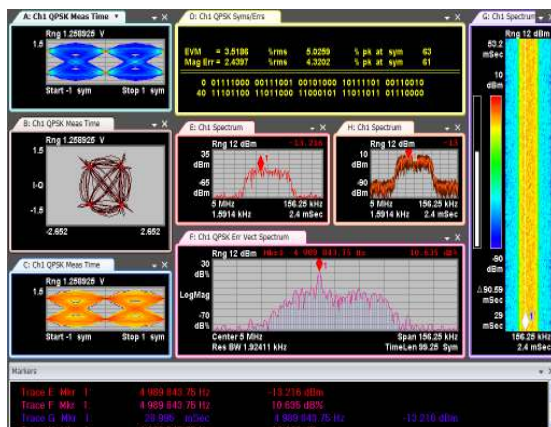# Keysight Technologies
89600 VSA Software

See through the complexity

- Gain greater insight with high-resolution FFT-based spectrum, time and modulation domain analysis
- Measure your signal: the 89600 VSA software supports more than 75 signal standards and modulation types
- Analyze and troubleshoot signals in cellular, wireless-connectivity, aerospace, defense and general-purpose applications
- Apply vector signal analysis at virtually any point in your design, from simulation to production, baseband to RF

KEYSIGHT
TECHNOLOGIES

Tools to Demodulate and Analyze Your Most Complex Signals

Development becomes more complex when faster data rates intersect with to-day's crowded spectral environment. Finding a signal problem is essential --but achieving the clarity to pinpoint the answer is the crucial challenge. The 89600 VSA software is a comprehensive set of tools for demodulation and vector signal analysis. These tools enable you to explore virtually every facet of a signal and optimize your most advanced designs. As you assess the tradeoffs, the 89600 VSA helps you see through the complexity.

Characterize the complex modulation of evolving cellular communications standards like LTE-Advanced.

Free 30-Day Trial

Download the 89600 VSA soft-ware and use it free for 30 days to make measurements with your analysis hardware, or use our recorded demo signals which are available by selecting File> Recall > Recall Demo > signal type on the software toolbar. Request your free trial license today:

www.keysight.com/find/89600_trial

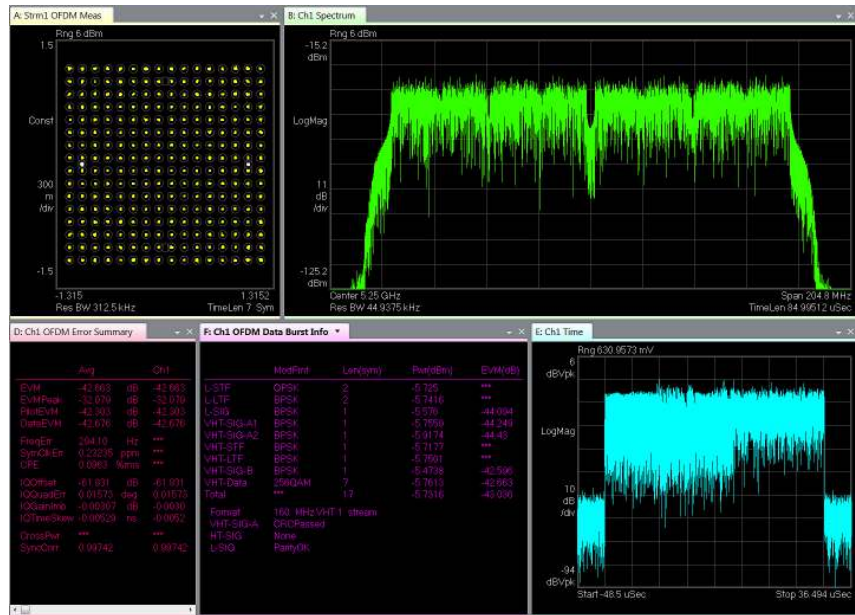## Choosing Between 89600 VSA and X-Series Measurement Applications

The 89600 VSA is ideal for evaluating and troubleshooting wireless signals in R&D. PC-based, supporting numerous hardware measurement platforms, the 89600 VSA software provides the flexibility and sophisticated mea-surement tools essential to find and fix signal problems.

The X-Series measurement appli-cations provide embedded format-specific, one-button measure-ments for the X-Series analyzers. With fast measurements, pass/fail testing and simplicity of opera-tion, these applications are ideally suited for automated design verifi-cation and manufacturing test.

www.keysight.com/find/X-Series_apps

Now Available- 89600 VSA Software for Simulation Environments

This special product caters to the users who primarily work in simula-tion environments, for example with EDA tools such as Keysight Tech-nologies Inc.ADS (Product number: 89601BE).

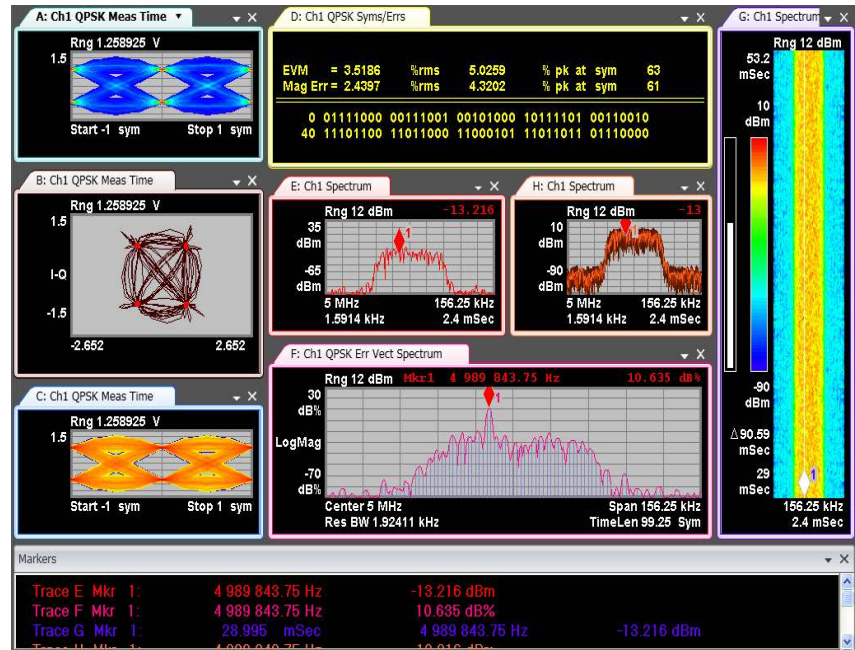## Test today's signals and be ready for tomorrow's standards and modulations

With the 89600 VSA software, you can measure more than 75 signal standards and modulation types for cellular communications, wireless connectivity, MILCOM, satellite communications and more. The 89600 VSA software also lets you leverage Keysight's consistent track record of being first to market with support for emerging standards, even before they are fully ratified.

Verify the latest WLAN signals with 802.11ac demodulation and analysis.

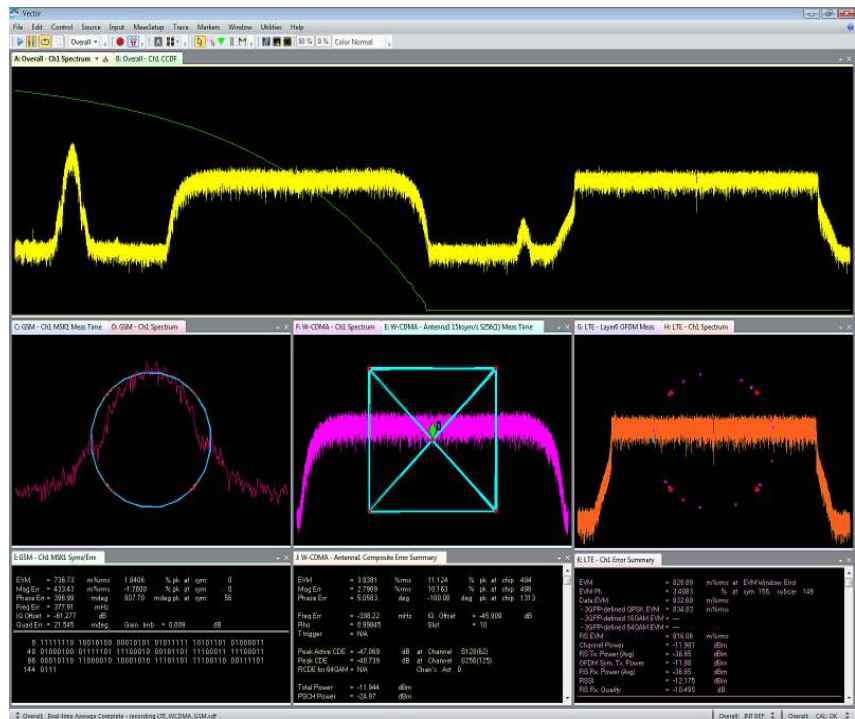## Over 75 signal standards and modulation types, including

- Cellular communications: LTE- Advanced, LTE, W-CDMA HSPA+, GSM/EDGE Evolution, cdma2000®, TD-SCDMA
- Wireless connectivity: WLAN 802.11ac, 802.11n, 802.11a/b/g, WiMAX™, *Bluetooth*®, Zigbee, RFID
- Aerospace, defense and satellite: AM, FM, PM, BPSK, QPSK, QAM, APSK, FSK, VSB, SOQPSK, APCO 25
- Custom modulation: evaluate your non-standard or proprietary OFDM and APSK signals
- Also supports up to 8 channels for MIMO and multi-channel test

Analyze modulation types ranging from AM/FM/PM to QPSK (shown), 1024QAM and 18APSK.

Multi-measurements: Analyze and display multiple signals at once

The industry's first multi-measurement capability can configure, execute and display multiple measurements simultaneously. A collection of measurements can be created and stored in memory, available to run instantly. Connect to multiple analyzers at the same time, or use a single multi-channel instrument, to acquire signals from different test points or frequency bands in parallel. Powerful display tools enable comparison and correlation of results from different measurements.
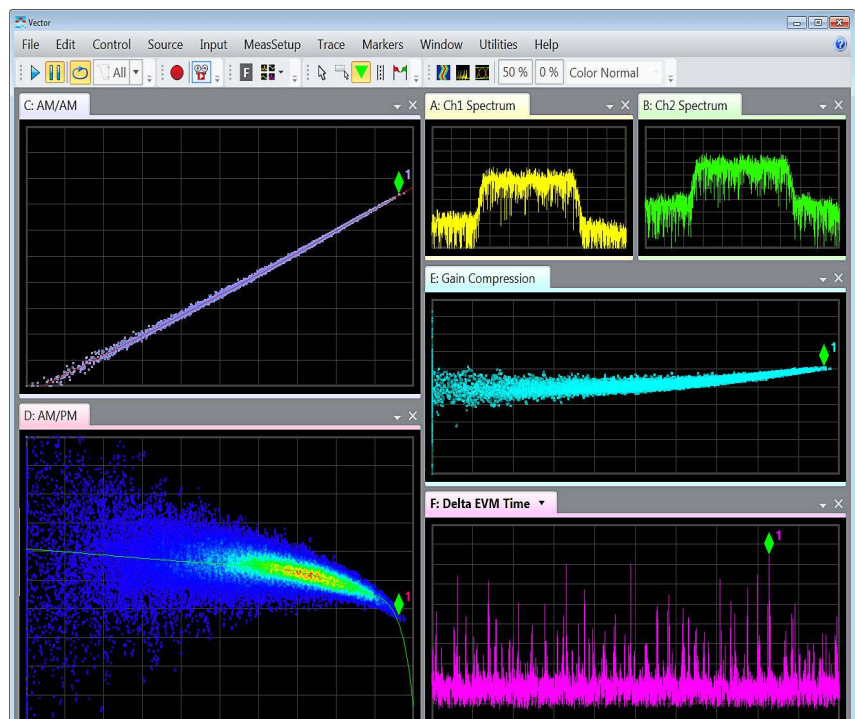

Multi-measurements enable capture, analysis and display of multiple signals at once. Four measurements are shown here: vector measurement for overall spectrum and CCDF, GSM, W-CDMA and LTE demodulations.

Thoroughly characterize power amplifier distortion and envelope tracking designs

Complex stimulus-response measurements provide the ability to measure and compare two signals, for measurements such as:

– AM/AM
– AM/PM
– Gain compression
– Differential EVM
– Time delay

Automatic time alignment, amplitude and phase compensation simplify setup and analysis. The unique capability of the 89600 VSA software to compare baseband and RF signals makes it ideal for optimizing and validating envelope tracking power amplifier and power supply designs.

Apply all of the software's advanced displays and troubleshooting tools to your stimulus-response measurements.

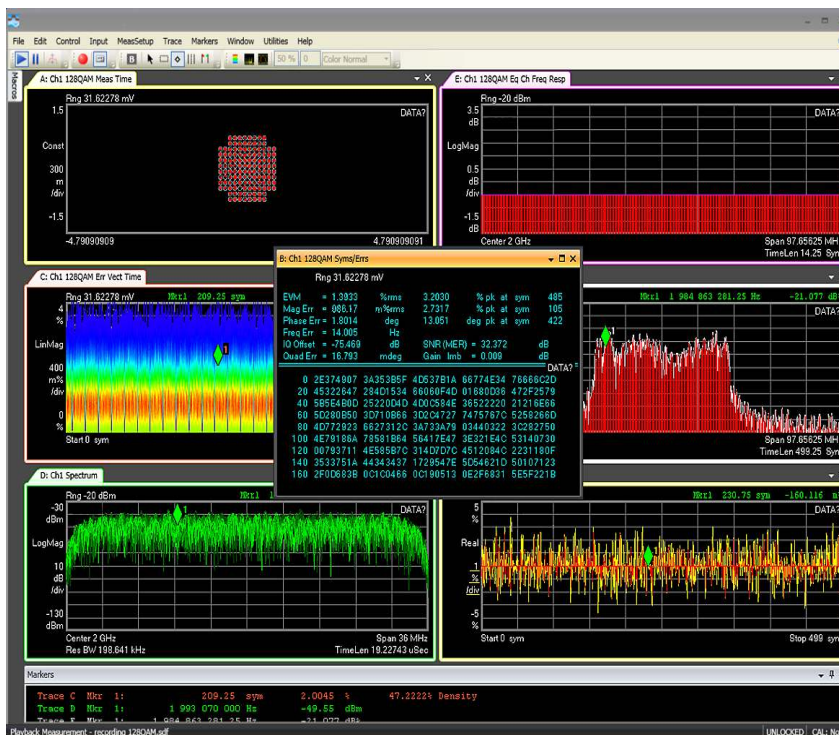# Pinpoint the Solution with Advanced Troubleshooting Tools

You can reach deeper into signals to find the root cause of problems with measurements in the time, frequency and modulation domains. Quantify spectral performance with high-resolution, FFT-based measurements and a rich set of markers. Analyze time-domain signal quality using features like time gating, CCDF, and auto-correlation. Characterize complex modulation schemes with constellation, EVM, decoded bits, and more.

In addition to standard tools like constellations, IQ parameters and overall EVM, the 89600 VSA software provides:

- Compound, color-coded constellations for signals with multiple modulations, zone, or control channel signals
- Pilot EVM, resource signal EVM, preamble EVM, EVM by symbol time or carrier, all color-coded to highlight carrier or modulation types, or control channel signals
- Tables showing the contents of the frame control header, training fields, and similar information
- MIMO condition number by carrier, I/Q parameters by stream, and more

Signal Capture and Playback

Capture and playback signals for detailed gap-free analysis. The full function playback facilitates analysis with loop-on-signal tools, user-defined file segment storage, and graphical/numeric displays showing the progression of the signal file. The flexible overlap processing built into the 89600 VSA slows down the playback for detailed analysis of the captured file.
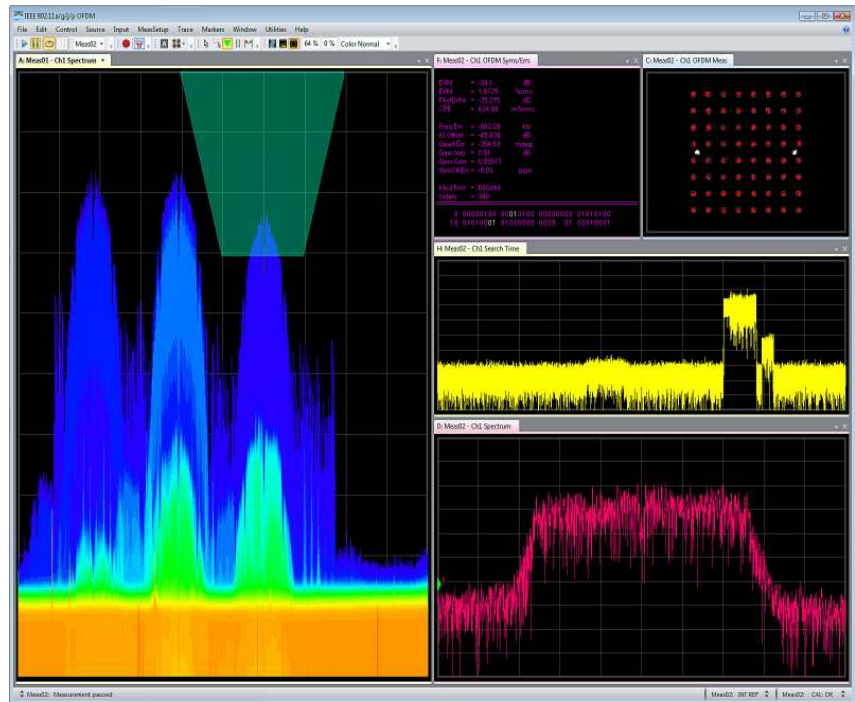

Reach deeper into signals with advanced troubleshooting tools

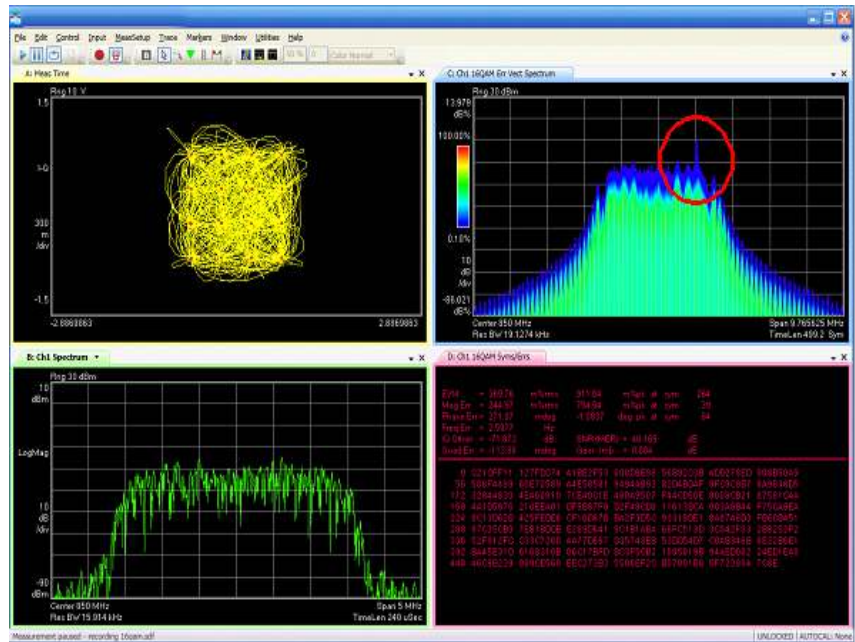## View multiple facets of complex signals—simultaneously

The 89600 VSA software graphical user interface (GUI) helps you see more and with greater clarity. It enables you to pinpoint problems with arbitrary arrangement and flexible sizing of unlimited traces at once, each with unlimited markers. Build the test view you need to optimize your signal evaluation and troubleshooting.

Perform detailed analysis of dynamic signal behaviors with advanced display types and triggering. Use spectrogram, digital persistence and cumulative history displays to help view dynamic frequency and amplitude behavior over time.

Catch elusive signals with flexible magnitude and external triggers, as well as frequency mask trigger, with real-time enabled PXA and MXA signal analyzers. Together, these provide unprecedented analysis detail of short-lived signal events in time, spectrum and modulation domains.
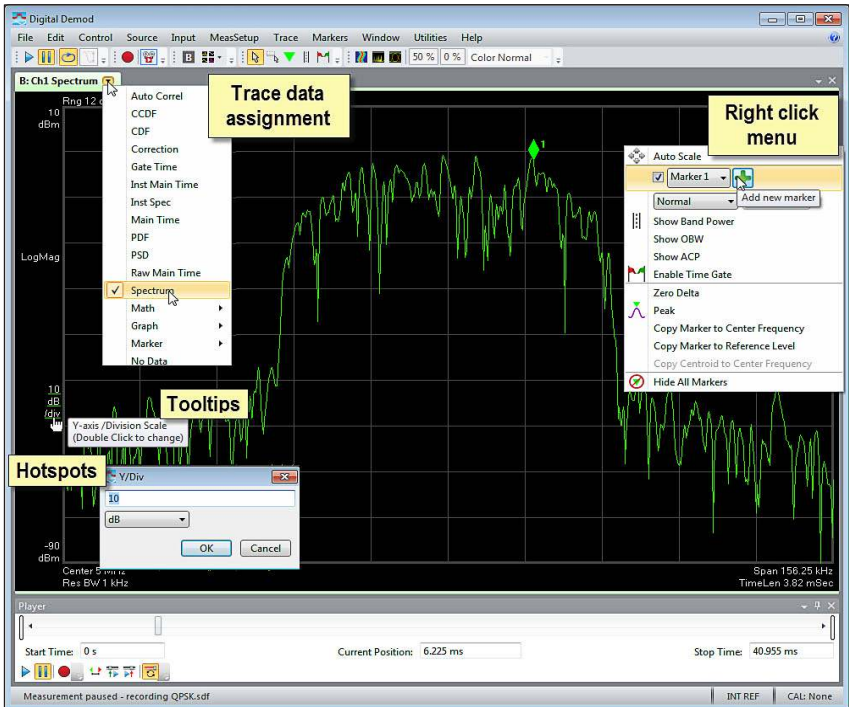
Create and execute a spectrally-selective frequency mask trigger from the 89600 VSA software when connected to real-time enabled PXA and MXA signal analyzers.

Trace C shows a spur occurring with this 16QAM signal. This low-power, intermittent in-band spur is masked by the signal and cannot be seen using a standard spectrum measurement (Trace B). Demodulating the signal and viewing it using EVM spectrum with the cumulative history display enabled reveals this difficult-to-isolate signal.

Powerful GUI

- View unlimited traces, each with unlimited markers
- Adjust trace shape to extend event observation time or increase viewable data
- Optimize trace arrangement to see signal patterns and study interactions
- Assign any measurement to any trace to analyze sophisticated signals, such as LTE-Advanced and 802.11ac
- Define and run multiple independent measurements, simultaneously
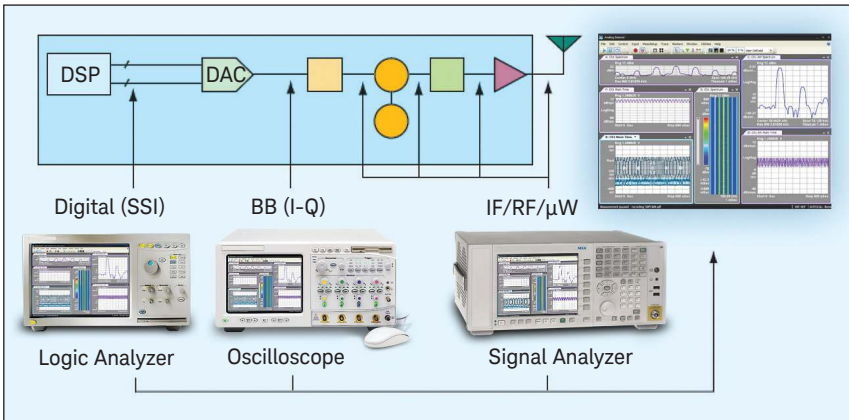- Create multiple trace windows to organize results

On trace 'hotspots" provide convenient, quick measurement set-up and control

Accelerate development with a consistent set of tools

The 89600 software runs on a PC or inside PC-based instruments and supports more than 40 Keysight platforms: signal analyzers, oscilloscopes, logic analyzers, modular instrument systems, as well as simulation software. Ensure repeatable, comparable results across teams, from baseband to RF, from simulation to design validation.

www.keysight.com/find/89600platforms

Use the 89600 VSA software with over 40 hardware platforms, including spectrum and signal analyzers, modular instruments and oscilloscopes.

Keep your 89600 VSA up-to-date

With rapidly evolving standards and continuous advancements in signal analysis, the 89601BU/BNU software update and subscription service offers you the advantage of immediate access to the latest features and enhancements, as available, for the 89600 VSA software.

– Keeps your 89600 VSA software current with new enhancements
– Automatic notification and shipment of software revisions
– Length of subscription: 12 to 24 months, renewable
– www.keysight.com/find/89601BU

Additional Resources

Literature

89600 VSA Software, Configuration Guide,
literature number 5990-6386EN

Web

To learn more about the 89600, visit Keysight's website at

www.keysight.com/find/89600vsa

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www.axiestandard.org

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www.lxistandard.org

LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.

www.pxisa.org

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