

SIGNAL ANALYZERS

Spectrum Analyzer, 10 kHz to 1.8 GHz

Model 8590A

- Lightweight and portable
- Programmable via HP-IB, HP-IL, or RS232C
- Direct printer and plotter output
- Accessory for battery operation
- Optional CATV functions and 75- Ω input
- Optional EMC functions



HP 8590A



HP 8590A Portable RF Spectrum Analyzer

This compact, portable RF spectrum analyzer offers many features of a high-performance model for a low, affordable price. With a wide frequency range (10 kHz to 1.5 GHz or optional 1.8 GHz), large amplitude range (-115 dBm to +30 dBm), and 50- or optional 75 Ω input, the HP 8590A has the versatility to make most RF signal measurements. Over 100 functions can be programmed from an optional computer interface, and many accessories are available to expand basic spectrum analyzer capabilities.

Automatic Control

Three computer-interface options are available to automate the spectrum analyzer's many functions: HP-IB¹, HP-IL², and RS232C. Even without a computer, the interface will send display data to a printer or plotter.

Portability and Performance

With this analyzer you can get the same quality test results in the field that you get in the factory. The analyzer weighs only 30 pounds and has a "briefcase" handle to make carrying easy. When no AC power is available, the analyzer can be run for about two hours from the HP 85901A Portable AC Power Source (see page 136).

Add-on Features

The portable spectrum analyzer is compatible with accessories such as computers, multi-pen plotters, a video monitor, and more. The HP 8444A Tracking Generator turns the HP 8590A into a stimulus-response system that makes frequency-response and insertion-loss measurements on RF components. The HP 10855A Preamplifier

improves the analyzer's noise performance when low-level signals are measured, and a family of close-field probes is available for EMI testing. The HP ThinkJet Printer makes permanent records of test results displayed by the analyzer.

HP 8590A Option H18 1790 MHz Operation

Option H18 extends the upper limit of the HP 8590A's frequency range to 1790 MHz.

HP 8590A Option H50 CATV Functions

This option adds a set of nine functions to simplify cable TV testing: channel selection, carrier level, carrier-to-noise, power line hum, crossmodulation, composite triple beat, modulation depth, system frequency response, and save/recall traces. A 75- Ω input (no-cost Option 001) minimizes mismatch loss in cable testing. All of the spectrum analysis capability of the standard HP 8590A is retained.

HP 8590A Option H51 EMC Functions

Find EMI "hot spots" in your new-product designs quickly and easily by using the HP 8590A Option H51 Close-Field EMC Analyzer and HP 11945A Close-Field Probe Set. The field strength is measured directly at the probe tip in dB μ A/m, and antenna factors for the probe are automatically applied. A special function accessed with a key helps you to discriminate between narrowband and broadband signals. For more information, see page 133.

¹HP-IB is Hewlett-Packard's hardware, software, documentation, and support for IEEE-488 and IEC-625 worldwide standards for interfacing instruments.

²HP-IL is the Hewlett-Packard Interface Loop for serial-interfacing instrument systems.

HP 8590A Specifications

Frequency

Frequency range: 10 kHz to 1.5 GHz with 4-digit resolution
10 kHz to 1.79 GHz with Opt. H18
1 MHz to 1.5 GHz with Opt. 001

Readout accuracy: $\pm(5 \text{ MHz} + 1\% \text{ of span})$ (50- Ω termination on 1st LO Out)

Frequency stability

Drift: <50 kHz/5 min. after 2-hour warmup and 5 min. after setting center frequency

Signal track: signal held at display center compensates for drift

Noise sidebands: <-65 dBc at 30 kHz offset (1 kHz RBW, 30 Hz VBW)

Frequency span range: zero and 50 kHz to 1.5 GHz with 4-digit resolution

Readout accuracy: $\pm 3\%$ of indicated frequency span

Bandwidth Characteristics³ (-3 dB)

Resolution BW (RBW): 1 kHz to 3 MHz in 1,3 sequence (Gaussian shape)

Video BW (VBW): 30 Hz to 3 MHz in 1,3 sequence

Sweep time range: 20 ms to 100 s

Readout accuracy: $\pm 10\%$ of indicated setting

Amplitude

Amplitude range (1 MHz to 1.3 GHz)³

50- Ω calibration: -115 dBm to +30 dBm

75- Ω calibration (Opt. 001): -60 dBmV to +72 dBmV

Readout resolution (with markers): <0.05 dB for log scale; <0.05% of Ref. Level for linear scale

Amplitude units: dBm, dBmV, dBuV, volt, watt

Amplitude scale: 1-20 dB/div. in 1 dB steps and linear

Maximum input power: +30 dBm (1 W) continuous; 0 V dc

Maximum dynamic range: 70 dB for on-screen viewing; 70 dB for signal-to-distortion; 105 dB for IF compression-to-noise

Displayed average noise: 1 MHz to 1.3 GHz (0 dB input attenuation, 1 kHz RBW, 30 Hz VBW)³

50- Ω calibration: <-115 dBm

75- Ω calibration (Opt. 001): <-60 dBmV

Gain compression: <1 dB for -10 dBm total power at input mixer

Spurious responses

Second Harmonic: <-70 dBc for -45 dBm at input mixer, input >5 MHz³

Third-order intermod.: <-70 dBc for two -30 dBm signals at input mixer, >50 kHz signal separation

Residual responses: <-95 dBm for no input signal (0 dB input atten. and 50- Ω termination on RF Input and 1st LO Out)

Amplitude Accuracy

Frequency response

Absolute variation: ± 1.5 dB referenced to Cal Out signal (10 dB atten.)

Peak variation (flatness): ± 1 dB referenced to mid-point between highest and lowest peak excursions

Calibrator accuracy (for 299.9 MHz \pm 300 kHz Cal Out signal)

50- Ω calibration: ± 1 dB for -20 dBm level

75- Ω calibration (Opt. 001): ± 1 dB for +28.75 dBmV level

Reference level setting (log scale)

0-60 dB atten.: ± 1.75 dB for +30 to -120 dBm range

10 dB atten.: ± 1.25 dB for 0 to -120 dBm range; ± 0.5 dB for 0 to -59 dBm range

Resolution BW switching: ± 0.25 dB for 3 kHz to 3 MHz RBW range

Log scale switching: no significant error for 1-20 dB/div. scale range

Log scale fidelity: ± 0.1 dB/dB change over 70 dB range with ± 0.75 dB max. over -60 dB range from Ref. Level; ± 1.0 dB max. over -70 dB range from Ref. Level

Linear scale fidelity: $\pm 3\%$ of Reference Level setting

Input/Output Characteristics

Front-panel connectors

RF input: 50- Ω BNC (standard); 75- Ω BNC (Opt. 001)

Probe power output: +15 V, -12.6 V, GND, 150 mA max.

Cal output

50- Ω BNC (standard): -20 dBm, 299.9 MHz

75- Ω BNC (Opt. 001): +28.75 dBmV, 299.9 MHz

1st LO output: 50- Ω BNC, +10 dBm, 2.05 to 3.55 GHz

Rear-panel connectors

Aux video output: 50- Ω BNC, 0 to 1 V

Monitor output: 50- Ω BNC, NTSC format, 19.2 kHz horiz. sync.

High sweep in/Out: BNC, high TTL = sweep, low TTL = retrace

Sweep output: BNC, 5 k- Ω , 0 to +10 V ramp

Aux IF output: 50- Ω BNC, -10 to -60 dBm, 21.4 MHz

Ext. trigger input: BNC, TTL levels, positive edge trigger

Interface connector: HP-IB (Opt. 021), HP-IL (Opt. 022), or RS232C (Opt. 023)

HP-IB codes: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C1, C2, C3, C28

General

Temperature: 0° to 55°C operating; -40° to +75°C storage

Temperature stability: 2 hours after storage at a constant temp. between 0° and +55°C and 30 minutes after analyzer turn-on at the same constant temperature

EMI compatibility²: CISPR pub. 11 (1985) and FTZ 526/527/79

Audible noise: <37.5 dBA pressure and <5.0 Bels power (ISO DP7779)

Power requirements: 86-127 or 195-253 V RMS; 47-66 Hz; 120 VA max.

Weight (characteristic): 13.5 kg (29.8 lb)

Size (characteristic): 213 mm (8.4") H \times 366 mm (14.4") W \times 460 mm (18.1") D

Warranty: One year limited warranty for materials and workmanship

Recommended Accessories

HP 2225A/B/D ThinkJet Printer

HP 7440A ColorPro Plotter

HP 8444A Opt. 059 Tracking Generator

HP 82913A Monitor

HP 85901A AC Power Source

HP 10855A Broadband Preamplifier

HP 11945A Close-Field Probe Set

HP 11867A RF Limiter

HP 11694A 50-75 Ω Matching Transformer

Rack Slide: P/N 1494-0060 (for HP 8590A Options 908/909)

Ordering Information

HP 8590A Portable RF Spectrum Analyzer

Price

\$7995

Option 001: 75- Ω Input Impedance

\$0

Option 021: HP-IB Interface

\$600

Option 022: HP-IL Interface

\$600

Option 023: RS232C Interface

\$600

Option 040: Front Panel Cover

\$200

Option 908: Rack Mount Without Handles

\$250

Option 909: Rack Mount With Handles

\$300

Option 910: Extra Operating and Installation

\$24

Manuals

Option 915: Support Manual and Extra Operating and Installation Manuals

\$110

Option H18: 1790 MHz Operation

\$350

Option H50: CATV Functions and Front Panel Cover

\$500

Option H51: Close-Field EMC Analyzer

\$560

Option W30: Additional Two Years of HP Service

\$190

²Refer to Installation Manual (08590-90003) and Operation Manual (08590-90005) for more information.