

SIGNAL ANALYZERS

Spectrum Analyzer, 50 kHz to 22 GHz

Model 8592A

137

- Built-in 100 MHz comb generator
- Programmable via HP-IB, RS232C, or HP-IL
- Direct printer and plotter output

- Internal preselection, 2.75 to 22 GHz
- Personalities—Digital Radio and CATV
- Optional 25 GHz operation



HP 8592A



HP 8592A Portable Microwave Spectrum Analyzer

Never before could you get so much from a portable microwave spectrum analyzer for so small an investment. The HP 8592A is loaded with features and benefits that don't just help you make measurements, but help you make them more easily and more conveniently. The analyzer's wide frequency range (50 kHz to 22 GHz) and amplitude range (-109 dBm to +30 dBm) enable you to make almost any RF and microwave measurement.

An internal preselector eliminates the worry about identifying signals that exist with unpreselected microwave analyzers. A built-in comb generator significantly improves frequency accuracy, especially in the upper frequency range. And if you want programmability, this analyzer's got it. Over 100 different functions are programmable over three different interfaces, allowing you to use a wide variety of computers. Whether your needs are in the field or in the factory, the HP 8592A has so much to offer that you can't afford to be without it.

It's Easy—Just Push a Button and Turn the Knob

Unquestionably the HP 8592A is one of the easiest spectrum analyzers you'll ever operate whether you are an experienced or a first-time user. Simply use the spectrum analyzer's three main control keys and its data-entry knob or key pad to measure any signal. The analyzer automatically adjusts internal parameters such as resolution bandwidth, video bandwidth, sweep time, IF gain, and input attenuation. You won't waste any time figuring out its operation.

Frequently-used functions are built into dedicated keys, and for additional measurement capability, display-menu softkeys give you nearly 100 more analysis and measurement functions. Easy-to-read control settings surround the graticule, and you can add a 50-character label at the top of the screen to identify traces and to get hardcopy data using HP printers and plotters.

Powerful New Functions

Many functions previously available only in our high-performance spectrum analyzers are available in our portable analyzers, including

the HP 8592A. With markers, the analyzer will automatically indicate the signal amplitude and frequency, sparing you from visually interpolating between graticule lines. Trace functions offer a multitude of display manipulations. You can store and recall up to nine different analyzer settings and five trace displays in non-volatile memory. The CORRECT TO COMB function can be used to get ± 2.7 MHz frequency accuracy at 22 GHz, and even better accuracy at lower frequencies and smaller spans. Just temporarily connect the built-in, 100 MHz comb generator, press the CORRECT TO COMB softkey, and use the markers to read the corrected frequency. Special functions perform complex measurements such as percent AM, 99% power bandwidth, and 3- or 6-dB points. The FFT (Fast Fourier Transform) function measures AM sidebands such as power-line hum, even though the sidebands may be less than the minimum resolution bandwidth of 1 kHz.

Lightweight and Portable

Weighing only 15 kg (33 lb), the HP 8592A does what you need at any location. Its small, compact size and light weight make it ideal for moving between lab benches or transporting to remote sites. Like other portable HP analyzers, it fits under an airplane seat.

HP 8592A Option H25 25 GHz Operation

Option H25 extends the upper limit of the HP 8592A's frequency range to 25 GHz.

HP 8592A Option H50 CATV Functions

Similar to HP 8590A Option H50 (see page 134).

HP 8592A Option H52 Digital Radio

This option adds functions and capability for making easy measurements on digital radio signals. A compare-to-mask function makes a mean power measurement and then compares the result to the mask. The mask can be any of 4 agency masks or of 12 user created masks. Mean power level, recording transient occurrences, and frequency response are also single-button measurements. All tests can be recorded with a hardcopy output.

SIGNAL ANALYZERS

Spectrum Analyzer, 50 kHz to 22 GHz (cont'd)

Model 8592A

Specifications

Frequency

Frequency Range: 50 kHz - 22 GHz

Band	N	Frequency Range
0	1-	50 kHz - 2.9 GHz
1	1-	2.75 GHz - 6.2 GHz
2	2-	6.0 GHz - 12.8 GHz
3	3-	12.4 GHz - 19.4 GHz
4	4-	19.1 GHz - 22 GHz

Frequency Readout Accuracy: $\pm(2\%$ of span + 5 MHz) for center frequency ≤ 2.75 GHz; $\pm(2\%$ of span + 0.2% of center frequency) for center frequency > 2.75 GHz

Frequency Readout Accuracy with CORRECT TO COMB function:

$\pm(2\%$ of separation between signal and nearest reference frequency + 0.5% of span + 0.007% of reference frequency) for spans > 17 MHz and ≤ 400 MHz and no change in center frequency or span

Frequency Stability

Drift (nominal): $<60 \cdot N$ kHz / 5 minutes, after 2-hour warm-up and 5 minutes after setting center frequency

Noise Sidebands: <-65 dBc/kHz for (50 kHz-6.2 GHz), >30 kHz offset, 1 kHz RBW, 30 Hz VBW

Frequency Span Range: zero span, 0 - 2.9 GHz, 2.75 - 22 GHz

Readout Accuracy: $<\pm 2\%$ of indicated setting for spans > 17 MHz; $<\pm 5\%$ of indicated setting for spans ≤ 17 MHz

Bandwidth: -3 dB nominal

Resolution: 1 kHz - 3 MHz in 1,3 sequence

Video: 30 Hz - 3 MHz in 1,3 sequence

Sweep Time Range: 20 ms - 100 s

Readout Accuracy: $<\pm 10\%$ of indicated setting

Comb Generator: 100 MHz Fundamental Frequency

Frequency Accuracy: $\pm 0.007\%$

Amplitude Accuracy

Frequency Response

Absolute Variation:	50 kHz-2.9 GHz	2.75-6.2 GHz	6.0-12.8 GHz	12.4-19.4 GHz	19.1-22 GHz
$<\pm 2.0$ dB					
$<\pm 2.0$ dB					
$<\pm 3.5$ dB					
$<\pm 4.0$ dB					
$<\pm 5.0$ dB					

for 10 dB atten., presel peak, Ref. to Cal Out signal, including bandswitching uncertainty

Peak Variation: (Flatness)	50 kHz-2.9 GHz	2.75-6.2 GHz	6.0-12.8 GHz	12.4-19.4 GHz	19.1-22 GHz
$<\pm 1.0$ dB					
$<\pm 1.5$ dB					
$<\pm 2.0$ dB					
$<\pm 2.0$ dB					
$<\pm 2.0$ dB					

Ref. to midpoint between highest and lowest peak excursions

Calibrator Accuracy: 299.9 MHz ± 300 kHz; -20 dBm ± 1 dB

Reference Level Setting: $<\pm 1.5$ dB for +30 to -120 dBm (0-60 dB atten.); $<\pm 1.0$ dB for 0 to -120 dBm (10 dB atten.); $<\pm 0.5$ dB for 0 to -59 dBm (10 dB atten.)

Resolution BW Switching: $<\pm 0.25$ dB for 3 kHz to 3 MHz

Log Scale Switching: No significant error for 1-20 dB/div. scale range

Log Scale Fidelity: $<\pm 0.1$ dB/dB change over 70 dB range; ± 0.75 dB max. over -60 dB range from Ref. Level

Linear Accuracy: $<\pm 3\%$ of Reference Level setting

Input Atten Step Accuracy: $<\pm 0.5$ dB; ≤ 60 dB atten. (@ 300 MHz) ± 0.75 dB; ≤ 70 dB atten.

General Characteristics

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

Temperature Stability: 2 hours after storage at a constant temperature after turn-on at the same constant temperature.

EMI Compatibility: 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; < 160 VA

Weight/Size: 15 kg (33 lbs) 213mm(8.4")H X 366mm(14.4")W X 460mm(18.1")D

Warranty: One year limited warranty for materials and workmanship

Amplitude

Amplitude Range: -109 dBm to +30 dBm

Readout Resolution (with Markers): <0.05 dB for log scale; 0.05% of ref. level for linear scale

Amplitude Units: dBm, dBmV, dBuV, volts, and watts

Amplitude Scale: log(1-20 dB/div. in 1 dB steps) and linear

Maximum Safe Input Level

Average Continuous Power: +30 dBm (1 watt, 7.1 Vrms)

DC: 0 volts

Peak Pulse Power: ± 50 dBm (100W) for <10 usec pulse width, $<1\%$ duty cycle

Maximum Dynamic Range: 70 dB on-screen viewing; 70 dB signal-to-distortion

Displayed Average Noise:

-90 dBm - 0.00038% of center frequency	(50 kHz - 5 MHz)
-109 dBm	(5 MHz-2.9 GHz)
-105 dBm	(2.75-6.2 GHz)
-99 dBm	(6.0-12.8 GHz)
-92 dBm	(12.4-19.4 GHz)
-87 dBm	(19.1-22 GHz)

for 0 dB atten., 1 kHz RBW, 30 Hz VBW

Gain Compression: <0.5 dB for -4 dBm total power at input mixer

Spurious Responses

Second Harmonic: <-70 dBc (10 MHz-2.9 GHz); <-100 dBc (>2.75 GHz for -40 dBm total power at input mixer)

Third Order Intermod.: <-70 dBc (10 MHz-22 GHz) for two -30 dBm signals at the input mixer with > 50 kHz spacing

Residual Responses: <-95 dBm (5 MHz-2.9 GHz); <-90 dBm (2.75-6.2 GHz) for 0 dB atten. and 50 Ω termination on input

Image, Multiple, and Out-of-Band Responses: <-70 dBc (50 kHz-2.9 GHz) applied freq. ≤ 10 GHz; <-70 dBc (2.75 GHz-22GHz) applied freq. ≤ 18 GHz; <-60 dBc (2.75 GHz-22 GHz) applied freq. ≤ 22 GHz

Input/Output Characteristics

Front Panel Connectors

Input: 50 Ω Type N

Cal Output: 50 Ω BNC, -20 dBm, 299.9 MHz

1st LO Output: 50 Ω SMA, 3.0 - 6.66 GHz

100 MHz Comb Out: 50 Ω SMA, 100 MHz $\pm 0.007\%$

Rear Panel Connectors

Aux Video Out: 50 Ω BNC, 0-1 V

Monitor Out: 50 Ω BNC, NTSC Format, 19.2 kHz horizontal synch.

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

Sweep Output: BNC, 5K 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), RS-232(Opt. 023)

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

Recommended Accessories

HP 2225A/B/D Thinkjet Printer

HP 11694A 50-75 Ω Matching Transformer

HP 85901A Portable Battery Pack

Ordering Information

HP 8592A Portable Microwave Spectrum Analyzer

Option 021: HP-IB Interface

Option 022: HP-IL Interface

Option 023: RS232C Interface

Option 040: Front Panel Cover

Option 908: Rack Mount without Handles

Option 909: Rack Mount with Handles

Option 910: Extra Operating and Installation Manuals

Option 915: Support Manual and Extra Operating and Installation Manuals

Option H25: 25 GHz upper frequency extension

Option H50: CATV personality

Option H52: Digital radio personality

Option K08: Soft Carrying Case

Option W30: Additional Two Years of HP Service

*May be below the displayed average noise.

*Refer to Installation Manual (08592-90003) and Operation Manual (08592-90005) for more information.