## About this Manual

We've added this manual to the Agilent website in an effort to help you support your product. This manual is the best copy we could find; it may be incomplete or contain dated information. If we find a more recent copy in the future, we will add it to the Agilent website.

## Support for Your Product

Agilent no longer sells or supports this product. Our service centers may be able to perform calibration if no repair parts are needed, but no other support from Agilent is available. You will find any other available product information on the Agilent Test & Measurement website, www.tm.agilent.com.

## HP References in this Manual

This manual may contain references to HP or Hewlett-Packard. Please note that Hewlett-Packard's former test and measurement, semiconductor products and chemical analysis businesses are now part of Agilent Technologies. We have made no changes to this manual copy. In other documentation, to reduce potential confusion, the only change to product numbers and names has been in the company name prefix: where a product number/name was HP XXXX the current name/number is now Agilent XXXX. For example, model number HP8648A is now model number Agilent 8648A.

# Installation and Verification EMI Receiver Series

## HP 8542E/HP 8546A EMI Receiver

## HP 85422E/HP 85462A Receiver RF Section


HP Part No. 5962-0478
Printed in USA December 1996

**Notice.**

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.


1400 Fountaingrove Parkway, Santa Rosa CA, 95403-1799, USA

## Certification

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institute's calibration facility, and to the calibration facilities of other International Standards Organization members.

### Regulatory Information

Regulatory information is located in the *EMI Receiver Series Reference* at the end of Chapter 1, "Specifications and Characteristics."

## Warranty

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Hewlett-Packard. Buyer shall prepay shipping charges to Hewlett-Packard and Hewlett-Packard shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Hewlett-Packard from another country.

Hewlett-Packard warrants that its software and firmware designated by Hewlett-Packard for use with an instrument will execute its programming instructions when properly installed on that instrument. Hewlett-Packard does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error-free.

#### Limitation of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. HEWLETT-PACKARD SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

#### Exclusive Remedies

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. HEWLETT-PACKARD SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT, OR ANY OTHER LEGAL THEORY.

## Assistance

*Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products. For any assistance, contact your nearest Hewlett-Packard Sales and Service Office.*

## Compliance

This instrument has been designed and tested in accordance with IEC Publication 348, 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.

## Safety Notes

The following safety notes are used throughout this manual. Familiarize yourself with each of the notes and its meaning before operating this instrument.

**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, would 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.

## General Safety Considerations

**WARNING**

- **No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock, do not remove covers.**
- **If this instrument is not used as specified, the protection provided by the equipment may be impaired. This instrument must be used in a normal condition (in which all means for protection are intact) only.**
- **For continued protection against fire hazard, replace line fuse only with same type and rating ([F 5A/250V]). The use of other fuses or material is prohibited.**

**CAUTION**

- Before switching on this instrument, make sure that the line voltage selector switch is set to the voltage of the power supply and the correct fuse is installed.
- Always use the three-prong ac power cord supplied with this instrument. Failure to ensure adequate earth grounding by not using this cord may cause instrument damage.
- Only clean the instrument cabinet using a damp cloth.

| | |
|---|---|
|  | 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. |
| CE | The CE mark is a registered trademark of the European Community. (If accompanied by a year, it is when the design was proven.) |
| ISM1-A | This is a symbol of an Industrial Scientific and Medical Group 1 Class A product. |
| CSA | The CSA mark is a registered trademark of the Canadian Standards Association. |

## Manual Conventions

| | |
|---|---|
| (Front-Panel Key) | This represents a key physically located on the instrument. |
| `Softkey` | This indicates a "softkey," a key whose label is determined by the firmware of the instrument. |
| `Screen Text` | This indicates text displayed on the instrument's screen. |

## EMI Receiver Series Documentation Description

The following documents are provided with either the EMI receiver or the receiver RF section.

- *Installation and Verification* provides information for installing your instrument, verifying instrument operation, and customer support.
- *User's Guide* describes instrument features and how to make measurements with your EMI receiver or receiver RF section.
- *Reference* provides specifications and characteristics, menu maps, error messages, and key descriptions.
- *Programmer's Guide* provides information on remote control instrument configuration, creating programs, and parameters for each of the programming commands available.

# Contents

# Figures

# Tables

# 1

# Preparing for Use

## Introducing the EMI Receiver

The EMI receiver includes the receiver RF section, the RF filter section, and all the accessories you will need to prepare the system for use.

This chapter contains information about accessories supplied, initial inspection, electrostatic discharge, and available power cables.

In addition, installation procedures show how to install the handles, lock the system together, set the line voltage selector switches, check the fuses, add the front and rear cables, and set the HP-IB address.

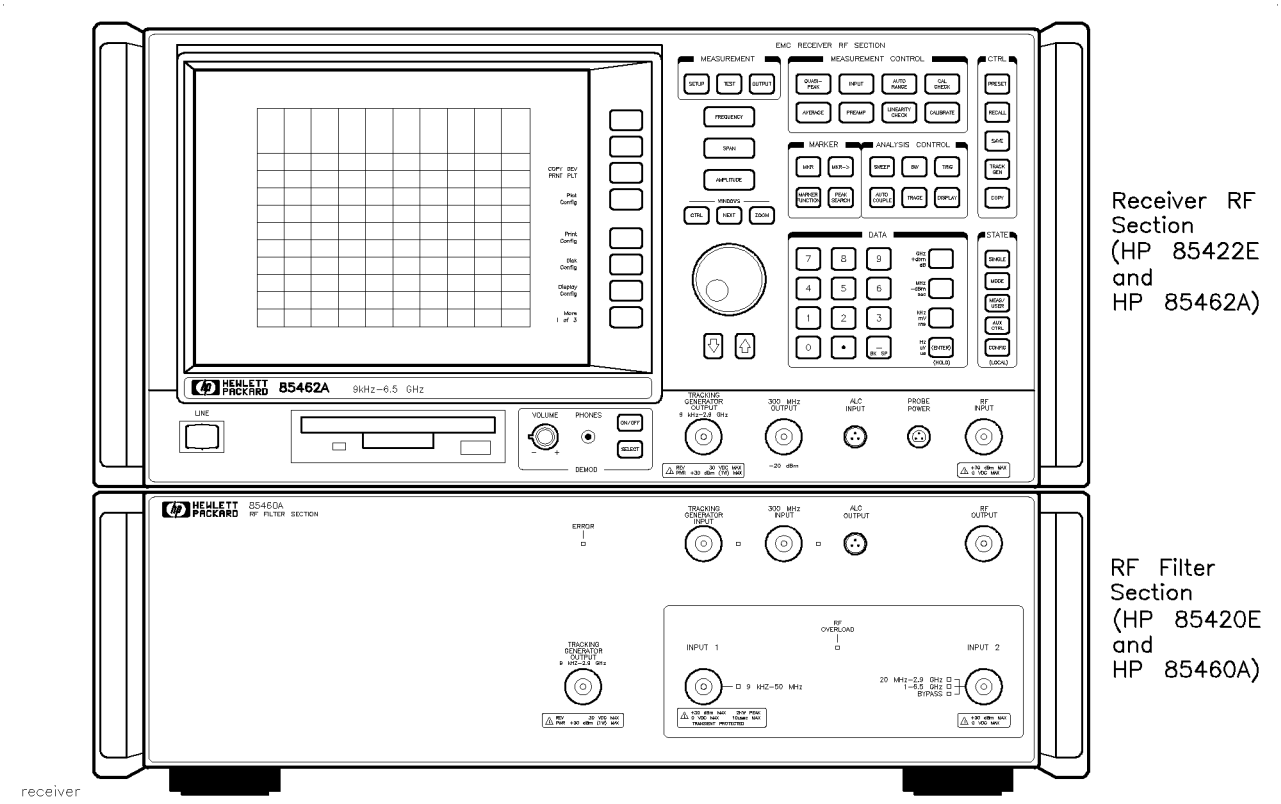
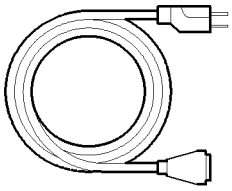
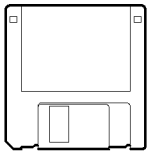
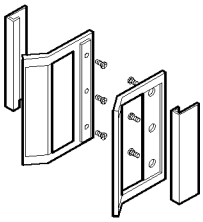
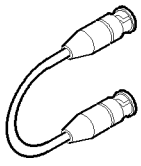
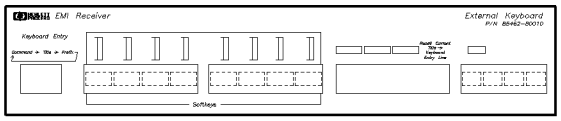



**Figure 1-1. EMI Receiver**

# Accessories Supplied

**Table 1-1. EMI Receiver Accessories Supplied**

| Accessory | Description | HP Part Number |
|---|---|---|
| **Receiver RF Section** | | |
|  accpwr | Power cable | See Table 1-3 |
|  accdisk | Limit line and antenna factor library disk | 5010-7721 |
|  acchand | Handles | 5062-3991 |
|  accincon | Adapters, Type N (m) to BNC (f) | 1250-0780 |
|  accshort | Cable, BNC (m) to BNC (m), 30 cm (12 in)[1] | 8120-1838 |
|  smtplate | External Keyboard Template | 85462-80010 |

1 For a standalone receiver RF section only, 23 cm (9 in), HP Part Number 8120-2682.

**Table 1-1. EMI Receiver Accessories Supplied (continued)**

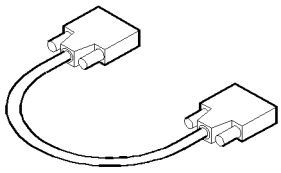
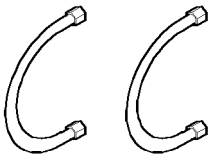
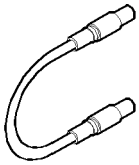
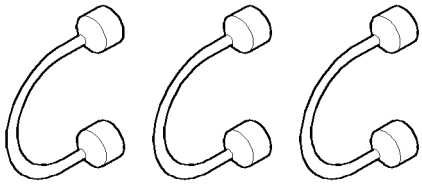
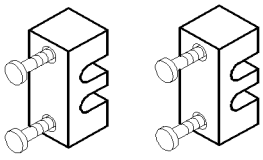
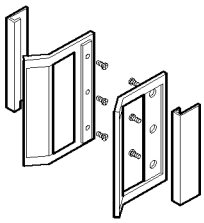
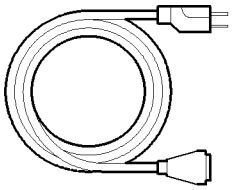
| Accessory | Description | HP Part Number |
|---|---|---|
| **RF Filter Section** | | |
|  acc9pin | Auxiliary interface cable | 8120-6337 |
|  accrigid | Two sweep flexible cables | 8120-8154 |
|  accalc | ALC cable | 8120-6212 |
|  acctypen | Three type-N semi-rigid cables | 85460-20036 |
|  acccImp | Two securing spacers | 85460-60028 |

**Table 1-1. EMI Receiver Accessories Supplied (continued)**

| Accessory | Description | HP Part Number |
|---|---|---|
| **RF Filter Section (continued)** | | |
|  acchand | Handles | 5062-3989 |
|  accpwr | Power cable | See Table 1-3 |

## Initial Inspection

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, keep it until you have verified that the contents are complete and you have tested the EMI receiver mechanically and electrically.

Table 1-1 contains the accessories shipped with the EMI receiver. If the contents are incomplete or if the EMI receiver does not pass the operation verification tests in Chapter 2, notify the nearest Hewlett-Packard office. If the shipping container is damaged or the cushioning material shows signs of stress, also notify the carrier. Keep the shipping materials for the carrier's inspection. The HP office will arrange for repair or replacement without waiting for a claim settlement.

If the shipping materials are in good condition, retain them for possible future use. You may wish to ship the EMI receiver to another location or return it to Hewlett-Packard for service. See "Returning the EMI Receiver for Service," in Chapter 3, for more information about shipping materials.

## Electrostatic Discharge

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe work station. Figure 1-2 shows an example of a static-safe work station using two types of ESD protection:

- 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. Of the two, only the table-mat and wrist-strap combination provides adequate ESD protection when used alone.

To ensure user safety, the static-safe accessories must provide at least 1 MΩ of isolation from ground. Refer to Table 1-2 for information on ordering static-safe accessories.

**WARNING** **Do not use either of the two types of ESD protection described above for a static-safe work station when working on circuitry with a voltage potential greater than 500 volts.**

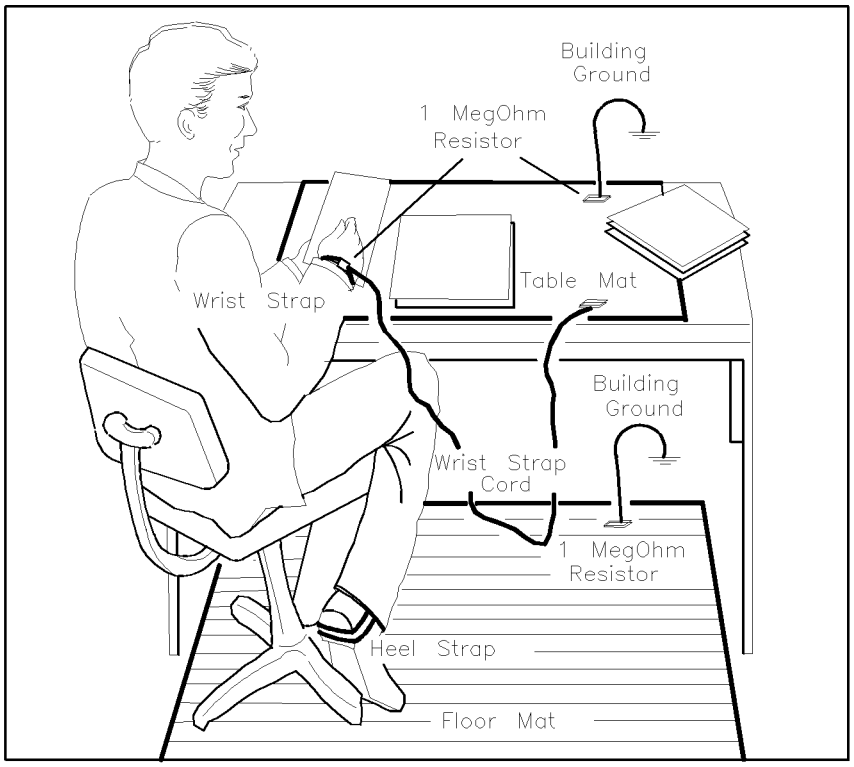



**Figure 1-2. Example of a Static-Safe Work Station**

## Reducing Damage Caused by ESD

The following suggestions may help reduce ESD damage that occurs during testing and servicing operations.

- Before connecting any coaxial cable to an EMI receiver connector for the first time each day, momentarily ground the center and outer conductors of the cable.
- Personnel should be grounded with a resistor-isolated wrist strap before touching the center pin of any connector and before removing any assembly from the unit.
- Be sure that all instruments are properly earth-grounded to prevent a buildup of static charge.

Table 1-2 lists static-safe accessories that can be obtained from Hewlett-Packard by using the HP part numbers shown.

**Table 1-2. Static-Safe Accessories**

| HP Part Number | Description |
|---|---|
| 9300-0797 | Set includes: 3M static control mat 0.6 m × 1.2 m (2 ft × 4 ft) and 4.6 cm (15 ft) ground wire. (The wrist-strap and wrist-strap cord are not included. They must be ordered separately.) |
| 9300-0980 | Wrist-strap cord 1.5 m (5 ft) |
| 9300-1383 | Wrist-strap, color black, stainless steel, without cord, has four adjustable links and a 7 mm post-type connection. |
| 9300-1169 | ESD heel-strap (reusable 6 to 12 months). |

## Installation Procedures

This section provides procedures on how to prepare the EMI receiver and receiver RF section for use. Refer to the procedure below that applies to your instrument.

- Installing the EMI receiver
- Installing the receiver RF section

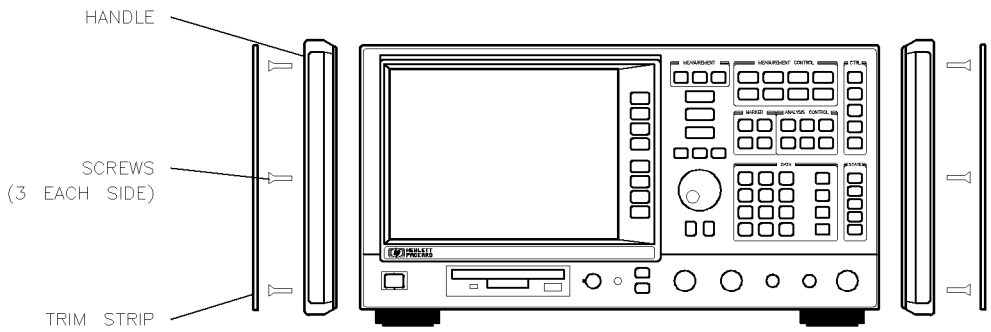
**WARNING** **Do not lift the instrument by its handles when it is configured as an EMI receiver, that is, when the receiver RF section is joined together with the RF filter section. Otherwise, personal injury may be incurred.**

**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, then forced convection must be used.

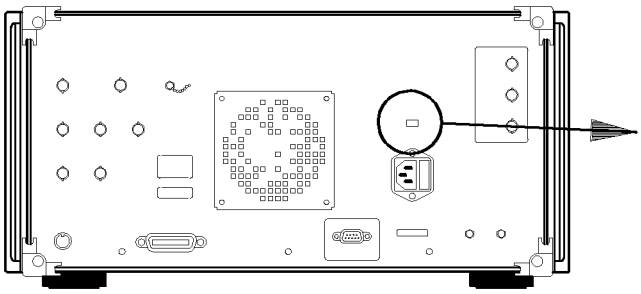
**CAUTION** The EMI receiver and receiver RF section are designed for use in Installation Category II and Pollution Degree 2 per IEC 1010 and 664, respectively.

## Installing the EMI Receiver

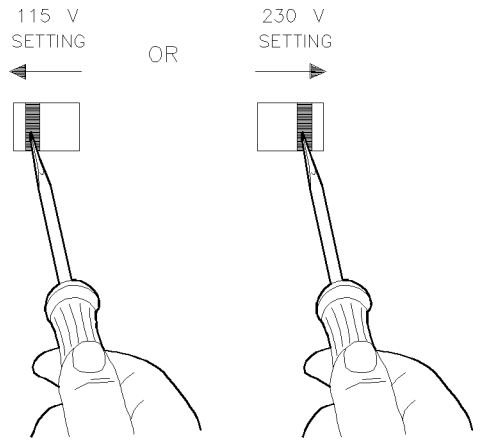
The following procedure shows how to install the EMI receiver. You will connect the receiver RF section to the RF filter section with securing spacers, install the handles, set the line voltage selector switches, check the fuses, connect the front and rear cables, verify communication between the receiver RF section and RF filter section, and set the HP-IB address (or RS-232 baud rate).



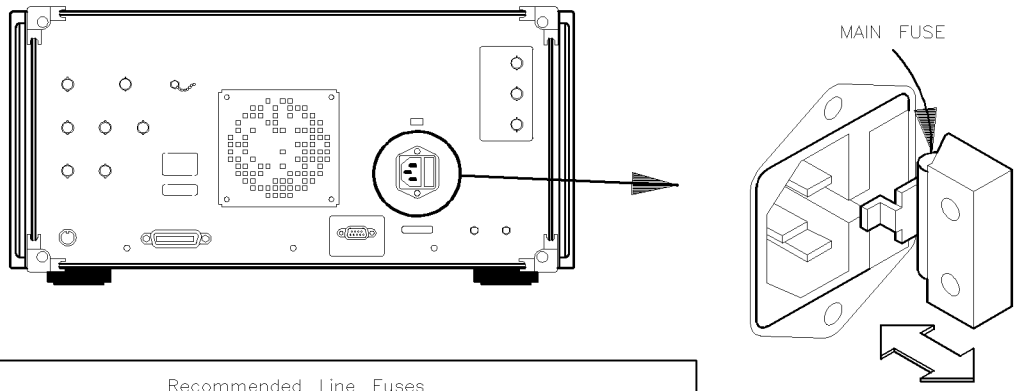

1. Install the handles according to the installation procedure shipped with the handles.



| Characteristic | 115 V Requirement | 230 V Requirement |
|---|---|---|
| Input Voltage<br>Frequency<br>Power—HP 85462A | 90 to 132 V rms<br>47 to 440 Hz<br><500 VA, <180 W | 198 to 264 V rms<br>47 to 66 Hz<br><500 VA, <180 W |



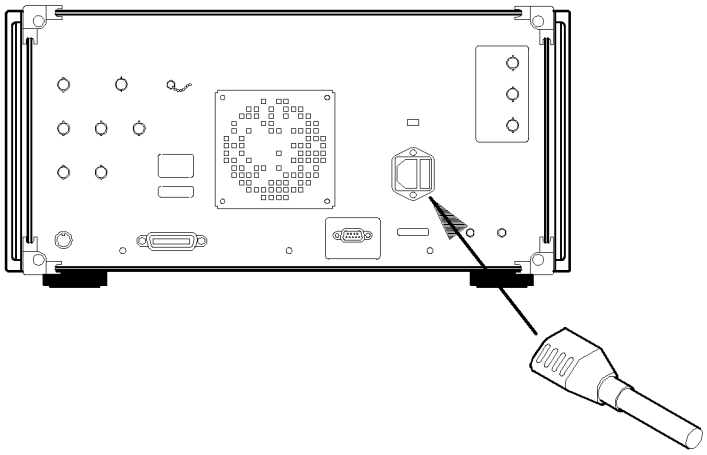

2. Set the line voltage selector switch.




| Recommended Line Fuses | | | |
|---|---|---|---|
| Size | Rating | Input Line Voltage | HP Part Number |
| 5 by 20 mm | FSA, 250 V, 5 Amp (IEC approved) | 115 V or 230 V | 2110-0709 |

step3

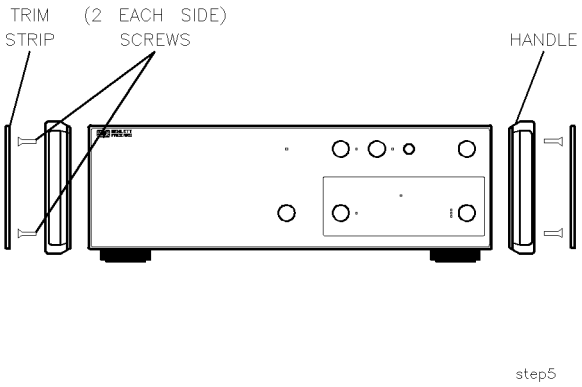
3. Check the line fuse.



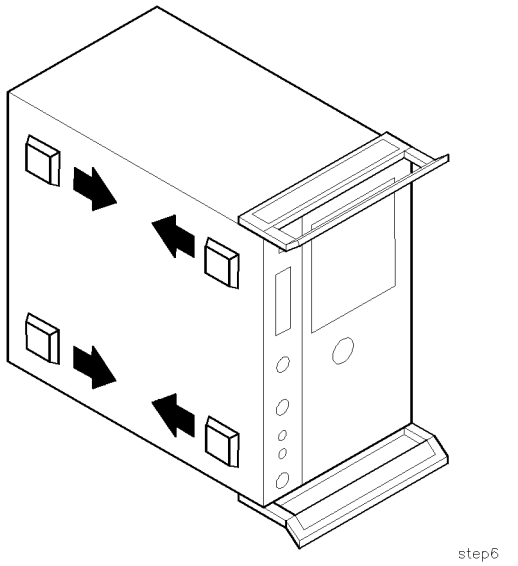
step4

4. Connect the power cord.

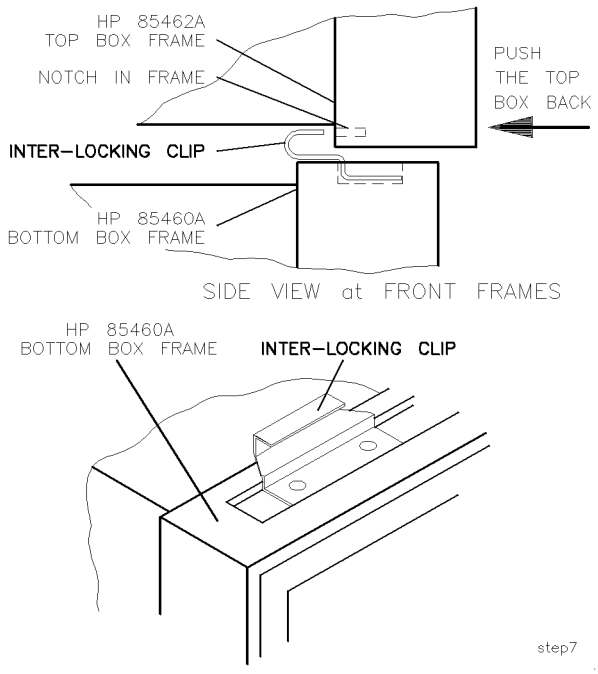
**Note** Be sure the line switch is off when you connect the power cord. The receiver RF section will not control the RF filter section if the receiver RF section is turned on before the RF filter section has been turned on.



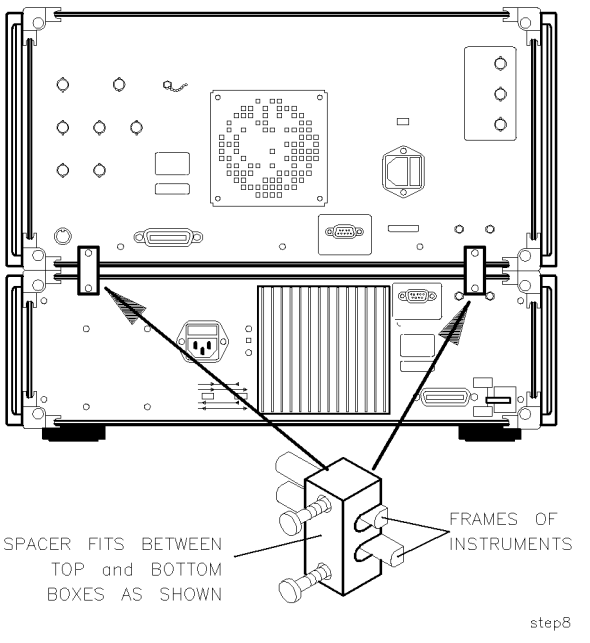

5. Install the handles according to the installation procedure shipped with the handles.



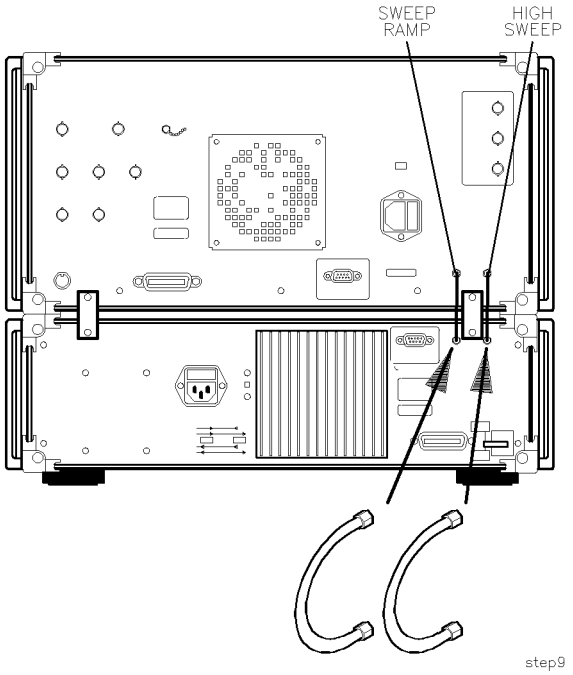

6. Remove the two rear bottom feet from the receiver RF section by lifting tab, moving feet toward front of instrument, then pulling feet out. Remove front feet by lifting tab, moving feet toward rear of instrument, then pulling feet out.



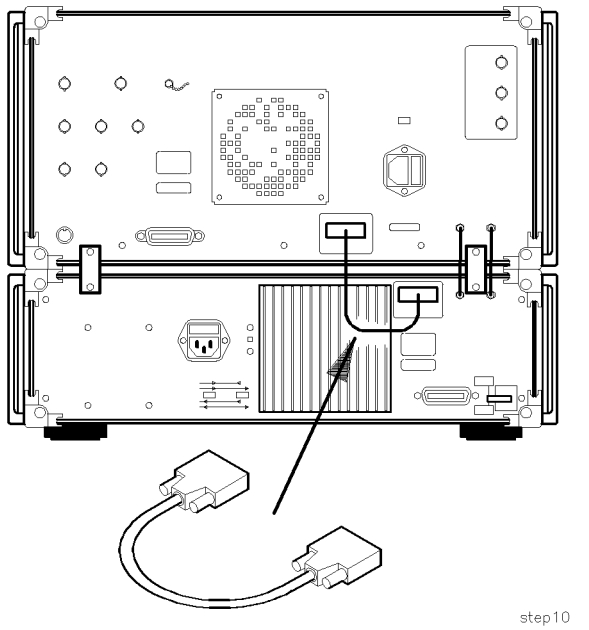

7. Place the receiver RF section on top of the RF filter section so that they lock together with the inter-locking clips on the RF filter section.



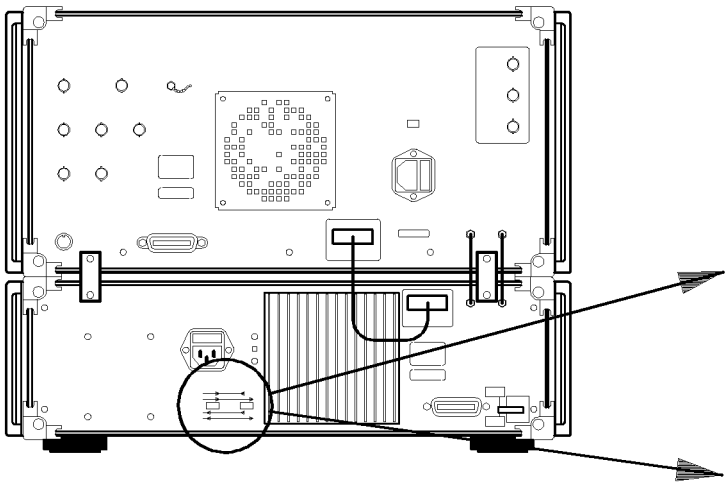

8. Connect the two securing spacers to the rear of the EMI receiver by lifting receiver RF section slightly, aligning screw holes in securing spacers with holes in instruments, pushing the securing spacers in place, and tightening the screws.



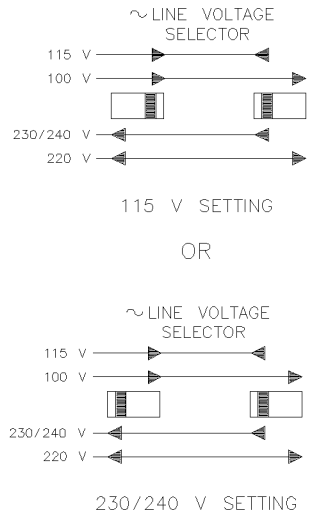

9. Connect the sweep ramp and high sweep cables.



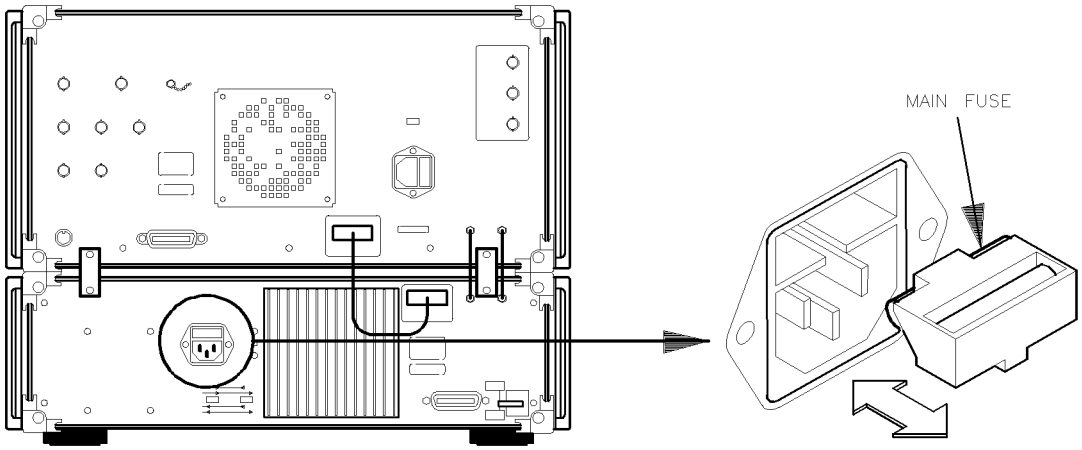

10. Make sure line switch is off, then connect the auxiliary interface cable.



| Characteristic | 115 V Requirement | 230 V Requirement |
|---|---|---|
| Input Voltage<br>Frequency<br>Power–HP 85460A | 90 to 132 V rms<br>47 to 440 Hz<br><115 VA, <85 W | 198 to 264 V rms<br>47 to 66 Hz<br><115 VA, <85 W |



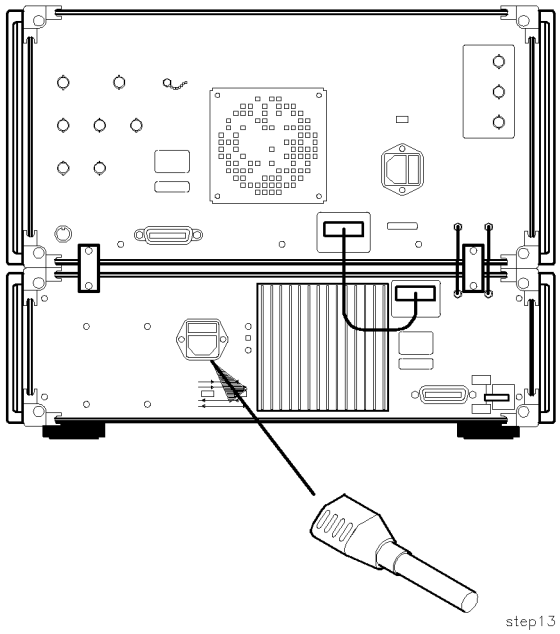

11. Set the line voltage selector switch.




| Recommended Line Fuses | | | |
|---|---|---|---|
| Size | Rating | Input Line Voltage | HP Part Number |
| 5 by 20 mm | FSA, 250 V, .5 Amp (IEC approved) | 115 V or 230 V | 2110-0458 |
| 5 by 20 mm | FSA, 250 V, 1 Amp (UL/CSA approved) | 115 V | 2110-0782 |

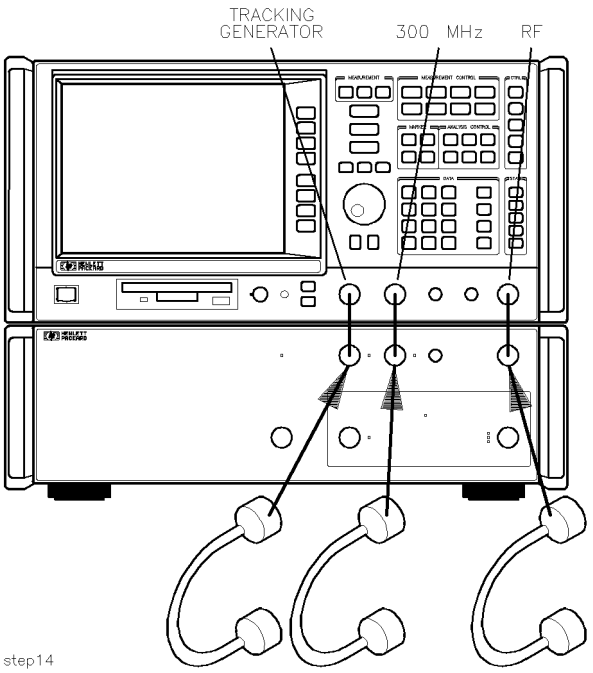
step12

12. Check the line fuse.



step13

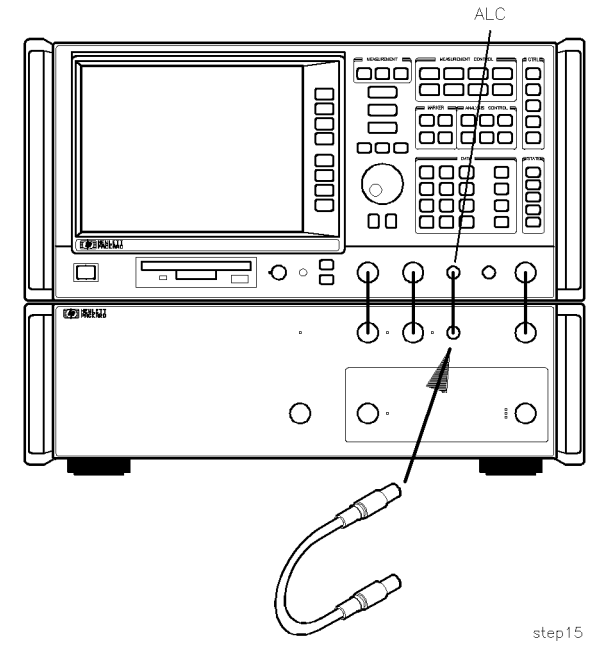
13. Connect the power cord.



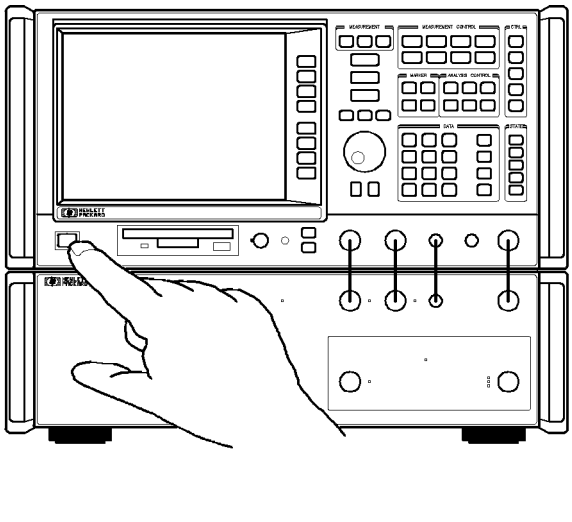

step14

14. Connect and firmly tighten the three type-N cables on the front panel.

**CAUTION** Before switching on this instrument, make sure that the line voltage selector switch is set to the voltage of the power supply and the correct fuse is installed. Assure that the supply voltage is in the specified range.




15. Connect the ALC cable by aligning red dots on cable with red dots on connector, then pushing cable into connector.

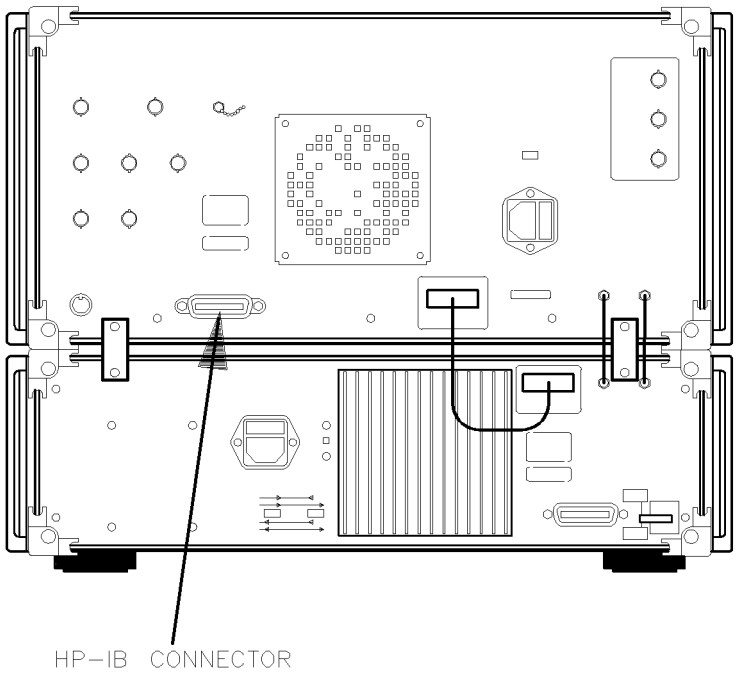



16. Turn the line switch on.

17. Press (INPUT). If the `INPUT 1 9K-50M`, `INPUT 2 20M-2.9G`, `INPUT 2 1-6.5G`[1], and `INPUT 2 BYPASS` softkeys appear on the screen, then communication between the receiver RF section and RF filter section has been established.

1 For an HP 8546A\HP 85462A only.

**CAUTION** Do not position this instrument where it is difficult to disconnect the power cord.




18. If your instrument has the HP-IB interface installed, connect the HP-IB cable to the HP-IB connector as shown.

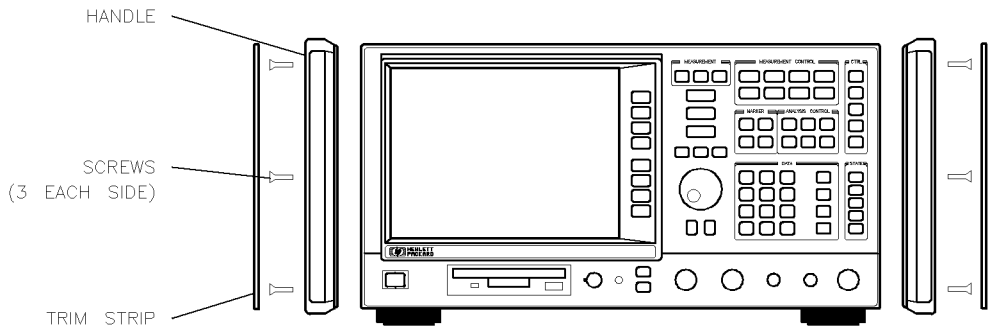
Note that the factory default HP-IB address is 18. To change the HP-IB address, press (CONFIG), `More 1 of 3`, then `RECEIVER ADDRESS`. Use the numeric keypad to enter the desired address, then press (ENTER). Note that the HP-IB address appears in the upper-left portion of the display.

19. If you have an RS-232 interface installed and you want to set the baud rate, press (CONFIG), `More 1 of 3`, `BAUD RATE`, (enter baud rate using data keys), (ENTER).

Be sure that the receiver's baud rate is the same as the baud rate of the printer or computer.

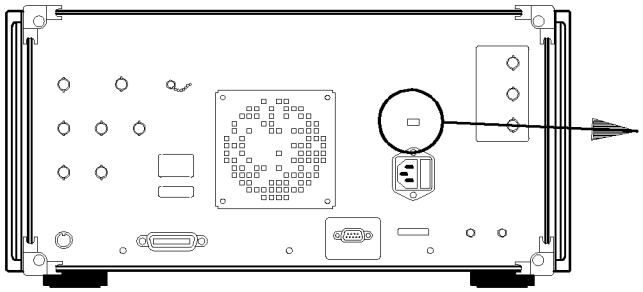
## Installing the Receiver RF Section

The following procedure shows how to install the receiver RF section. You will install the handles, set the line voltage selector switch, check the fuse, and set the HP-IB address (or RS-232 baud rate).

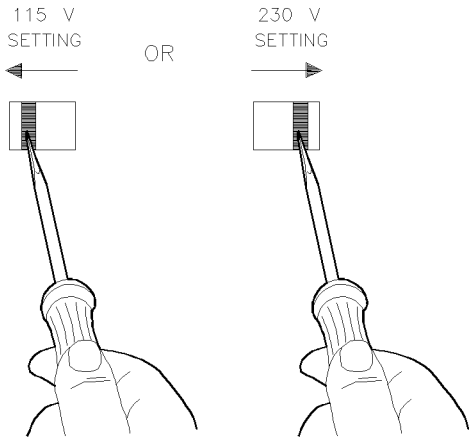



step1

1. Install the handles according to the installation procedure shipped with the handles.

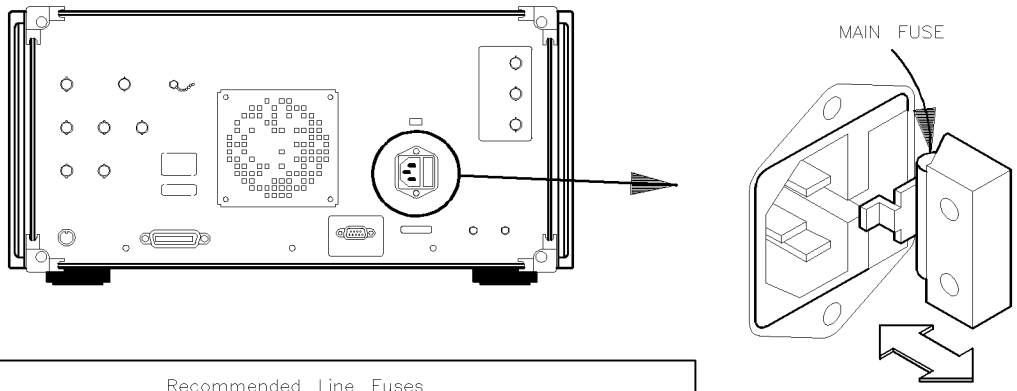


| Characteristic | 115 V Requirement | 230 V Requirement |
|---|---|---|
| Input Voltage<br>Frequency<br>Power—HP 85462A | 90 to 132 V rms<br>47 to 440 Hz<br><500 VA, <180 W | 198 to 264 V rms<br>47 to 66 Hz<br><500 VA, <180 W |




step2

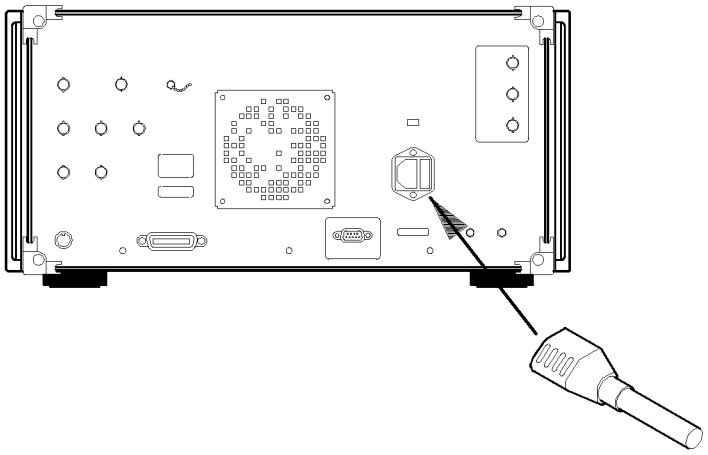
2. Set the line voltage selector switch.




| Recommended Line Fuses | | | |
|---|---|---|---|
| Size | Rating | Input Line Voltage | HP Part Number |
| 5 by 20 mm | FSA, 250 V, 5 Amp (IEC approved) | 115 V or 230 V | 2110-0709 |

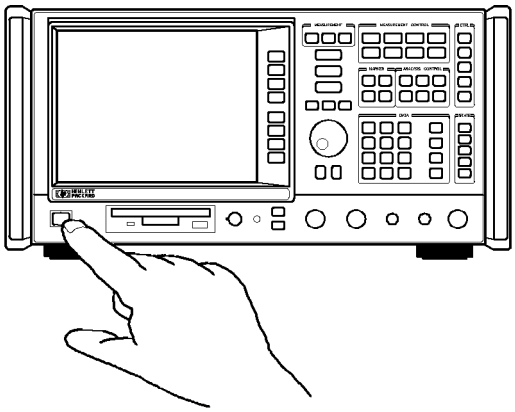
step3

3. Check the line fuse.



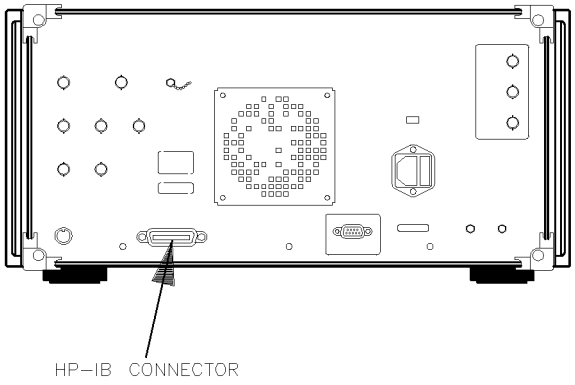
step4

4. Connect the power cord.



topline

5. Turn the line switch on.




stephpib

6. If your instrument has the HP-IB interface installed, connect the HP-IB cable to the HP-IB connector as shown.

Note that the factory default HP-IB address is 18. To change the HP-IB address, press (CONFIG), `More 1 of 3`, then `RECEIVER ADDRESS`. Use the numeric keypad to enter the desired address, then press (ENTER). Note that the HP-IB address appears in the upper-left portion of the display.

7. If you have an RS-232 interface installed and you want to set the baud rate, press (CONFIG), `More 1 of 3`, `BAUD RATE`, (enter baud rate using data keys), (ENTER).

Be sure that the receiver's baud rate is the same as the baud rate of the printer or computer.

## Power Cables

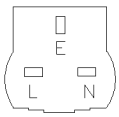
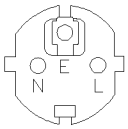
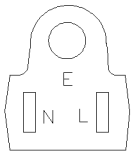
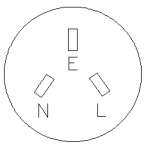
The EMI receiver is equipped with two three-wire power cables, in accordance with international safety standards. When connected to an appropriate power line outlet, these cables ground the instrument cabinet.

**WARNING**

**This is a Safety Class 1 Product provided with a protective earthing ground incorporated in the power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited.**

Various power cables are available to connect the EMI receiver to the types of ac power outlets unique to specific geographic areas. The cable appropriate for the area in which the EMI receiver is originally shipped is included with the unit. You can order additional ac power cables for use in different areas. Table 1-3 lists the available ac power cables, illustrates the plug configurations, and identifies the geographic area in which each cable is appropriate.

## Table 1-3. AC Power Cables Available

| PLUG TYPE ** | CABLE HP PART NUMBER | PLUG DESCRIPTION | CABLE LENGTH CM (INCHES) | CABLE COLOR | FOR USE IN COUNTRY |
|---|---|---|---|---|---|
| 250V   | 8120-1351<br>8120-1703 | Straight* BS1363A<br>90° | 229 (90)<br>229 (90) | Mint Gray<br>Mint Gray | Great Britain, Cyprus, Nigeria, Singapore, Zimbabwe |
| 250V   | 8120-1369<br>8120-0696 | Straight* NZSS198/ASC112<br>90° | 201 (79)<br>221 (87) | Gray<br>Gray | Argentina, Australia, New Zealand, Mainland China |
| 250V   | 8120-1689<br>8120-1692 | Straight* CEE7-Y11<br>90° | 201 (79)<br>201 (79) | Mint Gray<br>Mint Gray | East and West Europe, Central African Republic, United Arab Republic (unpolarized in many nations) |
| 125V   | 8120-1348<br>8120-1538 | Straight* NEMA5-15P<br>90° | 203 (80)<br>203 (80) | Black<br>Black | United States Canada, Japan (100 V or 200 V), Brazil, Colombia, Mexico, Phillipines, Saudia Arabia, Taiwan |
| | 8120-1378<br>8120-4753<br>8120-1521<br>8120-4754 | Straight* NEMA5-15P<br>Straight<br>90°<br>90° | 203 (80)<br>230 (90)<br>203 (80)<br>230 (90) | Jade Gray<br>Jade Gray<br>Jade Gray<br>Jade Gray | |
| 250V   | 8120-5182<br>8120-5181 | Straight* NEMA5-15P<br>90° | 200 (78)<br>200 (78) | Jade Gray<br>Jade Gray | Israel |

* Part number for plug is industry identifier for plug only. Number shown for cable is HP Part Number for complete cable, including plug.

** E = Earth Ground; L = Line; N = Neutral.

FORMAT80

# 2

# Operation Verification

This chapter contains operation verification test procedures that test the electrical performance of the receiver.

Allow the receiver to warm up in accordance with the Temperature Stability specification before performing the tests in this chapter.

None of the test procedures involve removing the cover of the receiver.

Operation verification tests only the most critical specifications of the receiver. These tests are recommended for incoming inspection, troubleshooting, or after repair.

The following table lists the operation verification tests included in this chapter.

**Table 2-1. Operation Verification Tests**

| Test Name | EMI Receiver | Receiver RF Section |
|---|---|---|
| 1. Frequency Readout and Marker Count Accuracy | • | • |
| 2. Frequency Span Readout Accuracy | • | • |
| 3. EMI Receiver Absolute Amplitude Accuracy | • | |
| 4. Input Attenuator Accuracy for Receiver RF Section | | • |
| 5. Input Attenuator Accuracy for EMI Receiver | • | |
| 6. Scale Fidelity | • | • |
| 7. EMI Receiver Reference Level Accuracy | • | |
| 8. Receiver RF Section Reference Level Accuracy | | • |
| 9. Calibrator Amplitude Accuracy | | • |
| 10. Calibration Repeatability and IF Bandwidth Switching Uncertainties | • | • |
| 11. Frequency Response for the Receiver RF Section | | • |
| 12. EMI Receiver Overload | • | |
| 13. Receiver RF Section Overload | | • |
| 14. Displayed Average Noise Level EMI Receiver | • | |
| 15. Displayed Average Noise Level Receiver RF Section | | • |
| 16. CISPR Pulse Response | • | • |

## Safety

Familiarize yourself with the safety symbols marked on the receiver, and read the general safety instructions and the symbol definitions given in the front of this guide *before* you begin verifying performance of the receiver.

## Before You Start

There are four things you should do before starting an operation verification test:

- Switch the receiver on and let it warm up in accordance with the Temperature Stability specification in Chapter 2.
- Read "Making a Measurement" in Chapter 2 of the User's Guide.
- After the receiver has warmed up as specified, perform the self-calibration routines as follows:
- If testing either an HP 8542E or an HP 8546A, connect the cable from the tracking generator output to INPUT 2. Use the RF INPUT if testing either an HP 85422E or an HP 85462A.

**For either an HP 8542E or an HP 85422E only.**

Press the following keys:
(CALIBRATE)
More 1 of 3
More 2 of 3
CAL TRK GEN
(CALIBRATE)
CAL ALL
CAL STORE

**For either an HP 8546A or an HP 85462A only.**

Press the following keys:
(CALIBRATE)
More 1 of 3
More 2 of 3
CAL TRK GEN
(CALIBRATE)
CAL ALL
More 1 of 3
More 2 of 3
CAL YTF
CAL STORE

The performance of the receiver is only specified after the receiver calibration routines have been run.

- Read the rest of this section before you start any of the tests, and make a copy of the Operation Verification Test Record at the end of this chapter.

## Test equipment you will need

Tables 2-2 through 2-4 list the recommended test equipment, accessories, and cables for the manual operation verification. Any equipment that meets the critical specifications given in the table can be substituted for the recommended model.

## Recording the test results

A operation verification test record is provided at the end of this chapter.

Each test result is identified as a *TR Entry* in the operation verification tests and on the operation verification test record. We recommend that you make a copy of the operation verification test record, record the test results on the copy, and keep the copy for your test record. This record could prove valuable in tracking gradual changes in test results over long periods of time.

## If the receiver doesn't meet specifications

If the receiver fails one or more specifications, complete any remaining tests and record all test results on a copy of the operation verification test record. Then refer to Chapter 3, "Customer Support," for instructions on how to solve the problem.

## Periodically verifying operation

The receiver requires periodic verification of operation. Under most conditions of use, you should test the receiver at least once a year with either operation verification or the complete set of operation verification tests.

**Table 2-2. Recommended Test Equipment**

| Equipment | Critical Specifications for Equipment Substitution | Recommended Model |
|---|---|---|
| Power Meter | Power Range: Calibrated in dBm and dB relative to reference power −70 dBm to +44 dBm, sensor dependent | HP 438A |
| Power Sensor | Frequency Range: 1 MHz to 350 MHz<br>Amplitude Range: −30 dBM to +20 dBm<br>Maximum SWR: 1.1 (1 MHz to 2.0 GHz)<br>1.30 (2.0 to 2.9 GHz) | HP 8482A |
| Power Sensor, Low-Power | Frequency Range: 300 MHz<br>Amplitude Range: −20 dBm to −70 dBm<br>Maximum SWR: 1.4 (10 MHz to 30 MHz)<br>1.15 (30 MHz to 2.9 GHz) | HP 8481D |
| Power Sensor, High Frequency | Frequency Range: 50 MHz to 6.5 GHz<br>Amplitude Range: −30 dBM to +20 dBm<br>Maximum SWR: 1.1 (300 MHz)<br>1.15 (50 MHz to 100 MHz)<br>1.10 (100 MHz to 2 GHz)<br>1.15 (2 GHz to 12.4 GHz) | HP 8485A |
| Pulse Generator | Period Range: 1 ms to 980 ms ±2%, single pulse mode<br>Level −2 V to +2 V<br>Transition Time: 6 ns ±10%, ±1 ns<br>Pulse Width: 150 ns to 3 μs ±1% ±1 ns | HP 8161A |
| Signal Generator | Frequency Range: 1 MHz to 1000 MHz<br>Amplitude Range: −35 dBm to +16 dBm<br>SSB Noise: <−120 dBc/Hz at 20 kHz offset | HP 8642A |
| Synthesized Sweeper | Frequency Range: 10 MHz to 6.5 GHz<br>Frequency Accuracy (CW): ±0.02%<br>Leveling Modes: Internal and External<br>Modulation Modes: AM<br>Power Level Range: −35 dBm to +16 dBm<br>*(two required)* | HP 83630A |
| Synthesizer/Level Generator | Frequency Range: 500 Hz to 80 MHz<br>Amplitude Range: +12 dBm to −85 dBm<br>Flatness: ±0.15 dB<br>Attenuator Accuracy: ±0.09 dB | HP 3335A |

**Table 2-3. Recommended Accessories**

| Equipment | Critical Specifications for Accessory Substitution | Recommended Model |
|---|---|---|
| Adapter | APC 3.5 (f) to APC 3.5 (f) *(two required)* | 5061-5311 |
| Adapter | SMB (m) to BNC (f) | 1250-1237 |
| Adapter | BNC (m) to BNC (m) | 1250-0216 |
| Adapter | Type N (f) to BNC (f) | 1250-1474 |
| Adapter | Type N (f) to APC 3.5 (f) | 1250-1745 |
| Adapter | Type N (f) to APC 3.5 (m) | 1250-1750 |
| Adapter | Type N (m) to APC 3.5 (f) | 1250-1744 |
| Adapter | Type N (m) to APC 3.5 (m) | 1250-1743 |
| Adapter | Type N (m) to BNC (f) *(two required)* | 1250-1476 |
| Adapter | Type N (f) to BNC (m) | 1250-1477 |
| Adapter | Type N (f) to N (f) | 1250-1472 |
| Adapter | Type N (m) to N (m) | 1250-1475 |
| Attenuator, 3 dB | Type N (m to f)<br>Attenuation: 3 dB<br>Frequency: dc to 12.4 GHz | HP 8491A<br>Option 003 |
| Attenuator, 10 dB | Type N (m to f)<br>Frequency: 300 MHz | HP 8491A<br>Option 010 |
| Attenuator,<br>1 dB Step | Attenuation Range: 0 to 12 dB<br>Frequency Range: 50 MHz<br>Connectors: BNC female | HP 355C |
| Attenuator,<br>10 dB Step | Attenuation Range: 0 to 30 dB<br>Frequency Range: 50 MHz<br>Connectors: BNC female | HP 355D |
| Low Pass Filter,<br>300 MHz | Cutoff Frequency: 300 MHz<br>Bandpass Insertion Loss <0.9 dB dB at 300 MHz<br>Stopband Insertion Loss: >40 dB at 435 MHz | 0955-0455 |
| Modulator<br>TeleTech SC35B | Frequency 50 MHz<br>ON/OFF RATIO >70 dB<br>Switching Speed 2 ns<br>Insertion Loss: 5 dB | 0955-0533 |

**Table 2-3. Recommended Accessories (continued)**

| Equipment | Critical Specifications for Accessory Substitution | Recommended Model |
|---|---|---|
| Power Splitter, Type N | Frequency Range: 50 kHz to 6.5 GHz<br>Insertion Loss: 6 dB (nominal)<br>Output Tracking: <0.20 dB<br>Equivalent Output SWR: <1.20:1 | HP 11667A |
| Power Splitter | Frequency Range: 50 kHz to 6.5 GHz<br>Insertion Loss: 6 dB (nominal)<br>Output Tracking: <0.25 dB<br>Equivalent Output SWR: <1.22:1 | HP 11667B |
| Termination, 50 Ω, Type N (m) | Impedance: 50 Ω (nominal) | HP 908A |
| Termination, 50 Ω, APC 3.5 (m) | Impedance: 50 Ω (nominal) | HP 909D |

**Table 2-4. Recommended Cables**

| Equipment | Critical Specifications for Cable Substitution | Recommended Model |
|---|---|---|
| Cable | Type N, 183 cm (72 in) | HP 11500A |
| Cable | Type N, 152 cm (60 in) | HP 11500D |
| Cable | Frequency Range: dc to 1 GHz<br>Length: ≥122 cm (48 in)<br>Connectors: BNC (m) both ends<br>*(three required)* | HP 10503A |
| Cable | Frequency Range: dc to 310 MHz<br>Length: 20 cm (9 in)<br>Connectors: BNC (m) both ends | HP 10502A |
| Cable | Frequency Range: 10 MHz to 22 GHz<br>Maximum SWR: <1.4 at 22 GHz<br>Length: ≥91 cm (36 in)<br>Connectors: APC 3.5 (m) both ends<br>Maximum Insertion Loss 2 dB | 8120-4921 |

# 1. Frequency Readout and Marker Count Accuracy

The frequency readout accuracy of the receiver is tested with an input signal of known frequency at the RF INPUT if testing the receiver RF section, or INPUT 2 if testing the EMI receiver. By using the same frequency standard for the receiver and the synthesized sweeper, the frequency reference error is eliminated.

## Equipment Required

Synthesized sweeper
Adapter, Type N (f) to APC 3.5 (m)
Adapter, APC 3.5 (f) to APC 3.5 (f)
Cable, APC 3.5, 91 cm (36 in)
Cable, BNC, 122 cm (48 in)

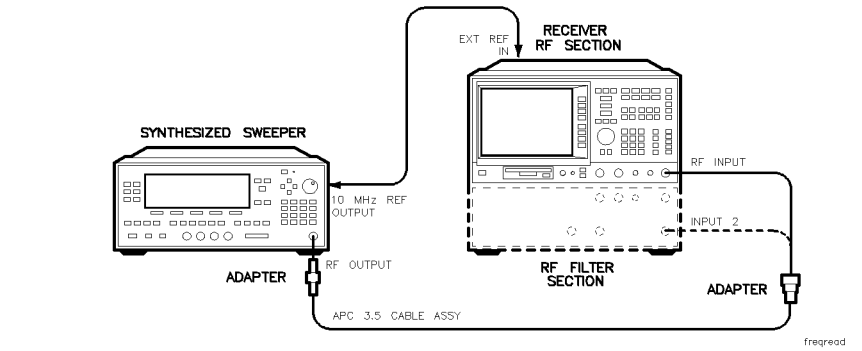



**Figure 2-1. Frequency Readout Accuracy Test Setup**

**Procedure** This operation verification test consists of two parts:

Part 1: Frequency Readout Accuracy
Part 2: Marker Count Accuracy

Perform "Part 1: Frequency Readout Accuracy" before "Part 2: Marker Count Accuracy."

## Part 1: Frequency Readout Accuracy

1. Connect the equipment as shown in Figure 2-1. Remember to connect the 10 MHz REF OUT of the synthesized sweeper to the EXT REF IN of the receiver.
2. Perform the following steps to set up the equipment:
   - Press INSTRUMENT PRESET on the synthesized sweeper, then set the controls as follows:

     CW ..... 1.5 GHz
     POWER LEVEL ..... −15 dBm

   - Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

     (MODE) EMI RECEIVER
     (FREQUENCY) CENTER FREQ 1.5 (GHz)
     (SPAN) 20 (MHz)
     (SWEEP) SWP TIME AUTO MAN (MAN) 75 (ms)

3. Press (INPUT) INPUT 2 20M-2.9G (EMI receiver only) (PEAK SEARCH) on the receiver to measure the frequency readout accuracy.
4. Record the MKR frequency reading in the operation verification test record as indicated in Table 2-5 or Table 2-6. The reading should be within the limits shown.

   Record the Frequency Readout Accuracy for the Receiver RF Section in section 1a of the operation and verification test record, use 1b for the Frequency Readout Accuracy for the EMI Receiver.
5. Change to the next receiver span, center frequency, and bandwidth setting listed in Table 2-5 or Table 2-6.

---

**Note**

- For the 3 kHz bandwidth setting, press (SWEEP) SWEEP TIME AUTO MAN (AUTO). For all other bandwidths set the sweep time to 75 mS by pressing, (SWEEP) SWEEP TIME AUTO MAN (MAN) 75 (ms).

  *For an HP 8546A/HP 85462A only.*

- When the center frequency changes to 4.0 GHz, press INPUT 2 1-6.5 G on the receiver before changing frequency, then set the synthesized sweeper CW to 4000 MHz and set the power level to −30 dBm.

---

6. Repeat steps 3 through 5 for each receiver frequency, span, and bandwidth settings listed in Table 2-5 or Table 2-6.

**Table 2-5.**
**Frequency Readout Accuracy for the Receiver RF Section**

| Receiver | | | | Synthesized Sweeper CW | Min. Frequency | TR Entry Frequency | Max. Frequency |
|---|---|---|---|---|---|---|---|
| | Center Frequency (GHz) | Span (MHz) | Bandwidth (kHz) | (GHz) | (GHz) | (GHz) | (GHz) |
| RF INPUT | 1.5 | 20 | 120 | 1.5 | 1.49918 | 1-1 | 1.50082 |
| (20MHz- | 1.5 | 10 | 120 | 1.5 | 1.49968 | 1-2 | 1.50032 |
| 2.9 GHz) | 1.5 | 1 | 10 | 1.5 | 1.499968 | 1-3 | 1.500032 |
| | 1.5 | .12 | .3 | 1.5 | 1.4999962 | 1-4 | 1.5000038 |
| RF INPUT † | 4 | 20 | 120 | 4 | 3.99918 | 1-5 | 4.00082 |
| (1 GHz- | 4 | 10 | 120 | 4 | 3.99968 | 1-6 | 4.00032 |
| 6.5 GHz) | 4 | 1 | 10 | 4 | 3.999968 | 1-7 | 4.000032 |
| *For HP 85462A only. | | | | | | | |

**Table 2-6.**
**Frequency Readout Accuracy for the EMI Receiver**

| Receiver | | | | Synthesized Sweeper CW | Min. Frequency | TR Entry Frequency | Max. Frequency |
|---|---|---|---|---|---|---|---|
| | Center Frequency (GHz) | Span (MHz) | Bandwidth (kHz) | (GHz) | (GHz) | (GHz) | (GHz) |
| INPUT 2 | 1.5 | 20 | 120 | 1.5 | 1.49918 | 1-1 | 1.50082 |
| (20MHz- | 1.5 | 10 | 120 | 1.5 | 1.49968 | 1-2 | 1.50032 |
| 2.9 GHz) | 1.5 | 1 | 10 | 1.5 | 1.499968 | 1-3 | 1.500032 |
| | 1.5 | .12 | .3 | 1.5 | 1.4999962 | 1-4 | 1.5000038 |
| INPUT 2* | 4 | 20 | 120 | 4 | 3.99858 | 1-5 | 4.00142 |
| (1 GHz- | 4 | 10 | 120 | 4 | 3.99948 | 1-6 | 4.00052 |
| 6.5 GHz) | 4 | 1 | 10 | 4 | 3.999948 | 1-7 | 4.000052 |
| * For HP 8546A only. | | | | | | | |

"Part 1: Frequency Readout Accuracy" is now complete. Continue with "Part 2: Marker Count Accuracy."

## Part 2: Marker Count Accuracy

Perform "Part 1: Frequency Readout Accuracy" before performing this procedure.

1. Press INSTRUMENT PRESET on the synthesized sweeper, then set the controls as follows:

   CW ..... 1.5 (GHz)
   POWER LEVEL ..... −15 dBm

2. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver to measure the marker count accuracy by pressing the following keys:

   (FREQUENCY) CENTER FREQ 1.5 (GHz)
   (SPAN) 20 (MHz)
   (BW) IF BW AUTO MAN (MAN) 300 (kHz)
   (MARKER FUNCTION) MK COUNT ON OFF ON
   More 1 of 2
   CNT RES AUTO MAN MAN 100 (Hz)

3. Press (PEAK SEARCH), then wait for a count to be taken (it may take several seconds).
4. Record the CNTR frequency reading in the operation verification test record as the TR Entry indicated in Table 2-7. The reading should be within the limits shown.

**Note**

*For an HP 8546A/HP 85462A only.*

When the center frequency changes to 4.0 GHz, press INPUT 2 1-6.5 G on the receiver before changing frequency, then set the synthesized sweeper CW to 4000 MHz and set the power level to −30 dBm.

5. Repeat step 3 and 4 for each receiver setting listed in Table 2-7.

**Table 2-7. Marker Count Accuracy**

| Receiver | | | | Synthesized Sweeper CW | Min. Frequency | TR Entry Frequency | Max. Frequency | IF BW |
|---|---|---|---|---|---|---|---|---|
| | Center Frequency (GHz) | Span (MHz) | Counter Resolution (Hz) | (GHz) | (GHz) | (GHz) | (GHz) | (kHz) |
| INPUT 2* | 1.5 | 20 | 100 | 1.5 | 1.4999989 | 1-8 | 1.5000011 | 300 |
| (20MHz- | 1.5 | 1 | 10 | 1.5 | 1.49999989 | 1-9 | 1.50000011 | 300 |
| 2.9 GHz) | 1.5 | .02 | 10 | 1.5 | 1.49999989 | 1-10 | 1.50000011 | .3 |
| INPUT 2*† | 4 | 20 | 100 | 4 | 3.9999989 | 1-11 | 4.0000011 | 300 |
| (1 GHz- | 4 | 1 | 10 | 4 | 3.99999989 | 1-12 | 4.00000011 | 300 |
| 6.5 GHz) | | | | | | | | |
| * Use RF INPUT if testing a receiver RF section. | | | | | | | | |
| † For an HP 8546A/HP 85462A only. | | | | | | | | |

Operation verification test, “Frequency Readout Accuracy and Marker Count Accuracy,” is now complete.

# 2. Frequency Span Readout Accuracy

For testing each frequency span, two synthesized sources are used to provide two precisely-spaced signals at the RF INPUT if testing an receiver RF section, or INPUT 2 if testing the EMI receiver. The marker functions are used to measure this frequency difference and the marker reading is compared to the specification.

## Equipment Required

Synthesized sweeper
Synthesizer/level generator
Signal generator
Power splitter
Adapter, Type N (m) to Type N (m)
Adapter, Type N (f) to APC 3.5 (f)
Cable, APC 3.5, 91 cm (36 in)
Cable, BNC, 122 cm (48 in)
Cable, Type N, 152 cm (60 in)

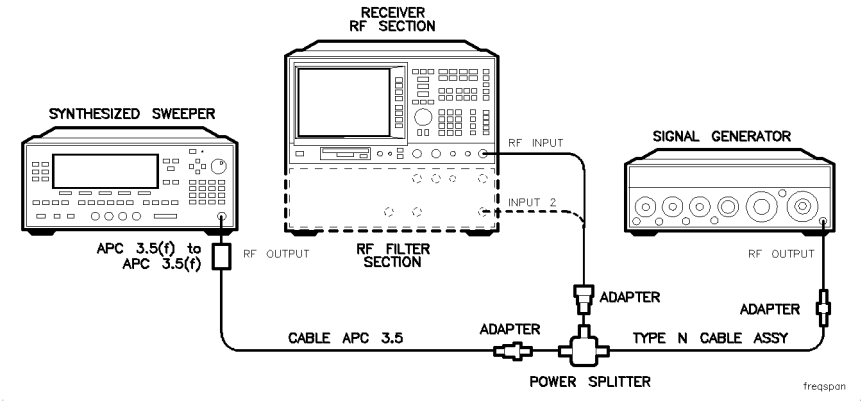



**Figure 2-2.**
**1800 MHz Frequency Span Readout Accuracy Test Setup**

## Procedure

This operation verification test consists of two parts:

Part 1: 1800 MHz Frequency Span Readout Accuracy
Part 2: 10.1 MHz to 10 kHz Frequency Span Readout Accuracy

Perform "Part 1: 1800 MHz Frequency Span Readout Accuracy" before "Part 2: 10.1 MHz to 10 kHz Frequency Span Readout Accuracy."

## Part 1: 1800 MHz Frequency Span Readout Accuracy

1. Connect the equipment as shown in Figure 2-2. Note that the power splitter is used as a combiner.
2. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (FREQUENCY) CENTER FREQ 900 (MHz)
   (SPAN) 1800 (MHz)
3. Press INSTRUMENT PRESET on the synthesized sweeper and set the controls as follows:

   CW ..... 1700 MHz
   POWER LEVEL ..... −15 dBm
4. On the signal generator, set the controls as follows:

   FREQUENCY (LOCKED MODE) ..... 200 MHz
   CW OUTPUT ..... −10 dBm

   If necessary, adjust the receiver center frequency to place the lower frequency on the second vertical graticule line (one division from the left-most graticule line).
5. On the receiver, press (SINGLE). Wait for the completion of a new sweep, then press the following keys:

   (PEAK SEARCH)
   MARKER Δ
   NEXT PEAK

   The two markers should be on the signals near the second and tenth vertical graticule lines (the first graticule line is the left-most).
6. Record the MARKER Δ frequency reading as TR Entry 2-1 in the operation verification test record.

   The MARKER Δ reading should be within 1.446 GHz and 1.554 GHz.

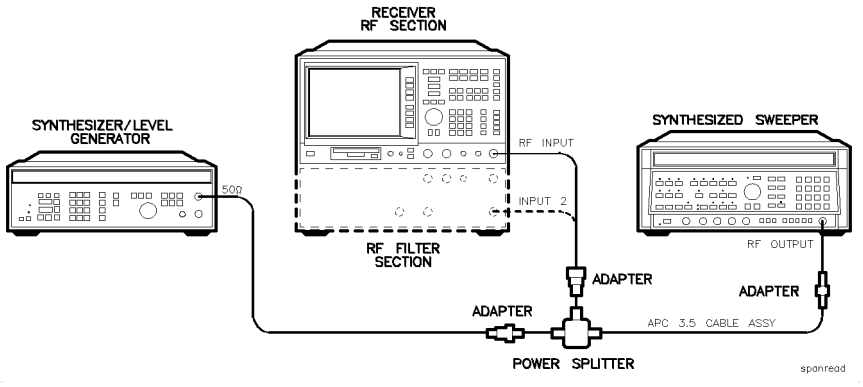



**Figure 2-3.**
**10.1 MHz to 10 kHz Frequency Span Readout Accuracy Test Setup**

## Part 2: 10.1 MHz to 10 kHz Frequency Span Readout Accuracy

Perform "Part 1: 1800 MHz Frequency Span Readout Accuracy" before performing this procedure.

1. Connect the equipment as shown in Figure 2-3. Note that the power splitter is used as a combiner.
2. Press [PRESET] on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   [FREQUENCY] CENTER FREQ 70 [MHz]
   [SPAN] 10.1 [MHz]
   [SWEEP] SWEEP TIME AUTO MAN MAN 75 [ms]

3. Press INSTRUMENT PRESET on the synthesized sweeper, then set the controls as follows:

   CW ..... 74 MHz
   POWER LEVEL ..... −15 dBm

4. Set the synthesizer/level generator controls as follows:

   FREQUENCY ..... 66 MHz
   AMPLITUDE ..... −10 dBm

   If necessary, adjust the receiver center frequency to place the lower frequency on the second vertical graticule line (one division from the left-most graticule line).

**Note**

If the receiver center frequency is adjusted, make sure it is reset to 70 MHz for the remaining tests. Otherwise, signals will not be present on the display.

5. On the receiver, press [SINGLE]. Wait for the completion of a new sweep, then press the following keys:

   [PEAK SEARCH]
   MARKER Δ
   NEXT PEAK

The two markers should be on the signals near the second and tenth vertical graticule lines (the first graticule line is the left-most).

6. Record the MARKER Δ frequency reading as TR Entry 2-2 in the operation verification test record.

   The MARKER Δ frequency reading should be within 7.70 MHz and 8.30 MHz.

7. On the receiver, press the following keys:

   (MKR)
   MARKER 1 ON OFF OFF

8. Change to the next equipment settings listed in Table 2-8. Be sure to set the synthesized sweeper, synthesizer/level generator, and IF bandwidth settings as shown in the table.

**Note**

If the receiver center frequency is adjusted, make sure it is reset to 70 MHz for the remaining tests. Otherwise, signals will not be present on the display.

9. On the receiver, press (SINGLE). Wait for the completion of a new sweep, then press the following keys:

   (PEAK SEARCH)
   MARKER Δ
   NEXT PEAK
   (SWEEP) SWEEP TIME AUTO MAN AUTO

10. Record the MARKER Δ frequency reading in the operation verification test record.

11. Repeat steps 8 through 10 for the remaining receiver span settings listed in Table 2-8.

Operation verification test, "Frequency Span Readout Accuracy," is now complete.

**Table 2-8. Frequency Span Readout Accuracy**

| Receiver Span Setting | IF BW | Synthesizer/Level Generator Frequency | Synthesized Sweeper Frequency | MKR-Δ Reading | | |
|---|---|---|---|---|---|---|
| | | MHz | MHz | Min. | TR Entry | Max. |
| 1800 MHz | 120 kHz | 200 | 1700 | 1.446 GHz | **2-1** | 1.554 GHz |
| 10.10 MHz | 120 kHz | 66.000 | 74.000 | 7.70 MHz | **2-2** | 8.30 MHz |
| 10.00 MHz | 3 kHz | 66.000 | 74.000 | 7.80 MHz | **2-3** | 8.20 MHz |
| 100.00 kHz | 1 kHz | 69.960 | 70.040 | 78.00 kHz | **2-4** | 82.00 kHz |
| 99.00 kHz | 300 Hz | 69.960 | 70.040 | 78.00 kHz | **2-5** | 82.00 kHz |
| 10.00 kHz | 300 Hz | 69.996 | 70.004 | 7.80 kHz | **2-6** | 8.20 kHz |
| 1.00 kHz | 100 Hz | 69.9996 | 70.0004 | 780 Hz | **2-7** | 820 Hz |

# 3. EMI Receiver Absolute Amplitude Accuracy

Absolute amplitude accuracy is done in two sections. One for INPUT 1: 9 kHz - 50 MHz, and one for INPUT 2: 20 MHz - 2.9 GHz. Each section tests with and without the preamplifier.

## Part 1: Input 1 9 KHz - 50 MHz

The Synthesizer/level generator is connected to Input 1 of the EMI receiver. The amplitude of various frequencies are measured.

### Equipment Required

Synthesizer/level generator
Cable, BNC, 122 cm (48 in)
Adapter, Type N (m) to BNC (f)

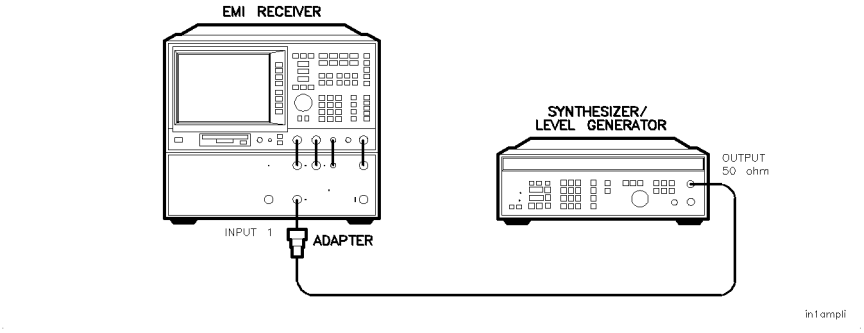



**Figure 2-4. Input 1 Absolute Amplitude Accuracy Setup**

### Procedure

1. Connect the equipment as shown in Figure 2-4.
2. Set the synthesizer/level generator amplitude to −47 dBm.
3. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (INPUT) INPUT 1 9K-50M
   (AMPLITUDE) SCALE LOG LIN LIN
   More 1 of 3 Amptd Units dBm
   (AMPLITUDE) −45 (dBm)

4. Set the synthesizer/level generator to the frequency settings listed in Table 2-9 starting with 9 kHz.
5. Set the receiver to the frequency and span settings listed in Table 2-9 starting with the following:

   (FREQUENCY) CENTER FREQ .009 (MHz)
   (SPAN) 1 (kHz)

6. On the receiver press (SINGLE) and wait for the completion of the sweep. Then press (PEAK SEARCH).
7. Subtract the synthesizer/level generator amplitude from the marker absolute amplitude and record this as TR Entry 3-1 in the operation verification test record.

8. Repeat steps 4 through 7 for frequency and span settings listed in Table 2-9.

**Table 2-9.**
**INPUT 1 Absolute Amplitude Accuracy Preamp Off**

| Frequency (MHz) | Span (kHz) | TR Entry |
|---|---|---|
| .009 | 1 | **3-1** |
| .015 | 1 | **3-2** |
| .020 | 1 | **3-3** |
| .035 | 1 | **3-4** |
| .050 | 1 | **3-5** |
| .080 | 1 | **3-6** |
| .12 | 1 | **3-7** |
| .16 | 50 | **3-8** |
| .2 | 50 | **3-9** |
| .3 | 50 | **3-10** |
| .4 | 50 | **3-11** |
| .6 | 50 | **3-12** |
| .8 | 50 | **3-13** |
| 1.0 | 50 | **3-14** |
| 1.4 | 50 | **3-15** |
| 1.6 | 50 | **3-16** |
| 2 | 50 | **3-17** |
| 3 | 50 | **3-18** |
| 4 | 50 | **3-19** |
| 6 | 50 | **3-20** |
| 8 | 50 | **3-21** |
| 10 | 50 | **3-22** |
| 15 | 50 | **3-23** |
| 20 | 50 | **3-24** |
| 25 | 50 | **3-25** |
| 30 | 500 | **3-26** |
| 40 | 500 | **3-27** |
| 50 | 500 | **3-28** |

9. On the receiver, press the following keys:

PREAMP
AMPLITUDE −45 dBm

10. Repeat steps 4 through 7 for the frequency and span settings listed in Table 2-10.

**Table 2-10.**
**INPUT 1 Absolute Amplitude Accuracy Preamp On**

| Frequency (MHz) | Span (kHz) | TR Entry |
|---|---|---|
| .009 | 5 | **3-29** |
| .015 | 20 | **3-30** |
| .020 | 20 | **3-31** |
| .035 | 20 | **3-32** |
| .050 | 20 | **3-33** |
| .080 | 20 | **3-34** |
| .12 | 20 | **3-35** |
| .16 | 50 | **3-36** |
| .2 | 50 | **3-37** |
| .3 | 50 | **3-38** |
| .4 | 50 | **3-39** |
| .6 | 50 | **3-40** |
| .8 | 50 | **3-41** |
| 1.0 | 50 | **3-42** |
| 1.4 | 50 | **3-43** |
| 1.6 | 50 | **3-44** |
| 2 | 50 | **3-45** |
| 3 | 50 | **3-46** |
| 4 | 50 | **3-47** |
| 6 | 50 | **3-48** |
| 8 | 50 | **3-49** |
| 10 | 50 | **3-50** |
| 15 | 50 | **3-51** |
| 20 | 50 | **3-52** |
| 25 | 50 | **3-53** |
| 30 | 500 | **3-54** |
| 40 | 500 | **3-55** |
| 50 | 500 | **3-56** |

## Part 2: Input 2 20 MHz - 2.9 GHz

The synthesized sweeper is connected to INPUT 2 of the RF filter section through a power splitter. The amplitude of various frequencies are measured.

### Equipment Required

Synthesized Sweeper
Power Meter
Power Sensor, 20 MHz to 2.9 GHz (low power)
Power Splitter
Cable, APC 3.5, 91 cm (36 in)
Adapter, Type N (m) to APC 3.5 (m)
Adapter, APC 3.5 (f) to APC 3.5 (f)

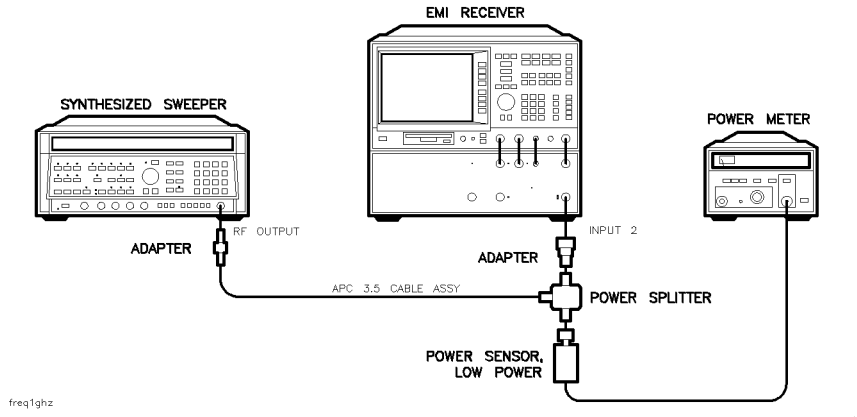



**Figure 2-5. Input 2 Absolute Amplitude Accuracy Setup**

1. Connect the equipment as shown in Figure 2-5.
2. If more then 5 minutes have passed since the last power meter zeroing, set the power meter and synthesized sweeper as follows:
   a. Set the synthesized sweeper POWER LEVEL to −100 dBm.
   b. Set the synthesized sweeper RF to OFF.
   c. Press the ZERO button on the power meter.
   d. Set the synthesized sweeper RF to ON.
3. Set the synthesized sweeper amplitude to −41 dBm.
4. Press [PRESET] on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   [AMPLITUDE] SCALE LOG LIN LIN
   Amptd Units dBm
   [AMPLITUDE] −45 [dBm]

5. Adjust the synthesized sweeper's power until the power meter reads −41 dBm.
6. Set the synthesized sweeper to the frequency settings listed in Table 2-11 starting with 20 MHz.

7. Set the receiver to the frequency and span settings listed in Table 2-11 starting with the following:

   (FREQUENCY) CENTER FREQ 20 (MHz)
   (SPAN) .05 (MHz)

8. On the receiver, press (SINGLE) and wait for the completion of the sweep. Then press (PEAK SEARCH).

9. Using the appropriate power sensor CAL factor for the frequency, subtract the measured power meter amplitude from the marker absolute amplitude and record this as TR Entry 3-57 in the operation verification test record.

10. Repeat steps 6 through 9 for the frequency and span settings listed in Table 2-11.

**Table 2-11.**
**INPUT 2 Absolute Amplitude Accuracy Preamp Off**

| Frequency (MHz) | Span (MHz) | TR Entry |
|---|---|---|
| 20 | .05 | **3-57** |
| 22 | .05 | **3-58** |
| 25 | .05 | **3-59** |
| 30 | .5 | **3-60** |
| 40 | .5 | **3-61** |
| 50 | .5 | **3-62** |
| 60 | .5 | **3-63** |
| 80 | .5 | **3-64** |
| 100 | .5 | **3-65** |
| 120 | .5 | **3-66** |
| 140 | .5 | **3-67** |
| 160 | .5 | **3-68** |
| 180 | .5 | **3-69** |
| 200 | .5 | **3-70** |
| 220 | .5 | **3-71** |
| 260 | .5 | **3-72** |
| 300 | .5 | **3-73** |
| 350 | .5 | **3-74** |
| 400 | .5 | **3-75** |
| 450 | .5 | **3-76** |
| 525 | .5 | **3-77** |
| 625 | .5 | **3-78** |
| 750 | .5 | **3-79** |
| 875 | .5 | **3-80** |
| 1200 | .5 | **3-81** |
| 2000 | .5 | **3-82** |
| 2900 | .5 | **3-83** |

11. On the receiver, press the following keys:

    PREAMP
    AMPLITUDE −45 dBm

12. Repeat steps 6 through 9 for the frequency and span settings listed in Table 2-12.

### 3. EMI Receiver Absolute Amplitude Accuracy

**Table 2-12.**
**INPUT 2 Absolute Amplitude Accuracy Preamp On**

| Frequency (MHz) | Span (MHz) | TR Entry |
|---|---|---|
| 20 | .05 | **3-84** |
| 22 | .05 | **3-85** |
| 25 | .05 | **3-86** |
| 30 | .5 | **3-87** |
| 40 | .5 | **3-88** |
| 50 | .5 | **3-89** |
| 60 | .5 | **3-90** |
| 80 | .5 | **3-91** |
| 100 | .5 | **3-92** |
| 120 | .5 | **3-93** |
| 140 | .5 | **3-94** |
| 160 | .5 | **3-95** |
| 180 | .5 | **3-96** |
| 200 | .5 | **3-97** |
| 220 | .5 | **3-98** |
| 260 | .5 | **3-99** |
| 300 | .5 | **3-100** |
| 350 | .5 | **3-101** |
| 400 | .5 | **3-102** |
| 450 | .5 | **3-103** |
| 525 | .5 | **3-104** |
| 625 | .5 | **3-105** |
| 750 | .5 | **3-106** |
| 875 | .5 | **3-107** |
| 1200 | .5 | **3-108** |
| 2000 | .5 | **3-109** |
| 2900 | .5 | **3-110** |

**Note** No amplitude should exceed an absolute value of 2 dB.

The operation verification test, "Absolute Amplitude Accuracy", is now complete.

# 4. Input Attenuator Accuracy for Receiver RF Section

A 50 MHz CW signal is applied to the receiver input. This test sets the module attenuator to the 10 dB setting. The receiver reads the power level of a −20 dBm signal and this becomes the reference signal level. The attenuator is set to the 0 dB setting and the signal is measured. The input attenuator accuracy is obtained by subtracting the reference signal from this reading. The attenuation is then set to the 20 dB step and another reading of the signal is made. Again the reference signal is subtracted from the reading. The procedure is repeated for the 30, 40, 50, 60 and 70 dB attenuator steps.

## Equipment Required

Synthesizer/level generator
Cable, BNC, 122 cm (48 in)
Adapter, Type N (m) to BNC (f)

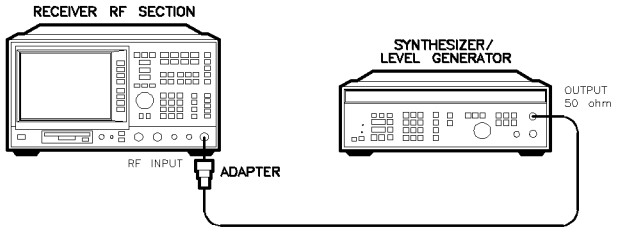



**Figure 2-6. Input Attenuator Accuracy Test Setup**

## Note

This test checks for proper functionality only; attenuation is not a specific parameter.

## Procedure

1. Set the synthesizer/level generator controls as follows:

   FREQUENCY ..... 50 MHz
   AMPLITUDE ..... −20 dBm
   OUTPUT ..... 50 Ω

2. Connect the equipment as shown in Figure 2-6.

3. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (FREQUENCY) CENTER FREQ 50 (MHz)
   (SPAN) 10 (MHz)
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (AMPLITUDE) −15 (dBm)
   ATTEN AUTO MAN MAN 10 (dB)
   (PEAK SEARCH)
   (MARKER FUNCTION) MK TRACK ON OFF ON
   (SPAN) 50 (kHz)

   Wait for the auto zoom routine to finish, then set the IF bandwidth and the AVG bandwidth by pressing the following keys:

   (BW) IF BW AUTO MAN MAN 3 (kHz)
   AVG BW AUTO MAN MAN 30 (Hz)

4. Set the reference for marker measurements by pressing the following receiver keys:

   (PEAK SEARCH)
   MARKER Δ

5. Continue by pressing the following receiver keys:

   (AMPLITUDE) ATTEN AUTO MAN MAN 0 (dB)
   (PEAK SEARCH)

6. Record the actual MKR Δ amplitude reading as TR Entry 4-1 in the operation verification test record. The MKR Δ amplitude should be within the limits shown.

7. Repeat steps 5 and 6 as needed for the remaining input attenuator settings listed in Table 2-13.

8. For each MKR Δ reading recorded in the operation verification test record, subtract the previous MKR Δ reading and record the result as the incremental error in the operation verification test record. The incremental error should not exceed the cummulative error for that step.

**Table 2-13. Input Attenuator Error**

| Synthesizer/Level Generator Nominal Amplitude | Input/Attenuator dB | TR Entry Cumulative Error (MKR Δ Reading) | | | TR Entry (Incremental Error) |
|---|---|---|---|---|---|
| | | Min. (dB) | Actual (dB) | Max. (dB) | TR Entry |
| −20 dBm | 0 | −.75 | **4-1** | +.75 | **4-8** |
| −20 dBm | 10 | 0(Ref) | 0(Ref) | 0(Ref) | 0(Ref) |
| −20 dBm | 20 | −.75 | **4-2** | +.75 | **4-9** |
| −20 dBm | 30 | −.75 | **4-3** | +.75 | **4-10** |
| −20 dBm | 40 | −.75 | **4-4** | +.75 | **4-11** |
| −20 dBm | 50 | −1.0 | **4-5** | +1.0 | **4-12** |
| −20 dBm | 60 | −1.5 | **4-6** | +1.5 | **4-13** |
| −20 dBm | 70 | −2.0 | **4-7** | +2.0 | **4-14** |

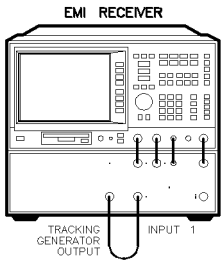
Operation Verification test, “Input Attenuator Accuracy for Receiver RF Section,” is now complete.

# 5. Input Attenuator Accuracy for EMI Receiver

The tracking generator is swept from 9 kHz to 50 MHz to find the minimum and the maximum amplitude for Input 1. Each frequency is tested in turn. A synthesizer/level generator provides a −50 dBm signal and the attenuator is set to the 10 dB setting. The receiver reads the power level and this becomes the reference signal level. The attenuator is set to the 0 dB setting and the signal is measured. Input attenuator accuracy is obtained by subtracting the reference signal from this reading. The attenuator is then set to the 20 dB step. Another reading of the signal is made. Again the reference signal is subtracted from the reading. The measurement is repeated for the 30, 40, 50, 60 and 70 dB attenuator steps. This procedure is repeated for both frequencies and then at 50 MHz for INPUT 2.

## Equipment Required

Synthesizer/level generator
Cable, BNC, 122 cm (48 in)
Adapter, Type N (m) to BNC (f)




in1abacc

**Figure 2-7.**
**Input Attenuator Accuracy Test Setup for Frequency Selection**

## Procedure

1. Connect the equipment as shown in Figure 2-7.
2. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (INPUT) INPUT 1 9k-50M

   (FREQUENCY) START FREQ 350 (kHz)

   (AMPLITUDE) More 1 of 3 Amptd Units dBm

   (AMPLITUDE) REF LVL −15 (dBm)

   ATTEN AUTO MAN MAN 20 (dB)

   (TRACK GEN) SRC POWER ON OFF ON −30 (dBm)

   TRACKING PEAK

   Wait for the sweep to finish.

   (SINGLE)
3. Wait for the sweep to finish and then press (PEAK SEARCH). Record the frequency below.

   Input 1 Maximum Amplitude Frequency_____MHz
4. Press (MKR →) MARKER → MINIMUM. Record the frequency below.

   Input 1 Minimum Amplitude Frequency_____MHz
5. First test the maximum amplitude frequency, then test minimum amplitude frequency, and finally check Input 2 with 50 MHz.
6. Connect the equipment as shown in Figure 2-8.

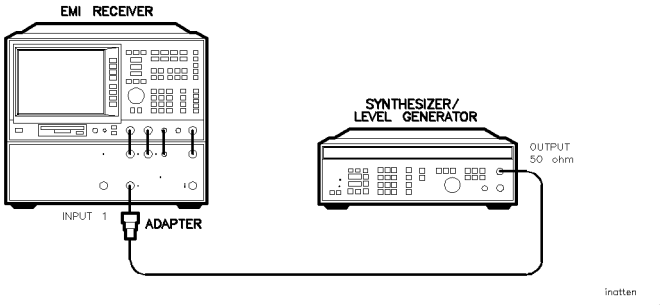



**Figure 2-8. Input Attenuator Accuracy Test Setup**

7. Set the synthesizer/level generator controls as follows:

   FREQUENCY ..... Maximum Amplitude Frequency
   AMPLITUDE ..... −50 dBm
   OUTPUT ..... 50 Ω
8. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (INPUT) INPUT 1 9k-50M

(FREQUENCY) CENTER FREQ (Maximum Amplitude Frequency)
(MHz)

9. Continue by setting the receiver as follows:

(SPAN) .5 (MHz)
(AMPLITUDE) More 1 of 3 Amptd Units dBm
(AMPLITUDE) REF LVL −40 (dBm)
ATTEN AUTO MAN MAN 10 (dB)
(PEAK SEARCH)
(MARKER FUNCTION) MK TRACK ON OFF ON
(SPAN) 50 (kHz)

10. Wait for the auto zoom routine to finish, then set the IF bandwidth and the AVG bandwidth by pressing the following keys:

(BW) IF BW AUTO MAN MAN 3 (kHz)
AVG BW AUTO MAN MAN 30 (Hz)

11. Set the reference for marker measurements by pressing the following receiver keys:

(PEAK SEARCH)
MARKER Δ

12. Continue by pressing the following receiver keys:

(AMPLITUDE) ATTEN AUTO MAN MAN 0 (dB)
(PEAK SEARCH)

13. Record the actual MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-14. The MARKER Δ amplitude should be within the limits shown.

14. Repeat steps 12 and 13 as needed for the remaining input attenuator settings listed in Table 2-14.

15. For each MKR Δ reading recorded in the operation verification test record, subtract the previous MKR Δ reading and record the result as the incremental error in the operation verification test record as the indicated TR Entry. The incremental error should not exceed the cummulative error for that step.

16. Repeat steps 8 through 15 using the Minimum Amplitude Frequency and record the readings in the operation verification test record as indicated in Table 2-15.

17. Move the output of the synthesizer/level generator to INPUT 2 of the receiver.

18. Set the synthesizer/level generator controls as follows:

FREQUENCY ..... 50 MHz
AMPLITUDE ..... −50 dBm
OUTPUT ..... 50 Ω

19. Repeat steps 8 through 15 using INPUT 2 `20M - 2.9G` with a center frequency of 50 MHz and record the readings in the operation verification test record as indicated in Table 2-16.

**Table 2-14.**
**Input 1 Maximum Amplitude Attenuator Error**

| Synthesizer/Level Generator Nominal Amplitude | Input/Attenuator dB | TR Entry Cumulative Error (MKR Δ Reading) | | | TR Entry (Incremental Error) |
|---|---|---|---|---|---|
| | | Min. (dB) | Actual (dB) | Max. (dB) | TR Entry |
| −50 dBm | 0 | −2.0 | **5-1** | +2.0 | **5-6** |
| −50 dBm | 10 | 0(Ref) | 0(Ref) | 0(Ref) | 0(Ref) |
| −50 dBm | 20 | −2.0 | **5-2** | +2.0 | **5-7** |
| −50 dBm | 30 | −2.0 | **5-3** | +2.0 | **5-8** |
| −50 dBm | 40 | −2.0 | **5-4** | +2.0 | **5-9** |
| −50 dBm | 50 | −2.0 | **5-5** | +2.0 | **5-10** |

**Table 2-15.**
**Input 1 Minimum Amplitude Attenuator Error**

| Synthesizer/Level Generator Nominal Amplitude | Input/Attenuator dB | TR Entry Cumulative Error (MKR Δ Reading) | | | TR Entry (Incremental Error) |
|---|---|---|---|---|---|
| | | Min. (dB) | Actual (dB) | Max. (dB) | TR Entry |
| −50 dBm | 0 | −2.0 | **5-11** | +2.0 | **5-16** |
| −50 dBm | 10 | 0(Ref) | 0(Ref) | 0(Ref) | 0(Ref) |
| −50 dBm | 20 | −2.0 | **5-12** | +2.0 | **5-17** |
| −50 dBm | 30 | −2.0 | **5-13** | +2.0 | **5-18** |
| −50 dBm | 40 | −2.0 | **5-14** | +2.0 | **5-19** |
| −50 dBm | 50 | −2.0 | **5-15** | +2.0 | **5-20** |

## 5. Input Attenuator Accuracy for EMI Receiver

**Table 2-16. Input 2, 50 MHz Attenuator Error**

| Synthesizer/Level Generator Nominal Amplitude | Input/Attenuator dB | TR Entry Cumulative Error (MKR Δ Reading) | | | TR Entry (Incremental Error) |
|---|---|---|---|---|---|
| | | Min. (dB) | Actual (dB) | Max. (dB) | TR Entry |
| −50 dBm | 0 | −2.0 | **5-21** | +2.0 | **5-26** |
| −50 dBm | 10 | 0(Ref) | 0(Ref) | 0(Ref) | 0(Ref) |
| −50 dBm | 20 | −2.0 | **5-22** | +2.0 | **5-27** |
| −50 dBm | 30 | −2.0 | **5-23** | +2.0 | **5-28** |
| −50 dBm | 40 | −2.0 | **5-24** | +2.0 | **5-29** |
| −50 dBm | 50 | −2.0 | **5-25** | +2.0 | **5-30** |

Operation verification test, “Input Attenuator Accuracy,” is now complete.

# 6. Scale Fidelity

A 50 MHz CW signal is applied to the RF INPUT of the receiver RF section, or INPUT 2 if you are testing the EMI receiver, through two step attenuators. The attenuators increase the effective amplitude range of the source. The amplitude of the source is decreased in 10 dB steps and the receiver marker functions are used to measure the amplitude difference between steps. The source internal attenuator is used as the reference standard. The test is performed in both log and linear amplitude scales.

## Equipment Required

Synthesizer/level generator
Attenuator, 1 dB step
Attenuator, 10 dB step
Cable, BNC, 122 cm (48 in)
Cable, BNC, 20 cm (9 in)
Adapter, Type N (m) to BNC (f)
Adapter, Type BNC (m) to BNC (m)

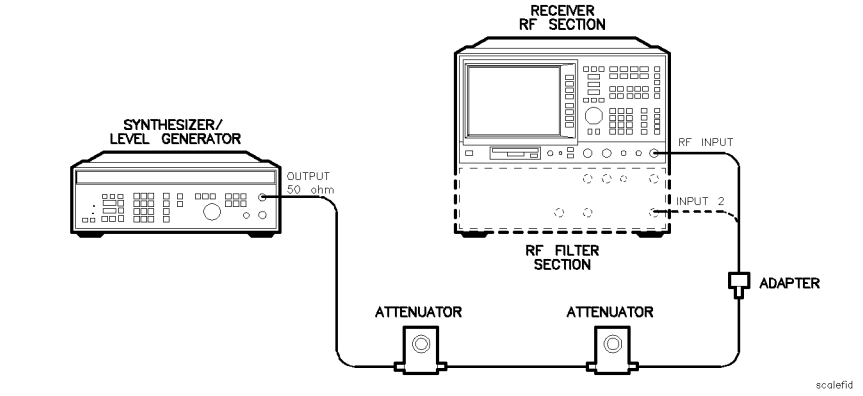



**Figure 2-9. Scale Fidelity Test Setup**

## Procedure

### Log Scale

1. Set the synthesizer/level generator controls as follows:

   FREQUENCY ..... 50 MHz
   AMPLITUDE ..... +10 dBm
   AMPTD INCR ..... 0.05 dB
   OUTPUT ..... 50 Ω

2. Connect the equipment as shown in Figure 2-9. Set the 10 dB step attenuator to 10 dB attenuation and the 1 dB step attenuator to 0 dB attenuation.

3. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (AMPLITUDE) REF LVL 0 dBm
   (FREQUENCY) CENTER FREQ 50 (MHz)
   (SPAN) 10 (MHz)
   (PEAK SEARCH)
   (MARKER FUNCTION) MK TRACK ON OFF ON
   (SPAN) 50 (kHz)

   Wait for the auto zoom routine to finish, then set the IF bandwidth and the AVG bandwidth by pressing the following keys:

   (BW) IF BW AUTO MAN MAN 3 (kHz)
   AVG BW AUTO MAN MAN 30 (Hz)

4. On the synthesizer/level generator, press AMPLITUDE and use the increment keys to adjust the amplitude until the receiver MKR amplitude reads 0 dBm ±0.05 dB.

   It may be necessary to decrease the resolution of the amplitude increment of the synthesizer/level generator to 0.01 dB to obtain a MKR reading of 0 dBm ±0.05 dB.

5. On the receiver, press the following keys:

   (PEAK SEARCH)
   MARKER Δ

6. Set the synthesizer/level generator AMPLITUDE INCREMENT to 4 dB.

7. On the synthesizer/level generator, press AMPLITUDE, then increment down to step the synthesizer/level generator to the next lowest nominal amplitude listed in Table 2-17.

8. Record the actual MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-17. The MKR amplitude should be within the limits shown.

9. Repeat steps 7 and 8 for the remaining synthesizer/level generator nominal amplitudes listed in Table 2-17.

10. For each actual MKR Δ reading recorded in operation verification, subtract the previous actual MKR Δ reading. Add 4 dB to the number and record the result as the incremental error in the operation verification test record as the TR Entry indicated in Table 2-17. The incremental error should not exceed 0.4 dB/4 dB.

**Table 2-17.**
**Cumulative and Incremental Error, Log Mode**

| Synthesizer/Level Generator Nominal Amplitude | dB from Ref Level (nominal) | TR Entry Cumulative Error (MKR Δ Reading) | | | TR Entry (Incremental Error) |
|---|---|---|---|---|---|
| | | Min. (dB) | Actual (dB) | Max. (dB) | TR Entry |
| +10 dBm | 0 | 0 (Ref) | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| +6 dBm | −4 | −4.34 | **6-1** | −3.66 | **6-18** |
| +2 dBm | −8 | −8.38 | **6-2** | −7.62 | **6-19** |
| −2 dBm | −12 | −12.42 | **6-3** | −11.58 | **6-20** |
| −6 dBm | −16 | −16.46 | **6-4** | −15.54 | **6-21** |
| −10 dBm | −20 | −20.50 | **6-5** | −19.50 | **6-22** |
| −14 dBm | −24 | −24.54 | **6-6** | −23.46 | **6-23** |
| −18 dBm | −28 | −28.58 | **6-7** | −27.42 | **6-24** |
| −22 dBm | −32 | −32.62 | **6-8** | −31.38 | **6-25** |
| −26 dBm | −36 | −36.66 | **6-9** | −35.34 | **6-26** |
| −30 dBm | −40 | −40.70 | **6-10** | −39.30 | **6-27** |
| −34 dBm | −44 | −44.74 | **6-11** | −43.26 | **6-28** |
| −38 dBm | −48 | −48.78 | **6-12** | −47.22 | **6-29** |
| −42 dBm | −52 | −52.82 | **6-13** | −51.18 | **6-30** |
| −46 dBm | −56 | −56.86 | **6-14** | −55.14 | **6-31** |
| −50 dBm | −60 | −60.90 | **6-15** | −59.10 | **6-32** |
| −54 dBm | −64 | −64.94 | **6-16** | −63.06 | N/A |
| −58 dBm | −68 | −68.98 | **6-17** | −67.02 | N/A |

11. Press the following receiver keys:

   SPAN 10 kHz
   BW IF BW AUTO MAN MAN 300 Hz
   MKR MARKER 1 ON OFF OFF
   PEAK SEARCH

12. Repeat steps 4 through 10 for the narrow bandwidths, and compare the results to those listed in Table 2-18. Record the results in the operation verification test record as the TR Entries indicated in Table 2-18.

**Table 2-18.**
**Cumulative and Incremental Error, Log Mode, Narrow Bandwidth**

| Synthesizer/Level Generator Nominal Amplitude | dB from Ref Level (nominal) | TR Entry Cumulative Error (MKR Δ Reading) | | | TR Entry (Incremental Error) |
|---|---|---|---|---|---|
| | | Min. (dB) | Actual (dB) | Max. (dB) | TR Entry |
| +10 dBm | 0 | 0 (Ref) | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| +6 dBm | −4 | −4.44 | **6-33** | −3.56 | **6-50** |
| +2 dBm | −8 | −8.48 | **6-34** | −7.52 | **6-51** |
| −2 dBm | −12 | −12.52 | **6-35** | −11.48 | **6-52** |
| −6 dBm | −16 | −16.56 | **6-36** | −15.44 | **6-53** |
| −10 dBm | −20 | −20.60 | **6-37** | −19.40 | **6-54** |
| −14 dBm | −24 | −24.64 | **6-38** | −23.36 | **6-55** |
| −18 dBm | −28 | −28.68 | **6-39** | −27.32 | **6-56** |
| −22 dBm | −32 | −32.72 | **6-40** | −31.28 | **6-57** |
| −26 dBm | −36 | −36.76 | **6-41** | −35.24 | **6-58** |
| −30 dBm | −40 | −40.80 | **6-42** | −39.20 | **6-59** |
| −34 dBm | −44 | −44.84 | **6-43** | −43.16 | **6-60** |
| −38 dBm | −48 | −48.88 | **6-44** | −47.12 | **6-61** |
| −42 dBm | −52 | −52.92 | **6-45** | −51.08 | **6-62** |
| −46 dBm | −56 | −56.96 | **6-46** | −55.04 | **6-63** |
| −50 dBm | −60 | −61.00 | **6-47** | −59.00 | **6-64** |
| −54 dBm | −64 | −65.04 | **6-48** | −62.96 | N/A |
| −58 dBm | −68 | −69.08 | **6-49** | −66.92 | N/A |

## Linear Scale

13. Set the synthesizer/level generator controls as follows:

    AMPLITUDE ..... +10 dBm
    AMPLITUDE INCREMENT ..... 0.05 dB

14. Set the 1 dB step attenuator to 0 dB attenuation.

15. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

    (AMPLITUDE) SCALE LOG LIN LIN
    More 1 of 3 Amptd Units Volts
    (AMPLITUDE) REF LVL 223.6 (mV)
    (FREQUENCY) CENTER FREQ 50 (MHz)
    (SPAN) 10 (MHz)
    (PEAK SEARCH)
    (MARKER FUNCTION) MK TRACK ON OFF ON
    (SPAN) 50 (kHz)

    Wait for the auto zoom routine to finish, then set the IF bandwidth and the AVG bandwidth by pressing the following keys:

    (BW) IF BW AUTO MAN MAN 3 (kHz)
    AVG BW AUTO MAN MAN 30 (Hz)

16. On the synthesizer/level generator, press AMPLITUDE, then use the increment keys to adjust the amplitude until the receiver MKR amplitude reads 223.6 mV ±0.4 mV. It may be necessary to decrease the resolution of the amplitude increment of the synthesizer/level generator to 0.01 dB to obtain a MKR reading of 0 dBm ±0.05 dB.

17. On the receiver, press the following keys:

    (PEAK SEARCH)
    (MARKER FUNCTION)
    MK TRACK ON OFF OFF

18. Set the synthesizer/level generator amplitude increment to 3 dB.

19. On the synthesizer/level generator, press AMPLITUDE, then increment down to step the synthesizer/level generator to the next lowest nominal amplitude listed in Table 2-19.

20. Press (PEAK SEARCH) and record the MKR amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-19. The MKR amplitude should be within the limits shown.

21. Repeat steps 19 and 20 for the remaining synthesizer/level generator nominal amplitudes listed in Table 2-19.

**Table 2-19. Scale Fidelity, Linear Mode**

| Synthesizer/Level Generator Nominal Amplitude | % of Ref Level (nominal) | MKR Reading | | |
|---|---|---|---|---|
| | | Min. (mV) | TR Entry | Max. (mV) |
| +10 dBm | 100 | (Ref) | (Ref) | (Ref) |
| +7 dBm | 70.7 | 151.59 | **6-65** | 165.01 |
| +4 dBm | 50 | 105.36 | **6-66** | 118.78 |
| +1 dBm | 35.48 | 72.63 | **6-67** | 86.05 |
| −2 dBm | 25 | 49.46 | **6-68** | 82.88 |

22. Press the following receiver keys:

    (SPAN) 10 (kHz)
    (BW) IF BW AUTO MAN MAN 300 (Hz)

23. Repeat steps 16 through 20 for the narrow bandwidths, and compare the results to those listed in Table 2-20. Record the results in the operation verification test record as the TR Entries indicated in Table 2-20.

**Table 2-20. Scale Fidelity, Linear Mode**

| Synthesizer/Level Generator Nominal Amplitude | % of Ref Level (nominal) | MKR Reading | | |
|---|---|---|---|---|
| | | Min. (mV) | TR Entry | Max. (mV) |
| +10 dBm | 100 | (Ref) | (Ref) | (Ref) |
| +7 dBm | 70.7 | 151.59 | **6-69** | 165.01 |
| +4 dBm | 50 | 105.36 | **6-70** | 118.78 |
| +1 dBm | 35.48 | 72.63 | **6-71** | 86.05 |
| −2 dBm | 25 | 49.46 | **6-72** | 82.88 |

## Log to Linear Switching

24. Set the 10 dB step attenuator to 10 dB attenuation and the 1 dB step attenuator to 0 dB attenuation.

25. Set the synthesizer controls as follows:

    FREQUENCY ..... 50 MHz
    AMPLITUDE ..... +6 dBm

26. On the receiver, press (PRESET), then wait for the preset routine to finish. Set the receiver by pressing the following keys:

    (AMPLITUDE) More 1 of 3 Amptd Units dBm
    (AMPLITUDE) REF LVL 0 dBm
    (FREQUENCY) CENTER FREQ 50 (MHz)
    (SPAN) 10 (MHz)
    (BW) IF BW AUTO MAN MAN 300 (kHz)

27. On the receiver, press the following keys:

    (PEAK SEARCH)
    (MKR →) MARKER → REF LVL
    (PEAK SEARCH)

28. Record the peak marker reading in Log mode below.

    Log Mode Amplitude Reading_____ dBm

29. Press (AMPLITUDE) SCALE LOG LIN LIN to change the scale to linear, then press More 1 of 3, Amptd Units, and dBm to set the amplitude units to dBm.

30. Press (PEAK SEARCH), then record the peak marker amplitude reading in linear mode.

    Linear Mode Amplitude Reading_____ dBm

31. Subtract the Linear Mode Amplitude Reading from the Log Mode Amplitude Reading, then record this value as the Log/Linear Error.

    Log/Linear Error_____ dBm

    Scale fidelity is complete.

32. If the log/linear error is less than 0 dB, record this value as TR Entry 6-73 in the operation verification test record. The absolute value of the reading should be less than 0.25 dB. If the log/linear error is greater than 0 dB, continue with the next step.

33. On the receiver, press the following keys:

    (MKR →) MARKER → REF LVL
    (PEAK SEARCH)

34. Record the peak marker amplitude reading in linear mode.

    Linear Mode Amplitude Reading_____ dBm

35. On the receiver, press the following keys:

    (AMPLITUDE) SCALE LOG LIN LOG
    (PEAK SEARCH)

36. Record the peak marker reading in Log mode below.

    Log Mode Amplitude Reading_____ dBm

37. Subtract the log mode amplitude reading from the linear mode amplitude reading, then record this value as the linear/log error.

    Linear/Log Error_____ dB

38. Record the linear/log error as TR Entry 6-73 in the operation verification test record. The absolute value of the reading should be less than 0.25 dB.

39. Press the following receiver keys:

    (SPAN) 10 (kHz)
    (BW) IF BW AUTO MAN MAN 300 (Hz)

40. Repeat steps 27 through 37. Record the results in the operation verification test record as TR Entry 6-74.

    Operation verification test, “Scale Fidelity,” is now complete.

# 7. EMI Receiver Reference Level Accuracy

A 50 MHz CW signal is applied to INPUT 2 of the EMI receiver through two step attenuators. The attenuators increase the effective amplitude range of the source. The amplitude of the source is decreased in 10 dB steps and the receiver marker functions are used to measure the amplitude difference between steps. The source internal attenuator is used as the reference standard. The test is performed in both log and linear amplitude scales.

It is only necessary to test reference levels as low as –90 dBm (with 10 dB attenuation) since lower reference levels are a function of the receiver microprocessor manipulating the trace data. There is no error associated with the trace data manipulation.

## Equipment Required

Synthesizer/level generator
Attenuator, 1 dB steps
Attenuator, 10 dB steps
Cable, BNC 122 cm (48 in)
Cable, BNC 20 cm (9 in)
Adapter, Type N (m) to BNC (f)
Adapter, BNC (m) to BNC (m)

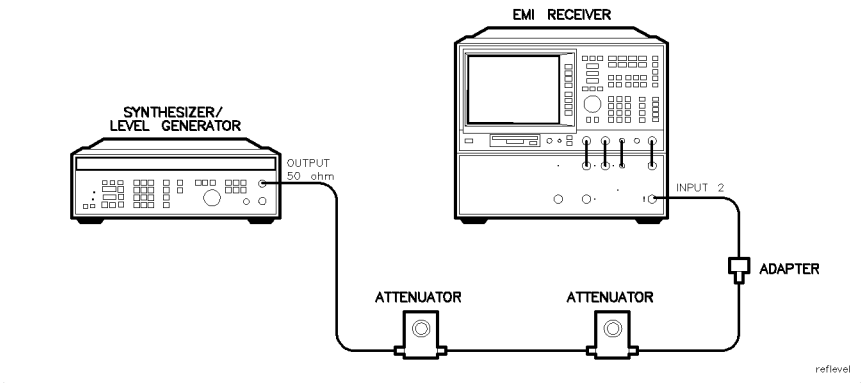



**Figure 2-10. Reference Level Accuracy Test Setup**

## Procedure

### Log Scale

1. Set the synthesizer/level generator controls as follows:

   FREQUENCY ..... 50 MHz
   AMPLITUDE ..... −10 dBm
   AMPLITUDE INCREMENT ..... 10 dB
   OUTPUT ..... 50 Ω

2. Connect the equipment as shown in Figure 2-10. Set the 10 dB step attenuator to 20 dB attenuation and the 1 dB step attenuator to 5 dB attenuation.

3. Press (PRESET) on the receiver RF section, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (FREQUENCY) CENTER FREQ 50 (MHz)
   (SPAN) 10 (MHz)
   (PEAK SEARCH)
   (MARKER FUNCTION) MK TRACK ON OFF ON
   (SPAN) 50 (kHz)
   (BW) IF BW AUTO MAN MAN 3 (kHz)
   AVG BW AUTO MAN MAN 30 (Hz)
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (AMPLITUDE) REF LVL −35 (dBm)
   SCALE LOG LIN LOG 1 (dB)

4. Set the 1 dB step attenuator to place the signal peak one to two dB (one to two divisions) below the reference level.

5. On the receiver, press the following keys:

   (SINGLE)
   (PEAK SEARCH) MARKER Δ

6. Set the synthesizer/level generator amplitude and receiver reference level according to Table 2-21. At each setting, press the following receiver keys:

   (SINGLE)
   (PEAK SEARCH)

7. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-21. The MKR Δ reading should be within the limits shown.

**Table 2-21. Reference Level Accuracy, Log Mode**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −35* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −25* | −0.4 | **7-1** | +0.4 |
| +10 | −15* | −0.5 | **7-2** | +0.5 |
| −20† | −45 | −0.4 | **7-3** | +0.4 |
| −30† | −55 | −0.5 | **7-4** | +0.5 |
| −40† | −65 | −0.8 | **7-5** | +0.8 |
| −50† | −75 | −1.0 | **7-6** | +1.0 |
| −60† | −85 | −1.1 | **7-7** | +1.1 |
| −70† | −95 | −1.2 | **7-8** | +1.2 |
| −80† | −105 | −1.3 | **7-9** | +1.3 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

## Linear Scale

8. Set the receiver controls as follows:

   (SPAN) 50 (kHz)
   (AMPLITUDE) REF LVL −35 (dBm)
   SCALE LOG LIN LIN
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (SWEEP) SWEEP CONT SGL CONT
   (MKR) MARKER 1 ON OFF OFF

9. Set the synthesizer/level generator amplitude to −10 dBm.
10. Set the 1 dB step attenuator to 5 dB attenuation.
11. Set the 1 dB step attenuator to place the signal peak one to two divisions below the reference level.
12. On the receiver, press the following keys:

    (SINGLE)
    (PEAK SEARCH) MARKER Δ

13. Set the synthesizer/level generator amplitude and receiver reference level according to Table 2-22. At each setting, press the following receiver keys:

    (SINGLE)
    (PEAK SEARCH)

14. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-22. The MKR Δ reading should be within the limits shown.

**Table 2-22. Reference Level Accuracy, Linear Mode**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −35* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −25* | −0.4 | **7-10** | +0.4 |
| +10 | −15* | −0.5 | **7-11** | +0.5 |
| −20† | −45 | −0.4 | **7-12** | +0.4 |
| −30† | −55 | −0.5 | **7-13** | +0.5 |
| −40† | −65 | −0.8 | **7-14** | +0.8 |
| −50† | −75 | −1.0 | **7-15** | +1.0 |
| −60† | −85 | −1.1 | **7-16** | +1.1 |
| −70† | −95 | −1.2 | **7-17** | +1.2 |
| −80† | −105 | −1.3 | **7-18** | +1.3 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

## Log Scale 1 dB

15. Press the following receiver keys:

    (AMPLITUDE) REF LVL −35 (dBm)
    SCALE LOG LIN LOG 1 (dB)
    (SPAN) 10 (kHz)
    (SWEEP) SWEEP CONT SGL CONT
    (BW) IF BW AUTO MAN MAN 300 (Hz)
    (MKR) MARKER 1 ON OFF OFF

16. Set the synthesizer/level generator to −10 dBm.

17. Set the 1 dB step attenuator to place the signal peak one to two dB (one to two divisions) below the reference level.

18. On the receiver, press the following keys:

    (SINGLE)
    (PEAK SEARCH) MARKER Δ

19. Set the synthesizer/level generator amplitude and receiver reference level according to Table 2-23. At each setting, press the following receiver keys:

    (SINGLE)
    (PEAK SEARCH)

20. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-23. The MKR Δ reading should be within the limits shown.

**Table 2-23.**
**Reference Level Accuracy, Log Mode for Narrow Bandwidths**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −35* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −25* | −0.4 | **7-19** | +0.4 |
| +10 | −15* | −0.5 | **7-20** | +0.5 |
| −20† | −45 | −0.4 | **7-21** | +0.4 |
| −30† | −55 | −0.5 | **7-22** | +0.5 |
| −40† | −65 | −0.8 | **7-23** | +0.8 |
| −50† | −75 | −1.1 | **7-24** | +1.1 |
| −60† | −85 | −1.2 | **7-25** | +1.2 |
| −70† | −95 | −1.3 | **7-26** | +1.3 |
| −80† | −105 | −1.4 | **7-27** | +1.4 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

## Linear Scale NBW

21. Repeat steps 8 through 13 using a span of 10 kHz for the narrow resolution bandwidths in linear mode, and compare the results to those listed in Table 2-24.

22. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-24. The MKR Δ reading should be within the limits shown.

**Table 2-24.**
**Reference Level Accuracy, Linear Mode for Narrow Bandwidths**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −35* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −25* | −0.4 | **7-28** | +0.4 |
| +10 | −15* | −0.5 | **7-29** | +0.5 |
| −20† | −45 | −0.4 | **7-30** | +0.4 |
| −30† | −55 | −0.5 | **7-31** | +0.5 |
| −40† | −65 | −0.8 | **7-32** | +0.8 |
| −50† | −75 | −1.1 | **7-33** | +1.1 |
| −60† | −85 | −1.2 | **7-34** | +1.2 |
| −70† | −95 | −1.3 | **7-35** | +1.3 |
| −80† | −105 | −1.4 | **7-36** | +1.4 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

Operation verification test, "EMI Receiver Reference Level Accuracy," is now complete.

# 8. Receiver RF Section Reference Level Accuracy

A 50 MHz CW signal is applied to the RF INPUT of the receiver RF section through two step attenuators. The attenuators increase the effective amplitude range of the source. The amplitude of the source is decreased in 10 dB steps and the receiver marker functions are used to measure the amplitude difference between steps. The source internal attenuator is used as the reference standard. The test is performed in both log and linear amplitude scales.

It is only necessary to test reference levels as low as –90 dBm (with 10 dB attenuation) since lower reference levels are a function of the receiver microprocessor manipulating the trace data. There is no error associated with the trace data manipulation.

## Equipment Required

Synthesizer/level generator
Attenuator, 1 dB steps
Attenuator, 10 dB steps
Cable, BNC 122 cm (48 in)
Cable, BNC 20 cm (9 in)
Adapter, Type N (m) to BNC (f)
Adapter, BNC (m) to BNC (m)

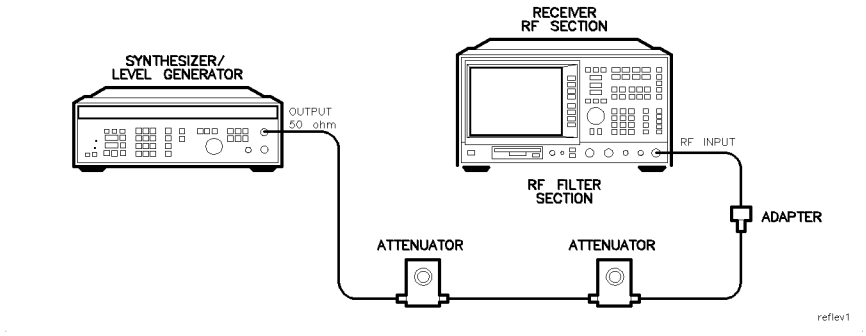



**Figure 2-11. Reference Level Accuracy Test Setup**

## Procedure

### Log Scale

1. Set the synthesizer/level generator controls as follows:

   FREQUENCY ..... 50 MHz
   AMPLITUDE ..... −10 dBm
   AMPLITUDE INCREMENT ..... 10 dB
   OUTPUT ..... 50 Ω

2. Connect the equipment as shown in Figure 2-11. Set the 10 dB step attenuator to 10 dB attenuation and the 1 dB step attenuator to 0 dB attenuation.

3. Press (PRESET) on the receiver RF section, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   (FREQUENCY) CENTER FREQ 50 (MHz)
   (SPAN) 10 (MHz)
   (PEAK SEARCH)
   (MARKER FUNCTION) MK TRACK ON OFF ON
   (SPAN) 50 (kHz)
   (BW) IF BW AUTO MAN MAN 3 (kHz)
   AVG BW AUTO MAN MAN 30 (Hz)
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (AMPLITUDE) REF LVL −20 (dBm)
   SCALE LOG LIN LOG 1 (dB)

4. Set the 1 dB step attenuator to place the signal peak one to two dB (one to two divisions) below the reference level.

5. On the receiver, press the following keys:

   (SINGLE)
   (PEAK SEARCH) MARKER Δ

6. Set the synthesizer/level generator amplitude and receiver reference level according to Table 2-25. At each setting, press the following receiver keys:

   (SINGLE)
   (PEAK SEARCH)

7. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-25. The MKR Δ reading should be within the limits shown.

**Table 2-25. Reference Level Accuracy, Log Mode**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −20* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −10* | −0.4 | **8-1** | +0.4 |
| +10 | 0* | −0.5 | **8-2** | +0.5 |
| −20† | −30 | −0.4 | **8-3** | +0.4 |
| −30† | −40 | −0.5 | **8-4** | +0.5 |
| −40† | −50 | −0.8 | **8-5** | +0.8 |
| −50† | −60 | −1.0 | **8-6** | +1.0 |
| −60† | −70 | −1.1 | **8-7** | +1.1 |
| −70† | −80 | −1.2 | **8-8** | +1.2 |
| −80† | −90 | −1.3 | **8-9** | +1.3 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

## Linear Scale

8. Set the receiver controls as follows:

   (SPAN) 50 (kHz)
   (AMPLITUDE) REF LVL −20 (dBm)
   SCALE LOG LIN LIN
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (SWEEP) SWEEP CONT SGL CONT
   (MKR) MARKER 1 ON OFF OFF

9. Set the synthesizer/level generator amplitude to −10 dBm.
10. Set the 1 dB step attenuator to 0 dB attenuation.
11. Set the 1 dB step attenuator to place the signal peak one to two divisions below the reference level.
12. On the receiver, press the following keys:

    (SINGLE)
    (PEAK SEARCH) MARKER Δ

13. Set the synthesizer/level generator amplitude and receiver reference level according to Table 2-26. At each setting, press the following receiver keys:

    (SINGLE)
    (PEAK SEARCH)

14. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-26. The MKR Δ reading should be within the limits shown.

**Table 2-26. Reference Level Accuracy, Linear Mode**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −20* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −10* | −0.4 | **8-10** | +0.4 |
| +10 | 0* | −0.5 | **8-11** | +0.5 |
| −20† | −30 | −0.4 | **8-12** | +0.4 |
| −30† | −40 | −0.5 | **8-13** | +0.5 |
| −40† | −50 | −0.8 | **8-14** | +0.8 |
| −50† | −60 | −1.0 | **8-15** | +1.0 |
| −60† | −70 | −1.1 | **8-16** | +1.1 |
| −70† | −80 | −1.2 | **8-17** | +1.2 |
| −80† | −90 | −1.3 | **8-18** | +1.3 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

## Log Scale 1 dB

15. Press the following receiver keys:

    (AMPLITUDE) REF LVL −20 (dBm)
    SCALE LOG LIN LOG 1 (dB)
    (SPAN) 10 (kHz)
    (SWEEP) SWEEP CONT SGL CONT
    (BW) IF BW AUTO MAN MAN 300 (Hz)
    (MKR) MARKER 1 ON OFF OFF

16. Set the synthesizer/level generator to −10 dBm.

17. Set the 1 dB step attenuator to place the signal peak one to two dB (one to two divisions) below the reference level.

18. On the receiver, press the following keys:

    (SINGLE)
    (PEAK SEARCH) MARKER Δ

19. Set the synthesizer/level generator amplitude and receiver reference level according to Table 2-27. At each setting, press the following receiver keys:

    (SINGLE)
    (PEAK SEARCH)

20. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-27. The MKR Δ reading should be within the limits shown.

**Table 2-27.**
**Reference Level Accuracy, Log Mode for Narrow Bandwidths**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −20* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −10* | −0.4 | **8-19** | +0.4 |
| +10 | 0* | −0.5 | **8-20** | +0.5 |
| −20† | −30 | −0.4 | **8-21** | +0.4 |
| −30† | −40 | −0.5 | **8-22** | +0.5 |
| −40† | −50 | −0.8 | **8-23** | +0.8 |
| −50† | −60 | −1.1 | **8-24** | +1.1 |
| −60† | −70 | −1.2 | **8-25** | +1.2 |
| −70† | −80 | −1.3 | **8-26** | +1.3 |
| −80† | −90 | −1.4 | **8-27** | +1.4 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

## Linear Scale NBW

21. Repeat steps 8 through 13 using a span of 10 kHz for the narrow resolution bandwidths in linear mode, and compare the results to those listed in Table 2-28.

22. Record the MKR Δ amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-28. The MKR Δ reading should be within the limits shown.

## 8. Receiver RF Section Reference Level Accuracy

**Table 2-28.**
**Reference Level Accuracy, Linear Mode for Narrow Bandwidths**

| Synthesizer/Level Generator Amplitude | Receiver Reference Level | MKR Δ Reading (dB) | | |
|---|---|---|---|---|
| (dBm) | (dBm) | Min. | TR Entry | Max. |
| −10 | −20* | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 0 | −10* | −0.4 | **8-28** | +0.4 |
| +10 | 0* | −0.5 | **8-29** | +0.5 |
| −20† | −30 | −0.4 | **8-30** | +0.4 |
| −30† | −40 | −0.5 | **8-31** | +0.5 |
| −40† | −50 | −0.8 | **8-32** | +0.8 |
| −50† | −60 | −1.1 | **8-33** | +1.1 |
| −60† | −70 | −1.2 | **8-34** | +1.2 |
| −70† | −80 | −1.3 | **8-35** | +1.3 |
| −80† | −90 | −1.4 | **8-36** | +1.4 |

* Change receiver's reference level before synthesizer/level gen. amplitude.

† Change synthesizer/level gen. amplitude before receiver's reference level.

Operation verification test, "Receiver RF Section Reference Level Accuracy," is now complete.

# 9. Calibrator Amplitude Accuracy

This test measures the accuracy of the RF filter section CAL OUT signal. The first part of the test characterizes the insertion loss of a low pass filter (LPF) and 10 dB attenuator. The harmonics of the CAL OUT signal are suppressed with the LPF before the amplitude accuracy is measured using a power meter.

Calibrator frequency is not included in this procedure. It is a function of the frequency reference error:

(CAL OUT Frequency = 300 MHz ±(300 MHz × Frequency Reference Error)).

## Equipment Required

Synthesized sweeper
Power meter *(two required)*
Power sensor, low power with a 50 MHz reference attenuator
Power sensor, 1 MHz to 350 MHz
Power splitter, Type N
10 dB Attenuator, Type N (m to f), dc-12.4 GHz
Low pass filter, 300 MHz
Cable, Type N, 152 cm (60 in)
Adapter, Type N (f) to APC 3.5 (f)
Adapter, Type N (f) to BNC (m)
Adapter, Type N (m) to BNC (f)

## Procedure

This operation verification test consists of two parts:

Part 1: LPF, Attenuator and Adapter Insertion Loss Characterization
Part 2: Calibrator Amplitude Accuracy

Perform "Part 1: LPF, Attenuator and Adapter Insertion Loss Characterization" before "Part 2: Calibrator Amplitude Accuracy." A worksheet is provided at the end of this procedure for calculating the corrected insertion loss and the calibrator amplitude accuracy.

## Part 1: LPF, Attenuator and Adapter Insertion Loss Characterization

**CAUTION** Do not attempt to calibrate the low-power power sensor without the reference attenuator or damage to the low-power power sensor will occur.

1. Zero and calibrate the power meters as described in the power meter operation manual.
2. Press INSTRUMENT PRESET on the synthesized sweeper, then set the controls as follows:

   CW ..... 300 MHz
   POWER LEVEL ..... −15 dBm

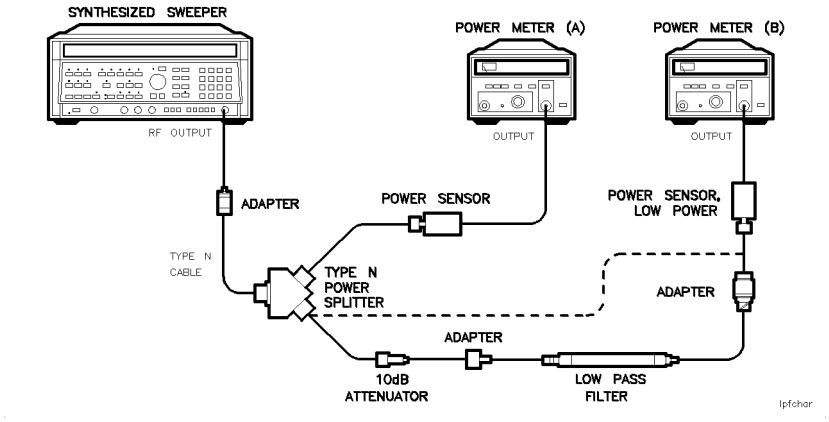



**Figure 2-12. LPF Characterization**

3. Connect the equipment as shown in Figure 2-12. Connect the low-power power sensor directly to the power splitter (bypass the LPF, attenuator, and adapters). Wait for the power sensor to settle before proceeding with the next step.
4. On the power meter (A), press the dB REF mode key. The power indication should be 0 dB.
5. On the power meter (B), press the dB REF mode key. The power indication should be 0 dB.
6. Connect the LPF, attenuator, and adapters as shown in Figure 2-12.
7. Record the power meter (A) reading in dB in the worksheet as the Mismatch Error. This is the relative error due to mismatch.
8. Record the power meter (B) reading in dB in the worksheet as the Uncorrected Insertion Loss. This is the relative uncorrected insertion loss of the LPF, attenuator and adapters.
9. Subtract the Mismatch Error (step 8) from the Uncorrected Insertion Loss (step 9). This is the corrected insertion loss. Record this value in the worksheet as the Corrected Insertion Loss.

   Example: If the Mismatch Error is −0.3 dB and the Uncorrected Insertion Loss is −10.2 dB, subtract the mismatch error from the insertion loss to yield a corrected reading of −9.9 dB.

**Calibrator Amplitude Accuracy Worksheet**

| Description | Measurement |
|---|---|
| Mismatch Error | _____dB |
| Uncorrected Insertion Loss | _____dB |
| Corrected Insertion Loss | _____dB |
| Power Meter Reading | _____dBm |
| CAL Out Power | _____dBm |

## Part 2: Calibrator Amplitude Accuracy

Perform "Part 1: LPF, Attenuator and Adapter Insertion Loss Characterization" before performing this procedure.

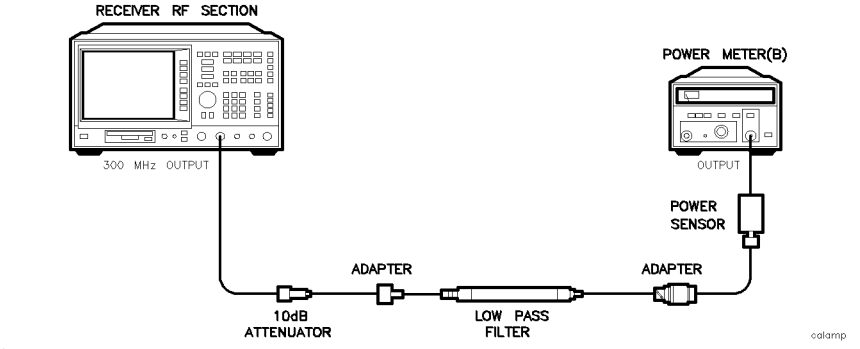



**Figure 2-13. Calibrator Amplitude Accuracy Test Setup**

### 9. Calibrator Amplitude Accuracy

1. Connect the equipment as shown in Figure 2-13. The receiver should be positioned so that the setup of the adapters, LPF and attenuator do not bind. It may be necessary to support the center of gravity of the devices.
2. On the power meter, press the dBm mode key. Record the Power Meter Reading in dBm in the worksheet as the Power Meter Reading.
3. Subtract the Corrected Insertion Loss (step 10) from the Power Meter Reading (step 12).

   CAL OUT Power = Power Meter Reading − Corrected Insertion Loss

   Example: If the Corrected Insertion Loss is −10.0 dB, and the measuring receiver reading is −30 dB, then (−30 dB) − (−10.0 dB) = −20 dB

4. Record this value as TR Entry 9-1 in the operation verification test record as the CAL OUT power. The CAL OUT should be −20 dBm ±0.4 dB.

Operation verification test, "Calibrator Amplitude Accuracy," is now complete.

# 10. Calibration Repeatability and IF Bandwidth Uncertainty

To measure the calibration repeatability, the reference signal is measured using the peak search function.

To measure the resolution bandwidth switching uncertainty, an amplitude reference is taken with the resolution bandwidth set to 3 kHz using the marker-delta function. The resolution bandwidth is changed to settings between 3 MHz and 1 kHz and the amplitude variation is measured at each setting and compared to the specification. The span is changed as necessary to maintain approximately the same aspect ratio.

## Equipment Required

Cable, BNC 20 cm (9in)
Adapter, Type N (m) to BNC (f)

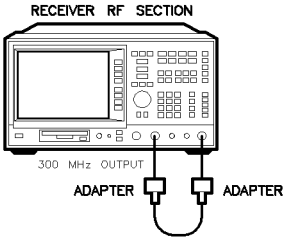



**Figure 2-14. Uncertainty Test Setup**

## Calibration Repeatability for Receiver RF Section

1. Connect the 300 MHz OUTPUT to the EMC analyzer input using the BNC cable and adapters, as shown in Figure 2-14.
2. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver controls by pressing the following keys:

   (FREQUENCY) CENTER FREQ 300 (MHz)
   (SPAN) 10 (MHz)
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (AMPLITUDE) REF LVL −20 (dBm)
   (PEAK SEARCH)
   (MARKER FUNCTION) MK TRACK ON OFF ON
   (SPAN) 50 (kHz)

   Wait for the auto zoom routine to finish, then set the IF bandwidth and the AVG bandwidth by pressing the following keys:

   (BW) IF BW AUTO MAN 3 (kHz)
   AVG BW AUTO MAN MAN 300 (Hz)

   Set the receiver to linear scale and select the sample detector by pressing.

   (AMPLITUDE) SCALE LOG LIN LIN
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (TRACE) More 1 of 3 DETECTOR SMP PK SMP

3. Press (PEAK SEARCH), then record the marker reading as TR Entry 10-1 in the operation verification test record.

   The marker reading should be within −20.15 and −19.85 dB.

## Resolution Bandwidth Switching Uncertainty

4. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver controls by pressing the following keys:

   (FREQUENCY) CENTER FREQ 300 (MHz)
   (SPAN) 10 (MHz)
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (AMPLITUDE) REF LVL −20 (dBm)
   SCALE LOG LIN LOG 1 (dB)
   (PEAK SEARCH)
   (INPUT) VIEW CAL ON OFF ON
   (MARKER FUNCTION) MK TRACK ON OFF ON
   (SPAN) 50 (kHz)

   Wait for the auto zoom routine to finish, then set the IF bandwidth and the AVG bandwidth by pressing the following keys:

(BW) IF BW AUTO MAN 3 (kHz)
AVG BW AUTO MAN MAN 1 (kHz)

5. Press (AMPLITUDE) REF LVL and use the knob to adjust the reference level until the signal appears one division below the reference level, then press the following keys:

   (SINGLE)
   (PEAK SEARCH) MARKER Δ

6. Set the receiver resolution bandwidth and span according to Table 2-29.

7. Press (SINGLE) then (PEAK SEARCH), then record the MKR Δ TRK amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-29.

   The amplitude reading should be within the limits shown.

8. Repeat steps 7 and 8 for each of the remaining resolution bandwidth and span settings listed in Table 2-29.

**Table 2-29.**
**Resolution Bandwidth Switching Uncertainty**

| Receiver | | MKR Δ TRK Amplitude Reading | | |
|---|---|---|---|---|
| IF BW Setting | SPAN Setting | Min. (dB) | TR Entry | Max. (dB) |
| 3 kHz | 50 kHz | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 1 kHz | 50 kHz | −0.5 | **10-2** | +0.5 |
| 9 kHz | 50 kHz | −0.4 | **10-3** | +0.4 |
| 10 kHz | 50 kHz | −0.4 | **10-4** | +0.4 |
| 30 kHz | 500 kHz | −0.4 | **10-5** | +0.4 |
| 100 kHz | 500 kHz | −0.4 | **10-6** | +0.4 |
| 120 kHz | 500 kHz | −0.4 | **10-7** | +0.4 |
| 300 kHz | 5 MHz | −0.4 | **10-8** | +0.4 |
| 1 MHz | 10 MHz | −0.4 | **10-9** | +0.4 |
| 3 MHz | 10 MHz | −0.4 | **10-10** | +0.4 |

9. Press the following receiver keys:

   (SPAN) 50 (kHz)
   (BW) IF BW AUTO MAN 3 (kHz)
   (SINGLE)
   (PEAK SEARCH) MARKER Δ MARKER Δ

10. Set the resolution bandwidth and span according to Table 2-30.

11. Press (SINGLE) then (PEAK SEARCH), then record the MKR Δ TRK amplitude reading in the operation verification test record as the TR Entry indicated in Table 2-30.

    The amplitude reading should be within the limits shown.

12. Repeat steps 11 through 12 for each of the remaining resolution bandwidth and span settings listed in Table 2-30.

**Table 2-30.**
**Resolution Bandwidth Switching Uncertainty for Narrow Bandwidths**

| Receiver | | MKR Δ TRK Amplitude Reading | | |
|---|---|---|---|---|
| IF BW Setting | SPAN Setting | Min. (dB) | TR Entry | Max. (dB) |
| 3 kHz | 50 kHz | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 300 Hz | 1 kHz | −0.6 | **10-11** | +0.6 |
| 200 Hz | 1 kHz | −0.6 | **10-12** | +0.6 |
| 100 Hz | 1 kHz | −0.6 | **10-13** | +0.6 |
| 30 Hz | 1 kHz | −0.6 | **10-14** | +0.6 |

Note that it is normal for the 200 Hz IF bandwidth shape to have a dip in the center of the response.

Operation verification test, “Calibration Repeatability and IF Bandwidth,” is now complete.

# 11. Frequency Response for the Receiver RF Section

The output of the synthesized sweeper is fed through a power splitter to a power sensor and the receiver RF section RF INPUT. The synthesized sweeper power level is adjusted at 300 MHz to place the displayed signal at the RF section's center horizontal graticule line. The power meter, is placed in dBm (REF) mode. At each new synthesized sweeper frequency and receiver RF section center frequency setting, the synthesized sweeper power level is adjusted to place the signal at the center horizontal graticule line. The power meter displays the inverse of the frequency response relative to 300 MHz (CAL OUT frequency).

## Equipment Required

Synthesized sweeper
Synthesizer/Level Generator
Power Meter
Power sensor, 50 MHz to 6.5 GHz (high frequency)
Power splitter
Termination, 50 Ω APC 3.5 (m)
Adapter, Type N (m) to APC 3.5 (m)
Adapter, SMB (m) to BNC (f)
Adapter, 3.5 mm (f) to 3.5mm (f)
Adapter, SMB (m) to BNC (f)
Cable, BNC, 122 cm (48 in)
Cable, APC 3.5, 91 cm (36 in)

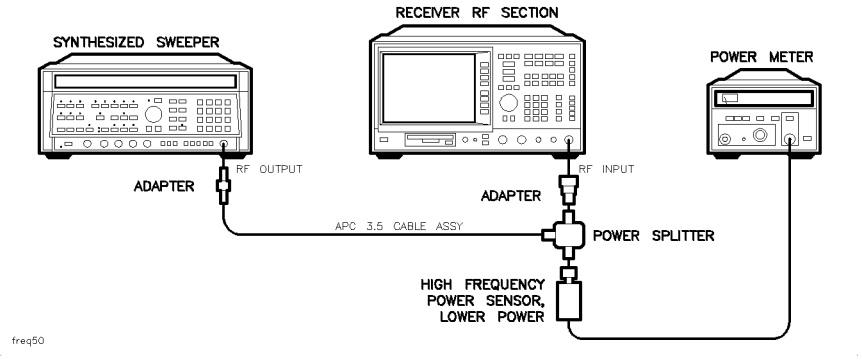



**Figure 2-15. Frequency Response Test Setup, ≥50 MHz**

## Procedure

1. Zero and calibrate the power meter and the high frequency power sensor in LOG mode as described in the power meter operation manual.
2. Connect the equipment as shown in Figure 2-15.
3. Press INSTRUMENT PRESET on the synthesized sweeper. Set the synthesized sweeper controls as follows:

   CW ..... 300 MHz
   FREQ STEP ..... 100 MHz
   POWER LEVEL ..... −8 dBm

4. Press (PRESET) on the receiver RF section, then wait for the preset routine to finish. Press the following keys:

   (AMPLITUDE) More 1 of 3 Amptd Units dBm

   (FREQUENCY) More 1 of 2 Band Lock 0-2.9 Gz BAND 0 (HP 85462A only)

   (FREQUENCY) CENTER FREQ 300 (MHz)

   CF STEP AUTO MAN MAN 100 (MHz)

   (SPAN) 10 (MHz)

   (AMPLITUDE) REF LVL −10 (dBm)

   More 1 of 3 More 2 of 3 COUPLE AC DC DC

   (AMPLITUDE) SCALE LOG LIN LOG 1 (dB)

   (BW) IF BW AUTO MAN MAN 1 (MHz)

   AVG BW AUTO MAN MAN 10 (kHz)

   (PEAK SEARCH)

   (MARKER FUNCTION) MK TRACK ON OFF ON

5. Adjust the synthesized sweeper power level for a MKR-TRK amplitude reading of −14 dBm ±0.1 dB.
6. Press dB (REF) on the power meter.

## Frequency Response, Band 0, ≥50 MHz

7. Set the synthesized sweeper CW to 50 MHz.
8. Press the following keys:

   (FREQUENCY) CENTER FREQ 50 (MHz)

9. Adjust the synthesized sweeper power level for an receiver RF section MKR-TRK amplitude reading of −14 dBm ±0.1 dB.
10. Record the power ratio displayed on the power meter below, then record the negative of this value in column 2 of Table 2-31 as the power meter reading at 50 MHz.

    Power Meter Reading_____dB

**Note** Be sure the power meter's calibration factor is set to the appropriate setting for the frequency being measured.

11. Set the synthesized sweeper CW to 100 MHz.
12. Press the following keys:

    (FREQUENCY) CENTER FREQ 100 (MHz)

13. Adjust the synthesized sweeper power level for an RF section MKR-TRK amplitude reading of −14 dBm ±0.1 dB.
14. Record the negative of the power ratio displayed on the power meter in column 2 of Table 2-31 as the power meter reading at 100 MHz.

**Note** Be sure the power meter's calibration factor is set to the appropriate setting for the frequency being measured.

15. On the synthesized sweeper, press CW, and up arrow (step up) key. On the RF section press the following keys:

    FREQUENCY (step up) key to step through the remaining frequencies listed in Table 2-31.

16. Repeat steps 13 through 15, for each frequency listed in Table 2-31.

## Frequency Response, Band 1

*For an HP 85462A only*

17. Set the synthesized sweeper CW to 2.75 GHz.

18. Press the following keys:

    FREQUENCY MORE 1 of 2 Band Lock 2.75 - 6.5 BAND 1
    FREQUENCY CENTER FREQ 2.75 GHz
    SPAN 10 MHz
    BW IF BW AUTO MAN MAN 1 MHz
    AVG BW AUTO MAN MAN 10 kHz
    PEAK SEARCH
    MARKER FUNCTION MK TRACK ON OFF ON

19. Adjust the synthesized sweeper power level for a RF section MKR-TRK amplitude reading of −14 dBm ±0.1 dB.

20. Record the negative of the power ratio displayed on the power meter in Table 2-32, column 2.

**Note** Be sure the power meter's calibration factor is set to the appropriate setting for the frequency being measured.

21. Set the synthesized sweeper CW to 2.8 GHz.

22. Press the following keys:

    FREQUENCY CENTER FREQ 2.8 GHz

23. Adjust the synthesized sweeper power level for a RF section MKR-TRK amplitude reading of −14 dBm ±0.1 dB.

24. Record the negative of the power ratio displayed on the power meter in Table 2-32, column 2.

**Note** Be sure the power meter's calibration factor is set to the appropriate setting for the frequency being measured.

25. On the synthesized sweeper, press CW, and up arrow (step up) key. On the RF section press the following keys:

    FREQUENCY (step up) key to step through the remaining frequencies listed in Table 2-32.

26. Repeat steps 23 through 25, for each frequency listed in Table 2-32.

## Frequency Response, Band 0, <50 MHz

27. Connect the equipment as shown in Figure 2-16, with the power sensor connected to power splitter.
28. Set the synthesizer/level generator controls as follows:

    FREQUENCY ..... 50 MHz
    AMPLITUDE ..... –8 dBm
    AMPTD INCR ..... 0.05 dB

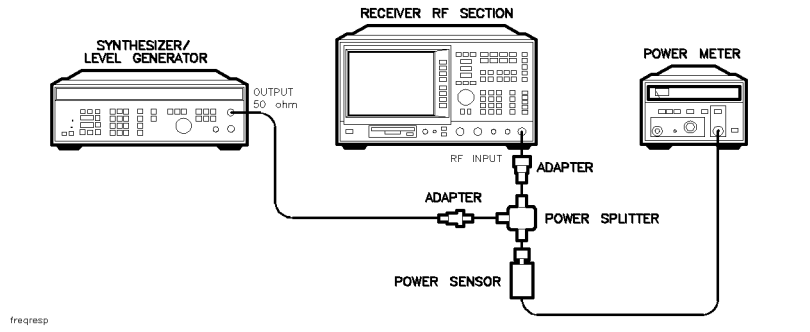



**Figure 2-16. Frequency Response Test Setup (<50 MHz)**

29. Press the following keys:

    (MKR) MARKER 1 ON OFF OFF

30. For an HP 85462A press:

    (FREQUENCY) Band Lock More 1 of 2 BND LOCK ON OFF OFF

31. Press the following keys:

    (FREQUENCY) CENTER FREQ 50 (MHz)
    (SPAN) 10 (MHz)
    (PEAK SEARCH)
    (MARKER FUNCTION) MKR TRACK ON OFF ON
    (SPAN) 100 (kHz)
    (BW) IF BW AUTO MAN MAN 10 (kHz)

32. Set the power sensor calibration factor for 50 MHz.
33. Adjust the synthesizer/level generator amplitude until the power meter display reads the same value as recorded in step 10. Record the synthesizer/level generator amplitude in Table 2-33 column 2.
34. Replace the power sensor with the 50 Ω termination.
35. On the RF section, press the following keys:

    (PEAK SEARCH) MARKER Δ
    (MARKER FUNCTION) MK TRACK ON OFF ON

36. Set the RF section center frequency and the synthesizer frequency to the frequencies listed in Table 2-33.
37. At each frequency, adjust the synthesizer/level generator amplitude for a MKR Δ-TRK amplitude reading of 0.00 ±0.05 dB. Record the synthesizer/level generator amplitude setting in Table 2-33 as the synthesizer/level generator amplitude.
38. For each of the frequencies in Table 2-33, subtract the synthesizer/level generator amplitude reading (column 2) from the synthesizer/level generator amplitude setting (50 MHz) recorded in step 31. Record the result as the response relative to 50 MHz (column 3) of Table 2-33.
39. Add to each of the column 3 entries in Table 2-33 the power meter reading for 50 MHz listed in Table 2-31. Record the results as the response relative to 300 MHz (column 4) in Table 2-33.

## Test Results

### Frequency Response, Band 0

1. Enter the most positive number from Table 2-33, column 4:
   _____ dB

2. Enter the most positive number from Table 2-31, column 2:
   _____ dB

3. Enter the more positive of numbers from step 1 and step 2 as TR Entry 11-1 in the operation verification test record (absolute referenced to 300 MHz).

4. Enter the most negative number from Table 2-33, column 4:
   _____ dB

5. Enter the most negative number from Table 2-31, column 2:
   _____ dB

6. Enter the more negative of numbers from step 4 and step 5 as TR Entry 11-2 in the operation verification test record.

7. Subtract step 6 from step 3. Enter this value as TR Entry 11-3 in the operation verification test record (relative flatness).

### Frequency Response, Band 1

*For an HP 85462A only*

1. Enter the most positive number from Table 2-32, column 2, as TR Entry 11-4 in the operation verification test record.
2. Enter the most negative number from Table 2-32, column 2, as TR Entry 11-5 in the operation verification test record.
3. Subtract step 2 from step 1. Enter this value as TR Entry 11-6 in the operation verification test record (relative flatness).

Operation verification test, "Frequency Response for the receiver RF section," is now complete.

**Table 2-31. Frequency Response Band 0 (≥50 MHz)**

| Column 1<br>Frequency (MHz) | Column 2<br>Power Meter Reading (dB) | Column 3<br>Measurement Uncertainty |
|---|---|---|
| 50 | _____ | +0.29/−0.31 dB |
| 100 | _____ | +0.29/−0.31 dB |
| 200 | _____ | +0.29/−0.31 dB |
| 300 | _____ | 0 (Reference) |
| 400 | _____ | +0.29/−0.31 dB |
| 500 | _____ | +0.29/−0.31 dB |
| 600 | _____ | +0.29/−0.31 dB |
| 700 | _____ | +0.29/−0.31 dB |
| 800 | _____ | +0.29/−0.31 dB |
| 900 | _____ | +0.29/−0.31 dB |
| 1000 | _____ | +0.29/−0.31 dB |
| 1100 | _____ | +0.29/−0.31 dB |
| 1200 | _____ | +0.29/−0.31 dB |
| 1300 | _____ | +0.29/−0.31 dB |
| 1400 | _____ | +0.29/−0.31 dB |
| 1500 | _____ | +0.29/−0.31 dB |
| 1600 | _____ | +0.29/−0.31 dB |
| 1700 | _____ | +0.29/−0.31 dB |
| 1800 | _____ | +0.29/−0.31 dB |
| 1900 | _____ | +0.29/−0.31 dB |
| 2000 | _____ | +0.29/−0.31 dB |
| 2100 | _____ | +0.29/−0.31 dB |
| 2200 | _____ | +0.29/−0.31 dB |
| 2300 | _____ | +0.29/−0.31 dB |
| 2400 | _____ | +0.29/−0.31 dB |
| 2500 | _____ | +0.29/−0.31 dB |
| 2600 | _____ | +0.29/−0.31 dB |
| 2700 | _____ | +0.29/−0.31 dB |
| 2800 | _____ | +0.29/−0.31 dB |
| 2900 | _____ | +0.29/−0.31 dB |

## 11. Frequency Response for the Receiver RF Section

**Table 2-32.**
**Frequency Response Band 1**
**(For an HP 85462A only)**

| Column 1<br>Frequency (GHz) | Column 2<br>Power Meter Reading (dB) | Column 3<br>Measurement Uncertainty |
|---|---|---|
| 2.75 | _____ | +0.43/−0.47 dB |
| 2.8 | _____ | +0.43/−0.47 dB |
| 2.9 | _____ | +0.43/−0.47 dB |
| 3.0 | _____ | +0.43/−0.47 dB |
| 3.1 | _____ | +0.43/−0.47 dB |
| 3.2 | _____ | +0.43/−0.47 dB |
| 3.3 | _____ | +0.43/−0.47 dB |
| 3.4 | _____ | +0.43/−0.47 dB |
| 3.5 | _____ | +0.43/−0.47 dB |
| 3.6 | _____ | +0.43/−0.47 dB |
| 3.7 | _____ | +0.43/−0.47 dB |
| 3.8 | _____ | +0.43/−0.47 dB |
| 3.9 | _____ | +0.43/−0.47 dB |
| 4.0 | _____ | +0.43/−0.47 dB |
| 4.1 | _____ | +0.43/−0.47 dB |
| 4.2 | _____ | +0.43/−0.47 dB |
| 4.3 | _____ | +0.43/−0.47 dB |
| 4.4 | _____ | +0.43/−0.47 dB |
| 4.5 | _____ | +0.43/−0.47 dB |
| 4.6 | _____ | +0.43/−0.47 dB |
| 4.7 | _____ | +0.43/−0.47 dB |
| 4.8 | _____ | +0.43/−0.47 dB |
| 4.9 | _____ | +0.43/−0.47 dB |
| 5.0 | _____ | +0.43/−0.47 dB |
| 5.1 | _____ | +0.43/−0.47 dB |
| 5.2 | _____ | +0.43/−0.47 dB |
| 5.3 | _____ | +0.43/−0.47 dB |
| 5.4 | _____ | +0.43/−0.47 dB |
| 5.5 | _____ | +0.43/−0.47 dB |
| 5.6 | _____ | +0.43/−0.47 dB |

**Table 2-32.**
**Frequency Response Band 1**
**(For an HP 85462A only) (continued)**

| Column 1<br>Frequency (GHz) | Column 2<br>Power Meter Reading (dB) | Column 3<br>Measurement Uncertainty |
|---|---|---|
| 5.7 | _____ | +0.43/−0.47 dB |
| 5.8 | _____ | +0.43/−0.47 dB |
| 5.9 | _____ | +0.43/−0.47 dB |
| 6.0 | _____ | +0.43/−0.47 dB |
| 6.1 | _____ | +0.43/−0.47 dB |
| 6.2 | _____ | +0.43/−0.47 dB |
| 6.3 | _____ | +0.43/−0.47 dB |
| 6.4 | _____ | +0.43/−0.47 dB |
| 6.5 | _____ | +0.43/−0.47 dB |

**Table 2-33. Frequency Response Band 0 (<50 MHz)**

| Column 1<br>Receiver Frequency Synthesizer Frequency | Column 2<br>Synthesizer/Level Generator Amplitude (dBm) | Column 3<br>Response Relative to 50 MHz | Column 4<br>Response Relative to 300 MHz | Column 5<br>Measurement Uncertainty |
|---|---|---|---|---|
| 50 MHz | _____ | 0 (Reference) | _____ | +0.34/−0.37 |
| 20 MHz | _____ | _____ | _____ | +0.34/−0.37 |
| 10 MHz | _____ | _____ | _____ | +0.34/−0.37 |
| 5 MHz | _____ | _____ | _____ | +0.34/−0.37 |
| 1 MHz | _____ | _____ | _____ | +0.34/−0.37 |
| 200 kHz | _____ | _____ | _____ | +0.34/−0.37 |
| 50 kHz | _____ | _____ | _____ | +0.34/−0.37 |

# 12. EMI Receiver Overload

The internal calibration signal is used to generate an overload condition. Ensure that no signals are present at INPUT 2.

## Equipment Required

None

## Procedure

1. Press [PRESET] on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

   200 MHz - 1 GHz

   [BW] IF BW AUTO MAN MAN 120 [kHz]

   [SPAN] 0 [Hz]

   [FREQUENCY] CENTER FREQ 300.360 [MHz] (300 MHz + 3 X RBW)

   [AMPLITUDE] REF LVL 35.1 [+dBμV] (−71.9 dBm)

2. Note no overload indication.

3. Press the following receiver keys:

   [INPUT]

   VIEW CAL ON OFF ON

   [SINGLE]

4. Note the IF overload indication on the display, and the overload LED on the filter section.

5. Press [PRESET] on the receiver.

Operation verification test, “EMI Receiver Overload,” is now complete.

# 13. Receiver RF Section Overload

The internal calibration signal is used to generate an overload condition. Ensure that no signals are present at the RF INPUT.

## Equipment Required

None

## Procedure

1. Press (PRESET) on the RF section, then wait for the preset routine to finish. Set the RF section by pressing the following keys:

   200 MHz - 1 GHz

   (BW) IF BW AUTO MAN MAN 120 (kHz)

   (SPAN) 0 (Hz)

   (FREQUENCY) CENTER FREQ 300.360 (MHz) (300 MHz + 3 X RBW)

   (AMPLITUDE) REF LVL 47.1 (+dBµV) (−59.9 dBm)

2. Note no overload indication.

3. Press the following receiver keys:

   (INPUT)

   VIEW CAL ON OFF ON

   (SINGLE)

4. Note the IF overload indication on the display.

5. Press (PRESET) on the receiver.

Operation verification test, “Receiver RF Section Overload,” is now complete.

# 14. Displayed Average Noise Level for EMI Receiver

This test measures displayed average noise. The EMI receiver INPUT 1 and INPUT 2 are terminated in 50 Ω. The test tunes the EMI receiver across several frequency ranges, uses the marker to locate the frequency with the highest response, and then reads the displayed noise in zero span.

## Equipment Required

Termination, 50 Ω Type N
Termination, 50 Ω APC 3.5
Adapter, Type N (m) to APC 3.5 (f) (2)

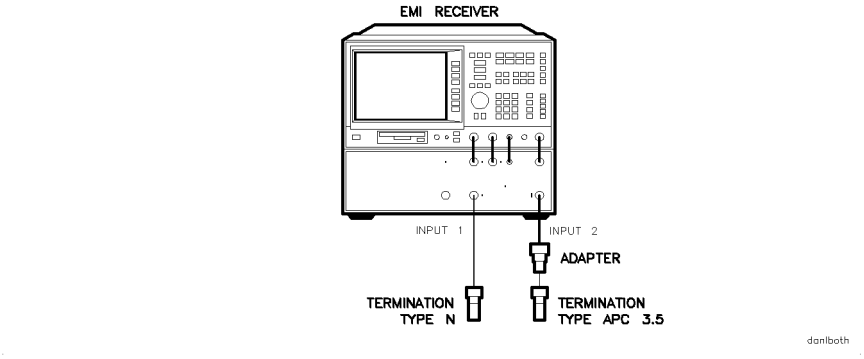



**Figure 2-17.**
**Displayed Average Noise Level Test Setup-EMI receiver**

## Procedure

### Part 1: INPUT 1, 400 kHz to 50 MHz

1. Connect an adapter and termination to INPUT 1 and INPUT 2 as shown in Figure 2-17.
2. Press [PRESET] on the receiver, then wait for the preset routine to finish.
3. Set the receiver by pressing the following keys:

   [INPUT]
   `INPUT 1 9kHz - 50 MHz`

4. Select the detector by pressing the following receiver keys:

   [TRACE] `More 1 of 3`
   `DETECTOR SMP PK` SMP

5. Press the following receiver keys:

   (FREQUENCY) CENTER FREQ 9.0 (kHz)
   (SPAN) 0 (Hz)
   (BW) IF BW AUTO MAN MAN 30 (Hz)
   AVG BW AUTO MAN MAN 30 (Hz) (AVG)
   (SWEEP) 2 SEC
   (AMPLITUDE) ATTEN AUTO MAN MAN 0 dB
   More 1 of 3 Amptd Units dBm
   (AMPLITUDE) −80 dB

6. Press REF LVL (▲) or (▼) repeatedly until the center of the noise is on screen. Press the following receiver keys:

**Note** If "IF OVERLOAD" indicator is displayed, increase ((▲)) REF LVL until the message disappears.

   (SINGLE)
   (TRACE) More 1 of 3
   VID AVG ON OFF ON 10 (ENTER)

7. Press (SINGLE), then wait for the completion of 10 new sweeps.

**Note** If "IF OVERLOAD" indicator is displayed, increase ((▲)) REF LVL until the message disappears.

8. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-34 for preamplifier off.
9. Press (PREAMP) to turn the preamplifier on.
10. Press (SINGLE), then wait for the completion of 10 new sweeps.
11. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-34 for preamplifier on.
12. Press (PREAMP) to turn the preamplifier off.
13. Repeat steps 5 to 12 for each of the settings listed in Table 2-34.

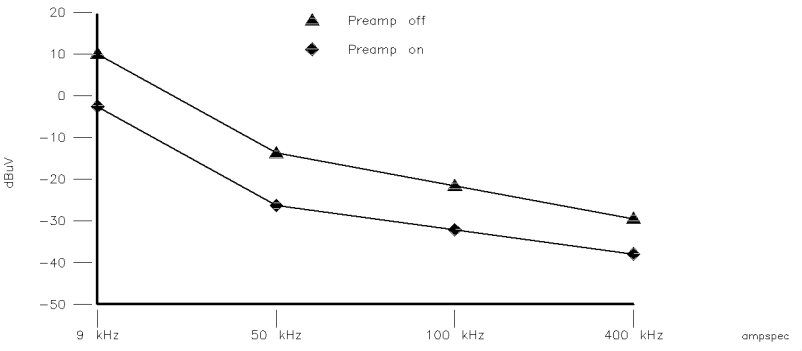



**Figure 2-18.**
**Displayed Average Noise Level Specifications ≤400 kHz**

**Table 2-34.**
**Non-CISPR Bandwidths Input #1 Preamp Off/On ≤400 kHz**

| Measurement Frequency (kHz) | IFBW (Hz) | AVG (Hz) | Specification Preamp Off | TR Entry Preamp Off | Specification Preamp On | TR Entry Preamp On |
|---|---|---|---|---|---|---|
| 9.0 | 30 | 30 | ≤−97 dBm | 14-1 | ≤−109 dBm | 14-5 |
| 50.0 | 30 | 30 | ≤−122 dBm | 14-2 | ≤−135 dBm | 14-6 |
| 100.0 | 30 | 30 | ≤−130 dBm | 14-3 | ≤−140 dBm | 14-7 |
| 400.0 | 30 | 30 | ≤−137 dBm | 14-4 | ≤−146 dBm | 14-8 |

## Part 2: INPUT 1, 400 kHz to 50 MHz

1. Connect an adapter and termination to INPUT 1 and INPUT 2 as shown in Figure 2-17.
2. Press [PRESET] on the receiver, then wait for the preset routine to finish.
3. Set the Receiver by pressing the following keys:

   [INPUT]
   `INPUT 1 9kHz - 50 MHz`
4. Select the detector by pressing the following receiver keys:

   [TRACE] `More 1 of 3`
   `DETECTOR SMP PK` SMP
5. Set the frequency range by pressing the following receiver keys:

   [FREQUENCY] `START FREQ` .4 [MHz]
   `STOP FREQ` 6 [MHz]
6. Press the following receiver keys:

   [BW] `IF BW AUTO MAN` MAN 10 [kHz] (IFBW1)
   `AVG BW AUTO MAN` MAN 10 [kHz] (AVG)
   [SWEEP] 2 `SEC`

(AMPLITUDE) ATTEN AUTO MAN MAN 0 dB
More 1 of 3 Amptd Units dBm
(AMPLITUDE) −100 dB

7. Press REF LVL (▲) or (▼) repeatedly until the center of the noise is on the screen. Press the following receiver keys:

**Note** If "IF OVERLOAD" indicator is displayed, increase ((▲)) REF LVL until the message disappears.

(SINGLE)
(TRACE) More 1 of 3
VID AVG ON OFF ON 10 (ENTER)

8. Press (SINGLE), then wait for the completion of a new sweep. Press (PEAK SEARCH) and note the frequency. Determine the frequency to test by adding 6.6 × IFBW2 to the noted frequency (or subtracting, if adding would make the test frequency higher than the original stop frequency).

   Maximum Amplitude Frequency ± ( 198 ) = Test Frequency

9. Press the following receiver keys:

   (FREQUENCY) CENTER FREQ (Test Frequency)
   (SPAN) 0 Hz
   (BW) IF BW AUTO MAN MAN 30 (Hz) (IF2)
   AVG BW AUTO MAN MAN 30 (Hz) (AVG)

10. Press (SINGLE), then wait for the completion of a new sweep.

**Note** If "IF OVERLOAD" indicator is displayed, increase ((▲)) REF LVL until the message disappears.

11. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-35 for preamplifier off.
12. Press (PREAMP) to turn the preamplifier on.
13. Press (SINGLE), then wait for the completion of 10 new sweeps.
14. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-35 for preamplifier on.
15. Press (PREAMP) to turn the preamplifier off.
16. Repeat steps 5 to 15 for each of the settings listed in Table 2-35.

**14. Displayed Average Noise Level for EMI Receiver**

**Table 2-35. Non-CISPR Bandwidths Input #1 Preamp Off/On ≥400 kHz**

| Start (MHz) | Stop (MHz) | IFBW1 (kHz) | AVG (kHz) | IFBW2 (Hz) | Specification Preamp Off | TR Entry Preamp Off | Specification Preamp On | TR Entry Preamp On |
|---|---|---|---|---|---|---|---|---|
| .4 | 6.0 | 10 | 10 | 30 | ≤−138 dBm | 14-9 | ≤−146 dBm | 14-13 |
| 6.0 | 18.0 | 10 | 10 | 30 | ≤−138 dBm | 14-10 | ≤−146 dBm | 14-14 |
| 18.0 | 30.0 | 10 | 10 | 30 | ≤−138 dBm | 14-11 | ≤−146 dBm | 14-15 |
| 30.0 | 50.0 | 30 | 30 | 30 | ≤−138 dBm | 14-12 | ≤−146 dBm | 14-16 |

## Part 3: INPUT 2, 20 MHz to 2.9 GHz

1. Connect an adapter and termination to INPUT 1 and INPUT 2 as shown in Figure 2-17.
2. Press [PRESET] on the receiver, then wait for the preset routine to finish.
3. Set the Receiver by pressing the following keys:

   [INPUT]
   INPUT 2 20M - 2.9G
4. Select the detector by pressing the following receiver keys:

   [TRACE] More 1 of 3
   DETECTOR SMP PK SMP
5. Set the frequency range by pressing the following receiver keys:

   [FREQUENCY] START FREQ 20 [MHz]
   STOP FREQ 100 [MHz]
6. Press the following receiver keys:

   [BW] IF BW AUTO MAN MAN 30 [kHz] (IFBW1)
   AVG BW AUTO MAN MAN 30 [kHz] (AVG)
   [SWEEP] 0.5 [SEC]
   [AMPLITUDE] ATTEN AUTO MAN MAN 0 dB
   More 1 of 3 Amptd Units dBm
   [AMPLITUDE] −90 dB
7. Press REF LVL [▲] or [▼] repeatedly until the center of the noise is on the screen. Press the following receiver keys:

**Note** If "IF OVERLOAD" indicator is displayed, increase ([▲]) REF LVL until the message disappears.

   [SINGLE]
   [TRACE] More 1 of 3
   VID AVG ON OFF ON 10 [ENTER]

8. Press (SINGLE), then wait for the completion of 10 new sweeps. Press (PEAK SEARCH) and note the frequency. Determine the frequency to test by adding 6.6 × IFBW2 to the noted frequency (or subtracting, if adding would make the test frequency higher than the original stop frequency).

   Maximum Amplitude Frequency ± ( 198 ) = Test Frequency

9. Press the following receiver keys:

   (FREQUENCY) CENTER FREQ (Test Frequency)

   (SPAN) 0 Hz

   (BW) IF BW AUTO MAN MAN 30 (Hz) (IF2)

   AVG BW AUTO MAN MAN 30 (Hz) (AVG)

10. Press (SINGLE), then wait for the completion of 10 new sweeps.

**Note** If "IF OVERLOAD" indicator is displayed, increase ((▲)) REF LVL until the message disappears.

11. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-36 for preamplifier off.
12. Press (PREAMP) to turn the preamplifier on.
13. Press (SINGLE), then wait for the completion of 10 new sweeps.
14. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-36 for preamplifier on.
15. Press (PREAMP) to turn the preamplifier off.
16. Repeat steps 5 to 15 for each of the settings listed in Table 2-36.

**Table 2-36. Non-CISPR Bandwidths Input #2 Preamp Off/On**

| Start (MHz) | Stop (MHz) | IFBW1 (kHz) | AVG (kHz) | IFBW2 (Hz) | Specification Preamp Off | TR Entry Preamp Off | Specification Preamp On | TR Entry Preamp On |
|---|---|---|---|---|---|---|---|---|
| 20.0 | 100.0 | 30 | 30 | 30 | ≤ −138 dBm | 14-17 | ≤ −146 dBm | 14-22 |
| 100.0 | 500.00 | 300 | 30 | 30 | ≤ −138 dBm | 14-18 | ≤ −146 dBm | 14-23 |
| 500.0 | 1000.00 | 300 | 30 | 30 | ≤ −138 dBm | 14-19 | ≤ −146 dBm | 14-24 |
| 1000.00 | 2000.0 | 300 | 30 | 30 | ≤ −138 dBm | 14-20 | ≤ −146 dBm | 14-25 |
| 2000.00 | 2900.00 | 300 | 30 | 30 | ≤ −138 dBm | 14-21 | ≤ −146 dBm | 14-26 |

## Part 4: INPUT 2, 1 GHz to 6.5 GHz

*For an HP 8546A only*

1. Connect an adapter and termination to INPUT 1 and INPUT 2 as shown in Figure 2-17.
2. Press [PRESET] on the receiver, then wait for the preset routine to finish.
3. Set the receiver by pressing the following keys:

   [INPUT]
   INPUT 2 1-6.5G
   [PREAMP] (turn preamplifier off)
4. Select the detector by pressing the following receiver keys:

   [TRACE] More 1 of 3
   DETECTOR SMP PK SMP
5. Set the frequency range by pressing the following receiver keys:

   [FREQUENCY]
   START FREQ 1 [GHz]
   STOP FREQ 2 [GHz]
6. Press the following receiver keys:

   [BW] IF BW AUTO MAN MAN 300 [kHz] (IFBW1)
   AVG BW AUTO MAN MAN 300 [kHz] (AVG)
   [SWEEP] 0.5 SEC
   [AMPLITUDE] ATTEN AUTO MAN MAN 0 dB
   More 1 of 3 Amptd Units dBm
   [AMPLITUDE] −70 dB
7. Press REF LVL [▲] or [▼] repeatedly until the center of the noise is on the screen. Press the following receiver keys:

**Note** If "IF OVERLOAD" indicator is displayed, increase ([▲]) REF LVL until the message disappears.

   [SINGLE]
   [TRACE] More 1 of 3
   VID AVG ON OFF ON 10 [ENTER]
8. Press [SINGLE], then wait for the completion of 10 new sweeps. Press [PEAK SEARCH] and note the frequency. Determine the frequency to test by adding 6.6 × IFBW2 to the noted frequency (or subtracting, if adding would make the test frequency higher than the original stop frequency).

   Maximum Amplitude Frequency ± ( 198 ) = Test Frequency

9. Press the following receiver keys:

   (FREQUENCY) CENTER FREQ (Test Frequency)
   (SPAN) 0 (Hz)
   (BW) IF BW AUTO MAN MAN 30 (Hz) (IF2)
   AVG BW AUTO MAN MAN 30 (Hz) (AVG)

10. Press (SINGLE), then wait for the completion of 10 new sweeps.

**Note** If "IF OVERLOAD" indicator is displayed, increase ((▲)) REF LVL until the message disappears.

11. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-37 for preamplifier off.
12. Press (PREAMP) to turn the preamplifier on.
13. Press (SINGLE), then wait for the completion of 10 new sweeps.
14. Set (DISPLAY) DSP LINE ON OFF ON. Adjust the display line so that it is centered on the average trace noise. Record this value in the operation verification test record as the TR Entry indicated in Table 2-37 for preamplifier on.
15. Press (PREAMP) to turn the preamplifier off.
16. Repeat steps 5 to 15 for each of the settings listed in Table 2-37.

**Table 2-37.**
**Non-CISPR Bandwidths Input #2, 1 GHz to 6.5 GHz Preamp Off/On**

| Start (GHz) | Stop (GHz) | IFBW1 (kHz) | AVG (Hz) | IFBW2 (Hz) | Specification Preamp Off | TR Entry Preamp Off | Specification Preamp On | TR Entry Preamp On |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 300 | 30 | 30 | ≤ −123 dBm | 14-27 | ≤ −144 dBm | 14-32 |
| 2 | 3 | 300 | 30 | 30 | ≤ −123 dBm | 14-28 | ≤ −144 dBm | 14-33 |
| 3 | 4 | 300 | 30 | 30 | ≤ −123 dBm | 14-29 | ≤ −144 dBm | 14-34 |
| 4 | 5 | 300 | 30 | 30 | ≤ −123 dBm | 14-30 | ≤ −144 dBm | 14-35 |
| 5 | 6.5 | 300 | 30 | 30 | ≤ −123 dBm | 14-31 | ≤ −144 dBm | 14-36 |

Operation verification test, "Displayed Average Noise Level for EMI Receiver," is now complete.

# 15. Displayed Average Noise Level for Receiver RF Section

This test measures the displayed average noise level in all four frequency bands. The RF INPUT is terminated in 50 Ω. In Band 0 (9 kHz to 2.9 GHz), the test first measures the average noise at 400 kHz and 1 MHz in zero span. The LO feedthrough is used as a frequency reference for these measurements. For the rest of Band 0 and for all of the remaining bands, the test tunes the RF section frequency across the band, uses the marker to locate the frequency with the highest response, and then reads the average noise in zero span.

To reduce measurement uncertainty due to input attenuator switching and resolution bandwidth switching, a reference level offset is added. The CAL OUT signal is used as the amplitude reference for determining the amount of offset required. The offset is removed at the end of the test by pressing (PRESET).

## Equipment Required

Cable, BNC, 23 cm (9 in)
Termination, 50 Ω APC 3.5
Adapter, Type N (m) to BNC (f)
Adapter, Type N (m) to APC 3.5 (f)

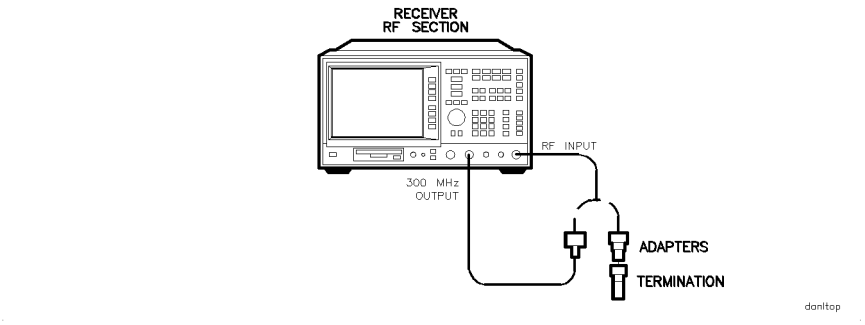



**Figure 2-19. Displayed Average Noise Level Test Setup**

## Procedure

1. Connect a cable from the CAL OUT to the INPUT 50 Ω of the receiver as shown in Figure 2-19.
2. Press (PRESET) on the RF section, then wait for the preset routine to finish. Set the RF section by pressing the following keys:

   (FREQUENCY) CENTER FREQ 300 (MHz)
   (SPAN) 10 (MHz)
   (AMPLITUDE) More 1 of 3 Amptd Units dBm
   (AMPLITUDE) REF LVL 20 –dBm
   ATTEN AUTO MAN MAN 0 (dB)

3. Press the following keys:

   (PEAK SEARCH)
   (MARKER FUNCTION) MK TRACK ON OFF ON
   (SPAN) 10 (kHz)

   Wait for the AUTO ZOOM message to disappear, then press the following keys:

   (BW) IF BW AUTO MAN 300 (Hz)
   AVG BW AUTO MAN MAN 30 (Hz)
   (MARKER FUNCTION) MK TRACK ON OFF OFF

4. Press (SINGLE), then wait for the completion of a new sweep. Press the following keys:

   (PEAK SEARCH)
   (AMPLITUDE) More 1 of 3 More 2 of 3 REF LVL OFFSET

   Subtract the MKR amplitude reading from −20 dBm and enter the result as the REF LVL OFFSET. For example, if the marker reads −20.21 dBm, enter +0.21 dB (−20 dBm − (−20.21 dBm) = +0.21 dB).

   REF LVL OFFSET _____ dB

5. Disconnect the cable. Connect the 50 Ω termination to the RF INPUT.

**400 kHz**

6. Press the following keys:

   (TRIG) SWEEP CONT SGL CONT
   (FREQUENCY) CENTER FREQ 400 (kHz)
   (SPAN) 20 (kHz)
   (AMPLITUDE) REF LVL 70 −dBm

7. Press the following keys:

   (BW) IF BW AUTO MAN MAN 30 (Hz)
   (TRACE) More 1 of 3 DETECTOR PK SMP SMP
   (SINGLE)

   Wait for the completion of a new sweep.

8. Press the following keys:

   (DISPLAY) DSP LINE ON OFF ON

9. Adjust the display line so that it is centered on the average trace noise.

10. Record the display line amplitude setting as TR Entry 15-1 in the operation verification test record as the noise level at 400 kHz for preamplifier on. The average noise level should be less than the specified limit.

11. Press (PREAMP) to turn the preamplifier on.

12. Press (SINGLE), then wait for the completion of a new sweep.
13. Adjust the display line so that it is centered on the average trace noise.
14. Record the display line amplitude setting as TR Entry 15-5 in the operation verification test record as the noise level at 400 kHz for preamplifier on. The average noise level should be less than the specified limit.
15. Press (PREAMP) to turn the preamplifier off.

**1 MHz**

16. Press the following keys:

    (FREQUENCY) CENTER FREQ 1 (MHz)
    (SINGLE)

    Wait for the completion of a new sweep.

17. Press the following keys:

    (DISPLAY) DSP LINE ON OFF ON

18. Adjust the display line so that it is centered on the average trace noise.
19. Record the display line amplitude setting as TR Entry 15-2 of the operation verification test record as the noise level at 1 MHz for preamplifier off. The average noise level should be less than the specified limit.
20. Press (PREAMP) to turn the preamplifier on.
21. Press (SINGLE), then wait for the completion of a new sweep.
22. Adjust the display line so that it is centered on the average trace noise.
23. Record the display line amplitude setting as TR Entry 15-6 in the operation verification test record as the noise level at 1 MHz for preamplifier on. The average noise level should be less than the specified limit.
24. Press (PREAMP) to turn the preamplifier off.

**1 MHz to 2.9 GHz**

25. Press the following keys:

    (TRIG) SWEEP CONT SGL CONT
    (FREQUENCY) More 1 of 2 Band Lock 0-2.9 Gz BAND 0
    (FREQUENCY) START FREQ 1 (MHz)
    STOP FREQ 2.9 (GHz)
    (BW) IF BW AUTO MAN MAN 1 (MHz)
    AVG BW AUTO MAN MAN 10 (kHz)

26. Press (FREQUENCY) CENTER FREQ, then adjust the center frequency, if necessary, to place the LO feedthrough just off-screen to the left.

**Note** "IF OVERLOAD" is displayed when the LO feedthrough is on screen.

27. Press the following keys:

    (SINGLE)
    (TRACE) More 1 of 3
    AVG AVG ON OFF ON 10 (Hz)
    (SINGLE)

    Wait until AVG 10 is displayed to the left of the graticule (the RF section will take ten sweeps, then stop).

28. Press (PEAK SEARCH) and record the MKR frequency as the Measurement Frequency for 1 MHz to 2.9 GHz in Table 2-38.

29. Press the following keys:

    (TRIG) SWEEP CONT SGL CONT
    (TRACE) More 1 of 3 VID AVG OFF
    DETECTOR PK SMP SMP
    (AUTO COUPLE) IF BW AUTO MAN AUTO
    AVG BW AUTO MAN AUTO
    (SPAN) 10 (kHz)
    (FREQUENCY)

    Set CENTER FREQ to the Measurement Frequency recorded in Table 2-38 in the previous step, then press the following keys:

    (BW) IF BW AUTO MAN MAN 30 (Hz)
    AVG BW AUTO MAN MAN 30 (Hz)

30. Press (SINGLE) on the RF section, then wait for a new sweep to finish. Press the following keys:

    (DISPLAY) DSP LINE ON OFF ON

31. Adjust the display line so that it is centered on the average noise trace, ignoring any residual responses.

32. Record the display line amplitude setting as TR Entry 15-3 in the operation verification test record as the noise level at the measured frequency (1 MHz to 2.9 GHz) for preamplifier off. The average noise level should be less than the specified limit.

33. Press (PREAMP) to turn the preamplifier on.

34. Press (SINGLE), then wait for the completion of a new sweep.

35. Adjust the display line so that it is centered on the average trace noise.

36. Record the display line amplitude setting as TR Entry 15-7 in the operation verification test record as the noise level at the measured frequency (1 MHz to 2.9 GHz) for preamplifier on. The average noise level should be less than the specified limit.

37. Press (PREAMP) to turn the preamplifier off.

38. Press (MKR) and MARKER 1 ON OFF OFF to turn the marker off.

### 2.75 to 6.5 GHz

*For an HP 85462A only*

39. Press the following keys:

    (TRIG) SWEEP CONT SGL CONT

    (FREQUENCY) More 1 of 2 Band Lock 2.75-6.5 BAND 1

    (BW) IF BW AUTO MAN MAN 1 (MHz)

    AVG BW AUTO MAN MAN 10 (kHz)

    (TRACE) More 1 of 3

    AVG AVG ON OFF ON 10 (Hz)

    Wait until AVG 10 is displayed to the left of the graticule (the RF section will take ten sweeps, then stop).

40. Press (PEAK SEARCH) and record the MKR frequency as the Measurement Frequency for 2.75 GHz to 6.5 GHz in Table 2-38.

41. Press the following keys:

    (TRIG) SWEEP CONT SGL CONT

    (TRACE) More 1 of 3 VID AVG OFF

    DETECTOR PK SMP SMP

    (AUTO COUPLE) IF BW AUTO MAN AUTO

    AVG BW AUTO MAN AUTO

    (SPAN) 10 (kHz)
    (FREQUENCY)

    Set CENTER FREQ to the Measurement Frequency recorded in Table 2-38 in the previous step, then press the following keys:

    (BW) IF BW AUTO MAN MAN 30 (Hz)

    AVG BW AUTO MAN MAN 30 (Hz)

42. Press (SINGLE) on the RF section, then wait for a new sweep to finish. Press the following keys:

    (DISPLAY) DSP LINE ON OFF ON

43. Adjust the display line so that it is centered on the average noise trace, ignoring any residual responses.

44. Record the display line amplitude setting as TR Entry 15-4 in the operation verification test record as the noise level at the measured frequency (2.75 GHz to 6.5 GHz) for preamplifier off. The average noise level should be less than the specified limit.

45. Press (PREAMP) to turn the preamplifier on.

46. Press (SINGLE), then wait for the completion of a new sweep.

47. Adjust the display line so that it is centered on the average trace noise.

48. Record the display line amplitude setting as TR Entry 15-8 in the operation verification test record as the noise level at the measured frequency (2.75 GHz to 6.5 GHz) for preamplifier on. The average noise level should be less than the specified limit.
49. Press (PREAMP) to turn the preamplifier off.
50. Press (MKR) and MARKER 1 ON OFF OFF to turn the marker off.

**Table 2-38. Displayed Average Noise Level Worksheet**

| Frequency Range | Measurement Frequency | Specification Preamp Off | TR Entry Preamp Off | Specification Preamp On | TR Entry Preamp On |
|---|---|---|---|---|---|
| 400 kHz | 400 kHz | −125 dBm | 15-1 | −146 dBm | 15-5 |
| 1 MHz | 1 MHz | −125 dBm | 15-2 | −146 dBm | 15-6 |
| 1 MHz to 2.9 GHz | _____ | −125 dBm | 15-3 | −146 dBm | 15-7 |
| 2.75 to 6.5 GHz* | _____ | −125 dBm | 15-4 | −146 dBm | 15-8 |
| *For an HP 85462A only | | | | | |

Operation verification test, “Displayed Average Noise Level for Receiver RF Section,” is now complete.

# 16. CISPR Pulse Response

This CISPR pulse response measurement is made using a pulsed RF input signal rather than a pulse signal because the equipment is readily available, easily calibrated, and flexible in use. Pulsed RF setup considerations as well as the relationship between the two techniques are explained in Application Note 150-2.

The CISPR pulse response test measures the receiver quasi-peak detector receiver system's response to a pulsed RF input signal relative to that of a CW input signal and as a function of pulse repetition frequency. The output of the synthesizer/level generator is modulated by the pulse generator using the pulse modulator to yield the pulsed RF signal. The output of the pulse modulator is connected to the input of the device under test (DUT) with a BNC cable through 3 dB of attenuation. This provides protection as well as a controlled source match. Amplitude accuracy is ensured by measuring the output signal of the 3 dB attenuation using the power meter with the pulse modulator dc biased to provide a CW signal. This measured CW amplitude also corresponds to the burst amplitude of the pulsed RF input signal when the pulse modulator is appropriately driven. The system is tested, through the 200 Hz, 9 kHz, and 120 kHz EMI bandwidth filters with a pulse repetition frequency (PRF) corresponding to CISPR specifications. The required CW amplitude for the tests is calculated based on the DUT's impulse bandwidth, the pulse width of the pulsed RF, and the CISPR specified spectral intensity.

## Equipment

Pulse generator
Synthesizer/level generator
Power meter
Power sensor, 1 MHz to 350 MHz
Attenuator, 3 dB
Modulator, TeleTech
Cable, BNC, 122 cm (48 in) *(three required)*
Adapter, Type N (m) to BNC (f)
Adapter, Type N (f) to Type N (f)

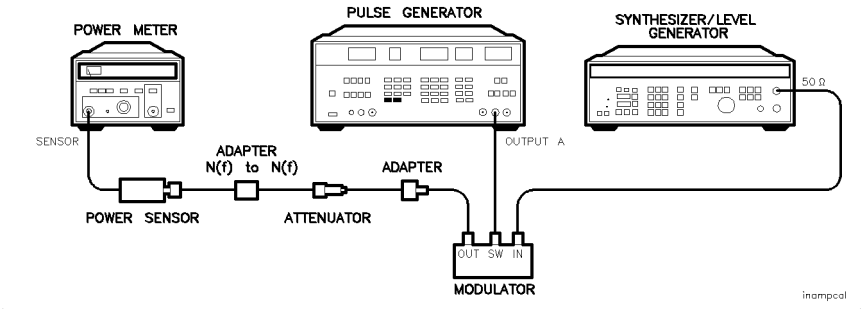



**Figure 2-20. Input Amplitude Calibration Test Setup**

## Input Amplitude Calibration

1. Zero and calibrate the power meter with 100 kHz to 1800 MHz power sensor, as described in the power meter operation manual.
2. Connect the equipment as shown in Figure 2-20.
3. Press RECALL 0 on the pulse generator to preset the pulse generator. To bias the modulator on, set the pulse generator to the following settings:

   Parameters:

   LEE ..... 3 ns
   TRE ..... 3 ns
   HIL ..... +2 V
   LOL ..... +1.8 V
   DEL ..... 0 ns

   Output Mode: Enabled

   Channel A ..... 50 Ω
   Channel A ..... NORM
4. Press STORE 1 on the pulse generator to store the settings in storage register 1.
5. Set the synthesizer/level generator to the following settings:

   FREQUENCY ..... 50 MHz
   AMPLITUDE ..... −3 dBm
6. Set the power meter to the following settings:

   MODE ..... dBm
   CAL FACTOR ..... power sensor Ref Cal Factor for 50 MHz
7. Adjust synthesizer/level generator power level for a −6.99 dBm (±0.03) reading on the power meter.
8. Record the synthesizer/level generator amplitude setting in Table 2-39 under Reference Amplitude at 50 MHz for the 200 Hz, 9 kHz and 120 kHz EMI bandwidths. Calculate the Required Amplitude for the 200 Hz, 9 kHz and 120 kHz resolution bandwidths using the following formula:

Reference Amplitude at 50 MHz + Amplitude Offset = Required Amplitude

   Note that the reference amplitude is the same for the 200 Hz, 9 kHz, and 120 kHz filters.

9. Enter the calculated 200 Hz, 9 kHz and 120 kHz Required Amplitude values in Table 2-39.
10. On the synthesizer/level generator, press STORE 1 to store the previous setting of the synthesizer/level generator in storage register 1.

## Isolation Check

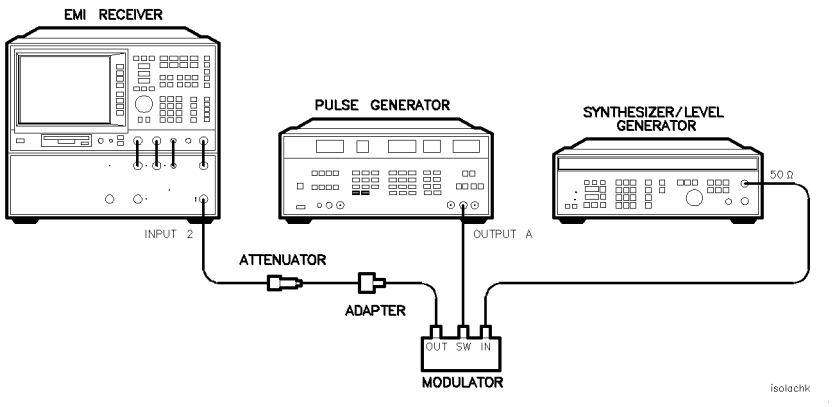



**Figure 2-21. Isolation Check Test Setup**

11. Connect the equipment as shown in Figure 2-21.
12. Press (PRESET) on the receiver, then wait for the preset routine to finish. Set the receiver by pressing the following keys:

    (AMPLITUDE) REF LVL 107.0 dBμV
    (FREQUENCY) CENTER FREQ 50 (MHz)
    (SPAN) 1 (MHz)
    (PEAK SEARCH)
    (SAVE) Save Internal STATE → INTRNL 1
    (MKR →) MARKER → REF LVL
    (MKR) MARKER Δ

13. Press RECALL 1 on the pulse generator. Set the pulse generator to the following settings to bias the modulator off:

    Use the CHS key to change signs of the entered value on the pulse generator.

    HIL ..... −1.5 V
    LOL ..... −1.7 V

14. Verify that the isolation of the modulator (the marker-delta reading) exceeds 70 dBc.

## CW Measurement for 200 Hz EMI Bandwidth

15. Press RECALL 1 on the pulse generator.
16. Subtract 40 dB from the Reference Amplitude at 50 MHz in Table 2-39. Set the synthesizer/level generator amplitude to the calculated value by pressing AMPLITUDE, (enter the calculated value), −dBm.
17. Press STORE 2 on the synthesizer/level generator.

18. Press (PRESET) on the receiver, then wait for the preset routine to finish. Press the following receiver keys:

    (RECALL) Recall Internal STATE → INTRNL 1
    (SPAN) 50 (kHz)
    (BW) 200 Hz EMI BW
    (PEAK SEARCH)
    (TEST) MEASURE AT MKR

    A message will be displayed warning that an improper bandwidth is selected. Disregard the message and press CONTINUE.

    Note that this routine will take 1 to 2 minutes to execute.

19. Record the quasi-peak reading (QP) displayed on the receiver screen in Table 2-40, under the Measured CW Amplitude for 200 Hz.

## 200 Hz Pulse RF Signal Setup

20. Press RECALL 1 on the pulse generator. Set the pulse generator to the following conditions:

    Use the CHS key to change the sign of the value entered on the pulse generator.

    PER ..... 40 ms
    WID ..... 0.1 ms
    LOL ..... −1.7 V

21. Press RECALL 1 on the synthesizer/level generator. Set the synthesizer/level generator amplitude to the Required Amplitude value for the 200 Hz filter recorded in Table 2-39 by pressing the following receiver keys:

    (AMPLITUDE)
    Enter the Required Amplitude for 200 Hz
    (−dBm)

22. Press the following receiver keys:

    (SPAN) ZERO SPAN
    (SWEEP) SWP TIME AUTO MAN MAN 2 (SEC)
    (AUTO RANGE)
    (QUASI-PEAK)

    Wait for the completion of the quasi-peak routine.
    (PEAK SEARCH)

**Note** IF and RF overload occurs until compensated for by the auto range function.

23. Record the quasi-peak reading in Table 2-40, as the Measured Amplitude for 25 Hz for the 200 Hz EMI bandwidth. Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band A, 25 Hz Repetition Frequency.

24. Set the PERIOD to 10 ms on the pulse generator. On the receiver, press (PEAK SEARCH).

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band A, 100 Hz Repetition Frequency.

25. Set the PERIOD to 16.7 ms on the pulse generator. Press (PEAK SEARCH) on the receiver.

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band A, 60 Hz Repetition Frequency.

26. Set the PERIOD to 100 ms on the pulse generator. Press (PEAK SEARCH) on the receiver.

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band A, 10 Hz Repetition Frequency.

27. Set the PERIOD to 200 ms on the pulse generator. Press (PEAK SEARCH) on the receiver.

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band A, 5 Hz Repetition Frequency.

28. Set the PERIOD to 500 ms on the pulse generator. Press the following receiver keys:

    (TEST) More 1 of 3 More 2 of 3

    QP/AVG 10X OFF 10X

    (SINGLE)

    (PEAK SEARCH)

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band A, 2 Hz Repetition Frequency.

29. Set the PERIOD to 980 ms on the pulse generator. Press the following receiver keys:

    (SINGLE)

    (PEAK SEARCH)

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band A, 1 Hz Repetition Frequency.

30. Press TRIG on the pulse generator. Press (SINGLE) on the receiver. Let the receiver sweep 3 divisions then press MAN on the pulse generator. Record the quasi-peak reading for Isolated Pulse Measured for Band A in Table 2-41.

## CW Measurement for 9 kHz EMI Bandwidth

31. Press RECALL 1 on the pulse generator.
32. Press RECALL 2 on the synthesizer/level generator.
33. Press the following keys on the receiver:

    (PRESET)
    (FREQUENCY) CENTER FREQ 50 (MHz)
    (AUTO RANGE)
    (SPAN) 50 (kHz)
    (BW) 9 kHz EMI BW
    (PEAK SEARCH)
    (TEST) MEASURE AT MKR

    A message will be displayed warning that an improper bandwidth is selected. Disregard the message and press CONTINUE.

34. Record the quasi-peak reading (QP) displayed on the receiver screen in Table 2-40, under the Measured CW Amplitude for 9 kHz.

## 9 kHz Pulse RF Signal Setup

35. Press RECALL 1 on the pulse generator. Set the pulse generator to the following conditions:

    Use the CHS key to change the sign of the value entered on the pulse generator.

    PER ..... 10 ms
    WID ..... 2.2 $\mu$s
    LOL ..... −1.7 V

36. Press RECALL 1 on the synthesizer/level generator. Set the synthesizer/level generator amplitude to the Required Amplitude value for the 9 kHz filter recorded in Table 2-39 by pressing the following receiver keys:

    (AMPLITUDE)
    Enter the Required Amplitude for 9 kHz
    (−dBm)

37. Press the following receiver keys:

    (SPAN) ZERO SPAN
    (SWEEP) SWP TIME AUTO MAN MAN 2 (SEC)
    (QUASI-PEAK)

    Wait for the completion of the quasi-peak routine.
    (PEAK SEARCH)

38. Record the quasi-peak reading in Table 2-40, as the Measured Amplitude for 100 Hz for the 9 kHz EMI bandwidth. Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band B, 100 Hz Repetition Frequency.

39. Set the PERIOD to 1 ms on the pulse generator. On the receiver, press (PEAK SEARCH).

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band B, 1000 Hz Repetition Frequency.

40. Set the PERIOD to 50 ms on the pulse generator. Press (PEAK SEARCH) on the receiver.

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band B, 20 Hz Repetition Frequency.

41. Set the PERIOD to 100 ms on the pulse generator. Press (PEAK SEARCH) on the receiver.

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band B, 10 Hz Repetition Frequency.

42. Set the PERIOD to 500 ms on the pulse generator. Press the following receiver keys:

    (TEST) More 1 of 3 More 2 of 3
    QP/AVG 10X OFF 10X
    (SINGLE)
    (PEAK SEARCH)

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band B, 2 Hz Repetition Frequency.

43. Set the PERIOD to 980 ms on the pulse generator. Press the following receiver keys:

    (SINGLE)
    (PEAK SEARCH)

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Band B, 1 Hz Repetition Frequency.

44. Press TRIG on the pulse generator. Press (SINGLE) on the receiver. Let the receiver sweep 3 divisions then press MAN on the pulse generator. Press (PEAK SEARCH) on the receiver.

45. Record the Marker reading for Isolated Pulse Measurement for Band B in Table 2-41.

## CW Measurement for 120 kHz EMI Bandwidth

46. Press RECALL 1 on the pulse generator.
47. Press RECALL 2 on the synthesizer/level generator.
48. Press the following receiver keys:

    (RECALL) Recall Internal
    INTRNL → STATE 1 (ENTER)
    (TEST) MEASURE AT MKR

49. Record the quasi-peak reading (QP) displayed on the receiver screen in Table 2-40 under the Measured CW Amplitude for 120 kHz.

## 120 kHz Pulse RF Signal Setup

50. Set the pulse generator to the following conditions:

    PER ..... 10 ms
    WID ..... 167 ns
    LOL ..... −1.7 V

51. Press RECALL 1 on the synthesizer/level generator. Set the synthesizer/level generator amplitude to the Required Amplitude value for the 120 kHz filter recorded in Table 2-39 by pressing the following receiver keys:

    (AMPLITUDE)
    Enter the Required Amplitude for 120 kHz
    (+dBm)

52. Press the following receiver keys:

    (SPAN) ZERO SPAN
    (AUTO RANGE)
    (SWEEP) SWP TIME AUTO MAN MAN 2 (SEC)
    (QUASI-PEAK)

    Wait for the completion of the quasi-peak routine.
    (SINGLE)
    (PEAK SEARCH)

53. Record the quasi-peak reading in Table 2-40, as the Measured Amplitude for 100 Hz for the 120 kHz EMI bandwidth. Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Bands C and D, 100 Hz Repetition Frequency.

54. Set PERIOD to 1 ms on the pulse generator. Press the following receiver keys:

    SINGLE
    PEAK SEARCH

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Bands C and D, 1000 Hz Repetition Frequency.

    Set the PERIOD to 50 ms on the pulse generator. Press the following receiver keys:

    TEST More 1 of 3 More 2 of 3
    QP/AVG 10X OFF 10X
    SINGLE
    PEAK SEARCH

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Bands C and D, 20 Hz Repetition Frequency.

55. Set PERIOD to 100 ms on the pulse generator. Press the following receiver keys:

    SINGLE
    PEAK SEARCH

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Bands C and D, 10 Hz Repetition Frequency.

56. Set the PERIOD to 500 ms on the pulse generator. Press the following receiver keys:

    SINGLE
    PEAK SEARCH

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Bands C and D, 2 Hz Repetition Frequency.

57. Set PERIOD to 980 ms on the pulse generator. Press the following receiver keys:

    SINGLE
    PEAK SEARCH

    Record the marker amplitude reading in Table 2-41 as the Measured Relative Equivalent Level of Pulse for Bands C and D, 1 Hz Repetition Frequency.

58. Press TRIG on the pulse generator. Press SINGLE on the receiver. Let the receiver sweep three divisions then press MAN on the pulse generator. Press PEAK SEARCH on the receiver.

59. Record the marker reading as the Isolated Pulse for Bands C and D in Table 2-41.

60. Enter the Measured value for the Band A 25 Hz Repetition Frequency as the Reference value for all the Repetition Frequencies listed for Band A in Table 2-41.

61. Enter the Measured value for the Band B 100 Hz Repetition Frequency as the Reference value for all the Repetition Frequencies listed for Band B in Table 2-41.

62. Enter the Measured value for the Bands C and D 100 Hz Repetition Frequency as the Reference value for all the Repetition Frequencies listed for Bands C and D in Table 2-41.

63. Calculate the amplitude error for each frequency listed in Table 2-40 using the following formula:

Measured CW Amplitude − Measured Amplitude for 25 Hz or 100 Hz = Error

64. Record these calculated values in the operation verification test record as the TR Entries indicated in Table 2-40.

65. Calculate the amplitude error for each of the frequencies listed in Table 2-41 using the following formula:

Measured − Reference = Error

66. Record these calculated values in the operation verification test record as the TR Entries indicated in Table 2-41.

Operation verification test, "CISPR Pulse Response," is now complete.

**Table 2-39. Input Amplitude Calibration Worksheet**

| EMI Bandwidth | Reference Amplitude at 50 MHz | Amplitude Offset | Required Amplitude |
|---|---|---|---|
| 200 Hz | _____ | −0.40 | _____ |
| 9 kHz | _____ | 0.05 | _____ |
| 120 kHz | _____ | 5.42 | _____ |

**Table 2-40.**
**Quasi-Peak Detector Reference Accuracy Worksheet**

| EMI Bandwidth | Measured CW Amplitude (dBμV) | Measured Amplitude for 25 Hz or 100 Hz (dBμV) | Error (TR Entry) | Limit |
|---|---|---|---|---|
| 200 Hz | _____ | _____ | **(15-1)** | ±1.5 |
| 9 kHz | _____ | _____ | **(15-2)** | ±1.5 |
| 120 kHz | _____ | _____ | **(15-3)** | ±1.5 |

**Table 2-41. Quasi-Peak Detector Accuracy**

| Repetition Frequency | Relative Equivalent Level of Pulse Band A (200 Hz EMI BW) | | | |
|---|---|---|---|---|
| (Hz) | Measured (dBμV) | Reference (dBμV) | TR Entry (Error) | Limit |
| 100 | _____ | _____ | **15-4** | +4.0 ±1.0 |
| 60 | _____ | _____ | **15-5** | +3.0 ±1.0 |
| 25 | _____ | _____ | **15-6** | 0 (Ref) |
| 10 | _____ | _____ | **15-7** | −4.0 ±1.0 |
| 5 | _____ | _____ | **15-8** | −7.5 ±1.5 |
| 2 | _____ | _____ | **15-9** | −13.0 ±2.0 |
| 1 | _____ | _____ | **15-10** | −17.0 ±2.0 |
| Isolated pulse | _____ | _____ | **15-11** | −19.0 ±2.0 |
| **Repetition Frequency** | **Relative Equivalent Level of Pulse Band B (9 kHz EMI BW)** | | | |
| (Hz) | Measured (dBμV) | Reference (dBμV) | TR Entry (Error) | Limit |
| 1000 | _____ | _____ | **15-12** | +4.5 ±1.0 |
| 100 | _____ | _____ | **15-13** | 0 (Ref) |
| 20 | _____ | _____ | **15-14** | −6.5 ±1.0 |
| 10 | _____ | _____ | **15-15** | −10.0 ±1.5 |
| 2 | _____ | _____ | **15-16** | −20.5 ±2.0 |
| 1 | _____ | _____ | **15-17** | −22.5 ±2.0 |
| Isolated pulse | _____ | _____ | **15-18** | −23.5 ±2.0 |
| **Repetition Frequency** | **Relative Equivalent Level of Pulse Bands C and D (120 kHz EMI BW)** | | | |
| (Hz) | Measured (dBμV) | Reference (dBμV) | TR Entry (Error) | Limit |
| 1000 | _____ | _____ | **15-19** | +8.0 ±1.0 |
| 100 | _____ | _____ | **15-20** | 0 (Ref) |
| 20 | _____ | _____ | **15-21** | −9.0 ±1.0 |
| 10 | _____ | _____ | **15-22** | −14.0 ±1.5 |
| 2 | _____ | _____ | **15-23** | −26.0 ±2.0 |
| 1 | _____ | _____ | **15-24** | −28.5 ±2.0 |
| Isolated pulse | _____ | _____ | **15-25** | −31.5 ±2.0 |

# Operation Verification Test Record

**Table 2-42. Operation Verification Test Record**

Hewlett-Packard Company

Address: _____

_____

_____

_____

Report No. _____

Date _____

(e.g. 10 JAN 1993)

Model EMI receiver

Serial No. _____

Options _____

Firmware Revision _____

receiver RF section

Serial No. _____

Options _____

Firmware Revision _____

Customer _____

Tested by _____

Ambient temperature _____ °C

Relative humidity _____ %

Power mains line frequency _____ Hz (nominal)

**Test Equipment Used:**

| Description | Model No. | Trace No. | Cal Due Date |
|---|---|---|---|
| Low Pass Filter, 300 MHz | | | |
| Attenuator, 1 dB Step | | | |
| Attenuator, 10 dB Step | | | |
| Attenuator, 3 dB | | | |
| Attenuator, 10 dB | | | |
| Modulator | | | |
| Power Meter | | | |
| Power Meter | | | |
| Power Sensor | | | |
| Power Sensor, Low Power | | | |
| Power Splitter, High Freq. | | | |
| Power Splitter, Type N | | | |
| Power Splitter | | | |
| Pulse Generator | | | |
| Signal Generator | | | |
| Synthesized Sweeper | | | |
| Synthesizer/Level Generator | | | |
| Termination, 50 Ω N (m) | | | |
| Termination, 50 Ω APC 3.5 (m) | | | |

Notes/Comments:

_____

_____

_____

_____

## Operation Verification Test Record (page 2 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **1a. Frequency Readout and Marker Count Accuracy for the Receiver RF Section** | | | |
| Frequency Readout Accuracy | | Frequency (GHz) | |
| **Frequency** = 1.5 GHz | | | |
| **SPAN** | | | |
| 20 MHz | 1.49918 | **(1-1)** _____ | 1.50082 |
| 10 MHz | 1.49968 | **(1-2)** _____ | 1.50032 |
| 1 MHz | 1.499968 | **(1-3)** _____ | 1.500032 |
| .12 MHz | 1.4999962 | **(1-4)** _____ | 1.5000038 |
| **Frequency** = 4.0 GHz* | | | |
| **SPAN** | | | |
| 20 MHz | 3.99918 | **(1-5)** _____ | 4.00082 |
| 10 MHz | 3.99968 | **(1-6)** _____ | 4.00032 |
| 1 MHz | 3.999968 | **(1-7)** _____ | 4.000032 |
| Marker Count Accuracy | | | |
| **Frequency** = 1.5 GHz | | | |
| **SPAN** | | | |
| (CNT RES = 100 Hz) 20 MHz | 1.4999989 | **(1-8)** _____ | 1.5000011 |
| (CNT RES = 10 Hz) 1 MHz | 1.49999989 | **(1-9)** _____ | 1.50000011 |
| (CNT RES = 10 Hz) .02 MHz | 1.49999989 | **(1-10)** _____ | 1.50000011 |
| **Frequency** = 4.0 GHz* | | | |
| **SPAN** | | | |
| (CNT RES = 100 Hz) 20 MHz | 3.9999989 | **(1-11)** _____ | 4.0000011 |
| (CNT RES = 10 Hz) 1 MHz | 3.99999989 | **(1-12)** _____ | 4.00000011 |

*For an HP 85462A only

## Operation Verification Test Record (page 3 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Min. | Results Measured (TR Entry) | Max. |
|---|---|---|---|
| **1b. Frequency Readout and Marker Count Accuracy for the EMI Receiver** | | | |
| Frequency Readout Accuracy | | Frequency (GHz) | |
| **Frequency** = 1.5 GHz | | | |
| **SPAN** | | | |
| 20 MHz | 1.49918 | **(1-1)** _____ | 1.50082 |
| 10 MHz | 1.49968 | **(1-2)** _____ | 1.50032 |
| 1 MHz | 1.499968 | **(1-3)** _____ | 1.500032 |
| .12 MHz | 1.4999962 | **(1-4)** _____ | 1.5000038 |
| **Frequency** = 4.0 GHz* | | | |
| **SPAN** | | | |
| 20 MHz | 3.999858 | **(1-5)** _____ | 4.000142 |
| 10 MHz | 3.99948 | **(1-6)** _____ | 4.00052 |
| 1 MHz | 3.999948 | **(1-7)** _____ | 4.000052 |
| Marker Count Accuracy | | | |
| **Frequency** = 1.5 GHz | | | |
| **SPAN** | | | |
| (CNT RES = 100 Hz) 20 MHz | 1.4999989 | **(1-8)** _____ | 1.5000011 |
| (CNT RES = 10 Hz) 1 MHz | 1.49999989 | **(1-9)** _____ | 1.50000011 |
| (CNT RES = 10 Hz) .02 MHz | 1.49999989 | **(1-10)** _____ | 1.50000011 |
| **Frequency** = 4.0 GHz* | | | |
| **SPAN** | | | |
| (CNT RES = 100 Hz) 20 MHz | 3.9999989 | **(1-11)** _____ | 4.0000011 |
| (CNT RES = 10 Hz) 1 MHz | 3.99999989 | **(1-12)** _____ | 4.00000011 |
| **2. Frequency Span Readout Accuracy** | | | |
| **SPAN** | | MKRΔ Reading | |
| 1800 MHz | 1.446 GHz | **(2-1)** _____ | 1.554 GHz |
| 10.10 MHz | 7.70 MHz | **(2-2)** _____ | 8.30 MHz |
| 10.00 MHz | 7.80 MHz | **(2-3)** _____ | 8.20 MHz |
| 100.00 kHz | 78.00 kHz | **(2-4)** _____ | 82.00 kHz |
| 99.00 kHz | 78.00 kHz | **(2-5)** _____ | 82.00 kHz |
| 10.00 kHz | 7.80 kHz | **(2-6)** _____ | 8.20 kHz |
| 1.00 kHz | 780 Hz | **(2-7)** _____ | 820 Hz |

*For an HP 8546A only

## Operation Verification Test Record (page 4 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Min. | Results Measured (TR Entry) | Max. |
|---|---|---|---|
| **3. EMI Receiver Absolute Amplitude Accuracy** | | | |
| Preamp Off | | Input 1 | |
| **Frequency** | | | |
| .009 MHz | −2 dB | **(3-1)** | +2 dB |
| .015 MHz | −2 dB | **(3-2)** | +2 dB |
| .020 MHz | −2 dB | **(3-3)** | +2 dB |
| .035 MHz | −2 dB | **(3-4)** | +2 dB |
| .050 MHz | −2 dB | **(3-5)** | +2 dB |
| .080 MHz | −2 dB | **(3-6)** | +2 dB |
| .12 MHz | −2 dB | **(3-7)** | +2 dB |
| .16 MHz | −2 dB | **(3-8)** | +2 dB |
| .2 MHz | −2 dB | **(3-9)** | +2 dB |
| .3 MHz | −2 dB | **(3-10)** | +2 dB |
| .4 MHz | −2 dB | **(3-11)** | +2 dB |
| .6 MHz | −2 dB | **(3-12)** | +2 dB |
| .8 MHz | −2 dB | **(3-13)** | +2 dB |
| 1.0 MHz | −2 dB | **(3-14)** | +2 dB |
| 1.4 MHz | −2 dB | **(3-15)** | +2 dB |
| 1.6 MHz | −2 dB | **(3-16)** | +2 dB |
| 2 MHz | −2 dB | **(3-17)** | +2 dB |
| 3 MHz | −2 dB | **(3-18)** | +2 dB |
| 4 MHz | −2 dB | **(3-19)** | +2 dB |
| 6 MHz | −2 dB | **(3-20)** | +2 dB |
| 8 MHz | −2 dB | **(3-21)** | +2 dB |
| 10 MHz | −2 dB | **(3-22)** | +2 dB |
| 15 MHz | −2 dB | **(3-23)** | +2 dB |
| 20 MHz | −2 dB | **(3-24)** | +2 dB |
| 25 MHz | −2 dB | **(3-25)** | +2 dB |
| 30 MHz | −2 dB | **(3-26)** | +2 dB |
| 40 MHz | −2 dB | **(3-27)** | +2 dB |
| 50 MHz | −2 dB | **(3-28)** | +2 dB |

## Operation Verification Test Record (page 5 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **3. EMI Receiver Absolute Amplitude Accuracy (continued)** | | | |
| Preamp On | | Input 1 | |
| **Frequency** | | | |
| .009 MHz | −2 dB | **(3-29)** | +2 dB |
| .015 MHz | −2 dB | **(3-30)** | +2 dB |
| .020 MHz | −2 dB | **(3-31)** | +2 dB |
| .035 MHz | −2 dB | **(3-32)** | +2 dB |
| .050 MHz | −2 dB | **(3-33)** | +2 dB |
| .080 MHz | −2 dB | **(3-34)** | +2 dB |
| .12 MHz | −2 dB | **(3-35)** | +2 dB |
| .16 MHz | −2 dB | **(3-36)** | +2 dB |
| .2 MHz | −2 dB | **(3-37)** | +2 dB |
| .3 MHz | −2 dB | **(3-38)** | +2 dB |
| .4 MHz | −2 dB | **(3-39)** | +2 dB |
| .6 MHz | −2 dB | **(3-40)** | +2 dB |
| .8 MHz | −2 dB | **(3-41)** | +2 dB |
| 1.0 MHz | −2 dB | **(3-42)** | +2 dB |
| 1.4 MHz | −2 dB | **(3-43)** | +2 dB |
| 1.6 MHz | −2 dB | **(3-44)** | +2 dB |
| 2 MHz | −2 dB | **(3-45)** | +2 dB |
| 3 MHz | −2 dB | **(3-46)** | +2 dB |
| 4 MHz | −2 dB | **(3-47)** | +2 dB |
| 6 MHz | −2 dB | **(3-48)** | +2 dB |
| 8 MHz | −2 dB | **(3-49)** | +2 dB |
| 10 MHz | −2 dB | **(3-50)** | +2 dB |
| 15 MHz | −2 dB | **(3-51)** | +2 dB |
| 20 MHz | −2 dB | **(3-52)** | +2 dB |
| 25 MHz | −2 dB | **(3-53)** | +2 dB |
| 30 MHz | −2 dB | **(3-54)** | +2 dB |
| 40 MHz | −2 dB | **(3-55)** | +2 dB |
| 50 MHz | −2 dB | **(3-56)** | +2 dB |

## Operation Verification Test Record (page 6 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **3. EMI Receiver Absolute Amplitude Accuracy (continued)** | | | |
| Preamp Off | | Input 2 | |
| **Frequency** | | | |
| 20 MHz | −2 dB | **(3-57)** | +2 dB |
| 22 MHz | −2 dB | **(3-58)** | +2 dB |
| 25 MHz | −2 dB | **(3-59)** | +2 dB |
| 30 MHz | −2 dB | **(3-60)** | +2 dB |
| 40 MHz | −2 dB | **(3-61)** | +2 dB |
| 50 MHz | −2 dB | **(3-62)** | +2 dB |
| 60 MHz | −2 dB | **(3-63)** | +2 dB |
| 80 MHz | −2 dB | **(3-64)** | +2 dB |
| 100 MHz | −2 dB | **(3-65)** | +2 dB |
| 120 MHz | −2 dB | **(3-66)** | +2 dB |
| 140 MHz | −2 dB | **(3-67)** | +2 dB |
| 160 MHz | −2 dB | **(3-68)** | +2 dB |
| 180 MHz | −2 dB | **(3-69)** | +2 dB |
| 200 MHz | −2 dB | **(3-70)** | +2 dB |
| 220 MHz | −2 dB | **(3-71)** | +2 dB |
| 260 MHz | −2 dB | **(3-72)** | +2 dB |
| 300 MHz | −2 dB | **(3-73)** | +2 dB |
| 350 MHz | −2 dB | **(3-74)** | +2 dB |
| 400 MHz | −2 dB | **(3-75)** | +2 dB |
| 450 MHz | −2 dB | **(3-76)** | +2 dB |
| 500 MHz | −2 dB | **(3-77)** | +2 dB |
| 625 MHz | −2 dB | **(3-78)** | +2 dB |
| 750 MHz | −2 dB | **(3-79)** | +2 dB |
| 875 MHz | −2 dB | **(3-80)** | +2 dB |
| 1000 MHz | −2 dB | **(3-81)** | +2 dB |
| 2000 MHz | −2 dB | **(3-82)** | +2 dB |
| 2900 MHz | −2 dB | **(3-83)** | +2 dB |

## Operation Verification Test Record (page 7 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **3. EMI Receiver Absolute Amplitude Accuracy (continued)** | | | |
| Preamp On | | Input 2 | |
| **Frequency** | | | |
| 20 MHz | −2 dB | **(3-84)** | +2 dB |
| 22 MHz | −2 dB | **(3-85)** | +2 dB |
| 25 MHz | −2 dB | **(3-86)** | +2 dB |
| 30 MHz | −2 dB | **(3-87)** | +2 dB |
| 40 MHz | −2 dB | **(3-88)** | +2 dB |
| 50 MHz | −2 dB | **(3-89)** | +2 dB |
| 60 MHz | −2 dB | **(3-90)** | +2 dB |
| 80 MHz | −2 dB | **(3-91)** | +2 dB |
| 100 MHz | −2 dB | **(3-92)** | +2 dB |
| 120 MHz | −2 dB | **(3-93)** | +2 dB |
| 140 MHz | −2 dB | **(3-94)** | +2 dB |
| 160 MHz | −2 dB | **(3-95)** | +2 dB |
| 180 MHz | −2 dB | **(3-96)** | +2 dB |
| 200 MHz | −2 dB | **(3-97)** | +2 dB |
| 220 MHz | −2 dB | **(3-98)** | +2 dB |
| 260 MHz | −2 dB | **(3-99)** | +2 dB |
| 300 MHz | −2 dB | **(3-100)** | +2 dB |
| 350 MHz | −2 dB | **(3-101)** | +2 dB |
| 400 MHz | −2 dB | **(3-102)** | +2 dB |
| 450 MHz | −2 dB | **(3-103)** | +2 dB |
| 500 MHz | −2 dB | **(3-104)** | +2 dB |
| 625 MHz | −2 dB | **(3-105)** | +2 dB |
| 750 MHz | −2 dB | **(3-106)** | +2 dB |
| 875 MHz | −2 dB | **(3-107)** | +2 dB |
| 1000 MHz | −2 dB | **(3-108)** | +2 dB |
| 2000 MHz | −2 dB | **(3-109)** | +2 dB |
| 2900 MHz | −2 dB | **(3-110)** | +2 dB |

## Operation Verification Test Record (page 8 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Min. | Results Measured (TR Entry) | Max. |
|---|---|---|---|
| **4. Input Attenuator Accuracy for Receiver RF Section** | | | |
| **Input Attenuator** | | Cumulative Error | |
| 0 dB | −.75 dB | **(4-1)** | +.75 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −.75 dB | **(4-2)** | +.75 dB |
| 30 dB | −.75 dB | **(4-3)** | +.75 dB |
| 40 dB | −.75 dB | **(4-4)** | +.75 dB |
| 50 dB | −1.0 dB | **(4-5)** | +1.0 dB |
| 60 dB | −1.5 dB | **(4-6)** | +1.5 dB |
| 70 dB | −2.0 dB | **(4-7)** | +2.0 dB |
| | | Incremental Error | |
| 0 dB | −.75 dB | **(4-8)** | +.75 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −.75 dB | **(4-9)** | +.75 dB |
| 30 dB | −.75 dB | **(4-10)** | +.75 dB |
| 40 dB | −.75 dB | **(4-11)** | +.75 dB |
| 50 dB | −1.0 dB | **(4-12)** | +1.0 dB |
| 60 dB | −1.5 dB | **(4-13)** | +1.5 dB |
| 70 dB | −2.0 dB | **(4-14)** | +2.0 dB |
| **5. Input Attenuator Accuracy for EMI Receiver** | | | |
| Input 1 Max Amp | | | |
| **Input Attenuator** | | Cumulative Error | |
| 0 dB | −2.0 dB | **(5-1)** | +2.0 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −2.0 dB | **(5-2)** | +2.0 dB |
| 30 dB | −2.0 dB | **(5-3)** | +2.0 dB |
| 40 dB | −2.0 dB | **(5-4)** | +2.0 dB |
| 50 dB | −2.0 dB | **(5-5)** | +2.0 dB |
| Input 1 Max Amp | | | |
| **Input Attenuator** | | Incremental Error | |
| 0 dB | −2.0 dB | **(5-6)** | +2.0 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −2.0 dB | **(5-7)** | +2.0 dB |
| 30 dB | −2.0 dB | **(5-8)** | +2.0 dB |
| 40 dB | −2.0 dB | **(5-9)** | +2.0 dB |
| 50 dB | −2.0 dB | **(5-10)** | +2.0 dB |

## Operation Verification Test Record (page 9 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Min. | Results Measured (TR Entry) | Max. |
|---|---|---|---|
| **5. Input Attenuator Accuracy for EMI Receiver (continued)** | | | |
| Input 1 Min Amp | | | |
| **Input Attenuator** | | Cumulative Error | |
| 0 dB | −2.0 dB | **(5-11)** | +2.0 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −2.0 dB | **(5-12)** | +2.0 dB |
| 30 dB | −2.0 dB | **(5-13)** | +2.0 dB |
| 40 dB | −2.0 dB | **(5-14)** | +2.0 dB |
| 50 dB | −2.0 dB | **(5-15)** | +2.0 dB |
| Input 1 Min Amp | | | |
| **Input Attenuator** | | Incremental Error | |
| 0 dB | −2.0 dB | **(5-16)** | +2.0 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −2.0 dB | **(5-17)** | +2.0 dB |
| 30 dB | −2.0 dB | **(5-18)** | +2.0 dB |
| 40 dB | −2.0 dB | **(5-19)** | +2.0 dB |
| 50 dB | −2.0 dB | **(5-20)** | +2.0 dB |
| Input 2 | | | |
| **Input Attenuator** | | Cumulative Error | |
| 0 dB | −2.0 dB | **(5-21)** | +2.0 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −2.0 dB | **(5-22)** | +2.0 dB |
| 30 dB | −2.0 dB | **(5-23)** | +2.0 dB |
| 40 dB | −2.0 dB | **(5-24)** | +2.0 dB |
| 50 dB | −2.0 dB | **(5-25)** | +2.0 dB |
| Input 2 | | | |
| **Input Attenuator** | | Incremental Error | |
| 0 dB | −2.0 dB | **(5-26)** | +2.0 dB |
| 10 dB | 0(Ref) | 0(Ref) | 0(Ref) |
| 20 dB | −2.0 dB | **(5-27)** | +2.0 dB |
| 30 dB | −2.0 dB | **(5-28)** | +2.0 dB |
| 40 dB | −2.0 dB | **(5-29)** | +2.0 dB |
| 50 dB | −2.0 dB | **(5-30)** | +2.0 dB |

## Operation Verification Test Record (page 10 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **6. Scale Fidelity** | | | |
| Log Mode | | Cumulative Error | |
| **dB from Ref Level** | | | |
| 0 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −4 | −4.34 dB | **(6-1)** _____ | −3.66 dB |
| −8 | −8.38 dB | **(6-2)** _____ | −7.62 dB |
| −12 | −12.42 dB | **(6-3)** _____ | −11.58 dB |
| −16 | −16.46 dB | **(6-4)** _____ | −15.54 dB |
| −20 | −20.50 dB | **(6-5)** _____ | −19.50 dB |
| −24 | −24.54 dB | **(6-6)** _____ | −23.46 dB |
| −28 | −28.58 dB | **(6-7)** _____ | −27.42 dB |
| −32 | −32.62 dB | **(6-8)** _____ | −31.38 dB |
| −36 | −36.66 dB | **(6-9)** _____ | −35.34 dB |
| −40 | −40.70 dB | **(6-10)** _____ | −39.30 dB |
| −44 | −44.74 dB | **(6-11)** _____ | −43.26 dB |
| −48 | −48.78 dB | **(6-12)** _____ | −47.22 dB |
| −52 | −52.82 dB | **(6-13)** _____ | −51.18 dB |
| −56 | −56.86 dB | **(6-14)** _____ | −55.14 dB |
| −60 | −60.90 dB | **(6-15)** _____ | −59.10 dB |
| −64 | −64.94 dB | **(6-16)** _____ | −63.06 dB |
| −68 | −68.98 dB | **(6-17)** _____ | −67.02 dB |
| Log Mode | | Incremental Error | |
| **dB from Ref Level** | | | |
| 0 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −4 | −4.34 dB | **(6-18)** _____ | −3.66 dB |
| −8 | −8.38 dB | **(6-19)** _____ | −7.62 dB |
| −12 | −12.42 dB | **(6-20)** _____ | −11.58 dB |
| −16 | −16.46 dB | **(6-21)** _____ | −15.54 dB |
| −20 | −20.50 dB | **(6-22)** _____ | −19.50 dB |
| −24 | −24.54 dB | **(6-23)** _____ | −23.46 dB |
| −28 | −28.58 dB | **(6-24)** _____ | −27.42 dB |
| −32 | −32.62 dB | **(6-25)** _____ | −31.38 dB |
| −36 | −36.66 dB | **(6-26)** _____ | −35.34 dB |
| −40 | −40.70 dB | **(6-27)** _____ | −39.30 dB |
| −44 | −44.74 dB | **(6-28)** _____ | −43.26 dB |
| −48 | −48.78 dB | **(6-29)** _____ | −47.22 dB |
| −52 | −52.82 dB | **(6-30)** _____ | −51.18 dB |
| −56 | −56.86 dB | **(6-31)** _____ | −55.14 dB |
| −60 | −60.90 dB | **(6-32)** _____ | −59.10 dB |

## Operation Verification Test Record (page 11 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured | | |
|---|---|---|---|
| | Min. | (TR Entry) | Max. |
| **6. Scale Fidelity (continued)** | | | |
| Log Mode | | Cumulative Error | |
| **dB from Ref Level** | | | |
| 0 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −4 | −4.44 dB | **(6-33)** _____ | −3.56 dB |
| −8 | −8.48 dB | **(6-34)** _____ | −7.52 dB |
| −12 | −12.52 dB | **(6-35)** _____ | −11.48 dB |
| −16 | −16.56 dB | **(6-36)** _____ | −15.44 dB |
| −20 | −20.60 dB | **(6-37)** _____ | −19.40 dB |
| −24 | −24.64 dB | **(6-38)** _____ | −23.36 dB |
| −28 | −28.68 dB | **(6-39)** _____ | −27.32 dB |
| −32 | −32.72 dB | **(6-40)** _____ | −31.28 dB |
| −36 | −36.76 dB | **(6-41)** _____ | −35.24 dB |
| −40 | −40.80 dB | **(6-42)** _____ | −39.20 dB |
| −44 | −44.84 dB | **(6-43)** _____ | −43.16 dB |
| −48 | −48.88 dB | **(6-44)** _____ | −47.12 dB |
| −52 | −52.92 dB | **(6-45)** _____ | −51.08 dB |
| −56 | −56.96 dB | **(6-46)** _____ | −55.04 dB |
| −60 | −61.00 dB | **(6-47)** _____ | −59.00 dB |
| −64 | −65.04 dB | **(6-48)** _____ | −62.96 dB |
| −68 | −69.08 dB | **(6-49)** _____ | −66.92 dB |
| Log Mode | | Incremental Error | |
| **dB from Ref Level** | | | |
| 0 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −4 | −4.44 dB | **(6-50)** _____ | −3.56 dB |
| −8 | −8.48 dB | **(6-51)** _____ | −7.52 dB |
| −12 | −12.52 dB | **(6-52)** _____ | −11.48 dB |
| −16 | −16.56 dB | **(6-53)** _____ | −15.44 dB |
| −20 | −20.60 dB | **(6-54)** _____ | −19.40 dB |
| −24 | −24.64 dB | **(6-55)** _____ | −23.36 dB |
| −28 | −28.68 dB | **(6-56)** _____ | −27.32 dB |
| −32 | −32.72 dB | **(6-57)** _____ | −31.28 dB |
| −36 | −36.76 dB | **(6-58)** _____ | −35.24 dB |
| −40 | −40.80 dB | **(6-59)** _____ | −39.20 dB |
| −44 | −44.84 dB | **(6-60)** _____ | −43.16 dB |
| −48 | −48.88 dB | **(6-61)** _____ | −47.12 dB |
| −52 | −52.92 dB | **(6-62)** _____ | −51.08 dB |
| −56 | −56.96 dB | **(6-63)** _____ | −55.04 dB |
| −60 | −61.00 dB | **(6-64)** _____ | −59.00 dB |

## Operation Verification Test Record (page 12 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Min. | Results Measured (TR Entry) | Max. |
|---|---|---|---|
| **6. Scale Fidelity (continued)** | | | |
| Linear Mode | | | |
| **% of Ref Level** | | | |
| 100.00 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 70.70 | 151.59 mV | **(6-65)** _____ | 165.01 mV |
| 50.00 | 105.36 mV | **(6-66)** _____ | 118.78 mV |
| 35.48 | 72.63 mV | **(6-67)** _____ | 86.05 mV |
| 25.00 | 49.46 mV | **(6-68)** _____ | 82.88 mV |
| **% of Ref Level** | | | |
| 100.00 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 70.70 | 151.59 mV | **(6-69)** _____ | 165.01 mV |
| 50.00 | 105.36 mV | **(6-70)** _____ | 118.78 mV |
| 35.48 | 72.63 mV | **(6-71)** _____ | 86.05 mV |
| 25.00 | 49.46 mV | **(6-72)** _____ | 82.88 mV |
| Log-to-Linear Switching | | | |
| | −0.25 dB | **(6-73)** _____ | +0.25 dB |
| | −0.25 dB | **(6-74)** _____ | +0.25 dB |
| **7. EMI Receiver Reference Level Accuracy** | | | |
| Log Mode | | | |
| **Reference Level (dBm)** | | | |
| −20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −10 | −0.40 dB | **(7-1)** _____ | +0.40 dB |
| 0 | −0.50 dB | **(7-2)** _____ | +0.50 dB |
| −30 | −0.40 dB | **(7-3)** _____ | +0.40 dB |
| −40 | −0.50 dB | **(7-4)** _____ | +0.50 dB |
| −50 | −0.80 dB | **(7-5)** _____ | +0.80 dB |
| −60 | −1.00 dB | **(7-6)** _____ | +1.00 dB |
| −70 | −1.10 dB | **(7-7)** _____ | +1.10 dB |
| −80 | −1.20 dB | **(7-8)** _____ | +1.20 dB |
| −90 | −1.30 dB | **(7-9)** _____ | +1.30 dB |

## Operation Verification Test Record (page 13 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured | | |
|---|---|---|---|
| | Min. | (TR Entry) | Max. |
| **7. EMI Receiver Reference Level Accuracy (continued)** | | | |
| Linear Mode | | | |
| **Reference Level (dBm)** | | | |
| −20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −10 | −0.40 dB | **(7-10)** _____ | +0.40 dB |
| 0 | −0.50 dB | **(7-11)** _____ | +0.50 dB |
| −30 | −0.40 dB | **(7-12)** _____ | +0.40 dB |
| −40 | −0.50 dB | **(7-13)** _____ | +0.50 dB |
| −50 | −0.80 dB | **(7-14)** _____ | +0.80 dB |
| −60 | −1.00 dB | **(7-15)** _____ | +1.00 dB |
| −70 | −1.10 dB | **(7-16)** _____ | +1.10 dB |
| −80 | −1.20 dB | **(7-17)** _____ | +1.20 dB |
| −90 | −1.30 dB | **(7-18)** _____ | +1.30 dB |
| Log Mode | | | |
| **Reference Level (dBm)** | | | |
| −20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −10 | −0.40 dB | **(7-19)** _____ | +0.40 dB |
| 0 | −0.50 dB | **(7-20)** _____ | +0.50 dB |
| −30 | −0.40 dB | **(7-21)** _____ | +0.40 dB |
| −40 | −0.50 dB | **(7-22)** _____ | +0.50 dB |
| −50 | −0.80 dB | **(7-23)** _____ | +0.80 dB |
| −60 | −1.10 dB | **(7-24)** _____ | +1.10 dB |
| −70 | −1.20 dB | **(7-25)** _____ | +1.20 dB |
| −80 | −1.30 dB | **(7-26)** _____ | +1.30 dB |
| −90 | −1.40 dB | **(7-27)** _____ | +1.40 dB |
| Linear Mode | | | |
| **Reference Level (dBm)** | | | |
| −20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −10 | −0.40 dB | **(7-28)** _____ | +0.40 dB |
| 0 | −0.50 dB | **(7-29)** _____ | +0.50 dB |
| −30 | −0.40 dB | **(7-30)** _____ | +0.40 dB |
| −40 | −0.50 dB | **(7-31)** _____ | +0.50 dB |
| −50 | −0.80 dB | **(7-32)** _____ | +0.80 dB |
| −60 | −1.10 dB | **(7-33)** _____ | +1.10 dB |
| −70 | −1.20 dB | **(7-34)** _____ | +1.20 dB |
| −80 | −1.30 dB | **(7-35)** _____ | +1.30 dB |
| −90 | −1.40 dB | **(7-36)** _____ | +1.40 dB |

## Operation Verification Test Record (page 14 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **8. Receiver RF Section** | | | |
| **Reference Level Accuracy** | | | |
| Log Mode | | | |
| **Reference Level (dBm)** | | | |
| −20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −10 | −0.40 dB | **(8-1)** _____ | +0.40 dB |
| 0 | −0.50 dB | **(8-2)** _____ | +0.50 dB |
| −30 | −0.40 dB | **(8-3)** _____ | +0.40 dB |
| −40 | −0.50 dB | **(8-4)** _____ | +0.50 dB |
| −50 | −0.80 dB | **(8-5)** _____ | +0.80 dB |
| −60 | −1.00 dB | **(8-6)** _____ | +1.00 dB |
| −70 | −1.10 dB | **(8-7)** _____ | +1.10 dB |
| −80 | −1.20 dB | **(8-8)** _____ | +1.20 dB |
| −90 | −1.30 dB | **(8-9)** _____ | +1.30 dB |
| Linear Mode | | | |
| **Reference Level (dBm)** | | | |
| −20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| −10 | −0.40 dB | **(8-10)** _____ | +0.40 dB |
| 0 | −0.50 dB | **(8-11)** _____ | +0.50 dB |
| −30 | −0.40 dB | **(8-12)** _____ | +0.40 dB |
| −40 | −0.50 dB | **(8-13)** _____ | +0.50 dB |
| −50 | −0.80 dB | **(8-14)** _____ | +0.80 dB |
| −60 | −1.00 dB | **(8-15)** _____ | +1.00 dB |
| −70 | −1.10 dB | **(8-16)** _____ | +1.10 dB |
| −80 | −1.20 dB | **(8-17)** _____ | +1.20 dB |
| −90 | −1.30 dB | **(8-18)** _____ | +1.30 dB |

## Operation Verification Test Record (page 15 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **8. Receiver RF Section Reference Level Accuracy (continued)** | | | |
| Log Mode | | | |
| **Reference Level (dBm)** | | | |
| –20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| –10 | –0.40 dB | **(8-19)** _____ | +0.40 dB |
| 0 | –0.50 dB | **(8-20)** _____ | +0.50 dB |
| –30 | –0.40 dB | **(8-21)** _____ | +0.40 dB |
| –40 | –0.50 dB | **(8-22)** _____ | +0.50 dB |
| –50 | –0.80 dB | **(8-23)** _____ | +0.80 dB |
| –60 | –1.10 dB | **(8-24)** _____ | +1.10 dB |
| –70 | –1.20 dB | **(8-25)** _____ | +1.20 dB |
| –80 | –1.30 dB | **(8-26)** _____ | +1.30 dB |
| –90 | –1.40 dB | **(8-27)** _____ | +1.40 dB |
| Linear Mode | | | |
| **Reference Level (dBm)** | | | |
| –20 | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| –10 | –0.40 dB | **(8-28)** _____ | +0.40 dB |
| 0 | –0.50 dB | **(8-29)** _____ | +0.50 dB |
| –30 | –0.40 dB | **(8-30)** _____ | +0.40 dB |
| –40 | –0.50 dB | **(8-31)** _____ | +0.50 dB |
| –50 | –0.80 dB | **(8-32)** _____ | +0.80 dB |
| –60 | –1.10 dB | **(8-33)** _____ | +1.10 dB |
| –70 | –1.20 dB | **(8-34)** _____ | +1.20 dB |
| –80 | –1.30 dB | **(8-35)** _____ | +1.30 dB |
| –90 | –1.40 dB | **(8-36)** _____ | +1.40 dB |

## Operation Verification Test Record (page 16 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured | | |
|---|---|---|---|
| | Min. | (TR Entry) | Max. |
| **9. Calibrator Amplitude Accuracy** | −20.4 dBm | **(9-1)** _____ | −19.6 dBm |
| **10. Calibration Repeatability and Resolution Bandwidth Switching Uncertainties** | | | |
| Calibration Repeatability† | −20.15 dB | **(10-1)** _____ | −19.85 dB |
| Resolution Bandwidth Switching Uncertainty | | | |
| **Resolution Bandwidth** | | | |
| 3 kHz | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 1 kHz | −0.5 dB | **(10-2)** _____ | +0.5 dB |
| 9 kHz | −0.4 dB | **(10-3)** _____ | +0.4 dB |
| 10 kHz | −0.4 dB | **(10-4)** _____ | +0.4 dB |
| 30 kHz | −0.4 dB | **(10-5)** _____ | +0.4 dB |
| 100 kHz | −0.4 dB | **(10-6)** _____ | +0.4 dB |
| 120 kHz | −0.4 dB | **(10-7)** _____ | +0.4 dB |
| 300 kHz | −0.4 dB | **(10-8)** _____ | +0.4 dB |
| 1 MHz | −0.4 dB | **(10-9)** _____ | +0.4 dB |
| 3 MHz | −0.4 dB | **(10-10)** _____ | +0.4 dB |
| 3 kHz | 0 (Ref) | 0 (Ref) | 0 (Ref) |
| 300 Hz | −0.6 dB | **(10-11)** _____ | +0.6 dB |
| 200 Hz | −0.6 dB | **(10-12)** _____ | +0.6 dB |
| 100 Hz | −0.6 dB | **(10-13)** _____ | +0.6 dB |
| 30 Hz | −0.6 dB | **(10-14)** _____ | +0.6 dB |
| **11. Frequency Response** | | | |
| Band 0 | | | |
| Max Positive Response | | **(11-1)** _____ | +1.5 dB |
| Max Negative Response | −1.5 dB | **(11-2)** _____ | |
| Peak-to-Peak Response | | **(11-3)** _____ | 2.0 dB |
| Band 1* | | | |
| Max Positive Response | | **(11-4)** _____ | +2.0 dB |
| Max Negative Response | −2.0 dB | **(11-5)** _____ | |
| Peak-to-Peak Response | | **(11-6)** _____ | 3.0 dB |

*For an HP 85462A only
† For a receiver RF section only

## Operation Verification Test Record (page 17 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **14. Displayed Average Noise Level for EMI Receiver** | | | |
| Preamp Off | | Input 1 | |
| **Frequency** | | | |
| 9 kHz | | **(14-1)** _____ | ≤ −97 dBm |
| 50 kHz | | **(14-2)** _____ | ≤ −122 dBm |
| 100 kHz | | **(14-3)** _____ | ≤ −130 dBm |
| 400 kHz | | **(14-4)** _____ | ≤ −137 dBm |
| Preamp On | | | |
| **Frequency** | | | |
| 9 kHz | | **(14-5)** _____ | ≤ −109 dBm |
| 50 kHz | | **(14-6)** _____ | ≤ −135 dBm |
| 100 kHz | | **(14-7)** _____ | ≤ −140 dBm |
| 400 kHz | | **(14-8)** _____ | ≤ −146 dBm |
| Preamp Off | | | |
| **Frequency** | | | |
| .4 MHz to 6 MHz | | **(14-9)** _____ | ≤ −138 dBm |
| 6 MHz to 18 MHz | | **(14-10)** _____ | ≤ −138 dBm |
| 18 MHz to 30 MHz | | **(14-11)** _____ | ≤ −138 dBm |
| 30 MHz to 50 MHz | | **(14-12)** _____ | ≤ −138 dBm |
| Preamp On | | | |
| **Frequency** | | | |
| .4 MHz to 6 MHz | | **(14-13)** _____ | ≤ −146 dBm |
| 6 MHz to 18 MHz | | **(14-14)** _____ | ≤ −146 dBm |
| 18 MHz to 30 MHz | | **(14-15)** _____ | ≤ −146 dBm |
| 30 MHz to 50 MHz | | **(14-16)** _____ | ≤ −146 dBm |
| Preamp Off | | Input 2 | |
| **Frequency** | | | |
| 20 MHz to 100 MHz | | **(14-17)** _____ | ≤ −138 dBm |
| 100 MHz to 500 MHz | | **(14-18)** _____ | ≤ −138 dBm |
| 500 MHz to 1000 MHz | | **(14-19)** _____ | ≤ −138 dBm |
| 1000 MHz to 2000 MHz | | **(14-20)** _____ | ≤ −138 dBm |
| 2000 MHz to 2900 MHz | | **(14-21)** _____ | ≤ −138 dBm |

## Operation Verification Test Record (page 18 of 19)

Hewlett-Packard Company
EMI Receiver Series
Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Min. | Results Measured (TR Entry) | Max. |
|---|---|---|---|
| **14. Displayed Average Noise Level for EMI Receiver (continued)** | | | |
| Preamp On | | Input 2 | |
| **Frequency** | | | |
| 20 MHz to 100 MHz | | **(14-22)** _____ | ≤ −146 dBm |
| 100 MHz to 500 MHz | | **(14-23)** _____ | ≤ −146 dBm |
| 500 MHz to 1000 MHz | | **(14-24)** _____ | ≤ −146 dBm |
| 1000 MHz to 2000 MHz | | **(14-25)** _____ | ≤ −146 dBm |
| 2000 MHz to 2900 MHz | | **(14-26)** _____ | ≤ −146 dBm |
| Preamp Off | | | |
| **Frequency*** | | | |
| 1 GHz to 2 GHz | | **(14-27)** _____ | ≤ −123 dBm |
| 2 GHz to 3 GHz | | **(14-28)** _____ | ≤ −123 dBm |
| 3 GHz to 4 GHz | | **(14-29)** _____ | ≤ −123 dBm |
| 4 GHz to 5 GHz | | **(14-30)** _____ | ≤ −123 dBm |
| 5 GHz to 6.5 GHz | | **(14-31)** _____ | ≤ −123 dBm |
| Preamp On | | | |
| **Frequency*** | | | |
| 1 GHz to 2 GHz | | **(14-32)** _____ | ≤ −144 dBm |
| 2 GHz to 3 GHz | | **(14-33)** _____ | ≤ −144 dBm |
| 3 GHz to 4 GHz | | **(14-34)** _____ | ≤ −144 dBm |
| 4 GHz to 5 GHz | | **(14-35)** _____ | ≤ −144 dBm |
| 5 GHz to 6.5 GHz | | **(14-36)** _____ | ≤ −144 dBm |
| **15. Displayed Average Noise Level for Receiver RF Section** | | | |
| Preamp Off | | | |
| **Frequency** | | | |
| 400 kHz | | **(15-1)** _____ | −125 dBm |
| 1 MHz | | **(15-2)** _____ | −125 dBm |
| 1 MHz to 2.9 GHz | | **(15-3)** _____ | −125 dBm |
| 2.75 to 6.5 GHz† | | **(15-4)** _____ | −125 dBm |
| Preamp On | | | |
| **Frequency** | | | |
| 400 kHz | | **(15-5)** _____ | −146 dBm |
| 1 MHz | | **(15-6)** _____ | −146 dBm |
| 1 MHz to 2.9 GHz | | **(15-7)** _____ | −146 dBm |
| 2.75 to 6.5 GHz† | | **(15-8)** _____ | −146 dBm |

*For an HP 8546A only
† For an HP 85462A only

## Operation Verification Test Record (page 19 of 19)

Hewlett-Packard Company
EMI Receiver Series

Model No. _____ Report No. _____

Serial No. _____ Date _____

| Test Description | Results Measured Min. | (TR Entry) | Max. |
|---|---|---|---|
| **16. CISPR Pulse Response** | | | |
| | _____ Amplitude Error _____ | | |
| Measured Amplitude | | | |
| 200 Hz EMI BW | | **(16-1)** _____ | |
| 9 kHz EMI BW | | **(16-2)** _____ | |
| 120 kHz EMI BW | | **(16-3)** _____ | |
| | _____ Amplitude Error _____ | | |
| Relative Level, Band A | | | |
| **Repetition Frequency** | | | |
| 100 | +3.0 dB | **(16-4)** _____ | +5.0 dB |
| 60 | +2.0 dB | **(16-5)** _____ | +4.0 dB |
| 25 | 0 (Ref) | **(16-6)** _____ | 0 (Ref) |
| 10 | −3.0 dB | **(16-7)** _____ | −5.0 dB |
| 5 | −6.0 dB | **(16-8)** _____ | −9.0 dB |
| 2 | −11.0 dB | **(16-9)** _____ | −15.0 dB |
| 1 | −15.0 dB | **(16-10)** _____ | −19.0 dB |
| Isolated Pulse | −17.0 dB | **(16-11)** _____ | −21.0 dB |
| Relative Level Band B, 9 kHz EMI BW | | | |
| **Repetition Frequency** | | | |
| 1000 | +5.5 dB | **(16-12)** _____ | +3.5 dB |
| 100 | 0 (Ref) | **(16-13)** _____ | 0 (Ref) |
| 20 | −5.5 dB | **(16-14)** _____ | −7.5 dB |
| 10 | −8.5 dB | **(16-15)** _____ | −11.5 dB |
| 2 | −18.5 dB | **(16-16)** _____ | −22.5 dB |
| 1 | −20.5 dB | **(16-17)** _____ | −24.5 dB |
| Isolated Pulse | −21.5 dB | **(16-18)** _____ | −25.5 dB |
| Relative Level Bands C and D, 120 kHz EMI BW | | | |
| **Repetition Frequency** | | | |
| 1000 | +9.0 dB | **(16-19)** _____ | +7.0 dB |
| 100 | 0 (Ref) | **(16-20)** _____ | 0 (Ref) |
| 20 | −8.0 dB | **(16-21)** _____ | −10.0 dB |
| 10 | −12.5 dB | **(16-22)** _____ | −15.5 dB |
| 2 | −24.0 dB | **(16-23)** _____ | −28.0 dB |
| 1 | −26.5 dB | **(16-24)** _____ | −30.5 dB |
| Isolated Pulse | −29.5 dB | **(16-25)** _____ | −33.5 dB |

# 3

# Customer Support

Your EMI receiver is built to provide dependable service. It is unlikely that you will experience a problem. However, Hewlett-Packard's worldwide sales and service organization is ready to provide the support you need.

## If You Have a Problem

Before calling Hewlett-Packard or returning the EMI receiver for service, please make the checks listed in "Check the Basics." If you still have a problem, please read the warranty printed at the front of this manual. If your EMI receiver is covered by a separate maintenance agreement, please be familiar with its terms.

Hewlett-Packard offers several maintenance plans to service your EMI receiver after warranty expiration. Call your HP Sales and Service Office for full details.

If you want to service the EMI receiver yourself after warranty expiration, contact your HP Sales and Service Office to obtain the most current test and maintenance information.

## Calling HP Sales and Service Offices

Sales and service offices are located around the world to provide complete support for your EMI receiver. To obtain servicing information or to order replacement parts, contact the nearest Hewlett-Packard Sales and Service office listed in Table 3-1. In any correspondence or telephone conversations, refer to the EMI receiver by its model number and full serial number. With this information, the HP representative can quickly determine whether your unit is still within its warranty period.

## Check the Basics

In general, a problem can be caused by a hardware failure, a software error, or a user error. Often problems may be solved by repeating what was being done when the problem occurred. A few minutes spent in performing these simple checks may eliminate time spent waiting for instrument repair.

### If Your EMI Receiver Does Not Turn On

- □ Check that the EMI receiver is plugged into the proper ac power source.
- □ Check that the line socket has power.
- □ Check that the rear-panel voltage selector switchs are set correctly.
- □ Check that the line fuses are good.
- □ Check that the EMI receiver is turned on.

### If the RF Filter Section Does Not Seem to be Working

- □ Check the ac power to the EMI receiver as described above.
- □ Verify that the rear-panel auxiliary interface cable is properly connected.
- □ Verify that the rear-panel sweep ramp and high sweep cables are properly connected.

### If the EMI Receiver Cannot Communicate Via HP-IB

- □ Verify that the proper HP-IB address has been set.
- □ Verify that there are no equipment address conflicts.
- □ Check that the other equipment and cables are connected properly and operating correctly.
- □ Verify that the HP-IB cable is connected to the receiver RF section and not the RF filter section.

### Verification of Proper Operation

- □ Check that the test being performed and the expected results are within the specifications and capabilities of the EMI receiver.
- □ Check operation by performing the operation verification procedures in Chapter 2 of this manual. Record all results in the operation verification test record.

### If the RF filter section Does Not Power Off

- □ Verify that the service power switch on the RF filter section is set to normal mode.

### Error Messages

- □ Check the EMI receiver display for error messages. Refer to Chapter 4 of this manual.

## Additional Support Services

### CompuServe

CompuServe, the worldwide electronic information utility, provides technical information and support for EMC instrumentation and communication with other EMI users.

With a CompuServe account and a modem-equipped computer, simply type `GO HPSYS` and select the EMC system section to get information on documentation, application notes, product notes, service notes, software, firmware revision listings, data sheets, and more.

If you are not a member of CompuServe and would like to join, call CompuServe and take advantage of the Free Introductory Membership. The membership includes the following:

- An introductory usage credit to CompuServe
- A private User ID and Password
- A complimentary subscription to CompuServe's monthly computing publication, *CompuServe Magazine*

To take advantage of the CompuServe Free Introductory Membership offer, call one of the telephone numbers below and ask for Representative Number 999.

| Country | Toll-Free | Direct |
|---|---|---|
| Argentina | — | (+54) 01-372-7883 |
| Australia | 008-023-158 | (+61) 2-410-4555 |
| Canada | — | (+1) 614-457-8650 |
| Chile | — | (+56) 2-696-8807 |
| Germany | 0130 86 4643 | (+49) (+89) 66 55 0-222 |
| Hong Kong | — | (+852) 867-0102 |
| Israel | — | (+972) 3-290466 |
| Japan | 0120-22-1200 | (+81) 3-5471-5806 |
| Korea | 080-022-7400 | (+82) 2-569-5400 |
| New Zealand | 0800-441-082 | — |
| South Africa | — | (+27) 12-841-2530 |
| Switzerland | 155 31 79 | — |
| Taiwan | — | (+886) 2-515-7035 |
| United Kingdom | 0800 289458 | (+44) (+272) 255111 |
| United States | 800-848-8990 | (+1) 614-457-8650 |
| Venezuela | — | (+58) 2-793-2984 |
| Elsewhere | — | (+1) 614-457-8650 |

## FAX Support Line

A fax sheet is provided at the end of this chapter as a method in which to directly contact the HP EMC support team in the event of a problem. The fax cover sheet provides EMC support team with information about your company, the product, and a detailed description about the problem.

**Note**

**All** items on the fax cover sheet *must* be completed in order to expedite your response. Any incomplete item may delay your response.

Simply copy the fax cover sheet, fill out the requested information, include any additional information sheets, and fax the sheet(s) to HP EMC Support at (707) 577-4200. Depending on the complexity of the problem, you should receive a response back within a few days.

## Returning the EMI Receiver for Service

Use the information in this section if it is necessary to return the EMI receiver to Hewlett-Packard.

**Note**

If you are returning an EMI receiver, you must return both the receiver RF section and RF filter section to the service center for repair and calibration. Also, you must package the units individually to avoid damage.

### Package the EMI receiver for shipment

Use the following steps to package the EMI receiver for shipment to Hewlett-Packard for service:

1. Fill in a service tag (available at the end of this chapter) and attach it to the instrument. Please be as specific as possible about the nature of the problem. Send a copy of any or all of the following information:
   - Any error messages that appeared on the EMI receiver display.
   - A completed operation verification test record located at the end of Chapter 2 in this manual.
   - Any other specific data on the performance of the EMI receiver.

**CAUTION**

Damage to the EMI receiver can result from using packaging materials other than those specified. Never use styrene pellets in any shape as packaging materials. They do not adequately cushion the instrument or prevent it from shifting in the carton. Styrene pellets cause equipment damage by generating static electricity and by lodging in the fan.

2. Use the original packaging materials or strong shipping containers that are made of double-walled, corrugated cardboard with 159 kg (350 lb) bursting strength. The cartons must be both large enough and strong enough and allow at least 3 to 4 inches on all sides of the instrument for packing material.
3. Protect the front panel with cardboard.
4. Surround the instrument with at least 3 to 4 inches of packing material, or enough to prevent the instrument from moving in the carton. If packing foam is not available, the best alternative is SD-240 Air Cap™ from Sealed Air Corporation (Commerce, CA 90001). Air Cap looks like a plastic sheet covered with 1-1/4 inch air-filled bubbles. Use the pink Air Cap to reduce static electricity. Wrap the instrument several times in the material to both protect the instrument and prevent it from moving in the carton.
5. Seal the shipping container securely with strong nylon adhesive tape.
6. Mark the shipping container "FRAGILE, HANDLE WITH CARE" to ensure careful handling.
7. Retain copies of all shipping papers.

## Table 3-1. Hewlett-Packard Sales and Service Offices

### US FIELD OPERATIONS

**Customer Information**
Hewlett-Packard Company
19320 Pruneridge Avenue
Cupertino, CA 95014, USA
(800) 752-0900

**California, Northern**
Hewlett-Packard Co.
301 E. Evelyn|gw421 South Manhattan Ave.
Mountain View, CA 94041
(415) 694-2000

**California, Southern**
Hewlett-Packard Co.

Fullerton, CA 92631
(714) 999-6700

**Colorado**
Hewlett-Packard Co.
24 Inverness Place, East
Englewood, CO 80112
(303) 649-5000

**Georgia**
Hewlett-Packard Co.
2000 South Park Place
Atlanta, GA 30339
(404) 955-1500

**Illinois**
Hewlett-Packard Co.
5201 Tollview Drive
Rolling Meadows, IL 60008
(708) 255-9800

**New Jersey**
120 W. Century Road
Paramus, NJ 07653
(201)599-5000

**Texas**
930 E. Campbell Rd.
Richardson, TX 75081
(214) 231-6101

### EUROPEAN FIELD OPERATIONS

**Headquarters**
Hewlett-Packard S.A.
150, Route du Nant-d'Avril
1217 Meyrin 2/Geneva
Switzerland
(41 22) 780.8111

**France**
Hewlett-Packard France
1 Avenue Du Canada
Zone D'Activite De Courtaboeuf
F-91947 Les Ulis Cedex
France
(33 1) 69 82 60 60

**Germany**
Hewlett-Packard GmbH
Berner Strasse 117
6000 Frankfurt 56
West Germany
(49 69) 500006-0

**Great Britain**
Hewlett-Packard Ltd
Eskdale Road, Winnersh Triangle
Wokingham, Berkshire RF11 5DZ
England
(44 734) 696622

### INTERCON FIELD OPERATIONS

**Headquarters**
Hewlett-Packard Company
3495 Deer Creek Rd.
Palo Alto, California 94304-1316
(415) 857-5027

**Australia**
Hewlett-Packard Australia Ltd.
31-41 Joseph Street
Blackburn, Victoria 3130
(61 3) 895-2895

**Canada**
Hewlett- Packard (Canada) Ltd.
17500 South Service Road
Trans- Canada Highway
Kirkland, Quebec H9J 2X8
Canada
(514) 697-4232

**China**
China Hewlett-Packard Co.
38 Bei San Huan X1 Road
Shuang Yu Shu
Hai Dian District
Beijing, China
(86 1) 256-6888

**Japan**
Yokogawa-Hewlett-Packard Ltd.
1-27-15 Yabe, Sagamihara
Kanagawa 229, Japan
(81 427) 59-1311

**Singapore**
Hewlett-Packard Singapore (Pte.) Ltd
1150 Depot Road
Singapore 0410
(65) 273-7388

**Taiwan**
Hewlett-Packard Taiwan
8th Floor, H-P Building
337 Fu Hsing North Road
Taipei, Taiwan
(886 2) 712-0404

HEWLETT PACKARD

**Fax Cover Sheet**

**To: HP EMC Support** **FAX Number: (707) 577-4200** **Page ____ of ____**

**Date Transmitted:** _____ **Time Transmitted:** _____

**From:**

Company: _____

Last Name: _____ First Name: _____

Address: _____

City: _____ State: _____

Country: _____ Postal Code: _____ Mail Stop: _____

Telephone Number **(include Country Code)**: _____

Fax Number **(required)**: _____

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**Product:**

☐ HP 8542E ☐ HP 85422E Option(s): _____

☐ HP 8546A ☐ HP 85462A Option(s): _____

| **Serial Number(s):** | Receiver RF Section | | RF Filter Section | |
|---|---|---|---|---|
| HP 8542E EMI Receiver: | HP 85422E | _____ | HP 85420E | _____ |
| HP 8546A EMI Receiver: | HP 85462A | _____ | HP 85460A | _____ |
| **Firmware Revision:** | HP 85422E | _____ | HP 85420E | _____ |
| | HP 85462A | _____ | HP 85460A | _____ |

**Is the problem reproducible?** ☐ **Yes** ☐ **No**

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**Detailed Problem Description:** (include all setup information and any additional pages)

_____

_____

_____

_____

_____

# 4

# Error Messages

The instrument can generate various messages that appear on its screen during operation to indicate a problem.

There are three types of messages: hardware error messages (H), user-created error messages (U), and informational messages (M).

- Hardware error messages indicate the instrument hardware is probably broken.
- User-created error messages appear when the instrument is used incorrectly. They are usually generated during remote operation (entering programming commands using either a controller or the external keyboard).
- Informational messages provide information indicating the progress of the instrument within a specific procedure.

The messages are listed in alphabetical order on the following pages; each message is defined, and its type is indicated by an (H), (U), or (M).

**$\phi$ LOCK OFF**
Indicates slow YTO tuning. This message may appear if the instrument is using default correction factors. If this message appears constantly, perform the self-calibration routine to try to eliminate this message. $\phi$ LOCK OFF appears briefly during the self-calibration routine, during instrument preset, or when the frequency value is changed; this is normal and does not indicate a problem. (U) and (H)

**ADC-2V FAIL**
Indicates a hardware failure. (H)

**ADC-GND FAIL**
Indicates a hardware failure. (H)

**ADC-TIME FAIL**
Indicates a hardware failure. (H) and (U)

**Bad device type in msus**
An attempt has been made to read a disk that is neither LIF nor DOS format or a communication failure between the main processor and the floppy disk subsystem. If the disk in use is LIF or DOS format, try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative. (U) (H)

**Bad mass storage parameter**
May be reported if an attempt is made to read a disk that is neither

LIF nor DOS format. Attempt a catalog operation on the disk or try a different disk. (U)

**Bad mass storage volume label**
May be reported if an attempt is made to read a disk that is neither LIF nor DOS format. Attempt a catalog operation on the disk or try a different disk. (U)

**Bad mass storage volume spec**
May be generated if the user removes media while it is being accessed or if a read or write operation is attempted on unformatted media. Try the operation again or try the operation on media you are sure has been appropriately formatted.

**Cal harmonic >= 5.7 GHz NOT found** *For an HP 8546A/ HP 85462A only.*
Indicates that the CAL YTF routine cannot find a harmonic of the 300 MHz calibration signal. If this happens, perform the CAL FREQ and CAL AMP routines, and then perform the CAL YTF routine again. For the HP 8546A, press CAL ALL then perform the CAL YTF routine again.(U) and (H)

**CAL: MAIN COIL SENSE FAIL**
The instrument could not set up span sensitivity of the main coil. If this message appears, press (FREQUENCY), CENTER FREQ, −37, (Hz), (CALIBRATE), More 1 of 3, More 2 of 3, DEFAULT CAL DATA, and perform the self-calibration routine again. (H)

**CAL: NBW 200 Hz notch amp failed**
Indicates that the 200 Hz IF bandwidth is not the correct shape for the calibration routine. (H)

**CAL: NBW 200 Hz notch failed**
Indicates that the 200 Hz IF bandwidth is not the correct shape for the calibration routine. (H)

**CAL: NBW 200 Hz width failed**
Indicates that the 200 Hz IF bandwidth is not the correct bandwidth for the calibration routine. (H)

**CAL: NBW gain failed**
Indicates that one of the IF bandwidths is not the correct amplitude for the calibration routine. (H)

**CAL: NBW width failed**
Indicates that one of the IF bandwidths is not the correct width for the calibration routine. (H)

**CAL: PASSCODE NEEDED**
Indicates that the function cannot be accessed without the pass code. For the DEFAULT CAL DATA function, the pass code is setting the center frequency of the instrument to −37 Hz. (M)

**CAL: RES BW AMPL FAIL**
The relative insertion loss of the IF bandwidth is incorrect. This message also sets SRQ 110. (H)

**CAL SIGNAL NOT FOUND**
Indicates the calibration signal cannot be found. Check that

the instrument input connectors are connected properly. If the calibration signal is connected properly but cannot be found, press (FREQUENCY), CENTER FREQ, −37, (Hz), (CALIBRATE), More 1 of 3, More 2 of 3, DEFAULT CAL DATA. If the calibration signal still cannot be found, press (FREQUENCY), CENTER FREQ, −37, (Hz) and perform the CAL FREQ and CAL AMP (receiver RF section) or CAL ALL (EMI receiver) self-calibration routines. This message also sets SRQ 110. (U) and (H)

**CAL: SPAN SENS FAIL**
The self-calibration span sensitivity routine failed. This message also sets SRQ 110. (H)

**CAL: USING DEFAULT DATA**
Indicates that the calibration data is corrupt and the default correction factors are being used. Interruption of the self-calibration routines or an error can cause this problem. (M)

**CAL YTF FAILED** *For an HP 8546A/HP 85462A only.*
Indicates that the CAL YTF routine could not be successfully completed. Perform the self-calibration routines, then perform the CAL YTF routine again. (U) and (H)

**CAL: ZERO FAIL**
The instrument could not set up the tuning sensitivity of the main coil. If this message appears, press (FREQUENCY), CENTER FREQ, −37, (Hz), (CALIBRATE), More 1 of 3, More 2 of 3, DEFAULT CAL DATA, and perform the self-calibration routines again. (H)

**Cannot engage phase lock with current CAL FREQ data**
Indicates that the CAL FREQ routine needs to be performed before phase locking can be turned on. (U)

**Cannot BYPASS Input 1**
An attempt was made to execute the BYPASS command while the signal path is routed through INPUT 1 of the RF filter section. Only INPUT 2 of the RF filter section can be bypassed.

**Checkread error**
This error may be due to conflicting disk operations invoked from the front-panel keys and the remote I/O port, or it may indicate that the disk is corrupt. After pressing the "HOLD" key, (ENTER), on the front panel, retry the operation. If the operation fails again, check the disk using the catalog function. (U)

**COMMAND ERROR:**_ _ _
The specified programming command is not recognized by the instrument. (U)

**Configuration Error**
This error indicates a serious problem in the ability of the instrument to use the floppy disk drive. Try presetting the instrument. If the condition persists, contact your HP representative. (H)

**CONF TEST FAIL**
Indicates that the confidence test failed. Perform the self-calibration routines, and then perform the confidence test again. This message also sets SRQ 110. (H) and (U)

**Directory not empty**
Reported if an attempt is made to purge a non-empty directory. Ensure that all files in any directory have been purged or moved before attempting to purge the directory. (U)

**Directory overflow**
Reported if the disk directory runs out of room. Change the media. (M)

**Drive not found or bad address**
An attempt has been made to read a disk that is neither LIF nor DOS format or a communications failure between the main processor and the floppy disk subsystem. If the disk in use is LIF or DOS format, try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative. (U) (H)

**Duplicate file name**
Reported if the file system tries to write data to a file that already exists, but did not exist previously. May be due to changing media just before an operation attempts to create a new file. (U)

**Duplicate file name, PROTECT is on**
Reported if the user attempts to overwrite a previously existing file with PROTECT status set to ON (the default state). Use a different file name, purge the file, or turn off the PROTECT feature. (U)

**End of file or buffer found**
Reported if an attempt is made to read or write beyond the current file or directory is made. Also reported if an attempt is made to add files to a directory that is already full. Try using a new disk. (U)

**End of rec found, random mode**
Reported if an attempt is made to read or write beyond the current record being accessed. Try the operation again. (U)

**FAIL:_ _ _**
An error was discovered during the power-up check. The 4-digit by 10-digit code indicates the type of error. (H)

**File name is undefined**
May be reported if the user changes media immediately before a read operation is attempted on a file of a specific name. Ensure that the file exists on the disk by using the catalog feature. (U)

**File not currently assigned**
May be generated if the user removes media while it is being accessed. Try the operation again. (U)

**File open on target device**
May be due to conflicting file operations invoked simultaneously from the front-panel keys and the remote I/O port. Attempt the operation again. (U)

**File type incompatible**
Indicates that the selected file is not a display image file. The file name for a display image file is always preceded by an "i." (U)

**FREQ UNCAL**
The FREQ UNCAL message appearing constantly, indicates a YTO-tuning error. Perform the `CAL FREQ` (receiver RF section) or `CAL ALL` (EMI receiver) routines. (U) and (H)

**Function not available in current Mode**
Indicates that the function that you have selected can only be used with the instrument mode. You can use the (MODE) key to select the instrument mode. (U)

**HFS disc may be corrupt**
This error may be due to conflicting disk operations invoked from the front-panel keys and the remote I/O port, or it may indicate that the disk is corrupt. After pressing the "HOLD" key, (ENTER), on the front panel, retry the operation. If the operation fails again, check the disk using the catalog function. (U)

**Improper destination type**
Reported if an attempt is made to append data to a file and the file cannot be extended. Try the operation using another disk. (U)

**Improper file name**
Reported if a file or directory name is specified that in some manner does not conform to file name conventions: too many characters, illegal character in file name, and so on.

**Improper file type**
Reported in the event that an operation appropriate for a data file is attempted on a directory. Check the contents of the disk using the catalog function. (U)

**Improper value or out of range**
Indicates an internal error in computing the amount of data to read from the disk or an invalid parameter. This may indicate corrupt media; try a new disk. If the condition persists, contact your HP representative. (H)

**Incorrect unit code in msus**
An attempt has been made to read a disk that is neither LIF nor DOS format or a communications failure between the main processor and the floppy disk subsystem. If the disk in use is LIF or DOS format, try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative. (U) (H)

**Incorrect volume code in msvs**
An attempt has been made to read a disk that is neither LIF nor DOS format or a communications failure between the main processor and the floppy disk subsystem. If the disk in use is LIF or DOS format, try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative. (U) (H)

**Insufficient Memory**
Indicates a temporary memory overflow condition. Attempt to free

memory that may have been temporarily allocated by performing the following steps:

1. If there is a disk catalog on the display, exit the catalog.
2. Execute the dispose softkeys under `Dispose User Mem` in the (CONFIG) menu. (U)

**INTEGER overflow**
Indicates a computation error during disk access. This may indicate corrupt media; try a new disk. If the condition persists, contact your HP representative. (H)

**Internal error**
Indicates a failure of the floppy disk controller or a failure in communications between the main processor and the floppy disk controller. Try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative. (H)

**INTERNAL LOCKED**
The internal trace and state registers of the instrument have been locked. To unlock the trace or state registers, press (SAVE), `Save Internal`, `SAV LOCK ON OFF` so that OFF is underlined. (U)

**INVALID AMPCOR: FREQ**
For the AMPCOR command, the frequency data must be entered in increasing order. See the description for the AMPCOR programming command for more information. (U)

**INVALID ENTER FORMAT**
The enter format is not valid. See the appropriate programming command description to determine the correct format. (U)

**INVALID <file name> NOT FOUND**
Indicates that the specified file could not be loaded into internal memory or purged from memory because the file name cannot be found. (U)

**INVALID FILENAME _ _ _**
Indicates the specified file name is invalid. A file name is invalid if there is no file name specified, if the first letter of the file name is not alphabetic, or if the specified file type does not match the type of file. See the description SAVRCLW or STOR programming commands for more information. (U)

**INVALID FILE: NO ROOM**
Indicates that there is insufficient space available on the floppy disk to store the data. (U)

**INVALID HP-IB ADRS/OPERATION**
An HP-IB operation was aborted due to an incorrect address or invalid operation. Check that there is only one controller (the EMI receiver) connected to the printer or plotter. (U)

**INVALID HP-IB OPERATION REN TRUE**
The HP-IB operation is not allowed. (This is usually caused by trying to print or plot when a controller is on the interface bus with the instrument.) To use the instrument print or plot functions, you must disconnect any other controllers on the HP-IB. If you are using programming commands to print or plot, you can use an HP

BASIC command instead of disconnecting the controller. See the description for the PRINT command for more information. (U)

**INVALID ITEM:**_ _ _
Indicates an invalid parameter has been used in a programming command. (U)

**INVALID KEYLBL:** _ _ _
Indicates that the specified key label contains too many characters. A key label is limited to 8 printable characters per label line. (U)

**INVALID KEYNAME:**_ _ _
The specified key name is not allowed. (The key name may have conflicted with a instrument programming command.) To avoid this problem, use an underscore as the second character in the key name, or avoid beginning the key name with the following pairs of letters: LB, OA, OL, TA, TB, TR, MA, MF, TS, OT, and DR. (U)

**INVALID OUTPUT FORMAT**
The output format is not valid. See the appropriate programming command description to determine the correct format. (U)

**INVALID RANGE: Stop < Start**
Indicates that the first trace element specified for a range of trace elements is larger that ending trace element. When specifying a trace range the starting element must be less than the ending element. For example, TRA[2,300] is legal but TRA[300,2] is not. (U)

**INVALID REGISTER NUMBER**
The specified trace register number is invalid. (U)

**INVALID RS-232 ADRS/OPERATION**
An RS-232 operation was aborted due to an invalid operation. (U)

**INVALID SAVE REG**
Data has not been saved in the specified state or trace register, or the data is corrupt. (U)

**INVALID SCRMOVE**
Indicates the instrument may have a hardware failure. (H)

**INVALID START INDEX**
Indicates that the first trace element specified for a range of trace elements is not within the trace range of the specified trace. (U)

**INVALID STOP INDEX**
Indicates that the ending trace element specified for a range of trace elements is not within the trace range of the specified trace. (U)

**INVALID TRACE:** _ _ _
The specified trace is invalid. (U)

**INVALID VALUE PARAMETER:** _ _ _
The specified value parameter is invalid. (U)

**INVALID WINDOW TYPE:** _ _ _
The specified window is invalid. See the description for the TWNDOW programming command. (U)

**LOST SIGNAL**
This message indicates that an internal hardware connection problem exists. (H)

**LO UNLVL**
Indicates that the local oscillator in the EMI receiver distribution amplifier is not functioning properly. (H)

**Marker Count Reduce SPAN**
Indicates the IF bandwidth to span ratio is too small to use the marker count function. Check the span and IF bandwidth settings. (U)

**Marker Count Widen RES BW**
Indicates that the current IF bandwidth setting is too narrow to use with the marker counter function. The marker counter function can be in narrow IF bandwidths (bandwidths that are less than 1 kHz) with the following procedure:

1. Place the marker on the desired signal.
2. Increase the IF bandwidth to 1 kHz and verify the marker is on the signal peak.
3. If the marker in on the signal peak, the marker count function can be used in either the 1 kHz IF bandwidth or the original narrow IF bandwidth setting. If the marker is not on the signal peak, it should be moved to the signal peak and the marker counter function should not be used with a IF bandwidth setting of less than 1 kHz. (U)

**Mass storage hardware failure**
Indicates a failure of the floppy disk controller or a failure in communications between the main processor and the floppy disk controller. Try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative. (H)

**Mass storage medium overflow**
Reported when a disk has no more room available to write data. Try a new disk. (U)

**Mass storage system error**
Indicates a failure of the floppy disk controller or a failure in communications between the main processor and the floppy disk controller. Try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative.

**Mass storage volume not present**
An attempt has been made to read a disk that is neither LIF nor DOS format or a communications failure between the main processor and the floppy disk subsystem. If the disk in use is LIF or DOS format, try turning the instrument off, wait a few seconds, then turn the instrument on again. If the condition persists, contact your HP representative. (U) (H)

**MEAS UNCAL**
The measurement is uncalibrated. Check the sweep time, span, and bandwidth settings, or press (AUTO COUPLE), AUTO ALL. (U)

**Medium changed or not in drive**
Reported if disk is removed during disk access cycle. Try the operation without removing the disk. (U)

**Medium uninitialized**
Indicates that a file operation has been attempted on an uninitialized disk, or on a disk that is neither LIF nor DOS format. Be sure that any disk on which file operations are attempted is properly formatted. The format softkeys, in the (CONFIG) menu, may be used to format a disk, but any information on the disk will be erased during the formatting process. (U)

**No points defined**
Indicates the specified limit line or amplitude correction function cannot be performed because no limit line segments or amplitude correction factors have been defined. (U)

**Operation failed on some files**
Reported if, during a purge operation on a file specifier that contains wildcards, the number of files actually purged does not match the original number of files found that match the file specifier. Check the disk using the catalog function. (U)

**Operation not allowed on open file**
May be due to conflicting file operations invoked simultaneously from the front-panel keys and the remote I/O port. Attempt the operation again. (U)

**OVEN COLD**
Indicates that the EMI receiver has been powered up for less than 5 minutes. (The actual temperature of the precision frequency oven is not measured.) (M)

**PARAMETER ERROR: _ _ _**
The specified parameter is not recognized by the instrument. See the appropriate programming command description to determine the correct parameters. (U)

**PASSCODE NEEDED**
Indicates that the function cannot be accessed without the pass code. (U)

**Permission denied**
Indicates that a file write-operation was attempted on either a read-only file or on a directory. Check the disk using the catalog function and try the operation on an appropriate file again. (U)

**Possibly corrupt file**
This error may be due to conflicting disk operations invoked from the front-panel keys and the remote I/O port, or it may indicate that the disk is corrupt. After pressing the "HOLD" key, (ENTER), on the front panel, retry the operation. If the operation fails again, check the disk using the catalog function. (U)

**POS-PK FAIL**
Indicates the positive-peak detector has failed. (H)

**RCVR Limits not allowed in SA mode**
This error is encountered when an attempt is made to enable limit-line display, limit-margin display, or limit testing of limits

defined in Receiver mode when the instrument is operating in Signal Analysis mode. To correct the problem, either purge the limits or switch to Receiver mode. (U)

**Read data error**
This error may be due to conflicting disk operations invoked from the front-panel keys and the remote I/O port, or it may indicate that the disk is corrupt. After pressing the "HOLD" key, (ENTER), on the front panel, retry the operation. If the operation fails again, check the disk using the catalog function. (U)

**Record address error**
This error may be due to conflicting disk operations invoked from the front-panel keys and the remote I/O port, or it may indicate that the disk is corrupt. After pressing the "HOLD" key, (ENTER), on the front panel, retry the operation. If the operation fails again, check the disk using the catalog function. (U)

**Record not found**
This error may be due to conflicting disk operations invoked from the front-panel keys and the remote I/O port, or it may indicate that the disk is corrupt. After pressing the "HOLD" key, (ENTER), on the front panel, retry the operation. If the operation fails again, check the disk using the catalog function. (U)

**REF UNLOCK**
Indicates that the frequency reference is not locked to the external reference input. Check that the 10 MHz REF OUTPUT connector is connected to the EXT REF IN connector, or, when using an external reference, that an external 10 MHz reference source of sufficient amplitude is connected to the EXT REF IN connector. (U) and (H)

**Require 1 signal > PEAK EXCURSION above THRESHOLD**
Indicates that the N dB PTS routine cannot locate a signal that is high enough to measure. The signal must be greater than the peak excursion above the threshold level to measure. (U)

**Require 3 signals > PEAK EXCURSION above THRESHOLD**
Indicates that the % AM routine cannot locate three signals that are high enough to measure. The signals must be greater than the peak excursion above the threshold level to measure. (U)

**Require 4 signals > PEAK EXCURSION above THRESHOLD**
Indicates that the TOI routine cannot locate four signals that are high enough to measure. The signals must be greater than the peak excursion above the threshold level to measure. (U)

**Required option not installed**
Some instrument functions require that an option be installed in the instrument. See the description for the function in the User's Guide for more information about which option is required. (U)

**RF Filter Section Absent**
This message is displayed if the bypass command is executed when the RF filter section is not connected to, or is not communicating with, the receiver RF section. (U) and (H)

**RFFS Error: COMMAND**
The RF filter section has received a command that it does not recognize. Assure that there is no cable connected to the RF filter

section Service Bus interface. If the condition persists, and there is no cable connected to the RF filter section Service Bus interface, contact your HP representative. (U)

**RFFS Error: HARDWARE**
The RF filter section has experienced a hardware failure. If the condition persists after presetting the instrument or cycling power, contact your HP representative. (H)

**RFFS Error: TIMEOUT**
Communication failure between the receiver RF section and the RF filter section. Check power to the RF filter section and check that the AUX interface cable is properly connected between both instruments. (U) (H)

**RFFS Service Bus Active**
This message appears in the active function area of the receiver RF section display when an external controller communicates with the RF filter section via the RF filter section Service Bus interface. (H)

**RF PRESEL ERROR** *For an HP 8546A/HP 85462A only.*
Indicates that the preselector peak routine cannot be performed. (H)

**RF PRESEL TIMEOUT** *For an HP 8546A/HP 85462A only.*
Indicates that the preselector peak routine cannot be performed. (H)

**SA Limits not allowed in RCVR mode**
This error is encountered when an attempt is made to enable limit-line display, limit-margin display, or limit testing of limits defined in Signal Analysis mode when the instrument is operating in Receiver mode. To correct the problem, either delete the limits or switch to Signal Analysis mode. (U)

**SAMPLE FAIL**
Indicates the sample detector has failed. (H)

**SIGNAL CLIPPED**
Indicates that the current FFT measurement sweep resulted in a trace that is above the top graticule line on the display. If this happens, the input trace (trace A) has been "clipped," and the FFT data is not valid. (U)

**Signal not found**
Indicates the PEAK ZOOM routine did not find a valid signal. (U)

**Signals do not fit expected % AM pattern**
Indicates that the % AM routine cannot perform the percent AM measurement because the onscreen signals do not have the characteristics of a carrier with two sidebands. (U)

**Signals do not fit expected TOI pattern**
Indicates that the TOI routine cannot perform the third-order intermodulation measurement because the onscreen signals do not have the characteristics of two signals and two distortion products. (U)

**SMPLR UNLCK**
Indicates that the sampling oscillator circuitry is not functioning

properly. If this message appears, check that the external frequency reference is correctly connected to the EXT REF INPUT. (U) and (H)

**SOFTKEY OVFL**
Softkey nesting exceeds the maximum number of levels. (U)

**SRQ _ _ _**
The specified service request is active. (M)

**STEP GAIN/ATTN FAIL**
Indicates the step gain has failed. (H)

**TABLE FULL**
Indicates the upper or lower table of limit lines contains the maximum number of entries allowed. Additional entries to the table are ignored. (U)

**TG SIGNAL NOT FOUND**
Indicates the tracking generator output signal cannot be found. For the receiver RF section, check that the TRACKING GENERATOR OUTPUT is connected to the RF INPUT connector with an appropriate cable. For the EMI receiver, check that the cable between the TRACKING GENERATOR OUTPUT and TRACKING GENERATOR is properly connected. (U)

**TG UNLVL**
This message can indicate the following: that the source power is set higher or lower than the instrument can provide, that the frequency span extends beyond the specified frequency range of the tracking generator, or that the calibration data for the tracking generator is incorrect. (U)

**Too many open files**
This error may be due to conflicting disk operations invoked from the front-panel keys and the remote I/O port, or it may indicate that the disk is corrupt. After pressing the "HOLD" key, (ENTER), on the front panel, retry the operation. If the operation fails again, check the disk using the catalog function. (U)

**Too many signal with valid N dB points**
Indicates the N dB PTS function has located two or more signals that have amplitudes within the specified dB from the signal peak. If this happens, you should decrease the span of the instrument so that only the signal that you want to measure is displayed. (U)

**Trace A is not available**
Indicates that trace A is in the store-blank mode and cannot be used for limit-line testing. Use `CLEAR WRITE A` or `VIEW A` to change trace A from the store-blank mode to the clear write mode, and then turn on limit-line testing. (U)

**Unable to replace file**
Reported if an attempt is made to append data to a file and the file cannot be extended. Try the operation using another disk. (U)

**USING DEFAULTS self cal needed**
Indicates that the current correction factors are the default correction factors and that the self-calibration routines need to be performed. For either an HP 8546A or an HP 85462A, also perform the `CAL YTF` self-calibration routine. (U)

**VID-BW FAIL**
Indicates the averaging bandwidths have failed. (H)

**Wildcard matches > 1 item**
An attempt was made to use the wildcard matching character on an operation that requires a specific file name. For example, an attempt to load from a file name that contains a wildcard character. Try the operation using a specific file name. (U)

**Wildcards not allowed**
An attempt was made to use the wildcard matching character on an operation that requires a specific file name. For example, an attempt to load from a file name that contains a wildcard character. Try the operation using a specific file name. (U)

**Write protected**
Indicates that a write operation was attempted on a disk that is write protected. Move the write-protect tab on the floppy disk to the unprotected position, reinsert the disk in the disk drive and attempt the operation again. (U)

## Nonrecoverable System Errors

Certain situations can create error conditions from which the main processor cannot recover. In the event that the processor detects a nonrecoverable error, the instrument will be initialized, the display will be blanked, and special error messages will be written to the display.

The following is a sample nonrecoverable system error message display.

```
System Error 4, HP 8546A, SN 4
13:18:20 DEC 13, 1993, Rev: 931210
      SR: 0000        PC:  00FFB370      00FF6F1E:   00009300
D0:   00000000        A0:  00FFB238      00FF6F22:   00000000
D1:   00000000        A1:  00FF803E      00FF6F26:   00000000
D2:   00FFB238        A2:  00FF803C      00FF6F2A:   00FF803E
D3:   00FF803E        A3:  00FFB2FE      00FF6F2E:   000031B1
D4:   00008E7D        A4:  00FFB2F4      00FF6F32:   0004065E
D5:   00FF80E8        A5:  00FC6948      00FF6F36:   0004EDE8
D6:   00FFB39A        A6:  FFFFFFFE      00FF6F3A:   00FF8000
D7:   00FFB392        A7:  00FF6F1E      00FF6F3E:   00FF88AE
                                         00FF6F42:   00FF87E0
                                         00FF6F46:   00FFB03C
                                         00FF6F4A:   000C9AEA
                                         00FF6F4E:   00FF8890
                                         00FF6F52:   040800FF
                                         00FF6F56:   000900FF
                                         00FF6F5A:   B23A0000
WARNING: Config Settings Defaulted
      Press COPY to print error report and
      advise your local HP representative
Press PRESET to resume operation
```

When a nonrecoverable error message is displayed, the instrument will only respond to the front-panel COPY and PRESET keys. If you have a printer configured and connected to the instrument, and if no remote controller is currently connected to the I/O port through which the printer is connected, you can generate a hardcopy of the diagnostic part of the error message by pressing the front-panel COPY key.

In order to resume instrument operation following a nonrecoverable system error, press the front-panel PRESET key. The instrument will resume operation from its preset state.

Among the conditions which can contribute to the occurrence of a nonrecoverable system error are:

- Hardware failure of the main processor
- Hardware failure of system memory available to the main processor
- Errors in the primary system control program
- Attempted execution of unsupported system commands

Nonrecoverable system errors may occur when attempting to load an improper file type into the machine. For example, loading a file with an incorrect format into a limit line or amplitude correction table may generate this error.

If nonrecoverable system errors occur regularly, contact your HP representative.

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