

Keysight Technologies

Z5602B Options

H24, H35, H50, H51 and H52

User's Guide

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.

Notices

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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 the following URL, search for the name of your product:

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

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CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

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Z5602B Options H24, H35, H50, H51 and H52

Description

The Keysight Z5602B Precision Power Reference is a portable 50 MHz sine wave source that requires a very short warm-up time. Traditionally, the process to determine the amplitude accuracy of a source, used to calibrate a device under test (DUT), involved power meter measurements and associated calculations to determine the uncertainty of the power meter, interconnect cables and the VSWR effects of the power meter/source and source/DUT. The Keysight Z5602B Precision Power Reference can achieve the same accuracy as the calibration source built into a power meter, and mates directly with the Type-N female connectors on the spectrum analyzer inputs. The Precision Power Reference greatly reduces the measurement uncertainties mentioned above.

The Precision Power Reference is available in three different connector types: 2.5 mm, 3.5 mm and Type-N (m). Additionally, the Type-N version has 3 different power levels: 0 dBm, -25 dBm and -30 dBm. Each Precision Power Reference has a power cable that can be directly connected to the probe power outlet (-12.6 V, +15 V) on a spectrum analyzer or other instruments with the probe power feature.

The small size and portability of the Precision Power Reference increases the potential for use in automated production test systems.

The Z5602B H24, H35 or H51 are required when adjusting and calibrating the N9038A MXE, PSA Series and X-Series Signal Analyzers.

Additional information can be found in the documentation for the N7818A, N7810A and N7814A calibration software.

Verifying the Shipment

Verify that you have received the proper option items listed in [Table 1](#). Inspect the shipping container. If the container or packing material is damaged, it should be kept until the contents of the shipment have been checked mechanically and electrically. If there is physical damage refer to ["Contacting Keysight" on page 12](#). Keep the damaged shipping materials (if any) for inspection by the carrier and a Keysight Technologies representative.

Table 1 **Option Numbers with Connector Types**

Option	Connector	Output Power
H24	2.4 mm (f)	-25 dBm
H35	3.5 mm (f)	-25 dBm
H50	Type-N (m)	0 dBm
H51	Type-N (m)	-25 dBm
H52	Type-N (m)	-30 dBm

Electrostatic Discharge Protection

Electrostatic discharge (ESD) can damage or destroy electronic components. The product is shipped in materials that prevent damage from static, and should only be removed from the packaging in an anti-static area ensuring that the correct anti-static precautions are taken.

Two types of ESD protection are listed below. Purchase acceptable ESD accessories from your local supplier.

- Conductive table-mat and wrist-strap combination
- Conductive floor-mat and heel-strap combination

Both types, when used together, provide a significant level of ESD protection. To ensure user safety, static-safe accessories must provide at least 1 M Ω of isolation from ground.

Connecting the Precision Power Reference

1. Turn On the spectrum analyzer.
2. Connect the Precision Power Reference to the RF Input connector.
3. Connect the probe power cable from the reference to the probe power output connector.
4. Perform a factory [**Preset**] on the spectrum analyzer so that it is in a known state.

Figure 1 Front Panel



Amplitude Accuracy

The PSA Series spectrum analyzer requires the Z5602B Option H24, H35 or H51 when adjusting the amplitude of the internal 50 MHz reference.

The following example illustrates how the Option H51 version of the Precision Power Reference can be used to verify the amplitude accuracy of the Keysight E4440A Spectrum Analyzer at 50 MHz.

Verify that the spectrum analyzer has been turned on for a minimum of 30 minutes.

Typeface Key Conventions

The following key conventions are used throughout this document.:

- [HARDKEYS] are labeled front panel keys
- SOFTKEYS are unlabeled key whose function is indicated on the instrument display

Adjustment Procedures

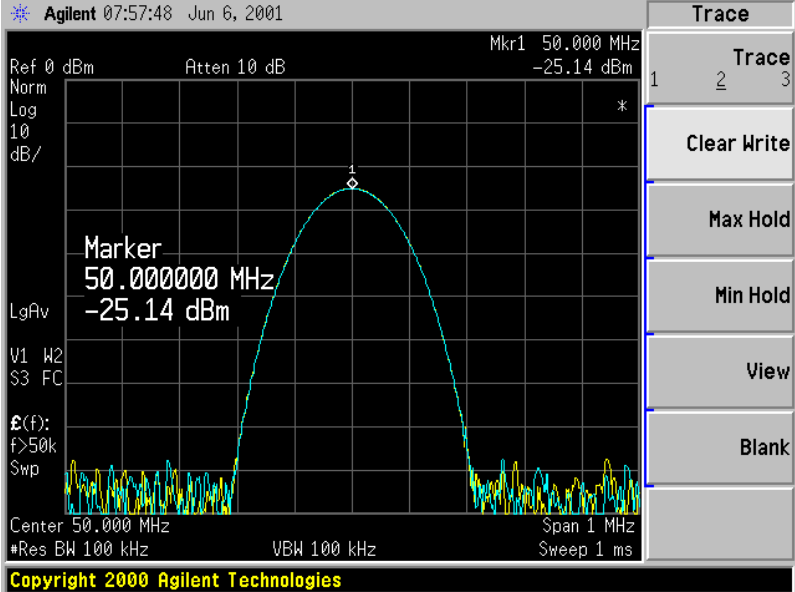
Perform the following front panel keystrokes on the spectrum analyzer.

1. Press [SYSTEM] > Alignments > Align All Now to trigger an alignment on the spectrum analyzer.
2. Connect the Precision Power Reference to the spectrum analyzer as shown in [Figure 1 on page 7](#).
3. To view the Precision Power Reference signal, set the spectrum analyzer controls as follows:
 - a. Press [Frequency] > [50 MHz] > [Span] > [1 MHz] > [Single] > [Peak Search].
 - b. Compare the signal amplitude displayed on the spectrum analyzer to the power level shown on the calibration sticker attached to the Precision Power Reference. For example; the spectrum analyzer marker value may be -25.07 dBm and the calibration sticker on your Precision Power Reference may indicate -25.009 dBm. Therefore, the spectrum analyzer amplitude error is -0.061 dB. Refer to [Figure 1 on page 7](#).

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Amplitude Accuracy

Figure 2

Z5602B Option H51 Signal



Specifications

The specifications for the Z5602B Option H24, H35, H50, H51 and H52 Precision Power References are listed [Table 2](#). No warm up time is required for the precision power reference once the power is turned on.

Table 2 50 MHz Precision Power Reference Specifications

Parameter	Specifications ^a				
Item	H24	H35	H50	H51	H52
Connector Type	2.4 mm	3.5 mm	Type-N (m)	Type-N (m)	Type-N (m)
Power Level	-25 dBm	-25 dBm	-0 dBm	-25 dBm	-30 dBm
Frequency Drift	$ \Delta f \leq 2.5$ kHz	$ \Delta f \leq 2.5$ kHz	$ \Delta f \leq 2.5$ kHz	$ \Delta f \leq 2.5$ kHz	$ \Delta f \leq 2.5$ kHz
Typical VSWR	1.06	1.06	1.06	1.06	1.06
Output Power Variation Over 20 °C – 30 °C	± 0.004 dBm	± 0.004 dBm	± 0.004 dBm	± 0.004 dBm	± 0.004 dBm
Output Power Variation Over 0 °C – 55 °C	± 0.02 dBm	± 0.02 dBm	± 0.02 dBm	± 0.02 dBm	± 0.02 dBm
Total Harmonic Content	< -45 dBc	< -45 dBc	< -45 dBc	< -45 dBc	< -45 dBc
Amplitude Error Due to Harmonic Content	< 0.0001 dB	< 0.0001 dB	< 0.0001 dB	< 0.0001 dB	< 0.0001 dB

a. The recommended cal cycle on the Z5602B Precision Power Reference is 1 year.

Keysight Support, Service and Assistance

Introduction

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument.

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Declaration of Conformity

Declarations of Conformity for this product and for other Keysight products may be downloaded from the Keysight Regulatory Website. Click on "Declarations of Conformity" and enter your product number to find the latest Declaration of Conformity statement. <http://regulations.about.keysight.com>

Statement of Compliance

This instrument has been designed and tested in accordance with CAN/CSA 22.2 No. 61010-1-04, UL Std No. 61010-1 (2nd Edition).

Before Applying Power

WARNING

If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock, do not remove covers.

Service and Support Options

There are many other repair and calibration options available from the Keysight Technologies support organization. These options cover a range of service agreements with varying response times. Contact Keysight for additional information on available service agreements for this product.

Contacting Keysight

Assistance with test and measurement needs and information on finding a local Keysight office are available on the Web at:

www.keysight.com/find/assist. If you do not have access to the Internet, please contact your Keysight field engineer.

NOTE!

In any correspondence or telephone conversation, refer to the Keysight product by its model number and full serial number. With this information, the Keysight representative can determine whether your product is still within its warranty period.

Shipping Your Product to Keysight for Service or Repair

IMPORTANT

Keysight Technologies reserves the right to reformat or replace the internal hard disk drive in your analyzer as part of its repair. This will erase all user information stored on the hard disk. It is imperative, therefore, that you make a backup copy of your critical test data located on the analyzer's hard disk before shipping it to Keysight for repair.

Should it become necessary to return a network analyzer for repair or service, follow the steps below:

1. Contact Keysight for instructions on where to ship your analyzer.
2. Include a complete description of the failure or service required.
3. Remove and retain the front handles and all rack mount hardware. The analyzer should be sent to Keysight in the same configuration as it was originally shipped.
4. Ship the analyzer module using the original packaging and anti-static materials. Shipping the analyzer module in anything other than the original packaging may result in non-warranted damage.

Regulatory Information

This section contains information that is required by various government regulatory agencies.



The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the documentation.



The AC symbol indicates the required nature of the line module input power.



This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).



This symbol indicates that the power line switch is ON.



This symbol indicates that the power line switch is in the STANDBY position.



This symbol indicates that the power line switch is in the OFF position.



This symbol is used to identify a terminal which is internally connected to the product frame or chassis.



The CE mark is a registered trademark of the European Community. (If accompanied by a year, it is when the design was proven.)



The CSA mark is a registered trademark of the CSA International.



This mark designates the product is an Industrial Scientific and Medical Group 1 Class A product (reference CISPR 11, Clause 5)



This is a marking to indicate product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001).



Direct Current.



The instrument has been designed to meet the requirements of IP 2 0 for egress and operational environment.



The RCM mark is a registered trademark of the Australian Communications and Media Authority



Indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.



This symbol on all primary and secondary packaging indicates compliance to China standard GB 18455-2001.



South Korean Certification (KC) mark; includes the marking's identifier code which follows the format: MSIP-REM-YYY-ZZZZZZZZZZZZZZ.

Electrical Safety Compliance

SAFETY

Complies with European Low Voltage Directive 2014/35/EU.

- IEC/EN 61010-1:2010, 3rd Edition
- Canada: CSA C22.2 No. 61010-1-12
- USA: UL std no. 61010-1, 3rd Edition
- Acoustic statement (European Machinery Directive 2022/42/EC, 1.7.4.2U)
Acoustical noise emission
LpA<70 dB
Operator position
Normal operation mode
Per ISO 7779

EMI and EMC Compliance

SAFETY

Complies with European EMC Directive 2014/30/EU.

- IEC/EN 61010-1:2010, 3rd Edition
- CISPR Pub 11 Group 1, class A
- AS/NZS CISPR 11:2011
- ICES/NMB-001
This ISM device complies with Canadian ICES-001.
Cet appareil ISM est conforme a la norme NMB du Canada.
- South Korean Class A EMC declaration: This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.

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Battery Collection

Do not throw batteries away but collect as small chemical waste, or in accordance with your country's requirements. You may return the battery to Keysight Technologies for disposal. Refer to ["Contacting Keysight" \(page 12\)](#) for assistance.