

Keysight X-Series Signal Analyzers

This manual provides documentation for the following Analyzers:

MXA Signal Analyzer N9020A

EXA Signal Analyzer N9010A

Notice: This document contains references to Agilent. Please note that Agilent's Test and Measurement business has become Keysight Technologies. For more information, go to www.keysight.com.

N9071A XFP
Combined GSM
User's &
Programmer's
Guide

Notices

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Warranty

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Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, browse to one of the following URLs, according to the name of your product:

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

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

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

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

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

To receive the latest updates by email, subscribe to Keysight Email Updates at the following URL:

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

Information on preventing analyzer damage can be found at:

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

Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

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

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[:SENSe]:LPSTep:LIST:FREQuency <freq>, ...	183	
[:SENSe]:LPSTep:LIST:FREQuency?	183	
[:SENSe]:LPSTep:LIST:GATE:RTIME <time>, ...	185	
[:SENSe]:LPSTep:LIST:GATE:RTIME?	185	
[:SENSe]:LPSTep:LIST:GATE:SOURce IMMEDIATE EXTErnal1 EXTErnal2 RFBurst FRAME, ...	185	
[:SENSe]:LPSTep:LIST:GATE:SOURce?	185	
[:SENSe]:LPSTep:LIST:STATe ON OFF 1 0, ...	183	
[:SENSe]:LPSTep:LIST:STATe?	183	
[:SENSe]:LPSTep:LIST:STEP <integer>, ...	182	
[:SENSe]:LPSTep:LIST:STEP?	182	
[:SENSe]:LPSTep:LIST:SWEep:STEP:OFFSet <time>, ...	182	
[:SENSe]:LPSTep:LIST:SWEep:STEP:OFFSet?	182	
[:SENSe]:LPSTep:LIST:TIME <time>, ...	184	
[:SENSe]:LPSTep:LIST:TIME?	184	
[:SENSe]:LPSTep:SWEep:POINts <integer>	198	
[:SENSe]:LPSTep:SWEep:POINts?	198	
[:SENSe]:LPSTep:SWEep:STEP:LENGth <time>	182	
[:SENSe]:LPSTep:SWEep:STEP:LENGth?	182	
[:SENSe]:LPSTep:SWEep:STEP:TIME <time>	181	
[:SENSe]:LPSTep:SWEep:STEP:TIME	181	

1 Locating Other Documentation

This measurement application does not have embedded Help functionality, but you can access supporting documentation from several sources:

- Hard Disk. Frequently-used documentation is present on the Analyzer's hard disk, either as HTML Help or Acrobat PDF files. To locate these files, see "[Locating On-disk Documentation](#)" on [page 28](#) below.
In addition to the interactive Windows (HTML) Help system files for most measurement applications, the Analyzer's hard disk contains Application Notes, tutorial documents, etc.
- Documentation CD. The same documentation set is also included on the Documentation CD shipped with your Analyzer.
- Web Site. All available documentation may be downloaded from the Agilent web site. Browse to one of the following URLs, according to the name of your product:

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

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

Locating On-disk Documentation

To navigate the instrument's directory structure effectively, you will need to connect a PC mouse and keyboard to the instrument, via any of the USB ports.

To display the Windows task bar, move the cursor to the lower edge of the screen, or press **Alt + Tab** to launch the Windows Explorer utility. Navigate to the directories below to access the files.

Documents are grouped in subdirectories of the disk's C: partition, as follows:

Directory Path	Content
C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help	HTML Help (CHM) files for most X-Series Measurement Applications
C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help\bookfiles	PDF versions of all current X-Series User's and Programmer's References ^a and Measurement Guides
C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help\otherdocs	PDF versions of Application Notes and other documentation relevant to X-Series Measurement Applications.

- a. The content of the User's and Programmer's Reference for each Measurement Application is essentially similar to that of the HTML Help file for that application. For the relative advantages of the CHM and PDF formats, see ["Viewing Documentation on a Separate Computer" on page 32](#).

Many supporting documents use the Adobe Acrobat (PDF) file format. You can view PDF files using the pre-installed Adobe Reader software.

The Adobe Reader user interface differs from the Windows Help interface. For full details on how to navigate within Acrobat documents using Adobe Reader, see ["Navigating Acrobat \(PDF\) Files" on page 29](#).

Navigating Acrobat (PDF) Files

IMPORTANT

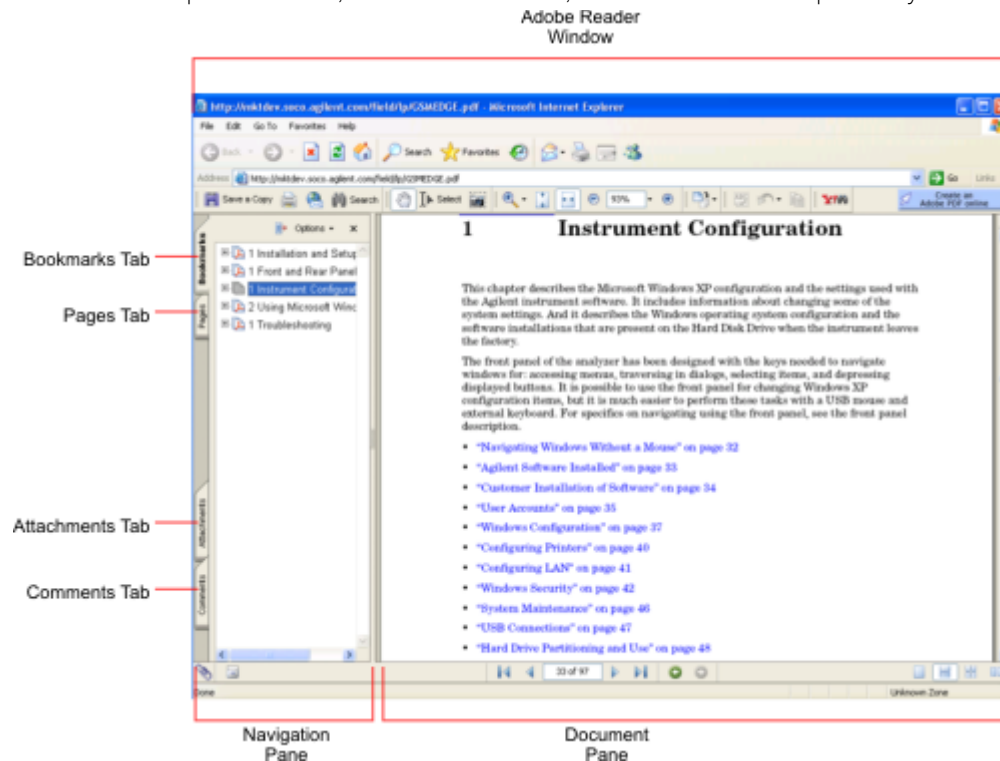
To navigate PDF files effectively, you must attach a mouse and keyboard to the Analyzer.

If it is not possible to attach a mouse and keyboard to the Analyzer, you should copy the PDF file to a separate computer, then open it on that computer. Every PDF file that is present on the Analyzer's hard disk can also be found on the Documentation CD shipped with the Analyzer. For details, see ["Copying the Acrobat \(PDF\) Files" on page 33](#).

Adobe Reader Window

When an Adobe Acrobat (PDF) file is open and being viewed, the Analyzer's display appears as below.

Note that, unlike the HTML Help Window, the Acrobat Reader Window is not embedded in the Analyzer's Application window. It is a separate window, which can be resized, moved and closed independently of the Application window.



The Adobe Reader Window itself consists of two panes, as shown in the diagram above.

On the left is the Navigation Pane (which may be hidden), and on the right is the Document Pane.

The Navigation Pane is further subdivided into four tabs: Bookmarks, Pages, Attachments and Comments. Typically, PDF files supplied with the Agilent X-Series Analyzers contain useful content only under the Bookmarks and Pages Tabs: the Attachments and Comments Tabs are not used.

Navigating the Acrobat Reader Window

The online Help for Adobe Reader provides detailed information on how to use the Reader. To access the online Help, do the following:

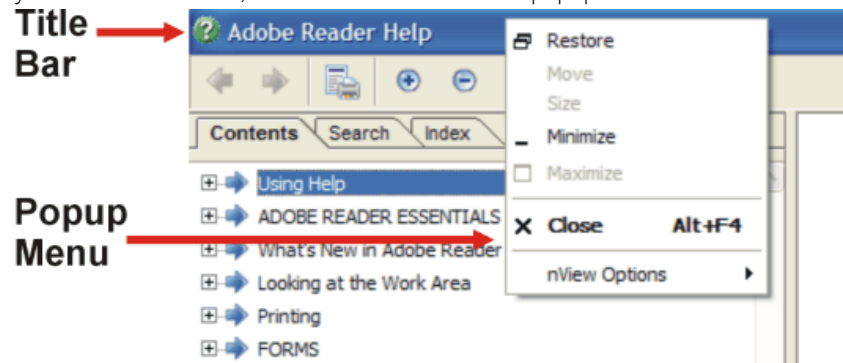
- With the Adobe Reader window open, click **Help, Adobe Reader Help** in the menu at the top of the screen. This opens the Help window on top of the document window.

Locating Other Documentation Navigating Acrobat (PDF) Files

- To close the Help window, either click the Red **X** at the top right of the window,



or right-click anywhere in the title bar, then select **Close** from the popup menu.



Printing Acrobat Files

NOTEThe driver for the appropriate printer must be installed on the Analyzer's hard disk before any file can be printed.

To print all or part of an open Acrobat file, do the following.

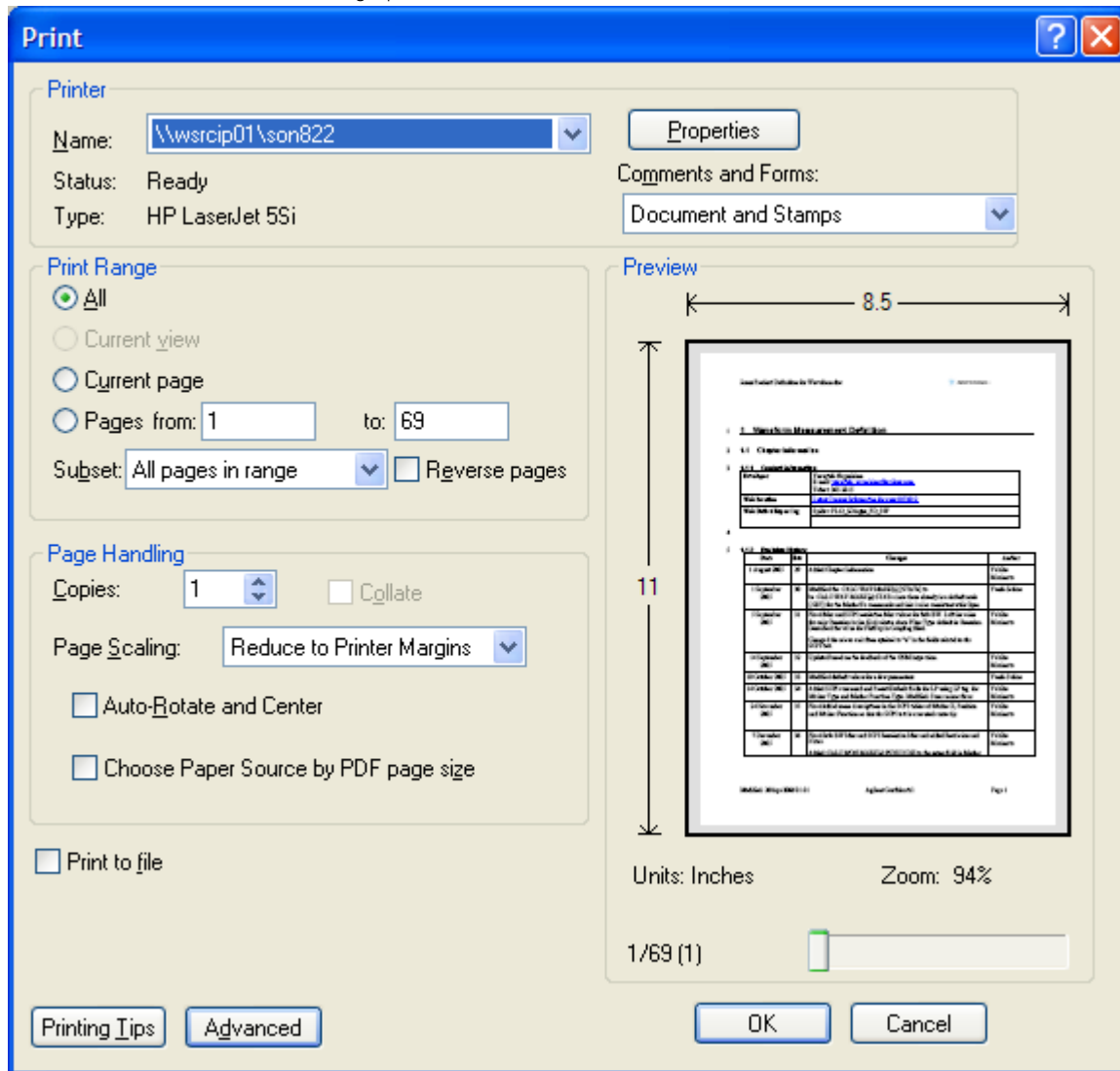
1. Either,

a.click on the **Print** icon in the Acrobat Reader toolbar,



b.or, select **File > Print** from the menu.

2. The Acrobat Reader Print dialog opens, as shown below.



3. Choose the desired options within the Print dialog, then click **OK** to print (or click **Cancel** to cancel the printing).

NOTE Clicking the **Properties** button within the Print dialog opens a window containing controls that are specific to the printer model installed. Check the printer manufacturer's documentation for details of these capabilities.

Locating Other Documentation

Viewing Documentation on a Separate Computer

Viewing Documentation on a Separate Computer

You may want to view help or other documents without having them appear on top of the Analyzer's screen.

For most Analyzer Modes, the same help information exists in two separate files, which contain all the same help pages in different formats:

1. A file in HTML Help (CHM) format,
2. A file in Acrobat (PDF) format.

You can copy any of the files to another computer, then open and view the pages in the file on that computer.

Your choice of which file to copy and view may depend on what you want to do with the file (for example, whether you want to print it and read the paper copy, or view it on the computer). The table below compares the relative advantages of the two formats:

Format Type	HTML Help Format (CHM Files)	Acrobat Format (PDF Files)
File Extension	CHM	PDF
Software Required to view file	Microsoft Windows operating system only, with Microsoft Internet Explorer installed.	Free Adobe Reader software can be downloaded for many operating systems, including: Microsoft Windows, Macintosh, Linux, Solaris.
Full Text Search?	Yes	Yes
Printable?	Yes, but with limited control.	Yes. Full print control.
Printable Table of Contents?	No	Yes
Navigable without a Mouse and Keyboard?	Yes, but with some loss of functionality.	No
Has Page Numbers?	No	Yes
Context-Sensitive Display?	Yes, when viewed using the X-Series Analyzer application window.	No
Indexed?	Yes	No
Active Hyperlinks?	Yes	Yes

Copying the HTML Help (CHM) Files

You can copy the HTML Help file(s) you need to a separate computer running Microsoft Windows. Each HTML Help file has a `.chm` extension.

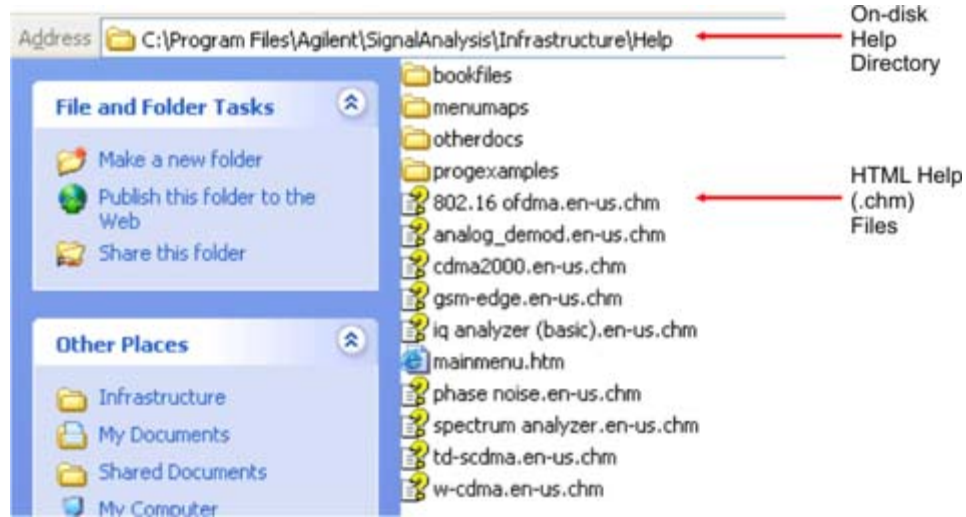
You can find the HTML Help (`.chm`) files:

- Either, on the documentation CD that came with the Analyzer,
- Or, in a special directory on the Analyzer's hard disk. The directory path is:
C:\Program Files\Agilent\SignalAnalysis\Infrastructure\Help

The illustration below shows an example listing of the HTML Help files in this directory, viewed using Windows Explorer.

Locating Other Documentation Viewing Documentation on a Separate Computer

Depending on which Analyzer software licenses you purchased, the content of the directory on your machine may vary.



NOTE You can open and view the HTML Help files only on a PC that has Microsoft Windows and Microsoft Internet Explorer installed.

Copying the Acrobat (PDF) Files

You can copy the Acrobat file(s) you need to a separate computer running any of several different operating systems. Each Acrobat file has a `.pdf` extension.

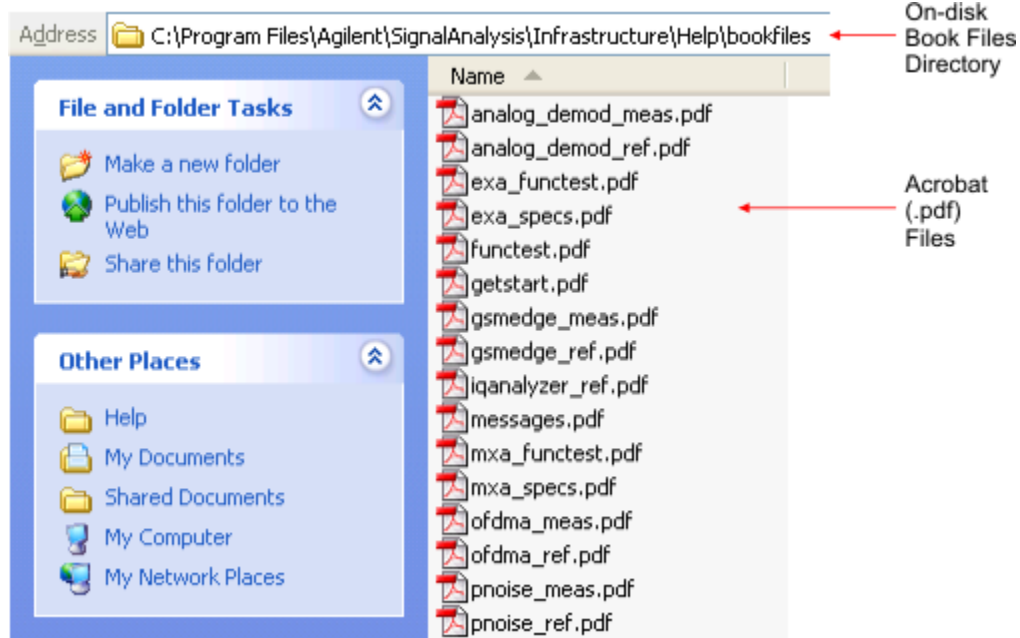
You can find the Acrobat (`.pdf`) files:

- Either, on the documentation DVD that came with the Analyzer,
- Or, on Keysight's web site.

Locating Other Documentation

Viewing Documentation on a Separate Computer

–The illustration below shows an example listing of the Acrobat files in this directory, viewed using Windows Explorer.



–The PDF versions of the help files are named <mode>_ref.pdf, where <mode> is the name of the Analyzer Mode. For example, the name of the PDF file for GSM/EDGE Mode is gsmedge_ref.pdf. (Note that the directory also contains other PDF documents.)

–When you open any <mode>_ref.pdf document, the title page displays "<Mode> User's and Programmer's Reference", where <Mode> is the name of the Analyzer Mode described by the document.

–Depending on which Analyzer software licenses you purchased, the content of the directory on your machine may vary.

Terms Used in This Documentation

Many special terms are used throughout this documentation. Please refer to the "Getting Started Guide" for detailed explanations of all these terms.

The following terms are used in the descriptive text and parameter tables for each front-panel key or softkey. However, a particular key description may not use all the terms listed.

Term	Meaning
Default Unit	The default measurement unit of the setting.
Default Terminator	Indicates the units that will be attached to the numeric value that you have entered. This default will be used from the front panel, when you terminate your entry by pressing the Enter key, rather than selecting a units key. This default will be used remotely when you send the command without specifying any units after your value(s).
Dependencies/ Couplings	Some commands may be unavailable when other parameters are set in certain ways. If applicable, any such limitations are described here.
Example	Provides command examples using the indicated remote command syntax.
Factory Preset	Describes the function settings after a Factory Preset .
Key Path	The sequence of Front-panel keys that accesses the function or setting.
Knob Increment/Decrement	The numeric value of the minimum increment or decrement that is applied when turning the thumb wheel knob.
Max	The Maximum numerical value that the setting can take.
Min	The Minimum numerical value that the setting can take.
Meas Global	The functionality described is the same in all measurements.
Meas Local	The functionality described is only true for the measurement selected.
Mode Global	The functionality described is the same for all modes.
Preset	In some cases, a Preset operation changes the status of a parameter. If the operation of the key specified is modified by a Preset operation, the effect is described here.
Range	Describes the range of the smallest to largest values to which the function can be set. If you try to set a value below the minimum value, the analyzer defaults to the minimum value. If you try to set a value above the maximum value, the analyzer defaults to the maximum value.
Remote Command	Shows the syntax requirements for each SCPI command.
Remote Command Notes	Additional notes regarding Remote Commands.
Resolution	Specifies the smallest change that can be made to the numeric value of a parameter.
SCPI Status Bits/OPC Dependencies	Pressing certain keys may affect one or more status bits. If applicable, details are given here.
State Saved	Indicates what happens to a particular function when the Analyzer state is saved (either to an external memory device or the internal D: drive). It also indicates whether the current settings of the function are maintained if the Analyzer is powered on or preset using Power On Last State or User Preset .

Locating Other Documentation
Terms Used in This Documentation

2 About the Analyzer

The X-Series signal analyzer measures and monitors complex RF and microwave signals. Analog baseband analysis is available on MXA. The analyzer integrates traditional spectrum measurements with advanced vector signal analysis to optimize speed, accuracy, and dynamic range. The analyzer has Windows XP Pro® built in as an operating system, which expands the usability of the analyzer.

With a broad set of applications and demodulation capabilities, an intuitive user interface, outstanding connectivity and powerful one-button measurements, the analyzer is ideal for both R&D and manufacturing engineers working on cellular, emerging wireless communications, general purpose, aerospace and defense applications.

Installing Application Software

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

When you purchase an application, you will receive an entitlement certificate that is used to obtain a license key for that particular measurement application. Enter the license key that you obtain into the Signal Analyzer to activate the new measurement application. See below for more information.

For the latest information on Keysight Signal Analyzer measurement applications and upgrade kits, visit the following internet URL.

http://www.keysight.com/find/sa_upgrades

Viewing a License Key

Measurement personalities 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 which measurement applications are currently licensed in your analyzer.

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

C:\Programing Files\Agilent\Licensing

NOTE

You may want to keep a copy of your license key in a secure location. You can print out a copy of the display showing the license numbers to do this. If you should lose your license key, call your nearest Agilent 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. Follow the instructions that accompany the certificate to obtain your license key.

Installing a license key for the selected application can be done automatically using a USB memory device. To do this, you would put the license file on 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 license management application in the instrument. It is found through the instrument front panel keys at **System, Licensing. . .**, or internally at C:\Programming Files\Agilent\Licensing.

NOTE

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

Missing and Old 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 assures that you get any improvements and expanded functionality that is available.

About the Analyzer Installing Application Software

Because the software was loaded at the initial purchase, there may be additional measurement applications that are now available. If the application you are interested in licensing is not available, you will need to do a software update. (Press **System, Show, System.**)

Check the Keysight website for the latest software versions available for downloading:

http://www.keysight.com/find/pxa_software

http://www.keysight.com/find/mxa_software

http://www.keysight.com/find/exa_software

http://www.keysight.com/find/cxa_software

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

X-Series Options and Accessories

Advanced Measurement Application Software

For a current list of application software, go to the following URLs.

For MXA,

<http://www.keysight.com/find/mxa/options>

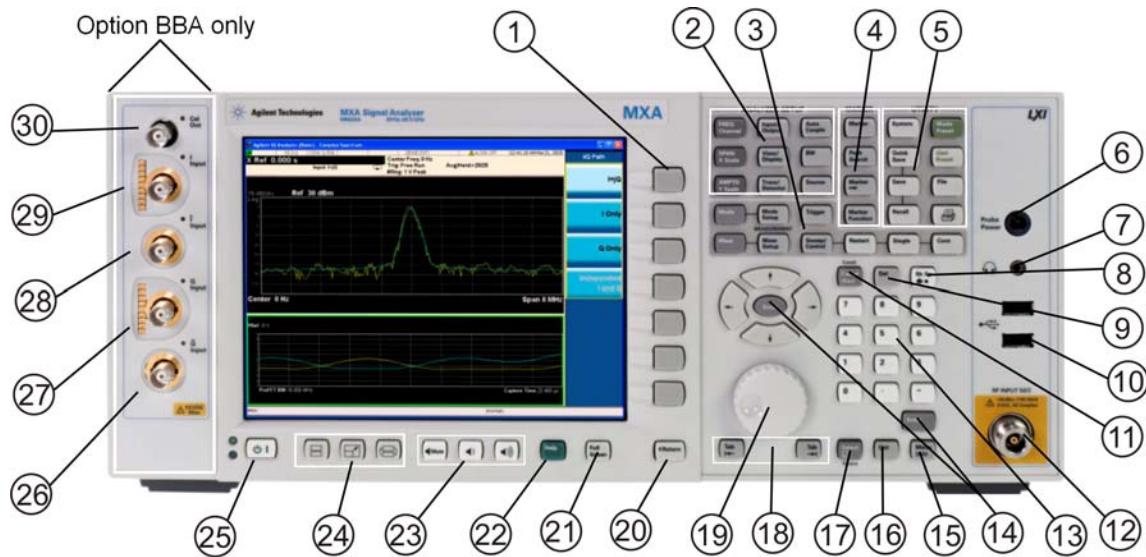
Select the MXA N9020A, Options and Measurement Applications link on the top of the page.

For EXA,

<http://www.keysight.com/find/exa/options>

Select the EXA N9010A, Options and Measurement Applications link on the top of the page.

Front-Panel Features



Item		Description
#	Name	
1	Menu Keys	Key labels appear to the left of the menu keys to identify the current function of each key. The displayed functions are dependent on the currently selected Mode and Measurement, and are directly related to the most recent key press.
2	Analyzer Setup Keys	These keys set the parameters used for making measurements in the current Mode and Measurement.
3	Measurement Keys	These keys select the Mode, and the Measurement within the mode. They also control the initiation and rate of recurrence of measurements.
4	Marker Keys	Markers are often available for a measurement, to measure a very specific point/segment of data within the range of the current measurement data.
5	Utility Keys	These keys control system-wide functionality such as: <ul style="list-style-type: none"> ▪ instrument configuration information and I/O setup, ▪ printer setup and printing, ▪ file management, save and recall, ▪ instrument presets.
6	Probe Power	Supplies power for external high frequency probes and accessories.
7	Headphones Output	Headphones can be used to hear any available audio output.
8	Back Space Key	Press this key to delete the previous character when entering alphanumeric information. It also works as the Back key in Help and Explorer windows.
9	Delete Key	Press this key to delete files, or to perform other deletion tasks.

About the Analyzer
Front-Panel Features

Item		Description
#	Name	
10	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, DVD drive, or hard drive.
11	Local/Cancel/(Esc) Key	<p>If you are in remote operation, Local:</p> <ul style="list-style-type: none"> returns instrument control from remote back to local (the front panel). turns the display on (if it was turned off for remote operation). can be used to clear errors. (Press the key once to return to local control, and a second time to clear error message line.) <p>If you have not already pressed the units or Enter key, Cancel exits the currently selected function without changing its value.</p> <p>Esc works the same as it does on a PC keyboard. It:</p> <ul style="list-style-type: none"> exits Windows dialogs clears errors aborts printing cancels operations.
12	RF Input	Connector for inputting an external signal. Make sure that the total power of all signals at the analyzer input does not exceed +30 dBm (1 watt).
13	Numeric Keypad	Enters a specific numeric value for the current function. Entries appear on the upper left of the display, in the measurement information area.
14	Enter and Arrow Keys	<p>The Enter key terminates data entry when either no unit of measure is needed, or you want to use the default unit.</p> <p>The arrow keys:</p> <ul style="list-style-type: none"> Increment and decrement the value of the current measurement selection. Navigate help topics. Navigate, or make selections, within Windows dialogs. Navigate within forms used for setting up measurements. Navigate within tables. <p>NOTE The arrow keys cannot be used to move a mouse pointer around on the display.</p>
15	Menu/ (Alt) Key	Alt works the same as a PC keyboard. Use it to change control focus in Windows pull-down menus.
16	Ctrl Key	Ctrl works the same as a PC keyboard. Use it to navigate in Windows applications, or to select multiple items in lists.
17	Select / Space Key	Select is also the Space key and it has typical PC functionality. For example, in Windows dialogs, it selects files, checks and unchecks check boxes, and picks radio button choices. It opens a highlighted Help topic.
18	Tab Keys	Use these keys to move between fields in Windows dialogs.
19	Knob	Increments and decrements the value of the current active function.
20	Return Key	Exits the current menu and returns to the previous menu. Has typical PC functionality.

Item		Description
#	Name	
21	Full Screen Key	Pressing this key turns off the softkeys to maximize the graticule display area. Press the key again to restore the normal display.
22	Help Key	Initiates a context-sensitive Help display for the current Mode. Once Help is accessed, pressing a front panel key brings up the help topic for that key function.
23	Speaker Control Keys	Enables you to increase or decrease the speaker volume, or mute it.
24	Window Control Keys	These keys select between single or multiple window displays. They zoom the current window to fill the data display, or change the currently selected window. They can be used to switch between the Help window navigation pane and the topic pane.
25	Power Standby/ On	<p>Turns the analyzer on. A green light indicates power on. A yellow light indicates standby mode.</p> <p>NOTE</p> <p>The front-panel switch is a standby switch, not a LINE switch (disconnecting device). The analyzer continues to draw power even when the line switch is in standby.</p> <p>The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.</p>
26	\bar{Q} Input	Input port for the \bar{Q} channel when in differential mode. ^a
27	Q Input	Input port for the Q channel for either single or differential mode. ^a
28	\bar{I} Input	Input port for the \bar{I} channel when in differential mode. ^a
29	I Input	Input port for the I channel for either single or differential mode. ^a
30	Cal Out	Output port for calibrating the I, \bar{I} , Q and \bar{Q} inputs and probes used with these inputs. ^a

a. Status of the LED indicates whether the current state of the port is active (green) or is not in use (dark).

Overview of key types

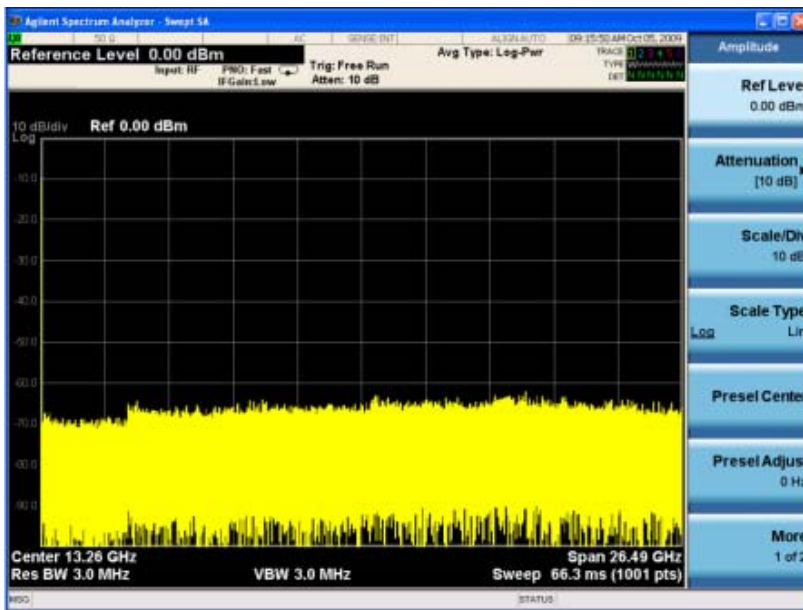
The keys labeled **FREQ Channel**, **System**, and **Marker Function** are all examples of front-panel keys.



Most of the dark or light gray keys access menus of functions that are displayed along the right side of the display. These displayed key labels are next to a column of keys called menu keys.

Menu keys list functions based on which front-panel key was pressed last. These functions are also dependant on the current selection of measurement application (Mode) and measurement (Meas).

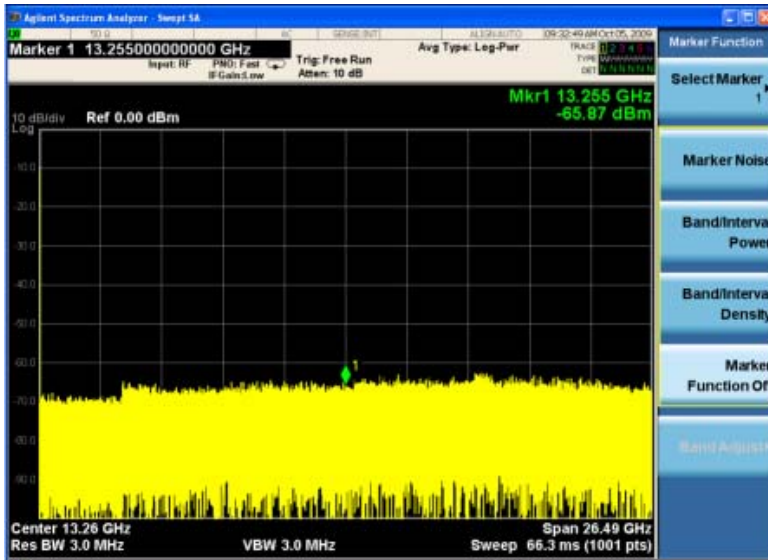
If the numeric value of a menu key function can be changed, it is called an active function. The function label of the active function is highlighted after that key has been selected. For example, press **AMPTD Y Scale**. This calls up the menu of related amplitude functions. The function labeled **Ref Level** (the default selected key in the Amplitude menu) is highlighted. **Ref Level** also appears in the upper left of the display in the measurement information area. The displayed value indicates that the function is selected and its value can now be changed using any of the data entry controls.



Some menu keys have multiple choices on their label, such as **On/Off**, **Auto/Man**, or **Log/Lin** (as shown above). The different choices are selected by pressing the key multiple times. For example, the **Auto/Man** type of key. To select the function, press the menu key and notice that **Auto** is underlined and the key becomes highlighted. To change the function to manual, press the key again so that **Man** is underlined. If there are more than two settings on the key, keep pressing it until the desired selection is underlined.

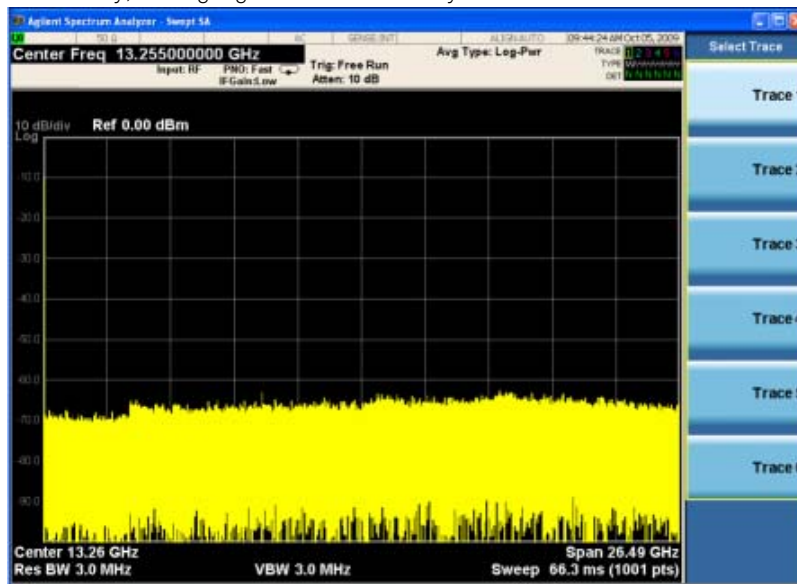
About the Analyzer Front-Panel Features

When a menu first appears, one key label is highlighted to show which key is the default selection. If you press Marker Function, the Marker Function Off key is the menu default key, and is highlighted.



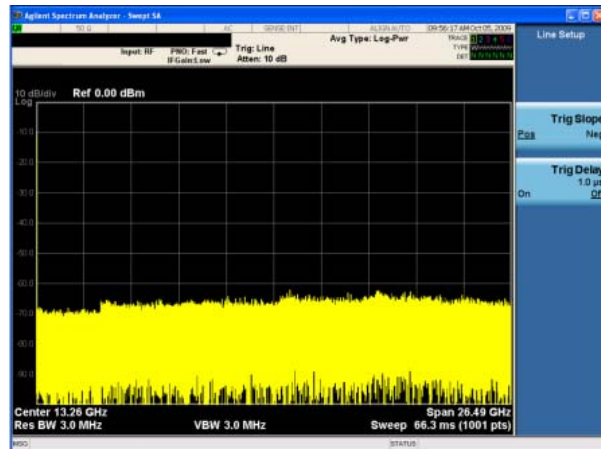
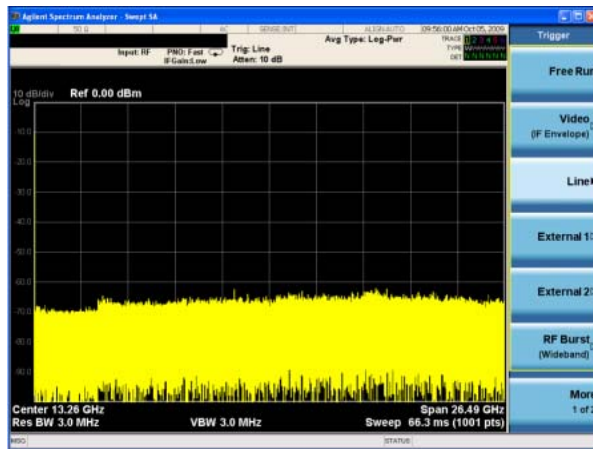
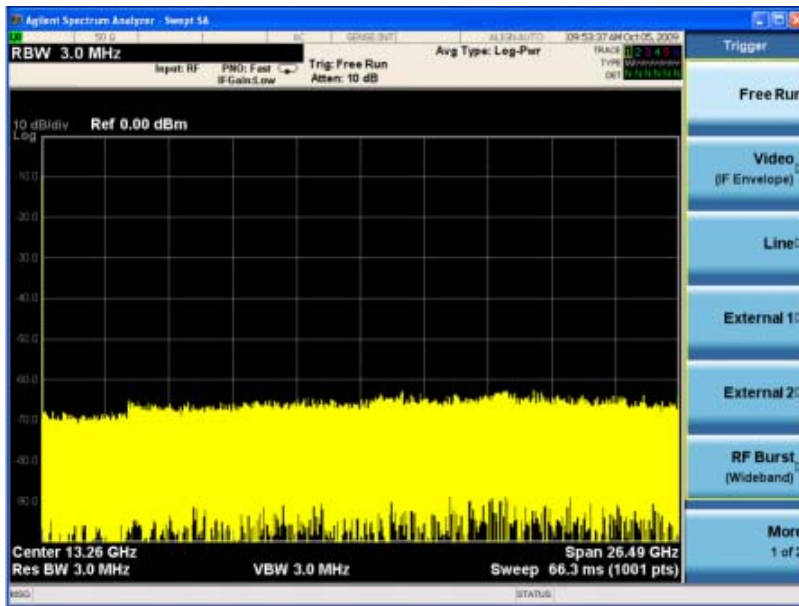
Some of the menu keys are grouped together by a yellow bar running behind the keys near the left side or by a yellow border around the group of keys. When you press a key within the yellow region, such as **Marker Noise**, the highlight moves to that key to show it has been selected. The keys that are linked are related functions, and only one of them can be selected at any one time. For example, a marker can only have one marker function active on it. So if you select a different function it turns off the previous selection. If the current menu is two pages long, the yellow bar or border could include keys on the second page of keys.

In some key menus, a key label is highlighted to show which key has been selected from multiple available choices. And the menu is immediately exited when you press one of the other keys. For example, when you press the Select Trace key (in the Trace/Detector menu), it brings up its own menu of keys. The Trace 1 key is highlighted. When you press the Trace 2 key, the highlight moves to that key and the screen returns to the Trace/Detector menu.



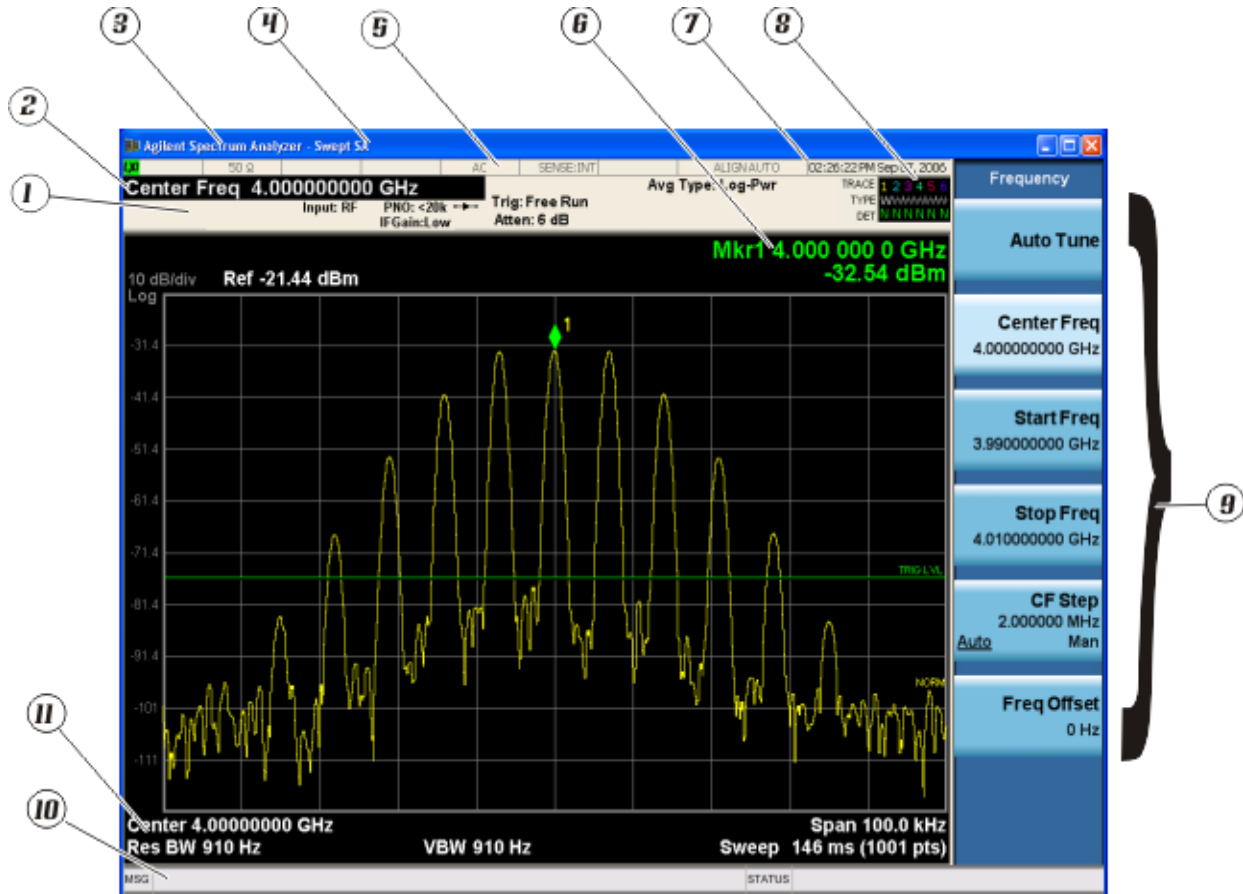
About the Analyzer Front-Panel Features



If a displayed key label shows a small solid-black arrow tip pointing to the right, it indicates that additional key menus are available. If the arrow tip is not filled in solid then pressing the key the first time selects that function. Now the arrow is solid and pressing it again brings up an additional menu of settings.



Display Annotations

This section describes the display annotation as it is on the Spectrum Analyzer Measurement Application display. Other measurement application modes have some annotation differences.



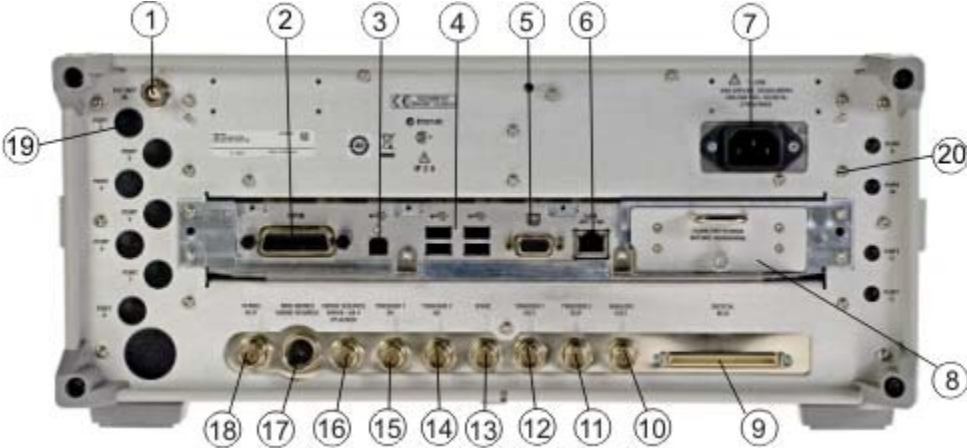
Item	Description	Function Keys
1	<p>Measurement bar - Shows general measurement settings and information.</p> <p>  Indicates single/continuous measurement.</p> <p>Some measurements include limits that the data is tested against. A Pass/Fail indication may be shown in the lower left of the measurement bar.</p>	All the keys in the Analyzer Setup part of the front panel.
2	Active Function (measurement bar) - when the current active function has a settable numeric value, it is shown here.	Currently selected front panel key.
3	Banner - shows the name of the selected application that is currently running.	Mode
4	Measurement title - shows title information for the current measurement, or a title that you created for the measurement.	Meas View/Display, Display, Title

About the Analyzer
 Display Annotations

Item	Description	Function Keys
5	Settings panel - displays system information that is not specific to any one application. <ul style="list-style-type: none"> • Input/Output status - green LXI indicates the LAN is connected. RLTS indicate Remote, Listen, Talk, SRQ • Input impedance and coupling • Selection of external frequency reference • Setting of automatic internal alignment routine 	Local and System, I/O Config Input/Output, Amplitude, System and others
6	Active marker frequency, amplitude or function value	Marker
7	Settings panel - time and date display.	System, Control Panel
8	Trace and detector information	Trace/Detector, Clear Write (W) Trace Average (A) Max Hold (M) Min Hold (m) Trace/Detector, More, Detector, Average (A) Normal (N) Peak (P) Sample (S) Negative Peak (p)
9	Key labels that change based on the most recent key press.	Softkeys
10	Displays information, warning and error messages. Message area - single events, Status area - conditions	
11	Measurement settings for the data currently being displayed in the graticule area. In the example above: center frequency, resolution band width, video band width, frequency span, sweep time and number of sweep points.	Keys in the Analyzer Setup part of the front panel.

Rear-Panel Features

MXA and EXA with Option PC2



EXA



Item		Description
#	Name	
1	EXT REF IN	Input for an external frequency reference signal: For MXA - 1 to 50 MHz For EXA - 10 MHz.
2	GPIB	A General Purpose Interface Bus (GPIB, IEEE 488.1) connection that can be used for remote analyzer operation.
3	USB Connector	USB 2.0 port, Type B. USB TMC (test and measurement class) connects to an external pc controller to control the instrument and for data transfers over a 480 Mbps link.

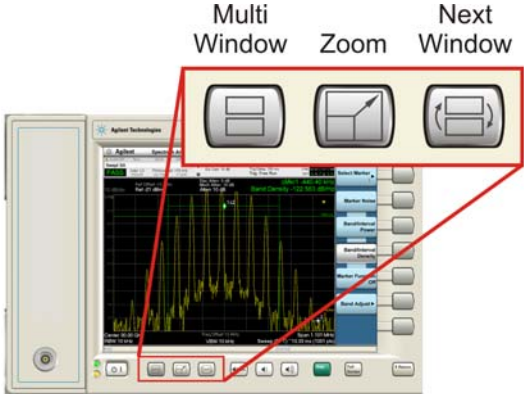
About the Analyzer

Rear-Panel Features

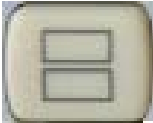
Item		Description
#	Name	
4	USB Connectors	Standard USB 2.0 ports, Type A. Connect to external peripherals such as a mouse, keyboard, printer, DVD drive, or hard drive.
5	MONITOR	Allows connection of an external VGA monitor.
6	LAN	A TCP/IP Interface that is used for remote analyzer operation.
7	Line power input	The AC power connection. See the product specifications for more details.
8	Removable Disk Drive	Standard on PXA and MXA. Optional on EXA.
9	Digital Bus	Reserved for future use.
10	Analog Out	n/a
11	TRIGGER 2 OUT	A trigger output used to synchronize other test equipment with the analyzer. Configurable from the Input/Output keys.
12	TRIGGER 1 OUT	A trigger output used to synchronize other test equipment with the analyzer. Configurable from the Input/Output keys.
13	Sync	Reserved for future use.
14	TRIGGER 2 IN	Allows external triggering of measurements.
15	TRIGGER 1 IN	Allows external triggering of measurements.
16	Noise Source Drive +28 V (Pulsed)	For use with Agilent/Keysight 346A, 346B, and 346C Noise Sources.
17	SNS Series Noise Source	For use with Agilent/Keysight N4000A, N4001A, N4002A Smart Noise Sources (SNS).
18	10 MHz OUT	An output of the analyzer internal 10 MHz frequency reference signal. It is used to lock the frequency reference of other test equipment to the analyzer.
19	Preselector Tune Out	Reserved for future use.
20	Aux IF Out	n/a

Window Control Keys

The instrument provides three front-panel keys for controlling windows. They are **Multi-Window**, **Zoom**, and **Next Window**. These are all “immediate action” keys. You can find these keys at the bottom left of the instrument’s front panel, as shown below.



Multi-Window



The **Multi Window** front-panel key toggles the display 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 once Zooms the selected window; pressing again un-zooms.

When Zoom is on for a window, that window fills 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.

Remote Command	:DISPlay:WINDow:FORMat:ZOOM
Remote Command	:DISPlay:WINDow:FORMat:TILE

About the Analyzer

Window Control Keys

Example	:DISP:WIND:FORM:ZOOM sets zoomed :DISP:WIND:FORM:TILE sets un-zoomed
Preset	TILE
Initial S/W Revision	Prior to A.02.00

Next Window

Selects the next window of the current view.

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

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

Selected Window

One and only one window is always selected. The selected window has the focus and all key presses are routed to that window.

The selected window has a green boundary. 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.

Navigating Windows

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.

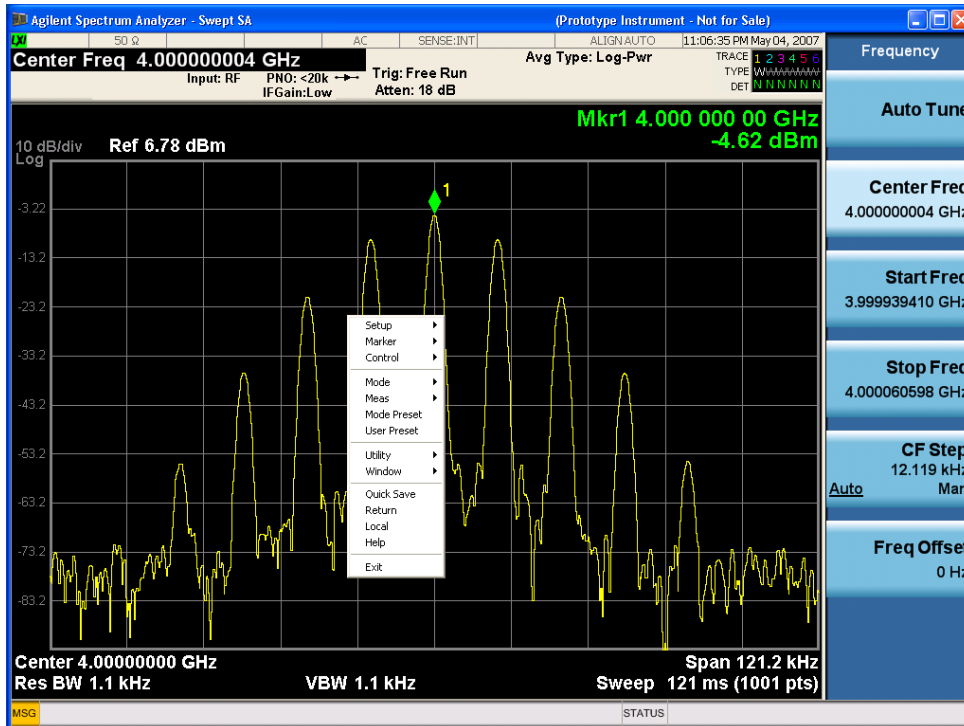
The window navigation does not use the arrow and **Select** keys. Those are reserved for navigation within a window.

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.

Right-Click

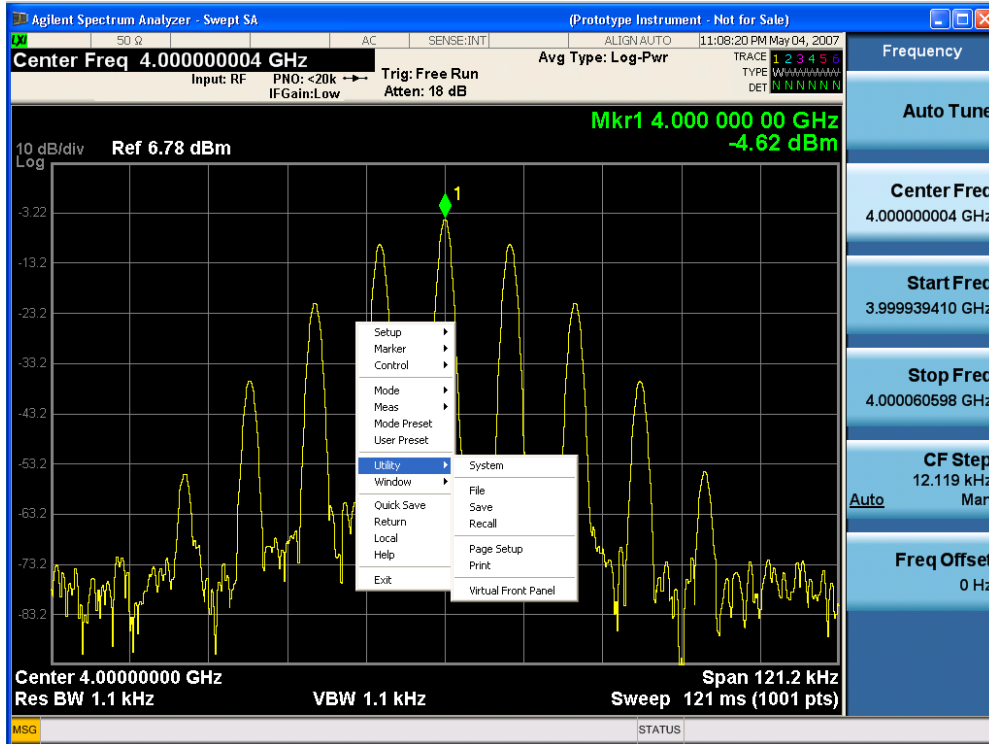
If you plug in a mouse, then right-click within the analyzer display area, a popup menu appears as below:



Placing the cursor on one of the menu rows marked with a right arrow symbol causes that row to expand, as shown in the example below, where the cursor is hovered over the “Utility” row:

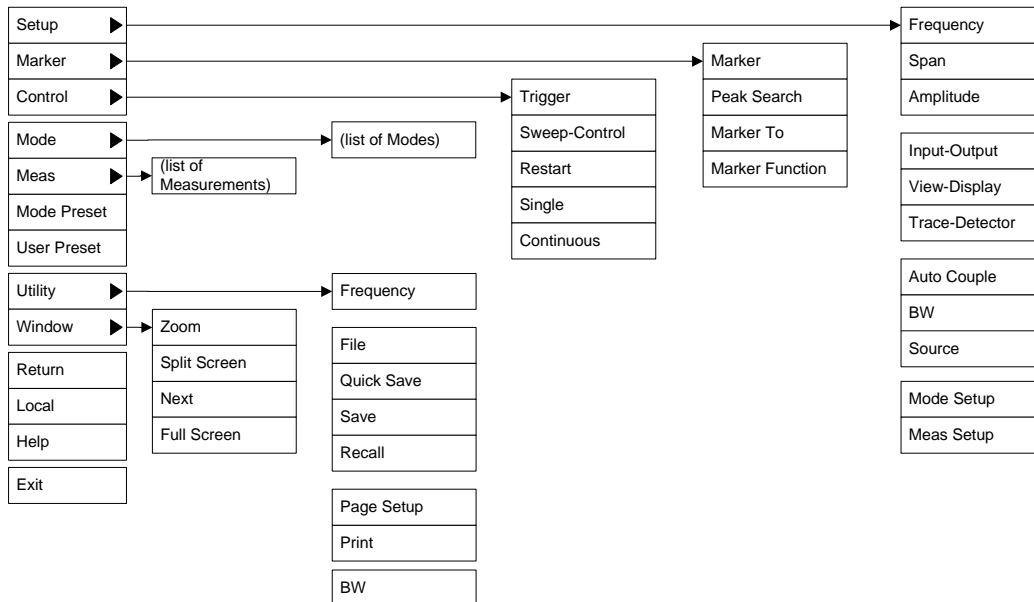
About the Analyzer

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 instrument 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

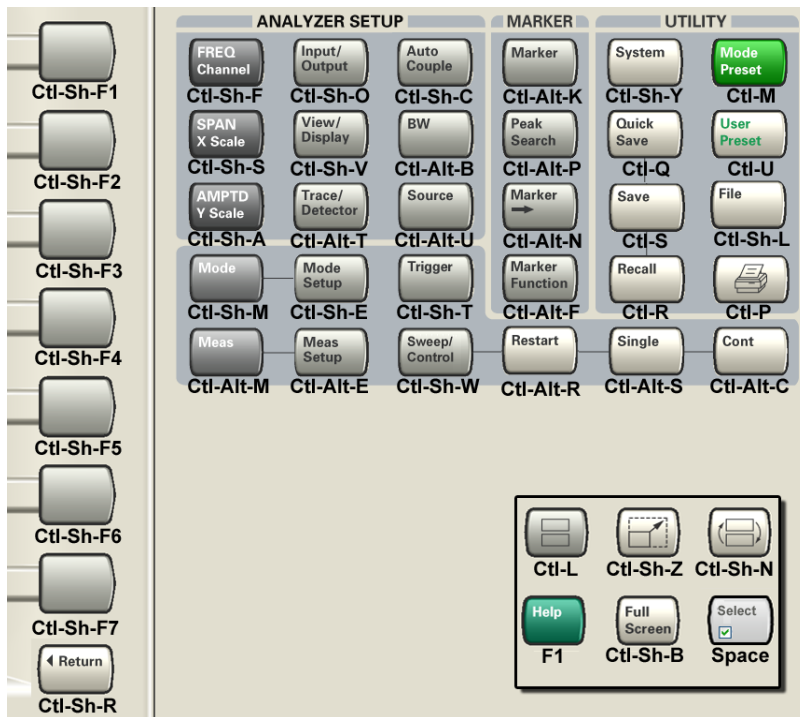
About the Analyzer

Mouse and Keyboard Control

Front-panel key	Key code
Next Window	CTRL+SHIFT+N
Split Screen	CTRL+L
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

Front-panel key	Key code
6	6
7	7
8	8
9	9
0	0

This is a pictorial view of the same 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 the X Series analyzers, this information is contained in the document "Security Features and Certificate of Volatility". This document is not included in the Documentation CD, or the instrument's on-disk library, but it may be downloaded from Keysight's 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 "N9020A", then click "Submit". Then, follow the on-screen instructions to download the file.

3 Introduction

This chapter provides overall information on the N9071A XFP Combined GSM Measurement Application and describes the measurements made by the analyzer.

What Does the N9071A Combined GSM Measurement Application Do?

The N9071A Combined GSM is a full-featured GSM signal analyzer that can help determine if a GSM modulated source or transmitter is working correctly.

The N9071A Combined GSM measurement provides a measurement that combines multiple measurements in a single package. The goal of this application is to provide all necessary measurement results at once in the fastest manner. The supporting measurements in the Combined GSM measurement application are:

- List Power Step
- Phase and Frequency Error (PFER)
- Edge EVM (EEVM)
- Power vs Time (PVT)
- Output RF Spectrum (ORFS)
- Marker Meas
- Harmonics

NOTE

This manual **supplements** the standard N9071A & W9071A GSM/EDGE User's and Programmer's Reference and Help. Only features specific to the N9071A XFP Combined GSM Measurement Application are documented here.

4 Programming the Analyzer

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

What Programming Information is Available?

The X-Series Documentation can be accessed through the Additional Documentation page in the instrument Help system and is included on the Documentation DVD shipped with the instrument. It can also be found

online at: http://www.agilent.com/find/mxa_manuals.

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">• Programming the X-Series Applications• Programming fundamentals• Programming examples 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">• Each measurement application has its own User's and Programmer's Reference.• 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).
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">• Licensing New Measurement Application Software - After Initial Purchase• Configuring instrument LAN Hostname, IP Address, and Gateway Address• Using the Windows XP Remote Desktop to connect to the instrument remotely• Using the Embedded Web Server Telnet connection to communicate SCPI This printed document is shipped with the instrument.
Agilent Application Notes	Printable PDF versions of pertinent application notes.
Agilent VISA User's Guide	Describes the Agilent Virtual Instrument Software Architecture (VISA) library and shows how to use it to develop I/O applications and instrument drivers on Windows PCs.

IEEE Common GPIB Commands

Numeric values for bit patterns can be entered using decimal or hexadecimal representations (that is, 0 to 32767 is equivalent to #H0 to #H7FFF).

Calibration Query

*CAL?

Performs a full alignment and returns a number indicating the success of the alignment. A zero is returned if the alignment is successful. A one is returned if any part of the alignment fails. The equivalent SCPI command is CALibrate[:ALL]?

Clear Status

Clears the status byte register, 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
Remote Command	*CLS
Example	*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.
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

Programming the Analyzer

IEEE Common GPIB Commands

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 <code>STATUS</code> 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 contains the model number, serial number, and firmware revision.

The response is organized into four comma-separated fields. The field definitions are as follows:

1. Manufacturer
2. Model
3. Serial number
4. Firmware version

Key Path	No equivalent key. See related key System, Show System .
Remote Command	*IDN?
Example	*IDN? Returns instrument identification information, such as: Agilent Technologies,N9020A,US01020004,A.01.02
Initial S/W Revision	Prior to A.02.00

Instrument Model Number

ID?

Returns an instrument identification string. The string contains the model number.

When the current Measurement Application is Remote Language Compatibility, the query returns the model number of the emulated instrument. When in any other Measurement Application, the returned model number is that of the actual hardware.

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. Hence, 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.

Remote Command	*OPC *OPC?
Example	INIT:CONT 0 Selects single sweeping. INIT:IMM Initiates a sweep. *OPC? Holds off any further commands until the sweep is complete.
Status Bits/OPC dependencies	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.
Initial S/W Revision	Prior to A.02.00

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. However, 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.

Remote Command	*OPT?
Initial S/W Revision	Prior to A.02.00

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 in the instrument, no state is recalled and an error is reported
- If the state being loaded has the same firmware revision as that in the instrument, the state is loaded.
- If the state being loaded has an older firmware revision than the revision in the instrument, the instrument loads only the parts of the state that apply to the older revision.

Remote Command	*RCL <register #>
Example	*RCL 7 Recalls the instrument state that is currently stored in register 7.
Notes	Registers 0 through 6 are accessible from the front panel in menu keys for Recall Registers.

Programming the Analyzer

IEEE Common GPIB Commands

Min	0
Max	127
Status Bits/OPC dependencies	The command is sequential.
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.

Remote Command	*SAV <register #>
Example	*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.

Remote Command	*SRE <integer> *SRE?
Example	*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.

Remote Command	*STB?
Example	*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 .
Remote Command	*TRG
Example	*TRG Triggers the instrument to take a sweep or start a measurement, depending on the current instrument settings.
Notes	See related command <code>:INITiate:IMMediate</code> .
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.

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

Remote Command	*WAI
Example	INIT:CONT OFF; INIT;*WAI Sets the instrument to single sweep. Starts a sweep and waits for its completion.
Status Bits/OPC dependencies	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.
Initial S/W Revision	Prior to A.02.00

5 Combined GSM/EDGE Measurement

This topic contains the following subsections:

[“Remote Commands for Combined GSM/EDGE” on page 69](#)

[“Remote SCPI Results for Combined GSM/EDGE” on page 69](#)

Combined GSM/EDGE is a measurement application that combines multiple measurements in a single package. The goal is to perform all necessary measurements simultaneously and provide the results in the fastest manner.

The measurements supported in the Combined GSM/EDGE measurement application are:

- Phase and Frequency Error (PFER)
- Edge EVM (EEVM)
- Power vs. Time (PVT)
- Output RF Spectrum (ORFS)
- Marker Meas
- Harmonics

Remote Commands for Combined GSM/EDGE

Measurements may be configured remotely as well as via Front-Panel keys. This section details Remote commands and results. For information on Front-Panel configuration and results, see [“View/Display” on page 152](#).

The following commands and queries can be used to retrieve the measurement results:

```
:CONFigure:CGSM
:CONFigure:CGSM:NDEFault
:FETCh:CGSM [n] ?
:INITiate:CGSM
:MEASure:CGSM [n] ?
:READ:CGSM [n] ?
```

Remote SCPI Results for Combined GSM/EDGE

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.

Combined GSM/EDGE Measurement

n	Results Returned
not specified or n = 1	<p>Measurement Result Values</p> <p>Total result length is variable.</p> <p>The returned contents may change depending on the measurement setting. For example, the result length varies, depending on how many Frequency List States are enabled. If there are multiple frequency lists, then the result below starts at the lowest active freq list.</p> <p>The result sequence is as follows:</p> <p>Freq List1, GSM or EDGE Demod Results</p> <p>Freq List1, ORFS Results</p> <p>Freq List1, PVT Results</p> <p>Freq List2, GSM or EDGE Demod Results</p> <p>Freq List2, ORFS Results</p> <p>Freq List2, PVT Results</p> <p>...</p> <p>ZSPan Results</p> <p>HARMonics Results</p> <p>GSM Results (Radio Format = GSM):</p> <p>Note that PFER results and EDGE results are exclusive of each other. That depends on which Radio Format is used in the frequency and it is written in the result of n = 2 (that is, "read:cgs2?"). For details of L_p, also refer to the description of n = 2 below. The result contents are customizable. See "GSM Result Selection" on page 134 for details. The list below represents the default result.</p> <p>(LD). Averaged RMS Phase Error</p> <p>(LD + 1). Maximum of the Peak Phase Error</p> <p>(LD + 2). Maximum of the Peak Phase Error Symbol Position</p> <p>(LD + 3). Averaged Frequency Error</p> <p>(LD + 4). Maximum Frequency Error</p> <p>(LD + 5). Averaged I/Q Origin Offset</p> <p>(LD + 6). Maximum I/Q Origin Offset</p> <p>(LD + 7). Averaged TO Offset</p>

n	Results Returned
not specified or n = 1 (continued)	<p>EDGE Results (Radio Format = EDGE):</p> <p>Note that PFER results and EDGE results are exclusive of each other. That depends on which Radio Format is used in the frequency and it is written in the result of n = 2 (that is, “read:cgs2?”). For details of L_P, also refer to the description of n = 2 below. The result contents are customizable. See “EDGE Result Selection” on page 136 for details. The list below represents the default result.</p> <ul style="list-style-type: none"> (LD). RMS 95th %tile EVM (LD + 1). Average RMS EVM (LD + 2). Maximum of the Peak EVM (LD + 3). Symbol position of the peak EVM (LD + 4). Average Magnitude Error (LD + 5). Maximum of the Peak Magnitude Error (LD + 6). Average Phase Error (LD + 7). Maximum of the Peak Phase Error (LD + 8). Average Frequency Error (LD + 9). Maximum Frequency Error (LD + 10). I/Q Origin Offset (LD + 11). Amplitude Droop Error (LD + 12). Trigger to T0 <p>ORFS Results:</p> <p>The result contents are customizable and the list shown below is a sample. See “ORFS Result Selection” on page 137 for details. For details of L_M and L_S, refer to the results description of n = 2 below.</p> <p>ORFS Modulation Result Table (if there are one or more ORFS modulation results):</p> <ul style="list-style-type: none"> (LM). Offset0 (Ref Carrier) Absolute (LM + 1). Offset1 Lower Relative (LM + 2). Offset1 Lower Absolute (LM + 3). Offset1 Lower Delta (LM + 4). Offset1 Upper Relative (LM + 5). Offset1 Upper Absolute (LM + 6). Offset1 Upper Delta (LM + 7). Offset2 Lower Relative (LM + 8). Offset2 Lower Absolute

Combined GSM/EDGE Measurement

n	Results Returned
not specified or n = 1 (continued)	<p>(LM + 9). Offset2 Lower Delta</p> <p>(LM + 10). Offset2 Upper Relative</p> <p>(LM + 11). Offset2 Upper Absolute</p> <p>(LM + 12). Offset2 Upper Delta</p> <p>...</p> <p>ORFS Switching Result Table (if there are one or more ORFS switching results):</p> <p>(LS). Offset0 (Ref Carrier) Absolute</p> <p>(LS + 1). Offset1 Lower Relative</p> <p>(LS + 2). Offset1 Lower Absolute</p> <p>(LS + 3). Offset1 Lower Delta</p> <p>(LS + 4). Offset1 Upper Relative</p> <p>(LS + 5). Offset1 Upper Absolute</p> <p>(LS + 6). Offset1 Upper Delta</p> <p>(LS + 7). Offset2 Lower Relative</p> <p>(LS + 8). Offset2 Lower Absolute</p> <p>(LS + 9). Offset2 Lower Delta</p> <p>(LS + 10). Offset2 Upper Relative</p> <p>(LS + 11). Offset2 Upper Absolute</p> <p>(LS + 12). Offset2 Upper Delta</p> <p>...</p> <p>PVT Results:</p> <p>The result contents are customizable and the list shown below is a sample. See “Power vs Time Result Selection” on page 138 for details. For details of L_p, refer to the results description of n = 2 below.</p> <p>Note that the “1st Burst” doesn’t always mean the leftmost burst in a frequency list. It means the leftmost burst that PVT mask test is done and it depends on the PVT Test Bitmap, PVT Secondary Test Group, and their backup burst test settings. If no valid backup bursts are configured, it always returns the test results of bursts configured by PVT Test Bitmap. If backup bursts are enabled, the list includes results for both primary and backup bursts, even though secondary bursts are not tested.</p> <p>(LP). PVT (Primary) Group Pass/Fail [0: Pass, 1: Fail]</p> <p>(LP + 1). 1st Burst, PVT Mask Test Pass/Fail [0: Pass, 1: Fail, -1:Not Tested]</p>

n	Results Returned
not specified or n = 1 (continued)	<p>(LP + 2). 1st Burst, Averaged Power</p> <p>(LP + 3). 1st Burst, Max Power</p> <p>(LP + 4). 1st Burst, 1st Error Point</p> <p>(LP + 5). 1st Burst, 1st Error Time</p> <p>(LP + 6). 2nd Burst, PVT Mask Test Pass/Fail</p> <p>(LP + 7). 2nd Burst, Averaged Power</p> <p>(LP + 8). 2nd Burst, Max Power</p> <p>(LP + 9). 2nd Burst, 1st Error Point</p> <p>(LP + 10). 2nd Burst, 1st Error Time</p> <p>...</p> <p>ZSPan Results:</p> <p>(LZ). Marker1 Y Value [This result is the same as that returned by "CALC:CGSM:ZSP:MARK:Y".]</p> <p>HARMonics Results:</p> <p>Number of results varies depending on number of harmonics to be measured</p> <p>(LH). Marker1 Y Value at 1st Harmonics [Marker1 Y Value for 1st Harmonics]</p> <p>(LH + 1). Marker1 Y Value at 2nd Harmonics [Marker1 Y Value for 2nd Harmonics]</p> <p>(LH + 2). Marker1 Y Value at 3rd Harmonics [Marker1 Y Value for 3rd Harmonics]</p> <p>...</p>

n	Results Returned
2	<p>Contents Location Pointer and Result Attributes</p> <p>The total result length is variable.</p> <p>The returned contents may change depending on the measurement setting. For example, the result length varies, depending on how many Frequency List States are enabled.</p> <p>Returns the following scalar results:</p> <p>0. Number of Total Result Length -</p> <p>Returns the number of the total result length of this query.</p> <p>1. Index where general measurement attributes starts. -</p> <p>It shows the location where the general measurement results starts. The value is zero-based. The location is denoted as L_g. For example, the value will be 14 in many cases.</p> <p>2. Index where PVT Attributes starts.</p> <p>The location is denoted as in this list. The value is zero-based.</p> <p>3. Index where ZSPan result starts.</p> <p>The location is denoted as (L_z) in $n = 1$ list. The value is zero-based.</p> <p>4. Index where HARMONICS result starts.</p> <p>The location is denoted as (L_H) in $n = 1$ list. The value is zero-based.</p> <p>5. Number of Frequency Lists pointers below.</p> <p>The number is denoted as N_F. It is 8 at present, but may be expanded in future.</p> <p>6. Index where Frequency List 1 result starts.</p> <p>7. Index where Frequency List 2 result starts</p> <p>...</p> <p>(5 + NF). Index where Frequency List NF result starts</p> <p>The values [3] to [2 + N_F] show the pointer where the result lists of the frequency list start. The values are zero-based. For example, the value of [3] will be 19 in many cases. If there are no results in the frequency list, the value is -999.0. The location is denoted as L_F (1..N_G)</p> <p>General Measurement Attributes:</p> <p>(Lg). Sampling Rate - returns sampling rate in Hz.</p> <p>(Lg + 1). Total Acquisition Points</p> <p>(Lg + 2). IF Band width - returns IF band width in Hz.</p>

n	Results Returned
2 (continued)	<p>PVT Attributes:</p> <p>Number of PVT Bursts - number of PVT bursts reported in n = 1 list.</p> <p>(Lp + 1). Burst Index of 1st Bursts</p> <p>(Lp + 2). Burst Index of 2nd Bursts</p> <p>...</p> <p>Result Tables of each Frequency Pointer List:</p> <p>(LF). Index where general attribute of the list starts - the location is denoted as (L_R) in this list. The value is zero-based.</p> <p>(LF + 1). Index where Demod result starts - the location is denoted as (L_D) in n = 1 list. The value is zero-based. If there are no results for Demod measurement, the value is -999.0.</p> <p>(LF + 2). Index where ORFS modulation result starts - the location is denoted as (L_M) in n = 1 list. The value is zero-based. If there are no results for ORFS modulation measurement, the value is -999.0.</p> <p>(LF + 3). Index where ORFS switching result starts - the location is denoted as (L_S) in n = 1 list. The value is zero-based. If there are no results for ORFS switching measurement, the value is -999.0.</p> <p>(LF + 4). Index where PVT result starts - the location is denoted as in n = 1 list. The value is zero-based.</p> <p>General Attribute of the List:</p> <p>(LR). Radio Format [1: GSM, 2: EDGE]</p> <p>(LR + 1). Center Frequency - returns the center frequency of the list in Hz.</p>

n	Results Returned
4	<p>GSM and EDGE individual bursts results:</p> <p>Returns demod result of each burst. The total result length is variable and the returned contents may change depending on the measurement setting. For example, the result length varies, depending on how many Frequency List States are enabled. If there are multiple frequency lists, then the result below starts at the lowest active freq list. If there are multiple bursts active on a frequency list, then the result starts at the leftmost burst.</p> <p>The result sequence is returned as follows:</p> <p>1st Freq List, 1st Burst, GSM or EDGE Demod Results 1st Freq List, 2nd Burst, GSM or EDGE Demod Results 1st Freq List, 3rd Burst, GSM or EDGE Demod Results ... 2nd Freq List, 1st Burst, GSM or EDGE Demod Results 2nd Freq List, 2nd Burst, GSM or EDGE Demod Results 2nd Freq List, 3rd Burst, GSM or EDGE Demod Results ...</p> <p>GSM Results (Radio Format = GSM):</p> <p>Note that PFER results and EDGE results are exclusive of each other. The results depend on which Radio Format is used in the frequency and is written in the result of n = 2 (that is, “read:cgs2?”). Whether the following results are output or not is decided by the setting of “GSM Result Selection” on page 134. This is the single burst’s result, so the average and the maximum value is the same. For such parameters, if either one of them is active, the result is output.</p> <ol style="list-style-type: none"> 1. RMS Phase Error 2. Peak Phase Error 3. Peak Phase Error Symbol Position 4. Frequency Error 5. I/Q Origin Offset 6. TO Offset 7. TSC <p>EDGE Results (Radio Format = EDGE):</p> <p>Note that PFER results and EDGE results are exclusive of each other. The results depend on which Radio Format is used in the frequency and is written in the result of n = 2 (that is, “read:cgs2?”). Whether the following results are output or not is decided by the setting of “EDGE Result Selection” on page 136. This is the single burst’s result, so the average and the maximum value is the same. For such parameters, if either one of them is active, the result is output.</p>

n	Results Returned
4 (continued)	<ol style="list-style-type: none"> 1. RMS 95th %tile EVM 2. RMS EVM 3. Peak EVM 4. Symbol position of the peak EVM 5. Magnitude Error 6. Peak Magnitude Error 7. Phase Error 8. Peak Phase Error 9. Frequency Error 10. I/Q Origin Offset 11. Amplitude Droop Error 12. Trigger to T0 13. Timing Offset of AM/PM path 14. TSC
5	<p>GSM and EDGE individual burst attributes</p> <p>Returns attributes of n = 4 results</p> <ol style="list-style-type: none"> 1. Number of individual bursts - Returns the number of burst results that exist in the n = 4 result. If this value is 'n', the total list length must be 1 + 3 * n. 2. 1st Burst, Location in the n = 4 result 3. 1st Burst, Frequency Index 4. 1st Burst, Burst Index 5. 2nd Burst, Location in the n = 4 result 6. 2nd Burst, Frequency Index 7. 2nd Burst, Burst Index ...
Key Path	Meas
Initial S/W Revision	Prior to A.02.00

Combined GSM/EDGE Measurement

Measurement Example - Configuration and Results

Measurement Example - Configuration and Results

The following are examples of Measurement configuration SCPI commands and results queries for the CGSM measurement.

NOTEIn all examples, the following SCPI commands should be sent first:

```
:INST:SEL EDGE GSM
*RST
:CONF:CGSM:NDEF
```

Example 1, Two Frequencies, 4 Bursts

Test Configuration

Frequency	850MHz and 950MHz
Radio Format	GSMK for 850MHz, EDGE for 950MHz
# of Bursts	4 Bursts for each frequency
Time Duration	10ms for each frequency
Burst Interval	1.154846ms (2 slots)
Start Offset	200us
Start Trigger	RF Burst
Demod (PFER and EEVM) Burst Location	The 3 rd and 4 th burst
PVT Burst	The 4 th burst
ORFS Burst	All bursts
ORFS Meas Type	Both Modulation and Switching Modulation: 400k and 600kHz Switching: 400kHz
Result Values (see "Result Values" on page 134)	As default

Measurement Configuration SCPI

```
:CGSM:LIST:FORM PFER,EEVM
:CGSM:LIST:FREQ 850MHZ,950MHZ
:CGSM:LIST:STAT 1,1,0,0,0,0,0,0
:CGSM:SWE:BURS:NUMB 4
:CGSM:SWE:OFFS 200US
:CGSM:SWE:BURS:INT 1.154846MS
:CGSM:CAPT 9MS
:CGSM:GATE:RTIM 1MS
```

Combined GSM/EDGE Measurement Measurement Example - Configuration and Results

```

:CGSM:GATE:SOUR IMM
:TRIG:CGSM:SOUR RFB
:TRIG:RFB:DEL -200US
:CGSM:DEM 1
:CGSM:DEM:TEST 12
:CGSM:PVT 1
:CGSM:PVT:TEST 8
:CGSM:PVT:SEC 0
:CGSM:PVT:BACK 0
:CGSM:ORFS 1
:CGSM:ORFS:TEST 15
:CGSM:ORFS:TYPE MSW
:CGSM:ZSP 0
:CGSM:HARM 0
:CALC:CGSM:PVT:MASK:SEL 1
:CALC:CGSM:PVT:MASK:PRES
:CALC:CGSM:PVT:MASK:SEL 2
:CALC:CGSM:PVT:MASK:PRES
:CGSM:FLIS:ORFS:MOD:STAT 1,0,0,0,1,1,0
:CGSM:FLIS2:ORFS:MOD:STAT 1,0,0,0,1,1,0
:CGSM:FLIS:ORFS:SWIT:STAT 1,1,0
:CGSM:FLIS2:ORFS:SWIT:STAT 1,1,0

```

READ:CGSM1 Result

Here is an example of a “:READ:CGSM1” query and its explanation.

1.742735654E-01	Freq1, PFER, Averaged RMS Phase Error
4.606593847E-01	Freq1, PFER, Maximum of the Peak Phase Error
3.430000000E+01	Freq1, PFER, Maximum of the Peak Phase Error Symbol Position
2.492690086E-02	Freq1, PFER, Averaged Frequency Error
3.420000374E-01	Freq1, PFER, Maximum Frequency Error
-6.773266799E+01	Freq1, PFER, Averaged I/Q Origin Offset
-6.640914154E+01	Freq1, PFER, Maximum I/Q Origin Offset
2.763937000E-04	Freq1, PFER, Averaged T0 Offset
-1.357914291E+01	Freq1, ORFS, Modulation, Off0 (Ref Carrier) Absolute
-7.215130728E+01	Freq1, ORFS, Modulation, Off1 (400kHz). Lower Relative
-8.573045018E+01	Freq1, ORFS, Modulation, Off1 (400kHz). Lower Absolute
-4.973045018E+01	Freq1, ORFS, Modulation, Off1 (400kHz). Lower Delta

Combined GSM/EDGE Measurement Measurement Example - Configuration and Results

-7.226565353E+01	Freq1, ORFS, Modulation, Off1 (400kHz). Upper Relative
-8.584479643E+01	Freq1, ORFS, Modulation, Off1 (400kHz). Upper Absolute
-4.984479643E+01	Freq1, ORFS, Modulation, Off1 (400kHz). Upper Delta
-8.034658796E+01	Freq1, ORFS, Modulation, Off2 (600kHz). Lower Relative
-9.392573087E+01	Freq1, ORFS, Modulation, Off2 (600kHz). Lower Absolute
-4.292573087E+01	Freq1, ORFS, Modulation, Off2 (600kHz). Lower Delta
-8.069719557E+01	Freq1, ORFS, Modulation, Off2 (600kHz). Upper Relative
-9.427633847E+01	Freq1, ORFS, Modulation, Off2 (600kHz). Upper Absolute
-4.327633847E+01	Freq1, ORFS, Modulation, Off2 (600kHz). Upper Delta
-6.692791840E+00	Freq1, ORFS, Switching, Off0 (Ref Carrier) Absolute
-6.855127423E+01	Freq1, ORFS, Switching, Off1 (400kHz). Lower Relative
-7.524406607E+01	Freq1, ORFS, Switching, Off1 (400kHz). Lower Absolute
-5.224406607E+01	Freq1, ORFS, Switching, Off1 (400kHz). Lower Delta
-6.942512799E+01	Freq1, ORFS, Switching, Off1 (400kHz). Upper Relative
-7.611791983E+01	Freq1, ORFS, Switching, Off1 (400kHz). Upper Absolute
-5.311791983E+01	Freq1, ORFS, Switching, Off1 (400kHz). Upper Delta
0.000000000E+00	Freq1, PVT, Primary Test Group Pass/Fail
0.000000000E+00	Freq1, PVT, 4 th Burst, PVT Mask Test Pass/Fail
-6.397717264E+00	Freq1, PVT, 4 th Burst, Averaged Power
-6.389250433E+00	Freq1, PVT, 4 th Burst, Max Power
-9.990000000E+02	Freq1, PVT, 4 th Burst, 1st Error Point
-9.990000000E+02	Freq1, PVT, 4 th Burst, 1st Error Time
7.124999841E-01	Freq2, EDGE, RMS 95th %tile EVM
3.715007454E-01	Freq2, EDGE, Average RMS EVM
1.030398846E+00	Freq2, EDGE, Maximum of the Peak EVM
4.400000000E+01	Freq2, EDGE, Symbol position of the peak EVM
6.977381185E-02	Freq2, EDGE, Average Magnitude Error
1.973391026E-01	Freq2, EDGE, Maximum of the Peak Magnitude Error
2.472979203E-01	Freq2, EDGE, Average Phase Error
1.847238302E+00	Freq2, EDGE, Maximum of the Peak Phase Error
3.048159122E-01	Freq2, EDGE, Average Frequency Error
1.567105276E+00	Freq2, EDGE, Maximum Frequency Error
-6.483923579E+01	Freq2, EDGE, I/Q Origin Offset
-4.778547013E-04	Freq2, EDGE, Amplitude Droop Error

Combined GSM/EDGE Measurement Measurement Example - Configuration and Results

2.773540643E-04	Freq2, EDGE, Trigger to T0
-1.419562637E+01	Freq2, ORFS, Modulation, Off0 (Ref Carrier) Absolute
...	...

READ:CGSM2 Result

Here is an example of a “:READ:CGSM2” query and its explanation.

33	Number of Total Result Length in this list
14	Index where general measurement attributes starts in this list
17	Index where PVT Attributes starts in this list
-999	Index where ZSPan result starts in n=1 list
-999	Index where HARMonics result starts in n=1 list
8	Number of Frequency Lists pointers below.
19	Index where Frequency List 1 result starts in n=1 list
26	Index where Frequency List 2 result starts in n=1 list
-999	Index where Frequency List 3 result starts in n=1 list
-999	Index where Frequency List 4 result starts in n=1 list
-999	Index where Frequency List 5 result starts in n=1 list
-999	Index where Frequency List 6 result starts in n=1 list
-999	Index where Frequency List 7 result starts in n=1 list
-999	Index where Frequency List 8 result starts in n=1 list
3.75E+06	General Measurement Attributes , Sampling Rate
67500	General Measurement Attributes , Total Acquisition Points
1.5E+06	General Measurement Attributes , IF Band width
1	PVT Attributes, Number of PVT Bursts
4	PVT Attributes, Burst Index of 1st Bursts
24	Result Tables of Freq List 1, Index where general attribute of the list starts
0	Result Tables of Freq List 1, Index where Demod result starts
8	Result Tables of Freq List 1, Index where ORFS modulation result starts
21	Result Tables of Freq List 1, Index where ORFS switching result starts
28	Result Tables of Freq List 1, Index where PVT result starts
1	General Attribute of Freq List 1, Radio Format = GSM
8.50E+08	General Attribute of Freq List 1, Center Frequency = 850MHz
31	Result Tables of Freq List 2, Index where general attribute of the list starts
34	Result Tables of Freq List 2, Index where Demod result starts
47	Result Tables of Freq List 2, Index where ORFS modulation result starts

Combined GSM/EDGE Measurement Measurement Example - Configuration and Results

60	Result Tables of Freq List 2, Index where ORFS switching result starts
67	Result Tables of Freq List 2, Index where PVT result starts
2	General Attribute of Freq List 2, Radio Format = EDGE
9.50E+08	General Attribute of Freq List 2, Center Frequency = 950MHz

READ:CGSM4 Result

Here is an example of a “:READ:CGSM4” query and its explanation.

1.624448299E-01	Freq1, 3 rd Burst, PFER, RMS Phase Error
4.606593847E-01	Freq1, 3 rd Burst, PFER, Peak Phase Error
3.430000000E+01	Freq1, 3 rd Burst, PFER, Peak Phase Error Symbol Position
3.420000374E-01	Freq1, 3 rd Burst, PFER, Frequency Error
-6.640914154E+01	Freq1, 3 rd Burst, PFER, I/Q Origin Offset
2.768930510E-04	Freq1, 3 rd Burst, PFER, T0 Offset
1.861023009E-01	Freq1, 4 th Burst, PFER, RMS Phase Error
4.573341906E-01	Freq1, 4 th Burst, PFER, Peak Phase Error
5.000000000E+00	Freq1, 4 th Burst, PFER, Peak Phase Error Symbol Position
-2.921462357E-01	Freq1, 4 th Burst, PFER, Frequency Error
-6.964576721E+01	Freq1, 4 th Burst, PFER, I/Q Origin Offset
2.758943491E-04	Freq1, 4 th Burst, PFER, T0 Offset
7.249999838E-01	Freq2, 3 rd Burst, EDGE, RMS 95th %tile EVM
3.871338069E-01	Freq2, 3 rd Burst, EDGE, RMS EVM
1.030398846E+00	Freq2, 3 rd Burst, EDGE, Peak EVM
4.400000000E+01	Freq2, 3 rd Burst, EDGE, Symbol position of the peak EVM
7.250271738E-02	Freq2, 3 rd Burst, EDGE, Magnitude Error
1.790225953E-01	Freq2, 3 rd Burst, EDGE, Peak Magnitude Error
2.689246535E-01	Freq2, 3 rd Burst, EDGE, Phase Error
1.847238302E+00	Freq2, 3 rd Burst, EDGE, Peak Phase Error
-9.574734515E-01	Freq2, 3 rd Burst, EDGE, Frequency Error
-6.609591484E+01	Freq2, 3 rd Burst, EDGE, I/Q Origin Offset
-1.176257863E-03	Freq2, 3 rd Burst, EDGE, Amplitude Droop Error
2.778531547E-04	Freq2, 3 rd Burst, EDGE, Trigger to T0
6.99999844E-01	Freq2, 4 th Burst, EDGE, RMS 95th %tile EVM

Combined GSM/EDGE Measurement
Measurement Example - Configuration and Results

3.558676839E-01	Freq2, 4 th Burst, EDGE, RMS EVM
9.535019994E-01	Freq2, 4 th Burst, EDGE, Peak EVM
9.300000000E+01	Freq2, 4 th Burst, EDGE, Symbol position of the peak EVM
6.704490632E-02	Freq2, 4 th Burst, EDGE, Magnitude Error
1.973391026E-01	Freq2, 4 th Burst, EDGE, Peak Magnitude Error
2.256711870E-01	Freq2, 4 th Burst, EDGE, Phase Error
-2.987661362E-01	Freq2, 4 th Burst, EDGE, Peak Phase Error
1.567105276E+00	Freq2, 4 th Burst, EDGE, Frequency Error
-6.386576653E+01	Freq2, 4 th Burst, EDGE, I/Q Origin Offset
2.205484603E-04	Freq2, 4 th Burst, EDGE, Amplitude Droop Error
2.768549738E-04	Freq2, 4 th Burst, EDGE, Trigger to T0

READ:CGSM5 Result

Here is an example of a “:READ:CGSM5” query and its explanation.

4	Total number of bursts in n = 4 result
0	The location index of the 1 st burst in the n = 4 list
1	The frequency index of the 1 st burst
3	The burst index of the 1 st burst
6	The location index of the 2 nd burst in the n = 4 list
1	The frequency index of the 2 nd burst
4	The burst index of the 2 nd burst
12	The location index of the 3 rd burst in the n = 4 list
2	The frequency index of the 3 rd burst
3	The burst index of the 3 rd burst
24	The location index of the 4 th burst in the n = 4 list
2	The frequency index of the 4 th burst
4	The burst index of the 4 th burst

Amplitude (AMPTD) Y Scale

There is no functionality unique to this measurement.

For details, see the “AMPTD Y Scale” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **Front-panel key**

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement.

For details, see “Attenuation” under the “AMPTD Y Scale” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **AMPTD Y Scale**

Presel Center

When this key is pressed, the centering of the preselector filter is adjusted to optimize the amplitude accuracy at the frequency of the selected marker.

For details, see “Presel Center” under the “AMPTD Y Scale” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **AMPTD Y Scale**

Presel Adjust

Allows you to manually adjust the preselector filter frequency to optimize its response to the signal of interest. This function is only available when Presel Center is available.

For details, see “Presel Adjust” under the “AMPTD Y Scale” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **AMPTD Y Scale**

Internal Preamp

This menu controls the internal preamplifier. Turning Internal Preamp on gives a better noise figure, but a poorer inter-modulation distortion (TOI) to noise floor dynamic range. You can optimize this setting for your particular measurement.

For details, see “Internal Preamp” under the “AMPTD Y Scale” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **AMPTD Y Scale**

BW

There are no keys available in the BW menu, so, when pressed, this key displays a blank menu.

Key Path

Front-panel key

Combined GSM/EDGE Measurement
Cont (Continuous Measurement/Sweep)

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements.

For details, see the “Cont” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

FREQ Channel

Operation of this key is identical across all measurements.

For details, see the “FREQ Channel” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Combined GSM/EDGE Measurement Input/Output

Input/Output

Operation of this key is identical across all measurements.

For details, see the “Input/Output” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Marker

For this measurement, there are no keys available in the Marker menu. When pressed, this key displays a blank menu.

For remote commands relevant to marker setup, see [“Marker” on page 103](#).

Key Path

Front-panel key

Combined GSM/EDGE Measurement
Marker Function

Marker Function

There are no menu keys available in the Marker Function menu, so, when pressed, this key displays a blank menu.

Key Path

Front-panel key

Marker To

There are no menu keys available under this menu, so, when pressed, this key displays a blank menu.

Key Path

Front-panel key

Combined GSM/EDGE Measurement Meas

Meas

Operation of this key is identical across all measurements.

For details, see the “Meas” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Meas Setup

There are no menu keys available in the Meas Setup menu. Meas Setup functions are performed using Remote Commands documented under [“General Setting Commands \(All Remote Commands Only\)” on page 93](#), or via setup tables, using the front-panel keys or a mouse and keyboard.

For more information on the measurement setup table screens see [“Measurement List \(View\)” on page 153](#) and [“Parameter List \(View\)” on page 154](#).

Key Path **Front-panel key**

General Setting Commands (All Remote Commands Only)

IF Gain Commands

In order to take full advantage of the RF dynamic range of the analyzer, we provide a switched IF amplifier with approximately 10 dB of gain. When it can be turned on without an overload, the dynamic range is always better with it on than off. The **IF Gain** commands can be used to set the IF Gain function to Auto, or to On (the extra 10 dB) or Off. These settings affect sensitivity and IF overloads.

This group includes the following commands:

[“IF Gain Auto” on page 93](#)

[“IF Gain State” on page 93](#)

IF Gain Auto

Activates the auto rules for IF Gain

Mode	GSM
Remote Command	[:SENSe] :CGSM:IF:GAIN:AUTO [:STATe] ON OFF 1 0 [:SENSe] :CGSM:IF:GAIN:AUTO [:STATe] ?
Example	CGSM:IF:GAIN:AUTO ON CGSM:IF:GAIN:AUTO?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	When either the auto attenuation works (for example, with electrical attenuator), or the optimized mechanical attenuator range is requested, the IF Gain setting is changed as following rule. 'Auto' sets IF Gain High under any of the following conditions: the input attenuator is set to 0 dB, the preamp is turned on, or the Max Mixer Level is 20 dBm or lower. For other settings, auto sets IF Gain to Low.
Preset	OFF
State Saved	Saved in instrument state.
Range	Auto Man
Initial S/W Revision	Prior to A.02.00

IF Gain State

Selects the range of IF gain.

Mode **GSM**

Combined GSM/EDGE Measurement Meas Setup

Remote Command	[:SENSe] :CGSM:IF:GAIN [:STATe] ON OFF 1 0 [:SENSe] :CGSM:IF:GAIN [:STATe] ?
Example	CGSM:IF:GAIN ON CGSM:IF:GAIN?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode. where ON = high gain OFF = low gain
Couplings	Coupled to IF Gain Auto, which this command forces to Man.
Preset	OFF
State Saved	Saved in instrument state.
Range	Low Gain (Best for Large Signals) High Gain (Best Noise Level)
Initial S/W Revision	Prior to A.02.00

Demodulation Setting Commands

SCPI commands in this section affect all frequency lists' GSM and EDGE measurements.

This group includes the following commands:

["Measurement Enable/Disable" on page 94](#)

["Demod Test Bitmap" on page 95](#)

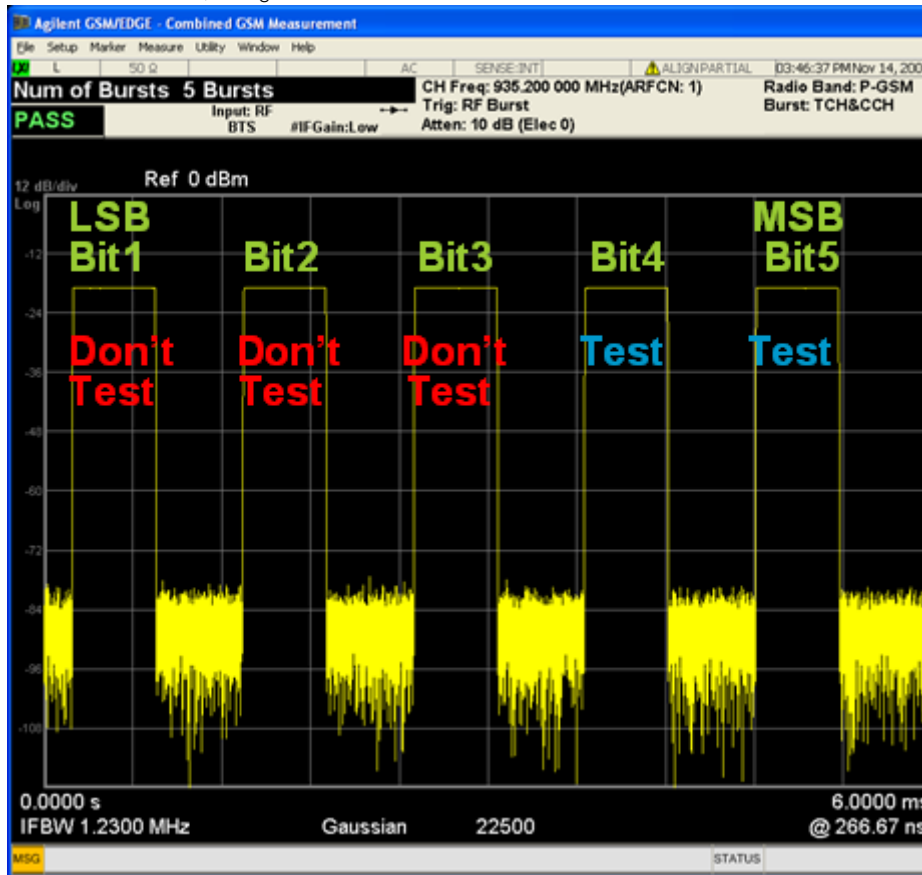
Measurement Enable/Disable

Allows you to enable or disable Demodulation measurements.

Mode	GSM
Remote Command	[:SENSe] :CGSM:DEMod [:ENABle] ON OFF 1 0 [:SENSe] :CGSM:DEMod [:ENABle] ?
Example	CGSM:DEM 0 CGSM:DEM?
Notes	You must be in the GSM/EDGE 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

Demod Test Bitmap

Selects which Bits are to be tested, using a 16-bit code.



Note: the figure above is not an actual screen shot, but is used to illustrate how the Test Bitmap is used.

The example above shows a test with “Number of Bursts” = 5. The “Test Bitmap” specifies which bursts are to be tested. Set the bit to 1 if you want to test the burst, to 0 if you want the instrument to ignore the burst. If you want to demodulate the 4th and 5th Bursts, set the test bitmap value to the decimal integer equivalent of the binary number. In the above example, the binary number is 11000, so the integer is 24. The test bitmap has a 16-bit field (0 to 65535 decimal) allowing up to 16 bursts to be tested. In the case of the illustration above, only Bits 1 – 5 are used, and Bits 6 to 16 are unused.

Mode	GSM
Remote Command	[:SENSe] :CGSM:DEMod:TEST <integer> [:SENSe] :CGSM:DEMod:TEST?
Example	CGSM:DEM:TEST 24 CGSM:DEM:TEST?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Preset	65535
State Saved	Saved in instrument state.
Min	1
Max	65535
Initial S/W Revision	Prior to A.02.00

Combined GSM/EDGE Measurement Meas Setup

EDGE Specific Setting Commands

SCPI commands in this section affect all frequency lists' EDGE measurements.

This group includes the following commands:

[“Droop Compensation” on page 96](#)

[“Polar Mod Align” on page 96](#)

Droop Compensation

Turn 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.

Mode	GSM
Remote Command	[:SENSe] :CGSM:DEMod:EEVM:DROop OFF ON 0 1 [:SENSe] :CGSM:DEMod:EEVM:DROop?
Example	CGSM:DEM:EEVM:DRO ON CGSM:DEM:EEVM:DRO?
Notes	You must be in the GSM/EDGE 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

Polar Mod Align

Turn On/Off polar modulation alignment.

Mode	GSM
Remote Command	[:SENSe] :CGSM:DEMod:EEVM:PMODulation:ALIGNment OFF ON 0 1 [:SENSe] :CGSM:DEMod:EEVM:PMODulation:ALIGNment?
Example	CGSM:DEM:EEVM:PMOD:ALIG OFF CGSM:DEM:EEVM:PMOD:ALIG?
Notes	You must be in the GSM/EDGE 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

ORFS Related Setting Commands

SCPI commands in this section affect all frequency lists' ORFS measurements.

This group includes the following commands:

[“Measurement Enable/Disable” on page 97](#)

[“ORFS Test Bitmap” on page 97](#)

[“Fast Average” on page 97](#)

[“Meas Type” on page 98](#)

[“Mod Average” on page 98](#)

[“ORFS Filter” on page 99](#)

Measurement Enable/Disable

Allows you to enable or disable ORFS measurement.

Mode	GSM
Remote Command	[:SENSe] :CGSM:ORFSpectrum[:ENABle] ON OFF 1 0 [:SENSe] :CGSM:ORFSpectrum[:ENABle] ?
Example	CGSM:ORFS 0 CGSM:ORFS?
Notes	You must be in the GSM/EDGE 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

ORFS Test Bitmap

See [“Demod Test Bitmap” on page 95](#) for the concept of the test bitmap.

Mode	GSM
Remote Command	[:SENSe] :CGSM:ORFSpectrum:TEST <integer> [:SENSe] :CGSM:ORFSpectrum:TEST?
Example	CGSM:ORFS:TEST 2 CGSM:ORFS:TEST?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Preset	65535
State Saved	Saved in instrument state.
Min	1
Max	65535
Initial S/W Revision	Prior to A.02.00

Fast Average

Used to change On/Off state of Fast Average.

Fast Average is for ORFS modulation measurement. When it is on, it averages both the before- midamble-part and the after-midamble-part at each specified offset frequency with regard to the standard specifying only the after-midamble-part.

Mode	GSM
------	-----

Combined GSM/EDGE Measurement Meas Setup

Remote Command	[:SENSe] :CGSM:ORFSpectrum:AVERage:FAST [:STATe] OFF ON 0 1 [:SENSe] :CGSM:ORFSpectrum:AVERage:FAST [:STATe] ?
Example	CGSM:ORFS:AVER:FAST ON CGSM:ORFS:AVER:FAST?
Notes	You must be in the GSM/EDGE 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

Meas Type

Selects the measurement type.

Type	SCPI	Description
Mod & Switch	MSWitching	Performs both Modulation and Switching measurements.
Modulation	MODulation	Measures the spectrum due to the 0.3 GMSK modulation and noise.
Switching	SWITching	Measures the spectrum due to switching transients (burst ramping up and down).
Mode	GSM	
Remote Command	[:SENSe] :CGSM:ORFSpectrum:TYPE MODulation MSWitching SWITching [:SENSe] :CGSM:ORFSpectrum:TYPE?	
Example	CGSM:ORFS:TYPE MOD CGSM:ORFS:TYPE?	
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	MODulation	
State Saved	Saved in instrument state.	
Range	MODulation MSWitching SWITching	
Initial S/W Revision	Prior to A.02.00	

Mod Average

Select the type of averaging for ORFS modulation measurement.

Type	SCPI	Description
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.
Mode	GSM	
Remote Command	[:SENSe] :CGSM:ORFSpectrum:AVERage:MODulation:TYPE LOG RMS [:SENSe] :CGSM:ORFSpectrum:AVERage:MODulation:TYPE?	

Example	CGSM:ORFS:AVER:MOD:TYPE LOG CGSM:ORFS:AVER:MOD:TYPE?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Preset	LOG
State Saved	Saved in instrument state.
Range	LOG RMS
Initial S/W Revision	Prior to A.02.00

ORFS Filter

Select the type of ORFS filter.

Type	SCPI	Description
5-Pole Sync Tuned	FPST	5-Pole Sync Tuned filter specified by standard
Gaussian	GAUSSian	Ideal Gaussian filter
Mode	GSM	
Remote Command	[:SENSE] :CGSM:ORFSpectrum:FILTer FPST GAUSSian [:SENSE] :CGSM:ORFSpectrum:FILTer	
Example	CGSM:ORFS:FILT GAUS CGSM:ORFS:FILT?	
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.	
Preset	FPST	
State Saved	Saved in instrument state.	
Range	FPST GAUS	
Initial S/W Revision	Prior to A.02.00	

PVT Related Setting Commands

This group includes the following commands:

- [“Measurement Enable/Disable” on page 99](#)
- [“PVT Secondary Test Group” on page 100](#)
- [“PVT Test Bitmap” on page 101](#)
- [“PVT Backup Burst Test Enable/Disable” on page 101](#)
- [“PVT Backup Burst Test Bitmap” on page 102](#)

Measurement Enable/Disable

Allows you to enable or disable PVT measurement.

Mode	GSM
------	-----

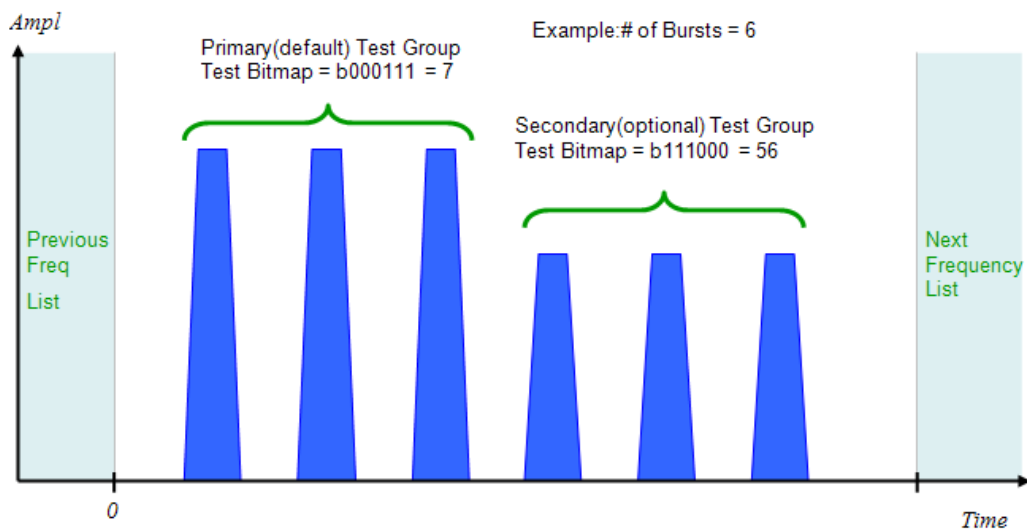
Combined GSM/EDGE Measurement Meas Setup

Remote Command	<code>[:SENSe] :CGSM :PVTtime [:ENABle] ON OFF 1 0</code> <code>[:SENSe] :CGSM :PVTtime [:ENABle] ?</code>
Example	<code>CGSM:PVT 0</code> <code>CGSM:PVT?</code>
Notes	You must be in the GSM/EDGE mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Preset	ON
State Saved	Saved in instrument state.
Range	ON OFF
Initial S/W Revision	Prior to A.02.00

PVT Secondary Test Group

A PVT measurement can have a Secondary (optional) test group. When the secondary test group is enabled, the secondary test bitmap is available and the group's pass/fail result is written after the primary (default) PVT group result. In the usual test case, Test bitmaps for both the Primary group and the Secondary group do not overlap, but the instrument will allow overlap if it is used. The instrument measures the burst points, and the results are used for both groups. Secondary test group is a feature only for PVT measurement.

Note that all other setups except test bitmap are shared with both test groups.



Mode	GSM
Remote Command	<code>[:SENSe] :CGSM :PVTtime :SECOndary [:ENABle] ON OFF 1 0</code> <code>[:SENSe] :CGSM :PVTtime :SECOndary [:ENABle] ?</code>
Example	<code>CGSM:PVT:SEC ON</code> <code>CGSM:PVT:SEC?</code>
Notes	You must be in the GSM/EDGE mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Preset	OFF
State Saved	Saved in instrument state.
Range	ON OFF

Initial S/W Revision

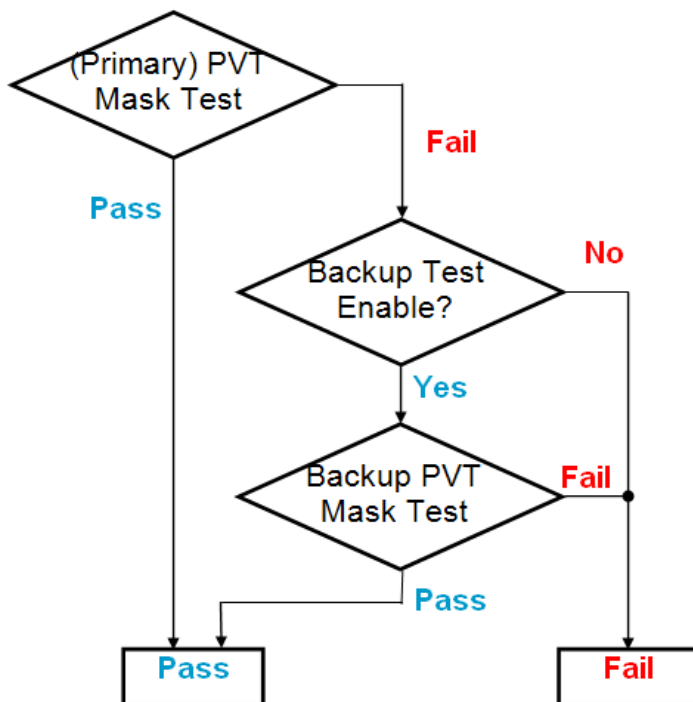
Prior to A.02.00

PVT Test Bitmap

See “Demod Test Bitmap” on page 95 for the concept of the test bitmap.

Mode	GSM
Remote Command	[:SENSe] :CGSM:PVTtime:TEST [1] 2 <integer> [:SENSe] :CGSM:PVTtime:TEST [1] 2?
Example	CGSM:PVT:TEST 6 CGSM:PVT:TEST?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode. The index 1 or 2 is for the selection of test group.
Preset	65535
State Saved	Saved in instrument state.
Min	1
Max	65535
Initial S/W Revision	Prior to A.02.00

PVT Backup Burst Test Enable/Disable



The PVT mask test is one of the most severe tests for GSM/EDGE. To reduce the total test time, in CGSM you can specify a set of backup bursts that are tested only when the primary bursts' mask test has failed. See the diagram above.

Combined GSM/EDGE Measurement Meas Setup

In a frequency list, the (primary) bursts that are specified by “PVT Test Bitmap” on page 101 is mask tested first. If any bursts fail, the PVT Backup Burst Test is enabled, and the backup bursts are mask tested. If all primary bursts pass the test, the backup bursts are not tested. Note that the backup bursts can be configured for each test group (see “PVT Secondary Test Group” on page 100).

Mode	GSM
Remote Command	[:SENSe] :CGSM:PVTtime:BACKup [1] 2 [:ENABle] ON OFF 1 0 [:SENSe] :CGSM:PVTtime:BACKup [1] 2 [:ENABle] ?
Example	CGSM:PVT:BACK 1 CGSM:PVT:BACK?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode. The index 1 or 2 is for the selection of test group.
Preset	OFF
State Saved	Saved in instrument state.
Range	ON OFF
Initial S/W Revision	Prior to A.02.00

PVT Backup Burst Test Bitmap

Specifies a bitmap for PVT Backup burst test. See “PVT Backup Burst Test Enable/Disable” on page 101 for details.

Mode	GSM
Remote Command	[:SENSe] :CGSM:PVTtime:BACKup [1] 2 :TEST <integer> [:SENSe] :CGSM:PVTtime:BACKup [1] 2 :TEST?
Example	CGSM:PVT:BACK2:TEST 6 CGSM:PVT:BACK2:TEST?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode. The index 1 or 2 is for the selection of the test group.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	65535
Initial S/W Revision	Prior to A.02.00

Zero Span Related Setting Commands

This group includes the following commands:

“Measurement Enable/Disable” on page 102

“Marker” on page 103

Measurement Enable/Disable

Allows you to enable or disable Zero Span measurement.

Mode	GSM
Remote Command	[:SENSe] :CGSM:ZSPan[:ENABle] ON OFF 1 0 [:SENSe] :CGSM:ZSPan[:ENABle]?
Example	CGSM:ZSP 0 CGSM:ZSP?
Notes	You must be in the GSM/EDGE 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

Marker

This group includes the following commands:

[“All Markers Off” on page 103](#)

[“Couple Marker” on page 103](#)

[“Marker Type” on page 104](#)

[“Marker X Axis Value” on page 104](#)

[“Marker X Axis Position” on page 105](#)

[“Marker Y Axis Value” on page 105](#)

[“Relative To” on page 106](#)

[“Peak Search” on page 106](#)

[“Marker Function Type” on page 106](#)

[“Band Span” on page 107](#)

[“Band Left” on page 107](#)

[“Band Right” on page 108](#)

All Markers Off

Turns off all markers.

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer:AOFF
Example	CALC:CGSM:ZSP:MARK:AOFF
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

Combined GSM/EDGE Measurement Meas Setup

Couple Marker

When this function is ON or true, moving any marker causes an equal X Axis movement of all other markers. “Equal X Axis movement” means that the instrument preserves 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).

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer:COUPle[:STATe] OFF ON 0 1 :CALCulate:CGSM:ZSPan:MARKer:COUPle[:STATe]?
Example	CALC:CGSM:ZSP:MARK:COUP ON CALC:CGSM:ZSP:MARK:COUP?
Notes	You must be in the GSM/EDGE 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 Type

Sets the marker control mode under **Normal**, **Delta** and **Off**, as described below. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MODE POSITION DELTA OFF :CALCulate:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:MODE?
Example	CALC:CGSM:ZSP:MARK:MODE POS CALC:CGSM:ZSP: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 a trace. You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
State Saved	Saved in instrument state.
Range	Normal Delta Off
Initial S/W Revision	Prior to A.02.00

Marker X Axis Value

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:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:X <time> :CALCulate:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:X?

Example	CALC:CGSM:ZSP:MARK3:X 1ks CALC:CGSM:ZSP:MARK3:X?
Notes	If no suffix is sent it will use 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" will be generated. If the specified marker is Fixed and a Marker Function is on, error -221 "Settings conflict; cannot adjust Fixed marker while Marker Function is on" 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 . You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	3.31333E-02
State Saved	No
Min	1 us
Max	6ks
Initial S/W Revision	Prior to A.02.00

Marker X Axis Position

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:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:X:POsition <integer> :CALCulate:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:X:POsition?

Example	CALC:CGSM:ZSP:MARK3:X 10 CALC:CGSM:ZSP:MARK3:X?
Notes	If no suffix is sent it will use 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" will be generated. If the specified marker is Fixed and a Marker Function is on, error -221 "Settings conflict; cannot adjust Fixed marker while Marker Function is on" 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 . You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	500
State Saved	No
Min	1
Max	6ks
Initial S/W Revision	Prior to A.02.00

Marker Y Axis Value

Queries Y Axis value in the current marker Y Axis unit. Marker Y Axis unit will be depend on the selected marker mode and marker function.

Mode	GSM
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Combined GSM/EDGE Measurement Meas Setup

Remote Command	:CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 : Y ?
Example	CALC:CGSM:ZSP:MARK:Y?
Notes	The query returns the marker Y-axis result, if the control mode is Normal or 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	500
State Saved	No
Min	-9.9E37
Max	9.9E37
Initial S/W Revision	Prior to A.02.00

Relative To

Selects the marker the selected marker will be relative to (its reference marker).

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 : REFerence <integer> :CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 : REFerence?
Example	CALC:CGSM:ZSP:MARK:REF 3 CALC:CGSM:ZSP: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.
Preset	2 3 4 5 6 7 8 9 10 11 12 1
State Saved	No
Min	1
Max	12
Initial S/W Revision	Prior to A.02.00

Peak Search

Places the selected marker on the trace point with the maximum y-axis value for that marker's trace.

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 : MAXimum
Example	CALC:CGSM:ZSP:MARK:MAX
Initial S/W Revision	Prior to A.02.00

Marker Function Type

Sets the marker function type. All interactions and dependencies detailed under the key description are enforced when the remote command is sent.

Mode	GSM
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Remote Command	:CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 :FUNCTION NOISe BPOWer BDENsity OFF :CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 :FUNCTION?
Example	CALC:CGSM:ZSP:MARK:FUNC NOIS CALC:CGSM:ZSP:MARK:FUNC?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Preset	OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF OFF
State Saved	No
Range	Noise BPower BDensity Off
Initial S/W Revision	Prior to A.02.00

Band Span

Sets the width of the span for the selected marker.

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 :FUNCTION:BAN D:SPAN <time> :CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 :FUNCTION:BAN D:SPAN?
Example	CALC:CGSM:ZSP:MARK:FUNC:BAND:SPAN 10ms CALC:CGSM:ZSP:MARK:FUNC:BAND:SPAN?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Changing the Band Span necessarily changes the Band Left and Band Right values Band Span is set to 0 when the marker is turned off Band Span is set to 5% of span when any marker function is turned on if and only if it is zero at that time
Preset	5% of Sweep Time
State Saved	No
Min	Graph Start Time
Max	Graph Stop Time
Initial S/W Revision	Prior to A.02.00

Band Left

Sets the left edge frequency or time for the band of the selected marker. The right edge is unaffected.

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 :FUNCTION:BAN D:LEFT <time> :CALCulate:CGSM:ZSPan:MARKer [1] 2 3 4 5 6 7 8 9 10 11 12 :FUNCTION:BAN D:LEFT?
Example	CALC:CGSM:ZSP:MARK:FUNC:BAND:LEFT 10ms CALC:CGSM:ZSP:MARK:FUNC:BAND:LEFT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.

Combined GSM/EDGE Measurement Meas Setup

Couplings	Changing the Band Span necessarily changes the Band Left and Band Right values Band Span is set to 0 when the marker is turned off Band Span is set to 5% of span when any marker function is turned on if and only if it is zero at that time
Preset	47.5% (50% - 5% / 2) of Sweep Time
State Saved	No
Min	Graph Start Time
Max	Graph Stop Time
Initial S/W Revision	Prior to A.02.00

Band Right

For the band of the selected marker, sets the right edge time or frequency. The left edge is unaffected.

Mode	GSM
Remote Command	:CALCulate:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:FUNCTION:BAND:RIGHT <time> :CALCulate:CGSM:ZSPan:MARKer[1] 2 3 4 5 6 7 8 9 10 11 12:FUNCTION:BAND:RIGHT?
Example	CALC:CGSM:ZSP:MARK:FUNC:BAND:RIGH 10ms CALC:CGSM:ZSP:MARK:FUNC:BAND:RIGH?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Couplings	Changing the Band Span necessarily changes the Band Left and Band Right values Band Span is set to 0 when the marker is turned off Band Span is set to 5% of span when any marker function is turned on if and only if it is zero at that time
Preset	52.5% (50% + 5% / 2) of Sweep Time
State Saved	No
Min	Graph Start Time
Max	Graph Stop Time
Initial S/W Revision	Prior to A.02.00

Acquisition Setup

This group includes the following commands:

“Res BW” on page 109

“Res BW Filter Type” on page 109

“Video BW” on page 109

“VBW:3dB RBW” on page 110

“Detector” on page 110

“Sweep Points” on page 111

“Sweep Time” on page 111

Res BW

Sets the resolution bandwidth for the current measurement. If an unavailable bandwidth is entered, the closest available bandwidth is selected.

Mode	GSM
Remote Command	[:SENSe] :CGSM:ZSPan:BANDwidth[:RESolution] <freq> [:SENSe] :CGSM:ZSPan:BANDwidth[:RESolution] ?
Example	CGSM:ZSP:BAND 3MHz CGSM:ZSP:BAND?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode
Preset	3.0 MHz
State Saved	Saved in instrument state.
Min	1.0 Hz
Max	8.0 MHz
Initial S/W Revision	Prior to A.02.00

Res BW Filter Type

Sets the type/shape of resolution bandwidth filter for the current measurement.

Mode	GSM
Remote Command	[:SENSe] :CGSM:ZSPan:BANDwidth:SHApe GAUSSian FLATtop [:SENSe] :CGSM:ZSPan:BANDwidth:SHApe?
Example	CGSM:ZSP:BAND:SHAP FLAT CGSM:ZSP:BAND:SHAP?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Preset	GAUSSian
State Saved	Saved in instrument state.
Range	Gaussian flattop
Initial S/W Revision	Prior to A.02.00

Video BW

Sets the video bandwidth for the current measurement. If an unavailable bandwidth is entered, the closest available bandwidth is selected.

When this function is set to ON, Video BW is automatically calculated with using values of VBW:3dB RBW and Res BW.

$$\text{Video BW} = \text{VBW:3dB RBW} \times \text{Res BW}$$

Mode	GSM
Remote Command	[:SENSe] :CGSM:ZSPan:BANDwidth:VIDeo <freq> [:SENSe] :CGSM:ZSPan:BANDwidth:VIDeo? [:SENSe] :CGSM:ZSPan:BANDwidth:VIDeo:AUTO OFF ON 0 1 [:SENSe] :CGSM:ZSPan:BANDwidth:VIDeo:AUTO?

Combined GSM/EDGE Measurement Meas Setup

Example	CGSM:ZSP:BAND:VID 3MHz CGSM:ZSP:BAND:VID? CGSM:ZSP:BAND:VID:AUTO ON CGSM:ZSP:BAND:VID:AUTO?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	3.0 MHz ON
State Saved	Saved in instrument state.
Min	1.0 Hz
Max	50.0 MHz
Initial S/W Revision	Prior to A.02.00

VBW:3dB RBW

Selects the ratio between the video bandwidth and the equivalent 3 dB resolution bandwidth to be used for setting the VBW when VBW is in Auto.

Mode	GSM
Remote Command	[:SENSe] :CGSM : ZSPan :BANDwidth :VIDeo :RATio <real> [:SENSe] :CGSM : ZSPan :BANDwidth :VIDeo :RATio? [:SENSe] :CGSM : ZSPan :BANDwidth :VIDeo :RATio :AUTO OFF ON 0 1 [:SENSe] :CGSM : ZSPan :BANDwidth :VIDeo :RATio :AUTO?
Example	CGSM:ZSP:BAND:VID:RAT 1 CGSM:ZSP:BAND:VID:RAT? CGSM:ZSP:BAND:VID:RAT:AUTO ON CGSM:ZSP:BAND:VID:RAT:AUTO?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	1.0 ON
State Saved	Saved in instrument state.
Min	0.00001
Max	3000000
Initial S/W Revision	Prior to A.02.00

Detector

Allows you to select a specific detector for the current measurement. When the detector choice is Auto, the analyzer selects the detector. The selected detector depends on marker functions, trace functions, and trace averaging functions for the current measurement.

Mode	GSM
Remote Command	[:SENSe] :CGSM : ZSPan :DETEctor [:FUNctioN] AVERage NEGAtive NORMAl POSitive SAMPlE [:SENSe] :CGSM : ZSPan :DETEctor [:FUNctioN] ?

Example	CGSM:ZSP:DET AVER CGSM:ZSP:DET?
Notes	You must be in the GSM/EDGE mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	AVERage
State Saved	Saved in instrument state.
Range	Average Negative Normal Positive Sample
Initial S/W Revision	Prior to A.02.00

Sweep Points

Sets the number of points per sweep. The resolution of setting the sweep time depends on the number of points selected. If Preset is selected, the number of points per sweep defaults to 1001. The current value of points is displayed parenthetically, next to the sweep time in the lower right corner of the display.

Mode	GSM
Remote Command	[:SENSe] :CGSM : ZSPan : SWEp : POINts <integer> [:SENSe] :CGSM : ZSPan : SWEp : POINts?
Example	CGSM:ZSP:SWE:POIN 2000 CGSM:ZSP:SWE:POIN?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	1001
State Saved	Saved in instrument state.
Min	2
Max	20001
Initial S/W Revision	Prior to A.02.00

Sweep Time

Selects the length of time in which the spectrum analyzer sweeps the displayed frequency span. Additional overhead time is required by the analyzer. It impacts the sweep rate, but is not calculated as part of the sweep time. Reducing the sweep time increases the rate of sweeps.

Mode	GSM
Remote Command	[:SENSe] :CGSM : ZSPan : SWEp : TIME <time> [:SENSe] :CGSM : ZSPan : SWEp : TIME?
Example	CGSM:ZSP:SWE:TIME 2 CGSM:ZSP:SWE:TIME?
Notes	You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	3.0 ms
State Saved	Saved in instrument state.
Min	1.0 us
Max	4000 s

Combined GSM/EDGE Measurement Meas Setup

Initial S/W Revision

Prior to A.02.00

Display

This group includes the following commands:

[“Y – Axis Scale/Div” on page 112](#)

[“Y – Axis Ref Value” on page 112](#)

Y – Axis Scale/Div

Sets the logarithmic units per vertical graticule division on the display.

Mode	GSM
Remote Command	:DISPlay:CGSM:ZSPan:TRACe:Y[:SCALe]:PDIVision <rel_amp1> :DISPlay:CGSM:ZSPan:TRACe:Y[:SCALe]:PDIVision?
Example	DISP:CGSM:ZSP:TRAC:Y:PDIV 2 DISP:CGSM:ZSP:TRAC:Y:PDIV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	10.0 dB
State Saved	Saved in instrument state.
Min	0.1 dB
Max	20 dB
Initial S/W Revision	Prior to A.02.00

Y – Axis Ref Value

Sets the absolute power reference value.

Mode	GSM
Remote Command	:DISPlay:CGSM:ZSPan:TRACe:Y[:SCALe]:RLEVel <amp1> :DISPlay:CGSM:ZSPan:TRACe:Y[:SCALe]:RLEVel?
Example	DISP:CGSM:ZSP:TRAC:Y:RLEV 2 DISP:CGSM:ZSP:TRAC:Y:RLEV?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	10.0 dBm
State Saved	Saved in instrument state.
Min	-250 dBm
Max	250 dBm
Initial S/W Revision	Prior to A.02.00

Harmonics Related Setting Commands

This group includes the following commands:

[“Measurement Enable/Disable” on page 113](#)

“Number of Harmonics” on page 113

“Capture Interval” on page 114

“Frequency List” on page 114

Measurement Enable/Disable

Allows you to enable or disable Harmonics measurement.

Mode	GSM
Remote Command	<code>[:SENSe] :CGSM:HARMonics [:ENABle] ON OFF 1 0</code> <code>[:SENSe] :CGSM:HARMonics [:ENABle] ?</code>
Example	CGSM:HARM 0 CGSM:HARM?
Notes	You must be in the GSM/EDGE 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

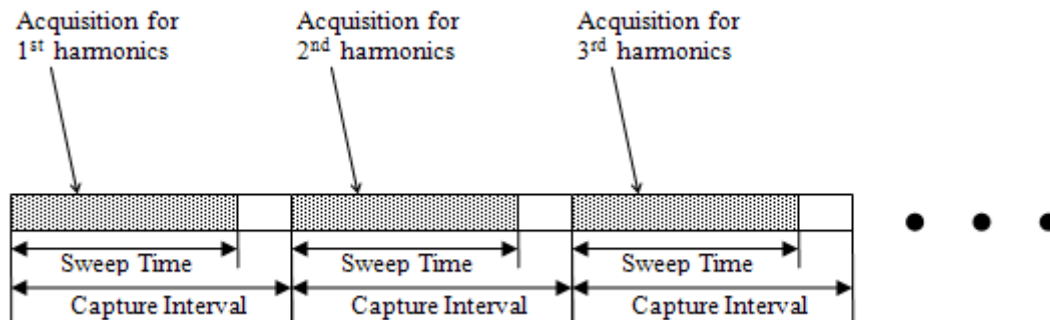
Number of Harmonics

Sets the number of harmonics to measure.

Mode	GSM
Remote Command	<code>[:SENSe] :CGSM:HARMonics:NUMBer <integer></code> <code>[:SENSe] :CGSM:HARMonics:NUMBer?</code>
Example	CGSM:HARM:NUMB 2 CGSM:HARM:NUMB?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	3
State Saved	Saved in instrument state.
Min	1
Max	10
Initial S/W Revision	Prior to A.02.00

Combined GSM/EDGE Measurement Meas Setup

Capture Interval



Sets the interval of capturing each harmonics. If the value is set to smaller than sweep time, it will be changed to the same value with sweep time.

Mode	GSM
Remote Command	[:SENSE] :CGSM:HARMonics:INTerval <time> [:SENSE] :CGSM:HARMonics:INTerval?
Example	CGSM:HARM:INT 1ms CGSM:HARM:INT?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Preset	4.615385ms
State Saved	Saved in instrument state.
Min	1 us
Max	10 s
Initial S/W Revision	Prior to A.02.00

Frequency List

List of frequencies for harmonics measurement. Parameter settings for Zero span measurement apply to acquisition and marker calculation.

Mode	GSM
Remote Command	[:SENSE] :CGSM:HARMonics:LIST:FREquency <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq> [:SENSE] :CGSM:HARMonics:LIST:FREquency?
Example	CGSM:HARM:LIST:FREQ 850e6,900e6,1.8e9 CGSM:HARM:LIST:FREQ?
Notes	Parameter settings for Zero span measurement apply to acquisition and marker calculation. Caution: When Harmonics are measured at a frequency beyond the electronic attenuator's specified operating range (3.6GHz), the value of E-Atten is changed to zero regardless of the value specified via the front panel or by SCPI command. When this occurs, the setting of the mechanical attenuator remains unchanged, as it has a wider effective range. In addition, the input preamplifier is disabled above frequencies for which a license is installed. You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.

Preset	935.2MHz, 935.2MHz, 935.2MHz, 935.2MHz, 935.2MHz, 935.2MHz, 935.2MHz, 935.2MHz, 935.2MHz, 935.2MHz
State Saved	Saved in instrument state.
Min	-79.999995 MHz
Max	Hard ware Dependent: Same as Center Frequency
Initial S/W Revision	Prior to A.02.00

Capture Step Setup

This group includes the following commands:

“Number of Bursts” on page 116

“Single Capture Interval” on page 116

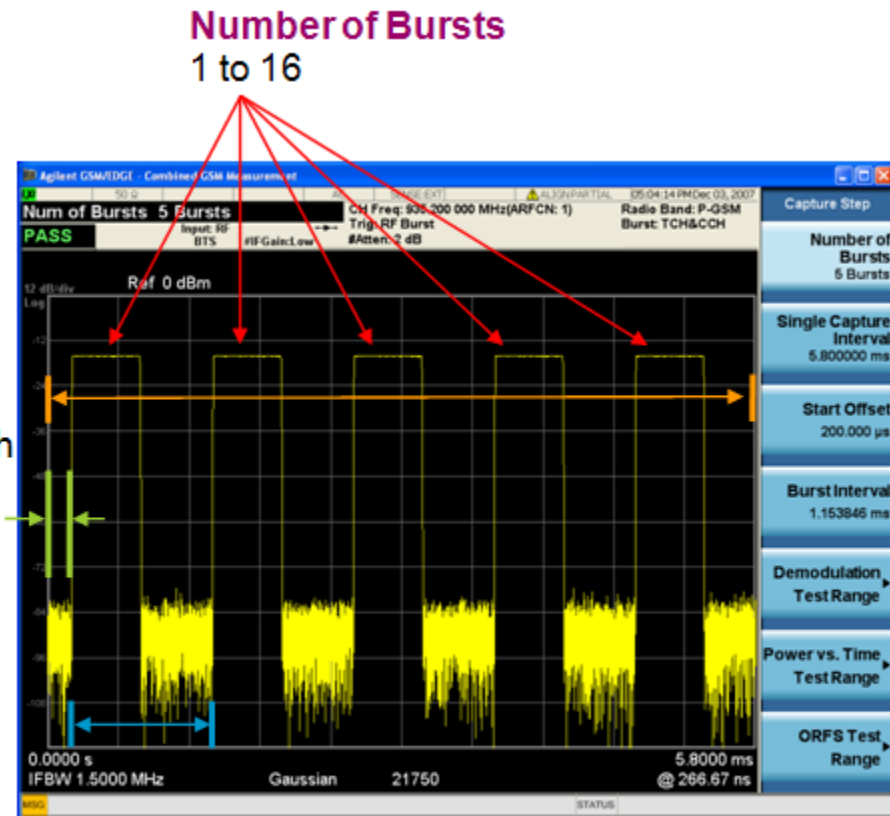
“Start Offset” on page 116

“Burst Interval” on page 117

Single Capture Interval
Specifies capture time length in each list

Start Offset
Minimum 200µs margin is required to measure the 1st burst

Burst Interval
More than 200µs slot-off time is required



(Note: the above screen shot is for illustration only and is not the actual screen displayed.)

Combined GSM/EDGE Measurement Meas Setup

Number of Bursts

Number of Bursts specifies how many bursts are to be measured for each frequency in the list.

Mode	GSM
Remote Command	[:SENSe] :CGSM:SWEep:BURSt:NUMBer <integer> [:SENSe] :CGSM:SWEep:BURSt:NUMBer?
Example	CGSM:SWE:BURS:NUMB 5 CGSM:SWE:BURS:NUMB?
Notes	You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Single Capture Interval, Start Offset and Burst Interval
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	Prior to A.02.00

Single Capture Interval

Single Capture Interval specifies capture time length in each frequency list.

Mode	GSM
Remote Command	[:SENSe] :CGSM:CAPTure [:TIME] <real> [:SENSe] :CGSM:CAPTure [:TIME] ?
Example	CGSM:CAPT 7MS CGSM:CAPT?
Notes	The total sampling points cannot exceed 4e6(4M) samples. The sampling points are calculated from the number of active freq list, BW and this parameter, Single Capture Interval. You must be in the GSM mode to use this command. Use INSTRument:SElect to set the mode.
Couplings	Number of Bursts, Start Offset and Burst Interval
Preset	9.76923E-4
State Saved	Saved in instrument state.
Min	9.76923E-4
Max	100ms
Initial S/W Revision	Prior to A.02.00

Start Offset

Start Offset specifies where the first burst slot boundary begins in each frequency list. The minimum value of the Start Offset is 200us.

Mode	GSM
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Remote Command	<code>[:SENSe] :CGSM:SWEep:OFFSet <real></code> <code>[:SENSe] :CGSM:SWEep:OFFSet?</code>
Example	<code>CGSM:SWE:OFFS 1.153846MS</code> <code>CGSM:SWE:OFFS?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Preset	200us
State Saved	Saved in instrument state.
Min	200us
Max	50ms
Initial S/W Revision	Prior to A.02.00

Burst Interval

Burst Interval specifies time between a burst and the next burst.

Mode	GSM
Remote Command	<code>[:SENSe] :CGSM:SWEep:BURSt:INTerval <real></code> <code>[:SENSe] :CGSM:SWEep:BURSt:INTerval?</code>
Example	<code>CGSM:SWE:BURS:INT 2MS</code> <code>CGSM:SWE:BURS:INT?</code>
Notes	You must be in the GSM mode to use this command. Use <code>INSTRument:SElect</code> to set the mode.
Preset	1.153846ms
State Saved	Saved in instrument state.
Min	1.153846ms
Max	100ms
Initial S/W Revision	Prior to A.02.00

Gate Setup

This group includes the following commands:

[“Gate Source” on page 117](#)

[“Gate Level” on page 118](#)

[“Gate Recovery” on page 118](#)

Gate Source

Defines the gate source setting at which the frequency list acquisition is made.

Mode	GSM
Remote Command	<code>[:SENSe] :CGSM:GATE:SOURce IMMEDIATE EXTERNAL1 EXTERNAL2 RFBURST FRAME</code> <code>[:SENSe] :CGSM:GATE:SOURce?</code>

Combined GSM/EDGE Measurement Meas Setup

Example	CGSM:GATE:SOUR IMM CGSM:GATE:SOUR?
Preset	IMMediate
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Gate Level

Gate Level is set by Trigger Level SCPI commands specified in Trigger, Measurement Functions section in the GSM/EDGE Measurement Application User's and Programmer's Reference or Help. For example, when Gate Source is External1, the trigger level is specified by the following SCPI command:

```
:TRIGger:EXtErnal1:LEVel <level>.
```

Gate Recovery

Gate Recovery is the recovery time required before the next list's acquisition begins. The value should be set for a settling time that allows the LO frequency to become stable.

Mode	GSM
Remote Command	[:SENSe] :CGSM:GATE:RTIMe <time> [:SENSe] :CGSM:GATE:RTIMe?
Example	CGSM:GATE:RTIM 500e-6 CGSM:GATE:RTIM?
Preset	1 ms
State Saved	Saved in instrument state.
Min	1 us
Max	10 ms
Initial S/W Revision	Prior to A.02.00

Frequency List Setup

This group includes the following commands:

["Frequency List" on page 118](#)

["Radio Format List" on page 119](#)

Frequency List

Combined CGSM allows setting multiple test frequencies and it captures the specified time length in 'Single Capture interval' at each frequency in order. Frequency List specifies these frequencies and their on/off states. A maximum of 8 frequencies may be set.

This specifies the frequencies for all measurements with the exception of Zero Span and Harmonics measurements.

Mode	GSM
------	-----

Remote Command	<pre>[:SENSe] :CGSM:LIST:FREQuency <freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq> [:SENSe] :CGSM:LIST:FREQuency? [:SENSe] :CGSM:LIST: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 [:SENSe] :CGSM:LIST:STATe?</pre>
Example	<pre>CGSM:LIST:FREQ 850e6,900e6,1.8e9 CGSM:LIST:FREQ? CGSM:LIST:STAT 1,1,1,0 CGSM:LIST:STAT?</pre>
Notes	<p>Combined CGSM allows setting multiple test frequencies and it captures the specified time length in 'Single Capture Interval' at each frequency in order. The 'Freq Hopping' under 'Mode Setup' is not related to this feature.</p> <p>In this measurement, frequency settings must be set here.</p> <p>The 'Center Frequency' setting under "Freq / Channel" front panel key or [:SENSe]:FREQuency:CENTer overwrites the first frequency in this list.</p> <p>CAUTION: When list acquisition is performed, the maximum frequency is 3.6 GHz even they are all the same frequency. When only the first list is used (see [:SENSe]:CGSM:LIST:STATe), there is no limitation. You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.</p>
Preset	<pre>935.2e6,935.2e6,935.2e6,935.2e6,935.2e6,935.2e6,935.2e6,935.2e6 1, 0, 0, 0, 0, 0, 0, 0</pre>
State Saved	Saved in instrument state.
Min	-79.999995 MHz
Max	Hardware Dependent: Same as Center Frequency
Initial S/W Revision	Prior to A.02.00

Radio Format List

Allows you to select measurement format.

Mode	GSM
Remote Command	<pre>[:SENSe] :CGSM:LIST:FORMat PFERror EEVM, PFERror EEVM, PFERror EEVM, PFERror EEVM, PFERror EEVM, PFERror EEVM, PFERror EEVM, PFERror EEVM [:SENSe] :CGSM:LIST:FORMat?</pre>
Example	<pre>CGSM:LIST:FORM PFER,EEVM,PFER,EEVM CGSM:LIST:FORM?</pre>
Preset	PFERror,PFERror,PFERror,PFERror,PFERror,PFERror,PFERror,PFERror
State Saved	Saved in instrument state.
Range	PFERror EEVM
Initial S/W Revision	Prior to A.02.00

Combined GSM/EDGE Measurement Meas Setup

PVT Related Setting Commands

This group includes the following commands:

[“Selected Freq Index” on page 120](#)

[“PVT Preset Standard Mask” on page 120](#)

[“PVT Mask Setting Commands” on page 120](#)

Selected Freq Index

Set a frequency index. This value is referred when PVT Mask Preset is operated. See [“PVT Preset Standard Mask” on page 120](#).

Mode	GSM
Remote Command	:CALCulate:CGSM:PVT:MASK:SElect <integer> :CALCulate:CGSM:PVT:MASK:SElect?
Example	CALC:CGSM:PVT:MASK:SEL 2 CALC:CGSM:PVT:MASK:SEL?
Notes	This value is referred when PVT Mask Preset is operated. See “PVT Preset Standard Mask” on page 120 . You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	8
Initial S/W Revision	Prior to A.02.00

PVT Preset Standard Mask

This is an immediate action function that resets PVT mask to default settings, depending on Radio Band, Radio Device, Power Control Level (Mode Setup parameters), Radio Format Type and Band Index (Band Setup parameters).

Mode	GSM
Remote Command	:CALCulate:CGSM:PVT:MASK:PRESet
Example	CALC:CGSM:PVT:MASK:PRES
Notes	PVT Mask on the specified frequency index (see “Selected Freq Index” on page 120) is automatically set, depending on "Radio Band", "Radio Device", "Power Control Level", and "Radio Format List". You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

PVT Mask Setting Commands

Start Time

Specifies the start time for each region.

Mode	GSM
------	-----

Combined GSM/EDGE Measurement Meas Setup

Res BW

Defines the resolution bandwidth list for the modulation spectrum part of the ORFS measurement. The first bandwidth specified is for the reference carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the modulation offset frequency list.

Mode	GSM
Remote Command	<pre>[:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:MODulation:Bandwidth <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq>, <freq> ,<freq>, <freq>, <freq>, <freq>, <freq>, <freq> [:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:MODulation:Bandwidth ?</pre>
Example	<pre>CGSM:FLIS:ORFS:MOD:BAND 3.0e4,3.0e4,3.0e4,3.0e4 CGSM:FLIS:ORFS:MOD:BAND?</pre>
Notes	<p>This supports variable array length. Undefined parameters will be unchanged.</p> <p>This command is valid only when SENS:CGSM:ORFS:TYPE is set to 'MOD' or 'MSW'.</p> <p>You must be in the GSM/EDGE mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Preset	3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4
State Saved	Saved in instrument state.
Min	1 kHz
Max	500 kHz
Initial S/W Revision	Prior to A.02.00

Relative Limit Level

Defines relative limit level list in dB for the modulation spectrum part of the ORFS measurement. The first limit level is for the reference carrier and it is not used. Each relative limit level in this list corresponds to an offset frequency in the modulation offset frequency list.

Mode	GSM
Remote Command	<pre>[:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:MODulation:LIMit:REL ative <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_a mpl>, <rel_ampl>, <rel_ampl> [:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:MODulation:LIMit:REL ative?</pre>
Example	<pre>CGSM:FLIS:ORFS:MOD:LIM:REL 0.0,-35.0,-60.0,-60.0 CGSM:FLIS:ORFS:MOD:LIM:REL?</pre>
Notes	<p>This implementation is different from the regular ORFS measurement.</p> <p>This supports variable array length. Undefined parameters will be unchanged.</p> <p>You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Preset	0, 0.5, -30, -33, -60, -60, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0

Initial S/W Revision

Prior to A.02.00

Absolute Limit Level

Defines absolute limit level list in dBm for the modulation spectrum part of the ORFS measurement. The first limit level is for the reference carrier and it is not used. Each absolute limit level in this list corresponds to an offset frequency in the modulation offset frequency list.

Mode	GSM
Remote Command	[:SENSE]:CGSM:FLIST[1] 2 3 4 5 6 7 8:ORFSpectrum:MODulation:LIMit:ABSolute <ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl> ,<ampl>,<ampl>,<ampl>,<ampl>,<ampl> [:SENSE]:CGSM:FLIST[1] 2 3 4 5 6 7 8:ORFSpectrum:MODulation:LIMit:ABSolute?
Example	CGSM:FLIS:ORFS:MOD:LIM:ABS 0.0,-65.0,-65.0,-65.0 CGSM:FLIS:ORFS:MOD:LIM:ABS?
Notes	This implementation is different from the regular ORFS measurement. This supports variable array length. Undefined parameters will be unchanged. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	0, -36, -36, -36, -36, -51, -51, 0, 0, 0, 0, 0, 0, 0
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

Switching Configuration Commands

This group includes the following commands:

[“Offset Frequency” on page 131](#)

[“Res BW” on page 132](#)

[“Relative Limit Level” on page 133](#)

[“Absolute Limit Level” on page 133](#)

Offset Frequency

Defines a list of offset frequencies for ORFS Switching test. The list value must be positive, and is measured at both lower and upper frequencies from the reference (0Hz).

Mode

GSM

Combined GSM/EDGE Measurement Meas Setup

Remote Command	<pre>[:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:SWITching:FREQuency <freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq> ,<freq>,<freq>,<freq>,<freq>,<freq> [:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:SWITching:FREQuency? [:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum: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] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:SWITching:STATe?</pre>
Example	<pre>CGSM:FLIS:ORFS:SWIT:FREQ 0.0,4.0e5,6.0e5 CGSM:FLIS:ORFS:SWIT:FREQ? CGSM:FLIS:ORFS:SWIT:STAT 1,1,1 CGSM:FLIS:ORFS:SWIT:STAT?</pre>
Notes	<p>Freq0 (1st parameter) is always '0'. It's for the reference carrier.</p> <p>This supports variable array length. Undefined parameters will be unchanged.</p> <p>You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.</p>
Preset	<pre>0,4e5,6e5,0,0,0,0,0,0,0,0,0,0,0,0,0 1,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0</pre>
State Saved	Saved in instrument state.
Min	0.0 Hz
Max	800 kHz
Initial S/W Revision	Prior to A.02.00

Res BW

Defines the resolution bandwidths list for the switching spectrum part of the ORFS measurement. The first bandwidth specified is for the reference carrier. Each resolution bandwidth in this list corresponds to an offset frequency in the switching offset frequency list.

Mode	GSM
Remote Command	<pre>[:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:SWITching:BANDwidth <freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq>,<freq> ,<freq>,<freq>,<freq>,<freq>,<freq> [:SENSe] :CGSM:FLISt [1] 2 3 4 5 6 7 8:ORFSpectrum:SWITching:BANDwidth?</pre>
Example	<pre>CGSM:FLIS:ORFS:SWIT:BAND 3.0e5,3.0e4,3.0e4 CGSM:FLIS:ORFS:SWIT:BAND?</pre>
Notes	<p>This supports variable array length. Undefined parameters will be unchanged.</p> <p>This command is valid only when CGSM:ORFS:TYPE is set to 'SWIT' or 'MSW'.</p> <p>You must be in the GSM/EDGE mode to use this command. Use INSTRument:SElect to set the mode.</p>
Preset	<pre>3e5,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4,3e4</pre>
State Saved	Saved in instrument state.
Min	1 kHz
Max	500 kHz

Initial S/W Revision

Prior to A.02.00

Relative Limit Level

Defines relative limit level list in dB for the switching spectrum part of the ORFS measurement. The first limit level is for the reference carrier and it is not used. Each relative limit level in this list corresponds to an offset frequency in the switching offset frequency list.

Mode	GSM
Remote Command	<pre>[:SENSE] :CGSM:FLIS:ORFS:SWIT:Lim:REL <rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ l_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_ampl>,<rel_a mpl>,<rel_ampl>,<rel_ampl> [:SENSE] :CGSM:FLIS:ORFS:SWIT:Lim:REL?</pre>
Example	<pre>CGSM:FLIS:ORFS:SWIT:Lim:REL 0.0,-57.0,-67.0 CGSM:FLIS:ORFS:SWIT:Lim:REL?</pre>
Notes	<p>This implementation is different from the regular ORFS measurement. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Preset	-200,-200,-200,-200,-200,-200,-200,-200,-200,-200,-200,-200,-200,-200,-200
State Saved	Saved in instrument state.
Min	-200.0
Max	200.0
Initial S/W Revision	Prior to A.02.00

Absolute Limit Level

Defines the absolute limit level list in dBm for the switching spectrum part of the ORFS measurement. The first limit level is for the reference carrier and it is not used. Each absolute limit level in this list corresponds to an offset frequency in the switching offset frequency list.

Mode	GSM
Remote Command	<pre>[:SENSE] :CGSM:FLIS:ORFS:SWIT:Lim:ABS <ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl>,<ampl> ,<ampl>,<ampl>,<ampl>,<ampl>,<ampl> [:SENSE] :CGSM:FLIS:ORFS:SWIT:Lim:ABS?</pre>
Example	<pre>CGSM:FLIS:ORFS:SWIT:Lim:ABS 0.0,-36.0,-36.0 CGSM:FLIS:ORFS:SWIT:Lim:ABS?</pre>
Notes	<p>This implementation is different from the regular ORFS measurement. You must be in the GSM mode to use this command. Use INSTRUMENT:SElect to set the mode.</p>
Preset	0, -23, -26, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
State Saved	Saved in instrument state.
Min	-200.0

Combined GSM/EDGE Measurement Meas Setup

Max	200.0
Initial S/W Revision	Prior to A.02.00

Result Values

Parameters may be selected or unselected for measurements. These settings affect measurement results displayed in the Result view and are also synchronized with the remote SCPI query result for index n = 1. Note that Measurement Enable/Disable switches such as described in [“Measurement Enable/Disable” on page 97](#) and [“Measurement Enable/Disable” on page 99](#) act as base switches. When a measurement is disabled, no parameters in the measurement are in effect.

This section includes the following results tables:

[“GSM Result Selection” on page 134](#)

[“EDGE Result Selection” on page 136](#)

[“ORFS Result Selection” on page 137](#)

[“Power vs Time Result Selection” on page 138](#)

GSM Result Selection

Here is the mapping of the Array indices to Result parameters.

Index	Result Parameter
1	<p>Average RMS Phase Error</p> <p>A floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase over the entire burst. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If there is more than one burst selected for Demod Bitmap, then the rms values are averaged.</p>
2	<p>Maximum RMS Phase Error</p> <p>A floating point number (in degrees) of the rms phase error between the measured phase and the ideal phase over the entire burst. The calculation is based on symbol decision points and points halfway between symbol decision points (i.e. 2 points/symbol). If there is more than one burst selected for Demod Bitmap, then it takes the highest rms value.</p>
3	<p>Average of the Peak Phase Error</p> <p>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 there is more than one burst selected for Demod Bitmap, then the rms values are averaged.</p>
4	<p>Maximum of the Peak Phase Error</p> <p>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 there is more than one burst selected for Demod Bitmap, then it takes the highest.</p>
5	<p>Peak Phase Error Symbol Position</p> <p>A floating point number (in symbols) representing the symbol number at which the peak phase error occurred.</p> <p>If multiple bursts are configured, it just takes the last burst's result.</p>
6	<p>Maximum of the Peak Phase Error Symbol Position</p> <p>A floating point number (in symbols) representing the symbol number at which the peak phase error occurred.</p>

Index	Result Parameter
7	<p>Average Frequency Error</p> <p>A floating point number (in Hz) of the frequency error over the entire measurement area. This is the difference between the measured phase trajectory and the reference phase trajectory.</p>
8	<p>Maximum Frequency Error</p> <p>A floating point number (in Hz) of the peak frequency error through over the measurement area. Take the peak frequency error from each burst and identify the highest.</p>
9	<p>Average I/Q Origin Offset</p> <p>A floating point number (in dB) of the I and Q error (magnitude squared) offset from the origin over the entire measurement area.</p>
10	<p>Maximum I/Q Origin Offset</p> <p>A floating point number (in dB) of the maximum I and Q error (magnitude squared) offset over the measurement area.</p>
11	<p>Average T0 Offset</p> <p>A floating-point number of the time interval between the slot boundary 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. The 'RF Sync Delay' under 'Mode Setup' is not considered in this measurement.</p>
12	<p>Maximum T0 Offset</p> <p>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. Take the T0 offset from each burst and identify the highest. The 'RF Sync Delay' under 'Mode Setup' is not considered in this measurement.</p>
13	<p>Detected TSC</p> <p>A floating-point number of detected TSC of the last measured burst.</p> <p>The returned value is 0~7 (Burst Type: Normal), 8 (Burst Type: Access), 9 (Burst Type: Sync) if TSC detected. If TSC not detected, the returned value is -999.0.</p>
Mode	CGSM
Remote Command	<pre>[:SENSe] :CGSM:DEMod:PFERror:RESult ON OFF 0 1, ... [:SENSe] :CGSM:DEMod:PFERror:RESult?</pre>
Example	<pre>CGSM:DEM:PFER:RES 0,1,0 CGSM:DEM:PFER:RES?</pre>
Notes	<p>Refer to the above table to see the mapping of the index and result parameter. This setting applies to all frequencies' results.</p> <p>The array length might be expanded for future enhancement.</p>
Preset	1,0,0,1,0,1,1,1,1,1,0,0
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Combined GSM/EDGE Measurement Meas Setup

EDGE Result Selection

Here is the mapping of the Array indices to Result parameters.

Index	Result Parameter
1	RMS 95th %tile EVM A floating point number (in percent) of EVM over 95% of the entire burst. The result is averaged over the all demodulated bursts at the frequency.
2	Average RMS EVM A floating point number (in percent) of EVM over the burst. The result is averaged over the all demodulated bursts at the frequency.
3	Maximum RMS EVM a floating point number (in percent) of the highest EVM over the all demodulated bursts at the frequency
4	Average of the Peak EVM A floating point number (in percent) of the average of the peak EVMs. Take the peak EVMs from each burst and average them together.
5	Maximum of the Peak EVM A floating point number (in percent) of the maximum peak EVM. Take the peak EVMs from each burst and identify the highest peak.
6	Symbol position of the peak EVM An integer number of the symbol position where the peak EVM error is detected.
7	Average Magnitude Error A floating point number (in percent) of the average magnitude error over the all demodulated bursts at the frequency.
8	Maximum Magnitude Error A floating point number (in percent) of maximum magnitude error over the all demodulated bursts at the frequency.
9	Average of the Peak Magnitude Error A floating point number (in percent) of the average of peak magnitude error over the all demodulated bursts at the frequency.
10	Maximum of the Peak Magnitude Error A floating point number (in percent) of the highest peak magnitude error over the all demodulated bursts at the frequency.
11	Average Phase Error A floating point number (in degrees) of average phase error over the entire measurement area.
12	Maximum Phase Error A floating point number (in degrees) of the highest of the average phase error over the entire measurement area.
13	Average of the Peak Phase Error A floating point number (in percent) of the average of peak phase error over the all demodulated bursts at the frequency.
14	Maximum of the Peak Phase Error A floating point number (in degrees) of the highest peak phase error over the entire measurement area.

Combined GSM/EDGE Measurement Meas Setup

Index	Result Parameter
3	Lower Delta Pick the lower value up between the “Lower Relative Delta” and the “Lower Absolute Delta”. For offset0, this is not output, regardless this state.
4	Upper Relative Amplitude relative to Offset 0 at Upper Offset in dB For offset0, this is not output, regardless this state.
5	Upper Absolute Absolute amplitude at Upper Offset in dBm For offset0, this is not output, regardless this state because it is same as the index 1.
6	Upper Delta Pick the lower value up between the “Upper Relative Delta” and the “Upper Absolute Delta”. For offset0, this is not output, regardless this state.
Mode	CGSM
Remote Command	[:SENSe] :CGSM:ORFSpectrum:RESult ON OFF 0 1,... [:SENSe] :CGSM:ORFSpectrum:RESult?
Example	CGSM:ORFS:RES 1,1,1,1,1 CGSM:ORFS:RES?
Notes	Refer above table for the mappings of the indices to result parameters. This setting applies to all frequencies' results.
Preset	1,1,1,1,1
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Power vs Time Result Selection

Here is the mapping of the Array indices to Result parameters.

Index	Result Parameter
1	Pass/Fail Result shows the mask test result 0:Pass, 1:Fail, -1:Not tested
2	Burst Amplitude The mean power (in dBm) across the useful part of the selected burst
3	Maximum Amplitude The peak amplitude of the specified region around the burst in dBm
4	Minimum Amplitude The lowest amplitude of the specified region around the burst in dBm.

Index	Result Parameter
5	<p>1st Error Point of the Burst</p> <p>It shows the first error point where the RF envelope exceeds the PVT mask from the point where the acquisition starts at the frequency, in sample. If the measured waveform is in the mask, it will be -999.0.</p>
6	<p>1st Error Time of the Burst</p> <p>It shows the first error point where the RF envelope exceeds the PVT mask from the slot boundary, in time unit. If the measured waveform is in the mask, it will be -999.0.</p>
Mode	CGSM
Remote Command	<pre>[:SENSe] :CGSM:PVTtime:RESult ON OFF 0 1,...</pre> <pre>[:SENSe] :CGSM:PVTtime:RESult?</pre>
Example	<pre>CGSM:PVT:RES 1,0,0,0,0</pre> <pre>CGSM:PVT:RES?</pre>
Preset	1,1,1,0,1,1
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Meas Preset

Restores all measurement parameters to their default values.

For details, see “Meas Preset” under the “Meas Setup” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Mode	GSM
Remote Command	:CONFigure:CGSM
Example	:CONF:CGSM
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

Combined GSM/EDGE Measurement Mode

Mode

Operation of this key is identical across all measurements.

For details, see the “Mode” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Mode Setup

Operation of this key is identical across all measurements.

For details, see the “Mode Setup” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Combined GSM/EDGE Measurement
Peak Search

Peak Search

There is no Peak Search functionality implemented for this measurement, so, when pressed, this key displays a blank menu.

Key Path

Front-panel key

Recall

Operation of this key is identical across all measurements.

For details, see the “Recall” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Combined GSM/EDGE Measurement
Restart

Restart

Operation of this key is identical across all measurements.

For details, see the “Restart” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Save

Operation of this key is identical across all measurements.

For details, see the “Save” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Combined GSM/EDGE Measurement
Single (Single Measurement/Sweep)

Single (Single Measurement/Sweep)

Operation of this key is identical across all measurements.

For details, see the “Single” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Source

Operation of this key is identical across all measurements.

For details, see the “Source” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Combined GSM/EDGE Measurement
SPAN X Scale

SPAN X Scale

There is no Span X Scale functionality implemented for this measurement, so, when pressed, this key displays a blank menu.

Key Path

Front-panel key

Sweep/Control

There is no measurement-specific Sweep/Control functionality, so, when pressed, this key displays a blank menu.

For information about keys and commands associated with sweep control, such as **Single**, **Cont**, **Restart**, **Pause/Resume** and **ABORT**, see the respective sections of the GSM/EDGE Measurement Application User's & Programmer's Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Combined GSM/EDGE Measurement
Trace/Detector

Trace/Detector

There are no menu keys available in Trace/Detector menu: the menu is blank.

Key Path

Front-panel key

Trigger

Selects the trigger source and trigger setup functionality. For trigger setup information, see the “Trigger” section in the GSM/EDGE Measurement Application User's and Programmer's Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

View/Display

The View/Display menu provides access to available view selections and their controls. This menu also includes the **Display** key, which opens a submenu that allows you to modify display settings.

View Selections

The CGSM measurement provides six views:

- [“Measurement List \(View\)” on page 153](#)
- [“Parameter List \(View\)” on page 154](#)
- [“Result Metrics \(View\)” on page 155](#)
- [“Power vs Time \(View\)” on page 156](#)
- [“Marker Meas \(Zero Span\) \(View\)” on page 159](#)
- [“RF Envelope \(View\)” on page 160](#)

For details of the Remote Command for view selection, see [“View Selection Remote Command” on page 160](#).

Key Path	Front-panel key
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Display

For details of the functionality associated with this key (except for [“Change Title” on page 152](#) under the **Title** menu), see “Display” under the “View/Display” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

For details of measurement-specific remote commands, see [“Display” on page 112](#).

Key Path	View/Display
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Title

For details of the keys in this menu (except for [“Change Title” on page 152](#) below), see “Title” under the “View/Display > Display” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path	View/Display, Display
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Change Title

Accesses an Alpha Editor menu that enables you to write a title across the top of the display.

For more details, see “Change Title” under the “View/Display > Display > Title” section of the GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path	View/Display, Display, Title
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Mode	GSM
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Remote Command	:DISPlay:CGSM:ANNotation:TITLe:DATA <string> :DISPlay:CGSM:ANNotation:TITLe:DATA?
----------------	--

Example	DISP:CGSM:ANN:TITL:DATA “Agilent” DISP:CGSM:ANN:TITL:DATA?
---------	---

Preset	Combined GSM/EDGE
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Initial S/W Revision	Prior to A.02.00

Measurement List (View)

By default, this view shows the current status of enabled measurements and results.

If the parameter “Show All Items” on page 153 is enabled via its softkey, all available measurements and items are displayed. When the measurement is disabled, the measurement name and items that belong to the measurement are grayed out.

Measurement	Measurement Item
Phase and Frequency Errors 1	Average RMS Phase Error
	Maximum RMS Phase Error
	Average Peak Phase Error
	Maximum Peak Phase Error
	Maximum Peak Phase Error
	Maximum Peak Phase Error Symbol Position
	Average Frequency Error
	Maximum Frequency Error
	Average I/Q Origin Offset
	Maximum I/Q Origin Offset
	Average T0 Offset
	Maximum T0 Offset
Edge EVM 1	TSC
	RMS 95th %tile EVM
	Average RMS EVM
	Maximum RMS EVM
	Average of the Peak EVM
	Maximum of the Peak EVM
	Symbol Position of the Peak EVM
	Average Magnitude Error
	Maximum Magnitude Error
	Average of the Peak Magnitude Error
	Maximum of the Peak Magnitude Error
	Average Phase Error
Maximum Phase Error	
Average of the Peak Phase Error	
Maximum of the Peak Phase Error	
Average Frequency Error	
Maximum Frequency Error	

MSG STATUS Burst Not Found

Key Path **View/Display**

Show All Items

Allows you to specify display settings of the Measurement List view. By default (OFF), the current status of enabled measurements, items are displayed.

Key Path **View/Display, Measurement List**

Combined GSM/EDGE Measurement View/Display

Mode	GSM
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Parameter List (View)

This view shows name, remote command and value of available commands for this measurement. The user can verify and change values with using menu and front panel keys or by using a mouse and keyboard.

L 50 Ω AC SENSE:INT ALIGN AUTO
CH Freq: 935.200 000 MHz(ARFCN: 1) Radio Band: P-GSM
Trig: RF Burst Burst: TCH&CCH
Atten: 10 dB (Elec 0)

Input: RF
BTS #IFGain:Low

Name	SCPI	Value
Freq7, ORFS Swt Rel Limit	:SENSe:CGSM:FLIS7:ORFSpectrum:SWITching:LIMit:RELative	List:Amplitude[15]
Freq7, ORFS Swt State	:SENSe:CGSM:FLIS7:ORFSpectrum:SWITching:STATe	List:Boolean[15]
Freq8, ORFS Mod Bandwidth	:SENSe:CGSM:FLIS8:ORFSpectrum:MODulation:BANDwidth	List:Frequency[15]
Freq8, ORFS Mod Offset Freq	:SENSe:CGSM:FLIS8:ORFSpectrum:MODulation:FREQuency	List:Frequency[15]
Freq8, ORFS Mod Abs Limit	:SENSe:CGSM:FLIS8:ORFSpectrum:MODulation:LIMit:ABSolute	List:Amplitude[15]
Freq8, ORFS Mod Rel Limit	:SENSe:CGSM:FLIS8:ORFSpectrum:MODulation:LIMit:RELative	List:Amplitude[15]
Freq8, ORFS Mod State	:SENSe:CGSM:FLIS8:ORFSpectrum:MODulation:STATe	List:Boolean[15]
Freq8, ORFS Swt Bandwidth	:SENSe:CGSM:FLIS8:ORFSpectrum:SWITching:BANDwidth	List:Frequency[15]
Freq8, ORFS Swt Offset Freq	:SENSe:CGSM:FLIS8:ORFSpectrum:SWITching:FREQuency	List:Frequency[15]
Freq8, ORFS Swt Abs Limit	:SENSe:CGSM:FLIS8:ORFSpectrum:SWITching:LIMit:ABSolute	List:Amplitude[15]
Freq8, ORFS Swt Rel Limit	:SENSe:CGSM:FLIS8:ORFSpectrum:SWITching:LIMit:RELative	List:Amplitude[15]
Freq8, ORFS Swt State	:SENSe:CGSM:FLIS8:ORFSpectrum:SWITching:STATe	List:Boolean[15]
Gate Recovery	:SENSe:CGSM:GATE:RTIME	1.000000 ms
Gate Source	:SENSe:CGSM:GATE:SOURce	IMMediate
Harmonics Meas. State	:SENSe:CGSM:HARMOnics:ENABle	On
Harmonics Interval	:SENSe:CGSM:HARMOnics:INTerval	4.62 ms
Harmonics Frequency List	:SENSe:CGSM:HARMOnics:LIST:FREQuency	List:Frequency[10]
Number of Harmonics	:SENSe:CGSM:HARMOnics:NUMBer	3
IFGainAuto	:SENSe:CGSM:IF:GAIN:AUTO:STATe	Off
IFGain	:SENSe:CGSM:IF:GAIN:STATe	Off
Format List	:SENSe:CGSM:LIST:FORMat	List:Enum[8]
Frequency List	:SENSe:CGSM:LIST:FREQuency	List:Frequency[8]
State List	:SENSe:CGSM:LIST:STATe	List:Boolean[8]
ORFS Fast Average	:SENSe:CGSM:ORFSpectrum:AVERAge:FAST:STATe	On
ORFS Mod Average	:SENSe:CGSM:ORFSpectrum:AVERAge:MODulation:TYPE	LOG
ORFS Enable	:SENSe:CGSM:ORFSpectrum:ENABle	On
ORFS Filter Type	:SENSe:CGSM:ORFSpectrum:FILTer	FPST
ORFS Result Selection	:SENSe:CGSM:ORFSpectrum:RESUlt	List:Boolean[6]
ORFS Test Bitmap	:SENSe:CGSM:ORFSpectrum:TEST	255
ORFS Meas Type	:SENSe:CGSM:ORFSpectrum:TYPE	MODulation
PVT Backup Burst Test Enable	:SENSe:CGSM:PVTime:BACKUp 1:ENABle	Off

MSG
STATUS ✖ Burst Not Found

View/Display

Display ▶

Measurement List ▶
[Show All: On]

Parameter List

Result Metrics

More
1 of 2

Key Path

View/Display

Index

Allows you to specify an array index for editing the value of specified index. This key only appears when a list type of "SCPI" is selected on Parameter List view. The maximum value of this index corresponds to the length of the selected SCPI.

Key Path	View/Display, Parameter List
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Value

Allows you to edit the value of the selected SCPI function in the Parameter List view.

Key Path	View/Display, Parameter List
Mode	GSM
Initial S/W Revision	Prior to A.02.00

Result Metrics (View)

This view shows measurement results in the same order in which remote command measurement results by index (n = 1) returns are provided.

Combined GSM/EDGE Measurement
View/Display

Measurement	Measurement Item	Result
Phase and Frequency Errors 1	Average RMS Phase Error	---
	Maximum Peak Phase Error	---
	Maximum Peak Phase Error Symbol Position	---
	Average Frequency Error	---
	Maximum Frequency Error	---
	Average I/Q Origin Offset	---
	Maximum I/Q Origin Offset	---
	Average T0 Offset	---
Output RF Spectrum 1	Mod, Ref, RBW:30.000 kHz, Abs	---
	Mod, Offs3:-200.00 kHz, RBW:30.000 kHz, Low Rel	---
	Mod, Offs3:-200.00 kHz, RBW:30.000 kHz, Low Abs	---
	Mod, Offs3:-200.00 kHz, RBW:30.000 kHz, Low Delta	---
	Mod, Offs3:+200.00 kHz, RBW:30.000 kHz, Upp Rel	---
	Mod, Offs3:+200.00 kHz, RBW:30.000 kHz, Upp Abs	---
	Mod, Offs3:+200.00 kHz, RBW:30.000 kHz, Upp Delta	---
	Mod, Offs4:-250.00 kHz, RBW:30.000 kHz, Low Rel	---
	Mod, Offs4:-250.00 kHz, RBW:30.000 kHz, Low Abs	---
	Mod, Offs4:-250.00 kHz, RBW:30.000 kHz, Low Delta	---
	Mod, Offs4:+250.00 kHz, RBW:30.000 kHz, Upp Rel	---
	Mod, Offs4:+250.00 kHz, RBW:30.000 kHz, Upp Abs	---
	Mod, Offs4:+250.00 kHz, RBW:30.000 kHz, Upp Delta	---
	Mod, Offs5:-400.00 kHz, RBW:30.000 kHz, Low Rel	---
	Mod, Offs5:-400.00 kHz, RBW:30.000 kHz, Low Abs	---
	Mod, Offs5:-400.00 kHz, RBW:30.000 kHz, Low Delta	---
Mod, Offs5:+400.00 kHz, RBW:30.000 kHz, Upp Rel	---	

View/Display

Display >

Measurement List > [Show All: On]

Parameter List

Result Metrics

More 1 of 2

MSG STATUS ✖ Burst Not Found

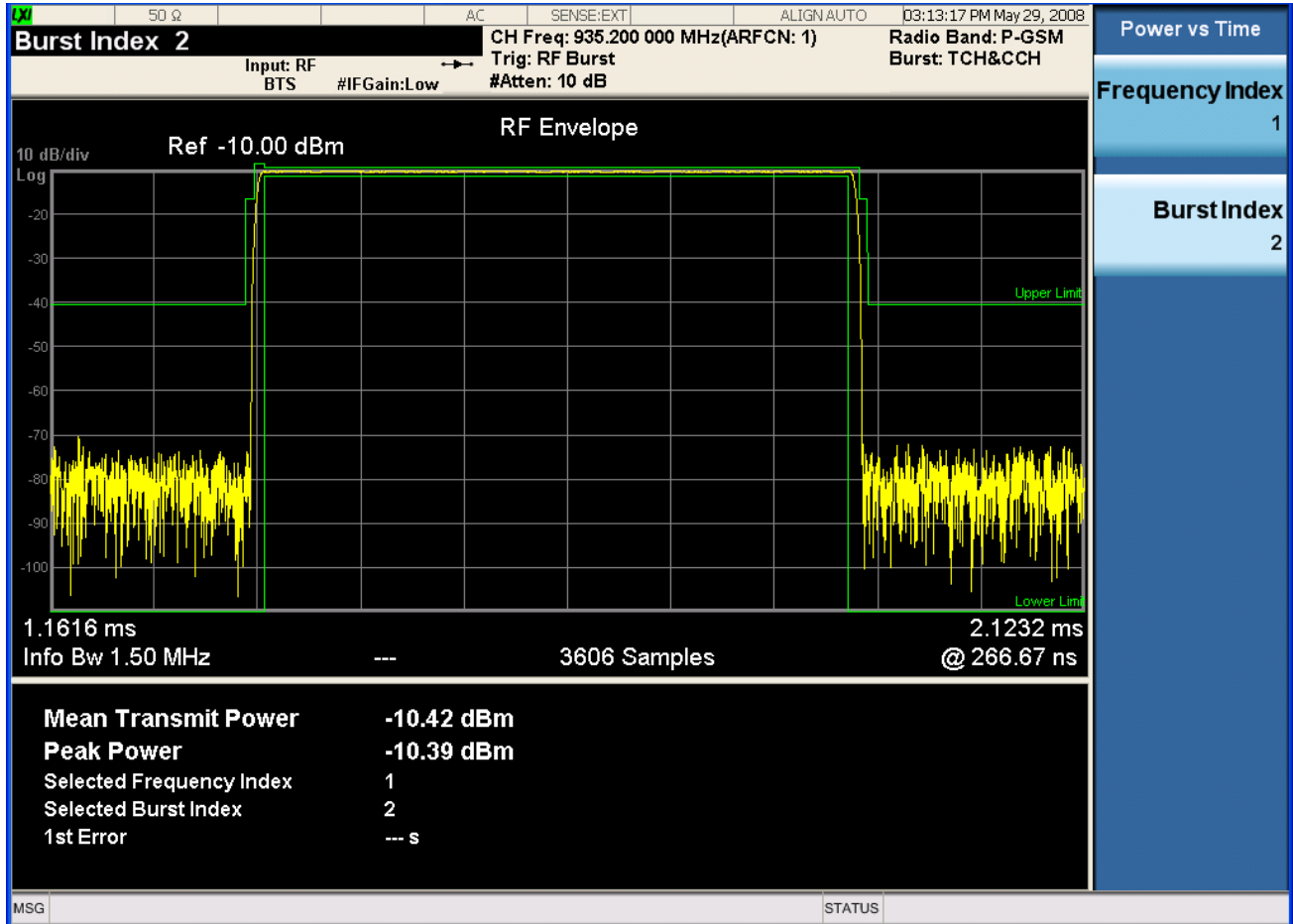
Key Path

View/Display

Power vs Time (View)

Power vs Time (PVT) View shows a time-domain magnitude plot with its PVT masks of the selected burst for the selected frequency. The burst and frequency are specified by "Burst Index" on page 158 and "Frequency Index" on page 160 respectively. When the indexed burst is not PVT tested, no plot is shown.

This view has 2 windows. For details of the items displayed in the Metrics Window, see "Metrics Window" on page 158..



Combined GSM/EDGE Measurement

View/Display

Metrics Window

Name	Corresponding Results	Display Format
Mean Transmit Power	n = 1, the location is variable. See the Remote SCPI Results table in “Combined GSM/EDGE Measurement” on page 69.	xx.xx dBm
Peak Power	n = 1, the location is variable. See the Remote SCPI Results table in “Combined GSM/EDGE Measurement” on page 69.	xx.xx dBm
Selected Frequency Index	Describes the index of the frequency list.	x
Selected Burst Index	Describes which burst to be shown in the frequency list.	x
1 st Error	Describes the first point where the mask test failed. The location is aligned by the slot boundary defined by “Start Offset” on page 116 and “Burst Interval” on page 117.	xx s

Key Path **View/Display**

Frequency Index

Frequency Index specifies which frequency index result is plotted on the display. If the state of the index is off, it shows nothing.

Key Path	View/Display, RF Envelope or Power vs Time
Mode	CGSM
Remote Command	:DISPlay:CGSM:VIEW:FREQuency <integer> :DISPlay:CGSM:VIEW:FREQuency?
Example	DISP:CGSM:VIEW:FREQ 2 DISP:CGSM:VIEW:FREQ?
Notes	If the selected frequency index isn't active, no meaningful result will be shown.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	8
Initial S/W Revision	Prior to A.02.00

Burst Index

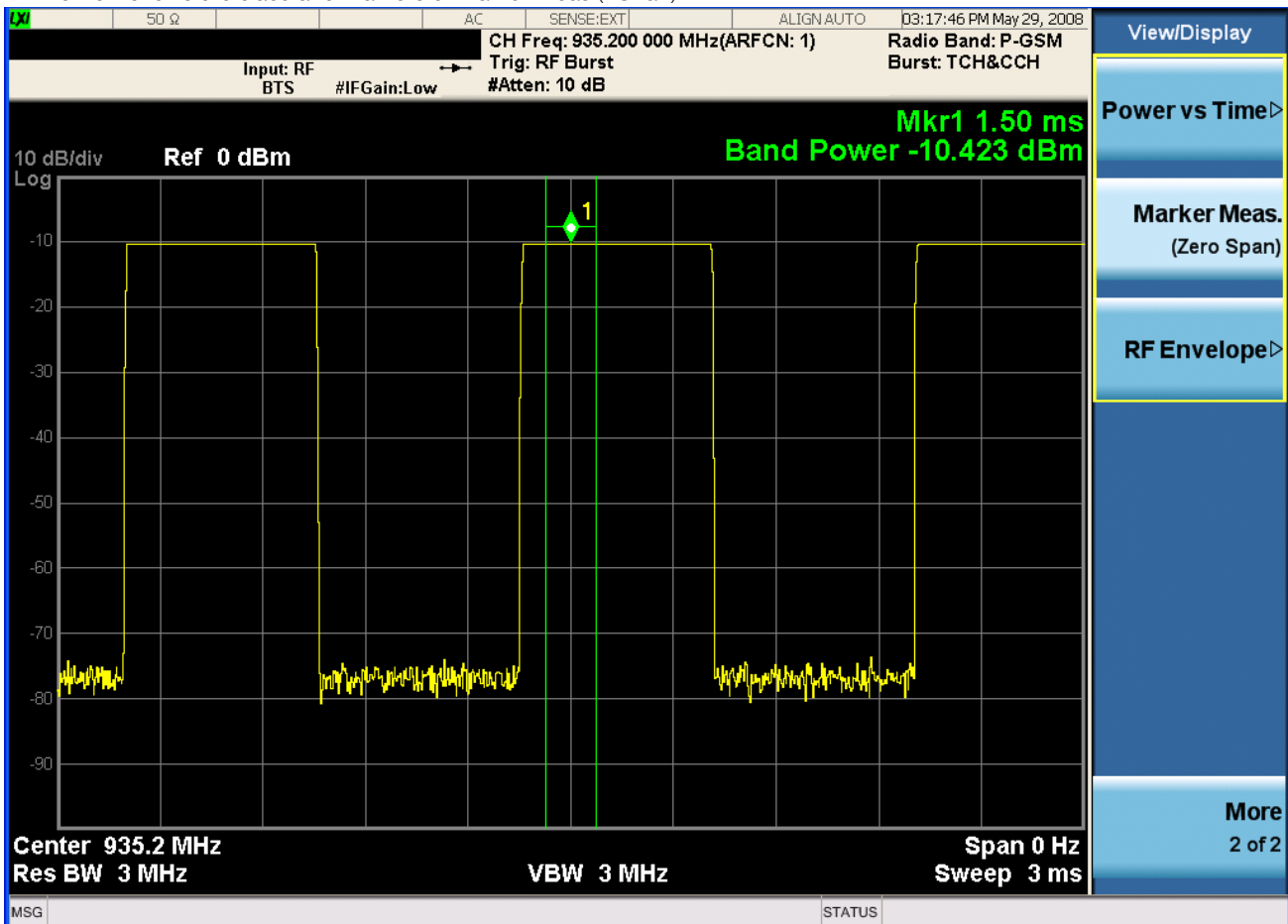
Burst Index specifies which bursts index's result is plotted on the display. If the state of the burst of the frequency is off, it shows nothing.

Key Path	View/Display, Power vs Time
Mode	CGSM
Remote Command	:DISPlay:CGSM:VIEW:BURSt <integer> :DISPlay:CGSM:VIEW:BURSt?

Example	DISP:CGSM:VIEW:BURS 2 DISP:CGSM:VIEW:BURS?
Notes	If the selected burst index isn't active, no meaningful result will be shown.
Preset	1
State Saved	Saved in instrument state.
Min	1
Max	16
Initial S/W Revision	Prior to A.02.00

Marker Meas (Zero Span) (View)

This view shows the trace and markers of Marker Meas (ZSpan).



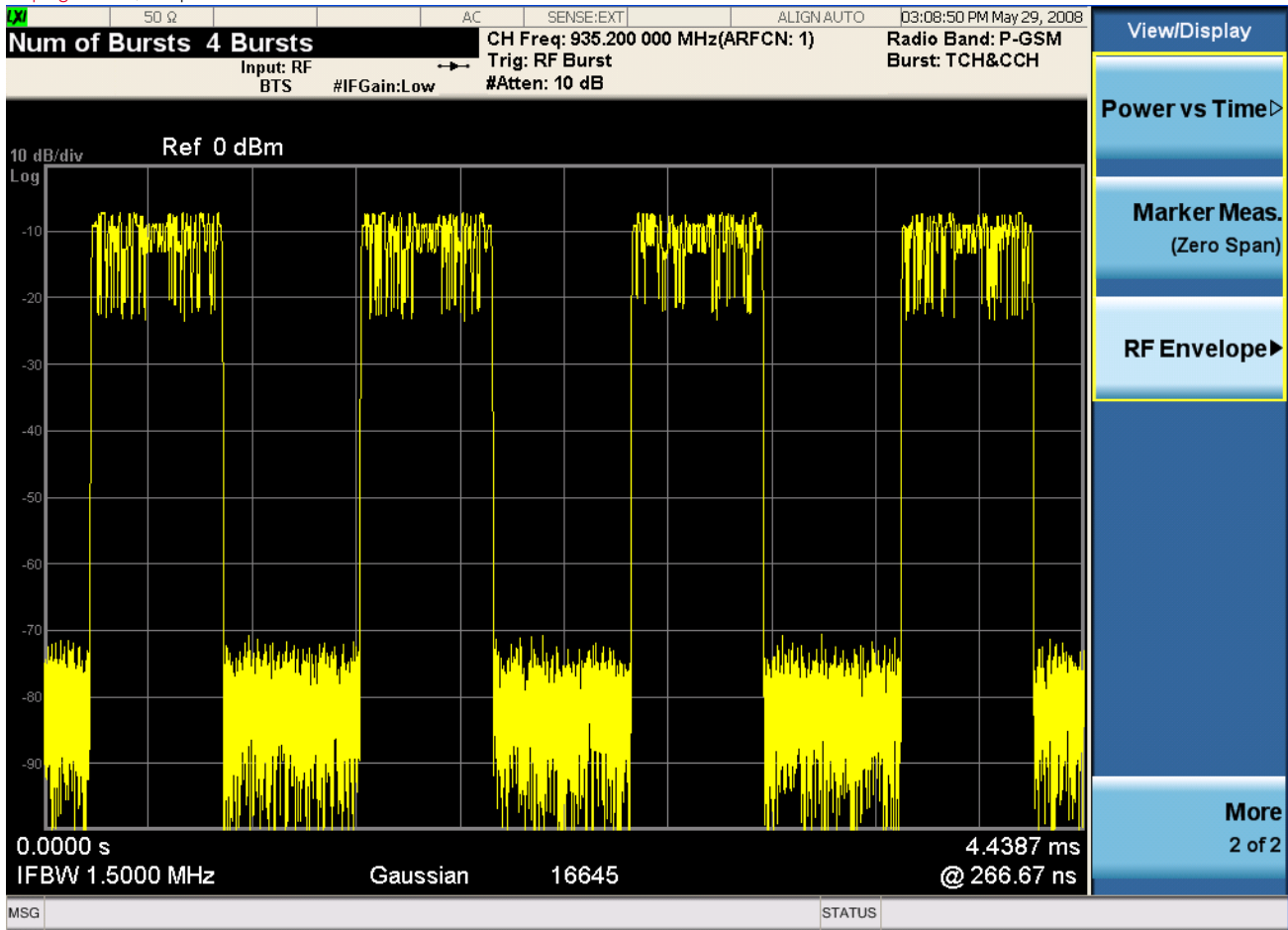
Key Path

View/Display

Combined GSM/EDGE Measurement View/Display

RF Envelope (View)

For diagnostic purposes, RF Envelope View shows a time-domain magnitude plot of each frequency. By changing Frequency Index, you can see the plot of the selected frequency. When the frequency list is off (see "Frequency List" on page 114), no plot of the list is shown.



Key Path

View/Display

Frequency Index

This key is available when either of [Power vs Time \(View\)](#) or [RF Envelope \(View\)](#) is selected. See "Frequency Index" on page 158.

View Selection Remote Command

Allows you to select the desired measurement view from the following selections:

- MLISt - [Measurement List \(View\)](#)
- PARAmeter - [Parameter List \(View\)](#)
- RESult - [Result Metrics \(View\)](#)
- PVTIme - [Power vs Time \(View\)](#)
- ZSPan - [Marker Meas \(Zero Span\) \(View\)](#)

• RFENvelope - RF Envelope (View)

Mode	GSM
Remote Command	:DISPlay:CGSM:VIEW[:SElect] MLISt PARAmeter RESult PVTime ZSPan RFENvelope :DISPlay:CGSM:VIEW[:SElect]?
Example	DISP:CGSM:VIEW RES DISP:CGSM:VIEW?
Preset	RESult
State Saved	Saved in instrument state.
Range	Measurement List Parameter, List Result Metrics Power vs Time Marker Meas RF Envelope
Initial S/W Revision	Prior to A.02.00

Combined GSM/EDGE Measurement
View/Display

6 List Power Step Measurement

This topic contains the following sections:

[“Measurement Commands for List Power Step” on page 163](#)

[“Remote Command Results for List Power Step” on page 164](#)

List Power Step measurement results may be queried remotely by SCPI (see below) or via results displays.

For more information, see [“Result Metrics View” on page 204](#) for the List Power Step measurement and [“RF Envelope View” on page 205](#) for the RF Envelope measurement.

Measurement Commands for List Power Step

The following commands and queries can be used to retrieve the measurement results:

`:CONFigure:LPSTep`

`:CONFigure:LPSTep:NDEFault`

`:INITiate:LPSTep`

`:FETCh:LPSTep [n] ?`

`:MEASure:LPSTep [n] ?`

`:READ:LPSTep [n] ?`

Remote Command Results for List Power Step

For the queries listed above, the results returned depend on the value of n, as follows.

n	Results Returned
not specified, or n = 1	Returns the following scalar results: <ol style="list-style-type: none"> 1. Sample Interval is a floating point number representing the time between samples when using the trace queries (n=2). 2. Mean Power is the mean power (in dBm). This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. 3. Mean Power Averaged is the power (in dBm) for N averages, if averaging is on. This is the power across the entire trace. If averaging is on, the power is for the latest acquisition. If averaging is off, the value of the mean power averaged is the same as the value of the mean power. 4. Sweep Points is the number of data points in the swept signal. This number is useful when performing a query on the signal (i.e. when n=2). 5. Peak-to-Mean ratio has units of dB. This is the ratio of the maximum signal level to the mean power. Valid values are only obtained with averaging turned off. If averaging is on, the peaktomean ratio is calculated using the highest peak value, rather than the displayed average peak value. 6. Maximum value is the maximum of the most recently acquired data (in dBm). 7. Minimum value is the minimum of the most recently acquired data (in dBm).
n = 2	Returns trace point values of the entire captured signal envelope 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 sweep points. The period between the samples is defined by the sample interval.
Key Path	Meas
Initial S/W Revision	Prior to A.02.00

Calculate Results (Remote Query Only)

Return power results of the selected sweep. The calculated period is specified with Calculation Time Setup.

Mode	WCDMA, GSM
Remote Command	:CALCulate:LPSTep:LIST [1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50? [RMS] MAXimum MINimum
Example	CALC:LPST:LIST2? MAX
Notes	<p>Query only command</p> <p>For obtaining results efficiently, it is recommended to query this result when analyzer is not sweeping during query. It is generally advisable to be in Single Sweep.</p> <p>Example Sequence:</p> <pre>INIT:CONT 0 Set Parameter INIT *OPC? CALC:LPST:LIST?</pre>
Initial S/W Revision	Prior to A.02.00

List Power Step Measurement Amplitude (AMPTD) Y Scale

Amplitude (AMPTD) Y Scale

Accesses the AMPTD Y Scale menu that allows you to set desired vertical scale settings.

For details, see the “AMPTD Y Scale” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **Front-panel key**

Ref Value

Sets the absolute power reference.

Key Path	AMPTD Y Scale
Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel <amp1> :DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:Y[:SCALe]:RLEVel?
Example	DISP:LPST:VIEW:WIND:TRAC:Y:SCAL:RLEV 5dbm DISP:LPST:VIEW:WIND:TRAC:Y:SCAL:RLEV?
Couplings	When Y Auto Scaling is set to On, this value is automatically determined by the measurement result. When you set this value manually, Y Auto Scaling is automatically set 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

Attenuation

This menu controls both the electrical and mechanical attenuators and their interactions. The value read back on the key in square brackets is the current Total (Elec + Mech) attenuation. When in Pre-Adjust for Min Clip mode, this value can change at the start of every measurement.

For details, see “Attenuation” under the “AMPTD Y Scale” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **AMPTD Y Scale**

Scale/Div

Allows you to enter a numeric value to change vertical display sensitivity.

Key Path	AMPTD Y Scale
Mode	WCDMA, GSM

List Power Step Measurement Amplitude (AMPTD) Y Scale

Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:RPOSition TOP CENTer BOTTom :DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:RPOSition?
Example	DISP:LPST:VIEW:WIND:TRAC:Y:SCAL:RPOS CENT DISP:LPST:VIEW:WIND:TRAC:Y:SCAL:RPOS?
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	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:COUPle 0 1 OFF ON :DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:Y[:SCALE]:COUPle?
Example	DISP:LPST:VIEW:WIND:TRAC:Y:COUP 0 DISP:LPST:VIEW:WIND:TRAC:Y:COUP?
Couplings	When Auto Scaling is On, and you press the Restart front-panel key, this function automatically determines the scale per division and reference values based on the measurement results. When you manually set a value for the Y Rel Value or Y Scale/Div, this parameter is automatically set to Off.
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Auto Couple

For details, see the “Auto Couple” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

List Power Step Measurement BW

BW

Allows you to control the Information Bandwidth and Video Bandwidth functions of the instrument.

Key Path

Front-panel key

Info BW (Remote Command Only)

Enables you to manually set the information bandwidth of the analyzer.

Mode	WCDMA, GSM
Remote Command	<code>[:SENSe] :LPSTep:BAWdwidth[:RESolution] <freq></code> <code>[:SENSe] :LPSTep:BAWdwidth[:RESolution] ?</code>
Example	LPST:BAWd 10 LPST:BAWd?
Notes	You must be in the GSM or WCDMA mode to use this command. Use INSTRUMENT:SElect to set the mode.
Preset	1MHz
State Saved	Saved in instrument state.
Min	10 Hz
Max	8 MHz
Initial S/W Revision	Prior to A.02.00

Filter Type (Remote Command Only)

Selects the type of bandwidth filter that is used. The choices are Gaussian or Flat top.

Mode	WCDMA, GSM
Remote Command	<code>[:SENSe] :LPSTep:BAWdwidth:SHAPE GAUSSian FLATtop</code> <code>[:SENSe] :LPSTep:BAWdwidth:SHAPE?</code>
Example	LPST:BAWd:SHAPE FLAT LPST:BAWd:SHAPE?
Preset	GAUS
State Saved	Saved in instrument state.
Range	Gaussian Flattop
Initial S/W Revision	Prior to A.02.00

Video BW (Remote Command Only)

Allows you to change the analyzer post-detection filter (VBW).

Mode

WCDMA, GSM

Remote Command	[:SENSe] :LPSTep :BANDwidth :VIDeo <freq> [:SENSe] :LPSTep :BANDwidth :VIDeo?
Example	LPST:BAND:VID 1MHz LPST:BAND:VID?
Preset	1MHz
State Saved	Saved in instrument state.
Min	1Hz
Max	50MHz
Initial S/W Revision	Prior to A.02.00

List Power Step Measurement
Cont (Continuous Measurement/Sweep)

Cont (Continuous Measurement/Sweep)

Operation of this key is identical across all measurements.

For details, see the “Cont” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

FREQ Channel

For details, see the “FREQ Channel” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

List Power Step Measurement
Input/Output

Input/Output

For details, see the “Input/Output” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Marker

There are no Markers implemented for this measurement, so, when pressed, this front-panel key displays a blank menu.

Key Path

Front-panel key

List Power Step Measurement
Marker Function

Marker Function

There are no Marker Functions implemented for this measurement, so, when pressed, this front-panel key displays a blank menu.

Key Path

Front-panel key

Marker To

There is no Marker To functionality implemented for this measurement, so, when pressed, this front-panel key displays a blank menu.

Key Path

Front-panel key

List Power Step Measurement
Meas

Meas

Operation of this key is identical across all measurements.

For details, see the “Meas” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Meas Setup

There are no keys for Meas Setup functions, so, when pressed, this key displays a blank menu.

All front-panel measurement setup is performed using the menus displayed alongside the [“Measurement List View”](#) on page 202 and [“Parameter List View”](#) on page 203.

Key Path **Front-panel key**

Avg/Hold Num (Remote Command Only)

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.

Mode	WCDMA, GSM
Remote Command	[:SENSe] :LPSTep:AVERage:COUNT <integer> [:SENSe] :LPSTep:AVERage:COUNT? [:SENSe] :LPSTep:AVERage [:STATe] OFF ON 0 1 [:SENSe] :LPSTep:AVERage [:STATe] ?
Example	LPST:AVER:COUN 3 LPST:AVER:COUN? LPST:AVER ON LPST:AVER?
Notes	You must be in the WCDMA or 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	20001
Initial S/W Revision	Prior to A.02.00

Average Mode (Remote Command Only)

Select the type of termination control used to averaging. This determines the averaging action after the specified number of data acquisitions (average count) is reached.

Mode	WCDMA, GSM
Remote Command	[:SENSe] :LPSTep:AVERage:TCONtrol EXPonential REPEAT [:SENSe] :LPSTep:AVERage:TCONtrol?
Example	LPST:AVER:TCON REP LPST:AVER:TCON?

List Power Step Measurement Meas Setup

Notes	<ul style="list-style-type: none"> • EXPponential - When Measure is set at Cont, data acquisitions will 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 - When Measure is set at Cont, data acquisitions will 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.
Preset	EXPponential
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Average Type (Remote Command Only)

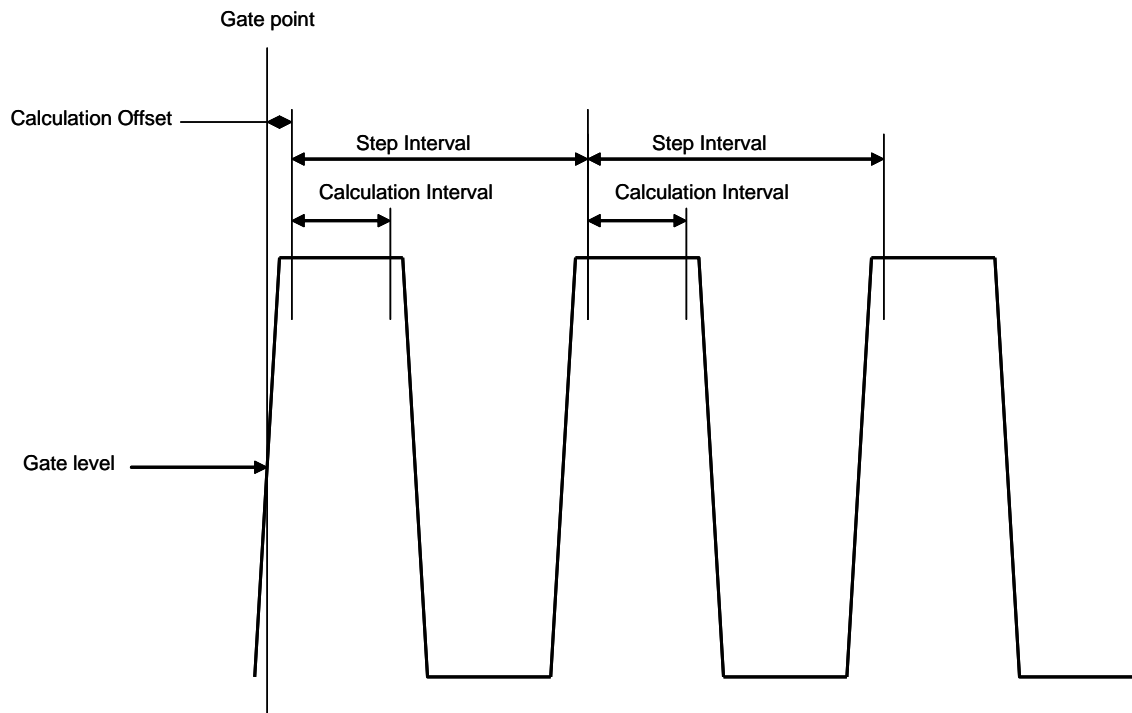
Specifies the type of trace and result averaging to use.

This parameter is valid only for Measure Trace.

Mode	WCDMA, GSM
Remote Command	[:SENSe] :LPSTep :AVERage :TYPE LOG RMS [:SENSe] :LPSTep :AVERage :TYPE?
Example	LPST:AVER:TYPE LOG LPST:AVER:TYPE?
Notes	<ul style="list-style-type: none"> • LOG - simulates the traditional spectrum analyzer type of averaging by averaging the log of the power. • RMS - true power averaging that is equivalent to taking the RMS value of the voltage. It is the most accurate type of averaging.
Preset	RMS
State Saved	Saved in instrument state.
Initial S/W Revision	Prior to A.02.00

Calculation Time Setup

Allows you to specify the period to be calculated for the swept trace.



Key Path

Meas Setup

Step Interval (Remote Command Only)

Step Interval is a real number in seconds. It defines the beginning of the next field of trace elements to be calculated. This is relative to the beginning of the previous field.

Mode	WCDMA, GSM
Remote Command	[:SENSe] :LPSTep:SWEp:STEP:TIME <time> [:SENSe] :LPSTep:SWEp:STEP:TIME
Example	LPST:SWE:STEP:TIME 0.001 LPST:SWE:STEP:TIME?
Preset	500 us
State Saved	Saved in instrument state.
Min	1 ns
Max	1s
Initial S/W Revision	Prior to A.02.00

Calculation Offset (Remote Command Only)

Calculation Offset is a real number in seconds. It specifies the amount of data points at the beginning of the gated sweep that will be ignored before the calculation process starts.

Mode

WCDMA, GSM

IF Gain State (Remote Command Only)

Selects the range of IF gain.

Mode	WCDMA, GSM
Remote Command	[:SENSE] :LPSTep : IF : GAIN [:STATe] AUTOrange LOW HIGH [:SENSE] :LPSTep : IF : GAIN [:STATe] ?
Example	LPST:IF:GAIN HIGH LPST:IF:GAIN?
Notes	<ul style="list-style-type: none"> • AUTO – slower follows signals • LOW – best for large signals • HIGH – best noise level
Preset	AUTOrange
State Saved	Saved in instrument state.
Range	Autorange Low High
Initial S/W Revision	Prior to A.02.00

Meas Preset (Remote Command Only)

Restores all the measurement parameters to their default values.

For details, see “Meas Preset” under the “Meas Setup” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Mode	WCDMA, GSM
Remote Command	:CONFigure : LPSTep
Example	CONF:LPST
Notes	You must be in the WCDMA or GSM mode to use this command. Use INSTRument:SElect to set the mode.
Initial S/W Revision	Prior to A.02.00

List Power Step Measurement Mode

Mode

Operation of this key is identical across all measurements.

For details, see the “Mode” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Mode Setup

Operation of this key is identical across all measurements.

For details, see the “Mode Setup” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

List Power Step Measurement
Peak Search

Peak Search

There is no Peak Search functionality implemented for this measurement, so, when pressed, this front-panel key displays a blank menu.

Key Path

Front-panel key

Recall

Operation of this key is identical across all measurements.

For details, see the “Recall” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

List Power Step Measurement
Restart

Restart

Operation of this key is identical across all measurements.

For details, see the “Restart” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Save

Operation of this key is identical across all measurements.

For details, see the “Save” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

List Power Step Measurement
Single (Single Measurement/Sweep)

Single (Single Measurement/Sweep)

Operation of this key is identical across all measurements.

For details, see the “Single” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

Source

There is no Source functionality for this application, so, when pressed, this front-panel key displays a blank menu.

Key Path

Front-panel key

SPAN X Scale

Accesses the SPAN/X Scale menu, which allows you to set the desired horizontal scale settings.

When any view other than “RF Envelope View” on page 205 is selected, this menu is blank.

Key Path **Front-panel key**

Ref Value

Allows you to set the display X reference value.

Key Path	SPAN X Scale
Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:RLEVel <time> :DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:RLEVel?
Example	DISP:LPST:VIEW:WIND:TRAC:X:RLEV 1 DISP:LPST:VIEW:WIND:TRAC:X:RLEV?
Notes	If X Auto Scaling is On, this value is automatically determined by the measurement result. When a value is set manually, X Auto Scaling is automatically set to Off.
Couplings	See Notes
Preset	Automatically calculated
State Saved	Saved in instrument state.
Min	-1s
Max	10s
Initial S/W Revision	Prior to A.02.00

Scale/Div

Allows you to set the display X scale/division value.

Key Path	SPAN X Scale
Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:PDIVision <time> :DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:PDIVision?
Example	DISP:LPST:VIEW:WIND:TRAC:X:PDIV 1ms DISP:LPST:VIEW:WIND:TRAC:X:PDIV?
Notes	If X Auto Scaling is set to On, this value is automatically determined by the measurement result. When a value is set manually, X Auto Scaling is automatically set to Off.
Couplings	See Notes
Preset	Automatically calculated
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 X reference position to the left, center, or right of the display.

Key Path	SPAN X Scale
Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:RPOStion LEFT CENTer RIGHT :DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:RPOStion?
Example	DISP:LPST:VIEW:WIND:TRAC:X:RPOS LEFT DISP:LPST:VIEW:WIND:TRAC:X:RPOS?
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 X Auto Scaling function between On and Off.

Key Path	SPAN X Scale
Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:COUPle 0 1 OFF ON :DISPlay:LPSTep:VIEW[1]:WINDow[1]:TRACe:X[:SCALE]:COUPle?
Example	DISP:LPST:VIEW:WIND:TRAC:X:COUP OFF DISP:LPST:VIEW:WIND:TRAC:X:COUP?
Notes	Upon pressing the Restart front-panel key, or Restart softkey under the Meas Control menu, 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 manually set a value to either X Rel Value or X Scale/Div, X Auto Scaling is automatically set to Off.
Couplings	See Notes
Preset	ON
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Sweep/Control

For details, see the “Sweep/Control” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path **Front-panel key**

Points (Remote Command Only)

Sets the number of points per sweep, from 1 to 20001. The sweep time and calculation time resolution setting will depend on the number of points selected.

Mode	WCDMA, GSM
Remote Command	<code>[:SENSe] :LPSTep :SWEep :POINts <integer></code> <code>[:SENSe] :LPSTep :SWEep :POINts?</code>
Example	LPST:SWE:POIN 1005 LPST:SWE:POIN?
Preset	1001
State Saved	Saved in instrument state.
Min	100
Max	20001
Initial S/W Revision	Prior to A.02.00

List Power Step Measurement
Trigger

Trigger

Selects the trigger source and trigger setup functionality.

For details, see the “Trigger” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path

Front-panel key

View/Display

The View/Display menu provides access to available view selections and their controls. This menu also includes the **Display** key, which opens a submenu that allows you to modify display settings.

View Selections

There are 4 available view types:

[“Measurement List View” on page 202](#)

[“Parameter List View” on page 203](#)

[“Result Metrics View” on page 204](#)

[“RF Envelope View” on page 205](#)

For details of Remote Commands for view selection, see [“View Selection Remote Commands” on page 206](#).

Key Path	Front-panel key
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Display

Key Path	View/Display
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Title

For details of the keys in this menu (except [“Change Title” on page 201](#) below), see "Title" under the “View/Display > Display” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path	View/Display, Display
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Change Title

Accesses an Alpha Editor menu that enables you to write a title across the top of the display.

For more details, see "Change Title" under the “View/Display > Display > Title” section of the W-CDMA or GSM/EDGE Measurement Application User’s & Programmer’s Reference, or the corresponding section of the online Help.

Key Path	View/Display, Display, Title
Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:ANNotation:TITLe:DATA <string> :DISPlay:LPSTep:ANNotation:TITLe:DATA?
Example	DISP:LPST:ANN:TITL:DATA “List Power Step” DISP:LPST:ANN:TITL:DATA?
Preset	List Power Step
State Saved	Saved in instrument state.
Range	Uppercase, Lowercase, Numeric, Symbol
Initial S/W Revision	Prior to A.02.00

List Power Step Measurement
View/Display

Measurement List View

This view shows the results of currently enabled measurements.

If “Show All Items” parameter is enabled from the soft key, all available measurements and results are displayed. When a measurement is disabled, the measurement name and results for the disabled measurement are grayed out.

Measurement	Measurement Item
Trace Power	Sample Interval
	Mean Power
	Mean Power Averaged
	Sweep Points
	Peak to Mean
	Maximum Power
	Minimum Power
Sweep List 1	Step Power 1
	Step Power 2
	Step Power 3
	Step Power 4
	Step Power 5
	Step Power 6
	Step Power 7
	Step Power 8
	Step Power 9
	Step Power 10
	Step Power 11
	Step Power 12
	Step Power 13
	Step Power 14
	Step Power 15
	Step Power 16
	Step Power 17
	Step Power 18
	Step Power 19
	Step Power 20
	Step Power 21
	Step Power 22

View/Display

Display ▶

Measurement List ▶

Parameter List

Result Metrics ▶

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Key Path **View/Display**

Show All Items

Allows you to specify display settings of the Measurement List view. In default (OFF), the current status of enabled measurements, items, limit settings and pass fail states are displayed.

Key Path	View/Display, Measurement List
Mode	GSM
Preset	OFF
State Saved	Saved in instrument state.
Range	On Off
Initial S/W Revision	Prior to A.02.00

Parameter List View

This view shows the name, remote commands and values of all available commands for the current measurement. You can verify and change values in the table by using front-panel keys, or a mouse and keyboard.

Name	SCPI	Value
LPS_ViewTypeNum	:DISPlay:LPSTep:VIEW:NSElect	4
LPS_ViewType	:DISPlay:LPSTep:VIEW:SElect	Parameter
Auto Scaling	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:X:SCALe:COUPlE	On
X Scale/Div	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:X:SCALe:PDIVision	1.000 ms
X Ref	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:X:SCALe:RLEVeI	0.000 s
LPS_XRefPosition_RfEnv	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:X:SCALe:RPOsition	Left
Auto Scaling	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:Y:SCALe:COUPlE	Off
Scale/Div	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:Y:SCALe:PDIVision	10.00 dB
Ref Value	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:Y:SCALe:RLEVeI	10.00 dBm
LPS_YRefPosition_RfEnv	:DISPlay:LPSTep:VIEW1:WINDow:TRACe:Y:SCALe:RPOsition	Top
ARFCN	:SENSe:CHANnel:ARFCn	1
Burst Type	:SENSe:CHANnel:BURSt	NORMAL
Time Slot	:SENSe:CHANnel:SLOT	0
Time Slot State	:SENSe:CHANnel:SLOT:AUTO	Off
TSC	:SENSe:CHANnel:TSCode	0
TSC Auto Detection	:SENSe:CHANnel:TSCode:AUTO	On
CH Freq	:SENSe:FREQuency:CENTer	935.200000 MHz
LPS_AdcDitherAuto	:SENSe:LPSTep:ADC:DITHer:AUTO:STATe	Off
LPS_AdcDither	:SENSe:LPSTep:ADC:DITHer:STATe	Off
Avg/Hold Number	:SENSe:LPSTep:AVERAge:COUNt	10
Average State	:SENSe:LPSTep:AVERAge:STATe	Off
Average Mode	:SENSe:LPSTep:AVERAge:TCONTRol	Exponential
Average Type	:SENSe:LPSTep:AVERAge:TYPE	Rms
Info BW	:SENSe:LPSTep:BANDwidth:RESolution	1.0000 MHz
LPS_IFFilterType	:SENSe:LPSTep:BANDwidth:SHAPE	Gaussian
VBW	:SENSe:LPSTep:BANDwidth:VIDeo	1.0000 MHz
Detector	:SENSe:LPSTep:DETEctor:FUNCTion	AVERAGE
IFGainAuto	:SENSe:LPSTep:IF:GAIN:AUTO:STATe	On
LPS_IFGain	:SENSe:LPSTep:IF:GAIN:STATe	Autorange
E-ATT List	:SENSe:LPSTep:LIST:EATTen	List:Amplitude[50]
Frequency List	:SENSe:LPSTep:LIST:FREQuency	List:Frequency[50]

View/Display
 Display ▶
 Measurement List
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 Result Metrics ▶
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Key Path View/Display

Index

Allows you to specify an index of array for editing the value of specified index. This key only appears when a list type of SCPI is selected on Parameter List view. Maximum number of this index corresponds to the length of selected SCPI.

Key Path View/Display, Parameter List

Mode GSM

Initial S/W Revision Prior to A.02.00

Value

Allows you to edit the value of selected SCPI on Parameter List view.

Key Path View/Display, Parameter List

List Power Step Measurement View/Display

Mode GSM
Initial S/W Revision Prior to A.02.00

Result Metrics View

This view displays measurement results in the same order as they are returned by the remote results (n=1) query.

The screenshot shows a software interface for displaying measurement results. At the top, it indicates 'CH Freq 1.000000000 GHz' and 'Radio Band: P-GSM'. Below this is a table with three columns: Measurement, Measurement Item, and Result. The table is organized into sections: Trace Power, Sweep List 1, Sweep List 2, and Sweep List 3. A sidebar on the right contains navigation buttons: View/Display, Display, Measurement List, Parameter List, Result Metrics, and More 1 of 2.

Measurement	Measurement Item	Result
Trace Power	Sample Interval	10.000 μ s
	Mean Power	-10.992 dBm
	Mean Power Averaged	-10.992 dBm
	Sweep Points	7345
	Peak to Mean	11.255 dB
	Maximum Power	0.26297 dBm
	Minimum Power	-205.56 dBm
Sweep List 1	Step Power 1	0.16 dBm
	Step Power 2	-2.06 dBm
	Step Power 3	-4.04 dBm
	Step Power 4	-6.06 dBm
	Step Power 5	-8.05 dBm
	Step Power 6	-10.02 dBm
Sweep List 2	Step Power 1	-12.06 dBm
	Step Power 2	-14.04 dBm
	Step Power 3	-16.04 dBm
	Step Power 4	-18.01 dBm
	Step Power 5	-20.01 dBm
	Step Power 6	-22.03 dBm
	Step Power 7	-24.02 dBm
	Step Power 8	-26.01 dBm
	Step Power 9	-28.04 dBm
	Step Power 10	-30.05 dBm
Sweep List 3	Step Power 1	-0.05 dBm

Key Path View/Display

Result Type

Allows you to choose type of power displayed in the Result Metrics view.

Key Path View/Display, Result Metrics

Mode WCDMA, GSM

Remote Command :DISPlay:LPSTep:VIEW:REStype RMS|MAXimum|MINimum
:DISPlay:LPSTep:VIEW:REStype?

Example DISP:LPST:VIEW:REST MAX
DISP:LPST:VIEW:REST?

Preset RMS

State Saved	Saved in instrument state.
Range	RMS Max Min
Initial S/W Revision	Prior to A.02.00

RF Envelope View

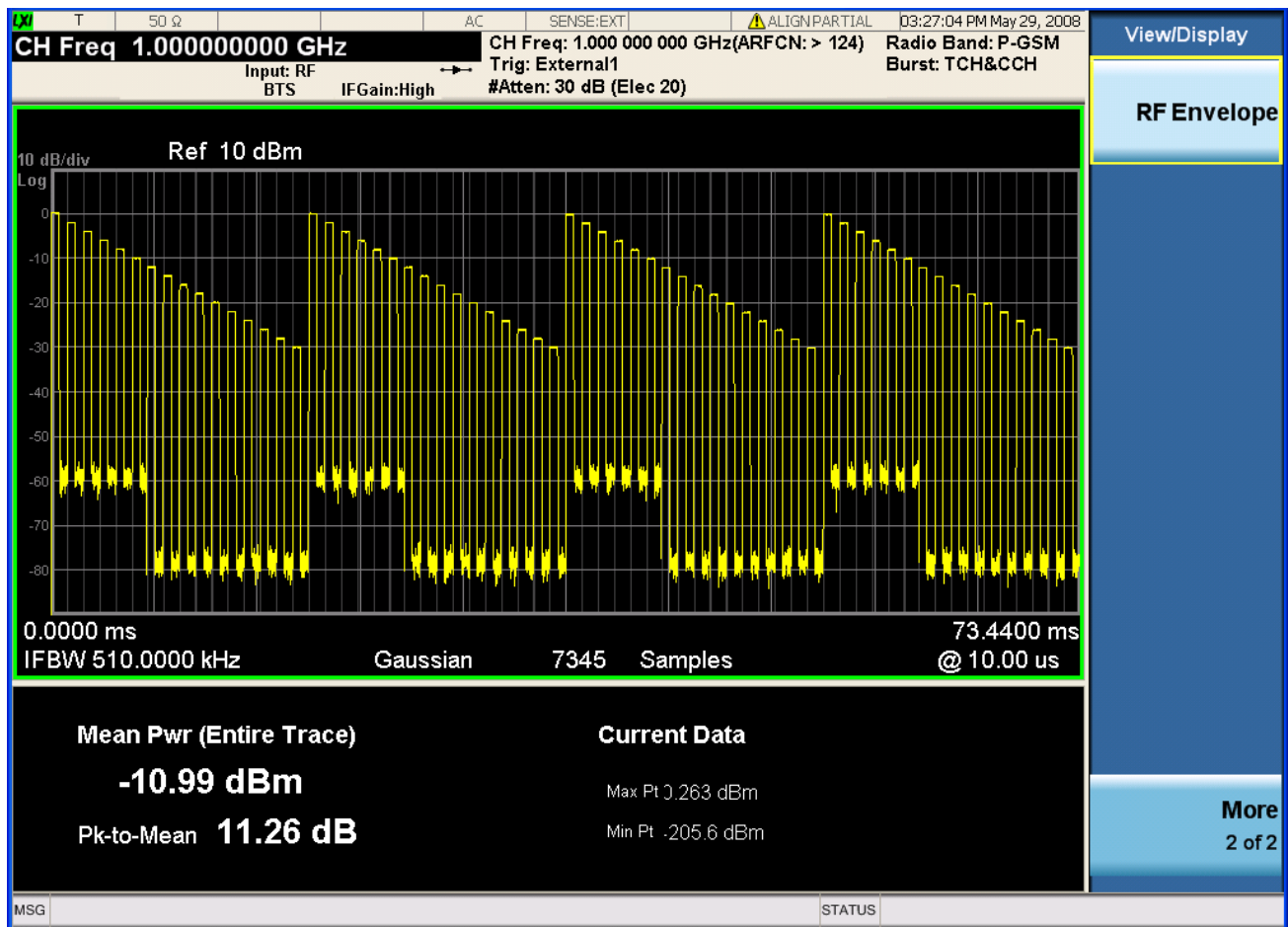
This view shows a time-domain magnitude trace that is connected to multiple gated sweeps by setting of List Setup parameters.

The gray vertical bars show the calculation period of related power results.

As shown in the example below, this view has 2 windows:

["Trace Window" on page 206](#)

["Results Window" on page 206](#)



List Power Step Measurement View/Display

Trace Window

Corresponding Trace yellow - n=2

Results Window

Name	Corresponding Results	Display Format
Meas Pwr (Entire Trace)	n=1, 2 nd item Meas power across the entire trace in dBm	XX.XX dBm
Pk-to-Mean	n=1, 5 th item The ratio of the maximum signal level to the mean power in dB.	XX.XX dB
Current Data Max	n=1, 6 th item Maximum value of the most recently acquired data in dBm	XX.XX dBm
Current Data Min	n=1, 7 th item Minimum value of the most recently acquired data in dBm	XX.XX dBm

Key Path **View/Display**

View Selection Remote Commands

Allows you to select the desired measurement view from the following selections:

- MLISt – [Measurement List View](#)
- PARAmeter – [Parameter List View](#)
- RESult – [Result Metrics View](#)
- RFENvelope – [RF Envelope View](#)

Key Path	View/Display
Mode	WCDMA, GSM
Remote Command	:DISPlay:LPSTep:VIEW[:SElect] MLISt PARAmeter RESult RFENvelope :DISPlay:LPSTep:VIEW[:SElect]?
Example	DISP:LPST:VIEW RES DISP:LPST:VIEW?
Preset	RESult
State Saved	Saved in instrument state.
Range	Measurement List Parameter List Result Metrics RF Envelope
Initial S/W Revision	Prior to A.02.00