

SIGNAL ANALYZERS

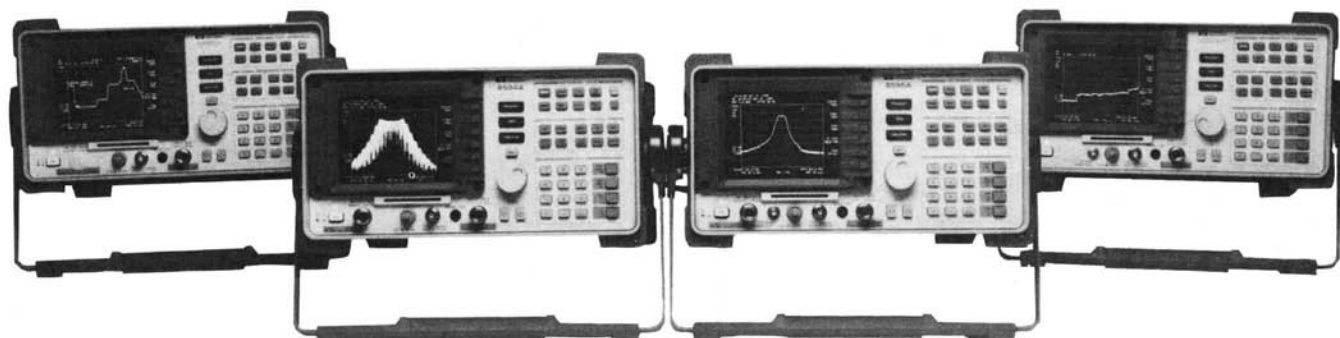
Spectrum Analyzers, Portable

HP 8590 Series

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- 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 spectrum analyzers can be added at the time of instrument purchase or any time after. You can also add a variety of printers, plotters, and accessories to help make your job easier.

Measurement Personalities

The HP 8591A, 8593A, 8594A, and 8595A portable spectrum analyzers include a built-in memory card reader and expanded program memory for storing measurements. The HP 8590B and 8592B include the expanded program memory and can be configured with the card reader as an option.

The memory card reader can be used to load application-specific measurement personalities into the analyzer. HP offers several measurement personality cards to customize your instrument for cable television, electromagnetic interference, and digital radio testing.

HP 85711A CATV Measurement Personality

This card customizes your HP 8590-series spectrum analyzer for headend testing, proof-of-performance measurements, trunk maintenance, and (with a microwave analyzer) CARS-band testing. Single-key functions 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 HP 8591A or 8593A option 301, you can listen to AM and FM signals and measure modulation depth on individual TV lines selected by number. HP 8590 series options H80 and H81 let you view TV pictures on the CRT of the spectrum analyzer.

HP 85712B EMC Measurement Personality

This card adds capabilities to an HP 8590-series spectrum analyzer for custom electromagnetic compatibility (EMC) diagnostic and pre-compliance 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 to the analyzer by this personality. (See page 200 for more information on EMC test products.)

HP 85713A Digital Radio Measurements Personality

This measurement card for your microwave portable 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. Additional digital radio tests, including multipath fading margin, power measurements, and flatness, are available using the HP 11758T digital radio test system.

Ordering Information

	Price
HP 85700A blank 32-Kbyte memory card	\$100
HP 85711A CATV measurements personality	\$600
HP 85712B EMC measurements personality	\$860
HP 85713A digital radio measurements personality	\$770

Selected accessories

HP 85901A portable ac power source	\$1,120
HP 11758T digital radio test set	\$58,000
HP 11945A Opt E51 close-field probe set	\$3,640
HP 11946A quasi-peak adapter/AM-FM demodulator upgrade kit	\$1,910
HP 8447D broadband preamplifier (100 kHz-1.3 GHz)	\$1,540
HP 41800A active probe (5 Hz to 500 MHz)	\$1,700
HP 85024A high frequency probe (300 kHz to 3 GHz)	\$1,900
HP 2225A/B ThinkJet printer	\$495
HP 7440A ColorPro plotter	\$1,295

☎ For same-day shipment, call HP DIRECT at 800-538-8787

SIGNAL ANALYZERS

Spectrum Analyzers, Low-cost Portable

HP 8590B, 8592B

- Low price
- Easy to use

- Sturdy and lightweight
- Measurement personalities



HP 8590B



HP 8592B



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 pounds). 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 (35 pounds) 15.9 kg. Amplitude range extends from -114 to $+30$ dBm. (For special applications or general export, the HP 8592B option 1BH does not tune above 18 GHz nor span greater than 2.3 GHz.) 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 specific measurement personalities for cable television, electromagnetic compatibility, or digital radio applications. Complex measurement routines and test limits are available at a key-stroke. 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 8590B Specifications

General

Temperature range

Operating: 0° to $+55^{\circ}$ C

Storage: -40° to $+75^{\circ}$ 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 Vrms, 47 to 66 Hz. 103 to 126 Vrms, 400 Hz $\pm 10\%$

Frequency

Range: 9 kHz to 1.8 GHz; 1 MHz to 1.8 GHz option 001

Readout accuracy: $\pm(5$ MHz $+ 1\%$ of frequency span)

Span

Range: 0 Hz (zero span), 50 kHz to 1.8 GHz

Accuracy: $\pm 3\%$ of indicated span

Sweep time

Range: 20 ms to 100 s

Accuracy: $\pm 3\%$ 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: <-95 dBc/Hz at >30 kHz offset from CW signal

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

HP 8590B Specifications (continued)

Amplitude

Amplitude range: -115 to +30 dBm (50 ohm); -63 to +75 dBmV (75 ohm, option 001)

Maximum safe input level:	50 ohm	75 ohm (option 001)
Average cont. power	+30 dBm (1 watt)	+75 dBmV (0.4 watts)
Peak pulse power	+30 dBm (1 watt)	+75 dBmV (0.4 watts)
DC	25 Vdc	100 Vdc

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

Displayed average noise level: <-115 dBm to <-113 dBm

Spurious responses

Second harmonic distortion > 5 MHz: <-70 dBc for -45 dBm tone at input mixer

Third-order intermodulation

Distortion > 5 MHz: <-70 dBc for two -30 dBm tones at input mixer and >50 kHz separation

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

Residual responses (input terminated and 0 dB attenuation)

	50 ohm	75 ohm (option 001)
150 kHz to 1 MHz	<-90 dBm	N/A
1 MHz to 1.8 GHz	<-90 dBm	<-38 dBmV

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, dBmV, dBmicroV, volts, watts

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

Reference level

Range: -115 to +30 dBm (50 ohm); -63 to +75 dBmV (75 ohm)

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

Accuracy (referred to -20 dBm reference level)

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

-60 to -115 dBm: ±(1.25 dB + input attenuator accuracy at 50 MHz)

Frequency response, 10 dB input attenuation

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

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

Calibrator output

Frequency: 300 MHz ±30 kHz

Amplitude: -20 dBm ±0.4 dB (50 ohm); +28.75 dBmV ±0.4 dB (75 ohm, option 001)

Input attenuator

Range: 0 to 60 dB, 10 dB steps

Accuracy: ±0.5 dB at 50 MHz, ref 10 dB attenuation, 0 to 50 dB; ±0.75 dB at 50 MHz, ref 10 dB attenuation, 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 at reference level

Display scale fidelity

Log incremental accuracy: ±0.2 dB/2 dB, 0 to -70 dB from ref lev

Log maximum cumulative: ±0.75 dB, 0 to -60 from ref level; ±1.0 dB, 0 to -70 dB from ref level

Linear accuracy: ±3% of reference level

HP 8592B Specifications

Frequency

Range: 9 kHz to 22 GHz; 9 kHz to 25 GHz (option H25)

Readout accuracy: ±[(5 x N) MHz + 0.01% of center frequency + 2% of frequency span]

Span

Range: 0 Hz (zero span), (50 x N) kHz to 19.25 GHz

Accuracy: ±2% of span, span >10 MHz; ±5% of span, span <10 MHz

Sweep time

Range: 20 ms to 100 s

Accuracy: ±3% of indicated sweep time

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

Stability

Noise sidebands: <(-95 + 20 log N) dBc/Hz >30 kHz offset from CW

System-related sidebands: <-65 dBc + 20 log N at >30 kHz offset from CW signal

Comb generator frequency accuracy: 100 MHz fundamental freq ±0.007%

Amplitude

Range: -114 to +30 dBm

Maximum safe input: +30 dBm (1 watt, 7.1 Vrms), 0 Vdc

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

Displayed average noise level: ≤-114 to ≤-92 dBm

Spurious responses

Second harmonic distortion

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 displayed average noise level)

Third-order intermodulation

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

Other input related: <-70 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, dBmV, dBμV, volts, watts

Reference level

Range: -114 to +30 dBm

Resolution: 0.01 dB for log scale; 0.12% of ref lev for linear

Accuracy referred to -20 dBm reference level

0 to -59.9 dBm: ±(0.5 dB + input atten acc @ 50 MHz)

-60 to -114 dBm: ±(1.25 dB + input atten acc @ 50 MHz)

Frequency response, referred to 300 MHz CAL OUT,

preselector peaked

Absolute: ±2.0 to +3.0 dB

Relative flatness: ±1.5 to +2.0 dB

Calibrator output

Frequency: 300 MHz ±30 kHz

Amplitude: -20 dBm ±0.4 dB

Input attenuator

Range: 0 to 70 dB in 10 dB steps

Accuracy

0 to 60 dB: 0.5 dB at 50 MHz, ref to 10 dB atten

70 dB: 1.2 dB at 50 MHz, ref to 10 dB atten

Resolution bandwidth (-3 dB nominal): 1 kHz to 3 MHz

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

Video bandwidth range: 30 Hz to 1 MHz

Log to linear switching: ±0.25 dB at reference level

Display scale fidelity: ±0.2 dB/2 dB, 0 to -70 dB from ref lev, incremental; ±0.75 dB, 0 to -60 dB from ref lev ±1.0 dB; 0 to -70 dB from ref lev, maximum cumulative

Linear accuracy: ±3% of reference level

Ordering Information

HP 8590B spectrum analyzer (9 kHz to 1.8 GHz)

HP 8592B spectrum analyzer (9 kHz to 22 GHz)

Opt 001 75 Ω input impedance (HP 8590B only)

Opt 003 card reader

Opt 010 tracking generator 50Ω

(HP 8590B only)

Opt 011 tracking generator 75Ω

(HP 8590B only)

Opt 021 HP-IB interface

Opt 023 RS-232 interface

Opt H25 frequency extension to

25 GHz (HP 8592B only)

Opt 1BH general export version

Price

\$9,590

\$19,640

\$0

\$600

\$3,900

\$3,900

\$3,900

\$600

\$600

\$3,350

\$0

\$0

\$0

HP 8591A Specifications (continued)

Amplitude

Amplitude range: -115 to +30 dBm (50 ohm); -63 to +75 dBmV (75 ohm, opt 001)

Maximum safe input	50 ohm	75 ohm
Average cont power	+30 dBm (1 watt)	+75 dBmV (0.4 watts)
Peak pulse power	+30 dBm (1 watt)	+75 dBmV (0.4 watts)
dc	25 Vdc	100 Vdc

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

Displayed average noise level: ≤ 115 to ≤ 113 dBm

Noise level

Spurious responses

Second harmonic distortion: 5 MHz to 1.8 GHz, < -70 dBc for -45 dBm tone at input mixer

Third-order intermodulation distortion: 5 MHz to 1.8 GHz, < -70 dBc for two -30 dBm tones at input mixer and > 50 kHz sep

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

Residual responses (input terminated and 0 dB attenuation)

150 kHz to 1 MHz: < -90 dBm, 50 ohm

1 MHz to 1.8 GHz: < -90 dBm, 50 ohm; < -38 dBmV, 75 ohm

Display range

Log scale: 0 to -70 dB from ref lev is cal'd; 1 to 20 dB/div in 1 dB steps; 8 divisions displayed

Linear scale: 8 divisions

Scale units: dBm, dBmV, dBmicroV, volts, watts

Marker readout resolution: 0.05 dB, log scale; 0.07% of ref level, linear scale

Fast sweep times for zero span (opt 101): 20 μ s to 20 ms, 0.7% of ref level for linear scale

Reference level

Range: -115 to +30 dBm (50 ohm), -63 to +75 dBmV (75 ohm)

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

Accuracy, referred to -20 dBm ref level: 0 dBm to -59.9 dBm, $\pm(0.5$ dB + input atten acc @ 50 MHz); -60 dBm to -115 dBm, $\pm(1.25$ dB + input atten acc @ 50 MHz)

Frequency response

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

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

Calibrator output

Frequency: 300 MHz $\pm(300$ MHz x freq ref error)

Amplitude: -20 dBm ± 0.4 dB (50 Ω); +28.75 dBmV ± 0.4 dB (75 Ω , opt 001)

Input attenuator

Range: 0 to 60 dB in 10 dB steps

Accuracy at 50 MHz, 10 dB atten: ± 0.5 dB, 0 to 50 dB; ± 0.75 dB, 60 dB

Resolution Bandwidth: 1 kHz to 3 MHz, $\pm 20\%$

Switching uncertainty, ref to 3 kHz bandwidth: 3 kHz to 3 MHz RBW, ± 0.4 dB; 1 kHz, ± 0.5 dB

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 ref lev

Log maximum cumulative: ± 0.75 dB, 0 to -60 dB from ref level; ± 1.0 dB, 0 to -70 dB from ref level

Linear accuracy: $\pm 3\%$ of reference level

HP 8593A Specifications

Frequency

Frequency range: 9 kHz to 22 GHz; 9 kHz to 26.5 GHz (option 026)

Frequency reference

Aging: $\pm 2 \times 10^{-6}$ /year

Stability: $\pm 5 \times 10^{-7}$

Temperature stability: $\pm 5 \times 10^{-6}$

Precision frequency reference (Opt 004)

Aging: $\pm 1 \times 10^{-7}$ /year

Stability: $\pm 1 \times 10^{-8}$

Temperature stability: $\pm 1 \times 10^{-8}$

Frequency readout accuracy: $\pm(\text{frequency readout} \times \text{frequency reference error} + 3\% \text{ of span} + 20\% \text{ of RBW} + 100 \text{ Hz sweep time})$ for spans ≤ 10 MHz; $\pm(\text{freq readout} \times \text{freq ref error} + 3\% \text{ of span} + 20\% \text{ of RBW})$ for spans > 10 MHz

Marker count accuracy (signal-to-noise ratio ≥ 25 dB, RBW/span ≥ 0.01): $\pm(\text{marker freq} \times \text{freq ref error} + \text{counter res} + 100 \text{ Hz})$ spans ≤ 10 MHz; $\pm(\text{marker freq} \times \text{freq ref error} + \text{counter res} + 1 \text{ kHz})$, spans > 10 MHz

Counter resolution: Selectable from 10 Hz to 100 kHz

Frequency span

Range: zero span, (10 x N) kHz to 19.25 GHz, (10 x N) kHz to 23.75 GHz (opt 026)

Accuracy: $\pm 2\%$ of span, span < 10 MHz; $\pm 3\%$ of span, span > 10 MHz

Sweep time

Range: 20 ms to 100 s, span = 0 Hz or > 10 kHz; 20 μ s to 100 s, span = 0 Hz (opt 101)

Accuracy: $\pm 3\%$, 20 ms to 100 s; $\pm 2\%$, 20 μ s to 20 ms

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

Stability

Noise sidebands: ≤ -95 dBc/Hz + 20 log N at > 30 kHz offset from CW signal

Residual FM: $< (400 \times N)$ Hz peak-peak in 100 ms (1 kHz RBW, 1 kHz VBW)

System-related sidebands: < -65 + 20 log N at > 30 kHz offset from CW signal

Comb generator: 100 MHz fundamental freq; $\pm 0.007\%$ freq accuracy

Amplitude

Amplitude range: -114 to +30 dBm

Maximum safe input level: +30 dBm (1 watt, 7.1 Vrms), 0 Vdc

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

Displayed average noise level: ≤ 114 to < -92 dBm

Spurious responses

Second harmonic distortion: < -70 dBc for -40 dBm tone at input mixer, 10 MHz to 2.9 GHz; < -100 dBc for -10 dBm tone power at input mixer or below displayed av noise lev), > 2.75 GHz

Third-order intermodulation distortion > 10 MHz: < -70 dBc for two -30 dBm tones at input mixer and > 50 kHz separation

Other input-related spurious: < -70 dBc for applied freq ≤ 18 GHz; < -60 dBc for applied freq ≤ 22 GHz

Display range

Log scale: 0 to -70 dB from ref lev is calibrated; 1 to 20 dB/div in 1 dB steps; 8 divisions displayed

Linear scale: 8 divisions

Scale units: dBm, dBmB, dBmicroV, volts, watts

Reference level

Range: -114 to +30 dBm

Resolution: 0.01 dB for log scale; 0.12% of ref lev for linear

Accuracy (ref to -20 dBm ref level): $\pm(0.05$ dB + input atten acc @ 50 MHz), 0 dBm to -59.9 dBm; $\pm(1.25$ dB + input atten acc @ 50 MHz), -60 to -114 dBm

Frequency response (ref to 300 MHz CAL OUT, preselector peaked)

Absolute: ± 2.0 to ± 3.0 dB

Relative flatness: ± 1.5 to ± 2.0 dB

Calibrator output

Frequency: 300 MHz ± 30 kHz

Amplitude: -20 dBm ± 0.4 dB

Input attenuator

Range: 0 to 70 dB in 10 dB steps

Accuracy at 50 MHz, ref to 10 dB atten: $+0.5$ dB, 0 to 60 dB; $+1.2$ dB, 70 dB

Resolution bandwidth: 1 kHz to 3 MHz, $\pm 20\%$

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

Video bandwidth range: 30 Hz to 1 MHz

Log to linear switching: $+0.25$ dB at reference level

Display scale fidelity: ± 0.2 dB/2 dB, 0 to -70 from ref lev, incremental; ± 0.75 dB, 0 to -60 dB from ref lev and ± 1.0 dB, 0 to -70 dB from ref lev, maximum cumulative

Linear accuracy: $\pm 3\%$ of reference level