HEWLETT PACKARD

HP 8562A/B High Performance Portable Spectrum Analyzer

Installation Manual

Serial Numbers

This manual applies directly to analyzers with serial number prefixes through:

HP 8562A: 2703A
HP 8562B: 2703A

For additional important information about serial numbers, see "Analyzers Covered by This Manual" in Chapter 1.

Manual Part Number 08562-90007
Microfiche Part Number 08562-90008
Printed in U.S.A. July 1987

1212 Valley House Drive, Rohnert Park, CA 94928-4999

HP 8562A/B Documentation Description

Manuals shipped with your analyzer:

Installation Manual
HP Part Number 08562-90007

- Tells you how to install the spectrum analyzer
- Tells you what to do in case of a failure

Operating and Programming Manual
HP Part Number 08562-90001

- Tells you how to make measurements with your spectrum analyzer
- Tells you how to program your spectrum analyzer
- Describes analyzer features

Pocket Operating Guide
HP Part Number 08562-90003

- An abbreviated version of the Operating and Programming Manual

Quick Reference Guide
HP Part Number 08562-90006

- Provides you with a listing of all remote programming commands

Options:

Support Manual (Part of Option 915)*
HP Part Number 08562-90009

- Describes troubleshooting and repair of the analyzer

* Option 915, Service Documentation, consists of one copy each of the Support Manual, the Installation Manual, the Operating and Programming Manual, the Pocket Operating Guide, and the Quick Reference Guide.

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 Bureau of Standards, to the extent allowed by the Bureau's calibration facility, and to the calibration facilities of the other International Standards Organization members.

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 HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP 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. HP 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. HP 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. Addresses are provided at the back of this manual.

SAFETY SYMBOLS

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

Instruction manual symbol. The instrument will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the instrument against damage. Location of pertinent information within the manual is indicated by use of this symbol in the table of contents.

Indicates dangerous voltages are present. Be extremely careful.

CAUTION

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

WARNING

The WARNING sign 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 sign until the indicated conditions are fully understood and met.

GENERAL SAFETY CONSIDERATIONS

WARNING

BEFORE THIS INSTRUMENT IS SWITCHED ON, make sure it has been properly grounded through the protective conductor of the ac power cable to a socket outlet provided with protective earth contact. Any interruption of the protective (grounding) conductor, inside or outside the instrument, or disconnection of the protective earth terminal can result in personal injury.

WARNING

There are voltages at many points in the instrument which can, if contacted, cause personal injury. Be extremely careful. Any adjustments or service procedures that require operation of the instrument with protective covers removed should be performed only by trained service personnel.

CAUTION

BEFORE THIS INSTRUMENT IS SWITCHED ON, make sure its primary power circuitry has been adapted to the voltage of the ac power source. Failure to set the ac power input to the correct voltage could cause damage to the instrument when the ac power cable is plugged in.

Electrostatic Discharge

Electrostatic discharge (ESD) can damage or destroy electronic components. Therefore, all work performed on assemblies consisting of electronic components should be done at a static-free work station. Figure 1 is 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

These methods may be used together or separately.

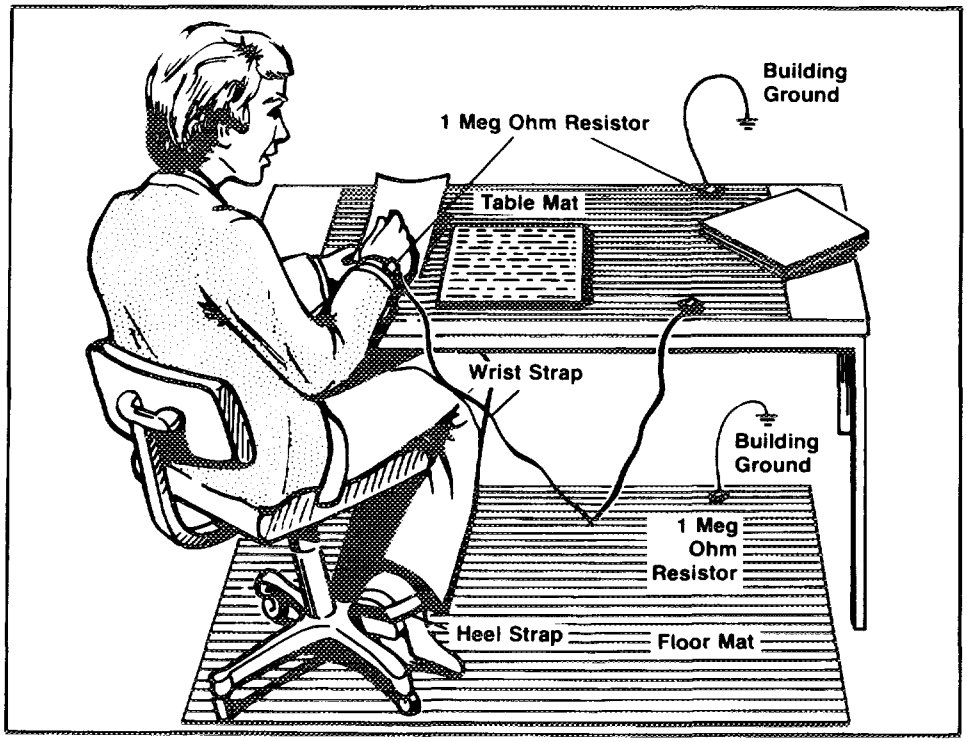


Figure 1. Example of a Static-Safe Work Station

Reducing Damage Caused by ESD

Following are suggestions that may help reduce ESD damage that occurs during testing and servicing operations.

- Before connecting any coaxial cable to an analyzer 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.

Static-Safe Accessories

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

Table 1. Static-Safe Accessories

HP Part Number	Description
Note: The following items can be ordered through any Hewlett-Packard Sales and Service Office.	
9300-0797	3M static control mat, 0.6m x 1.2m (2 ft. x 4 ft.) 4.6m (15 ft.) ground wire wrist strap and attachment cord
9300-0980	Wrist strap cord, 1.5m (5 ft.)
9300-0985	Wrist strap (large)
9300-0986	Wrist strap (small)
9300-1169	ESD heel strap (reusable 6 to 12 months)
9300-0793	Shoe ground strap (one-time use only)
Note: The following ESD accessories can be ordered only from: Hewlett-Packard Company Computer Supplies Operation 1320 Kifer Road Sunnyvale, CA 94086 Phone: (408) 738-8858	
92175A	Black, hard-surface, static control mat, 1.2m x 1.5m (4 ft. x 5 ft.)
92175B	Brown, soft-surface, static control mat, 2.4m x 1.2m (8 ft. x 4 ft.)
92175C	Small, black, hard-surface, static control mat, 1.2m x 0.9m (4 ft. x 3 ft.)
92175T	Tabletop static control mat, 58 cm x 76 cm (23 in. x 30 in.)
92176A	Anti-static carpet, natural color, 1.8m x 1.2m (6 ft. x 4 ft.)
92176B	Anti-static carpet, natural color, 2.4m x 1.2m (8 ft. x 4 ft.)
92176C	Anti-static carpet, russet color, 1.8m x 1.2m (6 ft. x 4 ft.)
92176D	Anti-static carpet, russet color, 2.4m x 1.2m (8 ft. x 4 ft.)

CHAPTER 1

INTRODUCING THE HP 8562A/B

1-1. What You'll Find in This Chapter

1-2. This chapter introduces you to the HP 8562A/B Spectrum Analyzer and its options and accessories that tailor the unit to your specific needs. To acquaint you with the analyzer's full capabilities, the HP 8562A/B specifications and characteristics are also provided.

1-3. Introducing the HP 8562A/B

1-4. The HP 8562A/B μw/RF High-Performance Portable Spectrum Analyzer is a small, lightweight, test instrument that is capable of measuring signals from −119.9 dBm to +30 dBm over a frequency range of 1 kHz to 22 GHz. The HP 8562A provides preselection from 2.75 to 22 GHz, while the HP 8562B is unpreselected. The frequency range of the analyzer can be extended, unpreselected, to 110 GHz using HP 11970 Series mixers and to 325 GHz using other commercially available mixers.

1-5. The HP 8562A/B is a complete, self-contained instrument that needs only an external ac power source for operation. An ac power cable, suitable for use in the country to which the analyzer is originally shipped, is included with the unit.

1-6. Accessories Supplied

1-7. See Figure 1-1 for a complete listing of the accessories supplied with your HP 8562A/B Spectrum Analyzer.

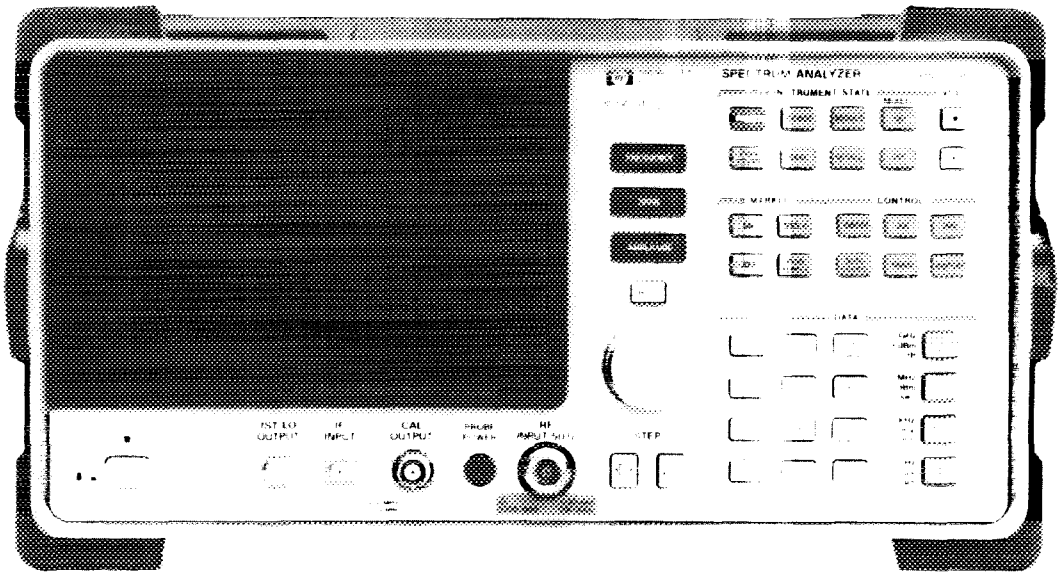
1-8. Options

1-9. Several options are available to tailor the HP 8562A/B to your needs. Options can be ordered by option number when you order the analyzer. Some of the options are also available as kits that can be ordered and installed after you have received your HP 8562A/B.

1-10. Second IF Output (Option 001): This option provides an output for the second IF (310.7 MHz) at rear-panel connector J10.

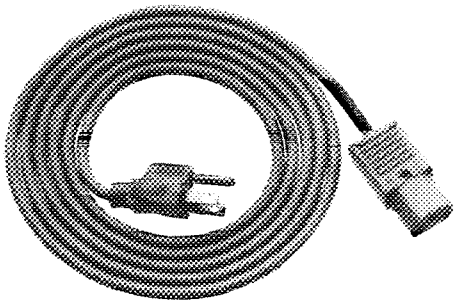
1-11. Rack Mount Flange Kit (Option 908): This option provides the parts necessary to mount the HP 8562A/B in an HP System II cabinet or in a standard 19-inch (482.6-mm) equipment rack. Option 908 is also available as a kit (HP Part Number 5062-0800).

1-12. Rack Mount Flange Kit With Handles (Option 909): Option 909 is the same as Option 908 but includes front handles for added convenience. Option 909 is also available as a kit (HP Part Number 5062-1900).



HP 8562A/B

ADAPTER
HP Part Number 1250-0780



LINE POWER CABLE
(Refer to Table 2-2)

50Ω TERMINATION
HP Part Number 1810-0118

ACCESSORIES SUPPLIED BUT NOT SHOWN:

- Standard Front Cover . . . . . HP 5061-9086
- 23 cm (9 in.) Coax Cable: Type BNC (m) . . . . . HP 10502A
- Fuse: 5A, 250V . . . . . HP 2100-0709
- 4mm Hex (Allen) Wrench . . . . . HP 8710-1755
- Sun Hood . . . . . HP 5180-9055

Figure 1-1. HP 8562A/B with Accessories Supplied

1-13. Additional Manual Set (Option 910): Option 910 provides an additional set of the manuals shipped with the analyzer. This includes an additional copy of the Installation Manual, the Operating and Programming Manual, the Pocket Operating Guide, and the Quick Reference Guide. To order additional manuals after initial shipment, order by the manual part number, which appears on the title page and on the back cover.

1-14. Service Documentation (Option 915): Option 915 provides a copy of the HP 8562A/B Support Manual and an additional set of the manuals shipped with the analyzer. The Support Manual documents the troubleshooting and repair of the analyzer. To obtain a copy of the HP 8562A/B Support Manual after initial shipment, order by the manual part number (HP Part Number 08562-90009).

1-15. Additional Pocket Operating Guide (Option 916): Option 916 provides an additional copy of the HP 8562A/B Pocket Operating Guide. To obtain a copy of the Pocket Operating Guide after initial shipment, order by the manual part number, which appears on the manual's title page.

1-16. Accessories Available

1-17. A number of accessories are available from Hewlett-Packard to help you configure your HP 8562A/B for your specific needs.

1-18. HP 85629A Test and Adjustment Module: The HP 85629A Test and Adjustment Module, when connected to the rear panel of the HP 8562A/B, assists the user in the testing and repairing of the analyzer. Four procedures are made available to the user:

- Functional Tests
- Adjustment Procedures
- Diagnostic (troubleshooting) Procedures
- Automatic Alignment Routines

1-19. The module displays menus, procedures, and results on the spectrum analyzer CRT. During testing with the module, the spectrum analyzer controls other instruments over HP-IB, reads data, and formats that data for the user. In addition to a large program stored in ROM, the module has the necessary hardware for troubleshooting. This includes dc signal injection and detection.

1-20. Camera Adapter: Camera adapter (HP Part Number 5041-7272) enables the use of a camera in making photographs of the display. Compatible with Tektronix C-5C and C-7 cameras.

1-21. Preamplifier: The HP 8447D Preamp provides a minimum of 26 dB gain from 100 kHz to 1.3 GHz to enhance measurements of very low-level signals.

1-22. Preamplifier: The HP 10855A Preamp provides a minimum of 22 dB gain from 2 MHz to 1300 MHz to enhance measurements of very low-level signals. It operates conveniently from the PROBE POWER output of the HP 8562A/B.

1-23. External Harmonic Mixers: The HP 11970 Series harmonic mixers extend the frequency range of the HP 8562A/B up to 110 GHz.

1-24. Close Field Probe: The HP 11940A Close-Field Probe is a small, hand-held, electromagnetic-field sensor. The probe provides repeatable, absolute, magnetic-field measurements from 30 MHz to 1 GHz. When attached to a source, the probe generates a localized magnetic field for electromagnetic interference (EMI) susceptibility testing.

1-25. 75 to 50 ohm Minimum-Loss Pad: The minimum-loss pad, HP Part Number 08562-60047, is a low VSWR device that is required for measurements on 75-ohm devices.

1-26. 75 to 50 ohm Adapter: The HP 11687A allows you to make measurements in 75-ohm systems while retaining amplitude calibration. It is effective over a frequency range of dc to 1300 MHz.

1-27. Microwave Limiter: The HP 11693A Limiter protects the analyzer input circuits from damage due to high power levels and operates over a frequency range of 0.4 to 12.4 GHz.

1-28. HP-IB Cable: Use HP 10833A/B/C/D HP-IB cables.

1-29. Controllers: The HP 8562A/B is fully HP-IB programmable. The preferred controllers are HP 9000 Series 300 computers. Consult your local Hewlett-Packard service representative for other recommended controllers and available software.

1-30. Plotter: The HP ColorPro 7440A Graphics Plotter adds a color printout capability to the HP 8562A/B for permanent records of important measurements. The eight-pen HP ColorPro produces color plots with 0.025-mm (0.001-in.) resolution on either 8.5 × 11-inch paper or transparency film.

1-31. Rack Slide Kit: This kit (HP Part Number 1494-0060) provides the hardware to adapt Rack Mount Kits (Options 908 and 909) for mounting the analyzer on slides in an HP System II cabinet.

1-32. Transit Case: The transit case (HP Part Number 9211-5604) provides extra protection for your HP 8562A/B for frequent travel situations. The HP transit case protects your instrument from hostile environments, shock, vibration, moisture, and impact while providing a secure enclosure for shipping.

1-33. Testmobile: The HP 1008A Testmobile provides a sturdy, mobile, platform for your analyzer.

1-34. Analyzers Covered by This Manual

1-35. This manual applies to analyzers with the serial number prefixes listed under SERIAL NUMBERS on the title page.

1-36. Serial Numbers

1-37. Hewlett-Packard makes frequent improvements to its products to enhance their performance, usability, or reliability. HP service personnel have access to complete records of design changes to each type of equipment, based on the equipment's serial number. Whenever you contact HP about your analyzer, have the complete serial number available to ensure obtaining the most complete and accurate information possible.

1-38. A mylar serial number label is attached to the rear of the analyzer. The serial number has two parts: the prefix (the first four numbers and a letter), and the suffix (the last five numbers). See Figure 1-2.

1-39. The first four numbers of the prefix are a code that identifies the date of the last major design change that is incorporated in your analyzer. The letter identifies the country in which the unit was manufactured. The five-digit suffix is a sequential number and is different for each unit. Whenever you list the serial number or refer to it in obtaining information about your analyzer, be sure to use the complete number, including the full prefix and the suffix.

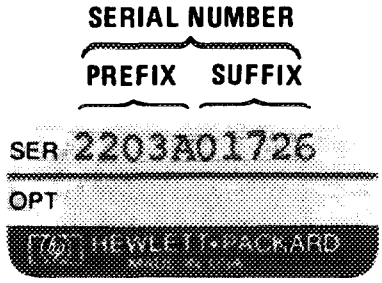


Figure 1-2. Typical Serial Number Label

1-40. Specifications and Characteristics

1-41. Table 1-1 lists the specifications for the HP 8562A/B. Unless stated otherwise, all specifications describe the analyzer's warranted performance under the following conditions:

a) five-minute warmup from ambient conditions
b) autocoupled controls
c) preselector peaked at the signal of interest
d) digital trace display
e) IF ADJ ON
f) REF LVL CAL adjusted
g) 1ST LO OUTPUT terminated in 50 ohms
h) 2ND IF OUTPUT (Option 001 analyzers) terminated in 50 ohms
i) one-year calibration cycle
j) environmental requirements met.

1-42. After a 30-minute warmup, at a temperature range of 20° to 30°C, the preselector does not have to be peaked at each signal of interest; factory preselector peak values are sufficient to meet all specifications.

NOTE

The REF LVL CAL adjustment uses the CAL OUTPUT signal to calibrate the reference level. How often this adjustment should be performed depends on internal temperature changes. Amplitude temperature drift is a nominal 1 dB/10°C. The nominal temperature drift is 10°C, most of which occurs during the first 30 minutes after power-on. Internal temperature equilibrium is reached after two hours of operation at a stable ambient temperature.

1-43. Characteristics provide useful information in the form of typical, nominal, or approximate values for analyzer performance. See Table 1-2 for a list of HP 8562A/B characteristics.

Table 1-1. HP 8562A/B Specifications (2 of 8)

FREQUENCY (Continued)	
Frequency Span	
Range	
Internal Mixing	0 Hz, 10 kHz to 19.25 GHz over the 10-division CRT horizontal axis, variable in approximately 1% increments or in a 1, 2, 5 sequence
External Mixing	Minimum span = 2.5 kHz x N*
Accuracy	$<\pm 5\%$
Resolution Bandwidths (−3 dB)	
Range	100 Hz to 1 MHz selectable in a 1, 3, 10 sequence
Accuracy	
1 MHz resolution bandwidth	$<\pm 25\%$
300 kHz to 300 Hz resolution bandwidth	$<\pm 10\%$
100 Hz resolution bandwidth	$<\pm 30\%$
Selectivity (60 dB/3 dB bandwidth ratio)	<15:1
Bandwidth Shape	Synchronously tuned, 4-pole filters
Video Bandwidth Post-detection low-pass filter averages displayed noise for a smooth trace.	
Range	1 Hz to 1 MHz in a 1, 3, 10 sequence
AMPLITUDE	
MEASUREMENT RANGE	
Maximum Safe Input Power	
Average Continuous Power Input Attenuation $\geq$10 dB	+30 dBm (1 Watt)
Peak Pulse Power Input Attenuation $\geq$30 dB	+50 dBm (100 Watts) for pulse widths <10 µs and <1% duty cycle
DC	0 Volts
Gain Compression With $\leq$−3 dBm at Input Mixer 10 MHz to 22 GHz (Input mixer power = Input power − Input Attenuation)	<1.0 dB

* N is the harmonic mixing mode. The desired 1st LO harmonic is always higher than the tuned frequency by the 1st IF frequency (3.9107 GHz for the 1 kHz to 2.9 GHz band and 310.7 MHz for all other bands).

Table 1-1. HP 8562A/B Specifications (3 of 8)

AMPLITUDE (Continued)		
Displayed Average Noise Level With no signal at input, 100 Hz resolution bandwidth, 1 Hz video bandwidth, and 0 dB input attenuation		
Frequency Range	**HP 8562A**	**HP 8562B**
10 kHz	< −90 dBm	< −90 dBm
100 kHz	< −100 dBm	< −100 dBm
1 MHz to 2.9 GHz	< −121 dBm	< −121 dBm
2.9 GHz to 6.46 GHz	< −121 dBm	< −121 dBm
6.46 GHz to 13.0 GHz	< −110 dBm	< −110 dBm
13.0 GHz to 19.7 GHz	< −105 dBm	< −105 dBm
19.7 GHz to 22.0 GHz	< −100 dBm	< −100 dBm
Spurious Responses		
	HP 8562A	**HP 8562B**
All input-related spurious responses, except as noted below, with ≤ −40 dBm mixer level [1]	< −60 dBc 10 MHz to 6.46 GHz	< −60 dBc 10 MHz to 2.9 GHz
Second Harmonic Distortion		
Frequency Range	**HP 8562A**	**HP 8562B**
10 MHz to 2.9 GHz	< −72 dBc, −40 dBm Mixer Level [1]	< −72 dBc, −40 dBm Mixer Level [1]
2.75 GHz to 22.0 GHz	< −100 dBc, −10 dBm Mixer Level [1]	< −60 dBc, −40 dBm Mixer Level [1]
Third Order Intermodulation Distortion With −30 dBm total power at input mixer [1]		
Frequency Range	**HP 8562A**	**HP 8562B**
10 MHz to 2.9 GHz	< −70 dBc	< −70 dBc
2.75 GHz to 22 GHz	< −75 dBc	< −75 dBc
Image, Multiple, and Out-of-Band Responses		
Frequency Range	**HP 8562A**	**HP 8562B**
10 MHz to 18 GHz	< −70 dBc	unspecified
10 MHz to 22 MHz	< −60 dBc	unspecified
Residual Responses 200 kHz to 6.46 GHz, with no signal at input, 0 dB input attenuation	< −90 dBm	
DISPLAY RANGE		
Amplitude Scale	10 vertical CRT divisions with the reference level (0 dB) at the top graticule line	

[1] Mixer level = Input level − input attenuation

Table 1-1. HP 8562A/B Specifications (4 of 8)

AMPLITUDE (Continued)

DISPLAY RANGE (Continued)

Calibration

Log

10 dB/Div for 90 dB display from reference level

5 dB/Div for 50 dB display expanded from reference level**

2 dB/Div for 20 dB display expanded from reference level

1 dB/Div for 10 dB display expanded from reference level**

Linear

10% of reference level per division when calibrated in voltage

Reference Level Range

Log, adjustable in 0.1 dB steps

Frequency Band	Range (dBm)
10 kHz to 2.9 GHz	−120 to +30
2.75 GHz to 6.46 GHz	−120 to +30
5.86 GHz to 13.0 GHz	−115 to +30
12.4 GHz to 19.7 GHz	−105 to +30
19.1 GHz to 22.0 GHz	−100 to +30

Linear, settable in 1% steps

Frequency Band	Range
10 kHz to 2.9 GHz	2.2 μV to 7.07V
2.75 GHz to 6.46 GHz	2.2 μV to 7.07V
5.86 GHz to 13.0 GHz	4.0 μV to 7.07V
12.4 GHz to 19.7 GHz	12.6 μV to 7.07V
19.1 GHz to 22.0 GHz	22 μV to 7.07V

AMPLITUDE ACCURACY

REFERENCE LEVEL UNCERTAINTY

Frequency Response

With 10 dB input attenuation

In-Band

Frequency Range	HP 8562A	HP 8562B
1 kHz to 2.9 GHz	< ±1.2 dB	< ±1.2 dB
2.9 GHz to 6.46 GHz	< ±2.5 dB	< ±2.0 dB
6.46 GHz to 13.0 GHz	< ±3.5 dB	< ±2.5 dB
13.0 GHz to 19.7 GHz	< ±4.0 dB	< ±3.0 dB
19.7 GHz to 22.0 GHz	< ±4.3 dB	< ±4.3 dB

Referenced to CAL OUTPUT (300 MHz)

1 kHz to 22.0 GHz	< ±5.1 dB	< ±5.1 dB

**These scales are available only in sweep times ≥30 ms (digital display mode).

Table 1-1. HP 8562A/B Specifications (5 of 8)

AMPLITUDE ACCURACY (Continued)		
	HP 8562A	**HP 8562B**
Band Switching Uncertainty Additional uncertainty added to In-Band Frequency Response for measurements between any two bands.	⟨ +0.5 dB	⟨ +0.5 dB
Calibrator Uncertainty (−10 dBm, 300 MHz)	⟨ ±0.3 dB	
Input Attenuator Switching Uncertainty 20 to 70 dB settings, referenced to 10 dB input attenuation		
Frequency Range		
1 kHz to 2.9 GHz	⟨ ±0.6 dB/10 dB step, ±1.8 dB max	
12.4 GHz to 19.4 GHz	⟨ ±1.3 dB/10 dB step, 2.5 dB max	
19.4 GHz to 22.0 GHz	⟨ ±1.8 dB/10 dB step, 3.5 dB max	
IF Gain Uncertainty 0 dBm to −80 dBm reference levels with 10 dB input attenuation	⟨ ±1.0 dB	
Resolution Bandwidth Switching Uncertainty Referenced to 300 kHz resolution bandwidth	⟨ ±0.5 dB	
IF Alignment Uncertainty Uncertainty when using 100 Hz and 300 Hz resolution bandwidths		
300 Hz resolution bandwidth	⟨ ±0.5 dB	
100 Hz resolution bandwidth	⟨ ±2.0 dB	
Pulse Digitization Uncertainty Pulse response mode, PRF ⟩720/sweep time		
Log	⟨ 1 dB peak-to-peak	
Linear	⟨ 4% of reference level peak-to-peak	
SCALE FIDELITY		
Log	⟨ ±0.4 dB/4 dB from reference level to a maximum of ±1.5 dB over 0 to 90 dB range	
Linear	⟨ ±3% of reference level	

Table 1-1. HP 8562A/B Specifications (6 of 8)

SWEEP	
Sweep Time	
Range	
Span = 0	50 µs to <30 ms (analog display)
Span = 0	30 ms to 60 s (digital display)
Span ≥10 kHz	50 ms to 100 s (digital display)
Accuracy (Span = 0)	
Sweep time ≥30 ms	<±1%
Sweep time <30 ms	<±15%
Sweep Trigger	Free Run, Single, Line, Video, External
INPUTS AND OUTPUTS	
IF INPUT	
Connector	SMA female, front panel
Input level for full-screen deflection (external mixing mode, 0 dBm reference level, 30 dB conversion loss)	−30 dBm ±1.5 dB
HP-IB	
Connector	IEEE-488 bus connector
Interface Functions	SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP1, DC1, DT0, C1, C28, E1
Direct Plotter Output	Supports HP 7225A, HP 7440A, HP 7470A, HP 7475A, HP 7550A, HP 9872A/B/C/T
CAL OUTPUT	
Connector	BNC female, front panel
Frequency	300 MHz ±(300 MHz x frequency reference accuracy)
Amplitude	−10 dBm ±0.3 dB
1ST LO OUTPUT	
Connector	SMA female, front panel
Amplitude	+16.5 dBm ±2.0 dB (20°C to 30°C)
10 MHz REF IN/OUT	
Connector	BNC female, rear panel
Frequency	10 MHz ±(10 MHz x frequency reference accuracy)
GENERAL	
Environmental	
Military Specification	Per MIL-T-28800C, Type III, Class 3 Style C as follows:
Calibration Interval	1 year
Warmup	5 minutes from ambient conditions***

*** 2 hours for conditions of internal condensation, 30 minutes to meet frequency response specifications without preselector peaking

Table 1-1. HP 8562A/B Specifications (7 of 8)

GENERAL (Continued)	
Environmental (Continued)	
Temperature	
Operating	−10°C to +55°C
Non-operating	−62°C to +85°C
Humidity	95% at 40°C for 5 days
Altitude	
Operating	15000 feet
Non-operating	50000 feet
Rain Resistance	Drip-proof at 16 liters/hour/square foot
Vibration	
5 to 15 Hz	0.059 inch peak-to-peak excursion
15 to 25 Hz	0.039 inch peak-to-peak excursion
25 to 55 Hz	0.020 inch peak-to-peak excursion
Pulse Shock	
Half Sine	30 g for 11 ms duration
Transit Drop	8-inch drop on 6 faces and 8 corners
Electromagnetic Compatibility	Conducted and radiated interference is in compliance with CISPR publication 11 (1985) and Messempfaenger-Postverfuegung 526/527/79 (Kennzeichnung Mit F-Nummer/Funkschutzzeichen). Meets the requirements of MIL-STD-461B, Part 4, with the exceptions shown below. Conducted Emissions CE01 (Narrowband): 1 kHz to 15 kHz only CE03 (Narrowband): Full limits CE03 (Broadband): 20 dB relaxation from 15 kHz to 100 kHz Conducted Susceptibility CS01: Full limits (limited to 36 Hz for HP 8562B) CS02: Full limits CS06: Full limits Radiated Emissions RE01: 15 dB relaxation to 30 kHz and exceptioned from 30 kHz to 50 kHz RE02: Full limits to 1 GHz Radiated Susceptibility RS01: Full limits RS02: Exceptioned RS03: Limited to 1 V/m from 14 kHz to 1 GHz, with 20 dB relaxation at IF frequencies (30 dB relaxation at IF frequencies for Option 001 instruments)

Table 1-1. HP 8562A/B Specifications (8 of 8)

GENERAL (Continued)

Power Requirements		
115 Vac Operation		
Voltage	90 to 140V rms	
Current	3.2A rms max	
Frequency	47 to 440 Hz	
230 Vac Operation		
Voltage	180 to 250V rms	
Current	1.8A rms max	
Frequency	47 to 66 Hz	
Maximum Power Dissipation	180 Watts	
Weight	**HP 8562A**	**HP 8562B**
	20 kg (44 lbs)	19 kg (41.8 lbs)
Dimensions		
Without handle or cover	184 mm high x 337 mm wide x 460.5 mm deep	
With handle and cover	200 mm high x 373 mm wide x 500 mm deep	

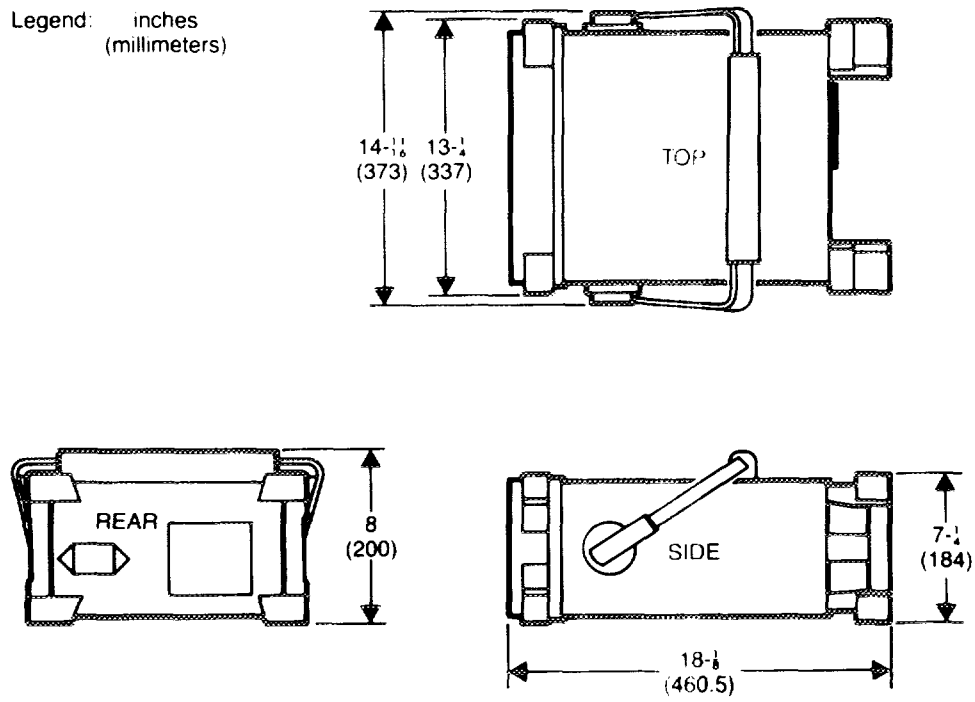


Table 1-2. HP 8562A/B Characteristics (1 of 3)

NOTE: These are not specifications. Characteristics provide useful, but non-warranted, information about instrument performance.

FREQUENCY

Frequency Reference Accuracy	
Aging	$< \pm 1 \times 10^{-6}$/year
Temperature drift (−10°C to +55°C)	$< \pm 2 \times 10^{-6}$
Settability	$< \pm 1 \times 10^{-6}$

DYNAMIC RANGE

Nominal Sensitivity
(100 Hz resolution bandwidth, 1 Hz video bandwidth, 0 dB input attenuation)

Frequency Range	Nominal Sensitivity
1 MHz to 2.9 GHz	−128 dBm
2.9 GHz to 6.46 GHz	−126.5 dBm
6.46 GHz to 13.0 GHz	−119 dBm
13.0 GHz to 19.7 GHz	−114 dBm
19.7 GHz to 22.0 GHz	−108 dBm

AMPLITUDE ACCURACY

Band-to-Band Frequency Response
Frequency response uncertainty for measurements between any two bands. Equivalent to the sum of the two In-Band Frequency Response values plus Band Switching Uncertainty. (Values in parentheses apply to HP 8562B.)

Band-to-Band Frequency Response (dB)

Band	0	1	2	3	4
0	——	4.2 (3.7)	5.2 (4.2)	5.7 (4.7)	6.0 (6.0)
1	4.2 (3.7)	——	6.5 (5.0)	7.0 (5.5)	7.3 (6.8)
2	5.2 (4.2)	6.5 (5.0)	——	8.0 (6.0)	8.3 (7.3)
3	5.7 (4.7)	7.0 (5.5)	8.0 (6.0)	——	8.8 (7.8)
4	6.0 (6.0)	7.3 (6.8)	8.3 (7.3)	8.8 (7.8)	——

Input Attenuator Repeatability: $< \pm 0.2$ dB

Pulse Digitization Uncertainty
(Pulse response mode, PRF >720/sweeptime)
Standard Deviation: <0.2 dB

Table 1-2. HP 8562A/B Characteristics (2 of 3)

NOTE: These are not specifications. Characteristics provide useful, but non-warranted, information about instrument performance.

SWEEP	
Sweep Time Accuracy (Span ≥10 kHz)	<±15%
DEMODULATION	
Spectrum Demodulation Modulation Type Audio Output Marker Pause Time	 AM and FM Internal speaker and phone jack with volume control 100 ms to 65 s
INPUTS AND OUTPUTS	
INPUT 50Ω Connector Type Impedance VSWR (At tuned frequency)	 Precision Type N female, front panel 50 ohms <1.5:1 for <2.9 GHz and ≥10 dB input attenuation <2.3:1 for >2.9 GHz and ≥10 dB input attenuation <3.0:1 for 0 dB input attenuation
LO Emission Level (Average) 10 dB input attenuation	 **HP 8562A** <−70 dBm **HP 8562B** <−10 dBm
IF INPUT Connector Type Impedance Frequency Noise Figure 1 dB Gain Compression Level Full Screen Level (Gain Compression and Full Screen Levels apply with 30 dB conversion loss setting and 0 dBm reference level.)	 SMA female, front panel 50 ohms 310.7 MHz 7 dB −23 dBm −30 dBm
1ST LO OUTPUT Connector Impedance Frequency Range	 SMA female, front panel 50 ohms 3.0000 GHz to 6.8107 GHz
CAL OUTPUT Connector Impedance	 BNC female, front panel 50 ohms
10 MHz REF IN/OUT Connector Impedance Output Amplitude Input Amplitude	 BNC female, rear panel 50 ohms 0 dBm −2 to +10 dBm

Table 1-2. HP 8562A/B Characteristics (3 of 3)

NOTE: These are not specifications. Characteristics provide useful, but non-warranted, information about instrument performance.

INPUTS AND OUTPUTS (Continued)

VIDEO OUTPUT	
Connector	BNC female, rear panel
Impedance (dc coupled)	50 ohms
Amplitude (into 50-ohm load)	0 to +1 Volt full-scale
LO SWP|0.5 V/GHz OUTPUT	
Connector	BNC female, rear panel
Impedance (dc coupled)	2 kohms
LO SWP OUTPUT (no load)	0 to +10V
0.5 V/GHz OUTPUT (no load)	0.5V/GHz of tuned frequency
BLANKING OUTPUT	
Connector	BNC female, rear panel
Amplitude	
During Retrace	Low TTL Level (sink 150 mA max.)
During Sweep	High TTL Level (source 0.5 mA max.)
Maximum Input (High TTL State)	+40V
EXT TRIG INPUT	
Connector	BNC female, rear panel
Impedance	⟩10 kohms
Trigger Level	Rising edge of TTL Level
PROBE POWER (front panel)	
Voltage	+15 Vdc, −12.6 Vdc
Current	150 mA max., each
EARPHONE	
Connector	1/8-inch miniature monophonic jack, rear panel
Power Output	0.25 Watts into 4 ohms
2ND IF OUT *(Option 001 instruments only)*	
Connector	SMA female, rear panel
Impedance	50 ohms
Frequency	310.7 MHz

Frequency Range	3 dB BW	Noise Figure	Conversion Gain
1 kHz to 2.9 GHz	⟩30 MHz	24 dB	−5.6 dB
2.75 GHz to 6.46 GHz	⟩20 MHz	24 dB	−3.6 dB
5.86 GHz to 6.46 GHz	⟩30 MHz	33.6 dB	−3.7 dB
12.4 GHz to 19.7 GHz	⟨30 MHz	39.8 dB	−9.9 dB
19.1 GHz to 22.0 GHz	⟨35 MHz	44.4 dB	−14.8 dB

CHAPTER 2

PREPARATION FOR USE

2-1. What You'll Find in This Chapter

2-2. This chapter describes the process of getting the HP 8562A/B ready to use. The process includes initial inspection procedures, setting up the unit for the selected ac power source, and performing the trace alignment and reference level calibration procedures.

2-3. Initial Inspection

2-4. 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 analyzer mechanically and electrically.

2-5. The contents of the shipment are shown in Figure 1-1 and Figure 2-1 and their accompanying legends. If the contents are incomplete or if the analyzer does not pass the operation verification tests (procedures are provided in Chapter 3), 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.

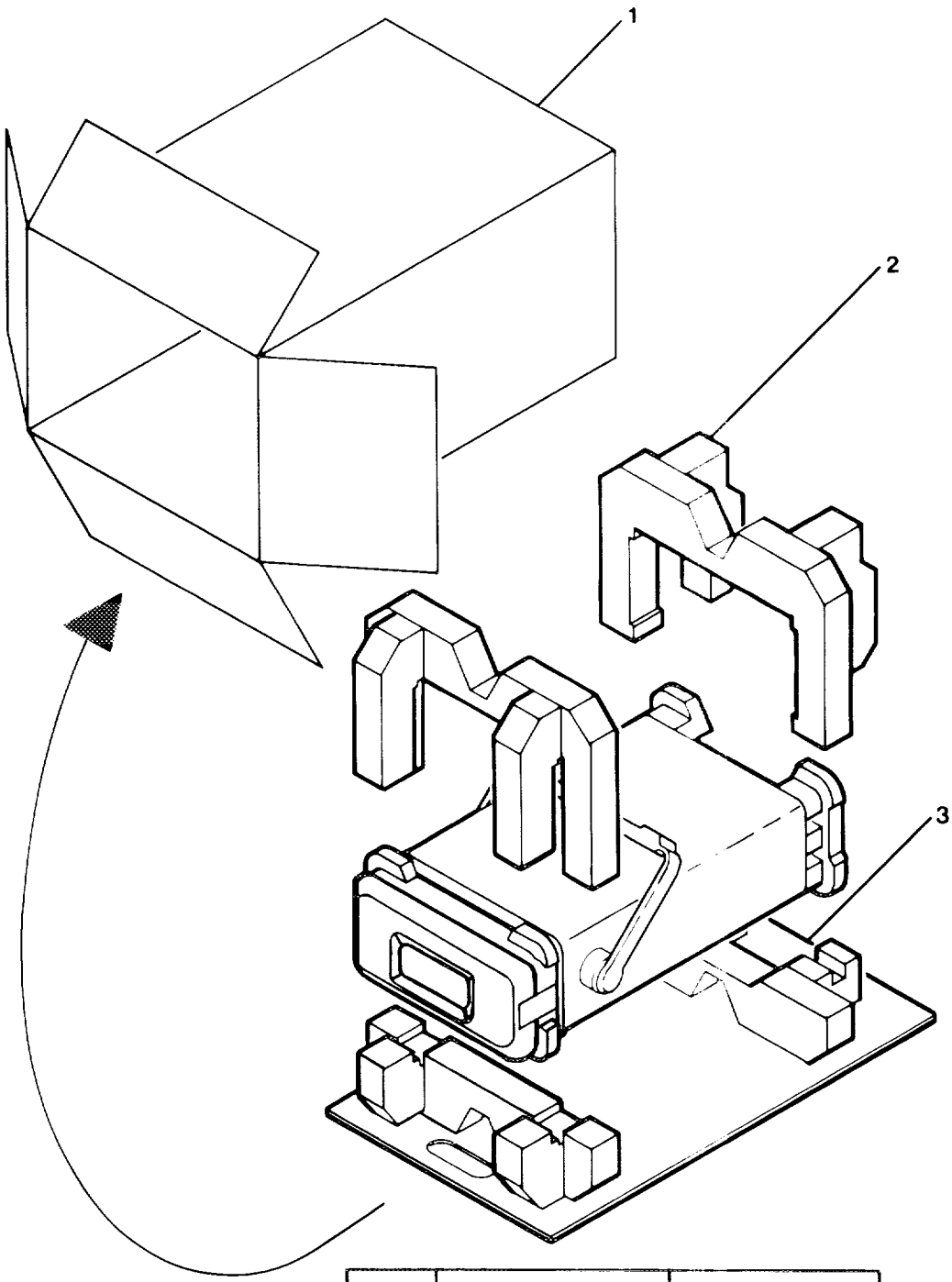
2-6. If the shipping container and cushioning material are in good condition, retain them for possible future use. You may wish to ship the analyzer to another location or to return it to Hewlett-Packard for service. Chapter 4 provides instructions for repackaging and shipping the analyzer.

2-7. Preparing the HP 8562A/B for Use

2-8. The HP 8562A/B is a portable instrument and requires no physical installation other than connection to a source of ac power. If you want to install your HP 8562A/B in an HP System II cabinet or a standard 19-inch (486.2-mm) equipment rack, complete instructions are provided in the Options 908 and 909 Rack Mounting Kits.

CAUTION

DO NOT connect ac power until you have verified that the line voltage is correct, the proper fuse is installed, and the line voltage selector switch is properly positioned, as described in the following paragraphs. Damage to the equipment could result.



Item	Description	Part Number
1	Outer Carton	9211-5636
2	Pads (2)	08590-80013
3	Bottom Tray	08590-80014

Figure 2-1. HP 8562A/B Shipping Container and Contents

2-9. Power Requirements

2-10. The power requirements for the HP 8562A/B are listed in Table 2-1.

Table 2-1. Power Requirements

Line Input	Power Requirements
115 Vac Operation	
Line Voltage	90–140V rms
Current	3.2A rms max.
Frequency	47–440 Hz
230 Vac Operation	
Line Voltage	180–280V rms
Current	1.8A rms max.
Frequency	47–66 Hz

2-11. Setting the Line Voltage Selector Switch

CAUTION

BEFORE CONNECTING the HP 8552A/B to the power source, you must set the rear-panel voltage selector switch correctly to adapt the HP 8562A/B to the power source. An improper selector switch setting can damage the analyzer when it is turned on.

2-12. Set the instrument's rear-panel voltage selector switch to the line voltage range (115V or 230V) corresponding to the available ac voltage. See Figure 2-2. Insert a small screwdriver or similar tool in the slot and slide the switch so that the proper voltage label is visible.

2-13. Checking the Fuse

2-14. The type of ac line input fuse will depend on the input line voltage. Use the following fuses:

115V operation: . . . . . 5A 125V UL/CSA (HP Part Number 2110-0756)

230V operation: . . . . . 5A 250V IEC (HP Part Number 2110-0709)

2-15. The line fuse is housed in a small container located on the rear-panel power connector. See Figure 2-2. The container provides space for storing a spare fuse, as shown in the figure.

2-16. To check the fuse, insert the tip of a screwdriver in the slot at the top of the container and pry gently to remove the container. When installing a new fuse, be sure to place the fuse in the proper position as illustrated in Figure 2-2.

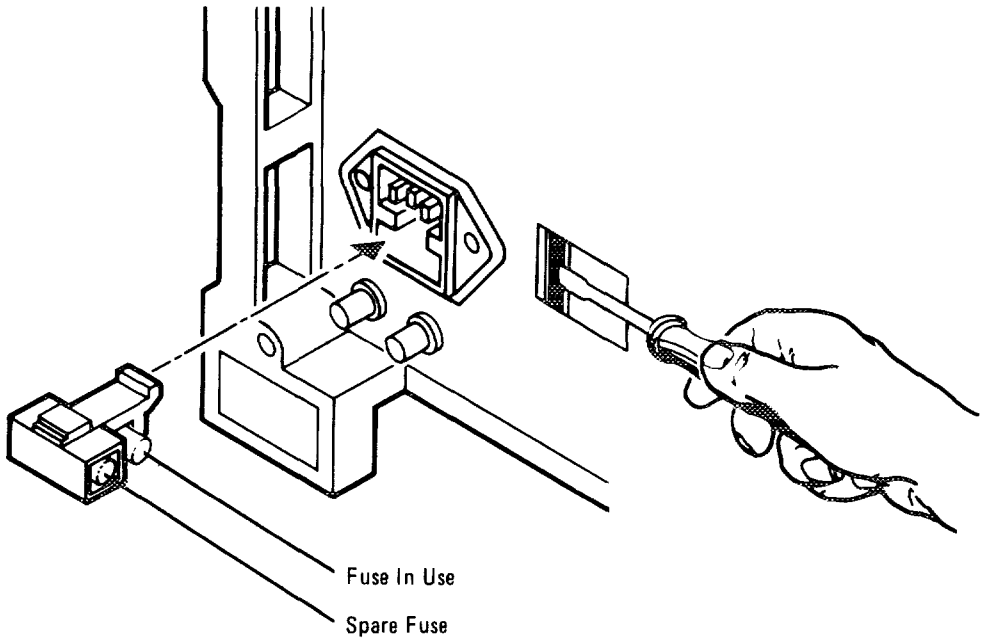


Figure 2-2. Voltage Selection Switch and Line Fuse Locations

2-17. Power Cable

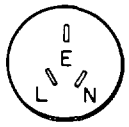
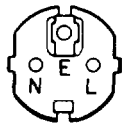
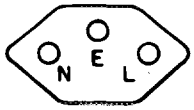
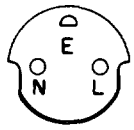
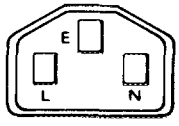
2-18. The HP 8562A/B is equipped with a three-wire power cable, in accordance with international safety standards. When connected to an appropriate power line outlet, this cable grounds the instrument cabinet.

WARNING

Failure to ground the analyzer properly can result in personal injury. Before turning on the HP 8562A/B, you must connect its protective earth terminals to the protective conductor of the main power cable. Insert the main power cable plug only into a socket outlet that has a protective earth contact. DO NOT defeat the earth-grounding protection by using an extension cable, power cable, or autotransformer without a protective ground conductor. If you are using an autotransformer, make sure its common terminal is connected to the protective earth contact of the power source outlet socket.

2-19. Various power cables are available to connect the HP 8562A/B to the types of ac power outlets unique to specific geographic areas. The cable appropriate for the area to which the analyzer is originally shipped is included with the unit. You can order additional ac power cables for use in different areas. Table 2-2 lists the available ac power cables, illustrates the plug configurations, and identifies the geographic area in which each cable is appropriate.

Table 2-2. 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 8120-1703	Straight*BS1363A 90°	229 (90) 229 (90)	Mint Gray Mint Gray	Great Britain, Cyprus, Nigeria, Rhodesia, Singapore, So. Africa, India
250V 	8120-1369 8120-0696	Straight*NZSS198/ASC112 90°	201 (79) 221 (87)	Gray Gray	Australia, New Zealand
250V 	8120-1689 8120-1692	Straight*CEE7-Y11 90°	201 (79) 201 (79)	Mint Gray Mint Gray	East and West Europe, Saudi Arabia, United Arab Republic (unpolarized in many nations)
125V 	8120-1348 8120-1398 8120-1754	Straight*NEMA5-15P 90° Straight*NEMA5-15P	203 (80) 203 (80) 91 (36)	Black Black Black	United States Canada, Japan (100 or 200V), Mexico, Phillipines, Taiwan
	8120-1378 8120-1521 8120-1676	Straight*NEMA5-15P 90° Straight*NEMA5-15P	203 (80) 203 (80) 91 (36)	Jade Gray Jade Gray Jade Gray	
250V 	8120-2104	Straight*SEV1011 1959-24507 Type 12	201 (79)	Gray	Switzerland
220V 	8120-0698	Straight*NEMA6-15P			
250V 	8120-1860	Straight*CEEE22-VI			

* Part number shown 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.

2-20. Turning the HP 8562A/B On for the First Time

2-21. When you turn the analyzer on for the first time, you should perform the following trace alignment and reference level calibration procedures. The HP-IB address may also be set if needed. Perform the following three steps before continuing with the procedures:

1. Press the LINE key.

2. The analyzer will take about half a minute to perform a series of self diagnostic and calibration routines. Upon completion of the routines, the screen displays the analyzer's model number (HP 8562A/B) and the firmware date (for example, 29.9.86 indicates September 29, 1986). Record the firmware date and keep it for reference. If you should ever need to call HP for service or with any questions regarding your analyzer, it will be helpful to have the firmware date readily available.

3. Allow the analyzer to warm up for five minutes. See the warmup specification in Table 1-1.

2-22. Trace Alignment Procedure

1. Press the PRESET key, the RECALL key, [MORE], and [CRT ADJ].

2. Adjust the rear-panel TRACE ALIGN until the leftmost line of the test pattern is parallel with the CRT bezel. See Figure 2-3.

3. Adjust the rear-panel X POSN until the leftmost "@" characters and the softkey labels appear just inside the left and right edges of the CRT bezel.

4. Adjust the rear-panel Y POSN until the softkey labels align with their appropriate softkeys.

5. Press the PRESET key to return the analyzer to normal operation.

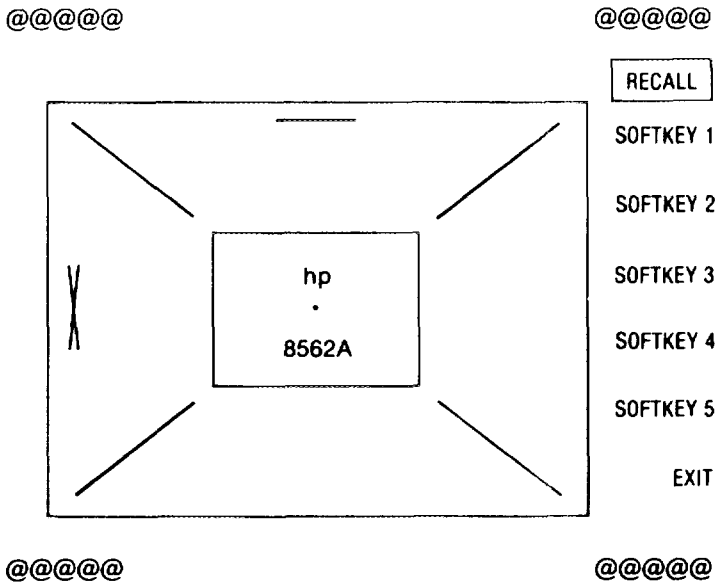


Figure 2-3. CRT Adjustment Pattern

2-23. Reference Level Calibration

1. Press the PRESET key.

2. Connect a 50-ohm coaxial cable (such as HP 10503A) between the front-panel CAL OUTPUT and RF INPUT 50Ω connectors.

3. Set the analyzer's center frequency to 300 MHz by pressing the FREQUENCY key, the 3 key, the 0 key, the 0 key, and the MHz key.

4. Set the analyzer's span to 20 MHz by pressing the SPAN key, the 2 key, the 0 key, and the MHz key.

5. Press the PEAK SEARCH key.

6. Set the analyzer's reference level to −10 dBm by pressing the AMPLITUDE key, the 1 key, the 0 key, and the −dBm key.

7. Press [MORE] and [REF LVL CAL].

8. Rotate the analyzer's front-panel knob until the marker (MKR) reads −10.00 dBm ±0.17 dB. There is a slight delay in time between the adjusting of the knob and the change in marker value. Notice that the REF LEVEL CAL value displayed on the screen changes.

9. Press [STORE REF LVL].

10. Press the PRESET key.

2-24. HP-IB Address Selection

1. The HP-IB address for the analyzer is preset at the factory to a decimal value of 18. Valid address values range from 0 to 31. To view the HP-IB address, press the PRESET key and [HPIB ADDRESS].

2. To change the address value, enter the new address number using the front-panel data keys, and terminate the entry by pressing a units key. For example, enter an address of 18 by pressing the PRESET key, [HPIB ADDRESS], the 1 key, the 8 key, and the Hz key.

3. Press the PRESET key.

2-25. When the trace alignment and reference level calibration procedures have been completed successfully, the analyzer is ready for normal operation.

CHAPTER 3

PERFORMANCE TESTS

3-1. What You'll Find in This Chapter

3-2. This chapter contains 22 test procedures which test the electrical performance of the HP 8562A/B Spectrum Analyzer against the specifications in Table 1-1. None of the test procedures require removing the cover of the spectrum analyzer. This chapter also provides instructions on using the HP 85629A functional tests.

3-3. What is Performance Verification?

3-4. The highest-level testing, called Performance Verification, verifies that analyzer performance is within all specifications of Table 1-1. It is time-consuming and requires extensive test equipment. Performance Verification consists of all the performance tests. See Table 3-1 for a complete listing of the performance tests.

Table 3-1. Performance Tests

Paragraph Number	Name
3-24	10 MHz Reference Output Accuracy
3-25	Calibrator Amplitude and Frequency Accuracy
3-26	Displayed Average Noise Level
3-27	Resolution Bandwidth Switching and IF Alignment Uncertainty
3-28	Resolution Bandwidth Accuracy and Selectivity
3-29	Input Attenuator Accuracy
3-30	IF Gain Uncertainty
3-31	Scale Fidelity
3-32	Residual FM
3-33	Noise Sidebands
3-34	Image, Multiple, and Out-of-Band Responses
3-35	Frequency Readout Accuracy/Frequency Count Marker Accuracy
3-36	Pulse Digitization Uncertainty
3-37	Second Harmonic Distortion
3-38	Frequency Response
3-39	Frequency Span Accuracy
3-40	Third Order Intermodulation Distortion
3-41	Gain Compression
3-42	First LO Output Amplitude
3-43	Sweep Time Accuracy
3-44	Residual Responses
3-45	IF Input Amplitude Accuracy

3-5. What is Operation Verification?

3-6. Operation Verification consists of a subset of the performance tests which test only the most critical specifications of the analyzer. It requires much less time and equipment than the Performance Verification and is recommended for verification of overall instrument operation, either as part of incoming inspection or after repair. Operation Verification consists of the following performance tests:

3-24. 10 MHz Reference Output Accuracy
3-25. Calibrator Amplitude and Frequency Accuracy
3-26. Displayed Average Noise Level
3-27. Resolution Bandwidth Switching Uncertainty
3-28. Resolution Bandwidth Accuracy and Selectivity
3-29. Input Attenuator Accuracy
3-30. IF Gain Uncertainty
3-31. Scale Fidelity
3-32. Residual FM
3-33. Noise Sidebands
3-35. Frequency Readout Accuracy/Frequency Count Marker Accuracy
3-37. Second Harmonic Distortion
3-38. Frequency Response

3-7. Before You Start

3-8. There are three things you must do **before** starting Performance Verification or Operation Verification:

1. Switch the analyzer on and let it warm up in accordance with the warmup specification in Table 1-1.

2. After the analyzer has warmed up as specified, perform the Trace Alignment Procedure and Reference Level Calibration contained in Chapter 2, "Preparation for Use." See paragraphs 2-22 and 2-23.

3. Read the rest of this section before you start any of the tests.

3-9. Test Equipment You'll Need

3-10. Table 3-5 lists the recommended test equipment for the performance tests. Any equipment that meets the critical specifications given in the table can be substituted for the recommended model(s). The table also lists the recommended equipment for the analyzer's adjustment procedures which are located in the HP 8562A/B Support Manual.

3-11. Recording the Test Results

3-12. Record the test results in the Performance Test Record, Table 3-38, located at the end of this chapter. The table lists test specifications and acceptable limits. We recommend that you make a copy of this table, record the complete test results on the copy, and keep the copy for your calibration test record. This record could prove valuable in tracking gradual changes in test results over long periods of time.

3-13. If the Analyzer Doesn't Meet Specifications

3-14. If the analyzer doesn't meet one or more of the specifications, complete any remaining tests and record all test results on a copy of the test record. Then refer to Chapter 4, "Help?", for instructions on how to solve the problem. If an error message is displayed, press the PRESET key and [REALIGN LO & IF]. If the error message persists after the automatic RF, LO, and IF adjustments are completed, refer to Appendix A.

3-15. Calibration Cycle

3-16. To ensure that the HP 8562A/B meets the specifications listed in Table 1-1, Performance Verification should be performed every 12 months.

3-17. HP 85629A Functional Tests

3-18. The HP 85629A Test and Adjustment Module (TAM) can be used to perform several automatic functional tests on the HP 8562A/B Spectrum Analyzer. These tests provide increased confidence in analyzer operation while requiring very little equipment or operator attention. Hard copy results are possible with an HP-IB printer. Because these functional tests have greater measurement uncertainties than their related performance tests, they should not be used as part of a calibration. The greater measurement uncertainties in the functional tests are a result of the limited set of test equipment.

3-19. Table 3-2 lists the Functional Tests, their corresponding Performance Tests, and the types of test equipment required for each test. The recommended test equipment for the Functional Tests is indicated in Table 3-5 with the letter "M" placed in the "Use" column.

Table 3-2. TAM Functional Tests

Functional Test	Corresponding Performance Test	Equipment Required
Noise Sidebands	3-33	None
Residual FM	3-32	None
IF Gain Uncertainty	3-30	Source
Scale Fidelity	3-31	Source
Input Attenuator Accuracy	3-29	Source
Frequency Marker Accuracy	3-35	Source
Image, Mult, Out-of-Band Resp	3-34	Source
RES BW Accy & Selectivity	3-27, 3-28	Source, 20 dB Pad
2nd Harmonic Distortion	3-37	Source, 50 MHz LPF
Frequency Span Accuracy	3-39	Source
Gain Compression	3-41	Source
T.O.I. Distortion	3-40	Source
Frequency Response	3-38	Source, Power Meter
1ST LO OUTPUT Amplitude	3-42	Power Meter
Displayed Average Noise Level	3-26	50Ω Termination
Residual Responses	3-44	50Ω Termination

3-20. Spectrum Analyzer/ TAM Compatibility

3-21. Table 3-3 lists the compatibility rating of each analyzer serial prefix for each TAM firmware revision. A rating of 10 indicates that the analyzer and TAM are fully compatible. If the rating is less than 10, the TAM can still be used, but the results of one or more of the tests will be invalid. Refer to Table 3-4 to determine which tests are valid for a particular TAM firmware revision. Make sure the analyzer's serial prefix matches the serial prefix listed on the table. New tables will be provided for analyzers with serial prefixes not listed on this manual's title page.

Table 3-3. Functional Test Compatibility Matrix

HP 8562A/B Serial Prefix(es)*	Compatibility Rating** HP 85629A Firmware Revision												
	A	B	C	D	E	F	G	H	I	J	K	L	M
2642A (A)	10												
2640A (B)	10												

* (A) identifies serial prefixes for HP 8562A analyzers; (B) identifies serial prefixes for HP 8562B analyzers.

** Compatibility is rated on a scale of 0 to 10 (0 = incompatible; 10 = fully compatible).

3-22. Running the Functional Tests

3-23. Connect the TAM to the rear panel of the HP 8562A/B. The HP 8562A/B should be allowed to warm up for at least five minutes before running any functional test. Perform the following steps to run the tests:

1. Perform a REF LVL CAL (reference level calibration) as described in Chapter 2, paragraph 2-23, before continuing.

2. Press the MODULE key to select the TAM's main menu. If any error message appears refer to the Error Message section of the HP 85629A Test and Adjustment Module Supplement. Error messages will be displayed either in the lower right-hand corner of the CRT, on the bottom line of the main menu, or in the active function area.

Table 3-4. Functional Test Validity Matrix

HP 8562A/B Serial Prefix: HP 8562A: 2642A
HP 8562B: 2640A

Functional Test	Functional Test Validity* HP 85629A Firmware Revision								
	A	B	C	D	E	F	G	H	I
Noise Sidebands	V								
Residual FM	V								
IF Gain Uncertainty	V								
Scale Fidelity	V								
Input Attenuator Accuracy	V								
Frequency Marker Accuracy	V								
Image, Mult, Out-of-Band Resp	V								
RES BW Accy & Selectivity	V								
2nd Harmonic Distortion	V								
Frequency Span Accuracy	V								
Gain Compression	V								
T. O. I. Distortion	V								
Frequency Response	V								
1ST LO OUTPUT Amplitude	V								
Displayed Average Noise Level	V								
Residual Responses	V								

* V = Test results are valid; I = Test results are invalid.

3. Press [Config] to enter the configuration menu and verify that the TAM is properly configured and that any test equipment is properly connected to the HP-IB. Refer to the System Configuration Menu section of the TAM Supplement for more information on configuring external test equipment. If a printer is configured and available, Functional Test results will be sent to the printer instead of the screen. If everything is properly configured, return to the main menu and press [Test].

4. Pressing [All Test] executes all the tests listed in the order shown. If only one test is to be performed, rotate the knob until the arrow points to the desired test and press [Execute].

5. The [Repeat] mode can be used to find suspected intermittent problems. If a printer is configured and connected to HP-IB, [Repeat] will perform the selected test continuously until [Abort] is pressed. The results will be sent to the printer. If a printer is not available, the [Repeat] test mode will pause at the end of each execution of the test to display the results. Testing will continue after pressing [Return]. This sequence will continue until [Abort] is pressed.

Table 3-5. Recommended Test Equipment (1 of 4)

Instrument	Critical Specifications for Equipment Substitution	Recommended Model	Use*
Synthesized Sweeper	Frequency Range: 10 MHz to 22 GHz Frequency Accy (CW): 1 X 10^{-9}/day Leveling Modes: Internal and External Modulation Modes: AM and Pulse Power Level Range: −35 to +16 dBm (2 required)	HP 8340A**	P,A,T,M,V
Synthesizer/ Level Generator	Frequency Range: 1 kHz to 80 MHz Frequency Accy: 1 X 10^{-7}/mo Flatness: ±0.15 dB Attenuator Accuracy: ⟨ ±0.9 dB	HP 3335A**	P,T,M,V
Synthesized Signal Generator	Frequency Range: 100 kHz to 2.5 GHz Residual SSB Phase Noise at 10 kHz offset (320 MHz⟨ fc ⟨ 640 MHz): ⟨ −131 dBc/Hz	HP 8663A	P,V
Pulse/Function Generator	Frequency Range: 10 kHz to 50 MHz Pulse Width: 200 ns Output Amplitude: 5V Pk-to-Pk Functions: Pulse and Triangle TTL Sync Output	HP 8116A	P
AM/FM Signal Generator	Frequency Range: 1 MHz to 200 MHz Frequency Modulation Mode Modulation Oscillator Frequency: 1 kHz FM Peak Deviation: 5 kHz	HP 8640B	A
Microwave Frequency Counter	Frequency Range: 9 MHz to 22 GHz Timebase Accy (Aging): ⟨5 X 10^{-10}/day	HP 5343A** Opt 001	P,A,M,V
Universal Counter	Modes: TI A→B, Frequency Count Time Interval Measurement Range: 45 us to 120 s. Timebase Accy (Aging): ⟨3 X 10^{-7}/mo	HP 5316A	P
Oscilloscope	Bandwidth (3 dB): dc to 100 MHz Minimum Vertical Deflection Factor: ≤2 mV/div	HP 1980A/B**	A
Measuring Receiver	Compatible with Power Sensors dB Relative Mode Resolution: 0.01 dB Reference Accuracy: ⟨ ±1.2%	HP 8902A**	P,A,T,M,V
Power Sensor	Frequency Range: 250 MHz to 350 MHz Power Range: 100 nW to 10 μW Maximum SWR: 1.15 (250 to 350 MHz)	HP 8484A	P,A

*P = Performance Tests; A = Adjustments; M = Test and Adjustment Module; T = Troubleshooting; V = Operation Verification
**Part of Microwave Workstation

Table 3-5. Recommended Test Equipment (2 of 4)

Instrument	Critical Specifications for Equipment Substitution	Recommended Model	Use*
Power Sensor	Frequency Range: 100 kHz to 2.9 GHz Maximum SWR: 1.1 (1 MHz to 2.0 GHz) 1.30 (2.0 GHz to 2.9 GHz)	HP 8482A**	P,A,T,M,V
Power Sensor	Frequency Range: 50 MHz to 22 GHz Maximum SWR: 1.15 (50 to 100 MHz) 1.10 (100 MHz to 2 GHz) 1.15 (2.0 to 12.4 GHz) 1.20 (12.4 to 18 GHz) 1.25 (18 to 22 GHz)	HP 8485A**	P,A,T,M,V
Amplifier	Frequency Range: 300 to 350 MHz VSWR: 〈2.2 1 dB Gain Compression Point: 〉+15 dBm Gain ≥20 dB	HP 8447E	P,A,V
Amplifier	Frequency Range: 2.0 to 8.0 GHz Minimum Output Power (Leveled): 2.0 to 8.0 GHz: +16 dBm Output SWR (Leveled): 〈1.7	HP 11975A	P
Digital Voltmeter	Range: −15 Vdc to +120 Vdc Accuracy: 〈±1 mV on 10V Range Input Impedance: ≥1 Megohm	HP3456A**	A
DVM Test Leads	≥36 inches long, alligator clips, probe tips	HP 34118A	A,T
10 dB Step Attenuator	Attenuation Range: 30 dB Frequency Range: dc to 80 MHz Connectors: BNC female	HP 355D	P,V
1 dB Step Attenuator	Attenuation Range: 12 dB Frequency Range: dc to 80 MHz Connectors: BNC female	HP 355C	P,V,A
20 dB Fixed Attenuator	Frequency Range: dc to 18 GHz Attenuation Accy: 〈±1 dB Maximum SWR: 1.2 (dc to 8 GHz) 1.5 (12.4 to 18 GHz)	HP 8491B Opt 020	P,V
10 dB Fixed Attenuator	Frequency Range: dc to 18 GHz Attenuation Accy: 〈±0.6 dB Maximum SWR: 1.2 (dc to 8 GHz) 1.5 (12.4 to 18 GHz)	HP 8491B Opt 010	P,V
10 dB Fixed Attenuator	Frequency Range: dc to 22 GHz Attenuation Accy: 〈±0.3 dB Maximum SWR: 1.25 (12.4 to 22 GHz)	HP 8493C Opt 010	P,V
Signature Multimeter	Clock Frequency 〉10 MHz	HP 5005A/B	

*P = Performance Tests; A = Adjustments; M = Test and Adjustment Module; T = Troubleshooting; V = Operation Verification
**Part of Microwave Workstation

Table 3-5. Recommended Test Equipment (3 of 4)

Instrument	Critical Specifications for Equipment Substitution	Recommended Model	Use*
Reference Attenuator	Supplied with HP 8484A	HP 11708A	P,A
Termination	Frequency Range: dc to 22 GHz Impedance: 50 ohms Maximum SWR: ⟨1.22 Connector: APC 3.5	HP 909D	P,M,V
Low Pass Filter	Cutoff Frequency: 50 MHz Rejection at 65 MHz: ⟩50 dB	HP 0955-0306	P,M,V
Low Pass Filter	Cutoff Frequency: 4.1 GHz Rejection at 5.1 GHz: ⟩50 dB (2 required)	HP 360D	P,V
Double Balanced Mixer	Maximum Conversion Loss: 9 dB Frequency Range: 5 to 350 MHz Conversion Compression: 0.3 dB for 0dBm signal at RF port Harmonic Distortion: ⟨−30 dBc	HP 10514A	P,V
Directional Coupler	Frequency Range: 1.7 to 22 GHz Coupling: 16.0 dB (nominal) Max Coupling Deviation: ±1 dB Directivity: 14 dB minimum Flatness: 0.75 dB maximum VSWR: ⟨1.45 Insertion Loss: ⟨1.3 dB	HP 0955-0125	P
Power Splitter	Frequency Range: 1 kHz to 22 GHz Insertion Loss: 6 dB (nominal) Output Tracking: ⟨0.25 dB Equivalent Output SWR: ⟨1.22	HP 11667B	P,A,M,V
RF Detector	Frequency Range: 0.1 to 1.2 GHz Maximum SWR: ⟨1.3 (typical) Low Level Sensitivity: ⟩0.35 mV μW	HP 8471A	A
Product Support Kit	No Substitute	HP 08562-60021	A
Adapter	Type N (f) to BNC (m)	HP 1250-1477	P,V
Adapter	Type N (m) to BNC (f) (3 required)	HP 1250-1476	P,A,M,V
Adapter	Type N (f) to APC 3.5 (m)	HP 1250-1750	A
Adapter	Type N (m) to SMA (f)	HP 1250-1250	P,V
Adapter	Type N (m) to APC 3.5 (m) (2 required)	HP 1250-1743	P,M,V,A
Adapter	Type N (m) to APC 3.5 (f)	HP 1250-1774	P,V,A
Adapter	Type N (f) to BNC (f)	HP 1250-1474	P,V

*P = Performance Tests; A = Adjustments; M = Test and Adjustment Module; T = Troubleshooting;
V = Operation Verification

Table 3-5. Recommended Test Equipment (4 of 4)

Instrument	Critical Specifications for Equipment Substitution	Recommended Model	Use*
Adapter	Type N (f) to SMA (f)	HP 1250-1772	P,A
Adapter	BNC (f) to BNC (f)	HP 1250-0059	A
Adapter	BNC Tee (f), (m), (f)	HP 1250-0781	P,A,M,V
Adapter	BNC (f) to SMA (m)	HP 1250-1200	P,A,V
Adapter	Type N (f) to APC 3.5 (f) (2 required)	HP 1250-1745	P,V
Adapter	APC 3.5 (f) to APC 3.5 (f) (2 required)	HP 5061-5311	P,M,V,A
Adapter	BNC (f) to Dual Banana Plug	HP 1251-2816	A
Cable	RG-214/U with Type N (m) connectors Length: ≥36 inches	HP 11500A	P,V
RF Cable	Semi-rigid 50 ohm cable, SMA (m) connectors, length 6 to 8 inches	HP 11975-20002	P
Cable	48 inch 50 ohm Coaxial cable with BNC (m) connectors on both ends (5 required)	HP 10503A	P,A,V
Cable	Frequency Range: 1 kHz to 22 GHz Maximum SWR: <1.4 at 22 GHz Length: ≥61 cm (24 inches) (2 required) Connectors: SMA (m) both ends Maximum Insertion Loss: 2 dB	HP 8120-1578	P,A,M,V
Cable	HP-IB (Required for using Performance Test Software and using HP 85629A Test and Adjustment Module Length: 2 m (6.6 feet) (12 required)	HP 10833B	P,A,M
Test Cable	Connectors: BNC (m) to SMB (f) Length: ≥61 cm (24 inches)	HP 85680-60093	A,M
Controller	Required for using Performance Test Software. No Substitute	HP 9816A, HP 9826A, HP 9836A/C, HP 310, or HP 320	P
Spectrum Analyzer	Frequency Range: 1 MHz to 7 GHz	HP 8566A/B	A,T
Power Supply	Output Voltage: ≥24 Vdc Output Voltage Accuracy: < ±0.2V	HP 6114A	A
Tuning Tool	N/A	HP 8710-1010	A

*P = Performance Tests; A = Adjustments; M = Test and Adjustment Module; T = Troubleshooting; V = Operation Verification

3-24. 10 MHz Reference Output Accuracy

SPECIFICATION

Frequency: $<\pm 4 \times 10^{-6}$/year

RELATED ADJUSTMENT

10 MHz Frequency Reference Adjustment

DESCRIPTION

The 10 MHz reference signal is measured for frequency accuracy by measuring the frequency of the 300 MHz CAL OUTPUT signal. The CAL OUTPUT signal is referenced to the 10 MHz reference. Measuring the CAL OUTPUT signal yields higher resolution than measuring the 10 MHz reference directly.

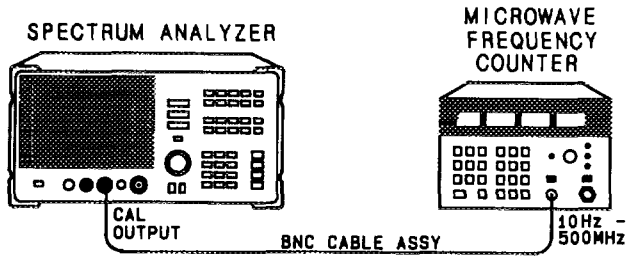


Figure 3-1. Frequency Reference Accuracy Test Setup

EQUIPMENT

Microwave Frequency Counter . . . . . HP 5343A

Cables:
BNC, 122 cm (48 in.) . . . . . HP 10503A

PROCEDURE

1. Connect the equipment as shown in Figure 3-1.

2. Set the HP 5343A controls as follows:

SAMPLE RATE	Midrange
50Ω–1 MΩ SWITCH	50Ω
10 Hz–500 MHz/500 MHz–26.5 GHz SWITCH	10 Hz–500 MHz

NOTE

The HP 5343A should have either an Option 001 timebase or be connected to a house standard with an aging rate better than 5 x 10^{-10}/day.

3. On the HP 8562A/B, press the PRESET key.

NOTE

The HP 8562A/B must be allowed to warm up for at least ten minutes with the frequency reference set to INTERNAL. If the HP 8562A/B has warmed up but the frequency reference has been set to EXTERNAL, wait at least five minutes after pressing [PRESET] before proceeding with step 4.

4. Wait for the frequency counter to settle. This may take two or three gate times.

5. Read the frequency counter display. The frequency should be within the following limits (±4 ppm with standard timebase):

299.998800 MHz ≤ _____ ≤ 300.001200 MHz

NOTE

The frequency reading will be invalid if any error message is displayed, especially a synthesizer-related error message.

3-25. Calibrator Amplitude and Frequency Accuracy

SPECIFICATION

Amplitude: −10 dBm ±0.3 dB
Frequency: 300 MHz ±1.2 kHz (using standard timebase)

RELATED ADJUSTMENT

Calibrator Amplitude Adjustment
10 MHz Frequency Reference Adjustment

DESCRIPTION

The amplitude and frequency accuracy of the CAL OUTPUT signal are checked for −10 dBm ±0.3 dB and 300 MHz ±1.2 kHz, respectively.

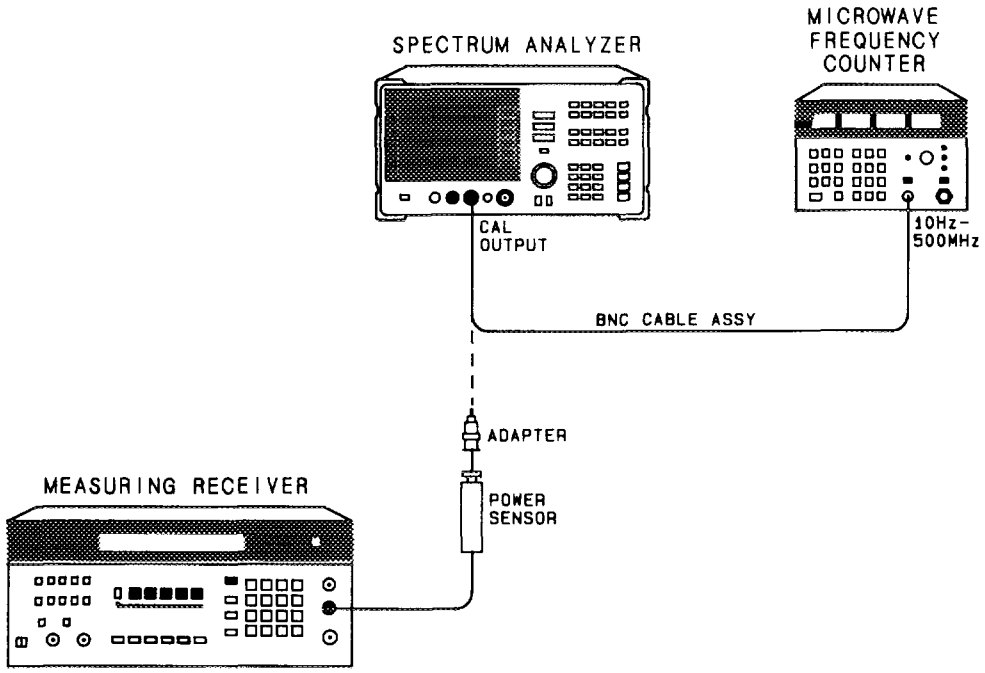


Figure 3-2. Calibrator Accuracy Test Setup

EQUIPMENT

Measuring Receiver	HP 8902A
Microwave Frequency Counter	HP 5343A
Power Sensor	HP 8482A
Adapters:	
Type N (f) to BNC (m)	HP 1250-1477
Cables:	
BNC, 122 cm (48 in.)	HP 10503A

PROCEDURE

1. Connect the equipment as shown in Figure 3-2. The HP 5343A 10 Hz–500 MHz input should be connected to the CAL OUTPUT of the HP 8562A/B.

Calibrator Frequency Accuracy

2. Set the HP 5343A controls as follows:

SAMPLE RATE	Midrange
50Ω–1 MΩ SWITCH	50Ω
10 Hz–500 MHz/500 MHz–26.5 GHz SWITCH	10 Hz–500 MHz

NOTE

The HP 5343A should have either an Option 001 timebase or be connected to a house standard with an aging rate better than 5 x 10^{-10}/day.

3. Wait for the frequency counter to settle. This may take two or three gate times.

4. Read the frequency counter display. The CAL OUTPUT frequency should be within the following limits (±4 ppm with standard timebase):

299.998800 MHz ≤ _____ ≤ 300.001200 MHz

Calibrator Amplitude Accuracy

5. Zero the HP 8902A and calibrate the HP 8482A power sensor at 300 MHz as described in the HP 8902A Operation Manual. Enter the power sensor's 300 MHz calibration factor into the HP 8902A.

6. Connect the power sensor through an adapter directly to the CAL OUTPUT connector. Read the power meter display. The power level should be within the following limits (±0.3 dB):

−10.3 dBm ≤ _____ ≤ −9.7 dBm

3-26. Displayed Average Noise Level

SPECIFICATION

Frequency	Average Noise Level
10 kHz	−90 dBm
100 kHz	−100 dBm
1 MHz–2.9 GHz	−121 dBm
2.9–6.46 GHz	−121 dBm
6.46–13.0 GHz	−110 dBm
13.0–19.7 GHz	−105 dBm
19.7–22 GHz	−100 dBm

RELATED ADJUSTMENT

Frequency Response Adjustment

DESCRIPTION

This test measures the displayed average noise level in all five frequency bands. The analyzer's input is terminated in 50 ohms. In Band 0, the test first measures the average noise at 10 and 100 kHz in zero span. For the rest of Band 0, and for all the remaining bands, the test tunes the analyzer frequency across the band, uses the marker to locate the frequency with the highest response, and then reads the average noise in zero span.

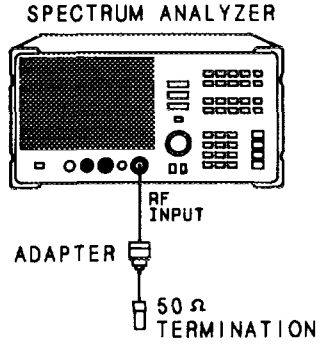


Figure 3-3. Displayed Average Noise Test Setup

EQUIPMENT

50Ω Termination . . . . . HP 909D

Adapters:
Type N (m) to APC 3.5 (f) . . . . . HP 1250-1744
Type N (m) to BNC (f) . . . . . HP 1250-1476

Cables:
BNC, 122 cm (48 in.) . . . . . HP 10503A

PROCEDURE

Displayed Average Noise, Band 0

1. Connect the CAL OUTPUT to the RF INPUT 50Ω. Press the PRESET key on the HP 8562A/B and set the controls as follows:

SPAN	0 Hz
CENTER FREQ	300 MHz
REF LVL	−10 dBm
ATTEN	0 dB
RES BW	100 Hz
VIDEO BW	1 Hz

2. Press the MARKER ON key, the AMPLITUDE key, [MORE], and [REF LVL CAL].

3. Use the knob or step keys to adjust the REF LEVEL CAL # until the MKR amplitude is −10.00 dBm ±0.17 dB.

4. Connect the HP 909D 50Ω termination to the HP 8562A/B RF INPUT 50Ω as shown in Figure 3-3.

5. On the HP 8562A/B, press the AMPLITUDE key, the 5 key, the 0 key, and the −dBm key.

6. Press the TRIG key, [SINGLE], [SINGLE], and the MARKER ON key. Read the marker amplitude and record it in Table 3-6 as the Displayed Average Noise Level at 10 kHz.

7. Change the HP 8562A/B center frequency to 100 kHz and press the TRIG key and [SINGLE]. Read the marker amplitude displayed at the upper right-hand corner of the screen and record it in Table 3-6 as the Displayed Average Noise Level at 100 kHz.

8. Set the HP 8562A/B controls as follows:

START FREQ	1 MHz
STOP FREQ	2.9 GHz
MARKER	OFF
RES BW	1 MHz
VIDEO BW	10 kHz

9. Trigger a single sweep and press the MARKER ON key and [MKRNOISE ON]. Use the front-panel knob to move the marker to the highest average noise level.

10. Press the MKR-> key, [MARKER->CF], the SPAN key, the 0 key, the Hz key, and the MARKER OFF key. Set the RES BW to 100 Hz and the VIDEO BW to 1 Hz.

11. Press the TRIG key, [SINGLE], and the MARKER ON key.

12. Read the marker amplitude and record the amplitude in Table 3-6 as the Displayed Average Noise Level from 1 MHz to 2.9 GHz.

Displayed Average Noise, Band 1

13. Set the HP 8562A/B controls as follows:

START FREQ	2.9 GHz
STOP FREQ	6.46 GHz
MARKER	[OFF]
RES BW	1 MHz
VIDEO BW	10 kHz

14. Repeat steps 9 through 11.

15. Read the marker amplitude and record the amplitude in Table 3-6 as the Displayed Average Noise Level from 2.9 GHz to 6.46 GHz.

Displayed Average Noise, Band 2

16. Set the HP 8562A/B controls as follows:

START FREQ	6.46 GHz
STOP FREQ	13.0 GHz
MARKER	[OFF]
RES BW	1 MHz
VIDEO BW	10 kHz

17. Repeat steps 9 through 11.

18. Read the marker amplitude and record the amplitude in Table 3-6 as the Displayed Average Noise Level from 6.46 to 13.0 GHz.

Displayed Average Noise, Band 3

19. Set the HP 8562A/B controls as follows:

START FREQ	13.0 GHz
STOP FREQ	19.7 GHz
MARKER	[OFF]
RES BW	1 MHz
VIDEO BW	10 kHz

20. Repeat steps 9 through 11.

21. Read the marker amplitude and record the amplitude in Table 3-6 as the Displayed Average Noise Level from 13.0 GHz to 19.7 GHz.

Displayed Average Noise, Band 4

22. Set the HP 8562A/B controls as follows:

START FREQ	19.7 GHz
STOP FREQ	22.0 GHz
MARKER	[OFF]
RES BW	1 MHz
VIDEO BW	10 kHz

23. Repeat steps 9 through 11.

24. Read the marker amplitude and record the amplitude in Table 3-6 as the Displayed Average Noise Level from 19.7 GHz to 22.0 GHz.

25. The displayed average noise level readings should be lower than the specifications listed in Table 3-6.

Table 3-6. Displayed Average Noise

Frequency	Displayed Average Noise Level (dBm)	Specification (dBm)		Measurement Uncertainty (dB)
		HP 8562A	HP 8562B	
10 kHz	_____	−90	−90	+1.74/−1.98
100 kHz	_____	−100	−100	+1.74/−1.98
1 MHz to 2.9 GHz	_____	−121	−121	+1.74/−1.98
2.9 GHz to 6.46. GHz	_____	−121	−121	+1.74/−1.98
6.46 GHz to 13.0 GHz	_____	−110	−110	+1.74/−1.98
13.0 GHz to 19.7 GHz	_____	−105	−105	+1.74/−1.98
19.7 GHz to 22 GHz	_____	−100	−100	+1.74/−1.98

3-27. Resolution Bandwidth Switching and IF Alignment Uncertainty

SPECIFICATION

Resolution Bandwidth Switching Uncertainty:
100 Hz to 1 MHz RES BW: <±0.5 dB (referenced to 300 kHz RES BW)

IF Alignment Uncertainty (additional uncertainty when using narrow resolution bandwidths):
300 Hz RES BW: <±0.5 dB
100 Hz RES BW: <±2 dB

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

This test utilizes the CAL OUTPUT signal for measuring the switching uncertainty and IF alignment uncertainty between resolution bandwidths. At each resolution bandwidth setting, the displayed amplitude variation of the signal is measured. All measurements are referenced to the 300 kHz bandwidth.

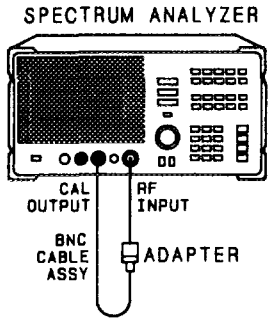


Figure 3-4. Resolution BW Switching and IF Alignment Uncertainty Test Setup

EQUIPMENT

Adapters:
Type N (m) to BNC (f) . . . . . HP 1250-1476

Cables:
BNC, 122 cm (48 in.) . . . . . HP 10503A

PROCEDURE

Setting the Reference

1. Connect the HP 8562A/B CAL OUTPUT to the RF INPUT 50Ω as shown in Figure 3-4.

2. Press the PRESET key, the AMPLITUDE key, [MORE], [IF ADJUST], and [FULL IF ADJ]. Wait for the IF ADJUST STATUS message to disappear and set the instrument controls as follows:

CENTER FREQ	300 MHz
SPAN	1 MHz
REF LVL	−5 dBm
dB/DIV	1 dB
RES BW	300 kHz
TRIGGER	SINGLE

3. Press the AMPLITUDE key, [MORE], [IF ADJUST], [IF ADJ OFF], the TRIG key, [SINGLE], the PEAK SEARCH key, and [MARKER DELTA].

Measuring Switching Uncertainty

4. Set the frequency SPAN and RES BW to the values listed in the second entry line of Table 3-7 (SPAN 5 MHz, RES BW 1 MHz).

5. Press the AMPLITUDE key, [MORE], [IF ADJUST], and [ADJ CURR IF STATE]. Wait for the IF ADJUST STATUS message to disappear and press the TRIG key, [SINGLE], and the PEAK SEARCH key. Record the Δ MKR amplitude in the Actual Δ MKR Reading column of Table 3-7. The Δ MKR reading should be within the limits shown.

6. Repeat step 5 for each set of frequency SPAN and RES BW settings in Table 3-7.

Table 3-7. Resolution BW Switching and IF Alignment Uncertainty

HP 8562A		Δ MKR Reading			Measurement Uncertainty (dB)
Span	Res BW	Min (dB)	Actual (dB)	Max (dB)	
1 MHz	300 kHz	0	0 (Ref)	0	0
5 MHz	1 MHz	−0.5	_____	+0.5	±0.06
500 kHz	100 kHz	−0.5	_____	+0.5	±0.06
100 kHz	30 kHz	−0.5	_____	+0.5	±0.06
50 kHz	10 kHz	−0.5	_____	+0.5	±0.06
10 kHz	3 kHz	−0.5	_____	+0.5	±0.06
10 kHz	1 kHz	−0.5	_____	+0.5	±0.06
10 kHz	300 Hz	−1.0	_____	+1.0	±0.11
10 kHz	100 Hz	−2.5	_____	+2.5	±0.27

3-28. Resolution Bandwidth Accuracy and Selectivity

SPECIFICATION

Accuracy:
100 Hz RES BW: <±30%
300 Hz to 300 kHz RES BW: <±10%
1 MHz RES BW: <±25%

Selectivity (60 dB BW/ 3 dB BW): <15:1

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

The accuracy of each of the instrument's 3 dB resolution bandwidths is measured. The 60 dB bandwidths are then determined and the results used to calculate the selectivity for each bandwidth (Selectivity = 60 dB BW/3 dB BW). A frequency synthesizer, phase-locked to the spectrum analyzer's 10 MHz standard, provides a 10.7 MHz measurement signal. A mixer upconverts this signal with the spectrum analyzer's 300 MHz CAL OUTPUT to produce a 310.7 MHz test signal. This signal is injected directly into the spectrum analyzer IF circuitry. The upper and lower 3 dB and 60 dB bandwidth frequencies may be determined by varying the frequency of the frequency synthesizer.

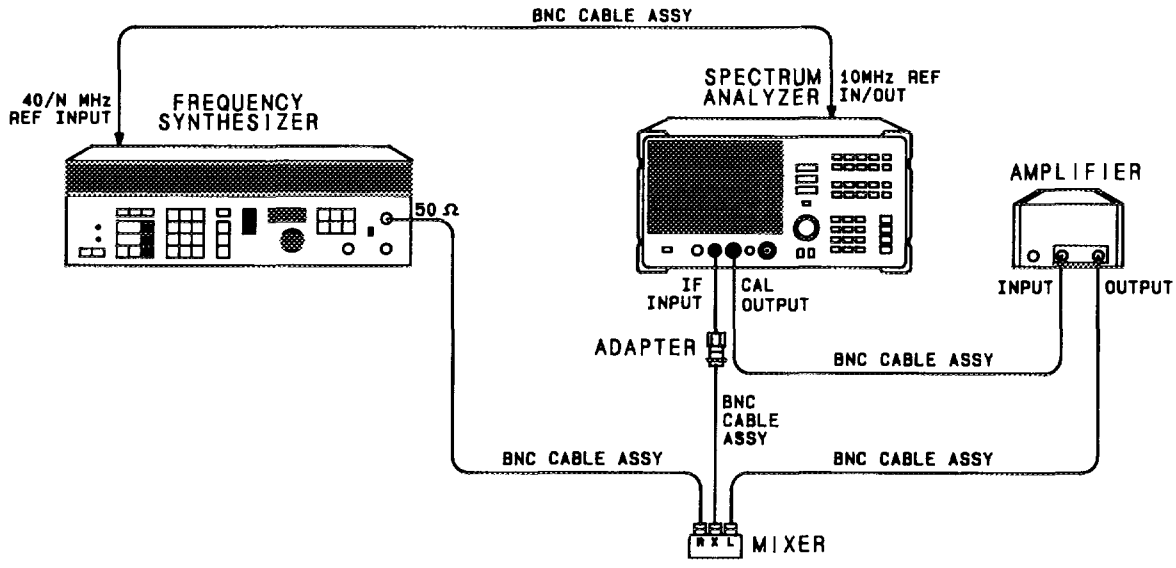


Figure 3-5. Resolution BW Accuracy/Selectivity Test Setup

EQUIPMENT

Frequency Synthesizer	HP 3335A
Amplifier	HP 8447E
Double-Balanced Mixer	HP 10514A
Adapters:	
Type BNC (f) to SMA (m)	HP 1250-1200
Cables:	
BNC, 122 cm (48 in.) (5 required)	HP 10503A

PROCEDURE

Resolution BW Accuracy

1. Connect the equipment as shown in Figure 3-5. The HP 8562A/B provides the frequency reference for the HP 3335A.

2. Set the HP 3335A controls as follows:

FREQUENCY	10.7 MHz
AMPLITUDE	−20 dBm
AMPTD INCR	1 dB

3. On the HP 8562A/B, press the PRESET key, the AMPLITUDE key, [LOG dB/DIV], the 1 key, and the dB key.

4. On the HP 8562A/B, press the AMPLITUDE key, [MORE], [IF ADJUST], and [IF ADJ OFF]. Press the EXT key to place the analyzer in external mixing mode.

5. Adjust the HP 3335A output amplitude to place the signal displayed on the HP 8562A/B one to two divisions (1 dB to 2 dB) below the reference level. Set the HP 3335A AMPTD INCR to 3 dB.

6. On the HP 8562A/B, press the AMPLITUDE key, [MORE], [IF ADJUST], and [ADJ CURR IF STATE]. Wait for the `IF ADJUST STATUS` message to disappear before continuing

7. Adjust the HP 3335A frequency for a peak signal amplitude on the HP 8562A/B display.

8. On the HP 3335A, press the AMPLITUDE key and the ↓ key.

9. On the HP 8562A/B, press the MARKER ON key and [MARKER DELTA].

10. Press the ↑ key on the HP 3335A.

11. Increase the HP 3335A frequency until the Δ MKR reading on the HP 8562A/B display reads 0 dB ±0.02 dB. Record the HP 3335A frequency as the Upper 3 dB Frequency in Table 3-8 for the current Resolution BW setting.

12. Decrease the HP 3335A frequency until the Δ MKR again reads 0 dB ±0.02 dB. Record the HP 3335A frequency as the Lower 3 dB Frequency in Table 3-8.

13. Subtract the Lower 3 dB Frequency from the Upper 3 dB Frequency. Record the result as the Actual 3 dB Bandwidth in Table 3-8 and as the 3 dB Bandwidth in Table 3-9. The bandwidth should be within the limits shown in Table 3-8.

14. Set the HP 3335A frequency to 10.7 MHz.

15. Press the MARKER OFF key on the HP 8562A/B.

16. Repeat steps 6 through 15 for the rest of the Resolution BW settings listed in column 1 of Table 3-8.

Resolution Bandwidth Selectivity

17. Set the HP 8562A/B controls as follows:

RES BW	1 MHz
dB/DIV	10 dB
VIDEO BW	1 kHz

18. Adjust the HP 3335A output amplitude to place the signal displayed on the HP 8562A/B at the reference level.

19. Press the AMPLITUDE key, [MORE], [IF ADJUST], and [ADJ CURR IF STATE] on the HP 8562A/B. Wait for the IF ADJUST STATUS message to disappear before continuing.

20. Adjust the HP 3335A frequency for a peak signal amplitude on the HP 8562A/B display.

21. Adjust the HP 3335A AMPLITUDE to place the signal displayed on the HP 8562A/B at the reference level.

NOTE

If it is necessary to set the HP 3335A AMPLITUDE below −26 dBm in step 21, insufficient amplitude range will occur. If this is the case, put 10 dB of attenuation between the HP 3335A output and the R input of the mixer. Continue with step 21.

22. Set the HP 3335A AMPTD INCR to 60 dB. Press the AMPLITUDE key and the ↓ key.

23. On the HP 8562A/B, press the MARKER ON key and [MARKER DELTA].

24. Press the ↑ key on the HP 3335A.

25. Decrease the HP 3335A frequency until the HP 8562A/B Δ MKR reads 0 dB ±0.2 dB. Record the HP 3335A frequency as the Lower 60 dB Frequency in Table 3-9 for the current resolution bandwidth.

26. Increase the HP 3335A frequency until the HP 8562A/B Δ MKR reads 0 dB ±0.2 dB. Record the HP 3335A frequency as the Upper 60 dB Frequency in Table 3-9.

27. Subtract the Lower 60 dB Frequency from the Upper 60 dB Frequency and record the result as the 60 dB Bandwidth in Table 3-9.

28. Divide the 60 dB Bandwidth by the 3 dB Bandwidth and record the result as the Actual Shape Factor in Table 3-9. The shape factor should be less than the limit shown.

29. Set the HP 3335A FREQUENCY to 10.7 MHz.

30. Press the MARKER OFF key on the HP 8562A/B.

31. Repeat steps 19 through 30 for the rest of the resolution bandwidth settings listed in Table 3-9.

Table 3-8. Resolution Bandwidth Accuracy

Res BW Setting	HP 3335A Frequency		3 dB Bandwidth			Measurement Uncertainty
	Upper 3 dB Frequency	Lower 3 dB Frequency	Min	Actual	Max	
1 MHz	_____	_____	750 kHz	_____	1.25 MHz	+6.8 kHz/−7.0 kHz
300 kHz	_____	_____	270 kHz	_____	330 kHz	+2.04 kHz/−2.1 kHz
100 kHz	_____	_____	90 kHz	_____	110 kHz	+680 Hz/−700 Hz
30 kHz	_____	_____	27 kHz	_____	33 kHz	+204 Hz/−210 Hz
10 kHz	_____	_____	9 kHz	_____	11 kHz	+68 Hz/−70 Hz
3 kHz	_____	_____	2.7 kHz	_____	3.3 kHz	+20.4 Hz/−21 Hz
1 kHz	_____	_____	900 Hz	_____	1.1 kHz	+6.8 Hz/−7 Hz
300 Hz	_____	_____	270 Hz	_____	330 Hz	+2.04 Hz/−2.1 Hz
100 Hz	_____	_____	70 Hz	_____	130 Hz	+0.68 Hz/−0.7 Hz

Table 3-9. Resolution Bandwidth Selectivity

Res BW Setting	HP 3335A Frequency		60 dB BW	3 dB BW	Shape Factor		Measurement Uncertainty (of 60 dB BW)
	Lower 60 dB Frequency	Upper 60 dB Frequency			Actual	Max	
1 MHz	_____	_____	_____	_____	_____	15	+63 kHz/−66 kHz
300 kHz	_____	_____	_____	_____	_____	15	+18.9 kHz/−19.8 kHz
100 kHz	_____	_____	_____	_____	_____	15	+6.3 kHz/−6.6 kHz
30 kHz	_____	_____	_____	_____	_____	15	+1.89 kHz/−1.98 kHz
10 kHz	_____	_____	_____	_____	_____	15	+630 Hz/−660 Hz
3 kHz	_____	_____	_____	_____	_____	15	+189 Hz/−198 Hz
1 kHz	_____	_____	_____	_____	_____	15	+63 Hz/−66 Hz
300 Hz	_____	_____	_____	_____	_____	15	+18.9 Hz/−19.8 Hz
100 Hz	_____	_____	_____	_____	_____	15	+6.3 Hz/−6.6 Hz

3-29. Input Attenuator Accuracy

SPECIFICATION

Accuracy (referenced to 10 dB input attenuation, for 20 to 70 dB settings):

1kHz to 2.9 GHz: <±0.6 dB/10 dB step to a maximum of ±1.8 dB

12.4 GHz to 19.4 GHz: <±1.3 dB/10 dB step to a maximum of ±2.5 dB

19.4 GHz to 22 GHz: <±1.8 dB/10 dB step to a maximum of ±3.5 dB

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

This test measures the input attenuator's switching accuracy and step-to-step accuracy over the full 70 dB range at 50 MHz. The frequency synthesizer is phase-locked to the spectrum analyzer's 10 MHz reference. Switching accuracy is referenced to the 10 dB attenuator setting. The attenuator in the synthesizer/level generator is the measurement standard. Step-to-step accuracy is calculated from switching accuracy data.

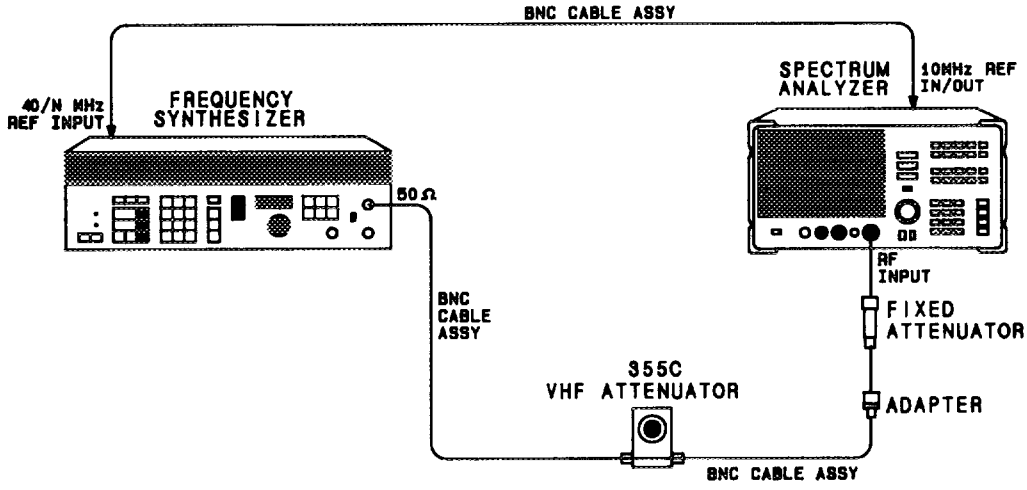


Figure 3-6. Input Attenuator Test Setup, 50 MHz

EQUIPMENT

Synthesized Sweeper	HP 8340A
Synthesizer/Level Generator	HP 3335A
20 dB Coaxial Fixed Attenuator	HP 8491B (Option 020)
10 dB Coaxial Fixed Attenuator	HP 8493C (Option 010)
1 dB VHF Step Attenuator	HP 355C
Adapters:	
Type N (m) to BNC (f)	HP 1250-1476
Type N (m) to APC 3.5 (f)	HP 1250-1744
Type APC 3.5 (f) to APC 3.5 (f)	HP 5061-5311
Cables:	
BNC, 122 cm (48 in.) (3 required)	HP 10503A
SMA, 61 cm (24 in.)	HP 8120-1578

PROCEDURE

Attenuator Switching Accuracy

1. Connect the equipment as shown in Figure 3-6. The HP 8562A/B provides the frequency reference for the HP 3335A.

2. Set the HP 3335A controls as follows:

FREQUENCY	50 MHz
AMPLITUDE	−50 dBm
AMPTD INCR	10 dB
OUTPUT	50Ω

3. On the HP 8562A/B, press the PRESET key and [REALIGN LO & IF] and set the controls as follows:

CENTER FREQ	50 MHz
SPAN	0 Hz
REF LVL	−70 dBm
dB/DIV	1 dB
RES BW	3 kHz
VIDEO BW	1 Hz

4. Set the HP 355C to 0 dB.

5. Adjust the HP 355C step attenuator to place the peak of the signal two to three divisions below the HP 8562A/B reference level.

6. On the HP 8562A/B, press the TRIG key, [SINGLE], and [SINGLE] and wait for a new sweep to finish. Press the MARKER ON key and [MARKER DELTA].

7. Set the HP 3335A amplitude to −40 dBm as indicated in row 2 of Table 3-10.

8. Set the HP 8562A/B REF LVL to −60 dBm and input attenuation to 20 dB as indicated in row 2 of Table 3-10.

9. On the HP 8562A/B, press the TRIG key and [SINGLE] and wait for a sweep to finish. Record the Δ MKR amplitude in Table 3-10 as the Actual Δ MKR Reading. The Δ MKR amplitude reading should be within the limits shown.

10. Repeat step 9 for each row of instrument settings indicated in Table 3-10.

11. Calculate the Step-to-Step Accuracy as described in the following steps and record the results in Table 3-10. Step-to-Step Accuracy should be within the limits shown in Table 3-10.

Step-to-Step Accuracy Calculation

NOTE

Step-to-Step Accuracy is the measure of how accurate a 10 dB step is. Step-to-Step Accuracy is calculated based upon the Actual Δ MKR readings in Table 3-10.

12. For the 20 dB ATTEN setting, subtract 10 dB from the Actual Δ MKR Reading to obtain the Step-to-Step Accuracy.

20 dB ATTEN: Step-to-Step Accuracy = Actual Δ MKR Reading − 10 dB

13. For the 30, 40, 50, 60, and 70 dB ATTEN settings, subtract the previous Actual Δ MKR Reading from the current Actual Δ MKR Reading. Subtract 10 dB from the result above to obtain the Step-to-Step Accuracy.

Accuracy = (Current Actual Δ MKR − Previous Actual Δ MKR) − 10 dB

Table 3-10. Input Attenuator Accuracy, 50 MHz

HP 3335A Amplitude (dBm)	HP 8562A Ref Lvl (dBm)	HP 8562A/B Atten (dBm)	Δ MKR Reading			Step-to-Step Accuracy		Measurement Uncertainty (dB)
			Min (dB)	Actual (dB)	Max (dB)	Actual (dB)	Spec (dB)	
−50	−70	10	0 (Ref)	0 (Ref)	0 (Ref)	0 (Ref)	0 (Ref)	0 (Ref)
−40	−60	20	+8.2	_____	+11.8	_____	0.6	±0.178
−30	−50	30	+18.2	_____	+21.8	_____	0.6	±0.178
−20	−40	40	+28.2	_____	+31.8	_____	0.6	±0.178
−10	−30	50	+38.2	_____	+41.8	_____	0.6	±0.178
0	−20	20	+48.2	_____	+51.8	_____	0.6	±0.178
+10	−10	20	+58.2	_____	+61.8	_____	0.6	±0.178

(Pages 3-29 through 3-36 intentionally deleted.)

3-30. IF Gain Uncertainty

SPECIFICATION

<±1.0 dB, reference levels 0 dBm to −80 dBm with 10 dB input attenuation

RELATED ADJUSTMENT

IF Amplitude Adjustment

DESCRIPTION

This test measures the log (10 dB and 1 dB) and linear IF gain uncertainties. A 0 dBm signal is displayed near the reference level for each test. The input signal level is decreased as the spectrum analyzer's reference level is decreased (IF gain increased). Since the signal level decreases in accurate steps, any error between the reference level and the signal level is caused by the analyzer's IF gain. The frequency synthesizer is phase-locked to the spectrum analyzer's 10 MHz reference.

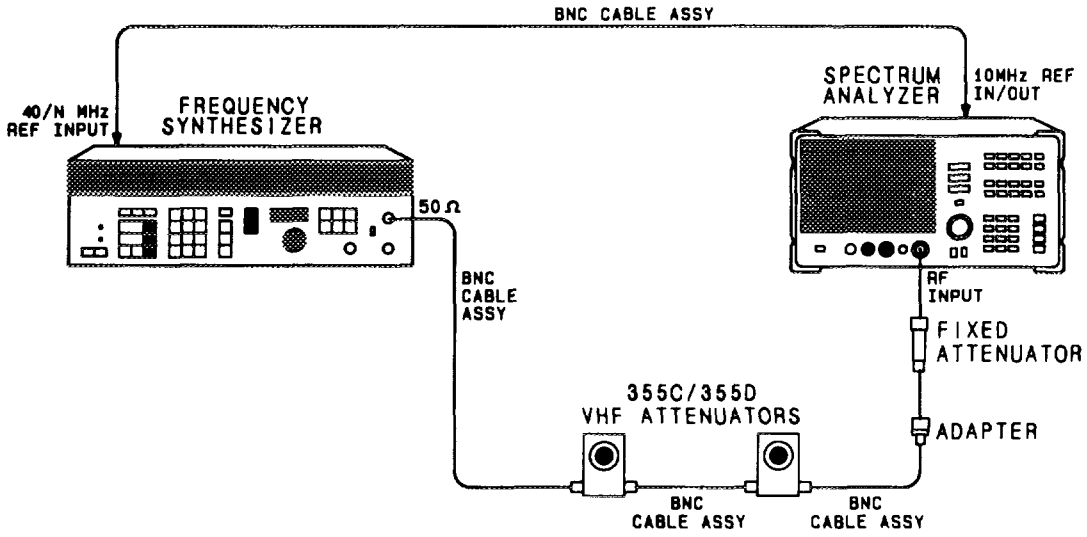


Figure 3-8. IF Gain Uncertainty Test Setup

EQUIPMENT

Frequency Synthesizer	HP 3335A
10 dB Coaxial Fixed Attenuator	HP 8491B (Option 010)
1 dB VHF Step Attenuator	HP 355C

Adapters:
Type N (m) to BNC (f) . . . . . HP 1250-1476

Cables:
BNC, 122 cm (48 in.) (3 required) . . . . . HP 10503A

PROCEDURE

1. Connect the equipment as shown in Figure 3-8. The HP 8562A/B provides the frequency reference for the HP 3335A.

Log Gain Uncertainty (10 dB Steps)

2. Set the HP 3335A controls as follows:

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

3. On the HP 8562A/B, press the PRESET key and [REALIGN LO & IF]. Set the controls as follows:

CENTER FREQ	50 MHz
SPAN	0 Hz
dB/DIV	1 dB
RES BW	1 kHz
VIDEO BW	1 Hz

4. Set the HP 355C to 0 dB attenuation.

5. On the HP 8562A/B, press the MARKER ON key.

6. Adjust the HP 355C to place the signal 2 to 3 dB (two to three divisions) below the HP 8562A/B reference level.

7. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the MARKER ON key, and [MARKER DELTA].

8. Press the AMPLITUDE key on the HP 3335A.

9. Press the ↓ key on the HP 3335A.

10. Set the HP 8562A/B REF LVL to −10 dBm.

11. On the HP 8562A/B, press the TRIG key and [SINGLE].

12. Record the HP 8562A/B Δ MKR amplitude reading in Table 3-15 as the Actual Δ MKR reading. The Δ MKR reading should be within the limits shown.

13. Repeat steps 9 through 12 for the remaining HP 8562A/B REF LVL settings listed in Table 3-15.

Log Gain Uncertainty (1 dB Steps)

14. Set the HP 3335A the AMPLITUDE key to +10 dBm and the AMPTD INCR key to 1 dB.

15. Set the HP 8562A/B controls as follows:

MARKER	MARKER NORMAL
REF LVL	0 dBm
dB/DIV	1 dB
TRIG	CONT

16. Adjust the HP 355C to place the signal 2 to 3 dB (two to three divisions) below the HP 8562A/B reference level.

17. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the MARKER ON key, and [MARKER DELTA].

18. Press the AMPLITUDE key on the HP 3335A.

19. Press the ↓ key on the HP 3335A.

20. On the HP 8562A/B, press the AMPLITUDE key and the ↓ key.

21. Press the TRIG key and [SINGLE] on the HP 8562A/B.

22. Record the HP 8562A/B Δ MKR amplitude reading in Table 3-16 as the Actual Δ MKR reading. The Δ MKR reading should be within the limits shown.

23. Repeat steps 19 through 22 for the remaining HP 8562A/B REF LVL settings listed in Table 3-16.

Linear Gain Uncertainty

24. Set the HP 3335A the AMPLITUDE key to +10 dBm and the AMPTD INCR key to 10 dB.

25. Set the HP 8562A/B controls as follows:

MARKER	MARKER NORMAL
REF LVL	0 dBm
AMPLITUDE SCALE	LINEAR
UNITS	dBm
TRIG	CONT

26. Adjust the HP 355C to place the signal two to three divisions below the HP 8562A/B reference level. The marker should read between −2 dBm and −3 dBm.

27. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the MARKER ON key, and [MARKER DELTA].

28. Press the AMPLITUDE key on the HP 3335A.

29. Press the ↓ key on the HP 3335A.

30. Set the HP 8562A/B REF LVL to −10 dBm.

31. On the HP 8562A/B, press the TRIG key and [SINGLE].

32. Record the HP 8562A/B Δ MKR amplitude reading in Table 3-17 as the Actual Δ MKR reading. The Δ MKR reading should be within the limits shown.

33. Repeat steps 29 through 32 for the remaining HP 8562A/B REF LVL settings listed in Table 3-17.

34. In Table 3-15, locate the Actual Δ MKR Reading with the greatest deviation from its corresponding REF LVL setting. Subtract the REF LVL setting from the Δ MKR Reading and record the result below.

Maximum Log IF Gain Uncertainty (10 dB Steps): _____ dB

35. In Table 3-16, locate the Actual Δ MKR Reading with the greatest deviation from its corresponding REF LVL setting. Subtract the REF LVL setting from the Δ MKR Reading and record the result below.

Maximum Log IF Gain Uncertainty (1 dB Steps): _____ dB

36. In Table 3-17, locate the Actual Δ MKR Reading with the greatest deviation from its corresponding REF LVL setting. Subtract the REF LVL setting from the Δ MKR Reading and record the result below.

Maximum Linear Gain Uncertainty: _____ dB

Table 3-15. Log IF Gain Uncertainty (10 dB Steps)

HP 8562A/B Ref Lvl (dBm)	HP 3335A Amplitude (dBm)	Δ MKR Reading			Measurement Uncertainty (dB)
		Min (dB)	Actual (dB)	Max (dB)	
0	+10 (Ref)	0	0 (Ref)	0	±0.035
−10	0	−11	_____	−9	±0.035
−20	−10	−21	_____	−19	±0.035
−30	−20	−31	_____	−29	±0.035
−40	−30	−41	_____	−39	+.038/−.039
−50	−40	−51	_____	−49	+.038/−.039
−60	−50	−61	_____	−59	+.093/−.095
−70	−60	−71	_____	−69	+.093/−.095
−80	−70	−81	_____	−79	+.093/−.095

Table 3-16. Log IF Gain Uncertainty (1 dB Steps)

HP 8562A/B Ref Lvl (dBm)	HP 3335A Amplitude (dBm)	Δ MKR Reading			Measurement Uncertainty (dB)
		Min (dB)	Actual (dB)	Max (dB)	
0	+10 (Ref)	0	0 (Ref)	0	±0.035
−1	+9	−2	_____	0	±0.035
−2	+8	−3	_____	−1	±0.035
−3	+7	−4	_____	−2	±0.035
−4	+6	−5	_____	−3	±0.035
−5	+5	−6	_____	−4	±0.035
−6	+4	−7	_____	−5	±0.035
−7	+3	−8	_____	−6	±0.035
−8	+2	−9	_____	−7	±0.035
−9	+1	−10	_____	−8	±0.035
−10	0	−11	_____	−9	±0.035
−11	−1	−12	_____	−10	±0.035
−12	−2	−13	_____	−11	±0.035

Table 3-17. Linear IF Gain Uncertainty

HP 8562A/B Ref Lvl (dBm)	HP 3335A Amplitude (dBm)	Δ MKR Reading			Measurement Uncertainty (dB)
		Min (dB)	Actual (dB)	Max (dB)	
0	+10 (Ref)	0	0 (Ref)	0	±0.038
−10	0	−11.0	_____	−9.0	±0.038
−20	−10	−21.0	_____	−19.0	±0.038
−30	−20	−31.0	_____	−29.0	±0.038
−40	−30	−41.0	_____	−39.0	±0.041
−50	−40	−51.0	_____	−49.0	±0.041
−60	−50	−61.0	_____	−59.0	+.094/−.097
−70	−60	−71.0	_____	−69.0	+.094/−.097
−80	−70	−81.0	_____	−79.0	+.094/−.097

3-31. Scale Fidelity

SPECIFICATION

Log Scale Fidelity: <±0.4 dB/4 dB to a maximum of ±1.5 dB over 0 to 90 dB range

Linear Scale Fidelity: <±3% of Reference Level

RELATED ADJUSTMENT

IF Amplitude Adjustment

DESCRIPTION

The 10 dB, 2 dB, and linear scales are tested for fidelity. A −10 dBm signal is displayed at the reference level for each scale. As the input signal level is decreased, the displayed signal level is compared to the reference level. The test also measures the incremental step errors. Figure 3-9 illustrates the test setup used for the test. The frequency synthesizer is phase-locked to the spectrum analyzer's 10 MHz reference.

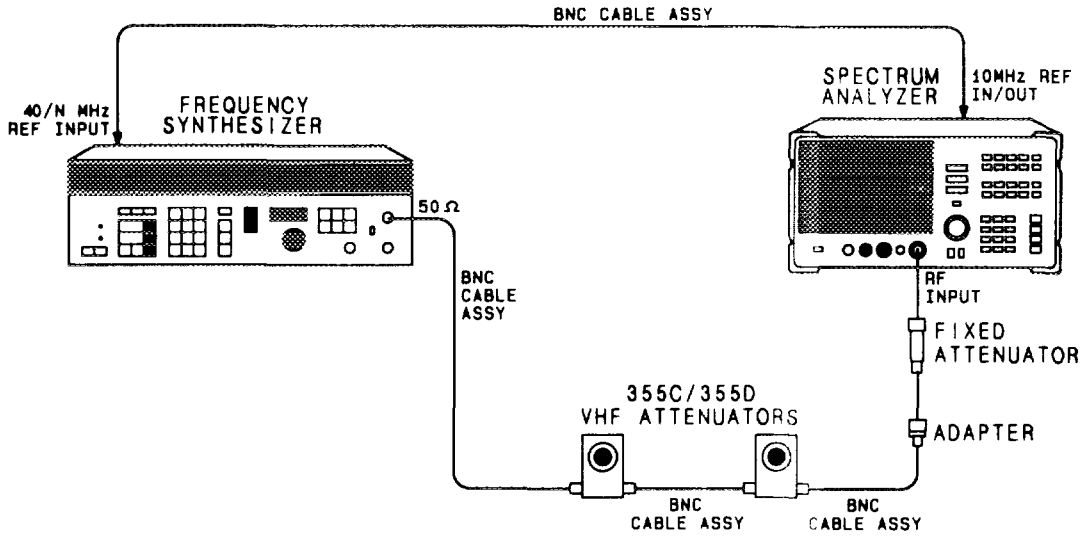


Figure 3-9. Scale Fidelity Test Setup

EQUIPMENT

Frequency Synthesizer	HP 3335A
10 dB Coaxial Fixed Attenuator	HP 8491B (Option 010)
1 dB VHF Step Attenuator	HP 355C
10 dB VHF Step Attenuator	HP 355D
Adapters:	
Type N (m) to BNC (f)	HP 1250-1476
Cables:	
BNC, 122 cm (48 in.) (3 required)	HP 10503A

PROCEDURE

1. Connect the equipment as shown in Figure 3-9. The HP 8562A/B provides the frequency reference for the HP 3335A.

2. Set the HP 3335A controls as follows:

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

3. On the HP 8562A/B, press the PRESET key and [REALIGN LO & IF]. Set the controls as follows:

CENTER FREQ	50 MHz
SPAN	0 Hz
REF LVL	−10 dBm
ATTEN	0 dB
RES BW	1 kHz
VIDEO BW	30 Hz

4. Set the HP 335C and HP 355D to 0 dB.

5. On the HP 8562A/B, press the MARKER ON key.

6. Adjust the HP 355C and HP 355D until the HP 8562A/B marker reads between −10 dBm and −11 dBm.

10 dB/DIV Log Scale

7. On the HP 3335A, press the AMPLITUDE key and use the INCR keys to adjust the amplitude until the HP 8562A/B marker reads exactly −10.00 dBm.

8. On the HP 3335A, set the AMPL INCR to 4 dB and press the AMPLITUDE key.

9. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the MARKER ON key, and [MARKER DELTA].

10. Set the HP 3335A amplitude to the next value listed in Table 3-18 using the INCR ↓ key. Set the AMPTD INCR to 2 dB before setting the HP 3335A AMPLITUDE to the last power level. Press the TRIG key and [SINGLE] on the HP 8562A/B. Record the Δ MKR amplitude reading in Table 3-18 column 4. The Δ MKR amplitude should be within the limits shown. Repeat this step for each HP 3335A setting.

11. For each Δ MKR reading, subtract the previous Δ MKR reading. Add 10 dB to this number and record the result as the Incremental Error in Table 3-18. The Incremental Error should not exceed ±0.4 dB.

Incremental Error = current Δ MKR − previous Δ MKR + 4 dB

For the last step:

Incremental Error = current Δ MKR − previous Δ MKR + 2 dB

2 dB/DIV Log Scale

12. Set the HP 8562A/B controls as follows:

TRIG	CONT
dB/DIV	2 dB

13. Set the HP 3335A controls as follows:

AMPLITUDE	+10 dBm
AMPL INCR	0.01 dB

14. On the HP 8562A/B, press the MARKER ON key and [MARKER NORMAL].

15. Adjust the HP 355C and HP 355D until the HP 8562A/B marker reads between −10 dBm and −11 dBm.

16. On the HP 3335A, press the AMPLITUDE key. Use the HP 3335A INCR keys to adjust the amplitude until the HP 8562A/B marker reads exactly −10.00 dBm.

17. Set the HP 3335A AMPL INCR key to 4 dB and press the AMPLITUDE key.

18. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the MARKER ON key, and [MARKER DELTA].

19. Set the HP 3335A amplitude to the next value listed in Table 3-19 using INCR ↓ key. Set the AMPTD INCR to 2 dB before setting the HP 3335A AMPLITUDE to the last power level. Press the TRIG key and [SINGLE] on the HP 8562A/B. Record the Δ MKR amplitude reading in Table 3-19 column 4. The Δ MKR amplitude should be within the limits shown. Repeat this step for each HP 3335A setting.

20. For each Δ MKR reading in Table 3-19, subtract the previous Δ MKR reading. Add 2 dB to this number and record the result as the Incremental Error in Table 3-19. The Incremental Error should not exceed ±0.4 dB.

Incremental Error= current Δ MKR − previous Δ MKR + 4 dB

For the last step:

Incremental Error = current Δ MKR − previous Δ MKR + 2 dB

Linear Scale

21. Set the HP 8562A/B controls as follows:

TRIG	CONT
LINEAR/LOG	LINEAR
UNITS	dBm

22. Set the HP 3335A controls as follows:

AMPLITUDE	+10 dBm
AMPL INCR	0.01 dB

23. On the HP 8562A/B, press the MARKER ON key and [MARKER NORMAL].

24. Adjust the HP 355C and HP 355D until the HP 8562A/B marker reads between −10 dBm and −11 dBm.

25. On the HP 3335A, press the AMPLITUDE key and use the INCR keys to adjust the HP 3335A amplitude until the HP 8562A/B marker reads exactly −10.00 dBm.

26. Set the HP 3335A the AMPL INCR key to 2 dB and press the AMPLITUDE key.

27. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the MARKER ON key, and [MARKER DELTA].

28. Set the HP 3335A amplitude to the next value listed in Table 3-20 using the the INCR ↓ key. Press the TRIG key and [SINGLE] on the HP 8562A/B. Record the Δ MKR amplitude reading in Table 3-20 column 4. The Δ MKR amplitude should be within the limits shown. Repeat this step for each HP 3335A setting.

29. In Table 3-18, locate the Actual Δ MKR Reading with the greatest deviation from its corresponding "(nominal) dB from REF LVL". Add the dB from REF LVL to the Actual Δ MKR Reading and record the result below.

Maximum Cumulative 10 dB Log Scale Fidelity: _____ dB

30. Record below the Incremental Error in Table 3-18 with the greatest deviation from 0 dB.

Maximum 10 dB Log Scale Incremental Error: _____ dB

31. In Table 3-19, locate the Actual Δ MKR Reading with the greatest deviation from its corresponding "(nominal) dB from REF LVL". Add the dB from REF LVL to the Actual Δ MKR Reading and record the result below.

Maximum Cumulative 2 dB Log Scale Fidelity: _____ dB

32. Record below the Incremental Error in Table 3-19 with the greatest deviation from 0 dB.

Maximum 2 dB Log Scale Incremental Error: _____ dB

Table 3-18. 10 dB/Div Log Scale Fidelity

HP 3335A Amplitude (dBm, nominal)	dB from Ref Level (nominal)	Δ MKR Reading			Incremental Error (dB)	Measurement Uncertainty (dB)
		Min (dB)	Actual (dB)	Max (dB)		
+10	0	0	0 (Ref)	0	0 (Ref)	0
+6	−4	−4.4	_____	−3.6	_____	+0.24/−0.25
+2	−8	−8.8	_____	−7.2	_____	+0.24/−0.25
−2	−12	−13.2	_____	−10.8	_____	+0.24/−0.25
−6	−16	−17.5	_____	−14.5	_____	+0.24/−0.25
−10	−20	−21.5	_____	−18.5	_____	+0.24/−0.25
−14	−24	−25.5	_____	−22.5	_____	+0.24/−0.25
−18	−28	−29.5	_____	−26.5	_____	+0.24/−0.25
−22	−32	−33.5	_____	−30.5	_____	+0.241/−0.255
−26	−36	−37.5	_____	−34.5	_____	+0.241/−0.255
−30	−40	−41.5	_____	−38.5	_____	+0.241/−0.255
−34	−44	−45.5	_____	−42.5	_____	+0.241/−0.255
−38	−48	−49.5	_____	−46.5	_____	+0.241/−0.255
−42	−52	−53.5	_____	−50.5	_____	+0.255/−0.270
−46	−56	−57.5	_____	−54.5	_____	+0.255/−0.270
−50	−60	−61.5	_____	−58.5	_____	+0.255/−0.270
−54	−64	−65.5	_____	−62.5	_____	+0.255/−0.270
−58	−68	−69.5	_____	−66.5	_____	+0.255/−0.270
−62	−72	−73.5	_____	−70.5	_____	+0.255/−0.270
−66	−76	−77.5	_____	−74.5	_____	+0.255/−0.270
−70	−80	−81.5	_____	−78.5	_____	+0.255/−0.270
−74	−84	−85.5	_____	−72.5	_____	+0.255/−0.270
−78	−88	−89.5	_____	−86.5	_____	+0.255/−0.270
−80[1]	−90	−91.5	_____	−88.5	_____[2]	+0.255/−0.270

[1] INCR keys cannot be used to set this step; key in the AMPLITUDE from the previous (−78 dBm, nominal) step minus 2 dB.

[2] This value should not exceed ±0.2 dB.

Table 3-19. 2 dB/Div Log Scale Fidelity

HP 3335A Amplitude (dBm, nominal)	dB from Ref Level (nominal)	Δ MKR Reading			Incremental Error (dB)	Measurement Uncertainty (dB)
		Min (dB)	Actual (dB)	Max (dB)		
+10	0	0	0 (Ref)	0	0 (Ref)	0
+8	2	−2.2	_____	−1.8	_____	±0.06
+6	4	−4.4	_____	−3.6	_____	±0.06
+4	6	−6.6	_____	−5.4	_____	±0.06
+2	8	−8.8	_____	−7.2	_____	±0.06
0	10	−11.0	_____	−9.0	_____	±0.06
−2	12	−13.2	_____	−10.8	_____	±0.06
−4	14	−15.4	_____	−12.6	_____	±0.06
−6	16	−17.5	_____	−14.5	_____	±0.06
−8	18	−19.5	_____	−16.5	_____	±0.06

Table 3-20. Linear Scale Fidelity

HP 3335A Amplitude (dBm, nominal)	dB from Ref Lvl (nominal)	Δ MKR Reading			Measurement Uncertainty (dB)
		Min (dB)	Actual (dB)	Max (dB)	
+10	0	0	0 (Ref)	0	0
+8	2	−2.33	_____	−1.68	+.033/−.033
+6	4	−4.42	_____	−3.60	+.034/−.034
+4	6	−6.54	_____	−5.50	+.037/−.037
+2	8	−8.68	_____	−7.37	+.041/−.041
0	10	−10.87	_____	−9.21	+.046/−.047
−2	12	−13.10	_____	−11.02	+.054/−.054
−4	14	−15.42	_____	−12.78	+.064/−.065
−6	16	−17.82	_____	−14.49	+.078/−.079
−8	18	−20.36	_____	−16.14	+.118/−.12

3-32. Residual FM

SPECIFICATION

Residual FM: <50 Hz × N p-p in 100 ms in zero span

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

The Residual FM Test measures the inherent short-term instability of the spectrum analyzer's LO system. With the analyzer placed in zero span, a stable signal is applied to the input and slope-detected on the linear portion of the IF bandwidth filter skirt. Any instability in the LO system transfers to the IF signal in the mixing process. The test determines the slope of the IF filter in Hz/dB and then measures the signal amplitude variation caused by the residual FM. Multiplying these two values gives the residual FM in Hz.

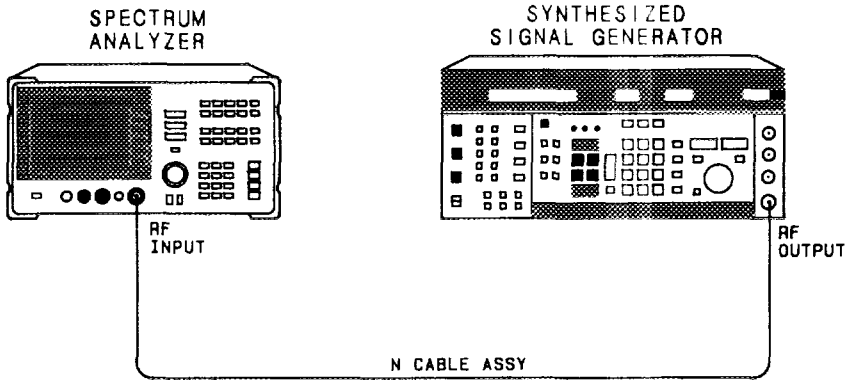


Figure 3-10. Residual FM Test Setup

EQUIPMENT

Synthesized Signal Generator	HP 8663A
Cables:	
Type N, 183 cm (72 in.)	HP 11500A

PROCEDURE

Determining the IF Filter Slope

1. Connect the equipment as shown in Figure 3-10.

2. Set the HP 8663A controls as follows:

FREQUENCY	2500 MHz
CW OUTPUT	−10 dBm

3. On the HP 8562A/B, press the PRESET key and set the controls as follows:

CENTER FREQ	2.5 GHz
SPAN	1 MHz
REF LEVEL	−5 dBm
dB/DIV	1 dB
RES BW	3 kHz

4. On the HP 8562A/B, press the PEAK SEARCH key, [SIGNAL TRK ON], and the SPAN key. Press the ↓ key six times. Press the BW key, the 1 key, the kHz key, the MKR-> key, [MARKER->CF], [MARKER->REF LVL], the MARKER ON key, [SIG TRK OFF], and the MARKER OFF key.

5. On the HP 8562A/B press the TRIG key, [SINGLE], the PEAK SEARCH key, and [MARKER DELTA].

6. Rotate the HP 8562A/B data entry knob counterclockwise until the Δ MKR reads −1 dB ±0.1 dB. Press [MARKER DELTA]. Rotate the data entry knob counterclockwise until the Δ MKR reads −4 dB ±0.1 dB.

7. Divide the Δ MKR frequency in Hertz by the Δ MKR amplitude in dB to obtain the slope of the RES BW filter. For example if the Δ MKR frequency is 380 Hz and the Δ MKR amplitute is 3.92 dB, the slope would be equal to 97 Hz/dB. Record the result below:

Slope: _____ Hz/dB

Measuring the Residual FM

8. On the HP 8562A/B, press the MARKER OFF key, the PEAK SEARCH key, and [MARKER DELTA]. Rotate the data entry knob counterclockwise until the Δ MKR reads −3 dB ±0.1 dB.

9. On the HP 8562A/B, press the MKR-> key, [MARKER NORMAL], [MARKER->CF], the SPAN key, and [ZERO SPAN]. Set the sweep time to 100 ms. Press the TRIG key, and [SINGLE].

NOTE

The displayed trace should be about three divisions below the reference level. If it is not, press [CONT], the FREQUENCY key, and use the data entry knob to place the displayed trace about three divisions below the reference level. Press the TRIG key and [SINGLE] then continue with step 10.

10. On the HP 8562A/B, press the PEAK SEARCH key and [MARKER DELTA]. Rotate the data entry knob to position the active marker at the lowest point on the displayed trace. Read the Δ MKR amplitude, take its absolute value, and record the result as the Deviation.

Deviation: _____ dB

11. Calculate the Residual FM by multiplying the Slope recorded in step 7 by the Deviation recorded in step 10. Record the result below. The Residual FM should be less than 50 Hz.

Residual FM: _____ Hz.

3-33. Noise Sidebands

SPECIFICATION

Noise Sidebands: <(−100 + 20 Log N) dBc/Hz

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

The noise sidebands of a 2.5 GHz, −10 dBm, signal are measured at an offset of 30 kHz from the carrier with a 1 kHz resolution bandwidth.

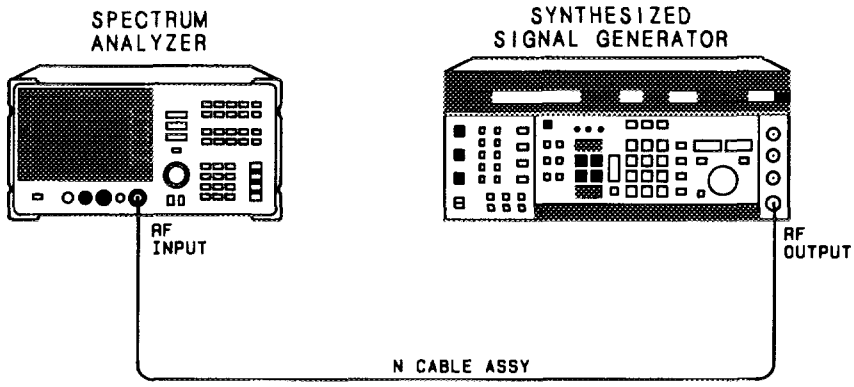


Figure 3-11. Noise Sidebands Test Setup

EQUIPMENT

Synthesized Signal Generator	HP 8663A
Cables:	
Type N, 183 cm (72 in.)	HP 11500A

PROCEDURE

1. Connect the equipment as shown in Figure 3-11.

2. Set the HP 8663A controls as follows:

FREQUENCY	2500 MHz
CW OUTPUT	−15 dBm

3. On the HP 8562A/B, press the PRESET key and set the controls as follows:

CENTER FREQ	2.5 GHz
SPAN	1 MHz
REF LEVEL	−10 dBm
ATTEN	0 dB
CF STEP	30 kHz

4. On the HP 8562A/B, press the PEAK SEARCH key, [SIG TRK ON], and the SPAN key. Press the ↓ key six times. Wait for the completion of two sweeps and then press the MARKER ON key, [SIG TRK OFF], the BW key, the kHz key, the SPAN key, and [ZERO SPAN]. Press the BW key, [VIDEO BW], the 1 key, the 1 key, and the Hz key.

5. Adjust the HP 8663A amplitude as necessary to place the peak of the signal at the HP 8562A/B reference level.

6. On the HP 8562A/B, press the TRIG key, [SINGLE], and [SINGLE]. Wait for the completion of the sweep and press the MARKER ON key, [MKR NOISE ON], and [MARKER DELTA].

7. On the HP 8562A/B, press the FREQUENCY key, [CF STEP], the 3 key, the 0 key, the kHz key, [CENTER FREQ], and the ↑ key.

8. Press the TRIG key and [SINGLE] on the HP 8562A/B. Wait for the completion of the sweep and then record the Δ MKR amplitude in Table 3-21 column 2 as the Single Sideband Noise for +30 kHz offset.

9. On the HP 8562A/B, press the FREQUENCY key, the ↓ key, and the ↓ key.

10. Press the TRIG key and [SINGLE] on the HP 8562A/B. Wait for the completion of the sweep and then record the Δ MKR amplitude in Table 3-21 column 2 as the Single Sideband Noise for −30 kHz offset.

11. The values recorded in steps 8 and 10 should be less than −100 dBc/Hz.

Table 3-21. Noise Sidebands

Offset (kHz)	Δ MKR Reading		Measurement Uncertainty (dB)
	Actual (dBc/Hz)	Max (dBc/Hz)	
+30	_____	−100	+1.51/−1.53
−30	_____	−100	+1.51/−1.53

3-34. Image, Multiple, and Out-of-Band Responses

SPECIFICATION

Image, Multiple, and Out-of-Band Responses:
<18 GHz: <—70 dBc
<22 GHz: <—60 dBc

RELATED ADJUSTMENT

YTF Adjustment (HP 8562A)

DESCRIPTION

This performance test applies only to HP 8562A analyzers. Image and out-of-band responses are tested in each of the five frequency bands.

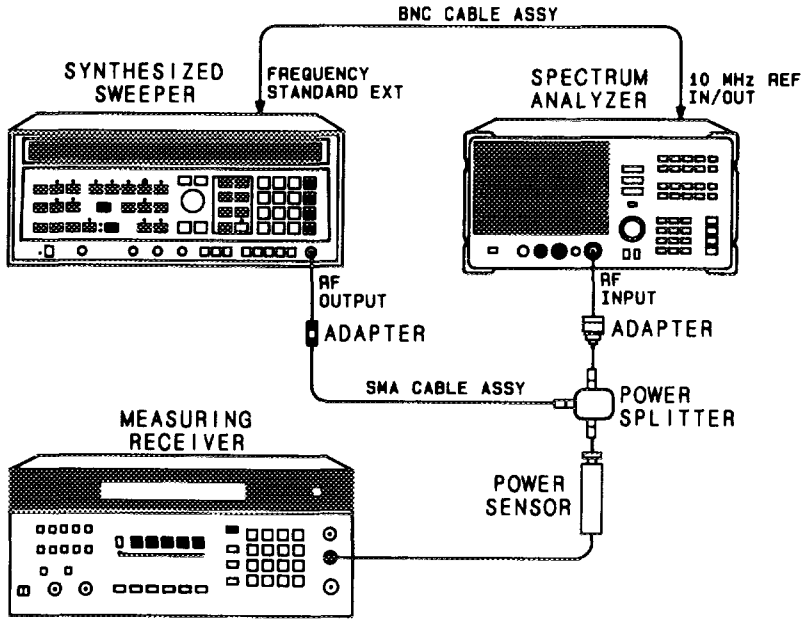


Figure 3-12. Image, Multiple, and Out-of-Band Responses Test Setup

EQUIPMENT

Synthesized Sweeper	HP 8340A
Measuring Receiver	HP 8902A
Power Sensor	HP 8485A

Adapters:
Type N (m) to APC 3.5 (m) . . . . . HP 1250-1743
Type APC 3.5 (f) to APC 3.5 (f) . . . . . HP 5061-5311

Cables:
BNC, 122 cm (48 in.) . . . . . HP 10503A
SMA, 61 cm (24 in.) . . . . . HP 8120-1578

PROCEDURE

Band 0

1. Connect the equipment as shown in Figure 3-12, but do not connect the power sensor to the power splitter.

2. Press the INSTR PRESET key on the HP 8340A, and set the controls as follows:

   CW . . . . . 2 GHz
   POWER LEVEL . . . . . −10 dBm
   FREQUENCY STANDARD SWITCH (rear panel) . . . . . EXT

3. On the HP 8562A, press the PRESET key, the RECALL key, [MORE], and [FACTORY PRESEL PK]. Set the HP 8562A controls as follows:

   CENTER FREQ . . . . . 2 GHz
   SPAN . . . . . 10 kHz
   REF LEVEL . . . . . −10 dBm
   ATTEN . . . . . 0 dB
   RES BW . . . . . 1 kHz

4. Zero and calibrate the HP 8902A and HP 8485A. Enter the power sensor's 2 GHz calibration factor into the HP 8902A. Connect the HP 8485A to the HP 11667B Power Splitter.

5. Adjust the HP 8340A POWER LEVEL key for a −10 dBm ±0.1 dB reading on the HP 8902A.

6. On the HP 8562A, press the PEAK SEARCH key, the MKR-> key, [MKR->REF LVL], the TRIG key, [SINGLE], the PEAK SEARCH key, and [MARKER DELTA].

7. For each of the frequencies listed in Table 3-22 for Band 0, do the following:

   a. Set the HP 8340A to the listed CW key frequency.

   b. Enter the appropriate power sensor calibration factor into the HP 8902A.

   c. Set the HP 8340A POWER LEVEL key for a −10 dBm reading on the HP 8902A.

   d. Press the TRIG key and [SINGLE] on the HP 8562A. Wait for the completion of the sweep before continuing.

   e. On the HP 8562A, press the PEAK SEARCH key and record the Δ MKR amplitude in Table 3-22 as the Response Amplitude. The Response Amplitude should be less than the specification listed in the table.

8. On the HP 8562A, press the MARKER OFF key, the TRIG key and [CONT].

Band 1

9. Set the HP 8562A center frequency to 4 GHz. Set the HP 8340A CW to 4 GHz.

10. Enter the power sensor's 4 GHz calibration factor into the HP 8902A.

11. On the HP 8562A, press the PEAK SEARCH key, the INT key, and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear and press the MARKER OFF key.

12. Repeat steps 5 through 8 for the HP 8340A frequencies listed in Table 3-22 for Band 1.

Band 2

13. Set the HP 8562A center frequency to 9 GHz. Set the HP 8340A CW to 9 GHz.

14. Enter the power sensor's 9 GHz calibration factor into the HP 8902A.

15. On the HP 8562A, press the PEAK SEARCH key, the INT key, and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear and press the MARKER OFF key.

16. Repeat steps 5 through 8 for the HP 8340A frequencies listed in Table 3-22 for Band 2.

Band 3

17. Set the HP 8562A center frequency to 15 GHz. Set the HP 8340A CW to 15 GHz.

18. Enter the power sensor's 15 GHz calibration factor into the HP 8902A.

19. On the HP 8562A, press the PEAK SEARCH key, the INT key, and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear and press the MARKER OFF key.

20. Repeat steps 5 through 8 for the HP 8340A frequencies listed in Table 3-22 for Band 3.

Band 4

21. Set the HP 8562A center frequency to 21 GHz. Set the HP 8340A CW to 21 GHz.

22. Enter the power sensor's 21 GHz calibration factor into the HP 8902A.

23. On the HP 8562A, press the PEAK SEARCH key, the INT key, and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear and press the MARKER OFF key.

24. Repeat steps 5 through 8 for the HP 8340A frequencies listed in Table 3-22 for Band 4.

25. Record the maximum Response Amplitude from Table 3-22 for Band 0, 1, 2, and 3 entries.

Maximum Response Amplitude (<18 GHz): _____ dBc

26. Record the maximum Response Amplitude from Table 3-22 for Band 4.

Maximum Response Amplitude (<22 GHz): _____ dBc

Table 3-22. Image, Multiple, and Out-of-Band Responses

Band	HP 8562A/B Center Freq (GHz)	HP 8340A [CW] (MHz)	Response Amplitude (dBc)	Specification (dBc)	Measurement Uncertainty (dB)
0	2.0	1978.6[1]	_____	−70	+1.52/−1.57
	2.0	2021.4[1]	_____	−70	+1.52/−1.57
	2.0	1378.6[1]	_____	−70	+1.52/−1.57
	2.0	2621.4[1]	_____	−70	+1.52/−1.57
	2.0	9821.6[2]	_____	−70	+1.52/−1.57
	2.0	7910.7[2]	_____	−70	+1.52/−1.57
	2.0	1810.7[3]	_____	−70	+1.52/−1.57
	2.0	289.3[3]	_____	−70	+1.52/−1.57
1	4.0	3978.6[1]	_____	−70	+1.52/−1.56
	4.0	4021.4[1]	_____	−70	+1.52/−1.56
	4.0	3378.6[1]	_____	−70	+1.52/−1.56
	4.0	4621.4[1]	_____	−70	+1.52/−1.56
	4.0	289.3[2]	_____	−70	+1.52/−1.56
	4.0	3721.4[3]	_____	−70	+1.52/−1.56
2	9.0	8978.6[1]	_____	−70	+1.52/−1.57
	9.0	9021.4[1]	_____	−70	+1.52/−1.57
	9.0	8378.6[1]	_____	−70	+1.52/−1.57
	9.0	9621.4[1]	_____	−70	+1.52/−1.57
	9.0	289.3[2]	_____	−70	+1.52/−1.57
	9.0	9921.4[3]	_____	−70	+1.52/−1.57
3	15.0	14978.6[1]	_____	−70	+1.53/−1.57
	15.0	15021.4[1]	_____	−70	+1.53/−1.57
	15.0	14378.6[1]	_____	−70	+1.53/−1.57
	15.0	15621.4[1]	_____	−70	+1.53/−1.57
	15.0	289.3[2]	_____	−70	+1.53/−1.57
	15.0	14721.4[3]	_____	−70	+1.53/−1.57
4	21.0	20978.6[1]	_____	−60	+1.53/−1.59
	21.0	21021.4[1]	_____	−60	+1.53/−1.59
	21.0	20378.6[1]	_____	−60	+1.53/−1.59
	21.0	21621.4[1]	_____	−60	+1.53/−1.59
	21.0	289.3[2]	_____	−60	+1.53/−1.59
	21.0	21921.4[3]	_____	−60	+1.53/−1.59

[1] Image Response
[2] Out-of-Band Response
[3] Multiple Response

3-35. Frequency Readout Accuracy/ Frequency Count Marker Accuracy

SPECIFICATION

Frequency Readout Accuracy: <±[(Center Frequency × 4 × 10^{-6}) + (5% of Span) + (15% of RES BW) + 250 Hz]

Frequency Count Marker Accuracy: <±[(Marker Freq. × 4 × 10^{-6}) + (50 Hz × N) + 1 LSD]

RELATED ADJUSTMENT

YTO Adjustment
10 MHz Frequency Reference Adjustment

DESCRIPTION

The accuracy of the HP 8562A/B frequency readout and frequency count marker is tested with an input signal of known frequency.

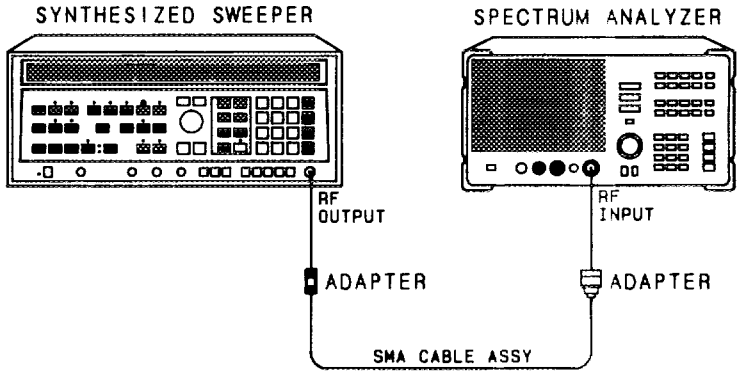


Figure 3-13. Frequency Readout and Frequency Count Accuracy Test Setup

EQUIPMENT

Synthesized Sweeper	HP 8340A
Adapters:	
Type N (m) to APC 3.5 (f)	HP 1250-1744
Type APC 3.5 (f) to APC 3.5 (f)	HP 5061-5311

Cables:
SMA, 61 cm (24 in.) . . . . . HP 8120-1578

PROCEDURE

1. Connect the equipment as shown in Figure 3-13.

Frequency Readout Accuracy

2. Press the INSTR PRESET key on the HP 8340A. Set the HP 8340A controls as follows:

CW . . . . . 1.5 GHz
POWER LEVEL . . . . . −10 dBm

3. On the HP 8562A/B, press the PRESET key and set the controls as follows:

CENTER FREQ . . . . . 1.5 GHz
SPAN . . . . . 1 MHz

4. *Omit this step if spectrum analyzer is an HP 8562B.* On HP 8562A analyzers, press the RECALL key, [MORE], and [FACTORY PRSEL PK].

5. On the HP 8562A/B, press the PEAK SEARCH key. Record the MKR frequency in Table 3-23 as the Actual Marker Reading. The reading should be within the limits shown.

6. Repeat step 5 for all the frequency and span combinations listed in Table 3-23. Peak the HP 8562A preselector after tuning the analyzer's center frequency and HP 8340A the CW key to frequencies of 4 GHz and above.

Frequency Count Marker Accuracy

7. Set the HP 8562A/B the SPAN key to 1 MHz. Press the FREQ COUNT key and set [COUNTER RES] to 10 Hz.

8. Key in the HP 8340A CW frequencies and the HP 8562A/B center frequencies as indicated in Table 3-24. For each pair of settings, press the PEAK SEARCH key and record the MKR frequency at each point in Table 3-24. The marker readings should be within the limits shown.

Table 3-23. Frequency Readout Accuracy

HP 8340A Frequency (GHz)	HP 8562A		Marker Reading			Measurement Uncertainty (kHz)
	Span	Center Freq	Min (GHz)	Actual (GHz)	Max (GHz)	
1.5	1 MHz	1.5 GHz	1.499942	_____	1.500058	±2.045
1.5	10 MHz	1.5 GHz	1.49948	_____	1.50052	±17.075
1.5	20 MHz	1.5 GHz	1.49895	_____	1.50105	±33.675
1.5	50 MHz	1.5 GHz	1.49745	_____	1.50255	±83.675
1.5	100 MHz	1.5 GHz	1.4948	_____	1.5052	±167.375
1.5	1 GHz	1.5 GHz	1.450	_____	1.550	±1670.375
4.0	1 MHz	4 GHz	3.999932	_____	4.000068	±2.67
4.0	10 MHz	4 GHz	3.99947	_____	4.00053	±17.7
4.0	20 MHz	4 GHz	3.99894	_____	4.00106	±34.3
4.0	50 MHz	4 GHz	3.99744	_____	4.00256	±84.3
4.0	100 MHz	4 GHz	3.9948	_____	4.0052	±168.0
4.0	1 GHz	4 GHz	3.950	_____	4.050	±1.671
9.0	1 MHz	9.0 GHz	8.999912	_____	9.000088	±3.92
9.0	10 MHz	9.0 GHz	8.99945	_____	9.00055	±18.95
9.0	20 MHz	9.0 GHz	8.99892	_____	9.00108	±35.55
9.0	50 MHz	9.0 GHz	8.99742	_____	9.00258	±85.55
9.0	100 MHz	9.0 GHz	8.9948	_____	9.0052	±169.25
9.0	1 GHz	9.0 GHz	8.950	_____	9.050	±1672.95
16.0	1 MHz	16.0 GHz	15.99984	_____	16.000116	±5.67
16.0	10MHz	16.0 GHz	15.99942	_____	16.00058	±20.70
16.0	20 MHz	16.0 GHz	15.99889	_____	16.00111	±37.3
16.0	50 MHz	16.0 GHz	15.99739	_____	16.00261	±87.3
16.0	100 MHz	16.0 GHz	15.9948	_____	16.0052	±171.0
16.0	1 GHz	16.0 GHz	15.950	_____	16.050	±1674.0
21.0	1 MHz	21.0 GHz	20.999864	_____	21.000136	±6.92
21.0	10 MHz	21.0 GHz	20.99940	_____	21.00060	±21.95
21.0	20 MHz	21.0 GHz	20.99887	_____	21.00113	±38.55
21.0	50 MHz	21.0 GHz	20.99737	_____	21.00263	±88.55
21.0	100 MHz	21.0 GHz	20.9948	_____	21.0052	±172.25
21.0	1 GHz	21.0 GHz	20.950	_____	21.050	±1675.25

Table 3-24. Frequency Count Marker Accuracy

HP 8340A Frequency (GHz)	HP 8562A Frequency (GHz)	Marker Frequency			Measurement Uncertainty (Hz)
		Min (GHz)	Actual (GHz)	Max (GHz)	
1.5	1.5	1.49999394	_____	1.50000606	±375
4.0	4.0	3.99998394	_____	4.00001606	±1000
9.0	9.0	8.99996389	_____	9.00003611	±2250
16.0	16.0	15.99993584	_____	16.00006416	±4000
21.0	21.0	20.99991579	_____	21.00008421	±5250

3-36. Pulse Digitization Uncertainty

SPECIFICATION

Pulse Digitization Uncertainty (Pulse Repetition Frequency >720/sweep time):

Peak-to-Peak:
Log <±1 dB
Linear <±4% of Reference Level

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

This test measures the ability of the analyzer's analog-to-digital circuitry to respond to pulsed RF signals. The synthesized sweeper is phase-locked to the spectrum analyzer's 10 MHz reference. Since the 1 dB/DIV and 5 dB/DIV scale factors are derived digitally from the 2 dB/DIV and 10 dB/DIV scale factors, respectively, it is only necessary to test the 1 dB/DIV, 5 dB/DIV, and Linear scale factors.

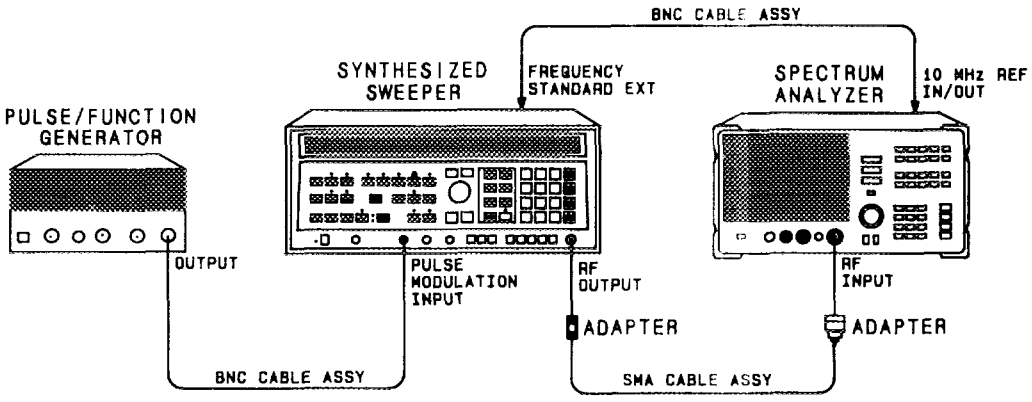


Figure 3-14. Pulse Digitization Uncertainty Test Setup

EQUIPMENT

Synthesized Sweeper	HP 8340A
Pulse/Function Generator	HP 8116A
Adapters:	
Type N (m) to APC 3.5 (f)	HP 1250-1744
Type APC 3.5 (f) to APC 3.5 (f)	HP 5061-5311

Cables:
BNC, 122 cm (48 in.) (2 required) . . . . . HP 10503A
SMA, 61 cm (24 in.) . . . . . HP 8120-1578

PROCEDURE

1. Connect the equipment as shown in Figure 3-14.

2. Press the INSTR PRESET key on the HP 8340A. Set the HP 8340A controls as follows:

CW	2500 MHz
POWER LEVEL	−15 dBm
MODULATION	PULSE
RF	ON
LEVELING	INT
FREQUENCY STANDARD SWITCH (rear panel)	EXT

3. Set the HP 8116A controls as follows:

FUNCTION	PULSE
FREQ	125 kHz
WID	200 ns
AMP	5.0V
OFS	0.0V
MODE	NORM
CTRL	OFF

4. On the HP 8562A/B, press the PRESET key, and set the controls as follows:

CENTER FREQ	2500 MHz
SPAN	0 Hz
REF LVL	−10 dBm
RES BW	1 MHz
VIDEO BW	3 MHz
DETECTOR	POS PEAK
dB/DIV	5 dB

5. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the PEAK SEARCH key, and [MARKER DELTA].

6. On the HP 8116A, use the range switch to set the frequency to 12.5 kHz.

7. On the HP 8562A/B, press the TRIG key, [SINGLE] and the PEAK SEARCH key. Read the Δ MKR amplitude. The value should be less than 1.0 dB.

8. Repeat steps 3 through 7 above, using a 1 dB/DIV scale on the HP 8562A/B. The Δ MKR amplitude reading in step 7 should be less than 1 dB.

9. Repeat steps 3 and 4.

10. Press the AMPLITUDE key, [LINEAR], [MORE], [UNITS], and the dBm key.

11. Adjust the HP 8340A POWER LEVEL to place the signal one division below the reference level.

12. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the PEAK SEARCH key, and [MARKER DELTA].

13. On the HP 8116A, use the range switch to set the frequency to 12.5 kHz.

14. On the HP 8562A/B, press the TRIG key, [SINGLE], and the PEAK SEARCH key. Read the Δ MKR amplitude. The Δ MKR value should be between −0.40 dB and +0.38 dB.

3-37. Second Harmonic Distortion

SPECIFICATION

For frequencies <2.9 GHz: <—72 dBc for a —40 dBm mixer level*

(HP8562A) For frequencies >2.9 GHz: <—100 dBc for a —10 dBm mixer level*

(HP8562B) For frequencies >2.9 GHz: <—60 dBc for a —40 dBm mixer level*

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

A synthesized sweeper and low-pass filter provide the signal for measuring second harmonic distortion. The low-pass filter eliminates any harmonic distortion originating at the signal source. The HP 8562A/B's frequency response is calibrated out for the >2.9 GHz test. The synthesized sweeper is phase-locked to the spectrum analyzer's 10 MHz reference.

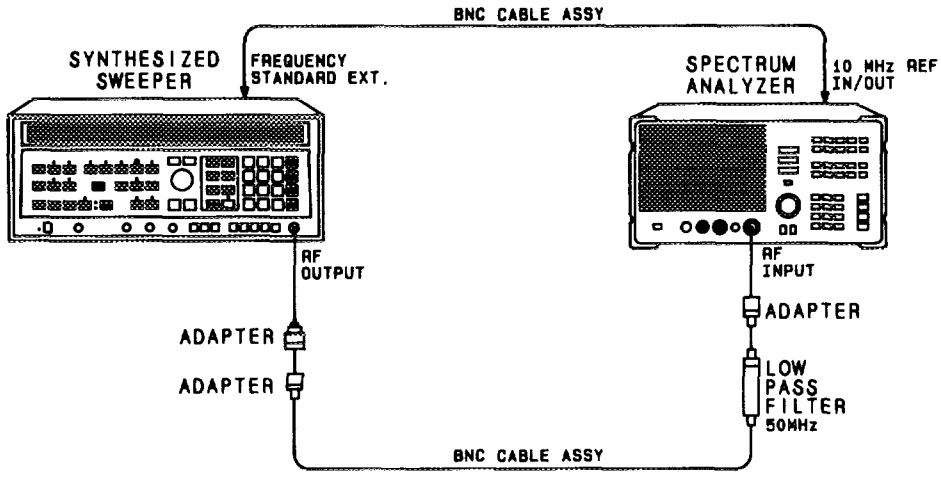


Figure 3-15. Second Harmonic Distortion Test Setup, Band 0

* Mixer Level = Input Level — Input Attenuation

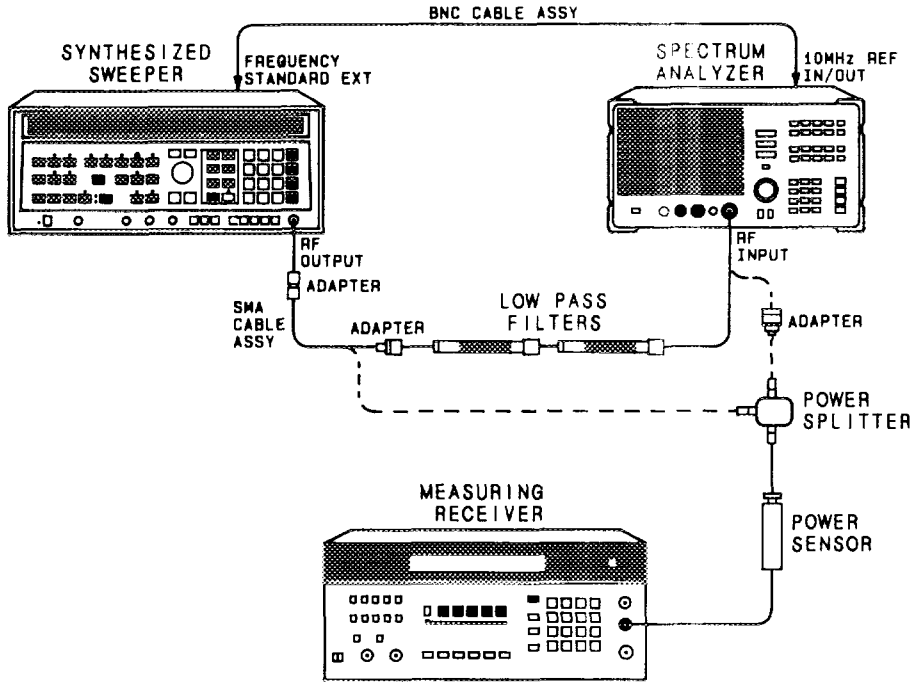


Figure 3-16. Second Harmonic Distortion Test Setup, Bands 1—4

EQUIPMENT

Synthesized Sweeper	HP 8340A
Measuring Receiver	HP 8902A
Power Sensor	HP 8485A
50 MHz low-pass filter	HP 0955-0306
4.1 GHz low-pass filter (2 required)	HP 360D
Adapters:	
Type N (m) to BNC (f) (2 required)	HP 1250-1476
Type N (m) to SMA (f)	HP 1250-1250
Type N (f) to APC 3.5 (f)	HP 1250-1745
Type N (m) to APC 3.5 (m)	HP 1250-1743
Type APC 3.5 (f) to APC 3.5 (f)	HP 5061-5311
Cables:	
BNC, 122 cm (48 in.) (2 required)	HP 10503A
SMA, 61 cm (24 in.)	HP 8120-1578

PROCEDURE

Distortion, Band 0

1. Connect the equipment as shown in Figure 3-15, using the 50 MHz low-pass filter and BNC cable.

2. Press the INSTR PRESET key on the HP 8340A. Set the HP 8340A controls as follows:

CW	30 MHz
POWER LEVEL	−30 dBm
FREQUENCY STANDARD SWITCH (rear panel)	EXT

3. On the HP 8562A/B press the PRESET key and set the controls as follows:

CENTER FREQ	30 MHz
SPAN	10 kHz
REF LEVEL	−30 dBm

4. On the HP 8562A/B, press the PEAK SEARCH key. Adjust the HP 8340A power level for a HP 8562A/B marker amplitude reading of −30 dBm.

5. On the HP 8562A/B, press the TRIG key, [SINGLE], the PEAK SEARCH key, the MKR-> key, and [MARKER->CF STEP]. Press [MARKER DELTA], the FREQUENCY key, and the ↑ key.

6. On the HP 8562A/B, press the TRIG key and [SINGLE]. After the HP 8562A/B completes a new sweep, press the PEAK SEARCH key. The Δ MKR should read less than −72 dB (<−72 dBc).

Second Harmonic Distortion (Band 0): _____ dBc

Distortion, Bands 1-4

7. Zero and calibrate the HP 8902A/ HP 8485A combination in log mode (readout in dBm). Enter the power sensor's 3 GHz calibration factor into the HP 8902A.

8. Connect the equipment as shown in Figure 3-16 without the filters in place.

9. Set the HP 8562A/B controls as follows:

CENTER FREQ	2.95 GHz
CF STEP	2.95 GHz
REF LVL	0 dBm

10. Set the HP 8340A controls as follows:

CW	2.95 GHz
POWER LEVEL	0 dBm

11. On the HP 8562A/B, press the TRIG key, [CONT], the MARKER OFF key, and the PEAK SEARCH key.

12. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, press the INT key and [PRESEL AUTO PK]. Wait for PEAKING message to disappear before continuing to the next step.

13. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR reading of −5 dBm.

14. Press the RATIO key on the HP 8902A. Enter the power sensor's 6 GHz calibration factor into the HP 8902A.

15. Set the HP 8340A CW to 5.9 GHz.

16. On the HP 8562A/B, press the FREQUENCY key, the ↑ key, and the PEAK SEARCH key.

17. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, press the INT key and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear before continuing to the next step.

18. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR reading of −5 dBm.

19. Record the HP 8902A reading below as the Frequency Response Error.

Frequency Response Error: _____ dB

20. Connect the equipment as shown in Figure 3-16 with the filters in place.

21. Set the HP 8340A controls as follows:

CW . . . . . 2.95 GHz
POWER LEVEL . . . . . −5 dBm
HP 8562B: −30 dBm

22. On the HP 8562A/B, press the FREQUENCY key, the ↓ key, and the PEAK SEARCH key.

23. *Omit this step if spectrum analyzer is an HP 8562A.* On the HP 8562B, press the AMPLITUDE key, the 3 key, the 0 key, and the −dBm key.

24. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, press the INT key and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear before continuing to the next step.

25. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B marker amplitude reading of 0 dBm. *HP 8562B: −30 dBm.*

26. On the HP 8562A/B, press the TRIG key, [SINGLE], [SINGLE], the PEAK SEARCH key, [MARKER DELTA], the FREQUENCY key, and the ↑ key.

27. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, press the AMPLITUDE key, the 3 key, the 0 key, and the −dBm key.

28. Press the TRIG key and [SINGLE] on the HP 8562A/B.

29. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, press the PEAK SEARCH key, the INT key, and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear before continuing to the next step.

30. Wait for the completion of a new sweep, then press the PEAK SEARCH key. Record the Δ MKR amplitude reading below.

Δ MKR Amplitude Reading: _____ dBc

31. Algebraically add the Frequency Response Error recorded in step 19 to the Δ MKR Amplitude Reading in step 30. Record the result below as the Second Harmonic Distortion (>2.7 GHz). The distortion should be less than −100 dBc *(HP 8562B: less than −60 dBc).*

Second Harmonic Distortion (>2.9 GHz): _____ dBc

3-38. Frequency Response

SPECIFICATION

In-band Frequency Response (10 dB Input Attenuation):

	HP 8562A	HP 8562B
1 kHz–2.90 GHz	±1.2 dB	±1.2 dB
2.75–6.46 GHz	±2.5 dB	±2.0 dB
6.46–13.0 GHz	±3.5 dB	±2.5 dB
13.0–19.7 GHz	±4.0 dB	±3.0 dB
19.7–22.0 GHz	±4.3 dB	±4.3 dB

Frequency Response relative to the calibrator (300 MHz): <±5.1 dB
Band Switching Uncertainty: <±0.5 dB

RELATED ADJUSTMENT

YTF Adjustment (HP 8562A)
Frequency Response Adjustment

DESCRIPTION

The output of the synthesized sweeper is fed through a power splitter to a power sensor and the HP 8562A/B. The synthesized sweeper's power level is adjusted at 300 MHz to place the displayed signal at the HP 8562A/B's center horizontal graticule line. The measuring receiver, used as a power meter, is placed in RATIO mode. At each new synthesized sweeper frequency, and HP 8562A/B center frequency, the sweeper's power level is adjusted to place the signal at the center horizontal graticule line. The measuring receiver displays the inverse of the frequency response relative to the calibrator.

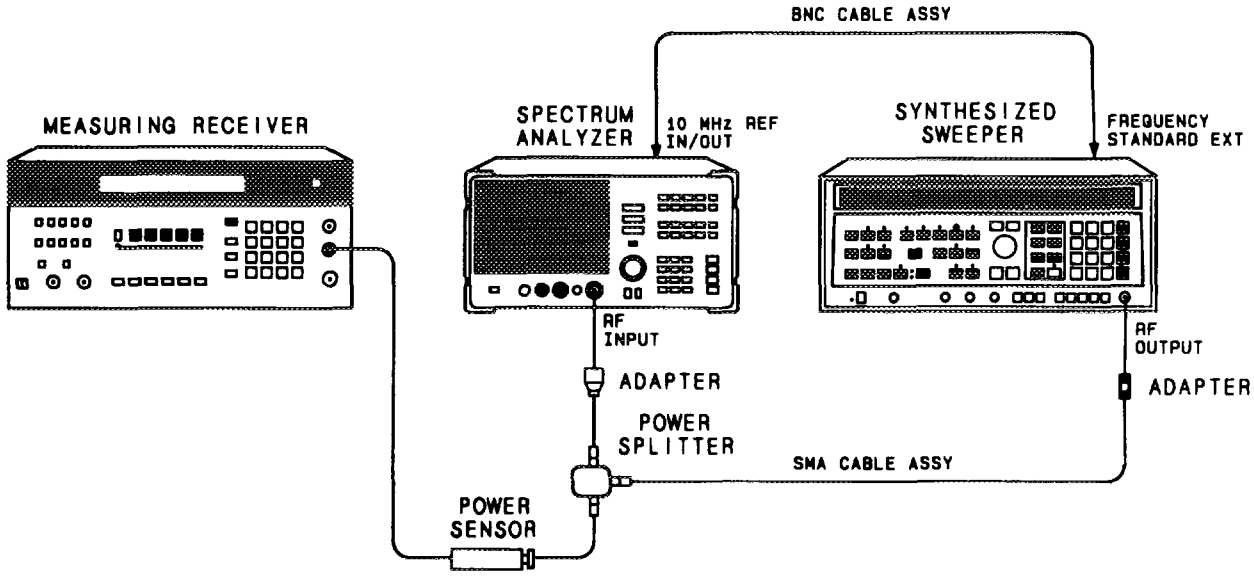


Figure 3-17. Frequency Response Test Setup, 50 MHz to 22 GHz

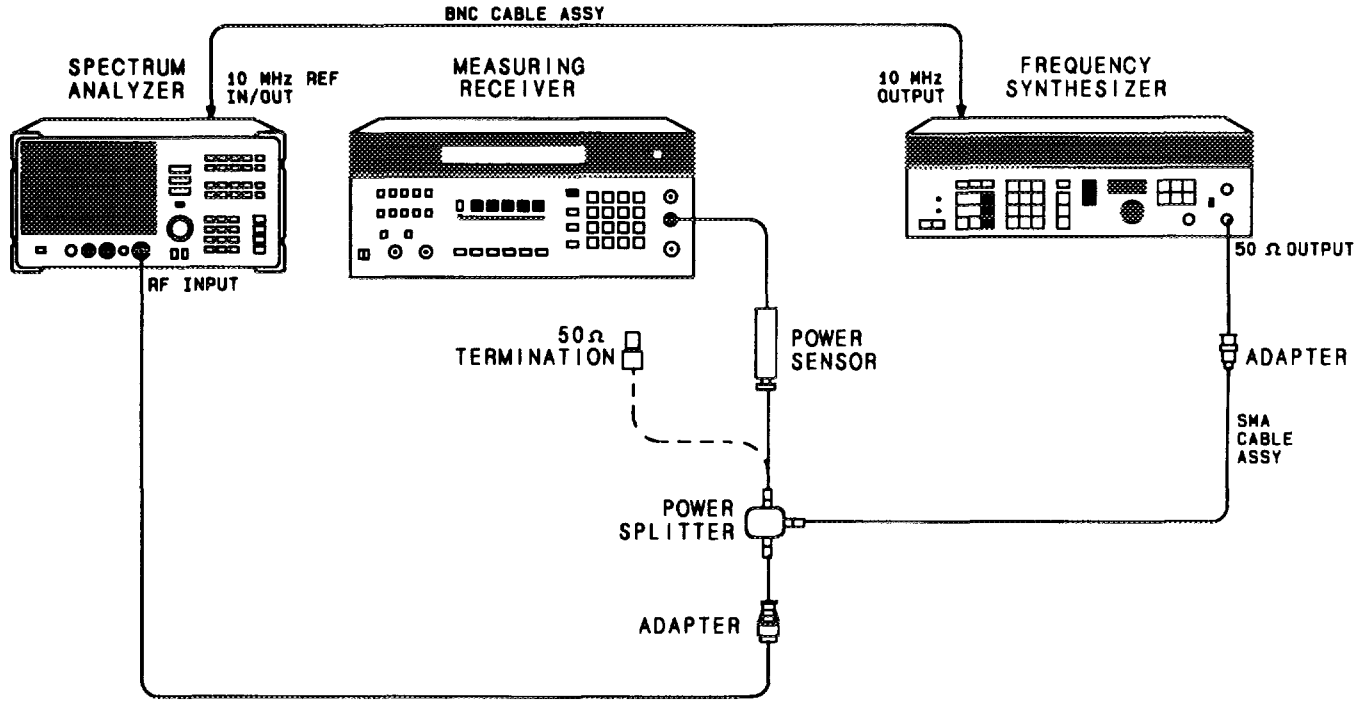


Figure 3-18. Frequency Response Test Setup, <50 MHz

EQUIPMENT

Measuring Receiver	HP 8902A
Synthesized Sweeper	HP 8340A
Frequency Synthesizer	HP 3335A
Power Sensor	HP 8485A
Power Splitter	HP 11667B
Coaxial 50-Ohm Termination	HP 909D
Adapters:	
Type N (m) to APC 3.5 (m) (2 required)	HP 1250-1743
Type N (f) to BNC (f)	HP 1250-1474
Type APC 3.5 (f) to APC 3.5 (f)	HP 5061-5311
Cables:	
BNC, 122 cm (48 in.)	HP 10503A
SMA, 61 cm (24 in.)	HP 8120-1578

PROCEDURE

1. Zero and calibrate the HP 8902A and HP 8485A in log mode as described in the HP 8902A Operation Manual.

2. Connect the equipment as shown in Figure 3-17.

3. Press the INSTR PRESET key on the HP 8340A. Set the HP 8340A controls as follows:

CW	300 MHz
FREQ STEP	100 MHz
POWER LEVEL	−4 dBm
FREQUENCY STANDARD SWITCH (rear panel)	EXT

4. On the HP 8562A/B, press the PRESET key. *If the analyzer is an HP 8562A, press the RECALL key, [MORE], and [FACTORY PRESEL PK].* Set the HP 8562A/B controls as follows:

CENTER FREQ	300 MHz
CF STEP	100 MHz
SPAN	0 Hz
REF LVL	−5 dBm
dB/DIV	1 dB
RES BW	300 kHz

5. On the HP 8562A/B, press the AMPLITUDE key, [MORE], [IF ADJUST], [IF ADJ ON], and the MARKER ON key.

6. Adjust the HP 8340A POWER LEVEL for a MKR amplitude reading of −10 dBm ±0.05 dB.

7. Press the RATIO key on the HP 8902A.

Frequency Response, Band 0 (≥50 MHz)

8. Set the HP 8340A CW to 50 MHz.

9. Set the HP 8562A/B [CENTER FREQ] to 50 MHz.

10. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR amplitude reading of −10 dBm ±0.05 dB.

11. Record the power ratio displayed on the HP 8902A here. Record the negative of the power ratio in Table 3-25.

HP 8902A reading at 50 MHz: _____dB

12. Set the HP 8340A CW to 100 MHz.

13. Set the HP 8562A/B [CENTER FREQ] to 100 MHz.

14. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR amplitude reading of −10 dBm ±0.05 dB.

15. Record the negative of the power ratio displayed on the HP 8902A in Table 3-25 as the HP 8902A Reading.

16. On the HP 8340A, press the CW key and the ↑ key and press the FREQUENCY key and the ↑ key on the HP 8562A/B to step through the remaining frequencies listed in Table 3-25. At each new frequency repeat steps 13 through 15, entering the power sensor's calibration factors into the HP 8902A as indicated in Table 3-25.

Frequency Response, Band 1

17. On the HP 8562A/B, press the FREQUENCY key, the 2 key, the . key, the 9 key, the 5 key, and the GHz key.

18. Set the HP 8340A CW to 2.95 GHz.

19. *If the spectrum analyzer is an HP 8562A, press the INT key and [PRESEL AUTO PK].* Wait for the PEAKING message to disappear.

20. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR amplitude reading of −10 dBm ±0.05 dB.

21. Record the negative of the power ratio displayed on the HP 8902A in Table 3-26.

22. On the HP 8340A, press CW and the ↑ key and on the HP 8562A/B press the FREQUENCY key and the ↑ key to step through the remaining frequencies listed in Table 3-26. At each new frequency repeat steps 19 through 21, entering the power sensor's calibration factors into the HP 8902A as indicated in Table 3-26.

Frequency Response, Band 2

23. On the HP 8562A/B, press the FREQUENCY key, the 6 key, the . key, the 5 key, the GHz key, [CF STEP], the 2 key, the 0 key, the 0 key, and the MHz key.

24. Set the HP 8340A CW to 6.5 GHz and the FREQ STEP to 200 MHz.

25. *If the spectrum analyzer is an HP 8562A, press the INT key and [PRESEL AUTO PK].* Wait for the PEAKING message to disappear.

26. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR amplitude reading of −10 dBm ±0.05 dB.

27. Record the negative of the power ratio displayed on the HP 8902A in Table 3-27 as the HP 8902A Reading.

28. Set the HP 8340A CW and the HP 8562A/B CENTER FREQ to 6.6 GHz. Repeat steps 25 through 27.

29. On the HP 8340A, press CW and the ↑ key and on the HP 8562A/B press the FREQUENCY key and the ↑ key to step through the remaining frequencies listed in Table 3-27. At each new frequency repeat steps 25 through 27, entering the power sensor's calibration factors into the HP 8902A as indicated in Table 3-27.

Frequency Response, Band 3

30. On the HP 8562A/B, press the FREQUENCY key, the 1 key, the 3 key, the . key, the 1 key, and the GHz key.

31. Set the HP 8340A CW to 13.1 GHz.

32. *If the spectrum analyzer is an HP 8562A, press the INT key and [PRESEL AUTO PK].* Wait for the PEAKING message to disappear.

33. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR amplitude reading of −10 dBm ±0.05 dB.

34. Record the negative of the power ratio displayed on the HP 8902A in Table 3-28 as the HP 8902A Reading.

35. Press CW and the ↑ key on the HP 8340A and the FREQUENCY key and the ↑ key on the HP 8562A/B to step through the remaining frequencies listed in Table 3-28. At each new frequency repeat steps 32 through 34, entering the power sensor's calbration factors into the HP 8902A as indicated in Table 3-28.

Frequency Response, Band 4

36. On the HP 8562A/B, press the FREQUENCY key, the 1 key, the 9 key, the . key, the 7 key, the 1 key, the GHz key, [CF STEP], the 1 key, the 0 key, the 0 key, and the MHz key.

37. Set the HP 8340A CW to 19.71 GHz and the FREQ STEP to 100 MHz.

38. *If the spectrum analyzer is an HP 8562A, press the INT key and [PRESEL AUTO PK].* Wait for the PEAKING message to disappear.

39. Adjust the HP 8340A POWER LEVEL for an HP 8562A/B MKR amplitude reading of −10 dBm ±0.05 dB.

40. Record the negative of the power ratio displayed on the HP 8902A in Table 3-29 as the HP 8902A Reading.

41. Set the HP 8340A CW and the HP 8562A/B CENTER FREQ to 19.8 GHz. Repeat steps 38 through 40.

42. Press CW and the ↑ key on the HP 8340A and the FREQUENCY key and the ↑ key on the HP 8562A/B to step through the remaining frequencies listed in Table 3-29. At each new frequency repeat steps 38 through 40, entering the power sensor's calibration factors into the HP 8902A as indicated in Table 3-29.

Frequency Response, Band 0 (<50 MHz)

43. Set the HP 8562A/B controls as follows:

CENTER FREQ	50 MHz
RES BW	100 Hz
MARKER	OFF

44. Connect the equipment as shown in Figure 3-18. Set the HP 3335A controls as follows:

FREQUENCY	50 MHz
AMPLITUDE	−4 dBm
AMPTD INCR	0.1 dB

45. Enter the power sensor's 50 MHz calibration factor into the HP 8902A.

46. Adjust the HP 3335A AMPLITUDE until the HP 8902A display reads the same value as recorded in step 11. Record the HP 3335A amplitude here and in Table 3-30.

HP 3335A Amplitude (50 MHz): _____dB

47. Replace the HP 8485A power sensor with the HP 909D 50-ohm termination.

48. On the HP 8562A/B, press the MARKER ON key and [MARKER DELTA].

49. Set the HP 8562A/B [CENTER FREQ] and HP 3335A FREQUENCY to the frequencies listed in Table 3-30. At each frequency, adjust the HP 3335A AMPLITUDE for a Δ MKR amplitude reading of 0.00 ±0.05 dB. Record the HP 3335A AMPLITUDE setting in Table 3-30 as the HP 3335A Amplitude.

50. For each of the frequencies in Table 3-30, subtract the HP 3335A the AMPLITUDE Reading (column 2) from the HP 3335A AMPLITUDE (50 MHz) recorded in step 46. Record the result as the Response Relative to 50 MHz (column 3) of Table 3-30.

51. Add to each of the Response Relative to 50 MHz entries in Table 3-30 the HP 8902A Reading for 50 MHz listed in Table 3-21. Record the results as the Response Relative to 300 MHz in Table 3-30.

Test Results

52. Frequency Response, Band 0

a. Enter most positive number from Table 3-30, column 4 . . . . . _____ dB

b. Enter most positive number from Table 3-25, column 2 . . . . . _____ dB

c. Enter more positive of numbers from (a) and (b) . . . . . _____ dB

d. Enter most negative number from Table 3-30, column 4 . . . . . _____ dB

e. Enter most negative number from Table 3-25, column 2 . . . . . _____ dB

f. Enter more negative of numbers from (d) and (e) . . . . . _____ dB

g. Subtract (f) from (c). The result should be less than 2.4 dB . . . . . _____ dB

h. The absolute values in (c) and (f) should be less than 5.1 dB.

53. Frequency Response, Band 1

a. Enter most positive number from Table 3-26, column 2 . . . . . _____ dB
The absolute value of this number should be less than 5.1 dB.

b. Enter most negative number from Table 3-26, column 2 . . . . . _____ dB
The absolute value of this number should be less than 5.1 dB.

c. Subtract (b) from (a) . . . . . _____ dB
The result should be less than 5.0 dB. *HP 8562B: 4.0 dB*

54. Frequency Response, Band 2

a. Enter most positive number from Table 3-27, column 2 . . . . . _____ dB
The absolute value of this number should be less than 5.1 dB.

b. Enter most negative number from Table 3-27, column 2 . . . . . _____ dB
The absolute value of this number should be less than 5.1 dB.

c. Subtract (b) from (a) . . . . . _____ dB
The result should be less than 7.0 dB. *HP 8562B: 5.0 dB*

55. Frequency Response, Band 3

a. Enter most positive number from Table 2-28, column 2 . . . . . _____ dB
The absolute value of this number should be less than 5.1 dB.

b. Enter most negative number from Table 2-28, column 2 . . . . . _____ dB
The absolute value of this number should be less than 5.1 dB.

c. Subtract (b) from (a) . . . . . _____ dB
The result should be less than 8.0 dB. *HP 8562B: 6.0 dB*

56. Frequency Response, Band 4

    a. Enter most positive number from Table 3-29, column 2 . . . . . _____ dB
    The absolute value of this number should be less than 5.1 dB.

    b. Enter most negative number from Table 3-29, column 2 . . . . . _____ dB
    The absolute value of this number should be less than 5.1 dB.

    c. Subtract (b) from (a) . . . . . _____ dB
    The result should be less than 8.6 dB.

Band Switching Uncertainty

57. In the top row of Table 3-31, enter the values recorded in the indicated steps. For example, if step 54(a) has a value of 1.22 dB, enter 1.22 dB in the top row of the Band 2 column.

58. In the left column of Table 3-31, enter the values recorded in the indicated steps. For example, if step 52(b) has a value of −0.95 dB, enter −0.95 dB in the left column of the Band 1 row.

59. Compute the other entries of Table 3-31 by taking the absolute value of the difference between the values in the left column and the top row.

60. Each computed entry should be less than the limit shown directly below the entry for HP 8562A analyzers. Limits shown in parentheses apply to HP 8562B analyzers.

Table 3-25. Frequency Response Band 0 (≥50 MHz)

Column 1	Column 2	Column 3	Column 4
Frequency (MHz)	**HP 8902A Reading (dB)**	**CAL Factor Frequency (GHz)**	**Measurement Uncertainty**
50	_____	.05	+.29/−.31 dB
100	_____	.05	+.29/−.31 dB
200	_____	.05	+.29/−.31 dB
300	_____	.05	0 (Ref)
400	_____	.05	+.29/−.31 dB
500	_____	.05	+.29/−.31 dB
600	_____	.05	+.29/−.31 dB
700	_____	.05	+.29/−.31 dB
800	_____	.05	+.29/−.31 dB
900	_____	.05	+.29/−.31 dB
1000	_____	.05	+.29/−.31 dB
1100	_____	2.0	+.29/−.31 dB
1200	_____	2.0	+.29/−.31 dB
1300	_____	2.0	+.29/−.31 dB
1400	_____	2.0	+.29/−.31 dB
1500	_____	2.0	+.29/−.31 dB
1600	_____	2.0	+.29/−.31 dB
1700	_____	2.0	+.29/−.31 dB
1800	_____	2.0	+.29/−.31 dB
1900	_____	2.0	+.29/−.31 dB
2000	_____	2.0	+.29/−.31 dB
2100	_____	2.0	+.29/−.31 dB
2200	_____	2.0	+.29/−.31 dB
2300	_____	2.0	+.29/−.31 dB
2400	_____	2.0	+.29/−.31 dB
2500	_____	3.0	+.29/−.31 dB
2600	_____	3.0	+.29/−.31 dB
2700	_____	3.0	+.29/−.31 dB
2800	_____	3.0	+.29/−.31 dB
2900	_____	3.0	+.29/−.31 dB

Table 3-26. Frequency Response, Band 1

Column 1	Column 2	Column 3	Column 4
Frequency (GHz)	**HP 8902A Reading (dB)**	**CAL Factor Frequency (GHz)**	**Measurement Uncertainty**
2.95	_____	3.0	+0.43/−0.47 dB
3.05	_____	3.0	+0.43/−0.47 dB
3.15	_____	3.0	+0.43/−0.47 dB
3.25	_____	3.0	+0.43/−0.47 dB
3.35	_____	3.0	+0.43/−0.47 dB
3.45	_____	3.0	+0.43/−0.47 dB
3.55	_____	4.0	+0.43/−0.47 dB
3.65	_____	4.0	+0.43/−0.47 dB
3.75	_____	4.0	+0.43/−0.47 dB
3.85	_____	4.0	+0.43/−0.47 dB
3.95	_____	4.0	+0.43/−0.47 dB
4.05	_____	4.0	+0.43/−0.47 dB
4.15	_____	4.0	+0.43/−0.47 dB
4.25	_____	4.0	+0.43/−0.47 dB
4.35	_____	4.0	+0.43/−0.47 dB
4.45	_____	4.0	+0.43/−0.47 dB
4.55	_____	5.0	+0.43/−0.47 dB
4.65	_____	5.0	+0.43/−0.47 dB
4.75	_____	5.0	+0.43/−0.47 dB
4.85	_____	5.0	+0.43/−0.47 dB
4.95	_____	5.0	+0.43/−0.47 dB
5.05	_____	5.0	+0.43/−0.47 dB
5.15	_____	5.0	+0.43/−0.47 dB
5.25	_____	5.0	+0.43/−0.47 dB
5.35	_____	5.0	+0.43/−0.47 dB
5.45	_____	5.0	+0.43/−0.47 dB
5.55	_____	6.0	+0.43/−0.47 dB
5.65	_____	6.0	+0.43/−0.47 dB
5.75	_____	6.0	+0.43/−0.47 dB
5.85	_____	6.0	+0.43/−0.47 dB
5.95	_____	6.0	+0.43/−0.47 dB
6.05	_____	6.0	+0.43/−0.47 dB
6.15	_____	6.0	+0.43/−0.47 dB
6.25	_____	6.0	+0.43/−0.47 dB
6.35	_____	6.0	+0.43/−0.47 dB
6.45	_____	6.0	+0.43/−0.47 dB

Table 3-27. Frequency Response, Band 2

Column 1	Column 2	Column 3	Column 4
Frequency (GHz)	**HP 8902A Reading (dB)**	**CAL Factor Frequency (GHz)**	**Measurement Uncertainty**
6.5	_____	6.0	+0.43/−0.48 dB
6.6	_____	7.0	+0.43/−0.48 dB
6.8	_____	7.0	+0.43/−0.48 dB
7.0	_____	7.0	+0.43/−0.48 dB
7.2	_____	7.0	+0.43/−0.48 dB
7.4	_____	7.0	+0.43/−0.48 dB
7.6	_____	8.0	+0.43/−0.48 dB
7.8	_____	8.0	+0.43/−0.48 dB
8.0	_____	8.0	+0.43/−0.48 dB
8.2	_____	8.0	+0.43/−0.48 dB
8.4	_____	8.0	+0.43/−0.48 dB
8.6	_____	9.0	+0.43/−0.48 dB
8.8	_____	9.0	+0.43/−0.48 dB
9.0	_____	9.0	+0.43/−0.48 dB
9.2	_____	9.0	+0.43/−0.48 dB
9.4	_____	9.0	+0.43/−0.48 dB
9.6	_____	10.0	+0.43/−0.48 dB
9.8	_____	10.0	+0.43/−0.48 dB
10.0	_____	10.0	+0.43/−0.48 dB
10.2	_____	10.0	+0.43/−0.48 dB
10.4	_____	10.0	+0.43/−0.48 dB
10.6	_____	11.0	+0.43/−0.48 dB
10.8	_____	11.0	+0.43/−0.48 dB
11.0	_____	11.0	+0.43/−0.48 dB
11.2	_____	11.0	+0.43/−0.48 dB
11.4	_____	11.0	+0.43/−0.48 dB
11.6	_____	12.0	+0.43/−0.48 dB
11.8	_____	12.0	+0.43/−0.48 dB
12.0	_____	12.0	+0.43/−0.48 dB
12.2	_____	12.0	+0.43/−0.48 dB
12.4	_____	12.0	+0.43/−0.48 dB
12.6	_____	13.0	+0.43/−0.48 dB
12.8	_____	13.0	+0.43/−0.48 dB
13.0	_____	13.0	+0.43/−0.48 dB

Table 3-28. Frequency Response, Band 3

Column 1	Column 2	Column 3	Column 4
Frequency (GHz)	HP 8902A Reading (dB)	CAL Factor Frequency (GHz)	Measurement Uncertainty
13.1	_____	13.0	0 (Ref)
13.3	_____	13.0	+0.43/−0.48 dB
13.5	_____	13.0	+0.43/−0.48 dB
13.7	_____	14.0	+0.43/−0.48 dB
13.9	_____	14.0	+0.43/−0.48 dB
14.1	_____	14.0	+0.43/−0.48 dB
14.3	_____	14.0	+0.43/−0.48 dB
14.5	_____	14.0	+0.43/−0.48 dB
14.7	_____	15.0	+0.43/−0.48 dB
14.9	_____	15.0	+0.43/−0.48 dB
15.1	_____	15.0	+0.43/−0.48 dB
15.3	_____	15.0	+0.43/−0.48 dB
15.5	_____	15.0	+0.43/−0.48 dB
15.7	_____	16.0	+0.43/−0.48 dB
15.9	_____	16.0	+0.43/−0.48 dB
16.1	_____	16.0	+0.43/−0.48 dB
16.3	_____	16.0	+0.43/−0.48 dB
16.5	_____	16.0	+0.43/−0.48 dB
16.7	_____	17.0	+0.43/−0.48 dB
16.9	_____	17.0	+0.43/−0.48 dB
17.1	_____	17.0	+0.43/−0.48 dB
17.3	_____	17.0	+0.43/−0.48 dB
17.5	_____	17.0	+0.43/−0.48 dB
17.7	_____	18.0	+0.43/−0.48 dB
17.9	_____	18.0	+0.43/−0.48 dB
18.1	_____	18.0	+0.43/−0.48 dB
18.3	_____	18.0	+0.43/−0.48 dB
18.5	_____	18.0	+0.43/−0.48 dB
18.7	_____	19.0	+0.43/−0.48 dB
18.9	_____	19.0	+0.43/−0.48 dB
19.1	_____	19.0	+0.43/−0.48 dB
19.3	_____	19.0	+0.43/−0.48 dB
19.5	_____	19.0	+0.43/−0.48 dB
19.7	_____	20.0	+0.43/−0.48 dB

Table 3-29. Frequency Response, Band 4

Column 1	Column 2	Column 3	Column 4
Frequency (GHz)	**HP 8902A Reading (dB)**	**CAL Factor Frequency (GHz)**	**Measurement Uncertainty (dB)**
19.701	_____	20.0	+0.55/−0.59
19.8	_____	20.0	+0.55/−0.59
19.9	_____	20.0	+0.55/−0.59
20.0	_____	20.0	+0.55/−0.59
20.1	_____	20.0	+0.55/−0.59
20.2	_____	20.0	+0.55/−0.59
20.3	_____	20.0	+0.55/−0.59
20.4	_____	20.0	+0.55/−0.59
20.5	_____	21.0	+0.55/−0.59
20.6	_____	21.0	+0.55/−0.59
20.7	_____	21.0	+0.55/−0.59
20.8	_____	21.0	+0.55/−0.59
20.9	_____	21.0	+0.55/−0.59
21.0	_____	21.0	+0.55/−0.59
21.1	_____	21.0	+0.55/−0.59
21.2	_____	21.0	+0.55/−0.59
21.3	_____	21.0	+0.55/−0.59
21.4	_____	21.0	+0.55/−0.59
21.5	_____	22.0	+0.55/−0.59
21.6	_____	22.0	+0.55/−0.59
21.7	_____	22.0	+0.55/−0.59
21.8	_____	22.0	+0.55/−0.59
21.9	_____	22.0	+0.55/−0.59
22.0	_____	22.0	+0.55/−0.59

Table 3-30. Frequency Response, Band 0 (<50 MHz)

Column 1	Column 2	Column 3	Column 4	Column 5
Frequency	**HP 3335A Amplitude (dBm)**	**Response Relative to 50 MHz**	**Response Relative to 300 MHz**	**Measurement Uncertainty (dB)**
50 MHz	_____	0 (Ref)	_____	+.34/−.37
20 MHz	_____	_____	_____	+.34/−.37
10 MHz	_____	_____	_____	+.34/−.37
1 MHz	_____	_____	_____	+.34/−.37
100 kHz	_____	_____	_____	+.34/−.37
10 kHz	_____	_____	_____	+.34/−.37
1 kHz	_____	_____	_____	+.34/−.37

Table 3-31. Band Switching Uncertainty

	Band 0 step 51(c) _____	**Band 1 step 52(a)** _____	**Band 2 step 53(a)** _____	**Band 3 step 54(a)** _____	**Band 4 step 55(a)** _____
Band 0 step 51(f) _____		_____ 4.2 dB (3.7 dB)	_____ 5.2 dB (3.7 dB)	_____ 5.7 dB (4.7 dB)	_____ 6.0 dB (6.0 dB)
Band 1 step 52(b) _____	_____ 4.2 dB (3.7 dB)		_____ 6.5 dB (5.0 dB)	_____ 7.0 dB (6.0 dB)	_____ 7.3 dB (6.8 dB)
Band 2 step 53(b) _____	_____ 5.2 dB (4.2 dB)	_____ 6.5 dB (5.0 dB)		_____ 8.0 dB (6.0 dB)	_____ 8.3 dB (7.3 dB)
Band 3 step 54(b) _____	_____ 5.7 dB (4.7 dB)	_____ 7.0 dB (6.0 dB)	_____ 8.0 dB (6.0 dB)		_____ 8.8 dB (7.8 dB)
Band 4 step 55(b) _____	_____ 6.0 dB (6.0 dB)	_____ 7.3 dB (6.8 dB)	_____ 8.3 dB (7.3 dB)	_____ 8.8 dB (7.8 dB)	

Performance Tests

a. *Set the HP 8340A #1 CW to the HP 8562A center frequency.*

b. *On the HP 8562A, press the* TRIG *key,* [CONT], *the* PEAK SEARCH *key, the* INT *key, and* [PRESEL AUTO PK]. *Wait for the* PEAKING *message to disappear before continuing to the next step.*

c. *On the HP 8562A, press the* TRIG *key and* [SINGLE].

d. *Proceed with steps 5 and 6 above.*

8. On the HP 8562B, press the TRIG key, [SINGLE], [SINGLE], the MARKER OFF key, and the PEAK SEARCH key.

9. Press the INT key and [SIG ID AT MKR]. Wait for the signal identification routine to finish.

10. If the frequency displayed in the active function block is within 50 MHz of the CW frequency of HP 8340A #1, and it is not identified as being an image, proceed to step 13.

11. If the frequency displayed in the active function block is more than 50 MHz from the CW frequency of HP 8340A #1 and/or is identified as being an image, press the MARKER ON key. Rotate the knob to place the marker on the peak of the next highest signal.

12. Repeat steps 9 through 11 until the conditions in step 10 are met.

13. Press the MARKER ON key and [MARKER DELTA]. Rotate the knob to place the active marker on a signal near the tenth vertical graticule line (one division from the rightmost graticule line).

14. Press the INT key and [SIG ID AT MKR]. Wait for the signal identification routine to finish.

15. If the frequency displayed in the active function block is within 50 MHz of the HP 8340A #2 CW frequency, and the signal has not been identified as being an image, proceed to step 18.

16. If the frequency displayed in the active function block is more than 50 MHz from the HP 8340A #2 CW frequency and/or is identified as being an image, press the MARKER ON key. Rotate the knob to place the active marker on the peak of the next highest signal.

17. Repeat steps 14 through 16 until the conditions in step 15 are met.

18. Record the HP 8562A/B Δ MKR frequency reading as the Actual Δ MKR reading in Table 3-32. The reading should be within the limits shown.

19. For all other frequency spans of 5 GHz or more on the HP 8562B, repeat steps 8 through 18 for the combinations of HP 8340A CW frequencies and HP 8562B center frequencies as indicated in Table 3-32.

Table 3-32. Frequency Span Accuracy

HP 8340A #1 Frequency (GHz)	HP 8340A #2 Frequency (GHz)	HP 8562A		Δ MKR Reading			Measurement Uncertainty
		Center Frequency	Span Setting	Min	Actual	Max	
1.499996	1.500004	1.5 GHz	10 kHz	7.60 kHz	_____	8.40 kHz	33 Hz
1.499992	1.500008	1.5 GHz	20 kHz	15.2 kHz	_____	16.8 kHz	66 Hz
1.499980	1.500020	1.5 GHz	50 kHz	38.0 kHz	_____	42.0 kHz	165 Hz
1.499960	1.500040	1.5 GHz	100 kHz	76.0 kHz	_____	84.0 kHz	330 Hz
1.499960	1.500040	1.5 GHz	101 kHz	76.0 kHz	_____	84.0 kHz	333.3 Hz
1.499920	1.500080	1.5 GHz	200 kHz	152 kHz	_____	168 kHz	660 Hz
1.499800	1.500200	1.5 GHz	500 kHz	380 kHz	_____	420 kHz	1.65 kHz
1.499600	1.500400	1.5 GHz	1.0 MHz	760 kHz	_____	840 kHz	3.3 kHz
1.499600	1.500400	1.5 GHz	1.01 MHz	760 kHz	_____	840 kHz	3.333 kHz
1.499200	1.500800	1.5 GHz	2.0 MHz	1.52 MHz	_____	1.68 MHz	6.6 kHz
1.498000	1.502000	1.5 GHz	5.0 MHz	3.80 MHz	_____	4.20 MHz	16.5 kHz
1.496	1.504	1.5 GHz	10.0 MHz	7.60 MHz	_____	8.40 MHz	33 kHz
1.492	1.508	1.5 GHz	20.0 MHz	15.2 MHz	_____	16.8 MHz	66 kHz
1.480	1.520	1.5 GHz	50.0 MHz	38 MHz	_____	42.0 MHz	165 kHz
1.460	1.540	1.5 GHz	100 MHz	76 MHz	_____	84.0 MHz	330 kHz
1.420	1.580	1.5 GHz	200 MHz	152 MHz	_____	168.0 MHz	660 kHz
1.300	1.700	1.5 GHz	500 MHz	380 MHz	_____	420 MHz	1.65 MHz
1.100	1.900	1.5 GHz	1.0 GHz	760 MHz	_____	840 MHz	3.3 MHz
0.700	2.300	1.5 GHz	2.0 GHz	1.52 GHz	_____	1.68 GHz	6.6 MHz
8.999996	9.000004	9.0 GHz	10 kHz	7.6 kHz	_____	8.4 kHz	33 Hz
8.992	9.008	9.0 GHz	20 MHz	15.2 MHz	_____	16.8 MHz	66 kHz
8.98	9.020	9.0 GHz	50 MHz	38.0 MHz	_____	42.0 MHz	165 kHz
7.0	11.0	9.0 GHz	5 GHz	3.8 GHz	_____	4.2 GHz	16.5 MHz
15.999996	16.000004	16.0 GHz	10 kHz	7.6 kHz	_____	8.4 kHz	33 Hz
15.98	16.02	16.0 GHz	50 MHz	38 MHz	_____	42 MHz	165 kHz
15.96	16.04	16.0 GHz	100 MHz	76.0 MHz	_____	84.0 MHz	330 kHz
14.0	18.0	16.0 GHz	5 GHz	3.8 GHz	_____	4.2 GHz	16.5 MHz
20.499996	20.500004	20.5 GHz	10 kHz	7.6 kHz	_____	8.4 kHz	33 Hz
20.48	20.52	20.5 GHz	50 MHz	38 MHz	_____	42 MHz	165 kHz
20.46	20.54	20.5 GHz	100 MHz	76.0 MHz	_____	84.0 MHz	330 kHz
3.0	21.0	12.40 GHz	19.25 GHz	17.1 GHz	_____	18.9 GHz	63.525 MHz

3-40. Third Order Intermodulation Distortion

SPECIFICATION

For a total mixer input level* of −30 dBm:

10 MHz–2.9 GHz: <−70 dBc
2.75–22 GHz: <−75 dBc

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

Two synthesized sweepers provide the signals required for measuring third order intermodulation. Both synthesized sweepers are phase-locked to the analyzer's 10 MHz reference.

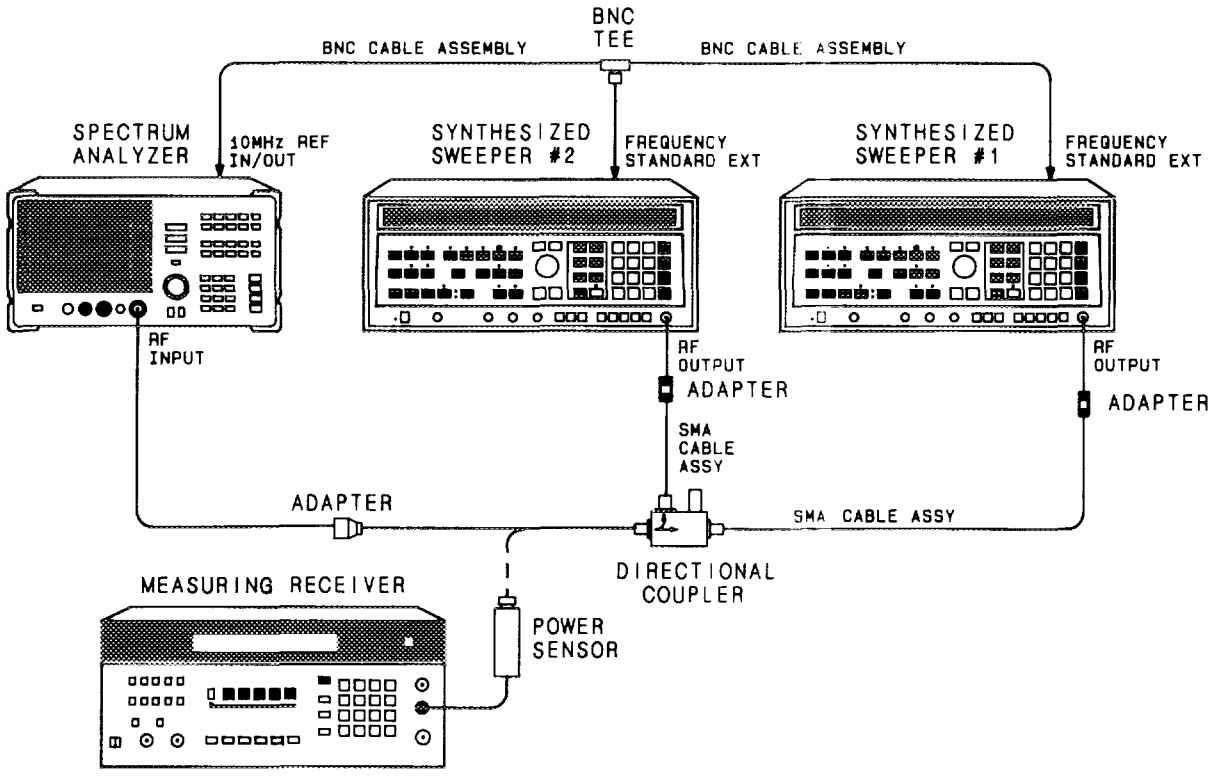


Figure 3-20. Third Order Intermodulation (>2.7 GHz) Test Setup

* Total mixer input level = Total Input Level − Input Attenuation

EQUIPMENT

Measuring Receiver	HP 8902A
Synthesized Sweeper (2 required)	HP 8340A
Directional Coupler	HP 0955-0125
Power Sensor	HP 8485A
Adapters:	
Type N (m) to APC 3.5 (m)	HP 1250-1743
Type APC 3.5 (f) to APC 3.5 (f) (2 required)	HP 5061-5311
Type BNC tee (m) (f) (f)	HP 1250-0781
Cables:	
BNC, 122 cm (48 in.) (2 required)	HP 10503A
SMA, 61 cm (24 in.) (2 required)	HP 8120-1578

PROCEDURE

Third Order Intermodulation (10 MHz—2.9 GHz)

1. Connect the equipment as shown in Figure 3-20.

2. Press the INSTR PRESET key on each HP 8340A. Set each of the HP 8340A controls as follows:

POWER LEVEL	−20 dBm
CW (HP 8340A #1)	2.800 GHz
CW (HP 8340A #2)	2.80005 GHz
MODULATION	OFF
RF	OFF
FREQUENCY STANDARD SWITCH (rear panel)	EXT

3. Set the HP 8902A controls as follows:

FUNCTION	RF POWER
LOG/LIN	LOG

4. On the HP 8562A/B, press the PRESET key. *On HP 8562A analyzers, press the RECALL key, [MORE], and [FACTORY PRSEL PK].* Set the HP 8562A/B controls as follows:

CENTER FREQ	2.8 GHz
REF LVL	−20 dBm
SPAN	10 kHz
CF STEP	50 kHz
RES BW	1 kHz
VIDEO BW	100 Hz

5. Zero the HP 8902A and calibrate the HP 8485A power sensor at 50 MHz as described in the HP 8902A Operation Manual. Enter the power sensor's 3 GHz calibration factor into the HP 8902A.

6. Connect the HP 8485A Power Sensor to the output of the directional coupler.

7. On the HP 8340A #1, press the RF key on. Adjust the the POWER LEVEL key for a −23 dBm reading on the HP 8902A display.

8. Disconnect the power sensor from the directional coupler. Connect the directional coupler directly to the HP 8562A/B RF INPUT using an adapter. (Do not use a cable.)

9. On the HP 8562A/B, press the following keys: the PEAK SEARCH key, the MKR-> key, and [MARKER->REF LVL]. Wait for a new sweep to finish, then press the following keys: [MARKER DELTA], the FREQUENCY key, and the ↑ key.

10. On the HP 8340A #2, press the RF key on.

11. On the HP 8562A/B, press the PEAK SEARCH key.

12. Adjust the the POWER LEVEL key of the HP 8340A #2 for a Δ MKR reading of 0.0 dB ±0.17 dB.

13. Press the following HP 8562A/B keys: the MARKER OFF key, the PEAK SEARCH key, [MARKER DELTA], the FREQUENCY key, and the ↑ key. Wait for a new sweep to finish, then press the PEAK SEARCH key.

14. Record the HP 8562A/B Δ MKR reading in Table 3-33 as the Upper Product Suppression. The suppression should be greater than 70 dB.

15. On the HP 8562A/B, press the FREQUENCY key, the ↓ key, the ↓ key, and the ↓ key. Wait for a new sweep to finish and press the PEAK SEARCH key.

16. Record the HP 8562A/B Δ MKR reading in Table 3-33 as the Lower Product Suppression. The suppression should be greater than 70 dB.

Third Order Intermodulation, >2.75 GHz

17. Disconnect the directional coupler from the HP 8562A/B. Connect the directional coupler to the power sensor.

18. On the HP 8340A #2, press the RF key off.

19. Set each of the HP 8340A frequencies, the CW key, to the next values listed in Table 3-33. Enter the appropriate power sensor calibration factor into the HP 8902A.

20. Adjust the the POWER LEVEL key on the HP 8340A #1 for a −23 dBm reading on the HP 8902A display.

21. Disconnect the power sensor from the directional coupler. Connect the directional coupler directly to the HP 8562A/B RF INPUT using an adapter.

22. Set the HP 8562A/B center frequency to the same frequency as the HP 8340A #1. Press the MARKER OFF key.

23. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, set the reference level to −20 dBm then press the following keys: the PEAK SEARCH key, the INT key, and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear.

24. On the HP 8562A/B, press the PEAK SEARCH key, the MKR-> key, and [MARKER->REF LVL]. Wait for the completion of a new sweep and press the following keys: [MARKER DELTA], the FREQUENCY key, and the ↑ key.

25. On the HP 8340A #2, press the RF key on.

26. On the HP 8562A/B, press the PEAK SEARCH key.

27. Adjust the the POWER LEVEL key of the HP 8540A #2 for a Δ MKR reading of 0.0 dB ±0.17 dB.

28. On the HP 8562A/B, press the FREQUENCY key and the ↑ key. Wait for the completion of a new sweep and press the PEAK SEARCH key. Record the HP 8562A/B Δ MKR reading in Table 3-33 as the Upper Product Suppression. The suppression should be greater than 75 dB.

29. Press the following keys on the HP 8562A/B: the FREQUENCY key, the ↓ key, the ↓ key, and the ↓ key. Wait for the completion of a new sweep and press the PEAK SEARCH key. Record the HP 8562A/B Δ MKR reading in Table 3-33 as the Lower Product Suppression. The suppression should be greater than 75 dB.

30. Record the maximum of the Lower Product Suppression and Upper Product Suppression for the 2.8 GHz entries in Table 3-33.

Third Order Intermodulation Distorion at 2.8 GHz: _____ dBc

31. Record the maximum of the Lower Product Suppression and Upper Product Suppression for the 4.0 GHz entries in Table 3-33.

Third Order Intermodulation Distorion at 4.0 GHz: _____ dBc

Table 3-33. Third Order Intermodulation Distortion

HP 8340A #1 [CW] (GHz)	HP 8340A #2 [CW] (GHz)	Lower Product		Upper Product		Measurement Uncertainty (dB)
		Frequency (GHz)	Supression (dB)	Frequency (GHz)	Supression (dB)	
2.80000	2.80005	2.79995	_____	2.8001	_____	±2.83
4.00000	4.00005	3.99995	_____	4.00010	_____	±2.83

3-41. Gain Compression

SPECIFICATION

<1 dB for a −3 dBm total mixer power level*

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

This test measures gain compression in low band and high band. Two signals, separated by 3 MHz, are used. First the test places a −30 dBm signal at the input of the spectrum analyzer (the analyzer's reference level is also set to −30 dBm). Then a +7 dBm signal is placed on the analyzer, overdriving its input. The decrease in the first signal's amplitude (gain compression) caused by the second signal is the measured gain compression.

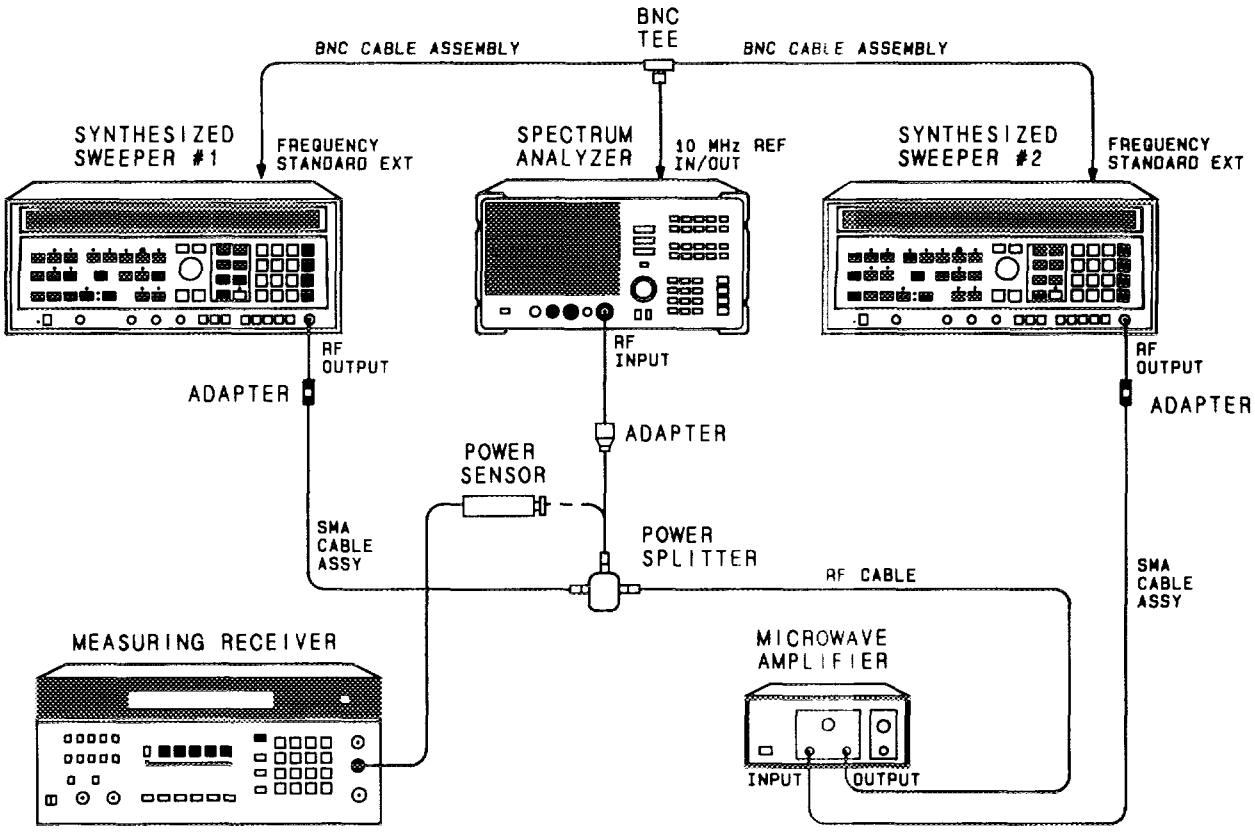


Figure 3-21. Gain Compression Test Setup

* Total mixer power level = Total Input Power Level − Input Attenuation

EQUIPMENT

Synthesized Sweeper (2 required)	HP 8340A
Measuring Receiver	HP 8902A
Amplifier	HP 11975A
Power Sensor	HP 8485A
Power Splitter	HP 11667B
Adapters:	
Type APC 3.5 (f) to APC 3.5 (f) (2 required)	HP 5061-5311
Type APC 3.5 (m) to N (m)	HP 1250-1743
Type BNC tee (m) (f) (f)	HP 1250-0781
Cables:	
BNC, 122 cm (48 in.) (2 required)	HP 10503A
SMA, 61 cm (24 in.)	HP 8120-1578
RF Cable	HP 11975-20002

PROCEDURE

<2.9 GHz

1. Zero the HP 8902A and calibrate the HP 8485A power sensor as described in the HP 8902A Operation Manual. Enter the power sensor's 2 GHz calibration factor into the HP 8902A.

2. Connect the equipment as shown in Figure 3-21, with the output of the power splitter connected to the HP 8485A Power Sensor.

3. Press the INSTR PRESET key on both HP 8340A's. Set the controls for the HP 8340A #1 as follows:

CW	2.0 GHz
POWER LEVEL	−24 dBm
FREQUENCY STANDARD SWITCH (rear panel)	EXT

4. Set the controls for the HP 8340A #2 as follows:

CW	2.003 GHz
POWER LEVEL	+8 dBm
FREQUENCY STANDARD SWITCH (rear panel)	EXT

5. On the HP 8562A/B, press the PRESET key. *On HP 8562A analyzers, press the RECALL key, [MORE], and [FACTORY PRESEL PK].* Set the HP 8562A/B controls as follows:

CENTER FREQ	2.0 GHz
REF LVL	−30 dBm
SPAN	10 MHz
RES BW	300 kHz
SCALE	1 dB/Div

6. Adjust the HP 11975A OUTPUT POWER LEVEL for a +7 dBm reading on the HP 8902A display.

7. Set the HP 8340A #2 POWER LEVEL key to −80 dBm.

8. Remove the power sensor from the power splitter. Connect the power splitter to the HP 8562A/B RF INPUT using an adapter. Do not use a cable.

9. Adjust the HP 8340A #1 POWER LEVEL key for a signal 1 dB below the HP 8562A/B reference level.

10. On the HP 8562A/B, press the PEAK SEARCH key and [MARKER DELTA].

11. Set the HP 8340A #2 POWER LEVEL key to +8 dBm.

12. On the HP 8562A/B, press the PEAK SEARCH key and [NEXT PEAK]. The active marker should be on the lower amplitude signal and not on the signal that is off the top of the screen. If it is not on the lower amplitude signal, reposition the marker to this peak using the front-panel function knob. Read the Δ MKR amplitude. The amplitude should read less than −1.0 dB.

Gain Compression Band 0 (<1.0 dB): _____dB

>2.9 GHz

13. Set the HP 8562A/B, HP 8340A #1, and HP 8340A #2 to the frequencies indicated in Table 3-34 for Band 1.

14. Enter the HP 8485A calibration factor at the HP 8562A/B center frequency value into the HP 8902A.

15. Disconnect the power splitter from the HP 8562A/B and reconnect it to the HP 8485A Power Sensor.

16. Adjust the HP 11975A OUTPUT POWER LEVEL for a +7 dBm reading on the HP 8902A display.

17. Set the HP 8340A #2 POWER LEVEL key to −80 dBm.

18. Reconnect the power splitter to the HP 8562A/B RF INPUT 50Ω.

19. Adjust the HP 8340A #1 POWER LEVEL key to bring the signal 1 dB (one division) below the HP 8562A reference level.

20. On the HP 8562A/B, press the MARKER OFF key and the PEAK SEARCH key.

21. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, press the INT key and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear before continuing to the next step.

22. On the HP 8562A/B, press the PEAK SEARCH key and [MARKER DELTA].

23. Set the HP 8340A #2 POWER LEVEL key to +8 dBm.

24. On the HP 8562A/B, press the PEAK SEARCH key and [NEXT PEAK]. The active marker should be on the peak of the lower amplitude signal. If it is not, reposition the marker to this peak using the front-panel function knob. Read the Δ MKR amplitude and record this as the Gain Compression in Table 3-34. The gain compression should be less than 1 dB.

25. Repeat steps 14 through 24 until all the entries in Table 3-34 have been completed.

Table 3-34. Gain Compression

Band	HP 8562A Center Freq (GHz)	HP 8340A #1 [CW] (GHz)	HP 8340A #2 [CW] (GHz)	Gain Compression (dB)	Measurement Uncertainty (dB)
0	2.0	2.000	2.003	_____	±0.23
1	4.0	4.000	4.003	_____	±0.23
2	7.0	7.000	7.003	_____	±0.23

3-42. 1ST LO Output Amplitude

SPECIFICATION

Amplitude (3.0—6.7 GHz): +16 dBm ±2.0 dB, 20 °C to 30 °C

RELATED ADJUSTMENT

First LO Distribution Amplifier Adjustment

DESCRIPTION

The 1ST LO OUTPUT power is measured with a power meter. The analyzer is placed in external mixing mode and harmonic-locked to N = 6. This allows the broadest tuning range of the 1ST LO.

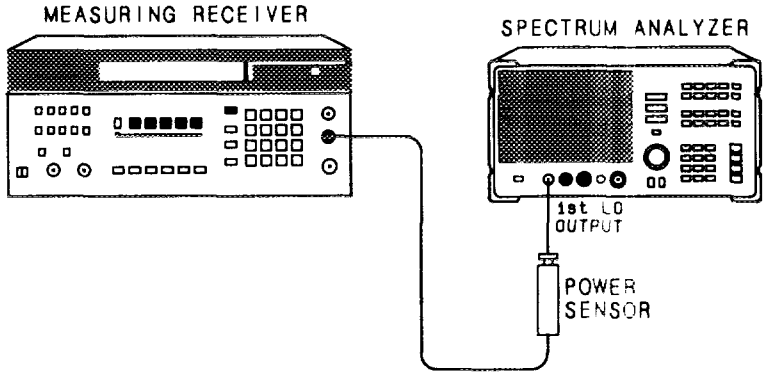


Figure 3-22. 1ST LO Output Amplitude Test Setup

EQUIPMENT

Measuring Receiver	HP 8902A
Power Sensor	HP 8485A

NOTE

The results of this test are valid only if the ambient temperature is between 20 °C and 30 °C.

PROCEDURE

1. Zero the HP 8902A and calibrate the HP 8485A Power Sensor at 50 MHz as described in the HP 8902A Operation Manual. Enter the power sensor's 3 GHz calibration factor into the HP 8902A. Set the HP 8902A for dBm output (LOG display).

2. Connect the equipment as shown in Figure 3-22.

3. Press the PRESET key, the SPAN key, and [ZERO SPAN] on the HP 8562A/B, and set the controls as follows:

   MIXING . . . . . EXT
   LOCK HARMONIC . . . . . #6
   CENTER FREQ . . . . . 18 GHz
   CF STEP . . . . . 1200 MHz

4. Read the RF Power displayed on the HP 8902A and record it as the 3.000 GHz entry in Table 3-35 column 5.

5. Use the [CENTER FREQ] and the ↑ keys to step the 1st LO frequency in 200 MHz steps (center frequency in 1200 MHz steps). At each step, record the power level displayed on the HP 8902A in Table 3-35. Enter the appropriate power sensor calibration factor into the HP 8902A as indicated in Table 3-35.

6. The power levels measured should be within the limits shown in Table 3-35.

7. Record the maximum 1ST LO OUTPUT POWER.

   Maximum 1ST LO OUTPUT POWER: _____ dB

8. Record the minimum 1ST LO OUTPUT POWER.

   Minimum 1ST LO OUTPUT POWER: _____ dB

Table 3-35. 1st LO Output Amplitude

1st LO Freq* (GHz)	Center Freq (n=6) (GHz)	CAL Factor Frequency (GHz)	1st LO Output Power			Measurement Uncertainty (dB)
			Min (dBm)	Actual (dBm)	Max (dBm)	
3.0	18	3.0	+14.5	_____	+18.5	±0.25
3.2	19.2	3.0	+14.5	_____	+18.5	±0.25
3.4	20.4	3.0	+14.5	_____	+18.5	±0.25
3.6	21.6	4.0	+14.5	_____	+18.5	±0.25
3.8	22.8	4.0	+14.5	_____	+18.5	±0.25
4.0	24.0	4.0	+14.5	_____	+18.5	±0.25
4.2	25.2	4.0	+14.5	_____	+18.5	±0.25
4.4	26.4	4.0	+14.5	_____	+18.5	±0.25
4.6	27.6	5.0	+14.5	_____	+18.5	±0.25
4.8	28.8	5.0	+14.5	_____	+18.5	±0.25
5.0	30.0	5.0	+14.5	_____	+18.5	±0.25
5.2	31.2	5.0	+14.5	_____	+18.5	±0.25
5.4	32.4	5.0	+14.5	_____	+18.5	±0.25
5.6	33.6	6.0	+14.5	_____	+18.5	±0.25
5.8	34.8	6.0	+14.5	_____	+18.5	±0.25
6.0	36.0	6.0	+14.5	_____	+18.5	±0.25
6.2	37.2	6.0	+14.5	_____	+18.5	±0.25
6.4	38.4	6.0	+14.5	_____	+18.5	±0.25
6.6	39.6	7.0	+14.5	_____	+18.5	±0.25
6.7	39.99997	7.0	+14.5	_____	+18.5	±0.25

* Nominal; actual 1st LO frequency is within 50 MHz of this frequency.

3-43. Sweep Time Accuracy

SPECIFICATION

For SPAN = 0 Hz:
Sweep time <30 ms: <±15%
Sweep time ≥30 ms: <±1%

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

For sweep times less than 30 ms, an amplitude-modulated signal is displayed on the analyzer in zero span, and the frequency of the modulating signal (triangle wave) is adjusted to space the peaks evenly across the display. The frequency of the modulating signal is counted and the actual sweep time is calculated and compared to the specification.

For sweep times of 30 ms and greater, the time interval of the BLANKING OUTPUT's low state is measured. This time interval corresponds to the sweep time. The measured sweep time is compared to the specification.

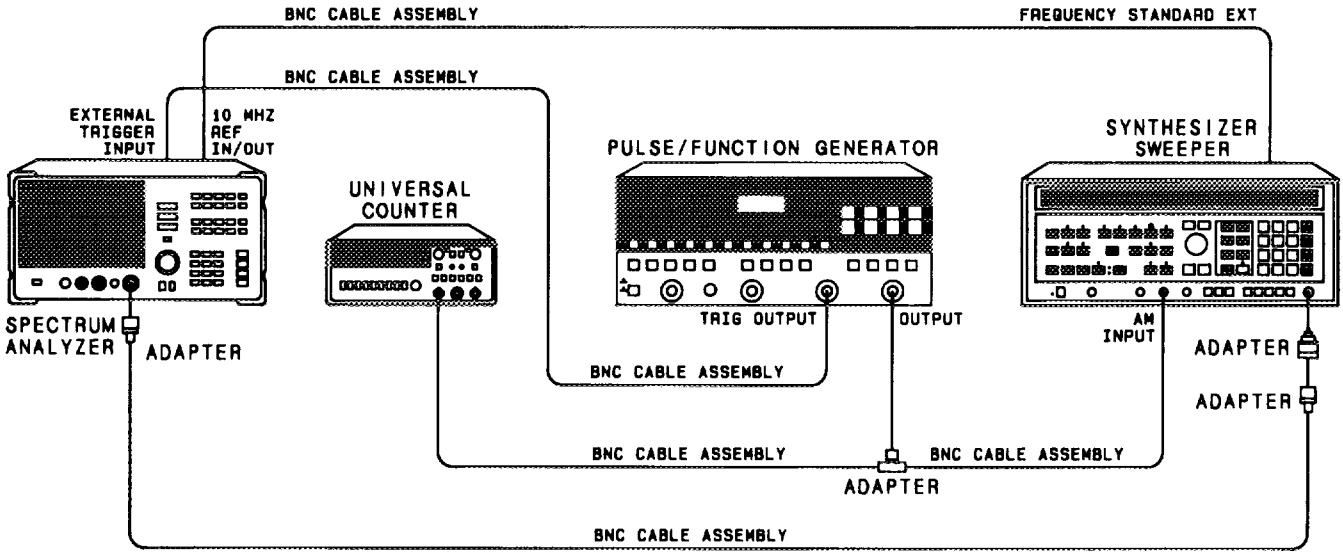


Figure 3-23. Sweep Time Accuracy Test Setup

EQUIPMENT

Synthesized Sweeper	HP 8340A
Universal Counter	HP 5316A
Pulse/Function Generator	HP 8116A
Adapters:	
Type APC 3.5 (f) fo N (f)	HP 1250-1745
Type N (m) to BNC (f) (2 required)	HP 1250-1476
Type BNC tee (m) (f) (f)	HP 1250-0781
Cables:	
BNC, 122 cm (48 in.) (5 required)	HP 10503A

PROCEDURE

1. Connect the equipment as shown in Figure 3-23, with the BNC cable from the HP 5316A connected to the HP 8562A/B EXT TRIG INPUT.

2. On the HP 8562A/B, press the PRESET key and set the controls as follows:

CENTER FREQ	300 MHz
SPAN	0 Hz
SWEEP TIME	50 µs
SCALE	LINEAR

3. Set all buttons on the HP 5816A out, including the blue SHIFT button. Set the LEVEL/SENS control for Channel A to midrange and the LEVEL/SENS control for Channel B fully counterclockwise. Set the GATE TIME Control to MIN.

   a. Push the FREQ A button in.

   b. Push the AC/DC buttons for Channels A and B in.

   c. Push the Channel A TRIGGER LEVEL/SENSITIVITY button in.

4. Set the HP 5116A controls as follows:

FRQ	200 kHz
DTY	50%
AMP	500 mV
OFS	0V
FUNCTION	TRIANGLE

5. Press the INSTR PRESET key on the HP 8340A. Set the controls as follows:

CW	300 MHz
POWER LEVEL	−5 dBm
MODULATION	AM

6. On the HP 8562A/B, press the TRIG key and [EXTERNAL].

7. Adjust the HP 8116A frequency for 10 cycles evenly spaced relative to the vertical graticule lines on the analyzer. For example, if the peak of the first cycle is 0.2 divisions to the right of the first graticule line, the peak of the tenth cycle should be set 0.2 divisions to the right of the tenth graticule line.

8. Read the frequency displayed on the HP 5316A. Calculate the measured sweep time using the equation below. Record the result as the Measured Sweep Time in Table 3-36 for the 50 µs Sweep Time Setting. The Measured Sweep Time should lie within the limits shown in Table 3-36.

   Measured Sweep Time = 10 / HP 5316A Frequency Reading

9. Repeat steps 6 and 7 above for sweep times between 100 µs and 20 ms listed in Table 3-36. Set the initial HP 8116A frequency according to the equation below.

   Initial HP 8116A Frequency = 10 / Sweep Time Setting

10. Disconnect the BNC cable between the HP 5316A and the HP 8116A. Connect a BNC cable from the BLANKING OUTPUT on the HP 8562A/B to the Channel A input of the HP 5316A.

11. On the HP 8562A/B, press the TRIG key, [FREE RUN], the SWEEP key, the 5 key, the 0 key, and the ms key.

12. On the HP 5316A, set the controls as follows:

    a. Set the Channel A LEVEL/SENS control fully counterclockwise.

    b. Press the TI A→B button.

    c. Push the SEP/COM A button in.

    d. Set the Channel A TRIGGER LEVEL/SENSITIVITY button out.

    e. Push the Channel A SLOPE button in (negative edge trigger).

13. On the HP 5316A, slowly rotate the Channel A LEVEL/SENS control clockwise until the yellow LED next to it begins to flash. Repeat for the Channel B LEVEL/SENS control.

14. Repeat the following steps for each sweep time listed in Table 3-36.

15. Set the HP 8562A/B to the sweep time listed in the first column of Table 3-36.

16. Wait for the HP 5316A display to settle (usually about three sweeps). Record the HP 5316A reading as the Measured Sweep Time in Table 3-36. The Measured Sweep Time should fall within the limits shown in Table 3-36.

NOTE

It might be necessary to readjust the LEVEL/SENS controls slightly for a stable display.

Table 3-36. Sweep Time Accuracy

Sweeptime Setting	Minimum Reading	Measured Sweeptime	Maximum Reading	Measurement Uncertainty
50 µs	42.5 µs	_____	57.5 µs	±101 ns
100 µs	85 µs	_____	115 µs	±101 ns
200 µs	170 µs	_____	230 µs	±102 ns
500 µs	425 µs	_____	575 µs	±103 ns
1 ms	850 µs	_____	1.15 ms	±105 ns
2 ms	1.70 ms	_____	2.30 ms	±108 ns
5 ms	4.25 ms	_____	5.75 ms	±119 ns
10 ms	8.5 ms	_____	11.5 ms	±137 ns
20 ms	17.0 ms	_____	23.0 ms	±171 ns
30 ms	29.7 ms	_____	30.3 ms	±209 ns
50 ms	49.5 ms	_____	50.5 ms	±281 ns
100 ms	99.0 ms	_____	101.0 ms	±461 ns
200 ms	198.0 ms	_____	202.0 ms	±821 ns
500 ms	495.0 ms	_____	505.0 ms	±1.901 µs
1 s	990.0 ms	_____	1010.0 ms	±3.7 µs
2 s	1.980 s	_____	2.020 s	±7.3 µs
5 s	4.95 s	_____	5.05 s	±18.1 µs
10 s	9.90 s	_____	10.1 s	±36.1 µs
20 s	19.8 s	_____	20.2 s	±72.1 µs
50 s	49.5 s	_____	50.5 s	±180.1 µs
60 s	59.4 s	_____	60.6 s	±216.1 µ

3-44. Residual Responses

SPECIFICATION

200 kHz to 6.46 GHz: <—90 dBm with no signal at input and 0 dB input attenuation

RELATED ADJUSTMENT

There is no related adjustment for this performance test.

DESCRIPTION

This test checks for residual responses in Bands 0 and 1 (N = 1). Any response located above the display line is measured in a narrow frequency span and resolution bandwidth. The spectrum analyzer RF INPUT 50Ω is terminated in 50 ohms.

EQUIPMENT

Coaxial 50-Ohm Termination	HP 909D
Adapters:	
Type N (m) to APC 3.5 (f)	HP 1250-1744
Type N (m) to BNC (f)	HP 1250-1476
Cables:	
BNC, 122 cm (48 in.)	HP 10503A

PROCEDURE

1. On the HP 8562A/B, press the PRESET key and set the controls as follows:

CENTER FREQ	300 MHz
SPAN	10 kHz
RES BW	300 Hz
REF LEVEL	−10 dBm
ATTEN	0 dB

2. On the HP 8562A/B, connect a BNC cable between the CAL OUTPUT and RF INPUT and press the PEAK SEARCH key, the AMPLITUDE key, [MORE], and [REF LEVEL CAL]. Use the data entry knob or step keys to change the REF LEVEL CAL value until the marker amplitude reads −10.00 dBm ±0.17 dB.

Residual Responses, Band 0

3. Remove the BNC cable and adapter from the RF INPUT. Install the Type N to APC 3.5 adapter and 50-ohm termination on the RF INPUT. Press the PRESET key and set the controls as follows:

CENTER FREQ	15.2 MHz
SPAN	30 MHz
CF STEP	28.5 MHz
REF LEVEL	−50 dBm
ATTEN	0 dB
RES BW	10 kHz
TRIG	SINGLE
DISPLAY LINE	−90 dBm

4. Press the TRIG key and [SINGLE] to trigger a sweep. The noise level should be at least 6 dB below the display line. If it is not, it will be necessary to reduce the SPAN and RES BW to reduce the noise level. If the SPAN is reduced, reduce the [CF STEP] to no more than 95% of the SPAN.

5. If a residual is suspected, press [SINGLE] again. A residual response will persist, but a noise peak will not. Record the frequency and amplitude of any responses above the display line.

6. If a response is marginal, verify the response amplitude as follows:

   a. Press the SAVE key, [SAVE STATE], and [STATE 0].

   b. Place the marker on the peak of the response in question.

   c. Press the MKR-> key and [MARKER->CF].

   d. Press the SPAN key, the ↓ key four times, the TRIG key, and [CONT].

   e. Press the BW key and [RES BW AUTO].

   f. Continue to reduce the SPAN until a RES BW of 300 Hz is reached. If the response is a synthesis-related residual, it might disappear as the SPAN is reduced. If this is the case, measure the amplitude with the narrowest span possible and a 300 Hz RES BW.

   g. Record the frequency and amplitude of any residual response above the display line.

   h. Press the RECALL key, [RECALL STATE], and [STATE 0].

7. Check for residuals up to 2.9 GHz using the procedure of steps 4 through 6 above. To change the center frequency, press [CENTER FREQ] and the ↑ key.

Residual Responses, Band 1

8. Set the HP 8562A/B CENTER FREQ to 2.915 GHz.

9. Check for residuals from 2.9 GHz to 6.46 GHz using the procedure of steps 4 through 6 above. To change the center frequency, press [CENTER FREQ] and the ↑ key.

3-45. IF Input Amplitude Accuracy

SPECIFICATION

For a signal at the reference level (EXTernal mixing mode, REF LVL of 0 dBm, CONVersion LOSS of 30 dB), the power applied to the IF INPUT shall be −30 dBm ±1.5 dB.

RELATED ADJUSTMENT

External Mixer Amplitude Adjustment

DESCRIPTION

The user-loaded conversion losses for K-band are recorded and reset to 30 dB. A 310.7 MHz signal is applied to the IF INPUT. The power level of the source is adjusted for a signal at the reference level. The power applied to the analyzer is measured with a power meter and the measured power is compared to the specification. The previously recorded conversion losses are re-entered.

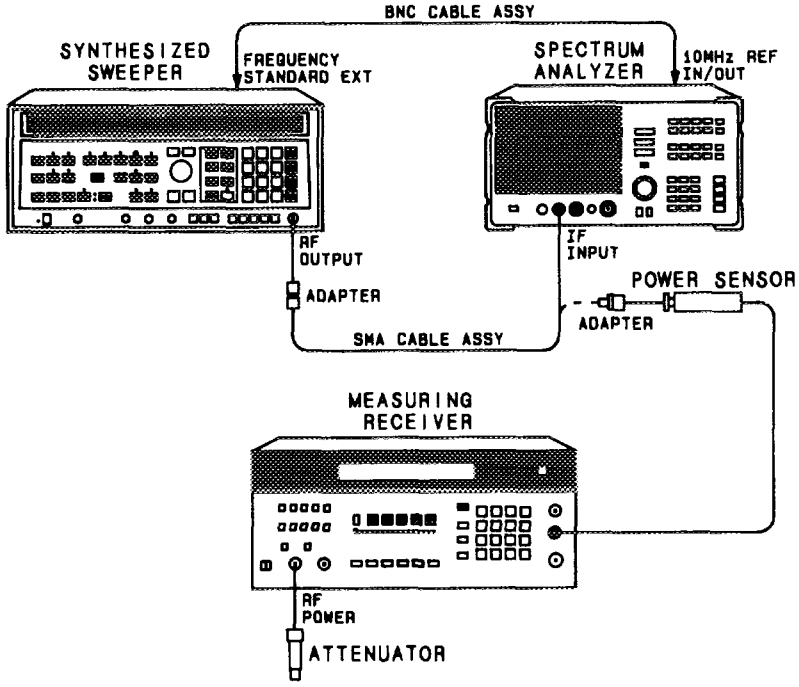


Figure 3-24. IF Input Amplitude Test Setup

EQUIPMENT

Synthesized Sweeper	HP 8340A
Measuring Receiver	HP 8902A
Power Sensor	HP 8484A
50 MHz Reference Attenuator (supplied with HP 8484A)	HP 11708A
Adapters:	
Type N (f) to SMA (f)	HP 1250-1772
Type APC 3.5 (f) to APC 3.5 (f)	HP 5061-5311
Cables:	
BNC, 122 cm (48 in.)	HP 10503A
SMA, 61 cm (24 in.)	HP 8120-1578

PROCEDURE

1. Connect the equipment as shown in Figure 3-24. The HP 8562A/B provides the frequency reference for the HP 8340A.

2. On the HP 8562A/B, press the PRESET key.

3. On the HP 8562A/B, press the AMPLITUDE key, [LOG dB/DIV], the 1 key, the dB key, and the MARKER ON key.

4. Press the MIXER EXT key, the SPAN key, [ZERO SPAN], the EXT key, [AMPTD CORRECT], and [CNV LOSS VS FREQ].

5. Note the conversion loss displayed in the active function block. Use the ↑ key and the ↓ key to step through the conversion losses for the other frequencies. If all conversion losses are 30.0 dB, proceed to step 11.

6. Press [CNV LOSS VS FREQ] on the HP 8562A/B.

7. Record the 18 GHz conversion loss in Table 3-37.

8. Enter a conversion loss of 30 dB.

9. Press the ↑ key on the HP 8562A/B.

10. Repeat steps 7 through 9 for the remaining frequencies listed in Table 3-37.

11. Press the INSTR PRESET key on the HP 8340A and set the controls as follows:

CW	310.7 MHz
POWER LEVEL	−30 dBm

12. Zero and calibrate the HP 8902A/HP 8484A combination in log mode. Enter the power sensor's 50 MHz calibration factor into the HP 8902A.

13. Adjust the HP 8340A POWER LEVEL key until the marker amplitude reads 0 dBm ±0.05 dB.

14. Disconnect the SMA cable from the HP 8562A/B IF INPUT and connect the cable, through an adapter, to the power sensor.

15. Read the power displayed on the HP 8902A and note the value below. The displayed power should read −30 dBm ±1.5 dB.

IF INPUT Amplitude: _____ dBm

NOTE

The following steps should be performed only if it was necessary to change the conversion loss values found in step 5.

16. Press [CNV LOSS VS FREQ] on the HP 8562A/B.

17. Enter the conversion loss at 18 GHz recorded in Table 3-37.

18. Press the ↑ key on the HP 8562A/B.

19. Repeat steps 17 and 18 for the remaining frequencies listed in Table 3-37.

Table 3-37. IF Input Amplitude Accuracy

Frequency (GHz)	Conversion Loss (dB)
18	_____
20	_____
22	_____
24	_____
26	_____
27	_____

Table 3-38. Performance Test Record (1 of 8)

Hewlett-Packard Company
Model ____ HP 8562A
____ HP 8562B (Check one)
Serial No. _____

Tested by _____
Date _____

Para. No.	Test Description	Results		
		Min	Actual	Max
3-24	10 MHz Reference Output Accuracy			
	5. 10 MHz Reference Frequency	299.998800 MHz	_____	300.001200 MHz
3-25	Calbrator Amplitude and Frequency Accuracy			
	4. Calibrator Frequency	299.998800 MHz	_____	300.001200 MHz
	6. Calibrator Amplitude	−10.3 dBm	_____	−9.7 dBm
3-26	Displayed Average Noise Level			
	25. 10 kHz		_____	−90 dBm
	100 kHz		_____	−100 dBm
	1 MHz to 2.9 GHz		_____	−121 dBm
	2.9 GHz to 6.46 GHz		_____	−121 dBm
	6.46 GHz to 13.0 GHz		_____	−110 dBm
	13.0 GHz to 19.7 GHz		_____	−105 dBm
	19.7 GHz to 22.0 GHz		_____	−100 dBm
3-27	Resolution Bandwidth Switching and IF Alignment Uncertainty			
	5. 1 MHz	−0.5 dB	_____	+0.5 dB
	100 kHz	−0.5 dB	_____	+0.5 dB
	30 kHz	−0.5 dB	_____	+0.5 dB
	10 kHz	−0.5 dB	_____	+0.5 dB
	3 kHz	−0.5 dB	_____	+0.5 dB
	1 kHz	−0.5 dB	_____	+0.5 dB
	300 Hz	−1.0 dB	_____	+1.0 dB
	100 Hz	−2.5 dB	_____	+2.5 dB
3-28	Resolution Bandwidth Accuracy and Selectivity			
	13. 1 MHz	750 kHz	_____	1.25 MHz
	300 kHz	270 kHz	_____	330 kHz
	100 kHz	90 kHz	_____	110 kHz
	30 kHz	27 kHz	_____	33 kHz
	10 kHz	9 kHz	_____	11 kHz
	3 kHz	2.7 kHz	_____	3.3 kHz
	1 kHz	900 Hz	_____	1.1 kHz
	300 Hz	270 Hz	_____	330 Hz
	100 Hz	70 Hz	_____	130 Hz

Table 3-38. Performance Test Record (2 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-28	Resolution Bandwidth Accuracy and Selectivity (Continued)			
	28. 1 MHz		_____	15
	300 kHz		_____	15
	100 kHz		_____	15
	30 kHz		_____	15
	10 kHz		_____	15
	3 kHz		_____	15
	1 kHz		_____	15
	300 Hz		_____	15
	100 Hz		_____	15
3-29	Input Attenuator Accuracy			
	9. Cumulative Accuracy at 50 MHz			
	20 dB ATTEN	+8.2 dB	_____	+11.8
	30 dB ATTEN	+18.2 dB	_____	+21.8
	40 dB ATTEN	+28.2 dB	_____	+31.8
	50 dB ATTEN	+38.2 dB	_____	+41.8
	20 dB ATTEN	+48.2 dB	_____	+51.8
	20 dB ATTEN	+58.2 dB	_____	+61.8
	11. Step-to-Step Accuracy at 50 MHz			
	20 dB ATTEN	−0.6 dB	_____	+0.6
	30 dB ATTEN	−0.6 dB	_____	+0.6
	40 dB ATTEN	−0.6 dB	_____	+0.6
	50 dB ATTEN	−0.6 dB	_____	+0.6
	60 dB ATTEN	−0.6 dB	_____	+0.6
	70 dB ATTEN	−0.6 dB	_____	+0.6

Table 3-38. Performance Test Record (3 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-30	IF Gain Uncertainty			
	34. Log IF Gain Uncertainty (10 dB steps)	−1.0 dB	_____	+1.0 dB
	35. Log IF Gain Uncertainty (1 dB steps)	−1.0 dB	_____	+1.0 dB
	36. Linear IF Gain Uncertainty	−1.0 dB	_____	+1.0 dB
3-31	Scale Fidelity			
	28. Linear Scale Fidelity			
	2 dB from REF LVL	−2.33 dB	_____	−1.68 dB
	4 dB from REF LVL	−4.42 dB	_____	−3.60 dB
	6 dB from REF LVL	−6.54 dB	_____	−5.50 dB
	8 dB from REF LVL	−8.68 dB	_____	−7.37 dB
	10 dB from REF LVL	−10.87 dB	_____	−9.21 dB
	12 dB from REF LVL	−13.10 dB	_____	−11.02 dB
	14 dB from REF LVL	−15.42 dB	_____	−12.78 dB
	16 dB from REF LVL	−17.82 dB	_____	−14.49 dB
	18 dB from REF LVL	−20.36 dB	_____	−16.14 dB
	29. Maximum Cumulative 10 dB Log Scale Fidelity	−1.5 dB	_____	+1.5 dB
	30. Maximum Incremental 10 dB Log Scale Fidelity	−0.4 dB	_____	+0.4 dB
	31. Maximum Cumulative 2 dB Log Scale Fidelity	−1.5 dB	_____	+1.5 dB
	32. Maximum Incremental 2 dB Log Scale Fidelity	−0.4 dB	_____	+0.4 dB
3-32	Residual FM			
	11. Residual FM		_____	50 Hz
3-33	Noise Sidebands			
	11. −30 kHz Offset		_____	−100 dBc/Hz
	+30 kHz Offset		_____	−100 dBc/Hz
3-34	Image, Multiple, and Out-of-Band Responses			
	25. Maximum Response Amplitude <18 GHz		_____	−70 dBc
	26. Maximum Response Amplitude <22 GHz		_____	−60 dBc

Table 3-38. Performance Test Record (4 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-35	Frequency Readout Accuracy and Frequency Count Marker Accuracy			
	5. 1.5 GHz CENTER FREQ			
	1 MHz SPAN	1.499942 GHz	_____	1.500058 GHz
	10 MHz SPAN	1.49948 GHz	_____	1.50052 GHz
	20 MHz SPAN	1.49895 GHz	_____	1.50105 GHz
	50 MHz SPAN	1.49745 GHz	_____	1.50255 GHz
	100 MHz SPAN	1.4948 GHz	_____	1.5052 GHz
	1 GHz SPAN	1.450 GHz	_____	1.550 GHz
	4.0 GHz CENTER FREQ			
	1 MHz SPAN	3.999932 GHz	_____	4.000068 GHz
	10 MHz SPAN	3.99947 GHz	_____	4.00053 GHz
	20 MHz SPAN	3.99894 GHz	_____	4.00106 GHz
	50 MHz SPAN	3.99744 GHz	_____	4.00256 GHz
	100 MHz SPAN	3.9948 GHz	_____	4.0052 GHz
	1 GHz SPAN	3.950 GHz	_____	4.050 GHz
	9.0 GHz CENTER FREQ			
	1 MHz SPAN	8.999912 GHz	_____	9.000088 GHz
	10 MHz SPAN	8.99945 GHz	_____	9.00055 GHz
	20 MHz SPAN	8.99892 GHz	_____	9.00108 GHz
	50 MHz SPAN	8.99742 GHz	_____	9.00258 GHz
	100 MHz SPAN	8.9948 GHz	_____	9.0052 GHz
	1 GHz SPAN	8.950 GHz	_____	9.050 GHz
	16.0 GHz CENTER FREQ			
	1 MHz SPAN	15.99984 GHz	_____	16.000116 GHz
	10 MHz SPAN	15.99942 GHz	_____	16.00058 GHz
	20 MHz SPAN	15.99889 GHz	_____	16.00111 GHz
	50 MHz SPAN	15.99739 GHz	_____	16.00261 GHz
	100 MHz SPAN	15.9948 GHz	_____	16.0052 GHz
	1 GHz SPAN	15.950 GHz	_____	16.050 GHz
	22.0 GHz CENTER FREQ			
	1 MHz SPAN	20.999864 GHz	_____	21.000136 GHz
	10 MHz SPAN	20.99940 GHz	_____	21.00060 GHz
	20 MHz SPAN	20.99887 GHz	_____	21.00113 GHz
	50 MHz SPAN	20.99737 GHz	_____	21.00263 GHz
	100 MHz SPAN	20.9948 GHz	_____	21.0052 GHz
	1 GHz SPAN	20.950 GHz	_____	21.050 GHz
	8. Frequency Count Marker Accuracy			
	1.5 GHz CENTER FREQ	1.49999394 GHz	_____	1.50000606 GHz
	4.0 GHz CENTER FREQ	3.99998394 GHz	_____	4.00001606 GHz
	9.0 GHz CENTER FREQ	8.99996389 GHz	_____	9.00003611 GHz
	16.0 GHz CENTER FREQ	15.99993584 GHz	_____	16.00006416 GHz
	21.0 GHz CENTER FREQ	20.99991579 GHz	_____	21.00008421 GHz

Table 3-38. Performance Test Record (5 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-36	Pulse Digitization Uncertainty			
	7. 5 dB/Div	−1.0 dB	_____	+1.0 dB
	8. 1 dB/Div	−1.0 dB	_____	+1.0 dB
	14. Linear	−0.40 dB	_____	+0.38 dB
3-37	Second Harmonic Distortion			
	6. <2.9 GHz		_____	−72 dBc
	31. >2.9 GHz		_____	−100 dBc (HP 8562B: −60 dBc)
3-38	Frequency Response			
	Band 0			
	51(c) Maximum Positive Response		_____	+5.1 dB
	51(f) Maximum Negative Reponse	−5.1 dB	_____	
	51(h) Peak-to-Peak Response		_____	+2.4 dB
	Band 1			
	52(a) Maximum Positive Response		_____	+5.1 dB
	52(b) Maximum Negative Response	−5.1 dB	_____	
	52(c) Peak-to-Peak Response		_____	+5.0 dB
	(HP 8562B:			+4.0 dB)
	Band 2			
	53(a) Maximum Positive Response		_____	+5.1 dB
	53(b) Maximum Negative Response	−5.1 dB	_____	
	53(c) Peak-to-Peak Response		_____	+7.0 dB
	(HP 8562B:			+5.0 dB)
	Band 3			
	54(a) Maximum Positive Response		_____	+5.1 dB
	54(b) Maximum Negative Response	−5.1 dB	_____	
	54(c) Peak-to-Peak Response		_____	+8.0 dB
	(HP 8562B:			+6.0 dB)
	Band 4			
	55(a) Maximum Positive Response		_____	+5.1 dB
	55(b) Maximum Negative Response	−5.1 dB	_____	
	55(c) Peak-to-Peak Response		_____	+8.6 dB

Table 3-38. Performance Test Record (6 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-38	Frequency Response (Cont'd)			
	Band Switching Uncertainty			
	59. Band 0 to Band 1		_____	4.2 dB (3.7)
	Band 0 to Band 2		_____	5.2 dB (4.2)
	Band 0 to Band 3		_____	5.7 dB (4.7)
	Band 0 to Band 4		_____	6.0 dB
	Band 1 to Band 2		_____	6.5 dB (5.0)
	Band 1 to Band 3		_____	7.0 dB (6.0)
	Band 1 to Band 4		_____	7.3 dB (6.8)
	Band 2 to Band 3		_____	8.0 dB (6.0)
	Band 2 to Band 4		_____	8.3 dB (7.3)
	Band 3 to Band 4		_____	8.8 dB (7.8)
	(Limits in parentheses apply to HP 8562B)			
3-39	Frequency Span Accuracy			
	6. 1.5 GHz CENTER FREQ			
	10 kHz SPAN	7.60 kHz	_____	8.40 kHz
	20 kHz SPAN	15.20 kHz	_____	16.80 kHz
	50 kHz SPAN	38.00 kHz	_____	42.00 kHz
	100 kHz SPAN	76.0 kHz	_____	84.0 kHz
	101 kHz SPAN	76.0 kHz	_____	84.0 kHz
	200 kHz SPAN	152.0 kHz	_____	168.0 kHz
	500 kHz SPAN	380.0 kHz	_____	420.0 kHz
	1 MHz SPAN	760 kHz	_____	840 kHz
	1.01 MHz SPAN	760 kHz	_____	840 kHz
	2 MHz SPAN	1.520 MHz	_____	1.680 MHz
	5 MHz SPAN	3.800 MHz	_____	4.200 MHz
	10 MHz SPAN	7.60 MHz	_____	8.40 MHz
	20 MHz SPAN	15.20 MHz	_____	16.80 MHz
	50 MHz SPAN	38.00 MHz	_____	42.00 MHz
	100 MHz SPAN	76.0 MHz	_____	84.0 MHz
	200 MHz SPAN	152.0 MHz	_____	168.0 MHz
	500 MHz SPAN	380.0 MHz	_____	420.0 MHz
	1 GHz SPAN	760 MHz	_____	840 MHz
	2 GHz SPAN	1.520 GHz	_____	1.680 GHz
	9.0 GHz CENTER FREQ			
	10 kHz SPAN	7.60 kHz	_____	8.40 kHz
	20 MHz SPAN	15.20 MHz	_____	16.80 MHz
	50 MHz SPAN	38.00 MHz	_____	42.00 MHz
	5 GHz SPAN	3.800 GHz	_____	4.200 GHz
	16.0 GHz CENTER FREQ			
	10 kHz SPAN	7.60 kHz	_____	8.40 kHz
	50 MHz SPAN	38.00 MHz	_____	42.00 MHz
	100 MHz SPAN	76.0 MHz	_____	84.0 MHz
	5 GHz SPAN	3.800 GHz	_____	4.200 GHz

Table 3-38. Performance Test Record (7 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-39	Frequency Span Accuracy (Cont'd)			
	20.5 GHz CENTER FREQ			
	10 kHz SPAN	7.60 kHz	_____	8.40 kHz
	50 MHz SPAN	38.00 MHz	_____	42.00 MHz
	100 MHz SPAN	76.0 MHz	_____	84.0 MHz
	12.4 GHz CENTER FREQ			
	19.25 GHz SPAN	17.10 GHz	_____	18.90 GHz
3-40	Third Order Intermodulation Distortion			
	30. TOI Distortion at 2.8 GHz		_____	–70 dBc
	31. TOI Distortion at 4.0 GHz		_____	–75 dBc
3-41	Gain Compression			
	12. Gain Compression at 2 GHz		_____	1.0 dB
	24. Gain Compression at 4 GHz		_____	1.0 dB
	Gain Compression at 7 GHz		_____	1.0 dB
3-42	1ST LO OUTPUT Amplitude			
	7. Maximum 1ST LO OUTPUT Power		_____	+18.5 dBm
	8. Minimum 1ST LO OUTPUT Power	+14.5 dBm	_____	
3-43	Sweep Time Accuracy			
	8. 50 µs SWEEP TIME	42.5 µs	_____	57.5 µs
	100 µs SWEEP TIME	85 µs	_____	115 µs
	200 µs SWEEP TIME	170 µs	_____	230 µs
	500 µs SWEEP TIME	425 µs	_____	575 µs
	1 ms SWEEP TIME	850 µs	_____	1.15 ms
	2 ms SWEEP TIME	1.70 ms	_____	2.30 ms
	5 ms SWEEP TIME	4.25 ms	_____	5.75 ms
	10 ms SWEEP TIME	8.5 ms	_____	11.5 ms
	20 ms SWEEP TIME	17.0 ms	_____	23.0 ms
	16. 30 ms SWEEP TIME	29.7 ms	_____	30.3 ms
	50 ms SWEEP TIME	49.5 ms	_____	50.5 ms
	100 ms SWEEP TIME	99.0 ms	_____	101.0 ms
	200 ms SWEEP TIME	198.0 ms	_____	202.0 ms
	500 ms SWEEP TIME	495.0 ms	_____	505.0 ms
	1 s SWEEP TIME	990.0 ms	_____	1010.0 ms
	2 s SWEEP TIME	1.980 s	_____	2.020 s
	5 s SWEEP TIME	4.95 s	_____	5.05 ms
	10 s SWEEP TIME	9.90 s	_____	10.1 s
	20 s SWEEP TIME	19.8 s	_____	20.2 s
	50 s SWEEP TIME	49.5 s	_____	50.5 s
	60 s SWEEP TIME	59.4 s	_____	60.6 s

Table 3-38. Performance Test Record (8 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-44	Residual Responses			
	7. 200 kHz to 2.9 GHz		_____	−90 dBm
	9. 2.9 GHz to 6.46 GHz		_____	−90 dBm
3-45	IF INPUT Amplitude Accuracy			
	15. IF INPUT Amplitude	−31.5 dBm	_____	−28.5 dBm

CHAPTER 4

HELP?

4-1. What You'll Find in This Chapter

4-2. Your HP 8562A/B Spectrum Analyzer is built to provide dependable service. It is unlikely that you will experience a problem with the HP 8562A/B. However, if you do, or if you desire additional information or wish to order parts, options, or accessories, HP's worldwide sales and service organization is ready to provide the support you need.

4-3. In general, a problem can be caused by a hardware failure, a software error, or a user error. Perform the quick checks listed in paragraph 4-7, "Check the Basics". These checks may eliminate the problem altogether, or may give a clearer idea of its cause. If you have an HP 8562A/B Test and Adjustment Module you can use its automatic fault isolation routine. See paragraph 4-9.

4-4. If the problem is a hardware problem, you have the following options:

- Repair it yourself: see paragraph 4-16, "Service Options".
- Return the analyzer to HP for repair:

  If the analyzer is still under warranty or is covered by an HP maintenance contract, it will be repaired under the terms of the warranty or maintenance contract (the warranty is printed in the front of this manual).

  If the analyzer is no longer under warranty or covered by an HP maintenance contract, HP will notify you of the cost of the repair after examining the unit.

4-5. See paragraph 4-20, "How to Call HP", and paragraph 4-22, "How to Return Your Analyzer for Service", for more information.

4-6. Before You Call HP

4-7. Check the Basics

4-8. A problem often can be solved by rechecking what was being done when the problem occurred. A few minutes spent in performing some simple checks may save waiting for your instrument to be repaired. Before calling HP or returning the analyzer for service, please make the following checks:

- Is the analyzer plugged in to the proper ac power source? Does the line socket have power?
- Is the rear-panel voltage selector switch set correctly? Is the line fuse good?
- Is the analyzer turned on?
- If other equipment, cables, and connectors are being used with the HP 8562A/B, are they connected properly and operating correctly?

- Review the procedure for the test being performed when the problem appeared. Are all the switch settings correct?
- Is the test being performed, and the results that are expected, within the specifications and capabilities of the HP 8562A/B? See Chapter 1, Table 1-1.
- Is the HP 8562A/B displaying an error message? If so, refer to Appendix A.
- Perform the Trace Alignment and Reference Level Calibration procedures given in Chapter 2, paragraph 2-20. If the necessary test equipment is available, perform the Operation Verification tests given in Chapter 3. Record all results in Table 3-38, the Performance Test Record.

4-9. HP 85629A Test and Adjustment Module

4-10. A powerful feature of the HP 85629A Test and Adjustment Module (TAM) is the Automatic Fault Isolation routine. If a problem with the HP 8562A/B is suspected, Automatic Fault Isolation can determine in most cases whether or not a fault exists in the analyzer. There are some problems, such as excessive residual FM, that Automatic Fault Isolation will not be able to detect. As a minimum, the display and keyboard must be operational to execute Automatic Fault Isolation.

4-11. Running the Automatic Fault Isolation Routine: To start the Automatic Fault Isolation routine, press the MODULE key and [Diagnose]. Rotate the front-panel knob until the arrow points to Automatic Fault Isolation. Press [Execute]. The CAL OUTPUT must be connected to the INPUT 50Ω. A BNC cable and Type N to BNC adapter is shipped with each analyzer in the front cover. Press [Continue] and the Automatic Fault Isolation routine will begin.

4-12. The Automatic Fault Isolation routine will perform checks of five sections of the analyzer. The routine's progress is displayed on the CRT. The routine will stop as soon as it detects a "Failure". If no failures are detected, the Automatic Fault Isolation routine will take about 90 seconds to complete.

4-13. If a failure is detected, either continue troubleshooting using the Support Manual or return the analyzer to the nearest HP Service Center as described in paragraph 4-22. If an HP-IB printer is available and properly connected and configured, a hard-copy printout of the Automatic Fault Isolation results can be obtained by pressing [Print Page]. Include a copy of this printout with the analyzer if it is being returned to an HP Service Center for repair.

4-14. Read the Warranty

4-15. The warranty for your HP 8562A/B is printed in the front of this manual. Please read it and become familiar with its terms. If your analyzer is covered by a separate maintenance agreement, please be familiar with its terms.

4-16. Service Options

4-17. HP offers several maintenance plans to service your analyzer after the warranty has expired. Call your HP Sales and Service office for full details.

4-18. If you want to service the analyzer yourself after the warranty expires, you can purchase the HP 8562A/B Support Manual, HP Part Number 08562-90009, which provides all necessary test and maintenance

information. An HP 8562A/B Product Support Kit, HP Part Number 08562-60021, is also available. The kit contains the following accessories:

- PC Board Prop
- Power Line Switch Assembly
- Power Line Assembly
- SMB Cable Puller
- Option Module Extender Cable
- Two Test Cables, BNC to SMB

4-19. You can order the Support Manual and Product Support Kit through your HP Sales and Service Office.

4-20. How to Call HP

4-21. Hewlett-Packard has Sales and Support offices around the world to provide you with complete support for your HP 8562A/B. To obtain servicing information or to order replacement parts, contact the nearest Hewlett-Packard Sales and Service Office listed in Table 4-1 at the end of this section. In any correspondence or telephone conversations, refer to the analyzer 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.

4-22. How to Return Your Analyzer for Service

4-23. Service Tag

4-24. If you are returning the analyzer to Hewlett-Packard for servicing, fill in and attach a blue service tag. Several service tags are supplied at the rear of this manual.

4-25. Please be as specific as possible about the nature of the problem. If you have recorded any error messages that appeared on the screen, or have completed a Performance Test Record, or have any other specific data on the performance of the analyzer, please send a copy of this information with the unit.

4-26. Original Packaging

4-27. Before shipping, pack the unit in the original factory packaging materials if they are available. If the original materials were not retained, identical packaging materials are available through any Hewlett-Packard office. Descriptions of the packaging materials are listed in the legend for Figure 2-1.

4-28. Other Packaging

CAUTION

Analyzer damage 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 equipment or prevent it from shifting in the carton. They cause equipment damage by generating static electricity and by lodging in the analyzer fan.

4-29. You can repackage the analyzer with commercially available materials, as follows:

1. Attach a completed service tag to the instrument.

2. Install the front-panel cover on the instrument.

3. Wrap the instrument in anti-static plastic to reduce the possibility of damage caused by electrostatic discharge.

4. Use a strong shipping container. A double-walled, corrugated cardboard carton with 159-kg (350-lb) bursting strength is adequate. The carton must be both large enough and strong enough to accommodate the analyzer. Allow at least three to four inches on all sides of the analyzer for packing material.

5. Surround the equipment with three to four inches of packing material and prevent the equipment from moving in the carton. If packing foam is not available, the best alternative is S.D.-240 Air CapTM from Sealed Air Corporation (Commerce, California, 90001). Air Cap looks like a plastic sheet filled with 1-1/4 inch air bubbles. Use the pink-colored Air Cap to reduce static electricity. Wrapping the equipment several times in this material should both protect the equipment and prevent it from moving in the carton.

6. Seal the shipping container securely with strong nylon adhesive tape.

7. Mark the shipping container "FRAGILE, HANDLE WITH CARE" to assure careful handling.

8. Retain copies of all shipping papers.

Table 4-1. HP Spectrum Analyzer Sales and Service Offices (1 of 2)

IN THE UNITED STATES

California
Hewlett-Packard Co.
P.O. Box 4230
1421 South Manhattan Ave.
Fullerton, CA 92631
(714) 999-6700

Hewlett-Packard Co.
333 Logue Ave.
Mountain View, CA 94040
(415) 969-0880

Colorado
Hewlett-Packard Co.
24 Inverness Place, East
Englewood, CO 80112
(303) 649-5000

Georgia
Hewlett-Packard Co.
P.O. Box 105005
2000 South Park Place
Atlanta, GA 30339
(404) 955-1500

Illinois
Hewlett-Packard Co.
5201 Tollview Drive
Rolling Meadows, IL 60008
(312) 255-9800

New Jersey
Hewlett-Packard Co.
120 W. Century Road
Paramus, NJ 07653
(201) 265-5000

Texas
Hewlett-Packard Co.
930 E. Campbell Rd.
Richardson, TX 75081
(214) 231-6101

IN AUSTRALIA
Hewlett-Packard Australia Ltd.
31-41 Joseph Street
Blackburn, Victoria 3130
895-2895

IN CANADA
Hewlett-Packard (Canada) Ltd.
17500 South Service Road
Trans-Canada Highway
Kirkland, Quebec H9J 2X8
(514) 697-4232

IN FRANCE
Hewlett-Packard France
F-91947 Les Ulis Cedex
Orsay
(6) 907-78-25

IN GERMAN FEDERAL REPUBLIC
Hewlett-Packard GmbH
Vertriebszentrale Frankfurt
Berner Strasse 117
Postfach 560 140
D-6000 Frankfurt 56
(0611) 50-04-1

IN GREAT BRITAIN
Hewlett-Packard Ltd.
King Street Lane
Winnersh, Wokingham
Berkshire RG11 5AR
0734 784774

IN OTHER EUROPEAN COUNTRIES
Hewlett-Packard (Schweiz) AG
Allmend 2
CH-8967 Widen (Zurich)
(0041) 57 31 21 11

Table 4-1. HP Spectrum Analyzer Sales and Service Offices (2 of 2)

IN JAPAN
Yokogawa-Hewlett-Packard Ltd.
29-21 Takaido-Higashi, 3 Chome
Suginami-ku Tokyo 168
(03) 331-6111

IN PEOPLE'S REPUBLIC OF CHINA
China Hewlett-Packard, Ltd.
P.O. Box 9610, Beijing
4th Floor, 2nd Watch Factory
Main Bldg.
Shuang Yu Shu, Bei San Huan Rd.
Beijing
28-0567

IN SINGAPORE
Hewlett-Packard Singapore
Pte. Ltd.
#08-00 Inchcape House
450-2 Alexandra Road
Alexandra P.O. Box 58
Singapore, 9115
4731788

IN TAIWAN
Hewlett-Packard Taiwan
8th Floor, Hewlett-Packard Building
337 Fu Hsing North Road
Taipei
(02) 712-0404

IN ALL OTHER LOCATIONS
Hewlett-Packard Inter-Americas
3200 Hillview Avenue
Palo Alto, California 94304

APPENDIX A

ERROR MESSAGES

The HP 8562A/B displays error messages in the lower right-hand corner of the CRT display. A number, or error code, is associated with each error message. Several different error codes can correspond to the same error message. These codes are used by service personnel to troubleshoot the spectrum analyzer.

It might be possible to eliminate some error messages by performing a [REALIGN LO & IF] sequence. Follow this procedure:

1. Press the SAVE key and [SAVE STATE].
2. Store the current state in a convenient STATE register.
3. Press the PRESET key and [REALIGN LO & IF]. Wait for the sequence to finish.
4. Press the RECALL key and [RECALL STATE].
5. Recall the previously stored STATE.

If an error message is still displayed, refer to Chapter 4 of this manual, "Help?"

If it is necessary to send the spectrum analyzer in for repair, note any error messages by the error code. This will provide useful information to the person troubleshooting the analyzer.

The HP 8562A/B can display only one error message at one time, although more error messages may exist. To check for more error messages, proceed as follows:

1. Press the RECALL key and [MORE].
2. Press [RECALL ERRORS]. An error message will be displayed in the active function block.
3. Use the ↑ and ↓ keys to scroll through any other error messages which might exist, making note of each error code.

Error messages and their associated error codes are listed below in numeric order.

ERR 100	NO PWRON	Power-on state is invalid; default state is loaded.
ERR 101	NO STATE	State to be RECALLed not valid or not SAVEd.
ERR 106	ABORTED!	Current operation is aborted; HP-IB parser reset.
ERR 107	HELLO ??	No HP-IB listener is present.
ERR 108	TIME OUT	Analyzer timed out when acting as controller.
ERR 109	CtrlFail	Analyzer unable to take control of the bus.
ERR 110	NOT CTRL	Analyzer is not system controller.
ERR 111	# ARGMTS	Command does not have enough arguments.
ERR 112	??CMD??	Unrecognized command.
ERR 113	FREQ NO!	Command cannot have frequency units.
ERR 114	TIME NO!	Command cannot have time units.

ERR 115	AMPL NO!	Command cannot have amplitude units.
ERR 116	?UNITS??	Unrecognizable units.
ERR 117	NOP NUM	Command cannot have numeric units.
ERR 118	NOP EP	Enable parameter cannot be used.
ERR 119	NOP UPDN	UP/DN are not valid arguments for command.
ERR 120	NOP ONOF	ON/OFF are not valid arguments for command.
ERR 121	NOP ARG	AUTO/MAN are not valid arguments for command.
ERR 122	NOP TRC	Trace registers are not valid for command.
ERR 123	NOP ABLK	A-block format not valid here.
ERR 124	NOP IBLK	I-block format not valid here.
ERR 125	NOP STRNG	Strings are not valid for this command.
ERR 126	NO ?	This command cannot be queried.
ERR 127	BAD DTMD	Not a valid peak detector mode.
ERR 128	PK WHAT?	Not a valid peak search parameter.
ERR 129	PRE TERM	Premature A-block termination.
ERR 130	BAD TDF	Arguments are only for TDF command.
ERR 131	?? AM/FM	AM/FM are not valid arguments for this command.
ERR 132	!FAV/RMP	FAV/RAMP are not valid arguments for this command.
ERR 133	!INT/EXT	INT/EXT are not valid arguments for this command.
ERR 134	??? ZERO	ZERO is not a valid argument for this command.
ERR 135	??? CURR	CURR is not a valid argument for this command.
ERR 136	??? FULL	FULL is not a valid argument for this command.
ERR 137	??? LAST	LAST is not a valid argument for this command.
ERR 138	!GRT/DSP	GRT/DSP are not valid arguments for this command.
ERR 139	PLOTONLY	Argument can only be used with PLOT command.
ERR 140	?? PWRON	PWRON is not a valid argument for this command.
ERR 141	BAD ARG	Argument can only be used with FDIAG command.
ERR 142	BAD ARG	Query expected for FDIAG command.
ERR 143	NO PRESL	No preselector hardware to use command with (HP 8562B).
ERR 200	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 201	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 250	OUTOF RG	ADC input is outside of ADC range.
ERR 251	NO IRQ	Microprocessor not receiving interrupt from ADC.
ERR 300	YTO UNLK	YTO (1st LO) phase-locked loop (PLL) is unlocked.
ERR 301	YTO UNLK	YTO PLL is unlocked.
ERR 302	OFF UNLK	Offset Roller Oscillator PLL is unlocked.
ERR 303	XFR UNLK	Transfer Roller Oscillator PLL is unlocked.
ERR 304	ROL UNLK	Main Roller Oscillator PLL is unlocked.
ERR 305	FREQ ACC	Frequency accuracy error.
ERR 306	FREQ ACC	Frequency accuracy error.
ERR 307	FREQ ACC	Frequency accuracy error.
ERR 308	FREQ ACC	Frequency accuracy error.
ERR 309	FREQ ACC	Frequency accuracy error.
ERR 310	FREQ ACC	Frequency accuracy error.
ERR 311	FREQ ACC	Frequency accuracy error.
ERR 312	FREQ ACC	Frequency accuracy error.
ERR 313	FREQ ACC	Frequency accuracy error.
ERR 314	FREQ ACC	Frequency accuracy error.
ERR 315	FREQ ACC	Frequency accuracy error.
ERR 316	FREQ ACC	Frequency accuracy error.
ERR 317	FREQ ACC	Frequency accuracy error.
ERR 318	FREQ ACC	Frequency accuracy error.
ERR 321	FREQ ACC	Frequency accuracy error.

ERR 322	FREQ ACC	Frequency accuracy error.
ERR 324	FREQ ACC	Frequency accuracy error.
ERR 325	FREQ ACC	Frequency accuracy error.
ERR 326	FREQ ACC	Frequency accuracy error.
ERR 327	OFF UNLK	Offset Roller Oscillator PLL is unlocked.
ERR 328	FREQ ACC	Frequency accuracy error.
ERR 329	FREQ ACC	Frequency accuracy error.
ERR 331	FREQ ACC	Frequency accuracy error.
ERR 333	600 UNLK	600 MHz Reference Oscillator PLL is unlocked.
ERR 334	LO AMPL	YTO (1st LO) unlevelled.

NOTE

Error codes 400 through 592 are generated when the automatic IF adjustment routine detects a fault. This routine adjusts amplitude parameters first, then resolution bandwidths in this sequence: 300 kHz, 1 MHz, 100 kHz, 30 kHz, 10 kHz, 3 kHz, 1 kHz, 300 Hz, and 100 Hz. The routine will restart from the beginning if a fault is detected. Parameters adjusted after the routine begins and before the fault is detected should be OK; parameters adjusted later in the sequence are suspect.

ERR 400	AMPL 100	Unable to adjust amplitude of 100 Hz RES BW.
ERR 401	AMPL 300	Unable to adjust amplitude of 300 Hz RES BW.
ERR 402	AMPL 1K	Unable to adjust amplitude of 1 kHz RES BW.
ERR 403	AMPL 3K	Unable to adjust amplitude of 3 kHz RES BW.
ERR 404	AMPL 10K	Unable to adjust amplitude of 10 kHz RES BW.
ERR 405	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 406	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 407	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 408	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 409	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 410	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 411	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 412	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 413	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 414	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 415	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 416	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 417	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 418	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 419	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 420	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 421	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 422	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 423	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 424	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 425	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 426	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 427	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 428	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 429	RBW 100	Unable to adjust 100 Hz RES BW.

ERR 430	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 431	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 432	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 433	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 434	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 435	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 436	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 437	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 438	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 439	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 440	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 441	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 442	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 443	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 444	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 445	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 446	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 447	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 448	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 449	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 450	IF SYSTM	IF hardware failure. Check other error messages.
ERR 451	IF SYSTM	IF hardware failure. Check other error messages.
ERR 452	IF SYSTM	IF hardware failure. Check other error messages.
ERR 454	AMPL	Unable to adjust step gain amplifiers.
ERR 455	AMPL	Unable to adjust step gain amplifiers.
ERR 456	AMPL	Unable to adjust step gain amplifiers.
ERR 457	AMPL	Unable to adjust step gain amplifiers.
ERR 458	AMPL	Unable to adjust step gain amplifiers.
ERR 459	AMPL	Unable to adjust step gain amplifiers.
ERR 460	AMPL	Unable to adjust step gain amplifiers.
ERR 461	AMPL	Unable to adjust step gain amplifiers.
ERR 462	AMPL	Unable to adjust step gain amplifiers.
ERR 463	AMPL	Unable to adjust step gain amplifiers.
ERR 464	AMPL	Unable to adjust step gain amplifiers.
ERR 465	AMPL	Unable to adjust step gain amplifiers.
ERR 466	LIN AMPL	Unable to adjust linear amplitude scale.
ERR 467	LOG AMPL	Unable to adjust log amplitude scale.
ERR 468	LOG AMPL	Unable to adjust log amplitude scale.
ERR 469	LOG AMPL	Unable to adjust log amplitude scale.
ERR 470	LOG AMPL	Unable to adjust log amplitude scale.
ERR 471	RBW 30K	Unable to adjust 30 kHz RES BW.
ERR 472	RBW 100K	Unable to adjust 100 kHz RES BW.
ERR 473	RBW 300K	Unable to adjust 300 kHz RES BW.
ERR 474	RBW 1M	Unable to adjust 1 MHz RES BW.
ERR 475	RBW 30K	Unable to adjust 30 kHz RES BW.
ERR 476	RBW 100K	Unable to adjust 100 kHz RES BW.
ERR 477	RBW 300K	Unable to adjust 300 kHz RES BW.
ERR 478	RBW 1M	Unable to adjust 1 MHz RES BW.
ERR 483	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 484	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 485	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 486	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 487	RBW 100	Unable to adjust 100 Hz RES BW.

ERR 488	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 489	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 490	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 491	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 492	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 493	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 494	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 495	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 496	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 497	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 498	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 499	CAL UNLK	A16 Cal Oscillator is unlocked.
ERR 500	AMPL 30K	Unable to adjust amplitude of 30 kHz RES BW.
ERR 501	AMPL .1M	Unable to adjust amplitude of 100 kHz RES BW.
ERR 502	AMPL .3M	Unable to adjust amplitude of 300 kHz RES BW.
ERR 503	AMPL 1M	Unable to adjust amplitude of 1 MHz RES BW.
ERR 504	AMPL 30K	Unable to adjust amplitude of 30 kHz RES BW.
ERR 505	AMPL .1M	Unable to adjust amplitude of 100 kHz RES BW.
ERR 506	AMPL .3M	Unable to adjust amplitude of 300 kHz RES BW.
ERR 507	AMPL 1M	Unable to adjust amplitude of 1 MHz RES BW.
ERR 508	AMPL 30K	Unable to adjust amplitude of 30 kHz RES BW.
ERR 509	AMPL .1M	Unable to adjust amplitude of 100 kHz RES BW.
ERR 510	AMPL .3M	Unable to adjust amplitude of 300 kHz RES BW.
ERR 511	AMPL 1M	Unable to adjust amplitude of 1 MHz RES BW.
ERR 512	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 513	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 514	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 515	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 516	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 517	RBW 100	Unable to adjust 100 Hz RES BW.
ERR 518	RBW 300	Unable to adjust 300 Hz RES BW.
ERR 519	RBW 1K	Unable to adjust 1 kHz RES BW.
ERR 520	RBW 3K	Unable to adjust 3 kHz RES BW.
ERR 521	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 522	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 523	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 524	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 525	RBW 10K	Unable to adjust 10 kHz RES BW.
ERR 550	LOG AMPL	Unable to adjust amplitude of log scale.
ERR 551	AMPL	Unable to adjust step gain amplifiers.
ERR 552	LOG AMPL	Unable to adjust amplitude of log scale.
ERR 553	LOG AMPL	Unable to adjust amplitude of log scale.
ERR 554	LOG AMPL	Unable to adjust amplitude of log scale.
ERR 555	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 556	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 557	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 558	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 559	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 560	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 561	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 562	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 563	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 564	LOG AMPL	Unable to adjust amplitude in log scale.

ERR 565	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 566	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 567	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 568	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 569	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 570	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 571	AMPL	Unable to adjust step gain amplifiers.
ERR 572	AMPL 1M	Unable to adjust amplitude of 1 MHz RES BW.
ERR 573	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 574	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 575	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 576	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 577	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 581	AMPL	Unable to adjust 100 kHz and <=10 kHz RES BW's.
ERR 582	AMPL	Unable to adjust 100 kHz and <=10 kHz RES BW's.
ERR 583	RBW 30K	Unable to adjust 30 kHz RES BW.
ERR 584	RBW 100K	Unable to adjust 100 kHz RES BW.
ERR 585	RBW 300K	Unable to adjust 300 kHz RES BW.
ERR 586	RBW 1M	Unable to adjust 1 MHz RES BW.
ERR 587	RBW 30K	Unable to adjust 30 kHz RES BW.
ERR 588	RBW 100K	Unable to adjust 100 kHz RES BW.
ERR 589	RBW 300K	Unable to adjust 300 kHz RES BW.
ERR 590	RBW 1M	Unable to adjust 1 MHz RES BW.
ERR 591	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 592	LOG AMPL	Unable to adjust amplitude in log scale.
ERR 600	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 601	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 650	OUTOF RG	ADC input is outside of the ADC range.
ERR 651	NO IRQ	Microprocessor is not receiving interrupt from ADC.
ERR 700	EEROM	Checksum error of EEROM A2U501.
ERR 701	AMPL CAL	Checksum error of frequency response correction data.
ERR 702	ELAP TIM	Checksum error of elapsed time data.
ERR 703	AMPL CAL	Checksum error of frequency response correction data.
ERR 704	PRESELCT	Checksum error of customer preselector peak data.
ERR 705	ROM U306	Checksum error of Program ROM A2U306.
ERR 706	ROM U307	Checksum error of Program ROM A2U307.
ERR 707	ROM U308	Checksum error of Program ROM A2U308.
ERR 708	ROM U309	Checksum error of Program ROM A2U309.
ERR 709	ROM U310	Checksum error of Program ROM A2U310
ERR 710	ROM U311	Checksum error of Program ROM A2U311.
ERR 711	RAM U303	Checksum error of System RAM A2U303.
ERR 712	RAM U302	Checksum error of System RAM A2U302.
ERR 713	RAM U301	Checksum error of System RAM A2U301.
ERR 714	RAM U300	Checksum error of System RAM A2U300.
ERR 715	RAM U305	Checksum error of System RAM A2U305.
ERR 716	RAM U304	Checksum error of System RAM A2U304.
ERR 717	BAD uP!!	Microprocessor not fully operational.
ERR 718	BATTERY?	Non-volatile RAM not working; check battery.
ERR 750	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 751	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 752	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 753	SYSTEM	Hardware/Firmware interaction; check other errors.

ERR 754	SYSTEM	Hardware/Firmware interaction; check other errors.
ERR 755	SYSTEM	Hardware/Firmware interaction; check other errors.

Error codes 800 through 899 , MODULE, are reserved for Option Modules, such as the HP 85629A Test and Adjustment Module. Refer to the Option Module's manual for a listing of error messages.

HEWLETT PACKARD

Manual Updating Supplement

Supplement HP Part Number: 08562-90060

Supplement Print Date: February 1988

This supplement updates the following document:

HP 8562A/B Spectrum Analyzer Installation Manual

Manual HP Part Number: 08562-90007
Manual Print Date: January 1987

What Are Manual Updating Supplements?

A Manual Updating Supplement keeps your manual up-to-date. The supplement, which consists of a cover page and various replacement and/or additional pages for your manual, is shipped with the manual that it updates.

SELECTING THE PAGES TO BE ADDED

The following information helps you select the applicable pages to add supplement information to your manual.

Serial Prefix or Firmware Version

Check the serial prefix or firmware version information on the pages. If there are several versions of a page, select the version that applies to your instrument. For example, your instrument has a serial prefix of 2825A, and the supplement has two versions of one page: *Serial Prefix 2731A and Above*, and *Serial Prefix 2829A and Above*. In this example *Serial Prefix 2731A and Above* applies to your instrument.

Supplement Revision Date

If there are two copies of a page with the same page number and serial prefix, but different revision dates (e.g., Rev. 12JUL87 and Rev. 28AUG87), select the page with the latest revision date.

If there is an All Serials version of a particular piece of information on a page *and* a version identified by a serial prefix that applies to your instrument, select the version with the latest revision date on the bottom of the page. If there are two such pages with different changes, use both (incorporate one with the other).

If the page already in your manual has a revision date that is *later* than the applicable page in the supplement, keep the page currently in your manual; the manual already may have been updated.

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The cover page of each Manual Updating Supplement gives the supplement part number and its print date. The supplement print date corresponds to the revision date of the supplement (e.g., Rev. 12JUL87) found at the bottom of the cover page.

The revision date of the supplement is updated each time the supplement changes, but the supplement part number stays the same. For each manual part number there is only one Manual Updating Supplement part number.

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A replacement page has the same page number as the page being replaced. Additional pages have page numbers with a lower-case letter. For example, if one additional page is added between pages 6-4 and 6-5, it will be numbered 6-4a.

The revision date appearing on each page is the date that the new page was *originally* added to the supplement.

Replacement or additional pages may contain several different types of information:

- new information that was not supplied in the original document
- change information that documents changes to the product that have occurred since the original printing of the manual
- error information (errata) that corrects errors that were present in the manual

New and change information is usually tied to a serial prefix or firmware version change; however, information that applies to *all* serials or *all* firmware versions may also be included in the supplement.

The applicable serial prefix or firmware version is printed on each page. If the information applies to all serial numbers of the instrument, the page will contain the notation *All Serials*. Similarly, if a replacement page contains error-correction information, it will contain the notation *Errata*.

INSERTING THE REPLACEMENT AND ADDITIONAL PAGES

After you have selected applicable pages, discard each old page for which you have a new version. Insert the new version of the page. Each replacement page will have the exact page number as the old version.

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HEWLETT PACKARD

HP 8562A/B High Performance Portable Spectrum Analyzer

Installation Manual

(Includes Options 001 and 026)

Serial Numbers

This manual applies directly to analzers with the following serial number prefixes:

HP 8562A: 2642A to 2805A
HP 8562B: 2640A to 2809A

For additional important information about serial numbers, see "Analyzers Covered by This Manual" in Chapter 1.

Manual Part Number 08562-90007
Microfiche Part Number 08562-90008
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1212 Valley House Drive, Rohnert Park, CA 94928-4999

Rev. 25FEB88

HP 8562A/B Documentation Description

Manuals shipped with your analyzer:

Installation Manual
HP Part Number 08562-90007

- Tells you how to install the spectrum analyzer
- Tells you what to do in case of a failure

Operating and Programming Manual
HP Part Number 08562-90001

- Tells you how to make measurements with your spectrum analyzer
- Tells you how to program your spectrum analyzer
- Describes analyzer features

Pocket Operating Guide
HP Part Number 08562-90003

- An abbreviated version of the Operating and Programming Manual

Quick Reference Guide
HP Part Number 08562-90006

- Provides you with a listing of all remote programming commands

Options

Support Manual (Part of Option 915)*
HP Part Number 08562-90009

- Describes troubleshooting and repair of the analyzer

* Option 915, Service Documentation, consists of one copy each of the Support Manual, the Installation Manual, the Operating and Programming Manual, the Pocket Operating Guide, and the Quick Reference Guide.

Table 1-1. HP 8562A/B Specifications (1 of 8)

FREQUENCY

Frequency Range

Internal Mixing

1 kHz to 22 GHz
Option 026: 1 kHz to 26.5 GHz

Internal Mixing Bands

Frequency Band	Harmonic Mixing Mode (N)*
1 kHz to 2.9 GHz	1–
2.75 GHz to 6.46 GHz	1–
5.86 GHz to 13.0 GHz	2–
12.4 GHz to 19.7 GHz	3–
19.1 GHz to 22.0 GHz	4–
Opt. 026: 19.1 GHz to 26.5 GHz	

External Mixing

External Mixing Bands

18 to 325 GHz

Frequency Band	Frequency Range (GHz)	Harmonic Mixing Mode (N)*
K	18.0 to 26.5	6–
A	26.5 to 40.0	8–
Q	33.0 to 50.0	10–
U	40.0 to 60.0	10–
V	50.0 to 75.0	14–
E	60.0 to 90.0	16–
W	75.0 to 110.0	18–
F	90.0 to 140.0	24–
D	110.0 to 170.0	30–
G	140.0 to 220.0	36–
Y	170.0 to 260.0	44–
J	220.0 to 325.0	54–

Frequency Readout Accuracy (accuracy of Start, Center, Stop, or Marker frequency)

< ± (frequency readout × frequency reference accuracy + 5% of frequency span + 15% of resolution bandwidth + 250 Hz)

Frequency Count Marker

Resolution

Selectable from 10 Hz to 1 MHz

Frequency Count Marker Accuracy (for signal-to-noise ratio ≥ 25 dB)

< ± (marker frequency × frequency reference accuracy + 50 Hz × N + 1 LSD)*

Delta Frequency Count Accuracy (for signal-to-noise ratio ≥ 25 dB)

< ± (delta frequency × frequency reference accuracy + 100 Hz × N + 2 LSD)*

Frequency Reference Accuracy

Includes aging, temperature drift, and settability.

$< \pm 4 \times 10^{-6}$ per year

Stability

Residual FM (zero span)

< 50 Hz × N* peak-to-peak in 100 ms

Spectral Purity

Noise sidebands (30 kHz offset)

< (−100 + 20logN) dBc/Hz*

* N is the harmonic mixing mode. The desired 1st LO harmonic is always higher than the tuned frequency by the 1st IF frequency (3.9107 GHz for the 1 kHz to 2.9 GHz band, and 310.7 MHz for all other bands).

Table 1-1. HP 8562A/B Specifications (2 of 8)

FREQUENCY (Continued)	
Frequency Span	
Range	
Internal Mixing	0 Hz, 2.5* kHz × N† to 19.25 GHz *(Opt. 026: to 23.75 GHz)* over the 10-division CRT horizontal axis, variable in approximately 1% increments or in a 1,2,5 sequence
External Mixing	Minimum span = 2.5 kHz × N†
Accuracy (Spans ≥ 10 kHz)	< ±5%
Resolution Bandwidths (–3 dB)	
Range	100 Hz to 1 MHz selectable in a 1, 3, 10 sequence; and 2 MHz‡
Accuracy	
1 and 2‡ MHz RES BW	< ±25%
300 kHz to 300 Hz RES BW	< ±10%
100 Hz RES BW	< ±30%
Selectivity (60 dB/3 dB bandwidth ratio)	< 15:1
Bandwidth Shape	Synchronously tuned, 4-pole filters
Video Bandwidth	
Post-detection low-pass filter averages displayed noise for a smooth trace.	
Range	1 Hz to 3 MHz in a 1, 3, 10 sequence

AMPLITUDE	
MEASUREMENT RANGE	
Maximum Safe Input Power	
Average Continuous Power (input attenuation ≥ 10 dB)	+30 dBm (1 watt)
Peak Pulse Power (input attn. ≥ 30 dB)	+50 dBm (100 watts) for pulse widths < 10 μs and < 1% duty cycle
DC	0 volts
Gain Compression	< 1.0 dB
10 MHz to 22 GHz (≤ –5 dBm§ at input mixer)	
2.9 GHz to 22 GHz (≤ –3 dBm at input mixer)	
Opt. 026: 2.9 GHz to 26.5 GHz (≤ –3 dBm at input mixer)	

* Minimum span is 10 kHz for spectrum analyzers with serial prefix of 2724A and below.

† N is the harmonic mixing mode. The desired 1st LO harmonic is always higher than the tuned frequency by the 1st IF frequency (3.9107 GHz for the 1 kHz to 2.9 GHz band, and 310.7 MHz for all other bands).

‡ The 2 MHz resolution bandwidth is specified only for HP 8562A analyzers with serial prefix of 2805A and above, and for HP 8562B analyzers with serial prefix of 2809A and above.

§ With ≤ –3 dBm at input mixer for HP 8562A with serial prefix 2805A and below, and HP 8562B with serial prefix 2750A and below.

Table 1-1. HP 8562A/B Specifications (3 of 8)

AMPLITUDE (Continued)		
Displayed Average Noise Level with no signal at input, 100 Hz RES BW, 1 Hz video BW, and 0 dB input attenuation		
Frequency Range	**HP 8562A**	**HP 8562B**
10 kHz	<–90 dBm	<–90 dBm
100 kHz	<–100 dBm	<–100 dBm
1 MHz to 2.9 GHz	<–120 dBm	<–120 dBm
2.9 GHz to 6.46 GHz	<–121 dBm	<–121 dBm
6.46 GHz to 13.0 GHz	<–110 dBm	<–110 dBm
13.0 GHz to 19.7 GHz	<–105 dBm	<–105 dBm
19.7 GHz to 22.0 GHz	<–100 dBm	<–100 dBm
Opt. 026: 19.7 GHz to 26.5 GHz		
Spurious Responses (All input-related spurious reponses, except as noted below, with ≤–40 dBm mixer level*)	**HP 8562A** <–60 dBc 10 MHz to 6.46 GHz	**HP 8562B** <–60 dBc 10 MHz to 2.9 GHz
Second Harmonic Distortion		
Frequency Range	**HP 8562A**	**HP 8562B**
10 MHz to 2.9 GHz	<–72 dBc, –40 dBm mixer level*	<–72 dBc, –40 dBm mixer level*
2.75 GHz to 22.0 GHz	<–100 dBc, –10 dBm mixer level*	<–60 dBc, –40 dBm mixer level*
Opt 026: 2.75 GHz to 26.5 GHz		
Third Order Intermodulation Distortion (with –30 dBm total power at input mixer*)		
Frequency Range	**HP 8562A**	**HP 8562B**
10 MHz to 2.9 GHz	<–70 dBc	<–70 dBc
2.75 GHz to 22 GHz	<–75 dBc	<–75 dBc
Opt. 026: 2.75 GHz to 26.5 GHz		
Image, Multiple, and Out-of-Band Responses		
Frequency Range	**HP 8562A**	**HP 8562B**
10 MHz to 18 GHz	<–70 dBc	unspecified
10 MHz to 22 GHz	<–60 dBc	unspecified
Opt. 026: 10 MHz to 26.5 GHz		
Residual Responses 200 kHz to 6.46 GHz, with no signal at input, 0 dB input attenuation	<–90 dBm	
DISPLAY RANGE		
Amplitude Scale	10 vertical CRT divisions with the reference level (0 dB) at the top graticule line	

* Mixer level = input level – input attenuation

Table 1-1. HP 8562A/B Specifications (4 of 8)

AMPLITUDE (Continued)

DISPLAY RANGE (Continued)

Calibration

Log

10 dB/Div for 90 dB display from reference level
5 dB/Div for 50 dB display expanded from reference level*
2 dB/Div for 20 dB display expanded from reference level
1 dB/Div for 10 dB display expanded from reference level*

Linear

10% of reference level per division when calibrated in voltage

Reference Level Range

Log, adjustable in 0.1 dB steps

Frequency Band	Range
10 kHz to 2.9 GHz	–120 dBm to +30 dBm
2.75 GHz to 6.46 GHz	–120 dBm to +30 dBm
5.86 GHz to 13.0 GHz	–115 dBm to +30 dBm
12.4 GHz to 19.7 GHz	–105 dBm to +30 dBm
19.1 GHz to 22.0 GHz	–100 dBm to +30 dBm
Opt. 026: 19.1 GHz to 26.5 GHz	

Linear, settable in 1% steps

Frequency Band	Range
10 kHz to 2.9 GHz	2.2 μV to 7.07V
2.75 GHz to 6.46 GHz	2.2 μV to 7.07V
5.86 GHz to 13.0 GHz	4.0 μV to 7.07V
12.4 GHz to 19.7 GHz	12.6 μV to 7.07V
19.1 GHz to 22.0 GHz	22 μV to 7.07V
Opt. 026: 19.1 GHz to 26.5 GHz	

AMPLITUDE ACCURACY

REFERENCE LEVEL UNCERTAINTY

Frequency Response (with 10 dB input attenuation)

In-Band

Frequency Range	HP 8562A	HP 8562B
1 kHz to 2.9 GHz	< ±1.2 dB	< ±1.2 dB
2.9 GHz to 6.46 GHz	< ±2.5 dB	< ±2.0 dB
6.46 GHz to 13.0 GHz	< ±3.5 dB	< ±2.5 dB
13.0 GHz to 19.7 GHz	< ±4.0 dB	< ±3.0 dB
19.7 GHz to 22.0 GHz	< ±4.3 dB	< ±4.3 dB
Opt. 026: 19.7 GHz to 26.5 GHz		

Referenced to CAL OUTPUT (300 MHz)

1 kHz to 22.0 GHz	< ±5.1 dB	< ±5.1 dB
Opt. 026: 1 kHz to 26.5 GHz		

* These scales are available only in sweeptimes ≥ 30 ms (digital display mode)

Table 1-1. HP 8562A/B Specifications (5 of 8)

AMPLITUDE ACCURACY (Continued)		
	HP 8562A	**HP 8562B**
Band Switching Uncertainty Additional uncertainty added to In-Band Frequency Response for measurements between any two bands.	< +0.5 dB	< +0.5 dB
Calibrator Uncertainty (–10 dBm, 300 MHz)	< ±0.3 dB	
Input Attenuator Switching Uncertainty 20 to 70 dB settings, referenced to 10 dB input attenuation		
Frequency Range 1 kHz to 2.9 GHz	< ±0.6 dB/10 dB step, 1.8 dB max.	
IF Gain Uncertainty 0 dBm to –80 dBm reference levels with 10 dB input attenuation	< ±1.0 dB	
Resolution Bandwidth Switching Uncertainty Referenced to 300 kHz RES BW	< ±0.5 dB	
IF Alignment Uncertainty (uncertainty when using 100 Hz and 300 Hz RES BW)		
300 Hz RES BW	< ±0.5 dB	
100 Hz RES BW	< ±2.0 dB	
Pulse Digitization Uncertainty Pulse response mode, PRF > 720/sweeptime		
Log	< 1.25 dB peak-to-peak for res BW ≤ 1 MHz < 3 dB peak-to-peak for res BW of 2 MHz*	
Linear	< 4% of reference level peak-to-peak for res BW ≤ 1 MHz < 12% of reference level peak-to-peak for res BW of 2 MHz*	
SCALE FIDELITY		
Log	< ±0.4 dB/4 dB from reference level to a maximum of ±1.5 dB over 0 to 90 dB range	
Linear	< ±3% of reference level	

* The 2 MHz RES BW is specified only for HP 8562A spectrum analyzers with serial prefix of 2805A and above, and for HP 8562B spectrum analyzers with serial prefix of 2809A and above.

Table 1-1. HP 8562A/B Specifications (6 of 8)

SWEEP	
Sweep Time	
Range	
Span = 0	50 μs to < 30 ms (analog display)
Span = 0	30 ms to 60s (digital display)
Span ≥ 2.5* kHz × N†	50 ms to 100s (digital display)
Accuracy (Span = 0)	
30 ms ≤ sweep time ≤ 60 seconds	< ± 1%
Sweep time < 30 ms	< ± 15%
Sweep Trigger	Free Run, Single, Line, Video, External
INPUTS AND OUTPUTS	
IF INPUT	
Connector	SMA female, front panel
Input level for full-screen deflection (external mixing mode, 0 dBm reference level, 30 dB conversion loss)	–30 dBm ± 1.5 dB
HP-IB	
Connector	IEEE-488 bus connector
Interface Functions	SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP1, DC1, DT0, C1, C28, E1
Direct Plotter Output	Supports HP 7225A, HP 7440A, HP 7470A, HP 7475A, HP 7550A, HP 9872A/B/C/T
CAL OUTPUT	
Connector	BNC female, front panel
Frequency	300 MHz ± (300 MHz × frequency reference accuracy)
Amplitude	–10 dBm ± 0.3 dB
1ST LO OUTPUT	
Connector	SMA female, front panel
Amplitude	+ 16.5 dBm ± 2.0 dB (20°C to 30°C)
10 MHz REF IN/OUT	
Connector	BNC female, rear panel
Frequency	10 MHz ± (10 MHz × frequency reference accuracy)
GENERAL	
Environmental	
Military Specification	Per MIL-T-28800C, Type III, Class 3 Style C as follows:
Calibration Interval	1 year
Warmup	5 minutes from ambient conditions‡

* Minimum span is 10 kHz for spectrum analyzers with serial prefix 2724A and below.

† N is the harmonic mixing mode. The desired 1st LO harmonic is always higher than the tuned frequency by the 1st IF frequency (3.9107 GHz for the 1 kHz to 2.9 GHz band, and 310.7 MHz for all other bands).

‡ 2 hours for conditions of internal condensation, 30 minutes to meet frequency response specifications without preselector peaking.

Table 1-1. HP 8562A/B Specifications (7 of 8)

GENERAL (Continued)	
Environmental (Continued)	
Temperature	
Operating	−10°C to +55°C
Non-operating	−62°C to +85°C
Humidity	95% at 40°C for 5 days
Altitude	
Operating	15000 feet
Non-operating	50000 feet
Rain Resistance	Drip-proof at 16 liters/hour/square foot
Vibration	
5 to 15 Hz	0.059 inch peak-to-peak excursion
15 to 25 Hz	0.039 inch peak-to-peak excursion
25 to 55 Hz	0.020 inch peak-to-peak excursion
Pulse Shock	
Half Sine	30 g for 11 ms duration
Transit Drop	8-inch drop on 6 faces and 8 corners
Electromagnetic Compatibility	Conducted and radiated interference is in compliance with CISPR publication 11 (1985) and Messempfaenger-Postverfuegung 526/527/79 (Kennzeichnung Mit F-Nummer/Funkschutzzeichen). Meets the requirements of MIL-STD-461B, Part 4, with the exceptions shown below. Conducted Emissions CE01 (Narrowband): 1 kHz to 15 kHz only CE03 (Narrowband): Full limits CE03 (Broadband): 20 dB relaxation from 15 kHz to 100 kHz Conducted Susceptibility CS01: Full limits (limited to 36 Hz for HP 8562B) CS02: Full limits CS06: Full limits Radiated Emissions RE01: 15 dB relaxation to 30 kHz and exceptioned from 30 kHz to 50 kHz RE02: Full limits to 1 GHz Radiated Susceptibility RS01: Full limits RS02: Exceptioned RS03: Limited to 1 V/m from 14 kHz to 1 GHz, with 20 dB relaxation at IF frequencies (30 dB relaxation at IF frequencies for Option 001 instruments)

Table 1-1. HP 8562A/B Specifications (8 of 8)

GENERAL (Continued)

Power Requirements		
115 Vac Operation		
Voltage	90 to 140V rms	
Current	3.2A rms max	
Frequency	47 to 440 Hz	
230 Vac Operation		
Voltage	180 to 250V rms	
Current	1.8A rms max	
Frequency	47 to 66 Hz	
Maximum Power Dissipation	180 Watts	
Weight	**HP 8562A**	**HP 8562B**
	20 kg (44 lbs)	19 kg (41.8 lbs)
Dimensions		
Without handle or cover	184 mm high x 337 mm wide x 460.5 mm deep	
With handle and cover	200 mm high x 373 mm wide x 500 mm deep	

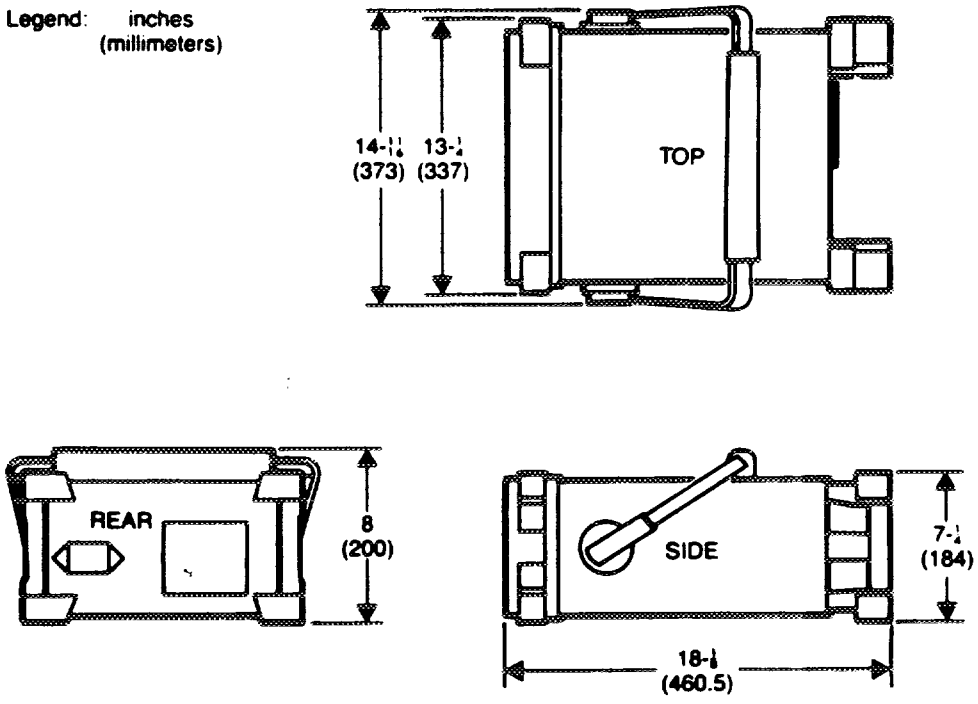

Table 1-2. HP 8562A/B Characteristics (1 of 3)

NOTE: These are not specifications. Characteristics provide useful, but non-warranted, information about instrument performance.

FREQUENCY

Frequency Reference Accuracy	
Aging	$< \pm 1 \times 10^{-6}$/year
Temperature drift (−10°C to +55°C)	$< \pm 2 \times 10^{-6}$
Settability	$< \pm 1 \times 10^{-6}$

DYNAMIC RANGE

Nominal Sensitivity (100 Hz Res BW, 1 Hz video BW, 0 dB input attenuation)	
Frequency Range	**Nominal Sensitivity**
1 MHz to 2.9 GHz	−128 dBm
2.9 GHz to 6.46 GHz	−126.5 dBm
6.46 GHz to 13.0 GHz	−119 dBm
13.0 GHz to 19.7 GHz	−114 dBm
19.7 GHz to 22.0 GHz	−108 dBm
Opt. 026: 19.7 GHz to 26.5 GHz	

AMPLITUDE ACCURACY

Band-to-Band Frequency Response
Frequency response uncertainty for measurements between any two bands. Equivalent to the sum of the two In-Band Frequency Response values plus Band Switching Uncertainty. (Values in parentheses apply to HP 8562B.)

Band-to-Band Frequency Response (dB)

Band	0	1	2	3	4
0	—	4.2 (3.7)	5.2 (4.2)	5.7 (4.7)	6.0 (6.0)
1	4.2 (3.7)	—	6.5 (5.0)	7.0 (5.5)	7.3 (6.8)
2	5.2 (4.2)	6.5 (5.0)	—	8.0 (6.0)	8.3 (7.3)
3	5.7 (4.7)	7.0 (5.5)	8.0 (6.0)	—	8.8 (7.8)
4	6.0 (6.0)	7.3 (6.8)	8.3 (7.3)	8.8 (7.8)	—

Input Attenuator Repeatability: $< \pm 0.2$ dB

Pulse Digitization Uncertainty (Pulse response mode, PRF > 720/sweeptime) Standard Deviation: < 0.2 dB

Table 1-2. HP 8562A/B Characteristics (2 of 3)

NOTE: These are not specifications. Characteristics provide useful, but non-warranted, information about instrument performance.

SWEEP	
Sweep Time Accuracy (span ≥2.5 kHz* × N†)	< ±15%
DEMODULATION	
Spectrum Demodulation	
Modulation Type	AM and FM
Audio Output	Internal speaker and phone jack with volume control
Marker Pause Time	100 ms to 60s
INPUTS AND OUTPUTS	
INPUT 50Ω	
Connector Type	Precision Type N female, front panel *Opt. 026: APC 3.5 male*
Impedance	50 ohms
VSWR (At tuned frequency)	<1.5:1 for <2.9 GHz and ≥10 dB input attenuation <2.3:1 for >2.9 GHz and ≥10 dB input attenuation <3.0:1 for 0 dB input attenuation
LO Emission Level (Average)	**HP 8562A** / **HP 8562B**
10 dB input attenuation	<–70 dBm / <–10 dBm
IF INPUT	
Connector Type	SMA female, front panel
Impedance	50 ohms
Frequency	310.7 MHz
Noise Figure	7 dB
1 dB Gain Compression Level	–23 dBm
Full Screen Level (Gain Compression and Full Screen Levels apply with 30 dB conversion loss setting and 0 dBm reference level.)	–30 dBm
1ST LO OUTPUT	
Connector	SMA female, front panel
Impedance	50 ohms
Frequency Range	3.0000 GHz to 6.8107 GHz
CAL OUTPUT	
Connector	BNC female, front panel
Impedance	50 ohms

* Minimum span is 10 kHz for spectrum analyzers with serial prefix 2724A and below.

† N is the harmonic mixing mode. The desired 1st LO harmonic is always higher than the tuned frequency by the 1st IF frequency (3.9107 GHz for the 1 kHz to 2.9 GHz band, and 310.7 MHz for all other bands.)

Table 1-2. HP 8562A/B Characteristics (3 of 3)

NOTE: These are not specifications. Characteristics provide useful, but non-warranted, information about instrument performance.

INPUTS AND OUTPUTS (Continued)

10 MHz REF IN/OUT	
Connector	BNC female, rear panel
Impedance	50 ohms
Output Amplitude	0 dBm
Input Amplitude	–2 to +10 dBm
VIDEO OUTPUT	
Connector	BNC female, rear panel
Impedance (dc coupled)	50 ohms
Amplitude (into 50-ohm load)	0 to +1 volt full-scale
LO SWP | 0.5 V/GHz OUTPUT	
Connector	BNC female, rear panel
Impedance (dc coupled)	2 kohms
LO SWP OUTPUT (no load)	0 to +10V
0.5 V/GHz OUTPUT (no load)	0.5V/GHz of tuned frequency
BLANKING OUTPUT	
Connector	BNC female, rear panel
Amplitude	
During Retrace	Low TTL Level (sink 150 mA max.)
During Sweep	High TTL Level (source 0.5 mA max.)
Maximum Input (High TTL State)	+40V
EXT TRIG INPUT	
Connector	BNC female, rear panel
Impedance	10 kohms
Trigger Level	Rising edge of TTL Level
PROBE POWER (front panel)	
Voltage	+15 Vdc, –12.6 Vdc
Current	150 mA max., each
EARPHONE	
Connector	1/8-inch miniature monophonic jack, rear panel
Power Output	0.25 watts into 4 ohms
2ND IF OUT *(Opt. 001 instruments only)*	
Connector	SMA female, rear panel
Impedance	50 ohms
Frequency	310.7 MHz

Frequency Range	3 dB BW	Noise Figure	Conversion Gain
1 kHz to 2.9 GHz	>30 MHz	24 dB	–5.6 dB
2.75 GHz to 6.46 GHz	>20 MHz	24 dB	–3.6 dB
5.86 GHz to 6.46 GHz	>30 MHz	33.6 dB	–3.7 dB
12.4 GHz to 19.7 GHz	>30 MHz	39.8 dB	–9.9 dB
19.1 GHz to 22.0 GHz	>35 MHz	44.4 dB	–14.8 dB
(Opt. 026: 19.1 GHz to 26.5 GHz)			

3-13. If the Analyzer Doesn't Meet Specifications

3-14. If the analyzer doesn't meet one or more of the specifications, complete any remaining tests and record all test results on a copy of the test record. Then refer to Chapter 4, "Help?", for instructions on how to solve the problem. If an error message is displayed, press the PRESET key and [REALIGN LO & IF]. If the error message persists after the automatic RF, LO, and IF adjustments are completed, refer to Appendix A.

3-15. Calibration Cycle

3-16. To ensure that the HP 8562A/B meets the specifications listed in Table 1-1, Performance Verification should be performed every 12 months.

3-17. HP 85629A Functional Tests

3-18. The HP 85629A Test and Adjustment Module (TAM) can be used to perform several automatic functional tests on the HP 8562A/B Spectrum Analyzer. These tests provide increased confidence in analyzer operation while requiring very little equipment or operator attention. Hard copy results are possible with an HP-IB printer. Because these functional tests have greater measurement uncertainties than their related performance tests, they should not be used as part of a calibration. The greater measurement uncertainties in the functional tests are a result of the limited set of test equipment.

3-19. Table 3-2 lists the Functional Tests, their corresponding Performance Tests, and the types of test equipment required for each test. The recommended test equipment for the Functional Tests is indicated in Table 3-5 with the letter "M" placed in the "Use" column.

Table 3-2. TAM Functional Tests

Functional Test	Corresponding Performance Test	Equipment Required
Noise Sidebands	3-33	None
Residual FM	3-32	None
IF Gain Uncertainty	3-30	Source
Scale Fidelity	3-31	Source
Input Attenuator Accuracy	3-29	Source
Frequency Marker Accuracy	3-35	Source
Image, Mult, Out-of-Band Resp	3-34	Source
RES BW Accy & Selectivity	3-27, 3-28	Source, 20 dB Pad
2nd Harmonic Distortion	3-37	Source, 50 MHz LPF
Frequency Span Accuracy	3-39	Source
Gain Compression	3-41	Source
T.O.I. Distortion	3-40	Source
Frequency Response	3-38	Source, Power Meter
1ST LO OUTPUT Amplitude	3-42	Power Meter
Displayed Average Noise Level	3-26	50Ω Termination
Residual Responses	3-44	50Ω Termination

3-20. Spectrum Analyzer/TAM Compatibility

3-21. Table 3-3 lists the compatibility rating of each analyzer serial prefix for each TAM firmware revision. A rating of 10 indicates that the analyzer and TAM are fully compatible. If the rating is less than 10, the TAM can still be used, but the results of one or more of the tests will be invalid. Refer to Table 3-4 to determine which tests are valid for a particular TAM firmware revision. Make sure the analyzer's serial prefix matches the serial prefix listed in the table. New tables will be provided for analyzers with serial prefixes not listed on this manual's title page.

Table 3-3. Functional Test Compatibility Matrix

HP 8562A/B Serial Prefix(es)*	Compatibility Rating† HP 85629A Firmware Revision								
	A	B	C	D	E	F	G	H	I
2642A to 2750A (A)	10	10	10	10					
2640A to 2750A (B)	10	10	10	10					
2809A (A)	9	9	9	10					
2809A (B)	9	9	9	10					

* (A) identifies serial prefixes for HP 8562A analyzers; (B) identifies serial prefixes for HP 8562B analyzers.

† Compatibility is rated on a scale of 0 to 10 (0 = incompatible; 10 = fully compatible).

3-22. Running the Functional Tests

3-23. Connect the TAM to the rear panel of the HP 8562A/B. The HP 8562A/B should be allowed to warm up for at least five minutes before running any functional test. Perform the following steps to run the tests:

1. Perform a REF LVL CAL (reference level calibration) as described in Chapter 2, paragraph 2-23, before continuing.

2. Press the MODULE key to select the TAM's main menu. If any error message appears, refer to the Error Message section of the HP 85629A Test and Adjustment Module Supplement. Error messages will be displayed either in the lower right-hand corner of the CRT, on the bottom line of the main menu, or in the active function area.

Table 3-4. Functional Test Validity Matrix

HP 8562A/B Serial Prefix: HP 8562A: 2642A to 2750A
HP 8562B: 2640A to 2750A

Functional Test	Functional Test Validity* HP 85629A Firmware Revision								
	A	B	C	D	E	F	G	H	I
Noise Sidebands	V	V	V	V					
Residual FM	V	V	V	V					
IF Gain Uncertainty	V	V	V	V					
Scale Fidelity	V	V	V	V					
Input Attenuator Accuracy	V	V	V	V					
Frequency Marker Accuracy	V	V	V	V					
Image, Mult, Out-of-Band Resp	V	V	V	V					
RES BW Accy & Selectivity	V	V	V	V					
2nd Harmonic Distortion	V	V	V	V					
Frequency Span Accuracy	V	V	V	V					
Gain Compression	V	V	V	V					
T.O.I. Distortion	V	V	V	V					
Frequency Response	V	V	V	V					
1ST LO OUTPUT Amplitude	V	V	V	V					
Displayed Average Noise Level	V	V	V	V					
Residual Responses	V	V	V	V					
* V = Test results are valid; I = Test results are invalid									

Table 3-4a. Functional Test Validity Matrix

HP 8562A/B Serial Prefix: HP 8562A: 2805A & 2809A
HP 8562B: 2809A

Functional Test	Functional Test Validity* HP 85629A Firmware Revision								
	A	B	C	D	E	F	G	H	I
Noise Sidebands	V	V	V	V					
Residual FM	V	V	V	V					
IF Gain Uncertainty	V	V	V	V					
Scale Fidelity	V	V	V	V					
Input Attenuator Accuracy	V	V	V	V					
Frequency Marker Accuracy	V	V	V	V					
Image, Mult, Out-of-Band Resp	V	V	V	V					
RES BW Accy & Selectivity	I	I	I	V					
2nd Harmonic Distortion	V	V	V	V					
Frequency Span Accuracy	V	V	V	V					
Gain Compression	V	V	V	V					
T.O.I. Distortion	V	V	V	V					
Frequency Response	V†	V†	V†	V					
1ST LO OUTPUT Amplitude	V	V	V	V					
Displayed Average Noise Level	V†	V†	V†	V					
Residual Responses	V	V	V	V					

* V = Test results are valid; I = Test results are invalid

† On Option 026 spectrum analyzers, these TAM firmware revisions will test only up to 22 GHz.

3. Press [Config] to enter the configuration menu and verify that the TAM is properly configured and that any test equipment is properly connected to the HP-IB. Refer to the System Configuration Menu section of the TAM Supplement for more information on configuring external test equipment. If a printer is configured and available, Functional Test results will be sent to the

printer instead of the screen. If everything is properly configured, return to the main menu and press [Test].

4. Pressing [All Test] executes all the tests listed in the order shown. If only one test is to be performed, rotate the knob until the arrow points to the desired test and press [Execute].

5. The [Repeat] mode can be used to find suspected intermittent problems. If a printer is configured and connected to HP-IB, [Repeat] will perform the selected test continuously until [Abort] is pressed. The results will be sent to the printer. If a printer is not available, the [Repeat] test mode will pause at the end of each execution of the test to display the results. Testing will continue after pressing [Return]. This sequence will continue until [Abort] is pressed.

3-27. Resolution Bandwidth Switching and IF Alignment Uncertainty

SPECIFICATION

Resolution Bandwidth Switching Uncertainty:
100 Hz to 2 MHz* RES BW: < ±0.5 dB (referenced to 300 kHz Res BW)

IF Alignment Uncertainty (additional uncertainty when using narrow resolution bandwidths):
300 Hz RES BW: < ±0.5 dB
100 Hz RES BW: < ±2 dB

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

This test utilizes the CAL OUTPUT signal for measuring the switching uncertainty and IF alignment uncertainty between resolution bandwidths. At each resolution bandwidth setting, the displayed amplitude variation of the signal is measured. All measurements are referenced to the 300 kHz bandwidth.

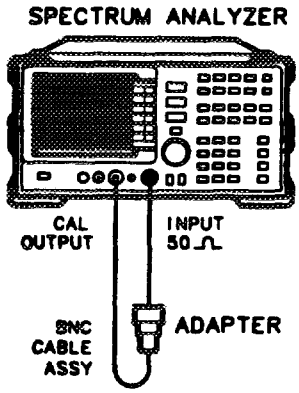

Figure 3-4. Resolution Bandwidth Switching and IF Alignment Uncertainty Test Setup

EQUIPMENT

Adapters

Type N (m) to BNC (f) . . . . . HP 1250-1476
Option 026: Type N (f) to APC 3.5 (f) . . . . . *HP 1250-1745*

Cables

BNC, 122 cm (48 in.) . . . . . HP 10503A

* The 2 MHz RES BW setting is specified only for HP 8562A analyzers with serial prefix of 2805A and above, and for HP 8562B analyzers with serial prefix of 2809A and above. On earlier units, the widest specified RES BW setting is 1 MHz.

PROCEDURE

Setting the Reference

1. Connect the HP 8562A/B CAL OUTPUT to the RF INPUT 50Ω as shown in Figure 3-4.

2. Press the PRESET key, the AMPLITUDE key, [MORE], [IF ADJUST], and [FULL IF ADJ]. Wait for the "IF ADJUST STATUS" message to disappear and set the instrument controls as follows:

   CENTER FREQ . . . . . 300 MHz
   SPAN . . . . . 1 MHz
   REF LVL . . . . . -5 dBm
   dB/DIV . . . . . 1 dB
   RES BW . . . . . 300 kHz
   TRIGGER . . . . . SINGLE

3. Press the AMPLITUDE key, [MORE], [IF ADJUST], [IF ADJ OFF], the TRIG key, [SINGLE], the PEAK SEARCH key, and [MARKER DELTA].

Measuring Switching Uncertainty

4. Set the frequency SPAN and RES BW to the values listed in the second row of Table 3-7. (SPAN 10 MHz, RES BW 2 MHz for HP 8562A with serial prefix of 2805A and above, and for HP 8562B with serial prefix of 2809A and above; SPAN 5 MHz and RES BW 1 MHz for serial prefixes below 2750A.)

5. Press the AMPLITUDE key, [MORE], [IF ADJUST], and [ADJ CURR IF STATE]. Wait for the "IF ADJUST STATUS" message to disappear and press the TRIG key, [SINGLE], and the PEAK SEARCH key. Record the Δ MKR amplitude in the Actual Δ MKR Reading column of Table 3-7. The Δ MKR reading should be within the limits shown.

6. Repeat step 5 for each set of frequency SPAN and RES BW settings in Table 3-7.

Table 3-7. Resolution Bandwidth Switching and IF Alignment Uncertainty

HP 8562A/B		Δ MKR Reading			Measurement Uncertainty (dB)
Span	RES BW	Min (dB)	Actual (dB)	Max (dB)	
1 MHz	300 kHz	0	0 (Ref.)	0	0
10 MHz	2 MHz*	-0.5	_____	+0.5	±0.06
5 MHz	1 MHz	-0.5	_____	+0.5	±0.06
500 kHz	100 kHz	-0.5	_____	+0.5	±0.06
100 kHz	30 kHz	-0.5	_____	+0.5	±0.06
50 kHz	10 kHz	-0.5	_____	+0.5	±0.06
10 kHz	3 kHz	-0.5	_____	+0.5	±0.06
10 kHz	1 kHz	-0.5	_____	+0.5	±0.06
10 kHz	300 Hz	-1.0	_____	+1.0	±0.11
10 kHz	100 Hz	-2.5	_____	+2.5	±0.27

* The 2 MHz RES BW setting is specified and tested only for HP 8562A analyzers with serial prefix of 2805A and above, and for HP 8562B analyzers with serial prefix 2809A and above.

3-28. Resolution Bandwidth Accuracy and Selectivity

SPECIFICATION

Accuracy: 100 Hz RES BW: < ±30%
300 Hz to 300 kHz RES BW: < ±10%
1 MHz and 2 MHz RES BW: < ±25%*

Selectivity (60 dB BW/3 dB BW): <15:1

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

The accuracy of each of the analyzer's 3 dB resolution bandwidths is measured. The 60 dB bandwidths are then determined and the results used to calculate the selectivity for each bandwidth (selectivity = 60 dB BW/3 dB BW). A frequency synthesizer, phase-locked to the spectrum analyzer's 10 MHz reference, provides a 40 MHz test signal.

The 2 MHz resolution bandwidth is specified and tested only for HP 8562A spectrum analyzers with serial prefix 2805A and above, and for HP 8562B spectrum analyzers with serial prefix 2809A and above.

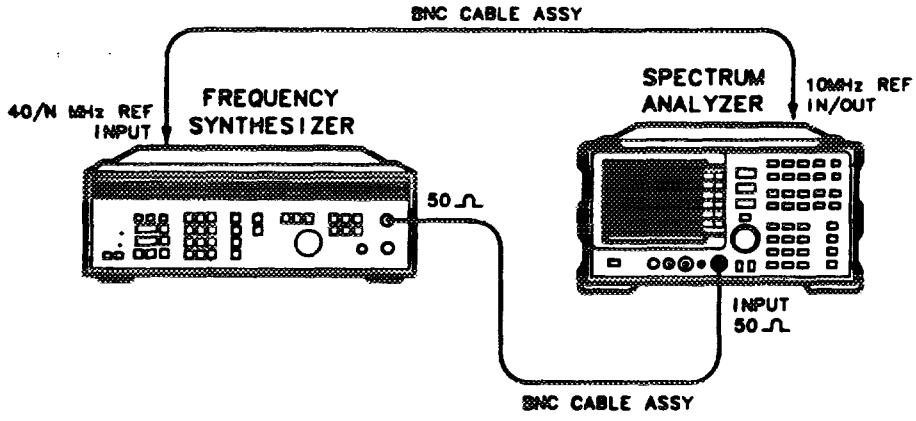

Figure 3-5. Resolution Bandwidth Accuracy and Selectivity Test Setup

* The 2 MHz RES BW setting is specified and tested only for HP 8562A spectrum analyzers with serial prefix 2805A and above, and for HP 8562B spectrum analyzers with serial prefix 2809A and above.

EQUIPMENT

Frequency Synthesizer . . . . . HP 3335A

Adapters

BNC (f) to Type N (m) . . . . . HP 1250-1476
Option 026: Type N (f) to APC 3.5 (f) . . . . . HP 1250-1745

Cables

BNC, 122 cm (48 in.) *(2 required)* . . . . . HP 10503A

PROCEDURE

Resolution Bandwidth Accuracy

1. Connect the equipment as shown in Figure 3-5. The HP 8562A/B provides the frequency reference for the HP 3335A.

2. Set the HP 3335A controls as follows:

   FREQUENCY . . . . . 40 MHz
   AMPLITUDE . . . . . –3 dBm
   AMPTD INCR . . . . . 1 dB

3. On the HP 8562A/B, press PRESET, AMPLITUDE, [MORE], [IF ADJUST], and [IF ADJ OFF]. Set the controls as follows:

   CENTER FREQ . . . . . 40 MHz
   SPAN . . . . . 0 Hz
   LOG dB/DIV . . . . . 1 dB
   RES BW . . . . . 2 MHz
   (1 MHz if HP 8562A/B has serial prefix 2750A or below)
   VIDEO BW . . . . . 300 Hz
   SWEEPTIME . . . . . 50 ms

4. Adjust the HP 3335A output amplitude to place the signal two to three divisions (2 dB to 3 dB) below the reference level. Set the HP 3335A AMPTD INCR to 3 dB.

5. On the HP 8562A/B, press AMPLITUDE, [MORE], [IF ADJUST], and [ADJ CURR IF STATE]. Wait for the "IF ADJUST STATUS" message to disappear before continuing.

6. Adjust the HP 3335A frequency to peak the signal amplitude displayed on the HP 8562A/B.

NOTE

Several minor peaks might be observed when finding the peak signal amplitude for the 2 MHz RES BW setting. Be sure that the peak found is the peak with the highest amplitude.

7. On the HP 3335A, press AMPLITUDE and [↓].

8. On the HP 8562A/B, press Marker ON and [MARKER DELTA].

9. On the HP 3335A, press [↑].

10. Increase the HP 3335A frequency until the HP 8562A/B Δ MKR reads 0 dB ±0.02 dB. In Table 3-8, record the HP 3335A frequency as the Upper 3 dB Frequency for the current RES BW setting.

11. Decrease the HP 3335A frequency until the peak of the signal is found. Decrease the frequency further until the Δ MKR again reads 0 dB ±0.02 dB. In Table 3-8, record the HP 3335A frequency as the Lower 3 dB Frequency for the current RES BW setting.

12. Subtract the Lower 3 dB Frequency from the Upper 3 dB Frequency. Record the result as the Actual 3 dB Bandwidth in Table 3-8, and as the 3 dB Bandwidth in Table 3-9, for the current RES BW setting. The bandwidth should be within the limits shown in Table 3-8.

13. Set the HP 3335A frequency to 40 MHz.

14. Press Marker OFF on the HP 8562A/B.

15. Repeat steps 5 through 14 for the rest of the RES BW settings listed in the first column of Table 3-8. For RES BW settings of 1 kHz and below, change the VIDEO BW to 1 Hz.

Resolution Bandwidth Selectivity

16. Set the HP 8562A/B controls as follows:

RES BW . . . . . 2 MHz
(1 MHz if HP 8562A/B has serial prefix 2750A or below)
LOG dB/DIV . . . . . 10 dB
VIDEO BW . . . . . 300 Hz

17. Set the HP 3335A amplitude to -3 dBm and AMPTD INCR to 60 dB.

18. On the HP 8562A/B, press AMPLITUDE, [MORE], [IF ADJUST], and [ADJ CURR IF STATE]. Wait for the "IF ADJUST STATUS" message to disappear before continuing.

19. Adjust the HP 3335A frequency for peak signal amplitude on the HP 8562A/B display.

NOTE

Several minor peaks might be observed when finding the peak signal amplitude for the 2 MHz RES BW setting. Be sure that the peak found is the peak with the highest amplitude.

20. On the HP 3335A, press [↓].

21. On the HP 8562A/B, press Marker ON and [MARKER DELTA].

22. On the HP 3335A, press [↑].

23. Increase the HP 3335A frequency until the HP 8562A/B Δ MKR reads 0 dB ±0.2 dB. In Table 3-9, record the HP 3335A frequency as the Upper 60 dB Frequency for the current RES BW setting.

24. Decrease the HP 3335A frequency until the peak signal amplitude is reached. Decrease the frequency further until the HP 8562A/B Δ MKR again reads 0 dB ±0.2 dB. In Table 3-9, record the HP 3335A frequency as the Lower 60 dB Frequency for the current RES BW setting.

25. Subtract the Lower 60 dB Frequency from the Upper 60 dB Frequency. Record the result as the 60 dB Bandwidth in Table 3-9 for the current RES BW setting.

26. Divide the 60 dB Bandwidth by the 3 dB Bandwidth and record the result as the Actual Shape Factor in Table 3-9 for the current RES BW setting. The Actual Shape Factor should be less than the limit shown in Table 3-9.

27. Set the HP 3335A frequency to 40 MHz.

28. Press Marker OFF on the HP 8562A/B.

29. Repeat steps 18 through 28 for the rest of the RES BW settings listed in Table 3-9. For RES BW settings of 1 kHz and below, change the VIDEO BW to 1 Hz.

Table 3-8. Resolution Bandwidth Accuracy

RES BW Setting	HP 3335A Frequency		3 dB Bandwidth			Measurement Uncertainty
	Upper 3 dB	Lower 3 dB	Min	Actual	Max	
2 MHz*	_____	_____	1.5 MHz	_____	2.5 MHz	+13.6/–14 kHz
1 MHz	_____	_____	750 kHz	_____	1.25 MHz	+6.8/–7.0 kHz
300 kHz	_____	_____	270 kHz	_____	330 kHz	+2.04/–2.1 kHz
100 kHz	_____	_____	90 kHz	_____	110 kHz	+680/–700 Hz
30 kHz	_____	_____	27 kHz	_____	33 kHz	+204/–210 Hz
10 kHz	_____	_____	9 kHz	_____	11 kHz	+68/–70 Hz
3 kHz	_____	_____	2.7 kHz	_____	3.3 kHz	+20.4/–21 Hz
1 kHz	_____	_____	900 Hz	_____	1.1 kHz	+6.8/–7.0 Hz
300 Hz	_____	_____	270 Hz	_____	330 Hz	+2.04/–2.1 Hz
100 Hz	_____	_____	70 Hz	_____	130 Hz	+0.68/–0.7 Hz

* The 2 MHz RES BW setting is specified and tested only for HP 8562A spectrum analyzers with serial prefix 2805A and above, and for HP 8562B spectrum analyzers with serial prefix 2809A and above.

Table 3-9. Resolution Bandwidth Selectivity

RES BW Setting	HP 3335A Frequency		60 dB BW	3 dB BW	Shape Factor		Measurement Uncertainty (of 60 dB BW)
	Upper 60 dB	Lower 60 dB			Actual	Max	
2 MHz*	_____	_____	_____	_____	_____	15	+126/–132 kHz
1 MHz	_____	_____	_____	_____	_____	15	+63/–66 kHz
300 kHz	_____	_____	_____	_____	_____	15	+19/–20 kHz
100 kHz	_____	_____	_____	_____	_____	15	+6.3/–6.6 kHz
30 kHz	_____	_____	_____	_____	_____	15	+1.9/–2.0 kHz
10 kHz	_____	_____	_____	_____	_____	15	+630/–660 Hz
3 kHz	_____	_____	_____	_____	_____	15	+190/–200 Hz
1 kHz	_____	_____	_____	_____	_____	15	+63/–66 Hz
300 Hz	_____	_____	_____	_____	_____	15	+19/–20 Hz
100 Hz	_____	_____	_____	_____	_____	15	+6.3/–6.6 Hz

* The 2 MHz RES BW setting is specified and tested only for HP 8562A spectrum analyzers with serial prefix 2805A and above, and for HP 8562B spectrum analyzers with serial prefix 2809A and above.

Table 3-24. Frequency Count Marker Accuracy

HP 8340A Frequency (GHz)	HP 8562A Frequency (GHz)	Marker Frequency			Measurement Uncertainty (Hz)
		Min (GHz)	Actual (GHz)	Max (GHz)	
1.5	1.5	1.49999394	_____	1.50000606	±375
4.0	4.0	3.99998394	_____	4.00001606	±1000
9.0	9.0	8.99996389	_____	9.00003611	±2250
16.0	16.0	15.99993584	_____	16.00006416	±4000
21.0	21.0	20.99991579	_____	21.00008421	±5250

3-36. Pulse Digitization Uncertainty

SPECIFICATION

Pulse digitization uncertainty (PDU) for pulse repetition frequency (PRF) >720/Sweeptime

LOG: <1.25 dB for RES BW ≤1 MHz
<3 dB for 2 MHz RES BW*

LINEAR: <4% of reference level for RES BW ≤1 MHz
<12% of reference level for 2 MHz RES BW*

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

This test measures the ability of the analyzer's analog-to-digital circuitry to respond to pulsed RF signals. The synthesized sweeper is phase-locked to the spectrum analyzer's 10 MHz reference. The only log scale tested is 5 dB/DIV, since this is the worst case. Linear scale is also tested.

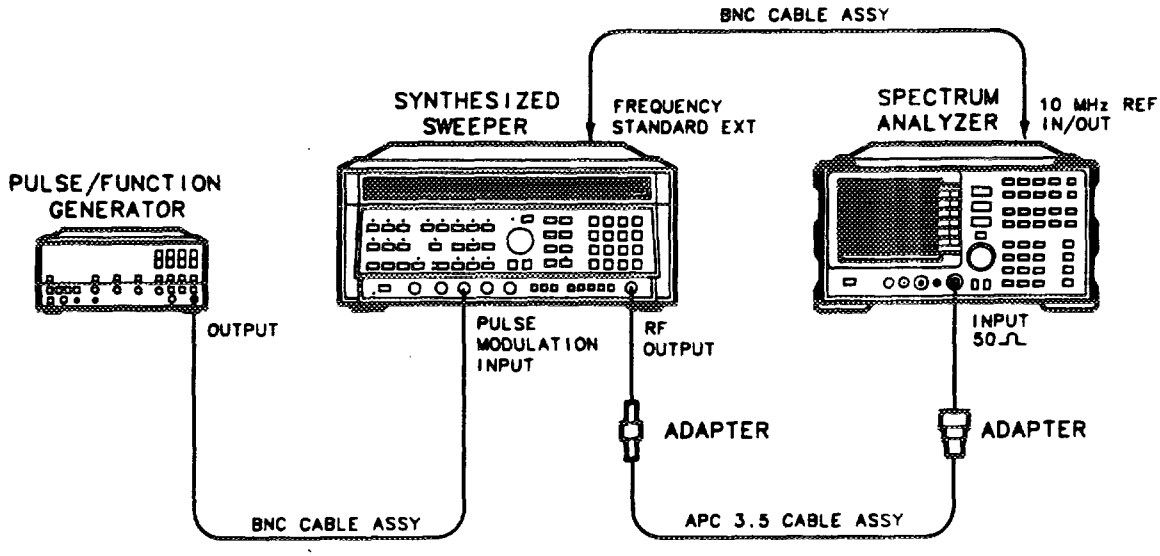

Figure 3-14. Pulse Digitization Uncertainty Test Setup

* Pulse digitization uncertainty is specified in the 2 MHz RES BW setting only for HP 8562A spectrum analyzers with serial prefix of 2805A and above, and for HP 8562B spectrum analyzers with serial prefix of 2809A and above.

EQUIPMENT

Synthesized Sweeper . . . . . HP 8340A
Pulse/Function Generator . . . . . HP 8116A

Adapters

Type N (m) to APC 3.5 (f) *(not necessary for Option 026)* . . . . . HP 1250-1744
APC 3.5 (f) to APC 3.5 (f) *(2 required for Option 026)* . . . . . HP 5061-5311

Cables

BNC, 122 cm (48 in.) *(2 required)* . . . . . HP 10503A
APC 3.5, 91 cm (36 in.) . . . . . HP 8120-4921

PROCEDURE

1. Connect the equipment as shown in figure 3-14.

2. Press INSTR PRESET on the HP 8340A. Set the HP 8340A controls as follows:

CW . . . . . 2500 MHz
POWER LEVEL . . . . . -15 dBm
MODULATION . . . . . PULSE
RF . . . . . ON
LEVELING . . . . . INT
FREQUENCY STANDARD SWITCH (rear panel) . . . . . EXT

3. Set the HP 8116A controls as follows:

FUNCTION . . . . . PULSE
FREQ . . . . . 144 kHz
WID . . . . . 200 ns
AMP 5.0V
OFS 0.0V
MODE . . . . . NORM
CTRL . . . . . OFF

4. On the HP 8562A/B, press PRESET, TRACE, [MORE], [DETECTOR MODES], and [DETECTOR POS PEAK]. Set the controls as follows:

CENTER FREQ . . . . . 2500 MHz
SPAN . . . . . 0 Hz
REF LVL . . . . . -10 dBm
RES BW . . . . . 1 MHz
VIDEO BW . . . . . 3 MHz
SWEEPTIME . . . . . 50 ms
dB/DIV . . . . . 5 dB

5. On the HP 8116A, use the RANGE switch to set FREQ to 144 kHz.

6. On the HP 8562A/B, press TRIG, [SINGLE], [SINGLE], and PEAK SEARCH. In Table 3-24a, record the Marker Amplitude reading as the MAX level for 144 kHz PRF.

7. Press Marker ON. Move the marker using the knob (RPG) until the marker is at the lowest point on the trace. In Table 3-24a, record the Marker Amplitude reading as the MIN level for 144 kHz PRF.

8. On the HP 8116A, use the RANGE switch to set FREQ to 14.4 kHz.

9. On the HP 8562A/B, press TRIG, [SINGLE], [SINGLE], and PEAK SEARCH. In Table 3-24a, record the Marker Amplitude reading as the MAX level for 14.4 kHz PRF.

10. Press Marker ON. Move the marker using the knob (RPG) until the marker is at the lowest point on the trace. In Table 3-24a, record the Marker Amplitude reading as the MIN level for 14.4 kHz PRF.

(Omit steps 11 and 12 if the spectrum analyzer has serial prefix 2750A or below.)

11. On the HP 8562A/B, press BW and set [RES BW] to 2 MHz.

12. Repeat steps 5 through 10.

13. On the HP 8562A/B, press BW and set [RES BW] to 1 MHz. Press AMPLITUDE and [LINEAR].

14. Repeat steps 5 through 10.

(Omit steps 15 and 16 if the spectrum analyzer has serial prefix 2750A or below.)

15. On the HP 8562A/B, press BW and set [RES BW] to 2 MHz.

16. Repeat steps 5 through 10.

17. For each row of entries in Table 3-24a for the LOG 5 dB/DIV scale, subtract the lowest MIN Marker Amplitude reading from the highest MAX Marker Amplitude reading. Record the result as the PDU (pulse digitization uncertainty). The PDU should be less than the listed specification.

18. For each row of entries in Table 3-24a for the LINEAR scale, calculate the PDU as a percentage of reference level using the equation below. The PDU should be less than the listed specification.

$$PDU = 100 \times [(\text{highest MAX Marker Amplitude}/\text{lowest MIN Marker Amplitude}) - 1]$$

Table 3-24a. Pulse Digitization Uncertainty

RES BW	Scale	Marker Amplitude Readings				PDU	Spec
		144 kHz PRF		14.4 kHz PRF			
		Max	Min	Max	Min		
1 MHz	LOG 5 dB/DIV	_____ dBm	_____ dBm	_____ dBm	_____ dBm	____ dB	1.25 dB
2 MHz*	LOG 5 dB/DIV	_____ dBm	_____ dBm	_____ dBm	_____ dBm	____ dB	3 dB
1 MHz	LINEAR	_____ mV	_____ mV	_____ mV	_____ mV	____ %	4%
2 MHz*	LINEAR	_____ mV	_____ mV	_____ mV	_____ mV	____ %	12%

* Pulse digitization uncertainty is only specified in the 2 MHz RES BW setting for HP 8562A analyzers with serial prefix of 2805A and above, and for HP 8562B analyzers with serial prefix 2809A and above.

24. On the HP 8562A/B, press the PEAK SEARCH key, the MKR-> key, and [MARKER->REF LVL]. Wait for the completion of a new sweep and press the following keys: [MARKER DELTA], the FREQUENCY key, and the ↑ key.

25. On the HP 8340A #2, press the RF key on.

26. On the HP 8562A/B, press the PEAK SEARCH key.

27. Adjust the the POWER LEVEL key of the HP 8540A #2 for a Δ MKR reading of 0.0 dB ±0.17 dB.

28. On the HP 8562A/B, press the FREQUENCY key and the ↑ key. Wait for the completion of a new sweep and press the PEAK SEARCH key. Record the HP 8562A/B Δ MKR reading in Table 3-33 as the Upper Product Suppression. The suppression should be greater than 75 dB.

29. Press the following keys on the HP 8562A/B: the FREQUENCY key, the ↓ key, the ↓ key, and the ↓ key. Wait for the completion of a new sweep and press the PEAK SEARCH key. Record the HP 8562A/B Δ MKR reading in Table 3-33 as the Lower Product Suppression. The suppression should be greater than 75 dB.

30. Record the maximum of the Lower Product Suppression and Upper Product Suppression for the 2.8 GHz entries in Table 3-33.

Third Order Intermodulation Distorion at 2.8 GHz: _____ dBc

31. Record the maximum of the Lower Product Suppression and Upper Product Suppression for the 4.0 GHz entries in Table 3-33.

Third Order Intermodulation Distorion at 4.0 GHz: _____ dBc

Table 3-33. Third Order Intermodulation Distortion

HP 8340A #1 [CW] (GHz)	HP 8340A #2 [CW] (GHz)	Lower Product		Upper Product		Measurement Uncertainty (dB)
		Frequency (GHz)	Supression (dB)	Frequency (GHz)	Supression (dB)	
2.80000	2.80005	2.79995	_____	2.8001	_____	±2.83
4.00000	4.00005	3.99995	_____	4.00010	_____	±2.83

3-41. Gain Compression

SPECIFICATION

10 MHz to 2.9 GHz: < 1.0 dB for total mixer power level* of -5 dBm†
2.9 GHz to 22 GHz (*Option 026: 2.9 GHz to 26.5 GHz*): < 1.0 dB for total mixer power level* of -3 dBm

RELATED ADJUSTMENT

There is no related adjustment procedure for this performance test.

DESCRIPTION

This test measures gain compression in low band and high band. Two signals, separated by 3 MHz, are used. First the test places a -30 dBm signal at the input of the spectrum analyzer (the analyzer's reference level is also set to -30 dBm). Then a +7 dBm signal is placed on the analyzer, overdriving its input. The decrease in the first signal's amplitude (gain compression) caused by the second signal is the measured gain compression.

Figure 3-21. Gain Compression Test Setup

* Total mixer power level = total input power level – input attenuation

† < 1.0 dB for total mixer power level of -3 dBm for HP 8562A serial prefix 2805A and below, and for HP 8562B serial prefix 2750A and below.

EQUIPMENT

Synthesized Sweeper (2 required)	HP 8340A
Measuring Receiver	HP 8902A
Amplifier	HP 11975A
Power Sensor	HP 8485A
Power Splitter	HP 11667B

Adapters

APC 3.5 (f) to APC 3.5 (f) (2 required)	HP 5061-5311
APC 3.5 (m) to Type N (m)	HP 1250-1743
BNC Tee (m) (f) (f)	HP 1250-0781

Cables

BNC, 122 cm (48 in.) (2 required)	HP 10503A
SMA, 61 cm (24 in.)	HP 8120-1578
RF Cable	HP 11975-20002

PROCEDURE

<2.9 GHz

1. Zero the HP 8902A and calibrate the HP 8485A power sensor as described in the HP 8902A Operation Manual. Enter the power sensor's 2 GHz calibration factor into the HP 8902A.

2. Connect the equipment as shown in Figure 3-21, with the output of the power splitter connected to the HP 8485A Power Sensor.

3. Press the INSTR PRESET key on both HP 8340A's. Set the controls for the HP 8340A #1 as follows:

CW	2.0 GHz
POWER LEVEL	-24 dBm
FREQUENCY STANDARD SWITCH (rear panel)	EXT

4. Set the controls for the HP 8340A #2 as follows:

CW	2.003 GHz
POWER LEVEL	+8 dBm
FREQUENCY STANDARD SWITCH (rear panel)	EXT

5. On the HP 8562A/B, press the PRESET key. *On HP 8562A analyzers, press the RECALL key, [MORE], and [FACTORY PRESEL PK].* Set the HP 8562A/B controls as follows:

CENTER FREQ	2.0 GHz
REF LVL	-30 dBm
SPAN	10 MHz
RES BW	300 kHz
SCALE	1 dB/Div

6. Adjust the HP 11975A OUTPUT POWER LEVEL for a +5 dBm* reading on the HP 8902A display.

* +7 dBm for HP 8562A serial prefix 2805A and below, and HP 8562B serial prefix 2750A and below.

7. Set the HP 8340A #2 POWER LEVEL key to −80 dBm.

8. Remove the power sensor from the power splitter. Connect the power splitter to the HP 8562A/B RF INPUT using an adapter. Do not use a cable.

9. Adjust the HP 8340A #1 POWER LEVEL key for a signal 1 dB below the HP 8562A/B reference level.

10. On the HP 8562A/B, press the PEAK SEARCH key and [MARKER DELTA].

11. Set the HP 8340A #2 POWER LEVEL key to +8 dBm.

12. On the HP 8562A/B, press the PEAK SEARCH key and [NEXT PEAK]. The active marker should be on the lower amplitude signal and not on the signal that is off the top of the screen. If it is not on the lower amplitude signal, reposition the marker to this peak using the front-panel function knob. Read the Δ MKR amplitude. The amplitude should read less than −1.0 dB.

Gain Compression Band 0 (<1.0 dB): _____dB

>2.9 GHz

13. Set the HP 8562A/B, HP 8340A #1, and HP 8340A #2 to the frequencies indicated in Table 3-34 for Band 1.

14. Enter the HP 8485A calibration factor at the HP 8562A/B center frequency value into the HP 8902A.

15. Disconnect the power splitter from the HP 8562A/B and reconnect it to the HP 8485A Power Sensor.

16. Adjust the HP 11975A OUTPUT POWER LEVEL for a +7 dBm reading on the HP 8902A display.

17. Set the HP 8340A #2 POWER LEVEL key to −80 dBm.

18. Reconnect the power splitter to the HP 8562A/B RF INPUT 50Ω.

19. Adjust the HP 8340A #1 POWER LEVEL key to bring the signal 1 dB (one division) below the HP 8562A reference level.

20. On the HP 8562A/B, press the MARKER OFF key and the PEAK SEARCH key.

21. *Omit this step if spectrum analyzer is an HP 8562B.* On the HP 8562A, press the INT key and [PRESEL AUTO PK]. Wait for the PEAKING message to disappear before continuing to the next step.

22. On the HP 8562A/B, press the PEAK SEARCH key and [MARKER DELTA].

23. Set the HP 8340A #2 POWER LEVEL key to +8 dBm.

24. On the HP 8562A/B, press the PEAK SEARCH key and [NEXT PEAK]. The active marker should be on the peak of the lower amplitude signal. If it is not, reposition the marker to this peak using the front-panel function knob. Read the Δ MKR amplitude and record this as the Gain Compression in Table 3-34. The gain compression should be less than 1 dB.

25. Repeat steps 14 through 24 until all the entries in Table 3-34 have been completed.

Table 3-34. Gain Compression

Band	HP 8562A Center Freq (GHz)	HP 8340A #1 [CW] (GHz)	HP 8340A #2 [CW] (GHz)	Gain Compression (dB)	Measurement Uncertainty (dB)
0	2.0	2.000	2.003	_____	±0.23
1	4.0	4.000	4.003	_____	±0.23
2	7.0	7.000	7.003	_____	±0.23

3-42. 1ST LO OUTPUT Amplitude

SPECIFICATION

Amplitude (3.0–6.7 GHz): +16.5 dBm ±2.0 dB, 20°C to 30°C

RELATED ADJUSTMENT

First LO Distribution Amplifier Adjustment

DESCRIPTION

The 1ST LO OUTPUT power is measured with a power meter. The analyzer is placed in external mixing mode and harmonic-locked to N = 6. This allows the broadest tuning range of the 1ST LO.

Figure 3-22. 1ST LO OUTPUT Amplitude Test Setup

EQUIPMENT

Measuring Receiver	HP 8902A
Power Sensor	HP 8485A

NOTE

The results of this test are valid only if the ambient temperature is between 20°C and 30°C.

14. Disconnect the SMA cable from the HP 8562A/B IF INPUT and connect the cable, through an adapter, to the power sensor.

15. Read the power displayed on the HP 8902A and note the value below. The displayed power should read −30 dBm ±1.5 dB.

IF INPUT Amplitude: _____ dBm

NOTE

The following steps should be performed only if it was necessary to change the conversion loss values found in step 5.

16. Press [CNV LOSS VS FREQ] on the HP 8562A/B.

17. Enter the conversion loss at 18 GHz recorded in Table 3-37.

18. Press the ↑ key on the HP 8562A/B.

19. Repeat steps 17 and 18 for the remaining frequencies listed in Table 3-37.

Table 3-37. IF Input Amplitude Accuracy

Frequency (GHz)	Conversion Loss (dB)
18	_____
20	_____
22	_____
24	_____
26	_____
27	_____

Table 3-38. Performance Test Record (1 of 8)

Hewlett-Packard Company
Model _____ HP 8562A
_____ HP 8562B (Check one)

Tested by_____

Serial No._____

Date_____

Para. No.	Test Description	Results		
		Min	Actual	Max
3-24	10 MHz Reference Output Accuracy			
	5. 10 MHz Reference Frequency	299.998800 MHz	_____	300.001200 MHz
3-25	Calibrator Amplitude and Freq. Accuracy			
	4. Calibrator Frequency	299.998800 MHz	_____	300.001200 MHz
	5. Calibrator Amplitude	–10.3 dBm	_____	–9.7 dBm
3-26	Displayed Average Noise Level			
	25. 10 kHz		_____	–90 dBm
	100 kHz		_____	–100 dBm
	1 MHz to 2.9 GHz		_____	–120 dBm
	2.9 GHz to 6.46 GHz		_____	–121 dBm
	6.46 GHz to 13.0 GHz		_____	–110 dBm
	13.0 GHz to 19.7 GHz		_____	–105 dBm
	19.7 GHz to 22.0 GHz		_____	–100 dBm
	(Option 026: 19.7 GHz to 26.5 GHz)		_____	–100 dBm
3-27	Resolution Bandwidth Switching and IF Alignment Uncertainty			
	5. 2 MHz*	–0.5 dB	_____	+0.5 dB
	1 MHz	–0.5 dB	_____	+0.5 dB
	100 kHz	–0.5 dB	_____	+0.5 dB
	30 kHz	–0.5 dB	_____	+0.5 dB
	10 kHz	–0.5 dB	_____	+0.5 dB
	3 kHz	–0.5 dB	_____	+0.5 dB
	1 kHz	–0.5 dB	_____	+0.5 dB
	300 Hz	–1.0 dB	_____	+1.0 dB
	100 Hz	–2.5 dB	_____	+2.5 dB

* Performance of the 2 MHz RES BW setting is specified only for HP 8562A spectrum analyzers with serial prefix 2805A and above, and for HP 8562B spectrum analyzers with serial prefix 2809A and above.

Table 3-38. Performance Test Record (2 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-28	Resolution Bandwidth Accuracy and Selectivity			
	13. 2 MHz*	1.5 MHz	_____	2.5 MHz
	1 MHz	750 kHz	_____	1.25 MHz
	300 kHz	270 kHz	_____	330 kHz
	100 kHz	90 kHz	_____	110 kHz
	30 kHz	27 kHz	_____	33 kHz
	10 kHz	9 kHz	_____	11 kHz
	3 kHz	2.7 kHz	_____	3.3 kHz
	1 kHz	900 Hz	_____	1.1 kHz
	300 Hz	270 Hz	_____	330 Hz
	100 Hz	70 Hz	_____	130 Hz
	28. 2 MHz*		_____	15
	1 MHz		_____	15
	300 kHz		_____	15
	100 kHz		_____	15
	30 kHz		_____	15
	10 kHz		_____	15
	3 kHz		_____	15
	1 kHz		_____	15
	300 Hz		_____	15
	100 Hz		_____	15
3-29	Input Attenuator Accuracy			
	9. Cumulative Accuracy at 50 MHz			
	20 dB ATTEN	+8.2 dB	_____	+11.8 dB
	30 dB ATTEN	+18.2 dB	_____	+21.8 dB
	40 dB ATTEN	+28.2 dB	_____	+31.8 dB
	50 dB ATTEN	+38.2 dB	_____	+41.8 dB
	60 dB ATTEN	+48.2 dB	_____	+51.8 dB
	70 dB ATTEN	+58.2 dB	_____	+61.8 dB
	11. Step-to-step Acccuracy at 50 MHz			
	20 dB ATTEN	–0.6 dB	_____	+0.6 dB
	30 dB ATTEN	–0.6 dB	_____	+0.6 dB
	40 dB ATTEN	–0.6 dB	_____	+0.6 dB
	50 dB ATTEN	–0.6 dB	_____	+0.6 dB
	60 dB ATTEN	–0.6 dB	_____	+0.6 dB
	70 dB ATTEN	–0.6 dB	_____	+0.6 dB

* Performance of the 2 MHz RES BW setting is specified only for HP 8562A spectrum analyzers with serial prefix 2805A and above, and for HP 8562B spectrum analyzers with serial prefix 2809A and above.

Table 3-38. Performance Test Record (3 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-30	IF Gain Uncertainty			
	34. Log IF Gain Uncertainty (10 dB steps)	−1.0 dB	_____	+1.0 dB
	35. Log IF Gain Uncertainty (1 dB steps)	−1.0 dB	_____	+1.0 dB
	36. Linear IF Gain Uncertainty	−1.0 dB	_____	+1.0 dB
3-31	Scale Fidelity			
	28. Linear Scale Fidelity			
	2 dB from REF LVL	−2.33 dB	_____	−1.68 dB
	4 dB from REF LVL	−4.42 dB	_____	−3.60 dB
	6 dB from REF LVL	−6.54 dB	_____	−5.50 dB
	8 dB from REF LVL	−8.68 dB	_____	−7.37 dB
	10 dB from REF LVL	−10.87 dB	_____	−9.21 dB
	12 dB from REF LVL	−13.10 dB	_____	−11.02 dB
	14 dB from REF LVL	−15.42 dB	_____	−12.78 dB
	16 dB from REF LVL	−17.82 dB	_____	−14.49 dB
	18 dB from REF LVL	−20.36 dB	_____	−16.14 dB
	29. Maximum Cumulative 10 dB Log Scale Fidelity	−1.5 dB	_____	+1.5 dB
	30. Maximum Incremental 10 dB Log Scale Fidelity	−0.4 dB	_____	+0.4 dB
	31. Maximum Cumulative 2 dB Log Scale Fidelity	−1.5 dB	_____	+1.5 dB
	32. Maximum Incremental 2 dB Log Scale Fidelity	−0.4 dB	_____	+0.4 dB
3-32	Residual FM			
	11. Residual FM		_____	50 Hz
3-33	Noise Sidebands			
	11. −30 kHz Offset		_____	−100 dBc/Hz
	+30 kHz Offset		_____	−100 dBc/Hz
3-34	Image, Multiple, and Out-of-Band Responses			
	25. Maximum Response Amplitude <18 GHz		_____	−70 dBc
	26. Maximum Response Amplitude <22 GHz *Opt. 026: <26.5 GHz*		_____	−60 dBc

Table 3-38. Performance Test Record (4 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-35	Frequency Readout Accuracy and Frequency Count Marker Accuracy			
	5. 1.5 GHz CENTER FREQ			
	1 MHz SPAN	1.499942 GHz	_____	1.500058 GHz
	10 MHz SPAN	1.49948 GHz	_____	1.50052 GHz
	20 MHz SPAN	1.49895 GHz	_____	1.50105 GHz
	50 MHz SPAN	1.49745 GHz	_____	1.50255 GHz
	100 MHz SPAN	1.4948 GHz	_____	1.5052 GHz
	1 GHz SPAN	1.450 GHz	_____	1.550 GHz
	4.0 GHz CENTER FREQ			
	1 MHz SPAN	3.999932 GHz	_____	4.000068 GHz
	10 MHz SPAN	3.99947 GHz	_____	4.00053 GHz
	20 MHz SPAN	3.99894 GHz	_____	4.00106 GHz
	50 MHz SPAN	3.99744 GHz	_____	4.00256 GHz
	100 MHz SPAN	3.9948 GHz	_____	4.0052 GHz
	1 GHz SPAN	3.950 GHz	_____	4.050 GHz
	9.0 GHz CENTER FREQ			
	1 MHz SPAN	8.999912 GHz	_____	9.000088 GHz
	10 MHz SPAN	8.99945 GHz	_____	9.00055 GHz
	20 MHz SPAN	8.99892 GHz	_____	9.00108 GHz
	50 MHz SPAN	8.99742 GHz	_____	9.00258 GHz
	100 MHz SPAN	8.9948 GHz	_____	9.0052 GHz
	1 GHz SPAN	8.950 GHz	_____	9.050 GHz
	16.0 GHz CENTER FREQ			
	1 MHz SPAN	15.99984 GHz	_____	16.000116 GHz
	10 MHz SPAN	15.99942 GHz	_____	16.00058 GHz
	20 MHz SPAN	15.99889 GHz	_____	16.00111 GHz
	50 MHz SPAN	15.99739 GHz	_____	16.00261 GHz
	100 MHz SPAN	15.9948 GHz	_____	16.0052 GHz
	1 GHz SPAN	15.950 GHz	_____	16.050 GHz
	22.0 GHz CENTER FREQ			
	1 MHz SPAN	20.999864 GHz	_____	21.000136 GHz
	10 MHz SPAN	20.99940 GHz	_____	21.00060 GHz
	20 MHz SPAN	20.99887 GHz	_____	21.00113 GHz
	50 MHz SPAN	20.99737 GHz	_____	21.00263 GHz
	100 MHz SPAN	20.9948 GHz	_____	21.0052 GHz
	1 GHz SPAN	20.950 GHz	_____	21.050 GHz
	8. Frequency Count Marker Accuracy			
	1.5 GHz CENTER FREQ	1.49999394 GHz	_____	1.50000606 GHz
	4.0 GHz CENTER FREQ	3.99998394 GHz	_____	4.00001606 GHz
	9.0 GHz CENTER FREQ	8.99996389 GHz	_____	9.00003611 GHz
	16.0 GHz CENTER FREQ	15.99993584 GHz	_____	16.00006416 GHz
	21.0 GHz CENTER FREQ	20.99991579 GHz	_____	21.00008421 GHz

Table 3-38. Peformance Test Record (5 of 8)

Para. No.	Test Description	Results		
		Min	Actual	Max
3-36	Pulse Digitization Uncertainty			
	17. LOG, 1 MHz RES BW		_____	1.25 dB
	17. LOG, 2 MHz* RES BW		_____	3.0 dB
	18. Linear, 1 MHz RES BW		_____	4%
	18. Linear, 2 MHz* RES BW		_____	12%
3-37	Second Harmonic Distortion			
	6. <2.9 GHz		_____	–72 dBc
	31. >2.9 GHz		_____	–100 dBc (HP 8562B: –60 dBc)
3-38	Frequency Response			
	Band 0			
	51(c) Maximum Positive Response		_____	+5.1 dB
	51(f) Maximum Negative Response	–5.1 dB	_____	
	51(h) Peak-to-Peak Response		_____	+2.4 dB
	Band 1			
	52(a) Maximum Positive Response		_____	+5.1 dB
	52(b) Maximum Negative Response	–5.1 dB	_____	
	52(c) Peak-to-Peak Response		_____	+5.0 dB
	(HP 8562B:			+4.0 dB)
	Band 2			
	53(a) Maximum Positive Response		_____	+5.1 dB
	53(b) Maximum Negative Response	–5.1 dB	_____	
	53(c) Peak-to-Peak Response		_____	+7.0 dB
	(HP 8562B:			+5.0 dB)
	Band 3			
	54(a) Maximum Positive Response		_____	+5.1 dB
	54(b) Maximum Negative Response	–5.1 dB	_____	
	54(c) Peak-to-Peak Response		_____	+8.0 dB
	(HP 8562B:			+6.0 dB)
	Band 4			
	55(a) Maximum Positive Response		_____	+5.1 dB
	55(b) Maximum Negative Response	–5.1 dB	_____	
	55(c) Peak-to-Peak Response		_____	+8.6 dB

* Performance of the 2 MHz RES BW setting is specified only for HP 8562A spectrum analyzers with serial prefix 2805A and above, and for HP 8562B spectrum analyzers with serial prefix 2809A and above.