

Agilent Technologies U3050AH11

User's and Service Guide

**Use this manual with the following documents:
PNA Series Network Analyzer On-line Help System**



Agilent Technologies

Manufacturing Part Number: U3050-90001

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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.**

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.

Definitions

- *Specifications* describe the performance of parameters covered by the product warranty (temperature –0 to 50 °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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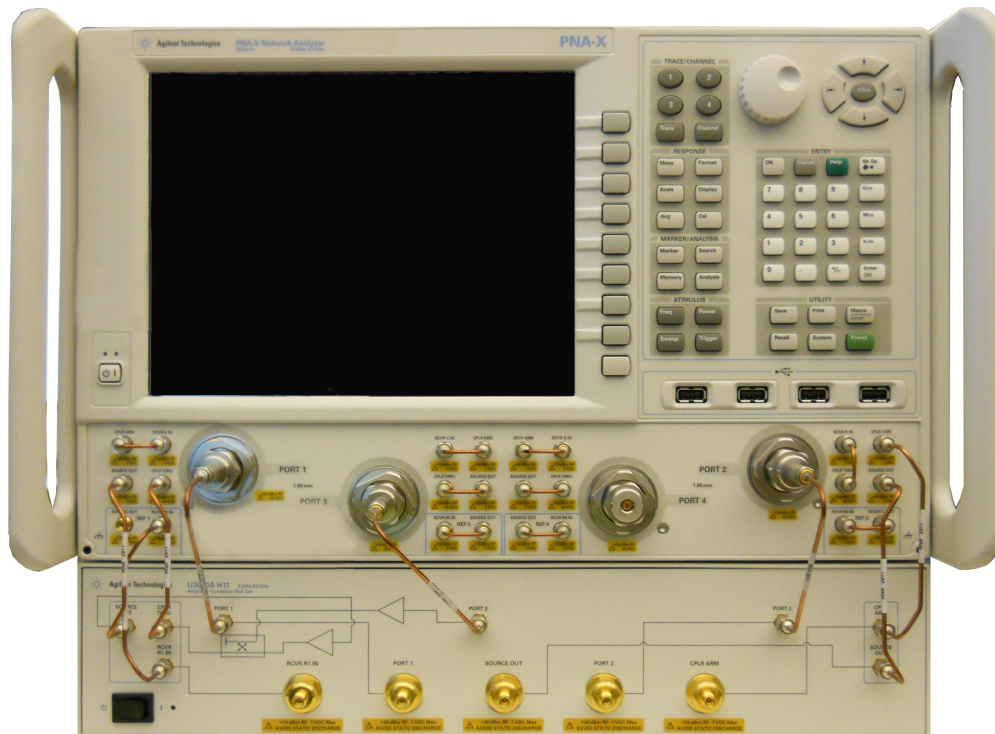
Contents

U3050AH11

Introduction

This document describes how to use and service the U3050AH11 Amplifier Combiner Test Set for with the Agilent N5245A PNA-X.

Figure 1 Front Panel N5247A with U3050AH11



Description

The Agilent U3050AH11 Test Set uses two amplifiers for increased power and a coupler to combine power from the N5245A Ports 1 and 3 for high power applications. Five bulkhead access connectors allows for custom configurations and minimizes connections to the PNA-X. These connections are RCVR R1 IN, PORT 1 Test Port, Port 2 Source Out, Port 2 Test Port, and Port 2 CPLR ARM (2.4 mm female connectors).

The N5245A PNA-X Network Analyzers will be referred to throughout this document as the PNA-X. The U3050AH11 will be referred to as the Test Set.

Network Analyzer Requirements

- N5245A Option 400 (4-Port)

More PNA information is available on the following website:

- Documentation - <http://www.agilent.com/find/pna>

Verifying the Shipment

To verify the contents shipped with your product, refer to the “Box Content List” included with the shipment.

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](#)” on page 32. Keep the damaged shipping materials (if any) for inspection by the carrier and an Agilent Technologies representative.

- U3021-60009 - Lock Link Kit U3021L Option 045
- U3050-60003 - Interface Cable Kit

Available Mounting Kits

- U3050AH11-ICM (Rack Mount Kit without handles)
- U3050AH11-ICN (Front Handle Kit)
- U3050AH11-ICP (Rack Mount Kit with handles)

General Specifications

Specifications for the Test Set (2 GHz to 50 GHz) are characteristic. A functional certificate is only offered for the Test Set. There are no system specifications.

Power Requirements

Verify that the required ac power is available before installing the Test Set to the PNA-X.

- 100/120/220/240 VAC (50/60Hz)
- The instrument can operate with mains supply voltage fluctuations up to $\pm 10\%$ of the nominal voltage.
- Air conditioning equipment (or other motor-operated equipment) should not be placed on the same ac line that powers the Test Set and PNA-X.
- [Table 1](#) contains the maximum wattage for all instruments. This table can be use to determine the electrical and cooling requirements.

Table 1 Power Requirements

Standard Equipment	
Instrument	Maximum Wattage
N5245A	450
U3050AH11	350

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 instrument, is likely to make the instrument dangerous. Intentional interruption is prohibited.

Environmental Requirements

Refer to the PNA-X standard documentation for environmental requirements.

Environmental Tests

The Test Set complies with all applicable safety and regulatory requirements for the intended location of use.

- Pressure Altitude (Operation)
3,000 meters (~10,000 feet)
- The instrument can safely operate in a relative humidity of 80% for temperatures to 31 degrees C, decreasing linearly to 50% relative humidity at 40 degrees C.

Equipment Heating and Cooling

If necessary, install air conditioning and heating to maintain the ambient temperature within the appropriate range. Air conditioning capacity must be consistent with the BTU ratings given in [Table 1](#).

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.

Required Conditions for Accuracy Enhanced Measurement

Accuracy-enhanced (error-corrected) measurements require the ambient temperature of the PNA-X and Test Set to be maintained within ± 1 °C of the ambient temperature at calibration.

Dimensions and Space Requirements

Standard installation of the Test Set and PNA-X includes configuration and installation on a customer provided lab bench or table top of adequate size and strength. For weight, dimensions and space requirements, refer to the network analyzer documentation that is used to configure the Test Set.

Table 2 Instrument Dimensions

Model	Weight	Height	Width	Depth
U3050AH11	9.2 kg (25.2 lb)	10.1 cm (4 in)	42.9 cm (16.9 in)	58.4 cm (23 in)

Maximum Power Levels

CAUTION It is recommended that you do not operate components near damage levels (+30 dBm). The power levels must be 3 dB below maximum level to ensure no damage, see [Table 3](#).

Table 3 Test Set Power Levels & Front Panel Connections

Maximum Test Port RF Power Levels:	
RCVR R1 IN	+15 dBm ± 15 Vdc
Interface Ports:	
Port 1 ¹	+20 dBm 0 Vdc
Port 1 CPLR THRU	+30 dBm 0 Vdc
Port 1 SOURCE OUT	+20 dBm 0 Vdc
Port 1 RCVR R1 IN	+20 dBm 0 Vdc
Port 2 ²	+30 dBm 7 Vdc +15 dBm 7 Vdc
Port 2 CPLR ARM	+30 dBm 0 Vdc
Port 2 SOURCE OUT	+30 dBm 0 Vdc
Port 3	+20 dBm 0 Vdc
Access Ports:	
CPLR ARM	+30 dBm 7 Vdc

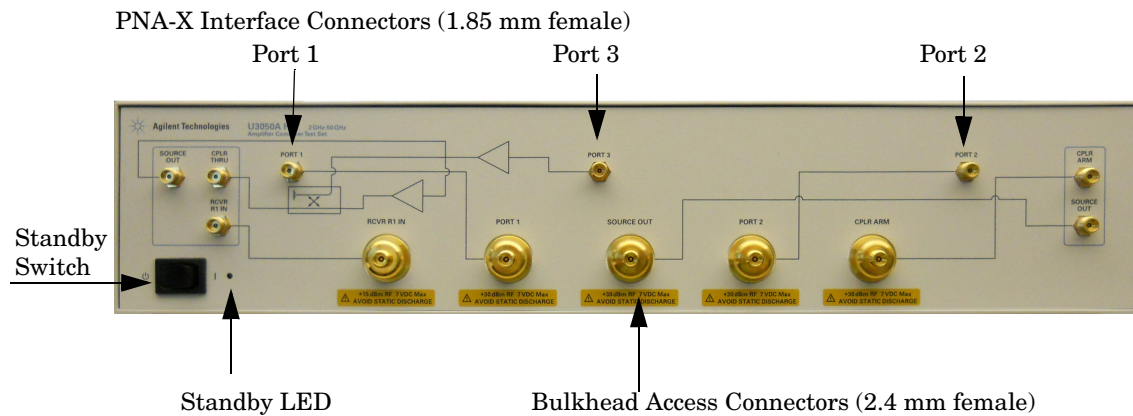
1. Power levels above 20 dBm may damage the amplifiers.
2. If CPLR THRU is connected to RCVR B IN on the PNA-X then Test Set Port 2 max power level is +15 dBm 7 Vdc.

NOTE Refer to your PNA-X specifications to determine the maximum input power levels for the access and test ports, or to optimize the power levels in the receivers.

NOTE Damage and maximum levels are not necessarily the optimum level.

Front and Rear Panel Features

Figure 2 U3050AH11 Front Panel



PNA-X to Test Set Interface Connectors – 1.85 mm (female)

- PORT 1, SOURCE OUT, CPLR THUR and RCVR R1 IN
- PORT 3
- PORT 2, SOURCE OUT and CPLR ARM

Bulkhead Access Connectors 2.4 mm (female)

- RCVR R1 IN, PORT 1, SOURCE OUT, PORT 2 and CPLR ARM

Standby LED

The LED is Off (not illuminated) when the Test Set is in Standby.

Standby Switch

Note that this switch is Standby only, not a line switch. The main power cord can be used as the system disconnecting device. It disconnects the mains circuits from the mains supply.

Figure 3 U3050AH11 Rear Panel

Chassis Ground

A threaded terminal post for connecting the Test Set to a conductive object, cabinet or structure to ensure a common potential and reduce leakage current in a system. Requires a metric M4 nut (0535-0023) with lock washer (2190-0646,) or M4 nut with an integrated washer (0535-0082).

Line Module

The line fuse, as well as a spare, reside within the line module. [Figure 4](#) illustrates where the fuses are located and how to access them.

Available Fuse

- Fuse (F 5 A/250V, 2110-0709) UL listed and CSA certified.

WARNING For continued protection against fire hazard replace line fuse only with same type and rating. The use of other fuses or material is prohibited.

Figure 4 Line Fuse

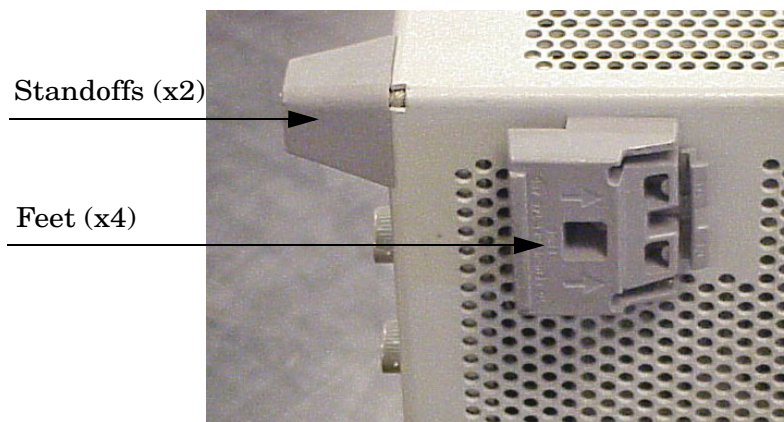
CAUTION Verify that the premise electrical voltage supply is within the range specified on the instrument.

System Setup with N5245A

Preparing the N5245A Network Analyzer

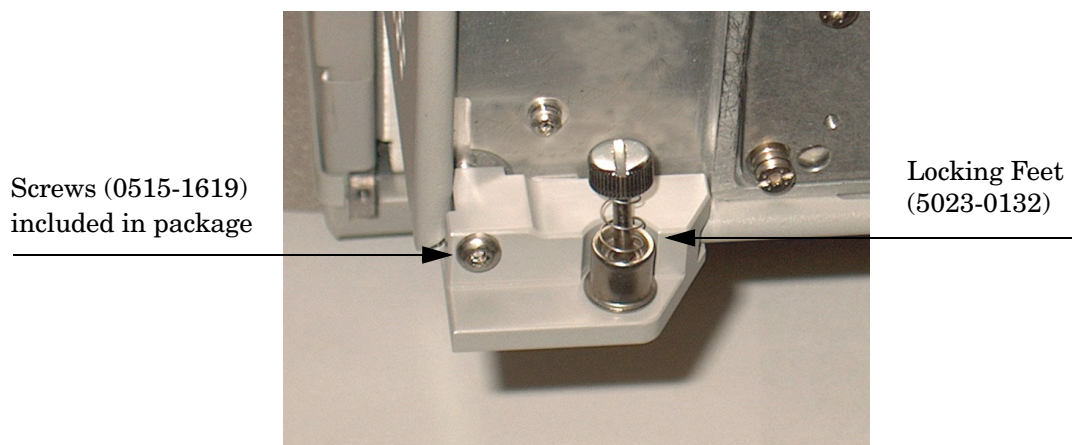
1. Remove the feet from the bottom of the network analyzer.
2. Remove the 2 lower standoffs and screws (0515-1619) from the rear panel on the network analyzer.

Figure 5 Rear Bottom Feet



3. Install the two rear locking feet (5023-0132) onto the PNA-X, using the included screws (0515-1619), where the standoffs were removed.

Figure 6 Install Locking Feet on PNA-X

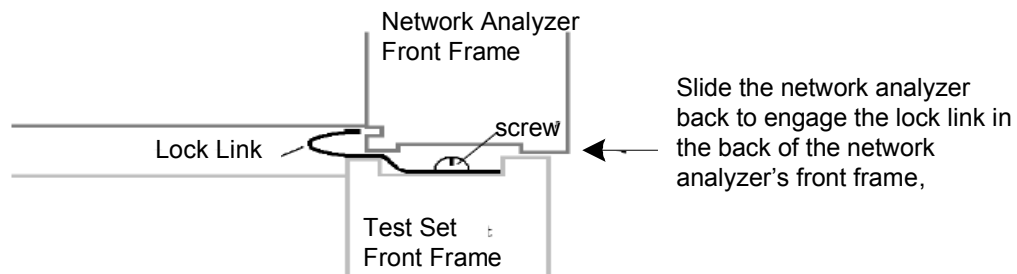


4. Remove the two upper feet from the U3050AH11 and install the two locking feet N5242-20206 (right foot) and the N5242-20207 (left foot) using two screws (0515-2317) as shown in [Figure 7](#).
5. Place the PNA-X on top of the U3050AH11. Ensure that the front frame of the PNA-X is positioned slightly forward of the locks that are attached to the Test Set. Slide the PNA-X back so the locks engage the front frame of the analyzer as shown in [Figure 8](#).

Figure 7 Rear Panel N5245A with U3050AH11



Figure 8 Locking the Analyzers



- Secure the PNA-X's lower locking feet to the U3050AH11 upper locking feet, using the spring-loaded screws. If the network analyzer's lower locking feet are not aligned with the screw holes in the Test Set's upper locking feet, loosen the screws securing the feet to the instrument slightly to align and tighten.

Figure 9 Locking Feet Screws



NOTE There are two Lock-Foot kits available. Refer to [“Contacting Agilent” on page 32](#) for ordering information.

- PNA-X – 5023-0132 (kit includes locking feet and screws)
- N5242-20206 (right) & N5242-20207 (left)
- 0515-2317 (screw)

RF Interface Cable Connections

Figure 10 on page 13 illustrates the Test Set configuration and cable connections to the PNA-X. The final two digits of the part numbers for each cable are used as identifiers. The cables have been supplied with the Test Set.

1. Remove the following jumpers on the PNA-X:
 - a. Port 1: SOURCE OUT to CPLR THRU
 - b. REF 1: SOURCE OUT to RCVR R1 IN
 - c. Port 2: SOURCE OUT to CPLR THRU
 - d. RCVR B IN to CPLR ARM and reposition to RCVR B IN to CPLR THRU
2. Connect the RF interconnect cables from the PNA-X to the Test Set front panel. As you are connecting each cable, torque to 8 in-lb. Refer to Table 4 and Figure 10 on page 13.

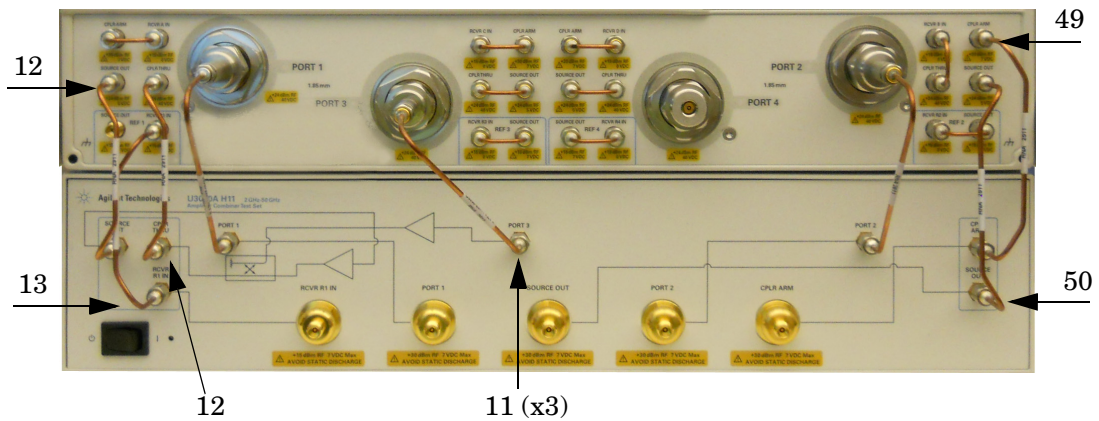
CAUTION Over torque will cause damage to the Test Set and may cause connectors to spin or become loose.

Table 4 N5245A RF Cable Connection

RF Cables	From PNA-X	To Test Set
U3050-20011	Port 1	Port 1
U3050-20011	Port 3	Port 3
U3050-20011	Port 2	Port 2
U3050-20012	Port 1 SOURCE OUT	SOURCE OUT
U3050-20012	Port 1 RCVR R1 IN	RCVR R1 IN
U3050-20049	Port 2 CPLR ARM	CPLR ARM
U3050-20050	Port 2 SOURCE OUT	SOURCE OUT
U3050-20013	Port 1 CPLR THRU	CPLR THRU

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

Figure 10 U3050AH11 Front Panel Connections



Operational Check

This operational check is to confirm the Test Set's operational performance. The operation verification limits provided ensure that your U3050AH11 is operating properly.

Verification Limits

Specifications for the Test Set are typical. System performance for the Test Set is only characteristic and intended as non-warranted information. Only a functional certificate is provided for the Test Set.

It is recommended that you return your instrument to Agilent Technologies for servicing or repair if the Test Set and PNA-X performance exceed the operational verification limits.

Table 5 U3050AH11 Operation Verification Limit

Connections	Response
RCVR R1 IN to RCVR R1 IN	< 2 dB loss
PORT 1, SOURCE OUT to CPLR THRU	>20 dB gain
Port 1 to Port 1	< 2 dB loss
Port 3 to CPLR THRU	>7.5 dB gain
PORT 2, SOURCE OUT to SOURCE OUT	< 2 dB loss
PORT 2 to PORT 2	< 2 dB loss
CPLR ARM to CPLR ARM	< 2 dB loss

Equipment Required

The Agilent U3050AH11 requires that the user be familiar with the equipment and components listed in [Table 6](#).

This section provides an equipment list and configuration of the PNA-X and Test Set.

Table 6 Equipment List

Description	Qty
N5245A or E8364B Network Analyzer (50 GHz analyzer)	1
RF cables (2.4 mm male connectors)	2
2.4 mm adapter (female to female)	3

Operational Check Procedure

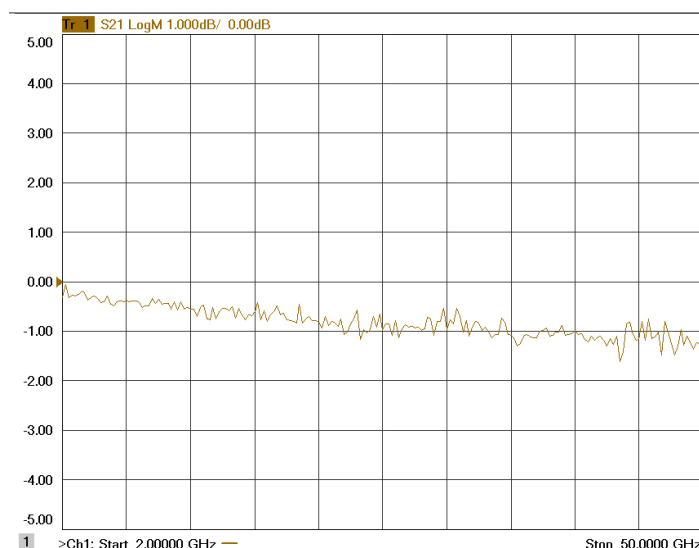
The sequence of this procedure is very important and must be followed or the performance accuracy and results may vary from the reference plots provided. Ensure that the Test Set is not connected to the PNA-X if you are performing a PNA-X Operator's Check. The PNA-X will indicate false failures if the Test Set is connected.

Non-Amplified RF Path Test

This test will verify the RF path insertion loss of RCVR R1 IN to RCVR R1 IN RF Path.

1. Select **[Preset]** and verify the PNA-X in Standalone Mode.
2. Verify that the **[Start Frequency]** is set to **[2 GHz]**.
3. Verify that the **[Stop Frequency]** is set to **[50 GHz]**.
4. Connect the RF cables to PNA-X Ports 1 and 2.
5. Connect the two RF test cables together using the 2.4 mm (f/f) adapter.
6. Measure S21 trace. Select **[Meas] > S21**.
7. Perform a **Response Calibration** or normalize the S21 trace to remove the loss created by the test cables. Select **[Memory] > Normalize**.
8. Remove the adapter.
9. Connect the Port 1 cable to 1.85 mm RCVR R1 IN port.
10. Connect the Port 2 cable to 2.4 mm access port RCVR R1 IN.
11. Verify that the S21 trace loss is approximately < 4 dB @ 50 GHz and is sloped as shown in [Figure 12](#).
12. Repeat for PORT 1 to PORT 1, SOURCE OUT to SOURCE OUT, PORT 2 to PORT 2 and CPLR ARM to CPLR ARM RF Paths. Refer to the [Figure 16 on page 22](#) and [Figure 2 on page 7](#).

Figure 12 Non-Amplified RF Path Test



Amplified RF Path Tests

This test will verify the RF Amplifiers in the Source Out to CPLR THRU path, and Port 3 to CPLR THRU Path.

1. Select [**Preset**] and verify the PNA-X in Standalone Mode.
2. Verify that the [**Start Frequency**] is set to [**2 GHz**].
3. Verify that the [**Stop Frequency**] is set to [**50 GHz**].
4. Connect the RF cables to PNA-X Ports 1 and 2.
5. Connect the two RF test cables together using the 2.4 mm (f/f) adapter.
6. Measure S21 trace. Select [**Meas**] > **S21**.
7. Perform a **Response Calibration** or normalize the S21 trace to remove the loss created by the test cables. Select [**Memory**] > **Normalize**.
8. Remove the Adapter.
9. Connect the PNA-X Port 1 cable to the Test Set Port 1 Source Out.
10. Connect the PXA-X Port 2 cable to the Test Set Port 1 CPLR THRU.
11. Verify that the S21 trace gain is approximately 22 dB @ 50 GHz as shown in [Figure 13](#).
12. Move the PNA-X Port 1 cable to Test Set Port 3.
13. Verify that the S21 trace gain is approximately 10 dB @ 50 GHz as shown in [Figure 14](#).

Figure 13 Amplifier Gain Port 1

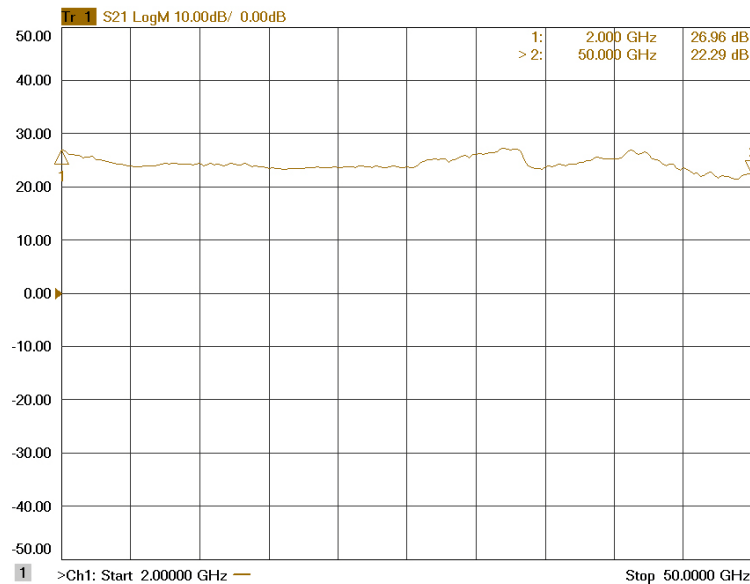
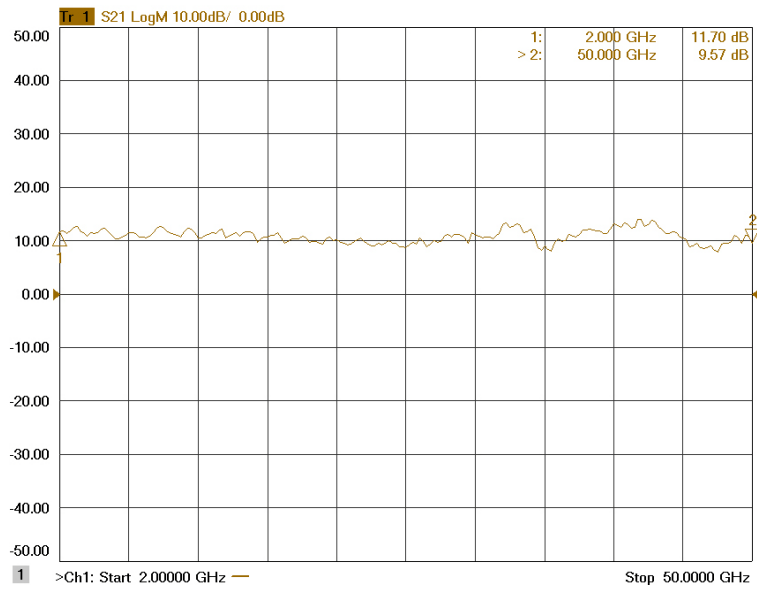


Figure 14 Amplifier Gain Port 3



Service Information

Refer to “[Contacting Agilent](#)” on page 32.

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

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.**

Replaceable Parts

The following replaceable parts are available from Agilent Technologies “Find-A-Part” system on the web at www.parts.agilent.com.

Table 7 Available Replaceable Parts (SPO)

Description	Agilent Part Number
Bulkhead connector, 2.4 mm	5062-7243
Bulkhead connector, 1.85 mm	5065-4673
Coupler	5086-7658
PWR Supply (AC/DC SWG 650W 9-Output)	0950-4729
Fuse (8 A 250 V non-time delay 0.0146 Ohm)	2110-0342
Fuse (5 A 250 V non-time delay Socket)	2110-0709

Table 8 U3050AH11 Replaceable Parts

Description	Agilent Part Number
Amplifier	83050A
Rear support foot (right)	N5242-20206
Rear support foot (left)	N5242-20207
U3050A-H11 User’s and Service Guide	U3050-90001

Theory of Operation

The following is a description of the operation of the Test Set. Reference the Test Set block diagrams shown in [Figure 16 on page 22](#). This section assumes the user has a general understanding of couplers, switches, and network analyzers.

The Test Set uses one coupler, two amplifiers and cables for RF transmission paths.

Coupler and Amplifiers

Port 1 Source Out to CPLR THRU

Port 1 Source Out is connected to Amplifier 1 input. The Amplifier's output is connected to the internal Coupler's input. The internal couplers output is connected to Port 1 CPLR THRU.

Port 3 to CPLR THRU

Port 3 is connected to the Amplifier 2 input. The Amplifier's output is connected to the internal coupler's coupled port.

RF Transmission Paths

Internal RF cable connections.

- Port 1 to Port 1
- Port 1 RCVR R1 IN to RCVR R1 IN
- Port 2 to Port 2
- Port 2 CPLR ARM to CPLR ARM
- Port 2 Source Out to Source Out

Amp Bias Board

The Amp Bias boards (Z5623-60175) provide ± 12 Vdc fuse protection for the Amplifiers and the front panel Standby LED. Refer to [Figure 16 on page 22](#).

Coupler

The Coupler is being used as a power combiner. Amplifier 1 will see low signal loss where Amplifier 2 output signal will encounter approximately 10 dB of coupling factor loss. The Coupler provides isolation between the two Amplifier outputs.

Power Supply

The power supply (0950-4729) converts the AC line voltages to DC and contains its own cooling fan. The AC line voltage (100 to 240 V @ 50/60 Hz) is provided from the line module on the rear panel. The power supply ± 12 Vdc will be used to bias the two amplifiers used in the Test Set.

Figure 15 U3050AH11 with N5245A Block Diagram

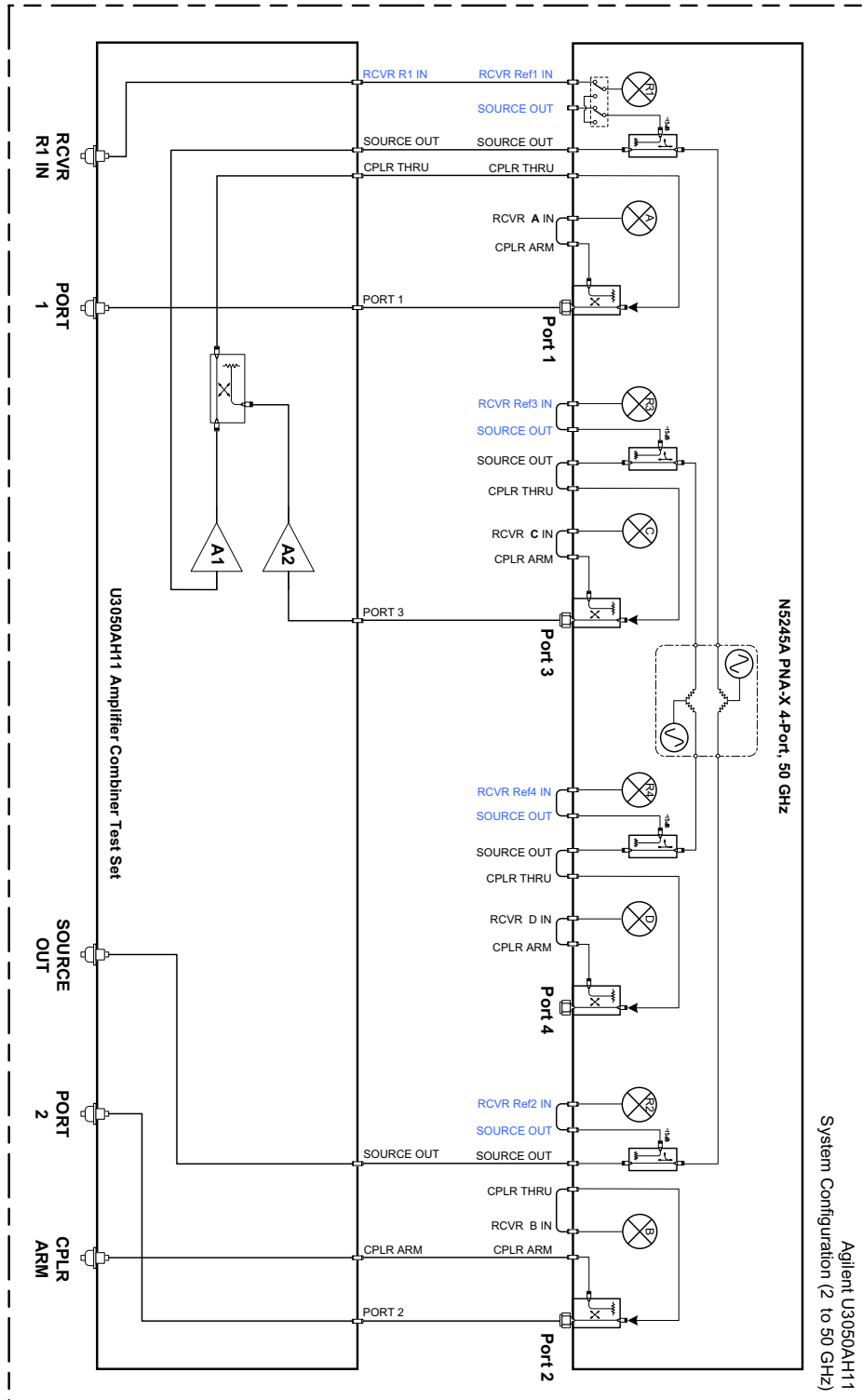
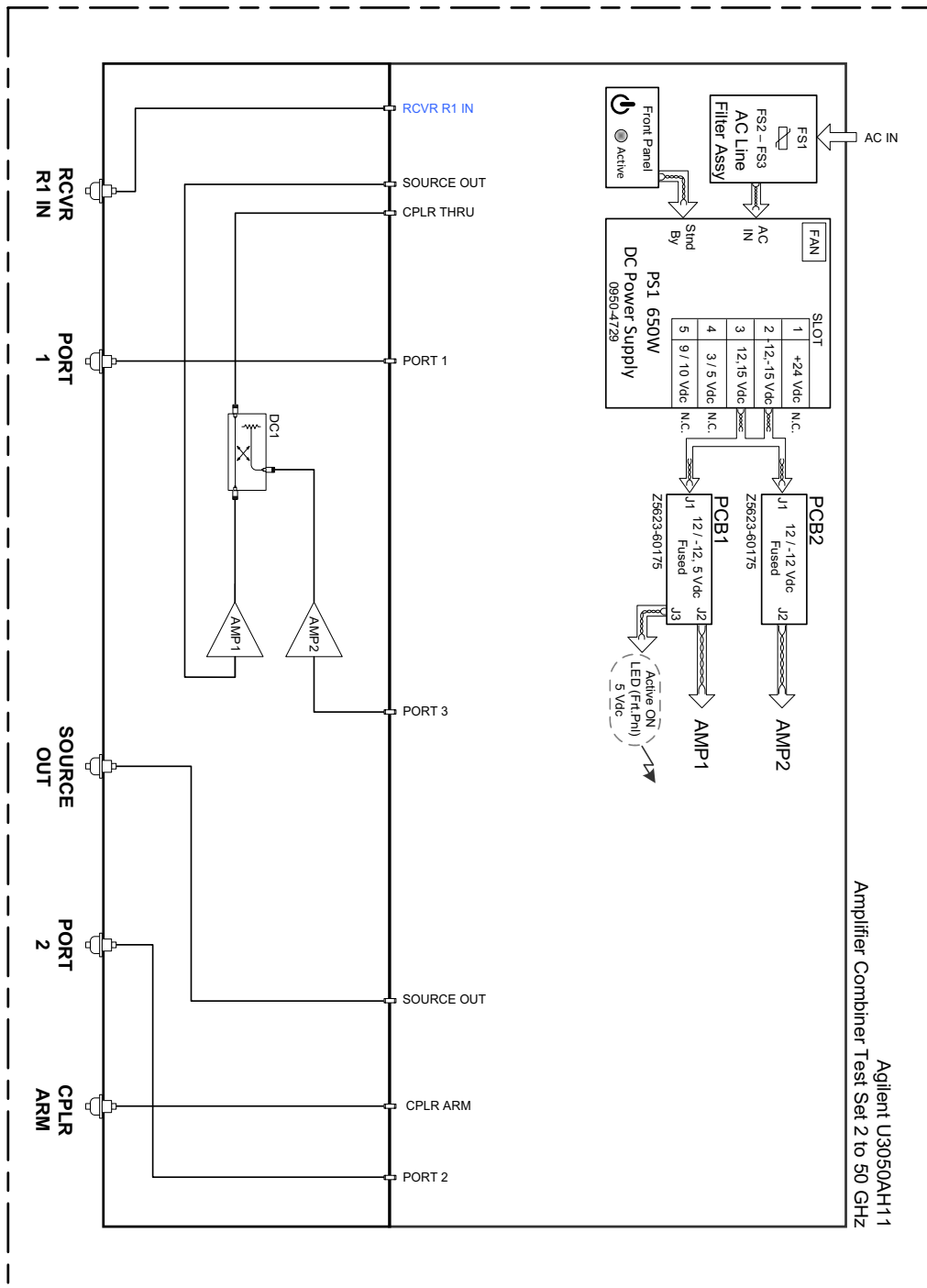


Figure 16 U3050AH11 Block Diagram



Troubleshooting

If the U3050AH11 is not operating properly, use the following procedures to isolate and repair the failure.

Refer to the Agilent PNA Series: Service & Support Home Page at: <http://na.tm.agilent.com/pna> for further information.

To request service, please contact your local service center. In the US, call 800-829-4444. For a listing of service centers worldwide, please visit us at www.agilent.com/find/service. Refer to “[Shipping Your Instrument to Agilent for Service or Repair](#)” on page 32.

Refer to the following procedures for type of problem encountered. It is recommended that a qualified service technician perform the following procedures.

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

Non-RF Failures

1. Verify that the front panel Power Switch is operational.
2. The front panel Standby LED should operate when the Standby Switch is in the On position.
3. AC line voltage checks (remove AC power from the instrument).
 - a. Ensure the proper AC line voltage is present at the instrument line cord.
 - b. Remove the AC power cord from the instrument. Confirm the instrument AC line module fuse is operational. See [Figure 4 on page 8](#).
 - c. AC line fuses; remove the bottom cover of the instrument. Near the rear panel are two fuse holders, remove the fuses and verify that they are operational.
4. DC Power; during this check you will apply AC power to the instrument with the top cover removed. Connect the AC power cord to the Test Set.
 - a. Set the front panel switch to the Standby position. The fans or indicator lights should be Off.
 - b. Set the Standby Switch to the On position. The internal power supply fan should be operational and the Standby LED should be On.
 - c. If there is no DC power, suspect the Power Supply Module or Standby Switch. The actual Power Supply terminal connection (+12/-12 Volt) should also be confirmed using a DVM.

Front Panel LED is not Illuminated

If the U3050AH11 power supplies are operating the following procedures can be used to verify the failure. Front Panel LED Assembly (U3050-60004) or Buffer Amplifier Bias Bd Assembly (Z5623-60175).

1. If the LED is Off, verify the voltages (+12 Volt) on the Power Supply. If the voltages are correct, verify that the cables are connected correctly on both Amplifier Bias Bd and the LED assembly.
2. Measure +5 V from the Amplifier Bias board, J3, pins 1 & 3.
3. If the +5 V supply from the Amplifier Bias Bd is correct, replace the LED Assembly.

Troubleshooting Diagrams and Tables

Table 9 Power Supply Connections

Power Supply Terminals	Wire Color	Amplifier Bias Boards (J1)
-12 V	Black	pin 4 (-12 V)
+12 V	Blue (common)	pin 3 (common)
-12 V	Green (common)	pin 2 (common)
+12 V	Yellow	pin 1 (+12 V)

Table 10 Amplifier Bias Board Connections

Amplifiers	Wire Color	Amplifier Bias Boards (J2)
-12 V	white/yellow/grey	pin 4
common	white/brown/grey	pin 3
n/a	n/a	pin 2
+12 V	grey	pin 1

Table 11 Standby LED Connections

Standby LED	Wire Color	Amplifier Bias Boards (J3)
cathode	yellow	pin 3 (gnd)
anode	orange	pin 1 (+5 V)

Figure 17 Power Supply Wire Connections

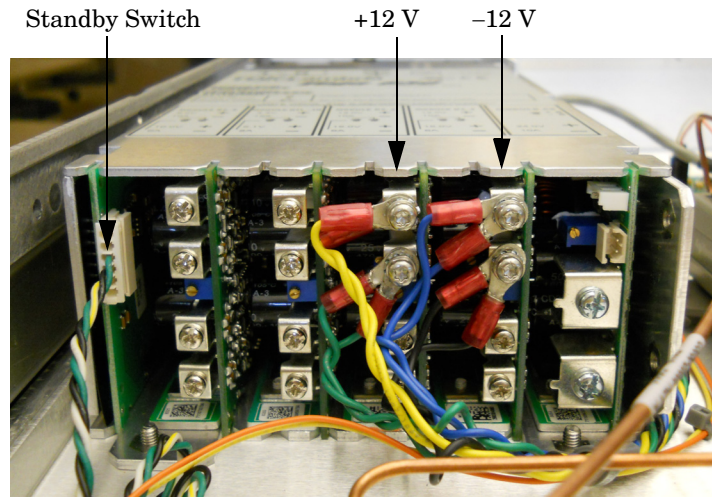
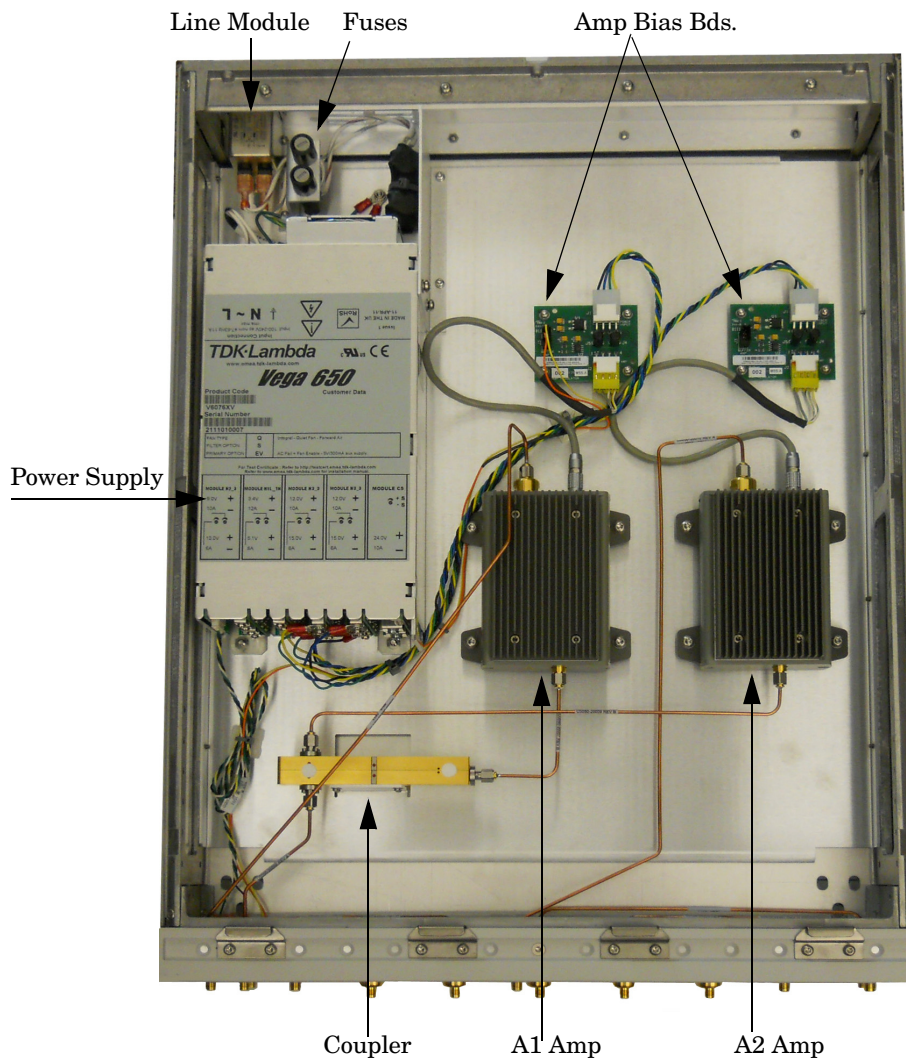


Figure 18 U3050AH11 Top View



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.

Before Applying Power

Verify that the premises electrical supply is within the range of the instrument. The instrument has an autoranging power supply.

WARNING To prevent electrical shock, disconnect the **Agilent Technologies U3050AH11** from mains electrical supply before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

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 Keep isopropyl alcohol away from heat, sparks, and flame. Store in a tightly closed container. It is extremely flammable. In case of fire, use alcohol foam, dry chemical, or carbon dioxide; water may be ineffective.

Declaration of Conformity

A copy of the Declaration of Conformity is available upon request, or a copy is available on the Agilent Technologies web site at <http://regulations.corporate.agilent.com/DoC/search.htm>

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 (Second Edition), and IEC 61010-1 (Second Edition).

General Safety Considerations

Cautions

Cautions applicable to this instrument.

CAUTION The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

CAUTION Always use the three prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage and the risk of electrical shock.

CAUTION This product is designed for use in Installation Category II and Pollution Degree 2.

CAUTION Verify that the premise electrical voltage supply is within the range specified on the instrument.

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.

Servicing

Warnings applicable to this instrument.

WARNING **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to manufacturer's instructions.**

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 the user to dangerous voltages. Disconnect the instrument from all voltage sources before opening.**

WARNING **This product is designed for use in Installation Category II and Pollution Degree 2.**

WARNING **No operator serviceable parts inside. Refer servicing to qualified personnel.**

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.**

Regulatory Information

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

Instrument Markings



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.



This symbol indicates that the instrument requires alternating current (ac) input.



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 instrument complies with Canada: CSA 22.2 No. 61010-1-04.

ISM1-A

This is a symbol of an Industrial Scientific and Medical Group 1 Class A product.

ICES/NMB-001

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



Direct Current.

IP 2 0

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



This is a required mark signifying compliance with an EMC requirement. The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.



China RoHS regulations include requirements related to packaging, and require compliance to China standard GB18455-2001.



This symbol indicates compliance with the China RoHS regulations for paper/fiberboard packaging.

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 Agilent Technologies for disposal. Refer to [“Contacting Agilent” on page 32](#) for assistance.

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 Maschinenlaermrerordnung-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

EMC Information

Complies with European EMC Directive 2004/108/EC

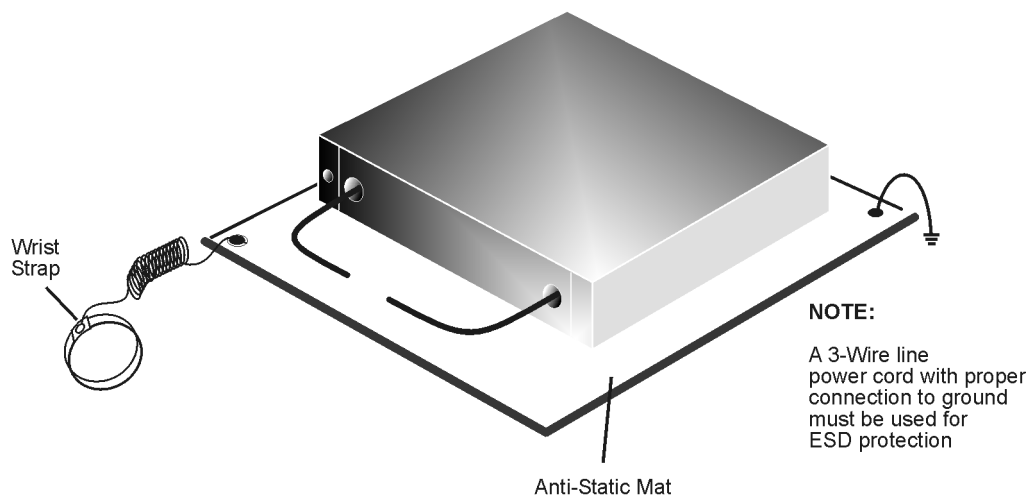
- IEC/EN 61326-1
- CISPR Pub 11 Group 1, class A
- AS/NZS CISPR 11
- This ISM device complies with Canadian ICES-001.
Cet appareil ISM est conforme a la norme NMB du Canada.

Electrostatic Discharge Protection

Protection against electrostatic discharge (ESD) is essential while removing assemblies from or connecting cables to the network analyzer. Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- *always* have a grounded, conductive table mat (9300-0797) in front of your test equipment.
- *always* wear a grounded wrist strap (9300-1367) with grounding cord (9300-0980), connected to a grounded conductive table mat, having a 1 M Ω resistor in series with it, when handling components and assemblies or when making connections.
- *always* wear a heel strap (9300-1126) when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- *always* ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.
- *always* ground the center conductor of a test cable before making a connection to the analyzer test port or other static-sensitive device. This can be done as follows:
 1. Connect a short (from your calibration kit) to one end of the cable to short the center conductor to the outer conductor.
 2. While wearing a grounded wrist strap, grasp the outer shell of the cable connector.
 3. Connect the other end of the cable to the test port and remove the short from the cable.

Figure 19 ESD Protection Setup



ku310b

Agilent Support, Services, and Assistance

Service and Support Options

The standard product warranty is a one-year return to Agilent Technologies service warranty.

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

Contacting Agilent

Assistance with test and measurements needs and information or finding a local Agilent office are available on the Web 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.

In any correspondence or telephone conversation, refer to the Agilent product by its model number and full serial number. With this information, the Agilent representative can determine the warranty status of your unit.

Shipping Your Instrument to Agilent for Service or Repair

IMPORTANT Agilent 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 Agilent for repair.

If you wish to send your instrument to Agilent Technologies for service or repair:

- Include a complete description of the service requested or of the failure and a description of any failed test and any error message.
- Ship the analyzer using the original or comparable antistatic packaging materials.
- Contact Agilent for instructions on where to ship your analyzer.⁶

