Agilent 89650S
Wideband Vector Signal Analyzer System with High Performance Spectrum Analysis

Configuration Guide

This configuration guide describes standard configurations, options and compatible accessories. For full specifications, see Agilent 89650S Technical Overview (literature number 5989-0871EN), and the Agilent PSA Series Data Sheet (literature number 5980-1284E). Contact your Agilent representative for additional information.

89650S Vector Signal Analyzer

The standard 89650S bundle includes:

- PSA Series high performance spectrum analyzer, including Option 111 USB 2.0 device side I/O. Choose from:
  - E4440A 3 kHz to 26.5 GHz
  - E4443A 3 kHz to 6.7 GHz
  - E4445A 3 kHz to 13.2 GHz

  Note: The PSA Series high performance spectrum analyzer must include a wideband digitizer; you may select from either Option 122 (80 MHz bandwidth digitizer) or Option 140 (40 MHz bandwidth digitizer).

- 89601A vector signal analysis software with wideband calibration capability
- Option 89601A-200 basic vector analysis software
- Option 89601A-300 hardware connectivity
- LAN cable (cross-over)
- One-year warranty
- One-year software update subscription service
- Operating and programming manuals, installation guide

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Spectrum Analyzer

You must choose one. For more configuration information, see the PSA Configuration Guide, literature number 5989-2773EN. Note: Lower frequency limit for operation with the 89600 VSA software is 3 kHz.

❏ **E4440A PSA spectrum analyzer, 3 to 26.5 GHz**

❏ **E4443A PSA spectrum analyzer, 3 to 6.7 GHz**

❏ **E4445A PSA spectrum analyzer, 3 to 13.2 GHz**

Wideband IF[3]

You must choose one.

❏ **Option 122, 80 MHz bandwidth digitizer**

❏ **Option 140, 40 MHz bandwidth digitizer**

Hardware Options[1,3]

In general, configure the PSA as you need to use it for a spectrum analyzer. Important options to consider are given below. Check the PSA configuration guide, literature number 5989-2773EN, for more information on available options. Note that the measurement personality options may have specific hardware requirements. Information listed here is only for hardware options that the 89600 VSA software utilizes.

❏ **USB 2.0 device side I/O interface, E444xA-111 (standard option)**
Provides USB connection for fastest measurement and recording update rates.

❏ **Preselector bypass, E444xA-123**
Bypasses the YIG tuned preselector in the RF path for frequencies > 3 GHz. **This option is highly recommended when performing modulation analysis at frequencies above 3 GHz,** because it provides enhanced amplitude and phase performance > 3 GHz and guarantees full 80 MHz bandwidth for Option 122.

❏ **RF/µW internal preamplifier, 10 MHz to the upper limit of PSA, E444xA-110**
Recommended for low-level signals above 10 MHz. Not compatible with Option 1DS.

❏ **100 kHZ to 3GHz built-in preamplifier, E444xA-1DS**
Recommended for low-level signals below 3 GHz. Not compatible with Option 110.

Measurement Personality Options[1,2,3]

The 89600 VSA software does not use any of the measurement personality options of the PSA. So, configure the PSA to meet your other spectrum analyzer needs. See the PSA configuration guide, literature number 5989-2773EN for more information on available options. You can order any of these as part of the 89650S system. Note that many of these measurement personalities require specific hardware options.

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1. Installed in PSA Series spectrum analyzers.
2. Not used by 89601A VSA software.
3. Options are E444xA-###, where x = 0,3, or 5.

Software Options[1]

The listing of software options which follows includes all 89601A VSA software options. Although not all options are compatible with the 89650S system bandwidth, they are included here for information. You can obtain further information from the 89600 VSA software data sheet, literature number 5989-1786EN, and the software technical overview, literature number 5989-1679EN.

❏ **Flexible modulation analysis, 89601A-AYA**

Whether you are designing to an open standard or a company proprietary specification, the flexible modulation analysis option has the tools you need to evaluate and characterize signal performance and dig down to the root of your modulation problems.

❏ **3G modulation analysis bundle, 89601A-B7N**

The bundle is an ordering convenience equivalent to Options B7T, B7U, B7W, B7X. It provides a price advantage versus ordering the options individually.

❏ **cdma2000®/1xEV-DV modulation analysis, 89601A-B7T**

Descramble, despread, and demodulate both forward and reverse link signals to test and troubleshoot your cdma2000/1xEV-DV signals. Option B7T automatically identifies all active channels regardless of symbol rate or Walsh code.

❏ **W-CDMA/HSPA modulation analysis, 89601A-B7U**

Measure, evaluate, and troubleshoot your W-CDMA, HSDPA/HSUPA, and Enhanced HSPA (HSPA+) signals with the tools in Option B7U. Use the single layer and composite code-domain power and code-domain error displays to determine the overall performance of your signal and the behavior of specific layers and channels.

❏ **1xEV-DO modulation analysis, 89601A-B7W**

Descramble, despread, and demodulate 1xEV-DO modulated signals. You can also analyze the reverse link (mobile station or access terminal) and forward link (base station or access network) channels.

❏ **TD-SCDMA modulation analysis, 89601A-B7X**

Troubleshoot and analyze your time division synchronous code domain multiple access (TD-SCDMA) modulation and RF performance with Option B7X. With 1.28 Mcps functionality, this analysis package handles the TSM and HSDPA (8PSK and 16 QAM) version of TD-SCDMA.

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1. Installed with 89601A vector signal analysis software-in user PC or optional laptop PC.

❑ **WLAN modulation analysis, 89601A-B7R**
Agilent is an industry leader in WLAN signal analysis. The WLAN analysis
option offers: IEEE 802.11a OFDM modulation analysis, IEEE 802.11b
DSSS/CCK/PBCC modulation analysis, IEEE 802.11g, j, p modulation analysis,
and IEEE 802.11a/b/g standards-based one button testing.

❑ **IEEE 802.16-2004 OFDM modulation analysis, 89601A-B7S**
Analyze IEEE 802.11-2004 signals with a comprehensive set of modulation
error analysis tools. All bandwidths, modulation formats, guard intervals
and sampling factors are supported. Use the time and frequency selective
capability to decompose your signal and uncover anomalies.

❑ **IEEE 802.16e OFDMA modulation analysis, 89601A-B7Y**
Troubleshoot these complex signals with a wide range of powerful tools
including support for WiMAX™ Wave 2 features. Analyze your uplink and
downlink OFDMA signals with automatic MAP decoding and configuration
for easy setup.

❑ **IEEE 802.11n MIMO modulation analysis, 89601A-B7Z**
Supports IEEE 802.11n modulation for single channel systems only, including
both 20 and 40 MHz IEEE 802.11n-compliant signal demodulation.

❑ **TEDS modulation analysis and test, 89601A-BHA**
Provides both detailed troubleshooting and a test plug-in with one-button tests
for TETRA Enhanced Data Services systems.

❑ **MB-OFDM modulation analysis, 89601A-BHB**
Allows analysis and troublshooting of WiMedia-based MB-OFDM ultra-
wideband systems, such as is used for certified Wireless USB designs.
Note that the bandwidth of the 89650S is insufficient to support this option.
However, we allow it to be ordered in case you will be using this software with
other front ends that do support UWB, such as Agilent Infiniium oscilloscopes.

❑ **RFID modulation analysis, 89601A-BHC**
Perform in-depth analysis of many common RFID standards, including the
EPC C1 Gen2 UHFGen1 (ISO 18000-6 Type C), ISO 18092, ISO 14443 Type A
and Type B, ISO 15693, and many more.

❑ **LTE FDD modulation analysis, 89601A-BHD**
Measure and analyze 3GPP Long Term Evolution signals. Option BHD supports
the LTE Generic frame structure as well as FDD transmission mode and
provides both uplink and downlink analysis.

❑**LTE TDD modulation analysis, 89601A-BHE**
Both uplink and downlink signal analysis of LTE TDD signals are possible.
While auto-detection and auto-configuration make setup easy, extensive
control over setup parameters provides in-depth troubleshooting capability.

❑ **Connectivity to Advanced Design System/SystemVue software, 89601A-105**
Link real world signals recorded with the 89650S to Agilent's EESof
ADS/SystemVue circuit design and simulation software to provide an actual
signal environment for your design stimulus. Or analyze your simulation results
using the same measurement tools and displays you use on prototype hardware.

❑ **Connectivity to The MathWorks Simulink Simulation-Based Design,
89601A-106**
This option provides a blockset that allows you to analyze and display, or
alternatively, source signals to your Simulink-based designs.

Software Update Subscription Service

Software update subscription service provides automatic notification and shipment of software upgrades as soon as they become available. Twelve-month coverage is included standard with the 89650S. An additional 12 months of coverage may be ordered. The full price for Options 012 and 024 will appear on orders/quotes. A discount item, Option D12, will be included to provide a discount equivalent to 1 year of software subscription service. You can find additional information at www.agilent.com/find/vsaupdate.

❏ **Software subscription service, 89601A-012 or 89601A-024**
For an additional year's coverage beyond the first year provided standard, just order the 89601A-024. This will extend the contract term to 24 months from the date of the initial sale.

Warranties

A one-year service warranty providing parts and labor coverage is included in the price of the 89650S. You can extend the warranty to 3 or 5 years and get continued repair coverage. All warranties require the equipment to be returned to Agilent for repair.

❏ **3-year, R-51B-001-3C**

❏ **5-year, R-51B-001-5C**

Additional Software (order separately)

❏ **89604A distortion suite**
This application software measures AM/AM and AM/PM distortion and is particularly well suited for working with pre-distortion linearized multi-channel power amplifiers (MCPAs). The stimulus signal can be narrowband CW or wideband complex modulation.

❏ **89607A WLAN test suite**
This standards-based test suite provides the convenience of automatic one-button test set-up and execution with the confidence of knowing your design is being tested based on the techniques, parameters, and specifications set down in the IEEE 802.11a/b/g standards. This product is included in the 89601A-B7R WLAN modulation analysis option.

Productivity Assistance

Agilent provides both product-specific and application training, as well as specialized consulting services. Of particular interest are the following:

❑ **One day of start-up assistance (recommended), PS-S20-01**

❑ Remote scheduled productivity assistance, PS-S10 (recommended 6 hours)

❑ One day of performance spectrum analyzers training, PS-T10-89650

❑ 89600 users' course, PS-T11-89650

❑ Digital radio troubleshooting, PS-T12-89650

❑ Wireless LAN technology fundamentals, PS-T13-89650

❑ VSA wireless LAN measurements consulting, PS-X10-89650

The 89600 users' course and WLAN technology fundamentals are classes available on-site at your location. The VSA wireless LAN measurements and productivity assistance products are consulting services tailored to your needs.

PC Requirements
The 89650S VSA requires a PC to control the spectrum analyzer and calculate/display results. You can use your PC for this task.

The following are the minimum requirements for a user-supplied PC. For best immunity to electrostatic discharge (ESD), use a desktop PC.

Operating system	Microsoft® Windows® XP Professional	Microsoft Windows Vista Business, Enterprise, or Ultimate
CPU	600 MHz Pentium® or AMD-K6 (> 2.0 GHz recommended)	1 GHz 32-bit (x86) (> 2.0 GHz recommended)
RAM	512 MB (1 GB recommended)	1 GB (2 GB recommended)
Video RAM	4 MB (16 MB recommended)	128 MB
Hard disk space	1 GB available	1 GB available
Additional drives	CD-ROM to load the software; license transfer requires 3.5 inch floppy drive, network access, or USB memory stick	CD-ROM to load the software; license transfer requires 3.5 inch floppy drive, network access, or USB memory stick

General Accessories

❏ Rack mount kit, E4440A-1CM

❏ Handle kit, E4440A-1CN

❏ Rack mount & handle kit, E4440A-1CP

❏ Rack slide kit, E4440A-1CR

Excluded Options[1]

The following options cannot be used in the 89650S VSA. Most of these options are incompatible with a wide bandwidth digitizer such as is included with the 89650S system. However, check the PSA configuration guide, literature number 5989-2773EN for further information.

- E444xA-107
- E444xA-235 (Note: This is an excluded option from the bundle because it is already included in the 89600 software.)
- E444xA-AYZ
- E444xA-H20
- E444xA-H25
- E444xA-H70
- E444xA-H7L
- E444xA-HA5
- E444xA-HB2
- E444xA-HBA
- E444xA-HN8
- E444xA-HN9
- E444xA-HNQ
- E444xA-HT1
- E444xA-HY7

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1. Options are E444xA-###, where x = 0, 3, or 5.

Related Literature

89650S Wideband Vector Signal Analyzer System with High Performance Spectrum Analysis,
Technical Overview, Literature number 5989-0871EN

89600 Demonstration Software,
CD, Literature number 5980-1989E

PSA Series Spectrum Analyzers,
Brochure, Literature number 5980-1283E

PSA Series Spectrum Analyzers,
Data Sheet, Literature number 5980-1284E

PSA Series High-Performance Spectrum Analyzers,
Configuration Guide, Literature number 5989-2773EN

89600 Series Vector Signal Analysis Software 89601A/89601AN/ 89601N12,
Technical Overview, Literature number 5989-1679EN

89600 Series Vector Signal Analysis Software 89601A/89601AN/ 89601N12,
Data Sheet, Literature number 5989-1786EN

Hardware Measurement Platforms for the 89600 Series Vector Signal Analysis Software,
Data Sheet, Literature number 5989-1753EN

Spectrum Analysis Basics,
Application Note 150, Literature number 5952-0292

Vector Signal Analysis Basics,
Application Note150-15, Literature number 5989-1121EN

Web Resources

www.agilent.com/find/psa

www.agilent.com/find/89600

myAgilent

www.agilent.com/find/myagilent
A personalized view into the information most relevant to you.

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

Three-Year Warranty

www.agilent.com/find/ThreeYearWarranty
Beyond product specification, changing the ownership experience. Agilent is the only test and measurement company that offers three-year warranty on all instruments, worldwide

Agilent Assurance Plans

www.Agilent.com/find/AssurancePlans
Five years of protection and no budgetary surprises to ensure your instruments are operating to specifications and you can continually rely on accurate measurements.

www.agilent.com/quality

Agilent Electronic Measurement Group
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