System Functions

## File

Opens a menu that enables you to access various standard and custom Windows functions. Press any other front-panel key to exit

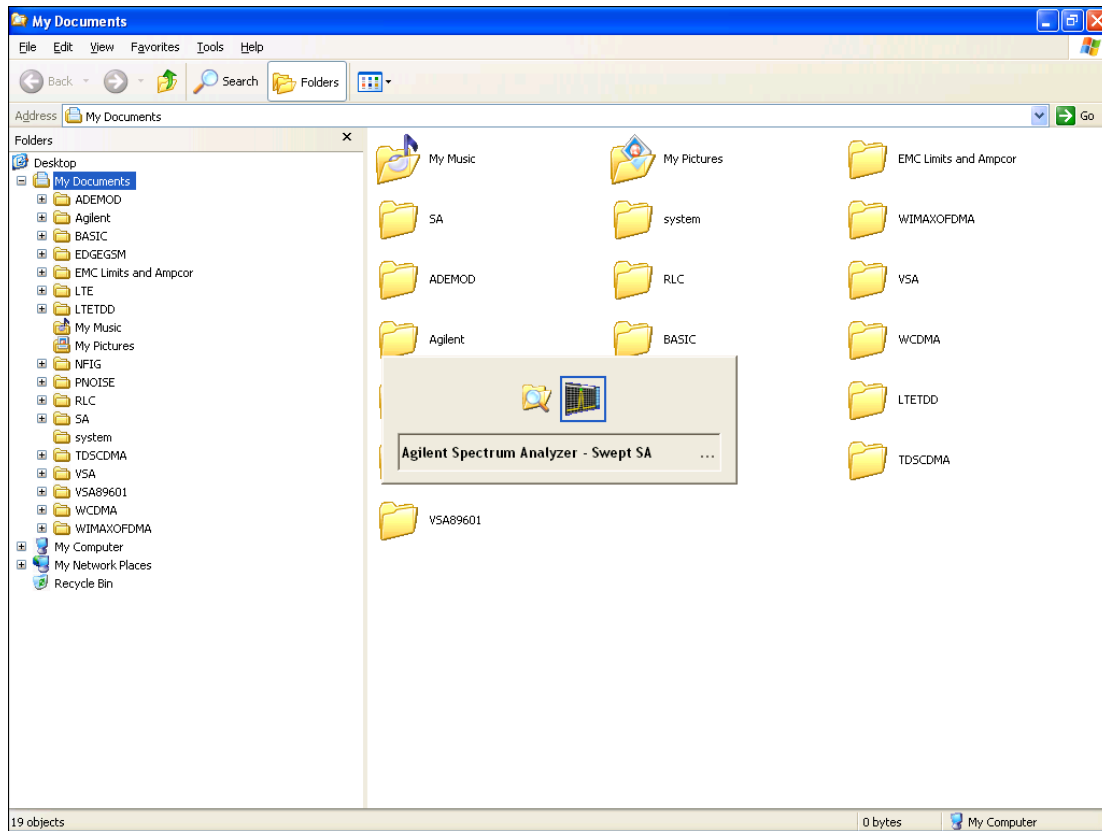
Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## File Explorer

Opens the standard Windows File Explorer. The File Explorer opens in the My Documents directory for the current user.

The File Explorer is a separate Windows application, so to return to the analyzer once you are in the File Explorer, you may either:

Exit the File Explorer by clicking on the red X in the upper right corner, with a mouse



Or use Alt-Tab: press and hold the Alt key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as shown above, then release the Alt key.

The ability to access File Explorer is not available if Option SF1 is installed.



Key Path	File
Initial S/W Revision	Prior to A.02.00

## Print

The Print key opens a Print dialog for configured printing (for example, to the printer of your choice). Refer to your Microsoft Windows Operating System manual for more information.

## Maximize/Restore Down

These keys allow the Instrument Application to be maximized and then restored to its prior state. Only one of the two keys is visible at a time. When not already maximized the Maximize Application key is visible, and when maximized, the Restore Down Application key is visible and replaces the Maximize Application key.

### Maximize

This key allows you to Maximize the Instrument Application, which causes the analyzer display to fill the screen. Once the application is maximized, this key is replaced by the Restore Down key.

Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

### Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

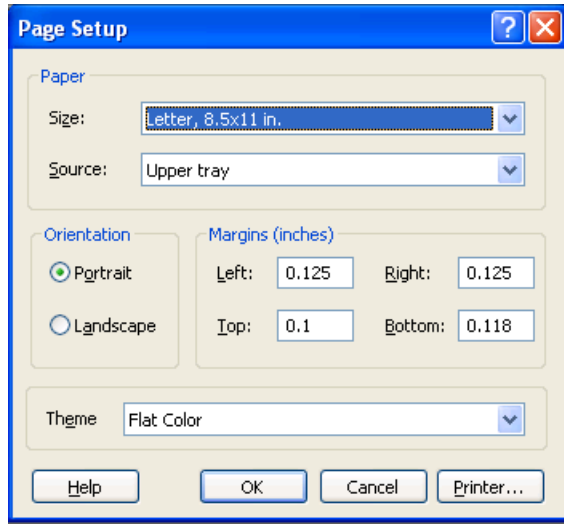
Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

## Page Setup

The Page Setup key brings up a Windows Page Setup dialog that allows you to control aspects of the pages sent to the printer when the PRINT hardkey is pressed.

Key Path	File
Initial S/W Revision	Prior to A.02.00

Paper size, the printer paper source, the page orientation and the margins are all settable. Just like any standard Windows dialog, you may navigate the dialog using the front-panel keys, or a mouse. There are no SCPI commands for controlling these parameters.



Also contained in this dialog is a drop-down control that lets you select the Theme to use when printing. For more on Themes, see information under View/Display, Display, System Display Settings, Theme. The Theme control has a corresponding SCPI command.

Parameter Name	Print Themes
Parameter Type	Enum
Mode	All
Remote Command	:SYSTem:PRINt:THEMe TDCOLOR TDMonochrome FCOLOR FMONochrome :SYSTem:PRINt:THEMe?
Example	:SYST:PRIN:THEM FCOL
Setup	:SYSTem:DEFault MISC
Preset	FCOL; not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
State Saved	No
Initial S/W Revision	Prior to A.02.00

## Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPY command is equivalent to pressing the PRINT key. The HCOPY:ABORT command can be used to abort a print which is already in progress. Sending HCOPY:ABORT will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORT command.

Key Path	Front-panel key
<b>Remote Command</b>	:HCOPY[:IMMEDIATE]
Initial S/W Revision	Prior to A.02.00

Key Path	SCPI command only
<b>Remote Command</b>	:HCOPY:ABORT
Initial S/W Revision	Prior to A.02.00


## Restore Down

This key allows you to Restore Down the Instrument Application and reverses the action taken by Maximize. This key is only visible when the application has been maximized, and after the Restore Down action has been completed this key is replaced by the Maximize key.

Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

## Minimize

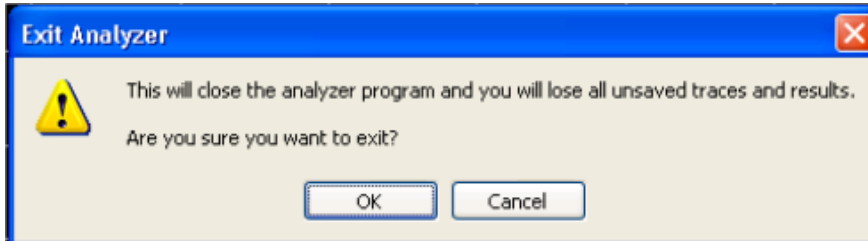
The Minimize key causes the analyzer display to disappear down into the task bar, allowing you to see the

Windows Desktop. You can use Alt-Tab (press and hold the Alt  key and press and release the Tab key) to restore the analyzer display.

Key Path	File
Mode	All
Notes	No equivalent remote command for this key.
State Saved	No
Initial S/W Revision	A.05.01

## Exit

This key, when pressed, will exit the Instrument Application. A dialog box is used to confirm that you intended to exit the application:



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Key Path	File
Mode	All
Notes	The Instrument Application will close. No further SCPI commands can be sent. Use with caution!
Initial S/W Revision	Prior to A.02.00

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## Print

This front-panel key is equivalent to performing a File, Print, OK. It immediately performs the currently configured Print to the Default printer.

The :HCOPY command is equivalent to pressing the PRINT key. The HCOPY:ABORT command can be used to abort a print which is already in progress. Sending HCOPY:ABORT will cause the analyzer to stop sending data to the printer, although the printer may continue or even complete the print, depending on how much data was sent to the printer before the user sent the ABORT command.

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Key Path	Front-panel key
<b>Remote Command</b>	:HCOPY[:IMMEDIATE]
Initial S/W Revision	Prior to A.02.00

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Key Path	SCPI command only
<b>Remote Command</b>	:HCOPY:ABORT
Initial S/W Revision	Prior to A.02.00

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## System

Opens a menu of keys that access various configuration menus and dialogs.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

## Show

Accesses a menu of choices that enable you to select the information window you want to view.

Key Path	System
Mode	All
Remote Command	:SYSTem:SHOW OFF   ERRor   SYSTem   HARDware   LXI   HWSTatistics   ALIGNment   SOFTware   CAPplication  :SYSTem:SHOW?
Example	:SYST:SHOW SYST
Notes	This command displays (or exits) the various System information screens.
Preset	OFF
State Saved	No
Range	OFF  ERRor   SYSTem   HARDware   LXI   HWSTatistics   ALIGNment   SOFTware CAPplication
Initial S/W Revision	Prior to A.02.00

## Errors

There are two modes for the Errors selection, History and Status.

The list of errors displayed in the Errors screen does not automatically refresh. You must press the Refresh key or leave the screen and return to it to refresh it.

History brings up a screen displaying the event log in chronological order, with the newest event at the top. The history queue can hold up to 100 messages (if a message has a repeat count greater than 1 it only counts once against this number of 100). Note that this count bears no relation to the size of the SCPI queue. If the queue extends onto a second page, a scroll bar appears to allow scrolling with a mouse. Time is displayed to the second.

Status brings up a screen summarizing the status conditions currently in effect. Note that the time is displayed to the second.

The fields on the Errors display are:

Type (unlabeled) - Displays the icon identifying the event or condition as an error or warning.

ID - Displays the error number.

Message - Displays the message text.

Repeat (RPT) - This field shows the number of consecutive instances of the event, uninterrupted by other events. If an event occurs 5 times with no other intervening event, the value of repeat will be 5.

If the value of Repeat is 1 the field does not display. If the value of Repeat is >1, the time and date shown are those of the most recent occurrence. If the value of repeat reaches 999,999 it stops there.

Time - Shows the most recent time (including the date) at which the event occurred.

Key Path	System, Show
Mode	All
Remote Command	:SYSTem:ERRor[:NEXT]?
Example	:SYST:ERR?
Notes	The return string has the format: “<Error Number>,<Error>” Where <Error Number> and <Error> are those shown on the Show Errors screen
Backwards Compatibility Notes	In some legacy analyzers, the Repeat field shows the number of times the message has repeated since the last time the error queue was cleared. In the X-Series, the Repeat field shows the number of times the error has repeated since the last intervening error. So the count may very well be different than in the past even for identical signal conditions  Unlike previous analyzers, in the X-Series all errors are reported through the Message or Status lines and are logged to the event queue. They never appear as text in the graticule area (as they sometimes do in previous analyzers) and they are never displayed in the settings panel at the top of the screen (as they sometimes do, by changing color, in previous analyzers).  As a consequence of the above, the user can only see one status condition (the most recently generated) without looking at the queue. In the past, at least in the Spectrum Analyzer, multiple status conditions might display on the right side of the graticule.  In general, there is no backwards compatibility specified or guaranteed between the error numbers in the X-Series and those of earlier products. Error, event, and status processing code in customers' software will probably need to be rewritten to work with X-Series.  In the legacy analyzers, some conditions report as errors and others simply turn on status bits. Conditions that report as errors often report over and over as long as the condition exists. In the X-series, all conditions report as start and stop events. Consequently, software that repeatedly queries for a condition error until it stops reporting will have to be rewritten for the X-series.
Initial S/W Revision	Prior to A.02.00

## Previous Page

See ["Next Page" on page 224.](#)

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

## Next Page

Next Page and Previous Page menu keys move you between pages of the log, if it fills more than one page. These keys are grayed out in some cases:

- If on the last page of the log, the Next Page key is grayed-out
- If on the first page of the log, the Previous Page key is grayed-out.
- If there is only one page, both keys are grayed out.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

## History

The History and Status keys select the Errors view. The Status key has a second line that shows a number in [square brackets]. This is the number of currently open status items.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

## Verbose SCPI On/Off

When you turn Verbose SCPI on, additional information is returned when you send the :SYSTem:ERRor? query. The additional information consists of the characters that stimulated the error. This can aid you in debugging your test programs by indicating where in the parsing of a SCPI command the instrument encountered an invalid command or query.

Specifically, with Verbose SCPI on, the SYSTem:ERRor? query is expanded to show the SCPI data received, with the indicator <Err> at the point in the stream that the error occurred.

Verbose SCPI has no effect on the Show Errors screen or front panel Message Line; it only changes the response to the :SYST:ERR? query.

See the example below, where the invalid command "SENS:BOGUS" is sent:

Normal response to :SYST:ERR (using the Telnet window):

```
SCPI> SENS:BOGUS
```

```
SCPI> SYST:ERR?
```

```
-113,"Undefined header"
```

Now after turning on Verbose SCPI:

```
SCPI> SYST:BOGUS
```

```
SCPI> SYST:ERR?
```

```
-113,"Undefined header;SYST:BOGUS<Err>"
```



Key Path	System, Show, Errors
Mode	All
<b>Remote Command</b>	:SYSTem:ERRor:VERBose OFF ON 0 1 :SYSTem:ERRor:VERBose?
<b>Example</b>	:SYST:ERR:VERB ON
Preset	This is unaffected by Preset but is set to OFF on a "Restore System Defaults->Misc"
State Saved	No
Range	On   Off
Initial S/W Revision	Prior to A.02.00

### Refresh

When pressed, refreshes the Show Errors display.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

### Clear Error Queue

This clears all errors in all error queues.

Note the following:

- Clear Error Queue does not affect the current status conditions.
- Mode Preset does not clear the error queue.
- Restore System Defaults will clear all error queues.
- \*CLS only clears the queue if it is sent remotely and \*RST does not affect any error queue.
- Switching modes does not affect any error queues.

Key Path	System, Show, Errors
Initial S/W Revision	Prior to A.02.00

### Status

See "[History](#)" on page 224.

### Input Overload Enable (Remote Command Only)

Input Overload errors are reported using the Input Overload status bit (bit 12 in the Measurement Integrity status register). Input Overloads (for example, ADC Overload errors) can come and go with great frequency, generating many error events (for example, for signals just on the verge of overload), and so are

not put into the SCPI error queue by default. Normally the status bit is the only way for detecting these errors remotely.

It is possible to enable Input Overload reporting to the SCPI queue, by issuing the :SYSTem:ERRor:OVERload ON command. To return to the default state, issue the :SYSTem:ERRor:OVERload OFF command. In either case, Input Overloads always set the status bit.

**NOTE**

For versions of firmware before A.10.01, the Input Overload was only a Warning and so was never available in the SCPI queue, although it did set the status bit. For A.10.01 and later, the Input Overload is an error and can be enabled to the SCPI queue using this command.

Key Path	SCPI only
Remote Command	:SYSTem:ERRor:OVERload[:STATe] 0 1 OFF ON
Example	:SYST:ERR:OVER 1 Enable overload errors
Preset	Set to OFF by Restore Misc Defaults (no Overload errors go to SCPI)
State Saved	Saved in instrument state.
Initial S/W Revision	A.10.01

### Power Up (Remote Command Only)

This serves to show the errors encountered during the application boot-up, such as: mismatch FW-FPGA, missing Calibration data, missing hardware and construction errors.

Remote Command	:SYSTem:ERRor:PUP?
Notes	<p>If no error occurs, the return value will be: "No Power Up Errors."            Return Value: &lt;list of error strings&gt;.            &lt;List of error strings&gt; is an &lt;IEEE488 Block&gt; format.            Return Value Example:            "Power up errors, see details in Windows Event Log"            "Unmatched FPGA Version(s), See details in Windows Event Log"</p>
Initial S/W Revision	E.14.30

### System

The System screen is formatted into three groupings: product descriptive information, options tied to the hardware, and software products:

```

<Product Name> <Product Description>
Product Number: N9020A
Serial Number: US46220924
Firmware Revision: A.01.01
Computer Name: <hostname>
Host ID: N9020A,US44220924

N9020A-503      Frequency Range to 3.6 GHz
N9020A-PFR     Precision Frequency Reference
N9020A-P03     Preamp 3.6 GHz

N9060A-2FP     Spectrum Analysis Measurement Suite  1.0.0.0
N9073A-1FP     WCDMA                               1.0.0.0
N9073A-2FP     WCDMA with HSDPA                     1.0.0.0

```

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page of information is presently displayed.

Key Path	System, Show
Mode	All
<b>Example</b>	SYST:SHOW SYST
Backwards Compatibility Notes	The hardware statistics that are displayed in the PSA Show System screen have been moved to a dedicated Show Hardware Statistics screen in the Service Menu.
Initial S/W Revision	Prior to A.02.00

### Show System contents (Remote Command Only)

A remote command is available to obtain the contents of the Show System screen (the entire contents, not just the currently displayed page).

<b>Remote Command</b>	:SYSTem:CONFigure[:SYSTem]?
<b>Example</b>	:SYST:CONF?
Notes	The output is an IEEE Block format of the Show System contents. Each line is separated with a new-line character.
Initial S/W Revision	Prior to A.02.00

### Computer System description (Remote Command Only)

A remote command is available to obtain the Computer System description. The Computer System is the operating system and patch level as reported by operating system.

<b>Remote Command</b>	:SYSTem:CSYSem?
<b>Example</b>	:SYST:CSYS?
<b>Notes</b>	The return value is the Computer System name and service pack level.
<b>Initial S/W Revision</b>	Prior to A.12.00

## Hardware

The show hardware screen is used to view details of the installed hardware. This information can be used to determine versions of hardware assemblies and field programmable devices, in the advent of future upgrades or potential repair needs.

The screen is formatted into two groupings: product descriptive information and hardware information. The hardware information is listed in a table format:

Hardware Information									
Agilent EXM Wireless Test Set									
Product Number: E6640A									
Serial Number: US12341234									
Instrument S/W Revision: E.14.00_R0133									
Revision Date: 1/23/2014 10:33:35 AM									
Assembly Name	Part #	Serial #	Matl Rev	Rev	OF Rev	Hw Id	Cal Date	Cal Interval	Misc
Reference	M9300A	MY53000146				0165			
Reference Carrier	M9300A	W1312-63281-23-1306-00076		01	1.2.1	0166			
Reference Plugin	M9300A	W1312-63386-30-1306-00038		01	1.3.0	0167			
Wideband Digitizer	M943063005	111111111111	001	0	0	138			
Downconverter	M943063006	111111111111	001	0	A	139			
RFIO	M943063009	111111111111	001	0	A	140			
Power Supply	M943063002	111111111111	001	0	A	141			
M9430 TRX	1234567890	SN12344321	0	0	0	142	2013.10.02	2 years	
Baseband Generator	M943063007	111111111111	002	0	0	136			
ModulatorSrcOutput	M943063008	111111111111	001	0	A	137			

The Previous Page is grayed-out if the first page of information is presently displayed. The Next Page menu key is grayed-out if the last page of information is presently displayed.

<b>Key Path</b>	System, Show
<b>Mode</b>	All
<b>Example</b>	SYST:SHOW HARD
<b>Initial S/W Revision</b>	Prior to A.02.00

## System Remote Commands (Remote Commands Only)

The commands in this section have no front-panel key equivalent.

"System Powerdown (Remote Command Only)" on page 229

"List installed Options (Remote Command Only)" on page 229

"Lock the Front-panel keys (Remote Command Only)" on page 229

"List SCPI Commands (Remote Command Only)" on page 230

"SCPI Version Query (Remote Command Only)" on page 230

"Date (Remote Command Only)" on page 230

"Time (Remote Command Only)" on page 231

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Initial S/W Revision	Prior to A.02.00
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### System Powerdown (Remote Command Only)

---

<b>Remote Command</b>	SYSTem:PDOWn [NORMal FORCe]
-----------------------	-----------------------------

---

Notes	Shuts down the instrument in the normal way (NORMal) or forced way (FORCe). In case there is another application with modified data pending for saving, the application prompt the user. The system waits until the user responds in the normal mode. It will go off after 20 seconds of wait in the force mode and all data will be lost.
-------	--

---

### List installed Options (Remote Command Only)

Lists the installed options that pertain to the instrument (signal analyzer). .

---

Mode	All
------	-----

---

<b>Remote Command</b>	:SYSTem:OPTions?
-----------------------	------------------

---

<b>Example</b>	:SYST:OPT?
----------------	------------

---

Notes	The return string is a comma separated list of the installed options. For example: "503,P03,PFR" :SYSTem:OPTions? and *OPT? are the same.
-------	---

---

State Saved	No
-------------	----

---

Initial S/W Revision	Prior to A.02.00
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### Lock the Front-panel keys (Remote Command Only)

Disables the instrument keyboard to prevent local input when the instrument is controlled remotely. Annunciation showing a "K" for 'Klock" (keyboard lock) alerts the local user that the keyboard is locked. Klock is similar to the GPIB Local Lockout function; namely that no front-panel keys are active with the exception of the Power Standby key. (The instrument is allowed to be turned-off if Klock is ON.) The Klock command is used in remote control situations where Local Lockout cannot be used.

Although primary intent of Klock is to lock-out the front panel, it will lock-out externally connected keyboards through USB. Klock has no effect on externally connected pointing devices (mice).

The front panel 'Local' key (Cancel/Esc) has no effect if Klock is ON.

Mode	All
<b>Remote Command</b>	:SYSTem:KLOCK OFF ON 0 1 :SYSTem:KLOCK?
<b>Example</b>	:SYST:KLOC ON
Notes	Keyboard lock remains in effect until turned-off or the instrument is power-cycled
Preset	Initialized to OFF at startup, unaffected by Preset
State Saved	No
Initial S/W Revision	Prior to A.02.00

### List SCPI Commands (Remote Command Only)

Outputs a list of the valid SCPI commands for the currently selected Mode.

<b>Remote Command</b>	:SYSTem:HELP:HEADers?
<b>Example</b>	:SYST:HELP:HEAD?
Notes	The output is an IEEE Block format with each command separated with the New-Line character (hex 0x0A)
Initial S/W Revision	Prior to A.02.00

### SCPI Version Query (Remote Command Only)

Returns the SCPI version number with which the instrument complies. The SCPI industry standard changes regularly. This command indicates the version used when the instrument SCPI commands were defined.

<b>Remote Command</b>	:SYSTem:VERSion?
<b>Example</b>	:SYST:VERS?
Initial S/W Revision	Prior to A.02.00

### Date (Remote Command Only)

The recommended access to the Date, Time, and Time zone of the instrument is through the Windows native control (Control Panel or accessing the Task Bar). You may also access this information remotely, as shown in this command and Time (below).

Sets or queries the date in the instrument.

Mode	All
<b>Remote Command</b>	:SYSTem:DATE "<year>,<month>,<day>" :SYSTem:DATE?

<b>Example</b>	:SYST:DATE "2006,05,26"
Notes	<p>&lt;year&gt; is the four digit representation of year. (for example, 2006)</p> <p>&lt;month&gt; is the two digit representation of year. (for example. 01 to 12)</p> <p>&lt;day&gt; is the two digit representation of day. (for example, 01 to 28, 29, 30, or 31) depending on the month and year</p> <p>Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken.</p>
Initial S/W Revision	Prior to A.02.00

### Time (Remote Command Only)

Sets or queries the time in the instrument.

Mode	All
<b>Remote Command</b>	:SYSTem:TIME "<hour>,<minute>,<second>" :SYSTem:TIME?
<b>Example</b>	:SYST:TIME "13,05,26"
Notes	<p>&lt;hour&gt; is the two digit representation of the hour in 24 hour format</p> <p>&lt;minute&gt; is the two digit representation of minute</p> <p>&lt;second&gt; is the two digit representation of second</p> <p>Unless the current account has Power User or Administrator privileges, an error will be generated by this command and no action will be taken.</p>
Initial S/W Revision	Prior to A.02.00

### Module Name (Remote Command Only)

Query only. This will return the name of the instance as displayed on the xSA main window.

Mode	All
<b>Remote Command</b>	:SYSTem:MODule:NAME?
<b>Example</b>	:SYST:MOD:NAME?
Notes	<p>If the first instance displays on the xSA main window, the return string is "TRX1". If the second instance displays on the main window, the return string is "TRX2". If the third instance displays on the main window, the return string is "TRX3". If the fourth instance displays on the main window, the return string is "TRX4".</p>
Preset	Not affected by Preset, reset to "Left" with Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

### Module Index (Remote Command Only)

Query only. This will return the index of this xSA instance. This index is used as the device number in a VISA address (“hslip#”).

Mode	All
<b>Remote Command</b>	:SYSTem:MODule:INDex?
<b>Example</b>	:SYST:MOD:IND?
Notes	It returns 0 if this instance’s device number in a VISA address is 0. It returns 1 if this instance’s device number in a VISA address is 1. It returns 2 if this instance’s device number in a VISA address is 2. It returns 3 if this instance’s device number in a VISA address is 3.
Preset	Not affected by Preset, reset to 0 with Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

### Module Mnemonic (Remote Command Only)

Query only. This will return the mnemonic of the instance as used in the command line “/Process:<mnemonic>” argument.

Mode	All
<b>Remote Command</b>	:SYSTem:MODule:MNEMonic?
<b>Example</b>	:SYST:MOD:MNEM?
Notes	This will return the mnemonic of the instance as used in the command line “/Process:<mnemonic>” argument.
Preset	Not affected by Preset and Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

### Module List (Remote Command Only)

Query only. This will return the list of defined mnemonics that can be used in the command line “/Process:<mnemonic>” argument with corresponding configuration information. The comma separated return values are: mnemonic, display name, Enabled/Disabled, VISA device id (instr# or hslip#), telnet port, socket port, Physics port, Physics configuration tag.

Mode	All
<b>Remote Command</b>	:SYSTem:MODule:LIST?
<b>Example</b>	:SYST:MOD:LIST?
Notes	Example:



---

it returns:

```
TRX1,TRX1,Enabled,0,5023,5025,3574,E6640AModules.config#TRX1
TRX2,TRX2,Disabled,1,5123,5125,3575,E6640AModules.config#TRX2
TRX3,TRX3,Disabled,2,5223,5225,3576,E6640AModules.config#TRX3
TRX4,TRX4,Disabled,3,5323,5325,3577,E6640AModules.config#TRX4
```

---

Preset	Not affected by Preset, reset to 0 with Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

---

### Module Enable (Remote Command Only)

Query and command. The query SYST:MOD:ENAB? "<mnemonic>" returns "0" for disabled, "1" for enabled. The command SYST:MOD:ENAB "<mnemonic>" 0|1 will disable/enable the configuration.

Notes: Enabling a configuration that does not have a HW will result in run-time errors when trying to start that configuration. Trying to disable the default configuration will result in the error: -221, "Setting conflict:Cannot disable default process configuration '<mnemonic>'".

Example:

```
}
```

```
SCPI>>syst:mod:enab? "TRX1"
```

```
<<1
```

```
SCPI>>syst:mod:enab? "TRX2"
```

```
<<0
```

```
SCPI>>syst:err?
```

```
<<+0,"No error"
```

```
SCPI>>syst:mod:enab "TRX1",0
```

```
SCPI>>syst:err?
```

```
<<-221,"Settings conflict;Cannot disable default process configuration 'TRX1'"
```

---

Mode	All
<b>Remote Command</b>	:SYSTem:MODule:ENABle? "<mnemonic>" :SYSTem:MODule:ENABle "<mnemonic>","0 1"

---

### Example

```
:SYST:MOD:ENAB? "TRX1"  
:SYST:MOD:ENAB "TRX4",0
```

---

Preset	Not affected by Preset and Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

### Module Default (Remote Command Only)

Query and command. The query SYST:MOD:DEF? returns the mnemonic of the default configuration. The command SYST:MOD:DEF "mnemonic" will set that configuration as the default. If the configuration was disabled, the module default command on it will enable this configuration.

Example:

```
SCPI>>syst:mod:def?
<<"TRX1"
SCPI>>syst:mod:enab "TRX2",0
SCPI>>syst:mod:enab? "TRX2"
<<0
SCPI>>syst:mod:def "TRX2"
SCPI>>syst:mod:enab? "TRX2"
<<1
SCPI>>syst:mod:def?
<<"TRX2"
```

Mode	All
Remote Command	:SYSTem:MODule:DEFault? :SYSTem:MODule:DEFault "<mnemonic>"
Example	:SYST:MOD:DEF? :SYST:MOD:DEF "TRX1"

Preset	Not affected by Preset, reset to "Left" with Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	A.13.80

### Module Model Number (Remote Command Only)

Query only. The query ":SYST:MODule:MODEl?" will return model number of the current module.

Mode	All
------	-----

<b>Remote Command</b>	:SYSTem:MODule:MODEl?
<b>Example</b>	:SYSTem:MODule:MODEl?
Notes	This query will return model number. e.g. "M9430A"
Preset	Not affected by Preset,
State Saved	No
Initial S/W Revision	E.14.14

### Module Model Serial Number (Remote Command Only)

Query only. The query ":SYST: MODule:SERial?" will return model serial number of the current module.

Mode	All
<b>Remote Command</b>	:SYSTem:MODule:SERial?
<b>Example</b>	:SYSTem:MODule:SERial?
Notes	This query will return model serial number like "SN12344321"
Preset	Not affected by Preset
State Saved	No
Initial S/W Revision	E.14.14

### Power On

Enables you to select how the instrument should power on. The options are: Mode and Input/Output Defaults, User Preset and Last State.

**NOTE** In products that run multiple instances of the X-Series Application, the same Power On type is shared between all the instances.

Key Path	System
Mode	All
<b>Remote Command</b>	:SYSTem:PON:TYPE MODE USER LAST :SYSTem:PON:TYPE?
<b>Example</b>	:SYST:PON:TYPE MODE
Preset	This is unaffected by a Preset but is set to Mode on a "Restore System Defaults->All"
State Saved	No
<b>Backwards Compatibility SCPI</b>	:SYSTem:PON:TYPE PRESet the "PRESet" parameter is supported for backward compatibility only and behaves the same as MODE.
Backwards Compatibility Notes	The Preset Type key in legacy analyzers has been removed, and the Power On toggle key has been replaced by this 1-of-N key in the System menu.
Initial S/W Revision	Prior to A.02.00

## Mode and Input/Output Defaults

When the analyzer is powered on in Mode and Input/Output Defaults, it performs a Restore Mode Defaults to all modes in the instrument and also performs a Restore Input/Output Defaults.

Persistent parameters (such as Amplitude Correction tables or Limit tables) are not affected at power on, even though they are normally cleared by Restore Input/Output Defaults and/or Restore Mode Defaults.

Key Path	System, Power On
Mode	All
<b>Example</b>	SYST:PON:TYPE MODE
Readback Text	Defaults
Initial S/W Revision	Prior to A.02.00

## User Preset

Sets Power On to User Preset. When the analyzer is powered on in User Preset, it will User Preset each mode and switch to the power-on mode. Power On User Preset will not affect any settings beyond what a normal User Preset affects.

**NOTE**

In products that run multiple instances of the X-Series Application, the same User Preset is shared between all the instances.

An instrument could never power up for the first time in User Preset.

Key Path	System, Power On
Mode	All
<b>Example</b>	SYST:PON:TYPE USER
Readback Text	User Preset
Backwards Compatibility Notes	Power On User Preset will cause the instrument to power up in the power-on mode, not the last mode the instrument was in prior to shut down. Also, Power On User Preset will User Preset all modes. This does not exactly match legacy behavior.
Initial S/W Revision	Prior to A.02.00

## Last State

Sets Power On to **Last**. When the analyzer is powered on, it will put all modes in the last state they were in prior to when the analyzer was put into Power Standby and it will wake up in the mode it was last in prior to powering off the instrument. The saving of the active mode prior to shutdown happens behind the scenes when a controlled shutdown is requested by using the front panel power Standby key or by using the remote command SYSTem:PDOWn. The non-active modes are saved as they are deactivated and recalled by Power On Last State.

**NOTE**

In products that run multiple instances of the X-Series Application, each instance has a unique Last State. An instrument can never power up for the first time in Last.

If line power to the analyzer is interrupted, for example by pulling the line cord plug or by switching off power to a test rack, Power On Last State may not work properly. For proper operation, Power On Last State depends on you shutting down the instrument using the Standby key or the SYSTem:PDOWn SCPI command. This will ensure the last state of each mode is saved and can be recalled during a power up.

Key Path	System, Power On
Mode	All
<b>Example</b>	SYST:PON:TYPE LAST
Notes	Power on Last State only works if you have done a controlled shutdown prior to powering on in Last. If a controlled shutdown is not done when in Power On Last State, the instrument will power up in the last active mode, but it may not power up in the active mode's last state. If an invalid mode state is detected, a Mode Preset will occur. To control the shutdown under remote control use the :SYSTem:PDOWn command.
Readback Text	Last State
Backwards Compatibility Notes	It is no longer possible to power-up the analyzer in the last mode the analyzer was running with that mode in the preset state. (ESA/PSA SYST:PRESET:TYPE MODE with SYST:PON:PRESET) You can power-on the analyzer in the last mode the instrument was running in its last state (SYST:PON:TYPE LAST), or you can specify the mode to power-up in its preset state (SYST:PON:MODE <mode>).
Initial S/W Revision	Prior to A.02.00

## Power On Application

Accesses a menu that lists the available Modes and lets you select which Mode is to be the power-on application.

This application is used for Power On Type “Mode and Input/Output Defaults” and Restore System Defaults All.

**NOTE**

In products that run multiple instances of the X-Series Application, the same Power On Application is shared between all the instances.

Key Path	System, Power On
Mode	All
<b>Remote Command</b>	:SYSTem:PON:MODE SA   BASIC   ADEMOD   NFIGURE   PNOISE   CDMA2K   TDSCDMA   VSA   VSA89601   WCDMA   WIMAXOFDMA :SYSTem:PON:MODE?
<b>Example</b>	SYST:PON:MODE SA
Notes	The list of possible modes (and remote parameters) to choose from is dependent on which modes are installed in the instrument.
Preset	This is unaffected by a Preset but is set on a “Restore System Defaults->All” to: SEQAN

---

State Saved	No
Initial S/W Revision	Prior to A.02.00

---

## Configure Applications

The Configure Applications utility can be used to:

- select applications for preload
- determine how many applications can fit in memory at one time
- specify the order of the Modes in the Mode menu.

This utility consists of a window with instructions, a set of “Select Application” checkboxes, a “fuel bar” style memory gauge, and keys that help you set up your configuration.

**NOTE**

In products that run multiple instances of the X-Series Application, the same Configure Applications Utility is shared between all the instances.

For more information, see the following topics:

["Preloading Applications" on page 238](#)

["Access to Configure Applications utility" on page 239](#)

["Virtual memory usage" on page 239](#)

---

Key Path	System, Power On
<b>Example</b>	:SYST:SHOW CAPP Displays the Config Applications screen
Initial S/W Revision	A.02.00

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## Preloading Applications

During runtime, if a Mode that is not preloaded is selected using the Mode menu or sending SCPI commands, there will be a pause while the Application is loaded. During this pause a message that says “Loading application, please wait ...” is displayed. Once loaded, the application stays loaded, so the next time you select it during a session, there is no delay.

Preloading enables you to “preload” at startup, to eliminate the runtime delay. Preloading an application will cause it to be loaded into the analyzer’s memory when the analyzer program starts up. If you do this, the delay will increase the time it takes to start up the analyzer program, but this may be preferable to having to wait the first time you select an application. Note that, once an application is loaded into memory, it cannot be unloaded without exiting and restarting the analyzer program.

Note that there are more applications available for the X-Series than can fit into Windows Virtual Memory. By allowing you to choose which licensed applications to load at startup, the Configure Applications utility allows you to make optimal use of your memory.

### Access to Configure Applications utility

A version of the utility runs the first time you power up the analyzer after purchasing it from Keysight. The utility automatically configures preloads so that as many licensed applications as possible are preloaded while keeping the total estimated virtual memory usage below the limit. This auto-configuration only takes place at the very first run, and after analyzer software upgrades.

You may, at any time, manually call up the Configure Applications utility by pressing System, Power On, Configure Applications, to find a configuration that works best for you, and then restart the analyzer program.

The utility may also be called if, during operation of the analyzer, you attempt to load more applications than can fit in memory at once.

### Virtual memory usage

There are more applications available for the X-Series than can fit into memory at any one time, so the Configure Applications utility includes a memory tracker that serves two purposes:

1. It will not let you preload more applications than will fit into memory at once.
2. You can determine how many of your favorite applications can reside in memory at one time.

The utility provides a graphical representation of the amount of memory (note that the memory in question here is Virtual memory and is a limitation imposed by the operating system, not by the amount of physical memory you have in your analyzer). You select applications to preload by checking the boxes on the left. Checked applications preload at startup. The colored fuel bar indicates the total memory required when all the checked applications are loaded (either preloaded or selected during runtime).

Here is what the fuel bar colors mean:

**RED:** the applications you have selected cannot all fit into the analyzer's memory. You must deselect applications until the fuel bar turns yellow.

**YELLOW:** the applications you have selected can all fit into the analyzer's memory, but there is less than 10% of the memory left, probably not enough to load any other applications, either via preload or by selecting a Mode while the analyzer is running..

**GREEN:** The indicator is green when <90% of the memory limit is consumed. This means the applications you have selected can all fit into the analyzer's memory with room to spare. You will likely be able to load one or more other applications without running out of memory.

### Select All

Marks all applications in the selection list. This allows you to enable all applications licensed on the instrument for pre-loading, or is a convenience for selecting all applications in one operation and then letting you deselect individual applications.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

### Deselect All

Clears the marks from all applications in the selection list, except the Power On application. The Power On application cannot be eliminated from the pre-load list.

---

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

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### Move Up

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application up in the list, thus moving the selected application earlier in the Mode Menu.

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Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

---

### Move Down

The application list is the order that applications appear in the Mode Menu. This key enables you to shift the selected application down in the list, thus moving the selected application later in the Mode Menu.

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Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

---

### Select/Deselect

Toggles the currently highlighted application in the list.

---

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00

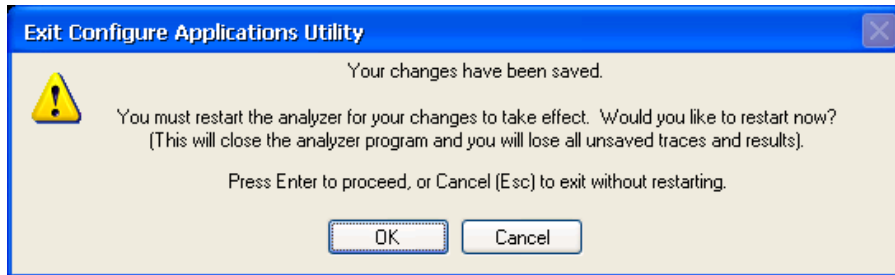
---

### Save Changes and Exit

Applies the configuration of the applications list. The marked applications will be pre-loaded in memory the next time the instrument application is started, and the order of the applications in the list will be the order of the applications in the Mode Menu.

After saving your changes, the analyzer asks you if you would like it to restart so that your changes can take effect (see dialog box, below). If you choose not to restart, the changes will not take effect until the next time you shut down and restart the analyzer.





Key Path	System, Power On, Configure Applications
Remote Command	:SYSTem:PUP:PROcEss
Example	:SYST:PUP:PROC This is the SCPI command for restarting the analyzer. You must Wait after this command for the instrument application to restart
Notes	The softkey will be grayed-out when the virtual memory of the selected applications exceeds 100% of the limit.
Notes	You cannot use *WAI or *OPC? to synchronize operation after a restart. This command stops and restarts the instrument application, thus the SCPI operation is terminated and restarted. A remote program must use fixed wait time to resume sending commands to the instrument. The wait time will be dependent upon which applications are pre-loaded.
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

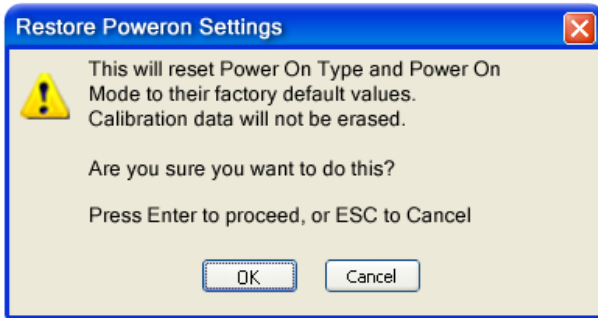
### Exit Without Saving

Pressing this key will exit the Configure Applications utility without saving your changes.

Key Path	System, Power On, Configure Applications
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

### Restore Power On Defaults

This selection causes the Power On Type and Power On Application settings to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On key, under the Restore System Defaults menu, causes the same action.



If you press any key other than OK or Enter, it is construed as a Cancel, because the only path that will actually cause the reset to be executed is through OK or Enter.

---

Key Path	System, Power On
Example	:SYST:DEF PON
Initial S/W Revision	Prior to A.02.00

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### Configure Applications - Instrument boot-up

At start-up of the analyzer program a dialog box similar to the one under the System, Power On, Configure Applications key will be displayed allowing you to choose which licensed applications are to be loaded. This dialog will only be displayed if the memory required to pre-load all of the licensed applications exceeds the Virtual Memory available.

### Configure Applications - Windows desktop

The Configure Applications Utility may be run from the Windows Desktop. The utility is launched by double-



clicking the icon on the desktop, which brings-up a dialog box similar to the one under the System, Power On, Configure Applications key, allowing you to choose which licensed applications are to be loaded when the analyzer program starts up. This dialog box has mouse buttons on it that do the job the softkeys normally do in the System, Power On, Configure Applications menu.

**NOTE**

In products that run multiple instances of the X-Series Application, the same Configure Applications Utility launched from the Windows Desktop will apply to all the instances.

### Configure Applications - Remote Commands

The following topics provide details on using remote commands to configure the list of applications you want to load into the instrument memory or query the Virtual Memory utilization for your applications.

- "Configuration list (Remote Command Only)" on page 243
- "Configuration Memory Available (Remote Command Only)" on page 243
- "Configuration Memory Total (Remote Command Only)" on page 243
- "Configuration Memory Used (Remote Command Only)" on page 243

- "Configuration Application Memory (Remote Command Only)" on page 244

### Configuration list (Remote Command Only)

This remote command is used to set or query the list of applications to be loaded in-memory.

<b>Remote Command</b>	:SYSTem:PON:APPLication:LLISt <string of INSTRument:SElect names> :SYSTem:PON:APPLication:LLISt?
<b>Example</b>	:SYST:PON:APPL:LLIS "SA,BASIC,WCDMA"
<b>Notes</b>	<string of INSTRument:SElect names> are from the enums of the :INSTRument:SElect command. The order of the <INSTRument:SElect names> is the order that the applications are loaded into memory, and the order that they appear in the Mode Menu. Error message -225 "Out of Memory" is reported when more applications are listed than can reside in Virtual Memory. When this occurs, the existing applications load list is unchanged.
<b>Preset</b>	Not affected by Preset
<b>State Saved</b>	Not saved in instrument state
<b>Initial S/W Revision</b>	A.02.00

### Configuration Memory Available (Remote Command Only)

This remote command is used to query the amount of Virtual Memory remaining.

<b>Remote Command</b>	:SYSTem:PON:APPLication:VMEMory[:AVAILable]?
<b>Example</b>	:SYST:PON:APPL:VMEM?
<b>Preset</b>	Not affected by Preset
<b>Initial S/W Revision</b>	A.02.00

### Configuration Memory Total (Remote Command Only)

This remote command is used to query the limit of Virtual Memory allowed for applications.

<b>Remote Command</b>	:SYSTem:PON:APPLication:VMEMory:TOTal?
<b>Example</b>	:SYST:PON:APPL:VMEM:TOT?
<b>Preset</b>	Not affected by Preset
<b>Initial S/W Revision</b>	A.02.00

### Configuration Memory Used (Remote Command Only)

This remote command is a query of the amount of Virtual Memory used by all measurement applications.

<b>Remote Command</b>	:SYSTem:PON:APPLication:VMEMory:USED?
<b>Example</b>	:SYST:PON:APPL:VMEM:USED?

Preset	Not affected by Preset
Initial S/W Revision	A.02.00

### Configuration Application Memory (Remote Command Only)

This remote command is used to query the amount of Virtual Memory a particular application consumes.

<b>Remote Command</b>	:SYSTem:PON:APPLication:VMEMory:USED:NAME? <INSTrument:SElect name>
<b>Example</b>	:SYST:PON:APPL:VMEM:USED:NAME? CDMA2K
<b>Notes</b>	<INSTrument:SElect name> is from the enums of the :INSTrument:SElect command Value returned will be 0 (zero) if the name provided is invalid.
Preset	Not affected by Preset
Initial S/W Revision	Prior to A.02.00

### Alignments

The Alignments Menu controls and displays the automatic alignment of the instrument, and provides the ability to restore the default alignment values.

The current setting of the alignment system is displayed in the system Settings Panel along the top of the display, including a warning icon for conditions that may cause specifications to be impacted.



Key Path	System
Initial S/W Revision	Prior to A.02.00

### Align Now

Accesses alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Key Path	System, Alignments
Initial S/W Revision	Prior to A.02.00

### All (Daily use)

Immediately executes an alignment of all subsystems which includes both the source and the analyzer in the TRX module. The “All” alignment is sufficient to maintain specified performance, provided that (1) the TRX’s internal temperature has not drifted more than +/-5 degree C since the previous alignment, and (2) no more than 8 hours have elapsed since the previous “All” alignment., and (3) no more than 1 week has elapsed since these three alignments have all been run: IF, RF, and Source, and (4) a 45 minute warm-up

period between power-up of the TRX and invoking the “All” alignment. The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the Restart key).

If an interfering user signal is present at the RF Input, the alignment is performed on all subsystems except the RF. After completion, the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference” is generated. In addition the Error Condition message “Align Now, RF required” is generated, and bits 11 and 12 are set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration[:ALL]? or \*CAL?) invokes the alignment of all subsystems and returns a success or failure value. An interfering user signal is not grounds for failure; if the alignment was able to succeed on all portions but unable to align the RF because of an interfering signal, the resultant will be the success value.

Successful completion of Align Now, All will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

If the Align RF subsystem succeeded in aligning (no interfering signal present), the elapsed time counter begins for Last Align Now, RF Time, and the temperature is captured for the Last Align Now, RF Temperature. In addition the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4.8 GHz interference” are cleared, the Error Condition “Align Now, RF required” is cleared, and bits 11 and 12 are cleared in the Status Questionable Calibration register.

Align Now, All can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be employed for an individual subsystem, but not a cohesive set of data for all subsystems.

In many cases, you might find it more convenient to change alignments to Normal, instead of executing Align Now, All. When the Auto Align process transitions to Normal, the analyzer will immediately start to update only the alignments that have expired, thus efficiently restoring the alignment process.

**NOTE**

In EXM, Source ARB play will be turned off and the source states will not be restored after Align Now, All.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration[:ALL] :CALibration[:ALL]?
Example	:CAL
Notes	:CALibration[:ALL]? returns 0 if successful :CALibration[:ALL]? returns 1 if failed :CALibration[:ALL]? is the same as *CAL? While Align Now, All is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command.

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	<p>Successful completion will clear bit 14 in the Status Questionable Calibration register.</p> <p>An interfering user signal is not grounds for failure of Align Now, All. However, bits 11 and 12 are set in the Status Questionable Calibration register to indicate Align Now, RF is required.</p> <p>An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.</p>
Couplings	<p>Initializes the time for the Last Align Now, All Time.</p> <p>Records the temperature for the Last Align Now, All Temperature.</p> <p>If Align RF component succeeded, initializes the time for the Last Align Now, RF Time.</p> <p>If Align RF component succeeded, records the temperature for the Last Align Now, RF Temperature.</p>
Status Bits/OPC dependencies	<p>Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.</p>
Initial S/W Revision	<p>Prior to A.02.00</p>

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Mode	All
<b>Remote Command</b>	*CAL?
<b>Example</b>	*CAL?
Notes	<p>*CAL? returns 0 if successful</p> <p>*CAL? returns 1 if failed</p> <p>:CALibration[:ALL]? is the same as *CAL?</p> <p>See additional remarks described with :CALibration[:ALL]?</p> <p>Everything about :CALibration[:ALL]? is synonymous with *CAL? including all conditions, status register bits, and couplings</p>
Initial S/W Revision	Prior to A.02.00

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Mode	All
<b>Remote Command</b>	:CALibration[:ALL]:NPENding
<b>Example</b>	CAL:NPEN
Notes	<p>:CALibration[:ALL]:NPENding is the same as :CALibration[:ALL] including all conditions, status register bits, except this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not.</p> <p>Typical usage is:</p> <ol style="list-style-type: none"> <li>1) :CALibration:ALL:NPENding (Start a calibration)</li> <li>2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared )</li> <li>3) :STATus:QUEStionable:CALibration:CONDition? (Check if there are any errors/failures in previous calibration procedure)</li> </ol>
Initial S/W Revision	X.14.20

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## All but RF

Immediately executes an alignment of all subsystems except the RF subsystem which includes both the source and the analyzer in the TRX module. The instrument will stop any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key). This can be used to align portions of the instrument that are not impacted by an interfering user input signal.

This operation might be chosen instead of All if you do not want the device under test to experience a large change in input impedance, such as a temporary open circuit at the analyzer input.

The query form of the remote commands (:CALibration:NRF?) will invoke the alignment and return a success or failure value.

Successful completion of Align Now, All but RF will clear the “Align Now, All required” Error Condition, and clear bit 14 in the Status Questionable Calibration register. If “Align Now, All required” was in effect prior to executing the All but RF, the Error Condition message “Align Now, RF required” is generated and bit 12 in the Status Questionable Calibration register is set. It will also begin the elapsed time counter for Last Align Now, All Time, and capture the Last Align Now, All Temperature.

Align Now, All but RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs the Error Condition message “Align Now, All required” is generated, and bit 14 is set in the Status Questionable Condition register. This is because new alignment data may be used for an individual subsystem, but not a full new set of data for all subsystems.

**NOTE**

In EXM, Source ARB play will be turned off and the source states will not be restored after Align Now, All but RF.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration:NRF :CALibration:NRF?
Example	:CAL:NRF
Notes	:CALibration:NRF? returns 0 if successful :CALibration:NRF? returns 1 if failed While Align Now, All but RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register and set bit 12 if invoked with “Align Now, All required”.
Couplings	Initializes the time for the Last Align Now, All Time. Records the temperature for the Last Align Now, All Temperature.
Status Bits/OPC dependencies	Bits 12 or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00

Mode	All
Remote Command	:CALibration:NRF:NPENding
Example	CAL:NRF:NPEN
Notes	:CALibration:NRF:NPENding is the same as :CALibration:NRF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1):CALibration:NRF:NPENding (start theAll but RF calibration) 2):STATus:OPERation:CONDition? (If bit 0 is set, then the system is doing calibration, the user should do re-query until this bit is cleared ) 3):STATus:QUEStionable:CALibration:CONDition? ( to check if there are any errors/failures in previous calibration procedure)
Initial S/W Revision	X.14.20

### RF (Weekly use)

Immediately executes an alignment of the RF subsystem which includes both the source and the analyzer in the TRX module . The instrument stops any measurement currently underway, performs the alignment, then restarts the measurement from the beginning (similar to pressing the Restart key).

This alignment corrects slow-rate drift which does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >2 minutes to complete.

This operation might be desirable if the alignments had been set to not include RF alignments, or if previous RF alignments could not complete because of interference which has since been removed.

If an interfering user signal is present at the RF Input, the alignment will terminate and generate the Error Condition message “Align skipped: 50 MHz interference” or “Align skipped: 4.8 GHz interference”, and Error Condition “Align Now, RF required”. In addition, bits 11 and 12 will be set in the Status Questionable Calibration register.

The query form of the remote commands (:CALibration:RF?) will invoke the alignment of the RF subsystem and return a success or failure value. An interfering user signal is grounds for failure.

Successful completion of Align Now, RF will begin the elapsed time counter for Last Align Now, RF Time, and capture the Last Align Now, RF Temperature.

Align Now, RF can be interrupted by pressing the Cancel (ESC) front-panel key or remotely with Device Clear followed by the :ABORt SCPI command. When this occurs, the Error Condition message “Align Now, RF required” is generated, and bit 12 is set in the Status Questionable Condition register. None of the new alignment data is used.

**NOTE**

In EXM, Source ARB play will be turned off and the source states will not be restored after Align Now, All but RF.



Key Path	System, Alignments, Align Now
Mode	All
<b>Remote Command</b>	:CALibration:RF :CALibration:RF?
<b>Example</b>	:CAL:RF
Notes	<p>:CALibration:RF? returns 0 if successful</p> <p>:CALibration:RF? returns 1 if failed (including interfering user signal)</p> <p>While Align Now, RF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register.</p> <p>This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command.</p> <p>Successful completion clears the Error Conditions “Align skipped: 50 MHz interference” and “Align skipped: 4800 MHz interference” and the Error Conditions “Align RF failed” and “Align Now, RF required”, and clears bits 3, 11, and 12 in the Status Questionable Calibration register.</p> <p>A failure encountered during alignment will generate the Error Condition message “Align RF failed” and set bit 3 in the Status Questionable Calibration register.</p> <p>An interfering user signal will result in bits 11 and 12 to be set in the Status Questionable Calibration register to indicate Align Now, RF is required.</p> <p>An interfering user supplied signal will result in the instrument requiring an Align Now, RF with the interfering signal removed.</p>
Couplings	<p>Initializes the time for the Last Align Now, RF Time.</p> <p>Records the temperature for the Last Align Now, RF Temperature.</p>
Status Bits/OPC dependencies	Bits 11, 12, or 14 may be set in the Status Questionable Calibration register.
Initial S/W Revision	Prior to A.02.00
Mode	All
<b>Remote Command</b>	:CALibration:RF:NPENding
<b>Example</b>	CAL:RF:NPEN
Notes	<p>:CALibration:RF:NPENding is the same as :CALibration:RF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not.</p> <p>Typical usage is:</p> <ol style="list-style-type: none"> <li>1):CALibration:RF:NPENding (Start a RF calibration)</li> <li>2):STATus:OPERation:CONDition? (If bit 0 is set, then the system is doing calibration, the user should do re-query until this bit is cleared )</li> <li>3):STATus:QUESTionable:CALibration:CONDition? ( to check if there are any errors/failures in previous calibration procedure)</li> </ol>
Initial S/W Revision	X.14.20

### Source (Weekly use)

Accesses source alignment processes that are immediate action operations. They perform complete operations and run until they are complete.

Immediately executes an IQ alignment, and power level alignment. The instrument stops any sequence of the source, performs the alignment, then restarts the sequence from the beginning.

This alignment corrects slow-rate drift which does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >2 minutes to complete.

There is no alert available for the source alignment. The operators have the responsibility to check temperature shift since last Align Now, Source to determine if the source alignment needs to be executed.

Key Path	System, Alignments, Align Now
Mode	All
Remote Command	:CALibration:INTernal:SOURce[:ALL] :CALibration:INTernal:SOURce[:ALL]?
Example	:CAL:INT:SOUR
Notes	:CAL:SOUR? Initiates an Alignment and returns 0 if successful :CAL:SOUR? Initiates an Alignment and returns 1 if failed
Couplings	Initializes the time for the Last Align Source Now, All Time. Records the temperature for the Last Align Source Now, All Temperature.
Initial S/W Revision	A.05.00

Mode	All
Remote Command	:CALibration:INTernal:SOURce[:ALL]:NPENDING
Example	CAL:INT:SOUR:NPEN
Notes	:CALibration:INTernal:SOURce[:ALL]:NPENDING is the same as :CALibration:INTernal:SOURce[:ALL] including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully completed or not. Typical usage is: 1):CALibration:INTernal:SOURce:NPENDING (start an internal source calibration) 2):STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared ) 3):STATus:QUESTionable:CALibration:EXTended:FAILure:CONDition? (Check if bit 14 is set or not. If this bit is set, that means there are some errors in previous internal source calibration)
Initial S/W Revision	X.14.20

**IF Alignment (Weekly use) (Remote Command Only)**

Immediately executes an alignment of the IF subsystem which includes both the source and the analyzer in the TRX module. The instrument stops any measurement currently underway, perform the alignment, and then restart the measurement from the beginning (similar to pressing the Restart key). This alignment corrects slow-rate which the drift does not impair specifications for time periods shorter than one week. Thus, it is required to perform this alignment on a weekly basis to maintain specifications. This alignment typically takes >4 minutes to complete.

A failure of IF will set the Error Condition “Align IF failed” and set bit 4 in the Status Questionable Calibration register. A failure will not employ new IF alignment data.

Successful completion of IF will clear the Error Condition “Align IF failed” and clear bit 6 in the Status Questionable Calibration register.

Align IF can be interrupted by pressing the Cancel (ESC) front-panel key or from remote with Device Clear followed by the :ABORt SCPI command. When this occurs, no new IF alignment data will be employed.

The query form of the remote commands (:CALibration:IF?) will invoke the alignment of the IF subsystem and return a success or failure value.

Note: In EXM, Source ARB play will be turned off and the source states will not be restored after IF Alignment.

Mode	All
<b>Remote Command</b>	:CALibration:IF :CALibration:IF?
<b>Example</b>	:CAL:IF
Notes	:CALibration:IF? returns 0 if successful :CALibration:IF? returns 1 if failed While Align Now, IF is performing the alignment, bit 0 in the Status Operation register is set. Completion, or termination, will clear bit 0 in the Status Operation register. This command is sequential; it must complete before further SCPI commands are processed. Interrupting the alignment from remote is accomplished by invoking Device Clear followed by the :ABORt command. Successful completion will clear bit 14 in the Status Questionable Calibration register.
Preset	Not affected by Preset and Restore System Defaults Misc.
State Saved	No
Initial S/W Revision	E.14.00

Mode	All
<b>Remote Command</b>	:CALibration:IF:NPENding
<b>Example</b>	CAL:IF:NPEN
Notes	:CALibration:IF:NPENding is the same as :CALibration:IF including all conditions, status register bits, except that this scpi command does not BLOCK the scpi session, so the user should use status register bits to query if the calibration is successfully

completed or not.

Typical usage is:

- 1) :CALibration:IF:NPENDING (Start a IF calibration)
- 2) :STATus:OPERation:CONDition? (Check if the calibration is completed or not, If bit 0 is set, then the system is doing calibration, the user should repeat this scpi query until the bit is cleared )
- 3):STATus:QUEStionable:CALibration:CONDition? (Check if bit 4 is set or not. If this bit is set, that means there are some errors in previous internal source calibration)

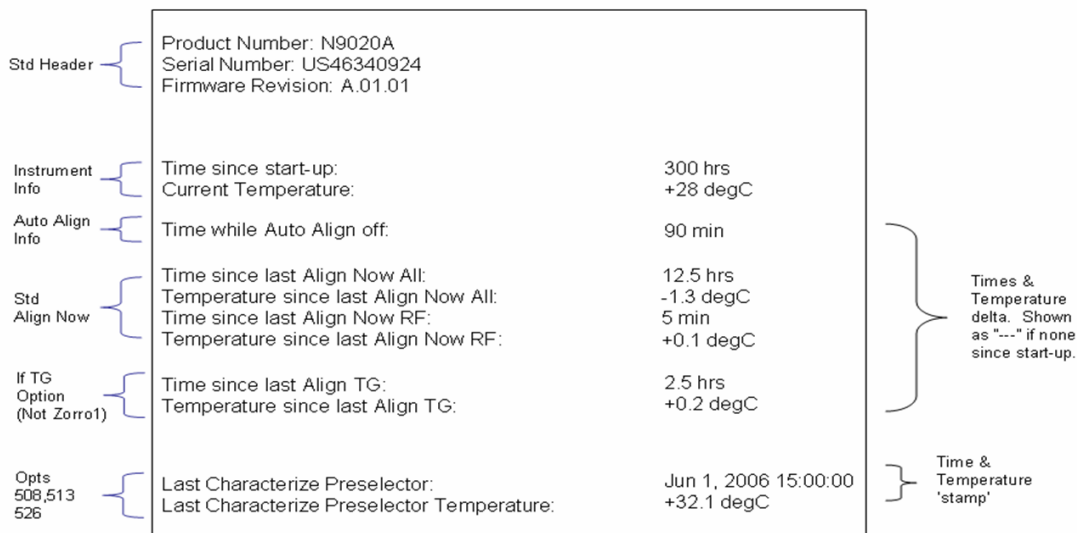
Initial S/W Revision X.14.20

### Show Alignment Statistics

Shows alignment information you can use to ensure that the instrument is operating in a specific manner. The Show Alignment Statistics screen is where you can view time and temperature information.

Values which are displayed are only updated when the Show Alignment Statistics screen is invoked, they are not updated while the Show Alignment Statistics screen is being displayed. The remote commands that access this information obtain current values.

An example of the Show Alignment Statistics screen would be similar to:



A successful Align Now, RF will set the Last Align RF temperature to the current temperature, and reset the Last Align RF time. A successful Align Now, All or Align Now, All but RF will set the Last Align Now All temperature to the current temperature, and reset the Last Align Now All time. A successful Align Now, All will also reset the Last Align RF items if the RF portion of the Align Now succeeded.

Key Path	System, Alignments
Mode	All
Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while

	the screen is being displayed.
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:SYSTem:PON:TIME?
<b>Example</b>	:SYST:PON:TIME?
Notes	Value is the time since the most recent start-up in seconds.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:CALibration:TEMPerature:CURRent?
<b>Example</b>	:CAL:TEMP:CURR?
Notes	Value is in degrees Centigrade. Value is invalid if using default alignment data (Align Now, All required)
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:CALibration:TIME:LALL?
<b>Example</b>	:CAL:TIME:LALL?
Notes	Value is the elapsed time, in seconds, since the last successful Align Now, All or Align Now, All but RF was executed.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:CALibration:TEMPerature:LALL?
<b>Example</b>	:CAL:TEMP:LALL?
Notes	Value is in degrees Centigrade at which the last successful Align Now, All or Align Now, All but RF

	was executed.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:CALibration:TIME:LRF?
<b>Example</b>	:CAL:TIME:LRF?
Notes	Value is the elapsed time, in seconds, since the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:CALibration:TEMPerature:LRF?
<b>Example</b>	:CAL:TEMP:LRF?
Notes	Value is in degrees Centigrade at which the last successful Align Now, RF was executed, either individually or as a component of Align Now, All.
State Saved	No
Initial S/W Revision	Prior to A.02.00

Key Path	SCPI Only
Mode	All
<b>Remote Command</b>	:CALibration:TIME:LIF?
<b>Example</b>	:CAL:TIME:LIF?
Notes	Value is the elapsed time, in seconds, since the last successful Align IF was executed.
State Saved	No
Initial S/W Revision	A.14.50

Key Path	SCPI Only
Mode	All
<b>Remote Command</b>	:CALibration:TEMPerature:LIF?

<b>Example</b>	:CAL:TEMP:LIF?
Notes	Value is in degrees Centigrade at which the last successful Align IF was executed.
State Saved	No
Initial S/W Revision	A.14.50

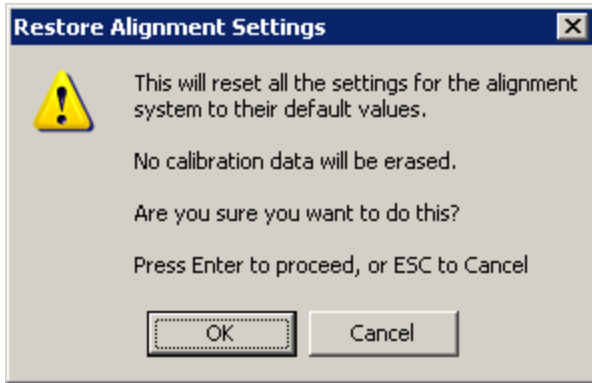
Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:CALibration:TIME:SOURce:LALL?
<b>Example</b>	:CAL:TIME:SOUR:LALL?
Notes	Value is the date and time of the last successful Align Now, Source was performed on the instrument.
State Saved	No
Initial S/W Revision	A.05.00

Key Path	Visual annotation in the Show Alignment Statistics screen
Mode	All
<b>Remote Command</b>	:CALibration:TEMPerature:SOURce: LALL?
<b>Example</b>	:CAL:TEMP:SOUR:LALL?
Notes	Value is in degrees Centigrade at which the last successful Align Now, Source was performed on the instrument.
State Saved	No
Initial S/W Revision	A.05.00

## Restore Align Defaults

Initializes the alignment user interface settings, not alignment data, to the factory default values. Align Now, All must be executed if the value of the Timebase DAC results in a change.

For front panel operation, you are prompted to confirm action before setting the alignment parameters to factory defaults:



The parameters affected are:

Parameter	Setting
Timebase DAC	Calibrated
Timebase DAC setting	Calibrated value
Auto Align State	Normal (if the instrument is not operating with default alignment data, Off otherwise)
Auto Align All but RF	Off
Auto Align Alert	Time & Temperature

Key Path	System, Alignments
Mode	All
<b>Example</b>	:SYST:DEF ALIG
Notes	Alignment processing that results as the transition to Auto Alignment Normal will be executed sequentially; thus *OPC? or *WAI will wait until the alignment processing is complete.
Initial S/W Revision	Prior to A.02.00

### Execute Expired Alignments (Remote Command Only)

Alignments can be expired in the situation where Auto Align is in the state of Partial or Off. This feature runs the alignments that have expired. This is different than performing an Align All, Now operation. Align All, Now performs an alignment of all subsystems regardless of whether they are needed or not, with Execute Expired Alignments, only the individual subsystems that have become due are aligned.

Mode	All
<b>Remote Command</b>	:CALibration:EXPIred?
<b>Example</b>	:CAL:EXP?
Notes	:CALibration:EXPIred? returns 0 if successful :CALibration:EXPIred? returns 1 if failed
Initial S/W Revision	Prior to A.02.00



## I/O Config

Activates a menu for identifying and changing the I/O configuration for remote control.

Key Path	System
Initial S/W Revision	Prior to A.02.00

## SCPI LAN

Activates a menu for identifying and changing the SCPI over a LAN configuration. There are a number of different ways to send SCPI remote commands to the instrument over LAN. It can be a problem to have multiple users simultaneously accessing the instrument over the LAN. These keys limit that somewhat by disabling the telnet, socket, and/or SICL capability.

**NOTE** Telnet port 5023, socket port 5025, SICL server 0 and HiSLIP server 0 will be assigned to first instance; Telnet port 5123, socket port 5125, SICL server 1 and HiSLIP server 1 will be assigned to second instance; Telnet port 5223, socket port 5225, SICL server 2 and HiSLIP server 2 will be assigned to third instance; Telnet port 5323, socket port 5325, SICL server 3 and HiSLIP server 3 will be assigned to the fourth instance.

Key Path	System, I/O Config
Initial S/W Revision	Prior to A.02.00

## SCPI Telnet

Turns the SCPI LAN telnet capability On or Off allowing you to limit SCPI access over LAN through telnet.

Key Path	System, I/O Config, SCPI LAN
Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:TELNet:ENABle?
Example	:SYST:COMM:LAN:SCPI:TELN:ENAB OFF
Preset	This is unaffected by Preset but is set to ON with a "Restore System Defaults->Misc"
State Saved	No
Range	On   Off
Initial S/W Revision	Prior to A.02.00

## SCPI Socket

Turns the capability of establishing Socket LAN sessions On or Off. This allows you to limit SCPI access over LAN through socket sessions.

Key Path	System, I/O Config, SCPI LAN
Mode	All
<b>Remote Command</b>	:SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SOCKet:ENABle?
<b>Example</b>	:SYST:COMM:LAN:SCPI:SOCK:ENAB OFF
Preset	This is unaffected by a Preset but is set to ON with a "Restore System Defaults->Misc"
State Saved	No
Range	On   Off
Initial S/W Revision	Prior to A.02.00

### SICL Server

Turns the SICL server capability On or Off, enabling you to limit SCPI access over LAN through the SICL server. (SICL IEEE 488.2 protocol.)

Parameter	Description	Setting
Maximum Connections	The maximum number of connections that can be accessed simultaneously	5
Instrument Name	The name (same as the remote SICL address) of your analyzer	inst0
Instrument Logical Unit	The unique integer assigned to your analyzer when using SICL LAN	8
Emulated GPIB Name	The name (same as the remote SICL address) of the device used when communicating with your analyzer	gpib7
Emulated GPIB Logical Unit	The unique integer assigned to your device when it is being controlled using SICL LAN	8
Emulated GPIB Address	The emulated GPIB address assigned to your transmitter tester when it is a SICL server (the same as your GPIB address)	18

Key Path	System, I/O Config, SCPI LAN
Mode	All
<b>Remote Command</b>	:SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:SICL:ENABle?
<b>Example</b>	:SYST:COMM:LAN:SCPI:SICL:ENAB OFF
Preset	This is unaffected by Preset, but is set to ON with a "Restore System Defaults->Misc"
State Saved	No
Range	On   Off
Initial S/W Revision	Prior to A.02.00

## HiSLIP Server

Turns the HiSLIP server capability On or Off, enabling you to limit SCPI access over LAN through the HiSLIP server.

HiSLIP stands for High Speed LAN Instrument Protocol and is part of the IVI–6.1 specification.

Here is an example of a VISA connection string used to connect to the HiSLIP Server on an X-Series Spectrum Analyzer:

```
TCPIP0::a-n9030a-93016::hislip0::INSTR
```

In the example above, hislip0 is the HiSLIP device name that VISA users must include in their HiSLIP VISA Address strings. Your HiSLIP device name may be different depending on your VISA settings.

Key Path	System, I/O Config, SCPI LAN
Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle OFF ON 0 1 :SYSTem:COMMunicate:LAN:SCPI:HISLip:ENABle?
Example	:SYST:COMM:LAN:SCPI:HISL:ENAB OFF
Preset	This is unaffected by Preset, but is set to ON with a “Restore System Defaults-> Misc”
State Saved	No
Range	On   Off
Initial S/W Revision	A.11.00

## SCPI Socket Control Port (Remote Command Only)

Returns the TCP/IP port number of the control socket associated with the SCPI socket session. This query enables you to obtain the unique port number to open when a device clear is to be sent to the instrument. Every time a connection is made to the SCPI socket, the instrument creates a peer control socket. The port number for this socket is random. The user must use this command to obtain the port number of the control socket. To force a device clear on this socket, open the port and send the string “DCL ” to the instrument.

If this SCPI command is sent to a non SCPI Socket interface, then 0 is returned.

Mode	All
Remote Command	:SYSTem:COMMunicate:LAN:SCPI:SOCKet:CONTRol?
Example	:SYST:COMM:LAN:SCPI:SOCK:CONT?
Preset	This is unaffected by Preset or “Restore System Defaults-> Misc”.
State Saved	No
Range	0 to 65534
Min	0
Max	65534
Initial S/W Revision	Prior to A.02.00

## System IDN Response

This key allows you to specify a response to the \*IDN? query, or to return the analyzer to the Factory response if you have changed it.

To choose the factory-set response, press the Factory key.

To specify your own response, press the User key, and enter your desired response.

If your test software is expecting the response to indicate Agilent Technologies as the Manufacturer, you can conveniently configure the response by pressing the Agilent key.

Key Path	System, I/O Config
Mode	All
<b>Remote Command</b>	
Notes	<ul style="list-style-type: none"> <li>• This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode..</li> <li>• It survives shutdown and restart of the software and therefore survives a power cycle</li> </ul>
Preset	This is unaffected by Preset but is set to Factory on a "Restore System Defaults->Misc"
State Saved	No
Initial S/W Revision	A.06.00
Modified at S/W Revision	x.14.50

## Factory

This key selects the factory setting, for example:

"Agilent Technologies,E6640,MY00012345, E.14.50"

where the fields are manufacturer, model number, serial number, firmware revision.

Note: In products that run multiple instances of the X-Series Application, all instances use the same factory System IDN response.

Key Path	System, I/O Config, IDN Response
<b>Example</b>	:SYST:IDN:CONF FACT
Initial S/W Revision	A.06.0

## User

This key allows you to specify your own response to the \*IDN? query. You may enter your desired response with the Alpha Editor or a plugin PC keyboard.

When you press this key, the active function becomes the current User string with the cursor at the end. This makes it easy to edit the existing string.

If you enter a null string (for example, by clearing the User String while editing and then pressing Done) the analyzer automatically reverts to the Factory setting.

Note: In products that run multiple instances of the X-Series Application, all instances use the same User System IDN response.

Key Path	System, I/O Config, IDN Response
<b>Example</b>	:SYST:IDN:CONF USER
Initial S/W Revision	A.06.00

### SYSTEM:IDN Response setting (Remote command)

This SCPI command is used to set or clear the User SYSTEM:IDN response.

<b>Remote Command</b>	:SYSTem:IDN <string> :SYSTem:IDN?
Notes	<ul style="list-style-type: none"> <li>• The format of the &lt;string&gt; must be four fields each separated by a comma, example: :SYST:IDN "XYZ Corp,Model 12,012345,A.01.01"</li> <li>• The four fields are &lt;manufacturer&gt;, &lt;model number&gt;, &lt;serial number&gt;, &lt;firmware revision&gt;. Thus, the text within a field cannot contain a comma.</li> <li>• This affects the response given in all Modes of the Analyzer, unless the current Mode has also specified a custom response, in which case the current Mode's custom IDN response takes precedence over the System's, but only while that Mode is the current Mode..</li> <li>• It survives shutdown and restart of the software and therefore survives a power cycle</li> <li>• Null string as parameter restores the Factory setting, example: :SYST:IDN ""</li> </ul>
Preset	This is unaffected by Preset but is set to the original factory setting on a "Restore System Defaults->Misc"
Initial S/W Revision	A.06.00

### Restore Defaults

Provides incremental initialization of the system setting groups along with supporting a comprehensive reset of the entire instrument back to a factory default state. The menu selections are the groups of system settings and when one is selected, that particular group of system settings is reset back to their default values.

#### NOTE

In products that run multiple instances of the X-Series Application, all instances have the same factory default states for Restore Defaults.

Key Path	System
Mode	All
<b>Remote Command</b>	:SYSTem:DEFault [ALL]   ALIGn   INPut   MISC   MODes   PON

---

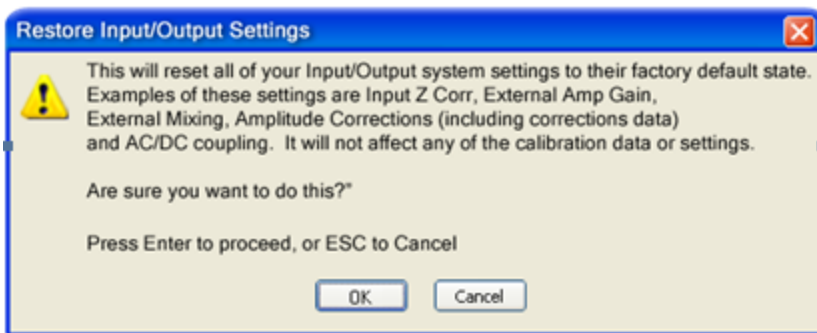
<b>Example</b>	SYST:DEF
State Saved	No
Initial S/W Revision	Prior to A.02.00

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### Restore Input/Output Defaults

Causes the group of settings and data associated with Input/Output front-panel key to be a reset to their default values. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. .

Confirmation is required to restore the Input/Output setting. The confirmation dialog is:



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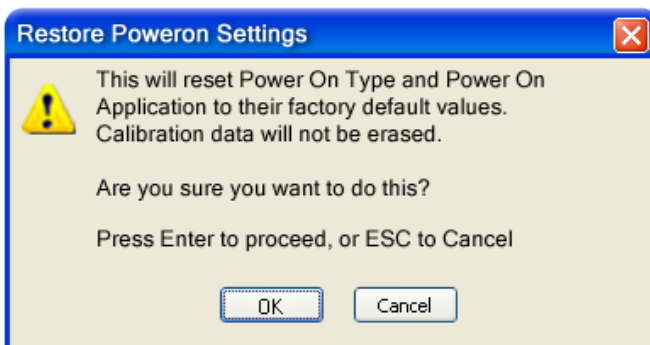
Key Path	System, Restore System Defaults
<b>Example</b>	:SYST:DEF INP
Initial S/W Revision	Prior to A.02.00

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### Restore Power On Defaults

This selection causes the Power On settings to be a reset to their default value. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. The Power On settings and their default values are Power On Type reset to Mode and Input/Output Defaults and Power On Application reset to whatever the factory set as its default value.

Confirmation is required to restore the factory default values. The confirmation dialog is:



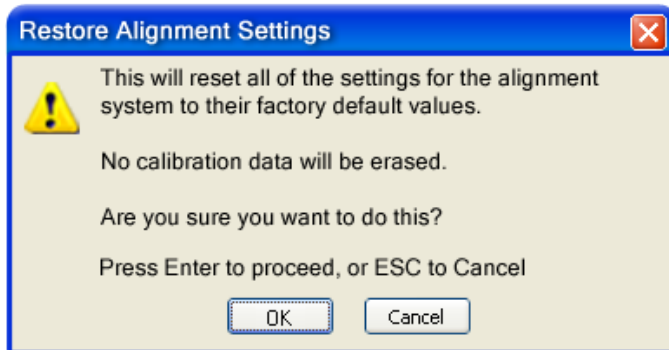
Key Path	System, Restore System Defaults
<b>Example</b>	:SYST:DEF PON
Initial S/W Revision	Prior to A.02.00

## Restore Align Defaults

This selection causes the Alignment system settings to be a reset to their default values. This does not affect any Alignment data stored in the system. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch.

After performing this function, it may impact the auto-alignment time of the instrument until a new alignment baseline has been established.

Confirmation is required to restore the factory default values. The confirmation dialog is:



Key Path	System, Restore System Defaults
<b>Example</b>	:SYST:DEF ALIG
Initial S/W Revision	Prior to A.02.00

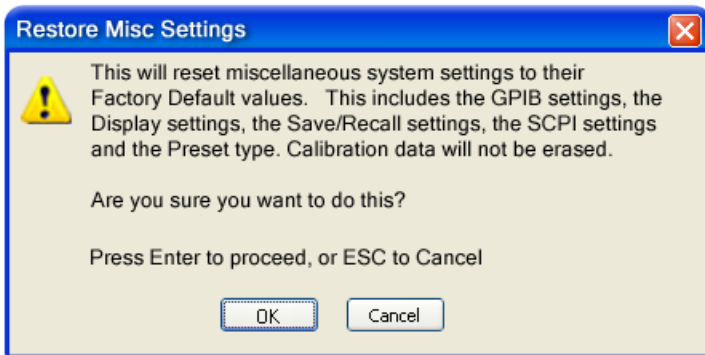
## Restore Misc Defaults

This selection causes miscellaneous system settings to be reset to their default values. With this reset, you lose the GPIB address and it is reset to 18, so this should be used with caution. This level of Restore System Defaults does not affect any other system settings, mode settings and does not cause a mode switch. This miscellaneous group contains the rest of the settings that have not been part of the other Restore System Defaults groups. The following table is a complete list of settings associated with this group:

Miscellaneous Setting	Default Value
Verbose SCPI	Off
The SYST:PRES:TYPE	MODE
Auto File Name Number	000

Miscellaneous Setting	Default Value
Save Type	State
State Save To	Register 1
Screen Save To	SCREEN000.png
DISP:ENABle	ON
Full Screen	Off
SCPI Telnet	ON
SCPI Socket	ON
SICL Server	ON
Softkey Language	English
System Annotation	ON
Display Theme	TDColor
System IDN Response	Factory result of *IDN?
System IDN Response selection	Factory

Confirmation is required to restore the factory default values. The confirmation dialog is:



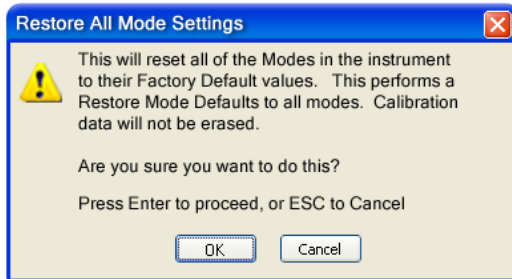
Key Path	System, Restore System Defaults
<b>Example</b>	:SYST:DEF MISC
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	x.14.50



## Restore Mode Defaults (All Modes)

This selection resets all of the modes in the instrument back to their default state just as a Restore Mode Defaults does and it switches the instrument to the power-on mode and causes the default measurement for the power-on mode to be active. This level of Restore System Defaults does not affect any system settings, but it does affect the state of all modes and does cause a mode switch unless the instrument was already in the power-on mode.

Confirmation is required to restore the factory default values. The confirmation dialog is:

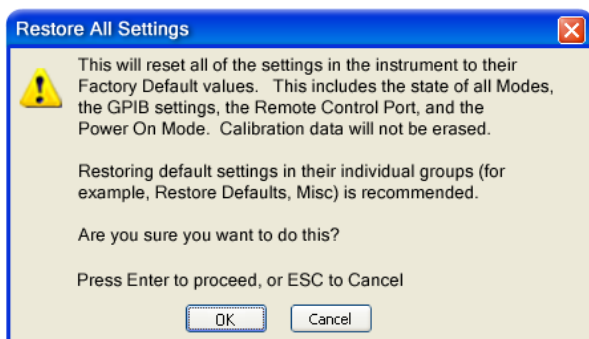


Key Path	System, Restore System Defaults
Example	:SYST:DEF MOD
Couplings	An All Mode will cause the currently running measurement to be aborted, mode switch to the power-on mode and activate the default measurement for the power-on mode.. It gets the mode to a consistent state with all of the default couplings set.
Initial S/W Revision	Prior to A.02.00

## All

This performs a comprehensive reset of ALL analyzer settings to their factory default values. It resets all of the system setting groups, causes a Restore Mode Defaults for all modes in the instrument, and switches back to the power-on mode. It does not affect the User Preset file or any user saved files.

Confirmation is required to restore the factory default values. The confirmation dialog is:



### NOTE

If you are using an Keysight USB External Mixer, then you will need to perform a Refresh USB Mixer Connection after Restoring All Defaults.

Key Path	System, Restore System Defaults
Example	:SYST:DEF ALL
Notes	If using Keysight USB External Mixer, perform a Refresh USB Mixer Connection (SCPI command :MIX:BAND USB) following a Restore All Defaults.
Couplings	An All will cause the currently running measurement to be aborted and get all modes to a consistent state, so it is unnecessary to couple any settings.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.14.00

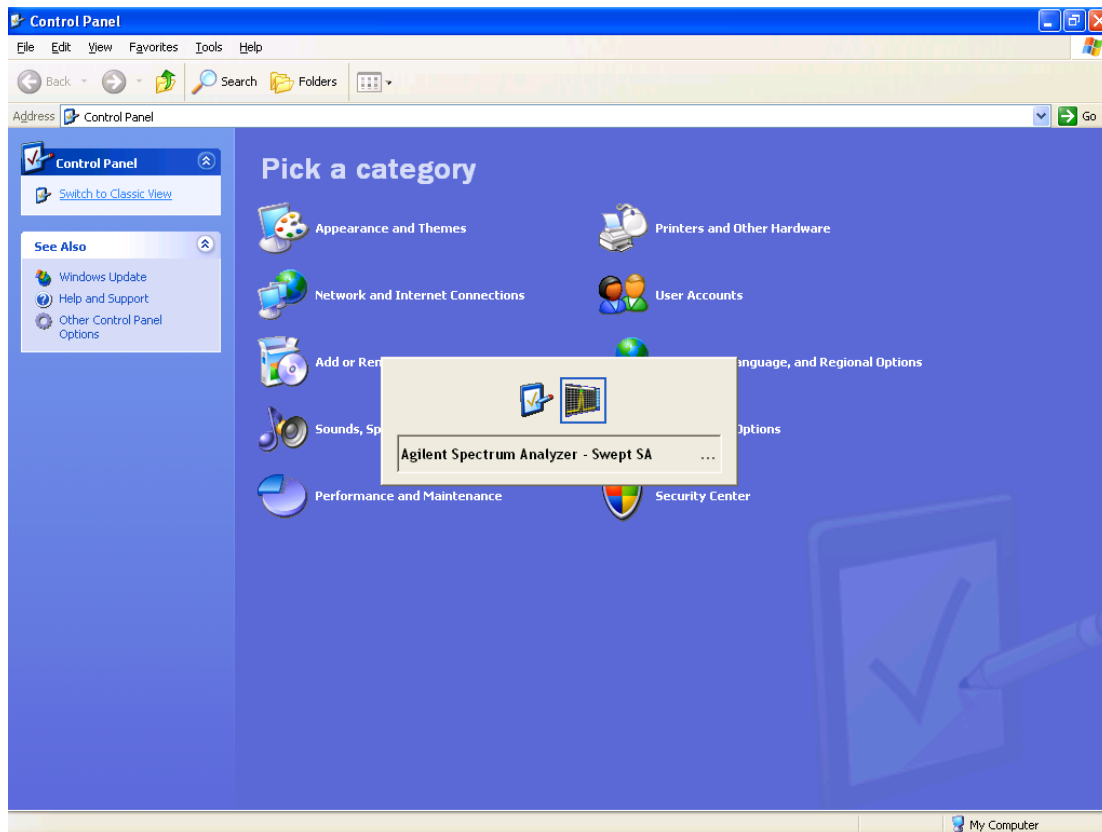
### Control Panel...

Opens the Windows Control Panel. The Control Panel is used to configure certain elements of Windows that are not configured through the hardkey/softkey System menus.

**NOTE** This feature is not available if option SF1 is installed.

The Control Panel is a separate Windows application, so to return to the analyzer once you are in the Control Panel, you may either:

Exit the Control Panel by clicking on the red X in the upper right hand corner, with a mouse





Or use Alt-Tab: press and hold the Alt key and press and release the Tab key until the Analyzer logo is showing in the window in the center of the screen, as above, then release the Alt key.

Key Path	System
Notes	No remote command for this key.
Initial S/W Revision	Prior to A.02.00

## Licensing...

Opens the license explorer.

**NOTE** This feature is not available if option SF1 is installed.

For Help on this key, select Help in the menu bar at the top of the license explorer window.

Key Path	System
Notes	No equivalent remote command for this key.
Backwards Compatibility Notes	In ESA the SCPI command for displaying the Show Licenses screen is: :SYSTem:CONFigure:LKEY:STATe OFF ON 0 1 :SYSTem:CONFigure:LKEY:STATe? There are no equivalent SCPI commands in the X-Series for displaying the License Explorer.
Initial S/W Revision	Prior to A.02.00

<b>Remote Command</b>	:SYSTem:LKEY <"OptionInfo">, <"LicenseInfo">
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<b>Example</b>	SYST:LKEY "N9073A-1FP", "027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"
----------------	---

Notes	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, since the system knows which version is supported for each feature.  The <"LicenseInfo"> contains the signature, the expiration date, and serial number for transport if transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the serial number, the system regards it as non-transportable. As a result, this supports reverse compatibility.
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Initial S/W Revision	Prior to A.02.00
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<b>Remote Command</b>	:SYSTem:LKEY:DELeTe <"OptionInfo">, <"LicenseInfo">
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<b>Example</b>	SYST:LKEY:DEL 'N9073A-1FP', "027253AD27F83CDA5673A9BA5F427FDA5E4F25AEB1017638211AC9F60D9C639FE539735909C551DE0A91"
<b>Notes</b>	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one, if more than one version is installed.  The <"LicenseInfo"> contains the signature, the expiration date, and whether or not be transportable. You must specify the signature, but you can omit the other information. If you omit the expiration date, the system regards it as permanent. If you omit the transportability, the system regards it as non-transportable. As a result, this supports reverse compatibility.
<b>Initial S/W Revision</b>	Prior to A.02.00

<b>Remote Command</b>	:SYSTem:LKEY:LIST?
<b>Notes</b>	<p>Return Value: An &lt;arbitrary block data&gt; of all the installed instrument licenses. The format of each license is as follows. &lt;Feature&gt;,&lt;Version&gt;,&lt;Signature&gt;,&lt;Expiration Date&gt;,&lt;Serial Number for Transport&gt;</p> <p>Return Value Example: #3136 N9073A-1FP,1.000,B043920A51CA N9060A-2FP,1.000,4D1D1164BE64 N9020A-508,1.000,389BC042F920 N9073A-1F1,1.000,5D71E9BA814C,13-aug-2005</p> <p>&lt;arbitrary block data&gt; is: #NMMM&lt;data&gt;</p> <p>Where: N is the number of digits that describes the number of MMM characters. For example if the data was 55 bytes, N would be 2. MMM would be the ASCII representation of the number of bytes. In the previous example, N would be 55. &lt;data&gt; ASCII contents of the data</p>
<b>Initial S/W Revision</b>	Prior to A.02.00

<b>Remote Command</b>	:SYSTem:LKEY? <"OptionInfo">
<b>Example</b>	SYST:LKEY? "N9073A-1FP"
<b>Notes</b>	The <"OptionInfo"> contains the feature and the version. You must specify the feature but can omit the version. If you omit the version, the system regards it as the latest one.  Return Value: <"LicenseInfo"> if the license is valid, null otherwise.

	<"LicenseInfo"> contains the signature, the expiration date, and serial number if transportable. Return Value Example: "B043920A51CA"
Initial S/W Revision	Prior to A.02.00

<b>Remote Command</b>	:SYSTem:HID?
Notes	Return value is the host ID as a string
Initial S/W Revision	Prior to A.02.00

## Security

Accesses capabilities for operating the instrument in a security controlled environment.

Key Path	System
Initial S/W Revision	A.04.00

## USB

The Windows operating system can be configured to disable write access to the USB ports for users who are in a secure environment where transferring data from the instrument is prohibited. This user interface is a convenient way for the customer to disable write access to USB.

Key Path	System, Security
Mode	All
Scope	Mode Global
<b>Remote Command</b>	:SYSTem:SECurity:USB:WPRotect[:ENABle] ON OFF 0 1 :SYSTem:SECurity:USB:WPRotect[:ENABle]?
<b>Example</b>	:SYST:SEC:USB:WPR ON Will set USB ports to Read-only
Notes	When the USB ports are in Read-only mode then no data can be stored to USB, including the internal USB memory used for a back-up location for the calibration data.
Dependencies	This key is grayed-out unless the current user has administrator privileges.
Preset	This is unaffected by Preset or any Restore System Defaults. An Agilent Recovery will set the USB to write protect OFF
State Saved	No
Range	Read-Write Read only
Initial S/W Revision	A.04.00

### Read-Write

Selection for allowing full read-write access to the USB ports.

Key Path	System, Security, USB	
<b>Example</b>	:SYST:SEC:USB:WPR OFF	Will set USB ports to Read-Write
Initial S/W Revision	A.04.00	

### Read only

Selection for disabling write access to the USB ports.

Key Path	System, Security, USB	
<b>Example</b>	:SYST:SEC:USB:WPR ON	Will set USB ports to Read only
Initial S/W Revision	A.04.00	

### Diagnostics

The Diagnostics key in the System menu gives you access to basic diagnostic capabilities of the instrument.

Key Path	System
Initial S/W Revision	Prior to A.02.00

### Show Hardware Statistics

Provides a display of various hardware statistics. The statistics include the following:

- High and Low temperature extremes
- Elapsed time that the instrument has been powered-on (odometer)

The display should appear listing the statistics, product number, serial number, and firmware revision.

Hardware Statistical Information	
Agilent MXA Signal Analyzer	
Product Number: N9020A	
Serial Number: US00061145	
Instrument S/W Revision: A.12.00	
Revision Date: 7/11/2012 12:11:10 PM	
Component Name	Value
MechAtten #1 Count Total	457304
Calibrator Switch Cycles	105953
AC/DC Switch Cycles	114240
2 dB #1 Mechanical Atten Cycles	112655
2 dB #2 Mechanical Atten Cycles	124456
MechAtten #2 Count Total	472265
6 dB Mechanical Atten Cycles	115302
10 dB Mechanical Atten Cycles	93602
20 dB Mechanical Atten Cycles	144781
30 dB Mechanical Atten Cycles	118580
Low Noise Path Switch	45668
Preselector Bypass Cycles	31133
High temperature operating extreme	45.75
Low temperature operating extreme	-23.9375
Elapsed Time (On-Time)(hours)	134164

In some CXA models this field is called "Fixed Aten"

Some CXA models omit these fields

Only shown if LNP installed

Only shown if MPB installed

The CXA models in which the AC/DC Switch field is called Fixed Aten and that omit the mechanical attenuation fields are the N9000A–503/507 models.

Modular HWs only have time and temperature information in Show Hardware Statistics.

The data will be updated only when the Show Hardware Statistics menu key is pressed, it will not be updated while the screen is displayed.

The tabular data should be directly printable.

Key Path	System, Diagnostics
Mode	All
Notes	The values displayed on the screen are only updated upon entry to the screen and not updated while the screen is being displayed.
Initial S/W Revision	Prior to A.02.00

### SCPI for Show Hardware Statistics ( Remote Commands Only)

Each of the hardware statistic items can be queried via SCPI.

- Error! Reference source not found.
- Error! Reference source not found.
- Error! Reference source not found.

## Self test

This key gives you access to diagnostic capabilities for self tests of the instrument.

Key Path	System, Diagnostics
Initial S/W Revision	Prior to A.10.00

## All Self Test

This key invokes all the self tests defined in the Diagnostics Self Test section.

Key Path	System, Diagnostics, Self Test
Remote Command	SYSTem:TEST:WCTS:[ALL]
Example	SYST:TEST:WCTS:[ALL]
Initial S/W Revision	A.12.50

## FEC Self Test

This key invokes the EXT E6607C front end control self test. When operation is complete, the generated test summary information is appended to log file E:\Agilent\Instrument\FECTestLog.txt. This test summary file can be retrieved from the instrument using the MMEM set of SCPI command, once you have the fully qualified the path and file name.

If the self test fails, the following error message will be generated:

“-330, Self-test failed, see log file E:\Agilent\Instrument\FECTestLog.txt”

If the self test passes, an advisory message “FEC self-test completed successfully” is generated.

Key Path	System, Diagnostics, Self Test
Remote Command	SYSTem:TEST:WCTS:FEC
Example	SYST:TEST:WCTS:FEC
Notes	Access log with command : MMEM:DATA? "E:\ Agilent\Instrument\FECTestLog.txt"
Initial S/W Revision	A.12.50

## Show Result

This key gives you access to show results of the following self tests:

- Source self-test results
- E6607C embedded MPA or E6640A/E6650A RFIO self-test results
- E6607C FEC self-test results



Key Path	System, Diagnostics, Self Test
Initial S/W Revision	A.12.50

### FEC Self Test Results

Provides a display of last FEC test results, the display should appear listing model number, serial number and test time at the top of display, and then list test date/time, test name, measured value, valid range and pass/fail of each FEC test item, the tabular data should be directly printable.

Key Path	System, Diagnostics, Self Test, Show Results
<b>Remote Command</b>	SYSTem:TEST:WCTS:SHOW:RESult FEC
<b>Example</b>	SYST:TEST:WCTS:SHOW:RES FEC
Initial S/W Revision	A.12.50

The example of FEC self test result display is as follows:

#### FEC Self Test Results

Produce Number: E6607C

Serial Number: MY51380437

Instrument S/W: 11/16/2012 2:51:19 PM

#### FpgaVersionTest

Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:56	Analog_FPGA	16.000	>= 16.000	Pass
11/23/2012	16:13:56	Digital_FPGA	50.000	>= 46.000	Pass
11/23/2012	16:13:56	CRFS_FPGA	38.000	>= 38.000	Pass

#### PowerSupplyTest

Date	Time(GMT)	Name	MeasValue	ValidRange	Result
11/23/2012	16:13:56	ABUS_+32CHK	31.904	30.900 - 32.900	Pass
11/23/2012	16:13:56	ABUS_+12CHK	12.296	10.800 - 13.200	Pass
11/23/2012	16:13:56	+10VA	9.935	9.600 - 10.200	Pass
11/23/2012	16:13:56	+5VA	4.995	4.900 - 5.100	Pass
11/23/2012	16:13:56	+3.3VA	3.299	3.200 - 3.400	Pass
11/23/2012	16:13:56	-3.3VA	-3.311	-3.400 - - 3.200	Pass
11/23/2012	16:13:56	ACOM	0.00	-0.200 -	Pass

					0.200	
11/23/2012	16:13:56	-5VA	-5.036	-5.100 - - 4.900	Pass	
11/23/2012	16:13:56	-6.1VA	-5.880	-6.200 - - 5.700	Pass	
11/23/2012	16:13:56	-10VA	-10.116	-10.200 - - 9.800	Pass	
11/23/2012	16:13:56	ABUS_-2.5V_REF	-2.508	-2.520 - - 2.470	Pass	
11/23/2012	16:13:56	ABUS_+2.5V_REF	2.508	2.480 - 2.520	Pass	
11/23/2012	16:13:56	ABUS_-10VPALC	-10.047	-10.200 - - 9.800	Pass	
11/23/2012	16:13:57	ABUS_DET_MOD_FLT	18.000	7.800 - 100.000	Pass	

**Show FEC Self Test Results contents (Remote Command Only)**

A remote command is available to obtain the contents of the Show FEC Self Test Results screen (the entire contents, not just the currently displayed page).

<b>Remote Command</b>	SYSTem:TEST:WCTS:FEC:RESult?
<b>Example</b>	SYST:TEST:WCTS:FEC:RES?
<b>Notes</b>	The output is an IEEE Block format of the Show FEC Self Test Results contents. Each line is separated with a new-line character.
<b>Initial S/W Revision</b>	A.12.50

	Keysight Converged	PSA
<b>IP Address</b>	SYSTem:COMMunicate:LAN:ADDRess <string> SYSTem:COMMunicate:LAN:ADDRess?	:SYSTem:COMMunicate:LAN[;SELF]:IP <string> :SYSTem:COMMunicate:LAN[;SELF]:IP?
<b>Gateway</b>	SYSTem:COMMunicate:LAN:DGATeway <string> SYSTem:COMMunicate:LAN:DGATeway?	:SYSTem:COMMunicate:LAN[;SELF]:GATEway <string> :SYSTem:COMMunicate:LAN[;SELF]:GATEway?
<b>Subnet Mask</b>	SYSTem:COMMunicate:LAN:SMASK <string> SYSTem:COMMunicate:LAN:SMASK?	:SYSTem:COMMunicate:LAN[;SELF]:SUBNetmask <string> :SYSTem:COMMunicate:LAN[;SELF]:SUBNetmask?

**Internet Explorer...**

This key launches Microsoft Internet Explorer. A mouse and external keyboard are highly desired for using Internet Explorer. When Internet Explorer is running, close Internet Explorer to return focus to the Instrument Application (or use Alt-Tab).

Key Path	System
Mode	All
Notes	No equivalent remote command for this key.
Initial S/W Revision	A.05.01



(Undefined variable: Primary.ProductName)  
GSM/EDGE Measurement Application Reference

## 7 Trigger Functions

## Trigger

Accesses a menu of keys to control the selection of the trigger source and the setup of each of the trigger sources. The analyzer is designed to allow triggering from a number of different sources, for example, Free Run, Video, External, RF Burst, and so forth.

The TRIG:SOURCe command (below) will specify the trigger source for the currently selected input (RF or I/Q). If you change inputs, the new input remembers the trigger source it was last programmed to for the current measurement, and uses that trigger source. You can directly set the trigger source for each input using the TRIGger:RF:SOURce and TRIGger:IQ:SOURce commands (later in this section). When in External Mixing, the analyzer uses the RF trigger source.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

See ["Trigger Source Presets" on page 279](#)

See ["RF Trigger Source" on page 282](#)

See ["I/Q Trigger Source" on page 283](#)

See ["More Information" on page 284](#)

Key Path	Front-panel key
<b>Remote Command</b>	<pre>:TRIGger:&lt;measurement&gt;[:SEquence]:SOURce EXTernal1   EXTernal2   IMMediate   LINE   FRAMe   RFBurst   VIDeo   IF   ALARm   LAN   IQMag   IDEMod   QDEMod   IINPut   QINPut   AIQMag   TV  :TRIGger:&lt;measurement&gt;[:SEquence]:SOURce?</pre> <p>where &lt;measurement&gt; is the measurement for which you wish to set the Source (blank for the Swept SA measurement)</p>
<b>Example</b>	<pre>TRIG:ACP:SOUR EXT1</pre> <p>Selects the external 1 trigger input for the ACP measurement and the selected input</p> <pre>TRIG:SOUR VID</pre> <p>Selects video triggering for the Swept SA (SANalyzer) measurement in the Spectrum Analyzer mode. For SAN, do not use the &lt;measurement&gt; keyword. Only send this form in the Spectrum Analyzer mode or you will get an Undefined Header error</p>
<b>Notes</b>	<p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. See the <a href="#">"RF Trigger Source" on page 282</a> and <a href="#">"I/Q Trigger Source" on page 283</a> commands for detailed information on which trigger sources are available for each input.</p> <p>Other trigger-related commands are found in the INITiate and ABORt SCPI command subsystems.</p> <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges and presets can vary from mode to mode.</p>
<b>Dependencies</b>	<p>In some models, there is no second External input. In these models, the External 2 key is blanked and</p>

	the EXternal2 parameter will generate a "Hardware missing; Not available for this model number" message.
Preset	See table below
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:SOURce EXTernal For backward compatibility, the parameter EXTernal is mapped to EXTernal1
<b>Backwards Compatibility SCPI</b>	[:SENSe]:<measurement>:TRIGger:SOURce This backwards compatibility alias command is provided for ESA/PSA compatibility This backwards compatibility command does not apply to the Swept SA measurement, for that just use :TRIGger:SOURce This backwards compatibility command does not apply to the monitor spectrum, log plot and spot frequency measurements
<b>Backwards Compatibility SCPI</b>	[:SENSe]:<measurement>:TRIGger:SOURce IF In earlier instruments, the parameter IF was used by apps for the video trigger, so using the IF parameter selects VIDeo triggering. Sending IF in the command causes VID to be returned to a query.
<b>Backwards Compatibility SCPI</b>	[:SENSe]:ACPr:TRIGger:SOURce This backwards Compatibility SCPI command is provided to support the same functionality as [:SENSe]:ACPr:TRIGger:SOURce (PSA W-CDMA, PSA cdma2000 and PSA 1xEVDO) due to the fact that the ACPr node conflicts with the ACPower node.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Trigger Source Presets

Here are the Trigger Source Presets for the various measurements:

Meas	Mode	Preset for RF	Preset for IQ	Notes
Swept SA	SA	IMM	IQ not supported	
CHP	SA, WCDMA, C2K, WIMAX OFDMA, 1xEVDO, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	IMM	IQ not supported	
OBW	SA, WCDMA, C2K, WIMAX OFDMA,	1xEVDO: EXT1 others: IMM	IQ not supported	For 1xEVDO mode, the trigger source is coupled with the gate state, as well as the gate

	TD-SCDMA, 1xEVDO, LTE, LTETDD, CMMB, ISDB-T, MSR			source. When the trigger source changes to RFBurst, External1 or External2, the gate state is set to on, and the gate source is set identically with the trigger source. When the trigger source changes to IMMEDIATE, VIDEO, LINE, FRAME or IF, the gate state is set to off.
CCDF	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV-DO, DVB- T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	WIMAX OFDMA: RFBurst LTETDD: BTS: External 1 MS: Periodic Timer TD-SCDMA and 1xEV-DO: BTS: External 1 MS: RFBurst SA, WCDMA, C2K, LTE, CMMB, ISDB- T, DVB-T/H, DTMB, Digital Cable TV, MSR: IMMEDIATE	TD-SCDMA and 1xEV-DO: BTS: External 1 MS: IQMag LTETDD: BTS: External 1 MS: Periodic Timer Others: IMM	For TD-SCDMA: Trigger source is coupled with radio device. When radio device changes to BTS, trigger source will be changed to EXTERNAL1. When radio device changes to MS, trigger source will be set as RFBurst for RF or IQ Mag for BBIQ. When TriggerSource is RFBurst or IQ Mag, Measure Interval is grayed out.
ACP	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB- T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR	IMM	IQ not supported	
Tx Power	SA, GSM, TD- SCDMA	SA, GSM: RFBurst TD-SCDMA: EXTERNAL	IMM	TD-SCDMA doesn't support the Line and Periodic Timer parameters. When the mode is TD-SCDMA, if the Radio Device is switched to BTS, the value will be changed to External 1 and if the Radio device is switched to MS, the value will be changed to RFBurst
SPUR	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEV- DO, DVB-T/H, LTE, LTETDD, MSR	IMM	IQ not supported	
SEM	SA, WCDMA, C2K, WIMAX OFDMA, TD-SCDMA, 1xEVDO, DVB-	1xEVDO(BTS): EXTERNAL1 All others: IMMEDIATE	IQ not supported	



	T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV, MSR			
CDP	WCDMA	IMM	IMM	
RHO	WCDMA	IMM	IMM	
PCON	WCDMA	IMM	IMM	
QPSK	WCDMA, C2K, 1xEVDO	All except CDMA1xEVDO: IMMediate CDMA1xEVDO: EXT1	IMM	
MON	All except SA and BASIC	IMM	IQ not supported	
WAV		LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: RFBurst All others: IMMediate	LTETDD: BTS: External 1 MS: Periodic Timer GSM/EDGE: IQMag All others: IMMMediate	
PVT	WIMAXOFDMA	RFB	IMM	
EVM	WIMAXOFDMA, DVB-T/H, DTMB, LTE, LTETDD, CMMB, ISDB-T, Digital Cable TV	All but CMMB: IMM CMMB: Periodic Timer	All but CMMB: IMM CMMB: External 1	LTE, LTETDD supports Free Run, Video and External 1 only.
SPEC	BASIC	IMM	IMM	
LOG Plot	PN	IMM	IQ not supported	
Spot Freq	PN	IMM	IQ not supported	
GMSK PVT	EDGE/GSM	RFB	IMM	
GMSK PFER	EDGE/GSM	RFB	IQMag	
GMSK ORFS	EDGE/GSM	RF Burst	IQ not supported	
EDGE PVT	EDGE/GSM	RFB	IMM	

EDGE EVM	EDGE/GSM	RFB	IQMag
EDGE ORFS	EDGE/GSM	Periodic Timer	IQ not supported
Combined WCDMA	WCDMA	IMM	IQ not supported
Combined GSM	EDGE/GSM	RFB	IQ not supported
List Power Step	WCDMA, EDGE/GSM	IMM	IQ not supported
Transmit On/Off Power	LTETDD	LTETDD: BTS: External 1 MS: Periodic Timer	LTETDD: BTS: External 1 MS: Periodic Timer
Transmit Analysis	BLUETOOTH	RFB	IQ not supported
Adjacent Channel Power	BLUETOOTH	IMM	IQ not supported
LE In-band Emissions	BLUETOOTH	IMM	IQ not supported
EDR In-band Spurious Emissions	BLUETOOTH	Periodic Timer	IQ not supported
Conformance EVM	LTE, LTETDD, MSR	IMM	IMM

## RF Trigger Source

The RF Trigger Source command selects the trigger to be used for the specified measurement when RF is the selected input. The RF trigger source can be queried and changed even while another input is selected, but it is inactive until RF becomes the selected input.

Note the inclusion of the <measurement> parameter in the command below. Because each measurement remembers its own Trigger Source, the command must be qualified with the measurement name. Note that for the Swept SA measurement this is not the case; for backwards compatibility, no <measurement> parameter is used when setting the Trigger Source for the Swept SA measurement.

<b>Remote Command</b>	<code>:TRIGger:&lt;measurement&gt;[:SEquence]:RF:SOURce EXTernal1   EXTernal2   IMMEDIATE   LINE   FRAME   RFBurst   VIDEO   IF   ALARm   LAN   TV</code> <code>:TRIGger:&lt;measurement&gt;[:SEquence]:RF:SOURce?</code>
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<b>Example</b>	<code>TRIG:ACP:RF:SOUR EXT1</code> Selects the external 1 trigger input for the ACP measurement and the RF input
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	<p>TRIG:RF:SOUR VID</p> <p>Selects video triggering for the SANalyzer measurement and the RF input. For SAN, do not use the &lt;measurement&gt; keyword.</p>
Notes	<p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. For the RF Trigger Source, the following trigger sources are available:</p> <ul style="list-style-type: none"> <li>–IMMediate - free run triggering</li> <li>–VIDeo - triggers on the video signal level</li> <li>–LINE - triggers on the power line signal</li> <li>–EXTernal1 (or EXTernal) - triggers on an externally connected trigger source marked “Trigger 1 In” on the rear panel</li> <li>–EXTernal2 - triggers on an externally connected trigger source marked “Trigger 2 In” on the front panel. In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a “Hardware missing; Not available for this model number” message</li> <li>–RFBurst - triggers on the bursted frame</li> <li>–FRAMe - triggers on the periodic timer</li> <li>–IF (video) - same as video, for backwards compatibility only</li> </ul> <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges, and presets can vary from mode to mode.</p>
Status Bits/OPC dependencies	<p>The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.</p>
Initial S/W Revision	Prior to A.02.00

## I/Q Trigger Source

This command selects the trigger to be used for the specified measurement when I/Q (which requires option BBA) is the selected input. The I/Q trigger source can be queried and changed even while another input is selected, but it is inactive until I/Q becomes the selected input.

<b>Remote Command</b>	<pre>:TRIGger:&lt;measurement&gt;[:SEquence]:IQ:SOURce EXTernal1   EXTernal2   IMMediate   IQMag   IDEMod   QDEMod   IINPut   QINPut   AIQMag  :TRIGger:&lt;measurement&gt;[:SEquence]:IQ:SOURce?</pre>
<b>Example</b>	<p>TRIG:WAVeform:SOUR IQM</p> <p>Selects I/Q magnitude triggering for the IQ Waveform measurement and the I/Q input</p>
Notes	<p>Not all measurements have all the trigger sources available to them. Check the trigger source documentation for your specific measurement to see what sources are available.</p> <p>Not all trigger sources are available for each input. For the I/Q Trigger Source, the following trigger sources are available:</p>

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	<ul style="list-style-type: none"> <li>–IMMediate - free run triggering</li> <li>–EXternal1 (or EXternal) - triggers on an externally connected trigger source on the rear panel</li> <li>–EXternal2 - triggers on an externally connected trigger source on the front panel</li> <li>–IQMag - triggers on the magnitude of the I/Q signal</li> <li>–IDEMod - triggers on the I/Q signal's demodulated I voltage</li> <li>–QDEMod - triggers on the I/Q signal's demodulated Q voltage</li> <li>–IINPut - triggers on the I channel's ADC voltage</li> <li>–QINPut - triggers on the Q channel's ADC voltage</li> <li>–AIQMag - triggers on the magnitude of the auxiliary receiver channel I/Q signal</li> </ul> <p>*OPC should be used after requesting data. This will hold off any subsequent changes to the selected trigger source, until after the sweep is completed and the data is returned.</p> <p>Available ranges, and from mode to mode presets can vary</p>
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

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## More Information

The trigger menus let you select the trigger source and trigger settings for a sweep or measurement. In triggered operation (basically, any trigger source other than Free Run), the analyzer will begin a sweep or measurement only with the selected trigger conditions are met, generally when your trigger source signal meets the specified trigger level and polarity requirements. (In FFT measurements, the trigger controls when the data acquisition begins for FFT conversion.)

For each of the trigger sources, you may define a set of operational parameters or settings which will be applied when that source is selected as the current trigger source. Examples of these settings are Trigger Level, Trigger Delay, and Trigger Slope. You may apply different settings for each source; so, for example, you could have a Trigger Level of 1v for External 1 trigger and –10 dBm for Video trigger.

Once you have established the settings for a given trigger source, they generally will remain unchanged for that trigger source as you go from measurement to measurement within a Mode (although the settings do change as you go from Mode to Mode). Furthermore, the trigger settings within a Mode are the same for the **Trigger** menu, the **Gate Source** menu, and the **Sync Source** menu that is part of the **Periodic Timer Trigger Setup** menu. That is, if **Ext1** trigger level is set to 1v in the **Trigger** menu, it will appear as 1v in both the **Gate Source** and the **Sync Source** menus. For these reasons the trigger settings commands are not qualified with the measurement name, the way the trigger source commands are.

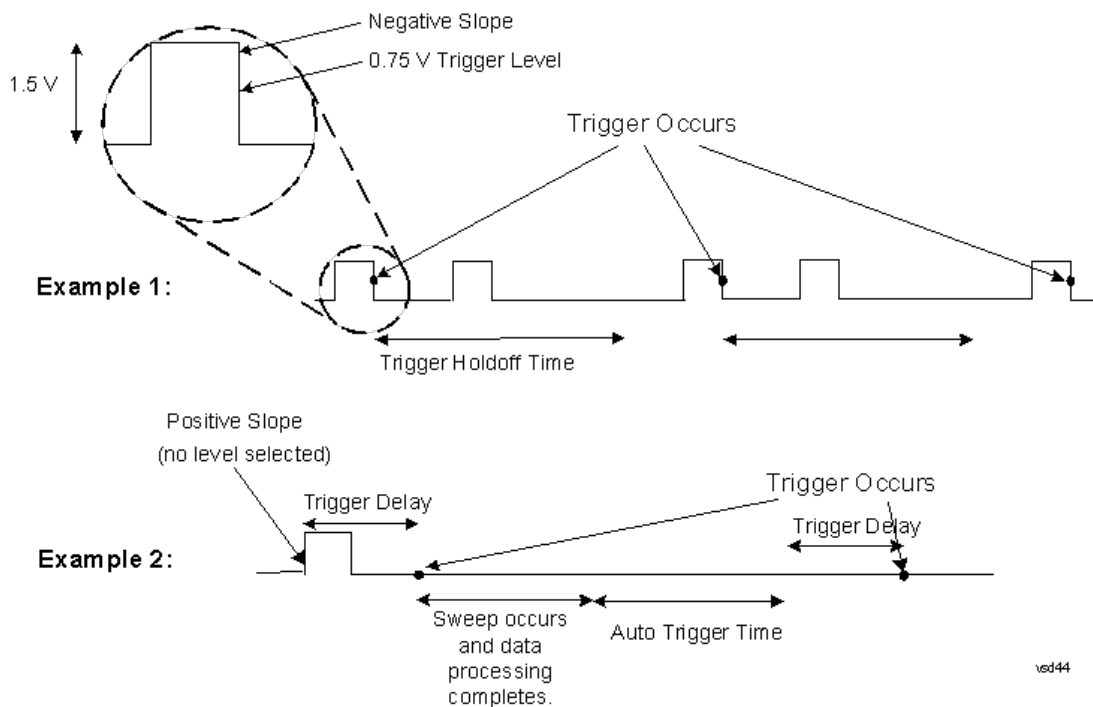
The settings setup menu can be accessed by pressing the key for the current trigger source a second time. For example, one press of Video selects the Video trigger as the source. The Video key becomes highlighted and the hollow arrow on the key turns black. Now a second press of the key takes you into the Video Trigger Setup menu.

Trigger Setup Parameters:

The following examples show trigger setup parameters using an external trigger source.

Example 1 illustrates the trigger conditions with negative slope and no trigger occurs during trigger Holdoff time.

Example 2 illustrates the trigger conditions with positive slope, trigger delay, and auto trigger time.



## Free Run

Pressing this key, when it is not selected, selects free-run triggering. Free run triggering occurs immediately after the sweep/measurement is initiated.

Key Path	Trigger
<b>Example</b>	TRIG:SOUR IMM Swept SA measurement TRIG:<meas>:SOUR IMM Measurements other than Swept SA
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

## Video (IF Envelope)

Pressing this key, when it is not selected, selects the video signal as the trigger. The Video trigger condition is met when the video signal (the filtered and detected version of the input signal, including both RBW and VBW filtering) crosses the video trigger level.

**NOTE**

When the detector selected for all active traces is the average detector, the video signal for triggering does not include any VBW filtering.

The video trigger level is shown as a labeled line on the display. The line is displayed as long as video is the selected trigger source.

Pressing this key, when it is already selected, accesses the video trigger setup functions.

Key Path	Trigger
<b>Example</b>	TRIG:SOUR VID Swept SA measurement TRIG:<meas>:SOUR VID Measurements other than Swept SA
Notes	Log Plot and Spot Frequency measurements do not support Video Trigger
Dependencies	Video trigger is allowed in average detector mode.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility Notes	In the past, the Average detector was not available when Video triggering was on, and consequently, functions that set the detector to average (such as Marker Noise or Band/Intvl Power) were not available when the video trigger was on. Similarly, Video triggering was not available when the detector was Average. In the X-Series, these restrictions are removed.
Initial S/W Revision	Prior to A.02.00

## Trigger Level

Sets a level for the video signal trigger. When the video signal crosses this level, with the chosen slope, the trigger occurs. This level is displayed with a horizontal line only if **Video** is the selected trigger source.

Key Path	Trigger, Video
<b>Remote Command</b>	:TRIGger[:SEquence]:VIDeo:LEVel <ampl> :TRIGger[:SEquence]:VIDeo:LEVel?
<b>Example</b>	TRIG:VID:LEV -40 dBm
Notes	When sweep type = FFT, the video trigger uses the amplitude envelope in a bandwidth wider than the FFT width as a trigger source. This might often be useful, but does not have the same relationship between the displayed trace and the trigger level as in swept triggering. Amplitude Corrections are not taken into account by the Video Trig Level. For example, if you have

given yourself effective gain with an amplitude correction factor, the Video Trigger will not fire until you have dropped the trigger line that far below the displayed signal level, rather than simply dropping it down to the displayed signal level.

Note that other corrections, specifically External Gain and Ref Level Offset, modify the actual trace data as it is taken and therefore ARE taken into account by Trig Level.

Couplings	This same level is used for the Video trigger source in the Trigger menu and for the Video selection in the Gate Source menu.
Preset	Set the Video Trigger Level -25 dBm on Preset. When the Video Trigger Level becomes the active function, if the value is off screen, set it to either the top or bottom of screen, depending on which direction off screen it was.
State Saved	Saved in instrument state
Min	-170 dBm
Max	+30 dBm
Default Unit	Depends on the current selected Y axis unit
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:IF:LEVel :TRIGger[:SEquence]:IF:LEVel?
Backwards Compatibility Notes	This alias is provided for backward compatibility with VSA/PSA comms apps.
Initial S/W Revision	Prior to A.02.00

## Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, Video
<b>Remote Command</b>	:TRIGger[:SEquence]:VIDeo:SLOPe POSitive NEGative :TRIGger[:SEquence]:VIDeo:SLOPe?
<b>Example</b>	TRIG:VID:SLOP NEG
Preset	POSitive
State Saved	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:IF:SLOPe NEGative POSitive :TRIGger[:SEquence]:IF:SLOPe? For backward compatibility with VSA/PSA comms apps
Backwards Compatibility Notes	The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

<b>Remote Command</b>	:TRIGger[:SEQuence]:SLOPe POSitive NEGative :TRIGger[:SEQuence]:SLOPe?
<b>Example</b>	TRIG:SLOP NEG
<b>Preset</b>	POSitive
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility Notes</b>	In ESA/PSA, the Trigger Slope was global to all triggers. In the X-Series, the slope can be set individually for each Trigger Source. For backward compatibility, the global SLOPe command updates all instances of trigger slope (VID, LINE, EXT1, EXT2, TV, RFB). The query returns the trigger slope setting of the currently selected trigger source.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Trig Delay

Controls a time delay during that the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in the time domain or FFT, but not in swept spans.

<b>Key Path</b>	Trigger, Video
<b>Remote Command</b>	:TRIGger[:SEQuence]:VIDeo:DELaY <time> :TRIGger[:SEQuence]:VIDeo:DELaY? :TRIGger[:SEQuence]:VIDeo:DELaY:STATe OFF ON 0 1 :TRIGger[:SEQuence]:VIDeo:DELaY:STATe?
<b>Example</b>	TRIG:VID:DEL:STAT ON TRIG:VID:DEL 100 ms
<b>Notes</b>	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
<b>Preset</b>	Off, 1 us
<b>State Saved</b>	Saved in instrument state
<b>Min</b>	-150 ms
<b>Max</b>	+500 ms
<b>Default Unit</b>	s
<b>Backwards Compatibility Notes</b>	! For backward compatibility with VSA/PSA comms apps :TRIGger[:SEQuence]:IF:DELaY :TRIGger[:SEQuence]:DELaY The legacy :TRIGger[:SEQuence]:DELaY command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers.
<b>Initial S/W Revision</b>	Prior to A.02.00



<b>Remote Command</b>	:TRIGger[:SEquence]:DELay <time> :TRIGger[:SEquence]:DELay? :TRIGger[:SEquence]:DELay:STATE OFF ON 0 1 :TRIGger[:SEquence]:DELay:STATE?
<b>Example</b>	TRIG:DEL 1 ms
<b>Preset</b>	1 us
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility Notes</b>	In ESA/PSA, the Trigger Delay was global to all triggers. In the X-Series, the delay can be set individually for each Trigger Source. For backward compatibility, the global DELay command updates all instances of trigger slope (VID, LINE, EXT1, EXT2) except TV and RFBurst. The query returns the trigger delay setting of the currently selected trigger source.
<b>Initial S/W Revision</b>	Prior to A.02.00

<b>Remote Command</b>	:TRIGger[:SEquence]:OFFSet <time> :TRIGger[:SEquence]:OFFSet? :TRIGger[:SEquence]:OFFSet:STATE OFF ON 0 1 :TRIGger[:SEquence]:OFFSet:STATE?
<b>Example</b>	TRIG:OFFS ON TRIG:OFFS -100 ms
<b>Notes</b>	These are ESA commands for trigger offset that allowed you to use a positive or negative delay when in zero span and in a Res BW $\geq$ 1 kHz. For ESA compatibility, X-series analyzers keep track of this offset and adds it to the Trigger Delay for VIDEo, LINE, EXTernal1 or EXTernal2 whenever the value is sent to the hardware, if in Zero Span and RBW $\geq$ 1 kHz.
<b>Preset</b>	Off, 0 s
<b>State Saved</b>	Saved in instrument state
<b>Min</b>	-11 s
<b>Max</b>	+11 s
<b>Initial S/W Revision</b>	Prior to A.02.00

## External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

<b>Key Path</b>	Trigger
<b>Example</b>	TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA

Dependencies	Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1.
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

## Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.

Key Path	Trigger, External 1
Remote Command	:TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel?
Example	TRIG:EXT1:LEV 0.4 V
Couplings	This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu.
Preset	1.2 V
State Saved	Saved in instrument state
Min	-5 V
Max	5 V
Default Unit	V
Backwards Compatibility SCPI	:TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility SCPI	:TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel
Initial S/W Revision	Prior to A.02.00

## Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, External 1
Remote Command	:TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative

	:TRIGger[:SEQuence]:EXTernal1:SLOPe?
<b>Example</b>	TRIG:EXT1:SLOP NEG
Couplings	This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEQuence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEQuence]:FRAMe:EXTernal1:SLOPe
Backwards Compatibility Notes	The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

## Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	Trigger, External 1
<b>Remote Command</b>	:TRIGger[:SEQuence]:EXTernal1:DELAy <time> :TRIGger[:SEQuence]:EXTernal1:DELAy? :TRIGger[:SEQuence]:EXTernal1:DELAy:STATe OFF ON 0 1 :TRIGger[:SEQuence]:EXTernal1:DELAy:STATe?
<b>Example</b>	TRIG:EXT1:DEL:STAT ON TRIG:EXT1:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	-150 ms
Max	+500 ms
Default Unit	s
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEQuence]:EXTernal:DELAy For backward compatibility, the parameter EXTernal is mapped to EXTernal1
Backwards Compatibility	The legacy :TRIGger[:SEQuence]:DELAy command affects the delay for the VID, LINE, EXT1, EXT2,

Notes	and RFB triggers. The legacy :TRIGger[:SEQuence]:OFFSet command is supported for the VIDEo, LINE, EXT1, and EXT2 triggers.
Initial S/W Revision	Prior to A.02.00

## Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the Zero Span Delay Comp On/Off feature to enable or disable zero span delay compensation.

Key Path	Trigger, External 1
Remote Command	:TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation OFF ON 0 1 :TRIGger[:SEQuence]:EXTernal1:DELay:COMPensation?
Example	TRIG:EXT1:DEL:COMP ON
Dependencies	No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP.
Preset	OFF
State Saved	Saved in instrument state
Initial S/W Revision	A.11.00

## External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

Key Path	Trigger
Example	TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2.

State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

Key Path	Trigger, External 2
<b>Remote Command</b>	:TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel?
<b>Example</b>	TRIG:EXT2:LEV 1.1 V
Couplings	This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu.
Preset	1.2 V
State Saved	Saved in instrument state
Min	-5 V
Max	5 V
Default Unit	V
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel
Initial S/W Revision	Prior to A.02.00

## Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, External 2
<b>Remote Command</b>	:TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe?
<b>Example</b>	TRIG:EXT2:SLOP NEG
Couplings	This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).

Preset	POSitive
State Saved	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEQuence]:FRAMe:EXTernal2:SLOPe
Backwards Compatibility Notes	The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

## Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	Trigger, External 2
<b>Remote Command</b>	:TRIGger[:SEQuence]:EXTernal2:DELay <time> :TRIGger[:SEQuence]:EXTernal2:DELay? :TRIGger[:SEQuence]:EXTernal2:DELay:STATe OFF ON 0 1 :TRIGger[:SEQuence]:EXTernal2:DELay:STATe?
<b>Example</b>	TRIG:EXT2:DEL:STAT ON TRIG:EXT2:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	-150 ms
Max	500 ms
Default Unit	s
Backwards Compatibility Notes	The legacy :TRIGger[:SEQuence]:DELay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers. The legacy :TRIGger[:SEQuence]:OFFSet command is supported for the VIDEo, LINE, EXT1, and EXT2 triggers.
Initial S/W Revision	Prior to A.02.00

## Zero Span Delay Comp On/Off

In zero span, there is a natural delay in the signal path, which comes from the RBW filter. This is usually desirable, as it allows you to trigger on events and also see those events, because the signal is delayed

from the trigger event. However, in some cases it is desirable to eliminate this delay, so that trigger events line up exactly with the zero time point in zero span. You can use the Zero Span Delay Comp On/Off feature to enable or disable zero span delay compensation.

Key Path	Trigger, External 2
Remote Command	:TRIGger[:SEquence]:EXTernal2:DELay:COMPensation OFF ON 0 1 :TRIGger[:SEquence]:EXTernal2:DELay:COMPensation?
Example	TRIG:EXT2:DEL:COMP ON
Dependencies	No effect except in zero-span, but not locked out in nonzero spans. Blanked in modes that do not support zero-span measurements. If the SCPI command is sent when the key is blanked, an error is returned: -221, "Settings conflict; Feature not supported for this measurement" In analyzers shipping N9060A, this feature requires N9060A-7FP.
Preset	OFF
State Saved	Saved in instrument state
Initial S/W Revision	A.11.00

## RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

Key Path	Trigger
Example	TRIG:SOUR RFB Swept SA measurement TRIG:<meas>:SOUR RFB Measurements other than Swept SA
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility Notes	The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

## Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

Key Path	Trigger, RF Burst
Scope	Meas Global
Remote Command	:TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute?
Example	TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm
Notes	Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below.  Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions.  If mode is Bluetooth, the default value is -50 dBm.
Couplings	This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu
Preset	-20 dBm
State Saved	Saved in instrument state
Min	-200 dBm
Max	100 dBm
Default Unit	depends on the current selected Y-Axis unit
Backwards Compatibility SCPI	:TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Key Path	Trigger, RF Burst
Remote Command	:TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE?
Example	TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative.
Preset	ABSolute
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00



## Relative Trigger Level

Sets the relative trigger level for the RF burst envelope.

In some models, the relative burst trigger function is implemented in hardware. In other models, without the advanced triggering hardware required, the relative burst trigger function is implemented in software in some measurements, and is unavailable in other measurements.

When implemented in software, the relative RF Burst trigger function is implemented as follows:

1. The measurement starts with the absolute RF Burst trigger setting. If it cannot get a trigger with that level, auto trigger fires and the acquisition starts anyway. After the acquisition, the measurement searches for the peak in the acquired waveform and saves it.
2. Now, in the next cycle of the measurement, the measurement determines a new absolute RF Burst level based on the peak value from the first measurement and the Relative RF Burst Trigger Level (always 0 or negative dB) set by the user. The following formula is used:
3. absolute RF Burst level = peak level of the previous acquisition + relative RF Burst level
4. If the new absolute RF Burst level differs from the previous by more than 0.5 dB, the new level is sent to the hardware; otherwise it is not updated (to avoid slowing down the acquisition)

Steps 2 and 3 repeat for subsequent measurements.

Key Path	Trigger, RF Burst
Scope	Meas Global
Remote Command	:TRIGger[:SEquence]:RFBurst:LEVel:RELative <rel_ampl> :TRIGger[:SEquence]:RFBurst:LEVel:RELative?
Example	TRIG:RFB:LEV:REL -10 dB sets the trigger level of the RF burst envelope signal to the relative level of -10 dB
Notes	Sending this command does not switch the setting from absolute to relative; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, above. The relative trigger level is not available in some measurements. In those measurements the RELative parameter, and the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command (above), will generate an error if sent.
Dependencies	This key is grayed out and Absolute Trigger Level selected if the required hardware is not present in your analyzer and the current measurement does not support Relative triggering.
Preset	-6 dB GSM: -25 dB
State Saved	Saved in instrument state
Min	-45 dB
Max	0 dB
Default Unit	dB or dBc
Backwards Compatibility SCPI	:TRIGger[:SEquence]:RFBurst:LEVel This legacy command is aliased to :TRIGger[:SEquence]:RFBurst:LEVel:RELative because the PSA

	had ONLY relative burst triggering
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

## Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, RF Burst
<b>Remote Command</b>	:TRIGger[:SEquence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEquence]:RFBurst:SLOPe?
<b>Example</b>	TRIG:RFB:SLOP NEG
Couplings	This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:FRAME:RFBurst:SLOPe
Backwards Compatibility Notes	The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

## Trig Delay

Controls a time delay during which the analyzer will wait to begin a sweep after meeting the trigger criteria. You can use negative delay to pre-trigger the instrument in time domain or FFT, but not in swept spans.

Key Path	Trigger, RF Burst
<b>Remote Command</b>	:TRIGger[:SEquence]:RFBurst:DELAy <time> :TRIGger[:SEquence]:RFBurst:DELAy? :TRIGger[:SEquence]:RFBurst:DELAy:STATe OFF ON 0 1 :TRIGger[:SEquence]:RFBurst:DELAy:STATe?
<b>Example</b>	TRIG:RFB:DEL:STAT ON TRIG:RFB:DEL 100 ms
Notes	Video trigger delay may be set to negative values, in time domain, FFT and even swept. It makes intuitive sense in time domain and works well in FFT mode where the bandwidth of the filter before the video trigger is about 1.25 span. In swept spans, negative settings of Trig Delay are treated as a zero setting within the internal hardware and the advisory message "Neg. Trig Delay unavailable in Swept Mode, zero delay used." is generated when such a delay is set.

Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	-150 ms
Max	500 ms
Default Unit	s
Backwards Compatibility Notes	The legacy :TRIGger[:SEQuence]:DELay command affects the delay for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

### Periodic Timer (Frame Trigger)

Pressing this key, when it is not selected, selects the internal periodic timer signal as the trigger. Triggering occurrences are set by the **Period** parameter, which is modified by the **Sync Source** and **Offset**. Pressing this key, when it is already selected, accesses the periodic timer trigger setup functions.

If you do not have a sync source selected (it is Off), then the internal timer will not be synchronized with any external timing events.

Key Path	Trigger
<b>Example</b>	TRIG:SOUR FRAM Swept SA measurement TRIG:<meas>:SOUR FRAM Measurements other than Swept SA
State Saved	Saved in instrument state
Readback	[Sync: <value of Sync Source>], for example, [Sync: External 1]
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

### Periodic Timer Triggering:

This feature selects the internal periodic timer signal as the trigger. Trigger occurrences are set by the **Periodic Timer** parameter, which is modified by the **Sync Source** and **Offset**.

The figure below shows the action of the periodic timer trigger. Before reviewing the figure, we'll explain some uses for the periodic trigger.

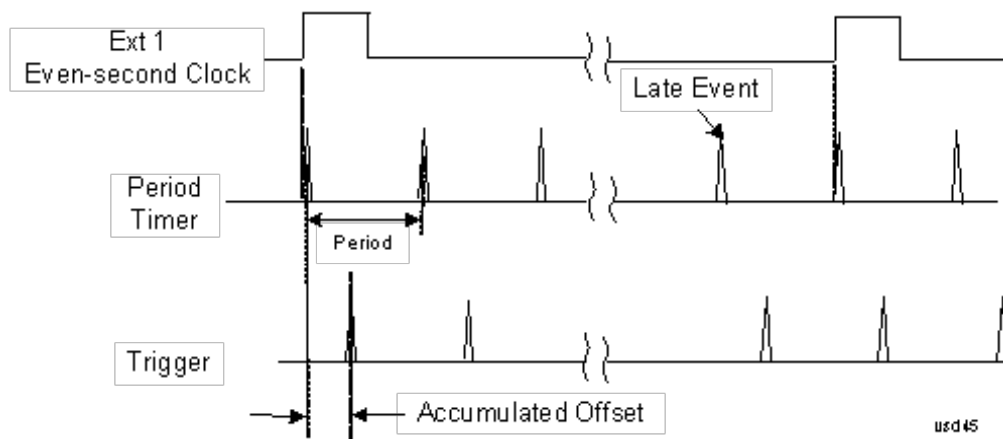
A common application is measuring periodic burst RF signals for which a trigger signal is not easily available. For example, we might be measuring a TDMA radio which bursts every 20 ms. Let's assume that the 20 ms period is very consistent. Let's also assume that we do not have an external trigger source available that is synchronized with the period, and that the signal-to-noise ratio of the signal is not high enough to provide a clean RF burst trigger at all of the analysis frequencies. For example, we might want to

measure spurious transmissions at an offset from the carrier that is larger than the bandwidth of the RF burst trigger. In this application, we can set the Periodic Timer to a 20.00 ms period and adjust the offset from that timer to position our trigger just where we want it. If we find that the 20.00 ms is not exactly right, we can adjust the period slightly to minimize the drift between the period timer and the signal to be measured.

A second way to use this feature would be to use **Sync Source** temporarily, instead of **Offset**. In this case, we might tune to the signal in a narrow span and use the RF Burst trigger to synchronize the periodic timer. Then we would turn the sync source off so that it would not miss-trigger. Miss-triggering can occur when we are tuned so far away from the RF burst trigger that it is no longer reliable.

A third example would be to synchronize to a signal that has a reference time element of much longer period than the period of interest. In some CDMA applications, it is useful to look at signals with a short periodicity, by synchronizing that periodicity to the "even-second clock" edge that happens every two seconds. Thus, we could connect the even-second clock trigger to Ext1 and use then Ext1 as the sync source for the periodic timer.

The figure below illustrates this third example. The top trace represents the even-second clock. It causes the periodic timer to synchronize with the leading edge shown. The analyzer trigger occurs at a time delayed by the accumulated offset from the period trigger event. The periodic timer continues to run, and triggers continue to occur, with a periodicity determined by the analyzer time base. The timer output (labeled "late event") will drift away from its ideal time due to imperfect matching between the time base of the signal being measured and the time base of the analyzer, and also because of imperfect setting of the period parameter. But the synchronization is restored on the next even-second clock event. ("Accumulated offset" is described in the in the **Offset** function section.)



## Period

Sets the period of the internal periodic timer clock. For digital communications signals, this is usually set to the frame period of your current input signal. In the case that sync source is not set to OFF, and the external sync source rate is changed for some reason, the periodic timer is synchronized at the every external synchronization pulse by resetting the internal state of the timer circuit.

Key Path	Trigger, Periodic Timer
Remote Command	:TRIGger[:SEquence]:FRAME:PERiod <time> :TRIGger[:SEquence]:FRAME:PERiod?

<b>Example</b>	TRIG:FRAM:PER 100 ms
Dependencies	The invalid data indicator turns on when the period is changed, until the next sweep/measurement completes.
Couplings	The same period is used in the Gate Source selection of the period timer.
Preset	20 ms GSM: 4.615383
State Saved	Saved in instrument state
Min	100.000 ns
Max	559.0000 ms
Default Unit	S
Initial S/W Revision	Prior to A.02.00

## Offset

Adjusts the accumulated offset between the periodic timer events and the trigger event. Adjusting the accumulated offset is different than setting an offset, and requires explanation.

The periodic timer is usually not synchronized with any external events, so the timing of its output events has no absolute meaning. Since the timing relative to external events (RF signals) is important, you need to be able to adjust (offset) it. However, you have no direct way to see when the periodic timer events occur. All that you can see is the trigger timing. When you want to adjust the trigger timing, you will be changing the internal offset between the periodic timer events and the trigger event. Because the absolute value of that internal offset is unknown, we will just call that the accumulated offset. Whenever the Offset parameter is changed, you are changing that accumulated offset. You can reset the displayed offset using Reset Offset Display. Changing the display does not change the value of the accumulated offset, and you can still make additional changes to accumulated offset.

To avoid ambiguity, we define that an increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.

<b>Key Path</b>	Trigger, Periodic Timer
<b>Remote Command</b>	:TRIGger[:SEquence]:FRAMe:OFFSet <time> :TRIGger[:SEquence]:FRAMe:OFFSet?
<b>Example</b>	TRIG:FRAM:OFFS 1.2 ms
<b>Notes</b>	<p>The front panel interface (for example, the knob), and this command, adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware each time the offset is updated is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. Note that the accumulated offset value is essentially arbitrary; it represents the accumulated offset from the last time the offset was zeroed (with the Reset Offset Display key).</p> <p>Note that this command does not change the period of the trigger waveform. Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section <a href="#">"Trig Delay" on page 309</a>.</p> <p>An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to</p>

	delay the timing of the trigger event.
Notes	When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated with the new value. However, the actual amount sent to the hardware is the delta value, that is, the current accumulated offset value minus the previous accumulated offset value. The SCPI query simply returns the value currently showing on the key.
Dependencies	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
Couplings	The same offset is used in the Gate Source selection of the period timer.
Preset	0 s
State Saved	Saved in instrument state
Min	-10.000 s
Max	10.000 s
Default Unit	S
Initial S/W Revision	Prior to A.02.00

### Offset Adjust (Remote Command Only)

This remote command does not work at all like the related front panel keys. This command lets you advance the phase of the frame trigger by the amount you specify.

It does not change the period of the trigger waveform. If the command is sent multiple times, it advances the phase of the frame trigger an additional amount each time it is sent. Negative numbers are permitted.

<b>Remote Command</b>	:TRIGger[:SEquence]:FRAMe:ADJust <time>
<b>Example</b>	TRIG:FRAM:ADJ 1.2 ms
Notes	Note also that Offset is used only when the sync source is set to OFF, otherwise delay is used, see section " <a href="#">Trig Delay</a> " on page 309 An increase in the "offset" parameter, either from the knob or the SCPI adjust command, serves to delay the timing of the trigger event.
Notes	The front panel interface (for example, the knob) and the :TRIG:FRAM:OFFS command adjust the accumulated offset, which is shown on the active function display. However, the actual amount sent to the hardware is the delta value, that is, the current offset value minus the previous offset value. When the SCPI command is sent the value shown on the key (and the Active Function, if this happens to be the active function) is updated by increasing it (or decreasing it if the value sent is negative) by the amount specified in the SCPI command. This is a "command only" SCPI command, with no query.
Dependencies	The invalid data indicator turns on when the offset is changed, until the next sweep/measurement completes.
Couplings	The same offset is used in the Gate Source selection of the period timer.
Preset	0 s
State Saved	Saved in instrument state

Min	-10.000 s
Max	10.000 s
Default Unit	S
Initial S/W Revision	Prior to A.02.00

## Reset Offset Display

Resets the value of the periodic trigger offset display setting to 0.0 seconds. The current displayed trigger location may include an offset value defined with the Offset key. Pressing this key redefines the currently displayed trigger location as the new trigger point that is 0.0 s offset. The Offset key can then be used to add offset relative to this new timing.

Key Path	Trigger, Periodic Timer
<b>Remote Command</b>	:TRIGger[:SEquence]:FRAMe:OFFSet:DISPlay:RESet
<b>Example</b>	TRIG:FRAM:OFFS:DISP:RES
Initial S/W Revision	Prior to A.02.00

## Sync Source

Selects a signal source for you to synchronize your periodic timer trigger to, otherwise you are triggering at some arbitrary location in the frame. Synchronization reduces the precision requirements on the setting of the period.

For convenience you may adjust the level and slope of the selected sync source in a conditional branch setup menu accessed from the Sync Source menu. Note that these settings match those in the **Trigger** and **Gate Source** menus; that is, each trigger source has only one value of level and slope, regardless of which menu it is accessed from.

Key Path	Trigger, Periodic Timer
<b>Remote Command</b>	:TRIGger[:SEquence]:FRAMe:SYNC EXTernal1   EXTernal2   RFBurst   OFF :TRIGger[:SEquence]:FRAMe:SYNC?
<b>Example</b>	TRIG:FRAM:SYNC EXT2
Dependencies	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message.
Preset	Off GSM/EDGE, MSR,LTE,LTETDD: RFBurst
State Saved	Saved in instrument state
Readback	The current setting is read back to this key and it is also Readback to the previous Periodic Timer trigger key.

<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:FRAMe:SYNC EXTernal
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.14.00

## Off

Turns off the sync source for your periodic trigger. With the sync source off, the timing will drift unless the signal source frequency is locked to the analyzer frequency reference.

<b>Key Path</b>	Trigger, Periodic Timer, Sync Source
<b>Example</b>	TRIG:FRAM:SYNC OFF
Readback	Off
Initial S/W Revision	Prior to A.02.00

## External 1

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 1 input connector on the rear panel.

Pressing this key, when it is already selected, accesses the external 1 trigger setup menu.

<b>Key Path</b>	Trigger
<b>Example</b>	TRIG:SOUR EXT1 Swept SA measurement TRIG:<meas>:SOUR EXT1 Measurements other than Swept SA
<b>Dependencies</b>	Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 1.
<b>State Saved</b>	Saved in instrument state
<b>Status Bits/OPC dependencies</b>	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Initial S/W Revision	Prior to A.02.00

## Trigger Level

Sets the value where the external 1 trigger input will trigger a new sweep/measurement.



Key Path	Trigger, External 1
<b>Remote Command</b>	:TRIGger[:SEquence]:EXTernal1:LEVel <level> :TRIGger[:SEquence]:EXTernal1:LEVel?
<b>Example</b>	TRIG:EXT1:LEV 0.4 V
Couplings	This same level is used for the Ext1 trigger source in the Trigger menu, for the Ext1 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext1 selection in the Gate Source menu.
Preset	1.2 V
State Saved	Saved in instrument state
Min	-5 V
Max	5 V
Default Unit	V
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:EXTernal:LEVel For backward compatibility, the parameter EXTernal is mapped to EXTernal1
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:FRAMe:EXTernal1:LEVel
Initial S/W Revision	Prior to A.02.00

### Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, External 1
<b>Remote Command</b>	:TRIGger[:SEquence]:EXTernal1:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal1:SLOPe?
<b>Example</b>	TRIG:EXT1:SLOP NEG
Couplings	This same slope is used in the Ext1 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:EXTernal:SLOPe For backward compatibility, the parameter EXTernal is mapped to EXTernal1
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:FRAMe:EXTernal1:SLOPe
Backwards Compatibility Notes	The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

## External 2

Pressing this key, when it is not selected, selects an external input signal as the trigger. A new sweep/measurement will start when the external trigger condition is met using the external 2 input connector. The external trigger 2 input connector is on the rear panel.

Pressing this key, when it is already selected, accesses the external 2 trigger setup menu.

<b>Key Path</b>	Trigger
<b>Example</b>	TRIG:SOUR EXT2 Swept SA measurement TRIG:<meas>:SOUR EXT2 Measurements other than Swept SA
<b>Dependencies</b>	In some models, there is no second External input. In these models, the External 2 key is blanked and the EXTernal2 parameter will generate a "Hardware missing; Not available for this model number" message. Grayed out if in use by Point Trigger in the Source Setup menu. Forced to Free Run if already selected and Point Trigger is set to External 2.
<b>State Saved</b>	Saved in instrument state
<b>Status Bits/OPC dependencies</b>	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	A.03.00

## Trigger Level

Sets the value where the external 2 trigger input will trigger a new sweep/measurement.

<b>Key Path</b>	Trigger, External 2
<b>Remote Command</b>	:TRIGger[:SEquence]:EXTernal2:LEVel :TRIGger[:SEquence]:EXTernal2:LEVel?
<b>Example</b>	TRIG:EXT2:LEV 1.1 V
<b>Couplings</b>	This same level is used for the Ext2 trigger source in the Trigger menu, for the Ext2 selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the Ext2 selection in the Gate Source menu.
<b>Preset</b>	1.2 V
<b>State Saved</b>	Saved in instrument state
<b>Min</b>	-5 V
<b>Max</b>	5 V
<b>Default Unit</b>	V
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:FRAMe:EXTernal2:LEVel
<b>Initial S/W Revision</b>	Prior to A.02.00

## Trig Slope

Controls the trigger polarity. It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, External 2
Remote Command	:TRIGger[:SEquence]:EXTernal2:SLOPe POSitive NEGative :TRIGger[:SEquence]:EXTernal2:SLOPe?
Example	TRIG:EXT2:SLOP NEG
Couplings	This same slope is used in the Ext2 selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
Backwards Compatibility SCPI	:TRIGger[:SEquence]:FRAMe:EXTernal2:SLOPe
Backwards Compatibility Notes	The legacy :TRIGger[:SEquence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

## RF Burst

Pressing this key, when it is not selected, selects the RF Burst as the trigger. A new sweep/measurement will start when an RF burst envelope signal is identified from the signal at the RF Input connector. Pressing this key, when it is already selected, accesses the RF Burst trigger setup menu.

In some models, a variety of burst trigger circuitry is available, resulting in various available burst trigger bandwidths. The analyzer automatically chooses the appropriate trigger path based on the hardware configuration and other settings of the analyzer.

Key Path	Trigger
Example	TRIG:SOUR RFB      Swept SA measurement TRIG:<meas>:SOUR RFB    Measurements other than Swept SA
State Saved	Saved in instrument state
Status Bits/OPC dependencies	The Status Operation Register bit 5 "Waiting for Trigger" is set at the same time as the Sweeping or Measuring bit is set. It is cleared when the trigger actually occurs (that is, after the trigger event occurs and all the applicable trigger criteria have been met). A corresponding pop-up message ("Waiting for trigger") is generated if no trigger signal appears after approximately 2 sec. This message goes away when a trigger signal appears.
Backwards Compatibility Notes	The legacy command: :TRIGger[:SEquence]:RFBurst:FSElectivity[:STATe] OFF ON 0 1 is not supported in the X-Series, as the hardware to do Frequency Selective burst triggers does not exist in X-Series.

Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

### Absolute Trigger Level

Sets the absolute trigger level for the RF burst envelope.

When using the External Mixing path, the Absolute Trigger Level is uncalibrated because the factory default was set to accommodate the expected IF levels for the RF path.

Key Path	Trigger, RF Burst
Scope	Meas Global
<b>Remote Command</b>	:TRIGger[:SEquence]:RFBurst:LEVel:ABSolute <ampl> :TRIGger[:SEquence]:RFBurst:LEVel:ABSolute?
<b>Example</b>	TRIG:RFB:LEV:ABS 10 dBm sets the trigger level of the RF burst envelope signal to the absolute level of 10 dBm
Notes	Sending this command does not switch the setting from relative to absolute; to switch it you need to send the :TRIGger[:SEquence]:RFBurst:LEVel:TYPE command, below.  Amplitude Corrections are not taken into account by the Absolute Trigger Level. For example, if you have given yourself effective gain with an amplitude correction factor, the Absolute Trigger will not fire until you have set the trigger level that far below the displayed signal level, rather than simply to the displayed signal level. This is only true for Amplitude Corrections, not External Gain or Ref Level Offset functions.  If mode is Bluetooth, the default value is -50 dBm.
Couplings	This same level is used for the RF Burst trigger source in the Trigger menu, for the RF Burst selection in the Periodic Timer sync source (in the Trigger menu and in the Gate Source menu), and also for the RF Burst selection in the Gate Source menu
Preset	-20 dBm
State Saved	Saved in instrument state
Min	-200 dBm
Max	100 dBm
Default Unit	depends on the current selected Y-Axis unit
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEquence]:FRAME:RFBurst:LEVel:ABSolute
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

Key Path	Trigger, RF Burst
<b>Remote Command</b>	:TRIGger[:SEquence]:RFBurst:LEVel:TYPE ABSolute RELative :TRIGger[:SEquence]:RFBurst:LEVel:TYPE?

<b>Example</b>	TRIG:RFB:LEV:TYPE REL sets the trigger level type of the RF burst trigger to Relative.
Preset	ABSolute
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.04.00

### Trigger Slope

It is set positive to trigger on a rising edge and negative to trigger on a falling edge.

Key Path	Trigger, RF Burst
<b>Remote Command</b>	:TRIGger[:SEQuence]:RFBurst:SLOPe POSitive NEGative :TRIGger[:SEQuence]:RFBurst:SLOPe?
<b>Example</b>	TRIG:RFB:SLOP NEG
Couplings	This same slope is used in the RF Burst selection for the trigger source in the Trigger menu and for the period timer sync source (in the Trigger menu and in the Gate Source menu).
Preset	POSitive
State Saved	Saved in instrument state
<b>Backwards Compatibility SCPI</b>	:TRIGger[:SEQuence]:FRAMe:RFBurst:SLOPe
Backwards Compatibility Notes	The legacy :TRIGger[:SEQuence]:SLOPe command affects the slopes for the VID, LINE, EXT1, EXT2, and RFB triggers.
Initial S/W Revision	Prior to A.02.00

### Trig Delay

This setting delays the measurement timing relative to the Periodic Timer.

Key Path	Trigger, Periodic Timer
<b>Remote Command</b>	:TRIGger[:SEQuence]:FRAMe:DELay <time> :TRIGger[:SEQuence]:FRAMe:DELay? :TRIGger[:SEQuence]:FRAMe:DELay:STATe OFF ON 0 1 :TRIGger[:SEQuence]:FRAMe:DELay:STATe?
Notes	Note that delay is used when the sync source is not set to OFF. If the sync source is set to OFF, offset is used.
Preset	Off, 1.000 us
State Saved	Saved in instrument state
Min	-150 ms

Max	+500 ms
Default Unit	s
Initial S/W Revision	Prior to A.02.00

## Auto/Holdoff

Opens up a menu that lets you adjust Auto Trigger and Trigger Holdoff parameters

Key Path	Trigger
Readback line	<p>Displays a summary of the Auto Trig and Holdoff settings, in square brackets</p> <p>First line: Auto Off or Auto On</p> <p>Second Line: "Hldf" followed by:</p> <ul style="list-style-type: none"> <li>• If Holdoff is Off, readback Off</li> <li>• If Holdoff On and Type = Normal, readback value</li> <li>• If Holdoff On and Type = Above, readback value followed by AL</li> <li>• If Holdoff On and Type = Below, readback value followed by BL</li> <li>• If Holdoff Type selection is not supported by the current measurement, Holdoff Type is always Normal</li> </ul>
Initial S/W Revision	A.02.00

## Auto Trig

Sets the time that the analyzer will wait for the trigger conditions to be met. If they are not met after that much time, then the analyzer is triggered anyway.

Key Path	Trigger, Auto/Holdoff
<b>Remote Command</b>	<pre>:TRIGger[:SEquence]:ATRigger &lt;time&gt; :TRIGger[:SEquence]:ATRigger? :TRIGger[:SEquence]:ATRigger:STATe OFF ON 0 1 :TRIGger[:SEquence]:ATRigger:STATe?</pre>
<b>Example</b>	<pre>TRIG:ATR:STAT ON TRIG:ATR 100 ms</pre>
Notes	The "time that the analyzer will wait" starts when the analyzer is ready for a trigger, which may be hundreds of ms after the data acquisition for a sweep is done. The "time" ends when the trigger condition is satisfied, not when the delay ends.
Preset	Off, 100 ms
State Saved	Saved in instrument state
Min	1 ms
Max	100 s
Default Unit	s
Initial S/W Revision	Prior to A.02.00

## Trig Holdoff

Sets the holdoff time between triggers. When the trigger condition is satisfied, the trigger occurs, the delay begins, and the holdoff time begins. New trigger conditions will be ignored until the holdoff time expires. For a free-running trigger, the holdoff value is the minimum time between triggers.

Key Path	Trigger, Auto/Holdoff
Remote Command	:TRIGger[:SEquence]:HOLDoff <time> :TRIGger[:SEquence]:HOLDoff? :TRIGger[:SEquence]:HOLDoff:STATe OFF ON 0 1 :TRIGger[:SEquence]:HOLDoff:STATe?
Example	TRIG:HOLD:STAT ON TRIG:HOLD 100 ms
Dependencies	Unavailable if the selected Input is BBIQ. If this is the case, the key is grayed out if it is pressed the informational message "Feature not supported for this Input" is displayed. If the SCPI command is sent, the error "Settings conflict; Feature not supported for this Input" is generated.
Preset	Off, 100 ms
State Saved	Saved in instrument state
Min	0 s
Max	0.5 s
Default Unit	s
Initial S/W Revision	Prior to A.02.00

## Holdoff Type

Lets you set the Trigger Holdoff Type.

### NOTE

Holdoff Type is not supported by all measurements. If the current measurement does not support it, this key will be blank and the Holdoff Type will be Normal. If the Holdoff Type SCPI is sent while in such a measurement, the SCPI will be accepted and the setting remembered, but it will have no effect until a measurement is in force that supports Holdoff Type.

Trigger Holdoff Type functionality:

- NORMal
- This is the "oscilloscope" type of trigger holdoff, and is the setting when the Holdoff Type key does not appear. In this type of holdoff, no new trigger will be accepted until the holdoff interval has expired after the previous trigger.
- ABOVE
- If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) and then remains above the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the

threshold (with negative slope) after having been above the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.

- BELow
- If the trigger slope is positive, a trigger event is generated only if the signal characteristic of interest crosses the trigger threshold (with positive slope) after having been below the threshold for at least the holdoff time. For negative slope, the trigger event is generated if the signal characteristic crosses the threshold (with negative slope) and then remains below the threshold for at least the holdoff time. In either case, the trigger event is associated with the time the level was crossed.

<b>Key Path</b>	Trigger, Auto/Holdoff
<b>Remote Command</b>	:TRIGger[:SEquence]:HOLDoff:TYPE NORMal ABOVe BELow :TRIGger[:SEquence]:HOLDoff:TYPE?
<b>Example</b>	TRIG:HOLD:TYPE NORM
<b>Preset</b>	All modes but GSM/EDGE: Normal GSM/EDGE: Below WLAN: Below
<b>State Saved</b>	Saved in instrument state
<b>Initial S/W Revision</b>	A.02.00



## 8 EDGE Power vs Time Measurement

Power vs. Time measures the mean transmit power during the “useful” part of bursts, and verifies that the power ramp fits within the defined mask. The “useful “ part of the burst is defined as, the 147 bits centered on the transition from bit 13 to bit 14 (the “TO” time point) of the 26 bit training sequence. The Power vs. Time measurement also lets you view the rise, fall, and the “useful” part of the bursts. Using the Multi-Slot function, up to eight slots in a frame can be viewed at one time.

This topic contains the following sections:

["Measurement Commands for EDGE Power vs Time" on page 314](#)

["Remote Command Results for EDGE Power vs Time" on page 315](#)

See also: ["Custom Limit Mask \(Remote Commands Only\)" on page 405](#)

## Measurement Commands for EDGE Power vs Time

The following commands and queries are used to retrieve the measurement results:

`:CONFigure:EPVTime`

`:CONFigure:EPVTime:NDEFault`

`:INITiate:EPVTime`

`:FETCh:EPVTime[n]?`

`:READ:EPVTime[n]?`

`:MEASure:EPVTime[n]?`

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1578](#).

## Remote Command Results for EDGE Power vs Time

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	Returns the following comma-separated scalar results: <ol style="list-style-type: none"> <li><b>Sample time</b> is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.).</li> <li><b>Power single burst</b> is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst.</li> <li><b>Power averaged</b> is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value.</li> <li><b>Number of samples</b> is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.).</li> <li><b>Start</b> is the index of the data point at the start of the useful part of the burst</li> <li><b>Stop</b> is the index of the data point at the end of the useful part of the burst</li> <li><b>T0</b> is the index of the data point where t0 occurred</li> <li><b>Burst width</b> is the width of the burst measured at .3dB below the mean power in the useful part of the burst.</li> <li><b>Maximum value</b> is the maximum value of the most recently acquired data (in dBm).</li> <li><b>Minimum value</b> is the minimum value of the most recently acquired data (in dBm).</li> <li><b>Burst search threshold</b> is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired.</li> <li><b>IQ point delta</b> is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta)</li> </ol>
2	Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.
3	Returns comma-separated points of the upper mask (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.
4	Returns comma-separated points of the lower mask (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.
7	Returns useful part power level values for the 8 slots in the current frame (in dBm).
8	Returns comma-separated trace points of the Max Hold Trace data (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.  There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.

n	Results Returned
	This command is available only when the Max Hold Trace State is ON.
9	<p>Returns comma-separated trace points of the Min Hold Trace data (in dBm) of the measured slots configured by Meas Time. The measured slots can be seen in Multi Slot view in View/Display.</p> <p>There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.</p> <p>This command is available only when the Min Hold Trace State is ON.</p>
10	<p>Returns the following comma-separated scalar results:</p> <ol style="list-style-type: none"> <li>13. Sample time is a floating point number that represents the time between samples when using the trace queries (n=0,2,etc.).</li> <li>14. Power single burst is the mean power (in dBm) across the useful part of the selected burst in the most recently acquired data, or in the last data acquired at the end of a set of averages. If averaging is on, the power is for the last burst.</li> <li>15. Power averaged is the power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. Average m is a single burst from the acquired trace. If there are multiple bursts in the acquired trace, only one burst is used for average m. This means that N traces are acquired to make the complete average. If averaging is off, the value of power averaged is the same as the power single burst value.</li> <li>16. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0,2,etc.).</li> <li>17. Start is the index of the data point at the start of the useful part of the burst</li> <li>18. Stop is the index of the data point at the end of the useful part of the burst</li> <li>19. <b>T0</b> is the index of the data point where t0 occurred</li> <li>20. Burst width is the width of the burst measured at .3dB below the mean power in the useful part of the burst.</li> <li>21. Maximum value is the maximum value of the most recently acquired data (in dBm).</li> <li>22. Minimum value is the minimum value of the most recently acquired data (in dBm).</li> <li>23. Burst search threshold is the value (in dBm) of the threshold where a valid burst is identified, after the data has been acquired.</li> <li>24. IQ point delta is the number of data points offset that are internally applied to the useful data in traces n=2,3,4. You must apply this correction value to find the actual location of the Start, Stop, or T0 values. (e.g. for n=2, Start (for the IQ trace data) = Start + IQ_point_delta)</li> <li>25. 1st Error point is the time (in second) which indicates the point on the X Scale where the first failure of a signal was detected. Use a marker to locate this point in order to examine the nature of the failure. If the limit passes, returned data has no meaning.</li> <li>26. Detected TSC is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal/Higher Symbol Rate (HSR)) if TSC detected. If TSC not detected, the returned value is -999.0. If Amptd or NONE( Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).</li> </ol>

n	Results Returned
	<p><b>NOTE</b></p> <p>The returned value in Sync (Synchronization Burst) is:</p> <p>10 if (BN42, BN43..BN105) =  (1,0,1,1,1,0,0,1,0,1,1,0,0,0,1,0,0,0,0,0,1,0,0,0,0,0,1,  1,1,1,0,0,1,0,1,1,0,1,0,0,0,1,0,1,0,1,1,1,0,1,1,0,0,0,0,1,1,0,1,1)</p> <p>11 if (BN42, BN43..BN105) =  (1,1,1,0,1,1,1,0,0,1,1,0,1,0,1,1,0,0,1,0,1,0,0,0,0,0,1,1,1,1,0,1,  1,1,1,0,1,0,0,0,1,1,1,1,1,0,1,1,0,0,1,0,1,1,0,0,0,1,0,1,0,1)</p> <p>12 if (BN42, BN43..BN105) =  (1,1,1,0,1,1,0,0,0,0,1,1,0,1,1,1,0,1,0,1,0,0,0,1,0,1,0,1,1,0,  1,0,0,1,1,1,1,0,0,0,0,0,1,0,0,0,0,0,1,0,0,0,1,1,0,1,0,0,1,1,1,0)</p> <p>The returned value in Access (Access Burst) is:</p> <p>20 if (BN8, BN9..BN48) =  (0,1,0,0,1,0,1,1,0,1,1,1,1,1,1,1,0,0,1,1,0,0,1,1,0,1,0,1,0,1,0,0,0,1,1,1,1,0,0,0)</p> <p>21 if (BN8, BN9..BN48) =  (0,1,0,1,0,1,0,0,1,1,1,1,1,0,0,0,1,0,0,0,0,1,1,0,0,0,1,0,1,1,1,0,0,1,0,0,1,1,0,1)</p> <p>22 if (BN8, BN9..BN48) =  (1,1,1,0,1,1,1,1,0,0,1,0,0,1,1,1,0,1,0,1,0,1,1,0,0,0,0,1,1,0,1,1,0,1,1,1,0,1,1,1)</p> <p>The returned value in AQPSK is more than or equal to 100100. Its first three digits represent TSC of VAMOS subchannel A. The second three digits represent VAMOS subchannel B. TSCs of TSC set 1 and TSC set 2 correspond to 100 to 107 and 200 to 207 respectively. Thus the returned value is ([TSC num of VAMOS subchannel A] * 1000 + [TSC num of VAMOS subchannel B]). For example, if measured AQPSK signal has TSC 3 of set1 on VAMOS subchannel A and TSC 5 of TSC set2 on VAMOS B, returned value is 103205.</p>
	<p>27. Detected Mod scheme is the most recently detected modulation scheme. The returned value is as follows: 0 for GMSK, 1 for Normal Burst (NB) 8PSK, 2 for NB 16QAM, 3 for NB 32QAM, 10 for AQPSK, 11 for Higher symbol rate Burst (HB) QPSK, 12 for HB 16QAM, 13 for HB 32QAM</p>
	<p>28. Estimated Carrier Power (ECP) in dBm</p>
	<p>29. Midamble Power Averaged is the midamble power (in dBm) of N averaged bursts, if averaging is on. The power is averaged across the training sequence part of the burst.</p>
	<p>30. Mask Ref Power is the reference power (in dBm) of PVT mask of the selected burst.</p>
	<p>31. Reserved for future use – the value returned is -999.0 (floating point)</p>
12	<p>Returns comma-separated trace points of the Measure Trace data. These data points are floating point numbers representing the power of the signal (in dBm).</p> <p>The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.</p>
13	<p>Returns comma-separated points of the upper mask (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.</p>
14	<p>Returns comma-separated points of the lower mask (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.</p>

n	Results Returned
17	Returns Estimated Carrier Power (ECP) level values for the eight slots in the current frame (in dBm)
18	Returns comma-separated trace points of the Max Hold Trace data (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.  There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.  This command is available only when the Max Hold Trace State is ON.
19	Returns comma-separated trace points of the Min Hold Trace data (in dBm) of the single slot. The slot is identified by Time Slot if its state is on. Or it is the first measured slot if Time Slot state is off. This single slot can be seen in Burst view in View/Display.  There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.  This command is available only when the Min Hold Trace State is ON.
20	Returns comma-separated integer numbers which represent modulation scheme of last measured slots. The returned value is as follows.  0 for GMSK, 1 for Normal Burst (NB) 8PSK, 2 for NB 16QAM, 3 for NB 32QAM, 10 for AQPSK, 11 for Higher symbol rate Burst (HB) QPSK, 12 for HB 16QAM, 13 for HB 32QAM
21	Returns comma-separated integer numbers of TSC of last measured slots. Returned values are translated to integer numbers in the same way as 14th element of n=10, Detected TSC.
22	Returns comma-separated numbers of midamble part power values for the eight slots in the current frame (in dBm).
23	Returns comma-separated numbers of mask reference power values for the eight slots (in dBm). Returned values depend on Ref Pwr Type selection and can be either useful part, midamble, estimated or tail bit powers averaged over N bursts.
24	Returns the following scalar results:  1. Detected TSC on VAMOS subchannel A is the most recently detected TSC on VAMOS subchannel A. The returned value is 0~7 if TSC of AQPSK burst detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).  2. Detected TSC on VAMOS subchannel B is the most recently detected TSC on VAMOS subchannel B. The returned value is 0~7 if TSC of TSC set 1 detected and 200 ~ 207 if TSC of TSC set 2 detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).

Key Path	Meas
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Ref Value (Burst view and Multi-slot view)

Allows you to set the absolute power reference.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1]   3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:EPVTime:VIEW[1]   3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV 5 DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. SubOpCode: EPVTime:VIEW[1]:WINDow[1]: Burst view RF Envelope window EPVTime:VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Preset	10 dBm 0.00 dBm
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Default Unit	dBm
Initial S/W Revision	Prior to A.02.00

### Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

## Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
Mode	BASIC
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe?</code>
Example	<code>:POW:RANG 10.0</code> <code>:POW:RANG?</code>
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

## Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe:OPTimize IMMEDIATE</code>
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe:OPTimize:ATTenuation OFF   ON   ELEctrical   COMBined</code>



	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :OPTimize :ATTenuation ?</code>
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECTRical and COMBined still can be used. Then, upon receiving ELECTRical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.
Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

### Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :PARatio &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe :PARatio ?</code>
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

### Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet &lt;real&gt;</code>

	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet ?</code>
<b>Example</b>	POW:RANG:MIX:OFFS -5 dB
Preset	0 dB
State Saved	Saved in instrument state
Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

### Scale/Div (Burst view and Multi-slot view)

Allows you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	<code>:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision &lt;rel_ ampl&gt;</code>  <code>:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?</code>
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV 10 DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW[1]:WINDow[1]: Burst view RF Envelope window VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Initial S/W Revision	Prior to A.02.00

### Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to Top, Center, or Bottom.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	<code>:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP   CENTER   BOTTOm</code>

	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW[1]:WINDow[1]: Burst view RF Envelope window VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Preset	TOP
State Saved	Saved in instrument state.
Range	Top Ctr Bot
Initial S/W Revision	Prior to A.02.00

### Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle Y axis auto scaling function between On and Off.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0   1   OFF   ON  :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:COUP 0 DISP:EPVT:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW[1]:WINDow[1]: Burst view RF Envelope window VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value either " <a href="#">Ref Value</a> " on page 323 or " <a href="#">Ref Position</a> " on page 326 manually, this parameter is set to 'Off' automatically.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

### Ref Value

Allows you to set the absolute power reference by Burst, Multi-slot and Rise & Fall views.

Key Path	AMPTD Y Scale
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Ref Value (Burst view and Multi-slot view)

Allows you to set the absolute power reference.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV 5 DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. SubOpCode: EPVTime:VIEW[1]:WINDow[1]: Burst view RF Envelope window EPVTime:VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Preset	10 dBm 0.00 dBm
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Default Unit	dBm
Initial S/W Revision	Prior to A.02.00

### Ref Value (Rise & Fall view)

Allows you to set the absolute power reference.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALe]:RLEVel?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV 5 DISP:EPVT:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. SubOpCode:

	EPVTime:VIEW2:WINDow[1]: Rising RF Envelope window EPVTime:VIEW2:WINDow2: Falling RF Envelope window
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Auto Scaling automatically changes to Off.
Preset	0.00 dBm
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Default Unit	dBm
Initial S/W Revision	Prior to A.02.00

### Scale/Div

Allows you to enter a numeric value to change the vertical display sensitivity by Burst, Multi-slot and Rise & Fall views.

Key Path	AMPTD Y Scale
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Scale/Div (Burst view and Multi-slot view)

Allows you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1]   3:WINDow[1]:TRACe:Y[:SCALE]:PDIVision <rel_ ampl>  :DISPlay:EPVTime:VIEW[1]   3:WINDow[1]:TRACe:Y[:SCALE]:PDIVision?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV 10 DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW[1]:WINDow[1]: Burst view RF Envelope window VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.

Min	0.1
Max	20.0
Initial S/W Revision	Prior to A.02.00

### Scale/Div (Rise & Fall view)

Allows you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALe]:PDIVision <rel_amp1> :DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALe]:PDIVision?
Example	DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV 10 DISP:EPVT:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW2:WINDow[1]: Rising RF Envelope window VIEW2:WINDow2: Falling RF Envelope window
Couplings	When Auto Scaling is On, this value is automatically determined by the measurement result. When you set this value manually, Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Initial S/W Revision	Prior to A.02.00

### Ref Position

Allows you to set the display reference position to Top, Center, or Bottom by Burst, Multi-slot and Rise & Fall views.

Key Path	AMPTD Y Scale
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to Top, Center, or Bottom.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP   CENTer   BOTTom  :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW[1]:WINDow[1]: Burst view RF Envelope window VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Preset	TOP
State Saved	Saved in instrument state.
Range	Top Ctr Bot
Initial S/W Revision	Prior to A.02.00

### Ref Position (Rise & Fall view)

Allows you to set the display reference position to Top, Center, or Bottom.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALe]:RPOSition TOP   CENTer   BOTTom  :DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALe]:RPOSition?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS CENT DISP:EPVT:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW2:WINDow[1]: Rising RF Envelope window VIEW2:WINDow2: Falling RF Envelope window
Preset	TOP
State Saved	Saved in instrument state.
Range	Top Ctr Bot
Initial S/W Revision	Prior to A.02.00

## Auto Scaling

Allows you to toggle Y axis auto scaling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Key Path	AMPTD Y Scale
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle Y axis auto scaling function between On and Off.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0   1   OFF   ON  :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:COUP 0 DISP:EPVT:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW[1]:WINDow[1]: Burst view RF Envelope window VIEW3:WINDow[1]: Multi-slot view RF Envelope window
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value either "Ref Value" on page 323 or "Ref Position" on page 326 manually, this parameter is set to 'Off automatically.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

### Auto Scaling (Rise & Fall view)

Allows you to toggle Y axis auto scaling function between On and Off.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALe]:COUPle 0   1   OFF   ON



	:DISP:ay:EPVTime:VIEW2:WINDow[1] 2:TRACe:Y[:SCALE]:COUPle?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:Y:COUP 0 DISP:EPVT:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Subopcode: VIEW2:WINDow[1]: Rising RF Envelope window VIEW2:WINDow2: Falling RF Envelope window
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set a value either "Ref Value" on page 323 or "Ref Position" on page 326 manually, this parameter is set to 'Off' automatically.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 330](#)

<b>Key Path</b>	Front-panel key
<b>Remote Command</b>	:COUPle ALL NONE
<b>Example</b>	:COUP ALL
<b>Notes</b>	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
<b>Initial S/W Revision</b>	Prior to A.02.00

### More Information

There are two types of functions that have Auto/Manual modes.

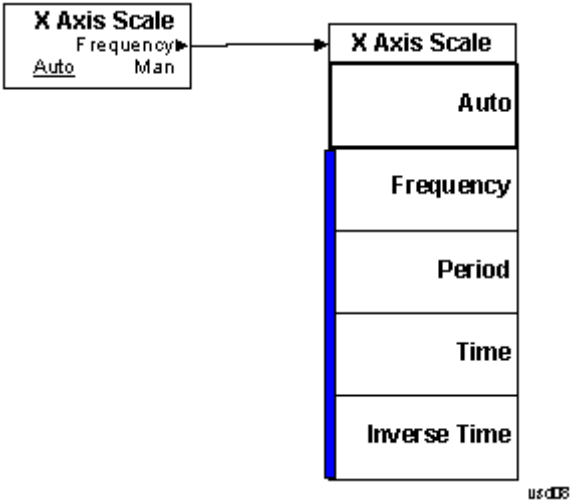
#### Auto/Man Active Function keys

An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either Auto or Man underlined as illustrated below.



#### Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



## BW

Accesses a menu that enables you to control the information bandwidth functions of the instrument. You can also select the filter type for the measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Info BW

Sets the information bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the burst signal, while not being so wide that it passes noise that reduces the dynamic range and the accuracy of low level measurements.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

Key Path	BW
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :EPVTime :BANDwidth [ :RESolution ] &lt;bandwidth&gt;</code> <code>[ :SENSe ] :EPVTime :BANDwidth [ :RESolution ] ?</code>
<b>Example</b>	EPVT:BAND 1000 EPVT:BAND?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	510 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent: No Option = 10 MHz WB (25 MHz or wider) = 25MHz WB = 160MHz
<b>Backwards Compatibility SCPI</b>	<code>[ :SENSe ] :EPVTime :BWIDth [ :RESolution ]</code>
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

### Filter Type

Allows you to select the type of resolution bandwidth filter. Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.

Key Path	BW
Mode	GSM
Remote Command	<code>[ :SENSe ] :EPVTime :BANDwidth [ :RESolution ] :TYPE FLATtop   GAUSSian</code> <code>[ :SENSe ] :EPVTime :BANDwidth [ :RESolution ] :TYPE?</code>
Example	EPVT:BAND:TYPE GAUS EPVT:BAND:TYPE?
Notes	<p><b>FLATtop</b> – a filter with a flat amplitude response, which provides the best amplitude accuracy.</p> <p><b>GAUSSian</b> – a filter with Gaussian characteristics, which provides the best pulse response.</p> <p>Selects the type of filter, either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. Even though they have a 5.5% wider noise bandwidth for the same –3 dB bandwidth as a flat top filter, that is only 0.23 dB more noise, and their step response is much cleaner and free of overshooting and ringing. If you want to precisely examine just the useful part of the burst, choose Flat.</p> <p>This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default, may cause invalid measurement results.</p>
Preset	GAUSSian
State Saved	Saved in instrument state.
Range	Gaussian Flattop
Backwards Compatibility SCPI	<code>[ :SENSe ] :EPVTime :BWIDth [ :RESolution ] :TYPE</code>
Initial S/W Revision	Prior to A.02.00

## Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing Cont does a Resume.

<b>Key Path</b>	Front-panel key
<b>Remote Command</b>	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
<b>Example</b>	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
<b>Preset</b>	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility Notes</b>	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold. The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON ) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
<b>Initial S/W Revision</b>	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of Trace Average, Max Hold, or Min Hold.

In Other Measurements/Modes:

With Avg/Hold Num (in the Meas Setup menu) set to Off or set to On with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with Avg/Hold Num set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the Cont key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until  $k = N$ , at which point the current sequence will stop and the instrument will go to the idle state.

8 EDGE Power vs Time Measurement  
File

File

See "File" on page 216



## FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel:ARFCn RFCHannel &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel:ARFCn RFCHannel?</code>
<b>Example</b>	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with <b>Center Frequency</b> . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

### Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1547](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

### Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1566](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1567](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1568](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is Center Freq.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a Global Settings key in its Mode Setup menu.

The Center Freq function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 342](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 344](#)

See ["Center Frequency Presets" on page 341](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	<code>[ :SENSe ] :FREQuency:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:CENTer?</code>
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See <a href="#">"Center Frequency Presets" on page 341</a> and <a href="#">"RF Center Freq" on page 342</a> and <a href="#">Ext Mix Center Freq</a> and <a href="#">"I/Q Center Freq" on page 344</a> .
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See <a href="#">"Center Frequency Presets" on page 341</a> and <a href="#">"RF Center Freq" on page 342</a> and <a href="#">"I/Q Center Freq" on page 344</a> .
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See <a href="#">"Center Frequency Presets" on page 341</a> and <a href="#">"RF Center Freq" on page 342</a> and <a href="#">"I/Q Center Freq" on page 344</a> .
Default Unit	Hz
Status Bits/OPC	Non-overlapped
Dependencies	
Initial S/W Revision	Prior to A.02.00

## Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

## RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:RF:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:RF:CENTer?</code>
<b>Example</b>	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:EMIXer:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:EMIXer:CENTer?</code>
<b>Example</b>	<code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	<p>If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table.</p> <p>When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz.</p> <p>Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.</p>
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

### I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	[ :SENSe ] :FREQuency:IQ:CENTer <freq> [ :SENSe ] :FREQuency:IQ:CENTer?
Example	FREQ:IQ:CENt: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	-40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

### BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel
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Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

### BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFChannel:TOP
<b>Example</b>	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFChannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENter as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

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	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz

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State Saved	No
Initial S/W Revision	Prior to A.02.00

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### BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

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Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel :MIDDLE</code>
<b>Example</b>	CHAN:ARFC:MIDD
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

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	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

## BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFChannel:BOTTom
<b>Example</b>	CHAN:ARFC:BOTT
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFChannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTom. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

### Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

### BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO ON OFF 1 0 [ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs SC   MC</code> <code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs ?</code>
<b>Example</b>	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

## Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :COUNT &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel :CARRier :COUNT ?</code>

<b>Example</b>	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

## Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :RCARrier <integer> [ :SENSe ] :CHANnel :CARRier :RCARrier?
<b>Example</b>	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers.  This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

## Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

## Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel:CARRier:LIST:COUPle OFF ON 0 1, ...</code> <code>[ :SENSe ] :CHANnel:CARRier:LIST:COUPle?</code>
<b>Example</b>	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple   Man
Initial S/W Revision	A.06.00

### Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :LIST :PPResent YES NO, ... [ :SENSe ] :CHANnel :CARRier :LIST :PPResent?
<b>Example</b>	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes   No
Initial S/W Revision	A.06.00

### Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global



<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval &lt;freq&gt;, ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval ?</code>
<b>Example</b>	CHAN:CARR:LIST:INT 600k CHAN:CARR:LIST:INT?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
<b>Dependencies</b>	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
<b>Couplings</b>	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
<b>Preset</b>	600kHz
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	400 kHz
<b>Max</b>	100 MHz
<b>Initial S/W Revision</b>	A.06.00
<b>Modified at S/W Revision</b>	A.07.00, A.08.00

## Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

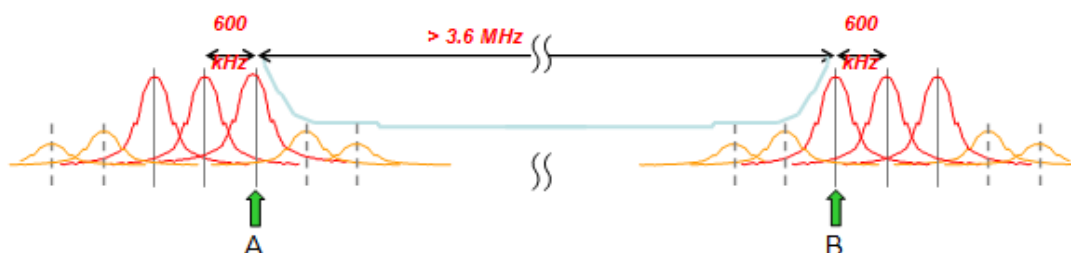
**Error! Reference source not found.**

See "[An example of non-contiguous frequency allocation](#)" on page 354

<b>Key Path</b>	FREQ Channel, Multi Carrier Setup
<b>Mode</b>	GSM
<b>Scope</b>	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :FALLocation</code> CONTiguous NCONTiguous <code>[ :SENSe ] :CHANnel :CARRier :FALLocation ?</code>
<b>Example</b>	CHAN:CARR:FALL NCON CHAN:CARR:FALL?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

An example of non-contiguous frequency allocation



### Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

### Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

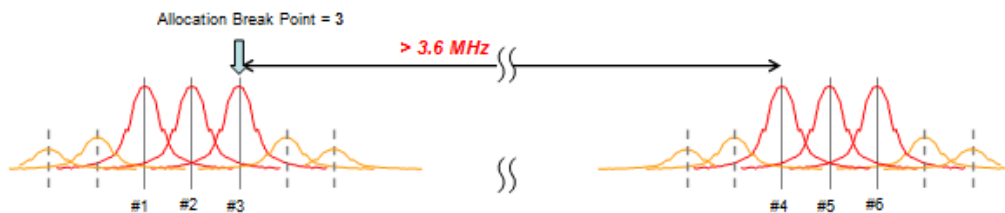
Error! Reference source not found.

See "An example of allocation break point" on page 356

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONtiguous :ABPoint <integer> [ :SENSe ] :CHANnel :CARRier :FALLocation :NCONtiguous :ABPoint ?
Example	CHAN:CARR:FALL:NCON:ABP 3 CHAN:CARR:FALL:NCON:ABP ?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers - 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

## An example of allocation break point



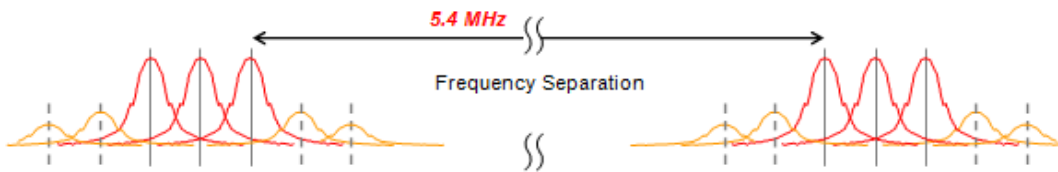
### Freq Separation

Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 357](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	<code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation &lt;freq&gt;</code> <code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?</code>
Example	<code>CHAN:CARR:FALL:NCON:FSEP 5.4M</code> <code>CHAN:CARR:FALL:NCON:FSEP?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

## An example of frequency separation



### Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	<code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ON   OFF   1   0</code> <code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ?</code>
Example	<code>RAD:CARR:NUMB:AUTO 1</code> <code>RAD:CARR:NUMB:AUTO ?</code>
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

### Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple [:SENSe]:RADio:CARRier:NUMBer?
<b>Example</b>	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:CHANnel:SLOT <integer> [:SENSe]:CHANnel:SLOT? [:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [:SENSe]:CHANnel:SLOT:AUTO?
<b>Example</b>	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

## Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :BURSt NORMal   SYNC   ACCess   HSRate   MIXed [ :SENSe ] :CHANnel :BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH)   Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

### TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:



- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

## Input/Output

See "[Input/Output](#)" on page 148

## Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

### Marker Type

Sets the marker control mode as described under Normal, Delta and Off, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:MODE POSition   DELTa   OFF :CALCulate:EPVTime:MARKer[1] 2 ... 12:MODE?
<b>Example</b>	CALC:EPVT:MARK:MODE OFF CALC:EPVT:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area.  Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.  Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision.  You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

## Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:EPVTime:MARKer[1] 2 ... 12:REFerence?
<b>Example</b>	CALC:EPVT:MARK:REF 2 CALC:EPVT:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried a single value is returned (the specified marker numbers relative marker).
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

## Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:TRACe RFENvelope   UMASk   LMASk

	MAXRfenvelop   MINRfenvelop :CALCulate:EPVTime:MARKer[1] 2 ... 12:TRACe?
<b>Example</b>	CALC:EPVT:MARK:TRAC LMAS CALC:EPVT:MARK:TRAC?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	Upper Mask and Lower Mask are available when " <b>Limit Mask</b> " on page 611 under View/Display is On. Max Hold RF Envelop is only available when Max Trace is set to On. Min Hold RF Envelop is only available when Min Hold Trace is set to On. Otherwise, the menu keys are grayed out and the commands are unavailable.
<b>Preset</b>	RFENvelope
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	RF Envelope Upper Mask Lower Mask Max Hold RF Envelope Min Hold RF Envelope
<b>Initial S/W Revision</b>	Prior to A.02.00

## Couple Markers

When this function is **On**, moving any marker causes an equal X Axis movement of every other marker which is not Off. By "equal X Axis movement" we mean that we preserve the difference between each marker's X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

<b>Key Path</b>	Marker
<b>Mode</b>	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer:COUple[:STATE] ON OFF 1 0 :CALCulate:EPVTime:MARKer:COUple[:STATE]?
<b>Example</b>	CALC:EPVT:MARK:COUP ON CALC:EPVT:MARK:COUP?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Preset</b>	OFF
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	On Off
<b>Initial S/W Revision</b>	Prior to A.02.00

## All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer:AOff
<b>Example</b>	CALC:EPVT:MARK:AOff
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

### Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is Off, but is the SCPI equivalent of entering an X value if the control mode is Normal or Delta.

Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:X <real> :CALCulate:EPVTime:MARKer[1] 2 ... 12:X?
<b>Example</b>	CALC:EPVT:MARK3:X 0 CALC:EPVT:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal, or the offset from the marker's reference marker if the control mode is Delta. The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time, seconds for Period and Time. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value will be changed by Meas Time parameter value.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns Not a Number (NaN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

### Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is Off, but is the SCPI equivalent of entering a value if the control mode is Normal or Delta except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:X:POsition <integer>

	:CALCulate:EPVTime:MARKer[1] 2 ... 12:X:POsition?
<b>Example</b>	CALC:EPVT:MARK10:X:POS 0 CALC:EPVT:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal, or the offset from the marker's reference marker in trace points if the control mode is Delta. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns Not a Number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

### Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- Absolute result: every marker has an absolute result, which, for Normal and Delta markers, is the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is Delta.

- Relative result: if a marker's control mode is Delta, the **relative** result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:Y?
<b>Example</b>	CALC:EPVT:MARK11:Y?
Notes	The query returns the marker Y-axis result. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	No
<b>Backwards Compatibility SCPI</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 4:FUNCTion:RESult?
Initial S/W Revision	Prior to A.02.00

### Marker State (Backward Compatibility/Remote Command Only)

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	EDGE GSM
Remote Command	:CALCulate:EPVTime:MARKer[1] 2 ... 12:STATe OFF ON 0 1 :CALCulate:EPVTime:MARKer[1] 2 ... 12:STATe?
Example	CALC:EPVT:MARK3:STAT ON CALC:EPVT:MARK3:STAT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00



## Marker Function

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

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Key Path	Front-panel key
Mode	EDGE GSM

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## Marker To

There is no functionality for this key in this measurement. When pressed, this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM

## Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

**NOTE**

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

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Key Path	Front-panel key
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### Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 1579

"Current Measurement Query (Remote Command Only)" on page 1581

"Limit Test Current Results (Remote Command Only)" on page 1581

"Data Query (Remote Command Only)" on page 1581

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 1582

"Calculate Peaks of Trace Data (Remote Command Only)" on page 1587

"Hardware-Accelerated Fast Power Measurement (Remote Command Only)" on page 1588

"Format Data: Numeric Data (Remote Command Only)" on page 1602

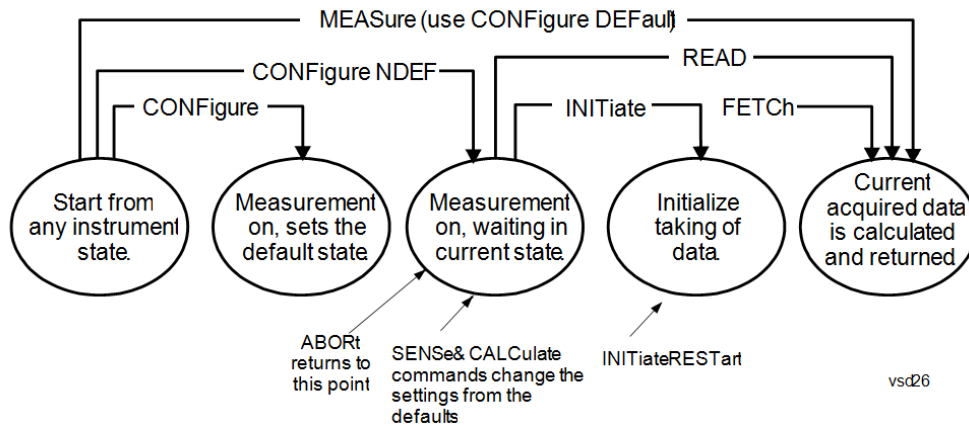
"Format Data: Byte Order (Remote Command Only)" on page 1603

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## Measurement Group of Commands




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### Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

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### Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

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the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

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#### Fetch Commands:

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:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

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#### INITiate Commands:

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:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
  - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
  - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
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#### READ Commands:

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:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
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measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
  - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
  - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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### Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

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<b>Remote Command</b>	:CONFigure?
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<b>Example</b>	CONF?
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### Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

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<b>Remote Command</b>	:CALCulate:CLIMits:FAIL?
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<b>Example</b>	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.
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### Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

<b>Remote Command</b>	:CALCulate:DATA[n]?
<b>Notes</b>	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

<b>Remote Command</b>	:CALCulate:DATA<n>:COMPRESS? BLOCK   CFIT   MAXimum   MINimum   MEAN   DMEan   RMS   RMSCubed   SAMPLE   SDEVIation   PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]
<b>Example</b>	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
<b>Notes</b>	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters.  This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
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- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

- 

**NOTE**

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$MEAN = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$MEAN = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where  $|X_i|$  is the magnitude of an I/Q pair, and  $n$  is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)



$$\text{DME} = 10 \times \log_{10} \left( \frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

**NOTE** For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPLe - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where  $X_i$  is a data point value,  $\bar{X}$  is the arithmetic mean of the data point values for the specified region (s), and  $n$  is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where  $|X_i|$  is the magnitude of an I/Q pair,  $\bar{X}$  is the mean of the magnitudes for the specified region(s), and  $n$  is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ( $n=0$ ) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

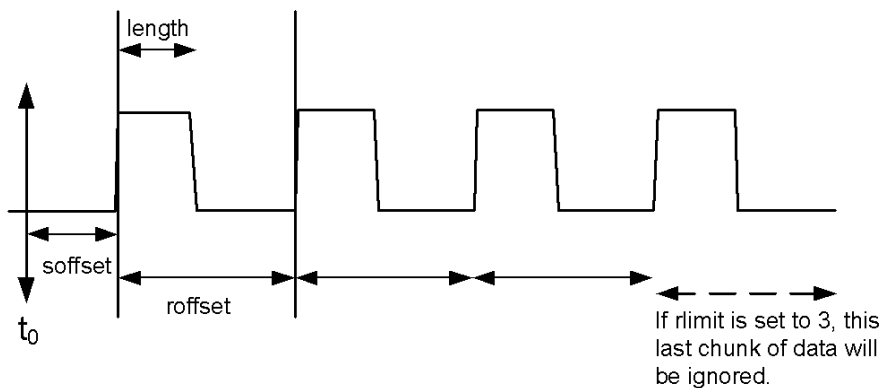
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where  $Y_i$  is the unwrapped phase of I/Q pair with applying frequency correction and  $n$  is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

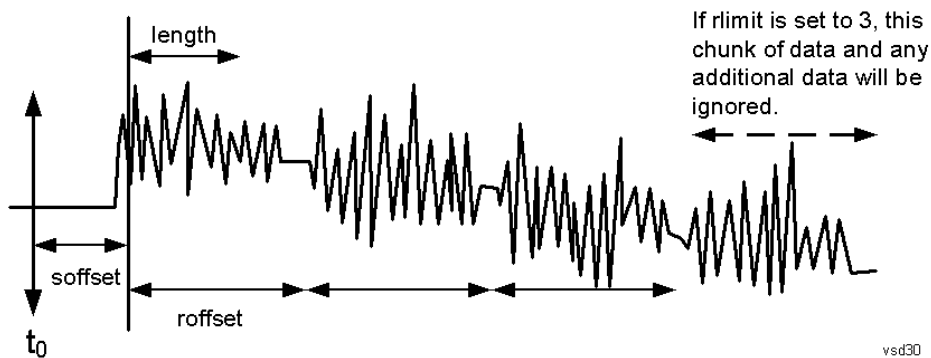
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



### Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

## Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

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<b>Remote Command</b>	<p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME[,ALL   GTDLine   LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME]</pre>
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<b>Example</b>	<p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p>
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<b>Notes</b>	<p>&lt;n&gt; - is the trace that will be used</p> <p>&lt;threshold&gt; - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p>&lt;excursion&gt; - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p>
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excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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Initial S/W Revision	Prior to A.02.00
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### Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

### Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

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Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

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Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWer[1,2,...,999]:DEFine "configuration string"
<b>Example</b>	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

### Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

### Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

## DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

## DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

## Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	<p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p>
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	<p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p>
Preset	0 dB
Range	0 – 24 dB (1 dB steps)



Default Unit	dB
Initial S/W Revision	A.14.00

#### IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

#### IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

#### Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

### Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

### Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

### Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

#### Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

#### Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	-5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

#### Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

### Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

### Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 - 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

### Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

### Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

### Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1 e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

### Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0
Initial S/W Revision	A.14.00

### Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	<p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p>
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

### Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	<p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p>
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	<p>This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.</p>

Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

#### Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

#### Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

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M All
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R :CALCulate:FPOWER:POWER[1,2,...,999]:DEFine?
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C
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m
a
n
d
E :CALC:FPOW:POW1:DEF?
x
a
m

```

```

p
l
e
N This command query is used to retrieve a list of all defined parameters in an ASCII format.
o The following is an example of the returned results:
t "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset
e =0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyRefer
s ence,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,Resolution
BW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=
[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-
3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False
e,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
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```

### Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure
<b>Example</b>	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00



### Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:INITiate
<b>Example</b>	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:FETCh?
<b>Example</b>	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

### Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]?
<b>Example</b>	:CALC:FPOW:POW1?
Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

### Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
<b>Example</b>	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

### Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
<b>Example</b>	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] 3. Declared function result for the 2nd specified channel [4 byte float] ... (m + 1). Declared function result for the last (mth) specified channel [4 byte float] ADC Over Range 1. ADC over-range occurred (1: true, 0: false) [2 byte short]

	<p>Spectrum Data</p> <ol style="list-style-type: none"> <li>1. Number of points in the spectrum data, k [4 byte int]</li> <li>2. Start frequency of spectrum data (Hz) [8 byte double]</li> <li>3. Step frequency of spectrum data (Hz) [8 byte double]</li> <li>4. FFT bin at 1st point (dBm) [4 byte float]</li> <li>5. FFT bin at 2nd point (dBm) [4 byte float]</li> </ol> <p>...</p> <p>(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]</p>
Initial S/W Revision	A.14.00

### Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

<b>Remote Command</b>	<pre>:FORMat[:TRACe][:DATA] ASCii INTeger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?</pre>
Notes	<p>The query response is:</p> <pre>ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32</pre> <p>When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm).</p> <p>The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.</p>
Dependencies	<p>Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL).</p> <p>Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".</p>
Preset	ASCii
Backwards Compatibility Notes	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

AScii - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

### Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

<b>Remote Command</b>	:FORMat:BORDER NORMAL   SWAPped :FORMat:BORDER?
<b>Preset</b>	NORMal
<b>Initial S/W Revision</b>	Prior to A.02.00

## Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Avg/Hold Num

Sets the number of bursts that are averaged. After the specified number of bursts (average counts), the averaging mode (termination control) setting determines the averaging action.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	[:SENSe]:EPVTime:AVERage:COUNT <integer> [:SENSe]:EPVTime:AVERage:COUNT? [:SENSe]:EPVTime:AVERage[:STATe] OFF ON 0 1 [:SENSe]:EPVTime:AVERage[:STATe]?
<b>Example</b>	EPVT:AVER:COUN 3 EPVT:AVER:COUN? EPVT:AVER 1 EPVT:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

### Avg Mode

Selects the type of termination control used for the averaging function. This selection only affects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

Mode	SCPI	Description
Exponential averaging	EXponential	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new

Mode	SCPI	Description
		data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
Repeat averaging	REPeat	When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Key Path	Meas Setup
Mode	GSM
Remote Command	[ :SENSe ] :EPVTime :AVERage :TCONtrol EXPonential   REPeat [ :SENSe ] :EPVTime :AVERage :TCONtrol ?
Example	EPVT:AVER:TCON REP EPVT:AVER:TCON?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	EXPonential
State Saved	Saved in instrument state.
Range	Exp Repeat
Initial S/W Revision	Prior to A.02.00

## Avg Type

Selects the averaging type, according to the following alternatives:

Key	SCPI	Type
Pwr Avg (RMS)	RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
Log-Pwr Avg (Video)	LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
None	MAXimum	Keeps track of the maximum values.
None	MINimum	Keeps track of the minimum values.
None	MXMinimum	Keeps track of the maximum and minimum values.

Key Path	Meas Setup
Mode	GSM
Remote Command	[ :SENSe ] :EPVTime :AVERage :TYPE LOG   RMS   MAXimum   MINimum   MXMinimum [ :SENSe ] :EPVTime :AVERage :TYPE ?
Example	EPVT:AVER:TYPE RMS

	EPVT:AVER:TYPE?
Notes	Maximum Minimum Max&Min can be selected only via SCPI. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	Selecting MAXimum MINimum MXMinimum forces to visible "Max Hold Trace" on page 590 or and "Min Hold Trace" on page 590. Measure Trace stays in RMS or Video average state.
Preset	LOG
State Saved	Saved in instrument state.
Range	Pwr Avg(RMS) Log-Pwr Avg(Video)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Meas Time

Allows you to measure more than one timeslot. Enter a value in integer increments of "slots" with a range of 1 to 8. The actual measure time, in  $\mu$ s, is set somewhat longer than the specified number of slots, to view the complete burst.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EPVTime:SWEEP:TIME <integer> [ :SENSe ] :EPVTime:SWEEP:TIME?
<b>Example</b>	EPVT:SWE:TIME 8 EPVT:SWE:TIME?
Notes	The actual sweep time may be slightly larger than required SweepTime due to limited trace point resolution, this is a hardware dependency. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	Scale/Div of X scale of Multi Slot View varies according to this value. Scale/Div should be adjusted to show set meas time.
Preset	1 slot
State Saved	Saved in instrument state.
Min	1
Max	8
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :EPVTime:MTIME
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## Burst Sync

Allows you to choose the source used to synchronize the measurement to the “T0” point of the EDGE burst. The “T0” point is defined as the time point of the transition from bit 13 to bit 14 of the midamble training sequence for a given time slot. The Burst Search Threshold setting (in the Mode Setup keys under Demod menu) applies to both Training Seq and RF Amptd. Pressing the Burst Sync key brings up a menu with some or all of the following choices:

- Training Seq (SCPI: TSEquence)
- RF Amptd (SCPI: RFBurst)
- None (SCPI: NONE)

The modulation scheme auto detection doesn't work when either RF Amptd or None is selected. Burst Type and the modulation schemes for NB and HB determine the mask type used in this case.

Key Path	Meas Setup
Mode	GSM
Remote Command	[ :SENSe ] :EPVTime :BSYNc :SOURce TSEquence   RFBurst   NONE [ :SENSe ] :EPVTime :BSYNc :SOURce ?
Example	EPVT:BSYN:SOUR NONE EPVT:BSYN:SOUR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When Burst Type in the Mode Setup menu is set to Mixed, this menu key is grayed out and Training Sequence (TSC) is used for synchronization. The "Training Seq" is shown on Meas Bar. The sync algorithm always runs in Training Sequence (TSC) synchronization mode in case of "Mixed" because Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync becomes effective again when Burst Type selection is changed from "Mixed" to another one. If the selected Burst Sync is "NONE", the key " <a href="#">Timeslot Length</a> " on page 404 becomes active. Otherwise the key is grayed-out.
Preset	TSEquence
State Saved	Saved in instrument state.
Range	Training Seq RF Amptd None
Initial S/W Revision	Prior to A.02.00

## Limit Test

Turns on or off limit pass/fail testing. Does not affect the limit line display.

Key Path	Meas Setup
Mode	GSM
Remote Command	:CALCulate:EPVTime:LIMit:TEST[:STATe] OFF ON 0 1 :CALCulate:EPVTime:LIMit:TEST[:STATe] ?



<b>Example</b>	CALC:EPVT:LIM:TEST ON CALC:EPVT:LIM:TEST?
Notes	If set to On, the measurement results are checked against the PVT Limit parameter to see if they meet the limit requirements. If set to Off, the PASS/FAIL indicator on the Meas Bar goes blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :EPVTime :LIMit :TEST
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## Limit Mask

Allows you to select Limit Mask type, against which the measured data is compared.

For custom, see also:

- ["Lower Mask Absolute Amplitude Levels" on page 405](#)
- ["Lower Mask Points" on page 406](#)
- ["Lower Mask Relative Amplitude Levels" on page 406](#)
- ["Lower Mask Time Points" on page 407](#)
- ["Upper Mask Absolute Amplitude Levels" on page 407](#)
- ["Upper Mask Points" on page 408](#)
- ["Upper Mask Relative Amplitude Levels" on page 408](#)
- ["Upper Mask Time Points" on page 409](#)

Key	SCPI	Mask
Standard	STANdard	The measurement algorithm uses standard-defined limit mask.
Custom	CUSTom	The measurement algorithm uses user-defined custom limit mask.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EPVTime :MASK :SElect STANdard CUSTom [ :SENSe ] :EPVTime :MASK :SElect?

<b>Example</b>	EPVT:MASK:SEL STAN EPVT:MASK:SEL?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	STANdard
State Saved	Saved in instrument state.
Range	Std Custm
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## Advanced

Accesses advanced features. These features are recommended for use only by advanced users.

Key Path	Meas Setup
Initial S/W Revision	A.02.00

## Ref Pwr Type

Pressing the Ref Pwr Type key allows you to choose the type of a reference power used for a limit mask. Pressing this key brings up a menu with some or all of the following choices:

- Useful Part (SCPI: UPART)
- Midamble (SCPI: MAMBLE)
- Estimated (SCPI: ESTimated)
- Tailbits (SCPI: TBITs)

Key Path	Meas Setup, Advanced
Mode	GSM
<b>Remote Command</b>	[ :SENSE ] : EPVTime : MASK : RPOWer : TYPE UPART   MAMBLE   ESTimated   TBITs [ :SENSE ] : EPVTime : MASK : RPOWer : TYPE?
<b>Example</b>	EPVT:MASK:RPOW:TYPE UPAR EPVT:MASK:RPOW:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	If the Burst Sync is set to "TSEQUence", the soft key "Estimated" becomes enabled. Otherwise the key is unavailable.
Preset	UPART
State Saved	Saved in instrument state.
Range	Useful Part Midamble Estimated Tailbits
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.03.00

## Ref Power

Allows you to manually set the reference power for time mask.

Key Path	Meas Setup, Advanced
Mode	GSM
Remote Command	[ :SENSe ] :EPVTime:MASK:RPOWer <ampl> [ :SENSe ] :EPVTime:MASK:RPOWer? [ :SENSe ] :EPVTime:MASK:RPOWer:AUTO [ :STATe ] OFF ON 0 1 [ :SENSe ] :EPVTime:MASK:RPOWer:AUTO [ :STATe ] ?
Example	EPVT:MASK:RPOW -20 EPVT:MASK:RPOW? EPVT:MASK:RPOW:AUTO 0 EPVT:MASK:RPOW:AUTO?
Preset	-10 ON
State Saved	Saved in instrument state.
Min	-200
Max	200
Initial S/W Revision	A.02.00

## Ref Pwr Offset

Allows you to set the reference power offset for time mask. The upper/lower mask amplitude level is calculated by adding the offset to the reference power for the specified mask reference power type. The offset doesn't have impact on the reference power displayed in the numeric results window. This UI is available only when the reference power state is set to AUTO.

Key Path	Meas Setup, Advanced
Mode	GSM
Remote Command	[ :SENSe ] :EPVTime:MASK:RPOWer:OFFSet <rel_ampl> [ :SENSe ] :EPVTime:MASK:RPOWer:OFFSet?
Example	EPVT:MASK:RPOW:OFFS 1 EPVT:MASK:RPOW:OFFS?
Couplings	If the Ref Power State is set to "MAN", this soft key is grayed-out.
Preset	0
State Saved	Saved in instrument state.
Min	-200
Max	200
Initial S/W Revision	A.03.00

## Timeslot Length

Allows you to change how the limit mask applies for each slot, when in a multi-slot measurement.

Key	SCPI	Operation
Even	EVEN	The measurement algorithm generates limit mask with the same slot length. All slots have 156.25 symbol
Not Even	INTEger	The measurement algorithm generates limit mask for slot 0 and 4 with slot length 157 symbol. And, the algorithm generates limit mask for slot 1, 2, 3, 5, 6, 7 with slot length 156 symbol. Slot 0 here is simply the first slot in the captured data, not the absolute slot determined by training sequence number.

Key Path	Meas Setup, Advanced
Mode	GSM
Remote Command	[ :SENSe ] :EPVTime:BSYNc:SLENgth EVEN INTEger [ :SENSe ] :EPVTime:BSYNc:SLENgth?
Example	EPVT:BSYN:SLEN INT EPVT:BSYN:SLEN?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is available only when the Burst Sync type is None. Otherwise it is grayed out.
Preset	INTEger
State Saved	Saved in instrument state.
Range	Even Not Even
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## Custom Mask Slot

Allows you to choose whether Custom Mask is applied to the 1st active slot only or to all active slots.

Key Path	Meas Setup, Advanced
Mode	GSM
Remote Command	[ :SENSe ] :EPVTime:MASK:CUSTom[:TYPE] FASLot AASLots [ :SENSe ] :EPVTime:MASK:CUSTom[:TYPE]?
Example	EPVT:MASK:CUST AASL EPVT:MASK:CUST?

Preset	AASlots
State Saved	Saved in instrument state.
Range	To First Active Slot Only To All Active Slots
Readback Text	First Active Slot All Active Slots
Initial S/W Revision	A.07.00

## Meas Preset

Restores all the measurement parameters to their default values.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	:CONFigure:EPVTime
<b>Example</b>	CONF:EPVT
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode
Initial S/W Revision	Prior to A.02.00

## Custom Limit Mask (Remote Commands Only)

The following Remote Only commands in this section define the custom limit mask:

- "Lower Mask Absolute Amplitude Levels" on page 405
- "Lower Mask Points" on page 406
- "Lower Mask Relative Amplitude Levels" on page 406
- "Lower Mask Time Points" on page 407
- "Upper Mask Absolute Amplitude Levels" on page 407
- "Upper Mask Points" on page 408
- "Upper Mask Relative Amplitude Levels" on page 408
- "Upper Mask Time Points" on page 409

## Lower Mask Absolute Amplitude Levels

Allows you to enter a power level for any of your mask line segments that require an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined. As the power of the Ref Level changes, all of the relative mask power levels change by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is lower than the specified absolute limit, then the value of the absolute limit is used for this segment.

Therefore, if the absolute reference limit is set to a very low value, the calculated value of the reference limit is never lower, and the specified relative limit is always used for the segment.

Every time point you defined with EPVT:MASK:LOW:TIME must have a power value defined in the same order.

<b>Remote Command</b>	<code>[ :SENSe ]:EPVTime:MASK:LIST:LOWer:ABSolute &lt;real&gt;, ...</code> <code>[ :SENSe ]:EPVTime:MASK:LIST:LOWer:ABSolute?</code>
<b>Example</b>	<code>EPVT:MASK:LIST:LOW:ABS 0,-10,-60</code> <code>EPVT:MASK:LIST:LOW:ABS?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
<b>Couplings</b>	Relative Amplitude Levels are also changed when this value has been set.
<b>Preset</b>	-200,-200
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	-200 dBm
<b>Max</b>	100 dBm
<b>Initial S/W Revision</b>	Prior to A.02.00

### Lower Mask Points

Queries the number of elements in the lower mask. This value is determined by the number of time points entered by EPVT:MASK:LIST:LOW:TIME.

<b>Remote Command</b>	<code>[ :SENSe ]:EPVTime:MASK:LIST:LOWer:POINts?</code>
<b>Example</b>	<code>EPVT:MASK:LIST:LOW:POIN?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode. Query only.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Lower Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the lower limit mask. There should be a power level for each time point entered using `[ :SENSe ]:EPVTime:MASK:LIST:LOWer:TIME`, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits at time T0.

Any portion of the signal that has no limit line segment defined for it defaults to a very low limit (-100dB relative to the reference power). This keeps the measurement from indicating a failure for that portion of the data.

<b>Remote Command</b>	<code>[ :SENSe ]:EPVTime:MASK:LIST:LOWer:RELative &lt;rel_ampl&gt;, ...</code> <code>[ :SENSe ]:EPVTime:MASK:LIST:LOWer:RELative?</code>
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<b>Example</b>	EPVT:MASK:LIST:LOW:REL -200,-200 EPVT:MASK:LIST:LOW:REL?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	Absolute Amplitude Levels are also changed when this value has been set.
Preset	-200,-200
State Saved	Saved in instrument state.
Min	-200
Max	200
Initial S/W Revision	Prior to A.02.00

### Lower Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the lower limit. A reference point designated "t0" is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 reference point is a negative time value.

First enter positive values in sequence starting from t0, then negative values in sequence starting from t0.

<b>Remote Command</b>	[ :SENSe ] :EPVTime:MASK:LIST:LOWer:TIME <seconds>, ... [ :SENSe ] :EPVTime:MASK:LIST:LOWer:TIME?
<b>Example</b>	EPVT:MASK:LIST:LOW:TIME 1,1 EPVT:MASK:LIST:LOW:TIME?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	1,-1
State Saved	Saved in instrument state.
Min	-1 s
Max	1 s
Initial S/W Revision	Prior to A.02.00

### Upper Mask Absolute Amplitude Levels

Allows you to enter a power level for any of your mask line segments that require an absolute minimum power limit in addition to its relative limit. Each time a measurement is made, the Ref Level is determined (This is the power level of the useful part of the burst, or midway between the upper/lower masks). Remember that, as the power of the Ref Level changes, all of the relative mask power levels changes by the same amount.

Each relative limit is then compared to the Ref Level and an equivalent absolute power level is calculated. This power level is compared to the specified absolute limit for each line segment. If this calculated relative limit is higher than the specified absolute limit, then the value of the absolute limit is used for this segment.

Therefore, if the absolute reference limit is set to a very low value (–200 dBm), the calculated value of the reference limit is never lower, and the specified relative limit is always used for the segment.

Every time point you defined with EPVT:MASK:UPP:TIME must have a power value defined in the same order.

<b>Remote Command</b>	<code>[ :SENSe ] :EPVTime :MASK :LIST :UPPer :ABSolute &lt;real&gt;, ...</code> <code>[ :SENSe ] :EPVTime :MASK :LIST :UPPer :ABSolute?</code>
<b>Example</b>	<code>EPVT:MASK:LIST:UPP:ABS -200, -200, -58, -200, -200, -200, -200, -58, -200</code> <code>EPVT:MASK:LIST:UPP:ABS?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
<b>Couplings</b>	Relative Amplitude Levels are also changed when this value has been set.
<b>Preset</b>	-200,-200
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	-200
<b>Max</b>	100
<b>Initial S/W Revision</b>	Prior to A.02.00

## Upper Mask Points

Queries the number of elements in the upper mask. This value is determined by the number of time points entered by EPVT:MASK:LIST:UPP:TIME.

<b>Remote Command</b>	<code>[ :SENSe ] :EPVTime :MASK :LIST :UPPer :POINts?</code>
<b>Example</b>	<code>EPVT:MASK:LIST:UPP:POIN?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode. Query only.
<b>Initial S/W Revision</b>	Prior to A.02.00

## Upper Mask Relative Amplitude Levels

Allows you to enter the relative power level for each horizontal line segment in the upper limit mask. There should be a power level for each time point entered using `[ :SENSe ] :EPVTime :MASK :LIST :UPPer :TIME`, and they must be entered in the same order. These power levels are all relative to the defined Reference Power Level (the average power in the useful part of the data). When an upper and lower limit mask have been defined, the Reference Power Level is the mid-point between these two limits.

<b>Remote Command</b>	<code>[ :SENSe ] :EPVTime :MASK :LIST :UPPer :RELative &lt;rel_ampl&gt;, ...</code> <code>[ :SENSe ] :EPVTime :MASK :LIST :UPPer :RELative?</code>
<b>Example</b>	<code>EPVT:MASK:LIST:UPP:REL 4, -32, -48, 100, 4, 7, -25, -43, 100</code> <code>EPVT:MASK:LIST:UPP:REL?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.



Couplings	Absolute Amplitude Levels are also changed when this value has been set.
Preset	100,100
State Saved	Saved in instrument state.
Min	-200
Max	200
Initial S/W Revision	Prior to A.02.00

## Upper Mask Time Points

Allows you to enter the time points that define the horizontal line segments for the upper limit. A reference point designated “t0” is at the center of the useful data (usually the center of the burst). Each line segment to the right of the t0 reference point is designated as a positive time value and each segment to the left of t0 is a negative time value.

First enter positive values in sequence starting from t0, then the negative values in sequence starting from t0.

We recommend that you select a large time value for your first and last mask points (for example, -1 and +1 second). This guarantees that you have defined a limit for all the measured data.

<b>Remote Command</b>	<code>[ :SENSe ] :EPVTime:MASK:LIST:UPPer:TIME &lt;seconds&gt;, ...</code> <code>[ :SENSe ] :EPVTime:MASK:LIST:UPPer:TIME?</code>
<b>Example</b>	<code>EPVT:MASK:LIST:UPP:TIME 1,-1</code> <code>EPVT:MASK:LIST:UPP:TIME?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	1,-1
State Saved	Saved in instrument state.
Min	-1 s
Max	1 s
Initial S/W Revision	Prior to A.02.00

## Lower Limit within Useful Part (Remote Commands Only)

### Limit Mask Useful Part Lower Normal

According to the Standards, the lower limit within the useful part of normal duration bursts (NB) is seen as undefined for 16-QAM and 32-QAM. The lower limit (red in the Figure 1) is set to -200 by default. This command allows you to set the lower limit as you like. Only SCPI remote command is supported. Note that the lower limit is shared in the BTS and MS modes.

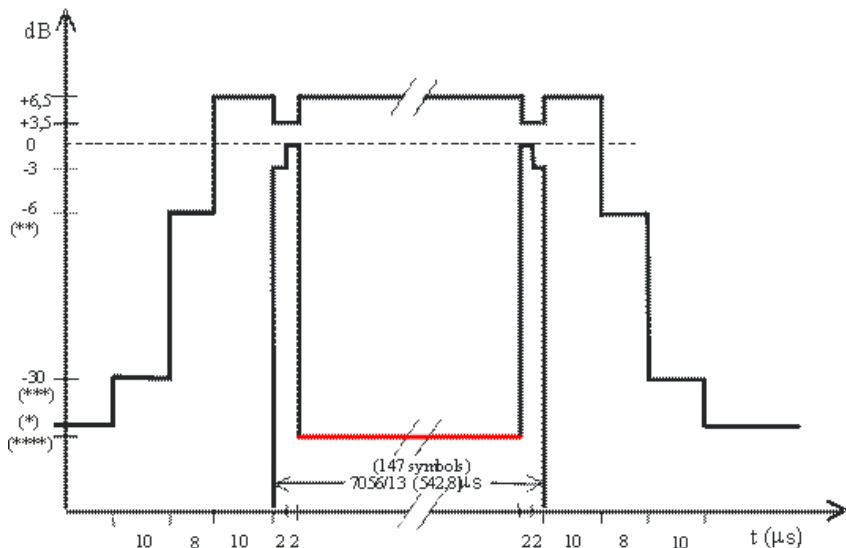


Figure 1 0-1 Time mask for normal duration bursts (NB) at 16-QAM and 32-QAM modulation at normal symbol rate

<b>Mode</b>	GSM
<b>Remote Command</b>	<code>[[:SENSe]:EPVTime:MASK[:UPARt]:LOWer:NORMal QAM16   QAM32, &lt;rel_ampl&gt;</code> <code>[[:SENSe]:EPVTime:MASK[:UPARt]:LOWer:NORMal? QAM16 QAM32</code>
<b>Example</b>	<code>EPVT:MASK:LOW:NORM QAM16, -40</code> <code>EPVT:MASK:LOW:NORM? QAM16</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
<b>Preset</b>	-200
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	-200
<b>Max</b>	200
<b>Initial S/W Revision</b>	A.02.00

### Limit Mask Useful Part Lower Higher Symbol Rate

According to the Standards, the lower limit within the useful part for higher symbol rate bursts (HB) is seen as undefined for 16-QAM and 32-QAM. The lower limit (red in the Figure 2) is set to -200 by default. This command allows you to set the lower limit as you like. Only SCPI remote command is supported. Note that the lower limit is shared in the BTS and MS modes and in the narrow and wide pulse shaping filter modes.

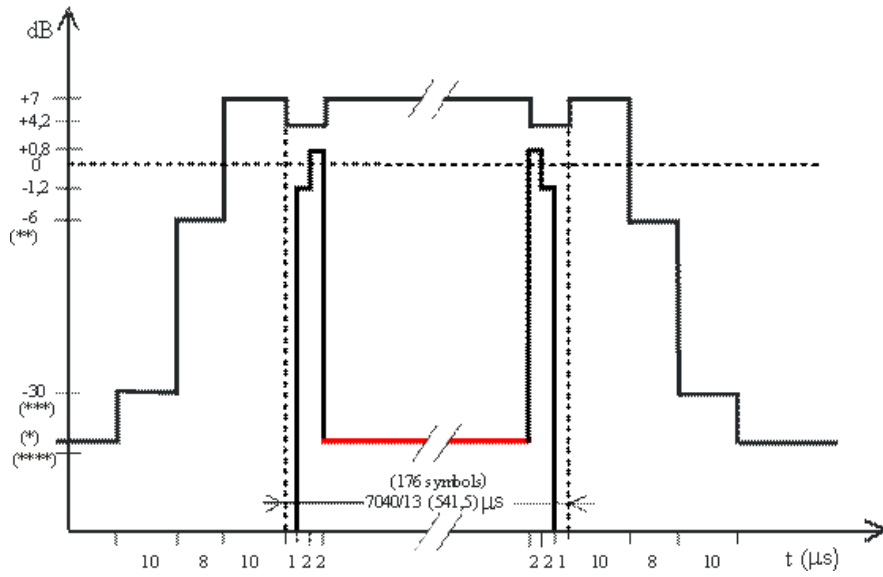


Figure 2 0-2 Time mask for higher symbol rate bursts (HB) at 16-QAM and 32-QAM modulation with narrow pulse shaping filter

Mode	GSM
Remote Command	<code>[ :SENSe ] :EPVTime:MASK[:UPARt]:LOWer:HSRate QAM16   QAM32, &lt;rel_ampl&gt;</code> <code>[ :SENSe ] :EPVTime:MASK[:UPARt]:LOWer:HSRate? QAM16 QAM32</code>
Example	<code>EPVT:MASK:LOW:HSR QAM16, -40</code> <code>EPVT:MASK:LOW:HSR? QAM16</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Preset	-200
State Saved	Saved in instrument state.
Min	-200
Max	200
Initial S/W Revision	A.02.00

## Mode

See "[Mode](#)" on page 174

## Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 414 for more information.

Key Path	Front-panel key
<b>Remote Command</b>	:SYSTem:PRESet
<b>Example</b>	:SYST:PRES
Notes	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

## How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPUt	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGN	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

## Mode Setup

See "[Mode Setup](#)" on page 193



## Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

Key Path	Front-panel key
Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:MAXimum
<b>Example</b>	CALC:EPVT:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

### Min Peak Search (Backwards Compatibility/Remote Command Only)

Mode	GSM
<b>Remote Command</b>	:CALCulate:EPVTime:MARKer[1] 2 ... 12:MINimum
<b>Example</b>	CALC:EPVT:MARK:MIN
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

8 EDGE Power vs Time Measurement  
Print

Print

See "[Print](#)" on page 221

## Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State\_0000.state. The next is State\_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State\_0010.state there is already a State\_0010.state file in the current directory, it advances the counter to State\_0011.state to ensure that no conflict will exist (and then it verifies that State\_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred\_0000.csv.

**NOTE**

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

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**NOTE**

If the filename you entered ends with \_dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

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Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

## Recall

The Recall menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an Import (Data) option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

**NOTE**

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	<p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATE &lt;filename&gt;.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p>
Backwards Compatibility Notes	<p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p>
Backwards Compatibility Notes	<p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p>
Initial S/W Revision	Prior to A.02.00

## State

The Recall State menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. Recall State will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 423](#).

<b>Key Path</b>	Recall
<b>Mode</b>	All
<b>Remote Command</b>	:MMEMory:LOAD:STATe <filename>
<b>Example</b>	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
<b>Example</b>	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
<b>Notes</b>	<p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> <li>• If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number.</li> </ul> <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> <li>• Makes the saved measurement for the mode the active measurement.</li> <li>• Clears the input and output buffers.</li> <li>• Status Byte is set to 0.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Executes a *CLS</li> </ul> <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away.</p> <p>After the Recall, the analyzer exits the Recall menu and returns to the previous menu.</p>
<b>Backwards Compatibility SCPI</b>	:MMEMory:LOAD:STATe 1,<filename>
Initial S/W Revision	Prior to A.02.00

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### More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

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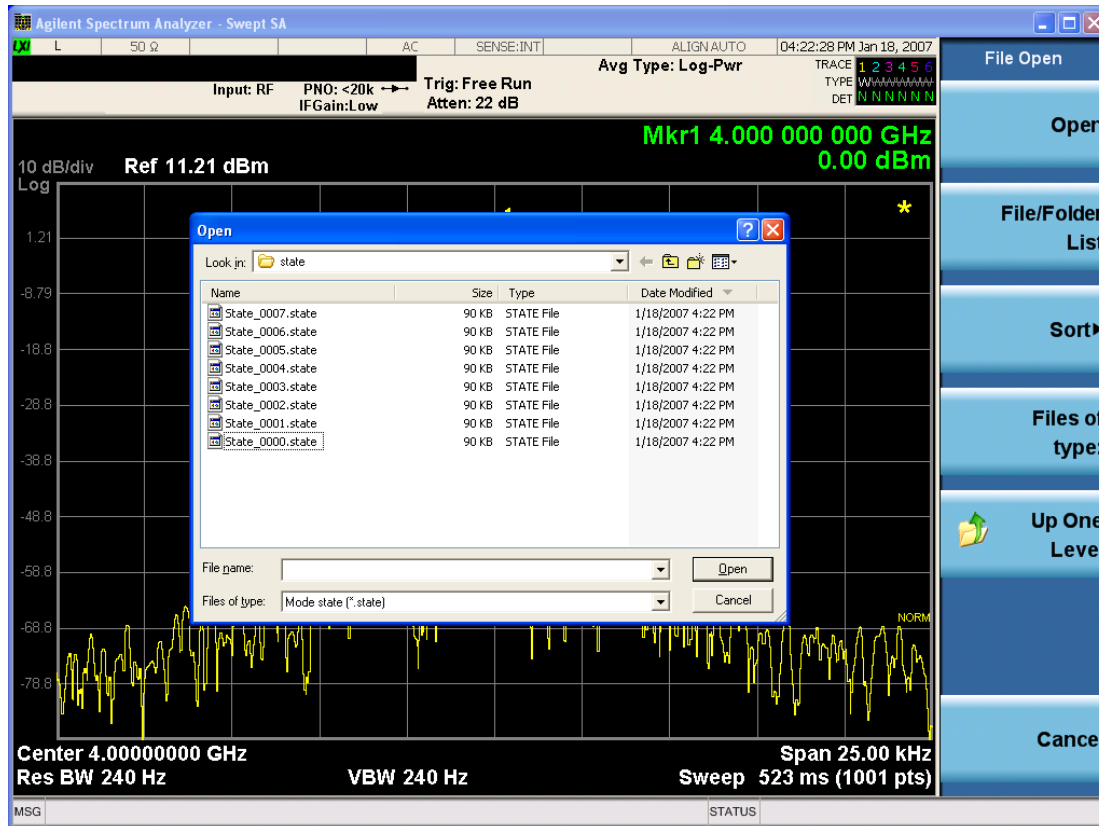
You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

---

### From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

## 8 EDGE Power vs Time Measurement Recall



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

### Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

### Look In

The Look In field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

### Sort



Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are By Date, By Name, By extension, and By Size.

#### Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (\*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

### Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the Save, State function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE**

In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE**

In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
<b>Example</b>	*RCL 1
Range	1-16 from front panel, 1-128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
<b>Remote Command</b>	:MMEMory:LOAD:SEQuences:   SLIS   ALIS   SAALIS   "MySequence.txt"
<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall, Sequences
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<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
<b>Dependencies</b>	Only available in XOBT
<b>Initial S/W Revision</b>	A.05.00

## Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[From File...](#)" on page 1621 in Recall, State, for a full description of this dialog and menu.

<b>Key Path</b>	Recall, Data
<b>Notes</b>	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
<b>Initial S/W Revision</b>	Prior to A.02.00

## Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 429

Key Path	Front-panel key
Remote Command	:INITiate[:IMMEDIATE] :INITiate:RESTART
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTIONable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write, but did not restart Max Hold and Min Hold. In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average, but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

### More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count  $k$  equals the number  $N$  set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

## Save

The Save menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an Export (Data) option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

## State

The Save State menu lets you choose a register or file for saving the state.

### NOTE

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
<b>Remote Command</b>	:MMEMory:STORe:STATe <filename>
<b>Example</b>	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote.

After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key.

After saving to a register, you remain in the Save State menu, so that you can see the Register key update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

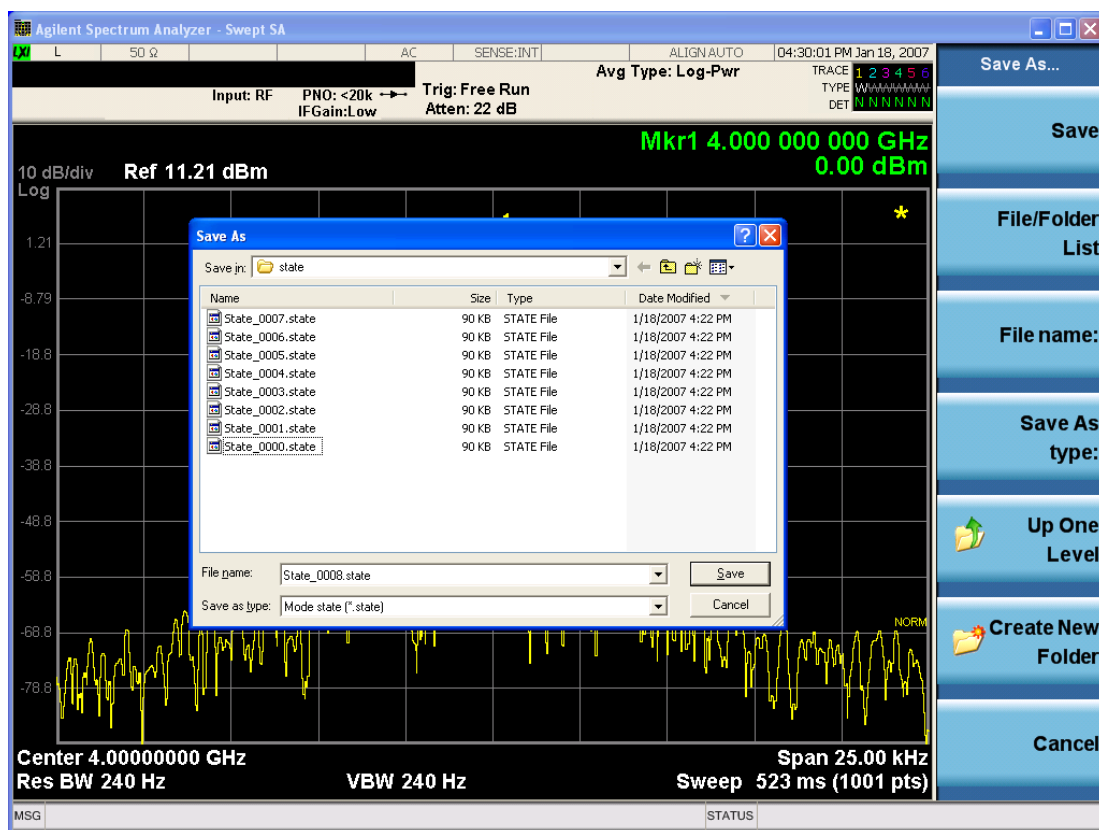
**Backwards** :MMEMory:STORE:STATe 1,<filename>

**Compatibility SCPI** For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.

**Initial S/W Revision** Prior to A.02.00

### To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “Save As.” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

#### Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting OK, or you can Cancel the request. If you select OK,



the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

#### Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

#### File Name

The File Name field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1617](#) documentation for more on the automatic file naming algorithm.

When you press the File Name key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the Done softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

#### Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (\*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Create New Folder

This key corresponds to the icon of a folder with the "\*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

## Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 434](#)

Key Path	Save, State
Mode	All
<b>Remote Command</b>	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
<b>Example</b>	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

## More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another

consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The \*SAV and \*RCL commands will not be affected by the custom register names, nor will the MMEM commands.

### Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

#### NOTE

In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at

what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
<b>Example</b>	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

## Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?
Notes	<p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The &lt;directory_name&gt; parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p>
Initial S/W Revision	Prior to A.02.00

## Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY <string>,<string>[,<string>,<string>]
Notes	<p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p>

## Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY:DEvice <source_string>,<dest_string>
Notes	<p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p>

### Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DELeTe <file_name>[,<directory_name>]
Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an "access denied" error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

### Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

### Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an "access denied" error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

### Mass Storage Move (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory.

---

Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.

The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

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Initial S/W Revision      Prior to A.02.00

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## Mass Storage Remove Directory (Remote Command Only)

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Key path	SCPI Only
<b>Remote Command</b>	<code>:MMEMory:RDIRectory &lt;directory_name&gt;</code>
Notes	<p>The string must be a valid logical path.</p> <p>Removes a directory. The &lt;directory_name&gt; parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p>

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Initial S/W Revision      Prior to A.02.00

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## Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

---

Key Path	Save, Sequences
Mode	All
<b>Remote Command</b>	<code>:MMEM:STOR:SEquences:   SLIST   ALIST   SAAList   SSTep "MySequence.txt"</code>
<b>Example</b>	<code>:MMEM:STOR:SEQ:SLIST "MySequence.txt"</code>
Notes	<p>Available file types are:</p> <ul style="list-style-type: none"> <li>–CSV (Comma delimited) (*.csv)</li> <li>–Text (Tab delimited) (*.txt)</li> </ul>

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Initial S/W Revision      A.05.00

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## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

## Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

## Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All



Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

## Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which **Meas Result** to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See ["Meas Results File Contents" on page 442](#).

See ["Marker Table" on page 442](#).

See ["Peak Table" on page 444](#).

See Spectrogram

<b>Remote Command</b>	:MMEMory:STORe:RESults:MTABle PTABle SPEctrogram <filename>
<b>Example</b>	:MMEM:STOR:RES:MTAB "myResults.csv" Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB "myResults.csv" Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC "myResults.csv" Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

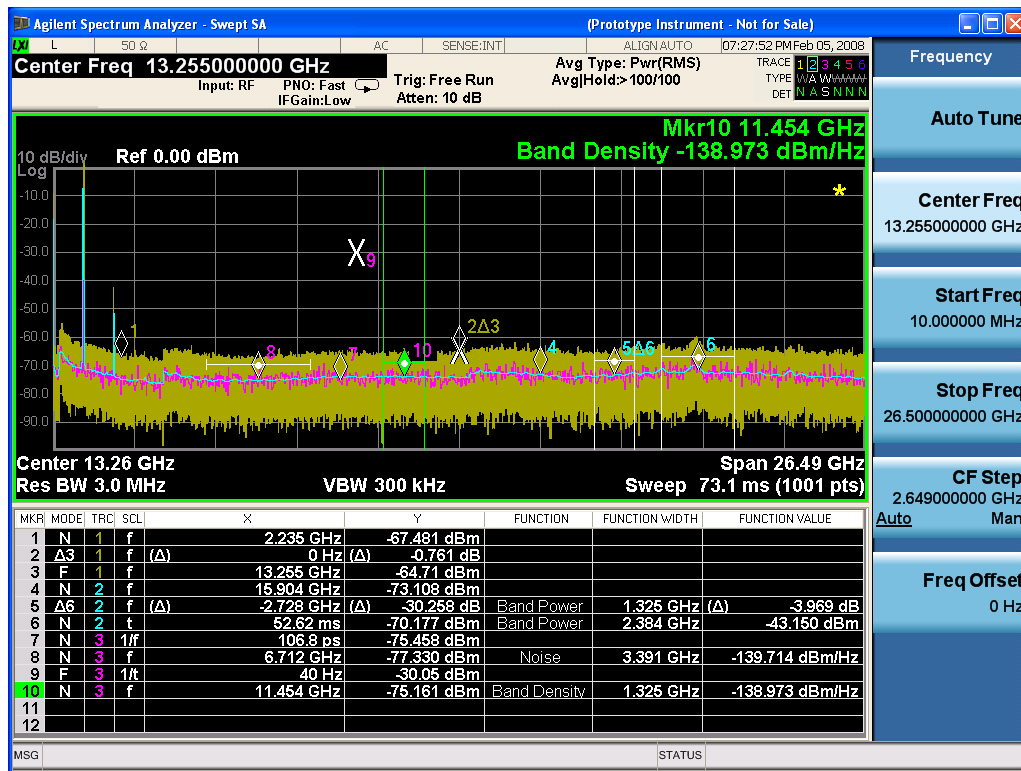
### Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

### Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementR	
result	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR	1
P26 EA3	
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.0662666

	67								
Start Frequency	10000000								
Stop Frequency	26500000 000								
Average Count	0								
Average Type	LogPower (Video)								
RBW	3000000								
RBW Filter	Gaussian								
RBW Filter BW	3dB								
VBW	3000000								
Sweep Type	Swept								
X Axis Scale	Lin								
PreAmp State	Off								
PreAmp Band	Low								
Trigger Source	Free								
Trigger Level	1.2								
Trigger Slope	Positive								
Trigger Delay	1.00E-06								
Phase Noise Optimization	Fast								
Swept If Gain	Low								
FFT If Gain	Autorange								
RF Coupling	AC								
FFT Width	411900								
Ext Ref	10000000								
Input	RF								
RF Calibrator	Off								
Attenuation	10								
Ref Level Offset	0								
External Gain	0								
X Axis Units	Hz								
Y Axis Units	dBm								
DATA									
MKR	MODE	TR C	SCL	X	Y	FUNCTI ON	FUNCTIO N WIDTH	FUNCTI ON VALUE	FUNCTI ON UNIT
1	Normal	1	Freque ncy	2.2350E+ 09	- 67.4	Off	0.0000E+ 00	0	None

81									
2	Delta3	1	Frequency	0.0000E+00	-0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	-64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	-73.108	Off	0.0000E+00	0	None
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

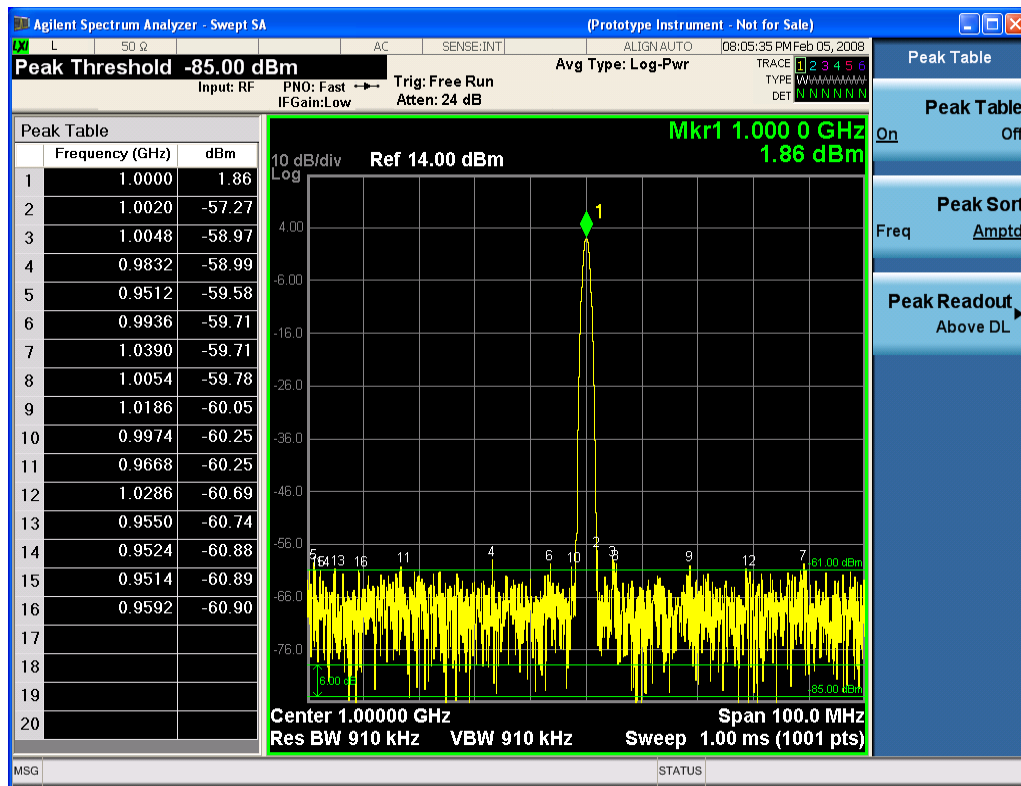
The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

### Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

## 8 EDGE Power vs Time Measurement

Save

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	-61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	-57.27
3	1.0048E+06	-58.97
4	9.8320E+05	-58.99
5	9.5120E+05	-59.58
6	9.9360E+05	-59.71
7	1.0390E+06	-59.71
8	1.0054E+06	-59.78
9	1.1086E+06	-60.05
10	9.9740E+05	-60.25
11	9.6680E+05	-60.25
12	1.0286E+06	-60.69
13	9.5500E+05	-60.74
14	9.5240E+05	-60.88
15	9.5140E+05	-60.89
16	9.5920E+05	-60.90
17		
18		
19		
20		

## Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

**NOTE**

The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:





For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a different time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 seconds after the Spectrogram started (trace 10 has a start time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

Result Type	Spectrogram
MeasResult	
Swept SA	
A.11.00.01	N9020A
503 508 513 526 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Save

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	-76.34749519
5999984440	-77.28097006
5999984465	-75.32317869
5999984490	-73.64417681
5999984515	-72.67154604

O

O

O

6000009315	-77.94423277
6000009340	-79.51829697
6000009365	-78.46108961
6000009390	-78.46108957
6000009415	-76.59570596
DATA2	4.708697055

5999984415	-80.98197882
5999984440	-80.98197879
5999984465	-75.83142132
5999984490	-74.02712079
5999984515	-73.57213005

0  
0  
0

6000009315	-75.9183103
6000009340	-79.53787488
6000009365	-78.82602191
6000009390	-78.82602188
6000009415	-76.37486709
DATA10	0
5999984415	-75.56751112
5999984440	-75.76485645
5999984465	-76.67718717
5999984490	-78.79238489
5999984515	-83.72680212

0  
0  
0

6000009315	-71.3942461
6000009340	-72.28308332
6000009365	-73.92684489
6000009390	-75.45548832
6000009415	-75.17904815

### Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

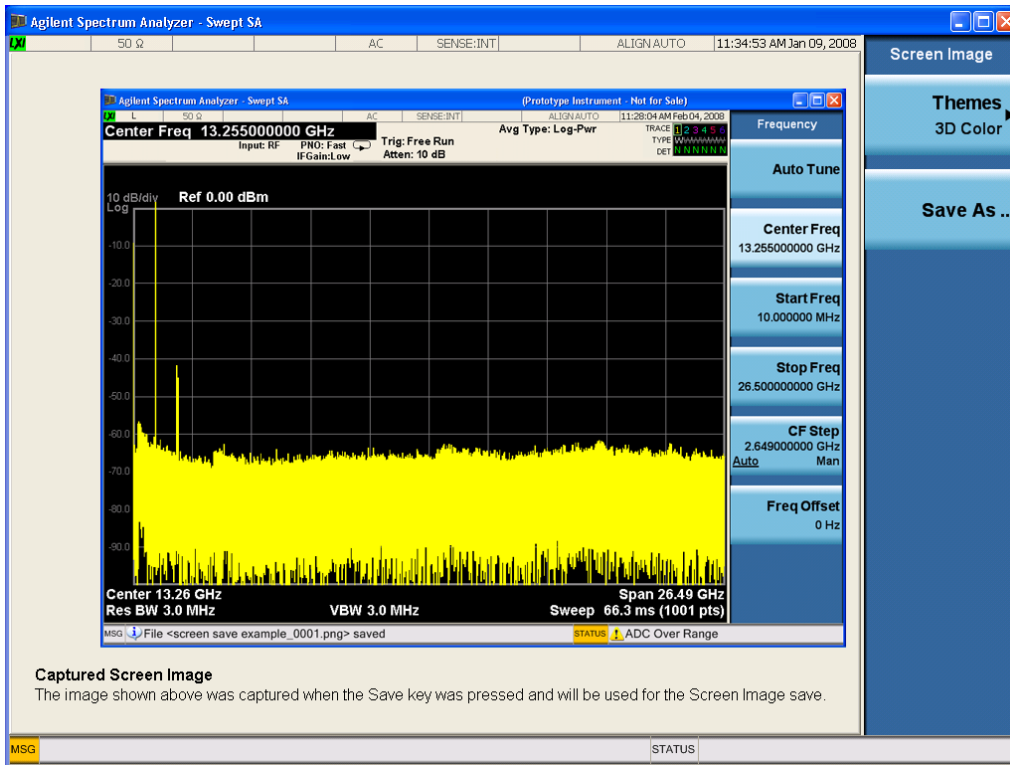
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

## Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the Save front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the Save As menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the Save menu. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the Quick Save front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

**NOTE**

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReem <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

**Themes**

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReem:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReem:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

<b>Key Path</b>	Save, Screen Image, Themes
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<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

## Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing Single does a Resume.

See "[More Information](#)" on page 456

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	<p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA &amp; PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p>
Initial S/W Revision	Prior to A.02.00

### More Information

See "[Restart](#)" on page 1627 for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the Single key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the Single key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the Single key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.



## Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key
----------	-----------------

## RF Output

This parameter sets the source RF power output state.

Key Path	Source
<b>Remote Command</b>	:OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]?
<b>Example</b>	OUTP OFF OUTP?
<b>Notes</b>	<p>The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p>
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
<b>Notes</b>	<p>The sub-menu under this button is for independent mode and has no effect on <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set <a href="#">"Sequencer" on page 1726</a> to Off will make source leave list sequencer and this button will be black out.</p>
Initial S/W Revision	A.05.00

## RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the ["RF Power Range " on page 459](#) table below for the valid ranges.

<b>Key Path</b>	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
<b>Example</b>	:SOUR:POW -100 dBm
<b>Notes</b>	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p>
<b>Notes</b>	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
<b>Dependencies</b>	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
<b>Preset</b>	-100 dBm
<b>Min</b>	The range of values depends on the current frequency and selected RF output port. Please refer to the <a href="#">"RF Power Range " on page 459</a> table below for the valid ranges.
<b>Max</b>	The range of values depends on the current frequency and selected RF output port. Please refer to the <a href="#">"RF Power Range " on page 459</a> table below for the valid ranges.
<b>Initial S/W Revision</b>	A.05.00

## RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz ≤ f ≤ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

## Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

### NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the " <a href="#">List Sequencer</a> " on page 1725 is turned ON.
Initial S/W Revision	A.05.00

## Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1648](#)

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe?
<b>Example</b>	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the <a href="#">"List Sequencer" on page 1725</a> is turned ON.
Couplings	This value is coupled to the <a href="#">"Set Reference Power " on page 1648</a> key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

## Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
<b>Example</b>	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

## Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
<b>Remote Command</b>	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
<b>Example</b>	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on page 1725. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on

[page 1725](#). If the "[Sequencer](#)" on [page 1726](#) is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.

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## Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]?
Example	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present, the frequency range should be limited to: 1.1GHz–1.7GHz, 2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called "Settings conflict; Frequency is outside available range".
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## Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: "[GSM/EDGE Channel Number Ranges](#)" on [page 463](#), "[W-CDMA Channel Number Ranges](#)" on [page 464](#), "[CDMA 2000 / 1xEVDO Channel Number Ranges](#)" on [page 465](#), and "[LTE FDD Channel Number Ranges](#)" on [page 467](#).

Key Path	Source, Frequency
<b>Remote Command</b>	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
<b>Example</b>	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1660 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
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### GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 850	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
GSM 700	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
T-GSM810	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

### W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
Band III	Downlink	$350 \leq n \leq 425$	$n \div 5$
		Uplink	$1162 \leq n \leq 1513$
Band IV	Downlink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
		Uplink	$537 \leq n \leq 1738$
	Uplink	$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
Band V	Downlink	$1312 \leq n \leq 1513$	$n \div 5 + 1450$
		$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
	Uplink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
Band VI	Downlink	$4357 \leq n \leq 4458$	$n \div 5$
		Uplink	$782 \leq n \leq 862$
	Uplink	$4132 \leq n \leq 4233$	$n \div 5$
Band VII	Downlink	$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
		$4387 \leq n \leq 4413$	$n \div 5$
	Uplink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
Band VIII	Downlink	$4162 \leq n \leq 4188$	$n \div 5$
		Uplink	$2237 \leq n \leq 2563$
	Uplink	$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
Band VIII	Downlink	$2012 \leq n \leq 2338$	$n \div 5 + 2100$
		Uplink	$2362 \leq n \leq 2687$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$
		Uplink	$2712 \leq n \leq 2863$



Band	Link (Device)	Range	Frequency (MHz)
Band IX	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

#### CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
AWS	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
US 2.5 GHz	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
700 Public Safety	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
C2K Lower 700	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
400 Euro PAMR	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
	Uplink (MS, reverse link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
	Downlink (BS, forward link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

### LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
1		2110	0	0 - 599	1920	18000 - 18599
2		1930	600	600 - 1199	1850	18600 - 19199
3		1805	1200	1200 - 1949	1710	19200 - 19949
4		2110	1950	1950 - 2399	1710	19950 - 20399
5		869	2400	2400 - 2649	824	20400 - 20649
6		875	2650	2650 - 2749	830	20650 - 20749
7		2620	2750	2750 - 3449	2500	20750 - 20449
8		925	3450	3450 - 3799	880	21450 - 21799
9		1844.9	3800	3800 - 4149	1749.9	21800 - 22149
10		2110	4150	4150 - 4749	1710	22150 - 22749
11		1475.9	4750	4750 - 4949	1427.9	22750 - 22949
12		729	5010	5010 - 5179	699	23010 - 23179
13		746	5180	5180 - 5279	777	23180 - 23279
14		758	5280	5280 - 5379	788	23280 - 23379
...						
17		734	5730	5730 - 5849	704	23730 - 23849
18		860	5850	5850 - 5999	815	23850 - 23999
19		875	6000	6000 - 6149	830	24000 - 24149
20		791	6150	6150 - 6449	832	24150 - 24449
21		1495.9	6450	6450 - 6599	1447.9	24450 - 24599
...						
24		1525	7700	7700 - 8039	1626.5	25700 - 26039
25		1930	8040	8040 - 8689	1850	26040 - 26689
26		859	8690	8690 - 9039	814	26690 - 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

## LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
33		1900	36000	36000 - 36199	1900	36000 - 36199
34		2010	36200	36200 - 36349	2010	36200 - 36349
35		1850	36350	36350 - 36949	1850	36350 - 36949
36		1930	36950	36950 - 37549	1930	36950 - 37549
37		1910	37550	37550 - 37749	1910	37550 - 37749
38		2570	37750	37750 - 38249	2570	37750 - 38249
39		1880	38250	38250 - 38649	1880	38250 - 38649
40		2300	38650	38650 - 39649	2300	38650 - 39649
41		2496	39650	39650 - 41589	2496	39650 - 41589
42		3400	41590	41590 - 43589	3400	41590 - 43589
43		3600	43590	43590 - 45589	3600	43590 - 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

## TDSCDMA Channel Number Ranges

### 1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio  
Frequency Channel Number 1.28  
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

## Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00

## Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:FREQuency:CHANnels:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38   BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF  :SOURce:FREQuency:CHANnels:BAND?
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PGSM
<b>Notes</b>	Set this setting to "NONE" will grey out "Channel" on page 1651 Channel
Initial S/W Revision	A.05.00

### None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

### E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

### R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

### DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

### PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

### GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00



**GSM 480**

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

**GSM 850**

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

**GSM 700**

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

**T-GSM 810**

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

**WCDMA**

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

**Band I**

Selects Band I as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

---

#### Band II

Selects Band II as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

---

#### Band III

Selects Band III as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

---

#### Band IV

Selects Band IV as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

---

#### Band V

Selects Band V as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

---

#### Band VI

Selects Band VI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

**Band VII**

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

**Band VIII**

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

**Band IX**

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

**Band X**

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

**Band XI**

Selects Band XI as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

---

#### Band XII

Selects Band XII as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

---

#### Band XIII

Selects band XIII as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

---

#### Band XIV

Selects Band XIV as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

---

#### Band XIX

Selects Band XIX as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIX
Initial S/W Revision	A.14.50

---

#### CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1xEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### US CELL

Selects US Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

### US PCS

Selects US PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

### Japan Cell

Selects Japan Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

### Korean PCS

Selects Korean PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

### NMT 450

Selects NMT 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

---

#### IMT 2000

Selects IMT 2000 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

---

#### Upper 700

Selects Upper 700 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

---

#### Secondary 800

Selects Secondary 800 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

---

#### 400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

---

#### 800 PAMR

Selects 800 PAMR as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

### 2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

### AWS

Selects AWS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

### US 2.5GHz

Selects US 2.5 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

### 700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

---

### C2K Lower 700

Selects C2K Lower 700 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

---

### LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

---

### BAND 1

Selects BAND 1 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

---

### BAND 2

Selects BAND 2 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

---

### BAND 3

Selects BAND 3 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

---



**BAND 4**

Selects BAND 4 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

---

**BAND 5**

Selects BAND 5 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

---

**BAND 6**

Selects BAND 6 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

---

**BAND 7**

Selects BAND 7 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

---

**BAND 8**

Selects BAND 8 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

---

### BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

### BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

### BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

### BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

### BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

**BAND 14**

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

**BAND 18**

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

**BAND 19**

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

**BAND 20**

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

#### BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

#### BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

#### BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

#### BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

#### BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

**BAND 28**

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

**BAND 31**

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

**LTE TDD**

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND 33**

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

**BAND 34**

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

**BAND 35**

Selects BAND 35 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

---

#### BAND 36

Selects BAND 36 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

---

#### BAND 37

Selects BAND 37 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

---

#### BAND 38

Selects BAND 38 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

---

#### BAND 39

Selects BAND 39 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

---

#### BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

**BAND 41**

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

**BAND 42**

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

**BAND 43**

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

**BAND 44**

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

**TDSCDMA**

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

---

#### BAND A

Selects BAND A as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

---

#### BAND B

Selects BAND B as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

---

#### BAND C

Selects BAND C as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

---

#### BAND D

Selects BAND D as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

---

#### BAND E

Selects BAND E as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
----------	---

---



<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

**BAND F**

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

**Radio Band Link**

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
<b>Example</b>	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN   UP
<b>Backwards Compatibility SCPI</b>	:SOURce:RADio:DEVice BTS MS :SOURce:RADio:DEVice?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

**Set Reference Frequency**

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

**NOTE**

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFerence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

### Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} + \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1678](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz

	:SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq>

	:SOURce:FREQuency:OFFSet?
<b>Example</b>	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

## Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1681, "AM" on page 1722, "FM" on page 1723, and "PM" on page 1724.

Key Path	Source
Initial S/W Revision	A.05.00

## ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a "MOD" annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]?
<b>Example</b>	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1726 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1726 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately.

The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. "-  
When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	<p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and</p>

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none of the waveform segments is loaded.

If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.

If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.

If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

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Key Path	Source, Modulation Setup, ARB, Select Waveform
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### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
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<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; - specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms,</p>

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when the ARB memory is full, the copy ceases, and an error is generated.  
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.  
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision      A.05.00

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

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Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

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Notes                          No remote command, SCPI front panel only.

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### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

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Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

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**Remote Command**        :SOURce:RADio:ARB:DEFault:DIRectory <string>  
                                  :SOURce:RADio:ARB: DEFault:DIRectory?

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**Example**                    :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"  
                                  :SOUR:RAD:ARB:DEF:DIR?

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State Saved                  Persistent, survives a power cycle and a preset but not saved in the instrument state

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### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

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Key Path                      Source, Modulation Setup, ARB, Select Waveform

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Initial S/W Revision      A.05.00

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### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

**NOTE**

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use ["Query ARB Memory Full File List \(Remote Command Only\)"](#) on page 1687.

<b>Remote Command</b>	:SOURce:RADio:ARB:CATalog?
<b>Example</b>	:SOUR:RAD:ARB:CATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
<b>Initial S/W Revision</b>	A.05.00

### Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

<b>Remote Command</b>	:SOURce:RADio:ARB:FCATalog?
<b>Example</b>	:SOUR:RAD:ARB:FCATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
<b>Initial S/W Revision</b>	A.09.00

### ARB Setup

Allows access to the ARB setup sub-menus.

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Initial S/W Revision</b>	A.05.00

### Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

### Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example	:SOUR:RAD:ARB:RSC 100.00
Notes	This setting cannot be set in E6640A. Grey out on menu and the value is fixed at 70.00%.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

### Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

<b>Key Path</b>	Source, Modulation Setup, ARB, ARB Setup
<b>Remote Command</b>	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
<b>Example</b>	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	0.00 Hz
<b>Min</b>	-50.00 MHz
<b>Max</b>	50.00 MHz
<b>Initial S/W Revision</b>	A.05.00

### Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous   SINGLE   SADVance GATE :SOURce:RADio:ARB:TRIGger:TYPE?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
<b>Notes</b>	Gated trigger type will be implemented at a later release
<b>Preset</b>	CONTInuous
<b>Range</b>	Continuous   Single   Seg Adv   Gated
<b>Initial S/W Revision</b>	A.05.00

### Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE   TRIGger   RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
<b>Preset</b>	FREE

Range	Free Run   Trigger + Run   Reset + Run
Initial S/W Revision	A.05.00

### Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

### Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

### Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

### Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate

	:SOURce:RADio:ARB:RETRigger?
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger   Buffered Trigger   Restart on Trigger
Initial S/W Revision	A.05.00

### No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

### Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

### Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

## Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] Single   CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] ?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Preset</b>	CONTInuous
<b>Range</b>	Single   Continuous
<b>Initial S/W Revision</b>	A.05.00

## Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Initial S/W Revision</b>	A.05.00

## Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
<b>Initial S/W Revision</b>	A.05.00

### Trigger Source

Allows access to the trigger source sub-menus. The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTernal2
Range	Trigger Key   Bus   External 2
Initial S/W Revision	A.05.00

### Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

### Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

### External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00



### Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

### Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even if required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>

<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
<b>Initial S/W Revision</b>	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Notes</b>	No remote command, SCPIfront panel only.
<b>Initial S/W Revision</b>	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
<b>State Saved</b>	Persistent, survives a power cycle and a preset but not saved in the instrument state
<b>Initial S/W Revision</b>	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe:ALL
<b>Example</b>	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<b>List Sequencer</b>" on page 1725 and "<b>Sequencer</b>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p>

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If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752.](#)

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
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Initial S/W Revision	Prior to A.09.00
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### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752.](#)

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753.](#)

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754.](#)

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1755](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1687](#).

Initial S/W Revision	Prior to A.09.00
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### Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

### Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

### Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

### Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected
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	Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

#### Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

#### Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

#### Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

#### Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1694](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) “NVWFM” or use a real full path representation. See the example below. MSUS “NVWFM” is mapped to D:\VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

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**Remote Command**      :SOURce:RADio:ARB:SEquence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below ["For Setup SCPI" on page 514](#) "For Setup SCPI".)

                          :SOURce:RADio:ARB:SEquence[:MWAVeform]? <filename>

(For additional description of each item, see Notes ["For Query SCPI" on page 515](#) below.)

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**Example**                For setup:

                          >:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3

                          Or

                          >:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D: VARB\wfmSegment2.wfm", 20, M1 M3

                          For query, must specify which waveform sequence file to query.

                          >:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"

                          Or

                          >:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",

---

**Notes**                                For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

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This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

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#### Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

### For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",
```

```
<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",
```

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.

If the waveform sequence file name is empty, an error is generated.

If the specified waveform sequence file cannot be found, an error is generated.

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Initial S/W Revision

A.05.00

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### Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Notes	If access multi-pack license sub-menu from modules other than "TRX1", an advisory message like "Please goto "TRX1" to operate multi-pack license" will display.
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

## Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

## Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string>
<b>Example</b>	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

## Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;“NVWFM” MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ sampes, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load afile to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p>

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision	A.05.00
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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Notes</b>	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00



### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

### Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Agilent signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int>
Example	SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

#### Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision	A.05.00

### Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
<b>Example</b>	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
<b>Range</b>	"Locked"   "Available"   "Trail"   "LockRequired"   "Nonexistent"
<b>Initial S/W Revision</b>	A.05.00

### Slots Free Query (Remote Command Only)

Returns the number of license slots free.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LICense[:FPACK]:WAVeform:FREE?
<b>Example</b>	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
<b>Initial S/W Revision</b>	A.05.00

### Slot Used Query (Remote Command Only)

Returns the number of license slots used.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LICense[:FPACK]:WAVeform:USED?
<b>Example</b>	:SYST:LKEY:WAV:USED?

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	or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

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### Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:NAME? <int>  or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>
<b>Example</b>	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.  If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

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### Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:UID? <int>  or :SYSTem:LIcense[:FPACK]:WAVeform:UID? <int>
<b>Example</b>	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.

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	If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

#### Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

#### Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136", "3812603511", "3710986266"
<b>Notes</b>	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

#### Marker Utilities

Allows access to the marker utilities sub-menus.

<b>Key Path</b>	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

#### Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

### Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated

	waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?
Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

### Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.



Marker points should be set before using this function. Enabling this function without setting marker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:PULSe NONE   M1   M2   M3   M4 :SOURce:RADio:ARB:MDEStination:PULSe?
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Range</b>	None   M1   M2   M3   M4
<b>Initial S/W Revision</b>	A.05.00

#### None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Initial S/W Revision</b>	A.05.00

#### Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
<b>Initial S/W Revision</b>	A.05.00

#### Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
<b>Initial S/W Revision</b>	A.05.00

### Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
<b>Example</b>	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None   M1   M2   M3   M4
Initial S/W Revision	A.05.00

### None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

### Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

### Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

### Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

<b>Key Path</b>	Source, Modulation Setup, ARB, Header Utilities
<b>Remote Command</b>	:SOURce:RADio:ARB:HEADer:CLEar
<b>Example</b>	:SOUR:RAD:ARB:HEAD:CLE
<b>Notes</b>	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
<b>Initial S/W Revision</b>	A.05.00

### Save Setup To Header

Allows you to save new file header information details to the file.

<b>Key Path</b>	Source, Modulation Setup, ARB, Header Utilities
<b>Remote Command</b>	:SOURce:RADio:ARB:HEADer:SAVE
<b>Example</b>	:SOUR:RAD:ARB:HEAD:SAVE
<b>Notes</b>	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
<b>Initial S/W Revision</b>	A.05.00

### Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

<b>Remote Command</b>	:MMEMory:HEADer:ID? "<file name>"
<b>Example</b>	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
<b>Notes</b>	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk.  If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
<b>Initial S/W Revision</b>	A.09.00

### Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:INITiate
<b>Example</b>	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

### AM

Allows access to the menu for configuring the Amplitude Modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:STATe :SOURce:AM:STATe?
<b>Example</b>	:SOUR:AM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### AM Depth

Allows you to set the amplitude modulation depth in percent.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]?
<b>Example</b>	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

## AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
<b>Example</b>	:SOUR:AM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

## FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:STATe :SOURce:FM:STATe?
<b>Example</b>	:SOUR:FM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
----------	------------------------------

<b>Remote Command</b>	:SOURce:FM[:DEVIation] :SOURce:FM[:DEVIation]?
<b>Example</b>	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

### FM Rate

Allows you to set the internal frequency modulation rate.

<b>Key Path</b>	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
<b>Example</b>	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### PM

Allows access to the menu for configuring the phase modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:STATe :SOURce:PM:STATe?
<b>Example</b>	:SOUR:PM:STAT OFF

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]?
<b>Example</b>	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

### PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
<b>Example</b>	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a



tabular form. The details of the SCPI for configuring the list sequencer can be found in "[Step Configuration \(Remote Command Only\)](#)" on page 1759.

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

## Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated

	and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " <a href="#">Query List Sequence Initiation Armed Status (Remote Command Only)</a> " on <a href="#">page 1770</a> Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

## List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer
----------	------------------------

## Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
<b>Example</b>	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

## Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
----------	--

Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

### Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of 1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

### Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

### Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

### Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE   INTERNAL   EXTERNAL2   KEY   BUS   EXTERNAL4  :SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
<b>Notes</b>	SCPI is supported after A.09.40
<b>Preset</b>	Free Run
<b>Range</b>	Free Run   Internal   Manual (Trigger Key)   Bus   External 2  EXTERNAL4
<b>Initial S/W Revision</b>	A.05.00

### Free Run

Sets the trigger input for the current step to Free Run.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
<b>Notes</b>	SCPI is supported after A.09.40
<b>Initial S/W Revision</b>	A.05.00

### Internal

Sets the trigger input for the current step to Internal.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG INT
<b>Notes</b>	SCPI is supported after A.09.40
<b>Initial S/W Revision</b>	A.05.00

### Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
<b>Notes</b>	SCPI is supported after A.09.40
<b>Initial S/W Revision</b>	A.05.00

## Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

## External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

## Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 $\mu$ s
Amplitude	100 $\mu$ s to within 0.1 dB 20 $\mu$ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANSition:TIME?
<b>Example</b>	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?
<b>Notes</b>	SCPI is supported after A.09.40
<b>Preset</b>	1.0 ms
<b>Min</b>	0.0 ms
<b>Max</b>	4.0 ks
<b>Initial S/W Revision</b>	A.05.00

### Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup
<b>Notes</b>	No remote command, front panel only.
<b>Initial S/W Revision</b>	A.05.00

### Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   NONE   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38

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BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB |  
BANDC | BANDD | BANDE | BANDF

:SOURce:LIST:STEP[1]|2|3...1000:SETup: RADio:BAND?

---

**Example** :SOUR:LIST:STEP2:SET:RAD:BAND PGSM  
:SOUR:LIST:STEP2:SET:RAD:BAND?

---

Notes SCPI is supported after A.09.40

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Initial S/W Revision A.05.00

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### None

Selects no radio standard for use on the current step.

---

Key Path Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard

---

**Example** :SOUR:LIST:STEP2:SET:RAD:BAND NONE

---

Notes SCPI is supported after A.09.40

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Initial S/W Revision A.05.00

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### GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

---

Key Path Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard

---

Initial S/W Revision A.05.00

---

### P-GSM

Selects P-GSM as the band for the current step.

---

Key Path Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE

---

Initial S/W Revision A.05.00

---

### E-GSM

Selects E-GSM as the band for the current step.

---

Key Path Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE

---

Initial S/W Revision A.05.00

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### R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00



**GSM 700**

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**T-GSM 810**

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**WCDMA**

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

**Band I**

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band II**

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band III**

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band X**

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XI**

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XII**

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIII**

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIV**

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIX**

Selects Band XIX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.14.50

### CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**IMT 2000**

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**Upper 700**

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**Secondary 800**

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**400 Euro PAMR**

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**800 PAMR**

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**2.5GHz IMT EXT**

Selects 2.5 GHz IMT EXT as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### AWS

Selects AWS as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### 700 Public Safety

Selects 700 Public Safety as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

**LTE**

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

**BAND 1**

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 2**

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 3**

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 4**

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 5**

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50



**BAND 12**

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 13**

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 14**

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 18**

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 19**

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

#### BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**BAND 28**

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**BAND 31**

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**LTE TDD**

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND 33**

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

**BAND 34**

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

**BAND 35**

Selects BAND 35 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

---

#### BAND 36

Selects BAND 36 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

---

#### BAND 37

Selects BAND 37 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

---

#### BAND 38

Selects BAND 38 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

---

#### BAND 39

Selects BAND 39 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

---

#### BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

**BAND 41**

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

**BAND 42**

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

**BAND 43**

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

**BAND 44**

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

**TDSCDMA**

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

---

#### BAND A

Selects BAND A as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

---

#### BAND B

Selects BAND B as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

---

#### BAND C

Selects BAND C as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

---

#### BAND D

Selects BAND D as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

---

#### BAND E

Selects BAND E as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

## BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

## Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN   UP
Initial S/W Revision	A.05.00

## Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency?
<b>Example</b>	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

## Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Power

Allows you to specify a power value for the current step.



Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.  The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1647 and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to "RF Power" on page 1647 and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

## Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off"   "CW"   "Cont"   "waveform name"

Preset	CW
Range	Waveform   Continue Previous   CW   Off
Initial S/W Revision	A.05.00

### CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list sequence will automatically apply header settings of the selected waveform in that step.
Initial S/W Revision	A.05.00

### Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <"NVWFM" MSUS + colon + filename>.

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When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.

When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .

If you specify a file over SCPI, but the file is not at the specified location, an error is generated.

If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.

If you try to load a Signal Studio waveform “\*.wfm” which contains invalid waveform header, an error is generated.

If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

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Initial S/W Revision      A.05.00

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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

---

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>

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Initial S/W Revision      A.05.00

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB

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memory is rejected with an error. When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated. It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated. It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated. When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision      A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

---

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe:ALL
<b>Example</b>	:SOUR:RAD:ARB:DELeTe:ALL
Notes	When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error. When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated. If you attempt to delete all files from ARB memory when there are waveform files used in " <a href="#">List Sequencer</a> " on page 1725 and " <a href="#">Sequencer</a> " on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated. If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Initial S/W Revision      A.05.00	

### Segments on Hard Disk

This key functions the same as "[Segments on Hard Disk](#)" on page 1752.

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Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

**Load Segment To ARB Memory**

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Load All To ARB Memory**

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Change Directory ...**

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Default Directory ...**

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Segments in ARB Memory**

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

**Delete Segment From ARB Memory**

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 1755.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME   COUNT   CONTInuous   CABort  :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query <b>Error! Reference source not found.</b> Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time   Play Count   Continuous   Continuous Abort
Initial S/W Revision	A.05.00

### Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Duration Time

Allows you to specify the length of time the current step will play.



When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found**. List Sequence Step Validation.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT?
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
<b>Notes</b>	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
<b>Notes</b>	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
<b>Preset</b>	1.00 ms
<b>Min</b>	100 $\mu$ s
<b>Max</b>	1800 s
<b>Initial S/W Revision</b>	A.05.00

### Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
<b>Notes</b>	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
<b>Initial S/W Revision</b>	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON   OFF   1   0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
<b>Example</b>	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

### Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE   INTernal   KEY
-----------------------	---

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```

BUS | EXTERNAL2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900
| TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX
| BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS |
JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11
| BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21
| BAND24 | BAND25 | BAND26 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37
| BAND38 | BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BANDA | BANDB |
BANDC | BANDD | BANDE | BANDF, DOWN | UP, <freq>, <ampl>, <string>,
TIME | COUNT | CONTinuous, <time>, ON | OFF | 1 | 0, [<int>],

:SOURce:LIST:STEP[1]|2|...|4..1000:SETup?

```

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**Example** :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM\_Test1.bin", TIME, 10ms, OFF, 255

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**Notes**

The parameters are:

(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)

1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see ["Step Trigger" on page 1728](#).
  2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see ["Transition Time" on page 1730](#).
  3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1731](#).
  4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see ["Radio Band Link" on page 1748](#).
  5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see ["Channel" on page 1748](#) and ["Frequency" on page 1749](#).
  6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see ["Power" on page 1749](#).
  7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:
    - <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.
    - CONT – continues playback of the ARB file from the previous step
    - CW – outputs a CW tone
    - OFF – disable RF output
  8. Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see ["Step](#)
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	<p><a href="#">Duration" on page 1757.</a></p> <p>9. Time or Count &lt;time/int&gt; – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, <a href="#">"Time" on page 1757</a> and <a href="#">"Play Count" on page 1758</a>.</p> <p>10. Output Trigger &lt;Boolean&gt; – specifies the output trigger for the step. For details of the ranges for this setting see <a href="#">"Output Trigger" on page 1759</a>.</p>
Dependencies	<p>The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a>.</p> <p>If you attempt to remotely set or query a subopcode that is out of range, an error is generated.</p>
Initial S/W Revision	A.05.00

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### Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Step Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

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<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:INPut:TRIGger &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:INPut:TRIGger?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?</pre>
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Trigger &lt;enum&gt; – specifies the input trigger for the step. For details of the valid types of step trigger see <a href="#">"Step Trigger" on page 1728</a>.</p> <p>If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Remote Command Notes	IMMEDIATE INTERNAL KEY BUS EXTERNAL2
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

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### Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

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<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TRANSition:TIME &lt;time&gt;, &lt;time&gt;, &lt;time&gt;, ... :SOURce:LIST:SETup:TRANSition:TIME?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms</pre>

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	:SOUR:LIST:SET:TRAN:TIME?
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Transition Time &lt;time&gt; – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see <a href="#">"Transition Time" on page 1730</a></p> <p>If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>R</b>	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...
<b>e</b>	:SOURce:LIST:SETup:RADio:BAND?
<b>m</b>	
<b>o</b>	
<b>t</b>	
<b>e</b>	
<b>C</b>	
<b>o</b>	
<b>m</b>	
<b>m</b>	
<b>a</b>	
<b>n</b>	
<b>d</b>	
<b>E</b>	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM
<b>X</b>	:SOUR:LIST:SET:RAD:BAND?
<b>a</b>	
<b>m</b>	
<b>p</b>	
<b>l</b>	
<b>e</b>	
<b>N</b>	The command is to setup below parameter array of whole list sequence.
<b>O</b>	Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see <a href="#">"Radio Setup" on page 1731</a> .
<b>t</b>	If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then
<b>e</b>	generate error ", and only those parameters whose index number falls in number of steps will be updated.
<b>s</b>	
<b>R</b>	NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI
<b>e</b>	V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO
<b>m</b>	REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1 DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1
	BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1

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o 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN  
t D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF  
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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "[Number of Steps](#)" on  
e [page 1727](#).

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## Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see <a href="#">"Radio Band Link" on page 1748</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
<b>Remote Command Notes</b>	DOWN UP
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
<b>Initial S/W Revision</b>	A.09.40

## Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:CNFRequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRequency?
<b>Example</b>	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see <a href="#">"Channel" on page 1748</a> and <a href="#">"Frequency" on page 1749</a> This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

#### Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?
<b>Example</b>	:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see <a href="#">"Power" on page 1749</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

#### Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:WAVeform <string>, <string>, <string>, ... :SOURce:LIST:SETup:WAVeform?
<b>Example</b>	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.



	<p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "<a href="#">Number of Steps</a>" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
Range	"filename"   "CW"   "Off"   "CONT"
Initial S/W Revision	A.09.40

#### Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:DURation:TYPE &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:DURation:TYPE?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?</pre>
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration <b>&lt;enum&gt;</b> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "<a href="#">Step Duration</a>" on page 1757.</p> <p>If input parameter number exceeds the step number defined by "<a href="#">Number of Steps</a>" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Remote Command Notes	TIME   COUNT   CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
Initial S/W Revision	A.09.40

#### Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure "Duration Time" or "Play Count" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TOCount &lt;time/int&gt;, &lt;time/int&gt;, &lt;time/int&gt;, ... :SOURce:LIST:SETup:TOCount?</pre>
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<b>Example</b>	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, " <a href="#">Time</a> " on page 1757 and " <a href="#">Play Count</a> " on page 1758. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current " <a href="#">Step Duration</a> " on page 1757 is "Continuous", then generate error -221,"Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

#### Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Output Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
<b>Example</b>	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see " <a href="#">Output Trigger</a> " on page 1759. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
<b>Remote Command Notes</b>	ON OFF 1 0
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

#### Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI featuredescribed in.

<b>Remote Command</b>	:SOURce:LIST:SETup:CLEar
<b>Example</b>	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

## Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

<b>Key Path</b>	Source, List Sequencer
<b>Remote Command</b>	:SOURce:LIST:TRIGgerout:TYPe BEGinningofstep DATamarker
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

## BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
<b>Remote Command</b>	No remote command, front panel only.
Initial S/W Revision	A.05.00

## Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to "Bus". Sending this command will trigger the step and continue the sequence.

<b>Remote Command</b>	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
<b>Example</b>	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

## Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

<b>Remote Command</b>	:SOURce:LIST:INITiation:ARMed?
<b>Example</b>	:SOUR:LIST:INIT:ARMed?
<b>Notes</b>	The return data is in the following format: Integer
<b>Notes</b>	Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see <a href="#">"Initiate Sequence" on page 1726</a> Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately.
<b>Notes</b>	There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?".
Initial S/W Revision	A.09.40

## Source Preset

Allows you to preset the source settings to their default values.

<b>Key Path</b>	Source
<b>Remote Command</b>	:SOURce:PRESet
<b>Example</b>	:SOUR:PRES

## SPAN X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Ref Value

Allows you to set the display X reference value by Burst, Multi-slot and Rise & Fall views.

Key Path	Span X Scale
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Ref Value (Burst view and Multi-slot view)

Allows you to set the display X reference value.

Key Path	SPAN X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALE]:RLEVel <time> :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALE]:RLEVel?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:X:RLEV 1 DISP:EPVT:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 585 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 585 automatically changes to Off.
Preset	-65.0 us -67 us
State Saved	Saved in instrument state.
Min	-1.00 s
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

### Ref Value (Rise & Fall view)

Allows you to set the display X reference value.

Key Path	SPAN X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:RLEVel <time> :DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:RLEVel?
<b>Example</b>	DISP:EPVT:VIEW2:WIND2:TRAC:X:RLEV 1 DISP:EPVT:VIEW2:WIND2:TRAC:X:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 585 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 585 automatically changes to Off.
Preset	0 s 542.8 us
State Saved	Saved in instrument state.
Min	-1.00 s
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

## Scale/Div

Allows you to set the display X scale/division value by Burst, Multi-slot and Rise & Fall views.

Key Path	Span X Scale
Mode	<b>EDGE</b> GSM
Initial S/W Revision	<b>Prior to A.02.00</b>

## Scale/Div (Burst view and Multi-slot view)

Allows you to set the display X scale/division value.

Key Path	Span X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:X:PDIV 1ms DISP:EPVT:VIEW:WIND:TRAC:X:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 585 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 585 automatically changes to Off.
Preset	70.00 us 84.00 us
State Saved	Saved in instrument state.

Min	1.00 ns
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

### Scale/Div (Rise & Fall view)

Allows you to set the display X scale/division value.

Key Path	Span X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:PDIVision?
<b>Example</b>	DISP:EPVT:VIEW2:WIND2:TRAC:X:PDIV 1ms DISP:EPVT:VIEW2:WIND2:TRAC:X:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 585 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 585 automatically changes to Off.
Preset	10.00 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

### Ref Position

Allows you to set the display reference position to Left, Center or Right by Burst, Multi-slot and Rise & Fall views.

Key Path	Span X Scale
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Ref Position (Burst view and Multi-slot view)

Allows you to set the display reference position to Left, Center or Right.

Key Path	SPAN X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALe]:RPOStion LEFT



	CENTer   RIGHt :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:X:RPOS LEFT DISP:EPVT:VIEW:WIND:TRAC:X:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left Ctr Right
Initial S/W Revision	Prior to A.02.00

### Ref Position (Rise & Fall view)

Allows you to set the display reference position to Left, Center or Right.

Key Path	SPAN X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:RPOSition LEFT   CENTer   RIGHt :DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:RPOSition?
<b>Example</b>	DISP:EPVT:VIEW2:WIND2:TRAC:X:RPOS LEFT DISP:EPVT:VIEW2:WIND2:TRAC:X:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	CENTer
State Saved	Saved in instrument state.
Range	Left Ctr Right
Initial S/W Revision	Prior to A.02.00

### Auto Scaling

Allows you to toggle the scale coupling function between On and Off by Burst, Multi-slot and Rise & Fall views.

Key Path	Span X Scale
Mode	EDGEgSM
Initial S/W Revision	Prior to A.02.00

### Auto Scaling (Burst view and Multi-slot view)

Allows you to toggle the scale coupling function between On and Off.

Key Path	Span X Scale
Mode	GSM
Remote Command	:DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALe]:COUPle 0   1   OFF   ON :DISPlay:EPVTime:VIEW[1] 3:WINDow[1]:TRACe:X[:SCALe]:COUPle?
Example	DISP:EPVT:VIEW:WIND:TRAC:X:COUP OFF DISP:EPVT:VIEW:WIND:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either "Ref Value" on page 582 or "Scale/Div" on page 583 manually, X Auto Scaling automatically changes to Off. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

### Auto Scaling (Rise & Fall view)

Allows you to toggle the scale coupling function between On and Off.

Key Path	Span X Scale
Mode	GSM
Remote Command	:DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:COUPle 0   1   OFF   ON :DISPlay:EPVTime:VIEW2:WINDow[1] 2:TRACe:X[:SCALe]:COUPle?
Example	DISP:EPVT:VIEW:WIND:TRAC:X:COUP OFF DISP:EPVT:VIEW:WIND:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either "Ref Value" on page 582 or "Scale/Div" on page 583 manually, X Auto Scaling automatically changes to Off. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing Restart, Single or Cont does a Resume.

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

### Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

<b>Remote Command</b>	:ABORT
<b>Example</b>	:ABOR

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Notes	If :INITiate:CONTinuous is ON, then a new continuous measurement will start immediately, with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTinuous is OFF, then :INITiate:IMMEDIATE is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

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## System

See "System" on page 222

## Trace/Detector

Accesses a menu that enables you to show (On) or hide (Off) the Max Hold Trace and Min Hold Trace. Max/Min Hold Traces will be held during the averaging cycle.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Max Hold Trace

This key enables you to show (On) or hide (Off) the Max Hold Trace.

Key Path	Trace/Detector
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON   OFF   1   0 :DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:MAXH ON DISP:EPVT:VIEW:WIND:TRAC:MAXH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting [:SENSe]:EPVTime:AVERage:TYPE MAXimum MXMinimum forces this parameter to ON.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

### Min Hold Trace

This key enables you to show (On) or hide (Off) the Min Hold Trace.

Key Path	Trace/Detector
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON   OFF   1   0 :DISPlay:EPVTime:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?
<b>Example</b>	DISP:EPVT:VIEW:WIND:TRAC:MINH ON DISP:EPVT:VIEW:WIND:TRAC:MINH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Couplings	Selecting [:SENSe]:EPVTime:AVERage:TYPE MINimum MXMinimum forces this parameter to ON.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Trigger

See ["Trigger" on page 278](#)

### Free Run

See ["Free Run " on page 285](#)

### Video

See ["Video \(IF Envelope\) " on page 286](#)

### Trigger Level

See ["Trigger Level " on page 286](#)

### Trig Slope

See ["Trig Slope " on page 287](#)

### Trig Delay

See ["Trig Delay " on page 288](#)

### External 1

See ["External 1 " on page 304](#)

### Trigger Level

See ["Trigger Level " on page 304](#)

### Trig Slope

See ["Trig Slope " on page 305](#)

### Trig Delay

See ["Trig Delay " on page 291](#)

### Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 292](#)

### External 2

See ["External 2 " on page 306](#)

### Trigger Level

See ["Trigger Level " on page 306](#)

### Trig Slope

See ["Trig Slope " on page 307](#)



## Trig Delay

See ["Trig Delay "](#) on page 294

## Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off"](#) on page 294

## RF Burst

See ["RF Burst "](#) on page 307

## Absolute Trigger

See ["Absolute Trigger Level"](#) on page 308

## Relative Trigger

See ["Relative Trigger Level"](#) on page 297

## Trig Slope

See ["Trigger Slope "](#) on page 309

## Trig Delay

See ["Trig Delay "](#) on page 298

## Periodic Timer

See ["Periodic Timer \(Frame Trigger\) "](#) on page 299

## Period

See ["Period "](#) on page 300

## Offset

See ["Offset "](#) on page 301

## Offset Adjust (Remote Command Only)

See ["Offset Adjust \(Remote Command Only\)"](#) on page 302

## Reset Offset Display

See ["Reset Offset Display "](#) on page 303

## Sync Source

See ["Sync Source "](#) on page 303

## Off

See ["Off "](#) on page 304

### **External 1**

See "[External 1](#) " on page 304

#### **Trigger Level**

See "[Trigger Level](#) " on page 304

#### **Trig Slope**

See "[Trig Slope](#) " on page 305

### **External 2**

See "[External 2](#) " on page 306

#### **Trigger Level**

See "[Trigger Level](#) " on page 306

#### **Trig Slope**

See "[Trig Slope](#) " on page 307

### **RF Burst**

See "[RF Burst](#) " on page 307

### **Absolute Trigger**

See "[Absolute Trigger Level](#)" on page 308

#### **Trig Slope**

See "[Trigger Slope](#) " on page 309

### **Trig Delay**

See "[Trig Delay](#)" on page 309

### **Auto/Holdoff**

See "[Auto/Holdoff](#) " on page 310

### **Auto Trig**

See "[Auto Trig](#) " on page 310

### **Trig Holdoff**

See "[Trig Holdoff](#) " on page 311

### **Holdoff Type**

See "[Holdoff Type](#)" on page 311

## User Preset

Accesses a menu that gives you the following three choices:

- User Preset – recalls a state previously saved using the Save User Preset function.
- User Preset All Modes – presets all of the modes in the analyzer
- Save User Preset– saves the current state for the current mode

### NOTE

In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	<p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p>
Initial S/W Revision	Prior to A.02.00

## User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, SYST:PRES:USER:SAV. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.

- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

## User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

**NOTE**

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER:ALL
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode.

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Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

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Initial S/W Revision      Prior to A.02.00

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## Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER:SAVE
<b>Example</b>	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

## View/Display

Accesses a menu of functions that enable you to:

- Set the display parameters for the current measurement
- Select the View

Key Path	Front-panel key
Mode	EDGE/GSM
Initial S/W Revision	Prior to A.02.00

## Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the System Display Settings key apply to all measurements in all modes.

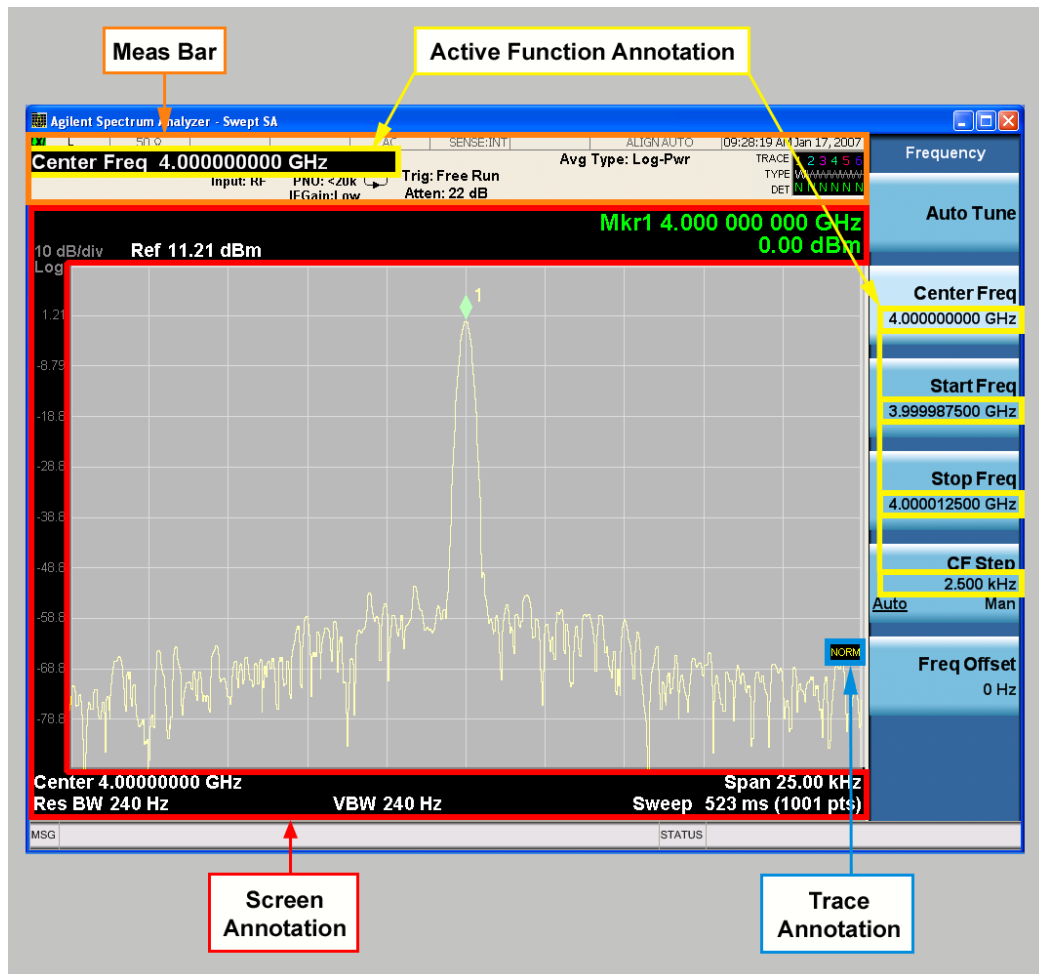
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

## Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:MBAR[:STATE] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATE]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Screen

This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

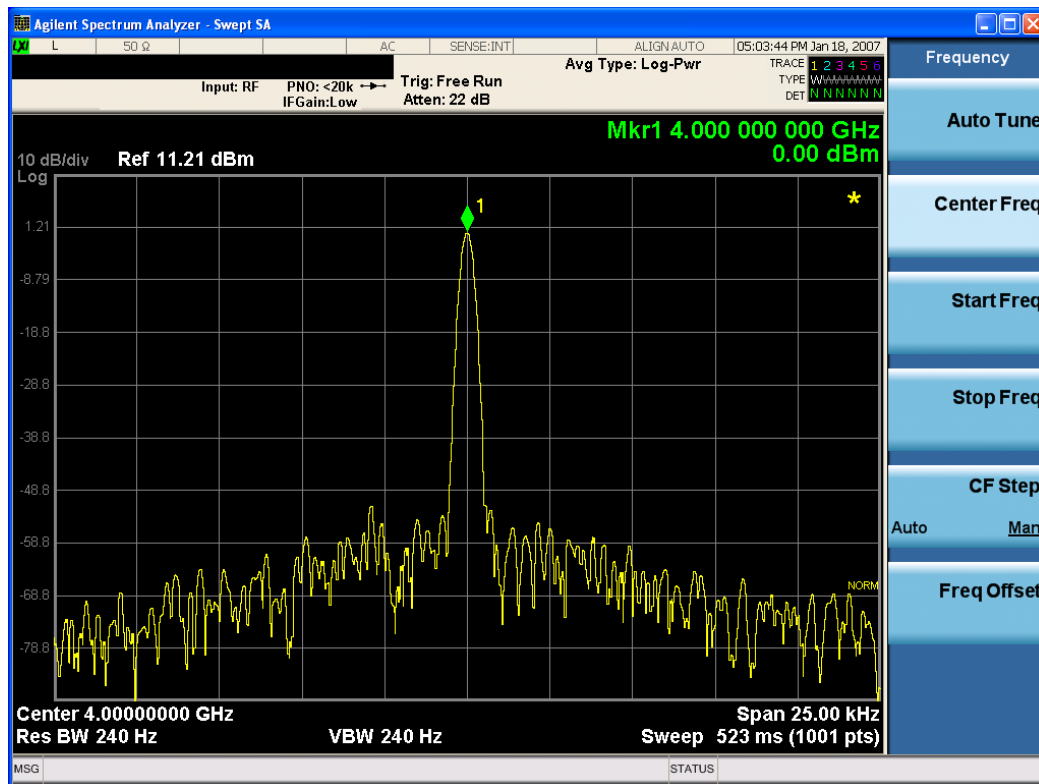
<b>Key Path</b>	View/Display, Display, Annotation
<b>Remote Command</b>	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
<b>Example</b>	DISP:ANN:SCR OFF
<b>Dependencies</b>	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
<b>Preset</b>	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
<b>State Saved</b>	Saved in instrument state.
<b>Initial S/W Revision</b>	Prior to A.02.00

## Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..





Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE]?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

## Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press Change Title again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing Title, Clear Title.

**NOTE**

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

**Clear Title**

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

## Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
<b>Remote Command</b>	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
<b>Example</b>	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by Restore Misc Defaults or Restore System Defaults under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

## Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is All Off, it forces ScreenAnnotation, Meas Bar, Trace, and Active Function Values settings to be OFF for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is All Off, the Screen, Meas Bar, Trace, and Active Function Values keys under the Display, Annotation menu are grayed out and forced to Off. When Local Settings is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
<b>Remote Command</b>	:DISPlay:WINDow[1]:ANNOtation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNOtation[:ALL]?
<b>Example</b>	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReen:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReen:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### Burst View

Shows power vs. time and mask result for the EDGE burst. This view has two windows:

- "RF Envelope Window" on page 606
- "Numeric Results Window " on page 607

For details of the associated Remote Commands, see [View Selection](#).

The figure below shows an example of the Burst View.

## 8 EDGE Power vs Time Measurement View/Display

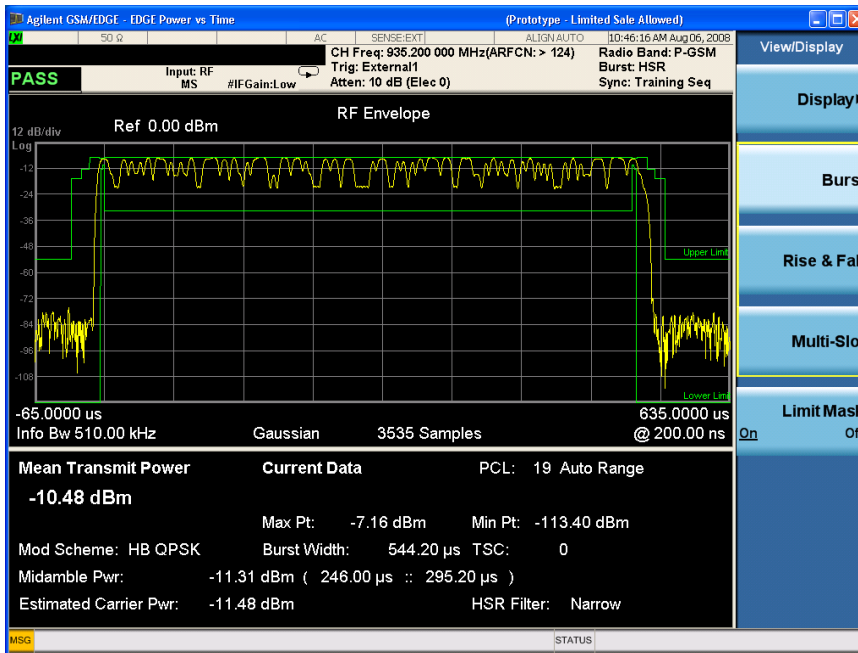


Figure 0-3 Burst View for EDGE Power vs. Time Measurement

### RF Envelope Window

Shows the trace and mask lines. Max Hold Trace and Min Hold Trace are not shown in the figure above.

The following tables provide details of the traces and masks.

#### Measured Trace

Marker Trace	Yes
Corresponding Trace	n=7
Color	Yellow

#### Max Hold Trace

Marker Trace	Yes
Corresponding Trace	n=8
Color	Water Blue

#### Min Hold Trace

Marker Trace	Yes
Corresponding Trace	n=9
Color	Magenta

#### Upper Mask

Marker Trace	Yes
Corresponding Trace	n=3
Color	Green

### Lower Mask

Marker Trace	Yes
Corresponding Trace	n=4
Color	Green

### Numeric Results Window

Name	Corresponding Trace	Description	Display Format
Mean Transmit Power	n=1, 3rd	The power of N averaged bursts, if averaging is on. The power is averaged across the useful part of the burst. If there are multiple bursts in the acquired trace, only one burst is used for average. This means that N traces are acquired to make the complete average.  If " <a href="#">Avg/Hold Num</a> " on page 397 is off or the number is 1, this number is the power averaged across the useful part of the most recently acquired data	##.## dBm
Mean Transmit Power (Current Data)	n=1, 2nd	The power averaged across the useful part of the most recently acquired data.  If " <a href="#">Avg/Hold Num</a> " on page 397 is off or the number is 1, the trace disappears from the window since the number is identical to the Mean Transmit Power above.	##.## dBm
Max Pt (Current Data)	n=1, 9th	The maximum value of the most recently acquired data.	##.## dBm
Min Pt (Current data)	n=1, 10th	The minimum value of the most recently acquired data.	##.## dBm
Mod Scheme	N=10,15th	The modulation scheme used for a burst signal of a specified time slot.	"NB GMSK", "NB 8PSK", "NB 16QAM", "NB 32QAM", "HB QPSK", "HB 16QAM",

Name	Corresponding Trace	Description	Display Format
			"HB 32QAM", "ACCESS", or "SYNC"
Burst Width	n=1, 8th	The width of the burst measured at -3 dB below the mean power in the useful part of the burst.	###.## µs
Midamble Pwr	None	The (Mask Reference) Power is the average power in dBm of the middle 16 symbols in the midamble. The times displayed are the corresponding start and stop times of the middle 16 symbols.	###.## dBm (###.# µs::###.# µs)
1st Error Pt	n=1, 13th	The time which indicates the point on the X Scale where the first failure of a signal was detected. Use a marker to locate this point in order to examine the nature of the failure. If the limit passes, disappear from the window.	##.## µs
PCL	None	Power Control Level that determined by the Mean Transmit Power and used to determine the limit mask. Since PCL is a Measurement Global parameter, [:SENSE]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSE]:RADio:PCL:STATe is set to 0 Off.	PCL: ## Auto
Detected TSC	None	The most recently detected TSC. The returned value is 0~7 (Burst Type : Normal/Higher Symbol Rate (HSR)) if TSC detected. If TSC not detected, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF). The returned value is 10~12 if Synchronization burst. The returned value is 20~22 if Access burst.	TSC: ##
Estimated Carrier Pwr	N=10, 16th	Estimated Carrier Power calculated from the specified time slot.	###.##dBm
HSR Filter	None	The specified pulse shaping filter used for higher symbol rate modulation	"Narrow" or "Wide"



Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Rise & Fall View

This view has three windows:

1. Rising RF Envelope Window. The parameters of this window are identical to those of the RF Window in the "Burst View" on page 605.
2. Falling RF Envelope Window. The parameters of this window are identical to those of the RF Window in the "Burst View" on page 605.
3. Numeric Results Window. The parameters of this window are identical to those of the Numeric Results Window in the "Burst View" on page 605.

For details of the associated Remote Command, see [View Selection](#).

The figure below shows an example of the Rise & Fall View.

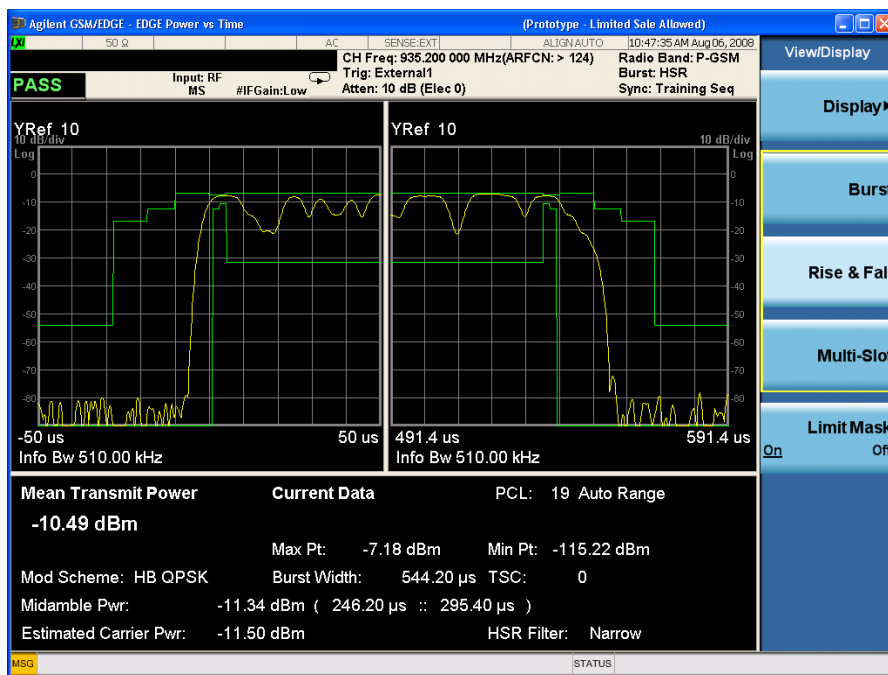


Figure 0-4 Rise & Fall View for EDGE Power vs. Time Measurement

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Multi-Slot View

This view has two windows.

- "RF Envelope Window" on page 610
- "Numeric Results Window" on page 610

For details of the associated Remote Command, see [View Selection](#).

The figure below shows an example of the Multi Slot View.

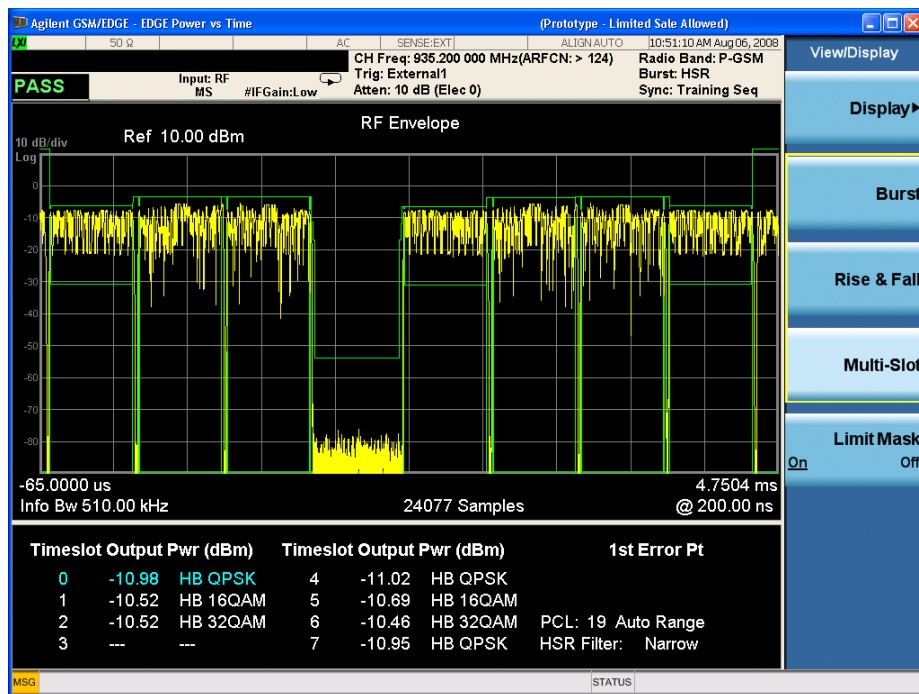


Figure 0-5 Multi Slot View for EDGE Power vs. Time Measurement

### RF Envelope Window

The parameters of this window are identical to those of the RF Window in the "Burst View" on page 605.

### Numeric Results Window

The output power of multi slots whose number is defined by Meas Time.

Name	Corresponding Trace	Description	Display Format
1st Error Pt	None	The time which indicates the point on the X Scale where the first failure of a signal was detected. Use a marker to locate this point in order to examine the nature of the failure.	##.## $\mu$ s
Timeslot Output Pwr	n=7	Power level values for each slot in the current frame	##.## dBm

Name	Corresponding Trace	Description	Display Format
Mod Scheme	None	The modulation scheme used for a burst signal of each time slot. If burst isn't found at a time slot, the word "---" is displayed.	"NB GMSK", "NB 8PSK", "NB 16QAM", "NB 32QAM", "HB QPSK", "HB 16QAM", "HB 32QAM", "ACCESS", "SYNC", or "---"
PCL	None	Power Control Level that determined by the Mean Transmit Power and used to determine the limit mask. Since PCL is a Measurement Global parameter, [:SENSe]:RADio:PCL, refer to the section Mode Functionality. Auto disappears when [:SENSe]:RADio:PCL:STAtE is set to Off.	PCL: ## Auto
HSR Filter	None	The specified pulse shaping filter used for higher symbol rate modulation	"Narrow" or "Wide"

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Limit Mask

This setting is used to show (On) or hide (Off) the limit mask that is displayed on the graticule. It also disables limit checking.

**NOTE** This does not affect any calculation taking place.

Key Path	View/Display
Mode	GSM
<b>Remote Command</b>	:DISPlay:EPVTime:LIMit:MASK OFF ON 0 1 :DISPlay:EPVTime:LIMit:MASK?
<b>Example</b>	DISP:EPVT:LIM:MASK 1 DISP:EPVT:LIM:MASK?
Notes	This parameter only hides or shows the limit mask line on the display. PASS/FAIL limit check would

---

be done if "**Limit Test**" on page 400 is set to On whether Limit Mask state is set to On or Off.  
You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

---

Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

---

## 9 EDGE EVM Measurement

EVM (Error Vector Magnitude) is the measure of modulation quality for EDGE. Since EDGE uses  $3\pi/8$  PSK modulation, the transmitter's phase, frequency, and amplitude accuracy are critical to the communications system's performance. EVM also ultimately affects range.

For more details, see ["EDGE EVM Measurement Description" on page 621](#).

This topic contains the following sections:

["Measurement Commands for EDGE EVM" on page 614](#)

["Remote Command Results for EDGE EVM" on page 615](#)

## Measurement Commands for EDGE EVM

The following commands and queries can be used to retrieve the measurement results:

```
:CONFigure:EEVM  
:CONFigure:EEVM:NDEFault  
:INITiate:EEVM  
:FETCh:EEVM[n]?  
:READ:EEVM[n]?  
:MEASure:EEVM[n]?
```

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1578](#).

## Remote Command Results for EDGE EVM

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a data array of comma-separated trace points, in volts. The sample rate is 637.5 kHz when Option DP2, B40 or wider IF Bandwidth option is installed. Otherwise the sample rate is 2.5 MHz.
1 (default)	Returns the following scalar results: <ol style="list-style-type: none"> <li>1. <b>RMS 95th %ile EVM</b> – a floating point number (in percent) of EVM over 95% of the entire measurement area.</li> <li>2. <b>Average RMS EVM</b> – a floating point number (in percent) of EVM over the entire measurement area.</li> <li>3. <b>Maximum RMS EVM</b> – a floating point number (in percent) of highest EVM over the entire measurement area.</li> <li>4. <b>Average Peak EVM</b> – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together.</li> <li>5. <b>Maximum Peak EVM</b> – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak.</li> <li>6. <b>Symbol position of the peak EVM</b> – an integer number of the symbol position where the peak EVM error is detected.</li> <li>7. <b>Average Magnitude error</b> – a floating point number (in percent) of average magnitude error over the entire measurement area.</li> <li>8. <b>Maximum Magnitude error</b> – a floating point number (in percent) of maximum magnitude error over the entire measurement area.</li> <li>9. <b>Average Phase error</b> – a floating point number (in degree) of average phase error over the entire measurement area.</li> <li>10. <b>Maximum Phase error</b> – a floating point number (in degree) of maximum phase error over the entire measurement area.</li> <li>11. <b>Average Frequency error</b> – a floating point number (in Hz) of the frequency error in the measured signal.</li> <li>12. <b>Maximum Frequency error</b> – a floating point number (in Hz) of the highest frequency error in the measured signal.</li> <li>13. <b>Average I/Q origin offset</b> – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.</li> <li>14. <b>Amplitude Droop Error</b> – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst.</li> <li>15. <b>Trigger to T0</b> – a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot.</li> </ol>
2	Returns a series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
3	Returns a series of floating point numbers (in percent) that represent each sample in the

n	Results Returned
	magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
4	Returns a series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.
5	<p>Returns a series of floating point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there is 1 point per symbol, so the series of numbers is:</p> <p>1st number = I of the symbol 0 decision point  2nd number = Q of the symbol 0 decision point  ...  (2) + 1 (or 3rd) number = I of the symbol 1 decision point  (2) + 2 (or 4th) number = Q of the symbol 1 decision point  ...  (2) x N + 1 number = I of the symbol N decision point  (2) x N + 2 number = Q of the symbol N decision point</p>
6	<p>Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing EVM.</p> <ol style="list-style-type: none"> <li>1. Test results of RMS EVM</li> <li>2. Test results of Peak EVM</li> <li>3. Test results of 95%ile EVM</li> <li>4. Test results of I/Q Origin Offset</li> <li>5. Test results of Frequency Error</li> </ol>
7	<p>Returns a series of integer values that represent the demoded symbols of the final corrected measured data for the last slot.</p> <p>bit/symbol is represented as a value between</p> <p>0 - 7 (octal) : 8PSK 142 symbols  0 - 3 (octal) : QPSK 169 symbols  0 - 15 (decimal) : 16QAM 169 symbols  0 - 31 (decimal) : 32QAM 169 symbols</p> <p>When AQPSK, it returns a series of floating point numbers that alternately represent demod bits of VAMOS subchannel pairs measured for the last slot. The first number is the VAMOS subchannel A bit and the second is the subchannel B bit of symbol 0. The series of numbers is:</p> <p>1st number = Subchannel A symbol 0 bit  2nd number = Subchannel B symbol 0 bit  3rd number = Subchannel A symbol 1 bit  4th number = Subchannel B symbol 1 bit  ...  2 x 141 + 1 = Subchannel A symbol 141 bit</p>



n	Results Returned
	2 x 141+2 = Subchannel B symbol 141 bit
8	<p>Returns the following scalar results:</p> <ol style="list-style-type: none"> <li>1. <b>RMS 95th %ile EVM</b> – a floating point number (in percent) of EVM over 95% of the entire measurement area.</li> <li>2. <b>Average RMS EVM</b> – a floating point number (in percent) of EVM over the entire measurement area.</li> <li>3. <b>Maximum RMS EVM</b> – a floating point number (in percent) of highest EVM over the entire measurement area.</li> <li>4. <b>Average Peak EVM</b> – a floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together.</li> <li>5. <b>Maximum Peak EVM</b> – a floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak.</li> <li>6. <b>Symbol position of the peak EVM</b> – an integer number of the symbol position where the peak EVM error is detected.</li> <li>7. <b>Average RMS Magnitude error</b> – a floating point number (in percent) of average RMS magnitude error over the entire measurement area.</li> <li>8. <b>Maximum RMS Magnitude error</b> – a floating point number (in percent) of maximum RMS magnitude error over the entire measurement area.</li> <li>9. <b>Average RMS Phase error</b> – a floating point number (in degree) of average RMS phase error over the entire measurement area.</li> <li>10. <b>Maximum RMS Phase error</b> – a floating point number (in degree) of maximum RMS phase error over the entire measurement area.</li> <li>11. <b>Average Frequency error</b> – a floating point number (in Hz) of the frequency error in the measured signal.</li> <li>12. <b>Maximum Frequency error</b> – a floating point number (in Hz) of the highest frequency error in the measured signal.</li> <li>13. <b>Average/I/Q origin offset</b> – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.</li> <li>14. <b>Amplitude Droop Error</b> – a floating point number (in dB) of the amplitude droop measured across the 142 symbol burst.</li> <li>15. <b>Trigger to T0</b> - a floating-point number (in sec) of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot.</li> <li>16. <b>Timing Offset of AM/PM path</b> - a floating number (in sec) of the averaged time interval between Amplitude Modulation path and Phase Modulation path. When GMSK is measured, this timing offset value is 0, which will be included in the average calculation.</li> <li>17. <b>Detected TSC</b> is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal), 10 (Burst Type : Sync), 20 (Burst Type :Access) if TSC detected. If TSC not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF).</li> </ol> <p>The returned value in AQPSK is more than or equal to 100100. Its first three digits</p>

n	Results Returned
	<p>represent TSC of VAMOS subchannel A. The second three digits represent VAMOS subchannel B. TSCs of TSC set 1 and TSC set 2 correspond to 100 to 107 and 200 to 207 respectively. Thus the returned value is <math>([\text{TSC num of VAMOS subchannel A}] * 1000 + [\text{TSC num of VAMOS subchannel B}])</math>. For example, if measured AQPSK signal has TSC 3 of set1 on VAMOS subchannel A and TSC 5 of TSC set2 on VAMOS B, returned value is 103205.</p> <p>The returned value is 200 ~ 207, <math>([\text{TSC num}] + 200)</math>, if one of Set2 TSCs is detected.</p> <p>18. <b>Detected Mod Scheme</b> (0:GMSK, 1:NB 8PSK, 2:NB 16QAM, 3:NB 32QAM, 10:NB AQPSK, 11:HB QPSK, 12:HB 16QAM, 13:HB 32QAM) Note that values except for GMSK and 8PSK return only when N/W9071A-3FP is installed.</p> <p>19. <b>Maximum I/Q origin offset</b> – a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the max hold number of the individual IQ Offset</p> <p>20. <b>Average Absolute Peak Phase error</b> – a floating point number (in percent) of the average of the absolute peak phase errors. Take the peak phase error from each burst and average them together.</p> <p>21. <b>Maximum Absolute Peak Phase error</b> – a floating point number (in percent) of the maximum absolute peak phase error. Take the peak phase errors from each burst and identify the highest peak.</p> <p>22. <b>Reserved</b> for future use (floating point) – the value returned is -999.0.</p>
9	<p>Returns series of floating point numbers that alternately represent I and Q pairs of the final corrected derotated measured data for the last slot. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the EVM, there is 1 point per symbol, so the series of numbers is:</p> <p>1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point...</p> <p>(2) +1 (or 3rd) number = I of the symbol 1 decision point</p> <p>(2) +2 (or 4th) number = Q of the symbol 1 decision point...</p> <p>(2) * N + 1 number = I of the symbol N decision point</p> <p>(2) * N + 2 number = Q of the symbol N decision point</p>
10	<p>Returns series of floating point numbers (in percent) that represent each sample in Max Hold of the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol.</p> <p>This command is available only when the Max Hold Trace State is ON.</p>
11	<p>Returns series of floating point numbers (in percent) that represent each sample in Min Hold of the EVM vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.</p>
12	<p>Returns series of floating point numbers (in percent) that represent each sample in Max Hold of the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.</p>
13	<p>Returns series of floating point numbers (in percent) that represent each sample in Min</p>

n	Results Returned
	Hold of the magnitude error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.
14	Returns series of floating point numbers (in degree) that represent each sample in Max Hold of the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Max Hold Trace State is ON.
15	Returns series of floating point numbers (in degree) that represent each sample in Min Hold of the phase error vector trace for the last slot. The first number is the symbol 0 decision point and there is 1 point per symbol. This command is available only when the Min Hold Trace State is ON.
16	Returns series of integer values that represent the demoded symbols of VAMOS subchannel A of the final corrected measured data for the last slot.
17	Returns series of integer values that represent the demoded symbols of VAMOS subchannel B of the final corrected measured data for the last slot.
18	Reserved for future use
19	Reserved for future use
20	Returns series of integer values that represent the demoded payload symbols of VAMOS subchannel A of the final corrected measured data for the last slot.
21	Returns series of integer values that represent the demoded payload symbols of VAMOS subchannel B of the final corrected measured data for the last slot.
22	Reserved for future use
23	Reserved for future use
24	<p>Returns the following scalar results:</p> <ol style="list-style-type: none"> <li>1. Detected TSC on VAMOS subchannel A is the most recently detected TSC on VAMOS subchannel A. The returned value is 0~7 if TSC of AQPSK burst detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) is specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF).</li> <li>2. Detected TSC on VAMOS subchannel B is the most recently detected TSC on VAMOS subchannel B. The returned value is 0~7 if TSC of TSC set 1 detected and 200 ~ 207 if TSC of TSC set 2 detected. If not detected, the returned value is -999.0. If Amptd or NONE (Power vs Time only) is specified in Sync Type, the returned value is -999.0. In multi slot condition, the returned value is the detected TSC of the specified slot (Time Slot ON) or the first evaluated slot (Time Slot OFF).</li> </ol>
25	<p>Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing EVM.</p> <ol style="list-style-type: none"> <li>1. Test results of RMS EVM</li> <li>2. Test results of Peak EVM</li> <li>3. Test results of 95%ile EVM</li> <li>4. Test results of I/Q Origin Offset</li> <li>5. Test results of Frequency Error</li> </ol>

n	Results Returned
	6. Test results of RMS Phase Error
	7. Test results of Peak Phase Error
	The tests for RMS and Peak Phase Errors are done only when mod scheme of last measured slot is GMSK. When not GMSK, pass value is returned.

## EDGE EVM Measurement Description

EDGE receivers rely on the quality of the  $3\pi/8$  PSK modulation signal to achieve the expected carrier to noise ratio. A transmitter with high EVM will often still be able to support phone calls during a functional test. However, it will tend to provide difficulty for mobiles trying to maintain service at the edge of the cell with low signal levels or under difficult fading and Doppler conditions.

Key Path	Meas
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Range

Accesses the Range menu to change baseband I/Q gain settings. This key has a readback text that describes gain range value.

This is only available when the selected input is IQ. For more details, see [Range@29880](#).

Key Path	AMPTD/Y Scale
Initial S/W Revision	Prior to A.02.00

### Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
Mode	BASIC
<b>Remote Command</b>	<code>[ :SENSe ] :POWer [ :RF ] :RANGe &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe?</code>
<b>Example</b>	<code>:POW:RANG 10.0</code> <code>:POW:RANG?</code>
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

## Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	[ :SENSe ] :POWer [ :RF ] :RANGe :OPTimize IMMEDIATE
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	[ :SENSe ] :POWer [ :RF ] :RANGe :OPTimize :ATTenuation OFF   ON   ELECTrical   COMBined  [ :SENSe ] :POWer [ :RF ] :RANGe :OPTimize :ATTenuation?
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECTrical and COMBined still can be used. Then, upon receiving ELECTrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.
Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	[ :SENSe ] :POWer [ :RF ] :RANGe :PARatio <real>

	<code>[ :SENSe ] : POWer [ :RF ] : RANGe : PARatio ?</code>
<b>Example</b>	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

### Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
<b>Remote Command</b>	<code>[ :SENSe ] : POWer [ :RF ] : RANGe : MIXer : OFFSet &lt;real&gt;</code> <code>[ :SENSe ] : POWer [ :RF ] : RANGe : MIXer : OFFSet ?</code>
<b>Example</b>	POW:RANG:MIX:OFFS -5 dB
Preset	0 dB
State Saved	Saved in instrument state
Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00



## Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 625

Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

### More Information

There are two types of functions that have Auto/Manual modes.

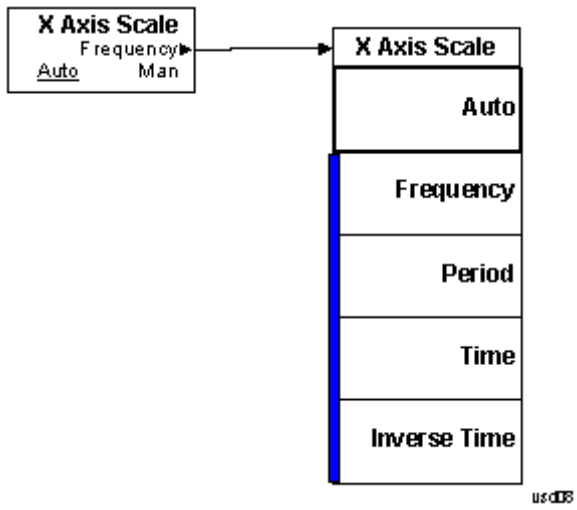
#### Auto/Man Active Function keys

An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either Auto or Man underlined as illustrated below.



#### Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.



## BW

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank key menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing Cont does a Resume.

<b>Key Path</b>	Front-panel key
<b>Remote Command</b>	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
<b>Example</b>	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
<b>Preset</b>	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility Notes</b>	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold. The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON ) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
<b>Initial S/W Revision</b>	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of Trace Average, Max Hold, or Min Hold.

In Other Measurements/Modes:

With Avg/Hold Num (in the Meas Setup menu) set to Off or set to On with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with Avg/Hold Num set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the Cont key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until  $k = N$ , at which point the current sequence will stop and the instrument will go to the idle state.

9 EDGE EVM Measurement  
File

File

See "File" on page 216

## FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel:ARFCn RFCHannel &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel:ARFCn RFCHannel?</code>
<b>Example</b>	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with <b>Center Frequency</b> . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

## Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1547](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1566](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00



## Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1567](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1568](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is Center Freq.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a Global Settings key in its Mode Setup menu.

The Center Freq function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 636](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 638](#)

See ["Center Frequency Presets" on page 635](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	[ :SENSe ] :FREQuency:CENTer <freq> [ :SENSe ] :FREQuency:CENTer?
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See "Center Frequency Presets" on page 635 and "RF Center Freq" on page 636 and Ext Mix Center Freq and "I/Q Center Freq" on page 638.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 635 and "RF Center Freq" on page 636 and "I/Q Center Freq" on page 638.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See "Center Frequency Presets" on page 635 and "RF Center Freq" on page 636 and "I/Q Center Freq" on page 638.
Default Unit	Hz
Status Bits/OPC	Non-overlapped
Dependencies	
Initial S/W Revision	Prior to A.02.00

## Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA, BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

## RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[ :SENSe ] :FREQuency:RF:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:RF:CENTer?</code>
Example	<code>FREQ:RF:CENT 30 MHz</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:EMIXer:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:EMIXer:CENTer?</code>
<b>Example</b>	<code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	<p>If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table.</p> <p>When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz.</p> <p>Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.</p>
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

### I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :FREQuency:IQ:CENTer <freq> [ :SENSe ] :FREQuency:IQ:CENTer?
<b>Example</b>	FREQ:IQ:CENt: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	-40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

### BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel
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Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

## BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFCHannel:TOP
<b>Example</b>	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENter as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

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	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz

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State Saved	No
Initial S/W Revision	Prior to A.02.00

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## BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

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Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel :MIDDLE</code>
<b>Example</b>	<code>CHAN:ARFC:MIDD</code>
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change <code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel</code> as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change <code>[ :SENSe ] :FREQuency :CENTer</code> as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

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	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

## BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFChannel:BOTTom
<b>Example</b>	CHAN:ARFC:BOTT
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	<p>Change [:SENSe]:CHANnel:ARFCn RFChannel as follows:</p> <p>E-GSM: 975</p> <p>P-GSM: 1</p> <p>R-GSM: 955</p> <p>DCS 1800: 512</p> <p>PCS 1900: 512</p> <p>GSM 450: 259</p> <p>GSM 480: 306</p> <p>GSM 700: 438</p> <p>GSM 850: 128</p> <p>T-GSM 810: 350</p> <p>Change BMT ARFCN to BMT FreqBOTTOM.</p> <p>Change [:SENSe]:FREQuency:CENTer as follows:</p> <p>E-GSM: 925.200 MHz</p> <p>P-GSM: 935.200 MHz</p> <p>R-GSM: 921.200 MHz</p>

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

## Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

## BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO ON OFF 1 0 [ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs SC  MC</code> <code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs ?</code>
<b>Example</b>	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

## Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :COUNT &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel :CARRier :COUNT ?</code>

<b>Example</b>	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

## Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :RCARrier <integer> [ :SENSe ] :CHANnel :CARRier :RCARrier?
<b>Example</b>	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers.  This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

## Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

## Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :LIST :COUPle OFF   ON   0   1 , ... [ :SENSe ] :CHANnel :CARRier :LIST :COUPle ?
<b>Example</b>	CHAN :CARR :LIST :COUP OFF CHAN :CARR :LIST :COUP ?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple   Man
Initial S/W Revision	A.06.00

### Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :LIST :PPResent YES NO, ... [ :SENSe ] :CHANnel :CARRier :LIST :PPResent?
<b>Example</b>	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes   No
Initial S/W Revision	A.06.00

### Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global

<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval &lt;freq&gt;, ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval ?</code>
<b>Example</b>	CHAN:CARR:LIST:INT 600k CHAN:CARR:LIST:INT?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
<b>Dependencies</b>	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
<b>Couplings</b>	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
<b>Preset</b>	600kHz
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	400 kHz
<b>Max</b>	100 MHz
<b>Initial S/W Revision</b>	A.06.00
<b>Modified at S/W Revision</b>	A.07.00, A.08.00

## Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

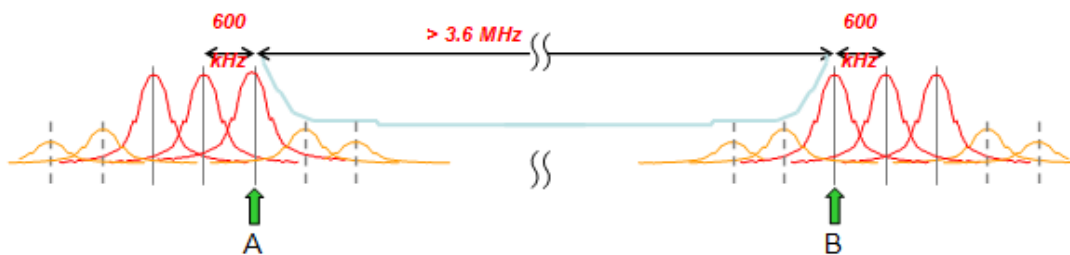
**Error! Reference source not found.**

See "[An example of non-contiguous frequency allocation](#)" on page 648

<b>Key Path</b>	FREQ Channel, Multi Carrier Setup
<b>Mode</b>	GSM
<b>Scope</b>	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :FALLocation</code> CONTiguous NCONTiguous <code>[ :SENSe ] :CHANnel :CARRier :FALLocation ?</code>
<b>Example</b>	CHAN:CARR:FALL NCON CHAN:CARR:FALL?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

### An example of non-contiguous frequency allocation



### Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

### Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

Error! Reference source not found.

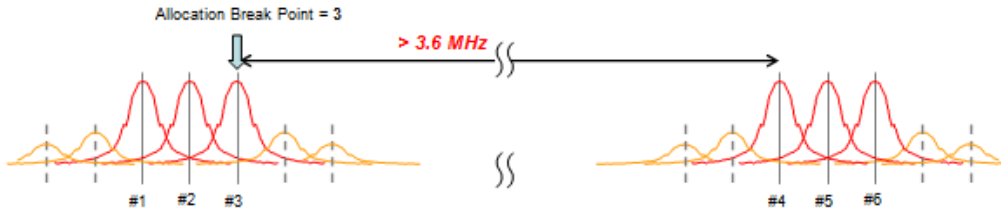
See "An example of allocation break point" on page 650

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint <integer> [ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint ?
Example	CHAN:CARR:FALL:NCON:ABP 3 CHAN:CARR:FALL:NCON:ABP ?



Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers - 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

## An example of allocation break point



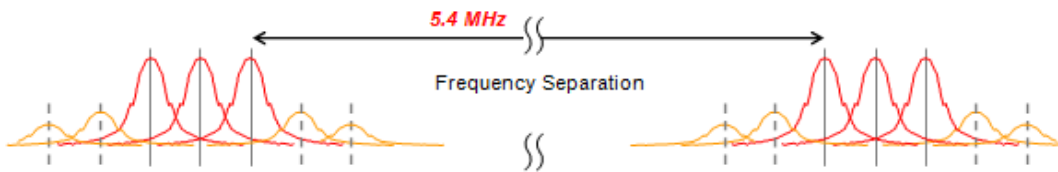
### Freq Separation

Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 651](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	<code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation &lt;freq&gt;</code> <code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?</code>
Example	<code>CHAN:CARR:FALL:NCON:FSEP 5.4M</code> <code>CHAN:CARR:FALL:NCON:FSEP?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTrument:SElect</code> to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

## An example of frequency separation



### Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	<code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ON   OFF   1   0</code> <code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ?</code>
Example	<code>RAD:CARR:NUMB:AUTO 1</code> <code>RAD:CARR:NUMB:AUTO ?</code>
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

### Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GSMK Phase & Frequency Error measurement
- EDGE EVM measurement
- GSMK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple [:SENSe]:RADio:CARRier:NUMBer?
<b>Example</b>	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:CHANnel:SLOT <integer> [:SENSe]:CHANnel:SLOT? [:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [:SENSe]:CHANnel:SLOT:AUTO?
<b>Example</b>	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

## Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :BURSt NORMal   SYNC   ACCess   HSRate   MIXed [ :SENSe ] :CHANnel :BURSt?
<b>Example</b>	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH)   Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
<b>Example</b>	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

## Input/Output

See "[Input/Output](#)" on page 148



## Marker

Accesses the Marker menus.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Marker Type

Sets the marker control mode to Normal, Delta or Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:MARKer[1] 2 ...12:MODE POSITION DELTA OFF :CALCulate:EEVM:MARKer[1] 2 ...12:MODE?
<b>Example</b>	CALC:EEVM:MARK:MODE OFF CALC:EEVM:MARK:MODE?
Notes	<p>When the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area.</p> <p>Default Active Function: the active function for the selected marker's current control mode. Note that if the current control mode is Off, there is no active function and the active function is turned off.</p> <p>Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision.</p> <p>You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</p>
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

### Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is Off, but is the SCPI equivalent of entering an X value if the control mode is Normal or Delta.

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:X <real> :CALCulate:EEVM:MARKer[1] 2 ...12:X?
Example	CALC:EEVM:MARK3:X 0 CALC:EEVM:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal, or the offset from the marker's reference marker if the control mode is Delta. The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time, seconds for Period and Time. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value will be changed.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a Not A Number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

### Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is Off, but is the SCPI equivalent of entering a value if the control mode is Normal or Delta except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:X:POsition <integer> :CALCulate:EEVM:MARKer[1] 2 ...12:X:POsition?
Example	CALC:EEVM:MARK10:X:POS 0 CALC:EEVM:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal, or the offset from the marker's reference marker in trace points if the control mode is Delta. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	After a preset, all markers are turned OFF, so a Marker X Axis Value query returns a Not A Number (NAN).

State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

### Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- **Absolute result:** every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is Delta.

- **Relative result:** if a marker’s control mode is Delta, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:MARKer[1] 2 ...12:Y?
<b>Example</b>	CALC:EEVM:MARK11:Y?
Notes	The query returns the marker Y-axis result. If the marker is Off the response is not a number. If ‘Polar’ is selected for Marker Trace, it returns the values of ‘I’ and ‘Q’ at the same time. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	No
<b>Backwards Compatibility SCPI</b>	:CALCulate:EEVM:MARKer[1] 2 ...4:FUNCTion:RESult?
Initial S/W Revision	Prior to A.02.00

### Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:REFerence <integer> :CALCulate:EEVM:MARKer[1] 2 ...12:REFerence?
Example	CALC:EEVM:MARK:REF 2 CALC:EEVM:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried a single value is returned (the specified marker number's relative marker).
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

## Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:EEVM:MARKer[1] 2 ...12:TRACe POLar   MERRor   PERRor   EVM   MAXMerror   MINMerror   MAXPerror   MINPerror   MAXEvm   MINEvm :CALCulate:EEVM:MARKer[1] 2 ...12:TRACe?
Example	CALC:EEVM:MARK:TRAC PERR CALC:EEVM:MARK:TRAC?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	EVM

State Saved	Saved in instrument state.
Range	IQ Polar Mag Error Phase Error EVM Max Hold Mag Error Min Hold Mag Error Max Hold Phase Error Min Hold Phase Error Max Hold EVM Min Hold EVM
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## Couple Markers

When this function is On, moving any marker causes an equal X Axis movement of every other marker which is not Off. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units). This may result in markers going off screen.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:EEVM:MARKer:COUPle[:STATe]?
<b>Example</b>	CALC:EEVM:MARK:COUP ON CALC:EEVM:MARK:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:MARKer:AOFF
<b>Example</b>	CALC:EEVM:MARK:AOFF
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

### Marker State (Backward Compatibility/Remote Command Only)

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	EDGE GSM
<b>Remote Command</b>	:CALCulate:EEVM:MARKer[1] 2 ...12:STATe OFF ON 0 1 :CALCulate:EEVM:MARKer[1] 2 ...12:STATe?
<b>Example</b>	CALC:EEVM:MARK3:STAT ON CALC:EEVM:MARK3:STAT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Marker Function

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank key menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Marker To

There is no functionality for this front-panel key in this measurement. Pressing this key displays a blank key menu.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00



## Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

**NOTE**

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

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Key Path	Front-panel key
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### Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 1579

"Current Measurement Query (Remote Command Only)" on page 1581

"Limit Test Current Results (Remote Command Only)" on page 1581

"Data Query (Remote Command Only)" on page 1581

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 1582

"Calculate Peaks of Trace Data (Remote Command Only)" on page 1587

"Hardware-Accelerated Fast Power Measurement (Remote Command Only)" on page 1588

"Format Data: Numeric Data (Remote Command Only)" on page 1602

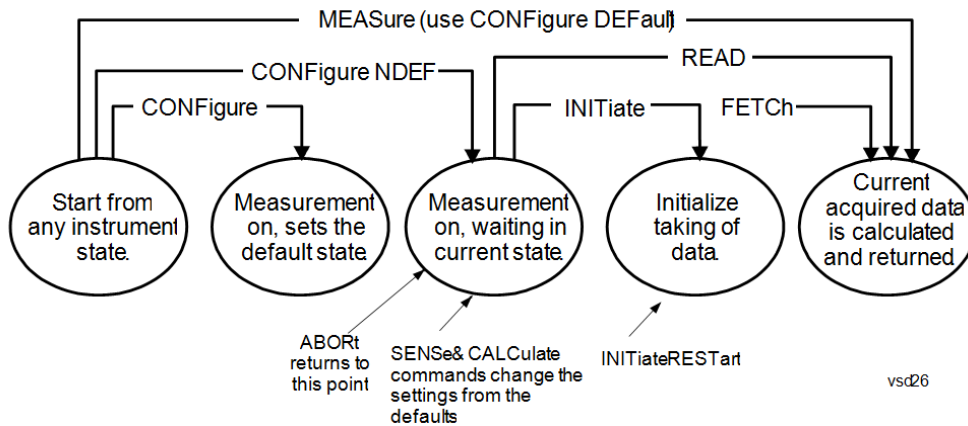
"Format Data: Byte Order (Remote Command Only)" on page 1603

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## Measurement Group of Commands




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### Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

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### Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

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the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

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#### Fetch Commands:

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:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

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#### INITiate Commands:

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:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
  - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
  - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
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#### READ Commands:

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:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
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measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
  - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
  - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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### Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

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<b>Remote Command</b>	:CONFigure?
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<b>Example</b>	CONF?
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### Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

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<b>Remote Command</b>	:CALCulate:CLIMits:FAIL?
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<b>Example</b>	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.
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### Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

<b>Remote Command</b>	:CALCulate:DATA[n]?
<b>Notes</b>	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement.
<b>Initial S/W Revision</b>	Prior to A.02.00

## Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

<b>Remote Command</b>	:CALCulate:DATA<n>:COMPRESS? BLOCK   CFIT   MAXimum   MINimum   MEAN   DMEan   RMS   RMSCubed   SAMPLE   SDEVIation   PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]
<b>Example</b>	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
<b>Notes</b>	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters.  This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
<b>Initial S/W Revision</b>	Prior to A.02.00

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

**NOTE** If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where  $|X_i|$  is the magnitude of an I/Q pair, and  $n$  is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left( \frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

**NOTE**

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPLe - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEVIation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where  $X_i$  is a data point value,  $\bar{X}$  is the arithmetic mean of the data point values for the specified region (s), and  $n$  is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where  $|X_i|$  is the magnitude of an I/Q pair,  $\bar{X}$  is the mean of the magnitudes for the specified region(s), and  $n$  is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ( $n=0$ ) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

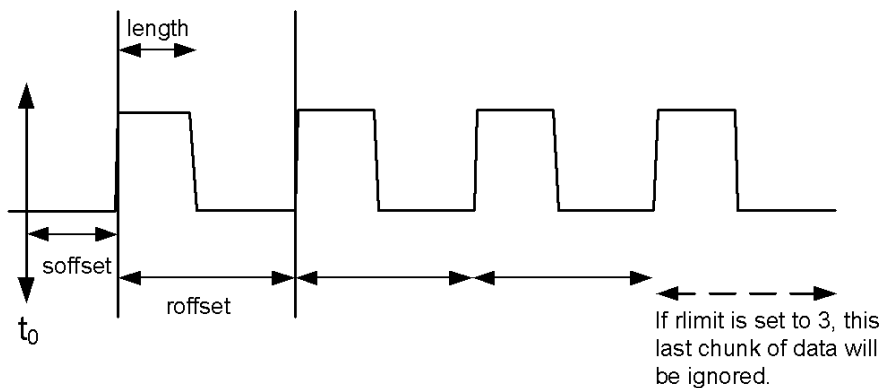
where  $Y_i$  is the unwrapped phase of I/Q pair with applying frequency correction and  $n$  is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

Sample Trace Data - Constant Envelope

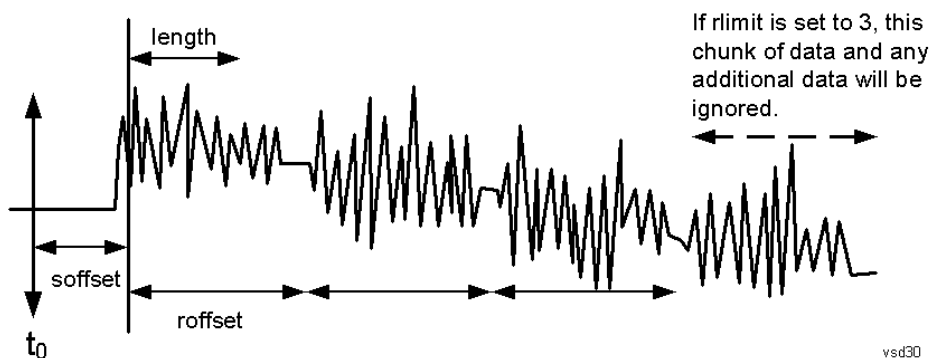
(See below for explanation of variables.)





### Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

## Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

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<b>Remote Command</b>	<p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME[,ALL   GTDLLine   LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME]</pre>
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<b>Example</b>	<p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p>
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<b>Notes</b>	<p>&lt;n&gt; - is the trace that will be used</p> <p>&lt;threshold&gt; - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p>&lt;excursion&gt; - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p>
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excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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Initial S/W Revision	Prior to A.02.00
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## Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

## Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

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Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

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Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWer[1,2,...,999]:DEFine "configuration string"
<b>Example</b>	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

### Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

### Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

## DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

## DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

## Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	<p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p>
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	<p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p>
Preset	0 dB
Range	0 – 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

## IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

## IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

## Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

### Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

### Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

### Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.



Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

#### Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

#### Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	-5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

#### Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

### Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

### Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 - 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

### Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

### Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

### Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1 e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

### Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0
Initial S/W Revision	A.14.00

### Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	<p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p>
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

### Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	<p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p>
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	<p>This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.</p>

Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

#### Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

#### Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

```

M All
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d
e
R :CALCulate:FPOWER:POWER[1,2,...,999]:DEFine?
e
m
o
t
e
C
o
m
m
a
n
d
E :CALC:FPOW:POW1:DEF?
x
a
m

```

```

p
l
e
-----
N This command query is used to retrieve a list of all defined parameters in an ASCII format.
o The following is an example of the returned results:
t "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset
e =0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyRefer
s ence,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,Resolution
BW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=
[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-
3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False
e,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
-----
I A.14.00
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```

### Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure
<b>Example</b>	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:INITiate
<b>Example</b>	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:FETCh?
<b>Example</b>	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

### Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]?
<b>Example</b>	:CALC:FPOW:POW1?
Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

### Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
<b>Example</b>	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

### Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
<b>Example</b>	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] 3. Declared function result for the 2nd specified channel [4 byte float] ... (m + 1). Declared function result for the last (mth) specified channel [4 byte float] ADC Over Range 1. ADC over-range occurred (1: true, 0: false) [2 byte short]



	<p>Spectrum Data</p> <ol style="list-style-type: none"> <li>1. Number of points in the spectrum data, k [4 byte int]</li> <li>2. Start frequency of spectrum data (Hz) [8 byte double]</li> <li>3. Step frequency of spectrum data (Hz) [8 byte double]</li> <li>4. FFT bin at 1st point (dBm) [4 byte float]</li> <li>5. FFT bin at 2nd point (dBm) [4 byte float]</li> </ol> <p>...</p> <p>(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]</p>
Initial S/W Revision	A.14.00

### Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

<b>Remote Command</b>	:FORMat[:TRACe][:DATA] ASCii INTeger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?
Notes	<p>The query response is:</p> <p>ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32</p> <p>When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm).</p> <p>The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.</p>
Dependencies	<p>Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL).</p> <p>Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".</p>
Preset	ASCii
Backwards Compatibility Notes	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

AScii - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

### Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

<b>Remote Command</b>	:FORMat:BORDER NORMAL   SWAPped :FORMat:BORDER?
<b>Preset</b>	NORMal
<b>Initial S/W Revision</b>	Prior to A.02.00

## Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Avg /Hold Num

Sets the number of data acquisitions that will be averaged. After the specified number of average counts, the average mode (termination control) setting determines the average action.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	[:SENSe]:EEVM:AVERage:COUNT <integer> [:SENSe]:EEVM:AVERage:COUNT? [:SENSe]:EEVM:AVERage[:STATe] OFF ON 0 1 [:SENSe]:EEVM:AVERage[:STATe]?
<b>Example</b>	EEVM:AVER:COUN 3 EEVM:AVER:COUN? EEVM:AVER ON EEVM:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When this value is changed, Avg State is set to On.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

### Avg Mode

Selects the type of termination control used to averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

- Exponential averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.

- Repeat averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

<b>Key Path</b>	Meas Setup
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EEVM:AVERage:TCONtrol EXPonential REPeat [ :SENSe ] :EEVM:AVERage:TCONtrol?
<b>Example</b>	EEVM:AVER:TCON REP EEVM:AVER:TCON?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SELEct to set the mode.
<b>Preset</b>	REPeat
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	Exp Repeat
<b>Initial S/W Revision</b>	Prior to A.02.00

## Burst Sync

Select the method of synchronizing the measurement to the bursts.

- Training Sequence (TSEquence) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.
- RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.
- Polar Modulation –The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence. (It's same as "Training Seq") The measurement start searching training sequence both on amplitude path and phase path to make synchronization
- None – The measurement is performed without searching burst.

<b>Key Path</b>	Meas Setup
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EEVM:BSYNc:SOURce TSEquence   RFBurst   PMODulation   NONE [ :SENSe ] :EEVM:BSYNc:SOURce?
<b>Example</b>	EEVM:BSYNC:SOUR RFB EEVM:BSYNC:SOUR?
<b>Dependencies</b>	When Burst Type in the Mode Setup menu is set to Mixed, this menu key is grayed out and Training Sequence (TSC) is used for synchronization. "Training Seq" is shown on the Meas Bar. The sync algorithm always runs in Training Sequence (TSC) synchronization mode in case of "Mixed" because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync

	becomes effective again when the Burst Type selection is changed from "Mixed" to another one. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	TSEquence
State Saved	Saved in instrument state.
Range	Training Seq RF Amptd Polar Modulation None
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## Limits

Accesses a menu that enables you to set the Limit Test to on or off and the Test Condition to a normal or extreme limit table.

Key Path	Meas Setup
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Limit Test

Turns on or off limit pass/fail testing.

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:TEST[:STATe] OFF ON 0 1 :CALCulate:EEVM:LIMit:TEST[:STATe]?
<b>Example</b>	CALC:EEVM:LIM:TEST ON CALC:EEVM:LIM:TEST?
Notes	When set to Off, the PASS/FAIL indicator on the Meas Bar goes blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Test Condition

This measurement could have different limit tables for different test environment, Normal and Extreme. This parameter allows you to select which limit table to be modified and used for the judgement.

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:TYPE NORMal EXTReme :CALCulate:EEVM:LIMit:TYPE?
<b>Example</b>	CALC:EEVM:LIM:TYPE NORM CALC:EEVM:LIM:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Norm Extreme
Initial S/W Revision	Prior to A.02.00

## RMS EVM

Accesses the menu to set the limit for the RMS EVM measurement pass/fail test per burst.

Key Path	Meas Setup, Mode, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## NB 8PSK

Sets the limit of the 8PSK burst for the RMS EVM measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM?
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM 12 CALC:EEVM:LIM:BTS:NORM:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	7.0

State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM <real> :CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM?
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:REVM 15 CALC:EEVM:LIM:BTS:EXTR:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:REVM <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM?
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:REVM 20 CALC:EEVM:LIM:MS:NORM:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:REVM <real> :CALCulate:EEVM:LIMit:MS:EXTReme:REVM?
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:REVM 15 CALC:EEVM:LIM:MS:EXTR:REVM?
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## NB 16QAM

Sets the limit of the normal symbol rate 16QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM16, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM16
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM:NSR QAM16, 12



	<b>CALC:EEVM:LIM:BTS:NORM:REVM:NSR? QAM16</b>
Notes	<p>On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition.</p> <p>But a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition..</p> <p>You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Dependencies	Blanked when the N/W9071A–3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	<pre>:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate QAM16, &lt;real&gt;</pre> <pre>:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? QAM16</pre>
<b>Example</b>	<pre>CALC:EEVM:LIM:BTS:EXTR:REVM:NSR QAM16, 15</pre> <pre>CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? QAM16</pre>
Notes	<p>On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition.</p> <p>Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.</p> <p>You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Dependencies	Blanked when the N/W9071A–3FP license is not installed.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	<pre>:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM16, &lt;real&gt;</pre>

	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM16
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:REVM:NSR QAM16, 20 CALC:EEVM:LIM:MS:NORM:REVM:NSR? QAM16
<b>Notes</b>	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	Blanked when the N/W9071A-3FP license is not installed.
<b>Preset</b>	7.0
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	0.0
<b>Max</b>	100.0
<b>Initial S/W Revision</b>	A.02.00
<b>Modified at S/W Revision</b>	A.04.00

Device is MS, Test Condition is Extreme

<b>Key Path</b>	Meas Setup, Limits, RMS EVM
<b>Mode</b>	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate QAM16, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate? QAM16
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:REVM:NSR QAM16, 15 CALC:EEVM:LIM:MS:EXTR:REVM:NSR? QAM16
<b>Notes</b>	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	Blanked when the N/W9071A-3FP license is not installed.
<b>Preset</b>	8.0
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	0.0
<b>Max</b>	100.0
<b>Initial S/W Revision</b>	A.02.00
<b>Modified at S/W Revision</b>	A.04.00

**NB 32QAM**

Sets the limit of the normal symbol rate 32QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM:NSR QAM32, 12 CALC:EEVM:LIM:BTS:NORM:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:REVM:NSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR QAM32, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.0

Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:NSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:REVM:NSR QAM32, 20 CALC:EEVM:LIM:MS:NORM:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:REVM:NSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:REVM:NSR QAM32, 15 CALC:EEVM:LIM:MS:EXTR:REVM:NSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.

Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.04.00

## HB QPSK

Sets the limit of the QPSK burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QPSK
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QPSK, 12 CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QPSK
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:HSRate? QPSK
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QPSK, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QPSK

Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QPSK
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:REVM:HSR QPSK, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QPSK
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	9.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QPSK, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QPSK

<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QPSK, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QPSK
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	10.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

### HB 16QAM

Sets the limit of the higher symbol rate 16QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM16
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QAM16, 12 CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	4.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate? QAM16
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QAM16, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM16
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:REVM:HSR QAM16, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00



Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate QAM16, <real> :CALCulate:EEVM:LIMit:MS:EXTRemE:REVM:HSRate? QAM16
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QAM16, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QAM16
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

## HB 32QAM

Sets the limit of the higher symbol rate 32QAM burst for the RMS EVM Measurement pass/fail test.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:HSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM:HSR QAM32, 12 CALC:EEVM:LIM:BTS:NORM:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	4.0
State Saved	Saved in instrument state.
Min	0.0

Max	100.0
Initial S/W Revision	A.02.00

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:REVM:HSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:REVM:HSR QAM32, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:NORMal:REVM:HSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:REVM:HSR QAM32, 20 CALC:EEVM:LIM:MS:NORM:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)

State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

Device is MS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate QAM32, <real> :CALCulate:EEVM:LIMit:MS:EXTReme:REVM:HSRate? QAM32
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:REVM:HSR QAM32, 15 CALC:EEVM:LIM:MS:EXTR:REVM:HSR? QAM32
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	100% (TBD in 3GPP)
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.02.00

### NB AQPSK Low SCPIR

Sets the limit of the normal symbol rate AQPSK burst for the RMS EVM Measurement pass/fail test when the absolute value of Subchannel Power Imbalance Ratio, |SCPIR| is equal to or less than 8.0 dB.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK1, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK1
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM:NSR AQPSK1, 12 CALC:EEVM:LIM:BTS:NORM:REVM:NSR? AQPSK1
Notes	On MUI operation, for example, if the selected device is BTS and Test

	<p>Condition is Extreme, test limits that can be set from the front panel are those for BTS and Extreme condition.</p> <p>Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.</p> <p>You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Dependencies	Blanked when the EDGE Evolution N/W9071A-3FP license is not installed.
Preset	7.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
<b>Backwards Compatibility SCPI</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK
Initial S/W Revision	A.11.01

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK1, <real> :CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK1
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR AQPSK1, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? AQPSK1
Notes	<p>On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition.</p> <p>Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition.</p> <p>You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	8.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
<b>Backwards Compatibility SCPI</b>	:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK
Initial S/W Revision	A.11.01

## NB AQPSK High SCPIR

Sets the limit of the normal symbol rate AQPSK burst for the RMS EVM Measurement pass/fail test when the absolute value of Subchannel Power Imbalance Ratio, |SCPIR| is greater than 8.0 dB.

Device is BTS, Test Condition is Normal

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate AQPSK2, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:REVM:NSRate? AQPSK2
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:REVM:NSR AQPSK2, 12 CALC:EEVM:LIM:BTS:NORM:REVM:NSR? AQPSK2
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limits that can be set from the front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Blanked when the EDGE Evolution N/W9071A-3FP license is not installed.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.11.01

Device is BTS, Test Condition is Extreme

Key Path	Meas Setup, Limits, RMS EVM
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate AQPSK2, <real> :CALCulate:EEVM:LIMit:BTS:EXTRemE:REVM:NSRate? AQPSK2
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:REVM:NSR AQPSK2, 15 CALC:EEVM:LIM:BTS:EXTR:REVM:NSR? AQPSK2
Notes	On MUI operation, for example, if the selected device is BTS and Test Condition is Extreme, test limit that can be set from front panel are those for BTS and Extreme condition. Meanwhile, a remote command can set each test limit without setting the radio device and test condition because it contains the information of the radio device and test condition. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Dependencies	Blanked when the N/W9071A-3FP license is not installed.
Preset	6.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.11.01

## Peak EVM

Sets the limit for the Peak EVM measurement pass/fail test.

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Peak EVM (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:PEVM <real> :CALCulate:EEVM:LIMit:BTS:NORMal:PEVM?
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:PEVM 12 CALC:EEVM:LIM:BTS:NORM:PEVM?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

### Peak EVM (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:PEVM?

<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:PEVM 15 CALC:EEVM:LIM:BTS:EXTR:PEVM?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	22.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

### Peak EVM (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:PEVM <real> :CALCulate:EEVM:LIMit:MS:NORMal:PEVM?
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:PEVM 20 CALC:EEVM:LIM:MS:NORM:PEVM?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

### Peak EVM (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:PEVM <real> :CALCulate:EEVM:LIMit:MS:EXTReme:PEVM?
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:PEVM 15 CALC:EEVM:LIM:MS:EXTR:PEVM?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	30.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

## 95%ile EVM

Sets the limit for the 95%ile EVM measurement pass/fail test.

Key Path	Meas Setup, Mode, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

## 95%ile EVM (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95 <real> :CALCulate:EEVM:LIMit:BTS:NORMal:EVMP95?
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:EVMP95 12 CALC:EEVM:LIM:BTS:NORM:EVMP95?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

## 95%ile EVM (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTReme:EVMP95 <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:EVMP95?



<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:EVMP95 15 CALC:EEVM:LIM:BTS:EXTR:EVMP95?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	11.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

### 95%ile EVM (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:EVMP95 <real> :CALCulate:EEVM:LIMit:MS:NORMal:EVMP95?
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:EVMP95 20 CALC:EEVM:LIM:MS:NORM:EVMP95?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	15.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

### 95%ile EVM (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95 <real> :CALCulate:EEVM:LIMit:MS:EXTReme:EVMP95?
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:EVMP95 15 CALC:EEVM:LIM:MS:EXTR:EVMP95?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	15.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	Prior to A.02.00

### I/Q Origin Offset

Sets the limit for the I/Q Origin Offset measurement pass/fail test.

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### I/Q Origin Offset (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset <real> :CALCulate:EEVM:LIMit:BTS:NORMal:IQOOffset?
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:IQOO -12 CALC:EEVM:LIM:BTS:NORM:IQOO?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	-35
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

### I/Q Origin Offset (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:IQOOffset?

<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:IQOO -15 CALC:EEVM:LIM:BTS:EXTR:IQOO?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	-35.0
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

#### I/Q Origin Offset (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset <real> :CALCulate:EEVM:LIMit:MS:NORMal:IQOOffset?
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:IQOO -20 CALC:EEVM:LIM:MS:NORM:IQOO?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	-30.0
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

#### I/Q Origin Offset (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReme:IQOOffset <real> :CALCulate:EEVM:LIMit:MS:EXTReme:IQOOffset?
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:IQOO -15 CALC:EEVM:LIM:MS:EXTR:IQOO?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	-30.0
State Saved	Saved in instrument state.
Min	-100.0
Max	0.0
Initial S/W Revision	Prior to A.02.00

## Freq Error

Sets the limit for the Frequency Error measurement pass/fail test.

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Freq Error (Device is BTS, BTS Type is Normal, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:BTS:NORMal:FERRor?
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:FERR 0.1 CALC:EEVM:LIM:BTS:NORM:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Normal or Micro and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

### Freq Error (Device is BTS, BTS Type is Normal, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:FERRor?

<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:FERR 0.1 CALC:EEVM:LIM:BTS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

#### Freq Error (Device is BTS, BTS Type is Micro, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:MBTS:NORMal:FERRor?
<b>Example</b>	CALC:EEVM:LIM:MBTS:NORM:FERR 0.1 CALC:EEVM:LIM:MBTS:NORM:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

#### Freq Error (Device is BTS, BTS Type is Micro, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor <real> :CALCulate:EEVM:LIMit:MBTS:EXTReme:FERRor?
<b>Example</b>	CALC:EEVM:LIM:MBTS:EXTR:FERR 0.1 CALC:EEVM:LIM:MBTS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is BTS and the “BTS Type” is Normal or Micro and the “Test Condition” is Extreme.

	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

#### Freq Error (Device is BTS, BTS Type is Pico, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:PBTS:NORMal:FERRor?
<b>Example</b>	CALC:EEVM:LIM:PBTS:NORM:FERR 0.1 CALC:EEVM:LIM:PBTS:NORM:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Pico and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

#### Freq Error (Device is BTS, BTS Type is Pico, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor <real> :CALCulate:EEVM:LIMit:PBTS:EXTReme:FERRor?
<b>Example</b>	CALC:EEVM:LIM:PBTS:EXTR:FERR 0.2 CALC:EEVM:LIM:PBTS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "BTS Type" is Pico and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.

Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

#### Freq Error (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:FERRor <real> :CALCulate:EEVM:LIMit:MS:NORMal:FERRor?
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:FERR 0.1 CALC:EEVM:LIM:MS:NORM:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is MS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

#### Freq Error (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limit
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTReMe:FERRor <real> :CALCulate:EEVM:LIMit:MS:EXTReMe:FERRor?
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:FERR 0.2 CALC:EEVM:LIM:MS:EXTR:FERR?
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is MS and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0.0
Max	50.0
Initial S/W Revision	Prior to A.02.00

## RMS Phase Error GMSK

Sets the limit of the normal symbol rate GMSK burst for the RMS Phase Error Measurement pass/fail test.

### RMS Phase Error GMSK (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:RPERror? GMSK
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:RPER GMSK, 0.5 CALC:EEVM:LIM:BTS:NORM:RPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

### RMS Phase Error GMSK (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTReme:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTReme:RPERror? GMSK
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:RPER GMSK, 5 CALC:EEVM:LIM:BTS:EXTR:RPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00



## RMS Phase Error GMSK (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:MS:NORMal:RPERror? GMSK
<b>Example</b>	CALC:EEVM:LIM:MS:NORM:RPER GMSK, 7 CALC:EEVM:LIM:MS:NORM:RPER? GMSK
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.06.00

## RMS Phase Error GMSK (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:EXTRemE:RPERror GMSK, <real> :CALCulate:EEVM:LIMit:MS:EXTRemE:RPERror? GMSK
<b>Example</b>	CALC:EEVM:LIM:MS:EXTR:RPER GMSK, 5 CALC:EEVM:LIM:MS:EXTR:RPER? GMSK
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

## Peak Phase Error GMSK

Sets the limit of the normal symbol rate GMSK burst for the Peak Phase Error Measurement pass/fail test.

### Peak Phase Error GMSK (Device is BTS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:NORMal:PPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:NORMal:PPERror? GMSK
<b>Example</b>	CALC:EEVM:LIM:BTS:NORM:PPER GMSK, 20 CALC:EEVM:LIM:BTS:NORM:PPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

### Peak Phase Error GMSK (Device is BTS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:BTS:EXTreme:PPERror GMSK, <real> :CALCulate:EEVM:LIMit:BTS:EXTreme:PPERror? GMSK
<b>Example</b>	CALC:EEVM:LIM:BTS:EXTR:PPER GMSK, 20 CALC:EEVM:LIM:BTS:EXTR:PPER? GMSK
Notes	This parameter can only be set using the front-panel "Limits" key if the device selected by the "Device" key is BTS and the "Test Condition" is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

### Peak Phase Error GMSK (Device is MS, Test Condition is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:LIMit:MS:NORMal:PPERror GMSK, <real>

	<code>:CALCulate:EEVM:LIMit:MS:NORMal:PPERror? GMSK</code>
<b>Example</b>	<code>CALC:EEVM:LIM:MS:NORM:PPER GMSK, 7</code> <code>CALC:EEVM:LIM:MS:NORM:PPER? GMSK</code>
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Normal. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20.0
State Saved	Saved in instrument state.
Min	0.0
Max	100.0
Initial S/W Revision	A.06.00

### Peak Phase Error GMSK (Device is MS, Test Condition is Extreme)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	<code>:CALCulate:EEVM:LIMit:MS:EXTReme:PPERror GMSK, &lt;real&gt;</code> <code>:CALCulate:EEVM:LIMit:MS:EXTReme:PPERror? GMSK</code>
<b>Example</b>	<code>CALC:EEVM:LIM:MS:EXTR:PPER GMSK, 5</code> <code>CALC:EEVM:LIM:MS:EXTR:PPER? GMSK</code>
Notes	This parameter can only be set using the front-panel “Limits” key if the device selected by the “Device” key is MS and the “Test Condition” is Extreme. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20.0
State Saved	Saved in instrument state.
Min	0
Max	180
Initial S/W Revision	A.06.00

### Droop Compensation

Turns Droop Compensation on or off. Droop Compensation corrects amplitude variations across a burst. You may want to turn off this compensation so you can see the changes in the measured magnitude error. Droop can result from signal impairments like a power amplifier problem.

Key Path	Meas Setup, More
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :EEVM:DROop OFF ON 0 1</code> <code>[ :SENSe ] :EEVM:DROop?</code>

<b>Example</b>	EEVM:DRO ON EEVM:DRO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

### Freq Error Tolerance Rng

Toggles between Wide and Normal settings for Frequency Error tolerance. To accurately demodulate complex signals which require more stringent tolerance for frequency error, Normal can be selected. For use with signals that are simpler with greater frequency error tolerance, Wide can be selected.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EEVM:FERRor:TRANge WIDE NORMal [ :SENSe ] :EEVM:FERRor:TRANge?
<b>Example</b>	EEVM:FERR:TRAN NORM EEVM:FERR:TRAN?
Preset	WIDE
State Saved	Saved in instrument state.
Range	Wide Normal
Initial S/W Revision	A.02.00

### Polar Mod Align

Turns On/Off polar modulation alignment.

Key Path	Meas Setup, More
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EEVM:BSYNc:PMODulation:ALIGNment OFF ON 0 1 [ :SENSe ] :EEVM:BSYNc:PMODulation:ALIGNment?
<b>Example</b>	EEVM:BSYNC:PMOD:ALIG OFF EEVM:BSYNC:PMOD:ALIG?
Notes	Available only when " <b>Burst Sync</b> " on page 692 is set to Polar Modulation. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF

State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Meas Preset

Restores all the measurement parameters to their default values.

Key Path	Meas Setup, More
Mode	GSM
<b>Remote Command</b>	:CONFigure:EEVM
<b>Example</b>	CONF:EEVM
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

## Mode

See ["Mode" on page 174](#)

## Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 728 for more information.

Key Path	Front-panel key
<b>Remote Command</b>	:SYSTem:PRESet
<b>Example</b>	:SYST:PRES
Notes	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

## How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPUt	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGN	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu



Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

## Mode Setup

See "[Mode Setup](#)" on page 193

## Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

If Marker Trace of selected marker is POL, peak search will not be performed.

Key Path	Front-panel key
Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:MARKer [1]   2   . . . 12 :MAXimum
<b>Example</b>	CALC:EEVM:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

### Min Peak Search (Backward Compatibility/Remote Command Only)

Mode	GSM
<b>Remote Command</b>	:CALCulate:EEVM:MARKer [1]   2   . . . 12 :MINimum
<b>Example</b>	CALC:EEVM:MARK:MIN
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

9 EDGE EVM Measurement  
Print

Print

See "Print" on page 221

## Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State\_0000.state. The next is State\_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State\_0010.state there is already a State\_0010.state file in the current directory, it advances the counter to State\_0011.state to ensure that no conflict will exist (and then it verifies that State\_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred\_0000.csv.

**NOTE**

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

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**NOTE**

If the filename you entered ends with \_dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

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Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

## Recall

The Recall menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an Import (Data) option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

**NOTE**

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	<p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATE &lt;filename&gt;.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p>
Backwards Compatibility Notes	<p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p>
Backwards Compatibility Notes	<p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p>
Initial S/W Revision	Prior to A.02.00

## State

The Recall State menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. Recall State will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 737](#).

<b>Key Path</b>	Recall
<b>Mode</b>	All
<b>Remote Command</b>	:MMEMory:LOAD:STATe <filename>
<b>Example</b>	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
<b>Example</b>	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
<b>Notes</b>	<p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> <li>• If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number.</li> </ul> <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> <li>• Makes the saved measurement for the mode the active measurement.</li> <li>• Clears the input and output buffers.</li> <li>• Status Byte is set to 0.</li> </ul>



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	<ul style="list-style-type: none"> <li>• Executes a *CLS</li> </ul> <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away.</p> <p>After the Recall, the analyzer exits the Recall menu and returns to the previous menu.</p>
<b>Backwards Compatibility SCPI</b>	:MMEMory:LOAD:STATe 1,<filename>
Initial S/W Revision	Prior to A.02.00

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### More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

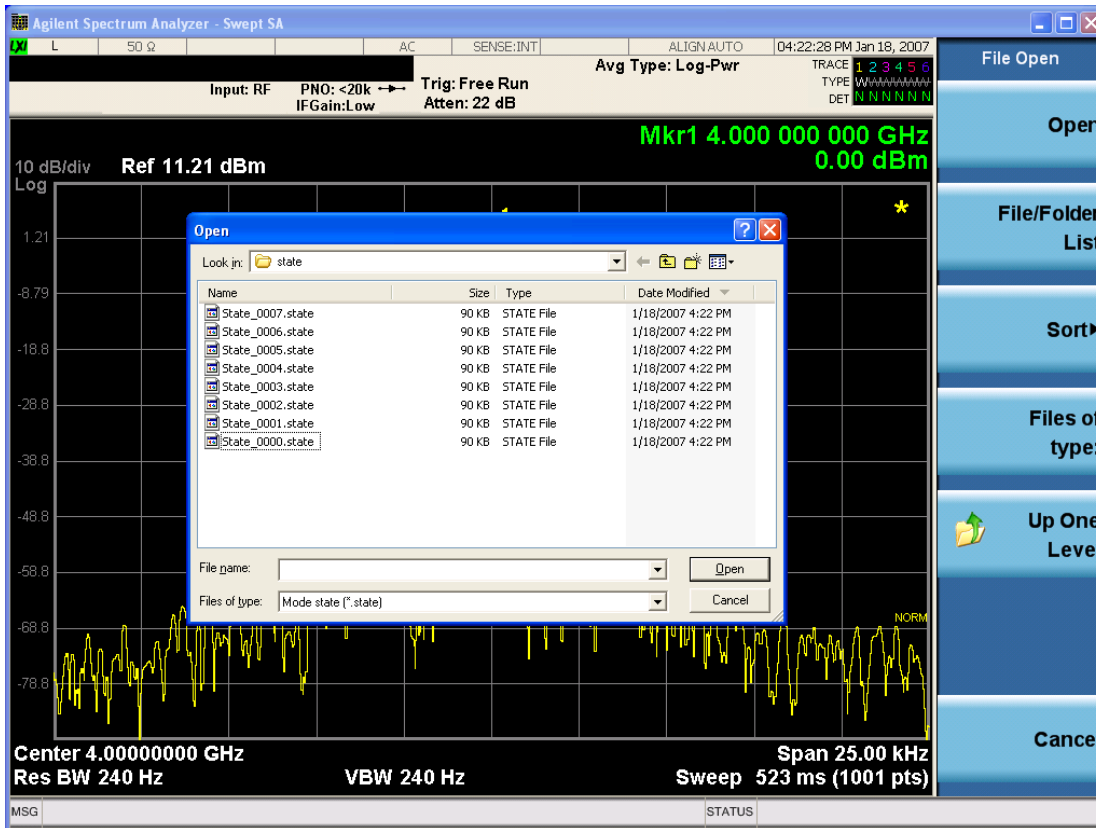
---

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

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### From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

#### Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

#### Look In

The Look In field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

#### Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are By Date, By Name, By extension, and By Size.

#### Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (\*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

### Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the Save, State function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
<b>Example</b>	*RCL 1
Range	1-16 from front panel, 1-128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
<b>Remote Command</b>	:MMEMory:LOAD:SEQuences:   SLIS   ALIS   SAALIS   "MySequence.txt"
<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall,Sequences
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<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
<b>Dependencies</b>	Only available in XOBT
<b>Initial S/W Revision</b>	A.05.00

## Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[From File...](#)" on page 1621 in Recall, State, for a full description of this dialog and menu.

<b>Key Path</b>	Recall, Data
<b>Notes</b>	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
<b>Initial S/W Revision</b>	Prior to A.02.00

## Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 743

Key Path	Front-panel key
Remote Command	:INITiate[:IMMEDIATE] :INITiate:RESTART
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTIONable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write, but did not restart Max Hold and Min Hold. In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average, but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

### More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count  $k$  equals the number  $N$  set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.



## Save

The Save menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an Export (Data) option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

## State

The Save State menu lets you choose a register or file for saving the state.

### NOTE

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
<b>Remote Command</b>	:MMEMory:STORe:STATe <filename>
<b>Example</b>	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote.

After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key.

After saving to a register, you remain in the Save State menu, so that you can see the Register key update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

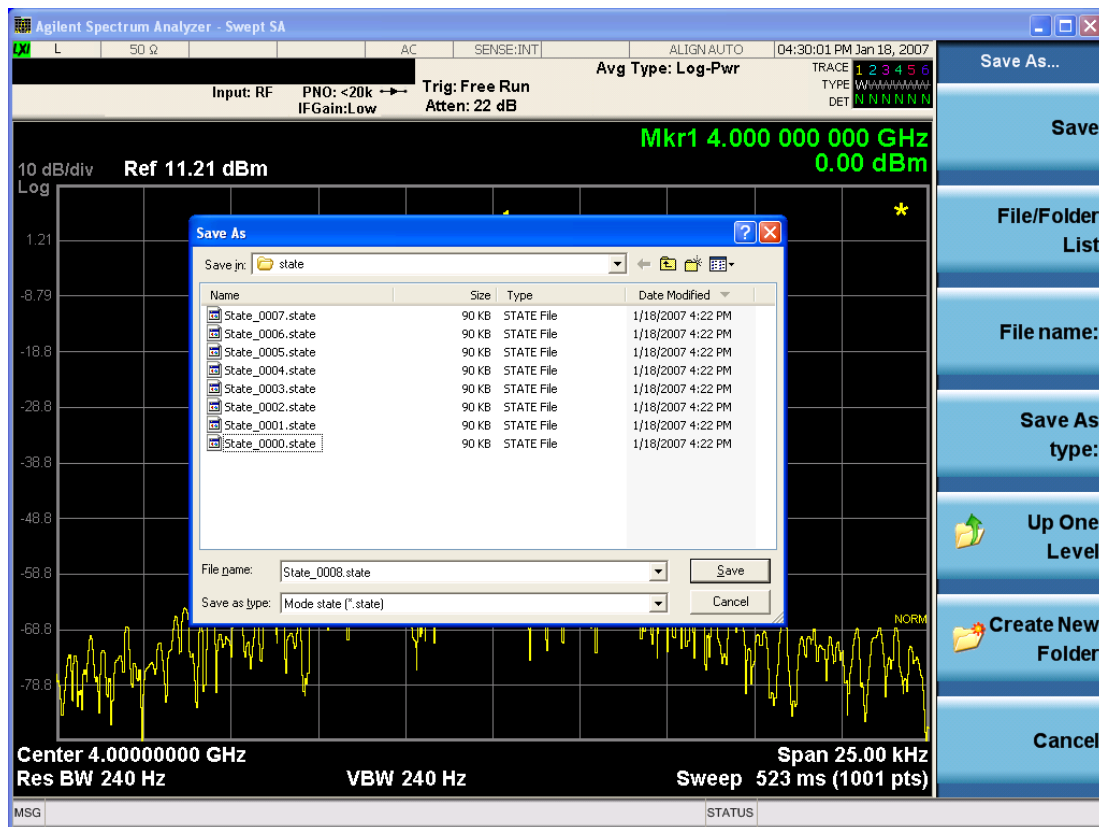
**Backwards Compatibility SCPI** :MMEMory:STORE:STATe 1,<filename>

For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.

Initial S/W Revision Prior to A.02.00

### To File . . .

When you press “To File”, the analyzer brings up a Windows dialog and a menu entitled “Save As.” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

#### Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting OK, or you can Cancel the request. If you select OK,

the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

#### Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

#### File Name

The File Name field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1617](#) documentation for more on the automatic file naming algorithm.

When you press the File Name key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the Done softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

#### Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (\*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Create New Folder

This key corresponds to the icon of a folder with the "\*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

## Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 748](#)

Key Path	Save, State
Mode	All
<b>Remote Command</b>	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
<b>Example</b>	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

## More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another

consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The \*SAV and \*RCL commands will not be affected by the custom register names, nor will the MMEM commands.

## Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

### NOTE

In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

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Key Path	Save, State
Mode	All
<b>Example</b>	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

## Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?
Notes	<p>The string must be a valid logical path.</p> <p>Changes the default directory for a mass memory file system. The &lt;directory_name&gt; parameter is a string. If no parameter is specified, the directory is set to the *RST value.</p> <p>At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal.</p> <p>Query returns full path of the default directory.</p>
Initial S/W Revision	Prior to A.02.00

## Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY <string>,<string>[,<string>,<string>]
Notes	<p>The string must be a valid logical path.</p> <p>Copies an existing file to a new file or an existing directory to a new directory.</p> <p>Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.</p> <p>The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.</p> <p>This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.</p>

## Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY:DEvice <source_string>,<dest_string>
Notes	<p>The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device.</p> <p>Valid device keywords are:</p> <p>SNS (smart noise source)</p> <p>An error is generated if the file or device is not found.</p>

## Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DELeTe <file_name>[,<directory_name>]
Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Move (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory.



Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.

The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Initial S/W Revision      Prior to A.02.00

### Mass Storage Remove Directory (Remote Command Only)

Key path                      SCPI Only

**Remote Command**        :MMEMory:RDIRectory <directory\_name>

Notes

The string must be a valid logical path.

Removes a directory. The <directory\_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.

This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.

Initial S/W Revision      Prior to A.02.00

### Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path                      Save, Sequences

Mode                            All

**Remote Command**        :MMEM:STOR:SEquences: | SLIST | ALIST | SAAList | SSTep  
"MySequence.txt"

**Example**                    :MMEM:STOR:SEQ:SLIST "MySequence.txt"

Notes

Available file types are:

- CSV (Comma delimited) (\*.csv)
- Text (Tab delimited) (\*.txt)

Initial S/W Revision      A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

## Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

## Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All

Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

## Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which **Meas Result** to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See ["Meas Results File Contents" on page 756](#).

See ["Marker Table" on page 756](#).

See ["Peak Table" on page 758](#).

See Spectrogram

<b>Remote Command</b>	:MMEMory:STORe:RESults:MTABle PTABle SPEctrogram <filename>
<b>Example</b>	:MMEM:STOR:RES:MTAB "myResults.csv" Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB "myResults.csv" Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC "myResults.csv" Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

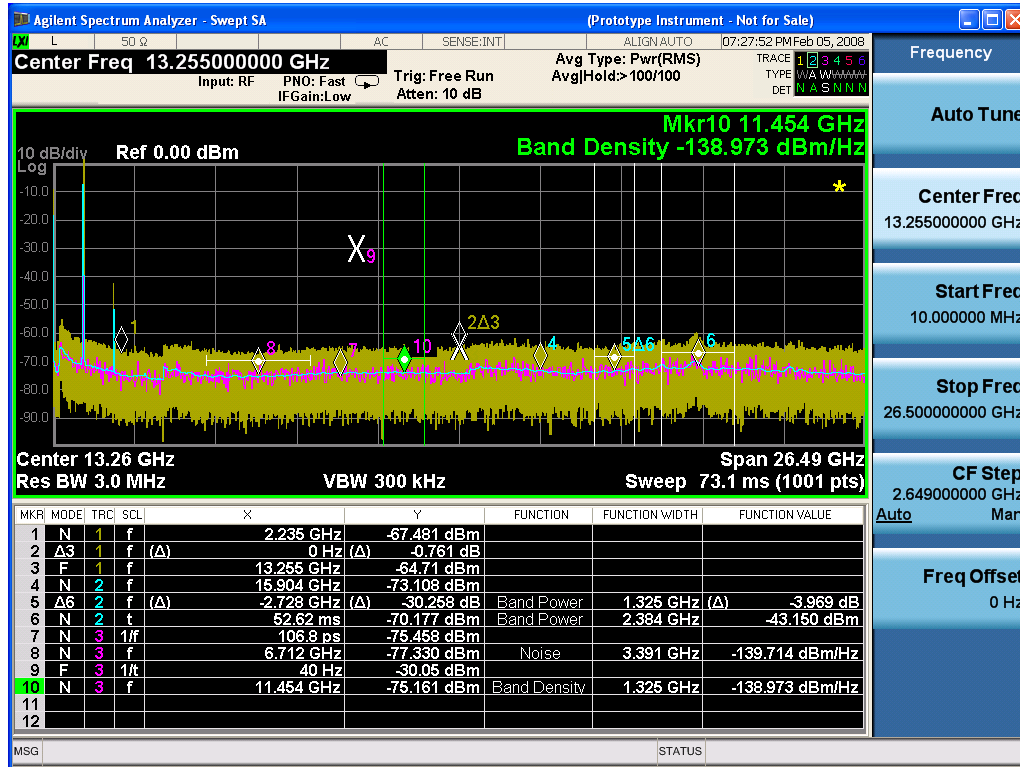
### Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

### Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementR	
result	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR	1
P26 EA3	
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.0662666

	67								
Start Frequency	10000000								
Stop Frequency	26500000 000								
Average Count	0								
Average Type	LogPower (Video)								
RBW	3000000								
RBW Filter	Gaussian								
RBW Filter BW	3dB								
VBW	3000000								
Sweep Type	Swept								
X Axis Scale	Lin								
PreAmp State	Off								
PreAmp Band	Low								
Trigger Source	Free								
Trigger Level	1.2								
Trigger Slope	Positive								
Trigger Delay	1.00E-06								
Phase Noise Optimization	Fast								
Swept If Gain	Low								
FFT If Gain	Autorange								
RF Coupling	AC								
FFT Width	411900								
Ext Ref	10000000								
Input	RF								
RF Calibrator	Off								
Attenuation	10								
Ref Level Offset	0								
External Gain	0								
X Axis Units	Hz								
Y Axis Units	dBm								
DATA									
MKR	MODE	TR C	SCL	X	Y	FUNCTI ON	FUNCTIO N WIDTH	FUNCTI ON VALUE	FUNCTI ON UNIT
1	Normal	1	Freque ncy	2.2350E+ 09	- 67.4	Off	0.0000E+ 00	0	None

81									
2	Delta3	1	Frequency	0.0000E+00	-0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	-64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	-73.108	Off	0.0000E+00	0	None
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

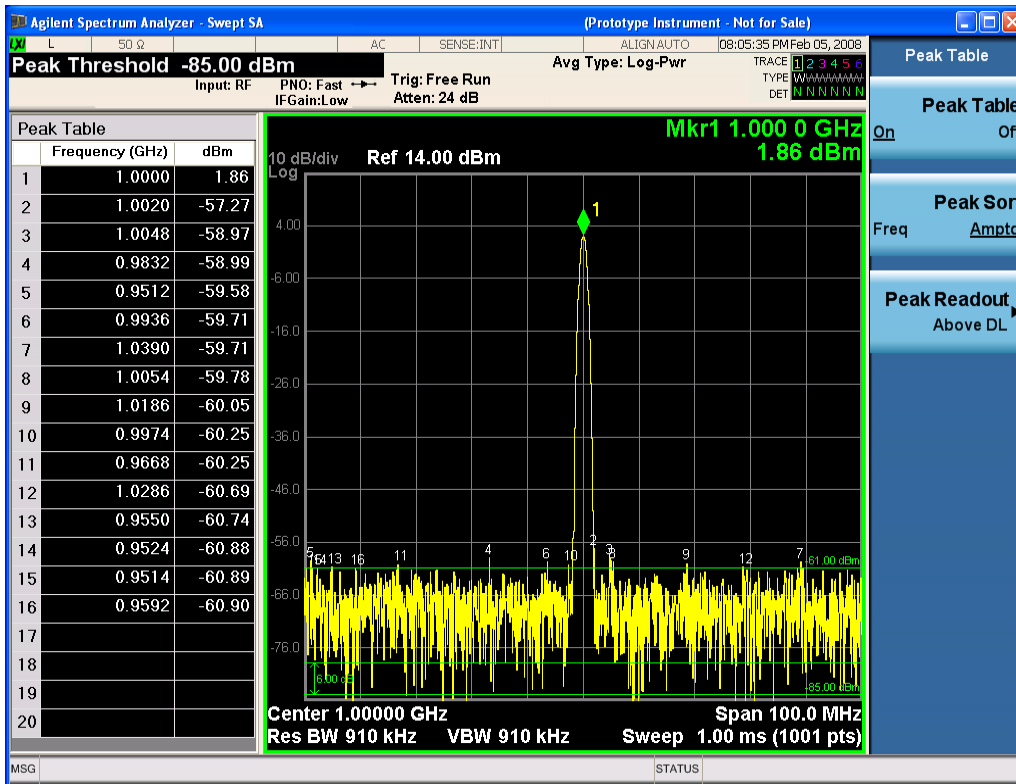
The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

### Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On



Display Line	-61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	-57.27
3	1.0048E+06	-58.97
4	9.8320E+05	-58.99
5	9.5120E+05	-59.58
6	9.9360E+05	-59.71
7	1.0390E+06	-59.71
8	1.0054E+06	-59.78
9	1.1086E+06	-60.05
10	9.9740E+05	-60.25
11	9.6680E+05	-60.25
12	1.0286E+06	-60.69
13	9.5500E+05	-60.74
14	9.5240E+05	-60.88
15	9.5140E+05	-60.89
16	9.5920E+05	-60.90
17		
18		
19		
20		

## Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

**NOTE**

The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:



For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a different time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 seconds after the Spectrogram started (trace 10 has a start time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

<b>Result Type</b>	<b>Spectrogram</b>
MeasResult	
Swept SA	
A.11.00.01	N9020A
503 508 513 526 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	-76.34749519
5999984440	-77.28097006
5999984465	-75.32317869
5999984490	-73.64417681
5999984515	-72.67154604

o  
o  
o

6000009315	-77.94423277
6000009340	-79.51829697
6000009365	-78.46108961
6000009390	-78.46108957
6000009415	-76.59570596
DATA2	4.708697055

5999984415	-80.98197882
5999984440	-80.98197879
5999984465	-75.83142132
5999984490	-74.02712079
5999984515	-73.57213005

- 
- 
- 

6000009315	-75.9183103
6000009340	-79.53787488
6000009365	-78.82602191
6000009390	-78.82602188
6000009415	-76.37486709
DATA10	0
5999984415	-75.56751112
5999984440	-75.76485645
5999984465	-76.67718717
5999984490	-78.79238489
5999984515	-83.72680212

- 
- 
- 

6000009315	-71.3942461
6000009340	-72.28308332
6000009365	-73.92684489
6000009390	-75.45548832
6000009415	-75.17904815

### Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\`<mode name>`\data\traces

For all of the Limit Data Files:

My Documents\`<mode name>`\data\limits

For all of the Measurement Results Data Files:

My Documents\`<mode name>`\data\`<measurement name>`\results

For all of the Capture Buffer Data Files:

My Documents\`<mode name>`\data\captureBuffer

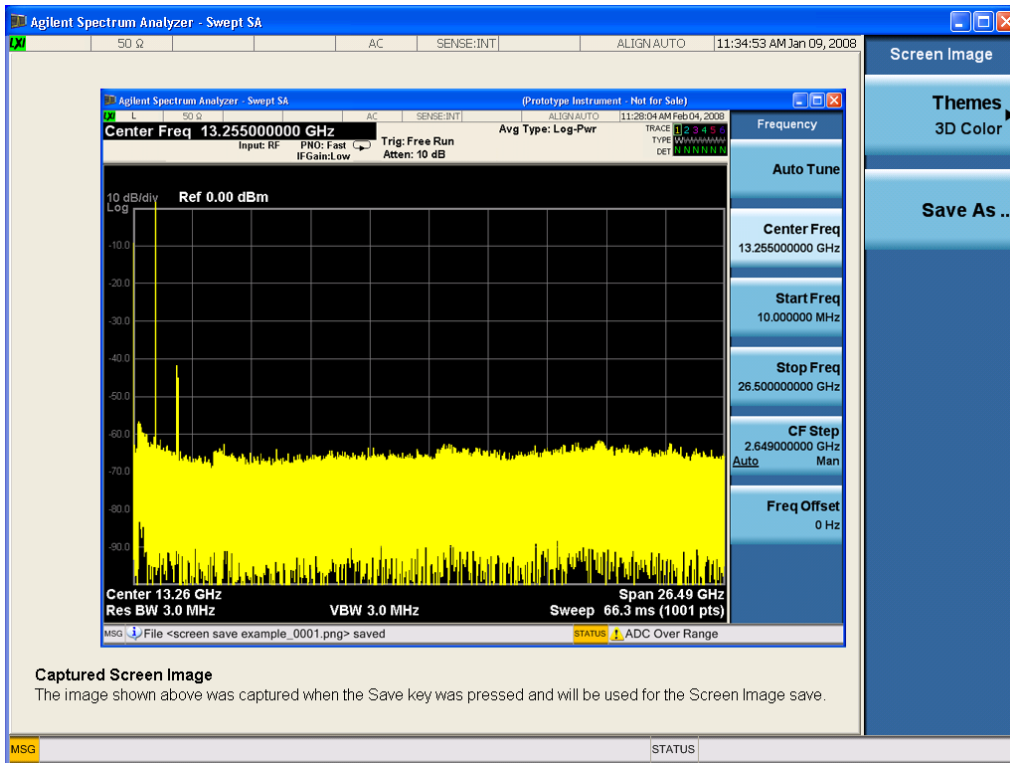
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <code>&lt;mode specific&gt;</code> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

## Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the Save front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the Save As menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the Save menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the Quick Save front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

**NOTE**

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReem <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

**Themes**

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReem:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReem:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

<b>Key Path</b>	Save, Screen Image, Themes
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<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

## Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing Single does a Resume.

See ["More Information" on page 770](#)

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	<p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA &amp; PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p>
Initial S/W Revision	Prior to A.02.00

### More Information

See ["Restart" on page 1627](#) for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the Single key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the Single key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the Single key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

## Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key
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## RF Output

This parameter sets the source RF power output state.

Key Path	Source
<b>Remote Command</b>	:OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]?
<b>Example</b>	OUTP OFF OUTP?
<b>Notes</b>	<p>The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p>
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
<b>Notes</b>	<p>The sub-menu under this button is for independent mode and has no effect on <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set <a href="#">"Sequencer" on page 1726</a> to Off will make source leave list sequencer and this button will be black out.</p>
Initial S/W Revision	A.05.00

## RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the "[RF Power Range](#) " on page 773 table below for the valid ranges.

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
Example	:SOUR:POW -100 dBm
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the " <a href="#">RF Power Range</a> " on page 773 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the " <a href="#">RF Power Range</a> " on page 773 table below for the valid ranges.
Initial S/W Revision	A.05.00

## RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz ≤ f ≤ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

## Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

### NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the " <a href="#">List Sequencer</a> " on page 1725 is turned ON.
Initial S/W Revision	A.05.00

## Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1648](#)

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe?
<b>Example</b>	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the <a href="#">"List Sequencer" on page 1725</a> is turned ON.
Couplings	This value is coupled to the <a href="#">"Set Reference Power " on page 1648</a> key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

## Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
<b>Example</b>	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

## Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
<b>Remote Command</b>	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
<b>Example</b>	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on page 1725. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on

[page 1725](#). If the "[Sequencer](#)" on [page 1726](#) is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.

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Initial S/W Revision      A.05.00

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## Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]?
Example	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present, the frequency range should be limited to: 1.1GHz–1.7GHz, 2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called "Settings conflict; Frequency is outside available range".
Initial S/W Revision	A.05.00

## Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: "[GSM/EDGE Channel Number Ranges](#)" on [page 777](#), "[W-CDMA Channel Number Ranges](#)" on [page 778](#), "[CDMA 2000 / 1xEVDO Channel Number Ranges](#)" on [page 779](#), and "[LTE FDD Channel Number Ranges](#)" on [page 781](#).



Key Path	Source, Frequency
<b>Remote Command</b>	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
<b>Example</b>	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1660 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
Initial S/W Revision	A.05.00

### GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 850	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
GSM 700	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
T-GSM810	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

### W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
Band III	Downlink	$350 \leq n \leq 425$	$n \div 5$
	Downlink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
Band IV	Uplink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
	Downlink	$537 \leq n \leq 1738$	$n \div 5 + 1805$
Band V	Downlink	$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
		Uplink	$1312 \leq n \leq 1513$
	Downlink	$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
Band VI	Downlink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
		$4357 \leq n \leq 4458$	$n \div 5$
	Uplink	$782 \leq n \leq 862$	$n \div 5 + 670.1$
Band VII	Downlink	$4132 \leq n \leq 4233$	$n \div 5$
		Downlink	$1037 \leq n \leq 1062$
	Uplink	$4387 \leq n \leq 4413$	$n \div 5$
Band VIII	Downlink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
		$4162 \leq n \leq 4188$	$n \div 5$
	Downlink	$2237 \leq n \leq 2563$	$n \div 5 + 2175$
Band IX	Downlink	$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
		Uplink	$2012 \leq n \leq 2338$
Band X	Downlink	$2362 \leq n \leq 2687$	$n \div 5 + 2030.1$
		Downlink	$2937 \leq n \leq 3088$
	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

### CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
AWS	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
US 2.5 GHz	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
700 Public Safety	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
C2K Lower 700	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
400 Euro PAMR	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
	Uplink (MS, reverse link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
	Downlink (BS, forward link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

### LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
1		2110	0	0 - 599	1920	18000 - 18599
2		1930	600	600 - 1199	1850	18600 - 19199
3		1805	1200	1200 - 1949	1710	19200 - 19949
4		2110	1950	1950 - 2399	1710	19950 - 20399
5		869	2400	2400 - 2649	824	20400 - 20649
6		875	2650	2650 - 2749	830	20650 - 20749
7		2620	2750	2750 - 3449	2500	20750 - 20449
8		925	3450	3450 - 3799	880	21450 - 21799
9		1844.9	3800	3800 - 4149	1749.9	21800 - 22149
10		2110	4150	4150 - 4749	1710	22150 - 22749
11		1475.9	4750	4750 - 4949	1427.9	22750 - 22949
12		729	5010	5010 - 5179	699	23010 - 23179
13		746	5180	5180 - 5279	777	23180 - 23279
14		758	5280	5280 - 5379	788	23280 - 23379
...						
17		734	5730	5730 - 5849	704	23730 - 23849
18		860	5850	5850 - 5999	815	23850 - 23999
19		875	6000	6000 - 6149	830	24000 - 24149
20		791	6150	6150 - 6449	832	24150 - 24449
21		1495.9	6450	6450 - 6599	1447.9	24450 - 24599
...						
24		1525	7700	7700 - 8039	1626.5	25700 - 26039
25		1930	8040	8040 - 8689	1850	26040 - 26689
26		859	8690	8690 - 9039	814	26690 - 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

## LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
33		1900	36000	36000 - 36199	1900	36000 - 36199
34		2010	36200	36200 - 36349	2010	36200 - 36349
35		1850	36350	36350 - 36949	1850	36350 - 36949
36		1930	36950	36950 - 37549	1930	36950 - 37549
37		1910	37550	37550 - 37749	1910	37550 - 37749
38		2570	37750	37750 - 38249	2570	37750 - 38249
39		1880	38250	38250 - 38649	1880	38250 - 38649
40		2300	38650	38650 - 39649	2300	38650 - 39649
41		2496	39650	39650 - 41589	2496	39650 - 41589
42		3400	41590	41590 - 43589	3400	41590 - 43589
43		3600	43590	43590 - 45589	3600	43590 - 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

## TDSCDMA Channel Number Ranges

### 1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio  
Frequency Channel Number 1.28  
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

## Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00



## Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:FREQuency:CHANnels:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38   BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF  :SOURce:FREQuency:CHANnels:BAND?
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PGSM
<b>Notes</b>	Set this setting to "NONE" will grey out "Channel" on page 1651 Channel
Initial S/W Revision	A.05.00

### None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

### E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

### R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

### DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

### PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

### GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

**GSM 480**

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

**GSM 850**

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

**GSM 700**

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

**T-GSM 810**

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

**WCDMA**

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

**Band I**

Selects Band I as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

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#### Band II

Selects Band II as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

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#### Band III

Selects Band III as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

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#### Band IV

Selects Band IV as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

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#### Band V

Selects Band V as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

---

#### Band VI

Selects Band VI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

**Band VII**

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

**Band VIII**

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

**Band IX**

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

**Band X**

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

**Band XI**

Selects Band XI as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

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#### Band XII

Selects Band XII as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

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#### Band XIII

Selects band XIII as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

---

#### Band XIV

Selects Band XIV as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

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#### Band XIX

Selects Band XIX as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIX
Initial S/W Revision	A.14.50

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#### CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1xEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### US CELL

Selects US Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

### US PCS

Selects US PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

### Japan Cell

Selects Japan Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

### Korean PCS

Selects Korean PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

### NMT 450

Selects NMT 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

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#### IMT 2000

Selects IMT 2000 as the active channel band.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

---

#### Upper 700

Selects Upper 700 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

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#### Secondary 800

Selects Secondary 800 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

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#### 400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

---

#### 800 PAMR

Selects 800 PAMR as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

### 2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

### AWS

Selects AWS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

### US 2.5GHz

Selects US 2.5 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

### 700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

---

### C2K Lower 700

Selects C2K Lower 700 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

---

### LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

---

### BAND 1

Selects BAND 1 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

---

### BAND 2

Selects BAND 2 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

---

### BAND 3

Selects BAND 3 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

---

**BAND 4**

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

**BAND 5**

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

**BAND 6**

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

**BAND 7**

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

**BAND 8**

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

### BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

### BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

### BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

### BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

### BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

**BAND 14**

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

**BAND 18**

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

**BAND 19**

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

**BAND 20**

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

### BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

### BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

### BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

### BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

### BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

**BAND 28**

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

**BAND 31**

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

**LTE TDD**

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND 33**

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

**BAND 34**

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

**BAND 35**

Selects BAND 35 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

---

#### BAND 36

Selects BAND 36 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

---

#### BAND 37

Selects BAND 37 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

---

#### BAND 38

Selects BAND 38 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

---

#### BAND 39

Selects BAND 39 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

---

#### BAND 40

Selects BAND 40 as the band for the current step.



Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

**BAND 41**

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

**BAND 42**

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

**BAND 43**

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

**BAND 44**

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

**TDSCDMA**

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

---

#### BAND A

Selects BAND A as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

---

#### BAND B

Selects BAND B as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

---

#### BAND C

Selects BAND C as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

---

#### BAND D

Selects BAND D as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

---

#### BAND E

Selects BAND E as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
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---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

**BAND F**

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

**Radio Band Link**

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
<b>Example</b>	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN   UP
<b>Backwards Compatibility SCPI</b>	:SOURce:RADio:DEVice BTS MS :SOURce:RADio:DEVice?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

**Set Reference Frequency**

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

**NOTE**

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFerence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

### Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} + \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1678](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz

	:SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq>

	:SOURce:FREQuency:OFFSet?
<b>Example</b>	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

## Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1681, "AM" on page 1722, "FM" on page 1723, and "PM" on page 1724.

Key Path	Source
Initial S/W Revision	A.05.00

## ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a "MOD" annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]?
<b>Example</b>	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1726 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1726 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately.

The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. “-

When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	<p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and</p>

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none of the waveform segments is loaded.

If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.

If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.

If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

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Key Path	Source, Modulation Setup, ARB, Select Waveform
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Initial S/W Revision	A.05.00
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### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
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<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; - specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms,</p>

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when the ARB memory is full, the copy ceases, and an error is generated.  
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.  
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

---

Initial S/W Revision      A.05.00

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

---

Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

---

Notes                          No remote command, SCPI front panel only.

---

Initial S/W Revision      A.05.00

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### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

---

Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

---

**Remote Command**        :SOURce:RADio:ARB:DEFault:DIRectory <string>  
                                  :SOURce:RADio:ARB: DEFault:DIRectory?

---

**Example**                    :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"  
                                  :SOUR:RAD:ARB:DEF:DIR?

---

State Saved                  Persistent, survives a power cycle and a preset but not saved in the instrument state

---

Initial S/W Revision      A.05.00

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### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

---

Key Path                      Source, Modulation Setup, ARB, Select Waveform

---

Initial S/W Revision      A.05.00

---

## Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

## Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

**NOTE**

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use **"Query ARB Memory Full File List (Remote Command Only)" on page 1687.**

---

<b>Remote Command</b>	:SOURce:RADio:ARB:CATalog?
<b>Example</b>	:SOUR:RAD:ARB:CATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
<b>Initial S/W Revision</b>	A.05.00

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### Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

---

<b>Remote Command</b>	:SOURce:RADio:ARB:FCATalog?
<b>Example</b>	:SOUR:RAD:ARB:FCATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
<b>Initial S/W Revision</b>	A.09.00

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### ARB Setup

Allows access to the ARB setup sub-menus.

---

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Initial S/W Revision</b>	A.05.00

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### Sample Rate

Allows you to set the ARB waveform playback sample rate.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

### Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example	:SOUR:RAD:ARB:RSC 100.00
Notes	This setting cannot be set in E6640A. Grey out on menu and the value is fixed at 70.00%.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

### Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

<b>Key Path</b>	Source, Modulation Setup, ARB, ARB Setup
<b>Remote Command</b>	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
<b>Example</b>	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	0.00 Hz
<b>Min</b>	-50.00 MHz
<b>Max</b>	50.00 MHz
<b>Initial S/W Revision</b>	A.05.00

### Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous   SINGLE   SADVance GATE :SOURce:RADio:ARB:TRIGger:TYPE?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
<b>Notes</b>	Gated trigger type will be implemented at a later release
<b>Preset</b>	CONTInuous
<b>Range</b>	Continuous   Single   Seg Adv   Gated
<b>Initial S/W Revision</b>	A.05.00

### Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE   TRIGger   RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
<b>Preset</b>	FREE

Range	Free Run   Trigger + Run   Reset + Run
Initial S/W Revision	A.05.00

### Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

### Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

### Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

### Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate

	:SOURce:RADio:ARB:RETRigger?
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger   Buffered Trigger   Restart on Trigger
Initial S/W Revision	A.05.00

### No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

### Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

### Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00



## Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] Single   CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Preset</b>	CONTInuous
<b>Range</b>	Single   Continuous
<b>Initial S/W Revision</b>	A.05.00

## Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Initial S/W Revision</b>	A.05.00

## Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
<b>Initial S/W Revision</b>	A.05.00

### Trigger Source

Allows access to the trigger source sub-menus. The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTernal2
Range	Trigger Key   Bus   External 2
Initial S/W Revision	A.05.00

### Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

### Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

### External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

### Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

### Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even if required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>

<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
<b>Initial S/W Revision</b>	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Notes</b>	No remote command, SCPIfront panel only.
<b>Initial S/W Revision</b>	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
<b>State Saved</b>	Persistent, survives a power cycle and a preset but not saved in the instrument state
<b>Initial S/W Revision</b>	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe:ALL
<b>Example</b>	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p>

---

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

---

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
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Initial S/W Revision	Prior to A.09.00
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### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

---

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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---

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

---

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
----------	---

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Initial S/W Revision	Prior to A.09.00
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### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

---

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
----------	---

---

Initial S/W Revision	Prior to A.09.00
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### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

---

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
----------	---

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Initial S/W Revision	Prior to A.09.00
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### Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1755](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1687](#).

Initial S/W Revision	Prior to A.09.00
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### Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

### Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

### Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

### Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected
----------	--

	Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

#### Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

#### Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

#### Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

#### Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1694](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) “NVWFM” or use a real full path representation. See the example below. MSUS “NVWFM” is mapped to D:\VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

---

**Remote Command**     :SOURce:RADio:ARB:SEQuence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below "[For Setup SCPI](#)" on page 828 "[For Setup SCPI](#)".)

:SOURce:RADio:ARB:SEQuence[:MWAVeform]? <filename>

(For additional description of each item, see Notes "[For Query SCPI](#)" on page 829 below.)

---

**Example**     For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D: VARB\wfmSegment2.wfm", 20, M1 M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

---

**Notes**     For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

---

---

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

---

#### Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

### For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",
```

```
<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",
```

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.

If the waveform sequence file name is empty, an error is generated.

If the specified waveform sequence file cannot be found, an error is generated.

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Initial S/W Revision

A.05.00

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### Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Notes	If access multi-pack license sub-menu from modules other than "TRX1", an advisory message like "Please goto "TRX1" to operate multi-pack license" will display.
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

## Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

## Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string>
<b>Example</b>	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

## Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;“NVWFM” MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p>



case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

**Key Path** Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

**Remote Command** :SOURce:RADio:ARB:LOAD:ALL <string>

**Example** :SOUR:RAD:ARB:LOAD:ALL "D: varb"

**Notes**

- <string> - specifies the directory on the HDD to load the files into ARB memory from.
- When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.
- When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
- If you specify a directory over SCPI, but the directory does not exist, an error is generated.
- If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

**Key Path** Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

**Notes** No remote command, SCPIfront panel only.

Initial S/W Revision A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

### Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Agilent signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int>
Example	SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

#### Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision	A.05.00

### Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
<b>Example</b>	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
<b>Range</b>	"Locked"   "Available"   "Trail"   "LockRequired"   "Nonexistent"
<b>Initial S/W Revision</b>	A.05.00

### Slots Free Query (Remote Command Only)

Returns the number of license slots free.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LICense[:FPACK]:WAVeform:FREE?
<b>Example</b>	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
<b>Initial S/W Revision</b>	A.05.00

### Slot Used Query (Remote Command Only)

Returns the number of license slots used.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LICense[:FPACK]:WAVeform:USED?
<b>Example</b>	:SYST:LKEY:WAV:USED?

---

	or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

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### Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:NAME? <int>  or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>
<b>Example</b>	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm"  or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.  If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

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### Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:UID? <int>  or :SYSTem:LIcense[:FPACK]:WAVeform:UID? <int>
<b>Example</b>	:SYST:LKEY:WAV:UID? 2 <"1346752140"  or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.

---

	If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

#### Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

#### Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136", "3812603511", "3710986266"
<b>Notes</b>	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

#### Marker Utilities

Allows access to the marker utilities sub-menus.

<b>Key Path</b>	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

#### Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00



### Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated

	waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?
Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

### Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:PULSe NONE   M1   M2   M3   M4 :SOURce:RADio:ARB:MDEStination:PULSe?
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Range</b>	None   M1   M2   M3   M4
<b>Initial S/W Revision</b>	A.05.00

#### None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Initial S/W Revision</b>	A.05.00

#### Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
<b>Initial S/W Revision</b>	A.05.00

#### Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
<b>Initial S/W Revision</b>	A.05.00

### Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
<b>Example</b>	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None   M1   M2   M3   M4
Initial S/W Revision	A.05.00

### None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

### Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

### Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

### Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

<b>Key Path</b>	Source, Modulation Setup, ARB, Header Utilities
<b>Remote Command</b>	:SOURce:RADio:ARB:HEADer:CLEar
<b>Example</b>	:SOUR:RAD:ARB:HEAD:CLE
<b>Notes</b>	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
<b>Initial S/W Revision</b>	A.05.00

### Save Setup To Header

Allows you to save new file header information details to the file.

<b>Key Path</b>	Source, Modulation Setup, ARB, Header Utilities
<b>Remote Command</b>	:SOURce:RADio:ARB:HEADer:SAVE
<b>Example</b>	:SOUR:RAD:ARB:HEAD:SAVE
<b>Notes</b>	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
<b>Initial S/W Revision</b>	A.05.00

### Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

<b>Remote Command</b>	:MMEMory:HEADer:ID? "<file name>"
<b>Example</b>	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
<b>Notes</b>	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk.  If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
<b>Initial S/W Revision</b>	A.09.00

## Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:INITiate
<b>Example</b>	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

## AM

Allows access to the menu for configuring the Amplitude Modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

## AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:STATe :SOURce:AM:STATe?
<b>Example</b>	:SOUR:AM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## AM Depth

Allows you to set the amplitude modulation depth in percent.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]?
<b>Example</b>	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

## AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
<b>Example</b>	:SOUR:AM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

## FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:STATe :SOURce:FM:STATe?
<b>Example</b>	:SOUR:FM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
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<b>Remote Command</b>	:SOURce:FM[:DEVIation] :SOURce:FM[:DEVIation]?
<b>Example</b>	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

### FM Rate

Allows you to set the internal frequency modulation rate.

<b>Key Path</b>	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
<b>Example</b>	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### PM

Allows access to the menu for configuring the phase modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:STATe :SOURce:PM:STATe?
<b>Example</b>	:SOUR:PM:STAT OFF

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]?
<b>Example</b>	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

### PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
<b>Example</b>	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a

tabular form. The details of the SCPI for configuring the list sequencer can be found in "[Step Configuration \(Remote Command Only\)](#)" on page 1759.

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

## Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated

	and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " <a href="#">Query List Sequence Initiation Armed Status (Remote Command Only)</a> " on <a href="#">page 1770</a> Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

## List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer
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## Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
<b>Example</b>	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

## Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
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Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

### Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of 1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

### Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

### Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

### Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE   INTERNAL   EXTERNAL2   KEY   BUS   EXTERNAL4  :SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run   Internal   Manual (Trigger Key)   Bus   External 2  EXTERNAL4
Initial S/W Revision	A.05.00

### Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

## Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

## External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

## Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 $\mu$ s
Amplitude	100 $\mu$ s to within 0.1 dB 20 $\mu$ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME?
<b>Example</b>	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?
<b>Notes</b>	SCPI is supported after A.09.40
<b>Preset</b>	1.0 ms
<b>Min</b>	0.0 ms
<b>Max</b>	4.0 ks
<b>Initial S/W Revision</b>	A.05.00

## Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup
<b>Notes</b>	No remote command, front panel only.
<b>Initial S/W Revision</b>	A.05.00

## Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   NONE   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38



BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BAND44 | BANDA | BANDB |  
BANDC | BANDD | BANDE | BANDF

:SOURce:LIST:STEP[1]|2|3...1000:SETup: RADio:BAND?

**Example** :SOUR:LIST:STEP2:SET:RAD:BAND PGSM  
:SOUR:LIST:STEP2:SET:RAD:BAND?

**Notes** SCPI is supported after A.09.40

**Initial S/W Revision** A.05.00

### None

Selects no radio standard for use on the current step.

**Key Path** Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard

**Example** :SOUR:LIST:STEP2:SET:RAD:BAND NONE

**Notes** SCPI is supported after A.09.40

**Initial S/W Revision** A.05.00

### GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

**Key Path** Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard

**Initial S/W Revision** A.05.00

### P-GSM

Selects P-GSM as the band for the current step.

**Key Path** Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE

**Initial S/W Revision** A.05.00

### E-GSM

Selects E-GSM as the band for the current step.

**Key Path** Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE

**Initial S/W Revision** A.05.00

### R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**GSM 700**

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**T-GSM 810**

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**WCDMA**

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

**Band I**

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band II**

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band III**

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band X**

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XI**

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XII**

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIII**

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIV**

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIX**

Selects Band XIX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.14.50

### CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**IMT 2000**

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**Upper 700**

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**Secondary 800**

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**400 Euro PAMR**

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**800 PAMR**

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**2.5GHz IMT EXT**

Selects 2.5 GHz IMT EXT as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### AWS

Selects AWS as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### 700 Public Safety

Selects 700 Public Safety as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---



**LTE**

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

**BAND 1**

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 2**

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 3**

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 4**

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 5**

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 12**

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 13**

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 14**

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 18**

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 19**

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

#### BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**BAND 28**

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**BAND 31**

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**LTE TDD**

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND 33**

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

**BAND 34**

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

**BAND 35**

Selects BAND 35 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

---

#### BAND 36

Selects BAND 36 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

---

#### BAND 37

Selects BAND 37 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

---

#### BAND 38

Selects BAND 38 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

---

#### BAND 39

Selects BAND 39 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

---

#### BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

**BAND 41**

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

**BAND 42**

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

**BAND 43**

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

**BAND 44**

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

**TDSCDMA**

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

---

#### BAND A

Selects BAND A as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

---

#### BAND B

Selects BAND B as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

---

#### BAND C

Selects BAND C as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

---

#### BAND D

Selects BAND D as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

---

#### BAND E

Selects BAND E as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
----------	---

---



<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

**BAND F**

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

**Radio Band Link**

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN   UP
Initial S/W Revision	A.05.00

**Channel**

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRrequency <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRrequency?
<b>Example</b>	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

## Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the “Source Unleveled” indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

## Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes “Off”   “CW”   “Cont”   “waveform name”

Preset	CW
Range	Waveform   Continue Previous   CW   Off
Initial S/W Revision	A.05.00

### CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list sequence will automatically apply header settings of the selected waveform in that step.
Initial S/W Revision	A.05.00

### Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <“NVWFM” MSUS + colon + filename>.

When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.

When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .

If you specify a file over SCPI, but the file is not at the specified location, an error is generated.

If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.

If you try to load a Signal Studio waveform “\*.wfm” which contains invalid waveform header, an error is generated.

If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

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Initial S/W Revision      A.05.00

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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB

memory is rejected with an error.

When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.

It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.

It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.

When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00
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### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>

Initial S/W Revision	A.05.00
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### Segments on Hard Disk

This key functions the same as "[Segments on Hard Disk](#)" on page 1752.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00



**Load Segment To ARB Memory**

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Load All To ARB Memory**

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Change Directory ...**

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Default Directory ...**

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

**Segments in ARB Memory**

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

**Delete Segment From ARB Memory**

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 1755.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME   COUNT   CONTInuous   CABort  :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query <b>Error! Reference source not found.</b> Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time   Play Count   Continuous   Continuous Abort
Initial S/W Revision	A.05.00

### Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found**. List Sequence Step Validation.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT?
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
<b>Notes</b>	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
<b>Notes</b>	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
<b>Preset</b>	1.00 ms
<b>Min</b>	100 μs
<b>Max</b>	1800 s
<b>Initial S/W Revision</b>	A.05.00

### Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
<b>Notes</b>	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
<b>Initial S/W Revision</b>	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON   OFF   1   0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
<b>Example</b>	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

### Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE   INTernal   KEY
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```

BUS | EXTernal2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900
| TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX
| BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS |
JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11
| BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21
| BAND24 | BAND25 | BAND26 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37
| BAND38 | BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BANDA | BANDB |
BANDC | BANDD | BANDE | BANDF, DOWN | UP, <freq>, <ampl>, <string>,
TIME | COUNT | CONTinuous, <time>, ON | OFF | 1 | 0, [<int>],

:SOURce:LIST:STEP[1]|2|...|4..1000:SETup?

```

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**Example** :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM\_Test1.bin", TIME, 10ms, OFF, 255

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**Notes**

The parameters are:

(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)

1. Step Trigger **<enum>** – specifies the input trigger for the step. For details of the valid types of step trigger see ["Step Trigger" on page 1728](#).
  2. Transition Time **<time>** – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see ["Transition Time" on page 1730](#).
  3. Radio Band **<enum>** – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1731](#).
  4. Radio Band Link **<enum>** – specifies the radio band link direction for the step. For details of the valid link types, see ["Radio Band Link" on page 1748](#).
  5. Frequency/Channel Number **<freq>/<chan num>** – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see ["Channel" on page 1748](#) and ["Frequency" on page 1749](#).
  6. Power **<ampl>** – specifies the output power for the step in dBm. For details of the valid ranges see ["Power" on page 1749](#).
  7. Waveform **<string>** – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:
    - <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.
    - CONT – continues playback of the ARB file from the previous step
    - CW – outputs a CW tone
    - OFF – disable RF output
  8. Step Duration **<enum>** – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see ["Step](#)
-

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	<p><b>Duration" on page 1757.</b></p> <p>9. Time or Count &lt;time/int&gt; – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, "<b>Time" on page 1757</b> and "<b>Play Count" on page 1758.</b></p> <p>10. Output Trigger &lt;Boolean&gt; – specifies the output trigger for the step. For details of the ranges for this setting see "<b>Output Trigger" on page 1759.</b></p>
Dependencies	<p>The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see "<b>Number of Steps" on page 1727.</b></p> <p>If you attempt to remotely set or query a subopcode that is out of range, an error is generated.</p>
Initial S/W Revision	A.05.00

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### Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Step Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "**Number of Steps" on page 1727** Number of Steps. As a step is setup, the value entered run through several levels of validation.

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<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:INPut:TRIGger &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:INPut:TRIGger?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?</pre>
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Trigger &lt;enum&gt; – specifies the input trigger for the step. For details of the valid types of step trigger see "<b>Step Trigger" on page 1728.</b></p> <p>If input parameter number exceeds the step number defined by "<b>Number of Steps" on page 1727</b> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Remote Command Notes	IMMEDIATE INTERNAL KEY BUS EXTERNAL2
Dependencies	<p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "<b>Number of Steps" on page 1727.</b></p>
Initial S/W Revision	A.09.40

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### Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "**Number of Steps" on page 1727** Number of Steps. As a step is setup, the value entered run through several levels of validation.

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<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TRANSition:TIME &lt;time&gt;, &lt;time&gt;, &lt;time&gt;, ... :SOURce:LIST:SETup:TRANSition:TIME?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms</pre>

---

	:SOUR:LIST:SET:TRAN:TIME?
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Transition Time &lt;time&gt; – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see <a href="#">"Transition Time" on page 1730</a></p> <p>If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>R</b>	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...
<b>e</b>	:SOURce:LIST:SETup:RADio:BAND?
<b>m</b>	
<b>o</b>	
<b>t</b>	
<b>e</b>	
<b>C</b>	
<b>o</b>	
<b>m</b>	
<b>m</b>	
<b>a</b>	
<b>n</b>	
<b>d</b>	
<b>E</b>	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM
<b>X</b>	:SOUR:LIST:SET:RAD:BAND?
<b>a</b>	
<b>m</b>	
<b>p</b>	
<b>l</b>	
<b>e</b>	
<b>N</b>	The command is to setup below parameter array of whole list sequence.
<b>O</b>	Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see <a href="#">"Radio Setup" on page 1731</a> .
<b>t</b>	If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then
<b>e</b>	generate error ", and only those parameters whose index number falls in number of steps will be updated.
<b>s</b>	
<b>R</b>	NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI
<b>e</b>	V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO
<b>m</b>	REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1 DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1
	BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1

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o 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN  
t D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF  
e

C  
o  
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m  
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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "[Number of Steps](#)" on  
e [page 1727](#).

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## Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see <a href="#">"Radio Band Link" on page 1748</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
<b>Remote Command Notes</b>	DOWN UP
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
<b>Initial S/W Revision</b>	A.09.40

## Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:CNFRequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRequency?
<b>Example</b>	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see <a href="#">"Channel" on page 1748</a> and <a href="#">"Frequency" on page 1749</a> This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

#### Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?
<b>Example</b>	:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see <a href="#">"Power" on page 1749</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

#### Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:WAVeform <string>, <string>, <string>, ... :SOURce:LIST:SETup:WAVeform?
<b>Example</b>	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:  <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

	<p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "<a href="#">Number of Steps</a>" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
Range	"filename"   "CW"   "Off"   "CONT"
Initial S/W Revision	A.09.40

#### Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:DURation:TYPE &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:DURation:TYPE?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?</pre>
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration &lt;enum&gt; – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "<a href="#">Step Duration</a>" on page 1757.</p> <p>If input parameter number exceeds the step number defined by "<a href="#">Number of Steps</a>" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Remote Command Notes	TIME   COUNT   CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
Initial S/W Revision	A.09.40

#### Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure "Duration Time" or "Play Count" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TOCount &lt;time/int&gt;, &lt;time/int&gt;, &lt;time/int&gt;, ... :SOURce:LIST:SETup:TOCount?</pre>
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<b>Example</b>	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, " <a href="#">Time</a> " on page 1757 and " <a href="#">Play Count</a> " on page 1758. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current " <a href="#">Step Duration</a> " on page 1757 is "Continuous", then generate error -221,"Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

#### Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Output Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
<b>Example</b>	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see " <a href="#">Output Trigger</a> " on page 1759. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
<b>Remote Command Notes</b>	ON OFF 1 0
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

#### Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI featuredescribed in.

<b>Remote Command</b>	:SOURce:LIST:SETup:CLEar
<b>Example</b>	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

## Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

<b>Key Path</b>	Source, List Sequencer
<b>Remote Command</b>	:SOURce:LIST:TRIGgerout:TYPe BEGinningofstep DATamarker
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

## BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
<b>Remote Command</b>	No remote command, front panel only.
Initial S/W Revision	A.05.00

## Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to "Bus". Sending this command will trigger the step and continue the sequence.

<b>Remote Command</b>	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
<b>Example</b>	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

## Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

<b>Remote Command</b>	:SOURce:LIST:INITiation:ARMed?
<b>Example</b>	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see <a href="#">"Initiate Sequence" on page 1726</a> Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately.
Notes	There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?".
Initial S/W Revision	A.09.40

## Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
<b>Remote Command</b>	:SOURce:PRESet
<b>Example</b>	:SOUR:PRES

## SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00



## Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing Restart, Single or Cont does a Resume.

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

### Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

<b>Remote Command</b>	:ABORt
<b>Example</b>	:ABOR

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Notes	<p>If :INITiate:CONTInuous is ON, then a new continuous measurement will start immediately, with sweep (data acquisition) occurring once the trigger condition has been met.</p> <p>If :INITiate:CONTInuous is OFF, then :INITiate:IMMEDIATE is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.</p>
Dependencies	<p>For continuous measurement, ABORt is equivalent to the Restart key.</p> <p>Not all measurements support the abort command.</p>
Status Bits/OPC dependencies	<p>The STATus:OPERation register bits 0 through 8 are cleared.</p> <p>The STATus:QUEStionable register bit 9 (INTegrity sum) is cleared.</p> <p>Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.</p>
Initial S/W Revision	Prior to A.02.00

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## System

See "System" on page 222

## Trace/Detector

Accesses a menu that enables you to view or hide Max Hold Trace and Min Hold Trace.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Max Hold Trace

This key allows you to view or hide Max Hold Trace on the Mag Error/Phase Error/EVM window in I/Q Error view. Max Hold Traces will be held during the averaging cycle.

Key Path	Trace/Detector
Mode	GSM
<b>Remote Command</b>	:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe] ON   OFF   1   0 :DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MAXHold[:STATe] ?
<b>Example</b>	DISP:EEVM:VIEW2:WIND:TRAC:MAXH ON DISP:EEVM:VIEW2:WIND:TRAC:MAXH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	A.02.00

### Min Hold Trace

This key allows you to view or hide Min Hold Trace on the Mag Error/Phase Error/EVM window in I/Q Error view. Min Hold Traces will be held during the averaging cycle.

Key Path	Trace/Detector
Mode	GSM
<b>Remote Command</b>	:DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe] ON   OFF   1   0 :DISPlay:EEVM:VIEW2:WINDow[1]:TRACe:MINHold[:STATe] ?
<b>Example</b>	DISP:EEVM:VIEW2:WIND:TRAC:MINH ON DISP:EEVM:VIEW2:WIND:TRAC:MINH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF

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State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	A.02.00

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## Trigger

See ["Trigger" on page 278](#)

### Free Run

See ["Free Run " on page 285](#)

### Video

See ["Video \(IF Envelope\) " on page 286](#)

### Trigger Level

See ["Trigger Level " on page 286](#)

### Trig Slope

See ["Trig Slope " on page 287](#)

### Trig Delay

See ["Trig Delay " on page 288](#)

### External 1

See ["External 1 " on page 304](#)

### Trigger Level

See ["Trigger Level " on page 304](#)

### Trig Slope

See ["Trig Slope " on page 305](#)

### Trig Delay

See ["Trig Delay " on page 291](#)

### Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 292](#)

### External 2

See ["External 2 " on page 306](#)

### Trigger Level

See ["Trigger Level " on page 306](#)

### Trig Slope

See ["Trig Slope " on page 307](#)

### **Trig Delay**

See ["Trig Delay "](#) on page 294

### **Zero Span Delay Comp**

See ["Zero Span Delay Comp On/Off"](#) on page 294

### **RF Burst**

See ["RF Burst "](#) on page 307

### **Absolute Trigger**

See ["Absolute Trigger Level"](#) on page 308

### **Relative Trigger**

See ["Relative Trigger Level"](#) on page 297

### **Trig Slope**

See ["Trigger Slope "](#) on page 309

### **Trig Delay**

See ["Trig Delay "](#) on page 298

### **Periodic Timer**

See ["Periodic Timer \(Frame Trigger\) "](#) on page 299

### **Period**

See ["Period "](#) on page 300

### **Offset**

See ["Offset "](#) on page 301

### **Offset Adjust (Remote Command Only)**

See ["Offset Adjust \(Remote Command Only\)"](#) on page 302

### **Reset Offset Display**

See ["Reset Offset Display "](#) on page 303

### **Sync Source**

See ["Sync Source "](#) on page 303

### **Off**

See ["Off "](#) on page 304

### **External 1**

See "[External 1](#) " on page 304

#### **Trigger Level**

See "[Trigger Level](#) " on page 304

#### **Trig Slope**

See "[Trig Slope](#) " on page 305

### **External 2**

See "[External 2](#) " on page 306

#### **Trigger Level**

See "[Trigger Level](#) " on page 306

#### **Trig Slope**

See "[Trig Slope](#) " on page 307

### **RF Burst**

See "[RF Burst](#) " on page 307

### **Absolute Trigger**

See "[Absolute Trigger Level](#)" on page 308

#### **Trig Slope**

See "[Trigger Slope](#) " on page 309

### **Trig Delay**

See "[Trig Delay](#)" on page 309

### **Auto/Holdoff**

See "[Auto/Holdoff](#) " on page 310

### **Auto Trig**

See "[Auto Trig](#) " on page 310

### **Trig Holdoff**

See "[Trig Holdoff](#) " on page 311

### **Holdoff Type**

See "[Holdoff Type](#)" on page 311



## User Preset

Accesses a menu that gives you the following three choices:

- User Preset – recalls a state previously saved using the Save User Preset function.
- User Preset All Modes – presets all of the modes in the analyzer
- Save User Preset– saves the current state for the current mode

### NOTE

In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	<p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p>
Initial S/W Revision	Prior to A.02.00

## User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, SYST:PRES:USER:SAV. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.

- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

### User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

**NOTE**

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:ALL
Example	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode.

---

Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

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Initial S/W Revision      Prior to A.02.00

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## Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER:SAVE
<b>Example</b>	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

## View/Display

Accesses a menu of functions that enable you to set the display parameters and select the view.

See ["Display" on page 1788](#) for the display settings.

See [View Selection](#) for details of view selection.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the System Display Settings key apply to all measurements in all modes.

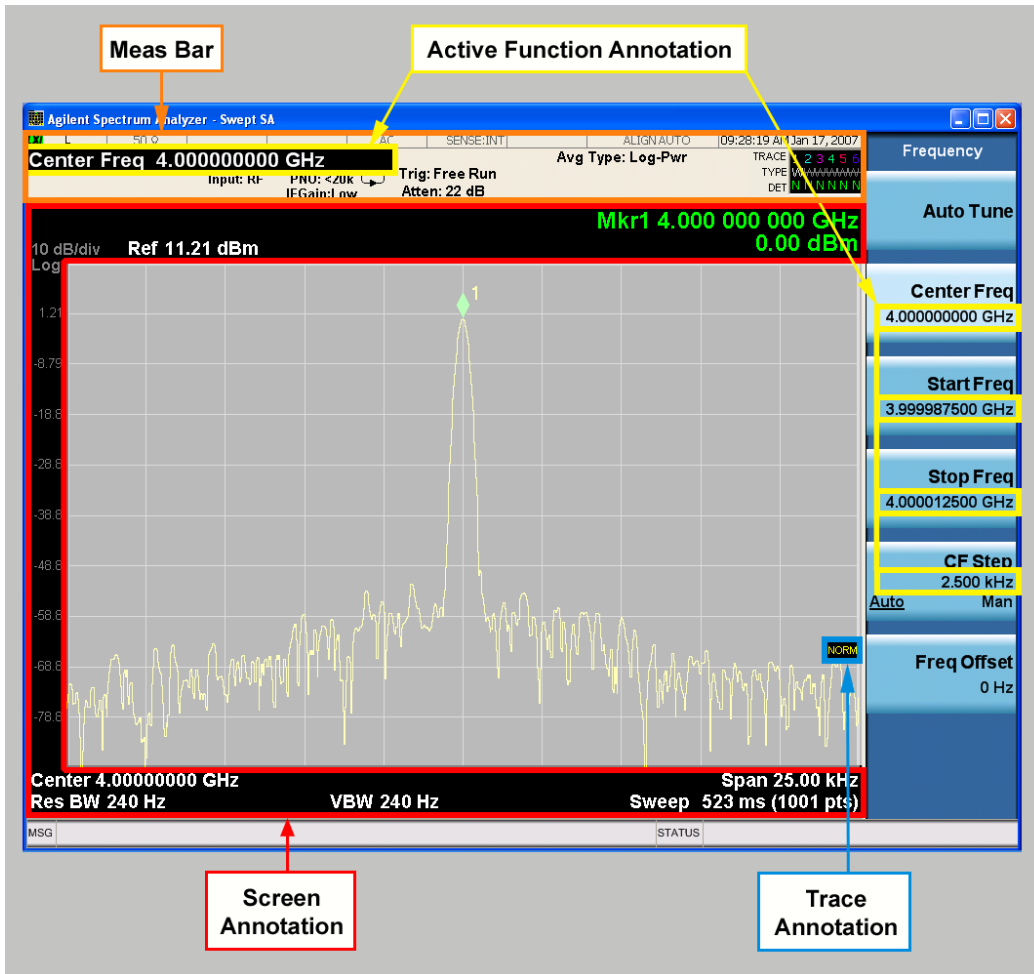
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

## Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:MBAR[:STATE] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATE]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Screen

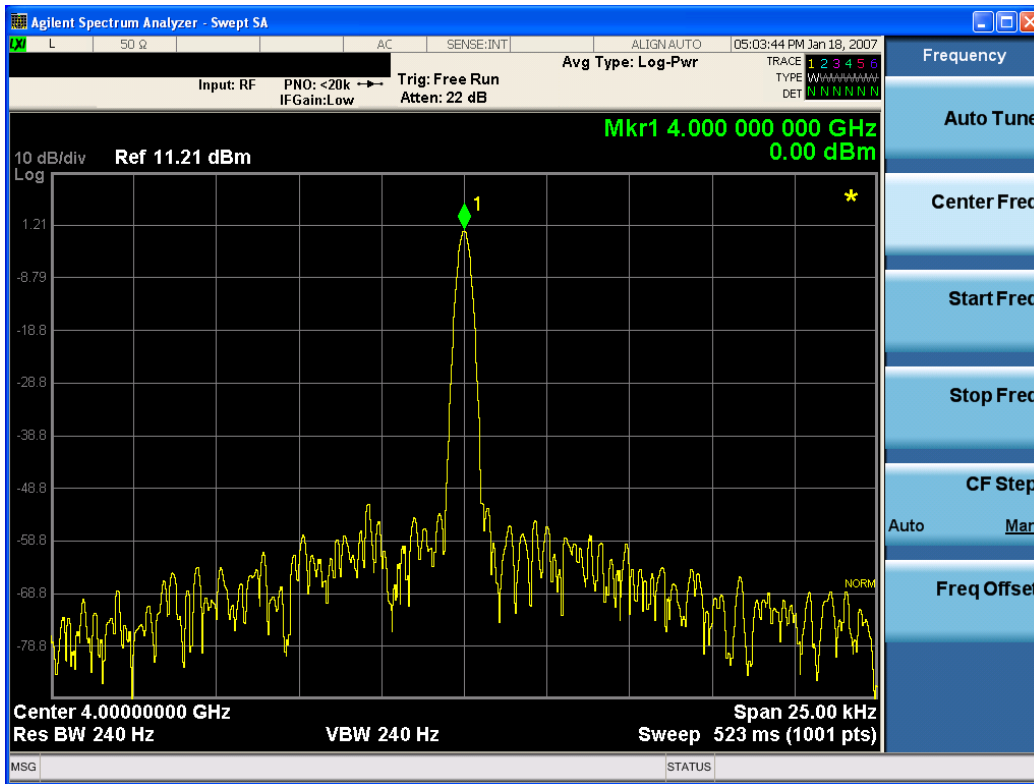
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

<b>Key Path</b>	View/Display, Display, Annotation
<b>Remote Command</b>	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
<b>Example</b>	DISP:ANN:SCR OFF
<b>Dependencies</b>	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
<b>Preset</b>	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
<b>State Saved</b>	Saved in instrument state.
<b>Initial S/W Revision</b>	Prior to A.02.00

## Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE]?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press Change Title again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing Title, Clear Title.

**NOTE**

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

**Clear Title**

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00



## Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
<b>Remote Command</b>	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
<b>Example</b>	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by Restore Misc Defaults or Restore System Defaults under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

## Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is All Off, it forces ScreenAnnotation, Meas Bar, Trace, and Active Function Values settings to be OFF for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is All Off, the Screen, Meas Bar, Trace, and Active Function Values keys under the Display, Annotation menu are grayed out and forced to Off. When Local Settings is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
<b>Remote Command</b>	:DISPlay:WINDow[1]:ANNotation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNotation[:ALL]?
<b>Example</b>	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReen:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReen:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### I/Q Measured Polar Graph

For the Remote Commands, see [View Selection](#) and [View Selection by number \(Remote Command Only\)](#).

This topic includes the following sections, which provide details of this view's windows, as shown in the examples below:

["Graph window" on page 918](#)

["Metric window" on page 918](#)

Below: Example View with Vector and Constellation Traces

9 EDGE EVM Measurement  
View/Display

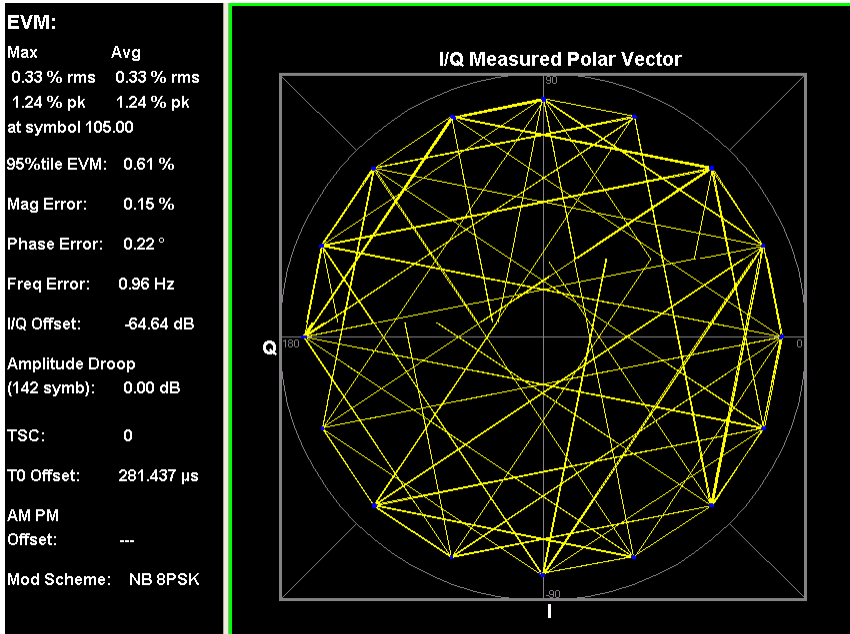


Figure 0-1 I/Q Measured Polar Graph view (Vector & Constellation) for EDGE EVM Measurement  
Below: Example View with Vector Trace Only

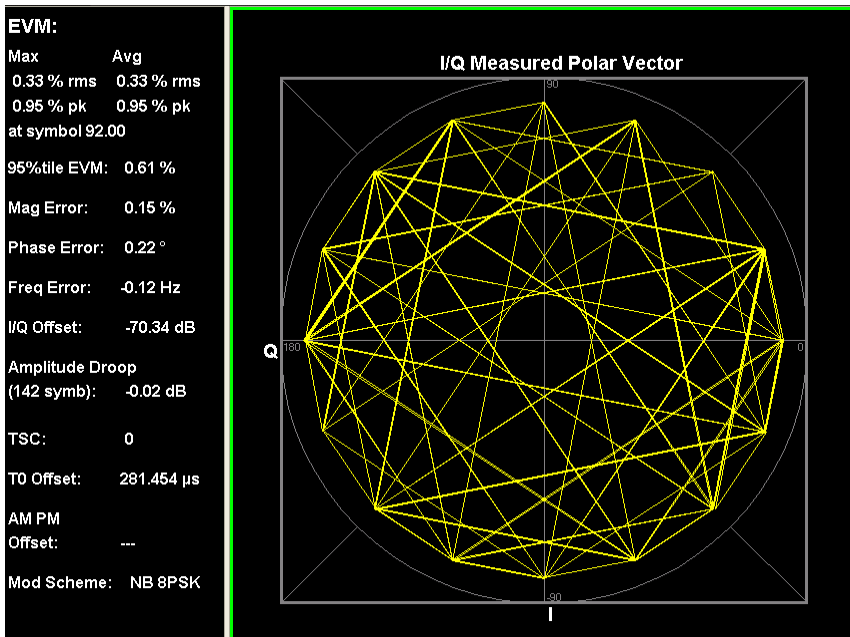


Figure 0-2 I/Q Measured Polar Graph view (Vector Only) for EDGE EVM Measurement  
Below: Example View with Constellation Trace Only

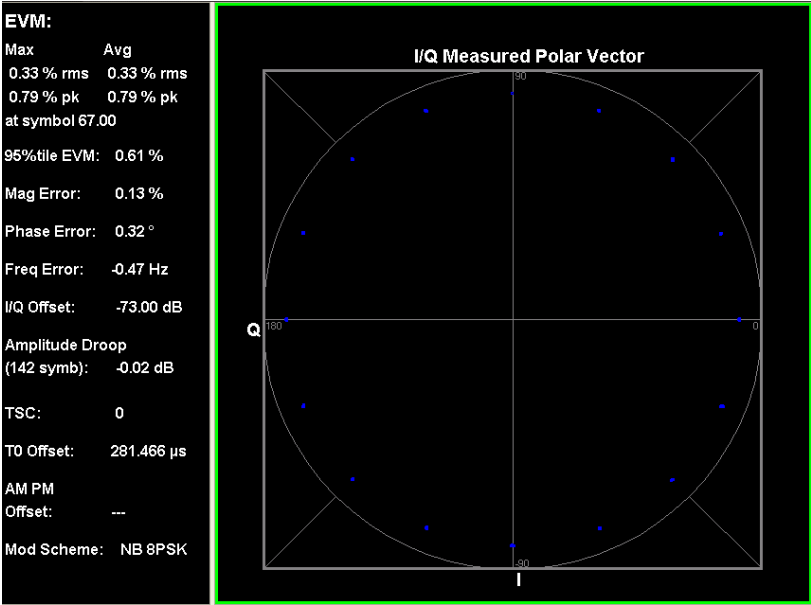


Figure 0-3 I/Q Measured Polar Graph view (Constellation Only) for EDGE EVM Measurement  
Below: Example View with Vector and Constellation Traces (Symbol Derotated)

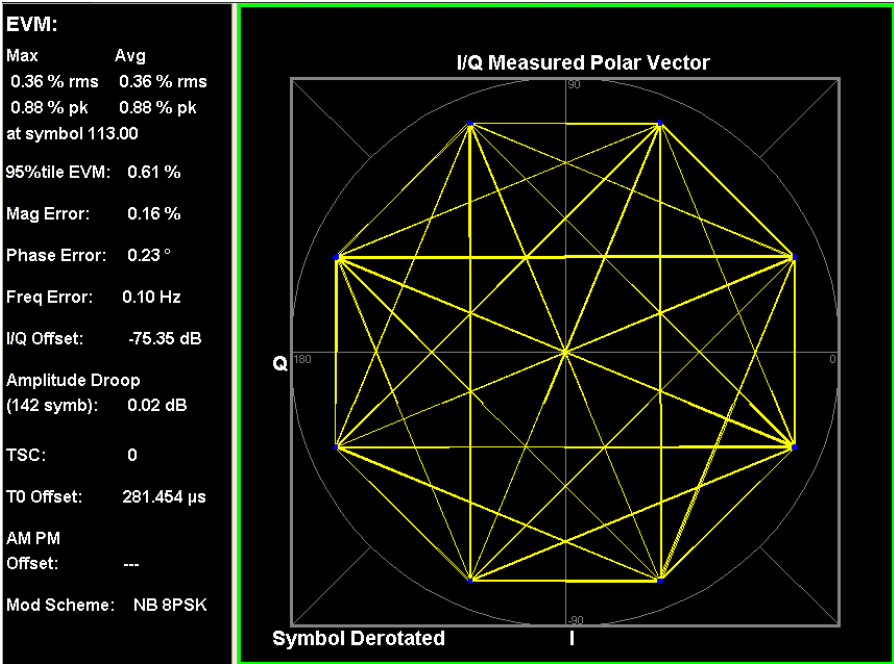


Figure 0-4 I/Q Measured Polar Graph view (Symbol Derotated) for EDGE EVM Measurement

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00

## Graph window

Marker Operation	No
Corresponding Trace	Series of float point numbers that alternately represent I and Q pairs of the final corrected measured data for the last slot. (n=5)

## Metric window

Name	Corresponding Results	Display Format
EVM rms (Max)	n=1 3rd Maximum RMS EVM	9.99 % rms
EVM rms (Avg)	n=1 2nd RMS EVM	9.99 % rms
EVM Pk (Max)	n=1 5th Maximum peak EVM	9.99 % pk
EVM Pk (Avg)	n=1 4th Peak EVM	9.99 % pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Mag Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Freq Error	n=1 11th Frequency error	-999.99 Hz
I/Q Offset	n=1 13th I/Q origin offset	-99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	-99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols
Mod Scheme	n=8 18th Modulation Scheme	NB 8PSK

**NOTE**

The value of 'T0 Offset' and 'AM PM Offset' is displayed by 'sec' and both 'Symbol' unit. (The figure above does not show this. See the Data Bits figure.)

## I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation provides options that allow you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONSTln)

Key Path	View/Display, I/Q Measured Polar Graph
Mode	GSM
Remote Command	:DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar VC VECTor CONSTln :DISPlay:EEVM:VIEW[1]:WINDow2:TRACe:POLar?
Example	DISP:EEVM:VIEW:WIND2:TRAC:POL VC DISP:EEVM:VIEW:WIND2:TRAC:POL?
Notes	VC : Vect & Constln VECTor: Vector CONSTln : Constellation You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	DISP:EEVM:VIEW POL changes this parameter to POL. DISP:EEVM:VIEW CONS changes this parameter to CONS.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln Vector Constellation
Initial S/W Revision	Prior to A.02.00

## Time Offset Unit

Toggles the unit of Time Offset result between Symbol and Second.

Key Path	View/Display, Display
Mode	GSM
Remote Command	:DISPlay:EEVM:TEXT:TFUNit SECond SYMBOL :DISPlay:EEVM:TEXT:TFUNit?
Example	DISP:EEVM:TEXT:TFUN SEC DISP:EEVM:TEXT:TFUN?
Notes	This command only affects the display result. Results returned by remote commands are always expressed in units of "SYMBOL".

Preset	SEC
State Saved	Saved in instrument state.
Range	sec symbols
Initial S/W Revision	Prior to A.02.00

## I/Q Symbol Derotation

Allows you to derotate I/Q symbols.

- On: Derotate I/Q Symbols.
- Off: No I/Q Symbol derotation.

Key Path	View/Display, I/Q Measured Polar Graph
Mode	GSM
<b>Remote Command</b>	:DISPlay:EEVM:SDERotation[:STATe] OFF ON 0 1 :DISPlay:EEVM:SDERotation[:STATe]?
<b>Example</b>	DISP:EEVM:SDER ON DISP:EEVM:SDER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## I/Q Error

For the Remote Commands, see [View Selection](#) and [View Selection by number \(Remote Command Only\)](#).

This topic includes the following sections, which provide details of this view's windows, as shown in the examples below:

["Mag Error window" on page 921](#)

["Phase Error window" on page 921](#)

["EVM window" on page 921](#)

["Metric window" on page 922](#)

Below: Example I/Q Error View



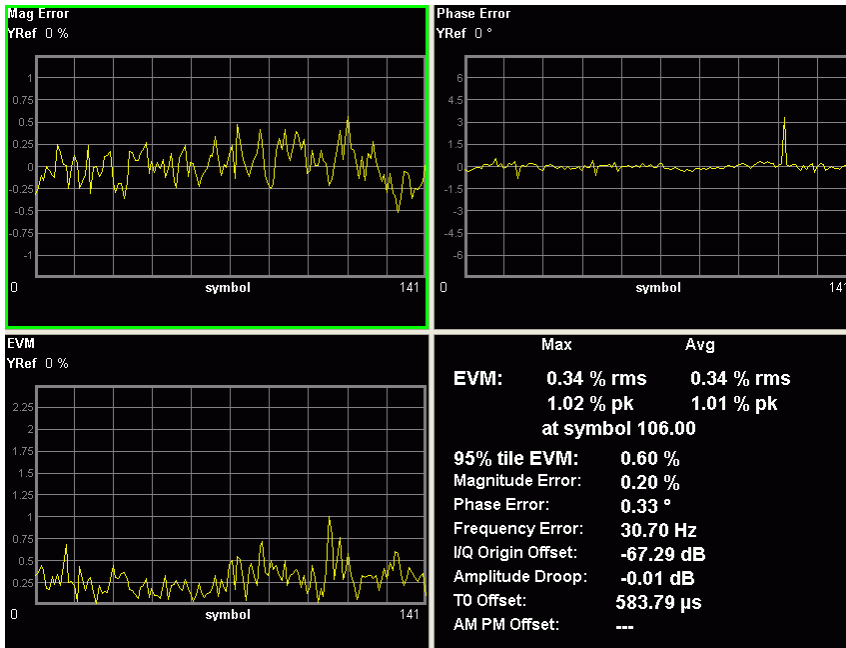


Figure 0-5 I/Q Error view for EDGE EVM Measurement

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

### Mag Error window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in percent) that represent each sample in the magnitude error vector trace for the last slot. (n=3)

### Phase Error window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degree) that represent each sample in the phase error vector trace for the last slot. (n=4)

### EVM window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in percent) that represent each sample in the EVM vector trace for the last slot. (n=2)

## Metric window

Name	Corresponding Results	Display Format
EVM [rms] (Max)	n=1 3rd Maximum RMS EVM	9.99 % rms
EVM [rms] (Avg)	n=1 2nd RMS EVM	9.99 % rms
EVM [pk] (Max)	n=1 5th Maximum peak EVM	9.99 % pk
EVM [pk] (Avg)	n=1 4th Peak EVM	9.99 % pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Magnitude Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Frequency Error	n=1 11th Frequency error	-999.99 Hz
I/Q Origin Offset	n=1 13th I/Q origin offset	-99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	-99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols

### NOTE

The value of 'T0 Offset' and 'AM PM Offset' is displayed by 'sec' and both 'Symbol' unit. (The figure above does not show this. See the Data Bits figure.)

## Symbol Dots

Allows you to toggle the symbol dots between On and Off.

- On: turns on blue symbol dots on the trace in 'Mag Error', 'Phase Error' & 'EVM' window.
- Off: turns off blue symbol dots on the trace in 'Mag Error', 'Phase Error' & 'EVM' window.

Key Path	View/Display
Mode	GSM
<b>Remote Command</b>	:DISPlay:EEVM:SDOTs[:STATe] OFF ON 0 1 :DISPlay:EEVM:SDOTs[:STATe]?
<b>Example</b>	DISP:EEVM:SDOT ON DISP:EEVM:SDOT?
Notes	This parameter does not control the constellation view/hide state on I/Q Measured Polar Graph. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :EEVM:SDOTs [ :STATe ]
Initial S/W Revision	Prior to A.02.00

## Time Offset Unit

Toggles the unit of Time Offset result between Symbol and Second.

Key Path	View/Display, Display
Mode	GSM
<b>Remote Command</b>	:DISPlay:EEVM:TEXT:TFUNit SECond SYMBol :DISPlay:EEVM:TEXT:TFUNit?
<b>Example</b>	DISP:EEVM:TEXT:TFUN SEC DISP:EEVM:TEXT:TFUN?
Notes	This command only affects the display result. Results returned by remote commands are always expressed in units of "SYMBol".
Preset	SEC
State Saved	Saved in instrument state.
Range	sec symbols
Initial S/W Revision	Prior to A.02.00

## Data Bits

For the Remote Command, see [View Selection](#) and [View Selection by number \(Remote Command Only\)](#).

This view has only one window: the "[Metric window](#)" on page 927.

Below: Example Data Bits View for EDGE Normal 8PSK Burst

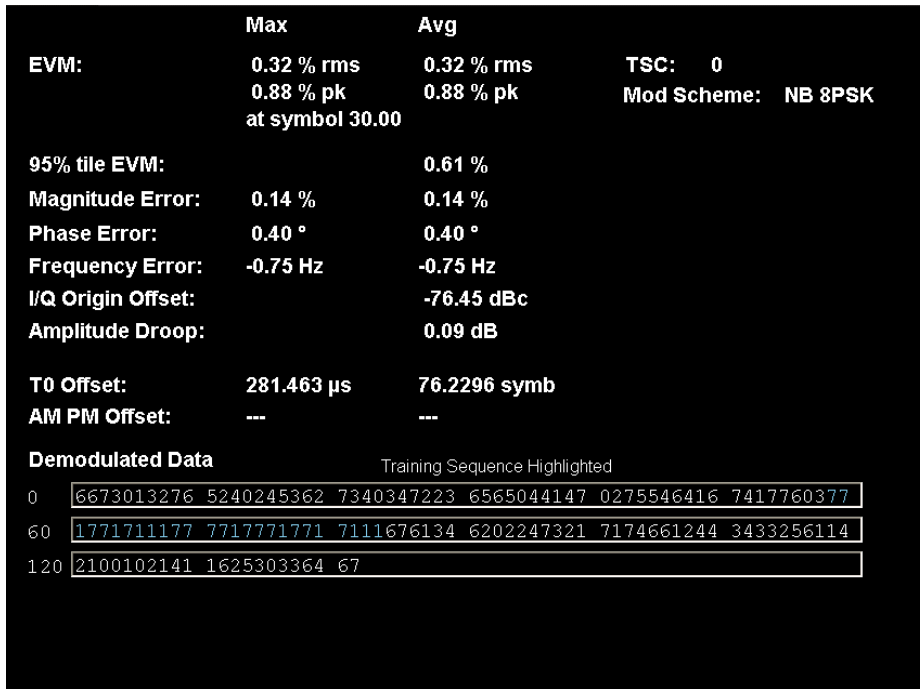


Figure 0-6 Data Bits view for EDGE Normal 8PSK Burst

Below: Example Data Bits View for EDGE Normal 16QAM Burst

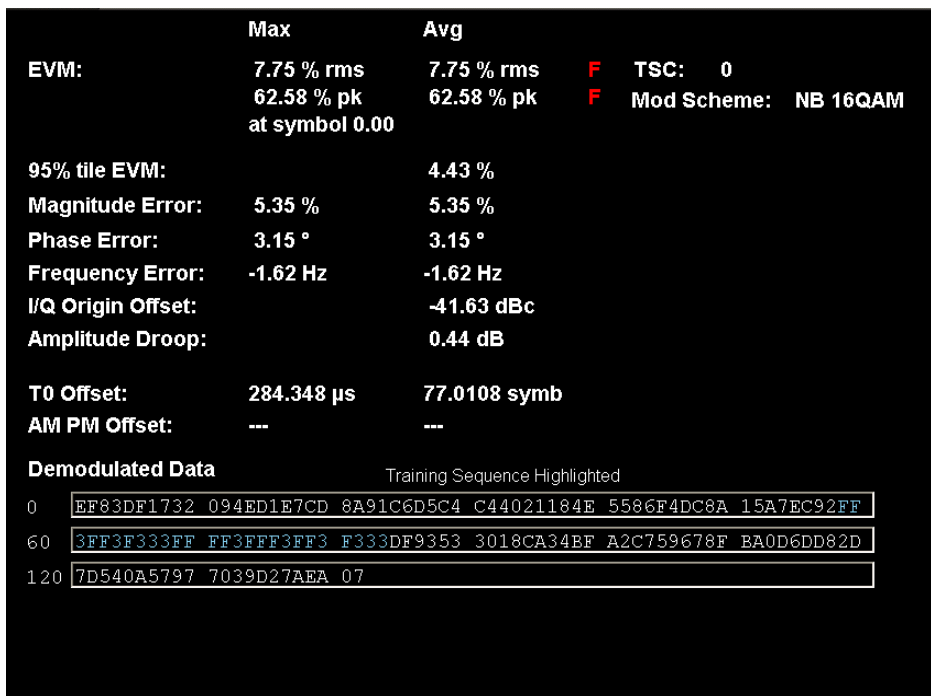


Figure 0-7 Data Bits view for EDGE Normal 16QAM Burst

Below: Example Data Bits View for EDGE Normal 32QAM Burst

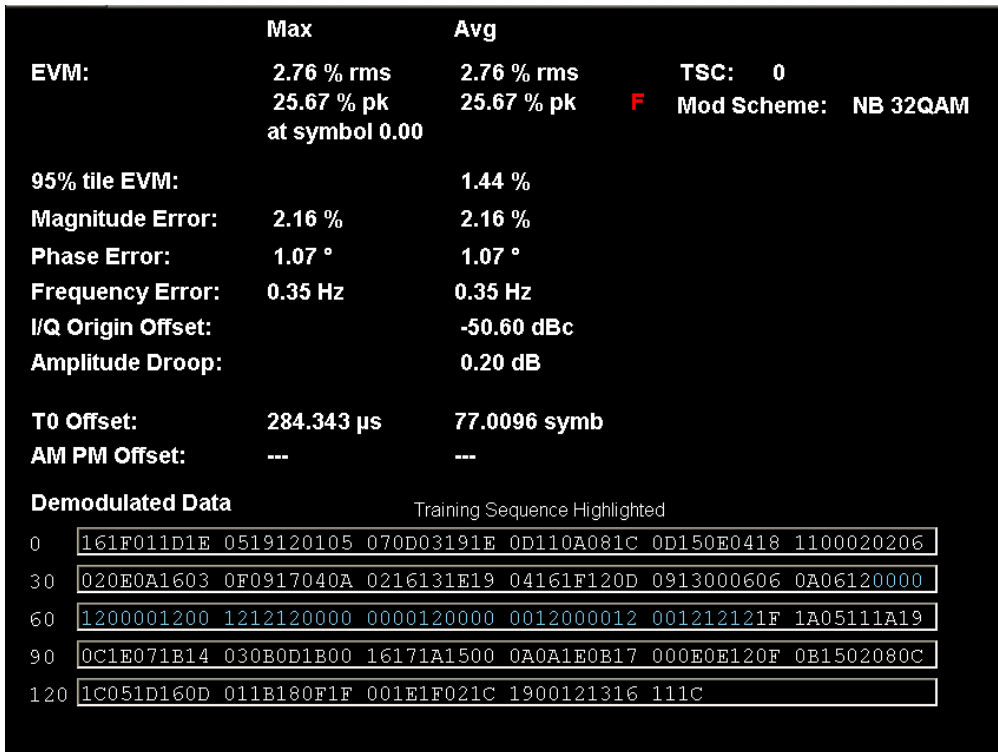


Figure 0-8 Data Bits view for EDGE Normal 32QAM Burst

Below: Example Data Bits View for EDGE HSR QPSK Burst

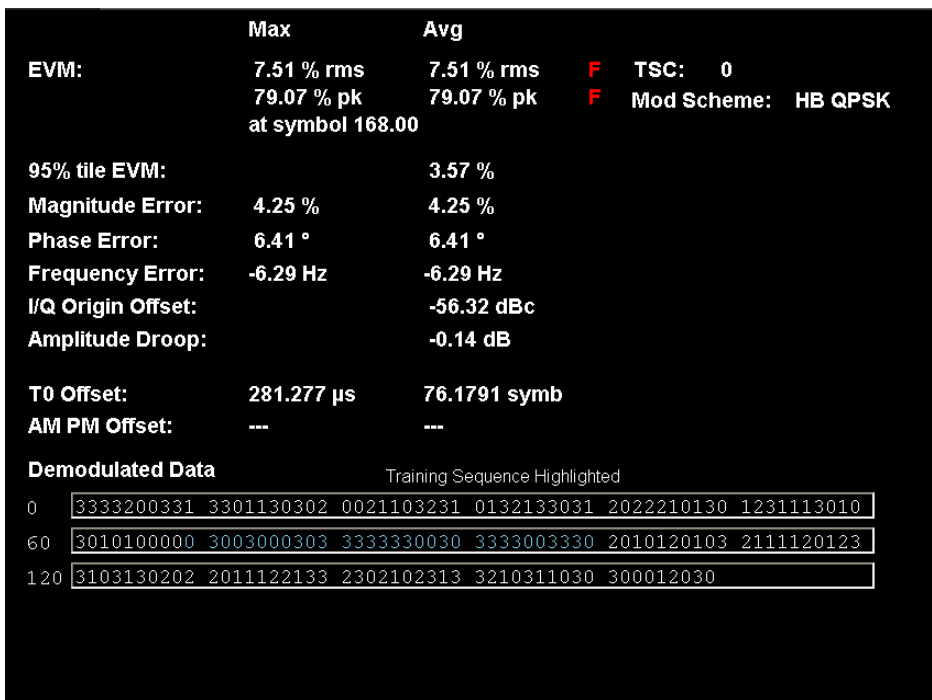


Figure 0-9 Data Bits view for EDGE HSR QPSK Burst

Below: Example Data Bits View for EDGE HSR 16QAM Burst

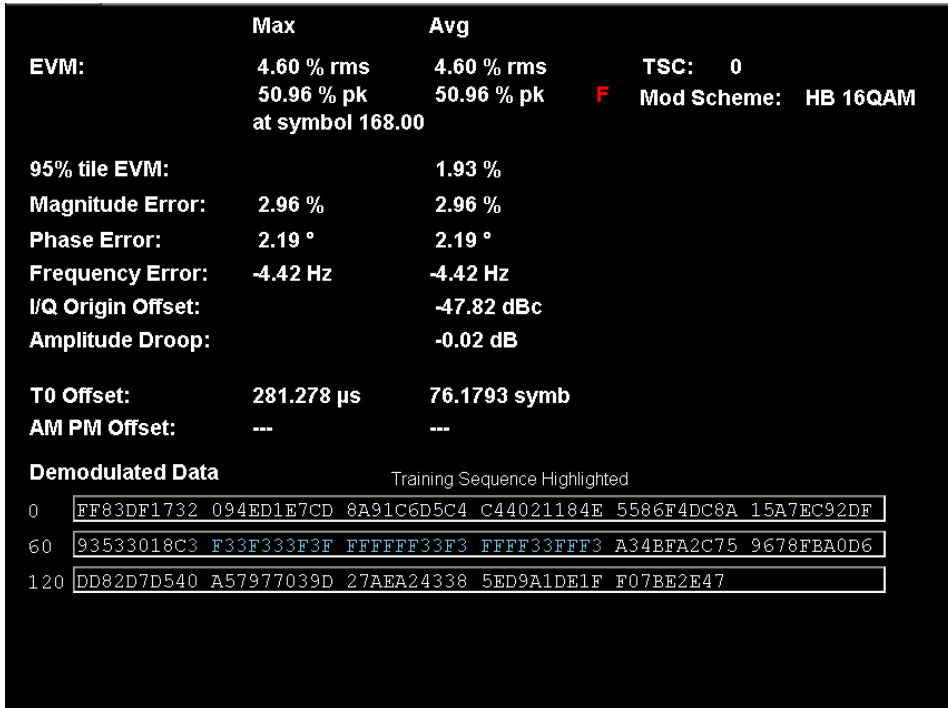


Figure 0-10 Data Bits view for EDGE HSR 16QAM Burst

Below: Example Data Bits View for EDGE HSR 32QAM Burst

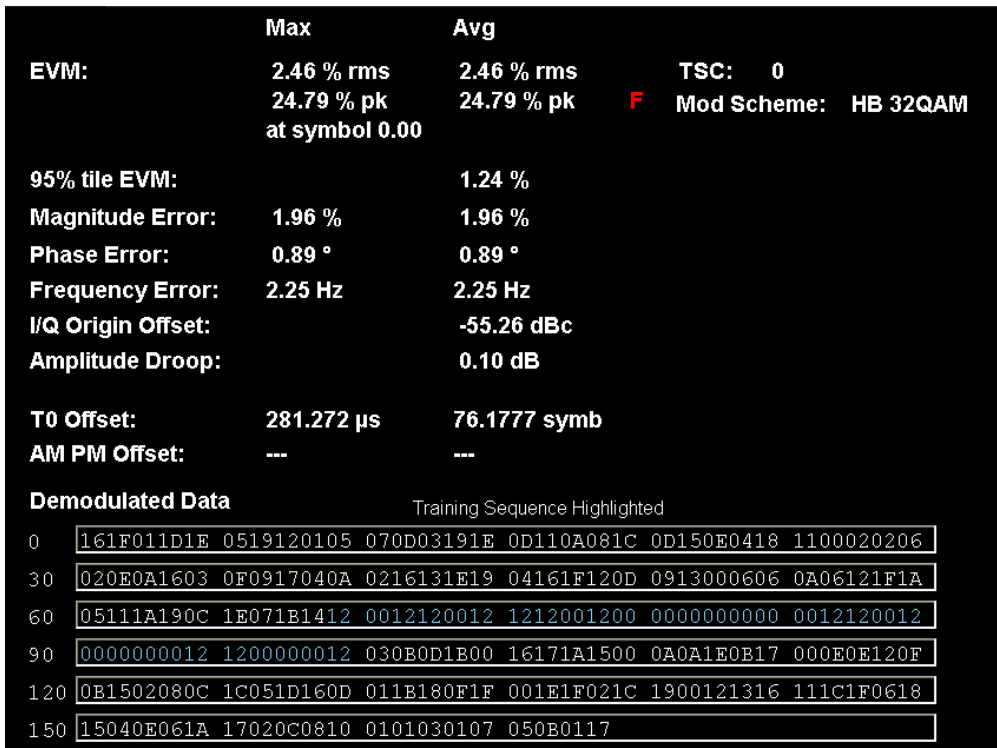


Figure 0-11 Data Bits view for EDGE HSR 32QAM Burst

## Metric window

Name	Corresponding Results	Display Format
EVM rms (Max)	n=1 3rd Maximum RMS EVM	9.99 %rms
EVM rms (Avg)	n=1 2nd RMS EVM	9.99 %rms
EVM Pk (Max)	n=1 5th Maximum peak EVM	9.99 %pk
EVM Pk (Avg)	n=1 4th Peak EVM	9.99 %pk
Symbol position of the peak EVM	n=1 6th Symbol position of Peak EVM.	99
95%ile EVM	n=1 1st RMS 95th %ile EVM	9.99 %
Magnitude Error	n=1 7th Magnitude error	9.99 %
Phase Error	n=1 9th Phase error	9.99 °
Frequency Error	n=1 11th Frequency error	-999.99 Hz
I/Q Origin Offset	n=1 13th I/Q origin offset	-99.99 dB
Amplitude Droop	n=1 14th Amplitude droop error	-99.99 dB
T0 Offset	n=1 15th Trigger to T0	0.000 us 0.000 symbols
AMPM Offset	n=1 16th AMPM Offset	0.000 us 0.0000 symbols
Mod Scheme	n=8 18th Modulation Scheme	NB 8PSK

Key Path	View/Display
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.02.00





## 10 EDGE Output RF Spectrum Measurement

The Output RF Spectrum measurement is the GSM version of the adjacent channel power (ACP) measurement.

This topic contains the following sections:

["Measurement Commands for EDGE Output RF Spectrum" on page 930](#)

["Remote Command Results for EDGE Output RF Spectrum" on page 931](#)

## Measurement Commands for EDGE Output RF Spectrum

The following commands and queries can be used to retrieve the measurement results:

`:CONFigure:EORFspectr`

`:CONFigure:EORFspectr:NDEFault`

`:INITiate:EORFspectr`

`:FETCh:EORFspectr [n]?`

`:READ:EORFspectr [n]?`

`:MEASure:EORFspectr [n]?`

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1578](#).

## Remote Command Results for EDGE Output RF Spectrum

For the queries listed above, the results returned depend on the value of n, as follows.

Measurement Method	n	Results Returned
	0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
Single offset	not specified or n = 1	Returns 4 comma-separated results for the specified offset: <ol style="list-style-type: none"> <li>1. Modulation spectrum power, dB</li> <li>2. Modulation spectrum power, dBm</li> <li>3. Switching transient power, dB</li> <li>4. Switching transient power, dBm</li> </ol>
Multi-Offset	not specified or n = 1	<p>Returns a list of comma-separated values for the modulation spectrum at all the offsets (lower and upper). This is followed by the switching transient results at all the offsets (lower and upper). The carrier is considered offset zero (0) and is the first set of results sent. Four values are provided for each of the offsets (including the carrier), in this order:</p> <ol style="list-style-type: none"> <li>1. Lower offset(a) - power relative to carrier (dB)</li> <li>2. Lower offset(a) - absolute average power (dBm)</li> <li>3. Upper offset(a) - power relative to carrier (dB)</li> <li>4. Upper offset(a) - absolute average power (dBm)</li> </ol> <p>Values for all possible offsets are sent. Zeros are sent for offsets that have not been defined. The total number of values sent <math>(120) = (4 \text{ results/offset}) * (15 \text{ offsets}) * (2 \text{ measurement types - modulation \&amp; switching})</math></p> <p>Carrier - modulation measurement values            Offset 1 - modulation measurement values and so on            ...            Offset 14 - modulation measurement values            Carrier - switching transients measurement values            Offset 1 - switching transients measurement values            ...            Offset 14 - switching transients measurement values and so on</p> <p>This measurement defaults to modulation measurements and not switching measurements. If you want to return the switching measurement values, you must change that default condition and use FETCh or READ to return values, rather than MEASure.</p>
Swept	not specified or n = 1	Returns 5 comma-separated results of the closest point to the limit line: <ol style="list-style-type: none"> <li>1. Frequency</li> <li>2. Offset frequency from carrier frequency</li> </ol>

Measurement Method	n	Results Returned
		3. Power in dBm 4. delta from limit (dB) 5. delta from reference (dB)
Single offset	2	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to modulation” signal, where N is the specified number of samples.
Multi-Offset or Swept	2	Nothing returns.
Single offset	3	Returns floating point numbers (in dBm) of the captured trace data. It contains N data points of the “spectrum due to switching transients” signal, where N is the specified number of samples.
Multi-Offset or Swept	3	Nothing returns.
Swept	4	Returns floating point numbers (in dBm) of the sweep spectrum trace.
Multi-Offset or Single Offset	4	Nothing returns.
Swept	5	Returns floating point numbers (in dBm) of the swept limit trace.
Multi-Offset or Single Offset	5	Nothing returns.
Multi-Offset	6	<p>Relative level to the test limit, and test limit itself for both modulation and switching transient measurements.</p> <p>Returns a list of relative level to the test limit, the relative test limit and the absolute test limit for all the offset frequencies. The relative level to the test limit is returned for both lower and upper offsets. Four values are returned for each offset in the following order:</p> <ol style="list-style-type: none"> <li>1. Relative level to the test limit (dB) at the lower offset frequency</li> <li>2. Relative level to the test limit (dB) at the upper offset frequency</li> <li>3. Relative test limit used (dB)</li> <li>4. Absolute test limit used (dBm)</li> </ol> <p>For #3 and #4, the value of the upper offset frequencies are returned when carriers are set to more than 1.</p> <p>Values for all possible offsets are returned.</p> <p>The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned.</p> <p>Zeros are returned for offsets that have not been defined.</p> <p>Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transient measurement results are 0.0.</p> <p>The total number of values returned is:</p> $120 = (4 \text{ results / offset}) * (15 \text{ offset frequencies}) * (2 \text{ measurement types})$

Measurement Method	n	Results Returned
		Carrier (Offset A) - modulation measurement results Offset 1 (Offset B) - modulation measurement results ... Offset 14 (Offset O) - modulation measurement results Carrier (Offset A) - switching transients measurement results Offset 1 (Offset B) - switching transient measurement results ... Offset 14 (Offset O) - switching transients measurement results
Single Offset or Swept	6	Returns NULL
All	7	Returns floating point number (in dBm) of Measured Carrier Power Level that determines the PCL.
Multi-Offset	8	Returns a list of relative level to the test limit, test limit itself, and the test limit actually applied for the test (Abs, Rel, or both Abs and Rel) for both modulation and switching transient measurements. Eight values are returned for each offset in the following order. <1 ~4: Lower Offset Freq.> 1. Relative level to the test limit (dB) 2. Relative test limit (dB) 3. Absolute test limit (dBm) 4. Test limit actually applied (1 for Abs, 2 for Rel, 3 for Abs and Rel) <5 ~8: Upper Offset Freq.> 5: Relative level to the test limit (dB) 6: Relative test limit (dB) 7: Absolute test limit (dBm) 8: Test limit actually applied (1 for Abs, 2 for Rel, 3 for Abs and Rel) The total number of values returned: $240 = (8 \text{ values/offset}) * (15 \text{ offset frequencies}) * (2 \text{ Meas Type})$ Values for all possible offsets are returned. The carrier frequency is considered offset zero (0.0 Hz) and is the first set of values returned. Zeros are returned for offsets that have not been defined. Zeros are returned for the measurement that was not performed. For example, if Meas Type is Modulation, all switching transient measurement results are 0.0. When Meas Type is Modulation: Carrier (Offset A) - All values are 0. Offset 1 (Offset B) - limit measurement values ...

Measurement Method	n	Results Returned
		<p>Offset 14 (Offset 0) - limit measurement values</p> <p>When Meas Type is Switching:</p> <p>Carrier (Offset A) - All values are 0.</p> <p>Offset 1 (Offset B) -limit measurement values</p> <p>...</p> <p>Offset 14 (Offset 0) - limit measurement values</p>
Single Offset or Swept	8	Returns NULL.
All	9	<p>Note that this query is duplicated. Use the query (n=11) instead.</p> <p>Returns a list of comma-separated values for the Carrier Header Information and the Carrier Power Measurement Results for Modulation and Switching.</p> <p>1. Carrier Header Information for Modulation</p> <p>Nine values are returned in the following order.</p> <p>(a) Number of Carriers</p> <p>(b) Reference Carrier</p> <p>(c) VBW/RBW Ratio</p> <p>(d) Modulation Carrier RBW 1</p> <p>(e) Modulation Carrier RBW 2</p> <p>(f) Modulation Carrier RBW 3</p> <p>(g) Power Reference Type (Reference Carrier = 0, Max Power = 1)</p> <p>(h) Actual Reference Carrier</p> <p>(i) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1)</p> <p>All of the modulation carrier RBW 1, 2, and 3 are valid only when the following conditions are met.</p> <ul style="list-style-type: none"> <li>+ The number of carriers is more than 1.</li> <li>+ The Meas Type is set to Modulation or Modulation&amp;Switching.</li> <li>+ The Carrier RBW is set to Auto.</li> <li>+ The Ofst Freq List is set to Standard in the Multi Offset method or the Wideband Noise is set to ON in the Swept method.</li> </ul> <p>All are invalid unless the Meas Type is set to Modulation or Modulation&amp;Switching.</p> <p>2. Carrier Power Measurement Results for Modulation</p> <p>Six values are returned for each carrier in the following order.</p> <p>(a) Carrier Power</p> <p>(b) Reference Power Measured with Modulation Carrier RBW 1</p> <p>(c) Reference Power Measured with Modulation Carrier RBW 2</p> <p>(d) Reference Power Measured with Modulation Carrier RBW 3</p>

Measurement Method	n	Results Returned
		<p>(e) Carrier Center Frequency</p> <p>(f) Power Present (No = 0, Yes = 1)</p> <p>The maximum number of carriers is 8, and therefore a total of 48 values are returned.</p> <p>The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0.</p> <p>The Reference Power is invalid when its corresponding Modulation Carrier RBW is invalid.</p> <p>All are invalid unless the Meas Type is set to Modulation or Modulation&amp;Switching.</p> <p>3. Carrier Header Information for Switching</p> <p>Seven values are returned in the following order.</p> <p>(a) Number of Carriers</p> <p>(b) Reference Carrier</p> <p>(c) VBW/RBW Ratio</p> <p>(d) Switching Carrier RBW</p> <p>(e) Power Reference Type (Reference Carrier = 0. Max Power = 1)</p> <p>(f) Actual Reference Carrier</p> <p>(g) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1)</p> <p>All are invalid unless the Meas Type is set to Switching or Modulation&amp;Switching.</p> <p>4 Carrier Power Measurement Results for Switching</p> <p>Four values are returned for each carrier in the following order.</p> <p>(a) Carrier Power</p> <p>(b) Reference Power Measured with Switching Carrier RBW</p> <p>(c) Carrier Center Frequency</p> <p>(d) Power Present (No = 0, Yes = 1)</p> <p>The maximum number of carriers is 8, and therefore a total of 32 values are returned.</p> <p>The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0.</p> <p>The Reference Power is invalid when the Switching Carrier RBW is invalid</p> <p>All are invalid unless the Meas Type is set to Switching or Modulation&amp;Switching.</p>
Multi-Offset	10	<p>Returns a list of results for both modulation and switching transient measurements in the multi-offset method. Sixteen values are returned for each offset in the following order.</p> <p>1. Offset frequency (Hz)</p> <p>2. Offset RBW (Hz)</p>

Measurement Method	n	Results Returned
		<p>&lt;3~9: Lower Offset Freq.&gt;</p> <p>3. Carrier RBW (Hz)</p> <p>4. Power relative to carrier (dB)</p> <p>5. Relative level to the test limit (dB)</p> <p>6. Absolute average power (dBm)</p> <p>7. Relative test limit (dB)</p> <p>8. Absolute test limit (dBm)</p> <p>9. Test limit actually applied (0 for not applied, 1 for Abs, 2 for Rel, 3 for Abs and Rel)</p> <p>&lt;10~16: Upper Offset Freq.&gt;</p> <p>10. Carrier RBW (Hz)</p> <p>11. Power relative to carrier (dB)</p> <p>12. Relative level to the test limit (dB)</p> <p>13. Absolute average power (dBm)</p> <p>14. Relative test limit (dB)</p> <p>15. Absolute test limit (dBm)</p> <p>16. Test limit actually applied (0 for not applied, 1 for Abs, 2 for Rel, 3 for Abs and Rel)</p> <p>The total number of values returned:  IF all the following conditions are met</p> <ul style="list-style-type: none"> <li>• The number of carriers is greater than one.</li> <li>• (CHAN:CARR:COUN n, where n &gt; 1)</li> <li>• The state of the test limit exception is set to On. (EORF:MCAR:LEXC ON)</li> <li>• The type of the multicarrier limit exception rule is set to Custom. (EORF:MCAR:LEXC:RULE CUST)</li> <li>• The type of a frequency list for multi offset is set to Limited Custom. (EORF:LIST:SEL LCUS)</li> </ul> <p>THEN</p> <p><math>1280 = (16 \text{ values/offset}) * (40 \text{ offset frequencies}) * (2 \text{ Meas Type})</math>  Values for all possible offsets are returned.</p> <p>Offset 1 – modulation measurement results ...</p> <p>Offset 40 – modulation measurement results</p> <p>Offset 1 – switching transient measurement results ...</p> <p>Offset 40 – switching transient measurement results</p> <p>ELSE</p> <p><math>448 = (16 \text{ values/offset}) * (14 \text{ offset frequencies}) * (2 \text{ Meas Type})</math>  Values for all possible offsets are returned.</p> <p>Offset 1 – modulation measurement results ...</p> <p>Offset 14 – modulation measurement results</p>



Measurement Method	n	Results Returned
		Offset 1 – switching transient measurement results ... Offset 14 – switching transient measurement results
All	11	<p>Returns a list of comma-separated values for the Carrier Header Information and the Carrier Power Measurement Results for Modulation and Switching.</p> <p>1. Carrier Header Information for Modulation</p> <p>Nine values are returned in the following order.</p> <ul style="list-style-type: none"> <li>(a) Number of Carriers</li> <li>(b) Reference Carrier</li> <li>(c) VBW/RBW Ratio</li> <li>(d) Modulation Carrier RBW 1</li> <li>(e) Modulation Carrier RBW 2</li> <li>(f) Modulation Carrier RBW 3</li> <li>(g) Power Reference Type (Reference Carrier = 0, Max Power = 1)</li> <li>(h) Actual Reference Carrier</li> <li>(i) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1)</li> </ul> <p>All of the modulation carrier RBW 1, 2, and 3 are valid only when the following conditions are met.</p> <ul style="list-style-type: none"> <li>+ The number of carriers is more than 1.</li> <li>+ The Meas Type is set to Modulation or Modulation&amp;Switching.</li> <li>+ The Carrier RBW is set to Auto.</li> <li>+ The Ofst Freq List is set to Standard in the Multi Offset method or the Wideband Noise is set to ON in the Swept method.</li> </ul> <p>All are invalid unless the Meas Type is set to Modulation or Modulation&amp;Switching.</p> <p>2. Carrier Power Measurement Results for Modulation</p> <p>Six values are returned for each carrier in the following order.</p> <ul style="list-style-type: none"> <li>(a) Carrier Power</li> <li>(b) Reference Power Measured with Modulation Carrier RBW 1</li> <li>(c) Reference Power Measured with Modulation Carrier RBW 2</li> <li>(d) Reference Power Measured with Modulation Carrier RBW 3</li> <li>(e) Carrier Center Frequency</li> <li>(f) Power Present (No = 0, Yes = 1)</li> </ul> <p>As a result, a total of 6 * N values are returned where N is the number of carriers.</p> <p>The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0.</p> <p>The Reference Power is invalid when its corresponding Modulation</p>

Measurement Method	n	Results Returned
		<p>Carrier RBW is invalid.</p> <p>All are invalid unless the Meas Type is set to Modulation or Modulation&amp;Switching.</p> <p>3. Carrier Header Information for Switching</p> <p>Seven values are returned in the following order.</p> <p>(a) Number of Carriers</p> <p>(b) Reference Carrier</p> <p>(c) VBW/RBW Ratio</p> <p>(d) Switching Carrier RBW</p> <p>(e) Power Reference Type (Reference Carrier = 0. Max Power = 1)</p> <p>(f) Actual Reference Carrier</p> <p>(g) Modulation Type for Actual Reference Carrier (GMSK = 0, EDGE = 1)</p> <p>All are invalid unless the Meas Type is set to Switching or Modulation&amp;Switching.</p> <p>4. Carrier Power Measurement Results for Switching</p> <p>Four values are returned for each carrier in the following order.</p> <p>(a) Carrier Power</p> <p>(b) Reference Power Measured with Switching Carrier RBW</p> <p>(c) Carrier Center Frequency</p> <p>(d) Power Present (No = 0, Yes = 1)</p> <p>As a result, a total of <math>4 * N</math> values are returned where N is the number of carriers.</p> <p>The Carrier Power and the Carrier Center Frequency are invalid when its corresponding Power Present is set to 0.</p> <p>The Reference Power is invalid when the Switching Carrier RBW is invalid</p> <p>All are invalid unless the Meas Type is set to Switching or Modulation&amp;Switching.</p>
Swept	12	<p>Returns the number of failed frequency bands and a list of the following four pieces of information for each of the frequency bands.</p> <p>1. The offset frequency of the band center frequency, Hz</p> <p>2. The worst delta power in the band, dBm</p> <p>3. The absolute frequency of the band center frequency, Hz</p> <p>4. The absolute frequency with the worst delta power in the band, Hz</p> <p>As a result, a total of <math>(1 + 4 * N)</math> values are returned where N is the number of failed frequency bands.</p>
Key Path	Meas	

Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00, A.13.00, A.14.00

## AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. These functions control how data on the vertical (Y) axis is displayed and control instrument settings that affect the vertical axis.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

### Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
Mode	BASIC
<b>Remote Command</b>	<code>[ :SENSe ] :POWer [ :RF ] :RANGe &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe?</code>
<b>Example</b>	<code>:POW:RANG 10.0</code> <code>:POW:RANG?</code>
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

### Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[ :SENSe]:POWer[:RF]:RANGe:OPTimize IMMEDIATE</code>
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

### Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
Remote Command	<code>[ :SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation OFF   ON   ELEctrical   COMBined</code>  <code>[ :SENSe]:POWer[:RF]:RANGe:OPTimize:ATTenuation?</code>
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.
Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

### Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[ :SENSe]:POWer[:RF]:RANGe:PARatio &lt;real&gt;</code>  <code>[ :SENSe]:POWer[:RF]:RANGe:PARatio?</code>
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out.

	Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

### Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
<b>Remote Command</b>	[ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet <real> [ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet?
<b>Example</b>	POW:RANG:MIX:OFFS -5 dB
Preset	0 dB
State Saved	Saved in instrument state
Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

## Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 943

Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

### More Information

There are two types of functions that have Auto/Manual modes.

#### Auto/Man Active Function keys

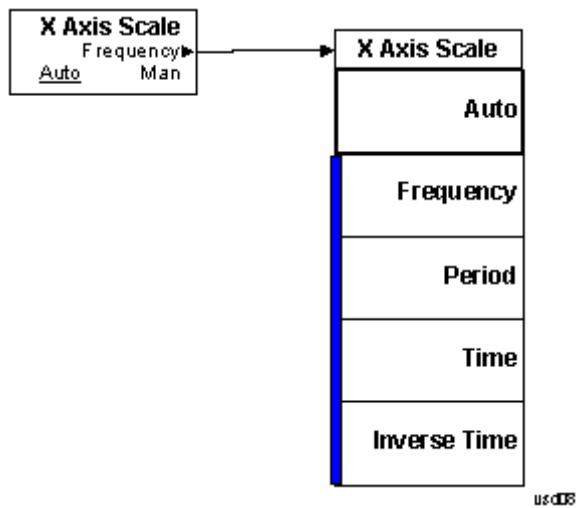
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either Auto or Man underlined as illustrated below.



#### Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.

10 EDGE Output RF Spectrum Measurement  
Auto Couple





## BW

There is no 'BW' functionality supported in EDGE Output RF Spectrum, so this Front-panel key displays a blank menu when pressed.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing Cont does a Resume.

<b>Key Path</b>	Front-panel key
<b>Remote Command</b>	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
<b>Example</b>	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
<b>Preset</b>	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility Notes</b>	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold. The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON ) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
<b>Initial S/W Revision</b>	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of Trace Average, Max Hold, or Min Hold.

In Other Measurements/Modes:

With Avg/Hold Num (in the Meas Setup menu) set to Off or set to On with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with Avg/Hold Num set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the Cont key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until  $k = N$ , at which point the current sequence will stop and the instrument will go to the idle state.

10 EDGE Output RF Spectrum Measurement  
File

File

See "File" on page 216

## FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel:ARFCn RFCHannel &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel:ARFCn RFCHannel?</code>
<b>Example</b>	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with <b>Center Frequency</b> . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

### Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1547](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

### Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1566](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1567](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1568](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is Center Freq.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a Global Settings key in its Mode Setup menu.

The Center Freq function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 954](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 956](#)

See ["Center Frequency Presets" on page 953](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	<code>[ :SENSe ] :FREQuency:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:CENTer?</code>
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See " <a href="#">Center Frequency Presets</a> " on page 953 and " <a href="#">RF Center Freq</a> " on page 954 and <a href="#">Ext Mix Center Freq</a> and " <a href="#">I/Q Center Freq</a> " on page 956.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See " <a href="#">Center Frequency Presets</a> " on page 953 and " <a href="#">RF Center Freq</a> " on page 954 and " <a href="#">I/Q Center Freq</a> " on page 956.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See " <a href="#">Center Frequency Presets</a> " on page 953 and " <a href="#">RF Center Freq</a> " on page 954 and " <a href="#">I/Q Center Freq</a> " on page 956.
Default Unit	Hz
Status Bits/OPC	Non-overlapped
Dependencies	
Initial S/W Revision	Prior to A.02.00



## Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA, BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

## RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	<code>[ :SENSe ] :FREQuency:RF:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:RF:CENTer?</code>
Example	<code>FREQ:RF:CENT 30 MHz</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:EMIXer:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:EMIXer:CENTer?</code>
<b>Example</b>	<code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	<p>If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table.</p> <p>When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz.</p> <p>Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.</p>
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

### I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	[ :SENSe ] :FREQuency:IQ:CENTer <freq> [ :SENSe ] :FREQuency:IQ:CENTer?
Example	FREQ:IQ:CENt: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	-40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

### BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel
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Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

### BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFChannel:TOP
<b>Example</b>	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFChannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENter as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

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	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz

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State Saved	No
Initial S/W Revision	Prior to A.02.00

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### BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

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Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel :MIDDLE</code>
<b>Example</b>	CHAN:ARFC:MIDD
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

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	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

## BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFCHannel:BOTTom
<b>Example</b>	CHAN:ARFC:BOT
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

### Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

### BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO ON OFF 1 0 [ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is



	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs SC   MC</code> <code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs ?</code>
<b>Example</b>	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

## Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :COUNT &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel :CARRier :COUNT ?</code>

<b>Example</b>	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

### Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :RCARrier <integer> [ :SENSe ] :CHANnel :CARRier :RCARrier?
<b>Example</b>	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers.  This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

## Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

## Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :COUPle OFF   ON   0   1, ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :COUPle ?</code>
<b>Example</b>	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP ?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple   Man
Initial S/W Revision	A.06.00

### Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :LIST :PPResent YES NO, ... [ :SENSe ] :CHANnel :CARRier :LIST :PPResent?
<b>Example</b>	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes   No
Initial S/W Revision	A.06.00

### Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global

<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval &lt;freq&gt;, ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval ?</code>
<b>Example</b>	CHAN:CARR:LIST:INT 600k CHAN:CARR:LIST:INT?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
<b>Dependencies</b>	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
<b>Couplings</b>	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
<b>Preset</b>	600kHz
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	400 kHz
<b>Max</b>	100 MHz
<b>Initial S/W Revision</b>	A.06.00
<b>Modified at S/W Revision</b>	A.07.00, A.08.00

## Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

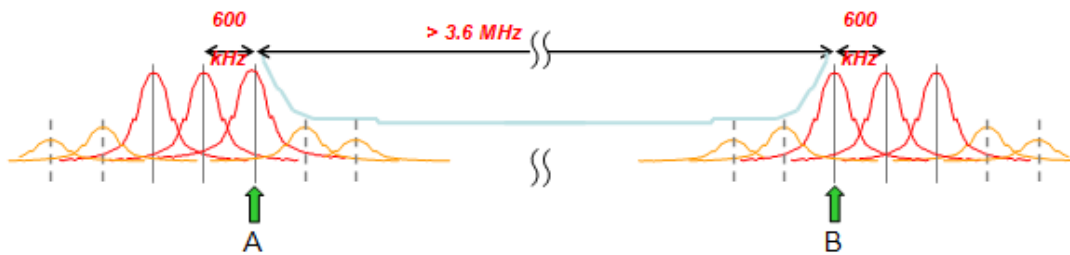
**Error! Reference source not found.**

See "[An example of non-contiguous frequency allocation](#)" on page 966

<b>Key Path</b>	FREQ Channel, Multi Carrier Setup
<b>Mode</b>	GSM
<b>Scope</b>	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :FALLocation</code> CONTiguous NCONTiguous <code>[ :SENSe ] :CHANnel :CARRier :FALLocation ?</code>
<b>Example</b>	CHAN:CARR:FALL NCON CHAN:CARR:FALL?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
<b>Dependencies</b>	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

An example of non-contiguous frequency allocation



Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

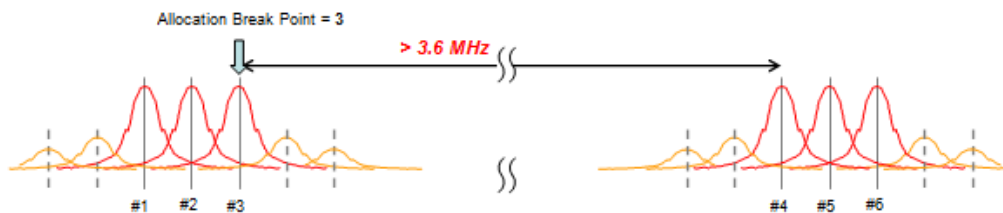
Error! Reference source not found.

See "An example of allocation break point" on page 968

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint <integer> [ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint ?
Example	CHAN:CARR:FALL:NCON:ABP 3 CHAN:CARR:FALL:NCON:ABP ?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers - 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

## An example of allocation break point



### Freq Separation

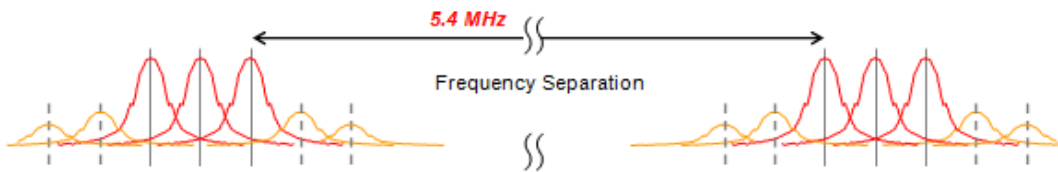
Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 969](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	<code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation &lt;freq&gt;</code> <code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?</code>
Example	<code>CHAN:CARR:FALL:NCON:FSEP 5.4M</code> <code>CHAN:CARR:FALL:NCON:FSEP?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTrument:SElect</code> to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00



## An example of frequency separation



### Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	<code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ON   OFF   1   0</code> <code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ?</code>
Example	<code>RAD:CARR:NUMB:AUTO 1</code> <code>RAD:CARR:NUMB:AUTO ?</code>
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

### Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GSMK Phase & Frequency Error measurement
- EDGE EVM measurement
- GSMK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple [:SENSe]:RADio:CARRier:NUMBer?
<b>Example</b>	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:CHANnel:SLOT <integer> [:SENSe]:CHANnel:SLOT? [:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [:SENSe]:CHANnel:SLOT:AUTO?
<b>Example</b>	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

## Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :BURSt NORMal   SYNC   ACCess   HSRate   MIXed [ :SENSe ] :CHANnel :BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH)   Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<pre>[ :SENSe]:CHANnel:TSCode &lt;integer&gt; [ :SENSe]:CHANnel:TSCode? [ :SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [ :SENSe]:CHANnel:TSCode:AUTO?</pre>
<b>Example</b>	<pre>CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?</pre>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

## Input/Output

See "[Input/Output](#)" on page 148

## Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Select Marker

Displays 12 markers available for selection

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

### Marker Type

Sets the marker control mode to Normal, Delta or Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:EORFspectr:MARKer[1] 2 ...12:MODE POSition   DELTa   OFF :CALCulate:EORFspectr:MARKer[1] 2 ...12:MODE?
<b>Example</b>	CALC:EORF:MARK:MODE OFF CALC:EORF:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area.  Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.  Active Function Display: the marker X axis value entered in the active function area displays the marker value to its full entered precision.  You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

## Properties

Accesses a menu that allow you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays 12 markers available for selection

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM
<b>Remote Command</b>	:CALCulate:EORFspectr:MARKer[1] 2 ...12:REFerence <integer> :CALCulate:EORFspectr:MARKer[1] 2 ...12:REFerence?
<b>Example</b>	CALC:EORF:MARK:REF 10 CALC:EORF:MARK:REF?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried a single value is returned (the specified marker numbers relative marker). A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself."
Dependencies	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself."
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

## Marker Trace

Assigns the specified marker to the designated trace.



Key Path	Marker, Properties
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ...12:TRACe RFEMod   RFESwitching   SPEMod   LIMMod  :CALCulate:EORFspectr:MARKer[1] 2 ...12:TRACe?
Example	CALC:EORF:MARK:TRACE RFES CALC:EORF:MARK:TRACE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	RF Envelope Modulation and RF Envelop Switching are available only when Meas Method is Single. Swp Spectrum Modulation and Limit Modulation are available when the Meas Method is Swept. Otherwise they are unavailable.
Preset	RFEMod
State Saved	Saved in instrument state.
Range	RF Envelope Modulation RF Envelope Switching Swp Spectrum Modulation Limit Modulation
Initial S/W Revision	Prior to A.02.00

## Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not Off. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Key Path	Marker
Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:EORFspectr:MARKer:COUPle[:STATe]?
Example	CALC:EORF:MARK:COUP ON CALC:EORF:MARK:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:EORFspectr:MARKer:AOff
<b>Example</b>	CALC:EORFspectr:MARK:AOff
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

## Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value, using the current marker X Axis Scale unit. It has no effect if the control mode is Off, but is the SCPI equivalent of entering an X value if the control mode is Normal, Delta or Fixed.

Mode	GSM
<b>Remote Command</b>	:CALCulate:EORFspectr:MARKer[1] 2 ...12:X <real> :CALCulate:EORFspectr:MARKer[1] 2 ...12:X?
<b>Example</b>	CALC:EORF:MARK3:X 0 CALC:EORF:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal, or the offset from the marker's reference marker if the control mode is Delta. The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time, seconds for Period and Time. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max/Min value is changed by Sweep Time or Frequency Span.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	-9.9E37.
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

## Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is Off, but is the SCPI equivalent of entering a value if the control mode is Normal or Delta except in trace points rather than X

Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ...12:X:POSition <integer> :CALCulate:EORFspectr:MARKer[1] 2 ...12:X:POSition?
Example	CALC:EORFspectr:MARK10:X:POS 0 CALC:EORFspectr:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal, or the offset from the marker's reference marker in trace points if the control mode is Delta. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max/Min value is changed by Sweep Time or Frequency Span.
Preset	After a preset, all markers are turned OFF, so Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

### Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value, the remote programmer must also know what the analyzer's Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- **Absolute** result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is Delta.

- **Relative** result: if a marker's control mode is Delta, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker.

Mode	GSM
Remote Command	:CALCulate:EORFspectr:MARKer[1] 2 ...12:Y?
Example	CALC:EORFspectr:MARK11:Y?
Notes	The query returns the marker Y-axis result. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Preset	0
State Saved	No
<b>Backwards Compatibility SCPI</b>	:CALCulate:EORFspectr:MARKer[1] 2 ...4:FUNction:RESult?
Initial S/W Revision	Prior to A.02.00

### Marker State (Backwards Compatibility/Remote Command Only)

Sets or queries the state of a marker. Setting a marker which is OFF to state ON or 1 puts it in Normal mode and places it at the center of the screen.

Mode	EDGE GSM
<b>Remote Command</b>	:CALCulate:EORFspectr:MARKer[1] 2 ...12:STATe OFF ON 0 1 :CALCulate:EORFspectr:MARKer[1] 2 ...12:STATe?
<b>Example</b>	CALC:EORF:MARK3:STAT ON
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Marker Function

There is no functionality for this Front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM
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## Marker To

There is no functionality for this Front-panel key in this measurement. Pressing this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM
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## Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

**NOTE**

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

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Key Path	Front-panel key
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### Remote Measurement Functions

This section contains the following topics:

"Measurement Group of Commands" on page 1579

"Current Measurement Query (Remote Command Only)" on page 1581

"Limit Test Current Results (Remote Command Only)" on page 1581

"Data Query (Remote Command Only)" on page 1581

"Calculate/Compress Trace Data Query (Remote Command Only)" on page 1582

"Calculate Peaks of Trace Data (Remote Command Only)" on page 1587

"Hardware-Accelerated Fast Power Measurement (Remote Command Only)" on page 1588

"Format Data: Numeric Data (Remote Command Only)" on page 1602

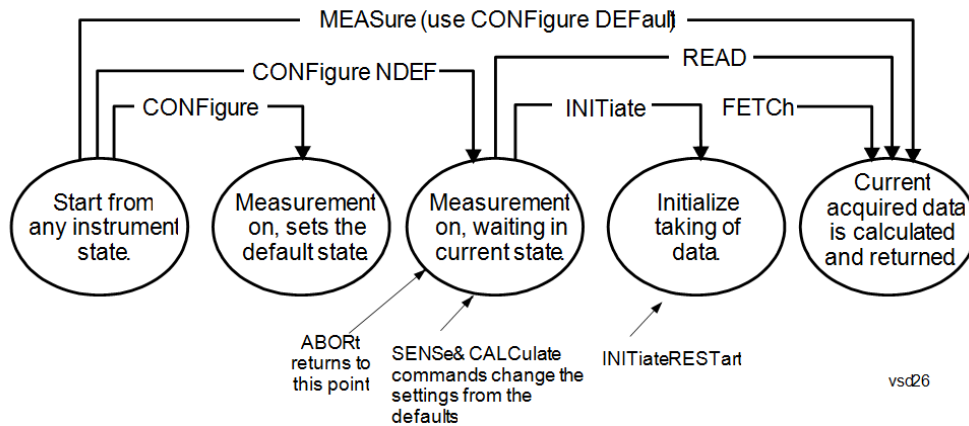
"Format Data: Byte Order (Remote Command Only)" on page 1603

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## Measurement Group of Commands




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### Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

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### Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

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the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTInuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

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#### Fetch Commands:

:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

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#### INITiate Commands:

:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
- For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
- Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
- If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.

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#### READ Commands:

:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
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measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
  - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
  - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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### Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

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<b>Remote Command</b>	:CONFigure?
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<b>Example</b>	CONF?
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### Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

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<b>Remote Command</b>	:CALCulate:CLIMits:FAIL?
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<b>Example</b>	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.
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### Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

<b>Remote Command</b>	:CALCulate:DATA[n]?
<b>Notes</b>	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement.
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### Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

<b>Remote Command</b>	:CALCulate:DATA<n>:COMPRESS? BLOCK   CFIT   MAXimum   MINimum   MEAN   DMEan   RMS   RMSCubed   SAMPLE   SDEVIation   PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]
<b>Example</b>	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
<b>Notes</b>	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters.  This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
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- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

**NOTE** If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where  $|X_i|$  is the magnitude of an I/Q pair, and  $n$  is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$\text{DME} = 10 \times \log_{10} \left( \frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

**NOTE**

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$\text{RMS} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPLe - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where  $X_i$  is a data point value,  $\bar{X}$  is the arithmetic mean of the data point values for the specified region (s), and  $n$  is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where  $|X_i|$  is the magnitude of an I/Q pair,  $\bar{X}$  is the mean of the magnitudes for the specified region(s), and  $n$  is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ( $n=0$ ) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

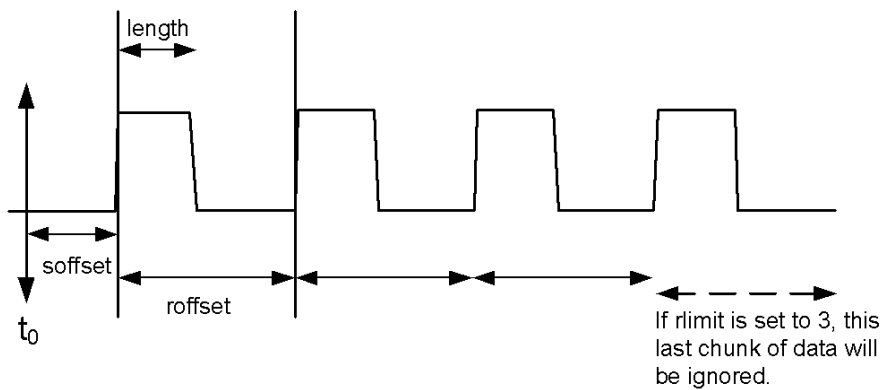
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where  $Y_i$  is the unwrapped phase of I/Q pair with applying frequency correction and  $n$  is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

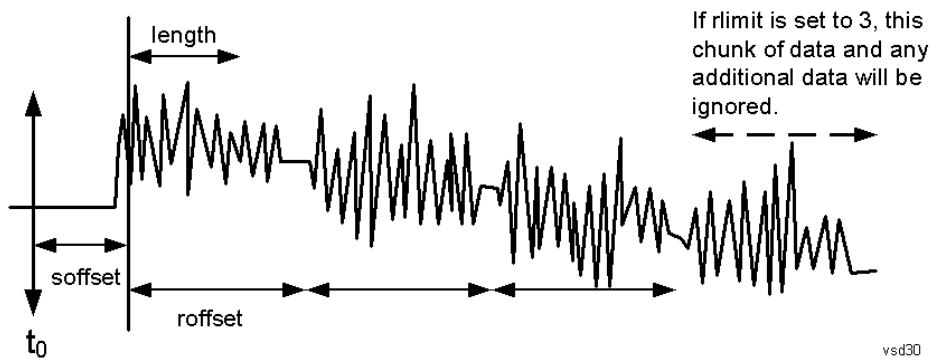
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



### Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

## Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

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<b>Remote Command</b>	<p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME[,ALL   GTDLine   LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME]</pre>
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<b>Example</b>	<p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p>
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<b>Notes</b>	<p>&lt;n&gt; - is the trace that will be used</p> <p>&lt;threshold&gt; - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p>&lt;excursion&gt; - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p>
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excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported

Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQUENCY - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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### Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

### Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

---

Mode	All
Remote Command	:CALCulate:FPOWer:POWer[1,2,...,999]:RESet
Example	:CALC:FPOW:POW1:RES

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Notes	Option FP2 is required.
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### Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWer[1,2,...,999]:DEFine "configuration string"
<b>Example</b>	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
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### Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
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### Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
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## DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
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## DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
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## Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	<p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p>
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	<p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p>
Preset	0 dB
Range	0 – 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

## IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

## IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

## Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

### Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

### Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

### Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

#### Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

#### Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	-5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

#### Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

### Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

### Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 - 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

### Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

### Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)



Default Unit	Boolean
Initial S/W Revision	A.14.00

### Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1 e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

### Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 - 1.0
Initial S/W Revision	A.14.00

### Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	<p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p>
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

### Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	<p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p>
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	<p>This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.</p>

Preset	[0.99]
Range	0 – 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

```

M All
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R :CALCulate:FPOWER:POWER[1,2,...,999]:DEFine?
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m
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t
e
C
o
m
m
a
n
d
E :CALC:FPOW:POW1:DEF?
x
a
m

```

```

p
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N This command query is used to retrieve a list of all defined parameters in an ASCII format.
o The following is an example of the returned results:
t "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset
e =0,UsePreSelector=False,ExternalReferenceFrequency=10000000,FrequencyReferenceSource=AutoExternalFrequencyRefer
s ence,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=1000000000,Resolution
BW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=
[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-
3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False
e,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"
I A.14.00
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```

### Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:CONFigure
<b>Example</b>	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:INITiate
<b>Example</b>	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:FETCh?
<b>Example</b>	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

### Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]?
<b>Example</b>	:CALC:FPOW:POW1?
Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

### Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
<b>Example</b>	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

### Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
<b>Example</b>	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] 3. Declared function result for the 2nd specified channel [4 byte float] ... (m + 1). Declared function result for the last (mth) specified channel [4 byte float] ADC Over Range 1. ADC over-range occurred (1: true, 0: false) [2 byte short]

	<p>Spectrum Data</p> <ol style="list-style-type: none"> <li>1. Number of points in the spectrum data, k [4 byte int]</li> <li>2. Start frequency of spectrum data (Hz) [8 byte double]</li> <li>3. Step frequency of spectrum data (Hz) [8 byte double]</li> <li>4. FFT bin at 1st point (dBm) [4 byte float]</li> <li>5. FFT bin at 2nd point (dBm) [4 byte float]</li> <li>...</li> <li>(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]</li> </ol>
Initial S/W Revision	A.14.00

### Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

<b>Remote Command</b>	<pre>:FORMat[:TRACe][:DATA] ASCii INTeger,32 REAL,32 REAL,64 :FORMat[:TRACe][:DATA]?</pre>
Notes	<p>The query response is:</p> <pre>ASCii: ASC,8 REAL,32: REAL,32 REAL,64: REAL,64 INTeger,32: INT,32</pre> <p>When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm).</p> <p>The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.</p>
Dependencies	<p>Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL).</p> <p>Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".</p>
Preset	ASCii
Backwards Compatibility Notes	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
Initial S/W Revision	Prior to A.02.00

The specs for each output type follow:

AScii - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

### Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

<b>Remote Command</b>	:FORMat:BORDER NORMAL   SWAPped :FORMat:BORDER?
<b>Preset</b>	NORMal
<b>Initial S/W Revision</b>	Prior to A.02.00



## Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Avg/Hold Num

Specifies the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On – Sets measurement averaging on.
- Off – Sets measurement averaging off.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	[:SENSe]:EORFspectr:AVERage:COUNT <integer> [:SENSe]:EORFspectr:AVERage:COUNT? [:SENSe]:EORFspectr:AVERage[:STATe] OFF ON 0 1 [:SENSe]:EORFspectr:AVERage[:STATe]?
<b>Example</b>	EORF:AVER:COUN 3 EORF:AVER:COUN? EORF:AVER ON EORF:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	20 ON
State Saved	Saved in instrument state.
Range	1 to 10000
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

### Meas Type

Selects the measurement type.

Key	SCPI	Type
Mod & Switch	MSWitching	Performs both Modulation and Switching measurements.
Modulation	MODulation	Measures the spectrum due to the 3/8pi shift 8PSK modulation and noise.
Switching	SWITching	Measures the spectrum due to switching transients (burst ramping).
Full Frame Modulation (FAST)	FFModulation	Improves measurement speed by acquiring a full frame of data prior to performing the FFT calculation. This feature can only be used when all slots in the transmitted frame are active.

Key Path	Meas Setup
Mode	GSM
Remote Command	[[:SENSE]:EORFspectr:TYPE MODulation   MSWitching   SWITching   FFModulation [:SENSE]:EORFspectr:TYPE?
Example	EORF:TYPE MOD EORF:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. If a grayed out selection is chosen via SCPI command, it is ignored (no error)
Dependencies	When "Meas Method" on page 1015 is set to SWEpt, the Mod & Switch and Full Frame Mod(FAST) selection keys are grayed out. When "Meas Method" on page 1015 is set to Single Offset, the Full Frame Mod selection key is grayed out.
Preset	MODulation
State Saved	Saved in instrument state.
Range	Mod & Switch Modulation Switching Full Frame Mod (FAST)
Initial S/W Revision	Prior to A.02.00

## Modulation

Opens a menu of keys that allows you to specify parameters for Modulation.

Key Path	Meas Setup, Meas Type
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Fast Avg

Allows you to change the On/Off state of fast averaging.

Fast average method shortens the measurement speed of spectrum due to modulation when averaging is On. This method halves the actual number of average and measures 10 ~ 90 % of the useful part of the time slot excluding midamble. When this state is set to Off, 50 ~ 90 % of the useful part of the time slot excluding midamble will be measured and actual average number will be the same as the Avg/Hold Num.

<b>Key Path</b>	Meas Setup, Meas Type, Modulation
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:AVErAge:FAST[:STATe] OFF ON 0 1 [ :SENSe ] :EORFspectr:AVErAge:FAST[:STATe] ?
<b>Example</b>	EORF:AVER:FAST ON EORF:AVER:FAST?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	This parameter is available when: <ul style="list-style-type: none"> <li>• Avg/Hold Num is set to more than 2 and the state is On</li> <li>• Meas Type is set to Modulation</li> <li>• Meas Method is set to Multi Offset or Single Offset.</li> </ul>
<b>Preset</b>	ON
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	On Off
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	A.03.00, A.06.00

## Switching

Opens a menu of keys that allows you to specify parameters for Switching.

<b>Key Path</b>	Meas Setup, Meas Type
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	A.06.00

## Fast Peak Det

Allows you to change the On/Off state of fast peak detection.

Fast peak detection method shortens the measurement speed of spectrum due to switching when averaging is On. This method reduces the actual number of average and measures more than 2 slots at one measurement cycle.

<b>Key Path</b>	Meas Setup, Meas Type, Switching
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:DETEctor:SWITChing:FAST[:STATe] ON   OFF   1   0

	<code>[ :SENSe] :EORFspectr:DETEctor:SWITching:FAST [ :STATe] ?</code>
<b>Example</b>	EORF:DET:SWIT:FAST ON EORF:DET:SWIT:FAST?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	This parameter is available when - Avg/Hold Num is set to more than 2 and the state is On. - Meas Type is set to Switching. - Meas Method is set to Multi Offset or Single Offset.
<b>Preset</b>	ON
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	On Off
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	A.03.00, A.06.00

## Mod Average

Allows you to select the type of averaging method when measuring the spectrum due to modulation.

Pwr Avg (RMS) - True power averaging that is equivalent to taking the RMS value

Log-Pwr Avg (Video) - Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power. (This is known as video averaging.)

This parameter determines how to average the results of spectrum due to modulation (Avg/Hold Num).

Key	SCPI	Operation
Log-Pwr Avg (Video)	LOG	The log of the power is averaged. (This is also known as video averaging.)
Pwr Avg (RMS)	RMS	The power is averaged, providing the rms of the voltage.

<b>Key Path</b>	Meas Setup
<b>Mode</b>	GSM
<b>Remote Command</b>	<code>[ :SENSe] :EORFspectr:AVERage:MODulation:TYPE LOG RMS</code> <code>[ :SENSe] :EORFspectr:AVERage:MODulation:TYPE?</code>
<b>Example</b>	EORF:AVER:MOD:TYPE LOG EORF:AVER:MOD:TYPE?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	This parameter is valid when the Meas Type is set to Modulation or Mod/Switch. Otherwise grayed out.
<b>Preset</b>	LOG
<b>State Saved</b>	Saved in instrument state.

Range	Pwr Avg (RMS) Log-Pwr Avg (Video)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.06.00

## Power Ref Carrier

Opens a menu of keys that allows you to specify parameters for power reference carrier.

Key Path	Meas Setup
Initial S/W Revision	A.06.00

## Power Ref Carrier Type

Allows you to select which carrier power should be used as reference when the Mod Ref Pwr Auto or the Switch Ref Pwr Auto is set to true.

Key	SCPI	Type
Ref Carrier	REF	Ref Carrier – Uses the power of the carrier indicated by Ref Carrier as reference.
Max Power Carrier	MAX	Max Power Carrier – Uses the power of the carrier with the highest power as reference.

Key Path	Meas Setup, Power Ref Carrier
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :EORFspectr:CARRier:PREFerence:TYPE REF MAX</code> <code>[ :SENSe ] :EORFspectr:CARRier:PREFerence:TYPE?</code>
<b>Example</b>	EORF:CARR:PREF:TYPE REF EORF:CARR:PREF:TYPE?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	MAX
State Saved	Saved in instrument state.
Range	Ref Carrier Max Power Carrier
Initial S/W Revision	A.06.00

## Mod Ref Power

Allows you to manually set the modulation reference power for each Meas Method

Key Path	Meas Setup, Power Ref Carrier
Mode	GSM
<b>Remote Command</b>	[:SENSe]:EORFspectr:MODulation:RPOWer <ampl> [:SENSe]:EORFspectr:MODulation:RPOWer? [:SENSe]:EORFspectr:MODulation:RPOWer:AUTO[:STATe] OFF   ON   0   1 [:SENSe]:EORFspectr:MODulation:RPOWer:AUTO[:STATe]?
<b>Example</b>	EORF:MOD:RPOW -20 EORF:MOD:RPOW? EORF:MOD:RPOW:AUTO 0 EORF:MOD:RPOW:AUTO?
Preset	-250 ON
State Saved	Saved in instrument state.
Min	-250
Max	250
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.06.00

## Switching Ref Power

Allows you to manually set the switching reference power for each Meas Method.

Key Path	Meas Setup, Power Ref Carrier
Mode	GSM
<b>Remote Command</b>	[:SENSe]:EORFspectr:SWITching:RPOWer <ampl> [:SENSe]:EORFspectr:SWITching:RPOWer [:SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe] OFF ON 0 1 [:SENSe]:EORFspectr:SWITching:RPOWer:AUTO[:STATe]?
<b>Example</b>	EORF:SWIT:RPOW -20 EORF:SWIT:RPOW? EORF:SWIT:RPOW:AUTO 0 EORF:SWIT:RPOW:AUTO?
Preset	-250 ON
State Saved	Saved in instrument state.
Min	-250
Max	250
Initial S/W Revision	A.02.00
Modified at S/W Revision	A.06.00

## Meas Method

Selects the measurement method.

Key	SCPI	Method
Multi-Offset	MULTiple	The measurement is done at all offsets in the offset frequency list.
Single Offset (Examine)	SINGLE	The measurement is done at only one offset as determined by the offset frequency setting. This allows detailed examination of the time-domain waveform at the specified offset frequency.
Swept	SWEPT	The measurement is done in the frequency domain. For output RF spectrum due to modulation it is done using time-gated spectrum analysis to sweep the analyzer with the gate turned on for the desired portion of the burst only.

Key Path	Meas Setup
Mode	GSM
Remote Command	[ :SENSe ] :EORFspectr:MEASure MULTiple SINGLE SWEPT [ :SENSe ] :EORFspectr:MEASure?
Example	EORF:MEAS SING EORF:MEAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. If a grayed out selection is chosen via SCPI command, it is ignored (no error). When "Select Modulation Method" is set to DISCcrete, this parameter is forced to MULTiple. When "Select Modulation Method" is set to SWEPT and Meas Type is set to Modulation or Switching, this parameter is forced to SWEPT
Preset	MULTiple
State Saved	Saved in instrument state.
Range	Multi Offset Single Offset (Examine) Swept
Readback Text	<b>Multi Offset:</b> [xxxx] where xxxx is the type of Multi-Offset Freq List: Standard  Short  Custom <b>Single Offset:</b> (Examine) [xxxx] where xxxx is the value of the Single Offset Freq <b>Swept:</b> [WB Noise: xxxx] where xxxx is the state ON/OFF of Wideband Noise
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Offset Frequency List

### Frequency list items for Single Carrier

Allows you to select the type of a frequency list used for Multi Offset for Single Carrier. You can select a Standard, Short, or Custom frequency list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets (kHz)
Standard	100, 200, 250, 400, 600, 800, 1000, 1200, 1400, 1600, 1800, 3000, 6000	400, 600, 1200, 1800
Short	200, 250, 400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800

Select the list of settings that are used to make the EORFspectr measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the EORFspectr measurement.

- CUSTom – uses the four user-defined lists that specify:
  - Offset frequencies for modulation spectrum measurement
  - Corresponding resolution bandwidths for each of the modulation offset frequencies
  - Offset frequencies for switching transient spectrum measurement
  - Corresponding resolution bandwidths for each of the switching transient offset frequencies
- SHORt – a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSE:EORFspectr subsystem.
- STANdard – the complete list of the offset frequencies specified in the GSM Standards, except for those offsets greater than 6 MHz. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSE:EORFspectr subsystem.

### Frequency list items for Multi Carrier

Allows you to select the type of a frequency list used for Multi Offset for Multi Carrier. You can select a Standard, Short, or Custom frequency list as shown in the table below.

Allows you to select the type of a frequency list used for Multi Offset for Multi Carrier. You can select a Standard, Short, Custom, or Limited Custom frequency list as shown in the table below.

List	Modulation Offsets (kHz)	Switching Transients Offsets
------	--------------------------	------------------------------



		(kHz)
Standard (Non Contiguous and Inner)	400, 600, 1200, 1800, 2000, 2200, 2400, 2600, and offsets that meet the following conditions. (1) The frequency point is between 2600 kHz (exclusive) above the uppermost carrier in lower group and 2600 kHz (exclusive) below the lowermost carrier in upper group. (2) The frequency point corresponds to the center frequency of one of IM products. (3) The number of offsets is less than 15.	400, 600, 1200, 1800
Standard (Except for the above)	400, 600, 1200, 1800, and offsets that meet the following conditions. (1) The frequency point is between 10 MHz below/above the lower/upper edge of operating band and 1.8 MHz (exclusive) below/above the lowermost/uppermost carrier (2) The frequency point corresponds to the center frequency of one of IM products. (3) The number of offsets is less than 15.	400, 600, 1200, 1800
Short	400, 600, 1200, 1800	400, 600, 1200, 1800
Custom	User-defined list that specifies: Offset Freq, RES BW, Limit Offsets, Meas Type, Initialized to be the same as the standard list Mod RBW, SW Trans RBW	400, 600, 1200, 1800
Limited Custom	User-defined list that specifies: Only Offset Freq The following SCPI command is used to specify a list of User-defined offset frequencies. “[:SENSe]:EORFspectr:MCARrier:LCUStom:LIST:COFREquency”	400, 600, 1200, 1800

Select the list of settings that are used to make the EORFspectr measurement. This specifies standard or customized lists and short lists. The lists contain the offset frequencies (and bandwidths) that are used for the modulation spectrum and transient spectrum parts of the EORFspectr measurement.

- CUSTom – uses the four user-defined lists that specify:
  - Offset frequencies for modulation spectrum measurement
  - Corresponding resolution bandwidths for each of the modulation offset frequencies
  - Offset frequencies for switching transient spectrum measurement
  - Corresponding resolution bandwidths for each of the switching transient offset frequencies
- SHORt - a shortened list of the offset frequencies specified in the GSM Standards. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSe:EORFspectr subsystem.

- **STANdard** – a list of the offset frequencies specified in the GSM Standard and the offset frequencies that correspond to IM products. It uses two internal offset frequency lists, one for modulation spectrum and the other for switching transient spectrum. These offset frequencies cannot be changed, but the resolution bandwidths can be changed by other commands in the SENSE:EORFspectr subsystem.
- **LCUStom** – a list of user specified offset frequencies. The difference between CUSTom and LCUStom is the user can specify only the offset frequencies in LCUStom. In other words, the user cannot specify resolution bandwidth or limit level for each of the offset frequencies in LCUStom.

<b>Key Path</b>	Meas Setup, Meas Method, Multi Offset
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr :LIST :SElect CUSTom   SHORt   STANdard   LCUStom [ :SENSe ] :EORFspectr :LIST :SElect ?
<b>Example</b>	EORF:LIST:SEL CUST EORF:LIST:SEL?
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Preset</b>	SHORt
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	Standard Freq List Short Freq List Custom Freq List Limited Custom Freq List
<b>Initial S/W Revision</b>	Prior to A.02.00
<b>Modified at S/W Revision</b>	A.14.00

### Min Freq Using Direct Time

Allows you to select the transition frequency (the first offset frequency) where the Direct Time Domain method is used instead of the FFT method. The Direct Time Domain offers a high dynamic range and the measurement speed is faster at a few offset frequencies. The FFT method has a moderate dynamic range (generally sufficient when the RBW = 30 kHz) and the measurement speed is much faster at many offset frequencies. The FFT method uses 5-pole sync-tuned filters, as required by the standards, while the Direct Time method does not. The use of 5-pole sync-tuned filters is critical at close-in offsets, such as 250 kHz and lower, because the measurement standards as written usually test the analyzer filter shape instead of the device under test. At 600 kHz offsets and above, the shape of the filters is unimportant, only their noise bandwidth and impulse bandwidth matter. At 400 kHz offset, the shape matters somewhat; therefore, the best agreement between different pieces of measurement equipment requires that the 400 kHz offset be measured with the FFT method.

<b>Key Path</b>	Meas Setup, Meas Method, Multi Offset
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr :BFRequency <freq> [ :SENSe ] :EORFspectr :BFRequency ?
<b>Example</b>	EORF:BFR 600e3 EORF:BFR?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Grayed out unless "Meas Method" on page 1015 is set to MULTiple and "Meas Type" on page 1009 is set to MSWitching or MODulation.
Preset	600 kHz
State Saved	Saved in instrument state.
Min	0 kHz
Max	6.2MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00, A.14.00

## Single Offset

Opens a menu of keys that allows you to specify parameters for Multi Offset measurement method.

Key Path	Meas Setup, Meas Method
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Single Offset Freq

Allows you to specify a frequency offset from the carrier at which a single offset Output RF Spectrum measurement is performed.

Key Path	Meas Setup, Meas Method, Single Offset
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:OFRequency <freq> [ :SENSe ] :EORFspectr:OFRequency?
<b>Example</b>	EORF:OFR 250kHz EORF:OFR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	250 kHz
State Saved	Saved in instrument state.
Min	-12.0 MHz
Max	+12.0 MHz
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

### Ref Pwr Avg

Allows you to specify how many averages you want to execute when measuring the reference power. This parameter is valid when the Meas Method is set to Single. Set to ON to use the same number of averages as specified in the number of bursts averaged command. Set to OFF to use the number specified in the reference power averages command.

Key Path	Meas Setup, Meas Method, Single Offset
Mode	GSM
Remote Command	[:SENSe]:EORFspectr:REFerence:AVERage:COUNT <integer> [:SENSe]:EORFspectr:REFerence:AVERage:COUNT? [:SENSe]:EORFspectr:REFerence:AVERage[:AUTO] ON OFF 1 0 [:SENSe]:EORFspectr:REFerence:AVERage[:AUTO]?
Example	EORF:REF:AVER:COUN 10 EORF:REF:AVER:COUN? EORF:REF:AVER OFF EORF:REF:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SELEct to set the mode.
Dependencies	This parameter is valid when the Meas Method is set to Single. Otherwise grayed out.
Preset	10 ON
State Saved	Saved in instrument state.
Min	1
Max	1000
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00, A.06.00

### Swept

Opens a menu of keys that allows you to specify parameters for Swept measurement method.

Key Path	Meas Setup, Meas Method
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

### Wideband Noise

Allows you to select whether to use the wideband noise function:

- OFF - the analyzer is tuned to the carrier and the sweep is performed as follows.

- Single Carrier: –1800 kHz to +1800 kHz on either side of the center frequency is swept with the bandwidth of 30 kHz.
- Multi Carrier:
  - Non-Contiguous Inner Mode: –400 kHz to +400 kHz from the center frequency of the lowermost and the uppermost carrier is swept with the bandwidth of 30 kHz.
  - Other: –1800 kHz to +1800 kHz from the center frequency of the lowermost and the uppermost carrier is swept with the resolution bandwidth of 30 kHz.
- ON – the span is extended until 2 MHz (10 MHz for Multi Carrier) outside the edge of the relevant Tx band. For single carrier, the power is measured with the resolution bandwidth of 100 kHz for frequency offsets 1800 kHz up to 2 MHz outside either side of the Tx band. The limit mask is changed accordingly to exclude between –1800 kHz (exclusive) to +1800 kHz (exclusive) on either side of the center frequency. For multi carrier, the power is measured as follows.

For frequency offsets from the centre frequency of the uppermost and lowermost active carrier of more than 6 MHz,

–Within a 600 kHz band centered at the centre frequencies of the intermodulation components, the power is measured with a measurement bandwidth of 300 kHz.

–For offsets outside the 600 kHz bands around the centre frequencies of the intermodulation components, the power is measured with a measurement bandwidth of 100 kHz.

For frequency offsets from the centre frequency of the uppermost and lowermost active carrier of 1.8 MHz up to and including 6 MHz, the power is measured with a measurement bandwidth of 100 kHz.

See "[Limit Test Region for the Swept Method](#)" on page 1023 for more details.

Key Path	Meas Setup, Meas Method
Mode	GSM
Remote Command	<code>[ :SENSe ] :EORFspectr:WBNoise ON OFF 1 0</code> <code>[ :SENSe ] :EORFspectr:WBNoise?</code>
Example	EORF:WBN ON EORF:WBN?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This function is effective only when " <a href="#">Meas Method</a> " on page 1015 is Swept and " <a href="#">Meas Type</a> " on page 1009 is Modulation. When Wideband Noise is ON, the sweep start/stop frequency is determined by the Radio Band parameter.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00, A.08.00

## Custom Offset Frequency List for Limited Custom

Allows you to specify a list of custom offset frequencies for the limited custom list.

Key Path	SCPI only
Mode	GSM
Remote Command	<code>[ :SENSe ] :EORFspectr:MCARrier:LCUStom:LIST:COFRequency &lt;freq&gt;, ...</code> <code>[ :SENSe ] :EORFspectr:MCARrier:LCUStom:LIST:COFRequency?</code>
Example	<code>EORF:MCAR:LCUS:LIST:COFR 600e3, 1200e3, 2400e3, 4800e3</code> <code>EORF:MCAR:LCUS:LIST:COFR?</code>
Notes	You can specify a maximum of 40 offset frequencies in the modulation measurement. This command is available when all the following conditions are met. <ul style="list-style-type: none"> <li>• The number of carriers is greater than one.</li> <li>• (CHAN:CARR:COUN n, where n &gt; 1)</li> <li>• The state of the test limit exception is set to On. (EORF:MCAR:LEXC ON).</li> <li>• The type of the multicarrier limit exception rule is set to Custom. (EORF:MCAR:LEXC:RULE CUST)</li> <li>• The type of a frequency list for multi offset is set to Limited Custom. (EORF:LIST:SEL LCUS)</li> </ul>
Preset	400 kHz, 600 kHz, 1200 kHz, 1800 kHz
State Saved	Saved in instrument state.
Initial S/W Revision	A.14.00

## Non-Contiguous Meas Region

Selects the region to measure for the non-contiguous frequency allocation from either inner or outer.

Key Path	Meas Setup
Mode	GSM
Remote Command	<code>[ :SENSe ] :EORFspectr:NCONtiguous:REGion INNer OUTer</code> <code>[ :SENSe ] :EORFspectr:NCONtiguous:REGion?</code>
Example	<code>EORF:NCON:REG INN</code> <code>EORF:NCON:REG?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This function is effective only when the number of active carriers is more than one.
Preset	INNer
State Saved	Saved in instrument state.
Range	Inner Outer
Initial S/W Revision	A.07.00

## Offset Frequency

The definition of offset frequency differs depending on the setting of the Non-Contiguous Meas Region. When it is set to Inner, the Lower/Upper offset frequency is defined as frequency offset from the uppermost/lowermost carrier of the lower/upper group, whose value is positive/negative. When it is set to Outer, meanwhile, the Lower/Upper offset frequency is defined as frequency offset from the lowermost/uppermost carrier, whose value is negative/positive.

The figure below shows Lower/Upper Offset Frequency Definition for Non-Contiguous Frequency Allocation.

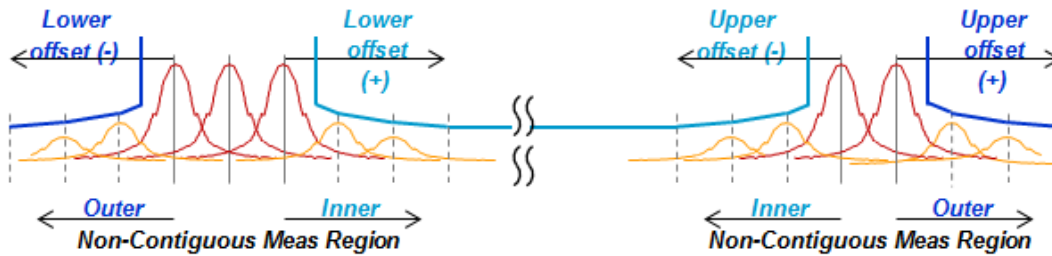


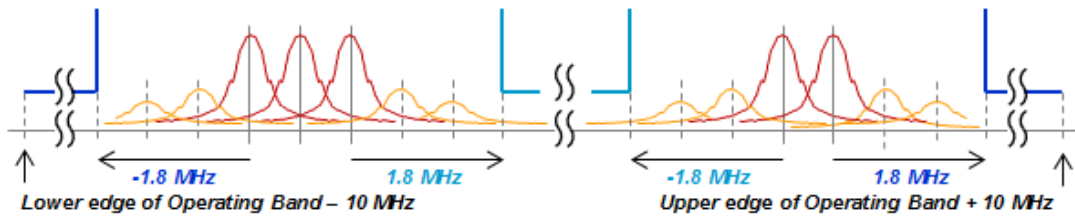
Figure 0-1 Lower/Upper Offset Frequency Definition for Non-Contiguous Frequency Allocation

## Limit Test Region for the Swept Method

The limit test region for the Swept method differs depending on the settings of both the Non-Contiguous Meas Region and the Wideband Noise.

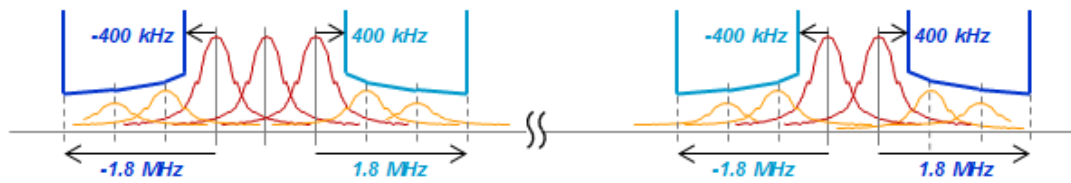
Wideband Noise	Non-Contiguous Meas Region	Limit Test to be Performed
ON (See "The Limit Test Region for the Wideband Noise ON" on page 1024)	Inner	Frequency offsets between 1.8 MHz (inclusive) above the uppermost carrier in lower group and 1.8 MHz (inclusive) below the lowermost carrier in upper group.
	Outer	Frequency offsets between lower/upper edge of operating band $\pm$ 10 MHz and 1.8 MHz (inclusive) below/above the lowermost/uppermost carrier.
OFF (See "The Limit Test Region for the Wideband Noise OFF" on page 1024)	Inner	Frequency offsets between 400 kHz and 1.8 MHz (exclusive) above/below the uppermost/lowermost carrier in lower/upper group.
	Outer	Frequency offsets between 400 kHz and 1.8 MHz (exclusive) below/above the lowermost/uppermost carrier.

The figure below shows the Limit Region for the Wideband Noise ON.



### The Limit Test Region for the Wideband Noise ON

The figure below shows the Limit Region for the Wideband Noise OFF.



### The Limit Test Region for the Wideband Noise OFF

#### Advanced

Opens a menu of keys that allows you to specify parameters for advanced features that are recommended for use only by advanced users.

Key Path	Meas Setup
Initial S/W Revision	Prior to A.02.00

### Modulation Meas BWs

Opens a menu of keys that allows you to specify parameters for bandwidth for the modulation measurement. There are four sections as listed below.

- Carrier RBW (For Modulation Meas BWs)
- <= 1800 kHz Offset RBW (for Modulation Meas BWs)
- >1800 kHz Offset RBW (for Modulation Meas BWs)
- >6000 kHz Offset RBW (for Modulation Meas BWs)

This menu key is grayed out when:

- "Meas Type" on page 1009 is Switching, or
- Multi-Offset Freq List is Custom, or
- "Meas Method" on page 1015 is Swept.

When Carrier is set to 1, the bottom key (i.e. >6000 kHz Offset RBW) is grayed out.



Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

### Carrier RBW (for Modulation Meas BWs)

Allows you to manually set the bandwidth for measuring the carrier when measuring spectrum due to modulation and wideband noise. When you select Auto, the following bandwidth is used.

Frequency Offset	Frequency Point	Bandwidth
<1.8 MHz	-	30 kHz
1.8 MHz ~ 6 MHz	Within 600 kHz band centered at the center frequency of the intermodulation components	100 kHz
	Outside 600 kHz bands around the center frequency of the intermodulation components	30 kHz
> 6 MHz	Within 600 kHz band centered at the center frequency of the intermodulation components	300 kHz
	Outside 600 kHz bands around the center frequency of the intermodulation components	30 kHz

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
Remote Command	<pre>[ :SENSe]:EORFspectr:BAWdth[:RESolution]:MODulation:CARRier &lt;freq&gt; [:SENSe]:EORFspectr:BAWdth[:RESolution]:MODulation:CARRier? [:SENSe]:EORFspectr:BAWdth[:RESolution]:MODulation:CARRier:AUTO OFF   ON   0   1 [:SENSe]:EORFspectr:BAWdth[:RESolution]:MODulation:CARRier:AUTO?</pre>
Example	<pre>EORF:BAND:MOD:CARR 30e3 EORF:BAND:MOD:CARR? EORF:BAND:MOD:CARR:AUTO 0 EORF:BAND:MOD:CARR:AUTO?</pre>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 1016 Standard or Short, and not with Custom.
Preset	30 kHz ON
State Saved	Saved in instrument state.
Min	1 kHz

Max	5 MHz
<b>Backwards Compatibility SCPI</b>	<code>[ :SENSe ] :EORFspectr :BWIDth [ :RESolution ] :MODulation :CARRier</code>
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

#### < 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies less than 1800 kHz.

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :EORFspectr :BANDwidth [ :RESolution ] :MODulation :OFFSet :CLOSe</code> <freq>  <code>[ :SENSe ] :EORFspectr :BANDwidth [ :RESolution ] :MODulation :OFFSet :CLOSe?</code>
<b>Example</b>	EORF:BAND:MOD:OFFS:CLOS 30 kHz EORF:BAND:MOD:OFFS:CLOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SELEct to set the mode.
Dependencies	This parameter is only used with the <a href="#">"Offset Frequency List" on page 1016</a> Standard or Short, and not with Custom.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
<b>Backwards Compatibility SCPI</b>	<code>[ :SENSe ] :EORFspectr :BWIDth [ :RESolution ] :MODulation :OFFSet :CLOSe</code>
Initial S/W Revision	Prior to A.02.00

#### >= 1800 kHz Offset RBW (for Modulation Meas BWs)

Sets the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies greater than or equal to 1800 kHz.

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :EORFspectr :BANDwidth [ :RESolution ] :MODulation :OFFSet :FAR [1]</code> <freq>  <code>[ :SENSe ] :EORFspectr :BANDwidth [ :RESolution ] :MODulation :OFFSet :FAR [1] ?</code>
<b>Example</b>	EORF:BAND:RES:MOD:OFFS:FAR 30 kHz

	EORF:BAND:RES:MOD:OFFS:FAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 1016 Standard or Short, and not with Custom.
Preset	100 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :EORFspectr:BWIDth [ :RESolution ] :MODulation:OFFSet:FAR
Initial S/W Revision	Prior to A.02.00

### > 6000 kHz IM Offset RBW (for Modulation Meas BWs)

Allows you to specify the resolution bandwidth used for the spectrum due to modulation part of the ORFS measurement for offset frequencies greater than 6 MHz.

Key Path	Meas Setup, Advanced, Modulation Meas BWs
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:Bandwidth [ :RESolution ] :MODulation:OFFSet:IM:FAR2 <freq>  [ :SENSe ] :EORFspectr:Bandwidth [ :RESolution ] :MODulation:OFFSet:IM:FAR2?
<b>Example</b>	EORF:BAND:RES:MOD:OFFS:IM:FAR2 300 kHz EORF:BAND:RES:MOD:OFFS:IM:FAR2?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 1016 Standard or Short, and not with Custom.  If there is only one carrier, this key will be grayed out.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Initial S/W Revision	A.06.00

## Switching Meas BWs

Accesses a menu with the following sections:

- Carrier RBW (For Modulation Meas BWs)
- < 1800 kHz Offset RBW (for Modulation Meas BWs)

- $\geq 1800$  kHz Offset RBW (for Modulation Meas BWs)
- VBW:3dB RBW (for Switching Meas BWs) – information only. Bandwidth ratio is fixed at 3.

This menu key is grayed out when "Meas Type" on page 1009 is Modulation or Full Frame Mod, or when "Offset Frequency List" on page 1016 is Custom.

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00

### Carrier RBW (for Switching Meas BWs)

Sets the resolution bandwidth for the carrier when measuring spectrum due to switching transients.

Key Path	Meas Setup, Advanced, Switching Meas BWs
Mode	GSM
Remote Command	<code>[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier &lt;freq&gt;</code> <code>[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:CARRier?</code>
Example	EORF:BAND:SWIT:CARR 30e3 EORF:BAND:SWIT:CARR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 1016 Standard or Short, and not with Custom.
Preset	300 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards Compatibility SCPI	<code>[ :SENSe]:EORFspectr:BWIDth[:RESolution]:SWITching:CARRier</code>
Initial S/W Revision	Prior to A.02.00

### < 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies less than 1800 kHz.

Key Path	Meas Setup, Advanced, Switching Meas BWs
Mode	GSM
Remote Command	<code>[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe &lt;freq&gt;</code> <code>[ :SENSe]:EORFspectr:BANDwidth[:RESolution]:SWITching:OFFSet:CLOSe?</code>
Example	EORF:BAND:RES:SWIT:OFFS:CLOS 30 kHz

	EORF:BAND:RES:SWIT:OFFS:CLOS?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 1016 Standard or Short, and not with Custom.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :EORFspectr:BWIDth [ :RESolution ] :SWITching:OFFSet:CLOSE
Initial S/W Revision	Prior to A.02.00

### >= 1800 kHz Offset RBW (for Switching Meas BWs)

Sets the resolution bandwidth used for the spectrum due to switching transients part of the EORFspectr measurement for offset frequencies greater than or equal to 1800 kHz.

Key Path	Meas Setup, Advanced, Switching Meas BWs
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:BWIDth [ :RESolution ] :SWITching:OFFSet:FAR <freq> [ :SENSe ] :EORFspectr:BWIDth [ :RESolution ] :SWITching:OFFSet:FAR?
<b>Example</b>	EORF:BAND:RES:SWIT:OFFS:FAR 30e3 EORF:BAND:RES:SWIT:OFFS:FAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This parameter is only used with the "Offset Frequency List" on page 1016 Standard or Short, and not with Custom.
Preset	30 kHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :EORFspectr:BWIDth [ :RESolution ] :SWITching:OFFSet:FAR
Initial S/W Revision	Prior to A.02.00

### Modulation Custom Offs & Lim

This menu key is available only when the parameters listed below are set to the specified values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch|Modulation|Full Frame Mod

- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

Key Path	Meas Setup, Advanced
Initial S/W Revision	Prior to A.02.00

### Offset

Selects the offset pairs (upper and lower) that affect the menu keys and displays the memory selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

Key Path	Meas Setup, Advanced
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Offset Freq

This parameter defines a custom set of states that defines whether or not the measurement is made on each defined offset frequency. Note that offset frequencies need to be arranged in ascending order from left to right. Otherwise, the analyzer cannot perform measurements properly.

Key	SCPI	Operation
On	ON   1	The measurement is made on the corresponding frequency in Custom Modulation Offset Freq list.
Off	OFF   0	The measurement is skipped for the corresponding frequency in Custom Modulation Offset Freq list.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Mode	GSM
Remote Command	<pre>[[:SENSE]:EORFspectr:LIST:MODulation[:FREQUENCY] &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;,&lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;  [:SENSE]:EORFspectr:LIST:MODulation[:FREQUENCY]?  [:SENSE]:EORFspectr:LIST:MODulation:STATE OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1  [:SENSE]:EORFspectr:LIST:MODulation:STATE?</pre>
Example	EORF:LIST:MOD:FREQ 0.0, 1.0e5, 2.0e5

	EORF:LIST:MOD:FREQ? EORF:LIST:MOD:STAT ON, ON, ON EORF:LIST:MOD:STAT?
Notes	Offset frequencies need to be arranged in ascending order from left to right. Otherwise, the analyzer cannot perform measurements properly. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0.0, 1.0e5, 2.0e5, 2.5e5, 4.0e5, 6.0e5, 8.0e5, 1.0e6, 1.2e6, 1.4e6, 1.6e6, 1.8e6, 3.0e6, 6.0e6, 0.0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Initial S/W Revision	Prior to A.02.00

## Res BW

Defines the custom set of resolution bandwidths for the modulation spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each list must be the same.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Remote Command	[ :SENSe ] :EORFspectr:LIST:MODulation:BANDwidth <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq> [ :SENSe ] :EORFspectr:LIST:MODulation:BANDwidth?
Example	EORF:LIST:MOD:BAND 10e3, 20e3, 10e3 EORF:LIST:MOD:BAND?
Notes	You must be in the GSM, EDGE mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This command is only valid when SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST.
Preset	3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 1.000000000E+05, 1.000000000E+05, 1.000000000E+05, 1.000000000E+05
State Saved	Saved in instrument state.
Min	1 kHz
Max	5 MHz
Backwards	[ :SENSe ] :EORFspectr:LIST:MODulation:BWIDth

### Compatibility SCPI

Initial S/W Revision	Prior to A.02.00
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### Rel Limit Level Offset

Defines the custom set of level offsets for the modulation spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Mode	GSM
Remote Command	<code>[ :SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier] &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;</code>  <code>[ :SENSe]:EORFspectr:LIST:MODulation:LOFFset[:RCARrier]?</code>
Example	<code>EORF:LIST:MOD:LOFF:RCAR 0.0, -2.0, -5.0</code> <code>EORF:LIST:MOD:LOFF:RCAR?</code>
Notes	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead.  This command is only valid if <code>SENS:EORF:MEAS</code> is set to multiple, and the custom list type is selected with <code>SENS:EORF:LIST:SEL CUST</code> .  You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

### Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the modulation spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies to all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Modulation Offset Freq.

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Mode	GSM
Remote Command	<code>[ :SENSe]:EORFspectr:LIST:MODulation:LOFFset:ABSolute &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;</code>



	<pre>ampl&gt;,&lt;rel_ampl&gt;,&lt;rel_ampl&gt;,&lt;rel_ampl&gt;,&lt;rel_ampl&gt;,&lt;rel_ampl&gt;,&lt;rel_ ampl&gt;,&lt;rel_ampl&gt;,&lt;rel_ampl&gt;</pre> <pre>[ :SENSe ] :EORFspectr:LIST:MODulation:LOFFset:ABSolute?</pre>
<b>Example</b>	<pre>EORF:LIST:MOD:LOFF:ABS 0.0, -2.0, -5.0</pre> <pre>EORF:LIST:MOD:LOFF:ABS?</pre>
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SELEct to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

### Apply Level Offset

Key	SCPI	Operation
Rel	RELative	<p>Only Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit.</p> <p>Standard-defined modulation relative test limit does not change.</p> <p>More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.</p>
Both	BOTH	<p>Custom Modulation Relative Limit Level Offsets are applied to standard-defined modulation relative test limit.</p> <p>And, Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit.</p> <p>More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.</p>
Abs	ABSolute	<p>Only Custom Modulation Absolute Limit Level Offsets are applied to standard-defined modulation absolute test limit.</p> <p>Standard-defined modulation absolute test limit does not change.</p> <p>More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.</p>

Key Path	Meas Setup, Advanced, Modulation Custom Offset & Limits
Mode	GSM
Remote Command	<pre>[ :SENSe ] :EORFspectr:LIST:MODulation:APPLy RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute, RELative   BOTH   ABSolute</pre>

	<code>[ :SENSe ] :EORFspectr :LIST :MODulation :APPLy ?</code>
<b>Example</b>	<code>EORF:LIST:MOD:APPL REL, REL, REL</code> <code>EORF:LIST:MOD:APPL?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
<b>Preset</b>	<code>BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH, BOTH</code>
<b>State Saved</b>	Saved in instrument state.
<b>Range</b>	<code>Rel Both Abs</code>
<b>Initial S/W Revision</b>	Prior to A.02.00

### Switching Custom Offs & Lim

This menu key is available only when parameters below are set to the following values at the same time. Otherwise it is grayed out.

- Meas Type: Mod & Switch | Switching
- Meas Method: Multi Offset
- Multi-Offset Freq List: Custom

<b>Key Path</b>	Meas Setup, Advanced
<b>Initial S/W Revision</b>	Prior to A.02.00

### Offset

Selects the offset pairs (upper and lower) that affect the menu keys and displays the memory selection menu from A to O. The memory selection menu allows you to store up to 5 sets of parameter values for the offset pairs, such as Offset Freq, Res BW, Rel Limit Level Offset, Abs Limit Level Offset and Apply Level Offset. Press Offset until the letter selection at a time is shown on this menu key label.

<b>Key Path</b>	Meas Setup, Advanced
<b>Mode</b>	GSM
<b>Initial S/W Revision</b>	Prior to A.02.00

### Offset Freq

Defines the custom set of offset frequencies at which the switching transient spectrum part of the `EORFspectr` measurement is made.

The first offset specified must be 0 Hz, for the carrier. For each offset frequency specified, the power is measured at both the lower and upper offsets. Up to 14 offset frequencies, plus the 0 Hz carrier frequency, may be defined.

For the BAF SCPI command:

Key	SCPI	Operation
On	ON   1	The measurement is made on the corresponding frequency in Custom Switching Offset Freq list.
Off	OFF   0	The measurement is skipped for the corresponding frequency in Custom Switching Offset Freq list.

Key Path	Meas Setup, Advanced, Switching Custom Offsets & Limits
Mode	GSM
Remote Command	<pre>[ :SENSe]:EORFspectr:LIST:SWITching[:FREQuency] &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;, &lt;freq&gt;  [:SENSe]:EORFspectr:LIST:SWITching[:FREQuency]?  [:SENSe]:EORFspectr:LIST:SWITching:STATe OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1, OFF   ON   0   1  [:SENSe]:EORFspectr:LIST:SWITching:STATe?</pre>
Example	<pre>EORF:LIST:SWIT:FREQ 0.0, 1.0e5, 2.0e5 EORF:LIST:SWIT:FREQ? EORF:LIST:SWIT:STAT ON, ON, ON EORF:LIST:SWIT:STAT?</pre>
Notes	<p>This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST.</p> <p>You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</p>
Preset	<pre>0.0, 4.0e5, 6.0e5, 1.2e6, 1.8e6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1</pre>
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	12.0 MHz
Initial S/W Revision	Prior to A.02.00

### Res BW

Defines the custom set of resolution bandwidths for the switching transient spectrum part of the EORFspectr measurement. The first bandwidth specified is for the carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching offset frequency list. The number of items in each list must be the same.

<b>Key Path</b>	Meas Setup, Advanced, Switching Custom Offsets & Limits
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:LIST:SWITching:BAWdth <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>  [ :SENSe ] :EORFspectr:LIST:SWITching:BAWdth?
<b>Example</b>	EORF:LIST:SWIT:BAW 1e3, 1e3,1e3 EORF:LIST:SWIT:BAW?
<b>Notes</b>	This command is only valid if SENS:EORFspectr:MEAS is set to multiple and the custom list type is selected with SENS:EORFspectr:LISE:SEL CUST.  You must be in the GSM, EDGE mode to use this command. Use INSTRument:SElect to set the mode.
<b>Preset</b>	3.000000000E+05, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04, 3.000000000E+04
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	1 kHz
<b>Max</b>	5 MHz
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :EORFspectr:LIST:SWITching:BWIDth
<b>Initial S/W Revision</b>	Prior to A.02.00

### Rel Limit Level Offset

Defines the custom set of level offsets for the switching transient spectrum part of the EORF measurement. This allows you to modify the standard limits by adding a delta amplitude value to them. The first level offset specified must be 0 dB for the carrier. Each level offset in this list corresponds to an offset frequency in the modulation offset frequency list. The number of items in each of these lists must be the same.

<b>Key Path</b>	Meas Setup, Advanced, Switching Custom Offsets & Limits
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:LIST:SWITching:LOFFset[:RCARrier] <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>, <rel_ampl>  [ :SENSe ] :EORFspectr:LIST:SWITching:LOFFset[:RCARrier]?
<b>Example</b>	EORF:LIST:SWIT:LOFF:RCAR 0.0, -2.0, -5.0 EORF:LIST:SWIT:LOFF:RCAR?
<b>Notes</b>	The first element of the parameters must be zero. Otherwise, the Custom freq list is not used, but Standard freq list is used instead.  This command is only valid if SENS:EORF:MEAS is set to multiple, and the custom list type is selected with SENS:EORF:LIST:SEL CUST.  You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

### Abs Limit Level Offset

This parameter defines a custom set of absolute limit level offsets for the Switching spectrum part of the EORFspectr measurement. It allows you to modify the standard-defined test limits by adding/subtracting a delta amplitude value to/from them. The single set of the offsets applies all the cases in terms of all the DUT types and power level classes. It takes an array of float64 numbers. Each element represents absolute level offsets at corresponding Custom Switching Offset Freq.

Key Path	Meas Setup, Advanced, Switching Custom Offsets & Limits
Mode	GSM
Remote Command	<code>[ :SENSE ] :EORFspectr:LIST:SWITching:LOFFset:ABSolute &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;, &lt;rel_ampl&gt;</code>  <code>[ :SENSE ] :EORFspectr:LIST:SWITching:LOFFset:ABSolute?</code>
Example	<code>EORF:LIST:SWIT:LOFF:ABS 0.0, -2.0, -5.0</code> <code>EORF:LIST:SWIT:LOFF:ABS?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

### Apply Level Offset

Key	SCPI	Operation
Rel	RELative	Only Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. Standard-defined switching relative test limit does not change. More relaxed test limit between the resulting relative test limit and the resulting absolute test limit is then used for the pass/fail judgment.
Both	BOTH	Custom Switching Relative Limit Level Offsets are applied to standard-defined switching relative test limit. And, Custom Switching Absolute Limit Level Offsets are applied to standard-defined



## IM Product Order

Sets the highest order of the intermodulation products to be considered in the measurement. It must be an integer between 3 and 5.

Key Path	Meas Setup, Advanced
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :EORFspectr:IMPorder &lt;integer&gt;</code> <code>[ :SENSe ] :EORFspectr:IMPorder?</code>
<b>Example</b>	EORF:IMP 5 EORF:IMP?
Notes	When an even value (i.e. 4) is entered, it's replaced with the maximum odd value that doesn't exceed the even value. If you recall 7, the previously saved value, it will be clipped to 5.
Preset	5
State Saved	Saved in instrument state.
Min	3
Max	5
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

## Multi Carrier Limit Exception

Accesses the menu to set Limit Exception parameters.

Key Path	Meas Setup
Readback	[On, Currently selected Exception Rule] [Off, ---]
Initial S/W Revision	A.14.00

## Multi Carrier Limit Exception State

Selects whether to apply the Multicarrier Limit Exception.

Key Path	Meas Setup, Advanced, Limit Exception
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :EORFspectr:MCARrier:LEXception[ :STATe ] OFF ON 0 1</code> <code>[ :SENSe ] :EORFspectr:MCARrier:LEXception[ :STATe ] ?</code>
<b>Example</b>	EORF:MCAR:LEXC ON EORF:MCAR:LEXC?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. If set to ON, the exception is applied.

Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	A.10.00
Modified at S/W Revision	A.14.00

### Multi Carrier Limit Exception Rule

Selects the Multicarrier Limit Exception Rule. The Rules are listed below.

FIXed: The exception bands (200 kHz block) are automatically allocated.

CUSTom: Allows you to allocate the exception bands (200 kHz block) manually.

Key Path	Meas Setup, Advanced, Limit Exception
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:MCARrier:LEXCeption:RULE FIXed CUSTom [ :SENSe ] :EORFspectr:MCARrier:LEXCeption:RULE?
<b>Example</b>	EORF:MCAR:LEXC:RULE CUST EORF:MCAR:LEXC:RULE?
Preset	FIXed
State Saved	Saved in instrument state.
Range	Fixed Custom
Initial S/W Revision	A.14.00

### Multi Carrier Limit Exception Frequency Band List

Specifies a list of center frequencies for the Multicarrier Limit Exception bands.

Key Path	SCPI only
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:MCARrier:LEXCeption:LIST:FREQuency <freq>, ... [ :SENSe ] :EORFspectr:MCARrier:LEXCeption:LIST:FREQuency?
<b>Example</b>	EORF:MCAR:LEXC:LIST:FREQ -600e3, 600e3 EORF:MCAR:LEXC:LIST:FREQ?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Each given frequency is determined as the center frequency of 200 kHz block of an exception band when EORF:MCAR:LEXC is set to "ON" and "EORF:MCAR:LEXC:RULE" is set to "CUSTom". In the following 3 cases, the warning message "Setting conflict" is issued in the error queue. -Case 1: where the number of the given list items exceeds the specified value (i.e. $18+3*(N-1)$ or up to 40), whichever the lowest, where N is the number of active multi carriers.



	<ul style="list-style-type: none"> <li>-Case 2: where the given frequency coincides with the center frequency of 3rd order IM products of any combination of two or three active carriers and corresponding adjacent channels (+/-200 kHz).</li> <li>-Case 3: where the given frequency is beyond either edge of the specified operating band +/-10 MHz margin.</li> </ul>
Preset	0
State Saved	Saved in instrument state.
Initial S/W Revision	A.14.00

### Band Extension for Multicarrier

Sets the band extension for multicarrier. The band extension is symmetrically applied on both sides of the relevant transmit band.

Key Path	Meas Setup, Advanced
Mode	GSM
<b>Remote Command</b>	[:SENSe]:EORFspectr:MCARrier:BEXTension <freq> [:SENSe]:EORFspectr:MCARrier:BEXTension?
<b>Example</b>	EORF:MCAR:BEXT 12e6 EORF:MCAR:BEXT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	10 MHz
State Saved	Saved in instrument state.
Min	100 kHz
Max	50 MHz
Initial S/W Revision	A.10.00

### Switching Ref Power Type

Selects the type of Switching Reference Power from either Average or Max Hold.

Key Path	Meas Setup, Advanced
Mode	GSM
<b>Remote Command</b>	[:SENSe]:EORFspectr:SWITching:RPOWer:TYPE AVERage MAXHold [:SENSe]:EORFspectr:SWITching:RPOWer:TYPE?
<b>Example</b>	EORF:SWIT:RPOW:TYPE AVER EORF:SWIT:RPOW:TYPE?
Preset	AVERage
State Saved	Saved in instrument state.
Range	Average Max Hold
Initial S/W Revision	A.11.00

## Meas Preset

Restores all the measurement parameters to their default values.

<b>Key Path</b>	Meas Setup
<b>Mode</b>	GSM
<b>Remote Command</b>	:CONFigure:EORFspectr
<b>Example</b>	CONF:EORF
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Initial S/W Revision</b>	Prior to A.02.00

## Mod Average Scheme for BTS

Allows you to select the type of power averaging scheme when measuring the spectrum due to modulation.

When calculating the spectrum due to modulation power, this parameter determines a combination of the detector setting, averaging method when calculating slot power from the acquired time domain trace, and measurement cycle averaging.

The following two combinations are available.

Key	SCPI	Operation
Standards	STANdard	3GPP TS51.021 Average requirement is applied. Detector: RMS Slot Power Avg: RMS Avg/Hold: Mod Average state (default = LOG)
Legacy	LEGacy	The slot power average method, "LOG" or "RMS," is aligned with the Mod Average state. This is for measurement result backward compatibility with the PSA. Detector: RMS Slot Power Avg: Mod Average state (default = LOG) Avg/Hold: Mod Average state (default = LOG)

<b>Key Path</b>	No softkey – SCPI only
<b>Mode</b>	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr :AVERage :MODulation :TYPE :LOG [ :BTS ] STANdard LEGacy [ :SENSe ] :EORFspectr :AVERage :MODulation :TYPE :LOG [ :BTS ] ?
<b>Example</b>	EORF:AVER:MOD:TYPE:LOG LEG EORF:AVER:MOD:TYPE:LOG?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. This parameter is applicable for BTS spectrum due to modulation power measurement.
Preset	STAN
State Saved	Saved in instrument state.
Range	STANdard LEGacy
Initial S/W Revision	A.10.00

## Mod Average Scheme for MS

Allows you to select the type of power averaging scheme when measuring the spectrum due to modulation.

When calculating the spectrum due to modulation power, this parameter determines a combination of the detector setting, averaging method when calculating slot power from the acquired time domain trace, and measurement cycle averaging.

The following two combinations are available.

Key	SCPI	Operation
Standards	STANdard	3GPP TS51.021 Average requirement is applied. Detector: Mod Average state (default = LOG) Slot Power Avg: RMS Avg/Hold: Mod Average state (default = LOG)
Legacy	LEGacy	The slot power average method, "LOG" or "RMS," is aligned with the Mod Average state. This is for measurement result backward compatibility with the PSA. Detector: Mod Average state (default = LOG) Slot Power Avg: Mod Average state (default = LOG) Avg/Hold: Mod Average state (default = LOG)

Key Path	No softkey – SCPI only
Mode	GSM
<b>Remote Command</b>	[ :SENSe ] :EORFspectr:AVErAge:MODulation:TYPE:LOG:MS STANdard LEGacy [ :SENSe ] :EORFspectr:AVErAge:MODulation:TYPE:LOG:MS?
<b>Example</b>	EORF:AVER:MOD:TYPE:LOG:MS LEG EORF:AVER:MOD:TYPE:LOG:MS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. This parameter is applicable for MS spectrum due to modulation power measurement.
Preset	LEG
State Saved	Saved in instrument state.

Range	STANdard LEGacy
Initial S/W Revision	A.10.00

Select Modulation Method (Backwards Compatibility/Remote Command Only)

Mode	GSM
Remote Command	[[:SENSe]:EORFspectr:TYPE:MODulation[:METHod] DISCrete SWEep [:SENSe]:EORFspectr:TYPE:MODulation[:METHod]?
Example	EORF:TYPE:MOD SWE EORF:TYPE:MOD?
Notes	The legacy parameter [:SENSe]:EORFspectr:TYPE:MODulation[:METHod] DISCrete SWEep is aliased to the new command [:SENSe]:EORFspectr:MEASure MULTiple SWEpt. When Meas Method is set to MULTiple, this parameter is forced to DISCrete. When Meas Method is set to SWEpt, this parameter is forced to SWEep. When this parameter is set to DISCrete, Meas Method is forced to MULTiple. When this parameter is set to SWEep and "Meas Type" on page 1009 is set to MODulation or SWITching., Meas Method is forced to SWEpt.
Dependencies	This parameter is available only when "Meas Type" on page 1009 is set to MODulation or SWITching.
Couplings	Coupled with "Meas Type" on page 1009 and Meas Method. See Notes.
Preset	DISC
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Mode

See "Mode" on page 174

## Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 1047 for more information.

<b>Key Path</b>	Front-panel key
<b>Remote Command</b>	:SYSTem:PRESet
<b>Example</b>	:SYST:PRES
<b>Notes</b>	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
<b>Couplings</b>	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
<b>Backwards Compatibility Notes</b>	In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

## How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPlE ALL	Auto Couple front-panel key
Meas Preset	:CONFIgure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODEs	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPut	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGn	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERSistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

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Mode Preset

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu



## Mode Setup

See ["Mode Setup" on page 193](#)

## Peak Search

Pressing Peak Search front-panel key performs a peak search and opens this Peak Search menu. Peak Search places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

<b>Key Path</b>	Front-panel key
<b>Mode</b>	GSM
<b>Remote Command</b>	:CALCulate:EORFspectr:MARKer[1] 2 ...12:MAXimum
<b>Example</b>	CALC:EORF:MARK2:MAX
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Min Peak Search (Backwards Compatibility/Remote Command Only)

<b>Mode</b>	GSM
<b>Remote Command</b>	:CALCulate:EORFspectr:MARKer[1] 2 ...12:MINimum
<b>Example</b>	CALC:EORF:MARK:MIN
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Initial S/W Revision</b>	Prior to A.02.00

Print

See "Print" on page 221

## Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State\_0000.state. The next is State\_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State\_0010.state there is already a State\_0010.state file in the current directory, it advances the counter to State\_0011.state to ensure that no conflict will exist (and then it verifies that State\_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred\_0000.csv.

**NOTE** Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

**NOTE** If the filename you entered ends with \_dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

## Recall

The Recall menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an Import (Data) option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

**NOTE**

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	<p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe &lt;filename&gt;.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p>
Backwards Compatibility Notes	<p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, "state" always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p>
Backwards Compatibility Notes	<p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p>
Initial S/W Revision	Prior to A.02.00

## State

The Recall State menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. Recall State will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 1056](#).

<b>Key Path</b>	Recall
<b>Mode</b>	All
<b>Remote Command</b>	:MMEMory:LOAD:STATe <filename>
<b>Example</b>	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
<b>Example</b>	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
<b>Notes</b>	<p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> <li>• If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number.</li> </ul> <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> <li>• Makes the saved measurement for the mode the active measurement.</li> <li>• Clears the input and output buffers.</li> <li>• Status Byte is set to 0.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Executes a *CLS</li> </ul> <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away.</p> <p>After the Recall, the analyzer exits the Recall menu and returns to the previous menu.</p>
<b>Backwards Compatibility SCPI</b>	:MMEMory:LOAD:STATe 1,<filename>
Initial S/W Revision	Prior to A.02.00

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### More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

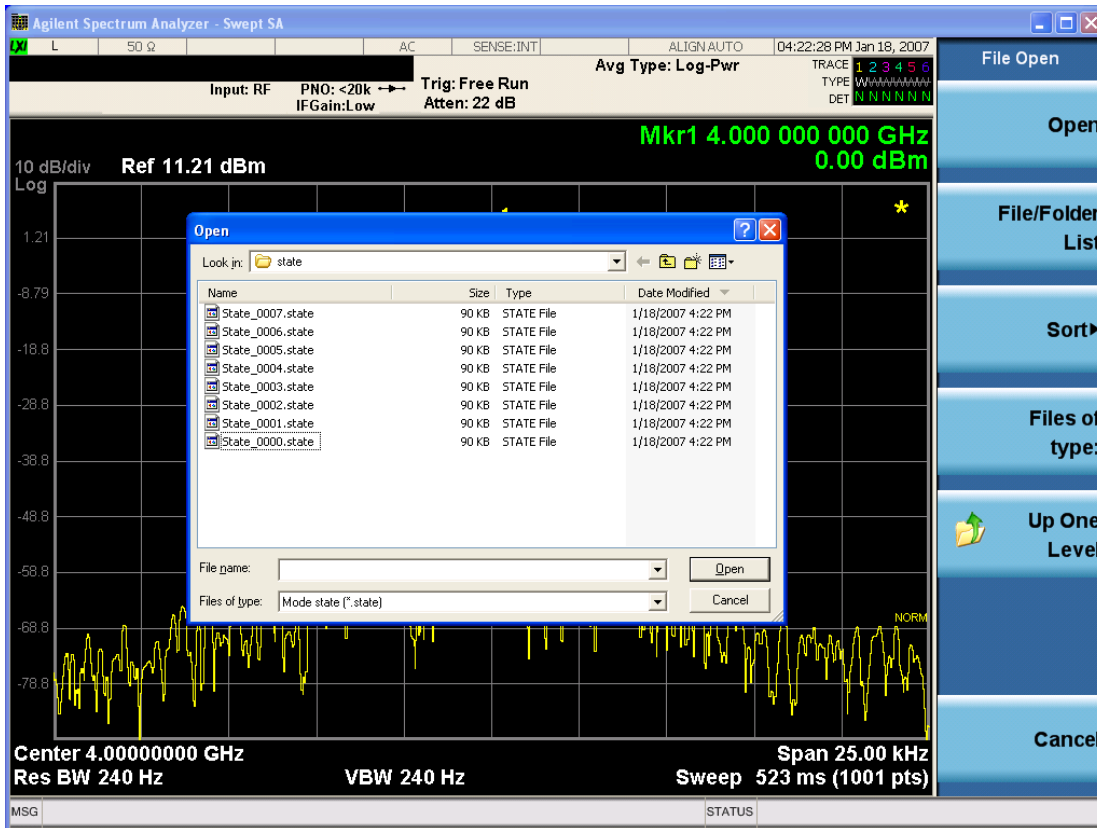
The following table describes the Trace Save and Recall possibilities:

You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

### From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.





Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

#### Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

#### Look In

The Look In field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

#### Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are By Date, By Name, By extension, and By Size.

#### Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (\*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

### Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the Save, State function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
<b>Example</b>	*RCL 1
Range	1-16 from front panel, 1-128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
<b>Remote Command</b>	:MMEMory:LOAD:SEQuences:   SLISt   ALISt   SAALISt   "MySequence.txt"
<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall,Sequences
----------	------------------

<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

## Open...

When you press “Open”, the analyzer brings up a Windows dialog and a menu entitled “**File Open.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[From File...](#)" on page 1621 in Recall, State, for a full description of this dialog and menu.

Key Path	Recall, Data
Notes	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
Initial S/W Revision	Prior to A.02.00

## Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMediate
- Sending the remote command INIT:REStart

See "[More Information](#)" on page 1062

Key Path	Front-panel key
Remote Command	:INITiate[:IMMediate] :INITiate:REStart
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:REStart and :INITiate:IMMediate perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTegrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart trace averages (displayed average count reset to 1) for a trace in Clear Write, but did not restart Max Hold and Min Hold.  In the X-Series, the Restart hardkey and the INITiate:REStart command restart not only Trace Average, but MaxHold and MinHold traces as well.  For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:REStart command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

### More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count  $k$  equals the number  $N$  set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

## Save

The Save menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an Export (Data) option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

## State

The Save State menu lets you choose a register or file for saving the state.

**NOTE** In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:STATe <filename>
Example	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote.



After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key.

After saving to a register, you remain in the Save State menu, so that you can see the Register key update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

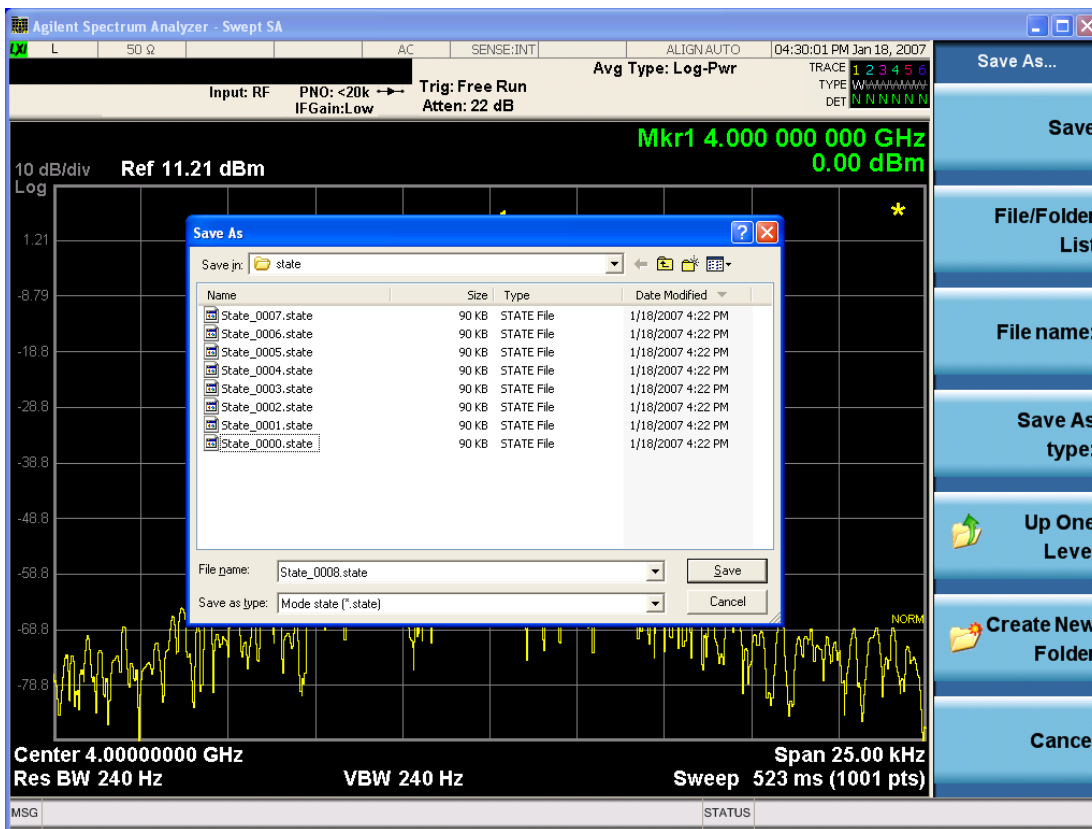
**Backwards Compatibility SCPI** :MMEMory:STORe:STATe 1,<filename>

For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.

Initial S/W Revision Prior to A.02.00

### To File . . .

When you press "To File", the analyzer brings up a Windows dialog and a menu entitled "Save As." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

#### Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting OK, or you can Cancel the request. If you select OK,

the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

#### Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

#### File Name

The File Name field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1617](#) documentation for more on the automatic file naming algorithm.

When you press the File Name key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the Done softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

#### Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (\*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Create New Folder

This key corresponds to the icon of a folder with the "\*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

## Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 1067](#)

Key Path	Save, State
Mode	All
<b>Remote Command</b>	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
<b>Example</b>	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

## More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another

consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The \*SAV and \*RCL commands will not be affected by the custom register names, nor will the MMEM commands.

### Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

**NOTE**

In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at

what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
<b>Example</b>	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

## Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?
Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
Remote Command	:MMEMory:COPY <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

## Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
Remote Command	:MMEMory:COPY:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

## Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DELeTe <file_name>[,<directory_name>]
Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an “access denied” error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an “access denied” error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Move (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory.

Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.

The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Initial S/W Revision      Prior to A.02.00

### Mass Storage Remove Directory (Remote Command Only)

Key path                      SCPI Only

**Remote Command**        :MMEMory:RDIRECTory <directory\_name>

Notes

The string must be a valid logical path.

Removes a directory. The <directory\_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.

This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.

Initial S/W Revision      Prior to A.02.00

### Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path                      Save, Sequences

Mode                            All

**Remote Command**        :MMEM:STOR:SEQ:ences: | SLIST | ALIST | SAAList | SSTep  
"MySequence.txt"

**Example**                    :MMEM:STOR:SEQ:SLIST "MySequence.txt"

Notes

Available file types are:

- CSV (Comma delimited) (\*.csv)
- Text (Tab delimited) (\*.txt)

Initial S/W Revision      A.05.00



## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
<b>Example</b>	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

## Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

## Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All

Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

## Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which **Meas Result** to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See "[Meas Results File Contents](#)" on page 1075.

See "[Marker Table](#)" on page 1075.

See "[Peak Table](#)" on page 1077.

See Spectrogram

<b>Remote Command</b>	:MMEMory:STORe:RESults:MTABle PTABle SPECTrogram <filename>
<b>Example</b>	:MMEM:STOR:RES:MTAB "myResults.csv" Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB "myResults.csv" Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC "myResults.csv" Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

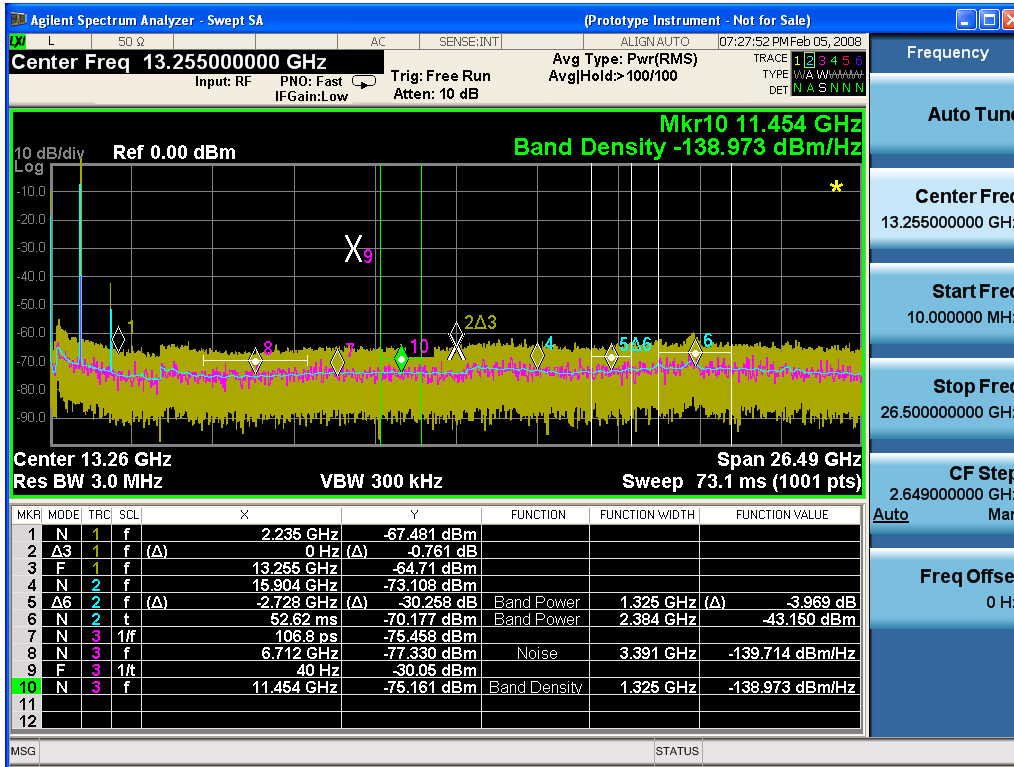
### Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

### Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementR	
result	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR	1
P26 EA3	
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.0662666

10 EDGE Output RF Spectrum Measurement  
Save

	67								
Start Frequency	10000000								
Stop Frequency	26500000 000								
Average Count	0								
Average Type	LogPower (Video)								
RBW	3000000								
RBW Filter	Gaussian								
RBW Filter BW	3dB								
VBW	3000000								
Sweep Type	Swept								
X Axis Scale	Lin								
PreAmp State	Off								
PreAmp Band	Low								
Trigger Source	Free								
Trigger Level	1.2								
Trigger Slope	Positive								
Trigger Delay	1.00E-06								
Phase Noise Optimization	Fast								
Swept If Gain	Low								
FFT If Gain	Autorange								
RF Coupling	AC								
FFT Width	411900								
Ext Ref	10000000								
Input	RF								
RF Calibrator	Off								
Attenuation	10								
Ref Level Offset	0								
External Gain	0								
X Axis Units	Hz								
Y Axis Units	dBm								
DATA									
MKR	MODE	TR C	SCL	X	Y	FUNCTI ON	FUNCTIO N WIDTH	FUNCTI ON VALUE	FUNCTI ON UNIT
1	Normal	1	Frequ ncy	2.2350E+ 09	- 67.4	Off	0.0000E+ 00	0	None

81									
2	Delta3	1	Frequency	0.0000E+00	-0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	-64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	-73.108	Off	0.0000E+00	0	None
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

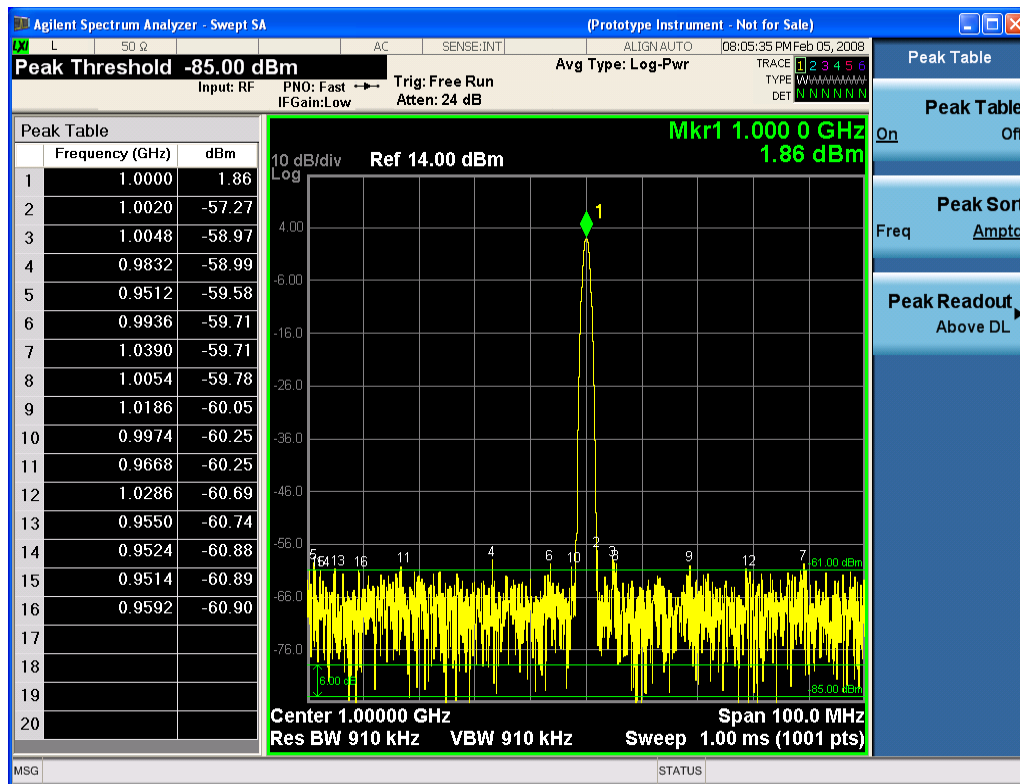
The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

### Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:

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Save



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	-61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	-57.27
3	1.0048E+06	-58.97
4	9.8320E+05	-58.99
5	9.5120E+05	-59.58
6	9.9360E+05	-59.71
7	1.0390E+06	-59.71
8	1.0054E+06	-59.78
9	1.1086E+06	-60.05
10	9.9740E+05	-60.25
11	9.6680E+05	-60.25
12	1.0286E+06	-60.69
13	9.5500E+05	-60.74
14	9.5240E+05	-60.88
15	9.5140E+05	-60.89
16	9.5920E+05	-60.90
17		
18		
19		
20		

### Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.



Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

**NOTE** The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:



For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a different time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 seconds after the Spectrogram started (trace 10 has a start time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

Result Type	Spectrogram
MeasResult	
Swept SA	
A.11.00.01	N9020A
503 508 513 526 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	-76.34749519
5999984440	-77.28097006
5999984465	-75.32317869
5999984490	-73.64417681
5999984515	-72.67154604

O  
O  
O

6000009315	-77.94423277
6000009340	-79.51829697
6000009365	-78.46108961
6000009390	-78.46108957
6000009415	-76.59570596
DATA2	4.708697055

5999984415	-80.98197882
5999984440	-80.98197879
5999984465	-75.83142132
5999984490	-74.02712079
5999984515	-73.57213005

o  
o  
o

6000009315	-75.9183103
6000009340	-79.53787488
6000009365	-78.82602191
6000009390	-78.82602188
6000009415	-76.37486709
DATA10	0
5999984415	-75.56751112
5999984440	-75.76485645
5999984465	-76.67718717
5999984490	-78.79238489
5999984515	-83.72680212

o  
o  
o

6000009315	-71.3942461
6000009340	-72.28308332
6000009365	-73.92684489
6000009390	-75.45548832
6000009415	-75.17904815

### Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "To File . . ." on page 1630 in Save, State for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\`<mode name>`\data\traces

For all of the Limit Data Files:

My Documents\`<mode name>`\data\limits

For all of the Measurement Results Data Files:

My Documents\`<mode name>`\data\`<measurement name>`\results

For all of the Capture Buffer Data Files:

My Documents\`<mode name>`\data\captureBuffer

Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <code>&lt;mode specific&gt;</code> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

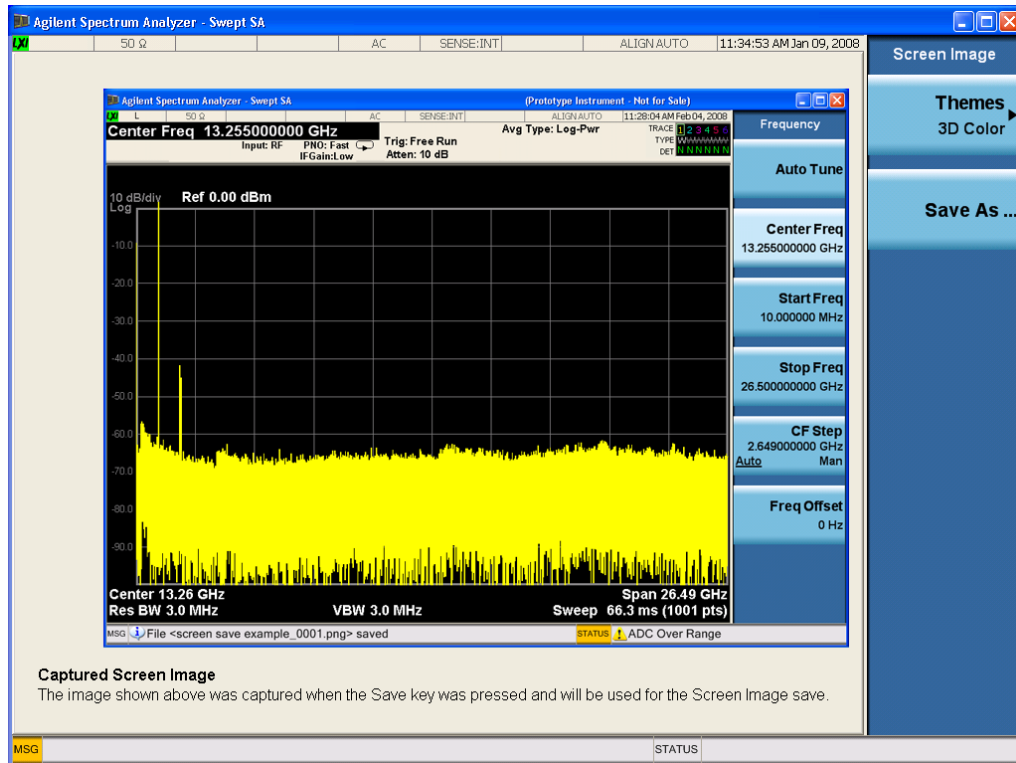
## Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the Save front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:

## 10 EDGE Output RF Spectrum Measurement Save



When you continue on into the Save As menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the Save menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the Quick Save front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

### NOTE

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDColor   TDMonochrome   FCOLOR   FMONochrome  :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color   3D Mono   Flat Color   Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
Example	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
----------	----------------------------

<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00



## Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing Single does a Resume.

See "[More Information](#)" on page 1089

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	<p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA &amp; PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p>
Initial S/W Revision	Prior to A.02.00

### More Information

See "[Restart](#)" on page 1627 for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the Single key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the Single key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the Single key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

## Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key
----------	-----------------

## RF Output

This parameter sets the source RF power output state.

Key Path	Source
<b>Remote Command</b>	:OUTPut[:EXTeRnal][:STATe] ON OFF 1 0 :OUTPut[:EXTeRnal][:STATe]?
<b>Example</b>	OUTP OFF OUTP?
Notes	<p>The EXTeRnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the "List Sequencer" on page 1725. If the "Sequencer" on page 1726 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the "Sequencer" on page 1726 is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p>
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
Notes	<p>The sub-menu under this button is for independent mode and has no effect on "List Sequencer" on page 1725. If the "Sequencer" on page 1726 is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set "Sequencer" on page 1726 to Off will make source leave list sequencer and this button will be black out.</p>
Initial S/W Revision	A.05.00

## RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the "RF Power Range " on page 1092 table below for the valid ranges.

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
<b>Example</b>	:SOUR:POW -100 dBm
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1092 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the "RF Power Range " on page 1092 table below for the valid ranges.
Initial S/W Revision	A.05.00

## RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz ≤ f ≤ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

## Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

### NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the " <a href="#">List Sequencer</a> " on page 1725 is turned ON.
Initial S/W Revision	A.05.00

## Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1648](#)

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer:REFerence <ampl> :SOURce:POWer:REFerence? :SOURce:POWer:REFerence:STATe OFF ON 0 1 :SOURce:POWer:REFerence:STATe?
<b>Example</b>	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the <a href="#">"List Sequencer" on page 1725</a> is turned ON.
Couplings	This value is coupled to the <a href="#">"Set Reference Power " on page 1648</a> key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

## Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
Example	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

## Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
Remote Command	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
Example	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on page 1725. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on

[page 1725](#). If the **"Sequencer"** on [page 1726](#) is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.

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Initial S/W Revision      A.05.00

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## Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
<b>Remote Command</b>	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]?
<b>Example</b>	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present, the frequency range should be limited to: 1.1GHz-1.7GHz, 2.4GHz-2.5GHz, 4.8GHz-6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called "Settings conflict; Frequency is outside available range".
Initial S/W Revision	A.05.00

## Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: ["GSM/EDGE Channel Number Ranges" on page 1096](#), ["W-CDMA Channel Number Ranges" on page 1097](#), ["CDMA 2000 / 1xEVDO Channel Number Ranges" on page 1098](#), and ["LTE FDD Channel Number Ranges" on page 1100](#).

Key Path	Source, Frequency
Remote Command	:SOURCE:FREQUENCY:CHANNELS:NUMBER <int> :SOURCE:FREQUENCY:CHANNELS:NUMBER?
Example	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1660 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
Initial S/W Revision	A.05.00

### GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$



Band	Link (Device)	Range	Frequency (MHz)
GSM 850	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
GSM 700	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
T-GSM810	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

### W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$ $350 \leq n \leq 425$	$n \div 5 + 1850.1$ $n \div 5$
Band III	Downlink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
	Uplink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
Band IV	Downlink	$537 \leq n \leq 1738$	$n \div 5 + 1805$
		$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
	Uplink	$1312 \leq n \leq 1513$ $1662 \leq n \leq 1862$	$n \div 5 + 1450$ $n \div 5 + 1380.1$
Band V	Downlink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
		$4357 \leq n \leq 4458$	$n \div 5$
	Uplink	$782 \leq n \leq 862$ $4132 \leq n \leq 4233$	$n \div 5 + 670.1$ $n \div 5$
Band VI	Downlink	$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
		$4387 \leq n \leq 4413$	$n \div 5$
	Uplink	$812 \leq n \leq 837$ $4162 \leq n \leq 4188$	$n \div 5 + 670.1$ $n \div 5$
Band VII	Downlink	$2237 \leq n \leq 2563$	$n \div 5 + 2175$
		$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
	Uplink	$2012 \leq n \leq 2338$ $2362 \leq n \leq 2687$	$n \div 5 + 2100$ $n \div 5 + 2030.1$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$
	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

### CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 489.000$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
AWS	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
US 2.5 GHz	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
700 Public Safety	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
C2K Lower 700	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
400 Euro PAMR	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
	Uplink (MS, reverse link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
	Downlink (BS, forward link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

### LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4–1 and ND L is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
1		2110	0	0 - 599	1920	18000 - 18599
2		1930	600	600 - 1199	1850	18600 - 19199
3		1805	1200	1200 - 1949	1710	19200 - 19949
4		2110	1950	1950 - 2399	1710	19950 - 20399
5		869	2400	2400 - 2649	824	20400 - 20649
6		875	2650	2650 - 2749	830	20650 - 20749
7		2620	2750	2750 - 3449	2500	20750 - 20449
8		925	3450	3450 - 3799	880	21450 - 21799
9		1844.9	3800	3800 - 4149	1749.9	21800 - 22149
10		2110	4150	4150 - 4749	1710	22150 - 22749
11		1475.9	4750	4750 - 4949	1427.9	22750 - 22949
12		729	5010	5010 - 5179	699	23010 - 23179
13		746	5180	5180 - 5279	777	23180 - 23279
14		758	5280	5280 - 5379	788	23280 - 23379
...						
17		734	5730	5730 - 5849	704	23730 - 23849
18		860	5850	5850 - 5999	815	23850 - 23999
19		875	6000	6000 - 6149	830	24000 - 24149
20		791	6150	6150 - 6449	832	24150 - 24449
21		1495.9	6450	6450 - 6599	1447.9	24450 - 24599
...						
24		1525	7700	7700 - 8039	1626.5	25700 - 26039
25		1930	8040	8040 - 8689	1850	26040 - 26689
26		859	8690	8690 - 9039	814	26690 - 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

### LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
33		1900	36000	36000 – 36199	1900	36000 – 36199
34		2010	36200	36200 – 36349	2010	36200 – 36349
35		1850	36350	36350 – 36949	1850	36350 – 36949
36		1930	36950	36950 – 37549	1930	36950 – 37549
37		1910	37550	37550 – 37749	1910	37550 – 37749
38		2570	37750	37750 – 38249	2570	37750 – 38249
39		1880	38250	38250 – 38649	1880	38250 – 38649
40		2300	38650	38650 – 39649	2300	38650 – 39649
41		2496	39650	39650 – 41589	2496	39650 – 41589
42		3400	41590	41590 – 43589	3400	41590 – 43589
43		3600	43590	43590 – 45589	3600	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

### TDSCDMA Channel Number Ranges

#### 1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio  
Frequency Channel Number 1.28  
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

## Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00

## Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:FREQuency:CHANnels:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38   BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF  :SOURce:FREQuency:CHANnels:BAND?
Example	:SOUR:FREQ:CHAN:BAND PGSM
Notes	Set this setting to "NONE" will grey out "Channel" on page 1651 Channel
Initial S/W Revision	A.05.00

### None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00



### E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

### R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

### DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

### PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

### GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

### GSM 480

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

### GSM 850

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

### GSM 700

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

### T-GSM 810

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

### WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### Band I

Selects Band I as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

#### Band II

Selects Band II as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

#### Band III

Selects Band III as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

#### Band IV

Selects Band IV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

#### Band V

Selects Band V as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

#### Band VI

Selects Band VI as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

---

#### Band VII

Selects Band VII as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

---

#### Band VIII

Selects Band VIII as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

---

#### Band IX

Selects Band IX as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

---

#### Band X

Selects Band X as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

---

#### Band XI

Selects Band XI as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

**Band XII**

Selects Band XII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

**Band XIII**

Selects band XIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

**Band XIV**

Selects Band XIV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

**Band XIX**

Selects Band XIX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIX
Initial S/W Revision	A.14.50

**CDMA 2000 / 1xEVDO**

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

---

#### US CELL

Selects US Cell as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

---

#### US PCS

Selects US PCS as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

---

#### Japan Cell

Selects Japan Cell as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

---

#### Korean PCS

Selects Korean PCS as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

---

#### NMT 450

Selects NMT 450 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

#### IMT 2000

Selects IMT 2000 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

#### Upper 700

Selects Upper 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

#### Secondary 800

Selects Secondary 800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

#### 400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

#### 800 PAMR

Selects 800 PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
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---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

---

### 2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

---

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

---

### AWS

Selects AWS as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

---

### US 2.5GHz

Selects US 2.5 GHz as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

---

### 700 Public Safety

Selects 700 Public Safety as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---



<b>Example</b>	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

### C2K Lower 700

Selects C2K Lower 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

### LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

### BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

### BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

### BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

#### BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

#### BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

#### BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

#### BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

#### BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

**BAND 9**

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

**BAND 10**

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

**BAND 11**

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

**BAND 12**

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

**BAND 13**

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

#### BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

#### BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

#### BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

#### BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

#### BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

**BAND 21**

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

**BAND 24**

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

**BAND 25**

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

**BAND 26**

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

**BAND 27**

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

### BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

### BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

### LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

### BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

### BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

### BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

#### BAND 36

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

#### BAND 37

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

#### BAND 38

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

#### BAND 39

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

#### BAND 40

Selects BAND 40 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

---

#### BAND 41

Selects BAND 41 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

---

#### BAND 42

Selects BAND 42 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

---

#### BAND 43

Selects BAND 43 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

---

#### BAND 44

Selects BAND 44 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

---

#### TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..



Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

#### BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

#### BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

#### BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

#### BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

#### BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

### BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

### Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
<b>Example</b>	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN   UP
<b>Backwards Compatibility SCPI</b>	:SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

### Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

**NOTE**

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFeRence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

### Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} + \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1678](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFeRence <freq> :SOURce:FREQuency:REFeRence? :SOURce:FREQuency:REFeRence:STATe OFF ON 0 1 :SOURce:FREQuency:REFeRence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz

	:SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

### Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq>

	:SOURce:FREQuency:OFFSet?
<b>Example</b>	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

## Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1681, "AM" on page 1722, "FM" on page 1723, and "PM" on page 1724.

Key Path	Source
Initial S/W Revision	A.05.00

## ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a "MOD" annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]?
<b>Example</b>	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1726Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1726Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately.

The ARB can only be turned on when there is a waveform file selected for playback. On the GUI if no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. “-

When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

Key Path	Source, Modulation Setup, ARB, Select Waveform
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Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
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Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
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Notes	<p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and</p>
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none of the waveform segments is loaded.

If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.

If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.

If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

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Key Path	Source, Modulation Setup, ARB, Select Waveform
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### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
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<b>Remote Command</b>	:SOURCE:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURCE:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms,</p>



when the ARB memory is full, the copy ceases, and an error is generated.  
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.  
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
<b>Notes</b>	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
<b>Initial S/W Revision</b>	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe:ALL
<b>Example</b>	:SOUR:RAD:ARB:DELeTe:ALL
<b>Notes</b>	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<b>List Sequencer</b>" on page 1725 and "<b>Sequencer</b>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
<b>Initial S/W Revision</b>	A.05.00

### Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

**NOTE**

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 1687.

<b>Remote Command</b>	:SOURce:RADio:ARB:CATalog?
<b>Example</b>	:SOUR:RAD:ARB:CATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
<b>Initial S/W Revision</b>	A.05.00

### Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

<b>Remote Command</b>	:SOURce:RADio:ARB:FCATalog?
<b>Example</b>	:SOUR:RAD:ARB:FCATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
<b>Initial S/W Revision</b>	A.09.00

### ARB Setup

Allows access to the ARB setup sub-menus.

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Initial S/W Revision</b>	A.05.00

### Sample Rate

Allows you to set the ARB waveform playback sample rate.

<b>Key Path</b>	Source, Modulation Setup, ARB, ARB Setup
<b>Remote Command</b>	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
<b>Example</b>	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
<b>Notes</b>	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	125.00 MHz
<b>Min</b>	1.00 kHz
<b>Max</b>	125.00 MHz
<b>Initial S/W Revision</b>	A.05.00

### Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

<b>Key Path</b>	Source, Modulation Setup, ARB, ARB Setup
<b>Remote Command</b>	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
<b>Example</b>	:SOUR:RAD:ARB:RSC 100.00
<b>Notes</b>	This setting cannot be set in E6640A. Grey out on menu and the value is fixed at 70.00%.
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	70.00 %
<b>Min</b>	1.00 %
<b>Max</b>	100.00 %
<b>Initial S/W Revision</b>	A.05.00

### Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 Hz
Min	-50.00 MHz
Max	50.00 MHz
Initial S/W Revision	A.05.00

### Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous   SINGLE   SADVance GATE :SOURce:RADio:ARB:TRIGger:TYPE?
Example	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
Notes	Gated trigger type will be implemented at a later release
Preset	CONTInuous
Range	Continuous   Single   Seg Adv   Gated
Initial S/W Revision	A.05.00

### Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE   TRIGger   RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset	FREE

Range	Free Run   Trigger + Run   Reset + Run
Initial S/W Revision	A.05.00

### Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

### Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

### Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

### Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate

	:SOURce:RADio:ARB:RETRigger?
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger   Buffered Trigger   Restart on Trigger
Initial S/W Revision	A.05.00

### No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

### Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

### Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

### Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE   CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Preset</b>	CONTInuous
<b>Range</b>	Single   Continuous
<b>Initial S/W Revision</b>	A.05.00

### Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Initial S/W Revision</b>	A.05.00

### Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
<b>Initial S/W Revision</b>	A.05.00



## Trigger Source

Allows access to the trigger source sub-menus. The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
<b>Example</b>	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTernal2
Range	Trigger Key   Bus   External 2
Initial S/W Revision	A.05.00

## Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
<b>Example</b>	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

## Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
<b>Example</b>	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

## External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
<b>Example</b>	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

### Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

### Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>

<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
<b>Initial S/W Revision</b>	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Notes</b>	No remote command, SCPIfront panel only.
<b>Initial S/W Revision</b>	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
<b>State Saved</b>	Persistent, survives a power cycle and a preset but not saved in the instrument state
<b>Initial S/W Revision</b>	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p>

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If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
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Initial S/W Revision	Prior to A.09.00
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### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

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### Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

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### Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1755](#).

---

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

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### Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1687](#).

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Initial S/W Revision	Prior to A.09.00
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### Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

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### Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.



Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

**Marker 1**

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

**Marker 2**

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

**Marker 3**

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected
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	Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

#### Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

#### Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

#### Save Sequence...

Pressing this key displays the “Save As” dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

#### Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1694](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D:VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

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**Remote Command**      :SOURce:RADio:ARB:SEQuence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below "[For Setup SCPI](#)" on page 1147 "[For Setup SCPI](#)".)

:SOURce:RADio:ARB:SEQuence[:MWAVeform]? <filename>

(For additional description of each item, see Notes "[For Query SCPI](#)" on page 1148 below.)

---

**Example**      For setup:

>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3

Or

>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1M3

For query, must specify which waveform sequence file to query.

>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"

Or

>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",

---

## Notes

### For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

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This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

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Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not ".seq", error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

## For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",

<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.

If the waveform sequence file name is empty, an error is generated.

If the specified waveform sequence file cannot be found, an error is generated.

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Initial S/W Revision

A.05.00

### Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Notes	If access multi-pack license sub-menu from modules other than "TRX1", an advisory message like "Please goto "TRX1" to operate multi-pack license" will display.
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

### Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

### Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LICense[:FPACK]:WAVeform:ADD <string>
<b>Example</b>	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;“NVWFM” MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p>

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision	A.05.00
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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
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Remote Command	:SOURce:RADio:ARB:LOAD:ALL <string>
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Example	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
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Notes	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
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Initial S/W Revision	A.05.00
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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
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Notes	No remote command, SCPI front panel only.
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Initial S/W Revision	A.05.00
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### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

### Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Agilent signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

<b>Key Path</b>	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int>
<b>Example</b>	SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
<b>Dependencies</b>	This key is only available if the currently selected slot is in the trial state.
<b>Initial S/W Revision</b>	A.05.00

#### Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

<b>Key Path</b>	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
<b>Example</b>	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
<b>Dependencies</b>	This key is only available if the currently selected slot is in the trial state or the lock required state.
<b>Initial S/W Revision</b>	A.05.00

### Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
<b>Example</b>	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
<b>Range</b>	"Locked"   "Available"   "Trail"   "LockRequired"   "Nonexistent"
<b>Initial S/W Revision</b>	A.05.00

### Slots Free Query (Remote Command Only)

Returns the number of license slots free.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LICense[:FPACK]:WAVeform:FREE?
<b>Example</b>	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
<b>Initial S/W Revision</b>	A.05.00

### Slot Used Query (Remote Command Only)

Returns the number of license slots used.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LICense[:FPACK]:WAVeform:USED?
<b>Example</b>	:SYST:LKEY:WAV:USED?

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	or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

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### Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:NAME? <int>  or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>
<b>Example</b>	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm"  or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.  If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

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### Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:UID? <int>  or :SYSTem:LIcense[:FPACK]:WAVeform:UID? <int>
<b>Example</b>	:SYST:LKEY:WAV:UID? 2 <"1346752140"  or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.

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	If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

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### Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

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<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

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### Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

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<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136", "3812603511", "3710986266"
<b>Notes</b>	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

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### Marker Utilities

Allows access to the marker utilities sub-menus.

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<b>Key Path</b>	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

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### Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

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<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

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### Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated



	waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?
Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

### Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting maker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:PULSe NONE   M1   M2   M3   M4 :SOURce:RADio:ARB:MDEStination:PULSe?
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Range</b>	None   M1   M2   M3   M4
<b>Initial S/W Revision</b>	A.05.00

#### None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Initial S/W Revision</b>	A.05.00

#### Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
<b>Initial S/W Revision</b>	A.05.00

#### Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
<b>Initial S/W Revision</b>	A.05.00

### Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
<b>Example</b>	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None   M1   M2   M3   M4
Initial S/W Revision	A.05.00

### None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

### Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

### Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

### Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:CLear
Example	:SOUR:RAD:ARB:HEAD:CLE
Notes	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

### Save Setup To Header

Allows you to save new file header information details to the file.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:SAVE
Example	:SOUR:RAD:ARB:HEAD:SAVE
Notes	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

### Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

Remote Command	:MMEMory:HEADer:ID? "<file name>"
Example	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk.  If the file cannot be found in ARB memory or on hard disk, an error is generated.and value -1 is returned
Initial S/W Revision	A.09.00

### Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:INITiate
<b>Example</b>	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

### AM

Allows access to the menu for configuring the Amplitude Modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:STATe :SOURce:AM:STATe?
<b>Example</b>	:SOUR:AM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### AM Depth

Allows you to set the amplitude modulation depth in percent.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]?
<b>Example</b>	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

## AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
<b>Example</b>	:SOUR:AM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

## FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:STATe :SOURce:FM:STATe?
<b>Example</b>	:SOUR:FM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
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<b>Remote Command</b>	:SOURce:FM[:DEVIation] :SOURce:FM[:DEVIation]?
<b>Example</b>	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

### FM Rate

Allows you to set the internal frequency modulation rate.

<b>Key Path</b>	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
<b>Example</b>	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### PM

Allows access to the menu for configuring the phase modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:STATe :SOURce:PM:STATe?
<b>Example</b>	:SOUR:PM:STAT OFF



Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]?
<b>Example</b>	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

### PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
<b>Example</b>	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a

tabular form. The details of the SCPI for configuring the list sequencer can be found in "[Step Configuration \(Remote Command Only\)](#)" on page 1759.

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

## Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated

	and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " <a href="#">Query List Sequence Initiation Armed Status (Remote Command Only)</a> " on <a href="#">page 1770</a> Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

## List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer
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## Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
<b>Example</b>	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

## Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
----------	--

Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

### Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of 1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

### Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

### Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

### Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE   INTernal   EXTernal2   KEY   BUS   EXTernal4  :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run   Internal   Manual (Trigger Key)   Bus   External 2   EXTernal4
Initial S/W Revision	A.05.00

### Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

### Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 $\mu$ s
Amplitude	100 $\mu$ s to within 0.1 dB 20 $\mu$ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME?
Example	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?
Notes	SCPI is supported after A.09.40
Preset	1.0 ms
Min	0.0 ms
Max	4.0 ks
Initial S/W Revision	A.05.00

### Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   NONE   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38

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Source

	BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF  :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

None

Selects no radio standard for use on the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

P-GSM

Selects P-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

E-GSM

Selects E-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00



**R-GSM**

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**DCS 1800**

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**PCS 1900**

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**GSM 450**

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**GSM 480**

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**GSM 850**

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band IV**

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band V**

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band VI**

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band VII**

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band VIII**

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band IX**

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band X

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XI

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XII

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XIII

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XIV

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XIX

Selects Band XIX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.14.50

### CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### NMT 450

Selects NMT 450 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### IMT 2000

Selects IMT 2000 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### Upper 700

Selects Upper 700 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### Secondary 800

Selects Secondary 800 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### 400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### 800 PAMR

Selects 800 PAMR as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

#### 2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### AWS

Selects AWS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### 700 Public Safety

Selects 700 Public Safety as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

## LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

## BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50



**BAND 6**

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 7**

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 8**

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 9**

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 10**

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 11**

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

### BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

### BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

### BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

### BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

### BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

### BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 20**

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 21**

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 24**

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 25**

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 26**

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

**BAND 27**

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

### BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

### BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

### LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

### BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

### BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

### BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

**BAND 36**

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

**BAND 37**

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

**BAND 38**

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

**BAND 39**

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

**BAND 40**

Selects BAND 40 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

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#### BAND 41

Selects BAND 41 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

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#### BAND 42

Selects BAND 42 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

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#### BAND 43

Selects BAND 43 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

---

#### BAND 44

Selects BAND 44 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

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#### TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

#### BAND A

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

#### BAND B

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

#### BAND C

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

#### BAND D

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

#### BAND E

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

### BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

### Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN   UP
Initial S/W Revision	A.05.00

### Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency?
<b>Example</b>	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.



	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

## Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURCE:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

## Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:WAVeform <string> :SOURCE:LIST:STEP[1] 2 3...1000:SETup:WAVeform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off"   "CW"   "Cont"   "waveform name"

Preset	CW
Range	Waveform   Continue Previous   CW   Off
Initial S/W Revision	A.05.00

### CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list sequence will automatically apply header settings of the selected waveform in that step.
Initial S/W Revision	A.05.00

### Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <"NVWFM" MSUS + colon + filename>.

When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.

When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .

If you specify a file over SCPI, but the file is not at the specified location, an error is generated.

If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.

If you try to load a Signal Studio waveform “\*.wfm” which contains invalid waveform header, an error is generated.

If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

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Initial S/W Revision      A.05.00

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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>

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Initial S/W Revision      A.05.00

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELete <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB

memory is rejected with an error.

When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.

It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.

It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.

When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

Initial S/W Revision	A.05.00
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### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as "[Segments on Hard Disk](#)" on page 1752.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as "[Load Segment To ARB Memory](#)" on page 1752.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as "[Load All To ARB Memory](#)" on page 1753.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as "[Change Directory...](#)" on page 1754.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as "[Default Directory...](#)" on page 1754

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Segments in ARB Memory

This key functions the same as "[Segments in ARB Memory](#)" on page 1754.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as "[Delete Segment From ARB Mem](#)" on page 1754.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00



## Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 1755.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

## Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME   COUNT   CONTInuous   CABort  :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query <b>Error! Reference source not found.</b> Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time   Play Count   Continuous   Continuous Abort
Initial S/W Revision	A.05.00

## Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

## Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found**. List Sequence Step Validation.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCOut <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCOut?
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
<b>Notes</b>	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
<b>Notes</b>	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
<b>Preset</b>	1.00 ms
<b>Min</b>	100 µs
<b>Max</b>	1800 s
<b>Initial S/W Revision</b>	A.05.00

### Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
<b>Notes</b>	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
<b>Initial S/W Revision</b>	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON   OFF   1   0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
<b>Example</b>	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

### Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE   INTERNAL   KEY
-----------------------	---

```
BUS | EXTERNAL2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900
| TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX
| BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS |
JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11
| BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21
| BAND24 | BAND25 | BAND26 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37
| BAND38 | BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BANDA | BANDB |
BANDC | BANDD | BANDE | BANDE, DOWN | UP, <freq>, <ampl>, <string>,
TIME | COUNT | CONTINUOUS, <time>, ON | OFF | 1 | 0, [<int>],
:SOURce:LIST:STEP[1]|2|...|4..1000:SETup?
```

**Example** :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM\_Test1.bin", TIME, 10ms, OFF, 255

**Notes**

The parameters are:

(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)

1. Step Trigger **<enum>** – specifies the input trigger for the step. For details of the valid types of step trigger see ["Step Trigger" on page 1728](#).
2. Transition Time **<time>** – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see ["Transition Time" on page 1730](#).
3. Radio Band **<enum>** – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1731](#).
4. Radio Band Link **<enum>** – specifies the radio band link direction for the step. For details of the valid link types, see ["Radio Band Link" on page 1748](#).
5. Frequency/Channel Number **<freq>/<chan num>** – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see ["Channel" on page 1748](#) and ["Frequency" on page 1749](#).
6. Power **<ampl>** – specifies the output power for the step in dBm. For details of the valid ranges see ["Power" on page 1749](#).
7. Waveform **<string>** – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:
  - <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.
  - CONT – continues playback of the ARB file from the previous step
  - CW – outputs a CW tone
  - OFF – disable RF output
8. Step Duration **<enum>** – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see ["Step](#)

[Duration" on page 1757.](#)

9. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 1757](#) and ["Play Count" on page 1758](#).

10. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 1759](#).

Dependencies	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> . If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision	A.05.00

### Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Step Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?
<b>Example</b>	:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see <a href="#">"Step Trigger" on page 1728</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
<b>Remote Command Notes</b>	IMMediate INTernal KEY BUS EXTernal2
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME?
<b>Example</b>	:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms

	:SOUR:LIST:SET:TRAN:TIME?
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Transition Time &lt;time&gt; – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see <a href="#">"Transition Time" on page 1730</a></p> <p>If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure "Radio Band" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

**R** :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...

**e** :SOURce:LIST:SETup:RADio:BAND?  
**m**  
**o**  
**t**  
**e**

**C**  
**o**  
**m**  
**m**  
**a**  
**n**  
**d**

**E** :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM

**x** :SOUR:LIST:SET:RAD:BAND?  
**a**  
**m**  
**p**  
**l**  
**e**

**N** The command is to setup below parameter array of whole list sequence.

**o** Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1731](#).  
**t** If input parameter number exceeds the step number defined by ["Number of Steps" on page 1727](#) Number of Steps then  
**e** generate error ", and only those parameters whose index number falls in number of steps will be updated.  
**s**

**R** NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI  
**e** V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO  
**m** REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1 DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|  
 BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1

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o 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN  
t D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF  
e

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "[Number of Steps](#)" on  
e [page 1727](#).

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### Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see <a href="#">"Radio Band Link" on page 1748</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
<b>Remote Command Notes</b>	DOWN UP
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:CNFRrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRrequency?
<b>Example</b>	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see <a href="#">"Channel" on page 1748</a> and <a href="#">"Frequency" on page 1749</a> This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in



	legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?
<b>Example</b>	:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?
Notes	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see <a href="#">"Power" on page 1749</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ... :SOURce:LIST:SETup:WAVEform?
<b>Example</b>	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
Notes	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

	<p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1727.
Range	"filename"   "CW"   "Off"   "CONT"
Initial S/W Revision	A.09.40

### Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:DURation:TYPE &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:DURation:TYPE?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?</pre>
<b>Notes</b>	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration &lt;enum&gt; – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1757.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
<b>Remote Command Notes</b>	TIME   COUNT   CONTinuous
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1727.
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure "Duration Time" or "Play Count" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TOCount &lt;time/int&gt;, &lt;time/int&gt;, &lt;time/int&gt;, ... :SOURce:LIST:SETup:TOCount?</pre>
-----------------------	---

<b>Example</b>	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, " <a href="#">Time</a> " on page 1757 and " <a href="#">Play Count</a> " on page 1758. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current " <a href="#">Step Duration</a> " on page 1757 is "Continuous", then generate error -221,"Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Output Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
<b>Example</b>	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see " <a href="#">Output Trigger</a> " on page 1759. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
<b>Remote Command Notes</b>	ON OFF 1 0
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

### Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI featuredescribed in.

<b>Remote Command</b>	:SOURce:LIST:SETup:CLEar
<b>Example</b>	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

## Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

<b>Key Path</b>	Source, List Sequencer
<b>Remote Command</b>	:SOURce:LIST:TRIGgerout:TYPE BEGinningofstep DATamarker
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

## BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
<b>Remote Command</b>	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to "Bus". Sending this command will trigger the step and continue the sequence.

<b>Remote Command</b>	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
<b>Example</b>	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

### Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

<b>Remote Command</b>	:SOURce:LIST:INITiation:ARMed?
<b>Example</b>	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see <a href="#">"Initiate Sequence" on page 1726</a> Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately.
Notes	There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?".
Initial S/W Revision	A.09.40

### Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
<b>Remote Command</b>	:SOURce:PRESet
<b>Example</b>	:SOUR:PRES

## SPAN X Scale

Accesses a menu of functions that enable you to set the horizontal scale parameters

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing Restart, Single or Cont does a Resume.

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

### Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

<b>Remote Command</b>	:ABORT
<b>Example</b>	:ABOR



Notes	<p>If :INITiate:CONTInuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met.</p> <p>If :INITiate:CONTInuous is OFF, then :INITiate:IMMEdiate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.</p>
Dependencies	<p>For continuous measurement, ABORt is equivalent to the Restart key.</p> <p>Not all measurements support the abort command.</p>
Status Bits/OPC dependencies	<p>The STATus:OPERation register bits 0 through 8 are cleared.</p> <p>The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared.</p> <p>Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.</p>
Initial S/W Revision	<p>Prior to A.02.00</p>

## System

See ["System" on page 222](#)

## Trigger

See ["Trigger" on page 278](#)

### Free Run

See ["Free Run " on page 285](#)

### Video

See ["Video \(IF Envelope\) " on page 286](#)

### Trigger Level

See ["Trigger Level " on page 286](#)

### Trig Slope

See ["Trig Slope " on page 287](#)

### Trig Delay

See ["Trig Delay " on page 288](#)

### External 1

See ["External 1 " on page 304](#)

### Trigger Level

See ["Trigger Level " on page 304](#)

### Trig Slope

See ["Trig Slope " on page 305](#)

### Trig Delay

See ["Trig Delay " on page 291](#)

### Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 292](#)

### External 2

See ["External 2 " on page 306](#)

### Trigger Level

See ["Trigger Level " on page 306](#)

### Trig Slope

See ["Trig Slope " on page 307](#)

### **Trig Delay**

See ["Trig Delay "](#) on page 294

### **Zero Span Delay Comp**

See ["Zero Span Delay Comp On/Off"](#) on page 294

### **RF Burst**

See ["RF Burst "](#) on page 307

### **Absolute Trigger**

See ["Absolute Trigger Level"](#) on page 308

### **Relative Trigger**

See ["Relative Trigger Level"](#) on page 297

### **Trig Slope**

See ["Trigger Slope "](#) on page 309

### **Trig Delay**

See ["Trig Delay "](#) on page 298

### **Periodic Timer**

See ["Periodic Timer \(Frame Trigger\) "](#) on page 299

### **Period**

See ["Period "](#) on page 300

### **Offset**

See ["Offset "](#) on page 301

### **Offset Adjust (Remote Command Only)**

See ["Offset Adjust \(Remote Command Only\)"](#) on page 302

### **Reset Offset Display**

See ["Reset Offset Display "](#) on page 303

### **Sync Source**

See ["Sync Source "](#) on page 303

### **Off**

See ["Off "](#) on page 304

### External 1

See ["External 1 "](#) on page 304

#### Trigger Level

See ["Trigger Level "](#) on page 304

#### Trig Slope

See ["Trig Slope "](#) on page 305

### External 2

See ["External 2 "](#) on page 306

#### Trigger Level

See ["Trigger Level "](#) on page 306

#### Trig Slope

See ["Trig Slope "](#) on page 307

### RF Burst

See ["RF Burst "](#) on page 307

### Absolute Trigger

See ["Absolute Trigger Level"](#) on page 308

#### Trig Slope

See ["Trigger Slope "](#) on page 309

### Trig Delay

See ["Trig Delay"](#) on page 309

### Auto/Holdoff

See ["Auto/Holdoff "](#) on page 310

### Auto Trig

See ["Auto Trig "](#) on page 310

### Trig Holdoff

See ["Trig Holdoff "](#) on page 311

### Holdoff Type

See ["Holdoff Type"](#) on page 311

## User Preset

Accesses a menu that gives you the following three choices:

- User Preset – recalls a state previously saved using the Save User Preset function.
- User Preset All Modes – presets all of the modes in the analyzer
- Save User Preset– saves the current state for the current mode

**NOTE**

In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

---

Key Path	Front-panel key
Backwards Compatibility Notes	<p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p>
Initial S/W Revision	Prior to A.02.00

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## User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, SYST:PRES:USER:SAV. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.

- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

## User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

**NOTE**

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER:ALL
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode.

---

Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

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Initial S/W Revision      Prior to A.02.00

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## Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

---

Key Path                      User Preset

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**Remote Command**        :SYSTem:PRESet:USER:SAVE

---

**Example**                    :SYST:PRES:USER:SAVE

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Notes                        :SYST:PRES:SAVE creates the same file as if the user requested a \*SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.

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Initial S/W Revision      Prior to A.02.00

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## View Selection

The View/Display key accesses a menu that allows you to select the desired view of the measurement from the following selections.

- ORFS Result Summary (SCPI: RSUMmary) – views the result summary.
- Carrier Info (SCPI: CINFo) – views the carrier information.

The measurement has several available view types. The displayed view depends on the settings of Meas Type (see ["Meas Type" on page 1009](#)) and Meas Method (see ["Meas Method" on page 1015](#)), in the Meas Setup menu.

For details of each view, click the link in the View column of the table below. For remote commands, see ["View Selection by Name" on page 1225](#) and ["View Selection by Number \(Remote Command Only\)" on page 1226](#).

Meas Type Setting	Meas Method Setting	View
Modulation <i>or</i> Full Frame Mod (FAST)	Multi Offset	Modulation Power, Multi Offset (See <a href="#">Modulation Power</a> )
Switching	Multi Offset	Switching Power, Multi Offset (See <a href="#">Switching Power</a> )
Mod & Switch	Multi Offset	Modulation and Switching, Multi Offset (See <a href="#">Modulation &amp; Switching</a> )
Mod & Switch	Single Offset	Modulation and Switching, Single Offset (See <a href="#">Modulation &amp; Switching</a> )
Modulation	Single Offset	Modulation, Single Offset (See <a href="#">Modulation Power</a> )
Switching	Single Offset	Switching, Single Offset (See <a href="#">Switching Power</a> )
Modulation <i>or</i> Switching	Swept	Swept Spectrum (See <a href="#">Swept Spectrum Views</a> )

For any view, if a result fails, a red 'F' is displayed beside the result.

### View Selection by Name

See also ["View Selection by Number \(Remote Command Only\)" on page 1226](#).

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:EORFspectr:VIEW[:SElect] RSUMmary CINFormation :DISPlay:EORFspectr:VIEW[:SElect]?
Example	DISP:EORF:VIEW RSUM

	DISP:EORF:VIEW?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	RSUMmary
State Saved	Saved in instrument state.
Range	ORFS Result Summary Carrier Info
Initial S/W Revision	A.06.00

### View Selection by Number (Remote Command Only)

Mode	GSM
<b>Remote Command</b>	:DISPlay:EORFSpectr:VIEW:NSElect <integer> :DISPlay:EORFSpectr:VIEW:NSElect?
<b>Example</b>	DISP:EORF:VIEW:NSEL 5 DISP:EORF:VIEW:NSEL?
Notes	5: ORFS Result Summary 6: Carrier Info You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	5
Max	6
Initial S/W Revision	A.06.00

### Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the System Display Settings key apply to all measurements in all modes.

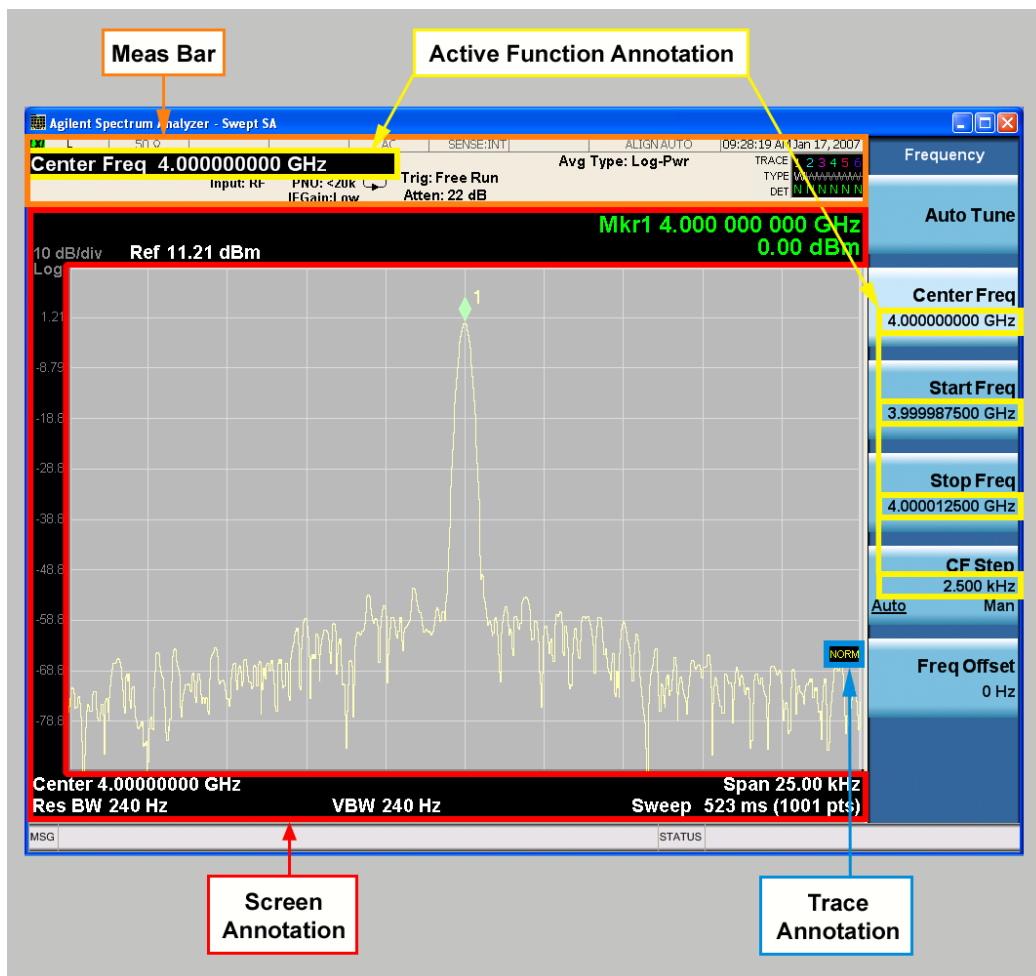
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

### Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATe]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Screen

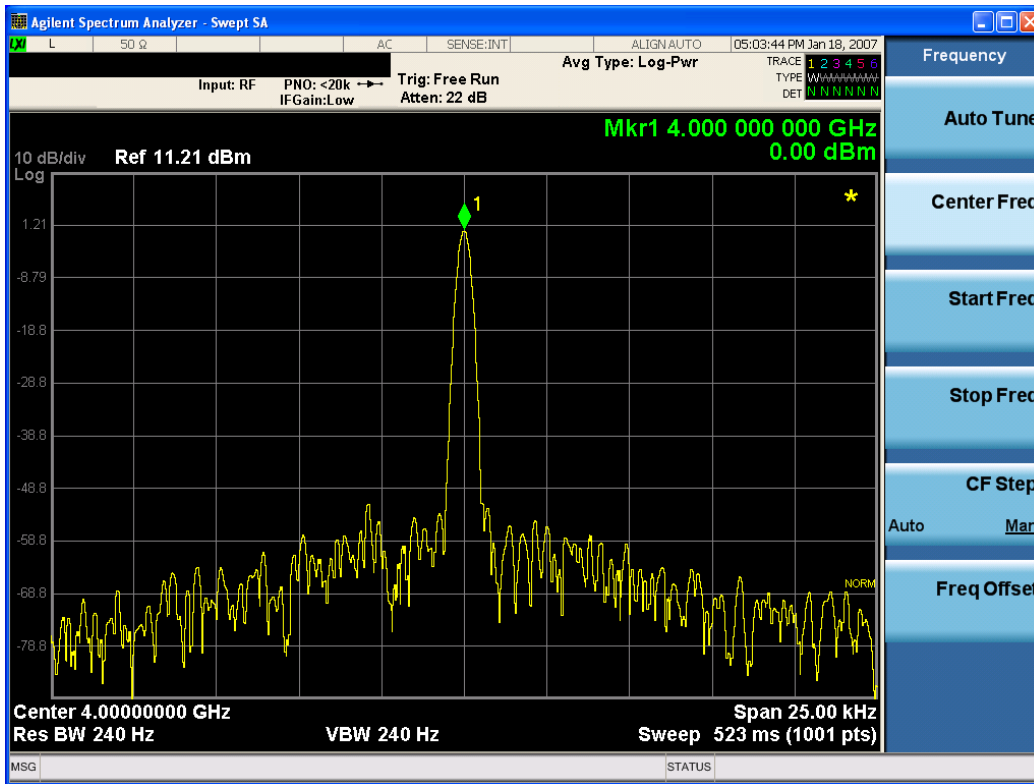
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
Example	DISP:ANN:SCR OFF
Dependencies	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE]?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press Change Title again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing Title, Clear Title.

**NOTE**

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

**Clear Title**

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

## Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
Remote Command	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by Restore Misc Defaults or Restore System Defaults under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

## Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is All Off, it forces ScreenAnnotation, Meas Bar, Trace, and Active Function Values settings to be OFF for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is All Off, the Screen, Meas Bar, Trace, and Active Function Values keys under the Display, Annotation menu are grayed out and forced to Off. When Local Settings is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
Remote Command	:DISPlay:WINDow[1]:ANNOtation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNOtation[:ALL]?
Example	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReen:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReen:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00



### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00



## 11 GSMK Phase and Frequency Measurement

Phase and frequency error are the measures of modulation quality for GSM systems. Since GSM systems use relative phase to transmit information, the phase and frequency accuracy of the transmitter are critical to the systems' performance and ultimately affect range.

**This topic contains the following sections:**

["Measurement Commands for GSMK Phase & Frequency" on page 1236](#)

["Remote Command Results for GSMK Phase & Frequency" on page 1237](#)

## Measurement Commands for GSM Phase & Frequency

The following commands and queries are used to retrieve the measurement results:

`:CONFigure:PFERror`

`:CONFigure:PFERror:NDEFault`

`:INITiate:PFERror`

`:FETCh:PFERror[n]?`

`:READ:PFERror[n]?`

`:MEASure:PFERror[n]?`

For more measurement related commands, see the section ["Remote Measurement Functions" on page 1578](#).

## Remote Command Results for GMSK Phase & Frequency

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	<p>Returns the 10 following scalar results:</p> <p>The result depends on the Average Type setting (Maximum or Mean) if the average state is ON. The average type is a remote command only parameter.</p> <p>Average type is:</p> <ul style="list-style-type: none"> <li>• Maximum (default setting) : Detected Maximum value in average cycle</li> <li>• Mean : Averaged value in average cycle</li> </ul> <ol style="list-style-type: none"> <li>1. <b>RMS Phase Error</b> is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol).</li> <li>2. <b>Peak Phase Error</b> is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process).</li> <li>3. <b>Peak Phase Error Symbol Position</b> is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred.</li> <li>4. <b>Frequency Error</b> is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory.</li> <li>5. <b>I/Q Origin Offset</b> is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin.</li> <li>6. <b>Trace Phase Sample</b> is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces.</li> <li>7. <b>Trace bit 0 Decision Offset</b> is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N.</li> <li>8. <b>Trace Sync Start</b> is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word.</li> <li>9. <b>Trace Time Sample</b> is a floating point number (in second) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs.</li> <li>10. <b>T0 Offset</b> is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec.</li> </ol>
2	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error trace. The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
3	Returns a series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. Phase error with frequency is the error vector between the measured phase (that has not had frequency compensation) and the ideal

n	Results Returned
	reference phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). The first number is the symbol 0 decision point and there are 10 points per symbol. Therefore, decision points are at 0, 10, 20, etc.
4	Returns a series of floating point numbers that represent each sample in the log magnitude trace of the original time record. Each number represents a value (in dBm) of the time record.
5	Returns a series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. The magnitude of each I and Q pair are normalized to 1.0. The first number is the in-phase (I) sample of symbol 0 decision point and the second is the quadrature-phase (Q) sample of symbol 0 decision point. As in the rms phase error, there are ten points per symbol, so that: 1st number = I of the symbol 0 decision point 2nd number = Q of the symbol 0 decision point ... 10th number = Q of the symbol 0 decision point 11th number = I of the symbol 1 decision point 12th number = Q of the symbol 1 decision point ... Nth number = Q of the symbol N decision point
6	Returns a series of logical values (0 or 1) that represent the demodulated bit value of the measured waveform. The first number is the symbol 0 decision point and there are 1 point per symbol. Therefore, decision points are at 0, 1, 2, etc.
7	Returns comma-separated scalar values of pass/fail (0.0 = passed, 1.0 = failed) results determined by testing Phase and Frequency Error. The tested results are changed between Maximum and Average. It depends on the Average Type (:PFER:AVER:TYPE) setting. 1. Test results of RMS Phase Error 2. Test results of Peak Phase Error 3. Test results of Frequency Error
8	Returns the following 22 scalar results: 1. <b>Average RMS Phase Error</b> is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the average of the individual rms phase error. 2. <b>Maximum RMS Phase Error</b> is a floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If averaging is ON, this is the max hold number of the individual rms phase error. 3. <b>Average Peak Phase Error</b> is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the average of the individual peak phase error.

n	Results Returned
4.	<b>Maximum Peak Phase Error</b> is a floating point number (in degrees) of the peak phase error of all the individual symbol decision points (prior to the rms averaging process). If averaging is ON, this is the max hold number of the individual peak phase error.
5.	<b>Average Peak Phase Error Symbol Position</b> is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst phase error.
6.	<b>Maximum Peak Phase Error Symbol Position</b> is a floating point number (in symbols) representing the symbol number at which the peak phase error occurred. If averaging is ON, keeps the position that has the worst maximum peak phase error.
7.	<b>Average Frequency Error</b> is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the average of the individual frequency error.
8.	<b>Maximum Frequency Error</b> is a floating point number (in Hz) of the frequency error in the measured signal. This is the difference between the measured phase trajectory and the reference phase trajectory. If averaging is ON, this is the max hold number of the individual frequency error.
9.	<b>Average I/Q Origin Offset</b> is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the average of the individual IQ Offset.
10.	<b>Maximum I/Q Origin Offset</b> is a floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin. If averaging is ON, this is the max hold number of the individual IQ Offset
11.	<b>Average T0 Offset</b> is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the average of the T0 offset.
12.	<b>Maximum T0 Offset</b> is a floating-point number of the time interval between the trigger point to T0. T0 means the transition time from symbol 13 to symbol 14 of the midamble training sequence for each time slot. Unit is sec. If averaging is ON, this is the max hold number of the T0 offset.
13.	<b>Trace Phase Sample</b> is a floating point number (in units of bits) representing the time between samples. It is used in querying phase error vector traces.
14.	<b>Trace bit 0 Decision Offset</b> is an integer number in units of sample pairs for the sample points in an I/Q vector trace that represents the bit 0 (zero) decision point. The sample pairs in the trace are numbered 0 to N.
15.	<b>Trace Sync Start</b> is an integer number in units of bits for the bit number, within the data bits trace, that represents the start of the sync word.
16.	<b>Trace Time Sample</b> is a floating point number (in second) of the time between samples. It is used in querying time domain traces. For the n=0 trace, of acquired I/Q pairs, this is the time between pairs.
17.	<b>Detected TSC</b> is the most recently detected TSC. The returned value is 0~7 (Burst Type : Normal), 10 (Burst Type : Sync), 20 (Burst Type : Access) if TSC detected. If TSC(Normal), Extended Training Sequence Bits(Sync) or Synch. Sequence Bits (Access) not detected, the returned value is -999.0. If Amptd or NONE( Power vs Time only) specified in Sync Type, the returned value is -999.0. In multi slot

n	Results Returned
	condition, the returned value is the detected TSC of the specified slot(Time Slot ON) or the first evaluated slot(Time Slot OFF).
	18. <b>Reserved</b> for future use - the value returned is -999.0 (floating point).
	19. <b>Reserved</b> for future use - the value returned is -999.0 (floating point).
	20. <b>Reserved</b> for future use - the value returned is -999.0 (floating point).
	21. <b>Reserved</b> for future use - the value returned is -999.0 (floating point).
	22. <b>Reserved</b> for future use - the value returned is -999.0 (floating point).

Key Path	Meas
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00



## AMPTD Y Scale

The Amplitude front-panel key activates the Amplitude menu and selects Reference Level or Reference Value (depending on the measurement) as the active function.

Some features in the Amplitude menu apply to multiple measurements; others apply only to specific measurements. Keys that only apply to some measurements are blanked or grayed out in measurements that are not supported.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Ref Value

Allows you to set the reference value, using absolute degree (Phase Error and Phase Error w/Freq) or absolute power (RF Envelope).

See also:

- ["Ref Value \(Phase Error and Phase Error w/Freq window\)" on page 1241](#)
- ["Ref Value \(RF Envelope window\)" on page 1242](#)

Key Path	AMPTD Y Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Ref Value (Phase Error and Phase Error w/Freq window)

Allows you to set the absolute degree reference.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:RLEVel?
<b>Example</b>	DISP:PFER:VIEW:WIND:TRAC:Y:RLEV 5 DISP:PFER:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When <a href="#">"Auto Scaling" on page 1246</a> is On, this value is automatically determined by the measurement result. When the user sets this value manually, <a href="#">"Auto Scaling" on page 1246</a> automatically changes to Off.
Preset	0.00
State Saved	Saved in instrument state.

Min	-36000.0
Max	36000.0
Initial S/W Revision	Prior to A.02.00

### Ref Value (RF Envelope window)

Allows you to set the absolute power reference.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALE]:RLEVel <real> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALE]:RLEVel?
<b>Example</b>	DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV 4 DISP:PFER:VIEW:WIND3:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When " <b>Auto Scaling</b> " on page 1246 is On, this value is automatically determined by the measurement result. When the user sets this value manually, " <b>Auto Scaling</b> " on page 1246 automatically changes to Off.
Preset	0.00
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

### Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

### Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
----------	-------

Mode	BASIC
<b>Remote Command</b>	[ :SENSe ] :POWer [ :RF ] :RANGe <real> [ :SENSe ] :POWer [ :RF ] :RANGe?
<b>Example</b>	:POW:RANG 10.0 :POW:RANG?
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

### Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
<b>Remote Command</b>	[ :SENSe ] :POWer [ :RF ] :RANGe:OPTimize IMMEDIATE
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

### Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
<b>Remote Command</b>	[ :SENSe ] :POWer [ :RF ] :RANGe:OPTimize:ATTenuation OFF   ON   ELEctrical   COMBined [ :SENSe ] :POWer [ :RF ] :RANGe:OPTimize:ATTenuation?
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELEctrical and COMBined still can be used. Then, upon receiving ELEctrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.

Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :PARatio &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe :PARatio?</code>
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

## Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet?</code>
Example	POW:RANG:MIX:OFFS -5 dB
Preset	0 dB
State Saved	Saved in instrument state

Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

### Scale/Div

Sets the Y scale per division on the display, using absolute degree (Phase Error and Phase Error w/Freq) or absolute power (RF Envelope).

See also:

- ["Ref Value \(Phase Error and Phase Error w/Freq window\)" on page 1241](#)
- ["Scale/Division \(RF Envelope window\)" on page 1245](#)

Key Path	AMPTD Y Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Scale/Div (Phase Error and Phase Error w/Freq window)

Allows you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:PDIVision <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:PDIVision?
<b>Example</b>	DISP:PFER:VIEW:WIND:TRAC:Y:PDIV 10 DISP:PFER:VIEW:WIND:TRAC:Y:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Preset	5.00
State Saved	Saved in instrument state.
Min	0.01
Max	360
Initial S/W Revision	Prior to A.02.00

### Scale/Division (RF Envelope window)

Allows you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision <rel_ampl> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:Y[:SCALe]:PDIVision?
Example	DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV 10 DISP:PFER:VIEW:WIND3:TRAC:Y:SCAL:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	0.1
Max	20.0
Initial S/W Revision	Prior to A.02.00

## Ref Position

Allows you to set the reference position.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2 3:TRACe:Y[:SCALe]:RPOsition TOP   CENTer   BOTTom :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:Y[:SCALe]:RPOsition?
Example	DISP:PFER:VIEW:WIND:TRAC:Y:RPOS TOP DISP:PFER:VIEW:WIND:TRAC:Y:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	CENT CENT TOP
State Saved	Saved in instrument state.
Range	Top Ctr Bot
Initial S/W Revision	Prior to A.02.00

## Auto Scaling

Allows you to toggle the auto scaling function between On and Off.

Key Path	AMPTD Y Scale
Mode	GSM
Remote Command	:DISPlay:PFERror:VIEW[1]:WINDow[1]2 3:TRACe:Y[:SCALe]:COUple ON   OFF

	1   0 :DISPlay:PFERror:VIEW[1]:WINDow[1]2 3:TRACe:Y[:SCALe]:COUPle?
<b>Example</b>	DISP:PFER:VIEW:WIND:TRAC:Y:COUP ON DISP:PFER:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you set either "Ref Value" on page 1241 or Presel Center@3017 manually, this parameter is set to 'Off' automatically.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See ["More Information" on page 1248](#)

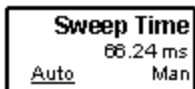
Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

### More Information

There are two types of functions that have Auto/Manual modes.

#### Auto/Man Active Function keys

An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either Auto or Man underlined as illustrated below.

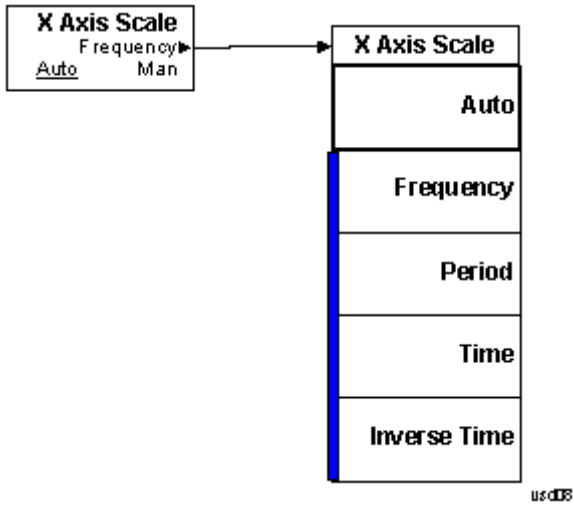


usd07

#### Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.





## BW

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

---

Key Path	Front-panel key
Mode	EDGE GSM

---

## Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing Cont does a Resume.

Key Path	Front-panel key
Remote Command	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
Example	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
Preset	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
State Saved	Saved in instrument state
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold. The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON ) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
Initial S/W Revision	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of Trace Average, Max Hold, or Min Hold.

In Other Measurements/Modes:

With Avg/Hold Num (in the Meas Setup menu) set to Off or set to On with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with Avg/Hold Num set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the Cont key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

## 11 GMSK Phase and Frequency Measurement Cont (Continuous Measurement/Sweep)

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until  $k = N$ , at which point the current sequence will stop and the instrument will go to the idle state.

File

See "File" on page 216

## FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel ?</code>
<b>Example</b>	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with <b>Center Frequency</b> . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

### Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1547](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

### Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1566](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1567](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1568](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is Center Freq.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a Global Settings key in its Mode Setup menu.

The Center Freq function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 1259](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 1261](#)

See ["Center Frequency Presets" on page 1258](#)



Key Path	FREQ Channel
Scope	Meas Global
Remote Command	[ :SENSe ] :FREQuency:CENTer <freq> [ :SENSe ] :FREQuency:CENTer?
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See " <a href="#">Center Frequency Presets</a> " on page 1258 and " <a href="#">RF Center Freq</a> " on page 1259 and <a href="#">Ext Mix Center Freq</a> and " <a href="#">I/Q Center Freq</a> " on page 1261.
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See " <a href="#">Center Frequency Presets</a> " on page 1258 and " <a href="#">RF Center Freq</a> " on page 1259 and " <a href="#">I/Q Center Freq</a> " on page 1261.
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See " <a href="#">Center Frequency Presets</a> " on page 1258 and " <a href="#">RF Center Freq</a> " on page 1259 and " <a href="#">I/Q Center Freq</a> " on page 1261.
Default Unit	Hz
Status Bits/OPC Dependencies	Non-overlapped
Initial S/W Revision	Prior to A.02.00

## Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

## RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:RF:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:RF:CENTer?</code>
<b>Example</b>	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency – 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

### Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:EMIXer:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:EMIXer:CENTer?</code>
<b>Example</b>	<code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	<p>If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq - Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table.</p> <p>When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz.</p> <p>Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.</p>
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band - 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

### I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :FREQuency:IQ:CENTer <freq> [ :SENSe ] :FREQuency:IQ:CENTer?
<b>Example</b>	FREQ:IQ:CEN: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	-40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

### BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel
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Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

### BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :ARFCn  RFCHannel :TOP
<b>Example</b>	CHAN:ARFC:TOP
Notes	<ol style="list-style-type: none"> <li>This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

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	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz

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State Saved	No
Initial S/W Revision	Prior to A.02.00

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## BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

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Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel:ARFCn RFChannel:MIDDLE</code>
<b>Example</b>	CHAN:ARFC:MIDD
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change <code>[ :SENSe ] :CHANnel:ARFCn RFChannel</code> as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change <code>[ :SENSe ] :FREQuency:CENTer</code> as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

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	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz

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State Saved	No
Initial S/W Revision	Prior to A.02.00

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### BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

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Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel :BOTTom</code>
<b>Example</b>	<code>CHAN:ARFC:BOTT</code>
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change <code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel</code> as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTOM. Change <code>[ :SENSe ] :FREQuency :CENTer</code> as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

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	DCS 1800: 1805.20 MHz
	PCS 1900: 1930.20 MHz
	GSM 450: 460.600 MHz
	GSM 480: 489.000 MHz
	GSM 700: 747.2 MHz
	GSM 850: 869.200 MHz
	T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

## Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

## BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO ON OFF 1 0 [ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :BASE :CLASs SC   MC [ :SENSe ] :CHANnel :CARRier :BASE :CLASs ?
<b>Example</b>	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?

**Notes**

You must be in the GSM mode to use this command.  
 Use INSTRument:SElect to set the mode.  
 Selection C1 and C2 are supported for backwards compatibility.  
 When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."

Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

## Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :COUNT <integer> [ :SENSe ] :CHANnel :CARRier :COUNT?

<b>Example</b>	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

## Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:CARRier:RCARrier <integer> [ :SENSe ] :CHANnel:CARRier:RCARrier?
<b>Example</b>	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers.  This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

## Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

## Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :LIST :COUPle OFF   ON   0   1, ... [ :SENSe ] :CHANnel :CARRier :LIST :COUPle ?
<b>Example</b>	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple   Man
Initial S/W Revision	A.06.00

### Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :PPResent YES   NO, ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :PPResent ?</code>
<b>Example</b>	<code>CHAN:CARR:LIST:PPR YES</code> <code>CHAN:CARR:LIST:PPR?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes   No
Initial S/W Revision	A.06.00

### Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global

<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval &lt;freq&gt;, ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval?</code>
<b>Example</b>	<code>CHAN:CARR:LIST:INT 600k</code> <code>CHAN:CARR:LIST:INT?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode. The softkey for the last carrier (say, #N) is grayed out.
<b>Dependencies</b>	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
<b>Couplings</b>	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
<b>Preset</b>	600kHz
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	400 kHz
<b>Max</b>	100 MHz
<b>Initial S/W Revision</b>	A.06.00
<b>Modified at S/W Revision</b>	A.07.00, A.08.00

## Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

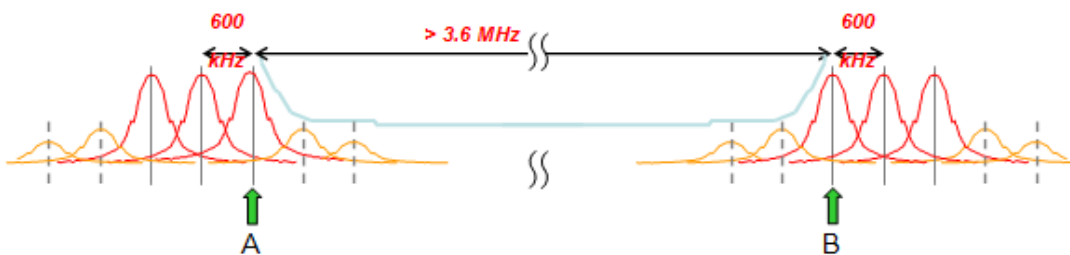
Error! Reference source not found.

See "An example of non-contiguous frequency allocation" on page 1271

<b>Key Path</b>	FREQ Channel, Multi Carrier Setup
<b>Mode</b>	GSM
<b>Scope</b>	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :FALLocation</code> <code>CONTiguous NCONTiguous</code> <code>[ :SENSe ] :CHANnel :CARRier :FALLocation?</code>
<b>Example</b>	<code>CHAN:CARR:FALL NCON</code> <code>CHAN:CARR:FALL?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
<b>Dependencies</b>	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

### An example of non-contiguous frequency allocation



### Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

### Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

Error! Reference source not found.

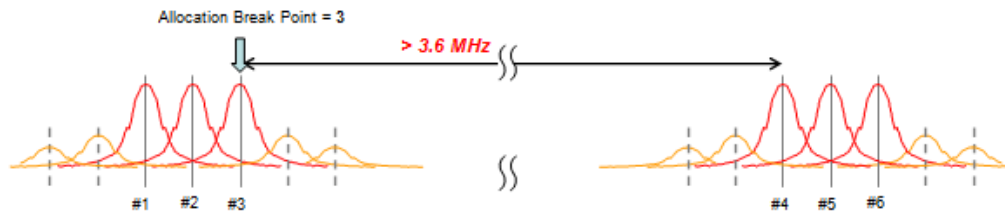
See "An example of allocation break point" on page 1273

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	<code>[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint?</code>
Example	<code>CHAN:CARR:FALL:NCON:ABP 3</code> <code>CHAN:CARR:FALL:NCON:ABP?</code>

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers - 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00



## An example of allocation break point



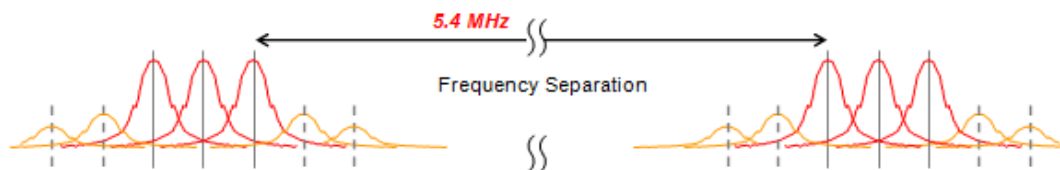
### Freq Separation

Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 1274](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONtiguous :FSEParation &lt;freq&gt;</code> <code>[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONtiguous :FSEParation?</code>
<b>Example</b>	<code>CHAN:CARR:FALL:NCON:FSEP 5.4M</code> <code>CHAN:CARR:FALL:NCON:FSEP?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

## An example of frequency separation



### Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	[ :SENSe ] :RADio:CARRier:NUMBer:AUTO ON OFF 1 0 [ :SENSe ] :RADio:CARRier:NUMBer:AUTO?
Example	RAD:CARR:NUMB:AUTO 1 RAD:CARR:NUMB:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

### Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :RADio :CARRier :NUMBer SINGLE   MULTiple</code> <code>[ :SENSe ] :RADio :CARRier :NUMBer ?</code>
<b>Example</b>	<code>RAD :CARR :NUMB SING</code> <code>RAD :CARR :NUMB ?</code>
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use <code>INSTrument :SElect</code> to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single   Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :SLOT &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel :SLOT ?</code> <code>[ :SENSe ] :CHANnel :SLOT :AUTO OFF   ON   0   1</code> <code>[ :SENSe ] :CHANnel :SLOT :AUTO ?</code>
<b>Example</b>	<code>CHAN :SLOT 0</code> <code>CHAN :SLOT ?</code> <code>CHAN :SLOT :AUTO OFF</code> <code>CHAN :SLOT :AUTO ?</code>
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

### Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence “TS1” and “TS2” are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe] :CHANnel :BURSt NORMal   SYNC   ACCess   HSRate   MIXed [ :SENSe] :CHANnel :BURSt?
<b>Example</b>	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH)   Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:

- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
<b>Example</b>	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

## Input/Output

See ["Input/Output" on page 148](#)

## Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

### Marker Type

Sets the marker control mode Normal, Delta and Off. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

See also:

- ["Marker X Axis Value \(Remote Command Only\)" on page 1283](#)
- ["Marker X Axis Position \(Remote Command Only\)" on page 1283](#)
- ["Marker Y Axis Value \(Remote Command Only\)" on page 1284](#)

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:MARKer[1] 2 ... 12:MODE POSition   DELTa   OFF :CALCulate:PFERror:MARKer[1] 2 ... 12:MODE?
<b>Example</b>	CALC:PFER:MARK:MODE OFF CALC:PFER:MARK:MODE?
<b>Notes</b>	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area. Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off. Active Function Display: the marker X-axis value entered in the active function area displays the marker value to its full entered precision. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF



State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

## Properties

Accesses a menu that allows you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Relative To

Selects the marker that the selected marker is relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:MARKer[1] 2 ... 12:REFerence <integer> :CALCulate:PFERror:MARKer[1] 2 ... 12:REFerence?
<b>Example</b>	CALC:PFER:MARK:REF 10 CALC:PFER:MARK:REF?
Notes	A marker cannot be relative to itself so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried, a single value is returned (the specified marker number's relative marker).
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

## Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:MARKer[1] 2 ... 12:TRACe PERRor   PFERror   RFENvelope   POLar :CALCulate:PFERror:MARKer[1] 2 ... 12:TRACe?
<b>Example</b>	CALC:PFER:MARK:TRAC POL CALC:PFER:MARK:TRAC?
Couplings	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	PERRor
State Saved	Saved in instrument state.
Range	IQ Polar Phase Error Phase Error w/Freq RF Envelope
Initial S/W Revision	Prior to A.02.00

## Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not Off. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:MARKer:COUPle[:STATE] ON OFF 1 0 :CALCulate:PFERror:MARKer:COUPle[:STATE]?
<b>Example</b>	CALC:PFER:MARK:COUP ON CALC:PFER:MARK:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:MARKer:AOff
<b>Example</b>	CALC:PFER:MARK:AOff
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

### Marker X Axis Value (Remote Command Only)

Sets the marker X Axis value in the current marker X Axis Scale unit. It has no effect if the control mode is Off, but is the SCPI equivalent of entering an X-value if the control mode is Normal or Delta.

Mode	EDGEgsm
<b>Remote Command</b>	:CALCulate:PFERror:MARKer[1] 2 ... 12:X <real> :CALCulate:PFERror:MARKer[1] 2 ... 12:X?
<b>Example</b>	CALC:PFER:MARK3:X 0 CALC:PFER:MARK3:X?
Notes	If no suffix is sent, uses the fundamental units for the current marker X Axis Scale. If a suffix is sent that does not match the current marker X Axis Scale unit, an error "Invalid suffix" is generated. The query returns the marker's absolute X Axis value if the control mode is Normal, or the offset from the marker's reference marker if the control mode is Delta. The query is returned in the fundamental units for the current marker X Axis scale: Hz for Frequency and Inverse Time, seconds for Period and Time. If the marker is Off, the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value would be changed.
Preset	After a preset, all markers are turned OFF, so the Marker X Axis Value query returns a not a number (NAN).
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

### Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is Off, but is the SCPI equivalent of entering a value if the control mode is Normal or Delta or Fixed - except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	EDGEgsm
<b>Remote Command</b>	:CALCulate:PFERror:MARKer[1] 2 ... 12:X:POsition <integer>

	:CALCulate:PFERror:MARKer[1] 2 ... 12:X:POSition?
<b>Example</b>	CALC:PFER:MARK10:X:POS 0 CALC:PFER:MARK10:X:POS?
<b>Notes</b>	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal, or the offset from the marker's reference marker in trace points if the control mode is Delta. If the marker is Off the response is not a number. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Preset</b>	After a preset, all markers are turned OFF, so the Marker X Axis Value query returns a not a number (NAN).
<b>State Saved</b>	No
<b>Min</b>	-9.9E37
<b>Max</b>	9.9E37
<b>Initial S/W Revision</b>	Prior to A.02.00

### Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The "result" of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value, the remote programmer must also know what the analyzer's Y Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- Absolute result: every marker has an absolute result:

For Normal and Delta markers, the Y-axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is Delta.

- Relative result: if a marker's control mode is Delta, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker.

<b>Mode</b>	EDGE GSM
<b>Remote Command</b>	:CALCulate:PFERror:MARKer[1] 2 ... 12:Y?
<b>Example</b>	CALC:PFERror:MARK11:Y?
<b>Notes</b>	The query returns the marker Y-axis result. If the marker is Off the response is not a number. If 'Polar' is selected for the Marker Trace, it returns the values of 'I' and 'Q' at the same time. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Preset</b>	0
<b>State Saved</b>	No
<b>Backwards Compatibility SCPI</b>	:CALCulate:PFERror:MARKer[1] 2 ... 4:FUNCTion:RESult?
<b>Initial S/W Revision</b>	Prior to A.02.00



## Marker Function

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM

## Marker To

There is no functionality for this front-panel key in this measurement. When pressed, this key displays a blank menu.

---

Key Path	Front-panel key
Mode	EDGE GSM

---

## Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

**NOTE**

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

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Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

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### Remote Measurement Functions

This section contains the following topics:

["Measurement Group of Commands" on page 1579](#)

["Current Measurement Query \(Remote Command Only\)" on page 1581](#)

["Limit Test Current Results \(Remote Command Only\)" on page 1581](#)

["Data Query \(Remote Command Only\)" on page 1581](#)

["Calculate/Compress Trace Data Query \(Remote Command Only\)" on page 1582](#)

["Calculate Peaks of Trace Data \(Remote Command Only\)" on page 1587](#)

["Hardware-Accelerated Fast Power Measurement \(Remote Command Only\)" on page 1588](#)

["Format Data: Numeric Data \(Remote Command Only\)" on page 1602](#)

["Format Data: Byte Order \(Remote Command Only\)" on page 1603](#)

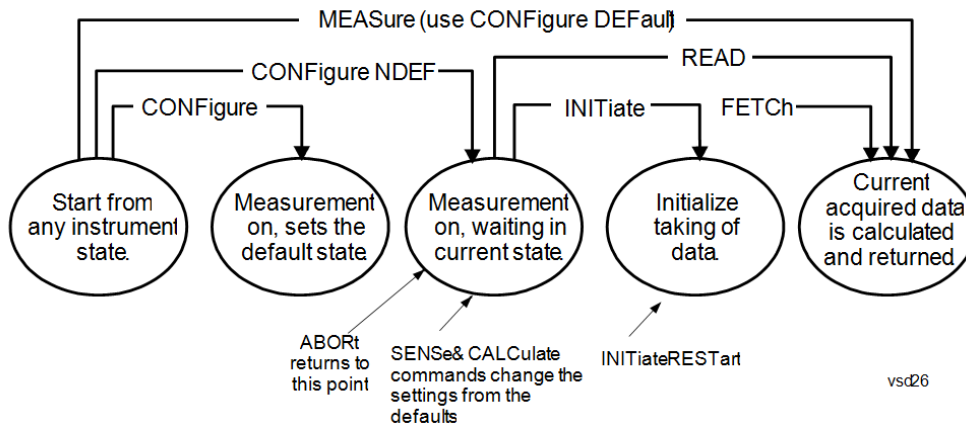
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Initial S/W Revision	Prior to A.02.00
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## Measurement Group of Commands




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### Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

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### Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

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the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

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#### Fetch Commands:

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:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

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#### INITiate Commands:

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:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
  - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
  - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
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#### READ Commands:

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:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
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measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
  - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
  - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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### Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

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<b>Remote Command</b>	:CONFigure?
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<b>Example</b>	CONF?
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### Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

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<b>Remote Command</b>	:CALCulate:CLIMits:FAIL?
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<b>Example</b>	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.
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### Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BOARDer and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

<b>Remote Command</b>	:CALCulate:DATA[n]?
<b>Notes</b>	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement.
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### Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

<b>Remote Command</b>	:CALCulate:DATA<n>:COMPRESS? BLOCK   CFIT   MAXimum   MINimum   MEAN   DMEan   RMS   RMSCubed   SAMPLE   SDEViation   PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]
<b>Example</b>	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
<b>Notes</b>	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters.  This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
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- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

- 

**NOTE**

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where  $|X_i|$  is the magnitude of an I/Q pair, and  $n$  is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$DME = 10 \times \log_{10} \left( \frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

**NOTE**

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$RMS = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$RMS = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPlE - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where  $X_i$  is a data point value,  $\bar{X}$  is the arithmetic mean of the data point values for the specified region (s), and  $n$  is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where  $|X_i|$  is the magnitude of an I/Q pair,  $\bar{X}$  is the mean of the magnitudes for the specified region(s), and  $n$  is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ( $n=0$ ) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

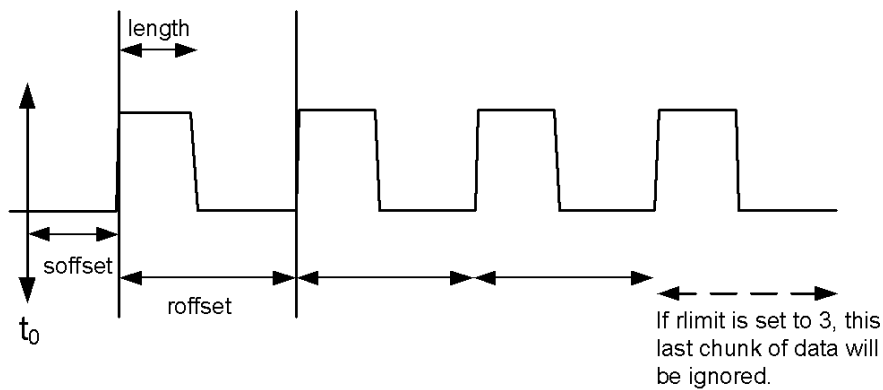
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where  $Y_i$  is the unwrapped phase of I/Q pair with applying frequency correction and  $n$  is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

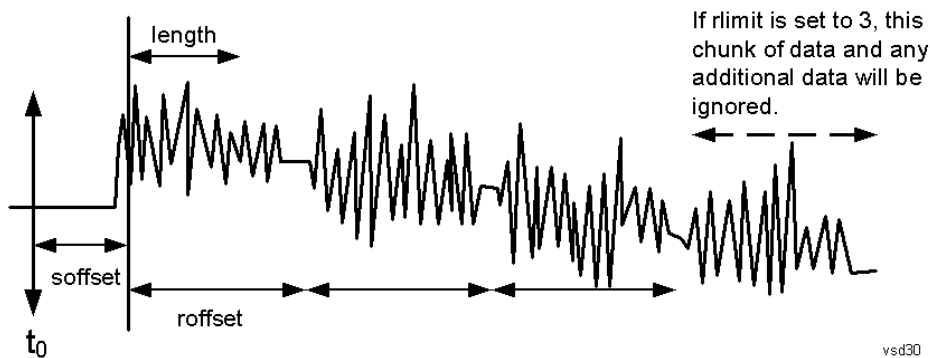
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.



## Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

<b>Remote Command</b>	<p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME[,ALL   GTDLline   LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME]</pre>
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<b>Example</b>	<p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p>
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<b>Notes</b>	<p>&lt;n&gt; - is the trace that will be used</p> <p>&lt;threshold&gt; - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p>&lt;excursion&gt; - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p>
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excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported. Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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## Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

## Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

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<b>Mode</b>	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer [1, 2, ..., 999] :RESet
<b>Example</b>	:CALC:FPOW:POW1:RES

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Notes	Option FP2 is required.
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### Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string"
<b>Example</b>	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
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### Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

### Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

### DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

### Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	<p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p>
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	<p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p>
Preset	0 dB
Range	0 - 24 dB (1 dB steps)

Default Unit	dB
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#### IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

#### IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

#### Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00

## Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

## Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

## Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

## Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

#### Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 - 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

#### Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	-5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

#### Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00



## Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

## Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

## Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

## Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

### Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

### Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0
Initial S/W Revision	A.14.00

### Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	<p>This parameter array defines what measurement is being made for each individually-specified channel:</p> <p>BandPower: Total power within the specified bandwidth of the channel (dBm)</p> <p>BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz)</p> <p>PeakPower: The peak power value within the specified bandwidth of the channel (dBm)</p> <p>PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz)</p> <p>XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter</p> <p>OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter</p> <p>All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.</p>
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

### Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	<p>The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel.</p> <p>All array parameters should have the same number of elements.</p>
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	<p>This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.</p>

Preset	[0.99]
Range	0 - 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

M	All
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R	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine?
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E	:CALC:FPOW:POW1:DEF?
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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

S "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=100000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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### Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure
<b>Example</b>	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:INITiate
<b>Example</b>	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:FETCh?
<b>Example</b>	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

### Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]?
<b>Example</b>	:CALC:FPOW:POW1?
Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00

### Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
<b>Example</b>	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

### Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
<b>Example</b>	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] 3. Declared function result for the 2nd specified channel [4 byte float] ... (m + 1). Declared function result for the last (mth) specified channel [4 byte float] ADC Over Range 1. ADC over-range occurred (1: true, 0: false) [2 byte short]

	<p>Spectrum Data</p> <ol style="list-style-type: none"> <li>1. Number of points in the spectrum data, k [4 byte int]</li> <li>2. Start frequency of spectrum data (Hz) [8 byte double]</li> <li>3. Step frequency of spectrum data (Hz) [8 byte double]</li> <li>4. FFT bin at 1st point (dBm) [4 byte float]</li> <li>5. FFT bin at 2nd point (dBm) [4 byte float]</li> <li>...</li> <li>(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]</li> </ol>
Initial S/W Revision	A.14.00

### Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

<b>Remote Command</b>	<pre>:FORMat [:TRACe] [:DATA] ASCii   INTeger, 32   REAL, 32   REAL, 64 :FORMat [:TRACe] [:DATA] ?</pre>
<b>Notes</b>	<p>The query response is:</p> <p>ASCii: ASC,8  REAL,32: REAL,32  REAL,64: REAL,64  INTeger,32: INT,32</p> <p>When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTeger, data is output in units of m dBm (.001 dBm).</p> <p>The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.</p>
<b>Dependencies</b>	<p>Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTeger, 32 for REAL).</p> <p>Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".</p>
<b>Preset</b>	ASCii
<b>Backwards Compatibility Notes</b>	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
<b>Initial S/W Revision</b>	Prior to A.02.00

The specs for each output type follow:



AScii - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

### Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

<b>Remote Command</b>	:FORMat:BORDER NORMal SWAPped :FORMat:BORDER?
<b>Preset</b>	NORMal
<b>Initial S/W Revision</b>	Prior to A.02.00

## Meas Setup

Displays the measurement setup menu for the currently selected measurement.

Key Path	Front-panel key
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

### Avg/Hold Num

Used to specify the number of data acquisitions that are averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On – Sets measurement averaging on.
- Off – Sets measurement averaging off.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	[:SENSe]:PFERror:AVERage:COUNT <integer> [:SENSe]:PFERror:AVERage:COUNT? [:SENSe]:PFERror:AVERage[:STATe] OFF ON 0 1 [:SENSe]:PFERror:AVERage[:STATe]?
<b>Example</b>	PFER:AVER:COUN 4 PFER:AVER:COUN? PFER:AVER OFF PFER:AVER?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When this value is changed, Avg State is set to On.
Preset	10 OFF
State Saved	Saved in instrument state.
Min	1
Max	10000
Initial S/W Revision	Prior to A.02.00

### Avg Mode

Allows you to choose either exponential or repeat averaging. This selection only effects the averaging after the number of N averages is reached (set using the Averages, Avg Bursts, or Avg Number key).

- Exponential averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages, exponential averaging is used with a weighting factor of N (the displayed average count stops at N). Exponential averaging weights new data more than old data, which allows tracking of slow-changing signals. The weighting factor N is set using the Averages, Avg Bursts key.
- Repeat averaging – When Measure is set at Cont, data acquisitions continue indefinitely. After N averages is reached, all previous result data is cleared and the average count is set back to 1. This is equivalent to being in Measure Single and pressing the Restart key when the Single measurement finishes.

Key Path	Meas Setup
Mode	GSM
Remote Command	[ :SENSe ] :PFERror:AVERage:TCONtrol EXPonential REPeat [ :SENSe ] :PFERror:AVERage:TCONtrol?
Example	PFER:AVER:TCON REP PFER:AVER:TCON?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	REPeat
State Saved	Saved in instrument state.
Range	Exp Repeat
Initial S/W Revision	Prior to A.02.00

## Burst Sync

Allows you to select the method of synchronizing the measurement to the bursts.

- RFBurst – The burst synchronization approximates the start and stop of the useful part of the burst without demodulation of the burst.
- Training Sequence (TSEQunce) – The burst synchronization performs a demodulation of the burst and determines the start and stop of the useful part of the burst based on the midamble training sync sequence.

Key Path	Meas Setup
Mode	GSM
Remote Command	[ :SENSe ] :PFERror:BSYNc:SOURce RFBurst TSEQunce [ :SENSe ] :PFERror:BSYNc:SOURce?
Example	PFER:BSYN:SOUR RFB PFER:BSYN:SOUR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	TSEQunce
State Saved	Saved in instrument state.
Range	Training Seq RF Amptd
Initial S/W Revision	Prior to A.02.00

## Limits

Accesses a menu that enables you to set the Limit Test.

Key Path	Meas Setup, Mode, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

## Limit Test

Turns on or off limit pass/fail testing.

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:TEST[:STATe] OFF ON 0 1 :CALCulate:PFERror:LIMit:TEST[:STATe]?
<b>Example</b>	CALC:PFER:LIM:TEST ON CALC:PFER:LIM:TEST?
Notes	If set to Off, PASS/FAIL indicator on the Meas Bar goes blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## RMS Phase Error

Sets the limit value for RMS Phase limit in degree for MS and BTS.

See also:

- ["RMS Phase Error Limit for BTS" on page 1317](#)
- ["RMS Phase Error Limit for MS" on page 1317](#)

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### RMS Phase Error Limit for BTS

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:BTS:RPHase <real> :CALCulate:PFERror:LIMit:BTS:RPHase?
<b>Example</b>	CALC:PFER:LIM:BTS:RPH 10 CALC:PFER:LIM:BTS:RPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

### RMS Phase Error Limit for MS

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:MS:RPHase <real> :CALCulate:PFERror:LIMit:MS:RPHase?
<b>Example</b>	CALC:PFER:LIM:MS:RPH 10 CALC:PFER:LIM:MS:RPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	5
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

### Peak Phase Error

Sets the limit value for Peak Phase limit in degree for MS and BTS.

See also:

- ["Peak Phase Error Limit for BTS" on page 1318](#)
- ["Peak Phase Error Limit for MS" on page 1318](#)

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Peak Phase Error Limit for BTS

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:BTS:PPHase <real> :CALCulate:PFERror:LIMit:BTS:PPHase?
<b>Example</b>	CALC:PFER:LIM:BTS:PPH 10 CALC:PFER:LIM:BTS:PPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Unit is Degree(s).
Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

### Peak Phase Error Limit for MS

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:MS:PPHase <real> :CALCulate:PFERror:LIMit:MS:PPHase?
<b>Example</b>	CALC:PFER:LIM:MS:PPH 10 CALC:PFER:LIM:MS:PPH?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	20
State Saved	Saved in instrument state.
Min	0.0
Max	180.0
Initial S/W Revision	Prior to A.02.00

## Frequency Error

Sets the limit value for frequency limit in ppm for MS and BTS.

See also:

- "Freq Error Limit for BTS (BTS Type is Normal)" on page 1319
- "Freq Error Limit for mBTS (BTS Type is one of Micro BTS types)" on page 1319
- "Freq Error Limit for pBTS (BTS Type is Pico1)" on page 1320
- "Freq Error Limit for MS" on page 1320

Key Path	Meas Setup, Limits
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Freq Error Limit for BTS (BTS Type is Normal)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:BTS:FERRor <real> :CALCulate:PFERror:LIMit:BTS:FERRor?
<b>Example</b>	CALC:PFER:LIM:BTS:FERR 10 CALC:PFER:LIM:BTS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

### Freq Error Limit for mBTS (BTS Type is one of Micro BTS types)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:MBTS:FERRor <real> :CALCulate:PFERror:LIMit:MBTS:FERRor?
<b>Example</b>	CALC:PFER:LIM:MBTS:FERR 10 CALC:PFER:LIM:MBTS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Preset	0.05
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

### Freq Error Limit for pBTS (BTS Type is Pico1)

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:PBTS:FERRor <real> :CALCulate:PFERror:LIMit:PBTS:FERRor?
<b>Example</b>	CALC:PFER:LIM:PBTS:FERR 10 CALC:PFER:LIM:PBTS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Unit is ppm.
Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00

### Freq Error Limit for MS

Key Path	Meas Setup, Limits
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:LIMit:MS:FERRor <real> :CALCulate:PFERror:LIMit:MS:FERRor?
<b>Example</b>	CALC:PFER:LIM:MS:FERR 10 CALC:PFER:LIM:MS:FERR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0.1
State Saved	Saved in instrument state.
Min	0
Max	100
Initial S/W Revision	Prior to A.02.00



## Meas Preset

Restores all the measurement parameters to their default values.

Key Path	Meas Setup
Mode	GSM
<b>Remote Command</b>	:CONFigure:PFERror
<b>Example</b>	CONF:PFER
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

## Average Type (Backward Compatibility/Remote Command Only)

Allows you to select the averaging type from the following selections:

- Maximum – The maximum values are restored (the maximum of all values is retained).
- Mean – The mean values are restored (the average of all values is retained).

Mode	EDGEgSM
<b>Remote Command</b>	[ :SENSe ] :PFERror:AVERage:TYPE MEAN MAXimum [ :SENSe ] :PFERror:AVERage:TYPE?
<b>Example</b>	PFER:AVER:TYPE MEAN PFER:AVER:TYPE?
Notes	SCPI only. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	MAXimum
State Saved	Saved in instrument state.
Range	Mean Maximum
Initial S/W Revision	Prior to A.02.00

## Mode

See "[Mode](#)" on page 174

## Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 1324 for more information.

Key Path	Front-panel key
<b>Remote Command</b>	:SYSTem:PRESet
<b>Example</b>	:SYST:PRES
Notes	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

## How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPUt	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGN	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

## Mode Setup

See "[Mode Setup](#)" on page 193

## Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

When Marker Trace of the selected marker is POL, peak search will not be performed.

Key Path	Peak Search
Mode	GSM
<b>Remote Command</b>	:CALCulate:PFERror:MARKer[1] 2 ... 12:MAXimum
<b>Example</b>	CALC:PFER:MARK2:MAX
Initial S/W Revision	Prior to A.02.00

Print

See "Print" on page 221



## Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State\_0000.state. The next is State\_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State\_0010.state there is already a State\_0010.state file in the current directory, it advances the counter to State\_0011.state to ensure that no conflict will exist (and then it verifies that State\_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred\_0000.csv.

**NOTE**

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

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**NOTE**

If the filename you entered ends with \_dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

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Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

## Recall

The Recall menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an Import (Data) option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

**NOTE**

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	<p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATe &lt;filename&gt;.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p>
Backwards Compatibility Notes	<p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p>
Backwards Compatibility Notes	<p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p>
Initial S/W Revision	Prior to A.02.00

## State

The Recall State menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. Recall State will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 1333](#).

<b>Key Path</b>	Recall
<b>Mode</b>	All
<b>Remote Command</b>	:MMEMory:LOAD:STATe <filename>
<b>Example</b>	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
<b>Example</b>	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
<b>Notes</b>	<p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> <li>• If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number.</li> </ul> <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> <li>• Makes the saved measurement for the mode the active measurement.</li> <li>• Clears the input and output buffers.</li> <li>• Status Byte is set to 0.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Executes a *CLS</li> </ul> <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away.</p> <p>After the Recall, the analyzer exits the Recall menu and returns to the previous menu.</p>
<b>Backwards Compatibility SCPI</b>	:MMEMory:LOAD:STATe 1,<filename>
Initial S/W Revision	Prior to A.02.00

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### More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

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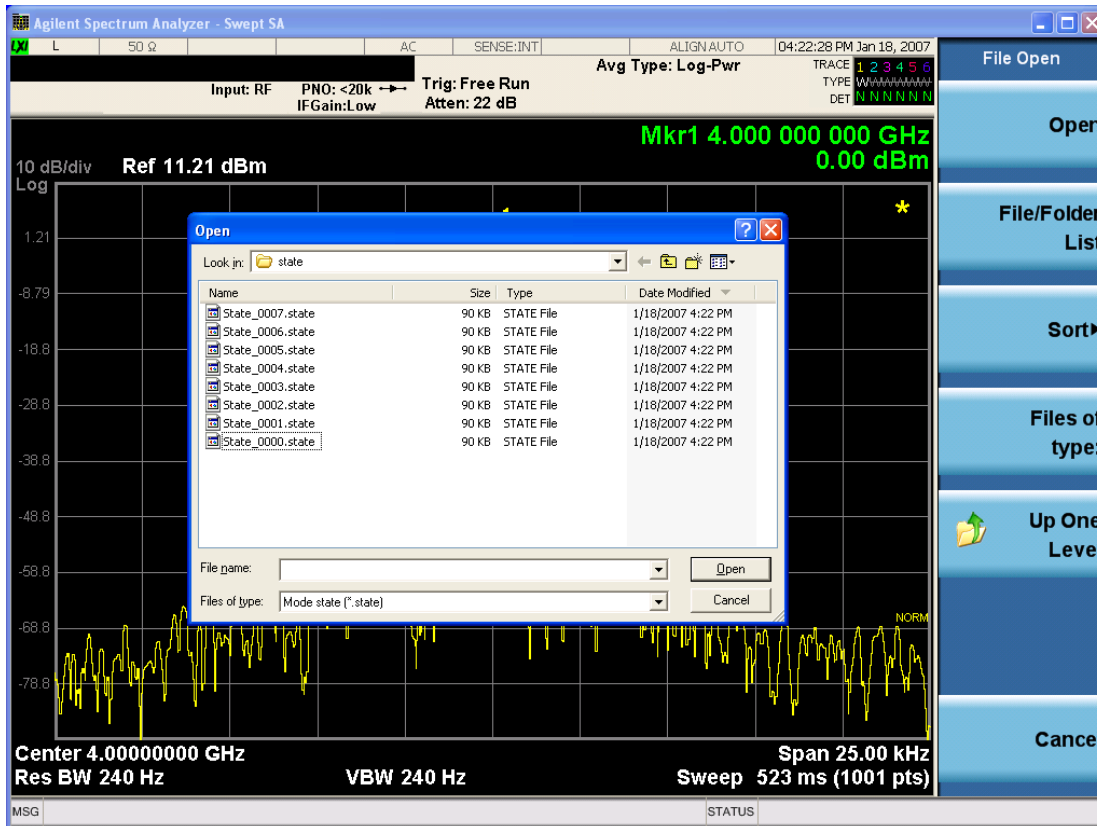
You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

---

### From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

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Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

### Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

### Look In

The Look In field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

### Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are By Date, By Name, By extension, and By Size.

#### Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (\*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

### Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the Save, State function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
<b>Example</b>	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.



After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
<b>Example</b>	*RCL 1
Range	1-16 from front panel, 1-128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
<b>Remote Command</b>	:MMEMory:LOAD:SEQuences:   SLIS   ALIS   SAALIS   "MySequence.txt"
<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall,Sequences
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<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
<b>Dependencies</b>	Only available in XOBT
<b>Initial S/W Revision</b>	A.05.00

## Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[From File...](#)" on page 1621 in Recall, State, for a full description of this dialog and menu.

<b>Key Path</b>	Recall, Data
<b>Notes</b>	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
<b>Initial S/W Revision</b>	Prior to A.02.00

## Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 1339

Key Path	Front-panel key
Remote Command	:INITiate[:IMMEDIATE] :INITiate:RESTART
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTIONable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write, but did not restart Max Hold and Min Hold. In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average, but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

### More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count  $k$  equals the number  $N$  set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

## Save

The Save menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an Export (Data) option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

## State

The Save State menu lets you choose a register or file for saving the state.

### NOTE

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
<b>Remote Command</b>	:MMEMory:STORe:STATe <filename>
<b>Example</b>	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote.

After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key.

After saving to a register, you remain in the Save State menu, so that you can see the Register key update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

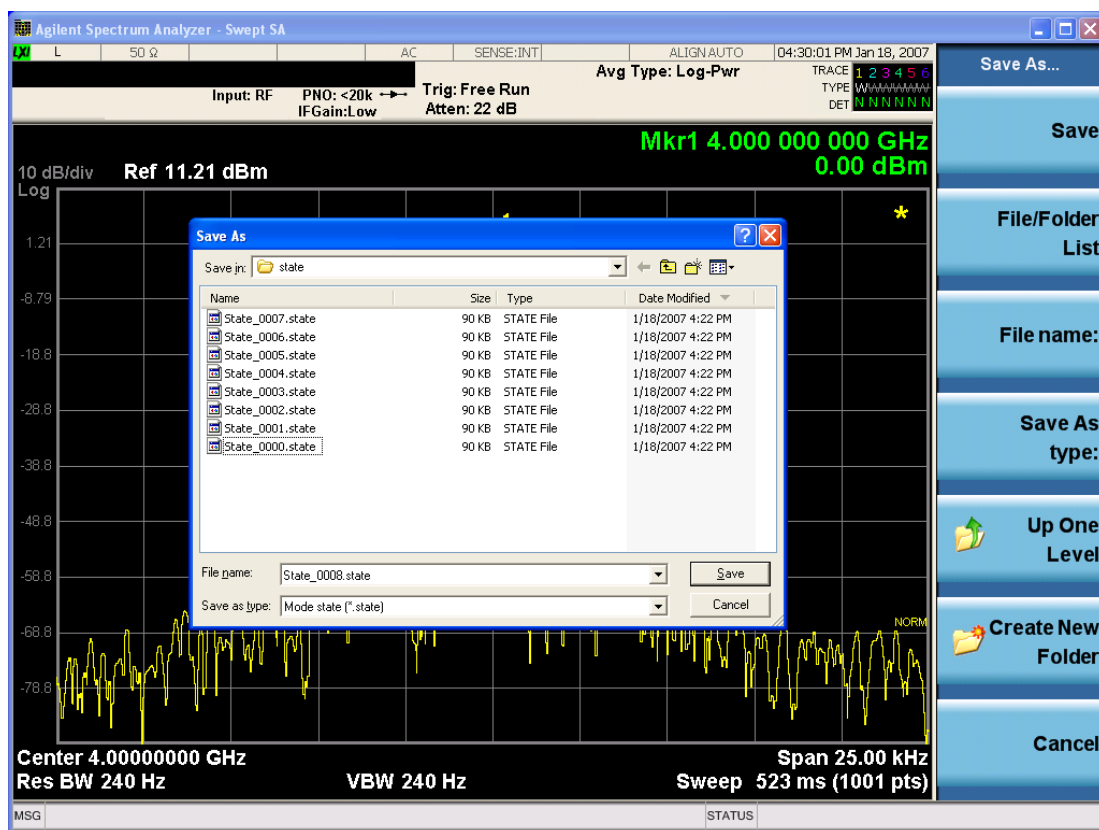
**Backwards** :MMEMory:STORE:STATe 1,<filename>

**Compatibility SCPI** For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.

**Initial S/W Revision** Prior to A.02.00

### To File . . .

When you press "To File", the analyzer brings up a Windows dialog and a menu entitled "Save As." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

#### Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting OK, or you can Cancel the request. If you select OK,

the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

#### Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

#### File Name

The File Name field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1617](#) documentation for more on the automatic file naming algorithm.

When you press the File Name key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the Done softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

#### Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (\*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Create New Folder

This key corresponds to the icon of a folder with the "\*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

## Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 1344](#)

Key Path	Save, State
Mode	All
<b>Remote Command</b>	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
<b>Example</b>	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

## More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another



consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The \*SAV and \*RCL commands will not be affected by the custom register names, nor will the MMEM commands.

### Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

**NOTE**

In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at

what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
<b>Example</b>	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

## Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?
Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

## Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

### Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DELeTe <file_name>[,<directory_name>]
Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an "access denied" error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

### Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

### Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an "access denied" error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

### Mass Storage Move (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory.

Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.

The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Initial S/W Revision      Prior to A.02.00

### Mass Storage Remove Directory (Remote Command Only)

Key path                      SCPI Only

**Remote Command**        :MMEMory:RDIRectory <directory\_name>

Notes                         The string must be a valid logical path.

                                Removes a directory. The <directory\_name> parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.

                                This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.

Initial S/W Revision        Prior to A.02.00

### Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path                      Save, Sequences

Mode                          All

**Remote Command**        :MMEM:STOR:SEquences: | SLIST | ALIST | SAAList | SSTep  
"MySequence.txt"

**Example**                    :MMEM:STOR:SEQ:SLIST "MySequence.txt"

Notes                         Available file types are:  
                                –CSV (Comma delimited) (\*.csv)  
                                –Text (Tab delimited) (\*.txt)

Initial S/W Revision        A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

## Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

## Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All

Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary. No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

## Measurement Results

Pressing this key selects Meas Results as the data type to be exported. Pressing the key a second time brings up the Meas Results menu, which allows you to select which **Meas Result** to save. In the Swept SA measurement, there are three types of Measurement Results files: Peak Table, Marker Table and Spectrogram.

See ["Meas Results File Contents" on page 1352](#).

See ["Marker Table" on page 1352](#).

See ["Peak Table" on page 1354](#).

See Spectrogram

<b>Remote Command</b>	:MMEMory:STORe:RESults:MTABle PTABle SPEctrogram <filename>
<b>Example</b>	:MMEM:STOR:RES:MTAB "myResults.csv" Saves the results from the current marker table to the file myResults.csv in the current path. :MMEM:STOR:RES:PTAB "myResults.csv" Saves the results from the current peak table to the file myResults.csv in the current path. :MMEM:STOR:RES:SPEC "myResults.csv" Saves the results from the current Spectrogram display to the file myResults.csv in the current path. The default path is My Documents\SA\data\SAN\results
Notes	If the save is initiated via SCPI, and the file already exists, the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	If a save of Marker Table results is requested and the Marker Table is not on, no file is saved and a message is generated If a save of Peak Table results is requested and the Peak Table is not on, no file is saved and a message is generated If a save of Spectrogram results is requested and the Spectrogram is not on, no file is saved and a message is generated. The Spectrogram choice only appears if option EDP is licensed.
Preset	Not part of Preset, but is reset to Peak Table by Restore Mode Defaults. Survives a shutdown.
Initial S/W Revision	Prior to A.02.00

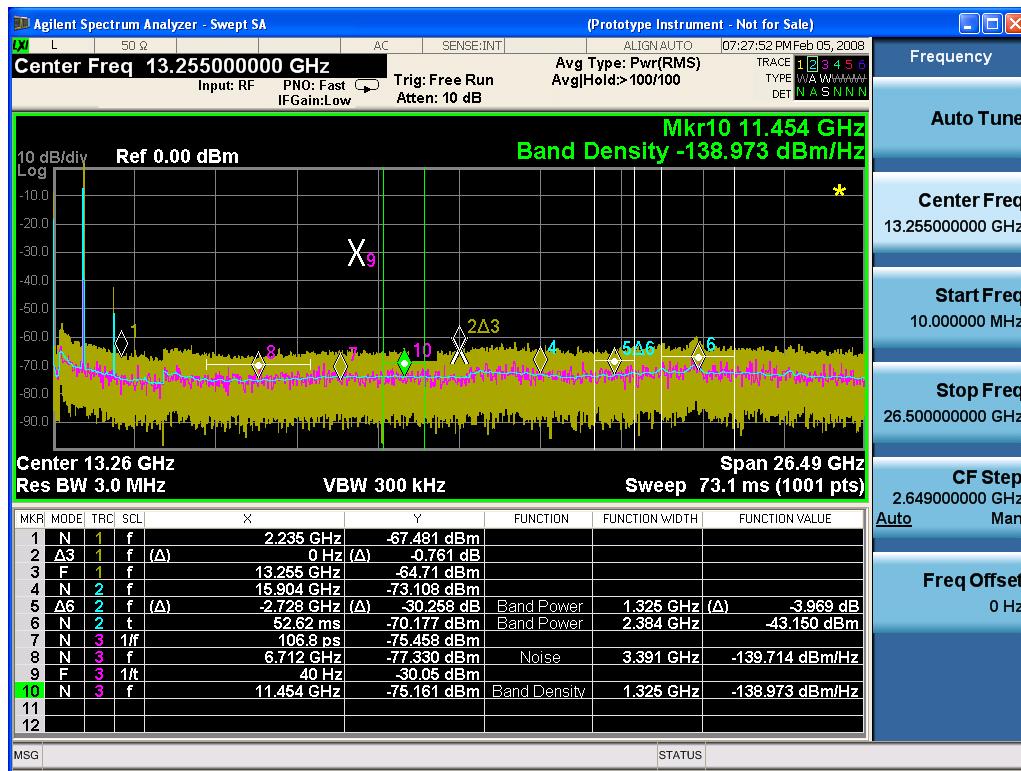
### Meas Results File Contents

All files are .csv files. The following section details the data in each file type.

### Marker Table

This section discusses the Marker Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the following data:

MeasurementR	
result	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR	1
P26 EA3	
Result Type	Marker Table
Ref Level	0
Number of Points	1001
Sweep Time	0.0662666



	67								
Start Frequency	10000000								
Stop Frequency	26500000 000								
Average Count	0								
Average Type	LogPower (Video)								
RBW	3000000								
RBW Filter	Gaussian								
RBW Filter BW	3dB								
VBW	3000000								
Sweep Type	Swept								
X Axis Scale	Lin								
PreAmp State	Off								
PreAmp Band	Low								
Trigger Source	Free								
Trigger Level	1.2								
Trigger Slope	Positive								
Trigger Delay	1.00E-06								
Phase Noise Optimization	Fast								
Swept If Gain	Low								
FFT If Gain	Autorange								
RF Coupling	AC								
FFT Width	411900								
Ext Ref	10000000								
Input	RF								
RF Calibrator	Off								
Attenuation	10								
Ref Level Offset	0								
External Gain	0								
X Axis Units	Hz								
Y Axis Units	dBm								
DATA									
MKR	MODE	TR C	SCL	X	Y	FUNCTI ON	FUNCTIO N WIDTH	FUNCTI ON VALUE	FUNCTI ON UNIT
1	Normal	1	Freque ncy	2.2350E+ 09	- 67.4	Off	0.0000E+ 00	0	None

81									
2	Delta3	1	Frequency	0.0000E+00	-0.761	Off	0.0000E+00	0	None
3	Fixed	1	Frequency	1.3255E+10	-64.71	Off	0.0000E+00	0	None
4	Normal	2	Frequency	1.5904E+10	-73.108	Off	0.0000E+00	0	None
5	Delta7	2	Frequency	-2.7280E+09	-30.258	Band Power	1.3250E+06	-3.969	dB
6	Normal	2	Time	5.2620E-02	-70.177	Band Power	2.3840E+06	-43.15	dBm
7	Normal	3	Period	1.0680E-10	-75.458	Off	0.0000E+00	0	None
8	Normal	3	Frequency	6.7120E+09	-77.33	Noise	3.3910E+06	-139.714	dBm/Hz
9	Fixed	3	Inverse Time	4.0000E+01	-30.05	Off	0.0000E+00	0	None
10	Normal	3	Frequency	1.1454E+10	-75.161	Band Density	1.3250E+06	-138.973	dBm/Hz
11	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None
12	Off	1	Frequency	0.0000E+00	0	Off	0.0000E+00	0	None

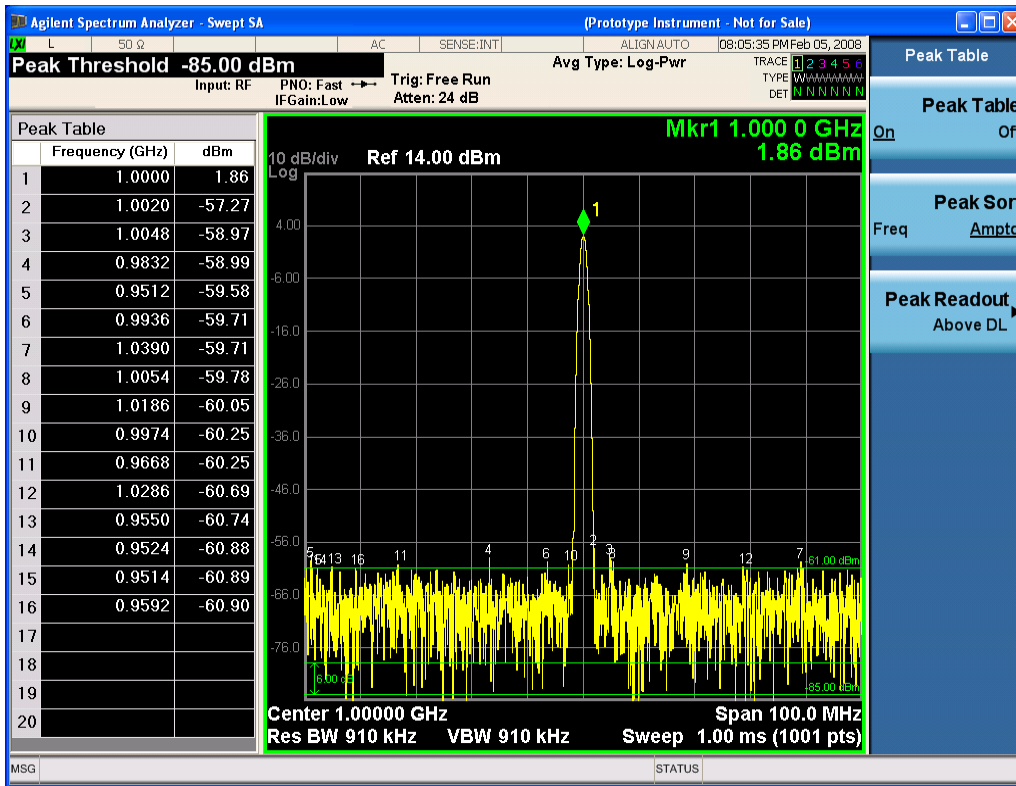
The numbers appear in the file exactly as they appear onscreen. If it says 11.454 GHz onscreen, then in the file it is 11.454E+09.

The metadata header is very similar to the metadata used in the trace data .csv files. See Trace File Contents. The only new information concerns the 1-of-N fields in the marker table itself.

### Peak Table

This section discusses the Peak Table Meas Results file format.

Imagine that, at the point where a Marker Table Meas Result is requested, the following screen is showing:



Then the Meas Results file, when opened, would show the header data (the same as for the Marker Table except that the Result Type is Peak Table) ending with a few fields of specific interest to Peak Table users:

- Peak Threshold
- Peak Threshold State (On|Off)
- Peak Excursion
- Peak Excursion State (On|Off)
- Display Line
- Peak Readout (All|AboveDL|BelowDL)
- Peak Sort (Freq|Amptd)

These fields are then followed by the data for the Peak Table itself.

Note that the label for the Frequency column changes to Time in 0 span.

Here is what the table for the above display looks like:

MeasurementResult	
Swept SA	
A.01.40_R0017	N9020A
526 B25 PFR P26 EA3	1

Result Type	Peak Table
Ref Level	0
Number of Points	1001
Sweep Time	0.066266667
Start Frequency	10000000
Stop Frequency	26500000000
Average Count	0
Average Type	LogPower(Video)
RBW	3000000
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	3000000
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	1.00E-06
Phase Noise Optimization	Fast
Swept If Gain	Low
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	10
Ref Level Offset	0
External Gain	0
X Axis Units	Hz
Y Axis Units	dBm
Peak Threshold	-85
Peak Threshold State	On
Peak Excursion	6
Peak Excursion State	On

Display Line	-61	
Peak Readout	AboveDL	
Peak Sort	Amptd	
DATA		
Peak	Frequency	Amplitude
1	1.0000E+06	1.86
2	1.0020E+06	-57.27
3	1.0048E+06	-58.97
4	9.8320E+05	-58.99
5	9.5120E+05	-59.58
6	9.9360E+05	-59.71
7	1.0390E+06	-59.71
8	1.0054E+06	-59.78
9	1.1086E+06	-60.05
10	9.9740E+05	-60.25
11	9.6680E+05	-60.25
12	1.0286E+06	-60.69
13	9.5500E+05	-60.74
14	9.5240E+05	-60.88
15	9.5140E+05	-60.89
16	9.5920E+05	-60.90
17		
18		
19		
20		

### Spectrogram

This section discusses the Spectrogram Results file format. The Spectrogram choice only appears if option EDP is licensed.

The Spectrogram results are the same as a Trace data export, except that instead of having just one trace's data, all 300 traces appear one after the other.

Each trace has its own data mark; the data for Spectrogram Trace 0 follows the row marked DATA, the data for Spectrogram Trace 1 follows the row marked DATA1, for Spectrogram Trace 2 follows the row marked DATA2, and so on.

Each DATA row has a timestamp in the second column (as of firmware revision A.11.01). So, for example, if Trace 0 had a relative start time of 1729.523 sec, then the first DATA row would look like this:

DATA,1729.523

And if Trace 13 had a relative start time of 100.45 sec, then the fourteenth data row would look like:

DATA13,100.453

To find the absolute time for the relative timestamps of each trace, the last row before the first DATA row gives the absolute start time of the Spectrogram, in the form YYYYMMDDHHMMSS

So, for example, if the absolute start time is 13:23:45:678 on January 30, 2012, this row would look like:

Start Time,20120130132345678

NOTE:

**NOTE**

The resolution of the absolute time stored is 1 ms, which matches up with the fact that the fastest sweep time is also 1 ms. However, there is no specification for the absolute accuracy of the clock in the analyzer, nor is there any facility provided to allow the user to set this time to any particular degree of accuracy.

Traces that have not yet been filled in the Spectrogram display are empty; there is no DATA header for them. The file ends after the last non-empty trace.

Imagine that, at the point where a Spectrogram Meas Result is requested, the following screen is showing:



For the purpose of this example, we have set the Average/Hold Number to 10, thus we have only traces 0 thru 10. The Spectrogram was started at 02:28:08:700 pm on April 25, 2012 (that is, 700 ms after 2:28:08 pm), although the screen dump itself shows a different time, as it was taken ten minutes after the Spectrogram data. Trace 0 is showing a start time of 5.30 seconds, meaning 5.3 seconds after the Spectrogram started (trace 10 has a start time of 0, as it was the first trace taken but has now rolled up into the tenth trace slot).

The Meas Results file, when opened, shows the header data and ten traces of trace data. Below is an extract from the result file for the above display. Note the start time of 20120425142808700 showing in the last row before the first DATA row, and the relative time of 5.299231048 showing in the first DATA row:

<b>Result Type</b>	<b>Spectrogram</b>
MeasResult	
Swept SA	
A.11.00.01	N9020A
503 508 513 526 ALL ALV B1C B1X B25 B2X B40 BAB BBA CR3 CRP DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA HBA K03 LFE MPB P03 P08 P13 P26 PFR RTL RTS S40 SB1 SEC SM1 UK6 YAS YAV	1
Segment	0
Number of Points	1001
Sweep Time	0.523333333
Start Frequency	5999984415
Stop Frequency	6000009415
Average Count	0
Average Type	LogPower(Video)
RBW	240
RBW Filter	Gaussian
RBW Filter BW	3dB
VBW	240
Sweep Type	Swept
X Axis Scale	Lin
PreAmp State	Off
PreAmp Band	Low
Trigger Source	Free
Trigger Level	1.2
Trigger Slope	Positive
Trigger Delay	0
Phase Noise Optimization	Wide
Swept If Gain	Low

Save

Result Type	Spectrogram
FFT If Gain	Autorange
RF Coupling	AC
FFT Width	411900
Ext Ref	10000000
Input	RF
RF Calibrator	Off
Attenuation	14
Ref Level Offset	0
External Gain	0
Trace Type	Clearwrite
Detector	Normal
Trace Math	Off
Trace Math Oper1	Trace5
Trace Math Oper2	Trace6
Trace Math Offset	0
Trace Name	Trace1
X Axis Units	Hz
Y Axis Units	dBm
Start Time	20120425142808700
DATA	5.299231048
5999984415	-76.34749519
5999984440	-77.28097006
5999984465	-75.32317869
5999984490	-73.64417681
5999984515	-72.67154604

O

O

O

6000009315	-77.94423277
6000009340	-79.51829697
6000009365	-78.46108961
6000009390	-78.46108957
6000009415	-76.59570596
DATA2	4.708697055



5999984415	-80.98197882
5999984440	-80.98197879
5999984465	-75.83142132
5999984490	-74.02712079
5999984515	-73.57213005

0  
0  
0

6000009315	-75.9183103
6000009340	-79.53787488
6000009365	-78.82602191
6000009390	-78.82602188
6000009415	-76.37486709
DATA10	0
5999984415	-75.56751112
5999984440	-75.76485645
5999984465	-76.67718717
5999984490	-78.79238489
5999984515	-83.72680212

0  
0  
0

6000009315	-71.3942461
6000009340	-72.28308332
6000009365	-73.92684489
6000009390	-75.45548832
6000009415	-75.17904815

### Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "To File . . ." on page 1630 in Save, State for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:

My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

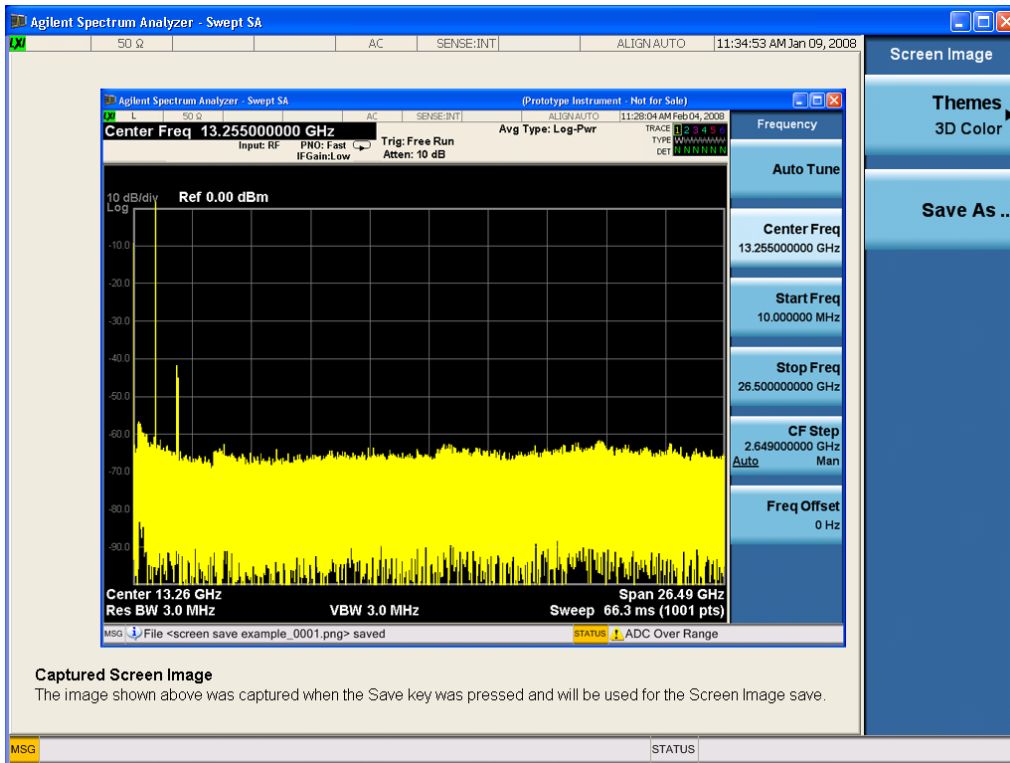
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

## Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the Save front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the Save As menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the Save menus. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the Quick Save front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

**NOTE** For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menus, the image that is saved will contain the Save menu softkeys, not the menus and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCREen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReem:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReem:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

<b>Key Path</b>	Save, Screen Image, Themes
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<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for Screen Images is

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

## Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing Single does a Resume.

See "[More Information](#)" on page 1366

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	<p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA &amp; PSA Spectrum Analysis Mode does an implied ABORT. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p>
Initial S/W Revision	Prior to A.02.00

### More Information

See "[Restart](#)" on page 1627 for details on the INIT:IMMEDIATE (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the Single key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the Single key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the Single key in the middle of a sweep does not restart the sweep, sending INIT:IMMEDIATE does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

## Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key
----------	-----------------

## RF Output

This parameter sets the source RF power output state.

Key Path	Source
<b>Remote Command</b>	:OUTPut[:EXTernal][:STATe] ON OFF 1 0 :OUTPut[:EXTernal][:STATe]?
<b>Example</b>	OUTP OFF OUTP?
<b>Notes</b>	<p>The EXTERNAL node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p>
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
<b>Notes</b>	<p>The sub-menu under this button is for independent mode and has no effect on <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set <a href="#">"Sequencer" on page 1726</a> to Off will make source leave list sequencer and this button will be black out.</p>
Initial S/W Revision	A.05.00

## RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the "[RF Power Range](#) " on page 1369 table below for the valid ranges.

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
<b>Example</b>	:SOUR:POW -100 dBm
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the " <a href="#">RF Power Range</a> " on page 1369 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the " <a href="#">RF Power Range</a> " on page 1369 table below for the valid ranges.
Initial S/W Revision	A.05.00



## RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz ≤ f ≤ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

## Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

### NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the " <a href="#">List Sequencer</a> " on page 1725 is turned ON.
Initial S/W Revision	A.05.00

## Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1648](#)

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe?
<b>Example</b>	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the <a href="#">"List Sequencer" on page 1725</a> is turned ON.
Couplings	This value is coupled to the <a href="#">"Set Reference Power " on page 1648</a> key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

## Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
<b>Example</b>	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

## Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
<b>Remote Command</b>	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
<b>Example</b>	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on page 1725. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the " <a href="#">Sequencer</a> " on page 1726 is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on " <a href="#">List Sequencer</a> " on

[page 1725](#). If the "[Sequencer](#)" on [page 1726](#) is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.

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Initial S/W Revision      A.05.00

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## Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW]?
Example	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present, the frequency range should be limited to: 1.1GHz–1.7GHz, 2.4GHz–2.5GHz, 4.8GHz–6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called "Settings conflict; Frequency is outside available range".
Initial S/W Revision	A.05.00

## Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: "[GSM/EDGE Channel Number Ranges](#)" on [page 1373](#), "[W-CDMA Channel Number Ranges](#)" on [page 1374](#), "[CDMA 2000 / 1xEVDO Channel Number Ranges](#)" on [page 1375](#), and "[LTE FDD Channel Number Ranges](#)" on [page 1377](#).

Key Path	Source, Frequency
<b>Remote Command</b>	:SOURce:FREQuency:CHANnels:NUMBer <int> :SOURce:FREQuency:CHANnels:NUMBer?
<b>Example</b>	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1660 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
Initial S/W Revision	A.05.00

### GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 850	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
GSM 700	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
T-GSM810	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

### W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
Band III	Downlink	$350 \leq n \leq 425$	$n \div 5$
	Uplink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
Band IV	Downlink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
		$537 \leq n \leq 1738$	$n \div 5 + 1805$
	Uplink	$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
Band V	Downlink	$1312 \leq n \leq 1513$	$n \div 5 + 1450$
		$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
	Uplink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
Band VI	Downlink	$4357 \leq n \leq 4458$	$n \div 5$
		$782 \leq n \leq 862$	$n \div 5 + 670.1$
	Uplink	$4132 \leq n \leq 4233$	$n \div 5$
Band VII	Downlink	$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
		$4387 \leq n \leq 4413$	$n \div 5$
	Uplink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
Band VIII	Downlink	$4162 \leq n \leq 4188$	$n \div 5$
		$2237 \leq n \leq 2563$	$n \div 5 + 2175$
	Uplink	$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
Band VIII	Downlink	$2012 \leq n \leq 2338$	$n \div 5 + 2100$
		$2362 \leq n \leq 2687$	$n \div 5 + 2030.1$
Band VIII	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$
	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

### CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
		$1792 \leq N \leq 2016$	$0.020 \times (N - 1792) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$



Band	Link (Device)	Range	Frequency (MHz)
AWS	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
US 2.5 GHz	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
700 Public Safety	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
C2K Lower 700	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
400 Euro PAMR	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
	Uplink (MS, reverse link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
	Downlink (BS, forward link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

### LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4-1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
1	2110	0	0 - 599	1920	18000	18000 - 18599
2	1930	600	600 - 1199	1850	18600	18600 - 19199
3	1805	1200	1200 - 1949	1710	19200	19200 - 19949
4	2110	1950	1950 - 2399	1710	19950	19950 - 20399
5	869	2400	2400 - 2649	824	20400	20400 - 20649
6	875	2650	2650 - 2749	830	20650	20650 - 20749
7	2620	2750	2750 - 3449	2500	20750	20750 - 20449
8	925	3450	3450 - 3799	880	21450	21450 - 21799
9	1844.9	3800	3800 - 4149	1749.9	21800	21800 - 22149
10	2110	4150	4150 - 4749	1710	22150	22150 - 22749
11	1475.9	4750	4750 - 4949	1427.9	22750	22750 - 22949
12	729	5010	5010 - 5179	699	23010	23010 - 23179
13	746	5180	5180 - 5279	777	23180	23180 - 23279
14	758	5280	5280 - 5379	788	23280	23280 - 23379
...						
17	734	5730	5730 - 5849	704	23730	23730 - 23849
18	860	5850	5850 - 5999	815	23850	23850 - 23999
19	875	6000	6000 - 6149	830	24000	24000 - 24149
20	791	6150	6150 - 6449	832	24150	24150 - 24449
21	1495.9	6450	6450 - 6599	1447.9	24450	24450 - 24599
...						
24	1525	7700	7700 - 8039	1626.5	25700	25700 - 26039
25	1930	8040	8040 - 8689	1850	26040	26040 - 26689
26	859	8690	8690 - 9039	814	26690	26690 - 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

### LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

<b>Band</b>	<b>Downlink</b>	<b>Uplink</b>		<b>Downlink</b>	<b>Uplink</b>	
<b>FDL_low (MHz)</b>	<b>NOffs-DL</b>	<b>Range of NDL</b>	<b>FUL_low (MHz)</b>	<b>NOffs-UL</b>	<b>Range of NUL</b>	
33	1900	36000	36000 –36199	1900	36000	36000 – 36199
34	2010	36200	36200 –36349	2010	36200	36200 – 36349
35	1850	36350	36350 –36949	1850	36350	36350 – 36949
36	1930	36950	36950 –37549	1930	36950	36950 – 37549
37	1910	37550	37550 –37749	1910	37550	37550 – 37749
38	2570	37750	37750 –38249	2570	37750	37750 – 38249
39	1880	38250	38250 –38649	1880	38250	38250 – 38649
40	2300	38650	38650 –39649	2300	38650	38650 – 39649
41	2496	39650	39650 – 41589	2496	39650	39650 – 41589
42	3400	41590	41590 – 43589	3400	41590	41590 – 43589
43	3600	43590	43590 – 45589	3600	43590	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

### TDSCDMA Channel Number Ranges

#### 1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio  
Frequency Channel Number 1.28  
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

## Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
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## Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:FREQuency:CHANnels:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38   BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF  :SOURce:FREQuency:CHANnels:BAND?
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PGSM
<b>Notes</b>	Set this setting to "NONE" will grey out "Channel" on page 1651 Channel
Initial S/W Revision	A.05.00

## None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

## GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

## P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

### E-GSM

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

### R-GSM

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

### DCS 1800

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

### PCS 1900

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

### GSM 450

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

**GSM 480**

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

**GSM 850**

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

**GSM 700**

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

**T-GSM 810**

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

**WCDMA**

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

**Band I**

Selects Band I as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

---

#### Band II

Selects Band II as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

---

#### Band III

Selects Band III as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

---

#### Band IV

Selects Band IV as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

---

#### Band V

Selects Band V as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

---

#### Band VI

Selects Band VI as the active channel band.



Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

#### Band VII

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

#### Band VIII

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

#### Band IX

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

#### Band X

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

#### Band XI

Selects Band XI as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

---

#### Band XII

Selects Band XII as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

---

#### Band XIII

Selects band XIII as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

---

#### Band XIV

Selects Band XIV as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

---

#### Band XIX

Selects Band XIX as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIX
Initial S/W Revision	A.14.50

---

#### CDMA 2000 / 1xEVDO

Sets CDMA 2000 / 1XEVD0 as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

#### US CELL

Selects US Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

#### US PCS

Selects US PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

#### Japan Cell

Selects Japan Cell as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

#### Korean PCS

Selects Korean PCS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

#### NMT 450

Selects NMT 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

---

#### IMT 2000

Selects IMT 2000 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

---

#### Upper 700

Selects Upper 700 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

---

#### Secondary 800

Selects Secondary 800 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

---

#### 400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

---

#### 800 PAMR

Selects 800 PAMR as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

### 2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

### AWS

Selects AWS as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

### US 2.5GHz

Selects US 2.5 GHz as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

### 700 Public Safety

Selects 700 Public Safety as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

---

### C2K Lower 700

Selects C2K Lower 700 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

---

### LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

---

### BAND 1

Selects BAND 1 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

---

### BAND 2

Selects BAND 2 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

---

### BAND 3

Selects BAND 3 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

---

**BAND 4**

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

**BAND 5**

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

**BAND 6**

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

**BAND 7**

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

**BAND 8**

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

### BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

### BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

### BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

### BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

### BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50



**BAND 14**

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

**BAND 18**

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

**BAND 19**

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

**BAND 20**

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50

#### BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

#### BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

#### BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

#### BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

#### BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

**BAND 28**

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

**BAND 31**

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

**LTE TDD**

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND 33**

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

**BAND 34**

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

**BAND 35**

Selects BAND 35 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

---

#### BAND 36

Selects BAND 36 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

---

#### BAND 37

Selects BAND 37 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

---

#### BAND 38

Selects BAND 38 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

---

#### BAND 39

Selects BAND 39 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

---

#### BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

**BAND 41**

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

**BAND 42**

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

**BAND 43**

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

**BAND 44**

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

**TDSCDMA**

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

---

#### BAND A

Selects BAND A as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

---

#### BAND B

Selects BAND B as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

---

#### BAND C

Selects BAND C as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

---

#### BAND D

Selects BAND D as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

---

#### BAND E

Selects BAND E as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
----------	---

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

## BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

## Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

Key Path	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
<b>Example</b>	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN   UP
<b>Backwards Compatibility SCPI</b>	:SOURce:RADio:DEVice BTS MS :SOURce:RADio:DEVice?
Backwards Compatibility Notes	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

## Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

**NOTE**

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFerence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

### Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

$$\text{Output frequency} = \text{reference frequency} + \text{entered frequency}$$

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1678](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFerence <freq> :SOURce:FREQuency:REFerence? :SOURce:FREQuency:REFerence:STATe OFF ON 0 1 :SOURce:FREQuency:REFerence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz



	:SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq>

	:SOURce:FREQuency:OFFSet?
<b>Example</b>	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

## Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1681, "AM" on page 1722, "FM" on page 1723, and "PM" on page 1724.

Key Path	Source
Initial S/W Revision	A.05.00

## ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a "MOD" annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]?
<b>Example</b>	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1726 Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1726 Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately.

The ARB can only be turned on when there is a waveform file selected for playback. On the GUI If no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. “-

When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
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### Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
Notes	<p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and</p>

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none of the waveform segments is loaded.

If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.

If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.

If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

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Key Path	Source, Modulation Setup, ARB, Select Waveform
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### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
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<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete.</p> <p>&lt;string&gt; - specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms,</p>

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when the ARB memory is full, the copy ceases, and an error is generated.  
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.  
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

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Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

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Notes                          No remote command, SCPI front panel only.

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### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

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Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

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**Remote Command**        :SOURce:RADio:ARB:DEFault:DIRectory <string>  
                                  :SOURce:RADio:ARB: DEFault:DIRectory?

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**Example**                    :SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles"  
                                  :SOUR:RAD:ARB:DEF:DIR?

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State Saved                  Persistent, survives a power cycle and a preset but not saved in the instrument state

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### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

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Key Path                      Source, Modulation Setup, ARB, Select Waveform

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Initial S/W Revision      A.05.00

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### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

**NOTE**

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use ["Query ARB Memory Full File List \(Remote Command Only\)" on page 1687](#).

<b>Remote Command</b>	:SOURce:RADio:ARB:CATalog?
<b>Example</b>	:SOUR:RAD:ARB:CATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
<b>Initial S/W Revision</b>	A.05.00

### Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

<b>Remote Command</b>	:SOURce:RADio:ARB:FCATalog?
<b>Example</b>	:SOUR:RAD:ARB:FCATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
<b>Initial S/W Revision</b>	A.09.00

### ARB Setup

Allows access to the ARB setup sub-menus.

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Initial S/W Revision</b>	A.05.00

### Sample Rate

Allows you to set the ARB waveform playback sample rate.



Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
Example	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
Notes	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	125.00 MHz
Min	1.00 kHz
Max	125.00 MHz
Initial S/W Revision	A.05.00

### Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
Example	:SOUR:RAD:ARB:RSC 100.00
Notes	This setting cannot be set in E6640A. Grey out on menu and the value is fixed at 70.00%.
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	70.00 %
Min	1.00 %
Max	100.00 %
Initial S/W Revision	A.05.00

### Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.

<b>Key Path</b>	Source, Modulation Setup, ARB, ARB Setup
<b>Remote Command</b>	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
<b>Example</b>	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	0.00 Hz
<b>Min</b>	-50.00 MHz
<b>Max</b>	50.00 MHz
<b>Initial S/W Revision</b>	A.05.00

### Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous   SINGLE   SADVance GATE :SOURce:RADio:ARB:TRIGger:TYPE?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
<b>Notes</b>	Gated trigger type will be implemented at a later release
<b>Preset</b>	CONTInuous
<b>Range</b>	Continuous   Single   Seg Adv   Gated
<b>Initial S/W Revision</b>	A.05.00

### Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE   TRIGger   RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
<b>Preset</b>	FREE

Range	Free Run   Trigger + Run   Reset + Run
Initial S/W Revision	A.05.00

### Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

### Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

### Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

### Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate

	:SOURce:RADio:ARB:RETRigger?
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger   Buffered Trigger   Restart on Trigger
Initial S/W Revision	A.05.00

### No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
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### Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

### Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

### Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] Single   CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Preset</b>	CONTInuous
<b>Range</b>	Single   Continuous
<b>Initial S/W Revision</b>	A.05.00

### Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Initial S/W Revision</b>	A.05.00

### Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
<b>Initial S/W Revision</b>	A.05.00

### Trigger Source

Allows access to the trigger source sub-menus. The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
Example	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTernal2
Range	Trigger Key   Bus   External 2
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### Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

### Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

### External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
Example	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

### Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

### Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMORY:COPY command.



NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operation is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even if required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>

<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
<b>Initial S/W Revision</b>	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Notes</b>	No remote command, SCPIfront panel only.
<b>Initial S/W Revision</b>	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
<b>State Saved</b>	Persistent, survives a power cycle and a preset but not saved in the instrument state
<b>Initial S/W Revision</b>	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe:ALL
<b>Example</b>	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<b>List Sequencer</b>" on page 1725 and "<b>Sequencer</b>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p>

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If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
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Initial S/W Revision	Prior to A.09.00
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### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

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Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
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Initial S/W Revision	Prior to A.09.00
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### Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1755](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1687](#).

Initial S/W Revision	Prior to A.09.00
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### Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

### Marker 1

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

### Marker 2

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

### Marker 3

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected
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	Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

**Marker 4**

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

**Delete Segment**

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

**Save Sequence...**

Pressing this key displays the "Save As" dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

**Build New Sequence (Remote Command Only)**

This command is the SCPI equivalent of the waveform sequence creation features described in ["Build New Sequence" on page 1694](#).

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) “NVWFM” or use a real full path representation. See the example below. MSUS “NVWFM” is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

---

**Remote Command**      :SOURce:RADio:ARB:SEQuence[:MWAveform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below ["For Setup SCPI" on page 1424](#) "For Setup SCPI".)

:SOURce:RADio:ARB:SEQuence[:MWAveform]? <filename>

(For additional description of each item, see Notes ["For Query SCPI" on page 1425](#) below.)

---

**Example**      For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1 M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", "D: VARB\wfmSegment1.wfm", 10, M2M3M4, "D: VARB\wfmSegment2.wfm", 20, M1 M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

---

Notes      For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

---



---

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE – This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 – these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL – This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

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Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not “.seq”, error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

## For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? “NVWFM:testSeq1.seq”,

<“wfmSegment1. wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3”,

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.

If the waveform sequence file name is empty, an error is generated.

If the specified waveform sequence file cannot be found, an error is generated.

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Initial S/W Revision

A.05.00

### Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Notes	If access multi-pack license sub-menu from modules other than "TRX1", an advisory message like "Please goto "TRX1" to operate multi-pack license" will display.
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

### Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

### Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string>
<b>Example</b>	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;“NVWFM” MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p>

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

Initial S/W Revision A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Notes</b>	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

### Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LIcense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Agilent signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.



Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int>
Example	SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

#### Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Remote Command	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
Example	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected slot is in the trial state or the lock required state.
Initial S/W Revision	A.05.00

### Slot Status Query (Remote Command Only)

Returns the status of the specified slot.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
<b>Example</b>	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
<b>Range</b>	"Locked"   "Available"   "Trail"   "LockRequired"   "Nonexistent"
<b>Initial S/W Revision</b>	A.05.00

### Slots Free Query (Remote Command Only)

Returns the number of license slots free.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LICense[:FPACK]:WAVeform:FREE?
<b>Example</b>	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
<b>Initial S/W Revision</b>	A.05.00

### Slot Used Query (Remote Command Only)

Returns the number of license slots used.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LICense[:FPACK]:WAVeform:USED?
<b>Example</b>	:SYST:LKEY:WAV:USED?

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	or :SYSTem:LiC:WAV:USED?
Notes	The second SCPI :SYSTem:LiCense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

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### Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:NAME? <int>  or :SYSTem:LiCense[:FPACK]:WAVeform:NAME? <int>
<b>Example</b>	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm"  or :SYST:LiC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.  If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

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### Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

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<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:UID? <int>  or :SYSTem:LiCense[:FPACK]:WAVeform:UID? <int>
<b>Example</b>	:SYST:LKEY:WAV:UID? 2 <"1346752140"  or :SYST:LiC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated.  Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.

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	If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

#### Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

#### Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136", "3812603511", "3710986266"
<b>Notes</b>	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

#### Marker Utilities

Allows access to the marker utilities sub-menus.

<b>Key Path</b>	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

#### Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

### Mkr 1 Polarity

Allows you to set the polarity of marker 1.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
Example	:SOUR:RAD:ARB:MPOL:MARK1 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 2 Polarity

Allows you to set the polarity of marker 2.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
Example	:SOUR:RAD:ARB:MPOL:MARK2 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 3 Polarity

Allows you to set the polarity of marker 3.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
Example	:SOUR:RAD:ARB:MPOL:MARK3 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated

	waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Mkr 4 Polarity

Allows you to set the polarity of marker 4.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?
Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

### Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

### Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting marker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:PULSe NONE   M1   M2   M3   M4 :SOURce:RADio:ARB:MDEStination:PULSe?
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Range</b>	None   M1   M2   M3   M4
<b>Initial S/W Revision</b>	A.05.00

#### None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Initial S/W Revision</b>	A.05.00

#### Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
<b>Initial S/W Revision</b>	A.05.00

#### Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
<b>Initial S/W Revision</b>	A.05.00

### Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
<b>Example</b>	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None   M1   M2   M3   M4
Initial S/W Revision	A.05.00

### None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00



### Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

### Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

### Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

<b>Key Path</b>	Source, Modulation Setup, ARB, Header Utilities
<b>Remote Command</b>	:SOURce:RADio:ARB:HEADer:CLEar
<b>Example</b>	:SOUR:RAD:ARB:HEAD:CLE
<b>Notes</b>	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
<b>Initial S/W Revision</b>	A.05.00

### Save Setup To Header

Allows you to save new file header information details to the file.

<b>Key Path</b>	Source, Modulation Setup, ARB, Header Utilities
<b>Remote Command</b>	:SOURce:RADio:ARB:HEADer:SAVE
<b>Example</b>	:SOUR:RAD:ARB:HEAD:SAVE
<b>Notes</b>	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
<b>Initial S/W Revision</b>	A.05.00

### Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

<b>Remote Command</b>	:MMEMory:HEADer:ID? "<file name>"
<b>Example</b>	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
<b>Notes</b>	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk.  If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
<b>Initial S/W Revision</b>	A.09.00

### Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:INITiate
<b>Example</b>	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

### AM

Allows access to the menu for configuring the Amplitude Modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:STATe :SOURce:AM:STATe?
<b>Example</b>	:SOUR:AM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### AM Depth

Allows you to set the amplitude modulation depth in percent.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]?
<b>Example</b>	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

## AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
<b>Example</b>	:SOUR:AM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

## FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:STATe :SOURce:FM:STATe?
<b>Example</b>	:SOUR:FM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
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<b>Remote Command</b>	:SOURce:FM[:DEVIation] :SOURce:FM[:DEVIation]?
<b>Example</b>	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

### FM Rate

Allows you to set the internal frequency modulation rate.

Key Path	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
<b>Example</b>	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### PM

Allows access to the menu for configuring the phase modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

### PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:STATe :SOURce:PM:STATe?
<b>Example</b>	:SOUR:PM:STAT OFF

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]?
Example	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

### PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
Remote Command	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
Example	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a

tabular form. The details of the SCPI for configuring the list sequencer can be found in "[Step Configuration \(Remote Command Only\)](#)" on page 1759.

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

## Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe]?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated

	and an error will be generated. There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see " <a href="#">Query List Sequence Initiation Armed Status (Remote Command Only)</a> " on <a href="#">page 1770</a> Query Source List Sequence Armed Status)
Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
Initial S/W Revision	A.05.00

## List Sequencer Setup

Allows you access to the list sequencer setup menus.

Key Path	Source, List Sequencer
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## Number of Steps

Allows you to specify the number of steps within the list sequence.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
<b>Example</b>	:SOUR:LIST:NUMB:STEP 1
Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values. Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
Preset	1
Min	1
Max	1000
Initial S/W Revision	A.05.00

## Current Step

Allows you to select the step number you wish to view or edit.

Key Path	Source, List Sequencer, List Sequencer Setup
----------	--



Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

### Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of 1000 steps, then insert more step will be rejected and popup error –221, “Setting Conflict; Cannot insert more steps, maximum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

### Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error –221, “Setting conflict; Cannot delete current step, minimum number of steps reached”

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

### Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

### Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE   INTERNAL   EXTERNAL2   KEY   BUS   EXTERNAL4  :SOURCE:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run   Internal   Manual (Trigger Key)   Bus   External 2  EXTERNAL4
Initial S/W Revision	A.05.00

### Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

### Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 $\mu$ s
Amplitude	100 $\mu$ s to within 0.1 dB 20 $\mu$ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME?
<b>Example</b>	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?
<b>Notes</b>	SCPI is supported after A.09.40
<b>Preset</b>	1.0 ms
<b>Min</b>	0.0 ms
<b>Max</b>	4.0 ks
<b>Initial S/W Revision</b>	A.05.00

### Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup
<b>Notes</b>	No remote command, front panel only.
<b>Initial S/W Revision</b>	A.05.00

### Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   NONE   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38

	BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF :SOURCE:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### None

Selects no radio standard for use on the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### P-GSM

Selects P-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### E-GSM

Selects E-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### R-GSM

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### DCS 1800

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### PCS 1900

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 450

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 480

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 850

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band IV

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band V

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VI

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VII

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band VIII

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

#### Band IX

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00



**Band X**

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XI**

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XII**

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIII**

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIV**

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band XIX**

Selects Band XIX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.14.50

### CDMA 2000 / 1xEVDO

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### US CELL

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### US PCS

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Japan Cell

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### Korean PCS

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

### NMT 450

Selects NMT 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

#### IMT 2000

Selects IMT 2000 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

#### Upper 700

Selects Upper 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

#### Secondary 800

Selects Secondary 800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

#### 400 Euro PAMR

Selects 400 Euro PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

#### 800 PAMR

Selects 800 PAMR as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

#### 2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### AWS

Selects AWS as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

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### 700 Public Safety

Selects 700 Public Safety as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

## LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

## BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 9

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 10

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 11

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 12**

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 13**

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 14**

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 17**

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 18**

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 19**

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 21

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 24

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 25

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 26

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

#### BAND 27

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00



**BAND 28**

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**BAND 31**

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

**LTE TDD**

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND 33**

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

**BAND 34**

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

**BAND 35**

Selects BAND 35 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

---

#### BAND 36

Selects BAND 36 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

---

#### BAND 37

Selects BAND 37 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

---

#### BAND 38

Selects BAND 38 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

---

#### BAND 39

Selects BAND 39 as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

---

#### BAND 40

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

#### BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

#### BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

#### BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

#### BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

#### TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

---

#### BAND A

Selects BAND A as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

---

#### BAND B

Selects BAND B as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

---

#### BAND C

Selects BAND C as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

---

#### BAND D

Selects BAND D as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

---

#### BAND E

Selects BAND E as the band for the current step.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

### BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

### Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN   UP
Initial S/W Revision	A.05.00

### Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRrequency <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRrequency?
<b>Example</b>	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

## Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the “Source Unleveled” indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

## Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform <string> :SOURce:LIST:STEP[1] 2 3...1000:SETup:WAVEform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes “Off”   “CW”   “Cont”   “waveform name”

Preset	CW
Range	Waveform   Continue Previous   CW   Off
Initial S/W Revision	A.05.00

### CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list sequence will automatically apply header settings of the selected waveform in that step.
Initial S/W Revision	A.05.00

### Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Off

Disable RF output of the current step.



Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <"NVWFM" MSUS + colon + filename>.

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When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.

When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .

If you specify a file over SCPI, but the file is not at the specified location, an error is generated.

If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.

If you try to load a Signal Studio waveform "\*.wfm" which contains invalid waveform header, an error is generated.

If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

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Initial S/W Revision      A.05.00

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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB

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<p>memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
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Initial S/W Revision	A.05.00
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### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe:ALL
<b>Example</b>	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in <b>"List Sequencer" on page 1725</b> and <b>"Sequencer" on page 1726</b> state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

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### Segments on Hard Disk

This key functions the same as **"Segments on Hard Disk" on page 1752**.

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Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

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### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 1755.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME   COUNT   CONTInuous   CABort  :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query <b>Error! Reference source not found.</b> Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time   Play Count   Continuous   Continuous Abort
Initial S/W Revision	A.05.00

### Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found**. List Sequence Step Validation.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TCOUNT?
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
<b>Notes</b>	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict; Cannot accept time or count input when step duration type is Continuous on step #"
<b>Notes</b>	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
<b>Preset</b>	1.00 ms
<b>Min</b>	100 μs
<b>Max</b>	1800 s
<b>Initial S/W Revision</b>	A.05.00

### Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
<b>Notes</b>	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
<b>Initial S/W Revision</b>	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON   OFF   1   0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
<b>Example</b>	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

### Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE   INTernal   KEY
-----------------------	---



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```

BUS | EXTernal2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900
| TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX
| BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS |
JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11
| BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21
| BAND24 | BAND25 | BAND26 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37
| BAND38 | BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BANDA | BANDB |
BANDC | BANDD | BANDE | BANDF, DOWN | UP, <freq>, <ampl>, <string>,
TIME | COUNT | CONTinuous, <time>, ON | OFF | 1 | 0, [<int>],

:SOURce:LIST:STEP[1]|2|...|4..1000:SETup?

```

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**Example** :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM\_Test1.bin", TIME, 10ms, OFF, 255

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**Notes**

The parameters are:

(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)

1. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see ["Step Trigger" on page 1728](#).
  2. Transition Time <time> – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see ["Transition Time" on page 1730](#).
  3. Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1731](#).
  4. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see ["Radio Band Link" on page 1748](#).
  5. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see ["Channel" on page 1748](#) and ["Frequency" on page 1749](#).
  6. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see ["Power" on page 1749](#).
  7. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:  
    - <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.
    - CONT – continues playback of the ARB file from the previous step
    - CW – outputs a CW tone
    - OFF – disable RF output
  8. Step Duration <enum> – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see ["Step](#)
-

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	<p><a href="#">Duration" on page 1757.</a></p> <p>9. Time or Count &lt;time/int&gt; – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, <a href="#">"Time" on page 1757</a> and <a href="#">"Play Count" on page 1758</a>.</p> <p>10. Output Trigger &lt;Boolean&gt; – specifies the output trigger for the step. For details of the ranges for this setting see <a href="#">"Output Trigger" on page 1759</a>.</p>
Dependencies	<p>The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a>.</p> <p>If you attempt to remotely set or query a subopcode that is out of range, an error is generated.</p>
Initial S/W Revision	A.05.00

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### Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Step Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

---

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:INPut:TRIGger &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:INPut:TRIGger?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?</pre>
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Trigger &lt;enum&gt; – specifies the input trigger for the step. For details of the valid types of step trigger see <a href="#">"Step Trigger" on page 1728</a>.</p> <p>If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Remote Command Notes	IMMEDIATE INTERNAL KEY BUS EXTERNAL2
Dependencies	<p>The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a>.</p>
Initial S/W Revision	A.09.40

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### Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

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<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TRANSition:TIME &lt;time&gt;, &lt;time&gt;, &lt;time&gt;, ... :SOURce:LIST:SETup:TRANSition:TIME?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms</pre>

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	:SOUR:LIST:SET:TRAN:TIME?
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Transition Time &lt;time&gt; – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see "Transition Time" on page 1730</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1727.
Initial S/W Revision	A.09.40

### Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure "Radio Band" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>R</b>	:SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...
<b>e</b>	:SOURce:LIST:SETup:RADio:BAND?
<b>m</b>	
<b>o</b>	
<b>t</b>	
<b>e</b>	
<b>C</b>	
<b>o</b>	
<b>m</b>	
<b>m</b>	
<b>a</b>	
<b>n</b>	
<b>d</b>	
<b>E</b>	:SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM
<b>x</b>	:SOUR:LIST:SET:RAD:BAND?
<b>a</b>	
<b>m</b>	
<b>p</b>	
<b>l</b>	
<b>e</b>	
<b>N</b>	The command is to setup below parameter array of whole list sequence.
<b>O</b>	Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see "Radio Setup" on page 1731.
<b>t</b>	If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then
<b>e</b>	generate error ", and only those parameters whose index number falls in number of steps will be updated.
<b>s</b>	
<b>R</b>	NONE PGSM EGSM RGSM DCS1800 PCS1900 TGSM810 GSM450 GSM480 GSM700 GSM850 BANDI BANDII BANDIII BANDI
<b>e</b>	V BANDV BANDVI BANDVII BANDVIII BANDIX BANDX BANDXI BANDXII BANDXIII BANDXIV BANDXIX USCELL USPCS JAPAN KO
<b>m</b>	REAN NMT IMT2K UPPER SECOND PAMR400 PAMR800 IMTEXT PCS1 DOT9G AWS US2DOT5G PUBLIC LOWER NONE BAND1
	BAND2 BAND3 BAND4 BAND5 BAND6 BAND7 BAND8 BAND10 BAND11 BAND12 BAND13 BAND14 BAND17 BAND18 BAND1

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o 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN  
t D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF  
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C  
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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "[Number of Steps](#)" on  
e [page 1727](#).

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### Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see <a href="#">"Radio Band Link" on page 1748</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
<b>Remote Command Notes</b>	DOWN UP
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:CNFRequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRequency?
<b>Example</b>	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see <a href="#">"Channel" on page 1748</a> and <a href="#">"Frequency" on page 1749</a> This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

#### Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?
<b>Example</b>	:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see <a href="#">"Power" on page 1749</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

#### Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:WAVeform <string>, <string>, <string>, ... :SOURce:LIST:SETup:WAVeform?
<b>Example</b>	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

	<p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1727.
Range	"filename"   "CW"   "Off"   "CONT"
Initial S/W Revision	A.09.40

#### Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:DURation:TYPE &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:DURation:TYPE?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?</pre>
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration &lt;enum&gt; – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1757.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Remote Command Notes	TIME   COUNT   CONTinuous
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1727.
Initial S/W Revision	A.09.40

#### Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure "Duration Time" or "Play Count" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TOCount &lt;time/int&gt;, &lt;time/int&gt;, &lt;time/int&gt;, ... :SOURce:LIST:SETup:TOCount?</pre>
-----------------------	---

<b>Example</b>	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, " <a href="#">Time</a> " on page 1757 and " <a href="#">Play Count</a> " on page 1758. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current " <a href="#">Step Duration</a> " on page 1757 is "Continuous", then generate error -221,"Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

#### Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Output Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
<b>Example</b>	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see " <a href="#">Output Trigger</a> " on page 1759. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
<b>Remote Command Notes</b>	ON OFF 1 0
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

#### Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI featuredescribed in.



<b>Remote Command</b>	:SOURce:LIST:SETup:CLEar
<b>Example</b>	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

## Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

<b>Key Path</b>	Source, List Sequencer
<b>Remote Command</b>	:SOURce:LIST:TRIGgerout:TYPe BEGinningofstep DATamarker
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

## BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

#### Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
<b>Remote Command</b>	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to "Bus". Sending this command will trigger the step and continue the sequence.

<b>Remote Command</b>	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
<b>Example</b>	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

### Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

<b>Remote Command</b>	:SOURce:LIST:INITiation:ARMed?
<b>Example</b>	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see <a href="#">"Initiate Sequence" on page 1726</a> Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately.
Notes	There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?".
Initial S/W Revision	A.09.40

### Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
<b>Remote Command</b>	:SOURce:PRESet
<b>Example</b>	:SOUR:PRES

## SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters

Key Path	Front-panel key
Mode	EDGE/GSM
Initial S/W Revision	Prior to A.02.00

### Ref Value

Allows you to set reference value by Phase Error and Phase Error w/Freq, and RF Envelope.

See also:

- ["Ref Value \(Phase Error and Phase Error w/Freq window\)" on page 1492](#)
- ["Ref Value \(RF Envelope window\)" on page 1493](#)

Key Path	SPAN X Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

### Ref Value (Phase Error and Phase Error w/Freq window)

Allows you to set the display X reference value for time axis 'bit'.

Key Path	SPAN / X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:RLEVel <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:RLEVel?
<b>Example</b>	DISP:PFER:VIEW:WIND:TRAC:X:RLEV 1.5 DISP:PFER:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the <a href="#">"Auto Scaling" on page 1495</a> is On, this value is automatically determined by the measurement result. When you set a value manually, <a href="#">"Auto Scaling" on page 1495</a> automatically changes to Off.
Preset	0.5
State Saved	Saved in instrument state.
Min	0.000
Max	5000000.000
Initial S/W Revision	Prior to A.02.00

## Ref Value (RF Envelope window)

Allow you to set the display X reference value for time axis 'sec'.

Key Path	SPAN / X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel <time> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:RLEVel?
<b>Example</b>	DISP:PFER:VIEW:WIND3:TRAC:X:RLEV 1.5 DISP:PFER:VIEW:WIND3:TRAC:X:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 1495 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 1495 automatically changes to Off.
Preset	-64.4 us
State Saved	Saved in instrument state.
Min	-1.0 s
Max	10.0 s
Initial S/W Revision	Prior to A.02.00

## Scale/Div

Allows you to set the display X scale/division value using bits (Phase Error and Phase Error w/Freq) or time (RF Envelope)

See also:

"Scale/Div (Phase Error and Phase Error w/Freq window)" on page 1493

"Scale/Div (RF Envelope window)" on page 1494

Key Path	SPAN X Scale
Mode	GSM
Initial S/W Revision	Prior to A.02.00

## Scale/Div (Phase Error and Phase Error w/Freq window)

Allows you to set the display X scale/division value.

Key Path	SPAN / X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:PDIVision <real> :DISPlay:PFERror:VIEW[1]:WINDow[1] 2:TRACe:X[:SCALe]:PDIVision?

<b>Example</b>	DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV 15 DISP:PFER:VIEW:WINDOW:TRAC:X:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 1495 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 1495 automatically changes to Off.
Preset	14.7
State Saved	Saved in instrument state.
Min	1.000
Max	500000.0
Initial S/W Revision	Prior to A.02.00

### Scale/Div (RF Envelope window)

Allows you to set the display X scale/division value.

<b>Key Path</b>	SPAN / X Scale
<b>Mode</b>	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:PFERror:VIEW[1]:WINDow3:TRACe:X[:SCALe]:PDIVision?
<b>Example</b>	DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV 1 DISP:PFER:VIEW:WINDOW3:TRAC:X:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	If the "Auto Scaling" on page 1495 is On, this value is automatically determined by the measurement result. When you set a value manually, "Auto Scaling" on page 1495 automatically changes to Off.
Preset	532.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

### Ref Position

Allows you to set the display reference position to Left, Center or Right.

<b>Key Path</b>	SPAN / X Scale
<b>Mode</b>	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:RPOSition LEFT   CENTER   RIGHT

	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:RPOSition?
<b>Example</b>	DISP:PFER:VIEW:WIND2:TRAC:X:RPOS LEFT DISP:PFER:VIEW:WIND2:TRAC:X:RPOS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left Ctr Right
Initial S/W Revision	Prior to A.02.00

## Auto Scaling

Allows you to toggle the scale coupling function between On and Off.

Key Path	SPAN / X Scale
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:COUPlE ON   OFF   1   0  :DISPlay:PFERror:VIEW[1]:WINDow[1] 2 3:TRACe:X[:SCALe]:COUPlE?
<b>Example</b>	DISP:PFER:VIEW:WIND:TRAC:X:COUP ON DISP:PFER:VIEW:WIND:TRAC:X:COUP?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either "Ref Value" on page 1492 or "Scale/Div" on page 1493 manually, Auto Scaling automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Sweep/Control

Accesses a menu that enables you to configure the Sweep and Control functions of the analyzer, such as Acquisition Time and Gating.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing Restart, Single or Cont does a Resume.

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:PAUSE
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

### Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

<b>Remote Command</b>	:ABORT
<b>Example</b>	:ABOR



Notes	<p>If :INITiate:CONTinuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met.</p> <p>If :INITiate:CONTinuous is OFF, then :INITiate:IMMediate is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.</p>
Dependencies	<p>For continuous measurement, ABORt is equivalent to the Restart key.</p> <p>Not all measurements support the abort command.</p>
Status Bits/OPC dependencies	<p>The STATus:OPERation register bits 0 through 8 are cleared.</p> <p>The STATus:QUESTionable register bit 9 (INTEgrity sum) is cleared.</p> <p>Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.</p>
Initial S/W Revision	<p>Prior to A.02.00</p>

## System

See ["System" on page 222](#)

## Trace/Detector

There is no functionality for this Front-panel key in this measurement. When pressed, this key displays a blank menu.

Key Path	Front-panel key
Mode	EDGE GSM

## Trigger

See ["Trigger" on page 278](#)

### Free Run

See ["Free Run " on page 285](#)

### Video

See ["Video \(IF Envelope\) " on page 286](#)

### Trigger Level

See ["Trigger Level " on page 286](#)

### Trig Slope

See ["Trig Slope " on page 287](#)

### Trig Delay

See ["Trig Delay " on page 288](#)

### External 1

See ["External 1 " on page 304](#)

### Trigger Level

See ["Trigger Level " on page 304](#)

### Trig Slope

See ["Trig Slope " on page 305](#)

### Trig Delay

See ["Trig Delay " on page 291](#)

### Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 292](#)

### External 2

See ["External 2 " on page 306](#)

### Trigger Level

See ["Trigger Level " on page 306](#)

### Trig Slope

See ["Trig Slope " on page 307](#)

### **Trig Delay**

See ["Trig Delay "](#) on page 294

### **Zero Span Delay Comp**

See ["Zero Span Delay Comp On/Off"](#) on page 294

### **RF Burst**

See ["RF Burst "](#) on page 307

### **Absolute Trigger**

See ["Absolute Trigger Level"](#) on page 308

### **Relative Trigger**

See ["Relative Trigger Level"](#) on page 297

### **Trig Slope**

See ["Trigger Slope "](#) on page 309

### **Trig Delay**

See ["Trig Delay "](#) on page 298

### **Periodic Timer**

See ["Periodic Timer \(Frame Trigger\) "](#) on page 299

### **Period**

See ["Period "](#) on page 300

### **Offset**

See ["Offset "](#) on page 301

### **Offset Adjust (Remote Command Only)**

See ["Offset Adjust \(Remote Command Only\)"](#) on page 302

### **Reset Offset Display**

See ["Reset Offset Display "](#) on page 303

### **Sync Source**

See ["Sync Source "](#) on page 303

### **Off**

See ["Off "](#) on page 304

### **External 1**

See ["External 1 "](#) on page 304

#### **Trigger Level**

See ["Trigger Level "](#) on page 304

#### **Trig Slope**

See ["Trig Slope "](#) on page 305

### **External 2**

See ["External 2 "](#) on page 306

#### **Trigger Level**

See ["Trigger Level "](#) on page 306

#### **Trig Slope**

See ["Trig Slope "](#) on page 307

### **RF Burst**

See ["RF Burst "](#) on page 307

### **Absolute Trigger**

See ["Absolute Trigger Level"](#) on page 308

#### **Trig Slope**

See ["Trigger Slope "](#) on page 309

### **Trig Delay**

See ["Trig Delay"](#) on page 309

### **Auto/Holdoff**

See ["Auto/Holdoff "](#) on page 310

### **Auto Trig**

See ["Auto Trig "](#) on page 310

### **Trig Holdoff**

See ["Trig Holdoff "](#) on page 311

### **Holdoff Type**

See ["Holdoff Type"](#) on page 311

## User Preset

Accesses a menu that gives you the following three choices:

- User Preset – recalls a state previously saved using the Save User Preset function.
- User Preset All Modes – presets all of the modes in the analyzer
- Save User Preset– saves the current state for the current mode

### NOTE

In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	<p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p>
Initial S/W Revision	Prior to A.02.00

## User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, SYST:PRES:USER:SAV. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.

- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

## User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

**NOTE**

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER:ALL
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode.



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Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

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Initial S/W Revision      Prior to A.02.00

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## Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER:SAVE
<b>Example</b>	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM: STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00

## View/Display

Accesses a menu of functions that enable you to set the display parameters for the current measurement and select the View.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the System Display Settings key apply to all measurements in all modes.

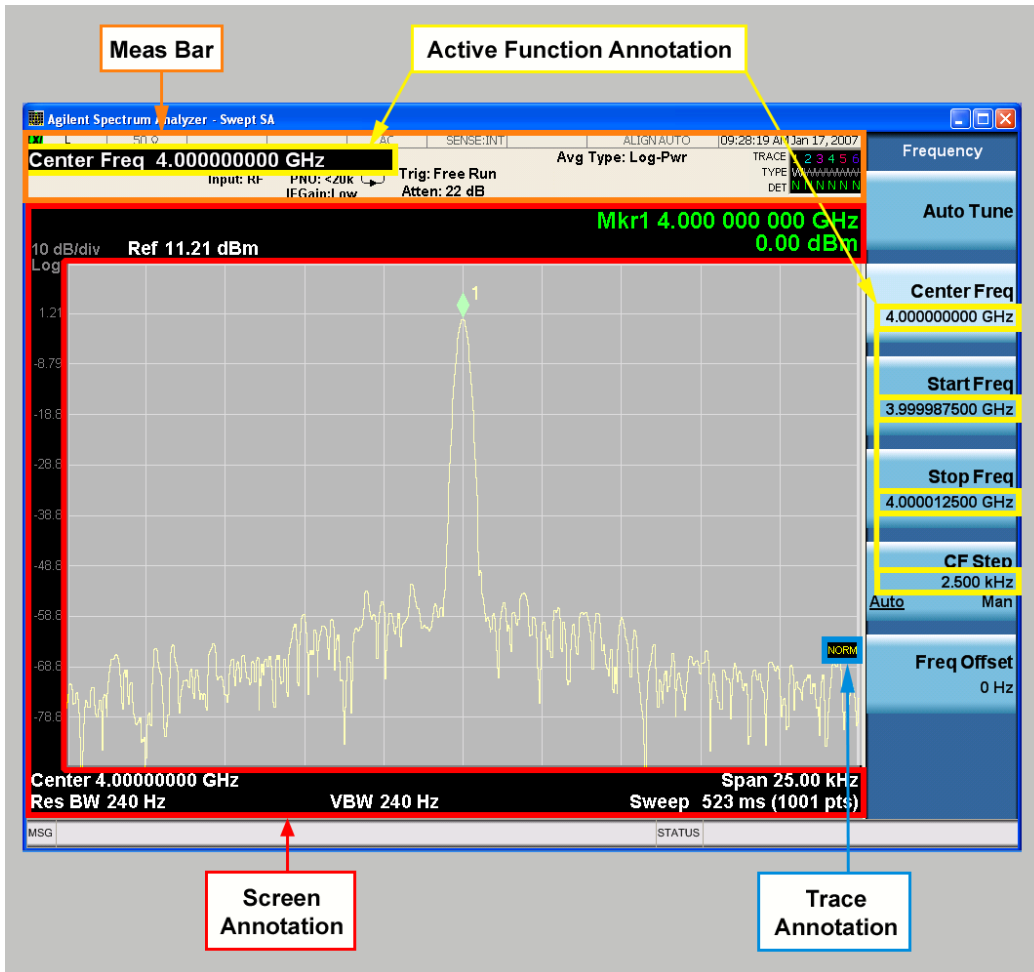
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

## Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ANNotation:MBAR[:STATE] OFF ON 0 1 :DISPlay:ANNotation:MBAR[:STATE]?
Example	DISP:ANN:MBAR OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

## Screen

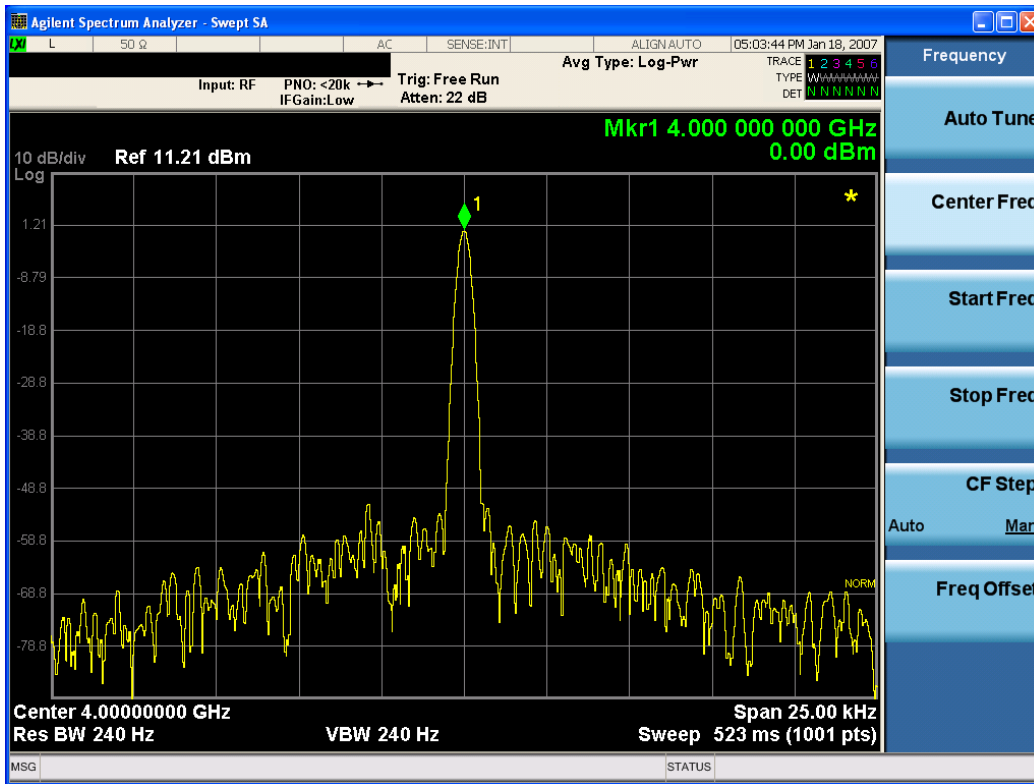
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

<b>Key Path</b>	View/Display, Display, Annotation
<b>Remote Command</b>	:DISPlay:ANNotation:SCReen[:STATe] OFF ON 0 1 :DISPlay:ANNotation:SCReen[:STATe]?
<b>Example</b>	DISP:ANN:SCR OFF
<b>Dependencies</b>	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
<b>Preset</b>	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
<b>State Saved</b>	Saved in instrument state.
<b>Initial S/W Revision</b>	Prior to A.02.00

## Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATe] ON OFF 1 0 :DISPlay:ACTivefunc[:STATe]?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press Change Title again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing Title, Clear Title.

**NOTE**

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

**Clear Title**

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00

## Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
Remote Command	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
Example	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by Restore Misc Defaults or Restore System Defaults under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

## Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is All Off, it forces ScreenAnnotation, Meas Bar, Trace, and Active Function Values settings to be OFF for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is All Off, the Screen, Meas Bar, Trace, and Active Function Values keys under the Display, Annotation menu are grayed out and forced to Off. When Local Settings is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
Remote Command	:DISPlay:WINDow[1]:ANNOtation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNOtation[:ALL]?
Example	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReen:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReen:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00



### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

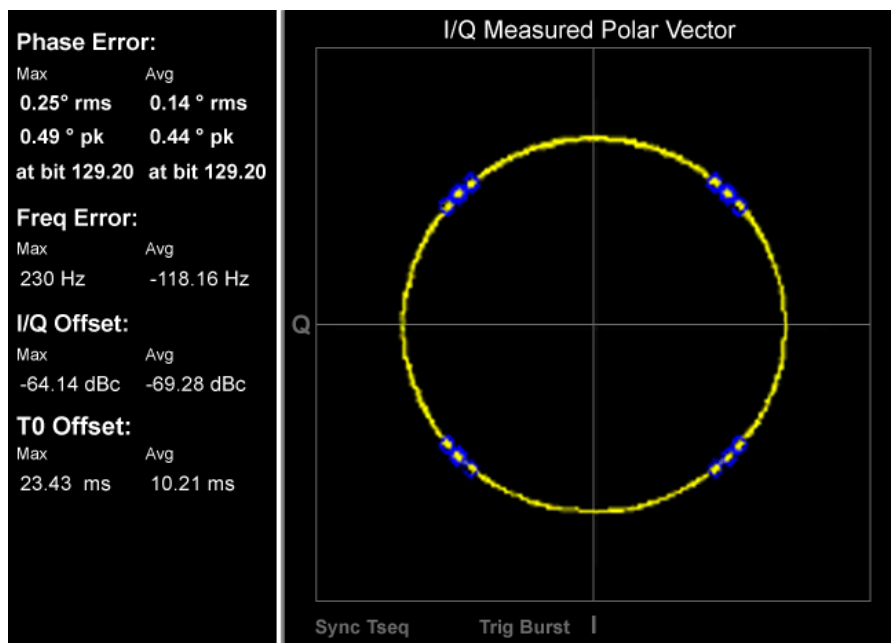
### I/Q Measured Polar Graph View

This view has 2 windows, as detailed in the sections below:

"Graph Window" on page 1514

"Metrics Window" on page 1514

The figure below shows an example of this view.



For any multi-window view, you can select each window using the Next Window key, and make the selected window full size using the Zoom key.

## Graph Window

Marker Operation	No
Corresponding Trace	Series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. (n=5)

## Metrics Window

The Metrics Window is identical to that of the I/Q Error view. Refer to the section "[I/Q Error](#)" on page 1521.

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation allows you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONSTln)

Key Path	View/Display
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar VC   VECTor   CONSTln :DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar?
<b>Example</b>	DISP:PFER:VIEW:WIND2:TRAC:POL VC DISP:PFER:VIEW:WIND2:TRAC:POL?
Notes	VC : Vect & Constln VECTor: Vector CONSTln : Constellation You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln Vector Constellation
Initial S/W Revision	Prior to A.02.00

## I/Q Error

This view has 4 windows, as detailed in the sections below:

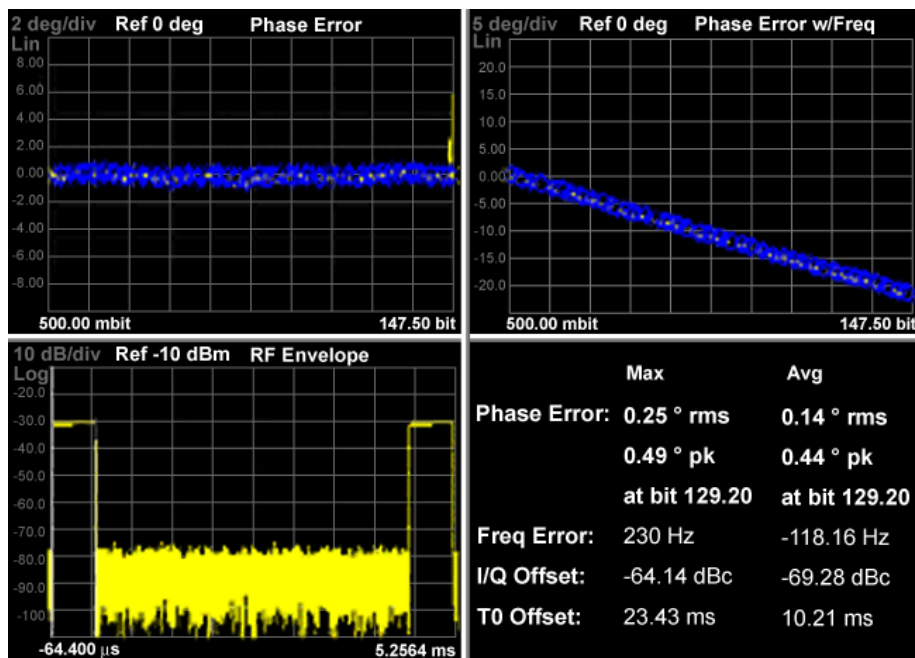
"Phase Err Window" on page 1515

"Phase Err w/Freq Window" on page 1515

"RF Envelope Window" on page 1516

"Metrics Window" on page 1516

The figure below shows an example of this view.



For any multi-window view, you can select each window using the Next Window key, and make the selected window full size using the Zoom key.

### Phase Err Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error trace. (n=2)

### Phase Err w/Freq Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. (n=3)

## RF Envelope Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers that represent each sample in the log magnitude trace of the original time record. (n=4)

## Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 μs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 μs

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Bit Dots

Allows you to toggle the bit dots between On and Off.

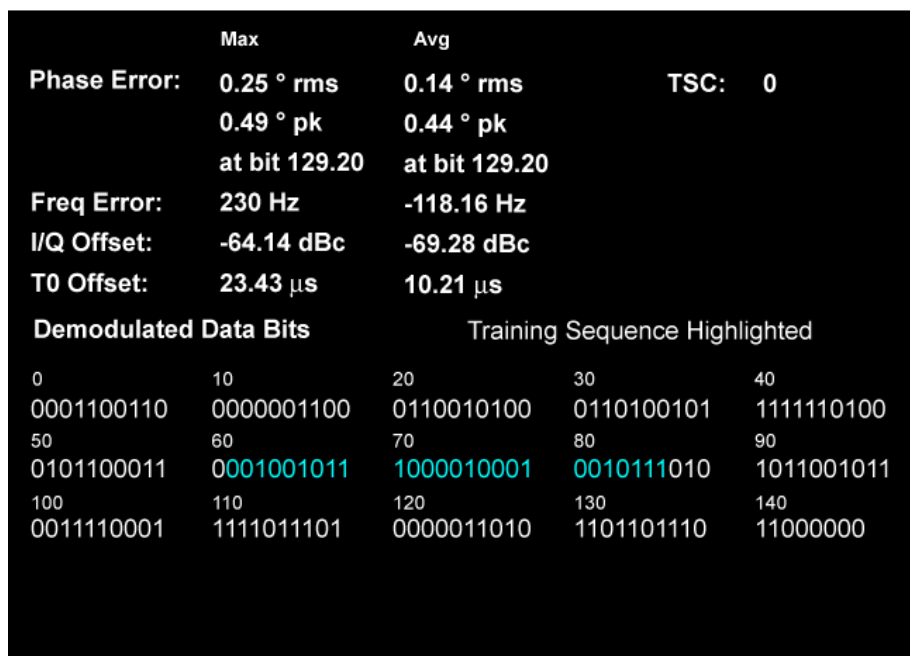
- On: turns on blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.
- Off: turns off blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:PFERror:BDOTs[:STATe] ON OFF 1 0 :DISPlay:PFERror:BDOTs[:STATe]?
Example	DISP:PFER:BDOT ON DISP:PFER:BDOT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. This SCPI command is included for completeness. But only affects the traces displayed on the screen.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Data Bits

This view has only one window, as detailed in the section "[Metrics Window](#)" on page 1518 below.

The figure below shows an example of this view.



## Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 μs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 μs
Demodulated Data Bits	n=6	

Key Path	View/Display
Mode	EDGE/GSM
Initial S/W Revision	Prior to A.02.00

## View

Accesses a menu that allows you to select the desired view of the measurement.

For remote commands associated with view selection, see ["View Selection by name \(SCPI only\)" on page 1519](#) and ["View Selection by number \(SCPI only\)" on page 1519](#).

The 3 following view selections are available:

### 1.I/Q Measured Polar Graph (SCPI: POLar) or (SCPI: 1)

Provides a view of numeric results and a polar vector graph. This view has 2 windows: Numeric Results, and I/Q Polar Graph.

For full details, see Section , "[I/Q Measured Polar Graph View](#)" on page 1520

### 2.I/Q Error (SCPI: ERRor|QUAD) or (SCPI: 2)

Provides a combination view, with 4 windows: Phase Error, Phase Error with Freq, RF Envelope, and Numeric Results.

For full details, see "[I/Q Error](#)" on page 1521

### 3.Data Bits (SCPI: DBITs) or (SCPI: 3)

Provides a view of the numeric results and data bits with the sync word (TSC) highlighted.

For full details of this view, see "[Data Bits](#)" on page 1524

### View Selection by name (SCPI only)

Key Path	View/Display
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[:SElect] POLar ERRor DBITs :DISPlay:PFERror:VIEW[:SElect]?
<b>Example</b>	DISP:PFER:VIEW ERR DISP:PFER:VIEW?
Notes	- POLar : I/Q Measured Polar Graph - ERRor : I/Q Error - DBITs : Data Bits You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	View Selection by number must be coupled with this parameter value.
Preset	ERRor
State Saved	Saved in instrument state.
Range	I/Q Error I/Q Measured Polar Graph Data Bits
Initial S/W Revision	Prior to A.02.00

### View Selection by number (SCPI only)

Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW:NSElect <integer> :DISPlay:PFERror:VIEW:NSElect?
<b>Example</b>	DISP:PFER:VIEW:NSEL 3
Notes	1: I/Q Measured Polar Graph 2: IQ Error

	3: Data Bits
	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	View Selection must be coupled with this parameter value.
Preset	2
State Saved	Saved in instrument state.
Min	1
Max	3
Initial S/W Revision	Prior to A.02.00

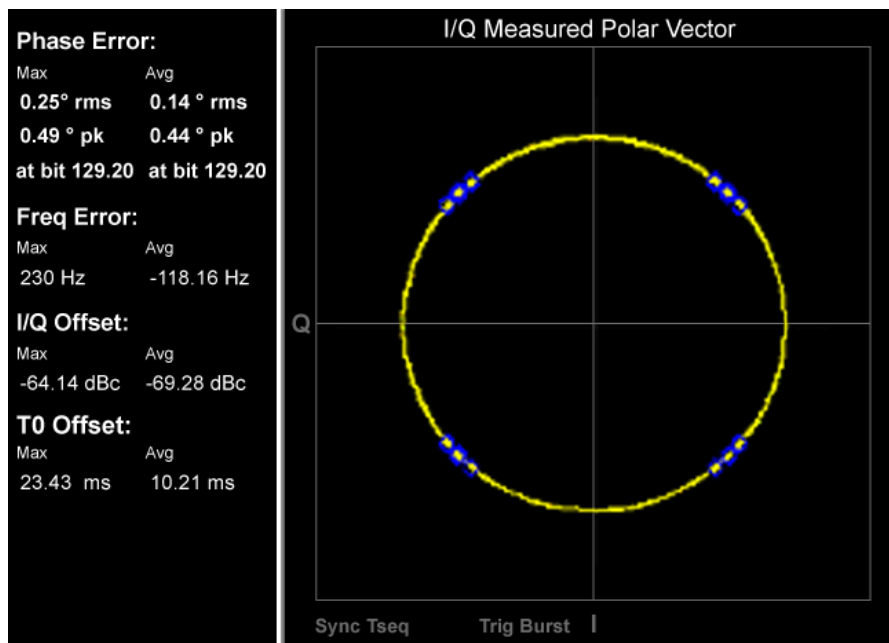
### I/Q Measured Polar Graph View

This view has 2 windows, as detailed in the sections below:

["Graph Window" on page 1520](#)

["Metrics Window" on page 1521](#)

The figure below shows an example of this view.



For any multi-window view, you can select each window using the Next Window key, and make the selected window full size using the Zoom key.

### Graph Window

Marker Operation	No
Corresponding Trace	Series of floating point numbers that alternately represent I and Q pairs of the corrected measured trace. (n=5)



## Metrics Window

The Metrics Window is identical to that of the I/Q Error view. Refer to the section "[I/Q Error](#)" on page 1521.

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## I/Q Polar Vect/Constln

I/Q Polar Vector/Constellation allows you to change the format of the polar vector graph. The following display options are available:

- Vector and Constellation (SCPI: VC)
- Vector Only (SCPI: VECTor)
- Constellation Only (SCPI: CONSTln)

Key Path	View/Display
Mode	GSM
<b>Remote Command</b>	:DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar VC   VECTor   CONSTln :DISPlay:PFERror:VIEW[1]:WINDow2:TRACe:POLar?
<b>Example</b>	DISP:PFER:VIEW:WIND2:TRAC:POL VC DISP:PFER:VIEW:WIND2:TRAC:POL?
Notes	VC : Vect & Constln VECTor: Vector CONSTln : Constellation You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	VC
State Saved	Saved in instrument state.
Range	Vect & Constln Vector Constellation
Initial S/W Revision	Prior to A.02.00

## I/Q Error

This view has 4 windows, as detailed in the sections below:

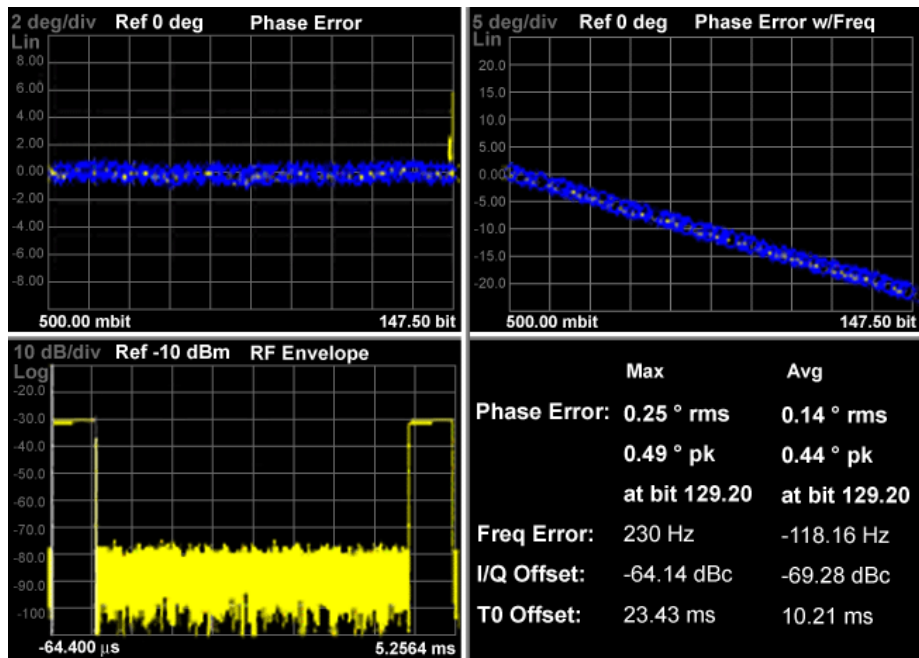
["Phase Err Window"](#) on page 1522

["Phase Err w/Freq Window"](#) on page 1522

["RF Envelope Window"](#) on page 1522

["Metrics Window"](#) on page 1523

The figure below shows an example of this view.



For any multi-window view, you can select each window using the Next Window key, and make the selected window full size using the Zoom key.

### Phase Err Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error trace. (n=2)

### Phase Err w/Freq Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers (in degrees) that represent each sample in the phase error with frequency trace. (n=3)

### RF Envelope Window

Marker Operation	Yes
Corresponding Trace	Series of floating point numbers that represent each sample in the log magnitude trace of the original time record. (n=4)

## Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 μs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 μs

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00

## Bit Dots

Allows you to toggle the bit dots between On and Off.

- On: turns on blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.
- Off: turns off blue bit dots on the trace in 'Phase Error' & 'Phase Error with Freq' window.

Key Path	View/Display
Mode	GSM
Remote Command	:DISPlay:PFERror:BDOTs[:STATe] ON OFF 1 0 :DISPlay:PFERror:BDOTs[:STATe]?
Example	DISP:PFER:BDOT ON DISP:PFER:BDOT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. This SCPI command is included for completeness. But only affects the traces displayed on the screen.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

### Data Bits

This view has only one window, as detailed in the section ["Metrics Window" on page 1524](#) below.

The figure below shows an example of this view.



### Metrics Window

Name	Corresponding Results	Display Format
Phase Error [rms] (Avg)	n=8 1st Average RMS Phase Error	9.99 ° rms

Name	Corresponding Results	Display Format
Phase Error [rms] (Max Hold)	n=8 2nd Maximum RMS Phase Error	9.99 ° rms
Phase Error [pk] (Avg)	n=8 3rd Average Peak Phase Error	9.99 °pk
Phase Error [pk] (Max Hold)	n=8 4th Maximum Peak Phase Error	9.99 °pk
Phase Error at bit (Avg)	n=8 5th Average Peak Phase Error Symbol Position	at bit 99.99
Phase Error at bit (Max Hold)	n=8 6th Maximum Peak Phase Error Symbol Position	at bit 99.99
Freq Error (Avg)	n=8 7th Average Frequency Error	-999.99 Hz
Freq Error (Max Hold)	n=8 8th Maximum Frequency Error	-999.99 Hz
I/Q Offset (Avg)	n=8 9th Average I/Q Origin Offset	-99.99 dBc
I/Q Offset (Max Hold)	n=8 10th Maximum I/Q Origin Offset	-99.99 dBc
T0 Offset (Avg)	n=8 11th Average T0 Offset	999.999 μs
T0 Offset (Max Hold)	n=8 12th Maximum T0 Offset	999.999 μs
Demodulated Data Bits	n=6	

Key Path	View/Display
Mode	EDGE GSM
Initial S/W Revision	Prior to A.02.00



## 12 Burst Power (Transmit Power)

The Burst Power (Transmit Power) measurement (at the base transceiver station) is used to determine the power delivered to the antenna system on the radio-frequency channel under test. The Burst Power measurement verifies the accuracy of the mean transmitted RF carrier power. This can be done across the frequency range and at each power step. For more information, see ["Transmit Power \(Burst Power\) Measurement Description" on page 1531](#). For measurement results and views, see ["View/Display" on page 1785](#).

This topic contains the following sections.

["Measurement Commands for Burst Power \(Transmit Power\)" on page 1528](#)

["Remote Command Results for Burst Power \(Transmit Power\)" on page 1529](#)

## Measurement Commands for Burst Power (Transmit Power)

The general functionality of CONFigure, FETCh, MEASure, and READ are described at the beginning of this section. See the SENSE:TXPower|BPOWer commands for more measurement related commands.

**NOTE**

The BPOWer form of the commands is included for backward compatibility only. They are not recommended for use in new designs. Use the TXPower keyword.

---

The following commands and queries are used to retrieve the measurement results:

```
:CONFigure:TXPower|BPOWer  
:CONFigure:TXPower|BPOWer:NDEFault  
:INITiate:TXPower|BPOWer  
:FETCh:TXPower|BPOWer[n]?  
:READ:TXPower|BPOWer[n]?  
:MEASure:TXPower|BPOWer[n]?
```

For more remote command information, see SENSE:TXPower|BPOWer commands and the section, ["Remote Measurement Functions" on page 1578](#).



## Remote Command Results for Burst Power (Transmit Power)

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
0	Returns unprocessed I/Q trace data, as a series of comma-separated trace points, in volts. The I values are listed first in each pair, using the 0 through even-indexed values. The Q values are the odd-indexed values.
not specified or n = 1	<p>Returns the following comma-separated scalar results:</p> <ol style="list-style-type: none"> <li>1. Sample time is a floating point number representing the time between samples when using the trace queries (n=0, 2, etc).</li> <li>2. Power is the mean power (in dBm) of the power value that calculated by specified method: above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition.</li> <li>3. Power averaged is the power (in dBm) for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of Power averaged is the same as the Power value.</li> <li>4. Number of samples is the number of data points in the captured signal. This number is useful when performing a query on the signal (i.e. when n=0, 2, etc.).</li> <li>5. Threshold value is the absolute threshold level (in dBm) above which the power is calculated when Meas Method is set to Above Threshold.</li> <li>6. Threshold points is the number of points that were above the threshold and were used to calculate Mean Transmit Power when <b>Meas Method</b> is set to Above Threshold. If <b>Meas Method</b> is set to Measured Burst Width, Measured Pts is returned.</li> <li>7. Maximum value is the maximum peak level of the most recently acquired trace data (in dBm).</li> <li>8. Minimum value is the minimum peak level of the most recently acquired trace data (in dBm).</li> </ol> <p>Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is 0.</p> <ol style="list-style-type: none"> <li>9. Full Burst width is the burst width of this signal regardless of the parameter value set for the current Measured width. The Burst width is determined by the Threshold Lvl when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold Lvl, this value is zero.</li> <li>10. Measured width is the time length that is used to calculate Mean Transmit Power when <b>Meas Method</b> is set to Measured Burst Width. If <b>Meas Method</b> is set to Above Threshold, this value is zero.</li> <li>11. Measured points is the number of points used to calculate Mean Transmit Power when Meas Method is set to Measured Burst Width. If Meas Method is set to Above Threshold, this value is 0.</li> </ol>
2	<p>Returns comma-separated trace points of the Measure Trace data.</p> <p>These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.</p>
3	<p>Returns comma-separated trace points of the Max Hold Trace data.</p> <p>These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.</p>

n	Results Returned
	* This is not available in TD-SCDMA.
4	<p>Returns comma-separated trace points of the Min Hold Trace data.</p> <p>These data points are floating point numbers representing the power of the signal (in dBm). There are N data points, where N is the number of samples. The period between the samples is defined by the sample time.</p> <p>* This is not available in TD-SCDMA.</p>

## Transmit Power (Burst Power) Measurement Description

Mobile stations and base transceiver stations must transmit enough power, with sufficient modulation accuracy, to maintain a call of acceptable quality without leaking power into frequency channels or timeslots allocated for others. The Burst Power measurement determines the average power for an RF signal burst at or above a specified threshold value or during the detected burst width. The threshold value may be absolute, or relative to the peak value of the signal. Burst width can be set automatically or manually.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## AMPTD Y Scale

Accesses a menu of functions that enable you to set the vertical scale parameters. Many of the parameter values are measurement dependent. Attenuation values, and the Internal Preamp selection are measurement global, so they are common across all measurements. Functions with operation unique to this measurement are described below. See ["AMPTD Y Scale" on page 1241](#) for more information.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Y Ref Value

Sets the absolute power reference.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <real> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
<b>Example</b>	DISP:TXP:VIEW:WIND:TRAC:Y:RLEV 5dbm DISP:TXP:VIEW:WIND:TRAC:Y:RLEV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets this value manually, Y Auto Scaling automatically changes to Off.
Preset	10.00
State Saved	Saved in instrument state.
Min	-250.0
Max	250.0
Initial S/W Revision	Prior to A.02.00

### Range

The Range menu allows setting amplitude controls of the instrument.

Key Path	AMPTD Y Scale
Scope	Meas Global
Initial S/W Revision	A.12.50

## Range

Represents the amplitude of the largest sinusoidal signal that could be present within the IF without being clipped by the ADC. For signals with high peak-to-average ratios, the range may need to exceed the rms signal power by a fair amount to avoid clipping.

Key Path	Range
Mode	BASIC
<b>Remote Command</b>	<code>[ :SENSe ] :POWer [ :RF ] :RANGe &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe?</code>
<b>Example</b>	<code>:POW:RANG 10.0</code> <code>:POW:RANG?</code>
Notes	The MIN and MAX values are affected by the External Gain parameters, and by the Center Frequency. (The hardware compensates for frequency response and alters the Range setting.)
Preset	0
State Saved	Saved in instrument state.
Min	-100
Max	100
Initial S/W Revision	A.12.50

## Adjust Range For Min Clip

Sets the combination of attenuation and gain based on the current measured signal level so that clipping will be at a minimum.

This is an "immediate action" function, that is, it executes once, when the key is pressed.

This key is grayed out in measurements that do not support this functionality.

Key Path	AMPTD Y Scale, Attenuation
<b>Remote Command</b>	<code>[ :SENSe ] :POWer [ :RF ] :RANGe:OPTimize IMMEDIATE</code>
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Pre-Adjust for Min Clip

If this function is on, it does the adjustment described under Adjust Range For Min Clip each time a measurement restarts. Therefore, in Continuous measurement mode, it only executes before the first measurement.

Key Path	AMPTD Y Scale, Attenuation
<b>Remote Command</b>	<code>[ :SENSe ] :POWer [ :RF ] :RANGe:OPTimize:ATTenuation OFF   ON   ELEctrical   COMBined</code>

	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :OPTimize :ATTenuation ?</code>
Notes	This parameter is shared with old XA platform which uses AutoAtten. To keep the backward compatibility, ELECTrical and COMBined still can be used. Then, upon receiving ELECTrical and COMBined, these enums will be interpreted as aliases of ON. Then, when queried, ON will be returned.
Preset	OFF for Swept SA measurement; ON for all other measurements that support Pre-Adjust for Min Clip
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Peak to Average

The Peak to Average Ratio is used with the Range setting to optimize the level control in the instrument. The value is the ratio, in dB, of the peak power to the average power of the signal to be measured. A ratio of 0 should be used for sinusoidal signals; for 802.11g OFDM signals use 9 dB.

All Applications (Modes) will show the current value of Peak to Average ratio on the softkey. However, some applications will not permit changing the value. In these situations the softkey will be grayed-out.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :PARatio &lt;real&gt;</code> <code>[ :SENSe ] :POWer [ :RF ] :RANGe :PARatio ?</code>
Example	POW:RANG:PAR 12 dB
Notes	In some Applications (Modes) this parameter will be read-only; meaning the value will appear on the softkey and query via SCPI, but not changeable. In such applications the softkey will be grayed-out. Attempting to change the value via SCPI will be ignored and no error message will be generated.
Preset	10 dB
State Saved	Saved in instrument state
Min	0 dB
Max	20 dB
Initial S/W Revision	A.13.00

## Mixer Level Offset

Mixer level offset is an advanced setting to adjust target Range at the input mixer which in turn affects the signal level in the instrument's IF. This setting can be used when additional optimization is needed after setting Peak to Average ratio. Positive values of offset optimize noise performance over distortion, negative values optimize distortion performance over noise.

Key Path	AMPTD Y Scale, Range
Remote Command	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet &lt;real&gt;</code>

	<code>[ :SENSe ] :POWer [ :RF ] :RANGe :MIXer :OFFSet ?</code>
<b>Example</b>	<code>POW:RANG:MIX:OFFS -5 dB</code>
Preset	0 dB
State Saved	Saved in instrument state
Min	-35 dB
Max	30 dB
Initial S/W Revision	A.13.00

## Scale/Division

Enables you to enter a numeric value to change the vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	<code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision &lt;rel_ampl&gt;</code> <code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:PDIVision?</code>
<b>Example</b>	<code>DISP:TXP:VIEW:WIND:TRAC:Y:PDIV 10dB</code> <code>DISP:TXP:VIEW:WIND:TRAC:Y:PDIV?</code>
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Couplings	When the Y Auto Scaling is On, this value is automatically determined by the measurement result. When the user sets a value manually, Y Auton Scaling automatically changes to Off.
Preset	10.00 dB
State Saved	Saved in instrument state.
Min	0.1 dB
Max	20.00 dB
Initial S/W Revision	Prior to A.02.00

## Ref Position

Enables you to set the display reference position to either, Top, Center or Bottom.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	<code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition TOP  </code> <code>CENTer   BOTTom</code> <code>:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RPOSition?</code>
<b>Example</b>	<code>DISP:TXP:VIEW:WIND:TRAC:Y:RPOS CENT</code> <code>DISP:TXP:VIEW:WIND:TRAC:Y:RPOS?</code>

Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	TOP
State Saved	Saved in instrument state.
Range	Top Ctr Bot
Initial S/W Revision	Prior to A.02.00

## Auto Scaling

Allows you to toggle the Y axis auto scaling function between On and Off.

Key Path	AMPTD Y Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle 0   1   OFF   ON :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:COUPle?
Example	DISP:TXP:VIEW:WIND:TRAC:Y:COUP 0 DISP:TXP:VIEW:WIND:TRAC:Y:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When Auto Scaling is On, upon pressing the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When the user sets a value either <b>Y Rel Value</b> or <b>Y Scale/Div</b> manually, this parameter automatically is set to 'Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00



## Auto Couple

The Auto Couple feature provides a quick and convenient way to automatically couple multiple instrument settings. This helps ensure accurate measurements and optimum dynamic range. When the Auto Couple feature is activated, either from the front panel or remotely, all parameters of the current measurement that have an Auto/Manual mode are set to Auto mode and all measurement settings dependent on (or coupled to) the Auto/Man parameters are automatically adjusted for optimal performance.

However, the Auto Couple key actions are confined to the current measurement only. It does not affect other measurements in the mode, and it does not affect markers, marker functions, or trace or display attributes.

See "[More Information](#)" on page 1537

Key Path	Front-panel key
Remote Command	:COUPle ALL NONE
Example	:COUP ALL
Notes	:COUPle ALL puts all Auto/Man parameters in Auto mode (equivalent to pressing the Auto Couple key). :COUPLE NONE puts all Auto/Man parameters in manual mode. It decouples all the coupled instrument parameters and is not recommended for making measurements.
Initial S/W Revision	Prior to A.02.00

### More Information

There are two types of functions that have Auto/Manual modes.

#### Auto/Man Active Function keys

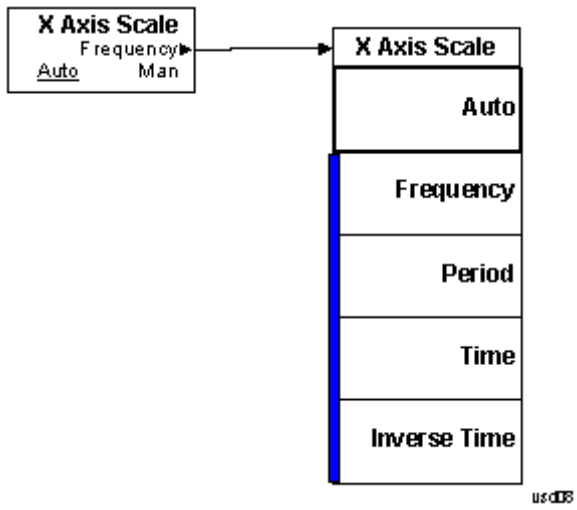
An Auto/Man toggle key controls the binary state associated with an instrument parameter by toggling between Auto (where the parameter is automatically coupled to the other parameters it is dependent upon) and Man (where the parameter is controlled independent of the other parameters), as well as making the parameter the active function. The current mode is indicated on the softkey with either Auto or Man underlined as illustrated below.



#### Auto/Man 1-of-N keys

An Auto/Man 1-of-N key allows you to manually pick from a list of parameter values, or place the function in Auto, in which case the value is automatically selected (and indicated) as shown below. If in Auto, Auto is underlined on the calling key. If in manual operation, manual is indicated on the calling key. But the calling key does not actually toggle the function, it simply opens the menu.

12 Burst Power (Transmit Power)  
Auto Couple



## BW

Accesses a menu of functions that enable you to specify and control the video and resolution bandwidths. You can also select the type of filter for the measurement and set the filter bandwidth.

**NOTE** If the selected mode is TD-SCDMA, this function is **not** available.

Key Path	Front-panel key
Mode	SA, EDGE/GSM
Initial S/W Revision	Prior to A.02.00

## Res BW

Sets the resolution bandwidth. This is the bandwidth used for the power measurement. The bandwidth is ideally wide enough to pass all the power of the burst signal, while not being so wide that it passes noise that reduces dynamic range and the accuracy of low level measurements.

Key Path	BW
Mode	SA, GSM
<b>Remote Command</b>	[ :SENSe ] :TXPower :BANDwidth [ :RESolution ] <bandwidth> [ :SENSe ] :TXPower :BANDwidth [ :RESolution ] ?
<b>Example</b>	TXP:BAND 1000 TXP:BAND?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	GSM: 510 kHz SA: 3 MHz
State Saved	Saved in instrument state.
Min	1 kHz
Max	Hardware Dependent: No Option = 10 MHz WB (25 MHz or wider) = Hardware Option Limit
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :TXPower :BWIDth [ :RESolution ]
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Key Path	BW
Mode	SA, GSM
<b>Remote Command</b>	<code>[ :SENSe ] :TXPower :BANDwidth :TYPE GAUSSian   FLATtop</code> <code>[ :SENSe ] :TXPower :BANDwidth :TYPE ?</code>
<b>Example</b>	TXP:BAND:TYPE GAUS TXP:BAND:TYPE?
Notes	Selects the type of filter: either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. This measurement does not trade off time domain accuracy vs. noise, just total power accuracy vs. noise level. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results. FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy. GAUSSian – a filter with Gaussian characteristics, which provides the best pulse response. You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	GAUSSian
State Saved	Saved in instrument state.
Range	Gaussian (Normal) Flattop
<b>Backwards Compatibility SCPI</b>	<code>[ :SENSe ] :TXPower :BWIDth :TYPE</code>
Initial S/W Revision	Prior to A.02.00

## RBW Control

Accesses a menu that enables you to select the filter bandwidth and type.

Key Path	BW
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## Filter Type

Besides the familiar Gaussian filter shape, there are certain special filter types, such as Flat Top, that are desirable under certain conditions.

Key Path	BW
Mode	SA, GSM
<b>Remote Command</b>	<code>[ :SENSe ] :TXPower :BANDwidth :TYPE GAUSSian   FLATtop</code> <code>[ :SENSe ] :TXPower :BANDwidth :TYPE ?</code>
<b>Example</b>	TXP:BAND:TYPE GAUS TXP:BAND:TYPE?

Notes	<p>Selects the type of filter: either Gaussian or Flat (Flattop). Gaussian is the best choice when looking at the overall burst or the rising and falling edges, as it has excellent pulse response. This measurement does not trade off time domain accuracy vs. noise, just total power accuracy vs. noise level. If you want to precisely examine just the useful part of the burst, choose Flat. This is an advanced control that normally does not need to be changed. Setting this to a value other than the factory default may cause invalid measurement results.</p> <p>FLATtop – a filter with a flat amplitude response, which provides the best amplitude accuracy.</p> <p>GAUSSian – a filter with Gaussian characteristics, which provides the best pulse response.</p> <p>You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.</p>
Preset	GAUSSian
State Saved	Saved in instrument state.
Range	Gaussian (Normal) Flattop
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :TXPower :BWidth :TYPE
Initial S/W Revision	Prior to A.02.00

## Cont (Continuous Measurement/Sweep)

Sets the analyzer for Continuous measurement operation. The single/continuous state is Meas Global so the setting will affect all measurements. If you are Paused, pressing Cont does a Resume.

<b>Key Path</b>	Front-panel key
<b>Remote Command</b>	:INITiate:CONTinuous OFF ON 0 1 :INITiate:CONTinuous?
<b>Example</b>	:INIT:CONT 0 puts analyzer in Single measurement operation. :INIT:CONT 1 puts analyzer in Continuous measurement operation
<b>Preset</b>	ON (Note that SYST:PRESet sets INIT:CONT to ON but *RST sets INIT:CONT to OFF)
<b>State Saved</b>	Saved in instrument state
<b>Backwards Compatibility Notes</b>	For Spectrum Analysis mode in ESA and PSA, there is no Cont hardkey, instead there is a Sweep Single/Cont key. In these analyzers, switching the Sweep Single/Cont key from Single to Cont restarts averages (displayed average count reset to 1), but does not restart Max Hold and Min Hold. The X-Series has Single and Cont keys in place of the SweepSingleCont key. In the X-Series, if in single measurement, the Cont key (and INIT:CONT ON ) switches to continuous measurement, but never restarts a measurement and never resets a sweep.
<b>Initial S/W Revision</b>	Prior to A.02.00

In Swept SA Measurement (Spectrum Analysis Mode):

The analyzer takes repetitive sweeps, averages, measurements, etc., when in Continuous mode. When the average count reaches the Average/Hold Number the count stops incrementing, but the analyzer keeps sweeping. See the Trace/Detector section for the averaging formula used both before and after the Average/Hold Number is reached. The trigger condition must be met prior to each sweep. The type of trace processing for multiple sweeps, is set under the Trace/Detector key, with choices of Trace Average, Max Hold, or Min Hold.

In Other Measurements/Modes:

With Avg/Hold Num (in the Meas Setup menu) set to Off or set to On with a value of 1, a sweep is taken after the trigger condition is met; and the analyzer continues to take new sweeps after the current sweep has completed and the trigger condition is again met. However, with Avg/Hold Num set to On with a value >1, multiple sweeps (data acquisitions) are taken for the measurement. The trigger condition must be met prior to each sweep. The sweep is not stopped when the average count k equals the number N set for Avg/Hold Num is reached, but the number k stops incrementing. A measurement average usually applies to all traces, marker results, and numeric results. But sometimes it only applies to the numeric results.

If the analyzer is in Single measurement, pressing the Cont key does not change k and does not cause the sweep to be reset; the only action is to put the analyzer into Continuous measurement operation.

If it is already in continuous sweep:

the INIT:CONT 1 command has no effect

the INIT:CONT 0 command will place the analyzer in Single Sweep but will have no effect on the current sequence until  $k = N$ , at which point the current sequence will stop and the instrument will go to the idle state.

12 Burst Power (Transmit Power)  
File

File

See "File" on page 216



## FREQ/Channel

Accesses a menu of keys that allows you to control the Frequency parameters of the instrument.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### ARFCN

Sets the analyzer to a frequency that corresponds to the ARFCN (Absolute RF Channel Number). Used to enter the channel to be measured for the selected band. If the Center Freq value entered does not exactly correlate with an ARFCN, the softkey label changes to display the closest ARFCN to the selected frequency, along with a > or < symbol indicating whether the frequency is above or below that ARFCN.

Key Path	FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel:ARFCn RFChannel &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel:ARFCn RFChannel?</code>
<b>Example</b>	CHAN:ARFC 3 CHAN:ARFC?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	Coupled with <b>Center Frequency</b> . Setting ARFCN sets Center Freq to the value corresponding to that ARFCN. BMT Freq choice changes this parameter.
Preset	1
State Saved	Saved in instrument state.
Range	Different for each BAND as follows: E-GSM: 0 to 124, and 975 to 1023 P-GSM: 1 to 124 R-GSM: 0 to 124(MS), and 955 to 1023(BTS) DCS1800: 512 to 885 PCS1900: 512 to 810 GSM450: 259 to 293 GSM480: 306 to 340 GSM700: 438 to 516 GSM850: 128 to 251 T-GSM 810: 350 to 425

Min	Different for each BAND as follows: E-GSM: 0(MS), and 975(BTS) P-GSM: 1 R-GSM: 0(MS), and 955(BTS) DCS1800: 512 PCS1900: 512 GSM450: 259 GSM480: 306 GSM700: 438 GSM850: 128 T-GSM 810: 350
Max	Different for each BAND as follows: E-GSM: 124(MS), and 1023(BTS) P-GSM: 124 R-GSM: 124(MS), and 1023(BTS) DCS1800: 885 PCS1900: 810 GSM450: 293 GSM480: 340 GSM700: 516 GSM850: 251 T-GSM 810: 425
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.07.00

## Center Freq

Sets the center frequency to be measured for the selected band. It is coupled with ARFCN – setting Center Freq sets ARFCN to the channel corresponding to that frequency.

For more information, see the section ["Center Freq" on page 1547](#).

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Time Slot

This functionality is the same as that of the corresponding key in the Demod menu. See ["Time Slot" on page 1566](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Burst Type

This functionality is the same as that of the corresponding key in the Demod menu. See ["Burst Type" on page 1567](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## TSC (Std)

This functionality is the same as that of the corresponding key in the Demod menu. See ["TSC \(Std\)" on page 1568](#) for details.

Key Path	FREQ Channel
Initial S/W Revision	Prior to A.02.00

## Center Freq

Sets the frequency that corresponds to the horizontal center of the graticule (when frequency Scale Type is set to linear). While adjusting the Center Frequency the Span is held constant, which means that both Start Frequency and Stop Frequency will change.

Pressing Center Freq also sets the frequency entry mode to Center/Span. In Center/Span mode, the center frequency and span values are displayed below the graticule, and the default active function in the Frequency menu is Center Freq.

The center frequency setting is the same for all measurements within a mode, that is, it is Meas Global. Some modes are also able to share a Mode Global center frequency value. If this is the case, the Mode will have a Global Settings key in its Mode Setup menu.

The Center Freq function sets (and queries) the Center Frequency for the currently selected input. If your analyzer has multiple inputs, and you select another input, the Center Freq changes to the value for that input. SCPI commands are available to directly set the Center Freq for a specific input.

Center Freq is remembered as you go from input to input. Thus you can set a Center Freq of 10 GHz with the RF Input selected, change to BBIQ and set a Center Freq of 20 MHz, then switch to External Mixing and set a Center Freq of 60 GHz, and when you go back to the RF Input the Center Freq will go back to 10 GHz; back to BBIQ and it is 20 MHz; back to External Mixing and it is 60 GHz.

See ["RF Center Freq" on page 1550](#)

See [Ext Mix Center Freq](#)

See ["I/Q Center Freq" on page 1552](#)

See ["Center Frequency Presets" on page 1549](#)

Key Path	FREQ Channel
Scope	Meas Global
Remote Command	<code>[ :SENSe ] :FREQuency:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:CENTer?</code>
Example	FREQ:CENT 50 MHz FREQ:CENT UP changes the center frequency to 150 MHz if you use FREQ:CENT:STEP 100 MHz to set the center frequency step size to 100 MHz FREQ:CENT?
Notes	This command sets either the RF or I/Q Center Frequency depending on the selected input. For RF input it is equivalent to FREQ:RF:CENT For I/Q input it is equivalent to FREQ:IQ:CENT Preset and Max values are dependent on Hardware Options (5xx) If no terminator (e.g. MHz) is sent the terminator Hz is used. If a terminator with unit other than Frequency is used, an invalid suffix error message is generated.
Dependencies	The Center Frequency can be limited by Start or Stop Freq limits, if the Span is so large that Start or Stop reach their limit.
Couplings	When operating in "swept span", any value of the Center Frequency or Span that is within the frequency range of the analyzer is allowed when the value is being set through the front panel numeric key pad or the SCPI command. The other parameter is forced to a different value if needed, to keep the Start and the Stop Frequencies within the analyzer's frequency range
Preset	Depends on instrument maximum frequency, mode, measurement, and selected input. See <a href="#">"Center Frequency Presets" on page 1549</a> and <a href="#">"RF Center Freq" on page 1550</a> and <a href="#">Ext Mix Center Freq</a> and <a href="#">"I/Q Center Freq" on page 1552</a> .
State Saved	Saved in instrument state
Min	Depends on instrument maximum frequency, mode, measurement, and selected input.. See <a href="#">"Center Frequency Presets" on page 1549</a> and <a href="#">"RF Center Freq" on page 1550</a> and <a href="#">"I/Q Center Freq" on page 1552</a> .
Max	Depends on instrument maximum frequency, mode, measurement, and selected input.. See <a href="#">"Center Frequency Presets" on page 1549</a> and <a href="#">"RF Center Freq" on page 1550</a> and <a href="#">"I/Q Center Freq" on page 1552</a> .
Default Unit	Hz
Status Bits/OPC	Non-overlapped
Dependencies	
Initial S/W Revision	Prior to A.02.00

## Center Frequency Presets

The following table provides the Center Frequency Presets for the Spectrum Analyzer mode, and the Max Freq, for the various frequency options:

Freq Option	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
503 (all but N9000A)	1.805 GHz	3.6 GHz	3.7 GHz
503 (N9000A)	1.505 GHz	3.0 GHz	3.08 GHz
507 (all but N9000A)	3.505 GHz	7.0 GHz	7.1 GHz
507 (N9000A)	3.755 GHz	7.5 GHz	7.58 GHz
508 (all but N9038A)	1.805 GHz	3.6 GHz	8.5 GHz
508 (N9038A)	4.205 GHz	8.4 GHz	8.5 GHz
513	6.805 GHz	13.6 GHz	13.8 GHz
526 (all but N9000A and N9038A)	13.255 GHz	26.5 GHz	27.0 GHz
526 (N9000A)	13.255 GHz	26.5 GHz	26.55 GHz
526 (N9038A)	1.805 GHz	3.6 GHz	27.0 GHz
532	16.005 GHz	32.0 GHz	32.5 GHz
543	21.505 GHz	43.0 GHz	TBD
544	22.005 GHz	44.0 GHz	44.5 GHz
550	25.005 GHz	50.0 GHz	51 GHz

Input 2:

Model	CF after Mode Preset	Stop Freq after Mode Preset	Max Freq (can't tune above)
N9000A opt C75	0.7505GHz	1.5 GHz	1.58 GHz
N9038A	505 MHz	1 GHz	1.000025 GHz

Tracking Generator Frequency Limits (N9000A only):

Tracking Generator Option	Min Freq (clips to this freq when turn TG on and can't tune below while TG on)	If above this Freq, Stop Freq clipped to this Freq when TG turned on	Max Freq (can't tune above) while TG on
T03	9 kHz	3.0 GHz	3.08 GHz
T06	9 kHz	6.0 GHz	6.05 GHz

The following table shows the Center Frequency Presets for modes other than Spectrum Analyzer:

Mode	CF Preset for RF
WCDMA	1 GHz
WIMAXOFDMA,	1 GHz
BASIC	1 GHz
ADEMOD	1 GHz
VSA	1 GHz
TDSCDMA	1 GHz
PNOISE	1 GHz
LTE	1 GHz
LTETDD	1 GHz
MSR	1 GHz
GSM	935.2 MHz
NFIGURE	1.505 GHz

## RF Center Freq

SCPI command for specifying the RF Center Frequency. This command will set the Center Frequency to be used when the RF input is selected, even if the RF input is not the input that is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:RF:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:RF:CENTer?</code>
<b>Example</b>	FREQ:RF:CENT 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Dependencies	If the electronic/soft attenuator is enabled, any attempt to set Center Frequency such that the Stop

	Frequency would be >3.6 GHz fails and results in an advisory message. If the equivalent SCPI command is sent, this same message is generated as part of a “-221, Settings conflict” warning. If Source Mode is set to Tracking, and the Max or Min Center Freq is therefore limited by the limits of the source, a warning message is generated, “Data out of range;clipped to source max/min” if these limits are exceeded. Note that for an external source, these limits can be affected by the settings of Source Numerator, Source Denominator and Power Sweep.
Preset	See table above
State Saved	Saved in instrument state.
Min	-79.999995 MHz, unless Source Mode is set to Tracking, in which case it is limited by the minimum frequency of the Source
Max	See table above. Basically instrument maximum frequency - 5 Hz. Note that, if the Source Mode is set to Tracking, the effective instrument maximum frequency may be limited by the source maximum frequency. If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.03.00

## Ext Mix Center Freq

SCPI command for specifying the External Mixer Center Frequency. This command will set the Center Frequency to be used when the External Mixer is selected, even if the External Mixer input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :FREQuency:EMIXer:CENTer &lt;freq&gt;</code> <code>[ :SENSe ] :FREQuency:EMIXer:CENTer?</code>
<b>Example</b>	<code>:FREQ:EMIX:CENT 60 GHz</code> <code>:FREQ:EMIX:CENT?</code>
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Couplings	When returning to External Mixing after having been switched to one of the other inputs (e.g., RF), you will come back into the settings that you had when you left External Mixing. So you will come back to the band you were in with the Center Frequency that you had. However, Span is not an input-dependent parameter, therefore you will bring the span over from the other input. Therefore, the analyzer comes back with the span from the previous input, limited as necessary by the current mixer setup.
Preset	When a Mode Preset is performed while in External Mixing, the Start frequency of the current Mode is set to the nominal Min Freq of the lowest harmonic range in the Harmonic Table for the current mixer setup. Similarly, the Stop frequency of the current Mode is set to the nominal Max Freq of the highest harmonic range in the Harmonic Table. The Center Freq thus presets to the point arithmetically equidistant from these two frequencies.

	<p>If the current measurement has a limited Span available to it, and cannot achieve the Span shown in the table (Span=Stop Freq – Start Freq), the analyzer uses the maximum Span the measurement allows, and still sets the Center Freq to the midpoint of the Start and Stop Freq values in the Harmonic Table.</p> <p>When Restore Input/Output Defaults is performed, the mixer presets to the 11970A, whose Start and Stop frequencies are 26.5 and 40 GHz respectively. The center of these two frequencies is 33.25 GHz.</p> <p>Therefore, after a Restore Input/Output Defaults, if you go into External Mixing and do a Mode Preset while in the Spectrum Analyzer Mode, the resulting Center Freq is 33.25 GHz.</p>
State Saved	Saved in instrument state.
Min	The minimum frequency in the currently selected mixer band + 5 Hz
Max	The maximum frequency in the currently selected mixer band – 5 Hz If the knob or step keys are being used, also depends on the value of the other three interdependent parameters Span, Start Frequency and Stop Frequency
Initial S/W Revision	A.08.01

### I/Q Center Freq

SCPI command for specifying the I/Q Center Frequency. This command will set the Center Frequency to be used when the I/Q input is selected, even if the I/Q input is not the input which is selected at the time the command is sent. Note that the Center Freq function in the Frequency menu on the front panel always applies to the currently selected input.

Scope	Meas Global
Remote Command	[ :SENSE ] :FREQuency:IQ:CENTer <freq> [ :SENSE ] :FREQuency:IQ:CENTer?
Example	FREQ:IQ:CENT: 30 MHz
Notes	This command is the same in all modes, but the parameter is Measurement Global. So the value is independent in each mode and common across all the measurements in the mode.
Preset	0 Hz
State Saved	Saved in instrument state.
Min	-40.049995 MHz
Max	40.049995 MHz
Initial S/W Revision	Prior to A.02.00

### BMT Freq

Enables quick selection from a subset of the available ARFCN numbers for the Top, Middle, or Bottom frequency in the selected band.

Key Path	FREQ Channel
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Mode	GSM
Scope	Meas Global
Notes	This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.
Dependencies	When I/Q Input is selected, this key is not available (blank).
Couplings	BMT choice changes ARFCN and Center Freq. Chosen ARFCN will be displayed on each menu key.
Range	Top Middle Bottom
Initial S/W Revision	Prior to A.02.00

## BMT Freq Top

Sets the analyzer to the frequency of the highest ARFCN (Absolute RF Channel Number) of the selected radio band.

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFCHannel:TOP
<b>Example</b>	CHAN:ARFC:TOP
Notes	1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this. 2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 124 P-GSM: 124 R-GSM: 124 DCS 1800: 885 PCS 1900: 810 GSM 450: 293 GSM 480: 340 GSM 700: 516 GSM 850: 251 T-GSM 810: 425 Change BMT ARFCN to BMT FreqTOP. Change [:SENSe]:FREQuency:CENter as follows: E-GSM: 959.800 MHz P-GSM: 959.800 MHz R-GSM: 959.800 MHz

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	DCS 1800: 1879.80 MHz
	PCS 1900: 1989.80 MHz
	GSM 450: 467.400 MHz
	GSM 480: 495.800 MHz
	GSM 700: 792.800 MHz
	GSM 850: 893.800 MHz
	T-GSM810: 866.000 MHz

---

State Saved	No
Initial S/W Revision	Prior to A.02.00

---

### BMT Freq Middle

Sets the analyzer to the frequency of the middle ARFCN (Absolute RF Channel Number) of the selected radio band.

---

Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :ARFCn   RFCHannel :MIDDLE</code>
<b>Example</b>	CHAN:ARFC:MIDD
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 38 P-GSM: 63 R-GSM: 28 DSC 1800: 699 PCS 1900: 661 GSM 450: 276 GSM 480: 323 GSM 700: 477 GSM 850: 190 T-GSM 810: 388 Change BMT ARFCN to BMT FreqMIDDLE. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 942.600 MHz P-GSM: 947.600 MHz R-GSM: 940.600 MHz

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	DCS 1800: 1842.60 MHz
	PCS 1900: 1960.00 MHz
	GSM 450: 464.000 MHz
	GSM 480: 492.400 MHz
	GSM 700: 755.000 MHz
	GSM 850: 881.600 MHz
	T-GSM 810: 858.600 MHz

---

State Saved	No
Initial S/W Revision	Prior to A.02.00

---

## BMT Freq Bottom

Sets the analyzer to the frequency of the lowest ARFCN (Absolute RF Channel Number) of the selected radio band.

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Key Path	FREQ Channel, BMT Freq
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel:ARFCn RFCHannel:BOTTom
<b>Example</b>	CHAN:ARFC:BOT
Notes	<ol style="list-style-type: none"> <li>1. This functionality does not affect the Combined GSM/EDGE measurement. You can set frequency settings using Frequency List (CGSM:LIST:FREQ) instead of this.</li> <li>2. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.</li> </ol>
Dependencies	When I/Q Input is selected, this key is not displayed.
Couplings	Change [:SENSe]:CHANnel:ARFCn RFCHannel as follows: E-GSM: 975 P-GSM: 1 R-GSM: 955 DCS 1800: 512 PCS 1900: 512 GSM 450: 259 GSM 480: 306 GSM 700: 438 GSM 850: 128 T-GSM 810: 350 Change BMT ARFCN to BMT FreqBOTTOM. Change [:SENSe]:FREQuency:CENTer as follows: E-GSM: 925.200 MHz P-GSM: 935.200 MHz R-GSM: 921.200 MHz

---

	DCS 1800: 1805.20 MHz PCS 1900: 1930.20 MHz GSM 450: 460.600 MHz GSM 480: 489.000 MHz GSM 700: 747.2 MHz GSM 850: 869.200 MHz T-GSM 810: 851.000 MHz
State Saved	No
Initial S/W Revision	Prior to A.02.00

## Carrier Setup

Allows you to set carrier parameters.

Key Path	FREQ Channel
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.14.00

## BTS Class

Selects a BTS class.

BTS Class	Definition
MC	Multicarrier BTS is defined as a class of BTS, characterized by the ability to, in addition to single carrier operation, process two or more carriers in common active RF components simultaneously, either in multicarrier transmitter only or, in both multicarrier transmitter and multicarrier receiver.
SC	Single carrier BTS is defined as a class of BTS, characterized by the ability to process one carrier in single carrier BTSs, not belonging to a Multicarrier BTS class.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Remote Command	[ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO ON OFF 1 0 [ :SENSe ] :CHANnel :CARRier :BASE :CLASs :AUTO?
Example	CHAN:CARR:BASE:CLAS:AUTO 1 CHAN:CARR:BASE:CLAS:AUTO?
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is

	sent, an undefined header error or illegal parameter error is returned.
Couplings	ON automatically changes to OFF when Multicarrier Class (MC) or Single carrier Class (SC) is selected as BTS Class.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.14.00

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs SC   MC</code> <code>[ :SENSe ] :CHANnel :CARRier :BASE :CLASs ?</code>
<b>Example</b>	CHAN:CARR:BASE:CLAS MC CHAN:CARR:BASE:CLAS?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Selection C1 and C2 are supported for backwards compatibility. When "C1" or "C2" is passed as SCPI command parameter, the BTS Class Auto is set to ON. As a result, it's converted to "SC" if the number of carriers is one, and otherwise "MC."
Dependencies	This parameter is available when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Preset	SC
State Saved	Saved in instrument state.
Range	Single Carrier Multi Carrier
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.10.01, A14.00

## Carriers

Defines the number of carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :COUNT &lt;integer&gt;</code> <code>[ :SENSe ] :CHANnel :CARRier :COUNT ?</code>

<b>Example</b>	CHAN:CARR:COUN 3 CHAN:CARR:COUN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	This can change when the SCPI command of the Carrier Power Present or the Carrier Interval is sent.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	A.06.00
Modified at S/W Revision	A.13.00

### Reference Carrier

Defines the reference active carrier. The Reference Carrier frequency point is always aligned with the Measurement Global Center Frequency. The minimum value 1 specifies the lowest frequency carrier among the active carriers. The maximum value specifies the highest frequency carrier among the active carriers.

Key Path	FREQ Channel, Carrier Setup
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :RCARrier <integer> [ :SENSe ] :CHANnel :CARRier :RCARrier?
<b>Example</b>	CHAN:CARR:RCAR 3 CHAN:CARR:RCAR?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. If you set it to more than the number of carriers, it's clipped to the number of carriers.  This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Couplings	When you decrease the number of carriers to a value which is less than this value, this is clipped to the value.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

## Configure Carriers

Opens a menu of keys that allows you to configure carriers.

Key Path	FREQ Channel, Multi Carrier Setup
Dependencies	This key is grayed out when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned.
Initial S/W Revision	A.06.00

## Select Carrier

Selects a carrier to configure.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	No
Min	1
Max	Number of carriers
Initial S/W Revision	A.06.00

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :COUPle OFF   ON   0   1 , ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :COUPle ?</code>
<b>Example</b>	CHAN:CARR:LIST:COUP OFF CHAN:CARR:LIST:COUP ?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	When Couple is selected, the carrier settings are coupled to carrier #1. Coupled parameters are

	Carrier Power Present, Carrier Interval. When a setting is changed, the couple is set to Man automatically. Carrier #1 is always set to couple and cannot be changed. Couple/Man selection on the Carrier key is not displayed when selected carrier number is #1.
Preset	ON
State Saved	No
Range	Couple   Man
Initial S/W Revision	A.06.00

### Carrier Power Present

Specifies whether each of carriers is active or not.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[ :SENSe ] :CHANnel :CARRier :LIST :PPResent YES NO, ... [ :SENSe ] :CHANnel :CARRier :LIST :PPResent?
<b>Example</b>	CHAN:CARR:LIST:PPR YES CHAN:CARR:LIST:PPR?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. Missing values are not permitted, therefore if you want to change values 2 and 6 you must send all values up to 6. Subsequent values will remain unchanged, unless the number of values sent is greater than the number of carriers, then subsequent values will be ignored.
Dependencies	This parameter is unavailable when there is only one carrier. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list.
Preset	YES
State Saved	Saved in instrument state.
Range	Yes   No
Initial S/W Revision	A.06.00

### Carrier Interval

Specifies the frequency interval between the Carrier #n and #n+1 center frequencies.

Key Path	FREQ Channel, Multi Carrier Setup, Configure Carriers
Mode	GSM
Scope	Meas Global



<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval &lt;freq&gt;, ...</code> <code>[ :SENSe ] :CHANnel :CARRier :LIST :INTerval ?</code>
<b>Example</b>	<code>CHAN:CARR:LIST:INT 600k</code> <code>CHAN:CARR:LIST:INT?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. The softkey for the last carrier (say, #N) is grayed out.
<b>Dependencies</b>	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned. This parameter is unavailable when there is only one carrier.
<b>Couplings</b>	Coupled to the number of carriers. When the SCPI command is sent, the number of carriers will be set to the number of entries in the parameter list. Changing Carrier Interval might affect the Span.
<b>Preset</b>	600kHz
<b>State Saved</b>	Saved in instrument state.
<b>Min</b>	400 kHz
<b>Max</b>	100 MHz
<b>Initial S/W Revision</b>	A.06.00
<b>Modified at S/W Revision</b>	A.07.00, A.08.00

## Carrier Frequency Allocation

Specifies the carrier frequency allocation. There are two types of allocation, contiguous and non-contiguous. Non-Contiguous frequency allocation is defined as an allocation where two groups of frequencies are separated with at least [3.6] MHz carrier separation between the innermost carriers. In case of the non-contiguous frequency allocation, tests will be measured between the uppermost carrier A of the lower frequency group and the lowermost carrier B of the upper frequency group.

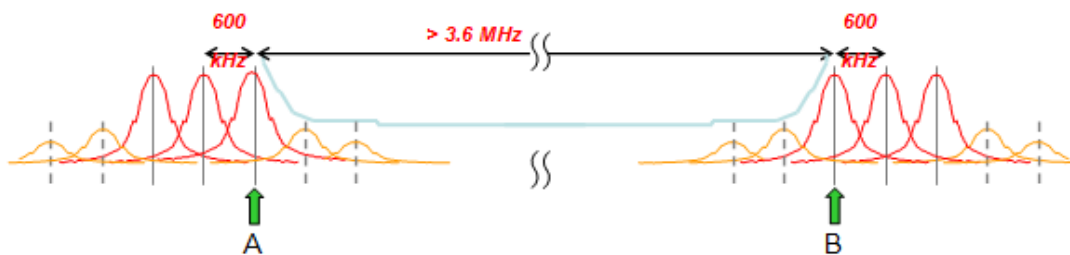
**Error! Reference source not found.**

See "[An example of non-contiguous frequency allocation](#)" on page 1562

<b>Key Path</b>	FREQ Channel, Multi Carrier Setup
<b>Mode</b>	GSM
<b>Scope</b>	Meas Global
<b>Remote Command</b>	<code>[ :SENSe ] :CHANnel :CARRier :FALLocation</code> <code>CONTiguous NCONTiguous</code> <code>[ :SENSe ] :CHANnel :CARRier :FALLocation ?</code>
<b>Example</b>	<code>CHAN:CARR:FALL NCON</code> <code>CHAN:CARR:FALL?</code>
<b>Notes</b>	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Dependencies</b>	This menu key is available only when the number of carriers is more than one.

	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	CONTiguous
State Saved	Saved in instrument state.
Range	Contiguous Non-Contiguous
Readback Text	CONTiguous NCONTiguous
Initial S/W Revision	A.07.00

### An example of non-contiguous frequency allocation



### Non-Contiguous

Opens a menu of keys that allows you to set non-contiguous frequency allocation parameters.

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Initial S/W Revision	A.07.00

### Allocation Break Pt

Specifies an allocation break point that is a sequence (or index) number of the uppermost carrier in the lower frequency group.

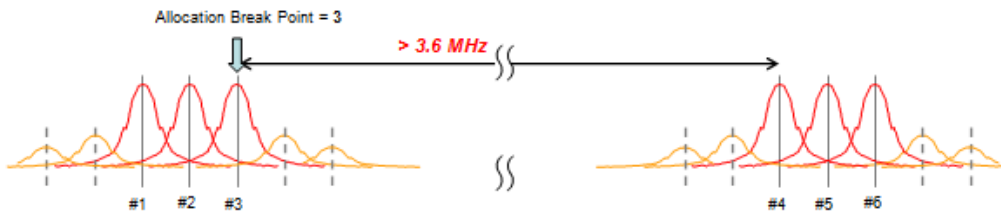
Error! Reference source not found.

See "An example of allocation break point" on page 1564

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint <integer> [ :SENSe ] :CHANnel :CARRier :FALLocation :NCONTiguous :ABPoint ?
Example	CHAN:CARR:FALL:NCON:ABP 3 CHAN:CARR:FALL:NCON:ABP ?

Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	The maximum value depends on the number of carriers. This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	This value can change when you decrease the number of carriers.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	Number of carriers - 1
Initial S/W Revision	A.07.00
Modified at S/W Revision	A.13.00

## An example of allocation break point



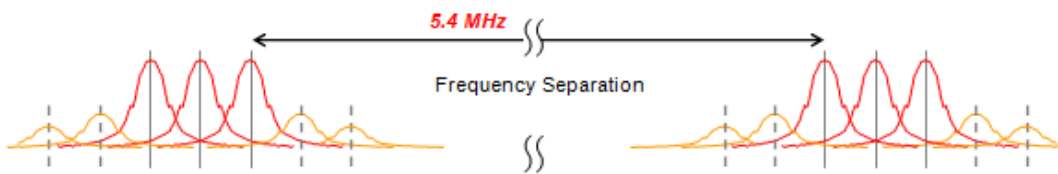
### Freq Separation

Specifies frequency separation between the innermost of carriers.

See ["An example of frequency separation" on page 1565](#)

Key Path	FREQ Channel, Multi Carrier Setup, Carr Freq Alloc, Non-Contiguous
Mode	GSM
Scope	Meas Global
Remote Command	<code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation &lt;freq&gt;</code> <code>[[:SENSe]:CHANnel:CARRier:FALLocation:NCONtiguous:FSEParation?</code>
Example	<code>CHAN:CARR:FALL:NCON:FSEP 5.4M</code> <code>CHAN:CARR:FALL:NCON:FSEP?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	Changing Frequency Separation might affect the Span
Preset	5.4 MHz
State Saved	Saved in instrument state.
Min	3.6 MHz
Max	100 MHz
Initial S/W Revision	A.07.00

## An example of frequency separation



### Carrier BPF

Selects whether to use the carrier bandpass filter.

Key Path	FREQ Channel, Multi Carrier SetupMode Setup, Demod
Mode	GSM
Remote Command	<code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ON   OFF   1   0</code> <code>[ :SENSe ] :RADio :CARRier :NUMBer :AUTO ?</code>
Example	<code>RAD:CARR:NUMB:AUTO 1</code> <code>RAD:CARR:NUMB:AUTO ?</code>
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Couplings	ON automatically changes to OFF when Multiple or Single is selected as Carrier BPF Type.
Preset	ON
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	A.06.00

### Carrier BPF Type

Opens a menu of keys that allows you to select the type of the bandpass filter. When carriers other than the signal of interest are present, especially if they are strong, they can interfere with the measurement, making it difficult to sync and producing artificially high EVM results. When this condition exists, toggle from Single to Multi. A band-limited filter will help reduce the measurement interference.

BPF Type	Description
MULTiple	Enable multi carrier tolerance filter.
SINGle	Disable multi carrier tolerance filter

This parameter applies only to the following measurements:

- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement
- GMSK Power vs. Time

- EDGE Power vs. Time

Key Path	FREQ Channel, Multi Carrier Setup, Carrier BPFMode Setup, Demod, Carrier BPF
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:RADio:CARRier:NUMBer SINGLE MULTiple [:SENSe]:RADio:CARRier:NUMBer?
<b>Example</b>	RAD:CARR:NUMB SING RAD:CARR:NUMB?
Notes	The Carrier Bandpass Filter key is in the Mode Setup menu, but only EDGE EVM and GSM PFER measurements support this feature. In other measurements, this setting is not applicable. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	This key is only shown when the N9071A-3FP license is installed. When it is unlicensed and SCPI is sent, an undefined header error or illegal parameter error is returned
Preset	SINGLE
State Saved	Saved in instrument state.
Range	Single Multi
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## Time Slot

Selects On or Off for slot searching. Generally, this feature is only valid in external and periodic timer trigger source modes that triggers every frame since another trigger source does not have the information that identifies the head of the frame. When Timeslot is set to On, the demodulation measurement is made on the nth timeslot specified by the trigger point + n timeslots, where n is the selected timeslot value 0 to 7.

This functionality is the same as Time Slot under the Freq/Channel menu.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
<b>Remote Command</b>	[[:SENSe]:CHANnel:SLOT <integer> [:SENSe]:CHANnel:SLOT? [:SENSe]:CHANnel:SLOT:AUTO OFF ON 0 1 [:SENSe]:CHANnel:SLOT:AUTO?
<b>Example</b>	CHAN:SLOT 0 CHAN:SLOT? CHAN:SLOT:AUTO OFF CHAN:SLOT:AUTO?
Notes	This functionality does not affect Combined GSM/EDGE measurement.

	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	0	OFF
State Saved	Saved in instrument state.	
Min	0	
Max	7	
Initial S/W Revision	Prior to A.02.00	

## Burst Type

Sets the burst type that the analyzer will search for and to which it will synchronize.

This functionality is the same as Burst Type under the FREQ Channel menu.

Key	SCPI	Description
Sync (SCH)	SYNC	Burst length = 142 symbols Extended training sequences for CTS and COMPACT synchronization bursts are not supported.
Access (RACH)	ACCess	Burst length = 88 symbols Alternative training (synchronization) sequence "TS1" and "TS2" are supported only in GSMK Power vs. Time.
Normal - NB (TCH & CCH)	NORMal	Burst length = 142 symbols Softkey label will be changed to 'Normal - NB' form 'Normal'
Higher Symbol Rate - HB (TCH & CCH)	HSRate	Burst length = 169 symbols This selection key is only shown when theN9071A-3FP license is installed.
Mixed (NB/HB for TSC sync)	MIXed	Enables auto detection between Normal (NB) and HSR (HB) TCH & CCH EDGE Burst. This selection key is only shown when theN9071A-3FP license is installed.

Measurement synchronization capability (Burst Sync = Training Seq)

	GMSK		8PSK		
			16QAM		
			32QAM		
			AQPSK		
GMSK Phase & Freq Error measurement	Yes	Yes	Yes	No	N/A
GMSK Power vs. Time measurement	Yes	Yes	Yes	No	(measures as Normal GMSK when selected)

GMSK Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off)	No	No	Yes	No		
EDGE EVM measurement	No	No	No	Yes	Yes	Yes
EDGE Power vs. Time measurement	Yes	Yes	Yes	Yes	Yes	Yes
EDGE Output RF Spectrum measurement (when Trigger Source is Periodic Timer and Sync Source is Off.)	No	No	Yes	Yes	Yes	Yes

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[ :SENSe ] :CHANnel :BURSt NORMal   SYNC   ACCess   HSRate   MIXed [ :SENSe ] :CHANnel :BURSt?
Example	CHAN:BURS NORM CHAN:BURS?
Notes	This functionality does not affect the Combined GSM/EDGE measurement. Higher Symbol Rate and Mixed selections are only available when the N9071A-3FP license is installed. Otherwise these menu keys are blank. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Higher Symbol Rate and Mixed selection keys are not shown unless N9071A-3FP is installed. When unlicensed and SCPI is sent, an undefined header error is returned. When "Mixed" is selected, the Burst Sync menu key under the Meas Setup menu will be grayed out and Training Sequence (TSC) will be used for synchronization. The sync algorithm always runs in Training Sequence (TSC) synchronization because the Burst Type can be determined by looking at TSC in the signal. Original selection of Burst Sync will become effective again when the Burst Type selection is changed from "Mixed" to another one.
Preset	NORMal
State Saved	Saved in instrument state.
Range	Sync (SCH)   Access (RACH) Normal - NB (TCH & CCH) Higher Symbol Rate - HB (TCH & CCH) Mixed (NB/HB for TSC sync)
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.06.00

## TSC (Std)

Allows you to select the Training Sequence Code that determines which burst is to be measured. Applicable only when Burst Sync is set to Training Sequence in the measurement. In the case of AQPSK, this parameter specifies TSC number of VAMOS sub-channel A. TSC of VAMOS sub-channel B is ignored.

This functionality is the same as TSC under the FREQ Channel menu.

This parameter applies only to the following measurements:



- GMSK/EDGE Power vs. Time measurement
- GMSK Phase & Frequency Error measurement
- EDGE EVM measurement

Selection	SCPI	Description
AutoDet	ON 1	The measurement is made on the first burst found to have any one of the valid TSCs in the range of 0 to 7. The measurement may be made on various timeslots if more than one timeslot has one of the 8 valid TSCs.
Man	OFF 0	The measurement is made on the first burst found to have the selected TSC. TSC numbers in the range of 0 to 7 can be selected. The measurement may be made on various timeslots if more than one timeslot has this same TSC.

Key Path	Mode Setup, Demod FREQ Channel
Mode	GSM
Scope	Meas Global
Remote Command	[:SENSe]:CHANnel:TSCode <integer> [:SENSe]:CHANnel:TSCode? [:SENSe]:CHANnel:TSCode:AUTO OFF ON 0 1 [:SENSe]:CHANnel:TSCode:AUTO?
Example	CHAN:TSC 3 CHAN:TSC? CHAN:TSC:AUTO 1 CHAN:TSC:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode. When Sync or Access is selected as Burst Type, this key is grayed out.
Preset	0 ON
State Saved	Saved in instrument state.
Min	0
Max	7
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)  
Input/Output

Input/Output

See "[Input/Output](#)" on page 148

## Marker

Accesses a menu that enables you to select, set up and control the markers for the current measurement.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Marker Type

Sets the marker control mode as described under Normal, Delta, Fixed and Off, below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Key Path	Marker
Mode	GSM, SA, TD-SCDMA
<b>Remote Command</b>	:CALCulate:TXPower:MARKer[1] 2 ...12:MODE POSITION DELTA OFF :CALCulate:TXPower:MARKer[1] 2 ...12:MODE?
<b>Example</b>	CALC:TXP:MARK:MODE OFF CALC:TXP:MARK:MODE?
Notes	If the selected marker is Off, pressing Marker sets it to Normal and places it at the center of the screen on the trace determined by the Marker Trace rules. At the same time, Marker X Axis Value appears on the Active Function area.  Default Active Function: the active function for the selected marker's current control mode. If the current control mode is Off, there is no active function and the active function is turned off.  Active Function Display: the marker X axis value entered in the active function area will display the marker value to its full entered precision.  You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
<b>Backwards Compatibility SCPI</b>	:CALCulate:BPOwer:MARKer[1] 2 ...12:MODE
Initial S/W Revision	Prior to A.02.00

## Properties

Accesses a menu that enables you to set marker properties and to access the marker trace menu.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Select Marker

Displays 12 markers available for selection.

Key Path	Marker
Initial S/W Revision	Prior to A.02.00

## Relative To

Selects the marker that the selected marker will be relative to (its reference marker).

Key Path	Marker, Properties
Mode	GSM, SA, TD-SCDMA
Remote Command	:CALCulate:TXPower:MARKer[1] 2 ...12:REFerence <integer> :CALCulate:TXPower:MARKer[1] 2 ...12:REFerence?
Example	CALC:TXP:MARK:REF 10 CALC:TXP:MARK:REF?
Notes	A marker cannot be relative to itself, so that choice is grayed out, and if sent from SCPI generates error -221: "Settings conflict; marker cannot be relative to itself." You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode. When queried a single value will be returned (the specified marker numbers relative marker).
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	Saved in instrument state.
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

## Marker Trace

Assigns the specified marker to the designated trace.

Key Path	Marker, Properties
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Mode	GSM, SA, TD-SCDMA
<b>Remote Command</b>	:CALCulate:TXPower:MARKer[1] 2 ...12:TRACe RFENvelope   MAXHold   MINHold :CALCulate:TXPower:MARKer[1] 2 ...12:TRACe?
<b>Example</b>	CALC:TXP:MARK:TRAC MAXH CALC:TXP:MARK:TRAC?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	If Detector/Max Hold Trace is Off, Max Hold is grayed out and MAXHold parameter is not available. If Detector/Min Hold Trace is Off, Min Hold is grayed out and MINHold parameter is not available.
Preset	RFENvelope
State Saved	Saved in instrument state.
Range	RF Envelope Max Hold RF Envelope Min Hold RF Envelope
<b>Backwards Compatibility SCPI</b>	:CALCulate:BPOwer:MARKer[1] 2 ...12:TRACe
Initial S/W Revision	Prior to A.02.00

## Couple Markers

When this function is true, moving any marker causes an equal X Axis movement of every other marker which is not Off. By “equal X Axis movement” we mean that we preserve the difference between each marker’s X Axis value (in the fundamental x-axis units of the trace that marker is on) and the X Axis value of the marker being moved (in the same fundamental x-axis units).

This may result in markers going off screen.

Key Path	Marker
Mode	GSM, SA, TD-SCDMA
<b>Remote Command</b>	:CALCulate:TXPower:MARKer:COUPle[:STATe] ON OFF 1 0 :CALCulate:TXPower:MARKer:COUPle[:STATe]?
<b>Example</b>	CALC:TXP:MARK:COUP ON CALC:TXP:MARK:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## All Markers Off

Turns off all markers.

Key Path	Marker
Mode	GSM, SA, TD-SCDMA
<b>Remote Command</b>	:CALCulate:TXPower:MARKer:AOff
<b>Example</b>	CALC:TXP:MARK:AOff
Notes	You must be in the Spectrum Analyzer mode, TDSCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
<b>Backwards Compatibility SCPI</b>	:CALCulate:BPOwer:MARKer:AOff
Initial S/W Revision	Prior to A.02.00

## Marker X Axis Position (Remote Command Only)

Sets the marker X position in trace points. It has no effect if the control mode is Off, but is the SCPI equivalent of entering a value if the control mode is Normal or Delta except in trace points rather than X Axis Scale units. The entered value is immediately translated into the current X Axis Scale units for setting the value of the marker.

Mode	GSM, SA, TD-SCDMA
<b>Remote Command</b>	:CALCulate:TXPower:MARKer[1] 2 ...12:X:POsition <real> :CALCulate:TXPower:MARKer[1] 2 ...12:X:POsition?
<b>Example</b>	CALC:TXP:MARK10:X:POS 500 CALC:TXP:MARK10:X:POS?
Notes	The query returns the marker's absolute X Axis value in trace points if the control mode is Normal, or the offset from the marker's reference marker in trace points if the control mode is Delta. If the marker is Off the response is not a number.  You must be in the Spectrum Analyzer mode, TDSCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Max value would be changed by Sweep/Meas Time parameter value.
Preset	Markers are turned OFF, so Marker X Axis Value query will return a not a number (NAN).
State Saved	No
Min	-9.9E+37
Max	9.9E+37
<b>Backwards Compatibility SCPI</b>	:CALCulate:BPOwer:MARKer[1] 2 ...12:X:POsition
Initial S/W Revision	Prior to A.02.00

## Marker Y Axis Value (Remote Command Only)

Returns the marker Y Axis value in the current marker Y Axis unit.

The “result” of a marker is the value which is displayed on the second line of the Marker Result block. To properly interpret the returned value the remote programmer must also know what the analyzer’s Y-Axis Unit is set to as described below.

A marker can have up to two results, only one of which is displayed or returned on a query, as follows:

- Absolute result: every marker has an absolute result and it is simply:

For Normal and Delta markers, the Y Axis value of the trace point the marker is currently on.

The absolute result is displayed in the result block or returned on a query unless the marker control mode is Delta.

- Relative result: if a marker’s control mode is Delta, the relative result is displayed in the result block or returned on a query. This is the ratio of the Absolute Result of a delta marker to the Absolute Result of its reference marker. The ratio is expressed in dB.

Mode	GSM, SA, TD-SCDMA
<b>Remote Command</b>	:CALCulate:TXPower:MARKer[1] 2 ...12:Y?
<b>Example</b>	CALC:TXP:MARK11:Y?
Notes	The query returns the marker Y Axis result. If the marker is Off the response is not a number. You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	0
State Saved	No
<b>Backwards Compatibility SCPI</b>	:CALCulate:TXPower:MARKer[1] 2 ...12:FUNCTION:RESult? :CALCulate:BPOWer:MARKer[1] 2 ...12:FUNCTION:RESult? :CALCulate:BPOWer:MARKer[1] 2 ...12:Y?
Initial S/W Revision	Prior to A.02.00

## Marker Function

There is no 'Marker Function' supported in Burst (Tx) Power, so this front-panel key displays a blank menu key when pressed.

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Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

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## Marker To

There is no 'Marker To' functionality supported in Burst (Tx) Power, so this front-panel key displays a blank menu key when pressed.

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Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

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## Meas

The information in this section is common to all measurements. For key and remote command information for a specific measurement, refer to the section that describes the measurement of interest.

Measurements available under the Meas key are specific to the current Mode.

When viewing Help for measurements, note the following:

**NOTE**

Operation for some keys differs between measurements. The information displayed in Help pertains to the current measurement. To see how a key operates in a different measurement, exit Help (press the Cancel Esc key), select the measurement, then reenter Help (press the Help key) and press that key.

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Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

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### Remote Measurement Functions

This section contains the following topics:

["Measurement Group of Commands" on page 1579](#)

["Current Measurement Query \(Remote Command Only\)" on page 1581](#)

["Limit Test Current Results \(Remote Command Only\)" on page 1581](#)

["Data Query \(Remote Command Only\)" on page 1581](#)

["Calculate/Compress Trace Data Query \(Remote Command Only\)" on page 1582](#)

["Calculate Peaks of Trace Data \(Remote Command Only\)" on page 1587](#)

["Hardware-Accelerated Fast Power Measurement \(Remote Command Only\)" on page 1588](#)

["Format Data: Numeric Data \(Remote Command Only\)" on page 1602](#)

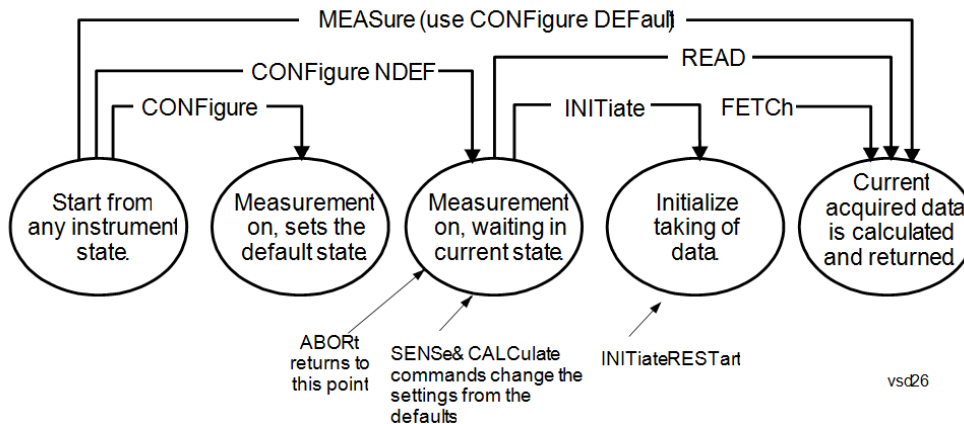
["Format Data: Byte Order \(Remote Command Only\)" on page 1603](#)

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## Measurement Group of Commands




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### Measure Commands:

:MEASure:<measurement>[n]?

This is a fast single-command way to make a measurement using the factory default instrument settings. These are the settings and units that conform to the Mode Setup settings (e.g. radio standard) that you have currently selected.

- Stops the current measurement (if any) and sets up the instrument for the specified measurement using the factory defaults
- Initiates the data acquisition for the measurement
- Blocks other SCPI communication, waiting until the measurement is complete before returning results.
- If the function does averaging, it is turned on and the number of averages is set to 10.
- After the data is valid it returns the scalar results, or the trace data, for the specified measurement. The type of data returned may be defined by an [n] value that is sent with the command.
- The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available.
- ASCII is the default format for the data output. (Older versions of Spectrum Analysis and Phase Noise mode measurements only use ASCII.) The binary data formats should be used for handling large blocks of data since they are smaller and faster than the ASCII format. Refer to the FORMat:DATA command for more information.

If you need to change some of the measurement parameters from the factory default settings you can set up the measurement with the CONFigure command. Use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to change the settings. Then you can use the READ? command to initiate the measurement and query the results.

If you need to repeatedly make a given measurement with settings other than the factory defaults, you can use the commands in the SENSe:<measurement> and CALCulate:<measurement> subsystems to set up the measurement. Then use the READ? command to initiate the measurement and query results.

Measurement settings persist if you initiate a different measurement and then return to a previous one. Use READ:<measurement>? if you want to use those persistent settings. If you want to go back to the default settings, use MEASure:<measurement>?.

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### Configure Commands:

:CONFigure:<measurement>

This command stops the current measurement (if any) and sets up the instrument for the specified measurement using

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the factory default instrument settings. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON. If you change any measurement settings after using the CONFigure command, the READ command can be used to initiate a measurement without changing the settings back to their defaults.

In the Swept SA measurement in Spectrum Analyzer mode the CONFigure command also turns the averaging function on and sets the number of averages to 10 for all measurements.

:CONFigure: <measurement>: NDEFault stops the current measurement and changes to the specified measurement. It does not change the settings to the defaults. It does not initiate the taking of measurement data unless INIT:CONTinuous is ON.

The CONFigure? query returns the current measurement name.

The CONFigure:CATalog? query returns a quoted string of all licensed measurement names in the current mode. For example, "SAN, CHP, OBW, ACP, PST, TXP, SPUR, SEM, LIST".

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#### Fetch Commands:

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:FETCh:<measurement>[n]?

This command puts selected data from the most recent measurement into the output buffer. Use FETCh if you have already made a good measurement and you want to return several types of data (different [n] values, for example, both scalars and trace data) from a single measurement. FETCh saves you the time of re-making the measurement. You can only FETCh results from the measurement that is currently active, it will not change to a different measurement. An error message is reported if a measurement other than the current one is specified.

If you need to get new measurement data, use the READ command, which is equivalent to an INITiate followed by a FETCh.

The scalar measurement results will be returned if the optional [n] value is not included, or is set to 1. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used for handling large blocks of data since they are smaller and transfer faster than the ASCII format. (FORMat:DATA)

FETCh may be used to return results other than those specified with the original READ or MEASure command that you sent.

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#### INITiate Commands:

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:INITiate:<measurement>

This command is not available for measurements in all the instrument modes:

- Initiates a trigger cycle for the specified measurement, but does not output any data. You must then use the FETCh<meas> command to return data. If a measurement other than the current one is specified, the instrument will switch to that measurement and then initiate it.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. If you send INIT:ACP? it will change from channel power to ACP and will initiate an ACP measurement.
  - Does not change any of the measurement settings. For example, if you have previously started the ACP measurement and you send INIT:ACP? it will initiate a new ACP measurement using the same instrument settings as the last time ACP was run.
  - If your selected measurement is currently active (in the idle state) it triggers the measurement, assuming the trigger conditions are met. Then it completes one trigger cycle. Depending upon the measurement and the number of averages, there may be multiple data acquisitions, with multiple trigger events, for one full trigger cycle. It also holds off additional commands on GPIB until the acquisition is complete.
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#### READ Commands:

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:READ:<measurement>[n]?

- Does not preset the measurement to the factory default settings. For example, if you have previously initiated the ACP
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measurement and you send READ:ACP? it will initiate a new measurement using the same instrument settings.

- Initiates the measurement and puts valid data into the output buffer. If a measurement other than the current one is specified, the instrument will switch to that measurement before it initiates the measurement and returns results.
  - For example, suppose you have previously initiated the ACP measurement, but now you are running the channel power measurement. Then you send READ:ACP? It will change from channel power back to ACP and, using the previous ACP settings, will initiate the measurement and return results.
  - Blocks other SCPI communication, waiting until the measurement is complete before returning the results
  - If the optional [n] value is not included, or is set to 1, the scalar measurement results will be returned. If the [n] value is set to a value other than 1, the selected trace data results will be returned. See each command for details of what types of scalar results or trace data results are available. The binary data formats should be used when handling large blocks of data since they are smaller and faster than the ASCII format. (FORMat:DATA)
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### Current Measurement Query (Remote Command Only)

This command returns the name of the measurement that is currently running.

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<b>Remote Command</b>	:CONFigure?
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<b>Example</b>	CONF?
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### Limit Test Current Results (Remote Command Only)

Queries the status of the current measurement limit testing. It returns a 0 if the measured results pass when compared with the current limits. It returns a 1 if the measured results fail any limit tests.

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<b>Remote Command</b>	:CALCulate:CLIMits:FAIL?
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<b>Example</b>	CALC:CLIM:FAIL? queries the current measurement to see if it fails the defined limits. Returns a 0 or 1: 0 it passes, 1 it fails.
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### Data Query (Remote Command Only)

Returns the designated measurement data for the currently selected measurement and subopcode.

n = any valid subopcode for the current measurement. See the measurement command results table for your current measurement, for information about what data is returned for the subopcodes.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. (See the format command descriptions under Input/Output in the Analyzer Setup section.)

<b>Remote Command</b>	:CALCulate:DATA[n]?
<b>Notes</b>	The return trace depends on the measurement. In CALCulate:<meas>:DATA[n], n is any valid subopcode for the current measurement. It returns the same data as the FETCH:<measurement>? query where <measurement> is the current measurement.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Calculate/Compress Trace Data Query (Remote Command Only)

Returns compressed data for the currently selected measurement and sub-opcode [n].

n = any valid sub-opcode for that measurement. See the MEASure:<measurement>? command description of your specific measurement for information on the data that can be returned.

The data is returned in the current Y Axis Unit of the analyzer. The command is used with a sub-opcode <n> (default=1) to specify the trace. With trace queries, it is best if the analyzer is not sweeping during the query. Therefore, it is generally advisable to be in Single Sweep, or Update=Off.

This command is used to compress or decimate a long trace to extract and return only the desired data. A typical example would be to acquire N frames of GSM data and return the mean power of the first burst in each frame. The command can also be used to identify the best curve fit for the data.

<b>Remote Command</b>	:CALCulate:DATA<n>:COMPRESS? BLOCK   CFIT   MAXimum   MINimum   MEAN   DMEan   RMS   RMSCubed   SAMPLE   SDEVIation   PPHase [,<soffset> [,<length>[,<roffset>[,<rlimit>]]]]
<b>Example</b>	To query the mean power of a set of GSM bursts: Supply a signal that is a set of GSM bursts. Select the IQ Waveform measurement (in IQ Analyzer Mode). Set the sweep time to acquire at least one burst. Set the triggers such that acquisition happens at a known position relative to a burst. Then query the mean burst levels using, CALC:DATA2:COMP? MEAN, 24e-6, 526e-6 (These parameter values correspond to GSM signals, where 526e-6 is the length of the burst in the slot and you just want 1 burst.)
<b>Notes</b>	The command supports 5 parameters. Note that the last 4 (<soffset>, <length>, <roffset>, <rlimit>) are optional. But these optional parameters must be entered in the specified order. For example, if you want to specify <length>, then you must also specify <soffset>. See details below for a definition of each of these parameters.  This command uses the data in the format specified by FORMat:DATA, returning either binary or ASCII data.
<b>Initial S/W Revision</b>	Prior to A.02.00

- BLOCK or block data - returns all the data points from the region of the trace data that you specify. For example, it could be used to return the data points of an input signal over several timeslots, excluding the portions of the trace data that you do not want. (This is x,y pairs for trace data and I,Q pairs for complex data.)

- CFIT or curve fit - applies curve fitting routines to the data. <soffset> and <length> are required to define the data that you want. <roffset> is an optional parameter for the desired order of the curve equation. The query will return the following values: the x-offset (in seconds) and the curve coefficients ((order + 1) values).

MIN, MAX, MEAN, DME, RMS, RMSC, SAMP, SDEV and PPH return one data value for each specified region (or <length>) of trace data, for as many regions as possible until you run out of trace data (using <roffset> to specify regions). Or they return the number of regions you specify (using <rlimit>) ignoring any data beyond that.

- MINimum - returns the minimum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the minimum magnitude of the I/Q pairs is returned.
- MAXimum - returns the maximum data point (y value) for the specified region(s) of trace data. For I/Q trace data, the maximum magnitude of the I/Q pairs is returned.
- MEAN - returns a single value that is the arithmetic mean of the data point values (in dB/ dBm) for the specified region(s) of trace data. For I/Q trace data, the mean of the magnitudes of the I/Q pairs is returned. See the following equations.

•

**NOTE**

If the original trace data is in dB, this function returns the arithmetic mean of those log values, not log of the mean power which is a more useful value. The mean of the log is the better measurement technique when measuring CW signals in the presence of noise. The mean of the power, expressed in dB, is useful in power measurements such as Channel Power. To achieve the mean of the power, use the RMS option.

Equation 1

Mean Value of Data Points for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 2

Mean Value of I/Q Data Pairs for Specified Region(s)

$$\text{MEAN} = \frac{1}{n} \sum_{X_i \in \text{region}(s)} |X_i|$$

where  $|X_i|$  is the magnitude of an I/Q pair, and  $n$  is the number of I/Q pairs in the specified region(s).

- DMEan - returns a single value that is the mean power (in dB/ dBm) of the data point values for the specified region(s) of trace data. See the following equation:

Equation 3

DMEan Value of Data Points for Specified Region(s)

$$DME = 10 \times \log_{10} \left( \frac{1}{n} \sum_{X_i \in \text{region}(s)} 10^{\frac{X_i}{10}} \right)$$

- RMS - returns a single value that is the average power on a root-mean-squared voltage scale (arithmetic rms) of the data point values for the specified region(s) of trace data. See the following equation.

**NOTE**

For I/Q trace data, the rms of the magnitudes of the I/Q pairs is returned. See the following equation. This function is very useful for I/Q trace data. However, if the original trace data is in dB, this function returns the rms of the log values which is not usually needed.

Equation 4

RMS Value of Data Points for Specified Region(s)

$$RMS = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i^2}$$

where  $X_i$  is a data point value, and  $n$  is the number of data points in the specified region(s).

Equation 5

RMS Value of I/Q Data Pairs for Specified Region(s)

$$RMS = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region(s).

Once you have the rms value for a region of trace data (linear or I/Q), you may want to calculate the mean power. You must convert this rms value (peak volts) to power in dBm:

$$10 \times \log[10 \times (\text{rms value})^2]$$

- SAMPLe - returns the first data value (x,y pair) for the specified region(s) of trace data. For I/Q trace data, the first I/Q pair is returned.
- SDEViation - returns a single value that is the arithmetic standard deviation for the data point values for the specified region(s) of trace data. See the following equation.
- For I/Q trace data, the standard deviation of the magnitudes of the I/Q pairs is returned. See the following equation.

Equation 6

Standard Deviation of Data Point Values for Specified Region(s)



$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (X_i - \bar{X})^2}$$

where  $X_i$  is a data point value,  $\bar{X}$  is the arithmetic mean of the data point values for the specified region (s), and  $n$  is the number of data points in the specified region(s).

$$\text{SDEV} = \sqrt{\frac{1}{n} \sum_{X_i \in \text{region}(s)} (|X_i| - \bar{X})^2}$$

where  $|X_i|$  is the magnitude of an I/Q pair,  $\bar{X}$  is the mean of the magnitudes for the specified region(s), and  $n$  is the number of data points in the specified region(s).

- PPHase - returns the x,y pairs of both rms power (dBm) and arithmetic mean phase (radian) for every specified region and frequency offset (Hz). The number of pairs is defined by the specified number of regions. This parameter can be used for I/Q vector ( $n=0$ ) in Waveform (time domain) measurement and all parameters are specified by data point in PPHase.

The rms power of the specified region may be expressed as:

$$\text{Power} = 10 \times \log [10 \times (\text{RMS I/Q value})] + 10.$$

The RMS I/Q value (peak volts) is:

$$\sqrt{\frac{1}{n} \sum_{X_i \in \text{region}} X_i X_i^*}$$

where  $X_i$  is the complex value representation of an I/Q pair,  $X_i^*$  its conjugate complex number, and  $n$  is the number of I/Q pairs in the specified region.

The arithmetic mean phase of the specified region may be expressed as:

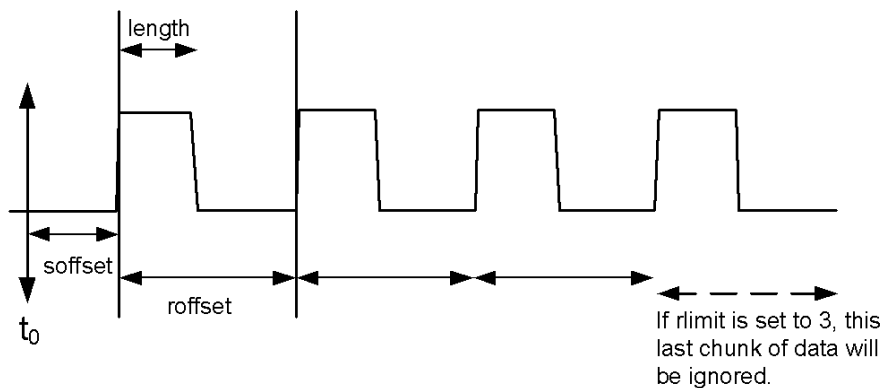
$$\frac{1}{n} \sum_{Y_i \in \text{region}} Y_i$$

where  $Y_i$  is the unwrapped phase of I/Q pair with applying frequency correction and  $n$  is the number of I/Q pairs in the specified region.

The frequency correction is made by the frequency offset calculated by the arithmetic mean of every specified region's frequency offset. Each frequency offset is calculated by the least square method against the unwrapped phase of I/Q pair.

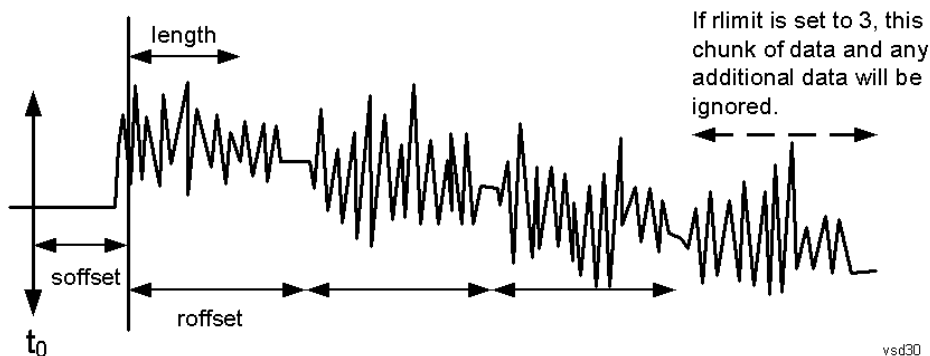
Sample Trace Data - Constant Envelope

(See below for explanation of variables.)



Sample Trace Data - Not Constant Envelope

(See below for explanation of variables.)



<soffset> - start offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It specifies the amount of data at the beginning of the trace that will be ignored before the decimation process starts. It is the time or frequency change from the start of the trace to the point where you want to start using the data. The default value is zero.

<length> - is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines how much data will be compressed into one value. This parameter has a default value equal to the current trace length.

<roffset> - repeat offset is an optional real number. (It is in seconds for time-domain traces, and is a dimensionless index 0 to Npoints - 1, for frequency-domain traces). It defines the beginning of the next field of trace elements to be compressed. This is relative to the beginning of the previous field. This parameter has a default value equal to the <length> variable. Note that this parameter is used for a completely different purpose when curve fitting (see CFIT above).

<rlimit> - repeat limit is an optional integer. It specifies the number of data items that you want returned. It will ignore any additional items beyond that number. You can use the Start offset and the Repeat limit to pick out exactly what part of the data you want to use. The default value is all the data.

## Calculate Peaks of Trace Data (Remote Command Only)

Returns a list of all the peaks for the currently selected measurement and sub-opcode [n]. The peaks must meet the requirements of the peak threshold and excursion values.

n = any valid sub-opcode for the current measurement. See the MEASure:<measurement> command description of your specific measurement for information on the data that can be returned.

The command can only be used with specific sub-opcodes with measurement results that are trace data. Both real and complex traces can be searched, but complex traces are converted to magnitude in dBm. In many measurements the sub-opcode n=0, is the raw trace data which cannot be searched for peaks. And Sub-opcode n=1, is often calculated results values which also cannot be searched for peaks.

This command uses the data setting specified by the FORMat:BORDER and FORMat:DATA commands and can return real or ASCII data. If the format is set to INT,32, it returns REAL,32 data.

The command has four types of parameters:

- Threshold (in dBm)
- Excursion (in dB)
- Sorting order (amplitude, frequency, time)
- Optional in some measurements: Display line use (all, > display line, < display line)

<b>Remote Command</b>	<p>For Swept SA measurement:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME[,ALL   GTDLline   LTDLine]]</pre> <p>For most other measurements:</p> <pre>:CALCulate:DATA[1] 2 ... 6:PEAKs? &lt;threshold&gt;,&lt;excursion&gt;[,AMPLitude   FREQuency   TIME]</pre>
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<b>Example</b>	<p>Example for Swept SA measurement in Spectrum Analyzer Mode:</p> <p>CALC:DATA4:PEAK? -40, 10, FREQ, GTDL This will identify the peaks of trace 4 that are above -40 dBm, with excursions of at least 10 dB. The peaks are returned in order of increasing frequency, starting with the lowest frequency. Only the peaks that are above the display line are returned.</p> <p>Query Results 1:</p> <p>With FORMat:DATA REAL, 32 selected, it returns a list of floating-point numbers. The first value in the list is the number of peak points that are in the following list. A peak point consists of two values: a peak amplitude followed by its corresponding frequency (or time).</p> <p>If no peaks are found the peak list will consist of only the number of peaks, (0).</p>
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<b>Notes</b>	<p>&lt;n&gt; - is the trace that will be used</p> <p>&lt;threshold&gt; - is the level below which trace data peaks are ignored. Note that the threshold value is required and is always used as a peak criterion. To effectively disable the threshold criterion for this command, provide a substantially low threshold value such as -200 dBm. Also note that the threshold value used in this command is independent of and has no effect on the threshold value stored under the Peak Criteria menu.</p> <p>&lt;excursion&gt; - is the minimum amplitude variation (rise and fall) required for a signal to be identified as peak. Note that the excursion value is required and is always used as a peak criterion. To effectively disable the excursion criterion for this command, provide the minimum value of 0.0 dB. Also note that the excursion value used in this command is independent of and has no effect on the</p>
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excursion value stored under the Peak Criteria menu.

Values must be provided for threshold and excursion. The sorting and display line parameters are optional (defaults are AMPLitude and ALL).

Note that there is always a Y-axis value for the display line, regardless of whether the display line state is on or off. It is the current Y-axis value of the display line which is used by this command to determine whether a peak should be reported

Sorting order:

AMPLitude - lists the peaks in order of descending amplitude, with the highest peak first (default if optional parameter not sent)

FREQuency - lists the peaks in order of occurrence, left to right across the x-axis.

TIME - lists the peaks in order of occurrence, left to right across the x-axis.

Peaks vs. Display Line:

ALL - lists all of the peaks found (default if optional parameter not sent).

GTDLine (greater than display line) - lists all of the peaks found above the display line.

LTDLine (less than display line) - lists all of the peaks found below the display line.

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Initial S/W Revision	Prior to A.02.00
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### Hardware-Accelerated Fast Power Measurement (Remote Command Only)

The Fast Power option (FP2) enables very fast channel power measurements for instruments with the prerequisite hardware (DP2 and/or B40). It accomplishes this by performing real-time overlapped FFTs at the hardware layer, using software for basic post-processing before returning the result to the user. The upshot of this approach is improved throughput for user applications that require many sequential power measurements.

The analysis bandwidth of FP2 is limited by the licenses in the instrument, but its maximum overall analysis bandwidth per acquisition is 40 MHz.

FP2 is remote-only, which means the instrument does not switch to any particular mode or measurement. FP2 commands can be sent while another application is in use on the front panel.

Each Fast Power measurement can be predefined using an array index, and up to 1,000 measurements can be stored. In the following documentation, instances of [1,2,...,999] can be substituted with a particular measurement index, e.g. CALC:FPOW:POW1?, CALC:FPOW:POW2?, CALC:FPOW:POW134?. In this way, power measurements can be defined one time in a batch, and then executed multiple times without having to redefine them, similar to “list mode” on other measurements.

In addition to basic channel power measurements, there are a number of other measurement “functions” for each channel, including peak power, peak frequency, and power spectral density. See the Function parameter for more information.

### Reset Fast Power Measurement (Remote Command Only)

Resets the measurement configuration to the defaults.

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<b>Mode</b>	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer [1, 2, ..., 999] :RESet
<b>Example</b>	:CALC:FPOW:POW1:RES

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Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Define Fast Power Measurement (Remote Command Only)

Fast Power acquisitions are configured using the DEFine command. This command accepts a comma-delimited string of configuration parameters and their appropriate values, which are all specified in the subsection below.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine "configuration string"
<b>Example</b>	:CALC:FPOW:POW1:DEF "CenterFrequency=2e9, AcquisitionTime=0.005"
Notes	See below for a list of measurement variables that can be defined in the configuration string.
Initial S/W Revision	A.14.00

### Acquisition Time

Example	CALC:FPOW:POW1:DEF "AcquisitionTime=0.002"
Notes	The acquisition time parameter sets the time in which the entire spectrum is measured. An increase in the acquisition time yields an improvement in measurement repeatability.
Preset	0.001 s
Range	0 s to 1 s
Default Unit	Time (s)
Initial S/W Revision	A.14.00

### Center Frequency

Example	CALC:FPOW:POW1:DEF "CenterFrequency=2e9"
Notes	The center frequency parameter sets the frequency in which the measurement is centered around. The OffsetFrequency parameter is calculated relative to the center frequency.
Preset	1 GHz
Range	0 Hz to maximum instrument frequency
Default Unit	Frequency (Hz)
Initial S/W Revision	A.14.00

### DC Coupled

Example	CALC:FPOW:POW1:DEF "DCCoupled=True"
Notes	The DC coupled parameter allows the user to specify whether the DC blocking capacitor is utilized. Set parameter to true when measuring frequencies below 10 MHz.
Preset	False
Range	True (DC Coupled) or False (AC Coupled)
Default Unit	Boolean
Initial S/W Revision	A.14.00

### DetectorType

Example	CALC:FPOW:POW1:DEF "DetectorType=Peak"
Notes	Option FP2 is required. The detector type parameter allows the user to choose whether a RMS average or peak value is used during the measurement.
Preset	RmsAverage
Range	RmsAverage, Peak
Initial S/W Revision	A.14.00

### Do Noise Correction

Example	CALC:FPOW:POW1:DEF "DoNoiseCorrection=True"
Notes	When noise correction is enabled, the linear noise power contributed by the analyzer is subtracted from all measurements. This effectively lowers the noise floor of the analyzer. When noise correction is enabled, the first measurement for a given set of input parameters will take extra time. This is because the analyzer takes an extra acquisition with the RF input disconnected from the analyzer's front end to measure the noise of just the analyzer. The measured noise floor is stored in a cache so the noise acquisition will occur only once for the same state settings. In other words, if noise correction was turned on and the analyzer made an acquisition at frequency A, then frequency B, and back again to frequency A, the hidden initial noise floor acquisition would only occur for the first acquisition at frequency A and the cached noise floor would be used the second time frequency A was measured.
Preset	False
Range	True (enable noise correction) or False (disable noise correction)
Default Unit	Boolean
Initial S/W Revision	A.14.00

## Do Spur Suppression

Example	CALC:FPOW:POW1:DEF "DoSpurSuppression=True"
Notes	<p>When measuring very low level signals, or when large out-of-band inputs are input into the analyzer, sometimes unwanted spurs and residuals can appear in the measured spectrum. Spur suppression is a method to help minimize the levels of these internally generated spurs and residuals.</p> <p>When spur suppression is enabled, the analyzer will automatically take two acquisitions using two different internal analog LO frequencies. The FFT spectrums from both acquisitions are combined by taking the minimum power between both traces on a per FFT bin basis. External signals will have the same amplitude for both traces and therefore will return the expected amplitudes. However, low level spurs and residuals generated internally to the analyzer tend to move to different FFT bins depending on the internal analog LO frequency used, and therefore tend to be suppressed using this spur suppression method.</p> <p>Because two acquisitions, rather than a single acquisition, are made when spur suppression is enabled, the measurement time will always be slower when spur suppression is enabled.</p>
Preset	False
Range	True (enable spur suppression) or False (disable spur suppression)
Default Unit	Boolean
Initial S/W Revision	A.14.00

## Electronic Attenuator Bypass

Example	CALC:FPOW:POW1:DEF "ElecAttBypass =False"
Notes	The electronic attenuation bypass parameter allows the user to either utilize or bypass the electronic attenuator. The electronic attenuator is only available for frequencies up to 3.6 GHz. Set parameter to true when using frequencies above 3.6 GHz and set the parameter to false when using the preamp.
Preset	True
Range	True (bypass electronic attenuator) or False (use electronic attenuator)
Default Unit	Boolean
Initial S/W Revision	A.14.00

## Electronic Attenuation

Example	CALC:FPOW:POW1:DEF "ElecAttenuation=10"
Notes	<p>Option EA3 is required.</p> <p>The electronic attenuation value parameter sets the amount of electrical attenuation from 0 to 24 dB (1 dB steps).</p> <p>Set "ElecAttBypass=False" to make sure the electronic attenuator path is enabled.</p>
Preset	0 dB
Range	0 - 24 dB (1 dB steps)

Default Unit	dB
Initial S/W Revision	A.14.00

#### IF Gain

Example	CALC:FPOW:POW1:DEF "IFGain=10"
Notes	The IF gain parameter allows the user to specify the gain at the IF stage anywhere from -6 to 16 dB (1 dB steps). This is an advanced feature, and for most cases this should remain at its default value of 0 dB.
Preset	0 dB
Range	-6 - 16 dB (1 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

#### IF Type

Example	CALC:FPOW:POW1:DEF "IFType=B25M"
Notes	The IF type parameter allows the user to select between different IF paths. For example, if the signal is less than 25 MHz wide, then the user can select the B25M path to take advantage of additional filtering on this analog IF path.
Preset	B40M
Range	B10M, B25M, B40M
Initial S/W Revision	A.14.00

#### Include Power Spectrum

Example	CALC:FPOW:POW1:DEF "IncludePowerSpectrum=True"
Notes	The power spectrum parameter allows the user to read data on the entire spectrum for diagnostic purposes. It is not recommended for production use. See CALC:FPOW:POW[n]:READ2? for details on the binary format of the response.
Preset	False
Range	True (return both channel power and full power spectrum) or False (returns only channel power)
Default Unit	Boolean
Initial S/W Revision	A.14.00



## Mechanical Attenuation

Example	CALC:FPOW:POW1:DEF "MechAttenuation=10"
Notes	The mechanical attenuation value parameter sets the amount of mechanical attenuation anywhere from 0 to 70 dB (2 dB steps).
Preset	0 dB
Range	0 – 70 dB (2 dB steps)
Default Unit	dB
Initial S/W Revision	A.14.00

## Preamp Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The license for the appropriate preamp is required. The preamp mode parameter specifies whether the preamps are being utilized. Low allows any preamps up to 3.6 GHz, and Full allows all licensed preamps. Set "ElecAttBypass=True" in order to utilize any preamps.
Preset	Off
Range	Off, Low, Full
Initial S/W Revision	A.14.00

## Resolution Bandwidth Mode

Example	CALC:FPOW:POW1:DEF "PreAmpMode=Low"
Notes	The resolution bandwidth mode parameter allows the user to choose whether the RBW filter is automatically or manually set. The BestSpeed value minimizes measurement time, while the Narrowest value minimizes RBW size (minimum of two FFT bins per RBW). To manually specify an RBW, set this parameter to Explicit, and set the ResolutionBW parameter to the desired value.
Preset	BestSpeed
Range	BestSpeed, Narrowest, Explicit
Initial S/W Revision	A.14.00

## Resolution Bandwidth

Example	CALC:FPOW:POW1:DEF "ResolutionBW=25e3"
Notes	The resolution bandwidth parameter sets the 3-dB bandwidth of the RBW filter. The ResolutionBWMode parameter must be set to Explicit in order to manually set the RBW.

Preset	0 Hz
Default Unit	Hz
Initial S/W Revision	A.14.00

#### Trigger Delay

Example	CALC:FPOW:POW1:DEF "TriggerDelay=0.025"
Notes	The trigger delay parameter sets the time after an external trigger is detected until the measurement is performed.
Preset	0 s
Range	0 - 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

#### Trigger Level

Example	CALC:FPOW:POW1:DEF "TriggerLevel=2"
Notes	The trigger level parameter sets the voltage value at which an external trigger is detected.
Preset	1.2 V
Range	-5 to 5 V
Default Unit	Volts
Initial S/W Revision	A.14.00

#### Trigger Slope

Example	CALC:FPOW:POW1:DEF "TriggerSlope=Negative"
Notes	The trigger slope parameter indicates the direction of the edge trigger voltage for detection.
Preset	Positive
Range	Positive, Negative
Initial S/W Revision	A.14.00

## Trigger Source

Example	CALC:FPOW:POW1:DEF "TriggerSource=Ext1"
Notes	The trigger source parameter allows the user to choose between measurement's triggering freely or controlled by an external input. Ext1 and Ext2 correspond to Trigger 1 In and Trigger 2 In, respectively.
Preset	Free
Range	Free, Ext1, Ext2
Initial S/W Revision	A.14.00

## Trigger Timeout

Example	CALC:FPOW:POW1:DEF "TriggerTimeout=0.1"
Notes	The trigger timeout parameter sets the time in which the analyzer will wait for a trigger before automatically performing the measurement.
Preset	1 s
Range	0 – 1 s
Default Unit	Seconds
Initial S/W Revision	A.14.00

## Signal Input

Example	CALC:FPOW:POW1:DEF "SignalInput=Fp50MHzCW"
Notes	The signal input parameter allows the user to select between using the main RF input or the internal analyzer reference CW signal of 50 MHz.
Preset	FpMainRf
Range	FpMainRf, Fp50MHzCW
Initial S/W Revision	A.14.00

## Use Preselector

Example	CALC:FPOW:POW1:DEF "UsePreSelector=True"
Notes	The preselector parameter allows the user to either utilize or bypass the front end tunable filter at frequencies above 3.6 GHz. For frequencies below 3.6 GHz, the preselector is automatically bypassed, so you do not need to set this parameter to False in those cases.
Preset	False
Range	True (use preselector above 3.6 GHz), or False (preselector bypassed)

Default Unit	Boolean
Initial S/W Revision	A.14.00

### Channel Bandwidth Array

Example	CALC:FPOW:POW1:DEF "Bandwidth=[3.84e6, 5e6, 3.84e6]"
Notes	The bandwidth parameter array defines the bandwidth of each channel that will be measured. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[1e6]
Range	0 to 40 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

### Channel Filter Type Array

Example	CALC:FPOW:POW1:DEF "FilterType=[RRC, IBW, RRC]"
Notes	The filter type parameter allows the user to choose between an integration bandwidth (IBW) filter or a root-raised-cosine (RRC) filter. The integration bandwidth filter weighs all frequencies within the bandwidth equally. The root-raised-cosine filter has an associated shape parameter, defined by the FilterAlpha parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[IBW]
Range	IBW, RRC
Initial S/W Revision	A.14.00

### Channel Filter Alpha Array

Example	CALC:FPOW:POW1:DEF "FilterAlpha=[0.5, 0.0, 0.5]"
Notes	The filter alpha parameter allows the user to adjust the alpha value associated with the root-raised-cosine (RRC) filter type. Set FilterType to RRC in order to utilize this parameter. All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single number with no square brackets can be used to define the parameter.
Preset	[0.22]
Range	0.0 – 1.0
Initial S/W Revision	A.14.00

## Channel Measurement Function Array

Example	CALC:FPOW:POW1:DEF "Function=[BandPower, PeakPower, BandPower]"
Notes	This parameter array defines what measurement is being made for each individually-specified channel: BandPower: Total power within the specified bandwidth of the channel (dBm) BandDensity: Total power density within the specified bandwidth of the channel (dBm/Hz) PeakPower: The peak power value within the specified bandwidth of the channel (dBm) PeakFrequency: The frequency which corresponds to the peak power value within the specified bandwidth of the channel. This frequency is relative to the center frequency (Hz) XdBBandwidth: The half power (-3.01 dB) bandwidth of the highest amplitude signal that resides within the channel (Hz), dB is configurable using XdBBandwidth parameter OccupiedBandwidth: The bandwidth at which 99% of the total power resides within the channel (Hz), percentage configurable using OccupiedBandwidthPercent parameter All array parameters should have the same number of elements. Alternatively, if all the elements are the same value, a single value with no square brackets can be used to define the parameter.
Preset	[BandPower]
Range	BandPower, BandDensity, PeakPower, PeakFrequency, XdBBandwidth, OccupiedBandwidth
Initial S/W Revision	A.14.00

## Channel Offset Frequency Array

Example	CALC:FPOW:POW1:DEF "OffsetFrequency=[-5e6, 0, 5e6]"
Notes	The offset frequency parameter array defines the difference between the center frequency to the center frequency of each channel. All array parameters should have the same number of elements.
Preset	[0]
Range	0 to 20 MHz
Default Unit	Hz
Initial S/W Revision	A.14.00

## Channel Occupied Bandwidth Percent Array

Example	CALC:FPOW:POW1:DEF "OccupiedBandwidthPercent =[0.95, 0.95, 0.95]"
Notes	This parameter only applies for channels whose Function is set to OccupiedBandwidth. The occupied bandwidth percent parameter specifies the percent of total power in these channels. The valid range for this parameter is 0.0 to 1.0, where 1.0 represents 100%. The default for this parameter is 0.99, which will return the bandwidth that contains 99% of the total channel power.

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Preset	[0.99]
Range	0 - 1.0
Initial S/W Revision	A.14.00

Channel x-dB Bandwidth Array

Example	CALC:FPOW:POW1:DEF " XdBBandwidth =[-6.02, -3.01, -1.0]"
Notes	This parameter only applies for channels whose Function is set to XdBBandwidth. The X dB bandwidth parameter is used to specify the power relative to the peak channel power over which the bandwidth is calculated. The parameter value must be a negative number.
Preset	[-3.01]
Range	-200 to 0 dB
Default Unit	dB
Initial S/W Revision	A.14.00

Define Fast Power Measurement Query (Remote Command Only)

The DEFine? command is used to retrieve a list of all defined parameters in an ASCII string format

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R	:CALCulate:FPOWer:POWer[1,2,...,999]:DEFine?
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E	:CALC:FPOW:POW1:DEF?
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N This command query is used to retrieve a list of all defined parameters in an ASCII format.

O The following is an example of the returned results:

S "DCCoupled=False,ElecAttBypass=True,ElecAttenuation=0,IFGain=0,MechAttenuation=0,PreAmpMode=Off,PreSelectorOffset=0,UsePreSelector=False,ExternalReferenceFrequency=1000000,FrequencyReferenceSource=AutoExternalFrequencyReference,IFType=B40M,LOMode=SLW,SignalInput=FpMainRf,AcquisitionTime=0.001,CenterFrequency=100000000,ResolutionBW=0,ResolutionBWMode=BestSpeed,DetectorType=RmsAverage,Bandwidth=[1000000],OffsetFrequency=[0],Function=[BandPower],FilterType=[IBW],FilterAlpha=[0.22],OccupiedBandwidthPercent=[0.99],XdBBandwidth=[-3.01],DoNoiseCorrection=False,DoSpurSuppression=False,MeasurementMethod=HardwareFFT,IncludePowerSpectrum=False,TriggerDelay=0,TriggerLevel=1.2,TriggerSlope=Positive,TriggerSource=Free,TriggerTimeout=1"

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### Configure Fast Power Measurement (Remote Command Only)

The configure command begins hardware setup and returns immediately, with no acquisition made. This can be used in parallel with other hardware operations to effectively hide the hardware setup time.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:CONFigure
<b>Example</b>	:CALC:FPOW:POW1:CONF
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Initiate Fast Power Measurement (Remote Command Only)

The INITiate command begins an acquisition and returns immediately. The results of the measurement can be retrieved using FETCh.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:INITiate
<b>Example</b>	:CALC:FPOW:POW1:INIT
Notes	Option FP2 is required.
Initial S/W Revision	A.14.00

### Fetch Fast Power Measurement (Remote Command Only)

The FETCh command query is used to retrieve the results of an acquisition initiated by the INIT command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]:FETCh?
<b>Example</b>	:CALC:FPOW:POW1:FETC?
Notes	Option FP2 is required. Returns m comma-separated ASCII values, where m corresponds to the number of bandwidths defined. 1. Declared function return in the 1st specified channel 2. Declared function return in the 2nd specified channel ... m. Declared function return in the last specified channel The INIT and FETC? command sequence performs the same functionality of a single CALC:FPOW:POW[n]? query. Units of the returned values are dependent on the Function parameter for each channel.
Initial S/W Revision	A.14.00

### Execute Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in ASCII string format. The string begins and ends with quotation marks.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWer:POWer[1,2,...,999]?
<b>Example</b>	:CALC:FPOW:POW1?
Notes	Option FP2 is required. See notes for Fast Power Fetch for return format.
Initial S/W Revision	A.14.00



### Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ? :CALCulate:FPOWER:POWER[1,2,...,999]:READ1?
<b>Example</b>	:CALC:FPOW:POW1:READ? :CALC:FPOW:POW1:READ1?
Notes	Option FP2 is required. Returns m 4 byte floating point binary values (Little-Endian), where m corresponds to the number of bandwidths defined.
Initial S/W Revision	A.14.00

### Diagnostic Binary Read Fast Power Measurement (Remote Command Only)

This command query is used as shorthand for an INIT command immediately followed by a FETC? command. The returned results are in a binary format. This command is used primarily for diagnostic purposes to test for ADC overloads and to visibly inspect the spectrum.

Mode	All
<b>Remote Command</b>	:CALCulate:FPOWER:POWER[1,2,...,999]:READ2?
<b>Example</b>	:CALC:FPOW:POW1:READ2?
Notes	Option FP2 is required. Note: Spectrum data is only returned if the IncludePowerSpectrum parameter is set to True. If IncludePowerSpectrum is False, the number of spectrum points will be zero (0). Units of the returned values are dependent on the Function parameter per channel (e.g. dBm for BandPower, Hz for PeakFrequency). Returns binary data (Little-Endian) that contains information on m amount of channels, along with ADC over range and full spectrum data. The following is the binary format of the response. Bandwidth Return Value 1. Number of channels specified, m [4 byte int] 2. Declared function result for the 1st specified channel [4 byte float] 3. Declared function result for the 2nd specified channel [4 byte float] ... (m + 1). Declared function result for the last (mth) specified channel [4 byte float] ADC Over Range 1. ADC over-range occurred (1: true, 0: false) [2 byte short]

	<p>Spectrum Data</p> <ol style="list-style-type: none"> <li>1. Number of points in the spectrum data, k [4 byte int]</li> <li>2. Start frequency of spectrum data (Hz) [8 byte double]</li> <li>3. Step frequency of spectrum data (Hz) [8 byte double]</li> <li>4. FFT bin at 1st point (dBm) [4 byte float]</li> <li>5. FFT bin at 2nd point (dBm) [4 byte float]</li> <li>...</li> <li>(k + 3). FFT bin at last (kth) point (dBm) [4 byte float]</li> </ol>
Initial S/W Revision	A.14.00

### Format Data: Numeric Data (Remote Command Only)

This command specifies the format of the trace data input and output. It specifies the formats used for trace data during data transfer across any remote port. It affects only the data format for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]?, :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

<b>Remote Command</b>	<pre>:FORMat [:TRACe] [:DATA] ASCii INTEger,32 REAL,32  REAL,64 :FORMat [:TRACe] [:DATA] ?</pre>
<b>Notes</b>	<p>The query response is:</p> <p>ASCii: ASC,8  REAL,32: REAL,32  REAL,64: REAL,64  INTEger,32: INT,32</p> <p>When the numeric data format is REAL or ASCii, data is output in the current Y Axis unit. When the data format is INTEger, data is output in units of m dBm (.001 dBm).</p> <p>The INT,32 format returns binary 32-bit integer values in internal units (m dBm), in a definite length block.</p>
<b>Dependencies</b>	<p>Sending a data format spec with an invalid number (for example, INT,48) generates no error. The analyzer simply uses the default (8 for ASCii, 32 for INTEger, 32 for REAL).</p> <p>Sending data to the analyzer which does not conform to the current FORMat specified, results in an error. Sending ASCII data when a definite block is expected generates message -161 "Invalid Block Data" and sending a definite block when ASCII data is expected generates message -121 "Invalid Character in Number".</p>
<b>Preset</b>	ASCii
<b>Backwards Compatibility Notes</b>	Note that the INT,32 format is only applicable to the command, TRACe:DATA. This preserves backwards compatibility for the Swept SA measurement. For all other commands/queries which honor FORMat:DATA, if INT,32 is sent the analyzer will behave as though it were set to REAL,32.
<b>Initial S/W Revision</b>	Prior to A.02.00

The specs for each output type follow:

AScii - Amplitude values are in ASCII, in the current Y Axis Unit, one ASCII character per digit, values separated by commas, each value in the form:

SX.YYYYYEsZZ

Where:

S = sign (+ or -)

X = one digit to left of decimal point

Y = 5 digits to right of decimal point

E = E, exponent header

s = sign of exponent (+ or -)

ZZ = two digit exponent

REAL,32 - Binary 32-bit real values in the current Y Axis Unit, in a definite length block.

REAL,64 - Binary 64-bit real values in the current Y Axis Unit, in a definite length block.

### Format Data: Byte Order (Remote Command Only)

This command selects the binary data byte order for data transfer and other queries. It controls whether binary data is transferred in normal or swapped mode. This command affects only the byte order for setting and querying trace data for the :TRACe[:DATA], TRACe[:DATA]? , :CALCulate:DATA[n]? and FETCh:SANalyzer[n]? commands and queries.

By definition any command that says it uses FORMat:DATA uses any format supported by FORMat:DATA.

The NORMal order is a byte sequence that begins with the most significant byte (MSB) first, and ends with the least significant byte (LSB) last in the sequence: 1|2|3|4. SWAPped order is when the byte sequence begins with the LSB first, and ends with the MSB last in the sequence: 4|3|2|1.

<b>Remote Command</b>	:FORMat:BORDER NORMal SWAPped :FORMat:BORDER?
<b>Preset</b>	NORMal
<b>Initial S/W Revision</b>	Prior to A.02.00

## Meas Setup

Displays the setup menu for the currently selected measurement. Many of the lower-level menu keys operate the same in all measurements. Unique functions are described below.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Avg/Hold Num

Specifies the number of data acquisition that will be averaged. After the specified number of average counts, the averaging mode (terminal control) setting determines the averaging action.

- On - Sets measurement averaging on.
- Off - Sets measurement averaging off.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	<pre>[ :SENSe ] :TXPower:AVERage:COUNT &lt;integer&gt; [ :SENSe ] :TXPower:AVERage:COUNT? [ :SENSe ] :TXPower:AVERage [ :STATe ] OFF ON 0 1 [ :SENSe ] :TXPower:AVERage [ :STATe ] ?</pre>
<b>Example</b>	<pre>TXP:AVER:COUN 100 TXP:AVER:COUN? TXP:AVER:0 TXP:AVER?</pre>
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	50 ON
State Saved	Saved in instrument state.
Min	1
Max	10000
<b>Backwards Compatibility SCPI</b>	[ :SENSe ] :BPOWer:AVERage:COUNT
Initial S/W Revision	Prior to A.02.00

## Avg Mode

Selects the type of termination control used for the averaging function. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Key	SCPI	Mode
Exponential	EXPOnential	After the average count is reached, each successive data acquisition is exponentially weighted and combined with the existing average.
Repeat	REPeat	After reaching the average count, the averaging is reset and a new average is started.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[ :SENSe ] :TXPower:AVERage:TCONtrol EXPOnential REPeat [ :SENSe ] :TXPower:AVERage:TCONtrol?
Example	TXP:AVER:TCON REP TXP:AVER:TCON?
Notes	You must be in the Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	EXPOnential
State Saved	Saved in instrument state.
Range	Exp Repeat
Backwards Compatibility SCPI	[ :SENSe ] :BPOWer:AVERage:TCONtrol
Initial S/W Revision	Prior to A.02.00

## Avg Type

Specifies the type of trace and result averaging to use.

Key	SCPI	Type
Pwr Avg (RMS)	RMS	True power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
Log-Pwr Avg (Video)	LOG	Simulates the traditional spectrum analyzer type of averaging by averaging the log of the power.
None	MAXimum	The maximum values are retained during the averaging cycle.
None	MINimum	The minimum values are retained during the averaging cycle.

SA, GSM Mode

Key Path	Meas Setup
Mode	SA, GSM
Remote Command	[ :SENSe ] :TXPower:AVERage:TYPE LOG MAXimum MINimum RMS [ :SENSe ] :TXPower:AVERage:TYPE?
Example	TXP:AVER:TYPE LOG TXP:AVER:TYPE?
Notes	Maximum Minimum are selected only via SCPI. You must be in the Spectrum Analyzer or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting MAXimum MINimum force to visible <b>Max Hold Trace</b> or and <b>Min Hold Trace</b> . Measure Trace stays in RMS or Video average state.
Preset	RMS
State Saved	Saved in instrument state.
Range	Pwr Avg (RMS) Log-Pwr Avg(Video) Maximum Minimum
Backwards Compatibility SCPI	[ :SENSe ] :BPOwer:AVERage:TYPE
Initial S/W Revision	Prior to A.02.00

## Threshold Lvl

When Meas Method is set to Above Threshold Lvl, the mean carrier power is calculated based on the trace above the threshold level. The threshold level is displayed in dB (relative to the measured carrier) or dBm (absolute).

A green line in the grid is displayed at the y-position associated with the current threshold level value. Its state is controlled by the On/Off state of the 'Display Line' under the View/Display menu.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[ :SENSe ] :TXPower:THReshold <real> [ :SENSe ] :TXPower:THReshold? [ :SENSe ] :TXPower:THReshold:TYPE ABSolute RELative [ :SENSe ] :TXPower:THReshold:TYPE?
Example	TXP:THR 0 TXP:THR?
Example	TXP:THR:TYPE ABS TXP:THR:TYPE?
Notes	You must be in the TD-SCDMA mode, Spectrum Analyzer mode or GSM mode to use this command. Use INSTRument:SElect to set the mode. BAF SCPI Command determines whether this command is setting an absolute or a relative power

	<p>level.</p> <p>Suffix dB and dBm are allowed, but it does not change the state of Threshold Type.</p> <p>Suffix may not be send.</p> <p>If Threshold Type is set to Relative, the positive value of Threshold level was allowed to +100dB and it treated as a negative value. Now max value of Threshold level is changed to 0dB. To keep the backward compatibility, the input from SCPI command allows to +100dB.</p>
Preset	<p>GSM: -20.0</p> <p>SA: -30.0</p> <p>TD-SCDMA : -60.0</p> <p>RELative</p>
State Saved	Saved in instrument state.
Min	-100
Max	<p>GSM, SA: Relative : 0dB</p> <p>Absolute : 100dBm</p> <p>TD-SCDMA: Relative : 0dB</p> <p>Absolute : 60dBm</p>
<b>Backwards Compatibility SCPI</b>	[ :SENSe] :BPOWer:THReshold
Initial S/W Revision	Prior to A.02.00

## Meas Method

When the selected mode is SA or GSM, there are two options for this parameter: .

- **Above Threshold Level** measurement algorithm is used to capture a time record, and average only those points in the time record that exceed the user-specified threshold level. No attempt is made to position the burst, or to calculate/display burst widths. This can be used to measure continuous signals, or bursted signals where the Measured Burst Width algorithm is too restrictive.
- **Measured Burst Width** measurement algorithm uses the threshold level to calculate the burst center, and average those points that lie within a user-specified burst width that is centered upon the burst. The burst width parameter is described in more detail below.

When the selected mode is TD-SCDMA, there is a third option:

- **Single Time Slot** measurement algorithm is to capture a single time slot record, and calculate the start and stop position of the time slot in terms of the trigger position theoretically. No attempt is made to position the burst, or to calculate/display burst widths. The burst width drawn in the screen is considered to be the theoretical width of the slot. This method is recommended to measure the mean transmit power in a single slot when trigger source is External Front/Rear while the Measured Burst Width algorithm is too restrictive.

SA, GSM mode

Key Path	Meas Setup
Mode	SA, GSM
Remote Command	[ :SENSe ] :TXPower:METhod THReshold BWIDth [ :SENSe ] :TXPower:METhod?
Example	TXP:METH BWID TXP:METH?
Preset	THReshold
State Saved	Saved in instrument state.
Range	Above Threshold Lvl Measured Burst Width
Backwards Compatibility SCPI	[ :SENSe ] :BPOWer:METhod
Initial S/W Revision	Prior to A.02.00

## Burst Width

When Burst Width Mode is set to manual, the user may enter a fixed-time value in seconds, or alternatively specify the burst width as a percentage of the last measured burst width (result in bottom-left corner of second window).

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
Remote Command	[ :SENSe ] :TXPower:BURSt:WIDTh <time> [ :SENSe ] :TXPower:BURSt:WIDTh? [ :SENSe ] :TXPower:BURSt:AUTO ON OFF 1 0 [ :SENSe ] :TXPower:BURSt:AUTO?
Example	TXP:BURS:WIDT 10 TXP:BURS:WIDT? TXP:BURS:AUTO 1 TXP:BURS:AUTO?
Example	TXP:BURS:AUTO 0 TXP:BURS:AUTO? TXP:BURS:AUTO 1 TXP:BURS:AUTO?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Dependencies	Burst Width will be grayed out if " <b>Meas Method</b> " on page 1607 is set to 'Above Threshold Lvl'.
Couplings	SA, GSM



	<p>Max value depends on Sweep Time, Res BW and RBW filter type.</p> <p>TD-SCDMA: If the measure method is not “Measured Burst Width”, this key will be grayed out. The default value is depending on the Burst type: If Burst Type = Traffic, Burst Width = 662.5us If Burst Type = Downlink Pilot, Burst Width = 50us If Burst Type = Uplink Pilot, Burst Width = 100us</p>
Preset	<p>SA, GSM: 255.6 us TD-SCDMA: 662.5us ON</p>
State Saved	Saved in instrument state.
Min	100.0 ns
Max	50 s
Initial S/W Revision	Prior to A.02.00

## Meas Preset

Returns parameters for this measurement to those set by the factory.

Key Path	Meas Setup
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	:CONFigure:TXPower
<b>Example</b>	CONF:TXP
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)  
Mode

Mode

See "[Mode](#)" on page 174

## Mode Preset

Returns the active mode to a known state.

Mode Preset does the following for the currently active mode:

- Aborts the currently running measurement.
- Brings up the default menu for the mode, with no active function.
- Sets measurement Global settings to their preset values for the active mode only.
- Activates the default measurement.
- Brings up the default menu for the mode.
- Clears the input and output buffers.
- Sets Status Byte to 0.

Mode Preset does not:

- Cause a mode switch
- Affect mode persistent settings
- Affect system settings
- See "[How-To Preset](#)" on page 1612 for more information.

Key Path	Front-panel key
<b>Remote Command</b>	:SYSTem:PRESet
<b>Example</b>	:SYST:PRES
Notes	*RST is preferred over :SYST:PRES for remote operation. *RST does a Mode Preset, as done by the :SYST:PRES command, and it sets the measurement mode to Single measurement rather than Continuous for optimal remote control throughput. Clears all pending OPC bits. The Status Byte is set to 0.
Couplings	A Mode Preset aborts the currently running measurement, activates the default measurement, and gets the mode to a consistent state with all of the default couplings set.
Backwards Compatibility Notes	In the X-Series, the legacy "Factory Preset" has been replaced with Mode Preset, which only presets the currently active mode, not the entire instrument. In the X-Series, the way to preset the entire instrument is by using System, Restore System Defaults All, which behaves essentially the same way as restore System Defaults does on ESA and PSA. There is also no "Preset Type" as there is on the PSA. There is a green Mode Preset front-panel key that does a Mode Preset and a white-with-green-letters User Preset front-panel key that does a User Preset. The old PRESet:TYPE command is ignored (without generating an error), and SYST:PRES without a parameter does a Mode Preset, which should cover most backward code compatibility issues. The settings and correction data under the Input/Output front-panel key (examples: Input Z Corr, Ext Amp Gain, etc.) are no longer part of any Mode, so they will not be preset by a Mode Preset. They are preset using Restore Input/Output Defaults, Restore System Defaults All. Note that because User Preset does a Recall State, and all of these settings are saved in State, they ARE recalled when using

	User Preset.
Initial S/W Revision	Prior to A.02.00

## How-To Preset

The table below shows all possible presets, their corresponding SCPI commands and front-panel access (key paths). Instrument settings depend on the current measurement context. Some settings are local to the current measurement, some are global (common) across all the measurements in the current mode, and some are global to all the available modes. In a similar way, restoring the settings to their preset state can be done within the different contexts.

Auto Couple - is a measurement local key. It sets all Auto/Man parameter couplings in the measurement to Auto. Any Auto/Man selection that is local to other measurements in the mode will not be affected.

Meas Preset - is a measurement local key. Meas Preset resets all the variables local to the current measurement except the persistent ones.

Mode Preset - resets all the current mode's measurement local and measurement global variables except the persistent ones.

Restore Mode Defaults - resets ALL the Mode variables (and all the Meas global and Meas local variables), including the persistent ones.

Type Of Preset	SCPI Command	Front Panel Access
Auto Couple	:COUPle ALL	Auto Couple front-panel key
Meas Preset	:CONFigure:<Measurement>	Meas Setup Menu
Mode Preset	:SYSTem:PRESet	Mode Preset (green key)
Restore Mode Defaults	:INSTrument:DEFault	Mode Setup Menu
Restore All Mode Defaults	:SYSTem:DEFault MODes	System Menu; Restore System Default Menu
*RST	*RST	not possible (Mode Preset with Single)
Restore Input/Output Defaults	:SYSTem:DEFault INPUt	System Menu; Restore System Default Menu
Restore Power On Defaults	:SYSTem:DEFault PON	System Menu; Restore System Default Menu
Restore Alignment Defaults	:SYSTem:DEFault ALIGN	System Menu; Restore System Default Menu
Restore Miscellaneous Defaults	:SYSTem:DEFault MISC	System Menu; Restore System Default Menu
Restore All System Defaults	:SYSTem:DEFault [ALL] :SYSTem:PRESet:PERsistent	System Menu; Restore System Default Menu
User Preset	:SYSTem:PRESet:USER	User Preset Menu
User Preset All Modes	:SYSTem:PRESet:USER:ALL	User Preset Menu

Power On Mode Preset	:SYSTem:PON:TYPE MODE	System Menu
Power On User Preset	:SYSTem:PON:TYPE USER	System Menu
Power On Last State	:SYSTem:PON:TYPE LAST	System Menu

12 Burst Power (Transmit Power)  
Mode Setup

## Mode Setup

See "[Mode Setup](#)" on page 193

## Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace. Pressing Peak Search with the selected marker off causes the selected marker to be set to Normal, then a peak search is immediately performed.

<b>Key Path</b>	Front-panel key
<b>Mode</b>	GSM, SA, TD-SCDMA
<b>Remote Command</b>	:CALCulate:TXPower:MARKer[1] 2 ...12:MAXimum
<b>Example</b>	CALC:TXP:MARK2:MAX
<b>Initial S/W Revision</b>	Prior to A.02.00

12 Burst Power (Transmit Power)  
Print

Print

See ["Print" on page 221](#)



## Quick Save

The Quick Save front-panel key repeats the most recent save that was performed from the Save menu, with the following exceptions:

- Register saves are not remembered as Saves for the purpose of the Quick Save function
- If the current measurement does not support the last non-register save that was performed, an informational message is generated, “File type not supported for this measurement”

Quick Save repeats the last type of qualified save (that is, a save qualified by the above criteria) in the last save directory by creating a unique filename using the Auto File Naming algorithm described below.

If Quick Save is pressed after startup and before any qualified Save has been performed, the Quick Save function performs a Screen Image save using the current settings for Screen Image saves (current theme, current directory), which then becomes the “last save” for the purpose of subsequent Quick Saves.

The Auto File Naming feature automatically generates a file name for use when saving a file. The filename consists of a prefix and suffix separated by a dot, as is standard for the Windows® file system. A default prefix exists for each of the available file types:

Type	Default Prefix	Menu
State	State_	(Save/Recall)
Trace + State	State_	(Save/Recall)
Screen	Screen_	(Save/Recall)
Amplitude Corrections	Ampcor_	(Import/Export)
Traces	Trace_	(Import/Export)
Limit Lines	LLine_	(Import/Export)
Measurement Result	MeasR_	(Import/Export)
Capture Buffer	CapBuf_	(Import/Export)

A four digit number is appended to the prefix to create a unique file name. The numbering sequence starts at 0000 within each Mode for each file type and updates incrementally to 9999, then wraps to 0000 again. It remembers where it was through a Mode Preset and when leaving and returning to the Mode. It is reset by Restore Misc Defaults and Restore System Defaults and subsequent running of the instrument application. So, for example, the first auto file name generated for State files is State\_0000.state. The next is State\_0001, and so forth.

One of the key features of Auto File Name is that we guarantee that the Auto File Name will never conflict with an existing file. The algorithm looks for the next available number. If it gets to 9999, then it looks for holes. If it find no holes, that is no more numbers are available, it gives an error.

For example, if when we get to State\_0010.state there is already a State\_0010.state file in the current directory, it advances the counter to State\_0011.state to ensure that no conflict will exist (and then it verifies that State\_0011.state also does not exist in the current directory and advances again if it does, and so forth).

If you enter a file name for a given file type, then the prefix becomes the filename you entered instead of the default prefix, followed by an underscore. The last four letters (the suffix) are the 4-digit number.

For example, if you save a measurement results file as “fred.csv”, then the next auto file name chosen for a measurement results save will be fred\_0000.csv.

**NOTE**

Although 0000 is used in the example above, the number that is used is actually the current number in the Meas Results sequence, that is, the number that would have been used if you had not entered your own file name.

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**NOTE**

If the filename you entered ends with \_dddd, where d=any number, making it look just like an auto file name, then the next auto file name picks up where you left off with the suffix being dddd + 1.

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Key Path	Front-panel key
Notes	No remote command for this key specifically.
Initial S/W Revision	Prior to A.02.00

## Recall

The Recall menu lets you choose what you want to recall, and where you want to recall it from. Among the types of files you can recall are **States and Traces**. In addition, an Import (Data) option lets you recall a number of data types stored in CSV files (as used by Excel and other spreadsheet programs).

**NOTE**

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to recall from.

The default paths for Recall are data type dependent and are the same as for the Save key.

Key Path	Front-panel key
Notes	<p>No remote command for this key specifically, but the :MMEM:LOAD command is available for specific file types. An example is :MMEM:LOAD:STATE &lt;filename&gt;.</p> <p>If you try to recall a State file for a mode that is not licensed or not available in the instrument, an error message will occur and the state will not change.</p>
Backwards Compatibility Notes	<p>In legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly (since User Preset is actually loading a state), it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p>
Backwards Compatibility Notes	<p>Recall for the X-Series supports backward compatibility in the sense that you can recall a state file from any X-Series model number and any version of X-Series software. This is only possible if part of the recalling process goes through a limiting step after recalling the mode settings, at least for settings that may vary with version number, model number, option and license differences. If you try to recall a state file onto an instrument with less capability than what was available on the instrument during the save, the recall will ignore the state it doesn't support and it will limit the recalled setting to what it allows.</p> <p>Example: if the saved state includes preamp ON, but the recalling instrument does not have a preamp; the preamp is limited to OFF. Conversely, if you save a state without a preamp, the preamp is OFF in the state file. When this saved file is recalled on an instrument with a licensed preamp, the preamp is changed to OFF. Another example is if the saved state has center frequency set to 20 GHz, but the instrument recalling the saved state is a different model and only supports 13.5 GHz. In this case, the center frequency is limited along with any other frequency based settings. Since the center frequency can't be preserved in this case, the recall limiting tries to at least preserve span to keep the measurement setup as intact as possible.</p> <p>It may be appropriate to issue a warning if the state is limited on the recall; warnings do not go out to SCPI so this would only affect the manual user.</p> <p>Note that there is no state file compatibility outside of the X-Series. For example, you cannot recall a state file from ESA or PSA.</p>
Initial S/W Revision	Prior to A.02.00

## State

The Recall State menu lets you choose a register or file from which to recall the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings that were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, GPIB address) are not affected by either a Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

Since each state file is only for one Mode, the settings for other Modes are unaffected when it is loaded. Recall State will cause a mode switch if the state being recalled is not from the current active mode.

After the recall completes, the message "File <filename> recalled" or "Recalled State Register <register number>" is displayed.

For rapid recalls, the State menu lists 16 registers that you can choose from to recall. Pressing a Register key initiates the recall. You can also select a file from which to recall.

The default path for all State Files is:

My Documents\<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

See ["More Information" on page 1621](#).

<b>Key Path</b>	Recall
<b>Mode</b>	All
<b>Remote Command</b>	:MMEMory:LOAD:STATe <filename>
<b>Example</b>	:MMEM:LOAD:STAT "myState.state" This recalls the file myState.state on the default path
<b>Example</b>	MMEM:LOAD:STAT "MyStateFile.state" This loads the state file data (on the default file directory path) into the instrument state.
<b>Notes</b>	<p>When you pick a file to recall, the analyzer first verifies that the file is recallable in the current instrument by checking the software version and model number of the instrument. If everything matches, a full recall proceeds by aborting the currently running measurement, clearing any pending operations, and then loading the State from the saved state file. You can open state files from any mode, so recalling a State file switches to the mode that was active when the save occurred. After switching to the mode of the saved state file, mode settings and data (if any for the mode) are loaded with values from the saved file. The saved measurement of the mode becomes the newly active measurement and the data relevant to the measurement (if there is any) is recalled.</p> <ul style="list-style-type: none"> <li>• If there is a mismatch between file version or model number or instrument version or model number, the recall function tries to recall as much as possible and returns a warning message. It may limit settings that differ based on model number, licensing or version number.</li> </ul> <p>After recalling the state, the Recall State function does the following:</p> <ul style="list-style-type: none"> <li>• Makes the saved measurement for the mode the active measurement.</li> <li>• Clears the input and output buffers.</li> <li>• Status Byte is set to 0.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Executes a *CLS</li> </ul> <p>If the file specified is empty an error is generated. If the specified file does not exist, another error is generated. If there is a mismatch between the file and the proper file type, an error is generated. If there is a mismatch between file version or model number or instrument version or model number, a warning is displayed. Then it returns to the State menu and File Open dialog goes away.</p> <p>After the Recall, the analyzer exits the Recall menu and returns to the previous menu.</p>
<b>Backwards Compatibility SCPI</b>	:MMEMory:LOAD:STATe 1,<filename>
Initial S/W Revision	Prior to A.02.00

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### More Information

In measurements that support saving Traces, for example, Swept SA, the Trace data is saved along with the State in the State file. When recalling the State, the Trace data is recalled as well. Traces are recalled exactly as they were stored, including the writing mode and update and display modes. If a Trace was updating and visible when the State was saved, it will come back updating and visible, and its data will be rewritten right away. When you use State to save and recall traces, any trace whose data must be preserved should be placed in View or Blank mode before saving.

The following table describes the Trace Save and Recall possibilities:

---

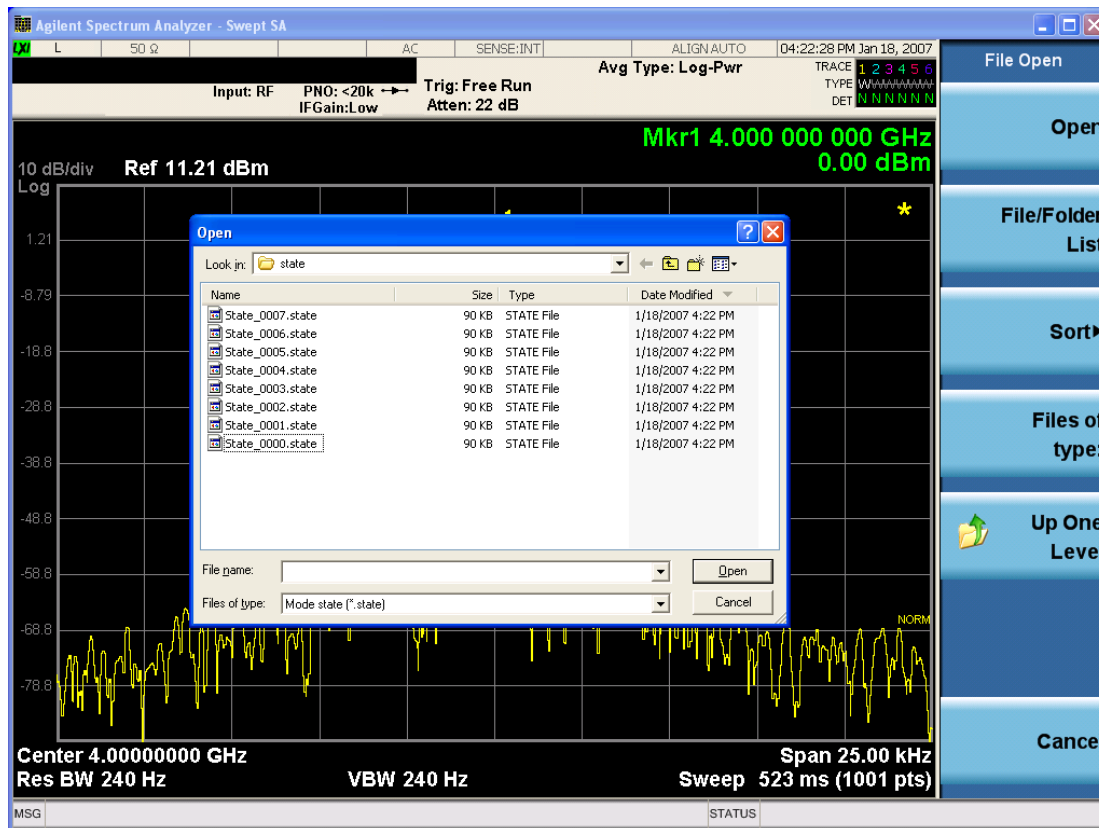
You want to recall state and one trace's data, leaving other traces unaffected.	Save Trace+State from 1 trace. Make sure that no other traces are updating (they should all be in View or Blank mode) when the save is performed.	On Recall, specify the trace you want to load the one trace's data into. This trace will load in View. All other traces' data will be unaffected, although their trace mode will be as it was when the state save was performed.
You want to recall all traces	Save Trace+State from ALL traces.	On Recall, all traces will come back in View (or Blank if they were in Blank or Background when saved)
You want all traces to load exactly as they were when saved.	Save State	On recall, all traces' mode and data will be exactly as they were when saved. Any traces that were updating will have their data immediately overwritten.

---

### From File...

When you press "From File", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

## 12 Burst Power (Transmit Power) Recall



Listed below are the functions of the various fields in the dialog, and the corresponding softkeys:

### Open

Performs the recall of the specified file. While the recall is being performed, the floppy icon appears briefly in the Meas bar.

### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Look In.

### Look In

The Look In field shows the path from which the file will be recalled and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Look In field** first uses the last path from the Save As dialog **Save In:** path for that same file type. There is no softkey for directly navigating to the Look In field, but you can use the left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

### Sort

Accesses a menu that enables you to sort the files within the File Open dialog. Only one sorting type can be selected at a time and the sorting happens immediately. The sorting types are By Date, By Name, By extension, and By Size.

#### Files of Type

This field shows the file suffix for the type of file you have selected to recall. For example, if you navigated here while recalling State, "Mode state (\*.state)" is in the field. If you navigated here while recalling Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while importing a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown menu, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Open** request to be cancelled. The ESC key does the same thing.

Key Path	Recall, State
Notes	Brings up the Open dialog for recalling a State Save Type
Initial S/W Revision	Prior to A.02.00

### Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

For more information and the SCPI command, see Edit Register Names under the Save, State function.

Key Path	Recall, State
Mode	All
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending the SCPI command generates an error, -221, "Settings conflict;Option not available"
Initial S/W Revision	A.11.00

### Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last

modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.

After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
Example	*RCL 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State, Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Register 1 thru Register 16

Selecting any one of these register keys causes the State of the mode from the specified Register to be recalled. Each of the register keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key under Save, State to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, recalling the same register name on each instance is a way to share setups between the instances.

Registers are shared by all modes, so recalling from any one of the registers will cause a mode switch to the mode that was active when the save to the Register occurred.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*RCL command.



After the recall completes, the message "Register <register number> recalled" appears in the message bar. If you are in the Spectrum Analyzer Mode, and you are recalling a register that was saved in the Spectrum Analyzer Mode, then after the recall, you will still be in the Recall Register menu. If the Recall causes you to switch modes, then after the Recall, you will be in the Frequency menu.

If a requested register is empty an error is generated.

Key Path	Recall, State
<b>Example</b>	*RCL 1
Range	1-16 from front panel, 1-128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Save, State,Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	Prior to A.11.00

## Sequences

These keys allow you to import a Tab separated or .txt file that will automatically setup all the parameters required for building a Sequence. The parameters will automatically be loaded into the Stated Sequencer.

Once selected, in order to import the selected Sequence Type you must select the Open key in the Source Sequence menu.

Key Path	Recall, Sequences
Mode	All
<b>Remote Command</b>	:MMEMory:LOAD:SEQuences:   SLIS   ALIS   SAALIS   "MySequence.txt"
<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
Notes	Available file types are: –CSV (Comma delimited) (*.csv) –Text (Tab delimited) (*.txt)
Initial S/W Revision	A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Recall,Sequences
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<b>Example</b>	:MMEM:LOAD:SEQ:SLIS "MySequence.txt"
<b>Dependencies</b>	Only available in XOBT
<b>Initial S/W Revision</b>	A.05.00

## Open...

When you press "Open", the analyzer brings up a Windows dialog and a menu entitled "File Open." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[From File...](#)" on page 1621 in Recall, State, for a full description of this dialog and menu.

<b>Key Path</b>	Recall, Data
<b>Notes</b>	The key location is mode-dependent and will vary. Brings up Open dialog for recalling a <mode specific> Save Type
<b>Initial S/W Revision</b>	Prior to A.02.00

## Restart

The Restart function restarts the current sweep, or measurement, or set of averaged/held sweeps or measurements. If you are Paused, pressing Restart does a Resume.

The Restart function is accessed in several ways:

- Pressing the Restart key
- Sending the remote command INIT:IMMEDIATE
- Sending the remote command INIT:RESTART

See "[More Information](#)" on page 1627

Key Path	Front-panel key
Remote Command	:INITiate[:IMMEDIATE] :INITiate:RESTART
Example	:INIT:IMM :INIT:REST
Notes	:INITiate:RESTART and :INITiate:IMMEDIATE perform exactly the same function.
Couplings	Resets average/hold count k. For the first sweep overwrites all active (update=on) traces with new current data. For application modes, it resets other parameters as required by the measurement.
Status Bits/OPC dependencies	This is an Overlapped command. The STATUS:OPERation register bits 0 through 8 are cleared. The STATUS:QUESTIONable register bit 9 (INTEgrity sum) is cleared. The SWEEPING bit is set. The MEASURING bit is set.
Backwards Compatibility Notes	For Spectrum Analysis mode in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart trace averages (displayed average count reset to 1) for a trace in Clear Write, but did not restart Max Hold and Min Hold. In the X-Series, the Restart hardkey and the INITiate:RESTART command restart not only Trace Average, but MaxHold and MinHold traces as well. For wireless comms modes in ESA and PSA, the Restart hardkey and the INITiate:RESTART command restart every measurement, which includes all traces and numeric results. There is no change to this operation.
Initial S/W Revision	Prior to A.02.00

### More Information

The **Restart** function first aborts the current sweep/measurement as quickly as possible. It then resets the sweep and trigger systems, sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is in the process of aligning when **Restart** is executed, the alignment finishes before the restart function is performed.

Even when set for Single operation, multiple sweeps may be taken when Restart is pressed (for example, when averaging/holding is on). Thus when we say that **Restart** "restarts a measurement," we may mean:

- It restarts the current sweep
- It restarts the current measurement
- It restarts the current set of sweeps if any trace is in Trace Average, Max Hold or Min Hold
- It restarts the current set of measurements if Averaging, or Max Hold, or Min Hold is on for the measurement
- depending on the current settings.

With **Average/Hold Number** (in **Meas Setup** menu) set to 1, or Averaging off, or no trace in Trace Average or Hold, a single sweep is equivalent to a single measurement. A single sweep is taken after the trigger condition is met; and the analyzer stops sweeping once that sweep has completed. However, with **Average/Hold Number** >1 and at least one trace set to **Trace Average, Max Hold, or Min Hold (SA Measurement)** or **Averaging on (most other measurements)**, multiple sweeps/data acquisitions are taken for a single measurement. The trigger condition must be met prior to each sweep. The sweep is stopped when the average count  $k$  equals the number  $N$  set for **Average/Hold Number**. A measurement average usually applies to all traces, marker results, and numeric results; but sometimes it only applies to the numeric results.

Once the full set of sweeps has been taken, the analyzer will go to idle state. To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command `CALC:AVER:TCON UP`.

## Save

The Save menu lets you choose what you want to save and where you want to save it. Among the types of files you can save are **States**, **Traces**, and **Screen Images**. In addition, an Export (Data) option lets you save a number of data types as CSV files for easy import into Excel and other spreadsheet programs.

Key Path	Front-panel key
Mode	All
Notes	No remote command for this key specifically, but the :MMEM:STORe command is available for specific file types. An example is :MMEM:STOR:STATe <filename>.
Initial S/W Revision	Prior to A.02.00

## State

The Save State menu lets you choose a register or file for saving the state.

### NOTE

In products that run multiple instances of the X-Series Application, all instances share the same register and file location where you want to save the state.

The content of a state file includes all of the settings and data required to return the analyzer as closely as possible to the Mode it was in, with the exact settings which were in place, when the save occurred. The Mode settings in each state file include the settings that are affected by Mode Preset, as well as the additional settings affected by Restore Mode Defaults; all of the Mode's settings. In addition, all of the settings of the Input/Output system are included, even though they are outside of the Mode's state, because they are needed to restore the complete setup. Persistent System settings (for example, Verbose SCPI) are not affected by either Mode Preset or Restore Mode Defaults, nor are they included in a saved State file.

After the save completes, the message "File <filename> saved" or "State Register <register number> saved" is displayed.

For rapid saving, the State menu lists 16 registers to save to. Pressing a Register key initiates the save. You can also select a file to save to.

The default path for all State Files is:

My Documents\<<mode name>\state

where <mode name> is the parameter used to select the mode with the INST:SEL command (for example, SA for the Spectrum Analyzer).

Key Path	Save
Mode	All
<b>Remote Command</b>	:MMEMory:STORe:STATe <filename>
<b>Example</b>	MMEM:STOR:STATe "MyStateFile.state" This stores the current instrument state data in the file MyStateFile.state in the default directory.
Notes	Both single and double quotes are supported for any filename parameter over remote.

After saving to a register, that register's menu key is updated with the date the time, unless a custom label has been entered for that key.

After saving to a register, you remain in the Save State menu, so that you can see the Register key update. After saving to a file, the analyzer automatically returns to the previous menu and any Save As dialog goes away.

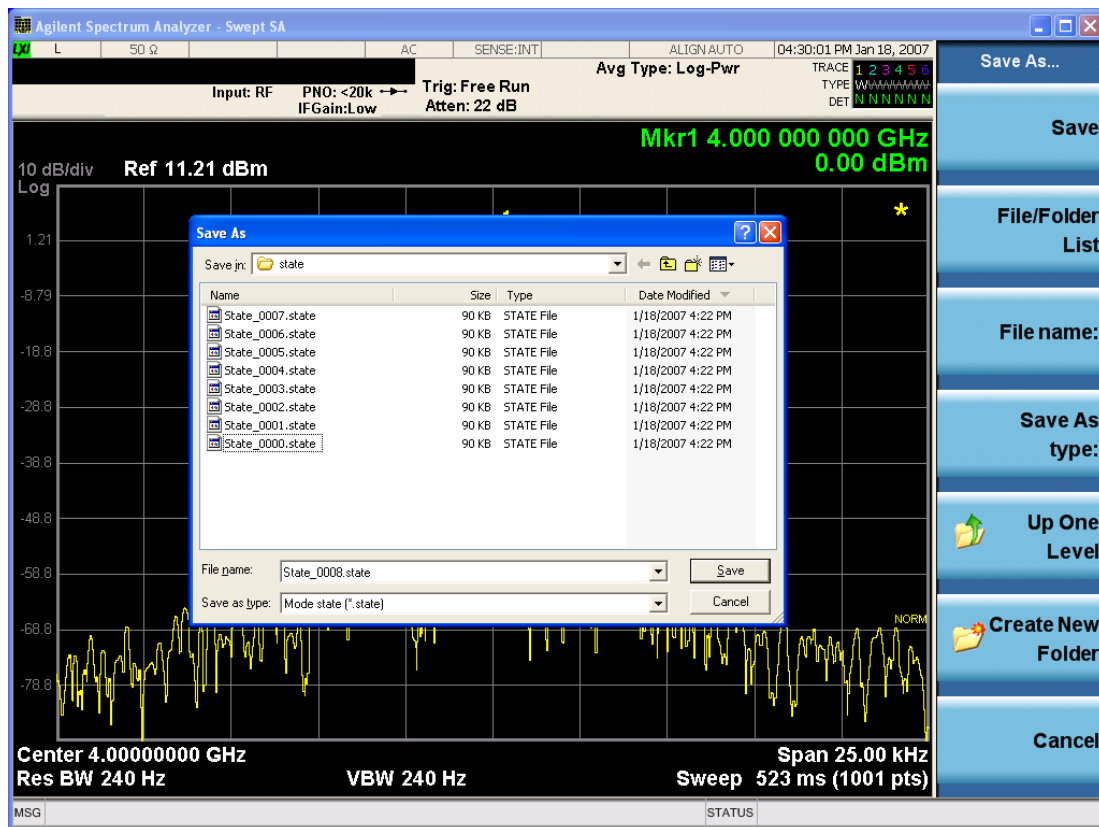
**Backwards Compatibility SCPI** :MMEMory:STORE:STATe 1,<filename>

For backwards compatibility, the above syntax is supported. The "1" is simply ignored. The command is sequential.

Initial S/W Revision Prior to A.02.00

### To File . . .

When you press "To File", the analyzer brings up a Windows dialog and a menu entitled "Save As." This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.



The Listed below

are the functions of the various fields in the dialog, and the corresponding softkeys:

### Save

Performs the save to the specified file of the selected type. If the file already exists, a dialog will appear that allows you to replace the existing file by selecting OK, or you can Cancel the request. If you select OK,

the file will be overwritten. Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.

While the save is being performed, the floppy icon appears briefly in the Meas bar.

#### File/Folder List

Enables you to navigate to the center of the dialog that contains the list of files and folders. Once here you can get information about the file and use the tab keys to navigate to the other fields in the dialog, such as Save In.

#### Save In

The Save In field shows the path to which the file will be saved and allows you to change the path using the up and down arrow keys to navigate to other paths; the Enter key to open a directory; and the Backspace key to go back one directory. The **Save In field** defaults to the default path for this type of file and remembers the last path you used to save this type of file. There is no softkey for directly navigating to the Save In field but you can use left tab to get here from the File/Folder List.

User specified paths are remembered when you leave and return to a Mode and are reset back to the default using Restore Mode Defaults.

#### File Name

The File Name field is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name key. See the ["Quick Save " on page 1617](#) documentation for more on the automatic file naming algorithm.

When you press the File Name key the analyzer displays the Alpha Editor. Use the knob to choose the letter to add and the front-panel Enter key to add the letter to the file name. The BK character moves you back and the FW character moves you forward in the filename. The Select key on the front panel generates a space character. When you are done entering the filename press the Done softkey. This returns back to the **File Open** dialog and menu, but does not cause the save to occur.

#### Save As Type

This field shows the file suffix for the type of file you have selected to save. For example, if you navigated here while saving State, "Mode state (\*.state)" is in the field. If you navigated here from saving Trace, ""Mode state (\*.trace)" is in the field. If you navigated here while exporting a trace data file, "Trace Data (\*.csv)" is in the field. For some file types, there is more than one choice in the dropdown, which you can select by using the up and down arrow keys and Enter.

#### Up One Level

This key corresponds to the icon of a folder with the up arrow that is in the tool bar of the dialog. When pressed, it causes the file and folder list to navigate up one level in the directory structure. The Backspace key does the same thing.

#### Create New Folder

This key corresponds to the icon of a folder with the "\*" that is in the tool bar of the dialog. When pressed, a new folder is created in the current directory with the name **New Folder** and you can enter a new folder name using the Alpha Editor.

#### Cancel

This key corresponds to the Cancel selection in the dialog. It causes the current **Save As** request to be cancelled. The ESC key does the same thing.

Key Path	Save, State
Mode	All
Notes	Brings up Save As dialog for saving a State Save Type
Initial S/W Revision	Prior to A.02.00

## Edit Register Names

You may enter a custom name on any of the Register keys, to help you remember what you are using that state to save. To do this, press the Edit Register Names key, choose the register whose name you wish to edit, and then enter the desired label using the Alpha Editor or an external PC keyboard.

The maximum number of characters that can be added is 30. In most cases, 30 characters will fit on two lines of the key.

See ["More Information" on page 1632](#)

Key Path	Save, State
Mode	All
<b>Remote Command</b>	:MMEMory:REGister:STATe:LABel <reg number>,"label" :MMEMory:REGister:STATe:LABel? <reg number>
<b>Example</b>	:MMEM:REG:STAT:LAB 1,"my label"
Notes	<reg number> is an integer from 1 to 16. If the SCPI specifies an invalid register number an error message is generated, -222,"Data out of range;Invalid register label number" "label" is a string from 0 to 30 characters in length. If a label exceeds 30 characters, an error message is generated, -150,"String data error;Label clipped to 30 characters" "label" of length 0 erases the custom label and restores the default (time and date) label. E.g.: :MMEM:REG:STAT:LAB 1,""
Dependencies	N9060A-7FP or N9060B-2FP license required to edit the register names. When the feature is not licensed, sending this command generates an error, -221,"Settings conflict;Option not available"
Preset	The names are unaffected by Preset or power cycle but are set to the default label (time and date) on a "Restore System Defaults->Misc"
Initial S/W Revision	A.11.00

## More Information

When you edit one of the register names, the time and date field will be replaced by the custom name.

If you delete all the characters in the custom name, it restores the default (time and date).

The register names are stored within the state files, but they are not part of the instrument state; that is, once you have edited a register name, loading a new state will not change that register name. Another



consequence of this is that the names will be persistent through a power cycle. Also, if a named state file is transferred to another analyzer, it will bring its custom name along with it.

If you try to edit the name of an empty register, the analyzer will first save the state to have a file to put the name in. If you load a named state file into an analyzer with older firmware it will ignore the metadata.

The \*SAV and \*RCL commands will not be affected by the custom register names, nor will the MMEM commands.

## Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

### NOTE

In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
Example	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

## Register 1 thru Register 16

Selecting any one of these register menu keys causes the State of the currently active mode to be saved to the specified Register. The registers are provided for rapid saving and recalling, since you do not need to specify a filename or navigate to a file. Each of the register menu keys annotates whether it is empty or at

what date and time it was last modified. In addition, you can use the Edit Register Names key to enter custom names for each register.

**NOTE** In products that run multiple instances of the X-Series Application, save with different register name if you do not want to overwrite the register of another running instance.

Although these 16 registers are the only registers available from the front panel, there are 128 state registers available in the instrument. Registers 17–128 are only available from the SCPI interface, using the \*SAV command.

There is one set of 128 state registers in the instrument, not one set for each Mode. When a state is saved, the Mode it was saved from is saved with it; then when it is recalled, the instrument switches to that Mode.

After the save completes, the corresponding register menu key annotation is updated with the date and time and the message "Register <register number> saved" is displayed.

Key Path	Save, State
Mode	All
<b>Example</b>	*SAV 1
Range	1–16 from front panel, 1–128 from SCPI
Readback	Date and time with seconds resolution are displayed on the key OR A custom name of up to 30 characters entered using the Edit Register Names key OR “(empty)” if no prior save operation has been performed to this register.
Initial S/W Revision	Prior to A.02.00
Modified at S/W Revision	A.11.00

### Mass Storage Catalog (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CATalog? [<directory_name>]
Notes	The string must be a valid logical path. Queries disk usage information (drive capacity, free space available) and obtains a list of files and directories in a specified directory in the following format: <numeric_value>,<numeric_value>,{<file_entry>} It returns two numeric parameters and as many strings as there are files and directories. The first parameter indicates the total amount of storage currently used in bytes. The second parameter indicates the total amount of storage available, also in bytes. The <file_entry> is a string. Each <file_entry> indicates the name, type, and size of one file in the directory list: <file_name>,<file_type>,<file_size> As the windows file system has an extension that indicates file type, <file_type> is always empty. <file_size> provides the size of the file in bytes. For directories, <file_entry> is surrounded by square brackets and both <file_type> and <file_size> are empty
Initial S/W Revision	Prior to A.02.00

## Mass Storage Change Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:CDIRectory [<directory_name>] :MMEMory:CDIRectory?
Notes	The string must be a valid logical path. Changes the default directory for a mass memory file system. The <directory_name> parameter is a string. If no parameter is specified, the directory is set to the *RST value. At *RST, this value is set to the default user data storage area, that is defined as System.Environment.SpecialFolder.Personal. Query returns full path of the default directory.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Copy (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Copies an existing file to a new file or an existing directory to a new directory. Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination. The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists. This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

## Mass Storage Device Copy (Remote Command Only)

This command transfers data to/from a file and a peripheral device.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:COPY:DEvice <source_string>,<dest_string>
Notes	The strings must be a valid logical path or a valid device keyword. If the dest_string is a device keyword, the data is copied from the source file to the device. If the source_string is a device keyword, the data is copied to the source file from the device. Valid device keywords are: SNS (smart noise source) An error is generated if the file or device is not found.

## Mass Storage Delete (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DELeTe <file_name>[,<directory_name>]
Notes	The string must be a valid logical path. Removes a file from the specified directory. The <file_name> parameter specifies the file name to be removed. This command will generate an "access denied" error if the file is in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Data (Remote Command Only)

Creates a file containing the specified data OR queries the data from an existing file.

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:DATA <file_name>, <data> :MMEMory:DATA? <file_name>
Notes	The string must be a valid logical path. The command form is MMEMory:DATA <file_name>,<data>. It loads <data> into the file <file_name>. <data> is in 488.2 block format. <file_name> is string data. The query form is MMEMory:DATA? <file_name> with the response being the associated <data> in block format.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Make Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MDIRectory <directory_name>
Notes	The string must be a valid logical path. Creates a new directory. The <directory_name> parameter specifies the name to be created. This command will generate an "access denied" error if the new directory would be in a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.
Initial S/W Revision	Prior to A.02.00

## Mass Storage Move (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:MOVE <string>,<string>[,<string>,<string>]
Notes	The string must be a valid logical path. Moves an existing file to a new file or an existing directory to a new directory.

Two forms of parameters are allowed. The first form has two parameters. In this form, the first parameter specifies the source, and the second parameter specifies the destination.

The second form has four parameters. In this form, the first and third parameters specify the source. The second and fourth parameters specify the directories. The first pair of parameters specifies the source. The second pair specifies the destination. An error is generated if the source doesn't exist or the destination file already exists.

This command will generate an "access denied" error if the destination is a restricted folder (e.g., C:\Windows) and the current user does not have Power User or Administrator privileges.

Initial S/W Revision      Prior to A.02.00

### Mass Storage Remove Directory (Remote Command Only)

Key path	SCPI Only
<b>Remote Command</b>	:MMEMory:RDIRectory <directory_name>
Notes	<p>The string must be a valid logical path.</p> <p>Removes a directory. The &lt;directory_name&gt; parameter specifies the directory name to be removed. All files and directories under the specified directory shall also be removed.</p> <p>This command will generate an "access denied" error if the folder is a restricted folder (e.g., C:\Windows) or is in a restricted folder and the current user does not have Power User or Administrator privileges.</p>
Initial S/W Revision	Prior to A.02.00

### Sequences

These keys allow you to save a Tab separated or CSV file of the setup parameters required to build a Sequence.

In order to save you must select the Save As button and choose a destination folder.

Key Path	Save, Sequences
Mode	All
<b>Remote Command</b>	:MMEM:STOR:SEquences:   SLIST   ALIST   SAAList   SSTep "MySequence.txt"
<b>Example</b>	:MMEM:STOR:SEQ:SLIST "MySequence.txt"
Notes	<p>Available file types are:</p> <ul style="list-style-type: none"> <li>-CSV (Comma delimited) (*.csv)</li> <li>-Text (Tab delimited) (*.txt)</li> </ul>
Initial S/W Revision	A.05.00

## Source Sequence

The list of parameters, that configure steps, that makes up a sequence for the Source.

The Source sequence is a sequence of flexible configurable steps that can be set anywhere in the instruments frequency range.

Key Path	Save, Sequences
Example	:MMEM:STOR:SEQ:SLIS "MySequence.txt"
Dependencies	Only available in XOBT
Initial S/W Revision	A.05.00

## Save As . . .

This menu lets you select the location where you can save the Sequence. This menu is a standard Windows® dialog with Save As menu keys. The "File Name" field in the Save As dialog is initially loaded with an automatically generated filename specific to the appropriate Save Type. The automatically generated filename is guaranteed not to conflict with any filename currently in the directory. You may replace or modify this filename using the File Name softkey. See the Quick Save key documentation for more on the automatic file naming algorithm.

The default path for all Sequence Files is:

My Documents\Sequences

Key Path	Save, Sequences
Mode	All
Notes	Brings up Save As dialog for saving a Sequence Save Type
Initial S/W Revision	A.05.00

## Data (Export)

Exporting a data file stores data from the current measurement to mass storage files. The Export Menu only contains data types that are supported by the current measurement.

Since the commonly exported data files are in .csv format, the data can be edited by you prior to importing. This allows you to export a data file, manipulate the data in Excel (the most common PC Application for manipulating .csv files) and then import it.

Selecting an Export Data menu key will not actually cause the exporting to occur, since the analyzer still needs to know where you wish to save the data. Pressing the Save As key in this menu brings up the Save As dialog and Save As menu that allows you to specify the destination file and directory. Once a filename has been selected or entered in the Open menu, the export will occur as soon as the Save key is pressed.

Key Path	Save
Mode	All

Notes	The menu is built from whatever data types are available for the mode. So the key locations in the sub menu will vary.  No SCPI command directly controls the Data Type that this key controls. The Data Type is included in the MMEM:STORe commands.
Dependencies	If a file type is not used by a certain measurement, that type is grayed out for that measurement. The key for a file type will not show at all if there are no measurements in the Mode that support it.
Preset	Is not affected by a Preset or shutdown, but is reset during Restore Mode Defaults
Readback	The data type that is currently selected
Initial S/W Revision	Prior to A.02.00

## Measurement Results

Pressing this key selects Meas Results as the data type to be exported.

The Meas Results file contains information which describes the current state of the analyzer. It is detailed in ["Meas Results File Contents" on page 1639](#) below.

Key Path	Save, Data
<b>Remote Command</b>	:MMEMory:STORe:RESults <string>
<b>Example</b>	:MMEM:STOR:RES "MeasR_0000.csv"
Notes	If the save is initiated via SCPI and the file already exists, the file will be overwritten.  The SCPI command exports Burst Power (Transmit Power) measurement results to the file specified as the parameter in the current path. The default path is My Documents\ <current mode&gt;\data\txp\results.<br=""></current> Using the C: drive is strongly discouraged, since it runs the risk of being overwritten during an instrument software upgrade.  The SCPI parameter is a quoted string that specifies the filename. Both single and double quotes are supported for any filename parameter over SCPI.
Dependencies	The current active measurement must be the Burst Power (Transmit Power) measurement to use this command.
Status Bits/OPC dependencies	Sequential – waits for the previous measurement to complete
Initial S/W Revision	Prior to A.02.00

## Meas Results File Contents

A Meas Results File contains measurement results with the following information.

- File ID string, which is "MeasResult"
- Measurement ID following Mode ID, which is "SA:TXP" for example.
- Firmware rev and model number
- Option string

- Center Frequency
- TXP\_InfoBw
- TXP\_Used\_CaptureTime

The file contains these data followed by MeasResult1 to MeasResult4 that flag the start of the measurement results. Each line of Measurement Results consists of four comma separated values from MeasResult1 value to MeasResult4 value. MeasResult1 contains the same results as MEAS/READ/FETCH:TXPower|BPOwer1; MeasResult2, MEAS/READ/FETCH:TXPower|BPOwer2;... (continues in the same manner)

Exported file is .csv file. The Meas Results file, when imported into Excel, will show the following data:

MeasResult			
SA:TXP			
A.10.53	N9030A		
526 ALV ATP B1X B1Y B25 B40 BBA CR3 CRP DCF DDA DP2 DRD EA3 EDP EMC EP1 ERC ESC ESP EXM FSA LFE LNP MAT MPB NFE NUL P26 PFR PNC RTL RTS S40 SB1 SEC SM1 TVT YAS YAV	1		
Center Frequency	1.33E+10		
TXP_InfoBw	3000000		
TXP_Used_CaptureTime	0.00064		
MeasResult1	MeasResult2	MeasResult3	MeasResult4
0			
-999			

## Save As . . .

When you press “Save As”, the analyzer brings up a Windows dialog and a menu entitled “**Save As.**” This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File . . .](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for saving files is:

For all of the Trace Data Files:

My Documents\<<mode name>\data\traces

For all of the Limit Data Files:

My Documents\<<mode name>\data\limits

For all of the Measurement Results Data Files:



My Documents\<<mode name>\data\<<measurement name>\results

For all of the Capture Buffer Data Files:

My Documents\<<mode name>\data\captureBuffer

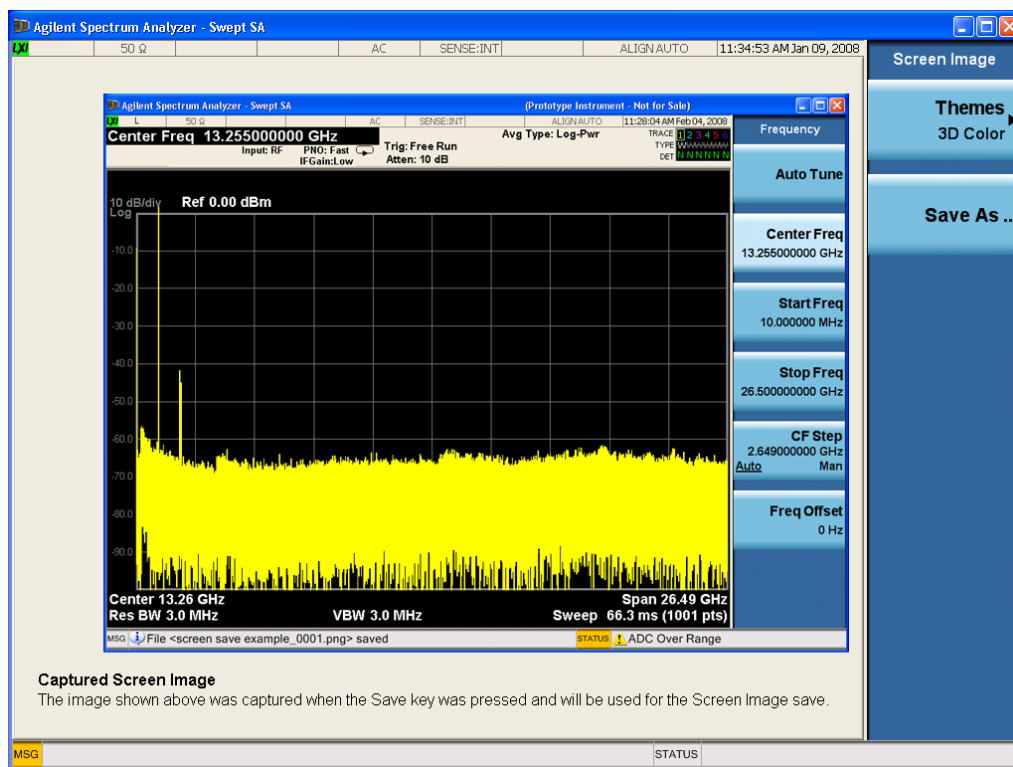
Key Path	Save, Data
Mode	All
Notes	The key location is mode-dependent and will vary. Brings up the Save As dialog for saving a <mode specific> Save Type. The save is performed immediately and does not wait until the measurement is complete.
Initial S/W Revision	Prior to A.02.00

## Screen Image

Pressing Screen Image accesses a menu of functions that enable you to specify a format and location for the saved screen image. It brings up a menu that allows you to specify the color scheme of the Screen Image (Themes) or navigate to the Save As dialog to perform the actual save.

Screen Image files contain an exact representation of the analyzer display. They cannot be loaded back onto the analyzer, but they can be loaded into your PC for use in many popular applications.

The image to be saved is actually captured when the Save front panel key is pressed, and kept in temporary storage to be used if you ask for a Screen Image save. When the Screen Image key is pressed, a "thumbnail" of the captured image is displayed, as shown below:



When you continue on into the Save As menu and complete the Screen Image save, the image depicted in the thumbnail is the one that gets saved, showing the menus that were on the screen before going into the Save menu. The save is performed immediately and does not wait until the measurement is complete.

After you have completed the save, the Quick Save front-panel key lets you quickly repeat the last save performed, using an auto-named file, with the current screen data.

**NOTE**

For versions previous to A.01.55, if you initiate a screen image save by navigating through the Save menu, the image that is saved will contain the Save menu softkeys, not the menu and the active function that were on the screen when you first pressed the Save front panel key.

Key Path	Save
Mode	All
Remote Command	:MMEMory:STORe:SCReen <filename>
Example	:MMEM:STOR:SCR "myScreen.png" This stores the current screen image in the file MyScreenFile.png in the default directory.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

Key Path	Save, Screen Image
Remote Command	:MMEMory:STORe:SCReen:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReen:THEMe?
Example	:MMEM:STOR:SCR:THEM TDM
Preset	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
Readback	3D Color   3D Mono   Flat Color   Flat Mono
Backwards Compatibility Notes	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
Initial S/W Revision	Prior to A.02.00

## 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
Readback	3D Color
Initial S/W Revision	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
Readback	3D Mono
Initial S/W Revision	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### Save As...

When you press "Save As", the analyzer brings up a Windows dialog and a menu entitled "**Save As.**" This menu allows you to navigate to the various fields in the Windows dialog without using a keyboard or mouse. The Tab and Arrow keys can also be used for dialog navigation.

See "[To File ...](#)" on page 1630 in Save, State for a full description of this dialog and menu.

The default path for Screen Images is

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Save

My Documents\`<mode name>`\screen.

where `<mode name>` is the parameter used to select the mode with the `INST:SEL` command (for example, SA for the Spectrum Analyzer).

Key Path	Save, Screen Image
Notes	Brings up Save As dialog for saving a Screen Image Save Type
Initial S/W Revision	Prior to A.02.00

## Single (Single Measurement/Sweep)

Sets the analyzer for Single measurement operation. The single/continuous state is Meas Global, so the setting will affect all the measurements. If you are Paused, pressing Single does a Resume.

See "[More Information](#)" on page 1645

Key Path	Front-panel key
Example	:INIT:CONT OFF
Notes	See Cont key description.
Backwards Compatibility Notes	<p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey and the INITiate:IMM switched from continuous measurement to single measurement and restarted sweeps and averages (displayed average count reset to 1), but did not restart Max Hold and Min Hold. In the X-Series, the Single hardkey and the INITiate:IMM command initiate a sweep/ measurement/ average sequence/hold sequence including MaxHold and MinHold.</p> <p>For Spectrum Analysis mode in ESA and PSA, the Single hardkey restarted the sweep regardless of whether or not you were in an active sweep or sweep sequence. In the X-Series, Restart does this but Single only restarts the sweep or sweep sequence if you are in the idle state.</p> <p>INIT[:IMM] in ESA &amp; PSA Spectrum Analysis Mode does an implied ABORt. In some other PSA Modes, INIT[:IMM] is ignored if not in the idle state. . The X-Series follows the ESA/PSA SA Mode model, which may cause some Modes to have compatibility problems.</p>
Initial S/W Revision	Prior to A.02.00

### More Information

See "[Restart](#)" on page 1627 for details on the INIT:IMMediate (Restart) function.

If you are already in single sweep, the INIT:CONT OFF command has no effect.

If you are already in Single Sweep, then pressing the Single key in the middle of a sweep does not restart the sweep or sequence. Similarly, pressing the Single key does not restart the sweep or sequence if the sweep is not in the idle state (for example, if you are taking a very slow sweep, or the analyzer is waiting for a trigger). Instead, it results in a message. "Already in Single, press Restart to initiate a new sweep or sequence". Even though pressing the Single key in the middle of a sweep does not restart the sweep, sending INIT:IMMediate does reset it.

To take one more sweep without resetting the average count, increment the average count by 1, by pressing the step up key while **Average/Hold Number** is the active function, or sending the remote command CALC:AVER:TCON UP.

## Source

Opens a menu of keys that access various source configuration menus and settings. In the test set, pressing this key also causes the central view area to change and display the Source Control Main view.

Key Path	Front-panel key
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## RF Output

This parameter sets the source RF power output state.

Key Path	Source
<b>Remote Command</b>	:OUTPut[:EXTErnal][:STATe] ON OFF 1 0 :OUTPut[:EXTErnal][:STATe]?
<b>Example</b>	OUTP OFF OUTP?
<b>Notes</b>	<p>The EXTErnal node is shown in RD text so the SCPI remains the same between internal and external source control. However, for EXT we do not wish to document this node to the customer since we are controlling the internal source rather than the external source.</p> <p>This setting is for the independent mode and has no effect on the <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change on front panel. When set to OFF will make source leave list sequencer and this setting will be black out and take effect immediately.</p> <p>When the RF Output is ON, an "RF" annunciator is displayed in the system settings panel. When the RF Output is turned Off, the RF annunciator is cleared. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the "RF" annunciator will be replaced by "SEQ" in the system settings panel, indicating that the output is controlled by the list sequencer.</p>
<b>Preset</b>	Off
<b>Range</b>	On   Off
<b>Initial S/W Revision</b>	A.05.00

## Amplitude

Allows you to access the Amplitude sub-menu.

Key Path	Source
<b>Notes</b>	<p>The sub-menu under this button is for independent mode and has no effect on <a href="#">"List Sequencer" on page 1725</a>. If the <a href="#">"Sequencer" on page 1726</a> is set to ON, the list sequencer controls the source output and this key will be grayed-out on front panel to indicate out-of-scope. When you set <a href="#">"Sequencer" on page 1726</a> to Off will make source leave list sequencer and this button will be black out.</p>
<b>Initial S/W Revision</b>	A.05.00

## RF Power

Allows you to adjust the power level of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Please refer to the "[RF Power Range](#) " on page 1648 table below for the valid ranges.

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer[:LEVel][:IMMediate][:AMPLitude] <ampl> :SOURce:POWer[:LEVel][:IMMediate][:AMPLitude]?
<b>Example</b>	:SOUR:POW -100 dBm
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. If the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>When signal generator is unable to maintain the requested output level, the "Source Unleveled" indicator will appear on status panel. When the source output setting is restored to the normal range, the "Source Unleveled" is removed from status panel.</p> <p>Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output power.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . This is only warning message, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to the " <a href="#">RF Power Range</a> " on page 1648 table below for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to the " <a href="#">RF Power Range</a> " on page 1648 table below for the valid ranges.
Initial S/W Revision	A.05.00

## RF Power Range

RF Output Port	Frequency Range	Min Output Power	Max Output Power
High Power RF Out	10 MHz ≤ f ≤ 6 GHz	-150 dBm	20 dBm
RFIO 1 & RFIO 2	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm
GPS (Note2)	10 MHz ≤ f ≤ 6 GHz	-150 dBm	0 dBm

Note: This is the UI power range, it's larger than actual spec.

Note2: GPS port is on the multiport adapter, or E6607C which has embedded MPA.

## Set Reference Power

This key allows you to set the power reference. Pressing this key turns the power reference state to ON, sets the reference power value to the current RF output power, maintains this power at the RF output, and sets the displayed power to 0.00 dB. All subsequent RF power values entered under Source>Amplitude>RF Power are interpreted as being relative to this reference power.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power – entered power

Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

In addition, the displayed power value is the same as a new value entered under Source>Amplitude>RF Power.

### NOTE

If Power Ref is set to ON with a reference value set, entering a value under Source>Amplitude>RF Power and pressing Set Reference Power will add that value to the existing Power Ref value.

If you wish to change the reference power value to a new value entered under Source>Amplitude>RF Power, first you must set Power Ref to OFF and then press Set Reference Power.

Key Path	Source, Amplitude
Dependencies	This key is unavailable, and is grayed out when the "List Sequencer" on page 1725 is turned ON.
Initial S/W Revision	A.05.00

## Power Ref

This key allows you to toggle the state of the power reference.

When you use a power reference, the signal generator outputs an RF power that is set relative to the reference power by the value entered under Source>Amplitude>RF Power as follows:

Output power = reference power + entered power



Where:

reference power equals the original RF Power entered under Source>Amplitude>RF Power and set as the reference power

entered power equals a new value entered under Source>Amplitude>Amptd Offset

For more information on Reference Frequency refer to ["Set Reference Power " on page 1648](#)

Key Path	Source, Amplitude
<b>Remote Command</b>	:SOURce:POWer:REFeRence <ampl> :SOURce:POWer:REFeRence? :SOURce:POWer:REFeRence:STATe OFF ON 0 1 :SOURce:POWer:REFeRence:STATe?
<b>Example</b>	:SOUR:POW:REF 0.00 dBm :SOUR:POW:REF:STATe ON
Dependencies	This setting is unavailable and is grayed out when the <a href="#">"List Sequencer" on page 1725</a> is turned ON.
Couplings	This value is coupled to the <a href="#">"Set Reference Power " on page 1648</a> key such that pressing the Set Reference Power key updates the reference power with the current output power.
Preset	0.00 dBm OFF
Min	-125.00 dBm
Max	10.00 dBm
Initial S/W Revision	A.05.00

## Amptd Offset

Allows you to specify the RF output power offset value.

When the amplitude offset is set to zero (0) and you set a new offset value (positive or negative), the displayed amplitude value will change as follows and the RF output power will not change:

Displayed value = output power + offset value

Where:

output power equals the original RF Power entered under Source>Amplitude>RF Power

offset value equals the value entered under Source>Amplitude>Amptd Offset

When the amplitude offset is set to a value other than zero (0) and you enter a new RF power value under Source>Amplitude>RF Power, the displayed power will be the same as the value entered and the RF output power will be equal to the value entered minus the offset value as follows:

Output power = entered power – offset power

Displayed Power = output power + offset power

Displayed power = entered power

Where:

entered power equals the amplitude entered under Source>Amplitude>RF Power

offset power equals the value previously entered and set under Source>Amplitude>Amptd Offset

Key Path	Source, Amplitude
Remote Command	:SOURce:POWer[:LEVel][:IMMediate]:OFFSet <rel_ampl> :SOURce:POWer[:LEVel][:IMMediate]:OFFSet?
Example	:SOUR:POW:OFFS 0.00 dB
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0.00 dB
Min	-200.00 dB
Max	200.00 dB
Initial S/W Revision	A.05.00

## Modulation

Allows you to toggle the state of the modulation.

Key Path	Source
Remote Command	:OUTPut:MODulation[:STATe] ON OFF 1 0 :OUTPut:MODulation[:STATe]?
Example	:OUTP:MOD OFF
Notes	This setting is for independent mode and has no effect on <b>"List Sequencer" on page 1725</b> . If the <b>"Sequencer" on page 1726</b> is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this setting will be none-forceful grey out on front panel to indicate out-of-scope. Non-forceful means user still can change this setting by SCPI but cannot change manually on front panel. When set to Off will make source leave list sequencer and this setting will be black out and take effect immediately. When the Modulation is ON, the "MOD" annunciator is displayed in the system settings panel. When the Modulation is turned Off, the "MOD" annunciator is cleared. If the <b>"Sequencer" on page 1726</b> is set to ON, the "MOD" annunciator will be replaced by "SEQ" in the system settings panel indicating that the output is controlled by list sequencer.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Frequency

Allows you to access the Frequency sub-menu.

Key Path	Source
Notes	The sub-menu under this button is for independent mode and has no effect on <b>"List Sequencer" on</b>

[page 1725](#). If the "Sequencer" on [page 1726](#) is set to ON, the list sequencer controls the source output and this key will be grayed-out. And this button will be grey out on front panel to indicate out-of-scope. When set to Off will make source leave list sequencer and this button will be black out.

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Initial S/W Revision      A.05.00

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## Frequency

Allows you to set the RF Output Frequency. You can adjust the frequency of the source using the numeric keypad, step keys, or RPG. Pressing any digit, 0 through 9, on the numeric keypad brings up the unit terminator.

Key Path	Source, Frequency
<b>Remote Command</b>	:SOURce:FREQuency[:CW] <freq> :SOURce:FREQuency[:CW] ?
<b>Example</b>	:SOUR:FREQ 1.00 GHz
Notes	Internal source has list sequence mode, which comprises of several steps which contain separate output power, frequency and waveform etc. When the source list sequence playing is complete, the last step keeps playing, and user can use this command to change the list sequence last step's output frequency.
Couplings	The frequency value is coupled to the current channel band and number, such that updates to the band and number will update the frequency value to the corresponding absolute frequency.
Preset	1.00 GHz If license F1A or 5WC is present, the default Center Frequency should be 2.412GHz.
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz For E6640A, if license 5WC is present, the frequency range should be limited to: 1.1GHz-1.7GHz, 2.4GHz-2.5GHz, 4.8GHz-6.0GHz. If the user-defined frequency is outside of range, UI will report an error message called "Settings conflict; Frequency is outside available range".
Initial S/W Revision	A.05.00

## Channel

The frequency of the source can be specified by a channel number of a given frequency band. This key allows you to specify the current channel number. For the appropriate range of channel numbers for a given frequency band, refer to the following tables: "[GSM/EDGE Channel Number Ranges](#)" on [page 1652](#), "[W-CDMA Channel Number Ranges](#)" on [page 1653](#), "[CDMA 2000 / 1xEVDO Channel Number Ranges](#)" on [page 1654](#), and "[LTE FDD Channel Number Ranges](#)" on [page 1656](#).

Key Path	Source, Frequency
Remote Command	:SOURCE:FREQUENCY:CHANNELS:NUMBER <int> :SOURCE:FREQUENCY:CHANNELS:NUMBER?
Example	:SOUR:FREQ:CHAN:NUMB 1
Notes	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Dependencies	This key is grayed out when the "Radio Standard" on page 1660 is set to NONE. This key is grayed out on E6630A.
Couplings	The channel number is coupled to the frequency value when the "Radio Standard" on page 1660 is not set to NONE. When the frequency value is changed, the channel number will increase or decrease to match the new frequency. If the frequency is not at an exact match for a channel number, the nearest channel number is displayed along with a greater than or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	Please refer to the tables below for the valid ranges.
Max	Please refer to the tables below for the valid ranges.
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### GSM/EDGE Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
P-GSM	Uplink (MS)	$1 \leq n \leq 124$	$890.0 + 0.2*n$
	Downlink (BS)	$1 \leq n \leq 124$	$935.0 + 0.2*n$
E-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$975 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$975 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
DCS 1800	Uplink (MS)	$512 \leq n \leq 885$	$1710.200 + 0.20*(n-512)$
	Downlink (BS)	$512 \leq n \leq 885$	$1805.200 + 0.20*(n-512)$
PCS 1900	Uplink (MS)	$512 \leq n \leq 810$	$1850.200 + 0.2*(n-512)$
	Downlink (BS)	$512 \leq n \leq 810$	$1930.200 + 0.2*(n-512)$
R-GSM	Uplink (MS)	$0 \leq n \leq 124$	$890.0 + 0.2*n$
		$955 \leq n \leq 1023$	$890.0 + 0.2*(n-1024)$
	Downlink (BS)	$0 \leq n \leq 124$	$935.0 + 0.2*n$
		$955 \leq n \leq 1023$	$935.0 + 0.2*(n-1024)$
GSM 450	Uplink (MS)	$256 \leq n \leq 293$	$450.6 + 0.2*(n-259)$
	Downlink (BS)	$256 \leq n \leq 293$	$460.6 + 0.2*(n-259)$
GSM 480	Uplink (MS)	$306 \leq n \leq 340$	$479.000 + 0.20*(n-306)$

Band	Link (Device)	Range	Frequency (MHz)
GSM 850	Downlink (BS)	$306 \leq n \leq 340$	$489.000 + 0.20*(n-306)$
	Uplink (MS)	$128 \leq n \leq 251$	$824.200 + 0.20*(n-128)$
GSM 700	Downlink (BS)	$128 \leq n \leq 251$	$869.200 + 0.20*(n-128)$
	Uplink (MS)	$438 \leq n \leq 516$	$777.200 + 0.20*(n-438)$
T-GSM810	Downlink (BS)	$438 \leq n \leq 516$	$747.200 + 0.20*(n-438)$
	Uplink (MS)	$350 \leq n \leq 425$	$806.0 + 0.20*(n-350)$
	Downlink (BS)	$350 \leq n \leq 425$	$851.0 + 0.20*(n-350)$

### W-CDMA Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
Band I	Downlink	$10562 \leq n \leq 10838$	$n \div 5$
	Uplink	$9612 \leq n \leq 9888$	$n \div 5$
Band II	Downlink	$412 \leq n \leq 687$	$n \div 5 + 1850.1$
		$9662 \leq n \leq 9938$	$n \div 5$
	Uplink	$12 \leq n \leq 287$	$n \div 5 + 1850.1$
Band III	Downlink	$350 \leq n \leq 425$	$n \div 5$
	Uplink	$1162 \leq n \leq 1513$	$n \div 5 + 1575$
Band IV	Downlink	$937 \leq n \leq 1288$	$n \div 5 + 1525$
	Uplink	$537 \leq n \leq 1738$	$n \div 5 + 1805$
Band V	Downlink	$1887 \leq n \leq 2087$	$n \div 5 + 1735.1$
		$1312 \leq n \leq 1513$	$n \div 5 + 1450$
	Uplink	$1662 \leq n \leq 1862$	$n \div 5 + 1380.1$
Band VI	Downlink	$1007 \leq n \leq 1087$	$n \div 5 + 670.1$
		$4357 \leq n \leq 4458$	$n \div 5$
	Uplink	$782 \leq n \leq 862$	$n \div 5 + 670.1$
Band VII	Downlink	$4132 \leq n \leq 4233$	$n \div 5$
		$1037 \leq n \leq 1062$	$n \div 5 + 670.1$
	Uplink	$4387 \leq n \leq 4413$	$n \div 5$
Band VIII	Downlink	$812 \leq n \leq 837$	$n \div 5 + 670.1$
		$4162 \leq n \leq 4188$	$n \div 5$
	Uplink	$2237 \leq n \leq 2563$	$n \div 5 + 2175$
Band IX	Downlink	$2587 \leq n \leq 2912$	$n \div 5 + 2105.1$
		$2012 \leq n \leq 2338$	$n \div 5 + 2100$
	Uplink	$2362 \leq n \leq 2687$	$n \div 5 + 2030.1$
Band X	Downlink	$2937 \leq n \leq 3088$	$n \div 5 + 340$
	Uplink	$2712 \leq n \leq 2863$	$n \div 5 + 340$

Band	Link (Device)	Range	Frequency (MHz)
Band IX	Downlink	$9237 \leq n \leq 9387$	$n \div 5$
	Uplink	$8762 \leq n \leq 8912$	$n \div 5$
Band X	Downlink	$3112 \leq n \leq 3388$	$n \div 5 + 1490$
		$3412 \leq n \leq 3687$	$n \div 5 + 1430.1$
	Uplink	$2887 \leq n \leq 3163$	$n \div 5 + 1135$
		$3187 \leq n \leq 3462$	$n \div 5 + 1075.1$
Band XI	Downlink	$3712 \leq n \leq 3812$	$n \div 5 + 736$
	Uplink	$3487 \leq n \leq 3587$	$n \div 5 + 733$
Band XII	Downlink	$3837 \leq n \leq 3903$	$n \div 5 - 37$
		$3927 \leq n \leq 3992$	$n \div 5 - 54.9$
	Uplink	$3612 \leq n \leq 3678$	$n \div 5 - 22$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIII	Downlink	$4017 \leq n \leq 4043$	$n \div 5 - 55$
		$4067 \leq n \leq 4092$	$n \div 5 - 64.9$
	Uplink	$3792 \leq n \leq 3818$	$n \div 5 + 21$
		$3702 \leq n \leq 3767$	$n \div 5 - 39.9$
Band XIV	Downlink	$4117 \leq n \leq 4143$	$n \div 5 - 63$
		$4167 \leq n \leq 4192$	$n \div 5 - 72.9$
	Uplink	$3892 \leq n \leq 3918$	$n \div 5 + 12$
		$3942 \leq n \leq 3967$	$n \div 5 + 2.1$
Band XIX	Downlink	$712 \leq n \leq 763$	$n \div 5 + 735$
		$787 \leq n \leq 837$	$n \div 5 + 720.1$
	Uplink	$312 \leq n \leq 363$	$n \div 5 + 770$
		$387 \leq n \leq 437$	$n \div 5 + 755.1$

### CDMA 2000 / 1xEVDO Channel Number Ranges

Band	Link (Device)	Range	Frequency (MHz)
US Cellular	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.030 \times N + 825.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 825.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 815.040$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.030 \times N + 870.000$
		$991 \leq N \leq 1023$	$0.030 \times (N - 1023) + 870.000$
		$1024 \leq N \leq 1323$	$0.030 \times (N - 1024) + 860.040$
US PCS	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1850.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$1930.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
Japan Cellular Band	Uplink (MS, reverse link)	$1 \leq N \leq 799$	$0.0125 \times (N + 915.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 898.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 887.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 893.000$
	Downlink (BS, forward link)	$1 \leq N \leq 799$	$0.0125 \times (N + 860.000)$
		$801 \leq N \leq 1039$	$0.0125 \times (N - 800) + 843.000$
		$1041 \leq N \leq 1199$	$0.0125 \times (N - 1040) + 832.000$
		$1201 \leq N \leq 1600$	$0.0125 \times (N - 1200) + 838.000$
Korean PCS Band	Uplink (MS, reverse link)	$0 \leq N \leq 599$	$0.050 \times N + 1750.000$
	Downlink (BS, forward link)	$0 \leq N \leq 599$	$0.050 \times N + 1840.000$
NMT-450 Band	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 450.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 410.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 451.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N - 1) + 460.000$
		$472 \leq N \leq 871$	$0.025 \times (N - 472) + 420.000$
		$1039 \leq N \leq 1473$	$0.020 \times (N - 1024) + 461.010$
		$1536 \leq N \leq 1715$	$0.025 \times (N - 1536) + 489.000$
IMT-2000 Band	Uplink (MS, reverse link)	$0 \leq N \leq 1199$	$1920.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1199$	$2100.000 + 0.050 \times N$
Upper 700 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$776.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 240$	$746.000 + 0.050 \times N$
Secondary 800 MHz Band	Uplink (MS, reverse link)	$0 \leq N \leq 719$	$0.025 \times N + 806.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 896.000$
	Downlink (BS, forward link)	$0 \leq N \leq 719$	$0.025 \times N + 851.000$
		$720 \leq N \leq 919$	$0.025 \times (N - 720) + 935.000$
2.5 GHz IMT Extension	Uplink (MS, reverse link)	$0 \leq N \leq 1399$	$2500.000 + 0.050 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 1399$	$2620.000 + 0.050 \times N$
US PCS 1.9 GHz	Uplink (MS, reverse link)	$0 \leq N \leq 1299$	$1850.000 + 0.050 \times N$

Band	Link (Device)	Range	Frequency (MHz)
AWS	Downlink (BS, forward link)	$0 \leq N \leq 1299$	$1930.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 899$	$1710.000 + 0.050 \times N$
US 2.5 GHz	Downlink (BS, forward link)	$0 \leq N \leq 899$	$2100.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$140 \leq N \leq 1459$	$2495.000 + 0.050 \times N$
700 Public Safety	Downlink (BS, forward link)	$140 \leq N \leq 1459$	$2617.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 240$	$787.000 + 0.050 \times N$
C2K Lower 700	Downlink (BS, forward link)	$0 \leq N \leq 240$	$757.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$0 \leq N \leq 360$	$698.000 + 0.050 \times N$
400 Euro PAMR	Downlink (BS, forward link)	$0 \leq N \leq 360$	$728.000 + 0.050 \times N$
	Uplink (MS, reverse link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 450.000$
	Uplink (MS, reverse link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 410.000$
	Uplink (MS, reverse link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 479.000$
	Downlink (BS, forward link)	$1 \leq N \leq 400$	$0.025 \times (N-1) + 460.000$
	Downlink (BS, forward link)	$472 \leq N \leq 871$	$0.025 \times (N-472) + 420.000$
	Downlink (BS, forward link)	$1536 \leq N \leq 1715$	$0.025 \times (N-1536) + 489.000$
	Downlink (BS, forward link)		
800 PAMR	Uplink (MS, reverse link)	$0 \leq N \leq 239$	$870.0125 + 0.025 \times N$
	Downlink (BS, forward link)	$0 \leq N \leq 239$	$915.0125 + 0.025 \times N$

### LTE FDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4–1 and ND L is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$



The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4-1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
1		2110	0	0 - 599	1920	18000 - 18599
2		1930	600	600 - 1199	1850	18600 - 19199
3		1805	1200	1200 - 1949	1710	19200 - 19949
4		2110	1950	1950 - 2399	1710	19950 - 20399
5		869	2400	2400 - 2649	824	20400 - 20649
6		875	2650	2650 - 2749	830	20650 - 20749
7		2620	2750	2750 - 3449	2500	20750 - 20449
8		925	3450	3450 - 3799	880	21450 - 21799
9		1844.9	3800	3800 - 4149	1749.9	21800 - 22149
10		2110	4150	4150 - 4749	1710	22150 - 22749
11		1475.9	4750	4750 - 4949	1427.9	22750 - 22949
12		729	5010	5010 - 5179	699	23010 - 23179
13		746	5180	5180 - 5279	777	23180 - 23279
14		758	5280	5280 - 5379	788	23280 - 23379
...						
17		734	5730	5730 - 5849	704	23730 - 23849
18		860	5850	5850 - 5999	815	23850 - 23999
19		875	6000	6000 - 6149	830	24000 - 24149
20		791	6150	6150 - 6449	832	24150 - 24449
21		1495.9	6450	6450 - 6599	1447.9	24450 - 24599
...						
24		1525	7700	7700 - 8039	1626.5	25700 - 26039
25		1930	8040	8040 - 8689	1850	26040 - 26689
26		859	8690	8690 - 9039	814	26690 - 27039
...						

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

### LTE TDD Channel Number Ranges

The carrier frequency in the uplink and downlink is designated by the E-UTRA Absolute Radio Frequency Channel Number (EARFCN) in the range 0 – 65535. The relation between EARFCN and the carrier frequency in MHz for the downlink is given by the following equation, where FDL\_low and NOffs-DL are given in table 5.4.4–1 and NDL is the downlink EARFCN.

$$FDL = FDL\_low + 0.1(NDL - NOffs-DL)$$

The relation between EARFCN and the carrier frequency in MHz for the uplink is given by the following equation where FUL\_low and NOffs-UL are given in table 5.4.4–1 and NUL is the uplink EARFCN.

$$FUL = FUL\_low + 0.1(NUL - NOffs-UL)$$

Band	Downlink		Uplink			
	FDL_low (MHz)	NOffs-DL	Range of NDL	FUL_low (MHz)	NOffs-UL	Range of NUL
33		1900	36000	36000 – 36199	1900	36000 – 36199
34		2010	36200	36200 – 36349	2010	36200 – 36349
35		1850	36350	36350 – 36949	1850	36350 – 36949
36		1930	36950	36950 – 37549	1930	36950 – 37549
37		1910	37550	37550 – 37749	1910	37550 – 37749
38		2570	37750	37750 – 38249	2570	37750 – 38249
39		1880	38250	38250 – 38649	1880	38250 – 38649
40		2300	38650	38650 – 39649	2300	38650 – 39649
41		2496	39650	39650 – 41589	2496	39650 – 41589
42		3400	41590	41590 – 43589	3400	41590 – 43589
43		3600	43590	43590 – 45589	3600	43590 – 45589

Note: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively.

### TDSCDMA Channel Number Ranges

#### 1.28 Mcps TDD Option

No TX-RX frequency separation is required as Time Division Duplex (TDD) is employed. Each subframe consists of 7 main timeslots where all main timeslots (at least the first one) before the single switching point are allocated DL and all main timeslots (at least the last one) after the single switching point are allocated UL.

The nominal channel spacing is 1.6 MHz, but this can be adjusted to optimise performance in a particular deployment scenario.

The carrier frequency is designated by the UTRA absolute radio frequency channel number (UARFCN). The value of the UARFCN in the IMT2000 band is defined in the general case as follows:

$$N_t = 5 * F \quad 0.0 \text{ MHz} \leq F \leq 3276.6 \text{ MHz}$$

where F is the carrier frequency in MHz

Additional channels applicable to operation in the frequency band defined in sub-clause 5.2(d) are defined via the following UARFCN definition:

$$N_t = 5 * (F - 2150.1 \text{ MHz}) \quad 2572.5 \text{ MHz} \leq F \leq 2617.5 \text{ MHz}$$

UARFCN

1.28 Mcps TDD Option

The following UARFCN range shall be supported for each band:

**Table: UTRA Absolute Radio  
Frequency Channel Number 1.28  
Mcps TDD Option**

Frequency Band	Frequency Range	UARFCN Uplink and Downlink transmission
For operation in frequency band as defined in subclause 5.2 (a)	1900–1920 MHz	9504 to 9596
	2010–2025 MHz	10054 to 10121
For operation in frequency band as defined in subclause 5.2 (b)	1850–1910 MHz	9254 to 9546
	1930–1990 MHz	9654 to 9946
For operation in frequency band as defined in subclause 5.2 (c)	1910–1930 MHz	9554 to 9646
For operation in frequency band as defined in subclause 5.2 (d)	2570–2620 MHz	12854 to 13096
For operation in frequency band as defined in subclause 5.2 (e)	2300–2400 MHz	11504 to 11996
For operation in frequency band as defined in subclause 5.2 (f)	1880–1920 MHz	9404 to 9596

## Radio Setup

Allows access to the sub-menus for selecting the radio standard and associated radio band. You can also set a frequency reference and offset.

This menu is greyed out when on E6630A. Radio band settings for GSM, cdma2000, and so on -- most of which are not actually supported in E6630A, which has three narrow frequency bands. So band settings are grayed out.

Key Path	Source, Frequency
Initial S/W Revision	A.05.00

## Radio Standard

Allows access to the channel band sub-menus to select the desired radio standard. When you have selected the radio standard, you can then set an active channel band. The radio standard and the active channel band allow you to use channel numbers to set frequency automatically.

Key Path	Source, Frequency, Radio Setup
Remote Command	:SOURce:FREQuency:CHANnels:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38   BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF  :SOURce:FREQuency:CHANnels:BAND?
Example	:SOUR:FREQ:CHAN:BAND PGSM
Notes	Set this setting to "NONE" will grey out "Channel" on page 1651 Channel
Initial S/W Revision	A.05.00

### None

Selects no radio standard for use. When you have selected the radio standard to NONE, you cannot use channel numbers to set frequency automatically. You will need to set the frequency manually.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### GSM/EDGE

Sets GSM/EDGE as the radio standard for use and accesses the GSM/EDGE specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### P-GSM

Selects P-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
Example	:SOUR:FREQ:CHAN:BAND PGSM
Initial S/W Revision	A.05.00

**E-GSM**

Selects E-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND EGSM
Initial S/W Revision	A.05.00

**R-GSM**

Selects R-GSM as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND RGSM
Initial S/W Revision	A.05.00

**DCS 1800**

Selects DCS 1800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND DCS1800
Initial S/W Revision	A.05.00

**PCS 1900**

Selects PCS 1900 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1900
Initial S/W Revision	A.05.00

**GSM 450**

Selects GSM 450 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM450
Initial S/W Revision	A.05.00

12 Burst Power (Transmit Power)  
Source

### GSM 480

Selects GSM 480 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM480
Initial S/W Revision	A.05.00

### GSM 850

Selects GSM 850 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM850
Initial S/W Revision	A.05.00

### GSM 700

Selects GSM 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND GSM700
Initial S/W Revision	A.05.00

### T-GSM 810

Selects T-GSM 810 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, GSM/EDGE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND T-GSM810
Initial S/W Revision	A.05.00

### WCDMA

Sets WCDMA as the radio standard for use and accesses the W-CDMA specific channel band sub-menus.

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### Band I

Selects Band I as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDI
Initial S/W Revision	A.05.00

**Band II**

Selects Band II as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDII
Initial S/W Revision	A.05.00

**Band III**

Selects Band III as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIII
Initial S/W Revision	A.05.00

**Band IV**

Selects Band IV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIV
Initial S/W Revision	A.05.00

**Band V**

Selects Band V as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDV
Initial S/W Revision	A.05.00

**Band VI**

Selects Band VI as the active channel band.

## 12 Burst Power (Transmit Power) Source

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVI
Initial S/W Revision	A.05.00

### Band VII

Selects Band VII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVII
Initial S/W Revision	A.05.00

### Band VIII

Selects Band VIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDVIII
Initial S/W Revision	A.05.00

### Band IX

Selects Band IX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDIX
Initial S/W Revision	A.05.00

### Band X

Selects Band X as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDX
Initial S/W Revision	A.05.00

### Band XI

Selects Band XI as the active channel band.



Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXI
Initial S/W Revision	A.05.00

**Band XII**

Selects Band XII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXII
Initial S/W Revision	A.05.00

**Band XIII**

Selects band XIII as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIII
Initial S/W Revision	A.05.00

**Band XIV**

Selects Band XIV as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIV
Initial S/W Revision	A.05.00

**Band XIX**

Selects Band XIX as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, WCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDXIX
Initial S/W Revision	A.14.50

**CDMA 2000 / 1xEVDO**

Sets CDMA 2000 / 1XEVDO as the radio standard for use and accesses the CDMA 2000/1xEVDO specific channel band sub-menus.

12 Burst Power (Transmit Power)  
Source

---

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

---

US CELL

Selects US Cell as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND USCELL
Initial S/W Revision	A.05.00

---

US PCS

Selects US PCS as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS
Initial S/W Revision	A.05.00

---

Japan Cell

Selects Japan Cell as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND JAPAN
Initial S/W Revision	A.05.00

---

Korean PCS

Selects Korean PCS as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND KOREAN
Initial S/W Revision	A.05.00

---

NMT 450

Selects NMT 450 as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND NMT
Initial S/W Revision	A.05.00

#### IMT 2000

Selects IMT 2000 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMT2K
Initial S/W Revision	A.05.00

#### Upper 700

Selects Upper 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND UPPER
Initial S/W Revision	A.05.00

#### Secondary 800

Selects Secondary 800 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND SECOND
Initial S/W Revision	A.05.00

#### 400 Euro PAMR

Selects 400 Euro PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR400
Initial S/W Revision	A.05.00

#### 800 PAMR

Selects 800 PAMR as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

12 Burst Power (Transmit Power)  
Source

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PAMR800
Initial S/W Revision	A.05.00

---

2.5GHz IMT EXT

Selects 2.5 GHz IMT EXT as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND IMTEXT
Initial S/W Revision	A.05.00

---

US PCS 1.9GHz

Selects US PCS 1.9 GHz as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND PCS1DOT9G
Initial S/W Revision	A.05.00

---

AWS

Selects AWS as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND AWS
Initial S/W Revision	A.05.00

---

US 2.5GHz

Selects US 2.5 GHz as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND US2DOT5G
Initial S/W Revision	A.05.00

---

700 Public Safety

Selects 700 Public Safety as the active channel band.

---

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
----------	--

---

<b>Example</b>	:SOUR:FREQ:CHAN:BAND PUBLIC
Initial S/W Revision	A.05.00

### C2K Lower 700

Selects C2K Lower 700 as the active channel band.

Key Path	Source, Frequency, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
<b>Example</b>	:SOUR:FREQ:CHAN:BAND LOWER
Initial S/W Revision	A.05.00

### LTE

Sets LTE FDD as the radio standard for use and accesses the LTE FDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

### BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND1
Initial S/W Revision	A.09.50

### BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND2
Initial S/W Revision	A.09.50

### BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND3
Initial S/W Revision	A.09.50

#### BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND4
Initial S/W Revision	A.09.50

#### BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND5
Initial S/W Revision	A.09.50

#### BAND 6

Selects BAND 6 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND6
Initial S/W Revision	A.09.50

#### BAND 7

Selects BAND 7 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND7
Initial S/W Revision	A.09.50

#### BAND 8

Selects BAND 8 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND8
Initial S/W Revision	A.09.50

**BAND 9**

Selects BAND 9 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND9
Initial S/W Revision	A.09.50

**BAND 10**

Selects BAND 10 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND10
Initial S/W Revision	A.09.50

**BAND 11**

Selects BAND 11 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND11
Initial S/W Revision	A.09.50

**BAND 12**

Selects BAND 12 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND12
Initial S/W Revision	A.09.50

**BAND 13**

Selects BAND 13 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND13
Initial S/W Revision	A.09.50

#### BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND14
Initial S/W Revision	A.09.50

#### BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND17
Initial S/W Revision	A.09.50

#### BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND18
Initial S/W Revision	A.09.50

#### BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND19
Initial S/W Revision	A.09.50

#### BAND 20

Selects BAND 20 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND20
Initial S/W Revision	A.09.50



**BAND 21**

Selects BAND 21 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND21
Initial S/W Revision	A.09.50

**BAND 24**

Selects BAND 24 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND24
Initial S/W Revision	A.09.50

**BAND 25**

Selects BAND 25 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND25
Initial S/W Revision	A.09.50

**BAND 26**

Selects BAND 26 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND26
Initial S/W Revision	A.12.53

**BAND 27**

Selects BAND 27 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND27
Initial S/W Revision	A.14.00

12 Burst Power (Transmit Power)  
Source

### BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND28
Initial S/W Revision	A.14.00

### BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND31
Initial S/W Revision	A.14.00

### LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

### BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

### BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

### BAND 35

Selects BAND 35 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

**BAND 36**

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

**BAND 37**

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

**BAND 38**

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

**BAND 39**

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

**BAND 40**

Selects BAND 40 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

#### BAND 41

Selects BAND 41 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

#### BAND 42

Selects BAND 42 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

#### BAND 43

Selects BAND 43 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

#### BAND 44

Selects BAND 44 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND44
Initial S/W Revision	A.14.00

#### TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND A**

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

**BAND B**

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

**BAND C**

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

**BAND D**

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

**BAND E**

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

## BAND F

Selects BAND F as the band for the current step.

<b>Key Path</b>	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

## Radio Band Link

Allows you to specify the channel band type as either uplink or downlink link direction. This value is used in conjunction with the channel band and channel number to determine the absolute frequency output by the source. When set to “Uplink”, the source will calculate the uplink frequency using an uplink formula together with the selected channel band and channel number . When set to “Downlink”, the source will calculate the downlink frequency using a downlink formula together with the selected channel band and channel number.

<b>Key Path</b>	Source, Frequency, Radio Setup
<b>Remote Command</b>	:SOURce:RADio:BAND:LINK DOWN UP :SOURce:RADio:BAND:LINK?
<b>Example</b>	:SOUR:RAD:BAND:LINK UP
Preset	DOWN
Range	DOWN   UP
<b>Backwards Compatibility SCPI</b>	:SOURce:RADio:DEVIce BTS MS :SOURce:RADio:DEVIce?
<b>Backwards Compatibility Notes</b>	BTS maps to the Downlink frequency MS maps to the Uplink frequency
Initial S/W Revision	A.05.00

## Set Reference Frequency

This key allows you to set the frequency reference. Pressing this key turns the frequency reference state to ON, sets the reference frequency value to the current frequency, maintains this frequency at the RF output, and sets the displayed frequency to 0.00 Hz. All subsequent frequencies entered under Source>Frequency>Frequency are interpreted as being relative to this reference frequency.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency - entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

In addition, the displayed frequency value will be the same as the value entered under Source>Frequency>Frequency.

**NOTE**

If Freq Reference is set to ON with a reference value set, entering a value under Source>Frequency>Frequency and pressing Set Frequency Reference will add that value to the existing Freq Reference value.

If you wish to change the reference frequency value to the new value entered under Source>Frequency>Frequency, first you must set Freq Reference to OFF and then press Set Frequency Reference.

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFeRence:SET
Example	:SOUR:FREQ:REF:SET
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Initial S/W Revision	A.05.00

## Freq Reference

This key allows you to toggle the state of the frequency reference. When the frequency reference state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When you use a frequency reference, the signal generator outputs a frequency that is set relative to the reference frequency by the value entered under Source>Frequency>Frequency as follows:

Output frequency = reference frequency + entered frequency

Where:

reference frequency equals the original RF frequency entered under Source>Frequency>Frequency and set as the reference frequency

entered frequency equals a new value entered under Source>Frequency>Frequency

For more information on Reference Frequency refer to ["Set Reference Frequency" on page 1678](#)

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:REFeRence <freq> :SOURce:FREQuency:REFeRence? :SOURce:FREQuency:REFeRence:STATe OFF ON 0 1 :SOURce:FREQuency:REFeRence:STATe?
Example	:SOUR:FREQ:REF 0.00 Hz

	:SOUR:FREQ:REF:STATe ON
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Couplings	The frequency reference state is coupled to the frequency reference set immediate action. When the reference set immediate action key is pressed, or the SCPI command issued, it turns the frequency reference state ON.
Preset	0.00 Hz OFF
Min	0.00 Hz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.8 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Freq Offset

Allows you to specify the frequency offset value. When the frequency offset state is ON, an annunciator is displayed on the main source view to indicate this state to the user.

When the frequency offset is set to zero (0) and you set a new offset value, the displayed frequency value will change as follows and the RF output frequency will not change:

Displayed value = output frequency + offset value

Where:

output frequency equals the original frequency entered under Source>Frequency>Frequency

offset value equals the value entered under Source>Frequency>Freq Offset

When the frequency offset is set to a value other than zero (0) and you enter a new frequency value under Source>Frequency>Frequency, the displayed frequency will be the same as the value entered and the RF output frequency will be equal to the value entered minus the offset value as follows:

Output frequency = entered frequency – offset frequency

Displayed frequency = output frequency + offset frequency

Displayed frequency = entered frequency

Where:

entered frequency equals the frequency entered under Source>Frequency>Frequency

offset frequency equals the value previously entered and set under Source>Frequency>Freq Offset

Key Path	Source, Frequency
Remote Command	:SOURce:FREQuency:OFFSet <freq>



	:SOURce:FREQuency:OFFSet?
<b>Example</b>	:SOUR:FREQ:OFFS 0 Hz
Dependencies	This setting is unavailable, and is grayed out when the List Sequencer is turned ON.
Preset	0 Hz
Min	-100.00 GHz
Max	100.00 GHz
Initial S/W Revision	A.05.00

## Modulation Setup

Allows access to the menus for setting up the available modulation types: "ARB" on page 1681, "AM" on page 1722, "FM" on page 1723, and "PM" on page 1724.

Key Path	Source
Initial S/W Revision	A.05.00

## ARB

Allows you access to the ARB sub-menus.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## ARB

Allows you to toggle the state of the ARB function. When the ARB is On, a "MOD" annunciator is displayed in the system settings panel. When the ARB is turned Off, the MOD annunciator is cleared

Key Path	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB[:STATe] ON OFF 1 0 :SOURce:RADio:ARB[:STATe]?
<b>Example</b>	:SOUR:RAD:ARB OFF :SOUR:RAD:ARB?
Notes	If the ARB is ON, a user then loads or deletes another file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.
Dependencies	This setting is for independent mode and has no effect on 3.3.8 list sequencer mode. Setting "Sequencer" on page 1726Sequencer to On will put source enter list sequencer mode, and even if ARB state is On, the ARB file will not be played. Setting "Sequencer" on page 1726Sequencer to Off will make source leave list sequencer mode, and this setting will take effect immediately.

The ARB can only be turned on when there is a waveform file selected for playback. On the GUI if no waveform is selected, this key is grayed out. If you send the SCPI command to turn the ARB on with no waveform selected for playback, the ARB state remains OFF and an error is generated. “-

When you try to recall a certain set of states in which the selected waveform is not in ARB memory and the ARB state is On, errors are reported

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to access to the waveform selection sub-menus.

Pressing this key changes the central view area to show the Waveform File Selection view.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Select Waveform

Allows you to select a waveform sequence or segment for the dual ARB to play.

NOTE: Selecting a waveform file does not result in automatic adjustments to burst timing (to compensate for the presence or absence of a Multiport Adapter); that adjustment occurs only when a waveform is loaded to ARB memory. See "Load Segment to ARB Memory" for more information about this adjustment.

Key Path	Source, Modulation Setup, ARB, Select Waveform
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Remote Command	:SOURce:RADio:ARB:WAVeform <string> :SOURce:RADio:ARB:WAVeform?
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Example	:SOUR:RAD:ARB:WAV "test_waveform.bin"
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Notes	<p>If intended waveform is not in the memory yet, then issuing this command by SCPI will invoke ARB loading operation first, which involves a delay of unpredictable length. So this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; - specifies the name of the waveform segment or waveform sequence to be played by the ARB.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, if the you attempt to play a waveform sequence but not all the required waveform segments are in the ARB playback memory, the application will reject the loading operation with an error is generated .</p> <p>When Include Source is No, if you attempt to play a waveform sequence but not all the required waveform segments are contained in the ARB playback memory, the application will attempt to load the required segments from either the default directory of the current directory. If the ARB memory does not have enough space for all the waveform segments to be loaded, an error is generated and</p>
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none of the waveform segments is loaded.

If the ARB is ON, and you attempt to play a waveform sequence but not all the waveform segments within the sequence could be found to be loaded into ARB memory, an error is generated. The selected waveform keeps the previous value and ARB state remains On.

If you specify a waveform segment over SCPI but the waveform segment is not present within ARB playback memory and cannot be found for auto loading within the current directory or the default directory, an error is generated and the file selection remains unchanged.

If you select a waveform for playback and the waveform requires a license that is not installed on the instrument, an error is generated.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

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Key Path	Source, Modulation Setup, ARB, Select Waveform
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Initial S/W Revision	A.05.00
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### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
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<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms,</p>

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when the ARB memory is full, the copy ceases, and an error is generated.  
 If you specify a directory over SCPI, but the directory does not exist, an error is generated.  
 If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

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### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

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### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

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Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

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### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURCE:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURCE:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Query ARB Memory File List (Remote Command Only)

Queries the test set for the list of waveform segments in the ARB memory.

**NOTE**

This command returns a string for waveform segment names in ARB memory. If you want a string list of waveform segments in the ARB memory, use "[Query ARB Memory Full File List \(Remote Command Only\)](#)" on page 1687.

<b>Remote Command</b>	:SOURce:RADio:ARB:CATalog?
<b>Example</b>	:SOUR:RAD:ARB:CATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <string> ... - comma separated list of waveform segments within ARB memory
<b>Initial S/W Revision</b>	A.05.00

### Query ARB Memory Full File List (Remote Command Only)

Queries the test set for the string list of waveform segments in the ARB memory. It returns a string list for waveform segment names in the ARB memory.

<b>Remote Command</b>	:SOURce:RADio:ARB:FCATalog?
<b>Example</b>	:SOUR:RAD:ARB:FCATalog?
<b>Notes</b>	The return data is in the following format: <integer> - memory used <integer> - memory free <integer> - file count in ARB memory <string>,<string>, ... <string> - comma separated string list of waveform segments within ARB memory Example: SOUR:RAD:ARB:FCAT? EXT returns: 27499,2069653,3,"c2k.wfm","gsm.wfm","wcdma.wfm"
<b>Initial S/W Revision</b>	A.09.00

### ARB Setup

Allows access to the ARB setup sub-menus.

<b>Key Path</b>	Source, Modulation Setup, ARB
<b>Initial S/W Revision</b>	A.05.00

### Sample Rate

Allows you to set the ARB waveform playback sample rate.

12 Burst Power (Transmit Power)  
Source

<b>Key Path</b>	Source, Modulation Setup, ARB, ARB Setup
<b>Remote Command</b>	:SOURce:RADio:ARB:SCLock:RATE <freq> :SOURce:RADio:ARB:SCLock:RATE?
<b>Example</b>	:SOUR:RAD:ARB:SCL:RATE 48.00 MHz
<b>Notes</b>	If there is a sample rate specified in the header of the waveform file, changing that sample rate is not recommended, as it may cause problems with burst timing.
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The sample rate is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the sample rate is updated with the value from the header file. The sample rate will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	125.00 MHz
<b>Min</b>	1.00 kHz
<b>Max</b>	125.00 MHz
<b>Initial S/W Revision</b>	A.05.00

### Run-Time Scaling

Allows you to adjust the run-time scaling value. The run-time scaling value is applied in real-time while the waveform is playing.

<b>Key Path</b>	Source, Modulation Setup, ARB, ARB Setup
<b>Remote Command</b>	:SOURce:RADio:ARB:RSCaling <real> :SOURce:RADio:ARB:RSCaling?
<b>Example</b>	:SOUR:RAD:ARB:RSC 100.00
<b>Notes</b>	This setting cannot be set in E6640A. Grey out on menu and the value is fixed at 70.00%.
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The run-time scaling is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the run-time scaling is updated with the value from the header file. The run-time scaling will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	70.00 %
<b>Min</b>	1.00 %
<b>Max</b>	100.00 %
<b>Initial S/W Revision</b>	A.05.00

### Baseband Freq Offset

Allows you to adjust the value by which the baseband frequency is offset relative to the carrier.



Key Path	Source, Modulation Setup, ARB, ARB Setup
Remote Command	:SOURce:RADio:ARB:BASEband:FREQuency:OFFSet <freq> :SOURce:RADio:ARB:BASEband:FREQuency:OFFSet?
Example	:SOUR:RAD:ARB:BAS:FREQ:OFFS 0.00 Hz
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The baseband frequency offset is one of the values stored within the header file. If the newly selected waveform has an associated header file, the baseband frequency offset is updated with the value from the header file. The baseband frequency offset will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	0.00 Hz
Min	-50.00 MHz
Max	50.00 MHz
Initial S/W Revision	A.05.00

### Trigger Type

Allows access to the trigger type sub-menus. The setting for trigger type determines the behavior of the waveform when it plays.

Key Path	Source, Modulation Setup, ARB
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE CONTInuous   SINGLE   SADVance GATE :SOURce:RADio:ARB:TRIGger:TYPE?
Example	:SOUR:RAD:ARB:TRIG:TYPE CONT :SOUR:RAD:ARB:TRIG:TYPE?
Notes	Gated trigger type will be implemented at a later release
Preset	CONTInuous
Range	Continuous   Single   Seg Adv   Gated
Initial S/W Revision	A.05.00

### Continuous

Sets the active trigger type to Continuous. If Continuous is already selected as the active trigger type, pressing this key allows access to the continuous trigger type setup menu. In Continuous trigger mode, the waveform repeats continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type
Remote Command	:SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE   TRIGger   RESet :SOURce:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
Example	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Preset	FREE

Range	Free Run   Trigger + Run   Reset + Run
Initial S/W Revision	A.05.00

### Free Run

Selects Free Run as the trigger response for the continuous trigger type. Free Run sets the waveform generator to play a waveform sequence or segment continuously, without waiting for a trigger. In this mode, the waveform generator does not respond to triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT FREE
Initial S/W Revision	A.05.00

### Trigger + Run

Sets Trigger and Run as the trigger response for the continuous trigger type. Trigger and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received, and to ignore any subsequent triggers.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT TRIG
Initial S/W Revision	A.05.00

### Reset + Run

Sets Reset and Run as the trigger response for the continuous trigger type. Reset and Run sets the waveform generator to play a waveform sequence or segment continuously when the first trigger is received. Subsequent triggers reset the waveform sequence or segment to the start, and then play it continuously.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Continuous
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:CONT RES
Initial S/W Revision	A.05.00

### Single

Sets the active trigger type to Single. If Single is already selected as the active trigger type, pressing this key allows access to the single trigger type setup menu. In Single trigger mode, the waveform plays once.

Key Path	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:RETRigger ON OFF IMMediate

	:SOURce:RADio:ARB:RETRigger?
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Notes	ON: Buffered Trigger OFF: No Retrigger Immediate: Restart on Trigger This is defined as an enumerated SCPI command, with ON OFF being considered as enumerated types rather than Boolean. This means the query will return OFF instead of 0, and ON instead of 1.
Preset	ON
Range	No Retrigger   Buffered Trigger   Restart on Trigger
Initial S/W Revision	A.05.00

### No Retrigger

Selects No Retrigger as the trigger response for single trigger type. No Retrigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. Any triggers then received during playback are ignored.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR OFF
Initial S/W Revision	A.05.00

### Buffered Trigger

Selects Buffered Trigger as the trigger response for single trigger type. Buffered Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator plays the sequence or segment to the end, then plays the sequence or segment once more.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR ON
Initial S/W Revision	A.05.00

### Restart on Trigger

Selects Restart on Trigger as the trigger response for single trigger type. Restart on Trigger sets the waveform generator to play a waveform sequence or segment once when a trigger is received. If a trigger is received during playback, the waveform generator resets and plays the sequence or segment from the start.

Key Path	Source, Modulation Setup, ARB, Trigger Type, Single
<b>Example</b>	:SOUR:RAD:ARB:RETR IMM
Initial S/W Revision	A.05.00

### Segment Advance

Sets the active trigger type to Segment Advance. If Segment Advance is already selected as the active trigger type, pressing this key allows access to the segment advance trigger type setup menu.

Segment Advance triggering allows you to control the playback of waveform segments within a waveform sequence. When a trigger is received the ARB advances to the next waveform segment within the waveform sequence. This type of triggering ignores the repetition count for the waveform segment within the waveform sequence. For example, if a waveform segment has a repetition count of 10 and you select single segment advance triggering mode, the waveform segment will only play once.

Segment Advance triggering can also be used for waveform segments only. In this situation the same waveform segment is played again when a trigger is received.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE   CONTInuous :SOURce:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Preset</b>	CONTInuous
<b>Range</b>	Single   Continuous
<b>Initial S/W Revision</b>	A.05.00

### Single

Selects Single as the trigger response for Segment Advance trigger type. With single selected, once a trigger is received a segment is played once. If a trigger is received during playback of a segment, the segment plays to completion and the next segment is played once.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV SING
<b>Initial S/W Revision</b>	A.05.00

### Continuous

Selects Continuous as the trigger response for Segment Advance trigger type. With continuous selected, once a trigger is received a segment is played continuously. When subsequent triggers are received, the currently playing segment plays to completion and then the next segment is played continuously.

<b>Key Path</b>	Source, Modulation Setup, ARB, Trigger Type, Segment Advance
<b>Example</b>	:SOUR:RAD:ARB:TRIG:TYPE:SADV CONT
<b>Initial S/W Revision</b>	A.05.00

## Trigger Source

Allows access to the trigger source sub-menus. The trigger source setting determines how the source receives the trigger that starts the waveform playing. Therefore, this key is grayed out if the trigger type is free run, since free run triggers immediately with no trigger source required.

Key Path	Source, Modulation Setup, ARB
<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger[:SOURce] KEY BUS EXTernal2 :SOURce:RADio:ARB:TRIGger[:SOURce]?
<b>Example</b>	:SOUR:RAD:ARB:TRIGger KEY
Dependencies	This key is grayed out if the current trigger type is Continuous, Free Run.
Preset	EXTernal2
Range	Trigger Key   Bus   External 2
Initial S/W Revision	A.05.00

## Trigger Key

Sets the current trigger source to the front panel Trigger key. When Trigger Key is selected, the waveform is triggered when you press the front panel Trigger key.

Key Path	Source, Modulation Setup, ARB, Trigger Source
<b>Example</b>	:SOUR:RAD:ARB:TRIGger KEY
Initial S/W Revision	A.05.00

## Bus

Sets the current trigger source to Bus. Selecting Bus trigger source enables triggering over GPIB, LAN, or USB using the :SOURce:RADio:ARB:TRIGger:INITiate command.

Key Path	Source, Modulation Setup, ARB, Trigger Source
<b>Example</b>	:SOUR:RAD:ARB:TRIGger BUS
Initial S/W Revision	A.05.00

## External 2

Sets the current trigger source to External 2. Selecting External 2 enables triggering a waveform by an externally applied signal.

Key Path	Source, Modulation Setup, ARB, Trigger Source
<b>Example</b>	:SOUR:RAD:ARB:TRIGger EXT2
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

### Trigger Initiate

Used to initiate an immediate trigger event if the trigger source is set to Trigger Key.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Waveform Sequences

Allows access to the waveform sequence sub-menus. Pressing this key changes the central view area to display the Waveform Sequence List view.

Key Path	Source, Modulation Setup, ARB
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Build New Sequence

Allows access to the sub-menus for creating a new waveform sequence. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, SCPI front panel only.
Initial S/W Revision	A.05.00

### Current Segment

Specifies the selected sequence segment that will be affected by the menu functions.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. This key is grayed out and unavailable if the sequence is currently empty.
Initial S/W Revision	A.05.00

### Insert New Waveform

Allows you access to the sub-menu for inserting a new waveform segment or sequence. Pressing this key also changes the central display to show the Waveform File Selection View.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Insert Waveform

Inserts the currently highlighted waveform to the end of the waveform sequence. Pressing this key also returns you to the menus for creating or editing a sequence, and returns the central view to the sequence creation view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Notes	No remote command, SCPI front panel only. Waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (non-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;"NVWFM" MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform "*.wfm" which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message –800, "Operation complete; Loaded &lt;filename&gt; successfully, but no license &lt;required licenses&gt; installed". User can install required licenses according to &lt;required licenses&gt; string to license it, or multi-pack license it.</p>
<b>Initial S/W Revision</b>	A.05.00

### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>



<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL "D: varb"
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
<b>Initial S/W Revision</b>	A.05.00

### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Notes</b>	No remote command, SCPIfront panel only.
<b>Initial S/W Revision</b>	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
<b>State Saved</b>	Persistent, survives a power cycle and a preset but not saved in the instrument state
<b>Initial S/W Revision</b>	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe <string>
Example	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<p>&lt;string&gt; - specifies the waveform to be deleted from the ARB playback memory.</p> <p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB memory is rejected with an error.</p> <p>When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.</p> <p>It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.</p> <p>It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.</p> <p>When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
Remote Command	:SOURce:RADio:ARB:DELeTe:ALL
Example	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p>

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If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

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### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

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### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

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### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

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### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

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### Segments in ARB Memory

This key functions the same as ["Segments in ARB Memory" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform
Initial S/W Revision	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as ["Delete Segment From ARB Mem" on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete All From ARB Memory

This key functions the same as ["Delete All From ARB Memory" on page 1755](#).

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Insert New Waveform, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Query ARB Memory File List (Remote Command Only)

This command functions the same as ["Query ARB Memory File List \(Remote Command Only\)" on page 1687](#).

Initial S/W Revision	Prior to A.09.00
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### Edit Selected Waveform

Allows access to the sub-menus for editing the details of the currently selected waveform segment.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Repetitions

Allows you to specify the number of times the currently selected waveform is played within the sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, SCPI front panel only.
Preset	1
Min	1
Max	65535
Initial S/W Revision	A.05.00

**Marker 1**

Allows you to enable or disable marker 1 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

**Marker 2**

Allows you to enable or disable marker 2 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

**Marker 3**

Allows you to enable or disable marker 3 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected
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12 Burst Power (Transmit Power)  
Source

	Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Marker 4

Allows you to enable or disable marker 4 for the currently selected waveform. For a waveform sequence, you can enable and disable markers on a per-segment basis, allowing you to output markers from some waveform segments within the sequence, but not for others.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence, Edit Selected Waveform
Notes	No remote command, front panel only.
Preset	Enabled
Range	Enabled Disabled
Initial S/W Revision	A.05.00

Delete Segment

Allows you to delete the selected segment from the waveform sequence.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

Save Sequence...

Pressing this key displays the "Save As" dialog. The sequence name is passed to the save as dialog to use as the filename for saving, and the directory the save as dialog will open into is the default waveform directory.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences, Build New Sequence
Initial S/W Revision	A.05.00

Build New Sequence (Remote Command Only)

This command is the SCPI equivalent of the waveform sequence creation features described in "[Build New Sequence](#)" on page 1694.

This command writes a waveform sequence file to the hard disk. You must specify the waveform sequence file path and filename which will be saved on the hard disk, and the waveform segment file path and name which will be nested into the waveform sequence file. You can utilize mass storage unit specifier (MSUS) "NVWFM" or use a real full path representation. See the example below. MSUS "NVWFM" is mapped to D: VARB directory on test set hard disk.

Any number of segments, up to a segment count limit of 64, can be used to create a sequence. Repeated segments are included in the count limit.

Each waveform segment name string length upper limit is 128 chars. Please do NOT insert waveform which name string exceeds 128 chars.

The internal source does not support nesting one waveform sequence file into another waveform sequence file.

---

**Remote Command**      :SOURce:RADio:ARB:SEQuence[:MWAVeform] <filename>, <waveform1>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, {<waveform2>, <reps>, NONE | M1 | M2 | M3 | M4 | M1M2 | M1M3 | M1M4 | M2M3 | M2M4 | M3M4 | M1M2M3 | M1M2M4 | M1M3M4 | M2M3M4 | M1M2M3M4 | ALL, } ...

(For additional description of each item, see Notes below "[For Setup SCPI](#)" on page 1703 "For Setup SCPI".)

:SOURce:RADio:ARB:SEQuence[:MWAVeform]? <filename>

(For additional description of each item, see Notes "[For Query SCPI](#)" on page 1704 below.)

---

**Example**                    For setup:

```
>:SOUR:RAD:ARB:SEQ "NVWFM:testSeq1.seq", "NVWFM:wfmSegment1.wfm", 10, M2M3M4, "NVWFM:wfmSegment2.wfm", 20, M1M3
```

Or

```
>:SOUR:RAD:ARB:SEQ "D: VARB\testSeq1.seq", " D: VARB\wfmSegment1.wfm", 10, M2M3M4, " D: VARB\wfmSegment2.wfm", 20, M1M3
```

For query, must specify which waveform sequence file to query.

```
>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq"
```

Or

```
>:SOUR:RAD:ARB:SEQ? "D: VARB\testSeq1.seq",
```

---

## Notes

### For Setup SCPI

For the Setup SCPI command, the parameters are:

<filename> - String Type

This variable specifies the path and name for the waveform sequence file. The path supports MSUS (NVWFM) or a real full path representation. See example.

<waveform1> - String Type

This variable specifies the path and name of the first existing waveform segment. The path supports MSUS (NVWFM) or a real full path representation. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> - Integer Type

---

---

This variable specifies the number of times a segment or sequence plays before moving on to the next segment or sequence.

<marker> - Enum Type

NONE - This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segments or sequence marker settings.

M1, M2, M3, M4 - these choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.

ALL - This choice enables all four markers in the waveform segment or sequence.

<waveform2> - String type.

This variable specifies the name of a second existing waveform segment. The path supports MSUS (NVWFM) and real full path representation both. See example.

The segment file must reside within ARB playback memory before it can be played by the ARB player.

<reps> same as above, for the 2nd waveform segment.

<marker> same as above, for the 2nd waveform segment.

You can insert several waveform segments into a waveform sequence file. Just repeat inserting waveform segments as described above.

Error Checks for Setup SCPI command:

If you do not specify a filename, or you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform sequence file path, an error is generated.

---

Notes

Error Checks for Query SCPI command: (Continued)

If the specified waveform sequence file name suffix is not ".seq", error is generated.

If you use an unsupported MSUS (that is, not NVWFM), or have an error in the waveform segment file path, an error is generated.

If the first specified waveform file cannot be found, an error is generated.

If you nest one waveform sequence file into another waveform sequence file, an error is generated.

If the specified repetition value is larger than 65535 or smaller than 1, an error is generated.

If the specified marker type is unrecognized, an error is generated.

## For Query SCPI

For the Query the parameters are:

<filename> - String type.

This variable specifies the path and name of the waveform sequence file being queried. The path supports MSUS (NVWFM) or a real full path representation. See example.

The return value is a <string>, which includes each waveform segment file name, repetitions, and marker type. For example:

>:SOUR:RAD:ARB:SEQ? "NVWFM:testSeq1.seq",

<"wfmSegment1.wfm, 10, ALL, wfmSegment2.wfm, 20, M1M3",

Error Checks for Query SCPI command:

If you do not specify a filename, an error is generated.

If the waveform sequence file name is empty, an error is generated.

If the specified waveform sequence file cannot be found, an error is generated.

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### Edit Selected Sequence

Allows access to the sub-menus for editing the sequence currently selected within the Waveform Sequence List view. Pressing this key changes the central view area to display the Waveform Sequence Creation and Editing view.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Current Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog and allows you to select the new directory of interest.

Key Path	Source, Modulation Setup, ARB, Waveform Sequences
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Waveform Utilities

Allows you access to the waveform utilities sub-menus.

Key Path	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

### Multi-Pack Licenses

Allows you access to the Multi - Pack License sub-menus. Pressing this key also changes the central view area to display the Multi -Pack License Management view.

On modular instrument like E6630A or E6640A, multi-pack license operations are only allowed on the default module, i.e. "Left" module for E6630A or "TRX1" module for E6640A.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities
Notes	If access multi-pack license sub-menu from modules other than "TRX1", an advisory message like "Please goto "TRX1" to operate multi-pack license" will display.
Dependencies	This key is only available if there is at least one Multi-pack license installed on the instrument.
Initial S/W Revision	A.05.00

### Add Waveform

Pressing this key accesses the Add Waveform sub-menu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if there is at least one slot available within at least one multi-pack license.
Initial S/W Revision	A.05.00

### Add Waveform

Allows you to add the currently selected waveform segment to a multi-pack license. The new waveform is added to the next available slot regardless of which slot was selected on the Multi-Pack License Management view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:ADD <string> or :SYSTem:LIcense[:FPACK]:WAVeform:ADD <string>
<b>Example</b>	SYST:LKEY:WAV:ADD "mywaveform.wfm" or SYST:LIC:WAV:ADD "mywaveform.wfm"
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:ADD is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Since adding a waveform segment to a Multi-Pack license causes the license slot to enter the trial period of only 48 hours, pressing this key causes a confirmation dialog to be displayed to ensure you do want to add the waveform segment to the Multi-Pack. If you attempt to license a waveform that is already licensed using another slot an error is generated. . If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Dependencies	This key is only available if the currently selected file is a secure waveform requiring a license, and there is at least one slot available within at least one multi-pack license. If the waveform highlighted is a secure waveform, but is already licensed, this key will be unavailable.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMory:COPI command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
<b>Notes</b>	<p>Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete.</p> <p>&lt;string&gt; – specifies the path name of the file to load from the HDD into ARB memory. It could be a &lt;full path + filename&gt;, or &lt;“NVWFM” MSUS + colon + filename&gt;.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.</p> <p>When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .</p> <p>If you specify a file over SCPI, but the file is not at the specified location, an error is generated.</p> <p>If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.</p> <p>If you try to load a Signal Studio waveform “*.wfm” which contains invalid waveform header, an error is generated.</p> <p>If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p> <p>ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this</p>

case, a GUI only warning message -800, "Operation complete; Loaded <filename> successfully, but no license <required licenses> installed". User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMory:COpy command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

---

Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

---

Remote Command            :SOURce:RADio:ARB:LOAD:ALL <string>

---

Example                      :SOUR:RAD:ARB:LOAD:ALL "D: varb"

---

Notes

- <string> - specifies the directory on the HDD to load the files into ARB memory from.
- When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.
- When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.
- If you specify a directory over SCPI, but the directory does not exist, an error is generated.
- If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

---

Key Path                      Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk

---

Notes                          No remote command, SCPIfront panel only.

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Initial S/W Revision      A.05.00

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### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
Example	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754](#).

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Add Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Replace Waveform

Pressing this key accesses the Replace Waveform submenu. It also changes the central display area to display the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
Dependencies	This key is only available if the currently selected slot is in the trial state.
Initial S/W Revision	A.05.00

### Replace Waveform

Allows you to replace the waveform in the currently selected slot with the waveform currently selected in the Multi-Pack License Waveform Add view.

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Remote Command	:SYSTem:LKEY:WAVeform:REPLace <int>, <string> or :SYSTem:LICense[:FPACK]:WAVeform:REPLace <int>, <string>
Example	SYST:LKEY:WAV:REPL 1, "myotherwaveform.wfm" or :SYST:LIC:WAV:REPL 1, "myotherwaveform.wfm"
Notes	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:REPLace is provided to be consistent with the style of Agilent signal sources. You can use either one of them. If you attempt to license a waveform that is already licensed using another slot an error is generated. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
Initial S/W Revision	A.05.00

### Segments on Hard Disk

This key functions the same as ["Segments on Hard Disk" on page 1752.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform
Initial S/W Revision	Prior to A.09.00

### Load Segment To ARB Memory

This key functions the same as ["Load Segment To ARB Memory" on page 1752.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as ["Load All To ARB Memory" on page 1753.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as ["Change Directory..." on page 1754.](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as ["Default Directory..." on page 1754](#)

Key Path	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses, Replace Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Clear Waveform from Slot

Allows you to clear the waveform from the selected slot.

<b>Key Path</b>	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:CLEar <int> or :SYSTem:LICense[:FPACK]:WAVeform:CLEar <int>
<b>Example</b>	SYST:LKEY:WAV:CLE 1 or :SYST:LIC:WAV:CLE 1
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:CLEar is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
<b>Dependencies</b>	This key is only available if the currently selected slot is in the trial state.
<b>Initial S/W Revision</b>	A.05.00

#### Lock Waveform in Slot

If the selected slot is in the trial state or the lock required state, the waveform that occupies the slot is locked and permanently licensed.

<b>Key Path</b>	Source, Modulation Setup, ARB, Waveform Utilities, Multi-Pack Licenses
<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:LOCK <int> or :SYSTem:LICense[:FPACK]:WAVeform:LOCK <int>
<b>Example</b>	SYST:LKEY:WAV:LOCK 1 or SYST:LIC:WAV:LOCK 1
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:LOCK is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. If current module is not "TRX1" module, the key will grey out, and error message is generated "-221 Setting conflict; Not allowed on current module. Goto "TRX1" to operate multi-pack license" when invoking SCPI.
<b>Dependencies</b>	This key is only available if the currently selected slot is in the trial state or the lock required state.
<b>Initial S/W Revision</b>	A.05.00



**Slot Status Query (Remote Command Only)**

Returns the status of the specified slot.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:STATus? <int> or :SYSTem:LICense[:FPACK]:WAVeform:STATus? <int>
<b>Example</b>	:SYST:LKEY:WAV:STAT? 1 <"Locked" or :SYST:LIC:WAV:STAT? 1 <"Locked"
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:STATus is provided to be consistent with the style of Agilent signal sources. You can use either one of them. Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.
<b>Range</b>	"Locked"   "Available"   "Trail"   "LockRequired"   "Nonexistent"
<b>Initial S/W Revision</b>	A.05.00

**Slots Free Query (Remote Command Only)**

Returns the number of license slots free.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:FREE? or :SYSTem:LICense[:FPACK]:WAVeform:FREE?
<b>Example</b>	:SYST:LKEY:WAV:FREE? or :SYST:LIC:WAV:FREE?
<b>Notes</b>	The second SCPI :SYSTem:LICense[:FPACK]:WAVeform:FREE is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
<b>Initial S/W Revision</b>	A.05.00

**Slot Used Query (Remote Command Only)**

Returns the number of license slots used.

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:USED? or :SYSTem:LICense[:FPACK]:WAVeform:USED?
<b>Example</b>	:SYST:LKEY:WAV:USED?

---

	or :SYST:LIC:WAV:USED?
Notes	The second SCPI :SYSTem:LIcense[:FPACK]:WAVeform:USED is provided to be consistent with the style of Agilent signal sources. You can use either one of them.
Initial S/W Revision	A.05.00

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### Slot Waveform Name Query (Remote Command Only)

Returns the waveform name of the specified slot

---

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:NAME? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:NAME? <int>
<b>Example</b>	:SYST:LKEY:WAV:NAME? 1 <"CDMA2K_22.wfm" or :SYST:LIC:WAV:NAME? 1 <"CDMA2K_22.wfm"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned. If no waveform stored in the specified slot, then empty string is returned.
Initial S/W Revision	A.12.00

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### Slot Waveform Unique ID Query (Remote Command Only)

Returns the waveform unique ID of the specified slot

---

<b>Remote Command</b>	:SYSTem:LKEY:WAVeform:UID? <int> or :SYSTem:LIcense[:FPACK]:WAVeform:UID? <int>
<b>Example</b>	:SYST:LKEY:WAV:UID? 2 <"1346752140" or :SYST:LIC:WAV:UID? 2 <"1346752140"
Notes	Waveform slot number <int> is positive. If you attempt to input a slot number less than or equals 0, an error is generated. Result type is string. If input slot number exceeds total available slot number, "Nonexistent" is returned.

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	If no waveform stored in the specified slot, then "0" is returned
Initial S/W Revision	A.12.00

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### Locked Waveform Name List Query (Remote Command Only)

Returns the waveform name list of locked.

---

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:NAME:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:NAME:LOCKed? <"CDMA2K_27.wfm", "GSM_MCS1.WFM", "c2kWfm.wfm"
Initial S/W Revision	A.11.00

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### Locked Waveform Unique ID List Query (Remote Command Only)

Returns the waveform unique id list of locked.

---

<b>Remote Command</b>	:SOURce:RADio:ARB:MPLicensed:UID:LOCKed?
<b>Example</b>	SOUR:RAD:ARB:MPL:UID:LOCKed? <"2996927136", "3812603511", "3710986266"
<b>Notes</b>	Each Signal Studio waveform has a unique id recorded in header. So if the unique ids are same, that means they are same one waveform. So besides SCPI to query locked waveform name list, also provide a SCPI to query locked waveform unique id list
Initial S/W Revision	A.11.00

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### Marker Utilities

Allows access to the marker utilities sub-menus.

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<b>Key Path</b>	Source, Modulation Setup, ARB
Initial S/W Revision	A.05.00

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### Marker Polarity

Allows access to the marker polarity sub-menu, which allows you to specify the polarity for the four markers. For a positive polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

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<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

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### Mkr 1 Polarity

Allows you to set the polarity of marker 1.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
<b>Remote Command</b>	:SOURce:RADio:ARB:MPOLarity:MARKer1 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer1?
<b>Example</b>	:SOUR:RAD:ARB:MPOL:MARK1 NEG
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	Pos
<b>Range</b>	Neg   Pos
<b>Initial S/W Revision</b>	A.05.00

### Mkr 2 Polarity

Allows you to set the polarity of marker 2.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
<b>Remote Command</b>	:SOURce:RADio:ARB:MPOLarity:MARKer2 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer2?
<b>Example</b>	:SOUR:RAD:ARB:MPOL:MARK2 NEG
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Preset</b>	Pos
<b>Range</b>	Neg   Pos
<b>Initial S/W Revision</b>	A.05.00

### Mkr 3 Polarity

Allows you to set the polarity of marker 3.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
<b>Remote Command</b>	:SOURce:RADio:ARB:MPOLarity:MARKer3 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer3?
<b>Example</b>	:SOUR:RAD:ARB:MPOL:MARK3 NEG
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated

---

waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.

---

Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

---

### Mkr 4 Polarity

Allows you to set the polarity of marker 4.

---

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Polarity
Remote Command	:SOURce:RADio:ARB:MPOLarity:MARKer4 POSitive NEGative :SOURce:RADio:ARB:MPOLarity:MARKer4?
Example	:SOUR:RAD:ARB:MPOL:MARK4 NEG
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The marker polarity is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the marker polarity is updated with the value from the header file. The marker polarity will remain unchanged if the newly selected waveform does not have an associated header file.
Preset	Pos
Range	Neg   Pos
Initial S/W Revision	A.05.00

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### Marker Routing

Allows access to the marker routing sub-menus, which allow you to specify where the marker events are routed. It should be noted that the markers can also be routed to Trigger 1 Out and Trigger 2 Out, however this must be set up using the menus accessed by pressing the “Trigger” hard key.

---

Key Path	Source, Modulation Setup, ARB, Marker Utilities
Initial S/W Revision	A.05.00

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### Pulse/RF Blank

Allows you to select which marker is used for the pulse/RF blanking function. The pulse/RF blanking function blanks the RF when the marker signal goes low. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Marker points should be set before using this function. Enabling this function without setting marker points may create a continuous low or high signal, dependant on the marker polarity. This causes either no RF output, or a continuous RF output.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:PULSe NONE   M1   M2   M3   M4 :SOURce:RADio:ARB:MDEStination:PULSe?
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Dependencies</b>	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The pulse/RF blanking setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the pulse/RF blanking setting is updated with the value from the header file. The pulse/RF blanking setting will remain unchanged if the newly selected waveform does not have an associated header file.
<b>Range</b>	None   M1   M2   M3   M4
<b>Initial S/W Revision</b>	A.05.00

#### None

Sets no marker to be used for the pulse/RF blanking function, essentially turning the RF blanking function off.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
<b>Initial S/W Revision</b>	A.05.00

#### Marker 1

Sets marker 1 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
<b>Initial S/W Revision</b>	A.05.00

#### Marker 2

Sets marker 2 to be used for the pulse/RF blanking function.

<b>Key Path</b>	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
<b>Initial S/W Revision</b>	A.05.00

### Marker 3

Sets marker 3 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the pulse/RF blanking function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, Pulse/RF Blank
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### ALC Hold

Allows you to specify which marker is routed for use within the ALC hold function. The ALC hold marker function holds the ALC circuitry at the average value of the sample points set by the marker.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing
<b>Remote Command</b>	:SOURce:RADio:ARB:MDEStination:ALCHold NONE M1 M2 M3 M4 :SOURce:RADio:ARB:MDEStination:ALCHold?
<b>Example</b>	:SOUR:RAD:ARB:MDES:ALCH NONE
Dependencies	When a new waveform is selected for playback the settings contained within the associated waveform header file are applied to the ARB. The ALC hold setting is one of the values stored within the header file. If the newly selected waveform file has an associated header file, the ALC hold setting is updated with the value from the header file. The ALC hold setting will remain unchanged if the newly selected waveform does not have an associated header file.
Range	None   M1   M2   M3   M4
Initial S/W Revision	A.05.00

### None

Sets no marker to be used for the ALC hold function, essentially turning the ALC hold function off.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS NONE
Initial S/W Revision	A.05.00

### Marker 1

Sets marker 1 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M1
Initial S/W Revision	A.05.00

### Marker 2

Sets marker 2 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M2
Initial S/W Revision	A.05.00

### Marker 3

Sets marker 3 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M3
Initial S/W Revision	A.05.00

### Marker 4

Sets marker 4 to be used for the ALC hold function.

Key Path	Source, Modulation Setup, ARB, Marker Utilities, Marker Routing, ALC Hold
<b>Example</b>	:SOUR:RAD:ARB:MDES:PULS M4
Initial S/W Revision	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00



### Clear Header

Allows you to clear the header information from the file header associated with the currently selected waveform.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:CLEar
Example	:SOUR:RAD:ARB:HEAD:CLE
Notes	Attempting to clear the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

### Save Setup To Header

Allows you to save new file header information details to the file.

Key Path	Source, Modulation Setup, ARB, Header Utilities
Remote Command	:SOURce:RADio:ARB:HEADer:SAVE
Example	:SOUR:RAD:ARB:HEAD:SAVE
Notes	Attempting to save the header details via SCPI when no waveform was selected for playback will generate an error.
Initial S/W Revision	A.05.00

### Query Waveform Unique ID (Remote Command Only)

Each Signal Studio waveform contains a unique waveform ID, which recorded in the header. This command allows you to query the unique waveform ID from the header. This is a SCPI only command. User can also check [Error! Reference source not found.](#) for waveform unique ID display.

Remote Command	:MMEMory:HEADer:ID? "<file name>"
Example	:MMEM:HEAD:ID? "test.wfm" (query the waveform already loaded into the ARB memory) :MMEM:HEAD:ID? "D: VARB\test.wfm" (query the waveform on the hard disk by absolute path) :MMEM:HEAD:ID? "NVWFM:test.wfm" (query the waveform on the hard disk by MSUS)
Notes	SCPI query only. The queried waveform file can be in ARB memory, or on hard disk. If want to query ARB in ARB memory, then give out the file name directly. If want to query ARB on the hard disk, then absolute file path or MSUS should be given along with the file name. The valid MSUS is "NVWFM" which is mapped to D: VARB on hard disk.  If the file cannot be found in ARB memory or on hard disk, an error is generated and value -1 is returned
Initial S/W Revision	A.09.00

### Bus Trigger Command (Remote Command Only)

Used to initiate an immediate trigger event if the trigger source is set to Bus.

<b>Remote Command</b>	:SOURce:RADio:ARB:TRIGger:INITiate
<b>Example</b>	:SOUR:RAD:ARB:TRIG:INIT
Initial S/W Revision	A.05.00

### AM

Allows access to the menu for configuring the Amplitude Modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### AM

Enables or disables the amplitude modulation.

Turning AM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:STATe :SOURce:AM:STATe?
<b>Example</b>	:SOUR:AM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

### AM Depth

Allows you to set the amplitude modulation depth in percent.

<b>Key Path</b>	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM[:DEPTh] [:LINear] :SOURce:AM[:DEPTh] [:LINear]?
<b>Example</b>	:SOUR:AM 0.1
Preset	0.1 %
Min	0.1 %
Max	95.0 %
Initial S/W Revision	A.05.00

## AM Rate

Allows you to set the internal amplitude modulation rate.

Key Path	Source, Modulation Setup, AM
<b>Remote Command</b>	:SOURce:AM:INTernal:FREQuency :SOURce:AM:INTernal:FREQuency?
<b>Example</b>	:SOUR:AM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

## FM

Allows access to the menu for configuring the frequency modulation.

Key Path	Source, Modulation Setup
Initial S/W Revision	A.05.00

## FM

Enables or disables the frequency modulation.

Turning FM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

Key Path	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:STATe :SOURce:FM:STATe?
<b>Example</b>	:SOUR:FM:STAT OFF
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## FM Deviation

Allows you to set the frequency modulation deviation.

Key Path	Source, Modulation Setup, FM
----------	------------------------------

<b>Remote Command</b>	:SOURce:FM[:DEVIation] :SOURce:FM[:DEVIation]?
<b>Example</b>	:SOUR:FM 1.00 kHz
Preset	1.00 Hz
Min	1.00 Hz
Max	100.00 kHz
Initial S/W Revision	A.05.00

### FM Rate

Allows you to set the internal frequency modulation rate.

<b>Key Path</b>	Source, Modulation Setup, FM
<b>Remote Command</b>	:SOURce:FM:INTernal:FREQuency :SOURce:FM:INTernal:FREQuency?
<b>Example</b>	:SOUR:FM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

### PM

Allows access to the menu for configuring the phase modulation.

<b>Key Path</b>	Source, Modulation Setup
Initial S/W Revision	A.05.00

### PM

Enables or disables the phase modulation.

Turning PM on when another modulation format is already on results in the previous modulation format being turned off and the generation of an error.

<b>Key Path</b>	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:STATe :SOURce:PM:STATe?
<b>Example</b>	:SOUR:PM:STAT OFF

Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## PM Deviation

Allows you to set the phase modulation deviation.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM[:DEVIation] :SOURce:PM[:DEVIation]?
<b>Example</b>	:SOUR:PM 1.00 rad
Preset	0.1 rad
Min	0.1 rad
Max	20.0 rad
Initial S/W Revision	A.05.00

## PM Rate

Allows you to set the internal phase modulation rate.

Key Path	Source, Modulation Setup, PM
<b>Remote Command</b>	:SOURce:PM:INTernal:FREQuency :SOURce:PM:INTernal:FREQuency?
<b>Example</b>	:SOUR:PM:INT:FREQ 40.0 Hz
Preset	400.0 Hz
Min	10 Hz
Max	40 kHz
Initial S/W Revision	A.05.00

## List Sequencer

Allows you access to the sub-menus for configuring the list sequencer.

List sequences allows you to enter frequencies and amplitudes at unequal intervals in nonlinear ascending, descending or random order. Each step within the list can also include its own waveform file for playback, step duration, trigger event and trigger output.

The complexities involved in configuring the list sequencer do not lend itself to manual configuration; hence the manual configuration for this feature is limited. For easier configuration of the list sequencer, it is recommended that you use either SCPI or load a tab delimited file containing the setup parameters in a

tabular form. The details of the SCPI for configuring the list sequencer can be found in "[Step Configuration \(Remote Command Only\)](#)" on page 1759.

Once the List Sequencer has been configured using the front panel, SCPI, or loading in a tab delimited file, the sequence must be initiated using the front panel Initiate Sequence key or the corresponding SCPI command.

Key Path	Source
Initial S/W Revision	A.05.00

## Sequencer

Allows you to set the state of the list sequencer. When the list sequencer is on, the source is outputting the sequence defined by the sequencer. When the list sequencer is off, the source outputs a single waveform segment or sequence (independent mode) at a single frequency and amplitude.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST[:STATe] ON OFF 1 0 :SOURce:LIST[:STATe] ?
Example	:SOUR:LIST OFF
Notes	When the sequencer is set to ON, the list sequencer controls the output of the source.
Couplings	When in Sequence Analyzer mode and the list sequencer state is Off, Include Source is forced to No, and the Include Source key is grayed out. When in Sequence Analyzer mode and the list sequencer state is On, Include Source is available to set. And, an ARB memory related operation, like load or delete will be rejected.
Preset	Off
Range	On   Off
Initial S/W Revision	A.05.00

## Initiate Sequence

Pressing this key arms the sequence for single execution. Once the sequence is armed the source begins the sequence as soon as the trigger is received. If the trigger is set to Free Run, the sequence starts immediately.

Key Path	Source, List Sequencer
Remote Command	:SOURce:LIST:TRIGger[:IMMediate]
Example	:SOUR:LIST:TRIG
Notes	When in Sequence Analyzer mode and Include Source is Yes, the Initiate list sequencer operation is rejected, and the key is grayed out, since source list sequence request is sent to physics via Parallel batch by sequence analyzer. If the file needed by the sequencer is not already in ARB memory, the sequence cannot be initiated

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and an error will be generated.

There is a blocking SCPI query which can be used to query if source list sequence being initiated successfully or not. (see "[Query List Sequence Initiation Armed Status \(Remote Command Only\)](#)" on [page 1770](#) Query Source List Sequence Armed Status)

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Dependencies	Under the Sequence Analyzer Mode, if Meas Setup->Include Source is set to YES, Source->List Sequencer->Initiate Sequence is disabled.
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Initial S/W Revision	A.05.00
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## List Sequencer Setup

Allows you access to the list sequencer setup menus.

---

Key Path	Source, List Sequencer
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---

## Number of Steps

Allows you to specify the number of steps within the list sequence.

---

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:NUMBer:STEPs <integer> :SOURce:LIST:NUMBer:STEPs?
<b>Example</b>	:SOUR:LIST:NUMB:STEP 1

---

Notes	Increasing the number of steps creates additional steps at the end of the list, with all the settings within the steps set to their default values.  Decreasing the number of steps removes steps from the end of the list. The settings within the removed steps are not reset. This means that increasing the number of steps again would allow you to retrieve these steps.
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Dependencies	The Step Count parameter is increased or decreased when you insert or delete a point from within the GUI interface to the sequencer.
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Preset	1
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Min	1
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Max	1000
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Initial S/W Revision	A.05.00
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## Current Step

Allows you to select the step number you wish to view or edit.

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Key Path	Source, List Sequencer, List Sequencer Setup
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Notes	No remote command, front panel only.
Preset	1
Min	1
Max	Step Count
Initial S/W Revision	A.05.00

### Insert Step Before

Allows you to insert a new step, containing default values, before the currently selected step. Inserting a step will automatically increase the Step Count parameter by 1. If sequence already reaches upper limit of 1000 steps, then insert more step will be rejected and popup error -221, "Setting Conflict; Cannot insert more steps, maximum number of steps reached"

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only. If the list already contains the maximum limit of 1000 steps, no operation will be made after pressing this key.
Initial S/W Revision	A.05.00

### Delete Step

Allows you to delete the current step. Deleting a step will automatically decrease the Step Count parameter by 1. If sequence only has one step left, delete step will be rejected and popup error -221, "Setting conflict; Cannot delete current step, minimum number of steps reached"

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, Front Panel key only. If the list already contains the minimum limit of 1 step, no operation will be made after pressing this key
Initial S/W Revision	A.05.00

### Clear List

Allows you to clear the list. Clearing the list sets the number of steps to the default value of 1 and sets the parameters for the only step to their default values.

Key Path	Source, List Sequencer, List Sequencer Setup
Initial S/W Revision	A.05.00

### Step Trigger

Allows access to the sub-menu for selecting the trigger input for the current step.



Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger IMMEDIATE   INTernal   EXTernal2   KEY   BUS   EXTernal4  :SOURce:LIST:STEP[1] 2 3...1000:SETup:INPut:TRIGger?
Example	:SOUR:LIST:STEP2:SET:INP:TRIG BUS :SOUR:LIST:STEP2:SET:INP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Free Run
Range	Free Run   Internal   Manual (Trigger Key)   Bus   External 2   EXTernal4
Initial S/W Revision	A.05.00

### Free Run

Sets the trigger input for the current step to Free Run.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG IMM
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Internal

Sets the trigger input for the current step to Internal.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG INT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Manual (Trigger Key)

Sets the trigger input for the current step to Manual (Trigger Key). Any step in the sequence set to Manual will cause the sequence execution to stop until the manual trigger key is pressed. Sending the Bus Trigger SCPI command will have no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
Example	:SOUR:LIST:STEP2:SET:INP:TRIG KEY
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Bus

Sets the trigger input for the current step to Bus. Any step in the sequence set to Bus will cause the sequence execution to stop until the Bus Trigger SCPI command is sent. Pressing the manual trigger key has no effect. At any point in the sequence where the list sequencer is paused waiting for a software trigger, a pop up dialog is displayed until the trigger event occurs.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG BUS
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### External 2

Sets the trigger input for the current step to External 2.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Trigger
<b>Example</b>	:SOUR:LIST:STEP2:SET:INP:TRIG EXT2
Notes	SCPI is supported after A.09.40
Notes	Note: When on E6640A, trigger 2 is a bi-directional trigger port. So when trigger 2 has been configured as OUTPUT type, choosing External 2 as the input trigger for the current step will generate error.
Initial S/W Revision	A.05.00

### Transition Time

Allows you to specify the transition time for the current step.

The transition time is the amount of time allowed for the source to settle at the current frequency or amplitude value.

Transition Time should not be taken as additional time before or inside the Step Duration. You can set a value for the settling time to allow the source output frequency or amplitude to become stable. Make sure that during this period of time, you do not use the source output signal.

The following table lists recommended values for appropriate settling times to allow for changes within the source.

Value Changed	Recommended Transition Time
Frequency	500 $\mu$ s
Amplitude	100 $\mu$ s to within 0.1 dB 20 $\mu$ s to within 1.0 dB

If the Transition Time value is shorter than the time necessary for the hardware to settle and a List Sequence is initiated, a **warning** is generated.

If the Transition Time value is longer than the Step Duration, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length. If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME <time> :SOURce:LIST:STEP[1] 2 3...1000:SETup:TRANsition:TIME?
Example	:SOUR:LIST:STEP2:SET:TRAN:TIME 1ms :SOUR:LIST:STEP2:SET:TRAN:TIME?
Notes	SCPI is supported after A.09.40
Preset	1.0 ms
Min	0.0 ms
Max	4.0 ks
Initial S/W Revision	A.05.00

## Radio Setup

Allows you access to the sub-menus for setting up the radio standard, band, and radio band link direction for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Notes	No remote command, front panel only.
Initial S/W Revision	A.05.00

## Radio Standard

Allows access to the sub-menus for selecting the radio standard and the associated radio band for use in the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:RADio:BAND NONE   PGSM   EGSM   RGSM   DCS1800   PCS1900   TGSM810   GSM450   GSM480   GSM700   GSM850   BANDI   BANDII   BANDIII   BANDIV   BANDV   BANDVI   BANDVII   BANDVIII   BANDIX   BANDX   BANDXI   BANDXII   BANDXIII   BANDXIV   BANDXIX   USCELL   USPCS   JAPAN   KOREAN   NMT   IMT2K   UPPER   SECOND   PAMR400   PAMR800   IMTEXT   PCS1DOT9G   AWS   US2DOT5G   PUBLIC   LOWER   NONE   BAND1   BAND2   BAND3   BAND4   BAND5   BAND6   BAND7   BAND8   BAND10   BAND11   BAND12   BAND13   BAND14   BAND17   BAND18   BAND19   BAND20   BAND21   BAND24   BAND25   BAND26   BAND27   BAND28   BAND31   BAND33   BAND34   BAND35   BAND36   BAND37   BAND38

## 12 Burst Power (Transmit Power) Source

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	BAND39   BAND40   BAND41   BAND42   BAND43   BAND44   BANDA   BANDB   BANDC   BANDD   BANDE   BANDF  :SOURce:LIST:STEP[1] 2 3...1000:SETup: RADio:BAND?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND PGSM :SOUR:LIST:STEP2:SET:RAD:BAND?
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

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### None

Selects no radio standard for use on the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND NONE
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

---

### GSM/EDGE

Pressing this key once selects GSM/EDGE as the radio standard and the current GSM/EDGE band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different GSM/EDGE band.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

---

### P-GSM

Selects P-GSM as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

---

### E-GSM

Selects E-GSM as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

---

**R-GSM**

Selects R-GSM as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**DCS 1800**

Selects DCS 1800 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**PCS 1900**

Selects PCS 1900 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**GSM 450**

Selects GSM 450 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**GSM 480**

Selects GSM 480 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

**GSM 850**

Selects GSM 850 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### GSM 700

Selects GSM 700 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### T-GSM 810

Selects T-GSM 810 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, GSM/EDGE
Initial S/W Revision	A.05.00

### WCDMA

Pressing this key once selects WCDMA as the radio standard and the current WCDMA band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different WCDMA band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

### Band I

Selects Band I as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band II

Selects Band II as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band III

Selects Band III as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band IV**

Selects Band IV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band V**

Selects Band V as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band VI**

Selects Band VI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band VII**

Selects Band VII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band VIII**

Selects Band VIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

**Band IX**

Selects Band IX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band X

Selects Band X as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XI

Selects Band XI as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XII

Selects Band XII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XIII

Selects Band XIII as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XIV

Selects Band XIV as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.05.00

### Band XIX

Selects Band XIX as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, WCDMA
Initial S/W Revision	A.14.50



**CDMA 2000 / 1xEVDO**

Pressing this key once selects CDMA 2000/1xEVDO as the radio standard and the current CDMA 2000/1xEVDO band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different CDMA 2000/1xEVDO band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.05.00

**US CELL**

Selects US Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**US PCS**

Selects US PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**Japan Cell**

Selects Japan Cell as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**Korean PCS**

Selects Korean PCS as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

**NMT 450**

Selects NMT 450 as the band for the current step.

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Source

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Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

**IMT 2000**

Selects IMT 2000 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

**Upper 700**

Selects Upper 700 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

**Secondary 800**

Selects Secondary 800 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

**400 Euro PAMR**

Selects 400 Euro PAMR as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

**800 PAMR**

Selects 800 PAMR as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

**2.5GHz IMT EXT**

Selects 2.5 GHz IMT EXT as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### US PCS 1.9GHz

Selects US PCS 1.9 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### AWS

Selects AWS as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### US 2.5GHz

Selects US 2.5 GHz as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### 700 Public Safety

Selects 700 Public Safety as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

### C2K Lower 700

Selects C2K Lower 700 as the band for the current step.

---

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, CDMA 2000 / 1xEVDO
Initial S/W Revision	A.05.00

---

## LTE

Pressing this key once selects LTE FDD as the radio standard and the current LTE FDD band as the active channel band. Pressing this key again allows access to the sub-menus for selecting a different LTE FDD band.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard
Initial S/W Revision	A.09.50

## BAND 1

Selects BAND 1 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 2

Selects BAND 2 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 3

Selects BAND 3 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 4

Selects BAND 4 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

## BAND 5

Selects BAND 5 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 6**

Selects BAND 6 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 7**

Selects BAND 7 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 8**

Selects BAND 8 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 9**

Selects BAND 9 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 10**

Selects BAND 10 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 11**

Selects BAND 11 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 12

Selects BAND 12 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 13

Selects BAND 13 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 14

Selects BAND 14 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 17

Selects BAND 17 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 18

Selects BAND 18 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

#### BAND 19

Selects BAND 19 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 20**

Selects BAND 20 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 21**

Selects BAND 21 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 24**

Selects BAND 24 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 25**

Selects BAND 25 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.09.50

**BAND 26**

Selects BAND 26 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.12.53

**BAND 27**

Selects BAND 27 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

### BAND 28

Selects BAND 28 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

### BAND 31

Selects BAND 31 as the band for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE
Initial S/W Revision	A.14.00

### LTE TDD

Sets LTE TDD as the radio standard for use and accesses the LTE TDD specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

### BAND 33

Selects BAND 33 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND33
Initial S/W Revision	A.11.50

### BAND 34

Selects BAND 34 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND34
Initial S/W Revision	A.11.50

### BAND 35

Selects BAND 35 as the band for the current step.



Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND35
Initial S/W Revision	A.11.50

**BAND 36**

Selects BAND 36 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND36
Initial S/W Revision	A.11.50

**BAND 37**

Selects BAND 37 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND37
Initial S/W Revision	A.11.50

**BAND 38**

Selects BAND 38 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND38
Initial S/W Revision	A.11.50

**BAND 39**

Selects BAND 39 as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND39
Initial S/W Revision	A.11.50

**BAND 40**

Selects BAND 40 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND40
Initial S/W Revision	A.11.50

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#### BAND 41

Selects BAND 41 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND41
Initial S/W Revision	A.11.50

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#### BAND 42

Selects BAND 42 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND42
Initial S/W Revision	A.11.50

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#### BAND 43

Selects BAND 43 as the band for the current step.

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Key Path	Source, Frequency, Radio Setup, Radio Standard, LTE TDD
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BAND43
Initial S/W Revision	A.11.50

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#### BAND 44

Selects BAND 44 as the band for the current step.

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Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup, Radio Standard, LTE TDD
Initial S/W Revision	A.14.00

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#### TDSCDMA

Sets TDSCDMA as the radio standard for use and accesses the TDSCDMA specific channel band sub-menus..

Key Path	Source, Frequency, Radio Setup, Radio Standard
Initial S/W Revision	A.11.50

**BAND A**

Selects BAND A as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDA
Initial S/W Revision	A.11.50

**BAND B**

Selects BAND B as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDB
Initial S/W Revision	A.11.50

**BAND C**

Selects BAND C as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDC
Initial S/W Revision	A.11.50

**BAND D**

Selects BAND D as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDD
Initial S/W Revision	A.11.50

**BAND E**

Selects BAND E as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
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<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDE
Initial S/W Revision	A.11.50

## BAND F

Selects BAND F as the band for the current step.

Key Path	Source, Frequency, Radio Setup, Radio Standard, TDSCDMA
<b>Example</b>	:SOUR:FREQ:CHAN:BAND BANDF
Initial S/W Revision	A.11.50

## Radio Band Link

Allows you to specify the radio band link direction for the steps within the list sequence. The link is used in conjunction with the channel band and channel number to determine the output frequency.

When set to “Uplink”, the source will calculate the uplink frequency according to an uplink formula together with selected channel band and channel number. When set to “Downlink”, the source will calculate the downlink frequency according to a downlink formula together with selected channel band and channel number.

Key Path	Source, List Sequencer, List Sequencer Setup, Radio Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK DOWN UP :SOURce:LIST:STEP [1]   2   3...1000:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:STEP2:SET:RAD:BAND:LINK UP :SOUR:LIST:STEP2:SET:RAD:BAND:LINK?
Notes	SCPI is supported after A.09.40
Preset	DOWN
Range	DOWN   UP
Initial S/W Revision	A.05.00

## Channel

Allows you to specify the frequency of the current step via a channel number.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:CNFRequency?
<b>Example</b>	:SOUR:LIST:STEP2:SET:CNFR 124 :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40.

	This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The channel number is coupled to the step frequency value. When the step frequency value is changed, the channel number will increase or decrease to match the new step frequency. If the step frequency is not at an exact match for a channel number, the nearest channel number is displayed, along with a greater than, or less than sign to indicate the frequency is above or below the channel number.
Preset	1
Min	0 (Please refer to for valid ranges.)
Max	10838 (Please refer to for valid ranges.)
Initial S/W Revision	A.05.00

## Frequency

Allows you to specify a frequency value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency <double> :SOURce:LIST:STEP[1] 2 3...1000:SETup:CNFRfrequency?
Example	:SOUR:LIST:STEP2:SET:CNFR 1GHz :SOUR:LIST:STEP2:SET:CNFR?
Notes	SCPI is supported after A.09.40. This SCPI is used to setup channel number or frequency setting, according to current Radio Band setting. If Radio Band is "NONE", then it's frequency. If Radio Band is not "NONE", then it's channel number.
Couplings	The frequency value is coupled to the channel band and number for the step, such that updates to the radio band and channel number will update the frequency value to the corresponding absolute frequency. The reverse is also true, changing the frequency value causes the value of the channel number to be updated.
Preset	1.00 GHz
Min	10.00 MHz
Max	Hardware Dependant: Option 503 = 3.6 GHz Option 504 = 3.9 GHz Option 506 = 6.00 GHz
Initial S/W Revision	A.05.00

## Power

Allows you to specify a power value for the current step.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:AMPLitude <double> :SOURCE:LIST:STEP[1] 2 3...1000:SETup:AMPLitude?
Example	:SOUR:LIST:STEP2:SET:AMPL -50dBm :SOUR:LIST:STEP2:SET:AMPL?
Notes	SCPI is supported after A.09.40
Notes	<p>Amplitude corrections can be specified for use with the source. In the event of amplitude corrections being applied, the valid ranges for the RF power do not change dependant on the current amplitude correction setting. Instead, if the combination of RF power + amplitude correction is higher or lower than the source output range, the Source Unleveled bit is set and the "Source Unleveled" indicator will appear on status panel to indicate that the source cannot maintain the output power that has been requested.</p> <p>The multiport adapter RFIO TX ports and GPS ports cannot ensure power accuracy when power setting is lower than -130dBm, this power setting value is defined by the sum of RF Power setting and related amplitude correction value. But user settable value could be lower than this limit. When application detected there exists power setting lower than -130dBm on MPA RFIO TX ports, then popup warning message . When application detected there exists power setting lower than -130dBm on MPA GPS ports, then popup warning message . These are only warning messages, and check is performed when RF is ON.</p>
Notes	The Min and Max value here defined UI settable amplitude range. This range is larger than actual amplitude range with level accuracy defined in spec.
Dependencies	The RF power is dependent on the RF output port and frequency, such that the current frequency and selected output port determine the valid range of power values.
Preset	-100 dBm
Min	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Max	The range of values depends on the current frequency and selected RF output port. Please refer to <a href="#">"RF Power" on page 1647</a> and the table RF Power Range for the valid ranges.
Initial S/W Revision	A.05.00

## Waveform

Allows you access to the sub-menus for selecting the waveform to be played back during the current step. Pressing this key also changes the central display area to show the Waveform File Selection view.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURCE:LIST:STEP[1] 2 3...1000:SETup:WAVEform <string> :SOURCE:LIST:STEP[1] 2 3...1000:SETup:WAVEform?
Example	:SOUR:LIST:STEP2:SET:WAV "CW" :SOUR:LIST:STEP2:SET:WAV?
Notes	SCPI is supported after A.09.40
Remote Command Notes	String type, takes "Off"   "CW"   "Cont"   "waveform name"

Preset	CW
Range	Waveform   Continue Previous   CW   Off
Initial S/W Revision	A.05.00

### CW

Sets the current step to output a CW tone.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "CW"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Selected Waveform

Inserts the currently selected waveform in the waveform selection view as the waveform for playback during the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "waveform name"
Notes	SCPI is supported after A.09.40 If the selected waveform contains header (which contains ARB play parameters), source list sequence will automatically apply header settings of the selected waveform in that step.
Initial S/W Revision	A.05.00

### Continue Previous

Sets the current step to continue with playback of the waveform from the previous step. When continuing the previous waveform, the ARB playback will not pause while the source retunes to the new frequency or amplitude that may be defined for the new step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
<b>Example</b>	:SOUR:LIST:STEP2:SET:WAV "Cont"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Off

Disable RF output of the current step.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Example	:SOUR:LIST:STEP2:SET:WAV "Off"
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Segments on Hard Disk

Allows you access to the sub-menus for loading waveform segments from the hard disk into ARB memory. The default directory is: D: varb.

Pressing this key changes the current view to the Waveform Management View.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Load Segment To ARB Memory

Allows you to load the selected file into ARB memory. On the front panel you select the file for loading to the ARB memory by highlighting the desired file in the list. Using the SCPI command, you specify the file name on the HDD.

“NVWFM” (none-volatile storage) MSUS (Mass Storage Unit Specifier) is supported in the memory subsystem because the ARB memory cannot be accessed directly. Therefore, files must be downloaded to the instrument hard disk and then loaded into the ARB memory. “NVWFM” MSUS will be mapped to the default directory D: VARB. The SCPI command supports using either “NVWFM” MSUS or specifying a full path. For more information, see [Memory Subsystem \(Remote Command Only\)](#).

If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MMEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Remote Command	:SOURce:RADio:ARB:LOAD <string>
Example	:SOUR:RAD:ARB:LOAD "D: VARB\testwaveform.bin" or :SOUR:RAD:ARB:LOAD "NVWFM:testwaveform.bin"
Notes	Because loading the file involves a delay of unpredictable length, this command should be followed by the query *OPC?, which holds off subsequent commands until the loading operating is complete. <string> – specifies the path name of the file to load from the HDD into ARB memory. It could be a <full path + filename>, or <"NVWFM" MSUS + colon + filename>.



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When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load a file to ARB memory will be rejected with an error.

When Include Source is No and if there is insufficient free ARB memory to load the selected waveform, an error is generated. .

If you specify a file over SCPI, but the file is not at the specified location, an error is generated.

If you try to load a waveform file but the file contains less than 500 IQ samples, an error is generated.

If you try to load a Signal Studio waveform “\*.wfm” which contains invalid waveform header, an error is generated.

If the ARB is ON when you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

ARB can be loaded into ARB memory even required licenses do not present on the instrument. In this case, a GUI only warning message -800, “Operation complete; Loaded <filename> successfully, but no license <required licenses> installed”. User can install required licenses according to <required licenses> string to license it, or multi-pack license it.

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Initial S/W Revision      A.05.00

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### Load All To ARB Memory

Allows you to load all the segment files within the currently selected directory into ARB memory. If a file of the same name already exists within ARB memory, it is overwritten. If you wish to load two segments of the same name, you must rename one of the segments before loading it into ARB memory. To rename a segment, you can either use Windows File Explorer, or the :MEMORY:COPY command.

NOTE: When a waveform file is loaded to ARB memory, burst timing adjustments are made automatically, based on whether or not a Multiport Adapter is connected to the test set and powered on. If the connection/power status of the Multiport Adapter is changed after a waveform file has been loaded, it needs to be loaded again.

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<b>Key Path</b>	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:LOAD:ALL <string>
<b>Example</b>	:SOUR:RAD:ARB:LOAD:ALL “D: varb”
<b>Notes</b>	<p>&lt;string&gt; - specifies the directory on the HDD to load the files into ARB memory from.</p> <p>When in Sequence Analyzer mode, and Include Source is Yes, an attempt to load all files from a directory to ARB memory is rejected with an error.</p> <p>When Include Source is No and there is insufficient free ARB memory to load all the waveforms, when the ARB memory is full, the copy ceases, and an error is generated.</p> <p>If you specify a directory over SCPI, but the directory does not exist, an error is generated.</p> <p>If the ARB is ON, a user then loads or deletes file to ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>

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Initial S/W Revision      A.05.00

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### Change Directory...

Allows you to change the currently selected directory on the hard disk. Pressing this key opens a standard windows change directory dialog allowing you to select the new directory of interest.

The current directory is used for manually loading waveform segments into ARB memory for playback, and as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence or a list sequence.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
Notes	No remote command, SCPIfront panel only.
Initial S/W Revision	A.05.00

### Default Directory...

Allows you to change the default directory. It is used as a search location for waveform segments that are required to be loaded into ARB memory for playback of a waveform sequence, and as a search location for selecting waveforms using SCPI.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments on Hard Disk
<b>Remote Command</b>	:SOURce:RADio:ARB:DEFault:DIRectory <string> :SOURce:RADio:ARB: DEFault:DIRectory?
<b>Example</b>	:SOUR:RAD:ARB:DEF:DIR "D:\ArbFiles" :SOUR:RAD:ARB:DEF:DIR?
State Saved	Persistent, survives a power cycle and a preset but not saved in the instrument state
Initial S/W Revision	A.05.00

### Segments in ARB Memory

Allows you access to the sub-menus for managing the files within ARB memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform
Initial S/W Revision	A.05.00

### Delete Segment From ARB Mem

Allows you to remove a segment from ARB playback memory.

Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe <string>
<b>Example</b>	:SOUR:RAD:ARB:DEL "testwaveform.bin"
Notes	<string> - specifies the waveform to be deleted from the ARB playback memory. When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete a file from ARB

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memory is rejected with an error.

When Include Source is No and you specify a file that does not exist within ARB memory, an error is generated.

It is possible to delete files from within the ARB memory when the ARB is ON. However, if you attempt to delete the file that is currently playing an error is generated.

It is possible to delete a file from within the ARB memory when the sequencer state is ON and the file is not being used by the List Sequencer. If you attempt to delete a file which is being used by the list sequencer, an error is generated.

When sequencer state is On, even if ARB state is On, the selected waveform will not be played. In this case, if the selected waveform is not used in List Sequence, it can be deleted and the ARB state is turned Off.

If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.

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Initial S/W Revision	A.05.00
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### Delete All From ARB Memory

Allows you to remove all segments from ARB playback memory.

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Key Path	Source, Modulation Setup, ARB, Select Waveform, Segments in ARB Memory
<b>Remote Command</b>	:SOURce:RADio:ARB:DELeTe:ALL
<b>Example</b>	:SOUR:RAD:ARB:DELeTe:ALL
Notes	<p>When in Sequence Analyzer mode and Include Source is Yes, an attempt to delete all files from ARB memory is rejected with an error.</p> <p>When Include Source is No and you attempt to delete all files from ARB memory when the ARB is currently playing a file, all files except the one playing are deleted and an error is generated.</p> <p>If you attempt to delete all files from ARB memory when there are waveform files used in "<a href="#">List Sequencer</a>" on page 1725 and "<a href="#">Sequencer</a>" on page 1726 state is ON, all files except the files currently being used in list sequencer are deleted, and an error is generated.</p> <p>If the ARB is ON and you load a file to ARB memory or delete a file from ARB memory, the playing waveform segment may not keep phase continuity during the ARB memory operation. The waveform will be replayed after the ARB operation is finished.</p>
Initial S/W Revision	A.05.00

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### Segments on Hard Disk

This key functions the same as "[Segments on Hard Disk](#)" on page 1752.

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Key Path	Source, List Sequencer, List Sequencer Setup, Waveform
Initial S/W Revision	Prior to A.09.00

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### Load Segment To ARB Memory

This key functions the same as "[Load Segment To ARB Memory](#)" on page 1752.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Load All To ARB Memory

This key functions the same as "[Load All To ARB Memory](#)" on page 1753.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Change Directory ...

This key functions the same as "[Change Directory...](#)" on page 1754.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Default Directory ...

This key functions the same as "[Default Directory...](#)" on page 1754

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segment on Hard Drive
Initial S/W Revision	Prior to A.09.00

### Segments in ARB Memory

This key functions the same as "[Segments in ARB Memory](#)" on page 1754.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory
Initial S/W Revision	Prior to A.09.00

### Delete Segment From ARB Memory

This key functions the same as "[Delete Segment From ARB Mem](#)" on page 1754.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

## Delete All From ARB Memory

This key functions the same as "Delete All From ARB Memory" on page 1755.

Key Path	Source, List Sequencer, List Sequencer Setup, Waveform, Segments in ARB Memory, Segment in ARB Memory
Initial S/W Revision	Prior to A.09.00

## Step Duration

Allows access to the sub-menus for setting up the duration of play for the current step.

The duration can be set to be either the number of times for the ARB file associated with the sequence to play, or a specific time value, or continuous. If the step is set to play a CW tone, the step duration cannot be set to a play count.

Key Path	Source, List Sequencer, List Sequencer Setup
Remote Command	:SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE TIME   COUNT   CONTInuous   CABort :SOURce:LIST:STEP[1] 2 3...1000:SETup:DURation:TYPE?
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME :SOUR:LIST:STEP2:SET:DUR:TYPE?
Notes	SCPI is supported after A.09.40
Notes	If "Step Duration" is set to "Time" or "Play Count" for the last step, the last step of ARB keeps playing as if set to "Continuous", until the set "Time" has expired or until the "Play Count" setting is reached. However, you can query <b>Error! Reference source not found.</b> Source Sweeping Condition Message to find out if the current list sequence is complete or not.
Range	Time   Play Count   Continuous   Continuous Abort
Initial S/W Revision	A.05.00

## Time

Sets the duration of the current step to be a time value for the length of time the step will play. Pressing this key again opens another menu which allows you to set the time value for the step duration.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
Example	:SOUR:LIST:STEP2:SET:DUR:TYPE TIME
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

## Duration Time

Allows you to specify the length of time the current step will play.

When Step Duration is **Continuous Abort** this parameter specifies the maximum duration that the waveform will continue to play after a step trigger is received before the transition to the next waveform will occur. Duration is limited to a maximum of 20 seconds.

If the Transition Time value is longer than the Step Duration Time, an error is generated when initiating a source list sequence. For source list sequence, transition time is included in the step duration length (not occupy additional time). If the Transition Time value is longer than the Step Duration Time, the real step duration length is extended to equal the transition time and cause a timing shift. This check is also described in section **Error! Reference source not found.** List Sequence Step Validation.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration, Time
<b>Remote Command</b>	:SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCOut <double> :SOURce:LIST:STEP [1]   2   3...1000:SETup:DURation:TCOut?
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TCO 1s :SOUR:LIST:STEP2:SET:DUR:TCO?
<b>Notes</b>	SCPI is supported after A.09.40 This SCPI is reused by "Play Count", "Duration Time" and "Continuous Abort" according to current Duration Type setting is "Play Count" or "Duration Time" or "Continuous Abort". If current "Duration Type" is "Continuous", then popup error -221, "Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
<b>Notes</b>	If "Duration Time" is set for the last step, the last step of ARB keeps playing as if set to "Continuous" after set time expires. However, you can query Source Sweeping Condition Message (:STAT:OPER:COND?) to find out if the current list sequence is complete or not.
<b>Preset</b>	1.00 ms
<b>Min</b>	100 µs
<b>Max</b>	1800 s
<b>Initial S/W Revision</b>	A.05.00

### Play Count

Sets the duration of the current step to be an integer value for the number of times (play count) the ARB file is selected for playback during this step. For example, a 5 second ARB will be set to play 5 times during the step.

<b>Key Path</b>	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE COUN
<b>Notes</b>	SCPI is supported after A.09.40 This key is unavailable and is grayed out if the current step is configured to CW tone rather than an ARB waveform.
<b>Initial S/W Revision</b>	A.05.00

### Header Utilities

Allows access to the header utilities sub-menu. Pressing this key also causes the central display area to change to display the File Header Information view.

Key Path	Source, Modulation Setup, ARB
Dependencies	This key is only available if there is currently a waveform selected for playback. If no waveform is selected, the key is grayed out.
Initial S/W Revision	A.05.00

### Continuous

Sets the current step to be played continuously until the next step starts. The waveform will always play completely before transitioning to the next step.

Key Path	Source, List Sequencer, List Sequencer Setup, Step Duration
<b>Example</b>	:SOUR:LIST:STEP2:SET:DUR:TYPE CONT
Notes	SCPI is supported after A.09.40
Initial S/W Revision	A.05.00

### Output Trigger

Allows you to specify the trigger output for the current step. The trigger output signal is sent at the start of the step.

When select “On”, trigger event will occur on both Internal and External2 paths. Select “Off” will turn off trigger output.

Key Path	Source, List Sequencer, List Sequencer Setup
<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger ON   OFF   1   0 :SOURce:LIST:STEP[1] 2 3...1000:SETup:OUTPut:TRIGger
<b>Example</b>	:SOUR:LIST:STEP2:SET:OUTP:TRIG ON :SOUR:LIST:STEP2:SET:OUTP:TRIG?
Notes	SCPI is supported after A.09.40
Preset	Off
Range	On Off
Initial S/W Revision	A.05.00

### Step Configuration (Remote Command Only)

This SCPI command is used to configure the List Sequencer and is detailed in the table below. The command is defined such that you send one command per step, with the step number being specified as a subopcode of the SCPI command. Each command includes all the parameter settings for the step. As a step is setup, the values entered are run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:STEP[1] 2 ... 4..1000:SETup IMMEDIATE   INTERNAL   KEY
-----------------------	---

---

```
BUS | EXTERNAL2, <time>, NONE | PGSM | EGSM | RGSM | DCS1800 | PCS1900
| TGSM810 | GSM450 | GSM480 | GSM700 | GSM850 | BANDI | BANDII |
BANDIII | BANDIV | BANDV | BANDVI | BANDVII | BANDVIII | BANDIX | BANDX
| BANDXI | BANDXII | BANDXIII | BANDXIV | BANDXIX | USCELL | USPCS |
JAPAN | KOREAN | NMT | IMT2K | UPPER | SECOND | PAMR400 | PAMR800 |
IMTEXT | PCS1DOT9G | AWS | US2DOT5G | PUBLIC | LOWER | NONE | BAND1 |
BAND2 | BAND3 | BAND4 | BAND5 | BAND6 | BAND7 | BAND8 | BAND10 | BAND11
| BAND12 | BAND13 | BAND14 | BAND17 | BAND18 | BAND19 | BAND20 | BAND21
| BAND24 | BAND25 | BAND26 | BAND33 | BAND34 | BAND35 | BAND36 | BAND37
| BAND38 | BAND39 | BAND40 | BAND41 | BAND42 | BAND43 | BANDA | BANDB |
BANDC | BANDD | BANDE | BANDF, DOWN | UP, <freq>, <ampl>, <string>,
TIME | COUNT | CONTINUOUS, <time>, ON | OFF | 1 | 0, [<int>],
:SOURce:LIST:STEP[1]|2|...|4..1000:SETup?
```

---

**Example** :SOUR:LIST:STEP1:SET INT, 1ms, PGSM, DOWN, 10, -25 dBm, "GSM\_Test1.bin", TIME, 10ms, OFF, 255

---

**Notes** The parameters are:  
(There is a total of 11 items in each step, the following is a list of the items in the order they must appear in the remote command.)

1. Step Trigger **<enum>** – specifies the input trigger for the step. For details of the valid types of step trigger see ["Step Trigger" on page 1728](#).
2. Transition Time **<time>** – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see ["Transition Time" on page 1730](#).
3. Radio Band **<enum>** – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1731](#).
4. Radio Band Link **<enum>** – specifies the radio band link direction for the step. For details of the valid link types, see ["Radio Band Link" on page 1748](#).
5. Frequency/Channel Number **<freq>/<chan num>** – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see ["Channel" on page 1748](#) and ["Frequency" on page 1749](#).
6. Power **<ampl>** – specifies the output power for the step in dBm. For details of the valid ranges see ["Power" on page 1749](#).
7. Waveform **<string>** – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are:  
  - <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.
  - CONT – continues playback of the ARB file from the previous step
  - CW – outputs a CW tone
  - OFF – disable RF output
8. Step Duration **<enum>** – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see ["Step](#)

---



---

[Duration" on page 1757.](#)

9. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, ["Time" on page 1757](#) and ["Play Count" on page 1758](#).

10. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see ["Output Trigger" on page 1759](#).

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Dependencies	The range of subopcode values is 1 to 1000 and the value you enter is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> . If you attempt to remotely set or query a subopcode that is out of range, an error is generated.
Initial S/W Revision	A.05.00

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### Step Configuration of Step Trigger parameter list (Remote Command Only)

This SCPI command is to configure “Step Trigger” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

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<b>Remote Command</b>	:SOURce:LIST:SETup:INPut:TRIGger <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:INPut:TRIGger?
<b>Example</b>	:SOUR:LIST:SET:INP:TRIG IMM,INT,EXT2 :SOUR:LIST:SET:INP:TRIG?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Step Trigger <enum> – specifies the input trigger for the step. For details of the valid types of step trigger see <a href="#">"Step Trigger" on page 1728</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
<b>Remote Command Notes</b>	IMMediate INTernal KEY BUS EXTernal2
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
<b>Initial S/W Revision</b>	A.09.40

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### Step Configuration of Transition Time parameter list (Remote Command Only)

This SCPI command is to configure “Transition Time” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

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<b>Remote Command</b>	:SOURce:LIST:SETup:TRANSition:TIME <time>, <time>, <time>, ... :SOURce:LIST:SETup:TRANSition:TIME?
<b>Example</b>	:SOUR:LIST:SET:TRAN:TIME 1ms,1ms,1ms

---

	:SOUR:LIST:SET:TRAN:TIME?
Notes	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Transition Time &lt;time&gt; – specifies the transition time for the step in seconds. For details of the valid ranges for the transition time see <a href="#">"Transition Time" on page 1730</a></p> <p>If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parameters whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Radio Band parameter list (Remote Command Only)

This SCPI command is to configure "Radio Band" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

**R** :SOURce:LIST:SETup:RADio:BAND <enum>, <enum>, <enum>, ...

**e** :SOURce:LIST:SETup:RADio:BAND?  
**m**  
**o**  
**t**  
**e**

**C**  
**o**  
**m**  
**m**  
**a**  
**n**  
**d**

**E** :SOUR:LIST:SET:RAD:BAND PGSM, EGSM, RGSM

**x** :SOUR:LIST:SET:RAD:BAND?  
**a**  
**m**  
**p**  
**l**  
**e**

**N** The command is to setup below parameter array of whole list sequence.

**o** Radio Band <enum> – specifies the radio band for the step. For details of the valid radio bands see ["Radio Setup" on page 1731](#).  
**t**  
**e** If input parameter number exceeds the step number defined by ["Number of Steps" on page 1727](#) Number of Steps then  
**s** generate error ", and only those parameters whose index number falls in number of steps will be updated.

**R** NONE|PGSM|EGSM|RGSM|DCS1800|PCS1900|TGSM810|GSM450|GSM480|GSM700|GSM850|BANDI|BANDII|BANDIII|BANDI  
**e** V|BANDV|BANDVI|BANDVII|BANDVIII|BANDIX|BANDX|BANDXI|BANDXII|BANDXIII|BANDXIV|BANDXIX|USCELL|USPCS|JAPAN|KO  
**m** REAN|NMT|IMT2K|UPPER|SECOND|PAMR400|PAMR800|IMTEXT|PCS1 DOT9G|AWS|US2DOT5G|PUBLIC|LOWER|NONE|BAND1|  
BAND2|BAND3|BAND4|BAND5|BAND6|BAND7|BAND8|BAND10|BAND11|BAND12|BAND13|BAND14|BAND17|BAND18|BAND1

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o 9|BAND20|BAND21|BAND24|BAND25|BAND26|BAND33|BAND34|BAND35|BAND36|BAND37|BAND38|BAND39|BAND40|BAN  
t D41|BAND42|BAND43|BANDA|BANDB|BANDC|BANDD|BANDE|BANDF  
e

C  
o  
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m  
a  
n  
d

N  
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t  
e  
s

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D The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "[Number of Steps](#)" on  
e [page 1727](#).

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### Step Configuration of Radio Band Link parameter list (Remote Command Only)

This SCPI command is to configure “Radio Band Link” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:RADio:BAND:LINK <enum>, <enum>, <enum>, ... :SOURce:LIST:SETup:RADio:BAND:LINK?
<b>Example</b>	:SOUR:LIST:SET:RAD:BAND:LINK DOWN,UP,UP :SOUR:LIST:SET:RAD:BAND:LINK?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Radio Band Link <enum> – specifies the radio band link direction for the step. For details of the valid link types, see <a href="#">"Radio Band Link" on page 1748</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.
<b>Remote Command Notes</b>	DOWN UP
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Frequency/Channel Number parameter list (Remote Command Only)

This SCPI command is to configure “Frequency” or “Channel Number” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:CNFRrequency <double>, <double>, <double>, ... :SOURce:LIST:SETup:CNFRrequency?
<b>Example</b>	:SOUR:LIST:SET:CNFR 1GHz,100MHz,100MHz :SOUR:LIST:SET:CNFR? SOUR:LIST:SET:CNFR 124,124,124 :SOUR:LIST:SET:CNFR?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Frequency/Channel Number <freq>/<chan num> – specifies the frequency in Hz or the channel number for the step. The channel number and frequency are combined as one parameter that represents the frequency or channel number depending on the radio band setting. If the radio band is set to NONE, this value is interpreted as a frequency value in Hz. If the radio band is set to a valid band, this value is interpreted as a channel number. For details of the valid ranges for frequency and channel numbers, see <a href="#">"Channel" on page 1748</a> and <a href="#">"Frequency" on page 1749</a> This SCPI is used to setup/query channel number or frequency setting, according to current Radio Band setting of that step. If Radio Band is “NONE”, then it’s frequency. If Radio Band is not “NONE”, then it’s channel number If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in

	legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Power parameter list (Remote Command Only)

This SCPI command is to configure “Power” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:AMPLitude <ampl>, <ampl>, <ampl>, ... :SOURce:LIST:SETup:AMPLitude?
<b>Example</b>	:SOUR:LIST:SET:AMPL -50dBm,-40dBm,-30dBm :SOUR:LIST:SET:AMPL?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Power <ampl> – specifies the output power for the step in dBm. For details of the valid ranges see <a href="#">"Power" on page 1749</a> . If input parameter number exceeds the step number defined by <a href="#">"Number of Steps" on page 1727</a> Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see <a href="#">"Number of Steps" on page 1727</a> .
Initial S/W Revision	A.09.40

### Step Configuration of Waveform parameter list (Remote Command Only)

This SCPI command is to configure “Waveform” parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in ["Number of Steps" on page 1727](#) Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:WAVEform <string>, <string>, <string>, ... :SOURce:LIST:SETup:WAVEform?
<b>Example</b>	:SOUR:LIST:SET:WAV "CW","Off","CONT" :SOUR:LIST:SET:WAV?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Waveform <string> – specifies the waveform for playback during the step. The step can output either a new ARB waveform, continue playback of the previous waveform, or output a CW tone. The options for specifying these are: <filename> - plays the specified waveform from the start. The filename value is the name of the file within ARB playback memory, it is does not include the windows path to the file on the HDD. If you enter a filename for a waveform that does not reside within ARB playback memory, an error is generated.

	<p>CONT – continues playback of the ARB file from the previous step</p> <p>CW – outputs a CW tone</p> <p>OFF – disable RF output</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
Dependencies	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1727.
Range	"filename"   "CW"   "Off"   "CONT"
Initial S/W Revision	A.09.40

### Step Configuration of Step Duration parameter list (Remote Command Only)

This SCPI command is to configure "Step Duration" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:DURation:TYPE &lt;enum&gt;, &lt;enum&gt;, &lt;enum&gt;, ... :SOURce:LIST:SETup:DURation:TYPE?</pre>
<b>Example</b>	<pre>:SOUR:LIST:SET:DUR:TYPE COUN,TIME,CONT :SOUR:LIST:SET:DUR:TYPE?</pre>
<b>Notes</b>	<p>The command is to setup below parameter array of whole list sequence.</p> <p>Step Duration &lt;enum&gt; – specifies the duration of the step. The duration can be specified to be either time, or play count of the ARB file associated with the step, or continuous. If Waveform is set to "CW", this value cannot be set to Play Count and an error will be generated. If continuous is selected, the following Time or Count value is ignored. For further details of this setting, see "Step Duration" on page 1757.</p> <p>If input parameter number exceeds the step number defined by "Number of Steps" on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated.</p>
<b>Remote Command Notes</b>	TIME   COUNT   CONTinuous
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see "Number of Steps" on page 1727.
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Duration Time or Play Count parameter list (Remote Command Only)

This SCPI command is to configure "Duration Time" or "Play Count" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "Number of Steps" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	<pre>:SOURce:LIST:SETup:TOCount &lt;time/int&gt;, &lt;time/int&gt;, &lt;time/int&gt;, ... :SOURce:LIST:SETup:TOCount?</pre>
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<b>Example</b>	:SOUR:LIST:SET:TOC 1s,2s,3s :SOUR:LIST:SET:TOC? :SOUR:LIST:SET:TOC 5,6,7 :SOUR:LIST:SET:TOC?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Time or Count <time/int> – specifies time duration in seconds or play count of the ARB file associated with the step. For further details of this setting, including the valid ranges for the time or play count setting, " <a href="#">Time</a> " on page 1757 and " <a href="#">Play Count</a> " on page 1758. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in number of steps will be updated. If current " <a href="#">Step Duration</a> " on page 1757 is "Continuous", then generate error -221,"Settings conflict;Cannot accept time or count input when step duration type is Continuous on step #"
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

### Step Configuration of Output Trigger parameter list (Remote Command Only)

This SCPI command is to configure "Output Trigger" parameter array of the whole List Sequencer at one time. The number of array is same as step number defined in "[Number of Steps](#)" on page 1727 Number of Steps. As a step is setup, the value entered run through several levels of validation.

<b>Remote Command</b>	:SOURce:LIST:SETup:OUTPut:TRIGger <bool>, <bool>, <bool>, ... :SOURce:LIST:SETup:OUTPut:TRIGger ?
<b>Example</b>	:SOUR:LIST:SET:OUTP:TRIG ON,OFF,ON :SOUR:LIST:SET:OUTP:TRIG?
<b>Notes</b>	The command is to setup below parameter array of whole list sequence. Output Trigger <Boolean> – specifies the output trigger for the step. For details of the ranges for this setting see " <a href="#">Output Trigger</a> " on page 1759. If input parameter number exceeds the step number defined by " <a href="#">Number of Steps</a> " on page 1727 Number of Steps then generate error ", and only those parametes whose index number falls in legal step number will be updated.
<b>Remote Command Notes</b>	ON OFF 1 0
<b>Dependencies</b>	The range is 1 to 1000 which is determined by the number of steps you have configured. For details see " <a href="#">Number of Steps</a> " on page 1727.
<b>Initial S/W Revision</b>	A.09.40

### Clear List (Remote Command Only)

This command is the SCPI equivalent of the Clear List UI featuredescribed in.

<b>Remote Command</b>	:SOURce:LIST:SETup:CLEar
<b>Example</b>	:SOUR:LIST:SETup:CLE
Initial S/W Revision	A.05.00

## Trigger Type

Allows access to the sub-menu for selecting the output trigger type for the list sequencer globally. It cannot be changed between different sequence steps.

<b>Key Path</b>	Source, List Sequencer
<b>Remote Command</b>	:SOURce:LIST:TRIGgerout:TYPe BEGinningofstep DATamarker
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG :SOUR:LIST:TRIG:TYP?
Notes	SCPI is supported after A.14.00
Preset	BEGinningofstep
Range	BEGinningofstep DATamarker
Initial S/W Revision	A.14.00

## BeginningOfStep

Sets the output trigger type as BeginningOfStep for the whole source sequence.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP BEG
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## DataMarker

Sets the output trigger type as DataMarker for the whole source sequence. When DataMarker is selected, which marker to route is also needed to be set.

<b>Key Path</b>	Source, List Sequencer, Trigger Type
<b>Example</b>	:SOUR:LIST:TRIG:TYP DAT
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## Marker 1

Sets the output trigger maker routing to Marker 1 for DataMarker in the whole source sequence.



Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M1
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Marker 2

Sets the output trigger maker routing to Marker 2 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M2
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Marker 3

Sets the output trigger maker routing to Marker 3 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M3
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

### Marker 4

Sets the output trigger maker routing to Marker 4 for DataMarker in the whole source sequence.

Key Path	Source, List Sequencer, Trigger Type, DataMarker
<b>Example</b>	:SOUR:LIST:TRIG:TYPE:MARK M4
Notes	SCPI is supported after A.14.00
Initial S/W Revision	A.14.00

## Manual Trigger Now

Pressing this key provides a software trigger event to the list sequencer. During execution of sequence, if the sequencer is halted on any step that has been configured with a “Manual” step trigger, then this key press will cause the sequencer to continue and execute the step.

Key Path	Source, List Sequencer
<b>Remote Command</b>	No remote command, front panel only.
Initial S/W Revision	A.05.00

### Remote Software Trigger (Remote command Only)

During execution of a list sequence, the sequence will halt and wait at any step that has Step Trigger set to "Bus". Sending this command will trigger the step and continue the sequence.

<b>Remote Command</b>	:SOURce:LIST:TRIGger:INITiate[:IMMediate]
<b>Example</b>	:SOUR:LIST:TRIG:INIT
Initial S/W Revision	A.05.00

### Query List Sequence Initiation Armed Status (Remote Command Only)

This is a blocking SCPI query to determine if source list sequence being initiated successfully or not.

<b>Remote Command</b>	:SOURce:LIST:INITiation:ARMed?
<b>Example</b>	:SOUR:LIST:INIT:ARMed?
Notes	The return data is in the following format: Integer
Notes	Query only SCPI. Returning "1" if list sequence has been initiated successfully, returning "0" if not. Once get "0", you can use :SYST:ERR? to query what error happened. Just like "*OPC?", this command can be blocked until event/status "IsSourceSweeping" happens, and then returns. Doing so can help user's script query armed status only once during the time interval of the initiation. As an ancillary SCPI of existing SCPI ":SOUR:LIST:TRIGger[:IMMediate]" (see <a href="#">"Initiate Sequence" on page 1726</a> Initiate Sequence), the right usage of this command is to use it after ":SOUR:LIST:TRIG". If not, this command will return "1" immediately.
Notes	There is an alias SCPI ":SOURce:LIST:TRIGger:INITiation:ARMed?".
Initial S/W Revision	A.09.40

### Source Preset

Allows you to preset the source settings to their default values.

Key Path	Source
<b>Remote Command</b>	:SOURce:PRESet
<b>Example</b>	:SOUR:PRES

## SPAN X Scale

Accesses a menu of functions that enable you set the horizontal scale parameters.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Ref Value

Enables you to set the display X reference value.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel <time> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RLEVel?
<b>Example</b>	DISP:TXP:VIEW:WIND:TRAC:X:RLEV 1s DISP:TXP:VIEW:WIND:TRAC:X:RLEV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the <b>X Auto Scaling</b> is On, this value is automatically determined by the measurement result. When you set a value manually, <b>X Auto Scaling</b> automatically changes to Off.
Preset	0 s
State Saved	Saved in instrument state.
Min	-10.0 s
Max	10.00 s
Initial S/W Revision	Prior to A.02.00

### Scale/Div

Enables you to set the display X scale/division value.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision <time> :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:PDIVision?
<b>Example</b>	DISP:TXP:VIEW:WIND:TRAC:X:PDIV 1ms DISP:TXP:VIEW:WIND:TRAC:X:PDIV?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	If the <b>X Auto Scaling</b> is On, this value is automatically determined by the measurement result. When you set a value manually, <b>X Auto Scaling</b> automatically changes to Off.

Preset	64.0 us
State Saved	Saved in instrument state.
Min	1.00 ns
Max	1.00 s
Initial S/W Revision	Prior to A.02.00

## Ref Position

Enables you to set the display X reference position to Left, Center or Right.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition LEFT   CENTER   RIGHT :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:RPOSition?
Example	DISP:TXP:VIEW:WIND:TRAC:X:RPOS LEFT DISP:TXP:VIEW:WIND:TRAC:X:RPOS?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	LEFT
State Saved	Saved in instrument state.
Range	Left Ctr Right
Initial S/W Revision	Prior to A.02.00

## Auto Scaling

Enables you to toggle the X auto scaling function between On and Off.

Key Path	SPAN X Scale
Mode	SA, GSM, TD-SCDMA
Remote Command	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle 0   1   OFF   ON :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:X[:SCALe]:COUPle?
Example	DISP:TXP:VIEW:WIND:TRAC:X:COUP OFF DISP:TXP:VIEW:WIND:TRAC:X:COUP?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Upon pressing the Restart front-panel key, the scale coupling function automatically determines the scale per division and reference values based on the measurement results if this parameter is set to On. When you set a value to either X Rel Value or X Scale/Div manually, X Auto Scaling

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	automatically changes to Off.
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

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## Sweep/Control

Accesses a menu of functions that enable you to set up and control the sweep for the current measurement. For details about this key, see "[Sweep/Control](#)" on page 1496.

Key Path	Front-panel key
Mode	SA, EDGE, GSM, TDSCDMA
Initial S/W Revision	Prior to A.02.00

### Sweep Time (for GSM mode)

Sets the number of slots which are used in each data acquisition. Each slot is approximately to 600 s.

Key Path	Sweep/Control
Mode	GSM
<b>Remote Command</b>	<code>[ :SENSe ] :TXPower :SWEep :TIME &lt;integer&gt;</code> <code>[ :SENSe ] :TXPower :SWEep :TIME?</code>
<b>Example</b>	<code>TXP:SWE:TIME 4</code> <code>TXP:SWE:TIME?</code>
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	50
Initial S/W Revision	Prior to A.02.00

### Pause/Resume

Pauses a measurement after the current data acquisition is complete.

When Paused, the label on the key changes to Resume. Pressing Resume un-pauses the measurement. When you are Paused, pressing Restart, Single or Cont does a Resume.

Key Path	Sweep/Control
<b>Remote Command</b>	<code>:INITiate:PAUSE</code>
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

Key Path	Sweep/Control
<b>Remote Command</b>	:INITiate:RESume
Dependencies	Grayed out in Measurements that do not support Pausing. Blanked in Modes that do not support Pausing.
Initial S/W Revision	Prior to A.02.00

### Abort (Remote Command Only)

This command is used to stop the current measurement. It aborts the current measurement as quickly as possible, resets the sweep and trigger systems, and puts the measurement into an "idle" state. If the analyzer is in the process of aligning when ABORT is sent, the alignment finishes before the abort function is performed. So ABORT does not abort an alignment.

If the analyzer is set for Continuous measurement, it sets up the measurement and initiates a new data measurement sequence with a new data acquisition (sweep) taken once the trigger condition is met.

If the analyzer is set for Single measurement, it remains in the "idle" state until an :INIT:IMM command is received.

<b>Remote Command</b>	:ABORt
<b>Example</b>	:ABOR
Notes	If :INITiate:CONTinuous is ON, then a new continuous measurement will start immediately; with sweep (data acquisition) occurring once the trigger condition has been met. If :INITiate:CONTinuous is OFF, then :INITiate:IMMEDIATE is used to start a single measurement; with sweep (data acquisition) occurring once the trigger condition has been met.
Dependencies	For continuous measurement, ABORt is equivalent to the Restart key. Not all measurements support the abort command.
Status Bits/OPC dependencies	The STATus:OPERation register bits 0 through 8 are cleared. The STATus:QUESTionable register bit 9 (INTegrity sum) is cleared. Since all the bits that feed into OPC are cleared by the ABORt, the ABORt will cause the *OPC query to return true.
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)  
System

System

See "[System](#)" on page 222



## Trace/Detector

Accesses a menu of functions that enable you to control the detectors for the current measurement.

Key Path	Front-panel key
Initial S/W Revision	Prior to A.02.00

### Max Hold Trace

This key enables you to select visible/invisible Max Hold Trace.

Key Path	Trace/Detector
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe] ON   OFF   1   0  :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MAXHold[:STATe]?
<b>Example</b>	:DISP:TXP:VIEW:WIND:TRAC:MAXH ON :DISP:TXP:VIEW:WIND:TRAC:MAXH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MAXimum forces this parameter to ON.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

### Min Hold Trace

This key enables you to select visible/invisible Min Hold Trace.

Key Path	Trace/Detector
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	:DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe] ON   OFF   1   0  :DISPlay:TXPower:VIEW[1]:WINDow[1]:TRACe:MINHold[:STATe]?
<b>Example</b>	:DISP:TXP:VIEW:WIND:TRAC:MINH ON :DISP:TXP:VIEW:WIND:TRAC:MINH?
Notes	You must be in the Spectrum Analyzer mode, TD-SCDMA mode or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Selecting [:SENSe]:TXPower:AVERage:TYPE MINimum forces this parameter to ON.

12 Burst Power (Transmit Power)  
Trace/Detector

Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

## Trigger

See ["Trigger" on page 278](#)

### Free Run

See ["Free Run " on page 285](#)

### Video

See ["Video \(IF Envelope\) " on page 286](#)

### Trigger Level

See ["Trigger Level " on page 286](#)

### Trig Slope

See ["Trig Slope " on page 287](#)

### Trig Delay

See ["Trig Delay " on page 288](#)

### External 1

See ["External 1 " on page 304](#)

### Trigger Level

See ["Trigger Level " on page 304](#)

### Trig Slope

See ["Trig Slope " on page 305](#)

### Trig Delay

See ["Trig Delay " on page 291](#)

### Zero Span Delay Comp

See ["Zero Span Delay Comp On/Off" on page 292](#)

### External 2

See ["External 2 " on page 306](#)

### Trigger Level

See ["Trigger Level " on page 306](#)

### Trig Slope

See ["Trig Slope " on page 307](#)

12 Burst Power (Transmit Power)  
Trigger

### **Trig Delay**

See "[Trig Delay](#) " on page 294

### **Zero Span Delay Comp**

See "[Zero Span Delay Comp On/Off](#)" on page 294

### **RF Burst**

See "[RF Burst](#) " on page 307

### **Absolute Trigger**

See "[Absolute Trigger Level](#)" on page 308

### **Relative Trigger**

See "[Relative Trigger Level](#)" on page 297

### **Trig Slope**

See "[Trigger Slope](#) " on page 309

### **Trig Delay**

See "[Trig Delay](#) " on page 298

### **Periodic Timer**

See "[Periodic Timer \(Frame Trigger\)](#) " on page 299

### **Period**

See "[Period](#) " on page 300

### **Offset**

See "[Offset](#) " on page 301

### **Offset Adjust (Remote Command Only)**

See "[Offset Adjust \(Remote Command Only\)](#)" on page 302

### **Reset Offset Display**

See "[Reset Offset Display](#) " on page 303

### **Sync Source**

See "[Sync Source](#) " on page 303

### **Off**

See "[Off](#) " on page 304

## External 1

See ["External 1 "](#) on page 304

### Trigger Level

See ["Trigger Level "](#) on page 304

### Trig Slope

See ["Trig Slope "](#) on page 305

## External 2

See ["External 2 "](#) on page 306

### Trigger Level

See ["Trigger Level "](#) on page 306

### Trig Slope

See ["Trig Slope "](#) on page 307

## RF Burst

See ["RF Burst "](#) on page 307

## Absolute Trigger

See ["Absolute Trigger Level"](#) on page 308

### Trig Slope

See ["Trigger Slope "](#) on page 309

## Trig Delay

See ["Trig Delay"](#) on page 309

## Auto/Holdoff

See ["Auto/Holdoff "](#) on page 310

## Auto Trig

See ["Auto Trig "](#) on page 310

## Trig Holdoff

See ["Trig Holdoff "](#) on page 311

## Holdoff Type

See ["Holdoff Type"](#) on page 311

## User Preset

Accesses a menu that gives you the following three choices:

- User Preset – recalls a state previously saved using the Save User Preset function.
- User Preset All Modes – presets all of the modes in the analyzer
- Save User Preset– saves the current state for the current mode

**NOTE**

In products that run multiple instances of the X-Series Application, all instances use the same location to save User Preset state. So Save User Preset of one instance will overwrite the Save User Preset of another instance.

Key Path	Front-panel key
Backwards Compatibility Notes	<p>User Preset is actually loading a state, and in legacy analyzers, it was possible to load a state without affecting the trace data, limit lines or correction data. Similarly it was possible to do a User Preset without affecting the trace data, limit lines or correction data.</p> <p>In the X-Series, “state” always includes all of this data; so whenever state is loaded, or User Preset is executed, all of the traces, limit lines and corrections are affected. Although this differs from previous behavior, it is desirable behavior, and should not cause adverse issues for users.</p> <p>On ESA and PSA, User Preset affected the entire instrument’s state. In the X-Series, User Preset only recalls the state for the active mode. There is a User Preset file for each mode. User Preset can never cause a mode switch as it can in legacy analyzers. If you want to recall all modes to their user preset file state, you will need to do a User Preset after mode switching into each mode.</p> <p>User Preset recalls mode state which can now include data like traces; whereas on ESA and PSA, User Preset did not affect data.</p>
Initial S/W Revision	Prior to A.02.00

## User Preset

User Preset sets the state of the currently active mode back to the state that was previously saved for this mode using the Save User Preset menu key or the SCPI command, SYST:PRES:USER:SAV. It not only recalls the Mode Preset settings, but it also recalls all of the mode persistent settings, and the Input/Output system setting that existed at the time Save User Preset was executed.

If a Save User Preset has not been done at any time, User Preset recalls the default user preset file for the currently active mode. The default user preset files are created if, at power-on, a mode detects there is no user preset file. There will never be a scenario when there is no user preset file to restore. For each mode, the default user preset state is the same state that would be saved if a Save User Preset is performed in each mode right after doing a Restore Mode Default and after a Restore Input/Output Defaults.

The User Preset function does the following:

- Aborts the currently running measurement.
- Sets the mode State to the values defined by Save User Preset.
- Makes the saved measurement for the currently running mode the active measurement.
- Brings up the saved menu for the power-on mode.

- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER
Notes	:SYST:PRES:USER:SAVE is used to save the current state as the user preset state. Clears all pending OPC bits. The Status Byte is set to 0. Pressing the User Preset front-panel key while already in the User Preset menu will cause the User Preset to get executed
Couplings	A user preset will cause the currently running measurement to be aborted and cause the saved measurement to be active. Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.
Initial S/W Revision	Prior to A.02.00

## User Preset All Modes

Recalls all of the User Preset files for each mode, switches to the power-on mode, and activates the saved measurement from the power-on mode User Preset file.

### NOTE

When the instrument is secured, all of the user preset files are converted back to their default user preset files.

The User Preset function does the following:

- Aborts the currently running measurement.
- Switches the Mode to the power-on mode.
- Restores the User Preset files for each mode.
- Makes the saved measurement for the power-on mode the active measurement.
- Brings up the saved menu for the power-on mode.
- Clears the input and output buffers.
- Sets the Status Byte to 0.

Key Path	User Preset
<b>Remote Command</b>	:SYSTem:PRESet:USER:ALL
<b>Example</b>	:SYST:PRES:USER:SAVE:SYST:PRES:USER:ALL
Notes	Clears all pending OPC bits. The Status Byte is set to 0. :SYST:PRES:USER:SAVE is used to save the current state as the user preset state.
Couplings	A user preset will cause the currently running measurement to be aborted, cause a mode switch to the power-on mode, and cause the saved measurement to be active in the power-on mode.

---

Recalling a User Preset file has the same issues that recalling a Save State file has. Some settings may need to be limited and therefore re-coupled, since the capabilities of the mode may have changes when the User Preset file was last saved.

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Initial S/W Revision      Prior to A.02.00

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## Save User Preset

Saves the currently active mode and its State. You can recall this User Preset file by pressing the User Preset menu key or sending the SYST:PRES:USER remote command. This same state is also saved by the Save State function.

Key Path	User Preset
Remote Command	:SYSTem:PRESet:USER:SAVE
Example	:SYST:PRES:USER:SAVE
Notes	:SYST:PRES:SAVE creates the same file as if the user requested a *SAV or a MMEM:STOR:STAT, except User Preset Save does not allow the user to specify the filename or the location of the file.
Initial S/W Revision	Prior to A.02.00



## View/Display

The View/Display key opens up the View menu for the current measurement. The views that are available are specific to the current measurement selected under the Meas key. Many of the lower-level menu keys are also the same across all measurements. Unique functions are described below.

This measurement has one view, which consists of two windows.

"RF Envelope view for TX Power Measurement(Above Threshold)" on page 1785

"RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)" on page 1786

"RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)" on page 1787

### RF Envelope view for TX Power Measurement(Above Threshold)

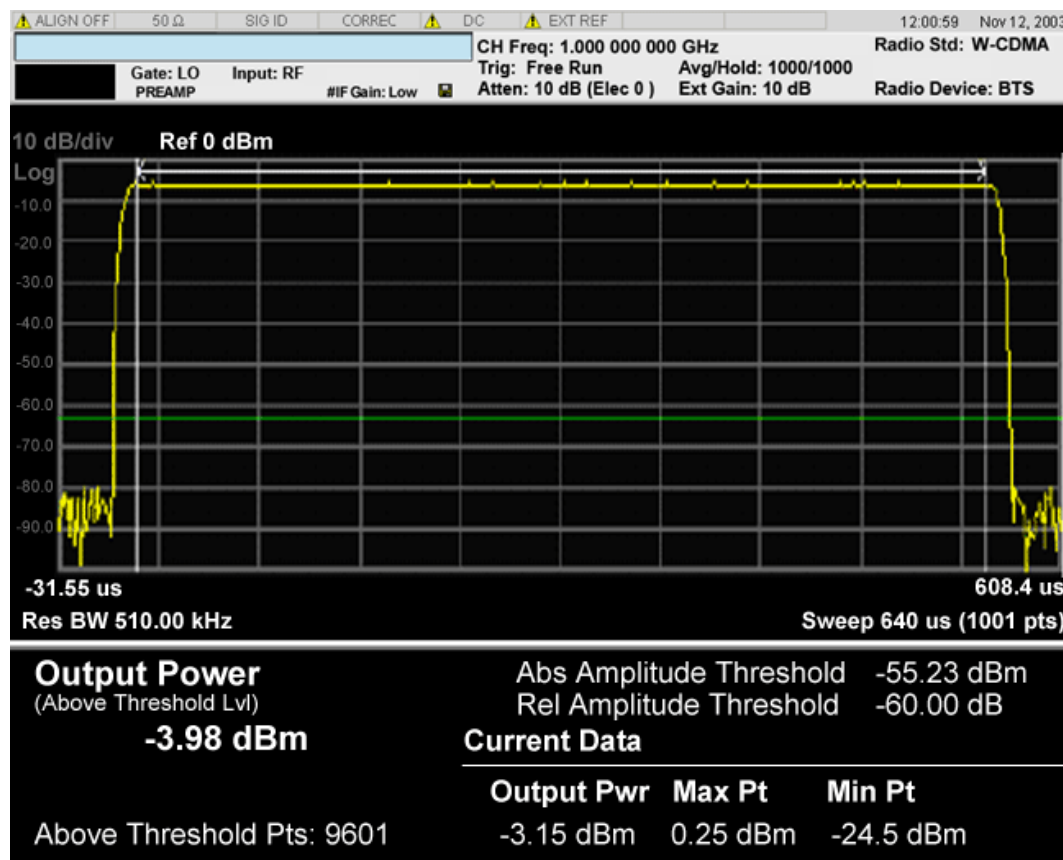


Figure 0-1 RF Envelope view for TX Power Measurement(Above Threshold)

RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)

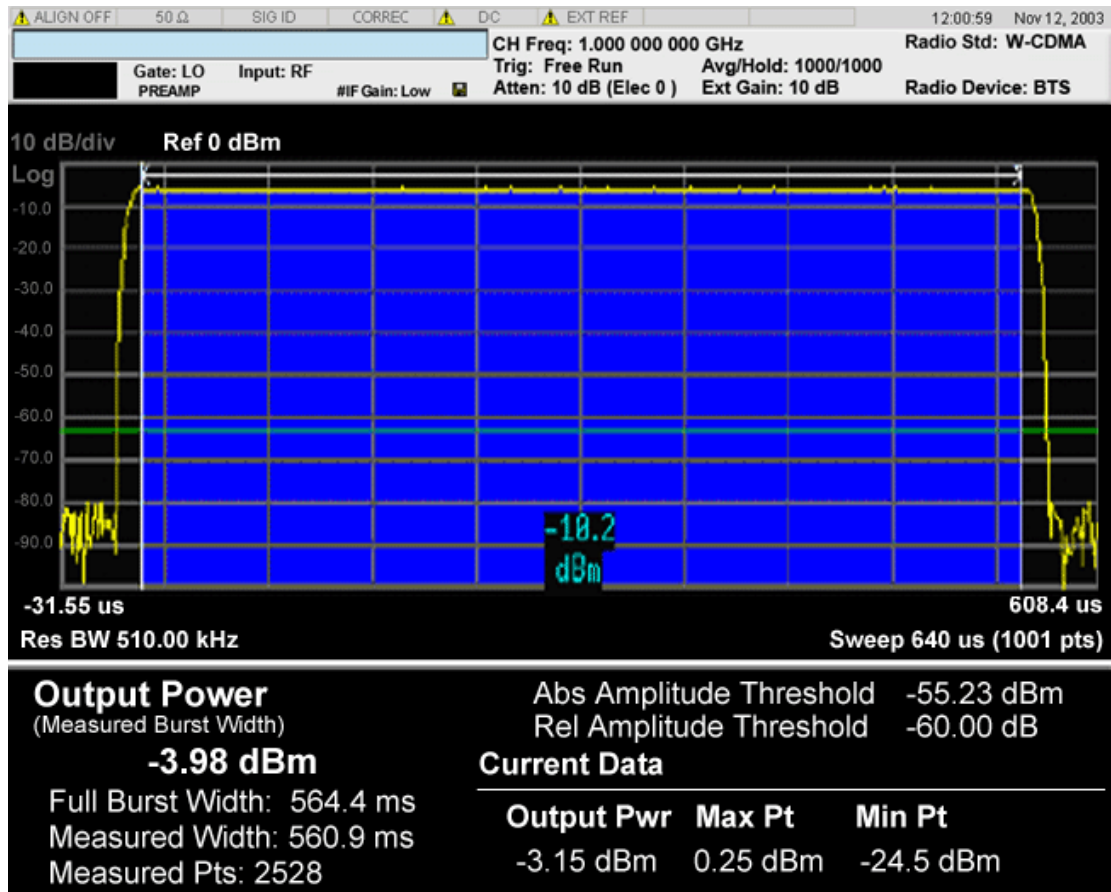


Figure 0-2 RF Envelope view with Bar Graph for TX Power Measurement (Measured Burst Width)

### RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)

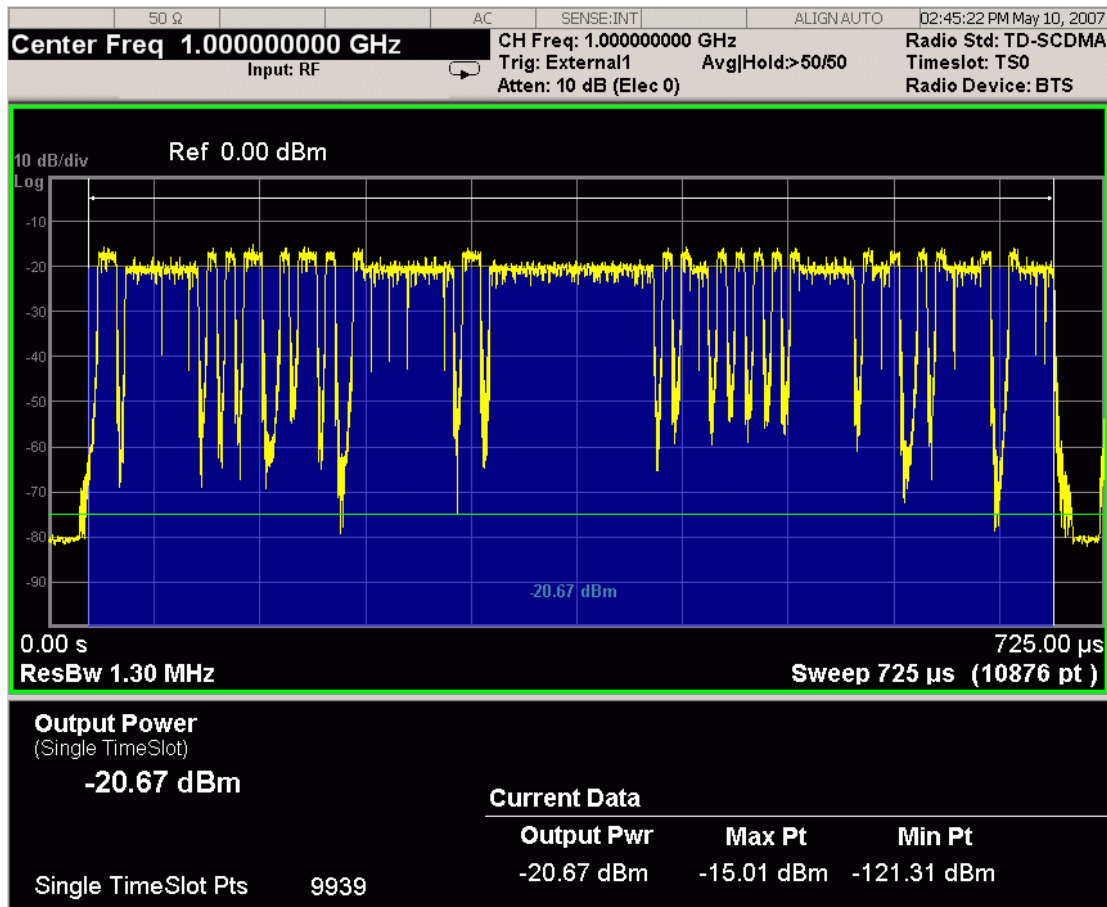


Figure 0-3 RF Envelope view with Bar Graph for TX Power Measurement (Single TimeSlot)

The bar graph represents the measured portion of the trace. It is the blue bar in the second figure. Its state (On/Off) is controlled by the **Bar Graph** key under the View/Display key.

#### RF Envelope window

Marker Operation	Yes
Corresponding Trace	Corrected measured trace (n=2,3,4)

#### Metrics window

Name	Corresponding Results	Display Format
Mean Transmit Power	n=1 3rd	99.99 dBm
Above Threshold or Measured Burst Width	Power Value above the threshold or measured burst width for N averages, if averaging is on. An average consists of N acquisitions of data which represents the current trace. If averaging is off, the value of power averaged is the same as the Mean Transmit Power of Current Data.	

Name	Corresponding Results	Display Format
Full Burst Width	n=1 9th Burst width that is determined by the <b>Threshold Lvl.</b>	999.9 us
Measured Width	n=1 10th Time length that is used to calculate Mean Transmit Power when <b>Meas Method</b> is Measured Burst Width. If <b>Meas Method</b> is set to Above Threshold, disappear from the window.	999.9 us
Above Thresh Pts	n=1 6th Number of points that were above the threshold level and were used for the power calculation when <b>Meas Method</b> is Above Threshold Level.	9999
Thresh Pts	N=1 6th Number of points that were used for the power calculation when Meas Method is Measured Burst Width.	9999
Abs Amplitude Threshold	n=1 5th Threshold value is the threshold (in dBm) above which the power is calculated.	99.99 dBm
Rel Amplitude Threshold	Threshold (in dB) relative to the peak carrier level above which the power is calculated	99.99 dB
Mean Transmit power (Current data)	n=1 2nd Power value above the threshold or measured burst width. If averaging is on, the power is for the latest acquisition.	99.99 dBm
Max Pt	n=1 7th Maximum peak level of the most recently acquired trace data.	99.99 dBm
Min Pt	n=1 8th Minimum peak level of the most recently acquired trace data.	99.99 dBm
Key Path	Front-panel key	
Mode	SA, EDGE/GSM, TDSCDMA	
Initial S/W Revision	Prior to A.02.00	

## Display

The Display menu is common to most measurements, and is used for configuring items on the display. Some Display menu settings apply to all the measurements in a mode, and some only to the current measurement. Those under the System Display Settings key apply to all measurements in all modes.

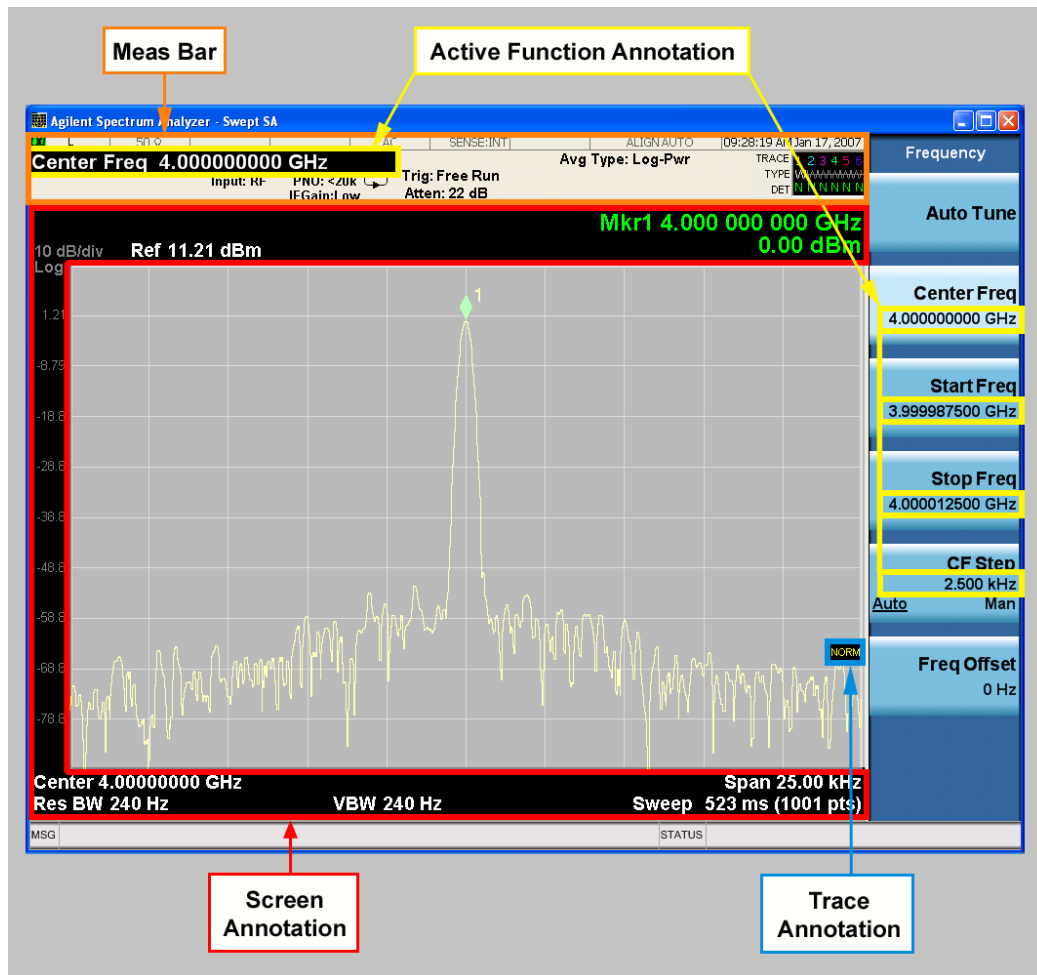
Key Path	Display
Key Path	View/Display
Initial S/W Revision	Prior to A.02.00

## Annotation

Turns on and off various parts of the display annotation. The annotation is divided up into four categories:

1. Meas Bar: This is the measurement bar at the top of the screen. It does not include the settings panel or the Active Function. Turning off the Meas Bar turns off the settings panel and the Active Function. When the Meas Bar is off, the graticule area expands to fill the area formerly occupied by the Meas Bar.
2. Screen Annotation: this is the annotation and annunciation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) This does NOT include the marker number or the N dB result. When off, the graticule expands to fill the entire graticule area.
3. Trace annotation: these are the labels on the traces, showing their detector (or their math mode).
4. Active Function annotation: this is the active function display in the meas bar, and all of the active function values displayed on softkeys.

See the figure below. Each type of annotation can be turned on and off individually.



Key Path View/Display, Display

Initial S/W Revision Prior to A.02.00

### Meas Bar On/Off

This function turns the Measurement Bar on and off, including the settings panel. When off, the graticule area expands to fill the area formerly occupied by the Measurement Bar.

<b>Key Path</b>	View/Display, Display, Annotation
<b>Remote Command</b>	:DISPlay:ANNOtation:MBAR[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:MBAR[:STATe]?
<b>Example</b>	DISP:ANN:MBAR OFF
<b>Dependencies</b>	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
<b>Preset</b>	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off.
<b>State Saved</b>	Saved in instrument state.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Screen

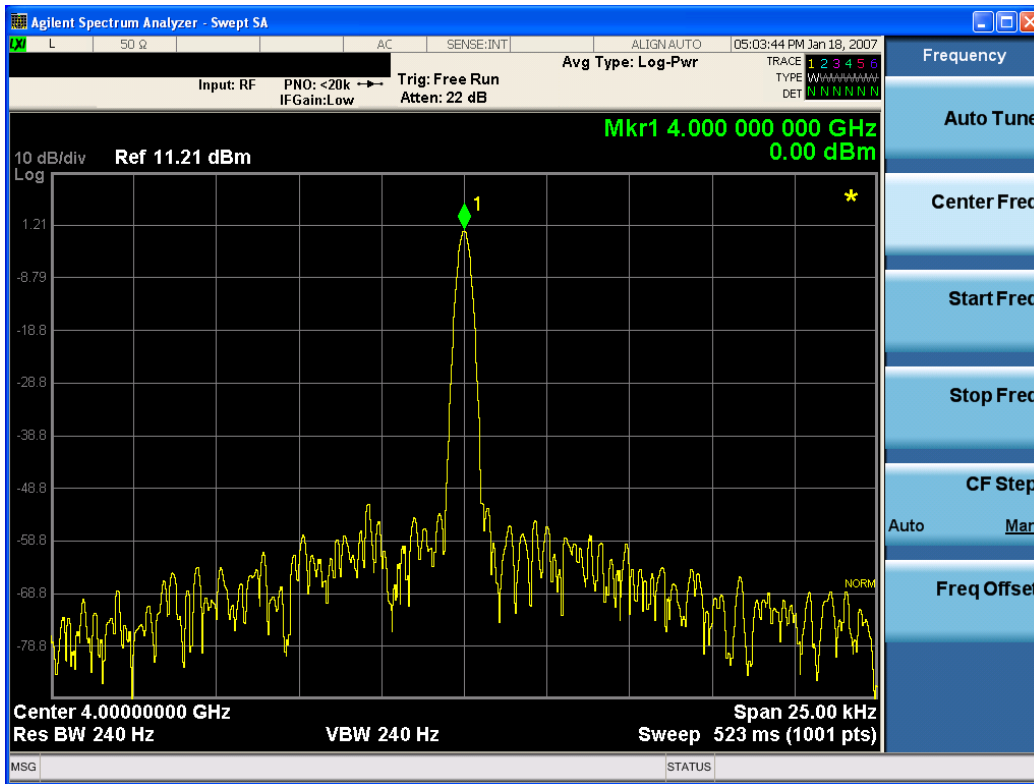
This controls the display of the annunciation and annotation around the graticule, including any annotation on lines (such as the display line, the threshold line, etc.) and the y-axis annotation. This does NOT include marker annotation (or the N dB result). When off, the graticule expands to fill the entire graticule area, leaving only the 1.5% gap above the graticule as described in the Trace/Detector chapter.

<b>Key Path</b>	View/Display, Display, Annotation
<b>Remote Command</b>	:DISPlay:ANNOtation:SCREen[:STATe] OFF ON 0 1 :DISPlay:ANNOtation:SCREen[:STATe]?
<b>Example</b>	DISP:ANN:SCR OFF
<b>Dependencies</b>	Grayed-out and forced to OFF when System Display Settings, Annotation is set to Off.
<b>Preset</b>	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
<b>State Saved</b>	Saved in instrument state.
<b>Initial S/W Revision</b>	Prior to A.02.00

### Active Function Values On/Off

Turns on and off the active function display in the Meas Bar, and all of the active function values displayed on the softkeys.

Note that all of the softkeys that have active functions have these numeric values blanked when this function is on. This is a security feature..



Key Path	View/Display, Display, Annotation
Remote Command	:DISPlay:ACTivefunc[:STATE] ON OFF 1 0 :DISPlay:ACTivefunc[:STATE]?
Example	DISP:ACT OFF
Dependencies	Grayed out and forced to OFF when System Display Settings, Annotation is set to Off.
Preset	On This should remain Off through a Preset when System DisplaySettings, Annotation is set to Off
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

### Title

Displays menu keys that enable you to change or clear a title on your display.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

### Change Title

Writes a title into the "measurement name" field in the banner, for example, "Swept SA".

Press Change Title to enter a new title through the alpha editor. Press Enter or Return to complete the entry. Press ESC to cancel the entry and preserve your existing title.

The display title will replace the measurement name. It remains for this measurement until you press Change Title again, or you recall a state, or a Preset is performed. A title can also be cleared by pressing Title, Clear Title.

**NOTE**

Notice the inclusion of the <measurement> parameter in the command below. Because each measurement remembers the Display Title, the command must be qualified with the measurement name. For the Swept SA measurement this is not the case; no <measurement> parameter is used when changing the Display Title for the Swept SA measurement.

Key Path	View/Display, Display, Title
Mode	All
Remote Command	:DISPlay:<measurement>:ANNotation:TITLe:DATA <string> :DISPlay:<measurement>:ANNotation:TITLe:DATA?
Example	DISP:ANN:TITL:DATA "This Is My Title" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "This Is My Title" This example is for Measurements other than Swept SA. Both set the title to: This Is My Title
Notes	Pressing this key cancels any active function. When a title is edited the previous title remains intact (it is not cleared) and the cursor goes at the end so that characters can be added or BKSP can be used to go back over previous characters.
Preset	No title (measurement name instead)
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

**Clear Title**

Clears a title from the front-panel display. Once cleared, the title cannot be retrieved. After the title is cleared, the current Measurement Name replaces it in the title bar.

Key Path	View/Display, Display, Title
Example	The following commands clear the title and restore the measurement's original title: DISP:ANN:TITL:DATA "" This example is for the Swept SA measurement in the Spectrum Analyzer mode. The SANalyzer <measurement> name is not used. DISP:ACP:ANN:TITL:DATA "" This example is for ACP; in measurements other than Swept SA the measurement name is required.
Notes	Uses the :DISPlay:<measurement>:ANNotation:TITLe:DATA <string> command with an empty string (in the Swept SA, the <measurement> is omitted).
Preset	Performed on Preset.
Initial S/W Revision	Prior to A.02.00



## Graticule

Pressing Graticule turns the display graticule On or Off. It also turns the graticule y-axis annotation on and off.

Key Path	View/Display, Display
<b>Remote Command</b>	:DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe] OFF ON 0 1 :DISPlay:WINDow[1]:TRACe:GRATicule:GRID[:STATe]?
<b>Example</b>	DISP:WIND:TRAC:GRAT:GRID OFF
Notes	The graticule is the set of horizontal and vertical lines that make up the grid/divisions for the x-axis and y-axis.
Preset	On
State Saved	Saved in instrument state
Initial S/W Revision	Prior to A.02.00

## System Display Settings

These settings are "Mode Global" – they affect all modes and measurements and are reset only by Restore Misc Defaults or Restore System Defaults under System.

Key Path	View/Display, Display
Initial S/W Revision	Prior to A.02.00

## Annotation Local Settings

This is a Mode Global override of the meas local annotation settings. When it is All Off, it forces ScreenAnnotation, Meas Bar, Trace, and Active Function Values settings to be OFF for all measurements in all modes. This provides the security based "annotation off" function of previous analyzers; hence it uses the legacy SCPI command.

When it is All Off, the Screen, Meas Bar, Trace, and Active Function Values keys under the Display, Annotation menu are grayed out and forced to Off. When Local Settings is selected, you are able to set the local annotation settings on a measurement by measurement basis.

Key Path	View/Display, Display, System Display Settings
<b>Remote Command</b>	:DISPlay:WINDow[1]:ANNOtation[:ALL] OFF ON 0 1 :DISPlay:WINDow[1]:ANNOtation[:ALL]?
<b>Example</b>	:DISP:WIND:ANN OFF
Preset	On (Set by Restore Misc Defaults)
State Saved	Not saved in instrument state.
Backwards Compatibility Notes	The WINDow parameter and optional subopcode is included for backwards compatibility but ignored – all windows are equally affected.
Initial S/W Revision	Prior to A.02.00

## Themes

Accesses a menu of functions that enable you to choose the theme to be used when saving the screen image.

The **Themes** option is the same as the **Themes** option under the **Display** and **Page Setup** dialogs. It allows you to choose between themes to be used when saving the screen image.

<b>Key Path</b>	Save, Screen Image
<b>Remote Command</b>	:MMEMory:STORe:SCReem:THEMe TDColor   TDMonochrome   FCOLor   FMONochrome  :MMEMory:STORe:SCReem:THEMe?
<b>Example</b>	:MMEM:STOR:SCR:THEM TDM
<b>Preset</b>	3D Color; Is not part of Preset, but is reset by Restore Misc Defaults or Restore System Defaults All and survives subsequent running of the modes.
<b>Readback</b>	3D Color   3D Mono   Flat Color   Flat Mono
<b>Backwards Compatibility Notes</b>	In ESA and PSA we offer the choice of "Reverse Bitmap" or "Reverse Metafile" when saving screen images. This is much like the "Flat Color" theme available in X-Series. Also, if you selected Reverse Bitmap AND a black & white screen image, that would be much like "Flat Monochrome". In other words, each of the X-Series themes has a similar screen image type in ESA/PSA. But they are not identical.
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Color

Selects a standard color theme with each object filled, shaded and colored as designed.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDC
<b>Readback</b>	3D Color
<b>Initial S/W Revision</b>	Prior to A.02.00

### 3D Monochrome

Selects a format that is like 3D color but shades of gray are used instead of colors.

<b>Key Path</b>	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM TDM
<b>Readback</b>	3D Mono
<b>Initial S/W Revision</b>	Prior to A.02.00

### Flat Color

Selects a format that is best when the screen is to be printed on an ink printer.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FCOL
Readback	Flat Color
Initial S/W Revision	Prior to A.02.00

### Flat Monochrome

Selects a format that is like Flat Color. But only black is used (no colors, not even gray), and no fill.

Key Path	Save, Screen Image, Themes
<b>Example</b>	MMEM:STOR:SCR:THEM FMON
Readback	Flat Mono
Initial S/W Revision	Prior to A.02.00

### Bar Graph

Enables you to select visible/invisible Bar Graph.

Key Path	View/Display
Mode	SA, GSM, TD-SCDMA
<b>Remote Command</b>	:DISPlay:TXPower:BARGraph[:STATe] ON OFF 1 0 :DISPlay:TXPower:BARGraph[:STATe]?
<b>Example</b>	DISP:TXP:BARG ON DISP:TXP:BARG?
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

12 Burst Power (Transmit Power)  
View/Display