



## Power and Waveform Measurements

With both time and frequency domain capability, Agilent 89400 vector signal analyzers show the behavior of complex signals in great detail and in a wide variety of formats.

Powerful cursor functions allow measurements to be time or frequency selective, or both. For example, to measure adjacent channel interference, position the spectrum cursors on the channel boundaries and select "Band Power" for a readout of the total integrated power. Or, to tie interference problems to a particular point in the time waveform, use the cursors to select the suspected waveform event, and select "Time Gating" to display the spectrum as it appears during just that interval.

Measurements may be viewed in real time or captured gap-free in high speed sample memory With Option

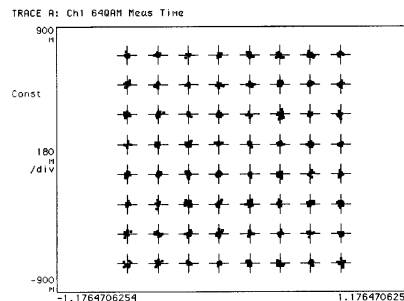
AY9 (1 Megasample Time Capture). Capture and save over 80 msec of full-bandwidth video signal for in-depth post-analysis.

### Additional Measurements

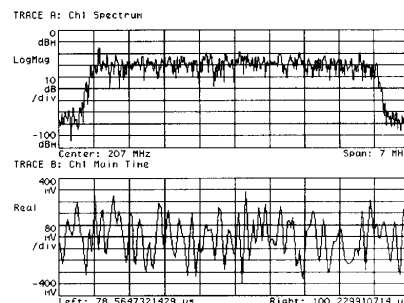
Other digital modulation formats supported include FSK, BPSK, QPSK, and MSK. Analog demodulation shows amplitude, frequency, or phase variations versus time or frequency, and can be used to investigate transient or unintended signal modulation, including carrier phase noise.

A built-in signal source outputs sinewave, chirp, noise, and arbitrary waveforms at baseband or (with Option AY8) at RF.

For a complete description of Agilent 89400 measurement capabilities, please refer to the 89400 series product brochure (publication #5963-3347E).



**64QAM signal analysis accommodates differential encoding for DVB systems, as well as absolute encoding.**



**89400 vector signal analyzers also provide a complete set of traditional spectrum and waveform measurements.**

### Operating Characteristics Supported Products

Model Number	Frequency Range	Sensitivity	Maximum Bandwidth
Agilent 89410A	dc - 10 MHz	-144 dBm/Hz	10 MHz
Agilent 89440A	dc - 1.8 GHz	-145 dBm/Hz	8 MHz
Agilent 89441A	dc - 2.65 GHz	-160 dBm/Hz	7 MHz

### Symbol Rates (Symbols/sec)

VSB formats:  
10.762 M nominal (adjustable)

QAM formats:  
Rate < (Max. BW) / (1 +  $\alpha$ )

Examples:

Model Number	QAM $\alpha = 0.2$	DVB $\alpha = 0.15$
89410A	<8.33 M	<8.70 M
89440A	<6.67 M	<6.96 M
89441A	<5.83 M	<6.09 M

### Maximum Data Block Size

1 sample/symbol: 4096 sym.  
5 samples/symbol: 819 sym.

**Residual Error** (instrument contributed)  
QAM formats: symbol rate 5-7 MHz,  
.15 <  $\alpha$  < .2, full-scale signal  $\geq$  25dBm:

$\leq$  1.0% EVM typ. ( $\leq$  40 dB SNR)

VSB formats: symbol rate 10.762 MHz,  
 $\alpha = .1152$ , full-scale signal  $\geq$  25 dBm:

$\leq$  1.5% EVM typ. ( $\leq$  36 dB SNR)

### Modulation Formats:

8, 16VSB  
16, 32, 64, 256QAM  
16, 32, 64QAM (DVB)

### Filter Shapes

Raised cosine, root raised cosine, Gaussian, rectangular, low pass, computed to  $\geq$ 40 symbols in length

Alpha/BT continuously adjustable from 0.05 to 1.0

### Required Options

AYA (vector mod. analysis)  
UFG (extended RAM)

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