

Agilent Technologies Z5602A Options H24/H35/H50/H51/H52

User's and Service Guide

50 MHz Precision Power Reference

**Use this manual with the following document:
E4440A Calibration and Adjustment Software Getting Started Guide
Part Number E4440-90555**



Agilent Technologies

Manufacturing Part Number: Z5602-90005

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Safety Notes

The following safety notes are used throughout this document. Familiarize yourself with each of these notes and its meaning before performing any of the procedures in this document.

WARNING	Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.
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CAUTION	Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.
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Definitions

- *Specifications* describe the performance of parameters covered by the product warranty (temperature –0 to 55 °C, unless otherwise noted.)
- *Typical* describes additional product performance information that is not covered by the product warranty. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range 20 to 30 °C. Typical performance does not include measurement uncertainty.
- *Nominal* values indicate expected performance or describe product performance that is useful in the application of the product, but is not covered by the product warranty.
- *Characteristic Performance* describes performance parameter that the product is expected to meet before it leaves the factory, but is not verified in the field and is not covered by the product warranty. A characteristic includes the same guard bands as a specification.

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Z5602A Option H24/H35/H50/H51/H52

Description

The Agilent Z5602A 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, the interconnect cables and the VSWR effects of the power meter/source and source/DUT. The Agilent Z5602A 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 (-12.6V, +15V) 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.

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 Agilent Sales and Service Offices”](#) on page 12. Keep the damaged shipping materials (if any) for inspection by the carrier and an Agilent Technologies representative.

Table 1 Option Numbers with Connector Types

Option Number	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

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. Refer to [Figure 1](#).
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 Z5602A Option H24/H35/H50/H51 or H52 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 Agilent 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.

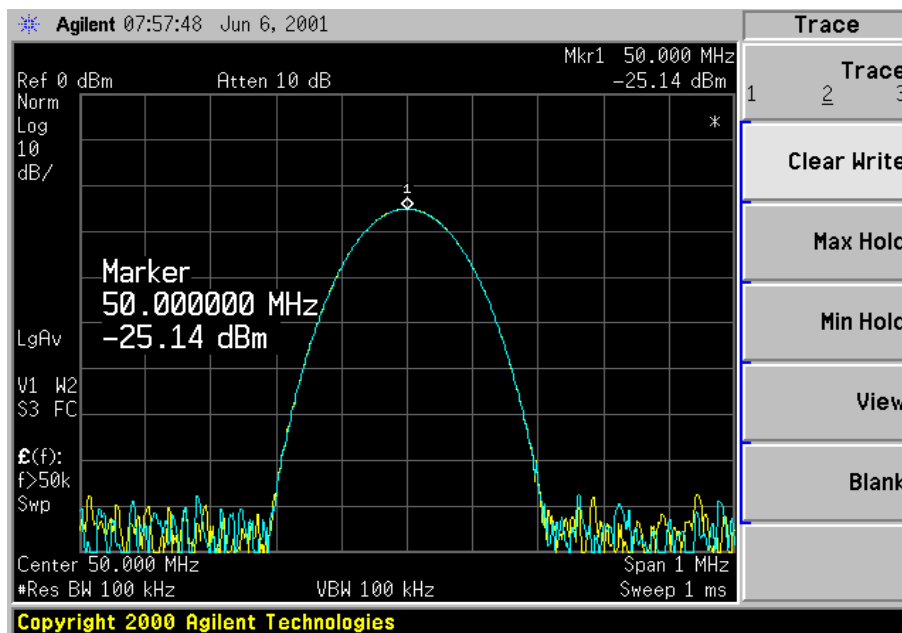
- **[HARDKEYS]** are labeled front panel keys
- **SOFTKEYS** are unlabeled key whose function is indicated on the instrument display

Adjustment Procedure

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 3](#).
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.

Figure 2 Agilent Z5602A Option H51 Signal



Specifications

The specifications for the Agilent Z5602A Option H24/H35/H50/H51/H52 Precision Power References are listed below.

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 ¹				
	H24	H35	H50	H51	H52
Option	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 \text{ KHz}$	$ \Delta f \leq 2.5 \text{ KHz}$	$ \Delta f \leq 2.5 \text{ KHz}$	$ \Delta f \leq 2.5 \text{ KHz}$	$ \Delta f \leq 2.5 \text{ KHz}$
Typical VSWR	1.06	1.06	1.06	1.06	1.06
Output Power Variation Over 20 °C – 30 °C	$\pm 0.004 \text{ dBm}$	$\pm 0.004 \text{ dBm}$	$\pm 0.004 \text{ dBm}$	$\pm 0.004 \text{ dBm}$	$\pm 0.004 \text{ dBm}$
Output Power Variation Over 0 °C – 55 °C	$\pm 0.02 \text{ dBm}$	$\pm 0.02 \text{ dBm}$	$\pm 0.02 \text{ dBm}$	$\pm 0.02 \text{ dBm}$	$\pm 0.02 \text{ dBm}$
Total Harmonic Content	$< -45 \text{ dBc}$	$< -45 \text{ dBc}$	$< -45 \text{ dBc}$	$< -45 \text{ dBc}$	$< -45 \text{ dBc}$
Amplitude Error Due to Harmonic Content	$< 0.0001 \text{ dB}$	$< 0.0001 \text{ dB}$	$< 0.0001 \text{ dB}$	$< 0.0001 \text{ dB}$	$< 0.0001 \text{ dB}$

1. The recommended cal cycle on the Agilent Z5602A Precision Power Reference is 1 year.

Safety and Regulatory Information

Introduction

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

Refer to the Getting Started Guide (E4440-90555) for the E4440A Performance Spectrum Analyzer.

Before Applying Power

Verify that the product is configured to match the available main power source. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

Connector Care and Cleaning

If alcohol is used to clean the connectors, the power cord to the instrument must be removed. All cleaning should take place in a well ventilated area. Allow adequate time for the fumes to disperse and moist alcohol to evaporate prior to energizing the instrument.

WARNING **To prevent electrical shock, disconnect the Agilent Technologies model product from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.**

Declaration of Conformity

For a copy of the manufacturer's Declaration of Conformity for this apparatus, contact your local Agilent Technologies office or sales representative. Refer to [“Contacting Agilent Sales and Service Offices”](#) on page 12.

Statement of Compliance

This instrument has been designed and tested in accordance with IEC Publication 1010, Safety Requirements for Electronic Measuring Apparatus, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the instrument in a safe condition.

Shipping Instructions

You must always call the Agilent Technologies Instrument Support Center to initiate service before retuning your instrument to a service office. See [“Contacting Agilent Sales and Service Offices” on page 12](#). Always transport or ship the instrument using the original packaging if possible. If not, comparable packaging must be used. Attach a complete description of the failure symptoms.

Compliance with Canadian EMC Requirements

This ISM device complies with Canadian ICES-001.
Cet appareil ISM est conforme a la norme NMB du Canada.

Compliance with German Noise Requirements

This is to declare that this instrument is in conformance with the German Regulation on Noise Declaration for Machines (Laermangabe nach der Maschinenlaermrrordnung-3. GSGV Deutschland).

Acoustic Noise Emission/Geraeuschemission	
LpA<70 dB	Lpa<70 dB
Operator Position	am Arbeitsplatz
Normal Operation	normaler Betrieb
per ISO 7779	nach DIN 45635 t. 19

Warnings

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

Warnings applicable to this instrument are:

WARNING To prevent electrical shock, disconnect the [Agilent Technologies Z5602A Options H24/H35/H50/H51/H52](#) from the mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

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 For continued protection against fire hazard replace line fuse only with same type and rating:

- United States—F 0.5A/250V, Part Number 2110-0202
- Europe—F 3.15A/250V, Part Number 2110-0655

The use of other fuses or material is prohibited.

WARNING This is a Safety Class I product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall be inserted only into a socket outlet provided with a protective earth contact. Any interruption of the protective conductor, inside or outside the product is likely to make the product dangerous. Intentional interruption is prohibited.

WARNING These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

WARNING The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the instrument from all voltage sources while it is being opened.

WARNING This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 61010-1: 2001.

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

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.**

Cautions

CAUTION The CAUTION notice denotes a hazard. It calls attention to an procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the product. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met

Cautions applicable to this instrument are:










CAUTION Always use the three-prong ac power cord supplied with this instrument. Failure to ensure adequate earth grounding (by not using this cord) can cause instrument damage.

CAUTION This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 61010 Second Edition and 664 respectively.

CAUTION This instrument has autoranging line voltage input; be sure the supply voltage is within the specified range.

CAUTION Ventilation Requirements: When installing the instrument in a cabinet, the convection into and out of the instrument must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the instrument by 4 °C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, forced convection must be used.

Instrument Markings

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
	This symbol indicates hazardous voltages.
	The laser radiation symbol is marked on products that have a laser output.
	This symbol indicates that the instrument requires alternating current (ac) input.
	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association.
	This symbol indicates the product meets the Australian Standards.
	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 text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is in the STANDBY position.
	Safety Earth Ground. This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

Contacting Agilent Sales and Service Offices

Assistance with test and measurement needs, and information on finding a local Agilent office are available on the Internet at:

<http://www.agilent.com/find/assist>

You can also purchase accessories or documentation items on the Internet at:

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

If you do not have access to the Internet, contact your field engineer.

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