SIGNAL ANALYZERS

Spectrum Analyzer Accessories

Various Models

HP 85644A

HP 85644A and 85645A Tracking Sources

Two portable tracking sources add versatile, high-performance scalar network analysis capability to a variety of HP spectrum analyzers. The HP 85644A has a frequency range of 300 kHz to 6.5 GHz; the HP 85645A, 300 kHz to 26.5 GHz. Features include:

- Leveled output range of +10 to −80 dBm
- Offset tracking, typically >1 GHz
- Up to 140 dB dynamic range
- Swept intermodulation-distortion measurement capability
- Rugged, portable package or optional system cabinet

Compatible spectrum analyzers are the HP 8566A/B; the HP 8560 series; the HP 71209A; and the HP 8593E, 8595E, 8596E Option 009. Compatible sweepers are the HP 83590 series, HP 8340, and 8341.

HP 85640A Portable Tracking Generator

This portable, rugged tracking generator adds scalar analysis capability from 300 kHz to 2.9 GHz to an HP 8560 series portable spectrum analyzer. Measure gain, frequency response, compression, flatness, and return loss on components and subsystems. A built-in attenuator gives output power of −80 to 0 dBm. Together, the spectrum analyzer and tracking generator have a dynamic range greater than 100 dB.

HP 8444A Option 059 Tracking Generator

Used with the HP 8568B and 8567A RF spectrum analyzers, this model adds stimulus response-response capability for a minimal cost. It allows swept-frequency testing of components and subsystems. Frequency range is 500 kHz to 1.5 GHz.

HP 85902A Burst Carrier Trigger

For performing transmitter tests, this accessory provides a TTL time reference that allows an HP 8590 A/E series or 8560 E series spectrum analyzer to trigger reliably off the RF signal. It has an input range of 60 dB and a separate built-in preamplifier for greater sensitivity. The HP 85902A works with all digital communication formats: NADC-TDMA, E-TDMA, JDC, GSM, DCS-1800, CT2-CAI, DECT, and PHS. Frequency range is 10 to 2000 MHz.

HP 85671A Phase Noise Measurement Utility

Characterize the phase noise of VCOs and varactor oscillators easily using this downloadable program with an HP 8560 series portable spectrum analyzer. It provides fast measurements of phase noise versus log offset frequency. Results are displayed graphically and can be stored in the analyzer, printed, or plotted.

HP 8447 Series RF Amplifiers

These amplifiers, with a frequency range of 9 kHz to 1.3 GHz, have low noise, and wide bandwidths, and improve spectrum analyzer sensitivity and noise figure while providing input isolation. See page 304.

HP 8449B Preamplifier

This high-gain, low-noise preamplifier has a frequency range of 1 to 26.5 GHz. It increases the sensitivity of any microwave spectrum analyzer for detection and analysis of very low-level signals. Its improved sensitivity can reduce measurement time. See page 305.

HP 87405A Preamplifier

The HP 87405A preamplifier has a frequency range of 0.01 to 3 GHz, reliable gain, and low noise figure to improve overall system performance and reduce systematic errors. Compact size, 22 to 27 dB gain, 6.5 dB noise figure, and convenient probe-power bias connectio make this preamplifier ideal for use with a number of instruments, i cluding the HP 8590 E series spectrum analyzers.

HP 85901A Portable AC Power Source

This easy-to-carry power source can be used as a standalone batte for over 1 hour of operation at 100 W continuous load, or can be connec ed to an external 12 Vdc source for longer use. It shuts off automaticall when the charge gets low, and can be recharged in six hours or less. Ove voltage, short-circuit, and overload protection on the inverter output ar built in. Also included are over-voltage protection on the inverter inpu and over-charge and over-discharge protection on the internal batter

HP 11867A and 11693A Limiters

Protect the input circuits of spectrum analyzers, counters, amplifier and other instruments from high power levels with minimal effect o measurement performance. The HP 11867A RF limiter (dc to 1.8 GHz reflects signals up to 10 W average power and 100 W peak power. In sertion loss is less than 0.75 dB. The HP 11693A microwave limite (100 MHz to 12.4 GHz, usable to 18 GHz) guards against input signal over 1 mW up to 1 W average power and 10 W peak power.

HP 11694A 75 Ω Matching Transformer

From 3 to 500 MHz, this transformer allows measurements i 75 Ω systems while retaining amplitude calibration with a 50 Ω spectrur analyzer input. VSWRs are less than 1.2; insertion loss is less tha 0.75 dB.

HP 86205A and 86207A RF Bridges

These bridges combine the directivity and broadband frequency rang of directional bridges with the low insertion loss and flat coupling facto of directional couplers. Directivity is 40 dB and the wide RF frequenc ranges are 300 kHz to 6 GHz for the 50Ω HP 86205A and 300 kHz t 3 GHz for the 75 Ω HP 86207A. Low insertion loss is nominally ±1.5 dB Frequency response of the coupled arm is within ±0.2 dB of the nomina 16 dB value. The RF bridges are ideal for use with spectrum analyzers scalar network analyzers, and vector network analyzers.

HP 41800A Active Probe

This probe offers high input impedance from 5 Hz to 500 MHz It works with many HP spectrum analyzers to evaluate the quality o circuits by measuring spurious level, harmonics, and noise. Low inpu capacitance offers probing with negligible circuit loading for precise in-circuit measurements of audio, video, HF, and VHF bands.

HP 85024A High-Frequency Probe

In-circuit measurements are easy with this 300 kHz to 3 GHz probe Input capacitance of 0.7 pF shunted by 1 MΩ resistance permits high frequency probing without adverse loading of the circuit under test. Ex cellent frequency response and unity gain guarantee highly accurat swept measurements. High sensitivity and low distortion levels allow measurements taking advantage of full analyzer dynamic range. See page 279.

Ordering Information

	Price
HP 85902A Burst Signal Trigger	$1,53
HP 85671A Phase Noise Measurement Utility	$76
HP 85644A Tracking Source	$19,00
HP 85645A Tracking Source	$31,60
HP 85640A Portable Tracking Generator	$8,47
HP 8444A Opt 059 Tracking Generator	$8,46
HP 8447A Preamplifier (100 kHz to 400 MHz)	$1,63
HP 8447D Preamplifier (100 kHz to 1.3 GHz)	$1,73
HP 8447E Power Amplifier (100 kHz to 1.3 GHz)	$1,96
HP 8447F Preamplifier-Power Amplifier (100 kHz to 1.3 GHz)	$3,05
HP 8449B Preamplifier	$8,32
HP 87405A Preamplifier	$1,79
HP 85901A Portable AC Power Source	$1,31
HP 11867A RF Limiter	$51
HP 11693A Microwave Limiter	$71
HP 41800A Active Probe	$2,05
HP 11694A 75 Ω Matching Transformer	$20
HP 85024A High-Frequency Probe	$2,55
HP 86205A RF Bridge (50 Ω)	$1,32
HP 86207A RF Bridge (75 Ω)	$1,32

For the most current prices and product information, contact your local Hewlett-Packard sales office—see page 632.

HP 8348A Microwave Preamplifier

Specifications

Frequency Range: 2.0 to 26.5 GHz

Maximum Output Power
(at 0 dBm input)
1.0 to 2.0 GHz: ≥+20 dBm (typical)
2.0 to 20.0 GHz: ≥+25 dBm
20.0 to 26.5 GHz: ≥+23 dBm

Power Flatness
(at 0 dBm input): ±4 dB (typical)

Minimum Small Signal Gain
(at −15 dBm input)
1.0 to 2.0 GHz: ≥20 dB (typical)
2.0 to 20.0 GHz: ≥25 dB
20.0 to 26.5 GHz: ≥23 dB

Spectral Purity

Harmonics Typical
(at maximum specified output power)
1.0 to 2.0 GHz: <−20 dBc
2.0 to 26.5 GHz: >−15 dBc

Third-Order Intercept
2.0 to 20.0 GHz: +36 dBm, nominal
20.0 to 26.5 GHz: +31 dBm, nominal

Maximum Continuous Input
Microwave power: +22 dBm
DC voltage: ±10 V

Input and Output Impedance: 50 Ω, nominal
Input SWR: 3:1 (typical)
Output SWR (typical)
1.0 to 2.0 GHz: 6:1
2.0 to 20.0 GHz: 4.5:1
20.0 to 26.5 GHz: 2:1
Reverse Isolation: >50 dB (typical)
Noise Figure (typical)
1.0 to 20 GHz: <10 dB
20 to 26.5 GHz: <13 dB

Pulse Transmission Capability

Rise/Fall Time: <5 ns (typical)
Delay Time: <5 ns (typical)

General

Input and Output Connectors: 3.5 mm male
Power Requirement: 50 to 400 Hz, 100, 120, 200, or 240 volts ac (±10%); 85 VA maximum
Size: 133 mm H × 214 mm W × 366 mm D (5.2 in × 8.4 in × 14.4 in)
Weight: Net, 7 kg (15 lb); shipping, 14 kg (31 lb)

Ordering Information

	Price
HP 8348A 2 to 26.5 GHz Microwave Preamplifier	$13,400

HP 8349B Microwave Amplifier

Frequency Specifications

Range: 2 to 20 GHz

Output and Input Specifications (25° C ±5° C)

Minimum Output Power (at +5 dBm input):

Frequency range (GHz)	Output	
	Leveled	Unleveled
2.0 to 18.6	19 dBm (80 mW)	20 dBm (100 mW)
18.6 to 20.0	17 dBm (50 mW)	18 dBm (63 mW)

1 dB Compression Point: +21 dBm, nominal
Power Flatness (Leveled): ±1.25 dB
Minimum Small Signal Gain (at −5 dBm input):
2.0 to 18.6 GHz: 15dB
18.6 to 20.0 GHz: 13dB
Noise figure: <13 dB, typical
Impedance (Input and Output): 50 Ω, nominal

VSWR:

Frequency range (GHz)	Input	Output	
		Leveled	Unleveled (typical)
2.0 to 5.0	≤2.8	≤2.5	≤4.8
5.0 to 11.0	≤2.8	≤2.5	≤3.8
11.0 to 18.0	≤2.8	≤2.5	≤3.2
18.0 to 20.0*	≤2.8	≤2.5	≤3.2

*VSWR from 18.0 to 20.0 GHz is typical

Maximum Continuous Input, to the Input or Output Ports:
+27 dBm (RF), ±10V (dc)

Spectral Purity

Harmonics (at +20 dBm output):
2.0 to 11.0 GHz: <−20 dBc
11.0 to 20.0 GHz: <−30 dBc typical
Non-Harmonic Spurious: ≤−55 dBc
Third-Order Intercept: + 33 dBm, nominal

Pulse Transmission Capability

Rise/Fall Time: <10 ns typical

General

Reverse Isolation: >50 dB, typical
RF Input/Output Connectors: Type-N female
Size: 214 mm W × 133 mm H × 366 mm D (8.36 in × 5.2 in × 13.6 in)
Weight: Net, 7 kg (15 lb); shipping, 14 kg (31 lb)

Ordering Information

	Price
HP 8349B 2 to 20 GHz Microwave Amplifier	$9,270
Opt 001 Rear Panel RF Input/Output	+$103
Opt 002 Rear Panel RF Input w/Front Panel RF Output	+$103
Opt W30 Extended Repair Service (see page 588)	+$165

HP 8449B Preamplifier

Specifications

Frequency range:	1.0 to 26.5 GHz		
Gain(mean, per channel):	≥26 dB (20° to 30° C)		
Gain flatness across full freq. range:	1 to 26.5 GHz ±4.5 dB (0° to 55° C); 2 to 22 GHz ±2.4 dB (20° to 30° C)		
Noise figure:	**Band**	**Typical**	
	1.0 to 12.7 GHz	≤8.5 dB	7 dB
	12.7 to 22.0 GHz	12.5 dB	9 dB
	22.0 to 26.5 GHz	≤14.5 dB	12 dB
Output power for 1 dB gain compression:	≤+7 dBm (characteristic)		
Harmonic distortion:	−30 dB for 0 dBm output (characteristic)		
Output for <−60 dB harmonic distortion:	−30 dBm (characteristic)		
VSWR:	**Input**	1.0 to 2.0 GHz	2.0:1
		2.0 to 12.5 GHz	1.5:1
		12.5 to 26.5 GHz	2.0:1
	Output	1.0 to 26.5 GHz	2.0:1
Reverse isolation:	>75 dB		
Maximum dc voltage:	±20 V		

Displayed average noise level, 0 dB attn (char)

HP 8563E (1 Hz RBW):		HP 8566B (10 Hz RBW):	
1.0 to 6.46 GHz	−165 dBm	1.0 to 2.5 GHz	−155 dBm
5.86 to 13.0 GHz	−163 dBm	2.0 to 5.8 GHz	−154 dBm
12.4 to 26.5 GHz	−160 dBm	5.8 to 12.5 GHz	−150 dBm
		12.5 to 18.6 GHz	−144 dBm
		18.6 to 22 GHz	−140 dBm

Size: 213 mm W × 102 mm H × 297 mm D (8.4 in × 4.0 in × 11.7 in)
Weight: Net, 4 kg (8.8 lb) nominal
Power: 100, 120, 220, or 240 V, ±10%; 47 to 63 Hz

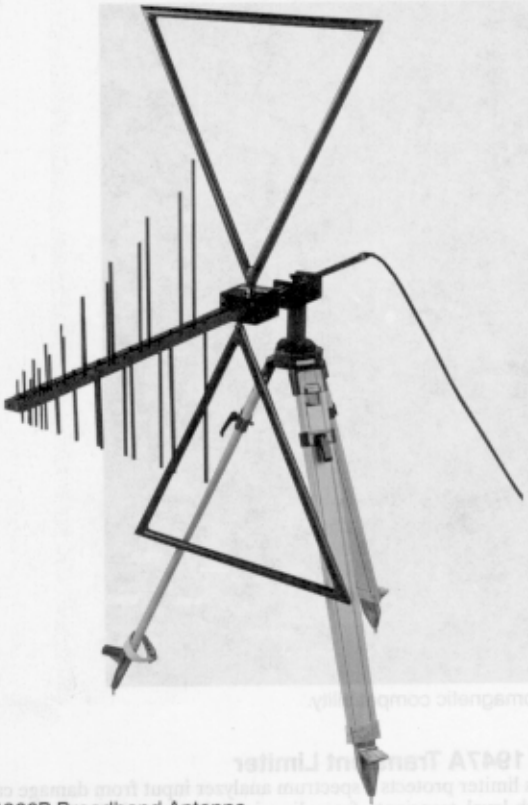
Ordering Information

	Price
HP 8449B 1 to 26.5 GHz Preamplifier	$8,320
Opt 907 Front Handle Kit	$79
Opt 908 Rack Mount Kit (half-rack width)	$62

EMI/EMC TEST SYSTEMS

EMC Accessories

Various Models



HP 11966P Broadband Antenna

HP 11967 Series Current Probes

This series is designed for MIL-STD 461/462 conducted-emission measurements on power and interconnecting leads. Used with 10 μF capacitors, HP p/n 0160-6683.

HP Model	Frequency Range
11967A Current Probe	15 kHz to 50 MHz, dc to 60 Hz powerlines
11967B Current Probe	20 Hz to 2 MHz, dc to 400 Hz powerlines

HP 11967C Line Impedance Stabilization Network

Used for commercial, CISPR-based conducted emission measurements, this single-phase unit meets the requirements of the FCC, VDE, and European Norms for conducted emission testing. Includes color-coded pin plugs for constructing a power cord to connect with the LISN.

HP 11967D Line Impedance Stabilization Network

Used for commercial conducted measurements. Maximum current 10 amps.

HP 11968 Series Positioning Devices

This series includes motorized and manually operated antenna masts and turntables.

HP Model	Description
11968B	Manually operated antenna-positioning mast
11968C	Non-metallic antenna tripod; minimizes unwanted reflections in the test environment
11968E	Manually operated turntable

11729-60014 Low-Noise Preamplifier

This amplifier provides the sensitivity needed for MIL-STD 461C CE-06 receiver/transmitter key-up testing. Frequency range is 10 Hz to 25 MHz.

HP 8447F Option H64 Dual Preamplifier

Improve receiver and spectrum analyzer sensitivity for more accurate radiated-emission measurements. This dual preamplifier is ideal for use with the HP 11940A and 11941A close-field probes to detect low-level signals from a device under test. Frequency range is 9 kHz to 1.3 GHz.

HP 8449B Microwave Preamplifier

This high-gain, low-noise preamplifier adds sensitivity for MIL-STD radiated measurements. Frequency range is 1 to 26.5 GHz (see page 353).

Ordering Information

	Price
HP 11950X "Designing for EMC" Course (per site)	$13,700
HP 8566B/8568B Opt 462 6 dB Bandwidths	$2,150
HP 11940A Close-Field Probe, 30 MHz to 1 GHz	$780
HP 11941A Close-Field Probe, 9 kHz to 30 MHz	$780
HP 11945A Close-Field Probe Set, 9 kHz to 1 GHz	$1,355
Opt 001 Rotary Joints	+$825
Opt 003 Delete Cables and Adapters (2 sets)	−$215
Opt E51 Add HP 8447F Option H64 Preamplifier, Carrying Bag, 36-in Type-N Cable	+$3,120
HP 11946A Quasi-Peak Adapter, AM/FM Demodulator Upgrade Kit	$2,120
HP 11947A Transient Limiter, 9 kHz to 200 MHz	$550
HP 11955A Biconical Antenna*	$1,000
HP 11956C Log Periodic Antenna*	$1,300
HP 11966A Active Loop H-Field Antenna, 10 kHz to 30 MHz	$2,740
HP 11966B Active Rod E-Field Antenna, 100 to 50 MHz	$2,400
HP 11966C Biconical Antenna, 30 to 300 MHz	$1,785
HP 11966D Log Periodic Antenna, 200 MHz to 1 GHz	$2,075
HP 11966E Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	$3,570
HP 11966F Conical Log Spiral Antenna, 200 MHz to 1 GHz	$2,135
HP 11966G Conical Log Spiral Antenna, 1 to 10 GHz	$2,130
HP 11966H Dipole Antenna Set, 28 MHz to 1 GHz	$4,165
HP 11966I Double-Ridged Waveguide Horn Antenna, 200 MHz to 2 GHz	$7,030
HP 11966J Double-Ridged Waveguide Horn Antenna, 18 to 40 GHz	$4,865
HP 11966K Magnetic Field Pickup Coil, 20 Hz to 50 kHz	$725
HP 11966L Coax Cable, Type N	$260
HP 11966M Coax Cable, BNC	$235
HP 11966N Log Periodic Antenna, 200 MHz to 5 GHz	$4,110
HP 11966P Broadband Antenna, 30 MHz to 1 GHz	$4,435
HP 11967A Current Probe, 15 kHz to 50 MHz	$1,350
HP 11967B Current Probe, 20 Hz to 2 MHz	$1,460
HP 11967C Line Impedance Stabilization Network	$3,105
HP 11968A Motorized Antenna Tower	$20,900
HP 11968B Manual Antenna-Positioning Mast	$3,295
HP 11968C Antenna Tripod	$830
HP 11968D Motorized Equipment Turntable	$13,500
HP 11968E Manual Equipment-Testing Turntable	$2,140
11729-60014 Low-Noise Preamplifier, 10 Hz to 25 MHz	$525
HP 8447F Option H64 Dual Preamplifier, 9 kHz to 1.3 GHz	$3,150
HP 8449B Microwave Preamplifier, 1 to 26.5 GHz	$8,160

*Typical Antenna factors supplied