

- Easy-to-use portable spectrum analyzers
- Full range of price and performance options

- Expanded memory and trace-storage capability
- Custom measurement personalities



HP 8590 series

HP 8590 Series Spectrum Analyzers

This family offers a wide range of performance, features, and prices designed to fit your budget. Choose from two low-cost basic performance analyzers or from four higher-performance models with synthesizer accuracy. Whatever your choice, you will find HP 8590 series spectrum analyzers easy to use and reliable. Their expandable feature sets allow them to be easily configured to meet your growing measurement needs.

Many options available for these portable analyzers can be added at the time of instrument purchase or after. These options include application-specific measurement personalities that customize your analyzer for specific tasks such as CATV, digital radio, cellular radio, EMC, and component test measurements (see page 240). You can also add a variety of printers, plotters, and other accessories.

HP 8590B and 8592B Spectrum Analyzers

These models offer basic RF and microwave measurement performance at a low cost. The HP 8590B has a frequency range of 9 kHz to 1.8 GHz, a 50- or optional 75-ohm input, and a weight of only 13.6 kg (30 lb). Amplitude range is a wide -115 to $+30$ dBm. The HP 8592B has a frequency range of 9 kHz to 22 GHz (or 25 GHz with Option H25), an internal preselector, and a weight of 15.9 kg (35 lb). Amplitude range extends from -114 to $+30$ dBm. If ac power is not available, both spectrum analyzers can be operated using the HP 85901A portable ac power source.

One Spectrum Analyzer for Many Applications

You can change the test capabilities of these spectrum analyzers to fit specific measurement needs. An optional memory card reader enables you to load application-specific measurement personalities. Complex measurement routines are reduced to a keystroke. An optional built-in tracking generator provides the HP 8590B RF analyzer with a synchronously swept signal source for stimulus-response measurements. Operating these analyzers requires only minimal training.

Easy-to-Use Features

Numerous features make it easier to control your measurements and to analyze the results. Both portable spectrum analyzers have built-in automatic calibration to ensure measurement consistency. Frequency panning lets you quickly reposition signals without repeated sweeps. The internal memory allows 50 traces to be stored, and 24 more can be stored on a RAM card with addition of the optional memory-card reader. Time-and-date stamping come standard. Direct output to printer or plotter are available with either the HP-IB or RS-232 interface option.

HP 8591A, 8594A, and 8595A RF Spectrum Analyzers

HP 8593A Microwave Spectrum Analyzer

These portable spectrum analyzers offer frequency accuracy and a wide range of options for applications that demand higher performance. The HP 8591A has a frequency range of 9 kHz to 1.8 GHz and amplitude range of -115 to $+30$ dBm. The HP 8594A has a frequency range of 9 kHz to 2.9 GHz and an amplitude range of -112 to $+30$ dBm. The HP 8595A has a frequency range of 9 kHz to 6.5 GHz and an amplitude range of -114 to $+30$ dBm. And the HP 8593A has a frequency range of 9 kHz to 22 GHz (or to 26.5 GHz with Option 026) and an amplitude range of -114 to $+30$ dBm.

All four instruments have a standard 7.5 ppm frequency accuracy that can be improved with an optional precision frequency reference to marker count accuracy of ± 230 Hz at 1 GHz or ± 2.3 kHz at 18 GHz.

Standard Features

These analyzers have the ease-of-use features found in the HP 8590B and 8592B. In addition, their built-in memory card reader allows you to load measurement personalities, your own custom programs, and measurement data on 32-Kbyte memory cards. A catalog function allows you to determine the exact content of information stored on your memory cards or within internal memory.

Option Flexibility

A growing variety of circuit-card options provide even more measurement capability. Circuit cards are installed easily into a built-in cardcage, and most card options are retrofittable.

HP's new circuit-card option for time-gated spectrum analysis lets you characterize burst-modulated or time-multiplexed signals from many sources: digital RF communication systems (including GSM, PCN, and CT-2 formats), video devices, and disk drive read/write heads.

Other circuit-card options include:

- AM/FM demodulator to view and hear signals
- TV sync trigger to select any line of the TV field for measurement
- Fast time-domain sweep to allow zero-span sweep rates to $20 \mu\text{s}$
- Quasi-peak detector for EMC measurements

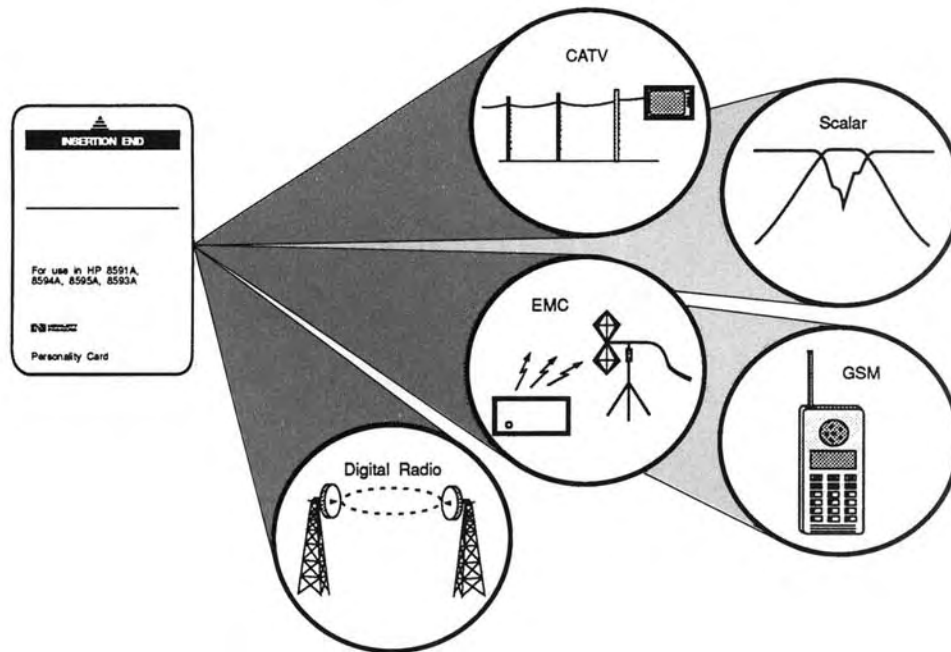
A built-in 2.9-GHz tracking generator is available for the HP 8593A, 8594A, and 8595A spectrum analyzers; a 1.8 GHz tracking generator for the HP 8591A. For microwave scalar network measurements, the new HP 85645A microwave tracking source can be used with the HP 8593A (see page 249).

SIGNAL ANALYZERS

Spectrum Analyzers, Portable

HP 8590 Series

- Application-specified measurements
- New component-test, GSM, and CATV personalities



Measurement personalities are available for specialized testing in a variety of fields.

Measurement Personality Cards

Hewlett-Packard's measurement personality cards are an economical way to customize your HP 8590 series spectrum analyzer for easier, more accurate testing in a number of application areas. The measurement personalities are loaded using the built-in memory card reader (optional on the HP 8590B and 8592B).

New HP 85714A Scalar Measurement Personality

Add an HP 85714A scalar measurement personality to an HP 8590 series analyzer with optional built-in tracking generator for fast, accurate scalar transmission measurements from 300 kHz to 2.9 GHz. Included are guided "thru" calibration, autoscaling, a transmission coefficient measurement marker, 120-dB extended display, and one-button measurement of CF, insertion loss/gain, bandwidth, and shape factor. For even more power, the scalar measurement personality becomes the interface for the HP 85630A scalar transmission reflection test set, which adds capabilities for reflection measurements as well, including a reflection coefficient measurement marker, a VSWR measurement marker, and simultaneous transmission/reflection display (see page 249).

New HP 85715A GSM Measurement Personality

This product expands the feature and measurement set of an HP 8590 series spectrum analyzer, customizing it for testing the Pan-European digital cellular radio system. Measurements include those recommended in GSM 11.10 and 11.20 documents: RF carrier power versus time, output RF spectrum, spurious emissions, and more.

New HP 85716A CATV System Monitoring Personality

The HP 85716A introduces a new concept in CATV testing: data acquisition through system monitoring. Nine automatic noninterfering measurements allow you to continuously monitor headend operation and make faster, easier system proof-of-performance tests. You will locate your system problems—without disrupting service—before they become customer complaints. Automatic measurements include visual carrier frequency, visual carrier level, visual-to-aural frequency difference, visual-to-aural level difference, visual carrier modulation depth, visual carrier powerline hum, visual carrier-to-noise ratio, system composite triple beat, and system composite second order.

HP 85711A CATV Measurement Personality

This card is recommended for manual headend testing, proof-of-performance measurements, trunk maintenance, and (with a microwave analyzer) CARS-band testing. One-key measurements include channel selection by number and beats identification, carrier level, carrier-to-noise ratio, power-line hum, cross modulation, composite triple beat, video modulation depth, and non-intrusive frequency response. With analyzer Option 301 you can listen to AM and FM signals and measure modulation depth on individual TV lines selected by number. HP 8590 series Option H80 and Option H81 let you view TV pictures on the CRT of the spectrum analyzer.

HP 85712B EMC Measurement Personality

This card adds capabilities for electromagnetic compatibility (EMC) diagnostic and precompliance measurements. EMC applications include field-strength testing in close fields, peak response measurements weighted for broadband emissions, and identification of narrowband and impulse (broadband) signals. Accessories such as a preamplifier and set of two close-field probes complement the EMC measurement capabilities added by this personality. (See page 243 for more information on EMC test products.)

HP 85713A Digital Radio Measurement Personality

This measurement card for the microwave spectrum analyzers includes five major agency masks for testing to US, UK, and FRG digital radio specifications. Automatic compare-to-mask and mean power level measurements are made on the modulated signal. Measurement functions include transient analysis monitoring and frequency response measurement. You can create and store your own masks and recall them for later use. More digital radio tests, including multipath fading margin, power measurements, and flatness, are available using the HP 11758T digital radio test system.



HP 8591A

Specifications

HP 8591A, 8593A, 8594A, 8595A

Note: Specifications apply to all four spectrum analyzers unless otherwise noted.

Frequency

Frequency range

HP 8591A:	50 Ω	9 kHz to 1.8 GHz
	75 Ω (Opt 001)	1 MHz to 1.8 GHz
HP 8594A:		9 kHz to 2.9 GHz
HP 8595A:		9 kHz to 6.5 GHz
HP 8593A:		9 kHz to 22 GHz; 9 kHz to 26.5 GHz (Opt 026)

Frequency readout accuracy (start, stop, center)

Span ≤ 10 MHz: ±(frequency readout × freq ref error + 3% of span + 20% of RBW + [100 × N] Hz)

Span > 10 MHz: ±(frequency readout × freq ref error + 3% of span + 20% of RBW)

Marker count accuracy (S/N ≥ 25 dB, RBW/span ≥ 0.01)

Span ≤ 10 MHz: ±(marker freq × freq ref error + counter res + [100 × N] Hz)

Span > 10 MHz: ±(marker freq × freq ref error + counter res + 1 kHz)

Counter resolution: Selectable from 10 Hz to 100 Hz

Frequency reference error

	Standard	Opt 004 Precision Freq Ref
Aging	±2 × 10 ⁻⁶ /yr	±1 × 10 ⁻⁷ /yr
Settability	±0.5 × 10 ⁻⁶	±1 × 10 ⁻⁸
Temperature	±5 × 10 ⁻⁶	±1 × 10 ⁻⁸

Span range

- HP 8591A:** 0 Hz (zero span), 10 kHz to 1.8 GHz
- HP 8594A:** 0 Hz (zero span), 10 kHz to 2.9 GHz
- HP 8595A:** 0 Hz (zero span), 10 kHz to 6.5 GHz
- HP 8593A:** 0 Hz (zero span), [10 × N] kHz to 19.25 GHz, [10 × N] kHz to 23.75 GHz (Opt 026)

Span accuracy

Span ≤ 10 MHz: ±2% of span

Span > 10 MHz: ±3% of span

Sweptime

Range

Span = 0 Hz or > 10 kHz: 20 ms to 100 s

Opt 101: 20 μs to 100 s

Accuracy

20 ms to 100 s: ±3%

20 μs to < 20 ms, Opt 101: ±2%

Sweep trigger: Free run, single, line, video, external

Stability

Noise sidebands (1 kHz RBW, 30 Hz VBW, Sample)

> 10 kHz offset from CW signal

HP 8591A: ≤ -90 dBc/Hz

HP 8594A: ≤ -85 dBc/Hz

HP 8595A: ≤ -85 dBc/Hz

HP 8593A: ≤ -85 + (20 log N) dBc/Hz

> 30 kHz offset from CW signal

HP 8591A: ≤ -100 dBc/Hz

HP 8594A: ≤ -95 dBc/Hz

HP 8595A: ≤ -95 dBc/Hz

HP 8593A: ≤ -95 + (20 log N) dBc/Hz

Residual FM (1 kHz RBW, 1 kHz VBW)

HP 8591A: < 250 Hz p-p in 100 ms

HP 8594A: < 400 Hz p-p in 100 ms

HP 8595A: < 400 Hz p-p in 100 ms

HP 8593A: < [400 × N] Hz p-p in 100 ms

System related sidebands: < -65 dBc at > 30 kHz offset from CW signal

Comb generator (HP 8593A only): 100 MHz fundamental frequency; ±0.007% frequency accuracy

SIGNAL ANALYZERS

Spectrum Analyzers, Portable (cont'd)

HP 8590 Series

Specifications

HP 8591A, 8593A, 8594A, 8595A (continued)

Amplitude

Amplitude range

HP 8591A:	
50 Ω	-115 to +30 dBm
75 Ω (Opt 001)	-63 to +75 dBm V
HP 8594A:	-112 to +30 dBm
HP 8595A:	-114 to +30 dBm
HP 8593A:	-114 to +30 dBm

Maximum safe input

HP 8591A	50 Ω	75 Ω
Avg cont power	+30 dBm (1 W)	+75 dBmW (0.4 W)
Peak pulse power	+30 dBm (1 W)	+75 dBmV (0.4 W)
dc	25 Vdc	100 Vdc

HP 8594A, 8595A, 8593A

Avg cont power: +30 dBm (1 W, 7.1 V rms) for input atten \geq 10 dB

Peak pulse power: +50 dBm (100 W) for $<$ 10 μ s pulse width, $<$ 1% duty cycle, input atten \geq 30 dB

dc: 0 V (dc coupled); 50 V (ac coupled)

Gain compression ($>$ 10 MHz): \pm 0.5 dB (total power at input mixer = -10 dBm)

Displayed average noise level

HP 8591A:	\leq -115 to \leq -113 dBm
HP 8594A:	\leq -112 to \leq -107 dBm
HP 8595A:	\leq -114 to \leq -110 dBm
HP 8593A:	\leq -114 to \leq -92 dBm

Spurious responses

Second harmonic distortion

HP 8591A: $<$ -70 dBc for -45 dBm tone at input mixer ($>$ 5 MHz)

HP 8594A, 8595A: $<$ -70 dBc for -40 dBm tone at input mixer ($>$ 10 MHz)

HP 8593A: $<$ -70 dBc for -40 dBm tone at input mixer (10 MHz to 2.9 GHz); $<$ -100 dBc for -10 dBm tone at input mixer or below DANL ($>$ 2.75 GHz)

Third-order intermodulation

HP 8591A: $<$ -70 dBc for two -30 dBm tones at input and $>$ 50 kHz separation (5 MHz to 1.8 GHz)

HP 8594A, 8595A, 8593A: $<$ -70 dBc ($>$ 10 MHz)

Other input-related spurious (\geq 30 kHz offset)

HP 8591A: $<$ -65 dBc for -20 dBm tone at input mixer (\leq 1.8 GHz)

HP 8594A, 8595A: $<$ -65 dBc

HP 8593A: $<$ -65 dBc (applied freq \leq 18 GHz); $<$ -60 dBc (applied freq \leq 22 GHz)

Display range

Log scale: 0 to -70 dB from reference level is calibrated; 0.1 to 20 dB/division in 1 dB steps; 8 divisions displayed

Linear scale: 8 divisions

Scale units: dBm, dBm V, dB μ V, volts, watts

Marker readout resolution

Log scale: 0.05 dB

Linear scale: 0.05% of ref level; 0.07% of ref level (Opt 101)

Reference Level

Range

HP 8591A: -115 to +30 dBm (50 Ω)
-63 to +75 dBm V (75 Ω)

HP 8594A: -112 to +30 dBm

HP 8595A, 8593A: -114 to +30 dBm

Resolution: 0.01 dB for log scale; 0.12% of reference level for linear

Accuracy (referred to -20 dBm reference level)

0 to -59.9 dBm: \pm (0.5 dB + input attenuation accuracy at 50 MHz)

-60 to -114 dBm: \pm (1.25 dB + input attenuation accuracy at 50 MHz)

Frequency response

Absolute (referred to 300 MHz CAL OUT)

HP 8591A, 8594A, 8595A: \pm 1.5 dB

HP 8593A: \pm 2.0 to \pm 3.0 dB (preselector peaked)

Relative flatness (referred to midpoint between highest and lowest frequency response deviations)

HP 8591A, 8594A, 8595A: \pm 1.0 dB

HP 8593A: \pm 1.5 to \pm 2.0 dB (preselector peaked)

Calibrator output

Frequency: 300 MHz \pm (300 MHz \times freq ref error)

Amplitude: -20 dBm \pm 0.4 dB

Input attenuator

Range

HP 8591A: 0 to 60 dB in 10 dB steps

HP 8594A, 8595A, 8593A: 0 to 70 dB in 10 dB steps

Accuracy at 50 MHz (ref 10 dB atten)

HP 8591A: \pm 0.5 dB (20 to 50 dB); \pm 0.75 dB (60 dB)

HP 8594A, 8595A, 8593A: \pm 0.5 dB (0 to 60 dB); \pm 1.2 dB (70 dB)

Resolution bandwidth: 1 kHz to 3 MHz, \pm 20%; 9 kHz and 120 kHz (6 dB) EMI bands

Switching uncertainty: \pm 0.4 dB (3 kHz to 3 MHz RBW); \pm 0.5 dB (1 kHz)

Video bandwidth range: 30 Hz to 1 MHz

Log to linear switching: \pm 0.25 dB at reference level

Display scale fidelity

Log incremental accuracy: \pm 0.2 dB/2 dB (0 to -70 dB from reference level)

Log maximum cumulative: \pm 0.75 dB (0 to -60 dB from reference level) and \pm 1.0 dB (0 to -70 dB from reference level)

Linear accuracy: \pm 3% of reference level

General Specifications

Temperature

Operating: 0° C to +55° C

Storage: -40° C to +75° C

EMI compatibility: Conducted and radiated interference CISPR Pub. 11 and Messemphaenger Postverfuegung 526/527/79

Audible noise: $<$ 37.5 dBA pressure and $<$ 5.0 Bels power (ISODP7779)

Power requirements: 86 to 127 V rms, or 195 to 250 V rms, 47 to 66 Hz; 103 to 126 V rms, 400 Hz \pm 10%

Specifications

HP 8590B and 8592B

Note: Specifications apply to both the HP 8590B and HP 8592B spectrum analyzers unless otherwise noted.

Frequency

Frequency range

HP 8590B:
 50 Ω 9 kHz to 1.8 GHz
 75 Ω (Opt 001) 1 MHz to 1.8 GHz
HP 8592B: 9 kHz to 22 GHz

Band	Harmonic mode (n)	Center frequency
0	1-	9 kHz to 2.9 GHz
1	1-	2.75 GHz to 6.4 GHz
2	2-	6.0 GHz to 12.8 GHz
3	3-	12.4 GHz to 19.4 GHz
4	4-	19.1 GHz to 22 GHz

Frequency readout accuracy (start, stop, center)

HP 8590B: ±(5 MHz + 1% of frequency span)
HP 8592B: ±[(5 × N) MHz + 0.01% of center frequency + 2% of frequency span]

Span

Range:
HP 8590B: 0 Hz (zero span), 50 kHz to 1.8 GHz
HP 8592B: 0 Hz [50 × N] kHz to 19.25 GHz

Accuracy:

HP 8590B: ±3% of indicated span
HP 8592B: ±2% of span for span > 10 MHz and single band spans, ±5% of span for span ≤ 10 MHz and single band spans

Sweep time

Range: 20 ms to 100 s
Accuracy: ±3% of indicated sweep time
Sweep trigger: Free run, single, line, video, external

Stability

Drift: < 75 kHz/5 minutes after 2-hour warmup and 5 minutes after setting center frequency

Noise sidebands

HP 8590B: < -95 dBc/Hz at > 30 kHz offset from CW signal
HP 8592B: < [-95 + 20 log N] at > 30 kHz offset from CW signal

System related sidebands: < -65 dBc at > 30 kHz offset from CW signal

Amplitude

Amplitude range

HP 8590B:
 50 Ω -115 dBm to +30 dBm
 75 Ω (Opt 001) -63 dBm V to +75 dBm V
HP 8592B: -114 dBm to +30 dBm

Maximum safe input level: 50 Ω 75 Ω

Avg. continuous power +30 dBm (1 W) +75 dBm V (0.4 W)
Peak pulse power +30 dBm (1 W) +75 dBm V (0.4 W)
dc 25 Vdc 100 Vdc

Gain compression (> 10 MHz): ≤ 0.5 dB (total power at input mixer = -10 dBm)

Displayed average noise level (input terminated, 0 dB atten, 1 kHz RBW, 30 Hz VBW)

HP 8590B: < -115 dBm to < -113 dBm
HP 8592B: < -114 dBm to < -92 dBm

Spurious responses

Second harmonic distortion (> 5 MHz)

HP 8590B: < -70 dBc for -45 dBm tone at input mixer
HP 8592B:
10 MHz to 2.9 GHz: < -70 dBc for -40 dBm tone at input mixer
> 2.75 GHz: < -100 dBc for -10 dBm tone at input mixer (or below DANL)

Third-order intermodulation

HP 8590B

Distortion > 5 MHz: < -70 dBc for two -30 dBm tones at input mixer

Other input-related: < -65 dBc for ≥ 30 kHz offset from CW signal

HP 8592B

Distortion > 10 MHz: < -65 dBc for two -30 dBm tones at input mixer and > 50 kHz separation

Other input-related: < -65 dBc for applied freq ≤ 18 GHz; < -60 dBc for applied freq ≤ 22 GHz

Display range

Log scale: 0 to -70 dB from reference level is calibrated; 1 to 20 dB/division in 1 dB steps; 8 divisions displayed

Linear scale: 8 divisions

Scale units: dBm, dBm V, dBm μV, volts, watts

Marker readout resolution: 0.05 dB for log scale; 0.05% of reference level for linear

Reference level

Range

HP 8590B: -115 dBm to +30 dBm (50 Ω)
 -63 to +75 dBm V (75 Ω)

HP 8592B: -114 dBm to +30 dBm

Resolution: 0.01 dB for log scale; 0.12% of reference level for linear

Accuracy (referred to -20 dBm reference level)

0 to -59.9 dBm: ±(0.5 dB + input attenuation accuracy at 50 MHz)

-60 to -114 dBm: ±(1.25 dB + input attenuation accuracy at 50 MHz)

Frequency response (10 dB input atten)

HP 8590B

Absolute: ±1.5 dB, ref to 300 MHz CAL OUT

Relative: ±1.0 dB, referred to midpoint between highest and lowest frequency response deviations

HP 8592B - preselector peaked

Absolute: ±2.0 to ±3.0 dB (300 MHz CAL OUT)

Relative: ±1.5 to ±2.0 dB

Calibrator output

Frequency: 300 MHz ±30 kHz

Amplitude: -20 dBm ±0.4 dB (50 Ω — HP 8590B/92B)
 +28.75 dBm V ±0.4 dB (75 Ω, Opt 001)

Input attenuator

Range: 0 to 60 dB, 10 dB steps

Accuracy: ±0.5 dB at 50 MHz (ref 10 dB atten, 0 to 50 dB)
 ±0.75 dB at 50 MHz (ref 10 dB atten, 60 dB)

Resolution bandwidth: 1 kHz to 3 MHz, -3 dB nominal

Switching uncertainty, referred to 3 kHz RBW: ±0.4 dB for 3 kHz to 3 MHz RBW; ±0.5 dB for 1 kHz

Video bandwidth range: 30 Hz to 1 MHz

Log to linear switching: ±0.25 dB at reference level

Display scale fidelity

Log incremental accuracy: ±0.2 dB/2 dB, 0 to -70 dB from reference level

Log maximum cumulative: ±0.75 dB, 0 to -60 dB from reference level

Linear accuracy: ±3% of reference level

General

Temperature range

Operating: 0° to +55° C

Storage: -40° to +75° C

EMI compatibility: CISPR Pub 11 and FRZ 526/527/79

Audible noise: <37.5 dBA pressure and <5.0 Bels power (ISODP7779)

Power requirements: 86 to 127 or 195 to 250 V rms, 47 to 66 Hz; 103 to 126 V rms, 400 Hz ±10%

SIGNAL ANALYZERS

Spectrum Analyzers, Portable (cont'd)

HP 8590 Series

Options



HP 8590 series RF spectrum analyzers have built-in tracking generator option.

Option 010 and 011 Built-in Tracking Generators

Option 010 (50 ohms) is available for all HP 8590 series spectrum analyzers except the HP 8592B. Option 011 (75 ohms) is available for the HP 8590B and 8591A only.

Frequency range:	50 Ω	75 Ω
HP 8590B, 8591A	100 kHz to 1.8 GHz	1 MHz to 1.8 GHz
HP 8594A, 8595A, 8593A	300 kHz to 2.9 GHz	
Tracking drift (nominal, 30-min warmup)		
HP 8590B	1.5 kHz/5 min (10 kHz RBW)	
HP 8591A, 8594A, 8595A, 8593A	1 kHz/5 min (1 kHz RBW)	
Output power level		
Range:	50 Ω	75 Ω
HP 8590B	0 to -15 dBm	+42.8 to +27.8 dBmV
HP 8591A	0 to -70 dBm	+42.8 to -27.2 dBmV
HP 8594A, 8595A, 8593A	+1 to -10 dBm	
Resolution:	0.1 dB	0.1 dB
Absolute accuracy:	HP 8590B	± 1.5 dB
	HP 8591A	± 1.0 dB
	HP 8594A, 8595A, 8593A	± 0.75 dB
Output vernier accuracy		
HP 8590B	± 1.0 dB	
HP 8591A	± 0.75 dB	
HP 8594A, 8595A, 8593A	± 0.50 dB	
Output flatness (referred to 300 MHz):		
HP 8590B	± 1.75 dB	
HP 8591A (10 dB attenuator)	± 1.75 dB	
HP 8594A, 8595A, 8593A (0 dBm)	± 2.0 dB	
Output attenuator (HP 8591A only)		
Range:	0 to 60 dB in 10 steps	
Switching accuracy (at 30 MHz):	± 0.8 dB or 2.5% of attenuator setting, whichever is greatest, for maximum of 1.5 dB (referred to 10 dB source attenuator setting)	
Tracking generator feedthrough		
HP 8590B, 8591A:	< -106 dBm (50 Ω); < -57.24 dBmV (75 Ω)	
HP 8594A, 8593A:	< -107 dBm (400 kHz to 5 MHz); < -112 dBm (5 MHz to 2.9 GHz)	
HP 8595A:	< -110 dBm (5 MHz to 2.9 GHz)	
Output VSWR (nominal)		
HP 8591A:	< 2.5:1 (0 dB attenuation)	
	< 1.6:1 (10 dB attenuation)	
HP 8594A, 8595A, 8593A:	< 2.0:1	

Ordering Information

HP 8590B Spectrum Analyzer (9 kHz to 1.8 GHz)	\$9,985
HP 8592B Spectrum Analyzer (9 kHz to 22 GHz)	\$21,650
Opt 001 75 Ω Input (HP 8590B only)	+ \$0
Opt 003 Card Reader	+ \$620
Opt 010 Tracking Generator 50 Ω (HP 8590B only)	+ \$4,300
Opt 011 Tracking Generator 75 Ω (HP 8590B only)	+ \$4,300
Opt 021 HP-IB Interface	+ \$650
Opt 023 RS-232 Interface	+ \$650
HP 8591A Spectrum Analyzer (9 kHz to 1.8 GHz)	\$12,825
HP 8594A Spectrum Analyzer (9 kHz to 2.9 GHz)	\$14,995
HP 8595A Spectrum Analyzer (9 kHz to 6.5 GHz)	\$20,750
HP 8593A Spectrum Analyzer (9 kHz to 22 GHz)	\$27,255
Options	
Opt 001 75 Ω Input (HP 8591A only)	+ \$0
Opt 004 Precision Frequency Reference	+ \$2,200
Opt 010 50 Ω Built-in Tracking Generator	+ \$4,900
Opt 011 75 Ω Built-in Tracking Generator (HP 8591A only)	+ \$4,900
Opt 021 HP-IB Interface	+ \$650
Opt 023 RS-232 Interface	+ \$650
Opt 026 26.5 GHz Frequency Extension (HP 8593A only)	+ \$3,415
Opt 101 Fast Time Domain Sweeps	+ \$1,050
Opt 102 AM/FM Demodulator and TV Sync Trigger	+ \$1,575
Opt 103 Quasi-Peak Detector/AM-FM Demodulator	+ \$1,700
Opt 105 Time-gated Spectrum Analysis	+ \$2,075
Opt 301 TV Sync Trigger (HP 8591A, 8594A, 8595A)	+ \$2,625
Measurement Personalities	
HP 85700A Blank 32-Kbyte Memory Card	\$105
HP 85711A CATV Measurement Personality	\$620
HP 85712B EMC Measurement Personality	\$860
HP 85713A Digital Radio Measurement Personality	\$880
HP 85714A Scalar Measurement Personality	\$985
HP 85715A GSM Measurement Personality	\$2,080
Selected Accessories	
HP 85901A Portable ac Power Source	\$1,290
HP 11758T Digital Radio Test Set	\$61,000
HP 11945A Opt E51 Close-Field Probe Set	\$2,720
HP 11946A Quasi-Peak Adapter/AM-FM Demodulator Upgrade Kit	\$1,910
HP 8447D Broadband Preamp (100 kHz to 1.3 GHz)	\$1,650
HP 41800A Active Probe (5 Hz to 500 MHz)	\$1,740
HP 85024A High-Frequency Probe (300 kHz to 3 GHz)	\$2,100
HP 2225A/B ThinkJet Printer	\$595
HP 7440A ColorPro Plotter	\$1,295

☎ For off-the-shelf shipment, call 800-452-4844.