# Keysight Vector Signal Analysis

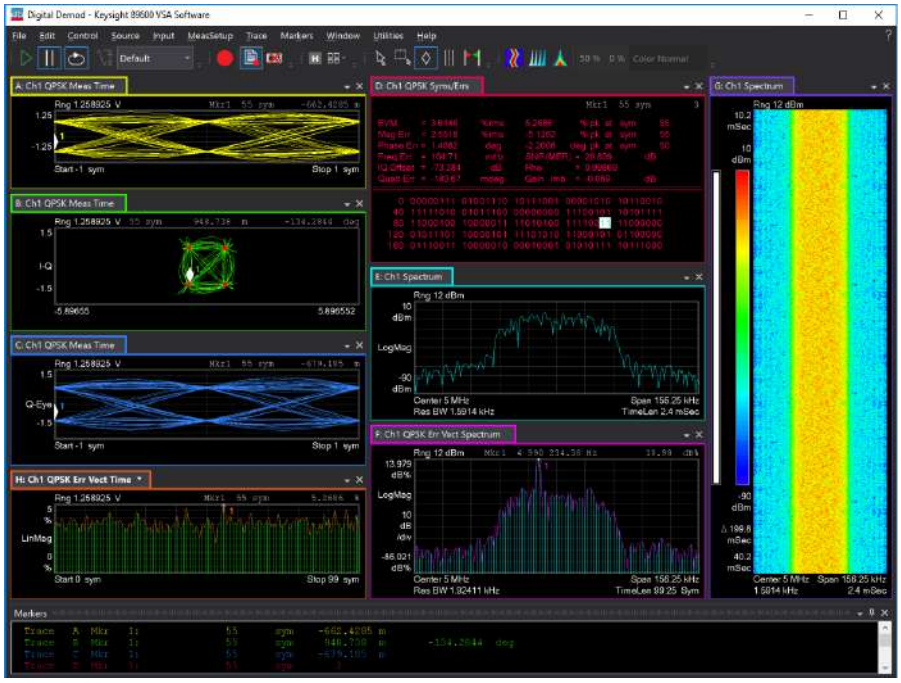
## 89600 VSA

BROCHURE

# Keysight Vector Signal Analysis (89600 VSA)

## See through the complexity

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



### Free 30-day trial

Download Vector Signal Analysis (VSA) software 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. 30-day trial license can enable all of the basic core vector signal analysis and hardware connectivity capabilities working as advanced tier. Request your free trial license today:

www.keysight.com/find/89600_trial

# Tools to Demodulate and Analyze Your Most Complex Signals

Development becomes more complex when faster data rates intersect with today's crowded spectral environment. Finding a signal problem is essential, but achieving the clarity to pinpoint the answer is the crucial challenge. Keysight Vector Signal Analysis (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 Keysight Vector Signal Analysis (VSA) helps you see through the complexity.

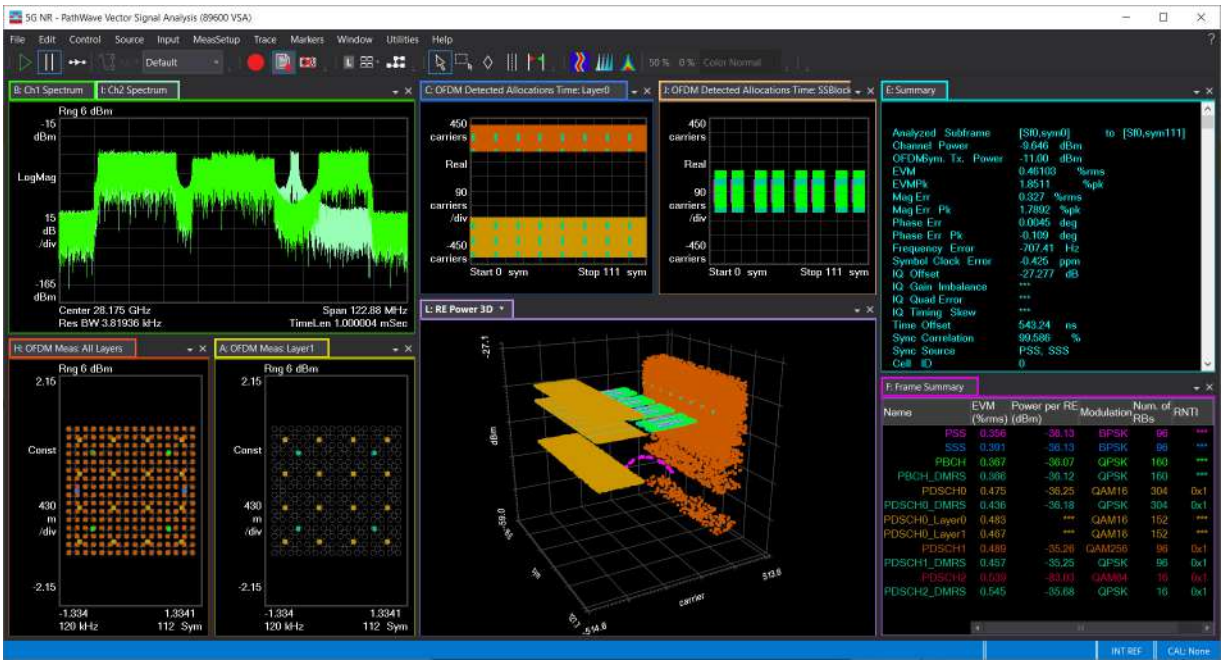



**Figure 1.** Characterize the complex modulation of evolving cellular communications standards like 5G NR (New Radio)

## Choosing between 89600 VSA and X-Series measurement applications

Keysight Vector Signal Analysis (VSA) software is ideal for evaluating and troubleshooting wireless signals in R&D. PC-based, supporting numerous hardware measurement platforms, the Keysight Vector Signal Analysis (VSA) software provides the flexibility and sophisticated measurement tools essential to find and fix signal problems.

The X-Series measurement applications provide embedded format-specific, one-button measurements for the X-Series analyzers. With fast measurements, pass/fail testing and simplicity of operation, these applications are ideally suited for automated design verification and manufacturing test.

www.keysight.com/find/X-Series_apps

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

With Keysight Vector Signal Analysis (VSA) software, you can measure more than 75 signal standards and modulation types for cellular communications including evolving 5G New Radio, wireless connectivity, WLAN 802.11ax/11be, 802.15.4/4z HRP UWB, MILCOM, satellite communications and more. Keysight Vector Signal Analysis (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.

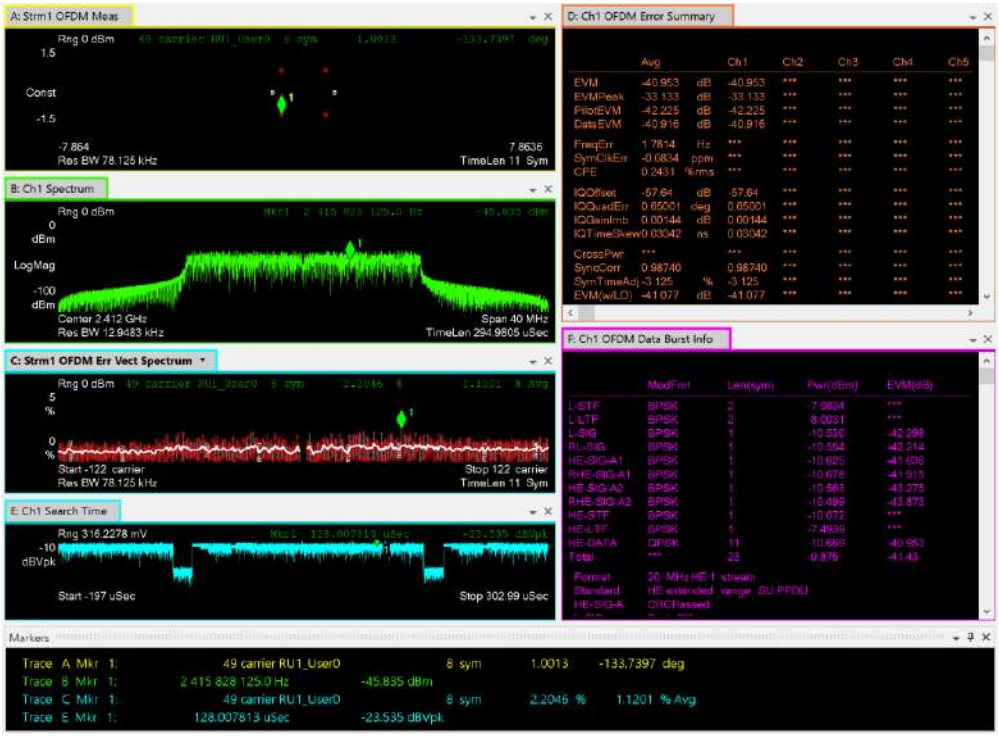



**Figure 2.** Verify the WLAN 802.11ax signal quality in multiple domains

# Over 75 signal standards and modulation types, including

- Cellular communications: 5G NR and 5G-Advanced, Verizon 5GTF, WiMax™ LTE- Advanced, LTE, W-CDMA/HSPA+, GSM/EDGE Evolution, cdma2000®, TD-SCDMA
- Wireless connectivity: WLAN 802.11be, 802.11ax, 802.11n/ac, 802.11a/b/g/j/p, WiMax™, *Bluetooth*®, Zigbee, RFID, 802.15.4 HRP UWB
- Aerospace, defense and satellite: AM, FM, PM, BPSK, QPSK, QAM, APSK, FSK, VSB, SOQPSK, APCO 25, DVB-S/S2/S2X
- Radar pulse: pulse, frequency hopping, FMCW
- Cable TV such as DOCSIS 3.0/3.1, and 4.0
- Custom modulation: Evaluate your non-standard or proprietary OFDM and APSK signals
- Also supports up to 8 channels for MIMO and multi-channel test


**Figure 3.** Analyze modulation types ranging from AM/FM/PM to QPSK (shown), up to 4096 QAM

# Multi-measurements: Analyze and display multiple signals at once

A multi-measurement capability can configure, execute and display multiple measurements simultaneously. For example, a systems engineer can analyze the coexistence of 5G and LTE signals leveraging Dynamic Spectrum Sharing. 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.

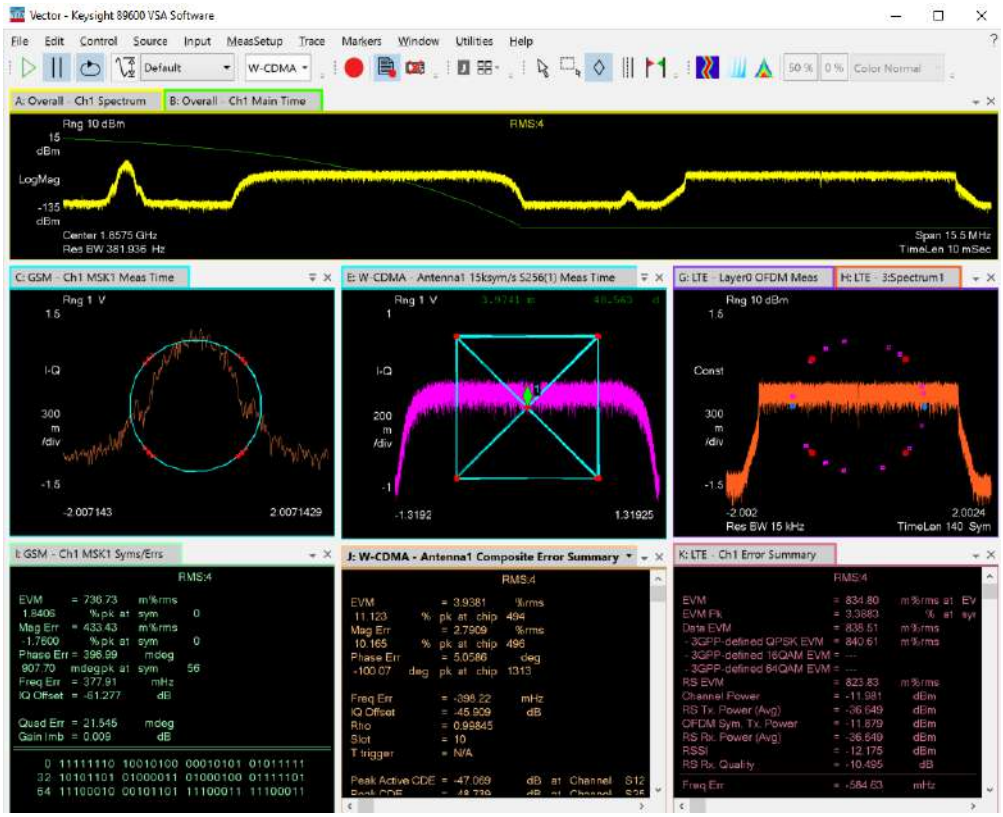



**Figure 4.** Multi-measurements enable capture, analysis and display of multiple signals at once. Four measurements are shown here: Vector measurement for overall spectrum and CCDF, GSM, W-CDMA and LTE demodulations

# 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 Keysight Vector Signal Analysis (VSA) software to compare baseband and RF signals makes it ideal for optimizing and validating envelope tracking power amplifier and power supply designs.

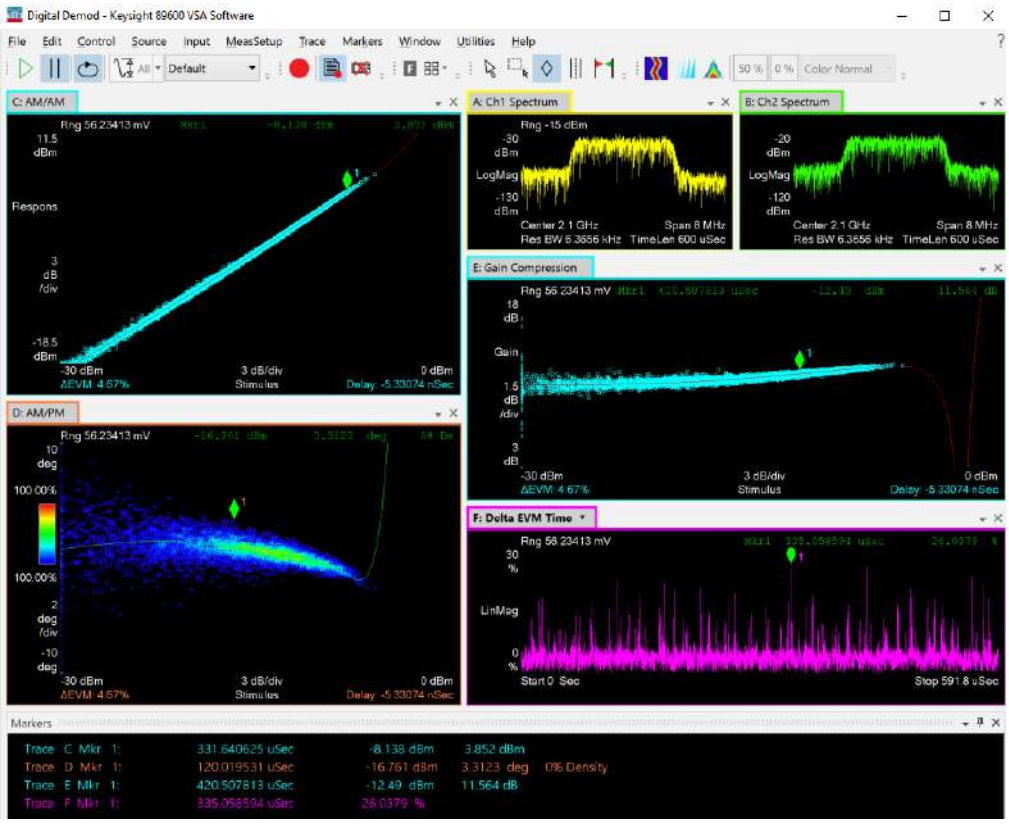



**Figure 5.** Apply all of the software's advanced displays and troubleshooting tools to your stimulus-response measurements

# 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, Vector Signal Analysis (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

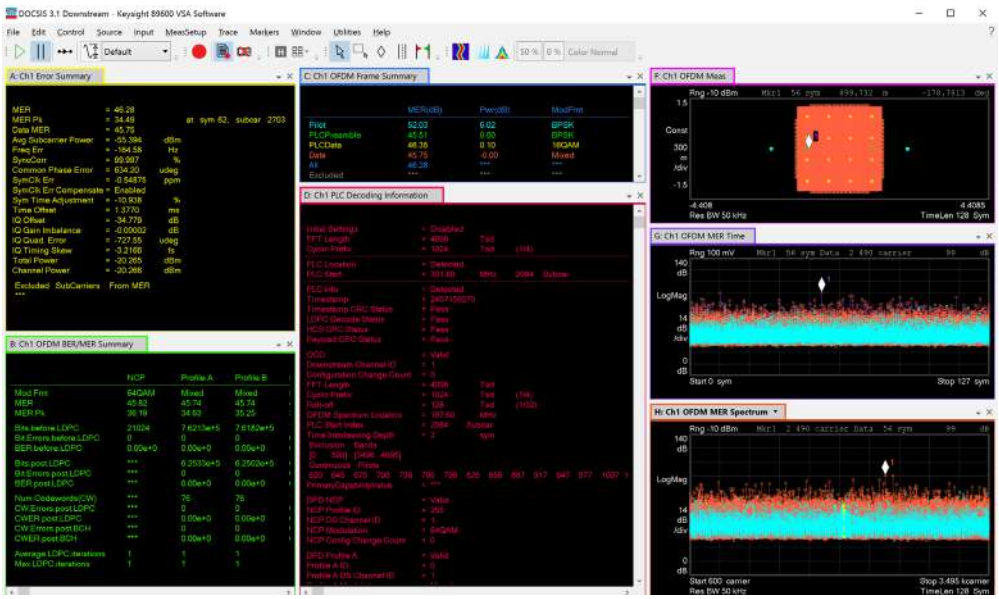


**Figure 6.** Reach deeper into signals with advanced troubleshooting tools even in decoding information of DOCSIS 3.1

## 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 Vector Signal Analysis (VSA) slows down the playback for detailed analysis of the captured file.

# View multiple facets of complex signals—simultaneously

Vector Signal Analysis (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 UXA, PXA and MXA signal analyzers. Together, these provide unprecedented analysis detail of short-lived signal events in time, spectrum and modulation domains.

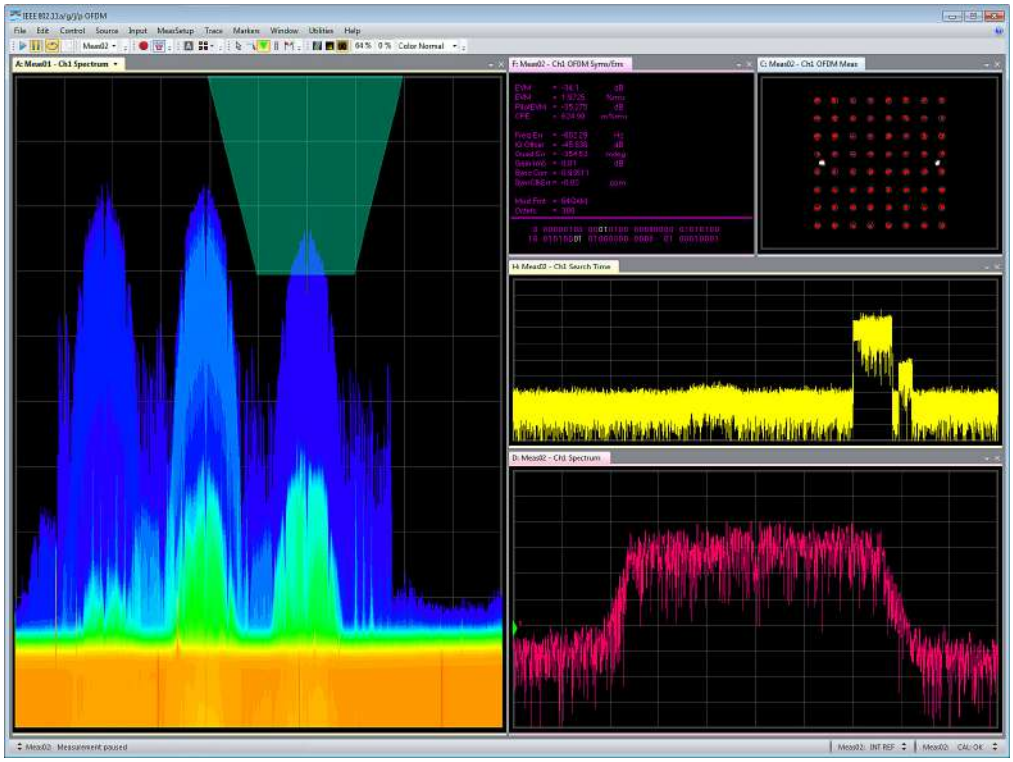


**Figure 7.** Create and execute a spectrally-selective frequency mask trigger from Vector Signal Analysis (VSA) software when connected to real-time enabled UXA, PXA, and MXA signal analyzers

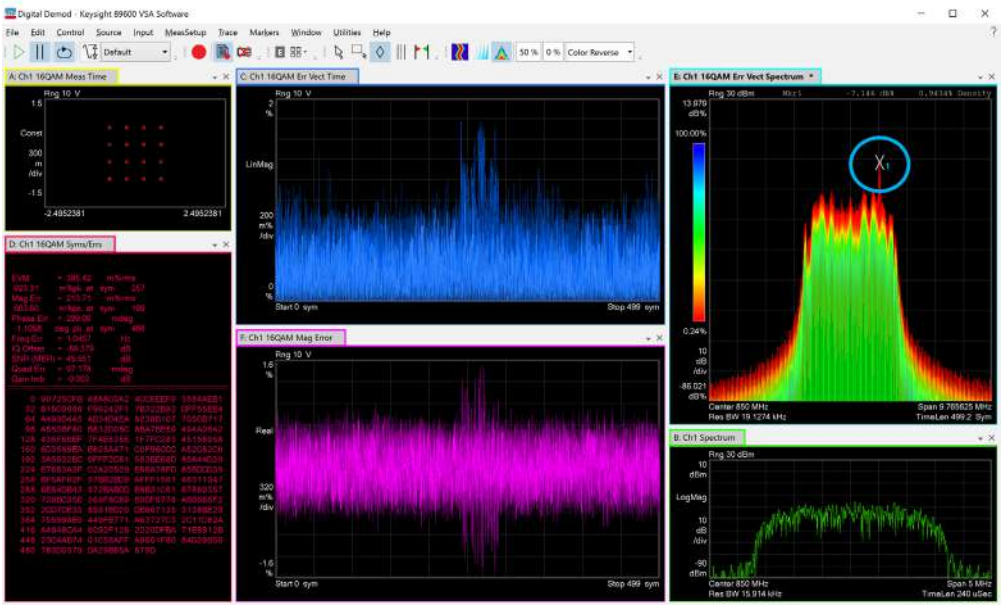


**Figure 8.** Trace E shows a spur occurring with this 16QAM signal. This low-power, intermittent in-band spur is masked by the signal and cannot be seen using a standard spectrum measurement (Trace B). Demodulating the signal and viewing it using EVM spectrum with the cumulative history display enabled 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 5G New Radio(NR), LTE, and WLAN 802.11n/ac/ax/be including MIMO
- Define and run multiple independent measurements, simultaneously
- Create multiple trace windows to organize results

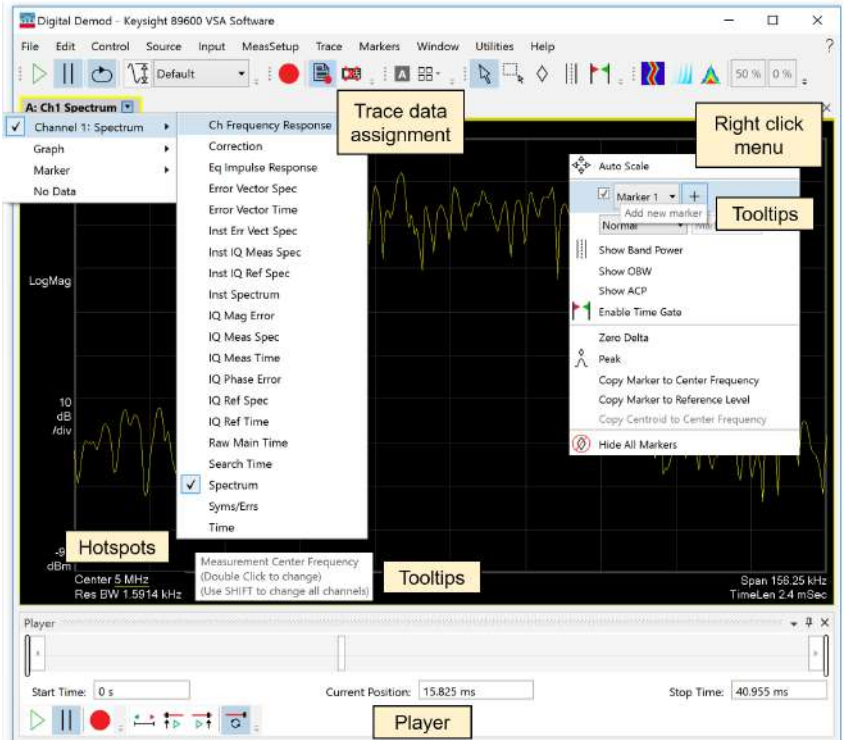



**Figure 9.** On trace 'hotspots" provide convenient, quick measurement set-up and control

## Accelerate development with a consistent set of tools

Vector Signal Analysis (VSA) runs on a PC or inside PC-based instruments and supports more than 45 Keysight platforms: signal analyzers, oscilloscopes, logic analyzers, vector network analyzer, modular instrument systems, as well as simulation software. Ensure repeatable, comparable results across teams, from baseband to RF and mmWave, from simulation to design validation.

www.keysight.com/find/89600_hardware

### Keep your 89600 VSA up-to-date

With rapidly evolving standards and continuous advancements in signal analysis, the software renewal service as KeysightCare support subscription offers you the advantage of immediate access to the latest features and enhancements, as available, for Keysight Vector Signal Analysis (VSA).

- Keeps your 89600 VSA software current with new enhancements
- Automatic notification and shipment of software revisions
- Length of subscription: monthly with 12-months or more

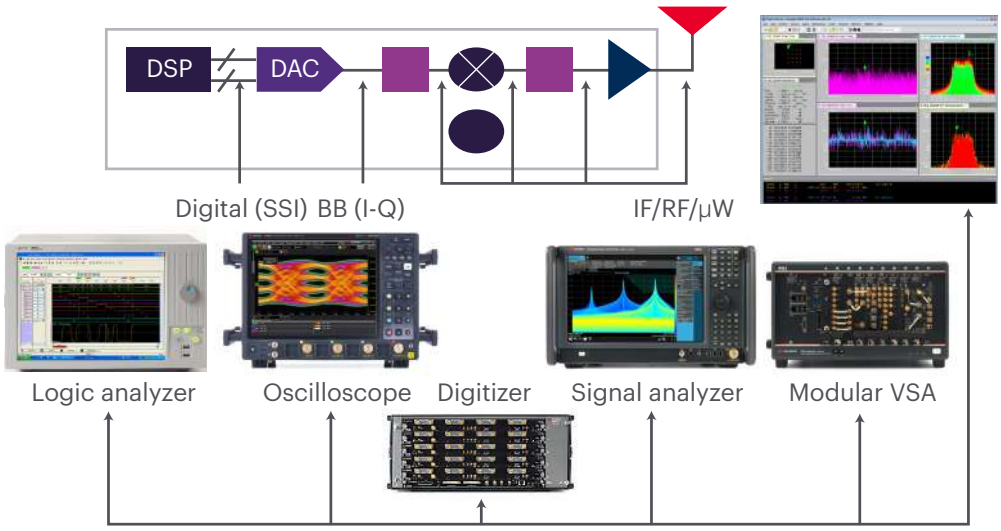



**Figure 10.** Use the 89600 VSA software with over 45 hardware platforms, including spectrum and signal analyzers, modular instruments and oscilloscopes

# Additional Resources

## Literature

| Publication title | Publication number |
|---|---|
| 89600 VSA Software - Configuration Guide | 5990-6386EN |
| 89600 VSA Basic Core VSA and Hardware Connectivity - Technical Overview | 5992-4210EN |

To learn more about 89600:
www.keysight.com/find/89600

To download the latest 89600 software and apply trial license:
www.keysight.com/find/89600_software

To learn more about 89600 supported hardware:
www.keysight.com/find/89600_hardware

# Basic Core Vector Signal Analysis and Hardware Connectivity with Tiered Options

89600 VSA basic core vector signal analysis provides the foundation of the tools and user interface that runs Vector Signal Analysis (VSA) software. Explore every facet of today's most complex signals with views of time, frequency, and modulation domains. Benefit from the flexible GUI capabilities: arbitrary arrangement and sizing of unlimited display traces, each with unlimited markers. Powerful display formats, signal recording and playback, and detailed Help text provide the insight needed for analyzing signals. Hardware connectivity included as part of the basic core vector signal analysis allows 89600 VSA to be linked to over 400 Keysight instrument model numbers. Choose the right instrument for your application and apply vector signal analysis across your mixed signal design.

Starting with VSA 2025 U1 release, the 89600 VSA software introduces three tiered options designed to balance cost and capability for a wide range of measurement needs. Whether you're managing a large lab, validating mobile devices, or developing advanced radar systems, these tier options provide scalable solutions for your specific requirements at least one of them is required to run 89600 VSA base platform.

### Essentials tier (89601203C):

- Optimized for mobile device testing, legacy WLAN, 5G NR FR1 compliance testing, and general RF design
- Covers frequencies up to 8 GHz with 160 MHz analysis bandwidth
- Supports single-carrier measurements, including I+Q using two physical inputs
- Ideal for individual test stations or dedicated application focus

### Standard tier (89601202C or 89601203C with 89601202U):

- Tailored for satellite communications, UWB, 5G NR FR2, WLAN, radar systems, and multi-channel applications
- Extends frequency range to 55 GHz with 2.16 GHz analysis bandwidth
- Supports up to 4 simultaneous measurements for efficient test sequencing
- Support up to 4 parallel VSA instances
- Includes source control and system calibration capabilities
- Enables phase-coherent measurements across channels, depending on hardware
- 89601203C essential tier can post upgrade to standard tier together with 89601202U, which will extend the capabilities from Essential to Standard.

## Advanced tier (89601201C or 89601202C with 89601201U):

- Designed for research labs, aerospace and advanced technology development
- No frequency or bandwidth limitations for cutting-edge applications
- Up to 64 measurement channels for complex MIMO and beamforming analysis
- Support up to 512 parallel VSA instances
- Full flexibility for large, shared lab environments
- 89601202C standard tier can post upgrade to advanced tier with 89601201U, which will extend the capabilities from Standard tier to Advanced tier.

For existing users, the legacy 89601200C license seamlessly transitions into the Advanced tier (89601201C), providing the same robust capabilities and measurement flexibility. It is fully compatible with VSA software version 2019 U1 or above, including those released prior to and following the VSA 2025 U1 update. This ensures continuity for existing users while offering access to the latest features.

Note that the newly introduced tiered options (89601201C, 89601202C, and 89601203C) require VSA 2025 U1 or later. 89601201U and 89601202U post upgrade requires VSA2025 U2 or later. For detailed guidance on compatibility and transition planning, contact your Keysight representative or visit www.keysight.com/find/89600.

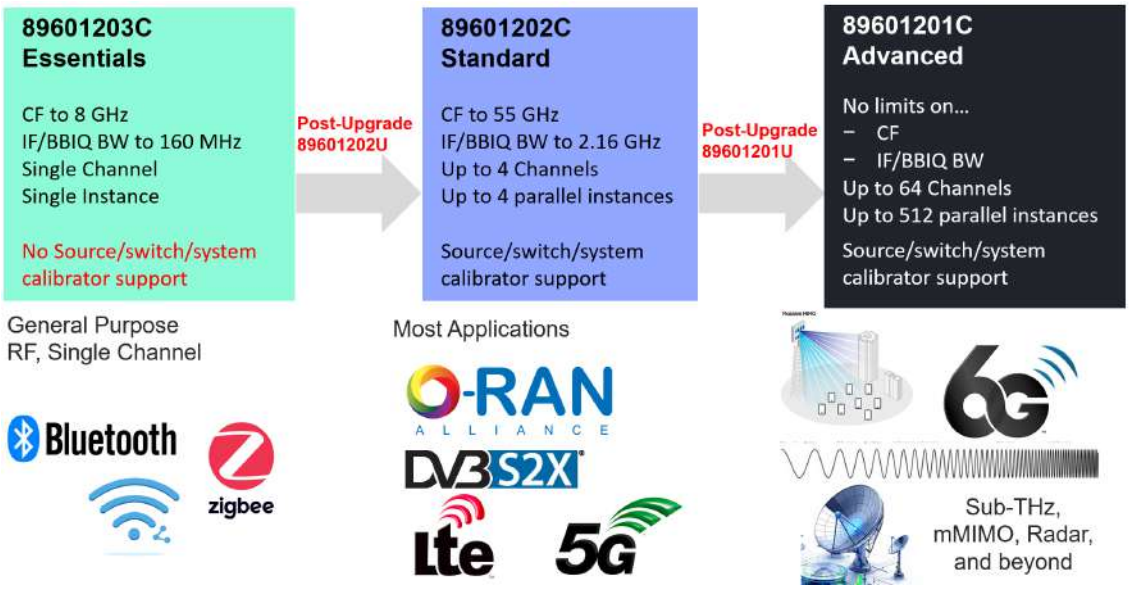



**Figure 11.** 89600 VSA tiered models definition and recommendation by application

## How to choose the right hardware and VSA tier

The figure above illustrates the 89600 VSA software's tiered options. When selecting your configuration, consider these factors:

1. Center frequency requirements
   - Applications below 8 GHz (e.g. 5G FR1, WLAN, general RF design): Essentials Tier
   - Applications between 8-55 GHz (e.g. satellite, radar, 5G FR2): Standard Tier
   - Applications above 55 GHz (e.g. sub-THz, optical modulation analysis, automotive radar): Advanced Tier
2. Bandwidth considerations
   - Essentials tier's 160 MHz bandwidth supports most general RF and FR1 applications
   - Standard tier extends to 2.16 GHz for wider bandwidth applications
   - Advanced tier removes bandwidth restrictions for the most demanding applications
3. Channel count and MIMO
   - Single-channel measurements are supported by any tier
   - Multi-channel applications up to 4 channels are supported by Standard tier
   - Applications requiring more than 4 channels need Advanced tier

### 5G NR FR1 design

Key requirement:

- Frequency: 450 MHz - 6 GHz
- Bandwidth: ≤ 100 MHz
- Single carrier analysis

Recommended:

Hardware: MXA N9020B

Tier: Essentials (89601203C)

### Satellite communications

Key requirement:

- X/Ku/Ka-band (up to 40 GHz)
- Moderate bandwidth
- Multiple channels

Recommended:

Hardware: PXA N9030B

Tier: Standard (89601202C)

### mmWave research

Key requirement:

- Frequency: > 55 GHz
- Wide bandwidth analysis
- Multiple channels/MIMO

Recommended:

Hardware: UXA N9042B+V3050A

Tier: Advanced (89601201C)

The examples above illustrate common hardware and tier combinations. Your specific requirements may vary - consult with your Keysight representative for detailed configuration guidance. The table below can be referred for basic vector signal analysis tiered option configuration recommended by Keysight hardware.

For a complete list of supported hardware configurations, visit www.keysight.com/find/89600_hardware

Table: 89600 VSA Recommended Basic Vector Analysis with Tiered Options By Hardware Models

| Hardware Model | Max Frequency | Max Bandwidth | Max Channels | VSA Tiered Model |
|---|---|---|---|---|
| UXA N9042B | 75 GHz | 4 GHz | 1 | 89601202C (Recommend)<br>89601201C (Freq>55 GHz or BW>2 GHz) |
| UXA N9042B+V3050A | 110 GHz | 4 GHz | 1 | 89601201C (Recommend) |
| UXA N9041B | 110 GHz | 1 GHz | 1 | 89601201C (Recommend) |
| UXA N9040B | 50 GHz | 1 GHz | 1 | 89601202C (Recommend) |
| PXA N9032B | 55 GHz | 2 GHz | 1 | 89601202C (Recommend) |
| PXA N9030A/B | 50 GHz | 2 GHz | 1 | 89601202C (Recommend) |
| MXA N9021B | 50 GHz | 510 MHz | 1 | 89601202C (Recommend) |
| MXA N9020A/B | 50 GHz | 160 MHz | 1 | 89601202C (Recommend) |
| EXA N9010A/B | 44 GHz | 40 MHz | 1 | 89601203C (Recommend)<br>89601202C (Freq>8 GHz) |
| CXA N9000A/B | 26.5 GHz | 25 MHz | 1 | 89601203C (Recommend)<br>89601202C (Freq>8 GHz) |
| CXA-m M9290A | 26.5 GHz | 25 MHz | 1 | 89601203C (Recommend)<br>89601202C (Freq>8 GHz) |
| PXE N9048B | 44 GHz | 40 MHz | 1 | 89601202C (Recommend) |
| MXE N9038B | 44 GHz | 160 MHz | 1 | 89601202C (Recommend) |
| PXI VXT M9421A/1xA<br>PXI VXT M941xE | 26.5GHz | 1.2 GHz | 8 | 89601202C (Recommend)<br>89601201C (MeasChannel >4) |
| PXI VSA M9391A/M9393A | 27 GHz | 160 MHz | 4 | 89601202C (Recommend) |
| Radio Test Set M8920A/B | 26.5 GHz | 1.2 GHz | 1 | 89601202C (Recommend) |
| OMA N4391B | 110 GHz | 110 GHz | 4 | 89601201C (Recommend) |
| UXR | 110 GHz | 110 GHz<br>2.16 GHz (DDC)<br>320MHz (RTSA) | 4 | 89601202C (Recommend)<br>89601201C (Freq>55 GHz,<br>BW >2.16 GHz or MeasChannel>4) |

| | | | | |
|---|---|---|---|---|
| MXR | 6 GHz | 6 GHz<br>2 GHz (DDC)<br>320MHz (RTSA) | 8 | 89601202C (Recommend)<br>89601201C (BW>2.16 GHz or MeasChannel>4) |
| EXR | 6 GHz | 6 GHz | 8 | |
| InfiniiVision HD3 | 1 GHz | 1 GHz | 4 | 89601203C (Recommend) |
| FieldFox N99xxA | 54 GHz | 100 MHz | 1 | 89601202C (Recommend) |
| PNA N52xxB | 120 GHz | 10 MHz | 1 | 89601202C (Recommend)<br>89601201C (Freq>55 GHz) |
| ENA E508xA/B | 53 GHz | 10 MHz | 1 | 89601202C (Recommend) |
| PXI NA M980xA | 53 GHz | 10 MHz | 1 | 89601202C (Recommend) |
| Streamline USB VNA P50xxA | 53 GHz | 10 MHz | 1 | 89601202C (Recommend) |
| UXM E7515A/B | 49.2 GHz | 800 MHz | 8 | 89601202C (Recommend)<br>89601201C (MeasChannel >4) |
| EXM E6640A | 6 GHz | 160 MHz | 8 | 89601202C (Recommend)<br>89601201C (MeasChannel >4) |
| Wireless Test Set E6680E | 7.3 GHz | 800 MHz | 4 | 89601202C (Recommend) |
| 5G Multi-band Vector Transceiver S9110A/E, S9115A | 49 GHz | 1.2 GHz | 2 | 89601202C (Recommend) |

# Choose Vector Signal Analysis (89600 VSA) License

| Description | Model number | Additional information |
|---|---|---|
| Advanced vector signal analysis and hardware connectivity with<br>• No center frequency limit<br>• No IF/BBIQ bandwidth limit<br>• No channel count limits<br>• Up to 64 channels<br>• Up to 512 parallel instances | 89601200C (Advanced tier runs with VSA2019 U1 or above release)<br>89601201C [1] (Advanced tier runs with VSA2025 U1 or above release) | One of the basic core tier models (89601200C, 89601201C, 89601202C, or 89601203C) is required to run 89600 VSA software<br>Basic core vector signal analysis can provide<br>• Time and frequency domain analysis with up to 409,601 point FFT<br>• Flexible traces and displays with simultaneous and multi-measurements<br>• Analog demodulation (AM, FM, PM)<br>• Channel quality modulation analysis<br>• Component testing – with gain compression, AM vs AM and AM vs PM<br>• Freq vs. Time and Time vs Time Heatmaps<br>• Event-based actions & scripting (SCPI/.NET)<br>• Advanced trigger with selectable level, slope, delay and hold-off<br>• Record the acquired signal waveforms to playback for troubleshooting<br>• Link to over 400 over instrument model numbers |
| Standard vector signal analysis and hardware connectivity with<br>• Center frequency up to 55 GHz center frequency,<br>• IF/BBIQ bandwidth up to 2.16 GHz bandwidth<br>• Up to 4 channels<br>• Up to 4 parallel instances | 89601202C [1] (Standard tier runs with VSA2025 U1 or above release) | |
| Essentials vector signal analysis and hardware connectivity with<br>• Center frequency up to 8 GHz center frequency,<br>• IF/BBIQ bandwidth up to 160 MHz bandwidth<br>• Single measurement channel support (RF or I+Q) | 89601203C (Essential tier runs with VSA2025 U1 or above release) | |
| | | |
| Digital demodulation analysis | 89601AYAC | Analysis of > 40 modulation formats, including custom APSK and presets for communication formats like GSM/EDGE, ZigBee FSK, *Bluetooth*® BR, APCO25 and SOQPSK |
| | | Proprietary and pre-standard, customized IQ constellation signals |
| | | TEDS modulation analysis |
| | | Channel response measurements such as phase/magnitude response and multi-tone group delay |
| | | Flexible frame signal analysis |

**Notes:**

1. 89601202C standard vector signal analysis and hardware connectivity is already included in each application package, so you don't need to order it separately.

| | | |
|---|---|---|
| FlexFrame wavefirm generation | 89602AYAC | Generate the ideal signal with FlexFrame settings, apply pre-distortion and/or AWGN, then playback in VSA, save to file, or download to the specified signal generator. Requires 89601AYAC license |
| Custom OFDM modulation analysis | 89601BHFC | Proprietary and pre-standard OFDM formats such as WLAN, DAB, DVB-T/H, DVB-SH, ISDB-T and more |
| Power Suite measurement | 89601PSMC | Support PowerSuite SEM and ACP measurements with FFT mode |
| Direct Data Connectivity | 89601101C | Allow user to use their own data input stream for 89600 VSA measurement |
| **Cellular Communication** | | |
| 5G NR Modulation Analysis | 89601BHNC | 5G NR and 5G-Advnaced modulation analysis |
| | | Pre-5G modulation analysis |
| LTE/LTE-A FDD modulation analysis | 89601BHGC | LTE FDD modulation analysis |
| | | LTE-Advanced FDD modulation analysis |
| LTE/LTE-A TDD modulation analysis | 89601BHHC | LTE TDD modulation analysis |
| | | LTE-Advanced TDD modulation analysis |
| 3G modulation analysis bundle | 89601B7NC | W-CDMA/HSPA+ modulation analysis |
| | | TD-SCDMA/HSPA modulation analysis |
| | | cdma2000 modulation analysis |
| | | 1xEV-DO and 1xEV-DV modulation analysis |
| **Wireless Connectivity** | | |
| Wireless connectivity modulation analysis | 89601B7RC | WLAN 802.11a/b/g/j/p modulation analysis |
| | | WiMax™ modulation analysis |
| High throughput WLAN modulation analysis | 89601BHXC | WLAN 802.11n/ac modulation analysis |
| | | WLAN 802.11ax modulation analysis |
| | | WLAN 802.11be modulation analysis |
| | | WLAN 802.11bn modulation analysis |
| IoT modulation analysis | 89601BHTC | NB-IoT modulation analysis |
| | | RFID modulation analysis |
| | | HRP UWB (IEEE 802.15.4/4z/4ab) |
| **Satellite Communication** | | |
| DVB Satellite Communication | 89601DVBC | DVB-S2/S2X modulation analysis with full channel decoding modulation analysis, and DVB-S2X Super Frame support with Format 5/6/7 |

| | | |
|---|---|---|
| **Radar analysis** | | |
| Pulse analysis | 89601BHQC | Pulsed modulated radar signal analysis |
| | | Frequency hopping signal analysis |
| | | Advanced radar signal analysis |
| FMCW analysis | 89601BHPC | For multi-chirp linear FM modulated signals or automotive radar |
| **Other standard formats** | | |
| DOCSIS modulation analysis | 89601BHMC | DOCSIS3.1 downstream and upstream modulation analysis |
| Multi-vendor hardware connectivity | 89601301C | Connect multi-vendor hardware for modulation analysis |
| ccEVM and IQ-NC | 89601EVMC | Improve EVM measurement through the Cross-Correlated EVM (ccEVM) technology or IQ Noise Correction (IQ-NC) technology |
| Phase Coherent Channel Count Expander Up to 8-Port | 89601CC1C | Phase Coherent Channel Count Expander Up to 8-Port with Sequential Acquisition |
| Phase Coherent Channel Count Expander up to 64-Port | 89601CC2C | Phase Coherent Channel Count Expander up to 64-Port with Sequential Acquisition |
| Channel Sounding Signal | 89601CSDC | Performance channel sounding measurement Analysis |

# Choose Flexible Licensing Types and Terms

Each of the following license types are offered as perpetual or time-based licenses as shown in the table below. A valid support contract is included with time-based licenses. For perpetual license, a separate support contract is required to access Keysight technical support and software updates.

| License type | Description | Pricing formula |
|---|---|---|
| Node-locked | Allows you to use the license on one specified instrument/ computer. | |
| Transportable | Allows you to use the license on one instrument or computer at a time. This license may be transferred to another instrument or computer using Keysight's online tool. | 130% of node-locked |
| USB Portable | Allows you to move the license from one instrument/computer to another by end-user only with certified USB dongle, USB Dongle FLEX10 must be ordered or already owned for USB portable license. | 130% of node-locked |
| Floating | Allows you to access the license on networked instruments/ computers from a server, one at a time. For concurrent access, multiple licenses may be purchased. | 140% of node-locked (floating, single site) 160% of node-locked (floating, single region) 180% of node-locked floating, worldwide) |
| Perpetual | Software license can be used in perpetuity | |
| Subscription (Time-based) | Software license is time limited to a defined period, such as 12 months. | 38% of perpetual for a 12-month license |
| Support contract for perpetual license | Allows license holder access to Keysight technical support and all software upgrades. | 15% or 3% of perpetual for 12 months of support contract |

# Choose Keysight Vector Signal Analysis (89600 VSA) Application Subscription Package

If you have a short-term need for multiple same category measurement applications, now Keysight provides you an alternative as subscription package, in which several measurement applications are combined into one application package. You just need to choose from the flexible licensing types and the duration that you need to use the software. Refer to the following table as the four kinds of 89600 VSA subscription packages are defined and the specified measurement applications included in each application package.

| Description | Model number | Keysight Vector Analysis (89600 VSA) features included |
|---|---|---|
| Custom Modulation Package | 89601C [1, 2, 3] | 89601202C for Basic vector signal analysis and hardware connectivity |
| | | 89601AYAC for Digital demodulation, Custom IQ and Flex Frame modulation analysis |
| | | 89601BHFC for Custom OFDM modulation analysis |
| | | 89601EVMC for ccEVM and IQ-NC EVM improvement technologies |
| | | 89601PSMC for PowerSuite SEM and ACP measurements with FFT mode |
| Pulse Analysis Package | 89602C [1, 2, 3] | 89601202C for Basic vector signal analysis and hardware connectivity |
| | | 89601BHQC for Pulse analysis and Advanced Radar Analysis |
| | | 89601BHPC for FMCW analysis |
| Wireless Connectivity Package | 89603C [1, 2, 3] | 89601202C for Basic vector signal analysis and hardware connectivity |
| | | 89601B7RC for Wireless connectivity modulation analysis |
| | | 89601BHXC for High Throughput modulation analysis |
| | | 89601PSMC for PowerSuite SEM and ACP measurements with FFT mode |
| | | 89601EVMC for ccEVM and IQ-NC EVM improvement technologies |

| Description | Model number | Keysight Vector Analysis (89600 VSA) features included |
|---|---|---|
| Cellular Package | 89604C [1, 2, 3] | 89601202C for Basic vector signal analysis and hardware connectivity |
| | | 89601B7NC for 3G modulation analysis (W-CDMA/HSPA+, TD-SCDMA/ HSPA, cdma2000/1xEV-DV, 1xEV-DO) |
| | | 89601BHHC for LTE/LTE-A TDD modulation analysis |
| | | 89601BHGC for LTE/LTE-A FDD modulation analysis |
| | | 89601BHNC for 5G NR modulation analysis |
| | | 89601PSMC for PowerSuite SEM and ACP measurements with FFT mode |
| | | 89601EVMC for ccEVM and IQ-NC EVM improvement technologies |
| Pick Any 3 or 5 89600 VSA Bundle | 89601BAXC [1, 2, 3] | Pick Any 3 or 5 from Vector Signal Analysis 89600 VSA licenses list |
| Pick Any 3 or 5 Signal Studio Waveform Playback and 89600 VSA Bundle | N7689EAZC [4, 5] | Pick the combination of any 3 or 5 licenses from the following:<br>• Signal generation waveform playback licenses list inside N7689EAXC<br>• Vector Signal Analysis 89600 VSA licenses list inside 89601BAXC |
| Pick Any 3 or 5 Signal Studio PC Application and 89600 VSA Bundle | N7689PAZC [4, 5] | Pick the combination of any 3 or 5 licenses from the following:<br>• Vector signal generation PC application licenses list inside N7689PAXC<br>• Vector Signal Analysis 89600 VSA licenses list inside 89601BAXC |

**Notes:**

1. 89601202C standard vector signal analysis and hardware connectivity is already included in each application package, so you don't need to order it separately.
2. Those subscription packages support the node-locked, transportable, USB portable, floating (single site, single region, worldwide).
3. The subscription duration can be chosen from 6 months, 12 month, 24 months, and 36 months.
4. The subscription duration can be chosen from 12-month or 36 months.
5. Those subscription packages only support the node-locked license type.

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.