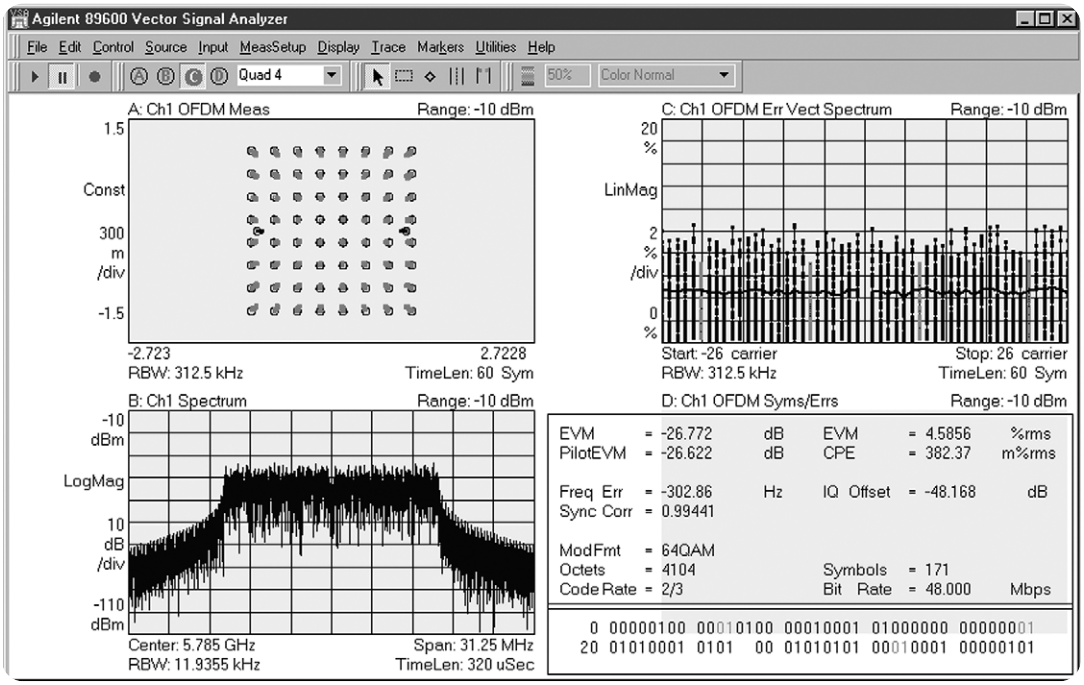
Agilent
89600 Series Vector Signal Analyzer
Software Version 3.0

Product Overview



802.11a and HiperLAN2 OFDM analysis (new option)

128QAM demodulation

Data streaming to Agilent EEsof ADS

Center frequency tuning for Ch1 + jCh2 mode

New links to analyzer and scopes

Agilent Technologies

The Agilent 89600 series PC-based vector signal analyzers (VSAs) are noted for their cutting-edge digital signal processing features, particularly for emerging communications standards. The version 3.0 software release adds to these advanced features by offering:

- 802.11a and HiperLAN2 OFDM modulation analysis capability
- A 128QAM demodulator
- High-speed data streaming to the Agilent EEsof Advanced Design System (ADS) environment
- Center frequency tuning for Ch1 + jCh2 mode
- Links to two of Agilent's Infiniium scopes and the Agilent E4406A VSA transmitter tester

802.11a and HiperLAN2 OFDM modulation analysis (Option 896xxA-B7R*)

Perform complete RF and modulation analysis on 802.11a and HiperLAN2 wireless LAN (WLAN) compatible signals with this new option. A powerful orthogonal frequency division multiplex (OFDM) demodulator, new EVM measurements and innovative WLAN-specific displays combine to provide the tools you need to evaluate and troubleshoot your WLAN signal.

The 89600 series of analyzers are particularly well suited for the challenges presented by 5 GHz wireless LAN. Their 36 MHz IF bandwidth easily handles the 20 MHz wide WLAN signal. Burst signal capture capability (up to 1.2 GB) is standard, as is time gating for examining the individual sections of WLAN bursts. And, extensive time- and frequency-domain tools support basic tests like power versus time, occupied bandwidth and spur search.

Use this option to demodulate your 802.11a or HiperLAN2 bursts. The OFDM signaling format is processed and all modulation formats allowed by either standard (BPSK, QPSK, 16QAM and 64QAM) are determined without operator intervention and demodulated, using block mode processing, down to the bit level.

*Note: To upgrade existing units, order 89601A with Option 89601A-B7R. xx = 01, 10, 11, 40, 41. For more option ordering information, please see page 8.

A compound constellation diagram (figure 1) shows all modulation formats present in a burst at the same time.

Use two new composite EVM displays to get instantaneous and average readings of the quality of the modulation on your signal (see figure 2). The error vector spectrum display measures the EVM of each subcarrier over a number of symbol periods. The error vector time display measures the EVM of each symbol in the burst.

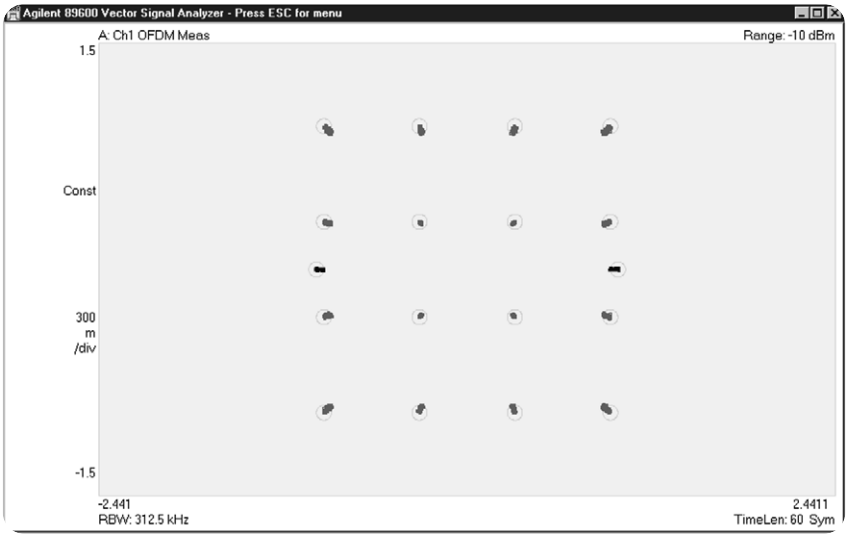


Figure 1. Compound constellation display of an 802.11a signal shows 16QAM modulation for the data symbols and BPSK for the pilot subcarriers and signal symbol.

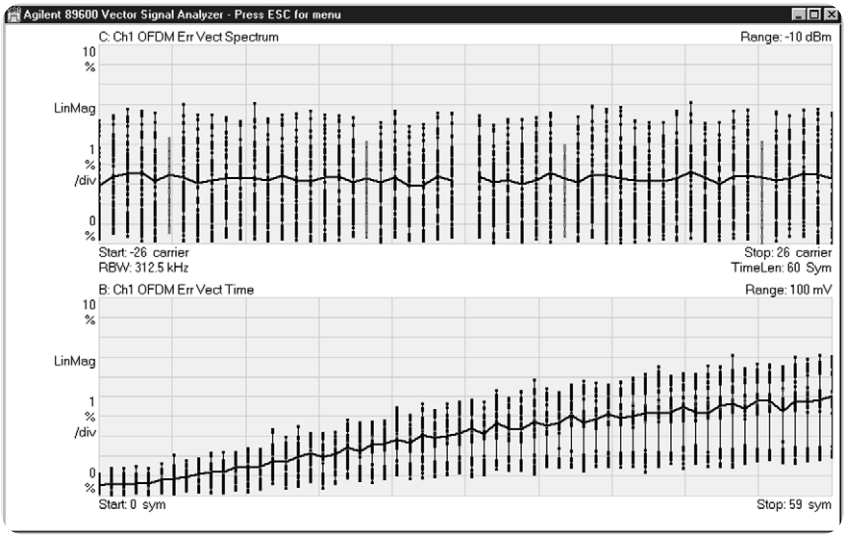


Figure 2. Composite error vector spectrum and error vector time displays. The columns display the instantaneous error vector values, while the graph shows average error vector values.

Use the common pilot error display (figure 3) to analyze how much pilot carrier variation was “tracked out” by the equalizer. View phase noise, incidental AM/PM and anything that was common to all four pilots.

The OFDM symbol/error table (figure 4) provides a wealth of data on a WLAN burst. Along with the demodulated data bits, this table provides payload EVM in dB and %rms, pilot carrier EVM and common pilot error (CPE), I/Q offset for measuring carrier leakage, frequency error at carrier, the modulation format of the data, code and bit rate, the number of symbols sent and the sync corr. Sync corr compares the captured short training sequence to the ideal short sequence (defined in the standard) to indicate sequence quality.

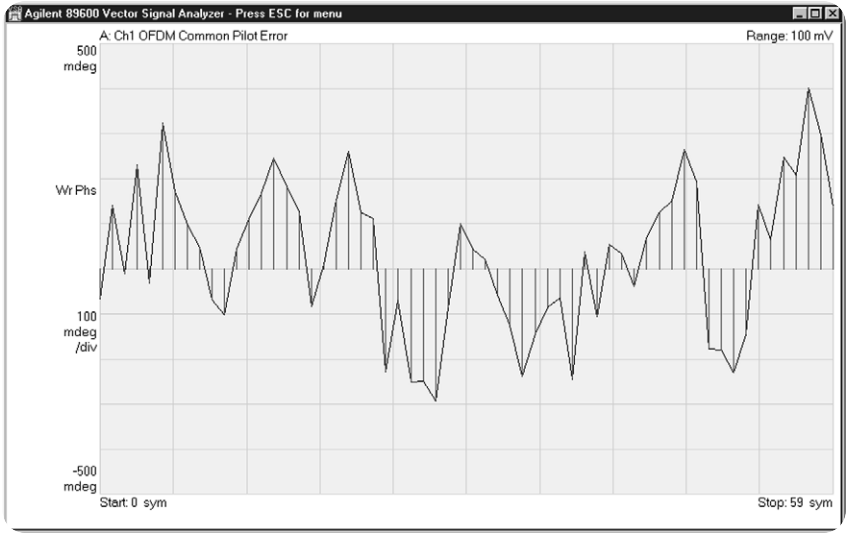


Figure 3. Common pilot error display showing the average pilot carrier phase error per symbol for 60 symbols

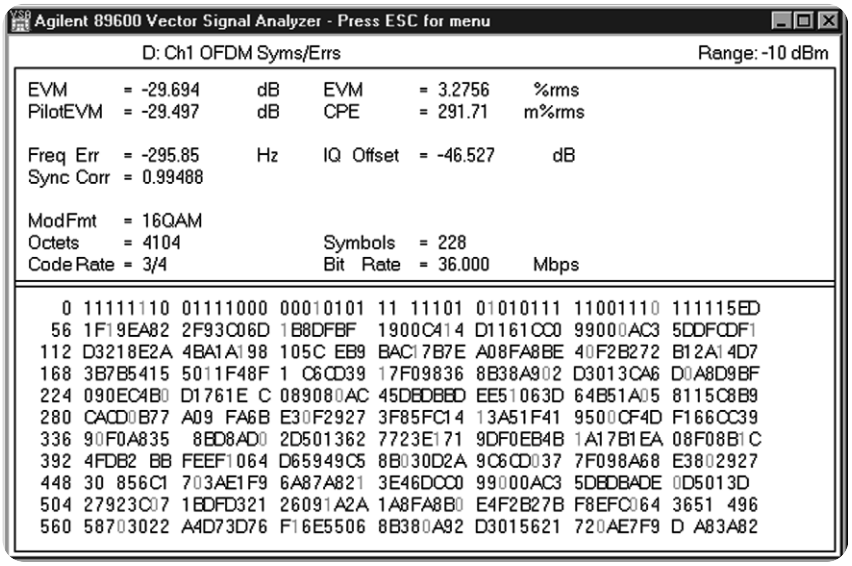


Figure 4. OFDM symbol/error table

Along with OFDM specific tools, the standard frequency, time and modulation analysis tools in the 89600 series VSAs provide important insight into your WLAN signal. Spectrum analysis tools help you evaluate signal bandwidth and search for spurs. Time domain displays provide data on the burst profile. And the time-domain-based complementary cumulative distribution function (CCDF) measures the percent of time your OFDM signal exceeds a given peak-to-average ratio, a key parameter for determining power amplifier headroom in your OFDM transmitter (figure 5).

Detailed evaluation of complicated signals requires many analysis tools – some signal specific, some general. Whether you're evaluating IEEE 802.11a, 802.11b, HiperLAN1 or HiperLAN2 signals, the 89600 series vector signal analyzers provide the tools you need. And the PC-based graphical user interface makes using the tools a lot less complex than the signals you'll be evaluating.

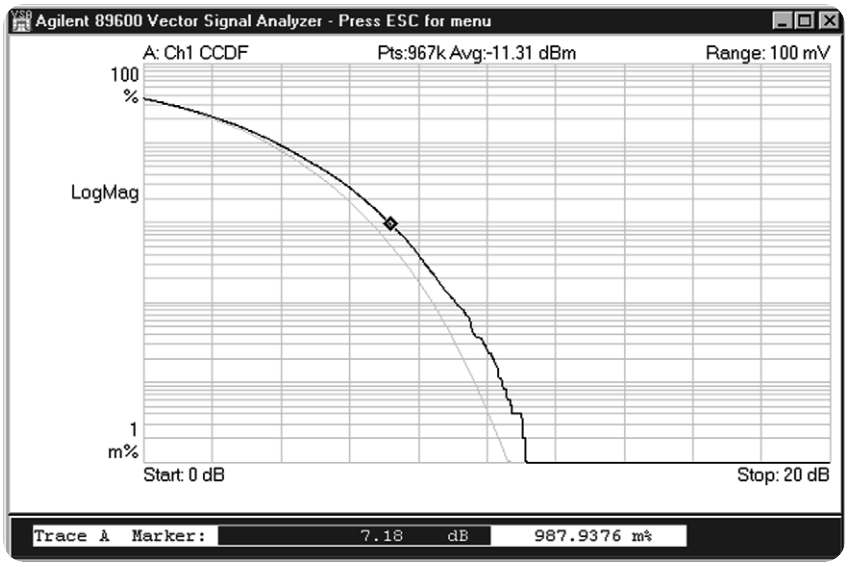


Figure 5. CCDF of OFDM signal showing the signal exceeding a level that is 7.1 dB above the average signal power (-11.3 dBm) only about 1% of the time

128QAM demodulator (part of Option 896xxA-AYA)

Version 3.0 adds a 128QAM demodulator to the 16, 32, 64 and 256QAM demodulators already offered in the vector modulation analysis option to the 89600 series VSAs. Use this demodulator to evaluate broadband signals such as local multipoint distribution service (LMDS) signals. You control center frequency, symbol rate, filter type and alpha/BT. Analyze your results using all of the 89600 series tools, including EVM, constellation display and eye diagram.

Data streaming to ADS (part of Option 896xxA-105)

Connect real-world signals to Agilent EEsof Advanced Design System (ADS) circuit simulations. The 89600 series VSA software links dynamically to ADS, Agilent's circuit design software. Release 3.0 enhances this capability by increasing the speed at which VSA data can be sent to ADS during simulations. Now you can capture real-world signals with the 89600 series VSAs and play them into ADS to test your receiver design.

Center frequency tuning for Ch1+jCh2 mode

The version 3.0 software release increases the versatility of the unique Ch1+jCh2 measurement mode provided in a two-channel 89610A dc – 40 MHz vector spectrum analyzer. This mode doubles the analysis bandwidth of the VSA if you provide I and Q representations of the signal of interest. Release 3.0 enables tuning of the center frequency of the doubled bandwidth away from dc.

89601AS software update service now included

The 89601AS software update service is now included standard with your 89600 series vector signal analyzer. This service helps you get the most out of your investment by keeping your 89600 series VSA current with new enhancements for one year.

Notification of enhancements and shipment of new software updates is provided automatically as soon as they become available. A detailed installation procedure is included with each shipment to speed the software loading process.

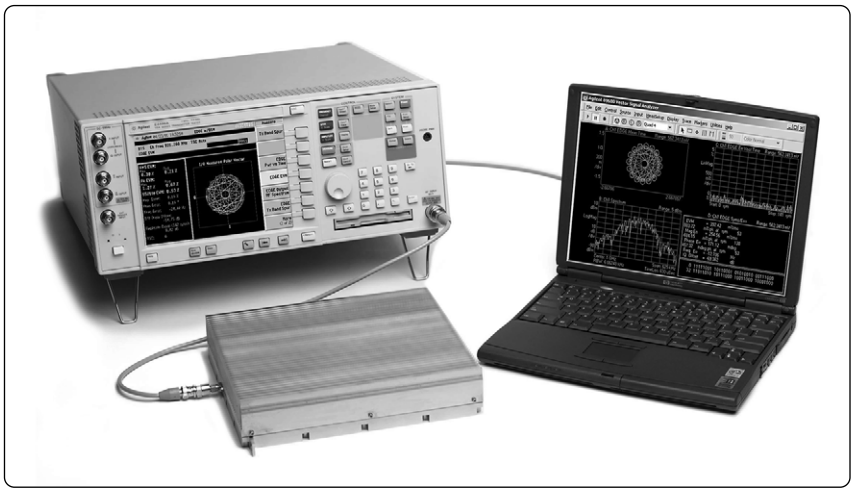


Figure 6. Control an Agilent scope or PSA series spectrum analyzer with 89600 series software running on a laptop.

Links to other Agilent analyzers and scopes

Expand the digital demodulation and analysis capacity of selected Agilent analyzers and scopes with the 89600 series VSA software. Load the software on your PC, hook directly to the instrument via LAN or GPIB, and you're ready to go.

Version 3.0 software now controls both the E4406A VSA series transmitter tester's RF input and its new I/Q input capability (Option E4406A-B7C). Teaming these tools provides the fast, accurate testing to a specification provided by the E4406A, and the ability to analyze the design with the 89600 series troubleshooting tools if it fails to meet the specification.

Do you have a superwide bandwidth signal to analyze? Team your VSA software with an Agilent scope and measure signals with bandwidths exceeding 100 MHz. Version 3.0 includes links to two of Agilent's Infiniium scopes, the 54810A (1 GSa/s) and 54845A (8 GSa/s). Use the modulation and evaluation capability of the VSA to demodulate and analyze any signal these products can capture.

The 89600 series vector signal analyzers

For engineers working with today's emerging broadband communication systems, the Agilent Technologies 89600 series vector signal analyzers are the indispensable tools for basic research, product development, manufacturing and field testing.

Along with wide IF bandwidths (36 – 39 MHz), VSAs offer traditional RF spectrum displays, baseband (I/Q) analysis, signal capture memory, RF and IF triggering, a wide variety of analog and digital demodulators, and an extensive set of time, frequency and modulation analysis tools. These capabilities make VSAs ideal for evaluating narrowband and broadband digital communications signals.

Analyze a wide variety of standard and non-standard signal formats. Twenty-three standard signal presets cover GSM, GSM (EDGE), cdmaOne, cdma2000, W-CDMA, 802.11a, 802.11b, HiperLAN1, HiperLAN2 and more. For emerging standards, the 89600 series VSAs offer 24 digital demodulators with variable center frequency, symbol rate, filter type and alpha/BT. A user-adjustable adaptive equalizer is also provided.

Perform time domain analysis on your design using the 89600 time domain tools. Evaluate pulse shape with the Main Time display, select specific portions of a burst for demodulation or other analysis with the Time Gating feature, and use statistical tools like CCDF and CDF to characterize the noise-like behavior of your modern communications signal.

Simplify the characterization of your signal with the frequency domain analysis tools in the 89600 series VSAs. Speed high-resolution spur searching with FFT-based swept spectrum capability. Match the measurement span to your signal bandwidth, thus maximizing signal-to-noise ratio (SNR), with the wide selection of spans available in these analyzers. Resolution bandwidths down to less than 1 Hz provide all the resolution needed for frequency domain investigations. A PSD (power spectral density) function is useful for estimating the level of the noise floor when calculating SNR. And a spectrogram display is provided for monitoring the wideband behavior of hopping signals over time.

Quickly evaluate and troubleshoot digitally modulated signals with the modulation domain analysis capabilities of the 89600 series VSAs. Examine symbol behavior with trellis/eye diagrams. Use the constellation and vector diagrams for an overall indication of signal behavior and clues to the cause of a problem. Take advantage of the EVM, EVM spectrum and EVM time capabilities for a more sensitive examination of signal errors.

If you are familiar with Microsoft® Windows® applications, you can quickly master an 89600 series VSA. Just load the software on your PC and connect it, via IEEE 1394 (FireWire), to the VSA's VXI hardware and you're up and running.

Look to the 89600 series vector signal analyzers when the job requires analysis of complicated signals. Whether you're evaluating IEEE 802.11a, cdma2000, GSM or DECT signals, or a signal for an emerging standard, the 89600 series VSAs provide the tools you need to do the job right. And the PC-based graphical user interface makes using the tools a lot less complex than the signals you'll be evaluating.

89601AS software update service

The 89601AS software update service is included standard with the 89600 series VSAs. It helps you get the most out of your investment by keeping your VSA current with new enhancements. This product provides automatic notification and shipment of new software upgrades as soon as they become available. A detailed installation procedure is included with each shipment to speed the software loading process.

The 89600 series VSA software version 3.0, and the new OFDM option, can be ordered as an upgrade to any 89600 series VSA system by ordering the 89601AS software update service. Contact Agilent for ordering information.

Configuration

Version 3.0 software is supplied as a standard part of new systems. All options, including Option 896xxA-B7R (802.11a and iperLAN2 OFDM modulation analysis) are available at additional cost.

Option ordering information

To add options to a product, use the following ordering scheme:

Model: 896xxA
(xx = 01, 10, 11, 40, 41)

Example model option: 89601A-001

To upgrade existing units, order 89601A with Option 89601A-B7R, for example

Options

89601A vector signal analysis software, V3.0

Option 896xxA-100
vector signal analysis

Option 896xxA-AYA
vector modulation analysis

Option 896xxA-B7N
W-CDMA and cdma2000 modulation analysis

Option 896xxA-B7R
802.11a and HiperLAN2 OFDM modulation analysis

Option 896xxA-105
dynamic link to EEsof ADS

89601AS software update service

Option 89601AS-0RU
software update service (quantity 12 equals 12 months)

Agilent Technologies' Test and Measurement Support, Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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(fax) (31 20) 547 2390

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(fax) (81) 426 56 7840

Korea:
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(fax) (82 2) 2004 5115

Latin America:
(tel) (305) 269 7500
(fax) (305) 269 7599

Taiwan:
(tel) 0800 047 866
(fax) 0800 286 331

Other Asia Pacific Countries:
(tel) (65) 6375 8100
(fax) (65) 6836 0252
Email: tm_asia@agilent.com

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