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**Agilent Technologies**

Innovating the HP Way

# HP 8901B Modulation Analyzer



Options 030/037  
10 MHz - 1.3 GHz

## Technical Specifications

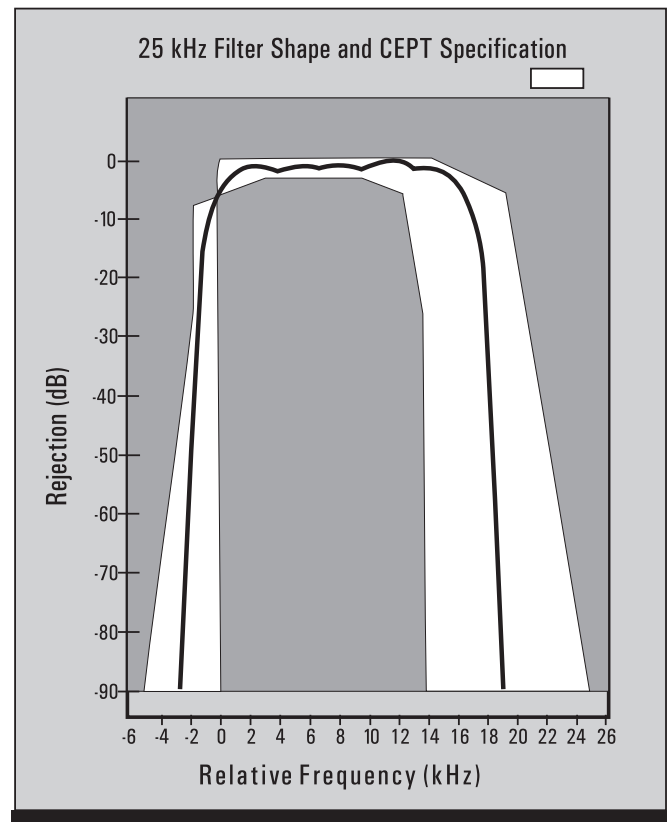
### Selective Power Measurements

#### Adjacent Channel Power Measurements

The HP 8901B Modulation Analyzer's easy-to-use selective power measurement option saves you time and money, speeding adjacent-channel power testing on your RF communications transmitters. These selective measurements meet the stringent CEPT standards for adjacent-channel power with superb accuracy:  $\pm 0.5$  dB; dynamic range  $>115$  dB; and selectivity  $>90$  dB. The HP 8901B also performs RF power, frequency, modulation and audio measurements, plus selective RF power measurements, fully characterizing your transmitter in seconds.

Making an adjacent channel power measurement is simple. You first select the appropriate filter (12.5, 25 or 30 kHz channel spacing) and measure the transmitter carrier power. Then, tune the analyzer to any offset desired, and measure the channel power. The analyzer displays the results in dBc (dB relative to the carrier power).

To meet the CEPT noise-floor requirements at frequencies greater than 300 MHz, the HP 8901B requires an external local oscillator (LO) such as the HP 8656B Synthesized Signal Generator. Selecting an external LO with fine frequency resolution also improves the analyzer's tuning resolution, which can be as coarse as 2 kHz at 1300 MHz. Using an HP 8656B signal generator gives you 10 Hz resolution up to 990 MHz. Dedicating a signal generator as the external LO is not necessary. When not being used as the LO, a built-in RF switch in the HP 8901B routes the signal generator's output to the rear panel of the analyzer.



#### Direct-Spectrum Carrier Noise Measurements

The HP 8901B Modulation Analyzer, with a low noise external LO, performs fast, accurate single-sideband (SSB) carrier noise measurements to 1.3 GHz. To make a carrier noise (AM noise and phase noise) measurement, you select the noise filter (2.5 kHz noise bandwidth), measure the source under test's carrier power, tune the analyzer to the frequency offset desired (5 kHz to 1300 MHz) and measure the noise. The data is displayed in real time, either as dBc in a 1 Hz bandwidth or as total power in the 2.5 kHz filter bandwidth.

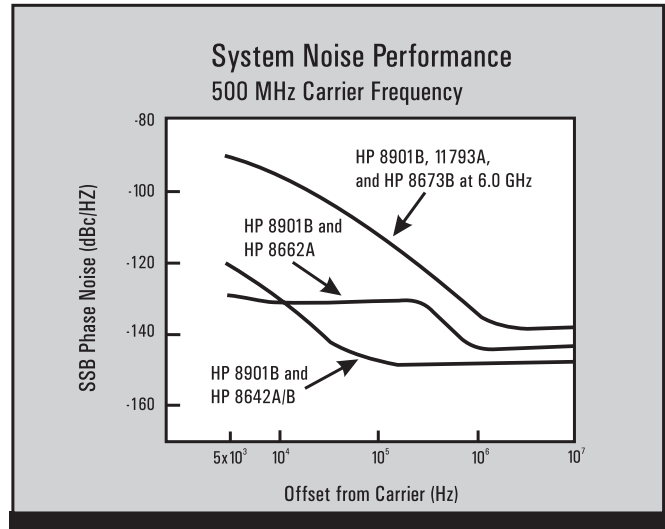


**HP-IB:** Not just IEEE-488, but the hardware documentation and support that delivers the shortest path to a measurement system.

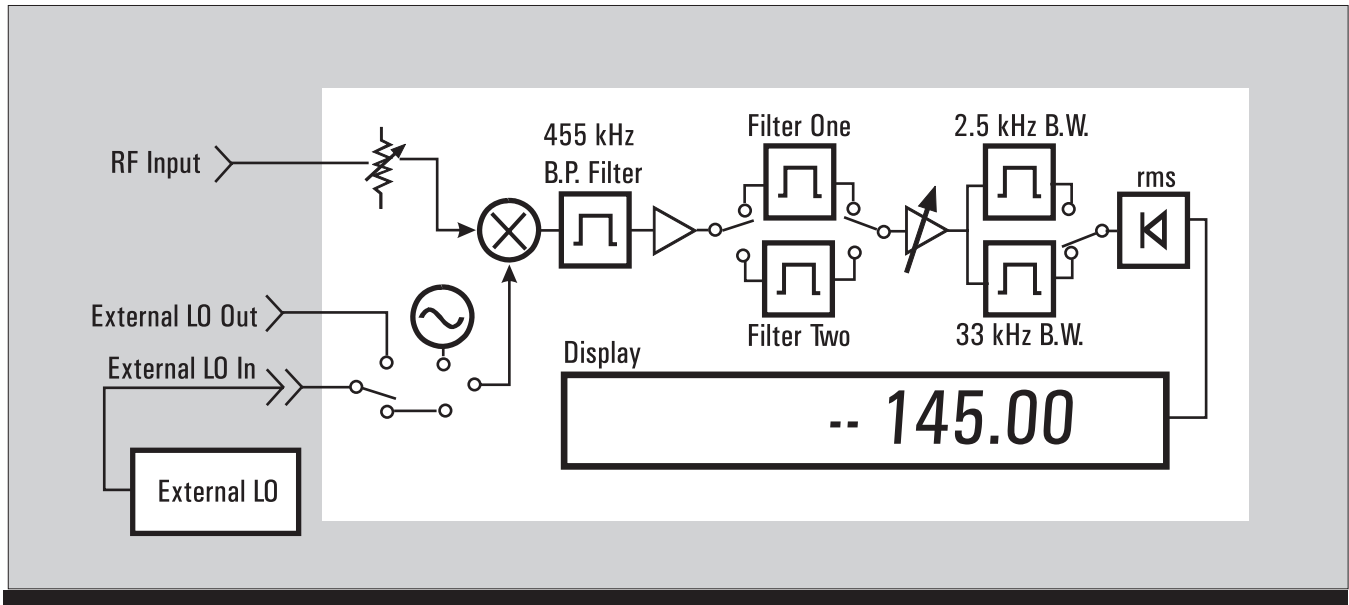
## Direct-Spectrum Carrier Noise Measurements (cont'd)

Phase noise usually dominates the carrier-noise measurement at most offsets of interest, so direct-spectrum noise measurements provide a convenient and simple way to measure phase noise of many sources. This measurement technique is relatively insensitive to many common pitfalls encountered in making phase noise measurements. There is no need to phase-lock signals. Testing can be fully automated using an external controller. Most important, selective signal and noise measurements are fast (five readings/second). The analyzer's measurement accuracy is better than  $\pm 0.5$  dB to  $-129$  dBc/Hz, typically better than  $\pm 1$  dB to  $-140$  dBc/Hz. The noise floor is  $-150$  dBc/Hz.

Many applications require spectral purity to be expressed as residual AM, FM or phase modulation. With the HP 8901B's convenient modulation capabilities you make these measurements with one key-stroke, in a variety of common bandwidths.



To extend the measurement range to 26.5 GHz, add the HP 11793A Microwave Converter and a low noise microwave source, such as the HP 8673B Synthesized Signal Generator. With this system you can test high-performance sources from 10 MHz to 26.5 GHz.



## Block Diagram

The high-selectivity option for the HP 8901B Modulation Analyzer adds an RF switch, a buffer amplifier, variable gain IF amplifiers, narrowband filters and a rms detector. To make selective power measurements, the analyzer mixes down the RF input signal using either the internal LO or an external LO.

The IF signal is buffered and sent through one of two narrowband bandpass filters which provide over 90 dB of rejection. The signal is amplified by precision IF amplifiers, filtered again and measured by the rms detector. The IF amplifiers provide as much as 95 dB of gain in 5 dB increments; the rms detector is used over a 20 dB dynamic range.

# Specifications

All parameters describe performance in automatic operation or properly set manual conditions.

**Specifications** describe's the instrument's warranted performance.

**Supplemental Characteristics** (*shown in italics*) are intended to provide information useful in applying the instrument by giving typical, but non-warranted, performance parameters.

**FREQUENCY RANGE:**

10 MHz to 1300 MHz.

**CARRIER POWER RANGE:**

+30 dBm to -20 dBm; 12.5 kHz, 25 kHz and 30 kHz filters.  
+30 dBm to -10 dBm; carrier noise filter.

**DYNAMIC RANGE:**

115 dB

**CARRIER REJECTION (Temp  $\leq 35^{\circ}\text{C}$ ):**

>90 dB; for offsets of at least 1 channel spacing or 5 kHz, whichever is greater.

**RELATIVE MEASUREMENT ACCURACY:**

$\pm 0.5$  dB; levels  $\geq -95$  dBc; 12.5 kHz, 25 kHz and 30 kHz filters.  
 $\pm 0.5$  dB; levels  $\geq -129$  dBc/Hz; carrier noise filter.

**CARRIER NOISE FILTER**

**Filter Noise Bandwidth:** 2.5 kHz nominal.  
**Noise Bandwidth Correction Accuracy (stored in non-volatile memory):**  $\pm 0.2$  dB.

**Supplemental Characteristics:**

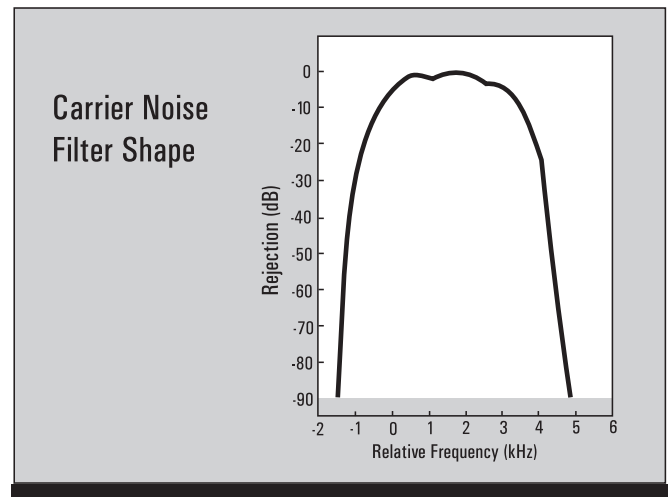
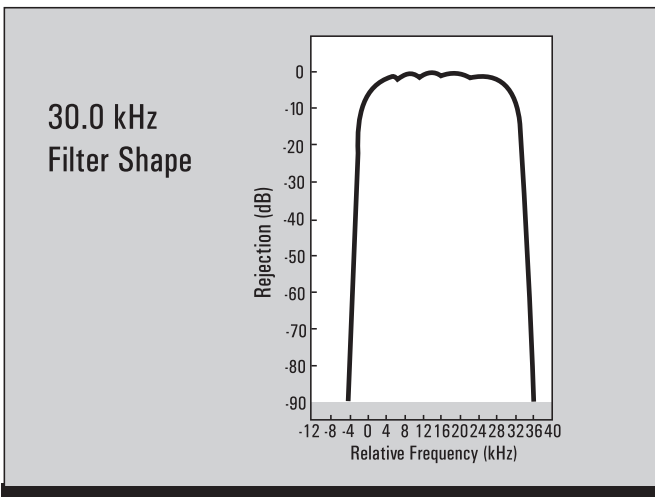
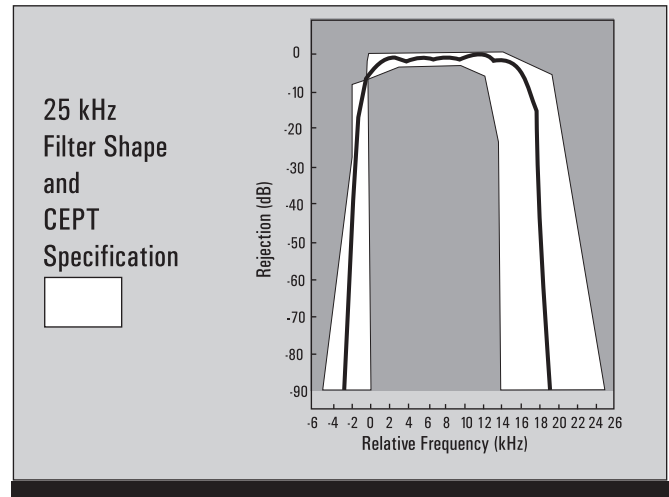
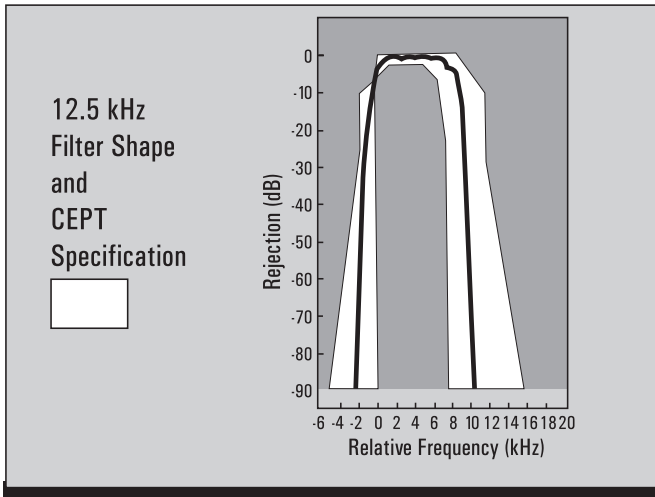
**ADJACENT/ALTERNATE CHANNEL FILTERS**

**6 dB Filter Bandwidth:**

*8.5kHz, 12.5kHz adjacent-channel filter.*  
*16.0 kHz, 25 kHz adjacent-channel filter.*  
*30.0 kHz, 30 kHz (cellular radio) alternate-channel filter.*

**TYPICAL NOISE FLOOR:** - 150 dBc/Hz, 0 dBm carrier power level. For System noise performance add LO contribution.

ALL OTHER HP 8901B SPECIFICATIONS ARE UNCHANGED.



## Ordering Information

### HP 8901B Modulation Analyzer

**Option 030:** High Selectivity  
(Option 030 includes rear-panel external LO connections.  
HP 8901B Option 003, Rear-Panel External LO Connections, may not be ordered with HP 8901B Option 030.)

#### Filter Options

(Select only two filter options.)

**Option 032:** 12.5 kHz Adjacent Channel Filter

**Option 033:** 25 kHz Adjacent Channel Filter

**Option 035:** 30 kHz (Cellular Radio) Alternate Channel Filter

**Option 037:** Carrier Noise Filter

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**Data subject to change**

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