Agilent PSA Series
High-Performance Spectrum Analyzers

Now with the industry's first 80 MHz analysis bandwidth for signals up to 50 GHz

Agilent Technologies

Performance Exceeding Expectations

The brainpower and the will are already yours; the next step is selecting precisely the right tools to reach the market first.

The new Agilent **N9030A PXA** signal analyzer (currently available up to 26.5 GHz) is built on the heritage of the venerable PSA legacy with the latest technologies. Customers who seek performance and usability beyond the PSA may consider the PXA to maximize their signal insights. PSA owners who seek a migration solution should take advantage of the PXA's "Form/Fit/Function" compatibility with the PSA to mitigate migration risks.

The Agilent PSA Series offers high-performance spectrum analysis up to 50 GHz and beyond with powerful one-button measurements, a versatile feature set, and a leading-edge combination of flexibility, speed, accuracy, and dynamic range. From millimeter wave and phase noise measurements to spur searches and modulation analysis, the PSA Series offers unique and comprehensive high-performance solutions to R&D and manufacturing engineers in cellular and emerging wireless communications, aerospace, and defense.

Dynamic range
Fine-tune measurements with the industry's most usable dynamic range.

Accuracy
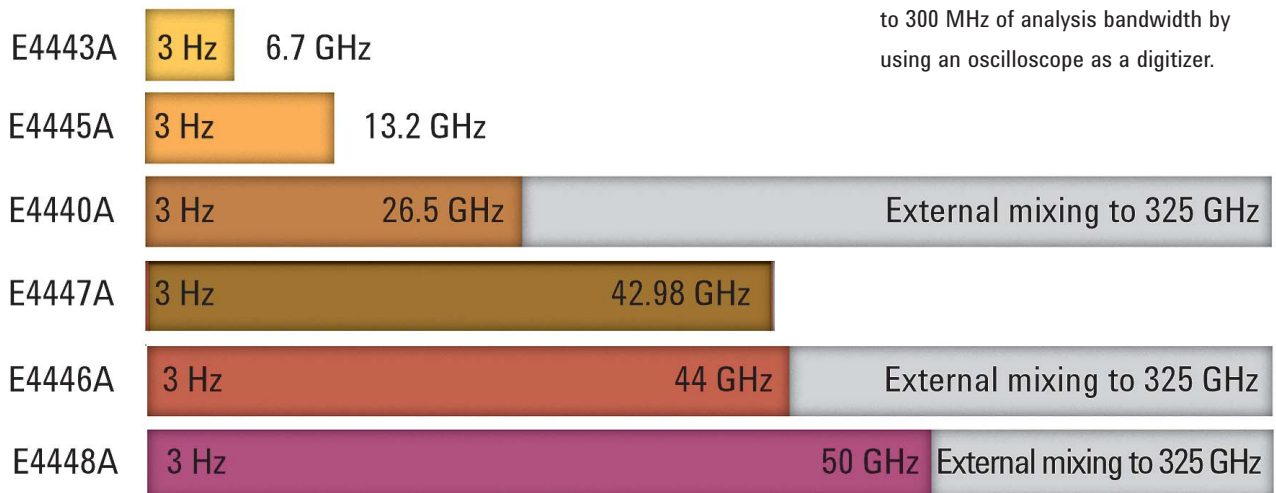Design with confidence using industry's highest accuracy.

Flexibility
Take control of measurement setups through advanced flexibility.

Analysis bandwidth
Maximize your signal analysis capabilities with up to 80 MHz of analysis bandwidth built-in (14-bit digitizer resolution); and up to 300 MHz of analysis bandwidth by using an oscilloscope as a digitizer.

PSA Series frequency range summary

Model	Range	External mixing
E4443A	3 Hz – 6.7 GHz	
E4445A	3 Hz – 13.2 GHz	
E4440A	3 Hz – 26.5 GHz	External mixing to 325 GHz
E4447A	3 Hz – 42.98 GHz	
E4446A	3 Hz – 44 GHz	External mixing to 325 GHz
E4448A	3 Hz – 50 GHz	External mixing to 325 GHz

Capability Beyond Limitation

Design efficiently and with confidence

To promote productivity in research and development, test and measurement tools must be flexible, thorough, and easy to use. Troubleshooting and design verification can be expedited and simplified with the PSA Series spectrum analyzers. With this one tool, it is easy to optimize setups for unique spectrum measurements, to customize advanced power measurements for modulated signals, and to dive down to the bit level using the digital demodulation personalities.

Having confidence in measurement results is essential to design verification. Understanding the importance of this, Agilent makes measurement integrity its highest priority. We provide guaranteed technical specifications to a set performance level on which you can depend.

Increase and maintain manufacturing throughput

From high-volume automated testing of cellular base stations to manually tuning oscillators, the PSA Series optimizes manufacturing throughput on many levels.

Increased throughput – Fast 1 ms sweeps, 30 ms ACP measurements, and 45/s update rates reduce automated test times. Manual tests are accelerated by one-button setups and fewer required button presses per measurement. The PSA Series shifts easily between measurement personalities, minimizing changeover time and accelerating troubleshooting.

Improved yields – Excellent specifications reduce measurement uncertainty to allow for narrower testmargins and improved yields. Sophisticated algorithms constantly monitor analyzer conditions and determine when internal background alignment is required.

One analyzer, many solutions – Using only 177 mm (7 in) of rack space, the PSA Series is packed with features. Superior accuracy (±0.19 dB typical) and linearity may eliminate the need for a power meter. Cellular communications measurement personalities give it digital demodulation capability. The phase noise personality transforms it to a phase noise tester. The external source control personality enables scalar stimulus/response measurements. The feature list is long and compatible with a broad selection of applications.

Saving measurement time becomes more critical to win competitive battles, whether you are in a manufacturing or R&D setting. By using the state-of-the-art processor and optimizing the instrument's structure, the **N9030A PXA** (currently available up to 26.5 GHz) significantly speeds up the measurements: Up to 12 times speed improvement over the PSA.

The PSA Series offers a wide variety of features for making more than just traditional spectrum analyzer measurements.

- Power Suite
- Measurement personalities
- Modulation analysis
- Modern connectivity

High-Performance Spectrum Analysis

Dynamic range

Great specifications are the starting point for great measurements. The PSA Series has the technology to offer unprecedented control over dynamic range, resolution, and speed.

2 dB step attenuator
160 RBW settings (10% steps)
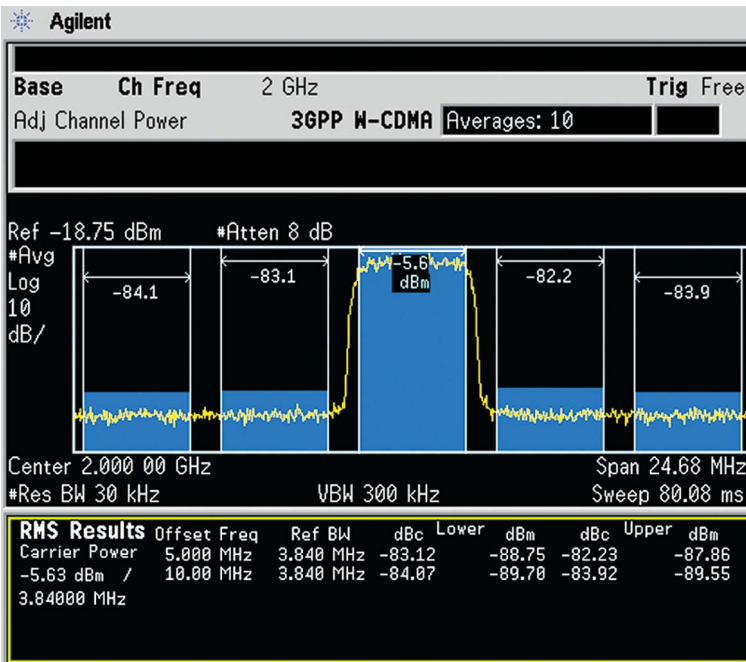**Optional built-in preamplifier**
Noise correction for ACP measurements

- −166 dBm typical DANL with built-in preamplifier
- +19 dBm typical TOI
- −118 dBc/Hz typical phase noise at 10 kHz offset
- 81 dB typical W-CDMA ACPR dynamic range with noise correction

The PSA Series has excellent dynamic range for a W-CDMA adjacent channel power (ACP) measurement

The **N9030A PXA** (currently available up to 26.5 GHz) meets or exceeds the PSA key specifications:

- down to -172 dBm typical DANL with NFE* and built-in preamplifier
- > +20 dBm typical TOI
- -128 dBc/Hz phase noise at 10 kHz offset
- 83 dBc typical W-CDMA ACPR dynamic range with noise correction

*NFE: Noise Floor Extension

High-Performance Spectrum Analysis (Continued)

Accuracy

The PSA Series achieves superior linearity and unsurpassed accuracy due to its advanced design and modern technology.
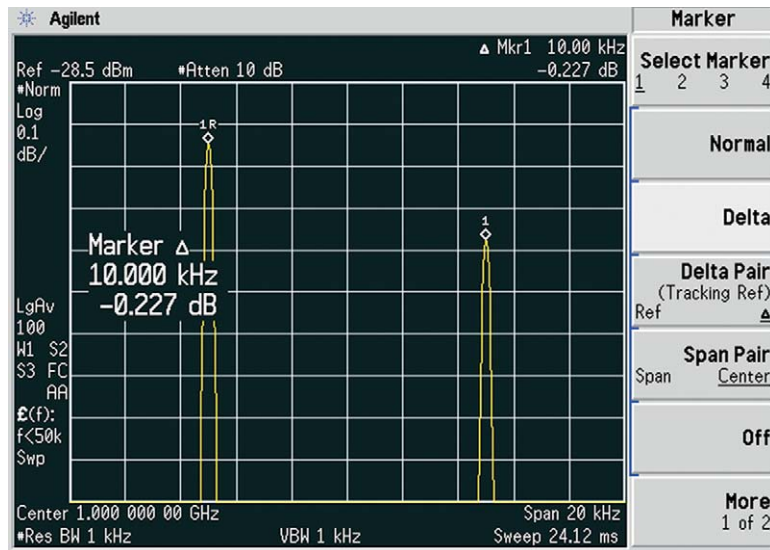
All-digital auto-ranging IF reduces or eliminates amplitude uncertainty

Auto alignment guarantees accuracy with temperature changes

Amplitude correction to compensate for gains and losses in your test setup

- ±0.19 dB typical amplitude accuracy
- 0 dB reference level uncertainty
- 0 dB display switching uncertainty
- ±0.05 dB RBW switching uncertainty
- ±0.07 dB display linearity

This figure illustrates 0.1 dB/division display resolution, 0.01 dB reference level resolution, and 0.001 marker resolution with averaging

To learn more, read…

PSA Series Amplitude Accuracy Product Note 5980-3080EN

The **N9030A PXA** inherits the superior PSA amplitude accuracy specifications.

High-Performance Spectrum Analysis (Continued)

Flexibility

From the novice to the most knowledgeable expert, the PSA makes it easy for anyone to obtain accurate, reliable results from their measurements.

Swept versus FFT
Perform swept-tuned measurements with digital RBW filters or fast Fourier transform (FFT) measurements with digital FFT filters. Use this flexibility to optimize for speed and sensitivity.

Phase noise optimization
The PSA Series' local oscillator (LO) phase lock loop configuration can be set to optimize phase noise close to a carrier within a 50 kHz offset, outside of a 50 kHz offset, or for tuning speed.

Digital detectors
Detector modes become important for accurately measuring different types of continuous wave, noise, and noise-like signals. The PSA Series offers this complete suite of detectors to assure correct measurement results.

- Normal
- Average (log, rms, voltage)
- Peak
- Sample
- Negative peak
- EMI detectors
  (quasi-peak, peak, average)
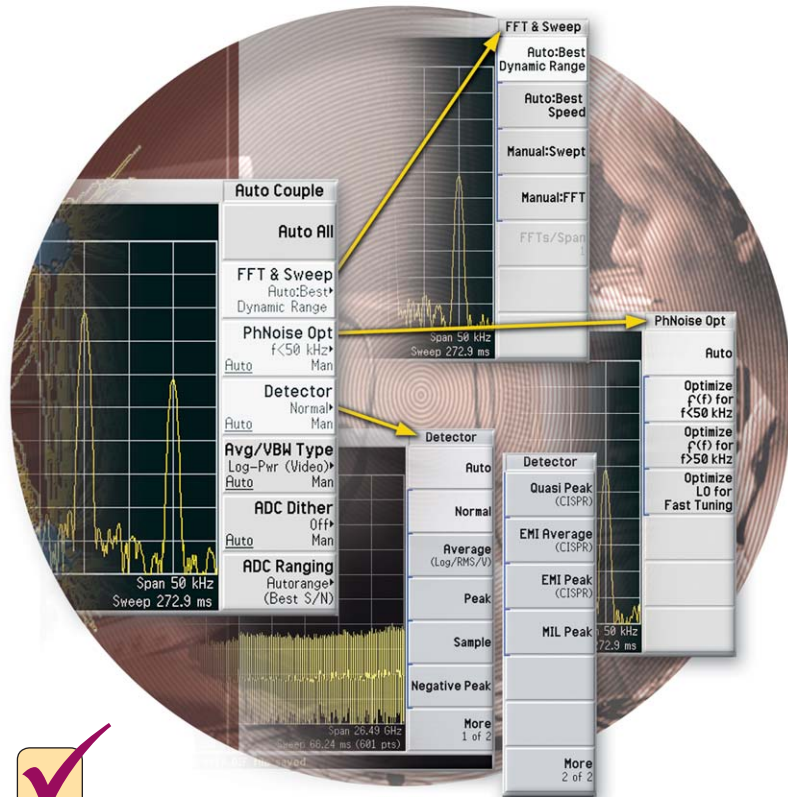
Analysis bandwidth

40/80 MHz bandwidth digitizer (Option 140/122)
Capture and measure complex vector time/frequency domain signals with up to 40 or 80 MHz of analysis bandwidth, up to 78 dB dynamic range, and excellent phase and amplitude flatness using Agilent's advanced interleave technology. Now available on 6.7 GHz, 13.2 GHz, 26.5 GHz, 44 GHz, and 50 GHz PSA Series, Option 140 or 122 helps you optimize the PSA configuration to best fit your signal analysis needs within your budget.

- Analyze carrier signal up to 50 GHz
- Third order intermodulation distortion −78 dBc (nominal)
- Capture depth of 512 Megabytes/ 128 Msamples
- 14 Bits of ADC resolution
- Random noise reduction using frame trigger
- Real time I/Q data conversion
- Flatness correction
- Broadband in-channel filtering using a wide range of filter

The **N9030A PXA** offers up to 140 MHz analysis bandwidth with 14 bits of ADC resolution (Option B1X) for carrier signals up to 26.5 GHz.

High-Performance Spectrum Analysis (Continued)

Expanded bandwidth

VSA solution with 300 MHz analysis bandwidth for signals up to 50 GHz

The Agilent PSA Series spectrum analyzer equipped with the 80 MHz wideband IF option (Option 122) has set the standard for bandwidth and measurement accuracy. However, many digital communications, radar, and EW systems produce complex waveforms requiring even greater analysis bandwidth. As analysis bandwidth increases, it becomes more and more difficult to ensure good linear phase performance and flat amplitude response over the measurement channel.

Agilent has eliminated this barrier by providing a new measurement capability in the 89601A vector signal analysis (VSA) software. This new capability allows engineers and technicians to use an Agilent Infiniium Series Oscilloscope to digitize the 321.4 MHz IF output of the PSA spectrum analyzer and achieve an analysis bandwidth of 300 MHz over the frequency range of 3 GHz through 50 GHz. Maximum system performance is guaranteed through a built-in system calibration routine that uses an Agilent ESG, PSG, or MXG signal generator as a calibration source. Calibration is controlled through the VSA software, providing the user with a familiar control, measurement, and calibration interface for the system. The calibration routine ensures flat amplitude and phase response over the 300 MHz analysis band, which results in minimum residual EVM for digital communications measurements and accurate signal characterization for modern pulsed radar waveforms.
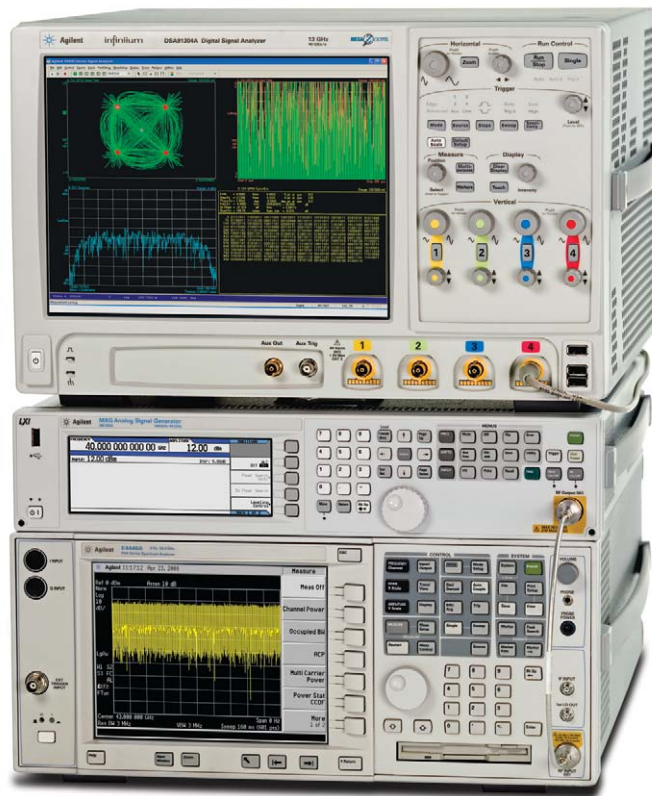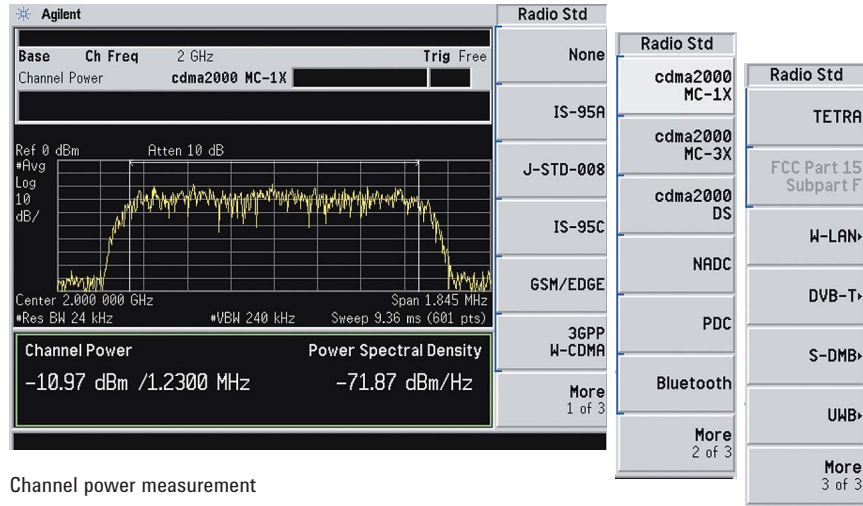
The Power to Realize

Making broadband signal measurements simple and intuitive requires unique spectrum analyzer measurement capability. The PSA Series offers a comprehensive suite of flexible, one-button RF and microwave power measurements, with wireless format-based setups for 2G/3G, W-LAN, *Bluetooth*™, UWB, and S-DMB standards. PowerSuite is a standard tool set included in every PSA Series spectrum analyzer.

PowerSuite measurements

- channel power
- occupied bandwidth
- adjacent channel power (with multiple offsets)
- multicarrier power/ 12-carrier ACP
- power statistics (CCDF)
- harmonic distortion
- burst power
- third order intercept (TOI)
- spurious emissions
- spectrum emission mask

Channel power measurement

EMI Measurements
Perform EMI precompliance measurements using the PSA's built-in CISPR and MIL standards compliant EMI detectors and bandwidths. Avoid costly redesign by measuring the radiated and conducted emissions of your design early in the develop-ment process.

To learn more, read...

PSA Series Swept and FFT Analysis Product Note 5980-3081EN

The PowerSuite is also offered standard in the **N9030A PXA** with improved user interface and faster implementation.

The Power to Realize (Continued)

Amplitude corrections

The Corrections menu, a standard feature in the PSA, allows you to enter and select a set of correction factors for antennas or other system components that you wish to account for in the measurements. These frequency and amplitude corrections will be applied to the displayed data to correct for system losses or gains outside the analyzer. Four different sets of correction data can be stored.

Limit lines

Customizable limit lines for pass/fail testing are standard with every PSA Series spectrum analyzer.
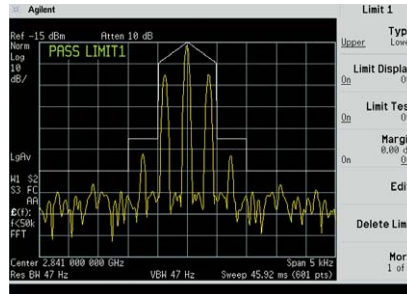
Gated sweep

Use the standard, built-in gated sweep capability to analyze time varying signals, such as burst RF or TDMA, without interference from switching the carrier on and off.

Internal RF/µW preamplifier (Option 110)

This internal preamplifier operates from 10 MHz to 50 GHz, or the upper frequency limit of the PSA used. Its high gain and low noise figure allows for measurements of extremely low-level signals and is calibrated and characterized.

PSA-based EMI measurement receiver

Add the N9039A RF preselector to the E444xA Series PSA Option 239 to give you a fully CISPR compliant EMI measurement receiver. Use the N5181A MXG signal generator for preselector alignments. The recommended user alignment cycle is 14-days.

Customize limit lines for pass/fail testing
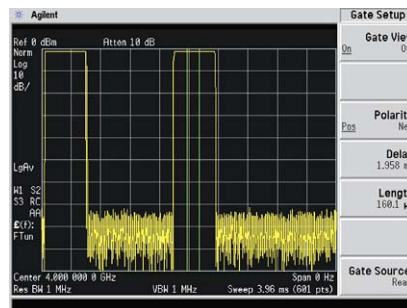
Gated sweep measurement

To learn more, read...

EMI Measurement Receiver Product Overview 5989-6807EN
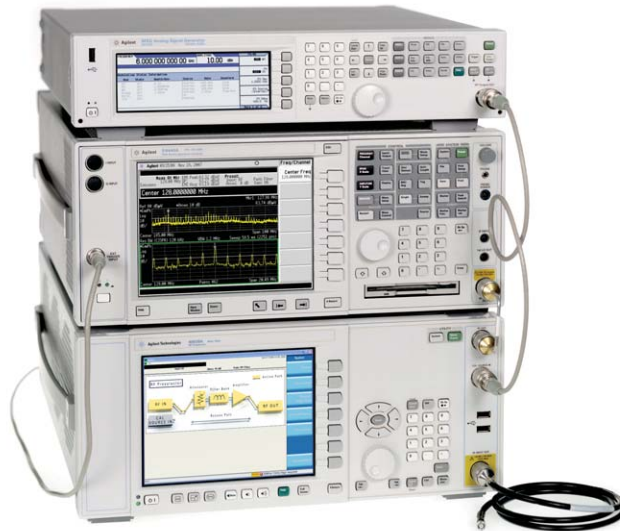
PSA-based EMI measurement receiver

Standard features of the **N9030A PXA** also include amplitude correction (Ampcor), limit lines (LL) and gated sweep. The PXA's Ampcor and LL are backward compatible with the PSA and have improved usability. The N9030A PXA provides an optional internal RF/uW preamplifier covering 100 kHz up to the maximum frequency of the analyzer.

Measurement Personalities

There are 16 measurement personalities available for the PSA Series. Conveniently built-in to the analyzer, these optional application-specific measurement personalities provide advanced capabilities with one-button measurement simplicity.

Updated

Measuring Receiver Personality (Option 233)

Available on all PSA models, the built-in measuring receiver personality converts the PSA Series high-performance spectrum analyzer into the heart of the flexible and compact N5531S measuring receiver system. The N5531S is comprised of a PSA, a P-Series power meter, and a sensor module with single-input connection up to 50 GHz. PSA Option 107 (audio input), along with Option 233 (built-in measuring receiver personality), enables audio analysis capabilities. It sets a new standard for signal generator and attenuator calibration to meet the most stringent metrology and calibration demands. AM/FM/PM carrier triggering, and a CCITT filter for audio or modulation analysis are offered standard with the measuring receiver (Firmware rev. >A.11.08). Recent enhancements include a tracking feature for the tuned RF level (TRFL) measurement, which enables accurate power measurements for drifting signal sources.
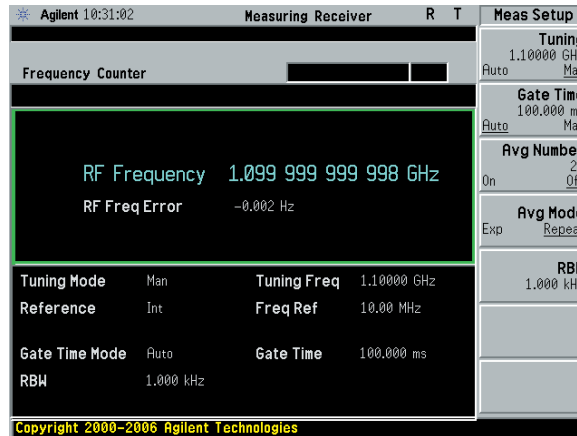
PSA measuring receiver personality

WLAN (Option 217)

This measurement personality analyzes the RF and modulation characteristics of IEEE-standard Wireless Local Area Network (WLAN) signals, including 802.11b/a/g. Additionally, signals with slightly different modulation parameters, such as 802.11j and 802.11a-turbo mode, can be analyzed.

Measurement Personalities (Continued)

Phase noise (Option 226)
This flexible tool quickly and easily generates plots of phase noise in dBc/Hz versus log offset frequency, measures jitter, or makes continuous spot frequency phase noise measurements.

Noise figure (Option 219)
Make noise figure measurements from 200 kHz to 26.5 GHz, or 10 MHz to 50 GHz (with a specified performance up to 3 GHz). Other measurements include gain, Y-factor, $T_{effective}$, P_{hot}, P_{cold} and a built-in uncertainty calculator to qualify the measurement system.
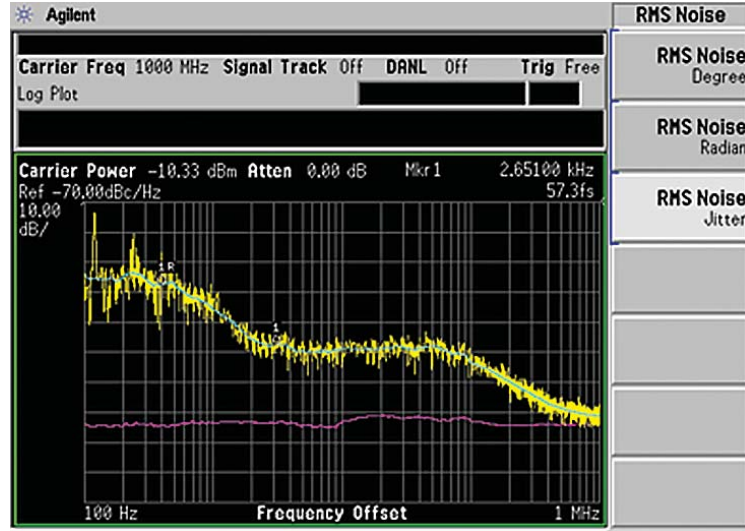
Log plot of phase noise measurement

Updated

External source control (Option 215)
Empower the PSA Series high-performance spectrum analyzers with scalar network analysis capability up to 50 GHz. With Option 215, all the PSA Series models can control Agilent PSG, ESG, or MXG (N5181A/N5182A) signal generators, providing a variety of sweep modes to optimize the stimulus/response measurements required for component characterization. Support to the Agilent MXG offers significant speed and cost advantages to customers.
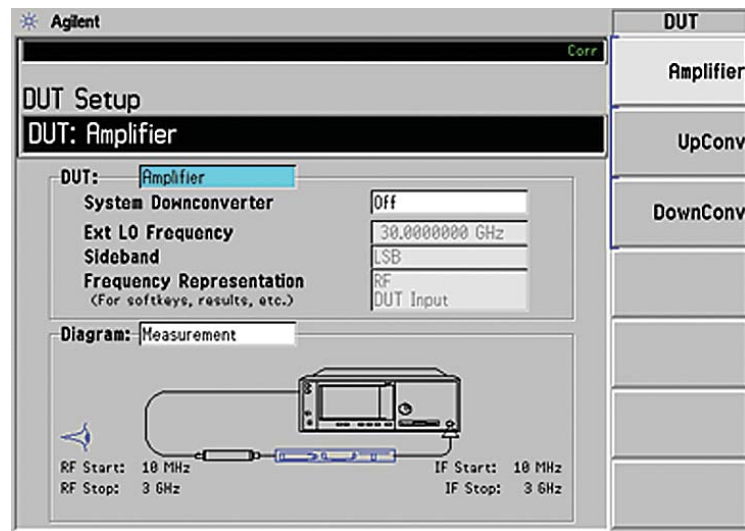
DUT setup menu for noise figure measurements

The N9068A phase noise measurement application and the N9069A noise figure measurement application are available for the **N9030A PXA**. Take advantage of superior phase noise performance of the PXA to achieve even better accuracy in phase noise measurements.

Flexible digital modulation analysis (Option 241)

Analyze and measure digital modulation quality and troubleshoot a wide variety of digitally modulated signals with this built-in flexible tool. Provide not only the EVM results, but also numerous traces with the EQ filter function.

Cellular communications

The PSA Series offers powerful, format-based power measurements and modulation analysis for several popular cellular formats.

- **W-CDMA** (Option BAF) for uplink and downlink

- **HSDPA and HSUPA** (Option 210) as an enhancement to the W-CDMA option

- **1xEV-DO** (Option 204) for forward and reverse links including 3GPP2 Rev-A support

W-CDMA/HSDPA/HSUPA modulation analysis

- **GSM with EDGE** (Option 202) for including EDGE EVM, PvT, PFER, and ORFS

- **cdma2000®** (Option B78) for forward and reverse links

- **1xEV-DV** (Option 214) as an enhancement to the cdma2000 option

- **cdmaOne** (Option BAC)

- **NADC/PDC** (Option BAE)

Updated

TD-SCDMA (Option 211/212/213)

PSA TD-SCDMA personalities perform measurements on TD-SCDMA signals, including new capabilities for high-speed downlink and uplink packet access—HSDPA/HSUPA and 8PSK modulation analysis. View modulation results, such as composite EVM and code domain power, as well as RF power metrics. The measurements have clear pass/fail indicators to verify standard conformance.

To learn more, read...

Measurement Personality Technical Overviews, a complete list is available on page 22

The 89601X VXA vector signal analysis application, built-in to the **N9030A PXA**, provides flexible digital modulation analysis tool, while using the instrument's front panel buttons

Truly User Friendly

The PSA Series has a simple and intuitive user interface. The display is large and bright with effective use of colors. Front panel hard keys perform frequently used functions and provide access to menus. Soft keys on the display are organized for quick and easy navigation. One-button setups are provided for many measurements.

Built-in, on-screen help makes it very easy to look up information for front panel soft keys and hard keys, including their equivalent remote SCPI commands. Help is available for the base instrument and Power Suite operations, as well as phase noise, noise figure, and TD-SCDMA measurement personalities.

Trace operations allow users to do post-measurement processing among displayed traces, including trace exchange, copying, addition, subtraction, mean, and trace normalization.

Real-time clock for time-stamping of data files and printouts

Expand measured results to full screen on the bright, high resolution, wide viewing angle, 17-cm color display

Built-in on screen help

Workstation processor

Automatic background alignment for exceptional accuracy

Frequency reference input (1 to 30 MHz)

321.4 MHz IF output*

High speed data throughput
(USB 2.0, device side only Option 111, standard)

70 MHz IF output (Option H70 or HY7)*

21.4 MHz IF output (Option HYX)*

GPIB to communicate with SCPI

*   321.4 MHz and 70 MHz IF output are not available
    for E4447A; 21.4 MHz IF output (Option HYX) is
    available for all PSA models.

Noise source control
output for noise
figure measurements
(Option 219)

10 baseT LAN for control and upgrades

Parallel printer port for connection to standard PC printers
and quick printouts of measurement results

VGA output to connect to a video monitor or projector

Shift easily between
measurement personalities

Access flexibility
features under one menu

Comprehensive
marker functions

Easy access to and control of
one-button measurements
and setups

External mixing (Option AYZ)

Precision type-N with
selectable DC coupling for
measurements from 3 Hz
(2.4 mm connector on
E4447A, E4446A, and
E4448A)

Floppy disk drive
(screen capture in .gif, frequency
and amplitude pairs in .csv)

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A Spectrum Analyzer with a Digital Brain

Agilent PSA Series block diagram

2 dB step attenuator
0 to 70 dB

Optional 30 dB gain preamplifier 500 kHz to 3 GHz
or 27 dB gain from 10 MHz to 50 GHz

30 megasamples/s (optional 200 megasamples/s) 14-bit analog digital converter (ADC)

FFT

LO

Marker △
–1.000000 MHz
–79.010 dB

LO phase noise optimization

Swept or FFT

160 narrow step resolution bandwidths

Digital detector suite

High-resolution display

All-digital auto-ranging IF

The PSA Series has an all-digital IF section with auto-ranging capability. After the input signal is downconverted, it is immediately digitized, and all processing is performed digitally. This architecture offers:

- Variable RBW filters in 10% steps

- Exact and predictable resolution bandwidths

- Zero uncertainty in reference level and display scale switching

- Improved filter shape factor

- Faster sweep speeds

- Increased display resolution

- FFT capability

- Multiple detector modes

With auto-ranging, the analyzer adjusts the input signal in real time during the sweep so that the full range of the digitizer is utilized. Thus, at every point in the sweep, the signal is being measured with the full resolution and dynamic range of the ADC.

- Signals are measured accurately everywhere on the display

- Accuracy and linearity do not degrade when measuring small signals in the presence of large signals

- The dynamic range of the instrument is not limited by the dynamic range of the digitizer

To learn more, read...

Measurement Innovations and Benefits
Product Note
5980-3082EN

Modern Connectivity

Connect
The PSA Series has a built-in capability to network with PCs, printers, and software programs. Standard connectivity features include:

- **IVI-C/IVI-COM** drivers for Agilent VEE

- **IntuiLink** software for easy transfer of measurement results into Microsoft® Excel and Word

- **Floppy disk drive**

- **GPIB** and **10 baseT LAN** for automated control and remote operation

- **82357B USB/GPIB interface** for direct connection from the USB port on your PC to the PSA

- **SCPI** programmability

- **High-speed data throughput** with device-side USB 2.0 interface (Option 111, device-side only); now shipped standard

- **Code compatibility measurement personality suite** (Option 266) for easily upgrading your 8566A/B, 8568A/B, or 8560 and 8590 Series spectrum analyzers to the PSA Series

- **Y-axis video output** (Option 124) provides performance similar to the 8566A/B, 8568A/B spectrum analyzer

- **Parallel port** for printing

- **BenchLink web remote** (Option 230) used to control analyzer functions, record and evaluate data, and view signals in real time, remotely anywhere in the world over the Web
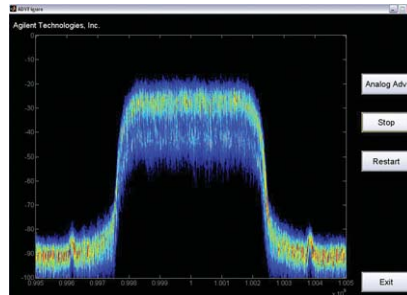
Example application developed in MATLAB software to visualize a W-CDMA signal

The **N9030A PXA** offers even more powerful connectivity. When used in a system, the **PXA** can be remotely controlled through GPIB, LAN/LXI, USB 2.0, or Windows desktop connectivity. With open Windows XP Pro and GPIB controller capacity, the PXA can even replace your current PC in the system rack. In addition, the USB port adds versatility by providing both device-side and master functionality.

The **N9061A** remote language compatibility application is included in every **PXA**, allowing seamless migration from the HP 8566/68 and HP/Agilent 856xE/EC legacy spectrum analyzers to the **PXA**.

The **PXA Option N9030A-YAV** is the equivalent to Option 124 in the PSA, offering Y-axis video output to emulate the 8566/68 features.

- **MATLAB® driver support** MATLAB, the well known software environment and programming language, enables you to configure, control, and acquire data from Agilent PSA Series spectrum analyzers; once data is in MATLAB, you can analyze and visualize it using interactive tools and command-line functions for data analysis tasks such as signal processing, statistical analysis, digital filtering, curve fitting, and nonlinear optimization; order MATLAB software directly from Agilent at **www.agilent.com/find/N6171A**

Agilent's IO Libraries Suite ships with the PSA Series to help you quickly establish an error-free connection between your PC and instruments – regardless of the vendor. It provides robust instrument control and works with the software development environment you choose.

# Connecting to the Industry's Leading VSA Software

Advanced modulation analysis with Agilent 89600 Series vector signal analysis software

For engineers working with today's emerging broadband communication systems, the PC-based Agilent 89600 Series vector signal analysis (VSA) software and the PSA together provide an indispensable tool for basic research and product development.

Evaluate modulated signals, digital and analog, with 40 or 80 MHz of analysis bandwidth and up to 78 dB of dynamic range (with Option 140 or 122). The 89600 Series vector signal analysis software teams advanced demodulation algorithms with highly flexible scalar and vector analysis tools to help you develop, troubleshoot and verify the physical layer performance of your radio system. Choose from options to analyze general purpose and standards-based modulation formats such as 3G, LTE, HSPA+, WiMAX, WLAN, RFID, and more.

See **www.agilent.com/find/89600** for more information.

Agilent 89600 Series vector signal analysis software

Agilent's 89600 Series vector signal analysis software resides in the **N9030A PXA** instrument, which has Widows-based operating system, eliminating the requirement of an external PC to run the software, providing the industry's most flexible digital modulation analysis.
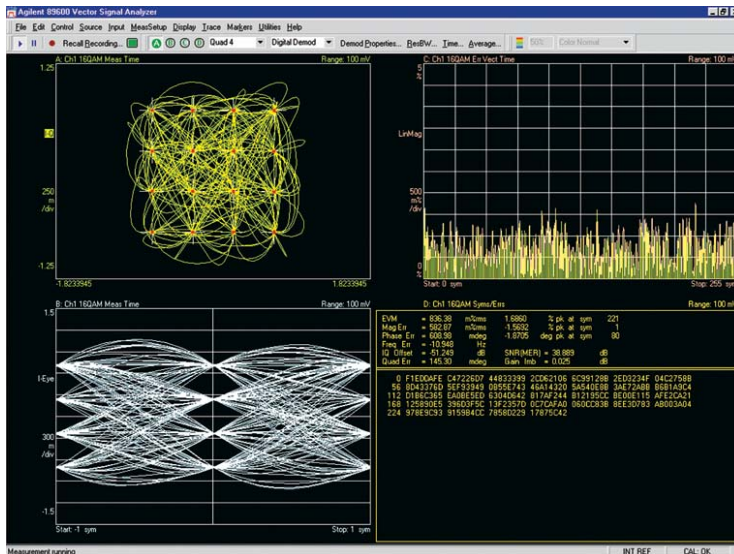
Confidence Brings Reward

PSA series specifications
Every PSA Series spectrum analyzer is thoroughly tested and guaranteed to meet the specifications given in the PSA Spectrum Analyzers Specifications Guide and other product literature. With reliable performance, error budgets for measurement uncertainty can be reduced resulting in increased yields, improved device specification settings, and reduction in test setup costs.

Typical performance
Because 80% of PSA Series analyzers typically perform significantly better than the guaranteed specifications, we supply a "typical" value for the more commonly used specifications. Use this typical data when comparing products, or when the application pushes the limit on a given specification.

Performance verification and instrument calibration
All functions and specifications of each PSA are fully calibrated and certified in the Agilent factory. The recommended calibration cycle for the PSA is two years, and Agilent calibration services are available worldwide to support this product. Furthermore, Agilent can provide ANSI Z540 or ISO 17025 conformant and accredited calibrations upon request, which provide detailed data reports and certifications.

To learn more, read...

ISO 17025 and Accredited Calibrations Brochure
5988-7953EN

Key Specifications

For more specification details, refer to the PSA Series Data Sheet, 5980-1284E

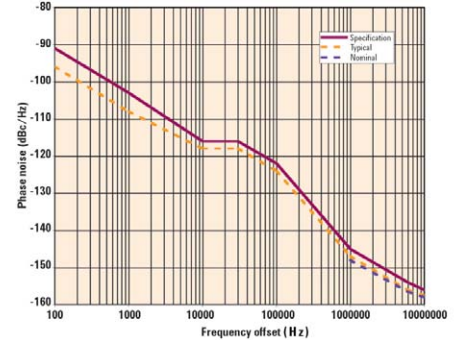## E4443A/E4445A/E4440A/E4447A/E4446A/E4448A

Frequency range 3 Hz to 6.7/13.2/26.5/42.98/44/50 GHz (to 325 GHz with external mixing)

Speed		
	Sweep time, span ≥ 10 Hz	1 ms to 2000 s
	Sweep time span = 0 Hz	1 μs to 6000 s
	Fast ACP measurement time	≤ 30 ms (0.2 dB standard deviation)
	Local measurement update rate	≥ 50 measurements/s
	Remote measurement update rate	≥ 45 measurements/s

Resolution		
	Resolution bandwidth range, swept and FFT	1 Hz to 3 MHz (10% steps), 4, 5, 6, 8 MHz
	Variable sweep (trace) point range	101 to 8192
	Phase noise at 1 GHz	
	10 kHz offset	–116 dBc/Hz (–118 dBc/Hz, typical)
	1 MHz offset	–145 dBc/Hz (–148 dBc/Hz, nominal)
	10 MHz offset	–155 dBc/Hz (–157 dBc/Hz, nominal)

PSA Series phase noise performance plot
(1 GHz center frequency)

Dynamic range		
	Displayed average noise level (DANL)	
	10 MHz to 3 GHz	–152 dBm (–153 dBm typical)
	3 GHz to 20 GHz	–147 dBm (–149 dBm typical)
	20 GHz to 26.5 GHz	–143 dBm (–145 dBm typical)
	26.5 GHz to 44 GHz	–129 dBm (–132 dBm typical)
	44 GHz to 50 GHz	–127 dBm (–130 dBm typical)
	Preamplifier (DANL), Option 1DS	
	100 kHz to 10 MHz	–158 dBm (–162 dBm typical)
	10 MHz to 3 GHz	–165 dBm (–166 dBm typical)
	Preamplifier (DANL), Option 110	
	10 MHz to 3 GHz	–153 dBm (–154 dBm typical)
	3 MHz to 26.5 GHz	–159 dBm (–161 dBm typical)
	26.5 MHz to 50 GHz	–136 dBm (–145 dBm typical)
	1 dB gain compression, 200 MHz to 3 GHz	+3 dBm (+7 dBm nominal)
	Input attenuator range	0 to 70 dB in 2 dB steps
	TOI, 1.7 GHz to 3.0 GHz	+17 dBm (+19 dBm typical)
	ACPR, W-CDMA (5 MHz offset)	
	Dynamic range	–74.5 dB typical
	With noise correction	–81 dB typical

Accuracy		
	Absolute amplitude accuracy	±(0.24 dB + frequency response)
		[±(0.06 dB + frequency response) typical]
	Frequency response, 3 Hz to 3 GHz	±0.38 dB (±0.11 dB typical)
	Frequency accuracy (1 GHz)	±100 Hz
	ACPR, W-CDMA accuracy (5 MHz offset)	
	Mobile station	±0.12 dB
	Base station	±0.22 dB

Analysis bandwidth[1]		
	With Option 140 (E4443A/45A/40A/46A/48A)	40 MHz
	With Option 122 (E4443A/45A/40A/46A/48A)	80 MHz
	With Option B7J (Option E444xA-B7J)	10 MHz
	321.4 MHz IF output [2]:	
	–1 dB bandwidth	20 to 30 MHz nominal
	With Option 123:	200 MHz nominal
	–3 dB bandwidth	30 to 60 MHz nominal

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To learn more, read...

PSA Series
Data Sheet
5980-1284E

</div>

1. Analysis bandwidth is the instantaneous bandwidth available around a center frequency over which the input signal can be digitized for further analysis or processing in the time, frequency, or modulation domain.
2. 321.4 MHz IF output is not available on E4447A; 21.4 MHz IF output with 10 MHz nominal bandwidth is available as option HYX for all PSA models.

Service and Support

The performance and flexibility of the PSA Series spectrum analyzer is only a small part of what is available from Agilent. In a constantly changing environment, Agilent's ability to understand your business needs and quickly provide the latest end-to-end service and support solutions gives the certainty and confidence necessary to accelerate the development and deployment of winning technologies.

Support solutions
Use Agilent's support solutions to get more from the PSA, as well as other test equipment, by increasing productivity and maximizing up-time. Our programs are designed with flexibility and can be tailored to meet your needs, including costs and response times.

Repair services – ensure that the instrument is up and running as quickly as possible. The PSA comes with a one-year return-to-Agilent warranty. Extended warranty and technical support options are available at the time of purchase.

Agilent Calibration services – are available worldwide to insure PSA measurement confidence to its original factory shipped condition. Choose from return-to-Agilent or on-site calibration services. Upfront calibration plans available at the time of purchase provide the best value.

Volume On-site Calibration (VOSCAL) service – minimizes instrument downtime and associated costs by delivering quality calibration on-site without interfering with output schedules. VOSCAL is a fully operational, high-quality mobile calibration laboratory complete with high-specification systems and automation.

System up-time services – provide Agilent's global resources and expertise to help prevent system failures and develop solutions to problems fast. Our system up-time teams are comprised of our best service specialists to keep systems up and running.

Equipment management services – assist in managing test and measurement assets. Agilent's global equipment management solution helps maximize the utilization and reduce the ownership cost of test equipment.

For more information on Agilent support solutions visit:
www.agilent.com/find/tm_services

Service and Support (Continued)

Knowledge services

Our goal at Agilent is to provide the key resources that will help you build the comprehensive solutions to stay competitive. Agilent's knowledge services are the best in the business and encompass a wide range of solutions designed with your goals in mind.

Technical consulting – provides the required technical expertise to complete and implement specific test strategies.

Process consulting – helps to integrate new R&D or manufacturing test processes and technology into your current environment.

Enterprise business consulting – provides business-planning services focused on enterprise-wide test issues.

Training and education – gives access to our depth of product expertise and helps keep you abreast of emerging technologies. Encompassing technology training, product training, measurement fundamentals and applications training, our classes can be delivered on-site or at an Agilent Training Center.

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PSA Series Ordering Information

For further information, refer to PSA Series Configuration Guide, 5989-2773EN

PSA Series spectrum analyzer

E4443A 3 Hz to 6.7 GHz
E4445A 3 Hz to 13.2 GHz
E4440A 3 Hz to 26.5 GHz
E4447A 3 Hz to 42.98 GHz
E4446A 3 Hz to 44 GHz
E4448A 3 Hz to 50 GHz

Options

To add options to a product,
use the following ordering scheme:
Model E444xA (x = 0, 3, 5, 6, 7 or 8)
Example options   E4440A-B7J, E4448A-1DS

Warranty & Service

Standard warranty is one year.

R-51B-001-3C	1-year return-to-Agilent warranty extended to 3 years

Calibration [1]

R-50C-011-3	Inclusive calibration plan, 3 year coverage
R-50C-013-3	Inclusive calibration plan and cal data, 3 year coverage
E444xA-0BW	Service manual
E444xA-UK6	Commercial calibration certificate with test data
E444xA-A6J	Factory ANSI Z540 standard-compliant calibration
E444xA-1A7	Factory ISO 17025 standard-compliant calibration
R-52A	Calibration software and licensing (ordered with PSA)
N7810A	PSA Series calibration application software (stand-alone order)

Measurement Personalities

E444xA-226	Phase noise	
E444xA-219	Noise figure	Requires Option IDS or 110 to meet specifications
E444xA-241	Flexible digital modulation analysis	
E444xA-BAF	W-CDMA	Requires B7J
E444xA-210	HSDPA/HSUPA (for W-CDMA)	Requires B7J and BAF
E444xA-202	GSM w/ EDGE	Requires B7J
E444xA-B78	cdma2000	Requires B7J
E444xA-214	1xEV-DV	Requires B7J and B78
E444xA-204	1xEV-DO	Requires B7J
E444xA-BAC	cdmaOne	Requires B7J
E444xA-BAE	NADC, PCD	Requires B7J
E444xA-217	WLAN	Requires 122 or 140
E444xA-211	TD-SCDMA power measurement	
E444xA-212	TD-SCDMA modulation	Requires B7J
E444xA-213	HSPA for TD-SCDMA	Requires Option 212
E444xA-215	External source control	
E444xA-266	Programming code compatibility suite	
E444xA-233	Built-in measuring receiver personality	
E444xA-239	N9039A RF preselector control	

Hardware

E444xA-1DS	RF internal preamplifier (100 kHz to 3 GHz)	Excludes 110
E444xA-110	RF/µW internal preamplifier (10 MHz to upper frequency limit of the PSA)	Excludes 1DS
E444xA-B7J	Digital demodulation hardware	
E444xA-122	80 MHz bandwidth digitizer	E4440A/43A/45A/46A/48A, excludes 140, 107, H70
E444xA-140	40 MHz bandwidth digitizer	E4440A/43A/45A/46A/48A, excludes 122, 107, H70
E444xA-123	Switchable MW preselector bypass	Excludes AYZ
E444xA-124	Y-axis video output	
E444xA-AYZ	External mixing	E4440A/47A/46A/48A only, excludes 123
E444xA-107	Audio input 100 kΩ	Requires 233 to operate; excludes 122, 140
E444xA-111	USB device side I/O interface	Now shipped standard
E444xA-115	512 MB user memory	Excludes 117, Shipped standard in all PSA instruments with serial number prefix ≥ MY4615 unless 117 is installed
E4440A-BAB	Replaces type-N input connector with APC 3.5 connector	
E444xA-H70	70 MHz IF output	Excludes 122, 140. Not available for E4447A
E444xA-HYX	21.4 MHz IF output	Available for all PSA models

PC Software

E444xA-230	BenchLink Web Remote Control Software	
E444xA-235	Wide BW digitizer external calibration wizard	Requires 122 or 140 E4443A/45A/40A/46A/48A

Accessories

E444xA-1CM	Rack mount kit
E444xA-1CN	Front handle kit
E444xA-1CP	Rack mount with handles
E444xA-1CR	Rack slide kit
E444xA-015	6 GHz return loss measurement accessory kit
E444xA-045	Millimeter wave accessory kit
E444xA-0B1	Extra manual set including CD ROM

1. Options not available in all countries

Product Literature

Publication Title	Publication Type	Publication Number
PSA Series		
Selecting the Right Signal Analyzer for Your Needs	Selection Guide	5968-3413E
PSA Series	Brochure	5980-1283E
PSA Series	Data Sheet	5980-1284E
PSA Series	Configuration Guide	5989-2773EN
Self-Guided Demonstration for Spectrum Analysis	Product Note	5988-0735EN
PXA Series		
N9030A PXA Brochure	Brochure	5990-3951EN
N9030A PXA Data Sheet	Data Sheet	5990-3952EN
N9030A PXA Configuration Guide	Configuration Guide	5990-3953EN
PSA Wide bandwidth and vector signal analysis		
40/80 MHz Bandwidth Digitizer	Technical Overview	5989-1115EN
Using Extended Calibration Software for Wide Bandwidth Measurements, PSA Option 122 & 89600 VSA	Application Note 1443	5988-7814EN
PSA Series Spectrum Analyzer Performance Guide Using 89601A Vector Signal Analysis Software	Product Note	5988-5015EN
PSA Measurement personalities and applications		
Phase Noise Measurement Personality	Technical Overview	5988-3698EN
Noise Figure Measurement Personality	Technical Overview	5988-7884EN
External Source Measurement Personality	Technical Overview	5989-2240EN
Flexible Modulation Analysis Measurement Personality	Technical Overview	5989-1119EN
W-CDMA and HSDPA/HSUPA Measurement Personalities	Technical Overview	5988-2388EN
GSM with EDGE Measurement Personality	Technical Overview	5988-2389EN
cdma2000 and 1xEV-DV Measurement Personalities	Technical Overview	5988-3694EN
1xEV-DO Measurement Personality	Technical Overview	5988-4828EN
WLAN Measurement Personality	Technical Overview	5989-2781EN
TD-SCDMA Measurement Personality	Technical Overview	5989-0056EN
Built-in Measuring Receiver Personality / Agilent N5531S Measuring Receiver	Technical Overview	5989-4795EN
IntuiLink Software	Data Sheet	5980-3115EN
Programming Code Compatibility Suite	Technical Overview	5989-1111EN
EMI Measurement Receiver	Product Overview	5989-6807EN
PSA Hardware options		
PSA Series Spectrum Analyzers Video Output (Option 124)	Technical Overview	5989-1118EN
PSA Series Spectrum Analyzers, Option H70,70 MHz IF Output	Product Overview	5988-5261EN
Spectrum analyzer fundamentals		
Optimizing Dynamic Range for Distortion Measurements	Product Note	5980-3079EN
PSA Series Amplitude Accuracy	Product Note	5980-3080EN
PSA Series Swept and FFT Analysis	Product Note	5980-3081EN
PSA Series Measurement Innovations and Benefits	Product Note	5980-3082EN
Spectrum Analysis Basics	Application Note 150	5952-0292
Vector Signal Analysis Basics	Application Note 150-15	5989-1121EN
8 Hints for Millimeter Wave Spectrum Measurements	Application Note	5988-5680EN
Spectrum Analyzer Measurements to 325 GHz with the Use of External Mixers	Application Note 1453	5988-9414EN
EMI	Application Note 150-10	5968-3661E

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Revised: July 2, 2009

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