Keysight Technologies
Spectrum Analyzer and Signal Analyzer

Selection Guide

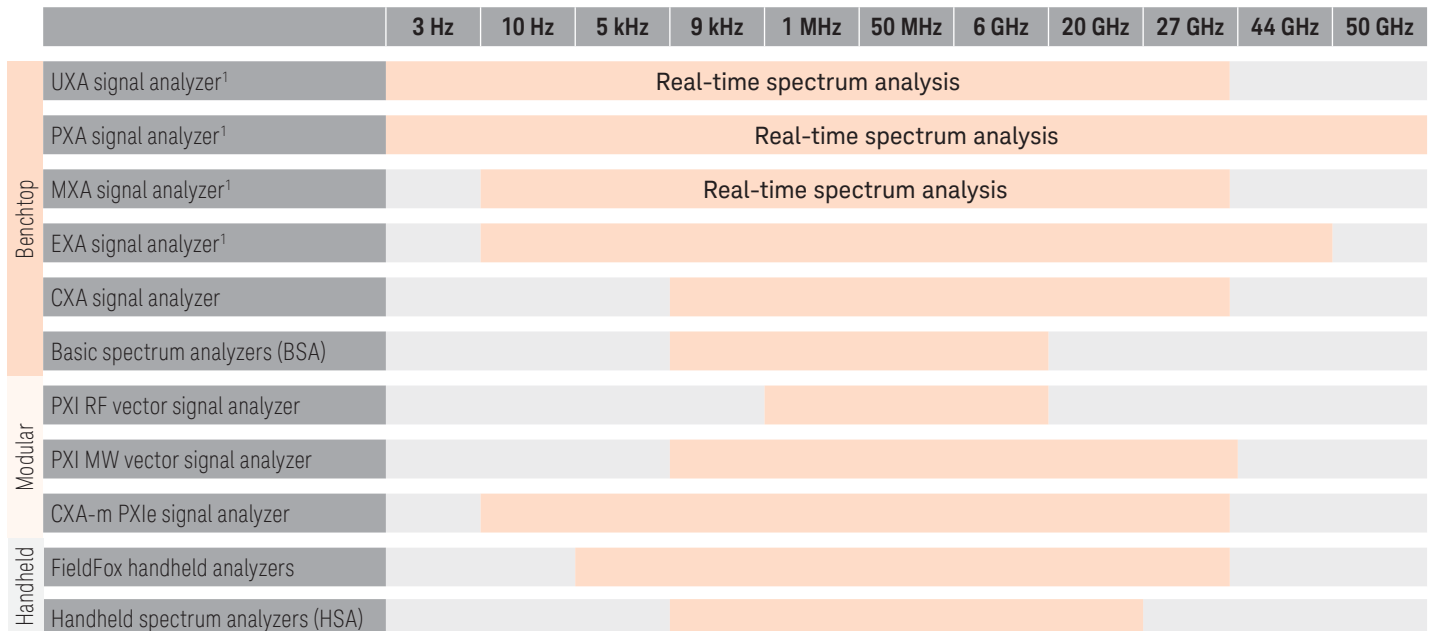**KEYSIGHT**
TECHNOLOGIES

Introduction

Keysight's extensive array of signal analyzer products, from DC to 325[1] GHz and beyond, address whatever application you may be working on.

Proven measurement science and expertise are incorporated into all of our signal analyzers and measurement software, ensuring accurate frequency, amplitude, and modulation measurements, including distortion, spurious, phase noise, and 2G to 4G wireless communications signals. And because many of Keysight's benchtop and modular instruments share a common set of software applications, you gain efficiency with measurement integrity that ensures consistent results that correlate across platforms as your product moves through its product lifecycle.

Additionally, for applications that require greater mobility, handheld products offer the ability to take precision out into the field.

This selection guide is designed to help you identify the right spectrum or signal analyzer and software to fit your budget, application, and specific measurement needs.

Frequency coverage for Keysight spectrum and signal analyzers

		3 Hz	10 Hz	5 kHz	9 kHz	1 MHz	50 MHz	6 GHz	20 GHz	27 GHz	44 GHz	50 GHz
Benchtop	UXA signal analyzer[1]	Real-time spectrum analysis										
	PXA signal analyzer[1]	Real-time spectrum analysis										
	MXA signal analyzer[1]		Real-time spectrum analysis									
	EXA signal analyzer[1]											
	CXA signal analyzer											
	Basic spectrum analyzers (BSA)											
Modular	PXI RF vector signal analyzer											
	PXI MW vector signal analyzer											
	CXA-m PXIe signal analyzer											
Handheld	FieldFox handheld analyzers											
	Handheld spectrum analyzers (HSA)											

1. Up to 1.1 THz with external mixing

Product Categories

Traditionally, spectrum analyzers are referred to as swept-tuned, super-heterodyne receivers that provide a display of amplitude versus frequency. Modern day analyzers offer both swept-tuned and Fast Fourier transform (FFT) architectures.

While the terms spectrum analyzer and signal analyzer are used interchangeably, signal analyzer is a more accurate term for modern day analyzers that combine the superior dynamic range of a swept tuned spectrum analyzer with vector signal analyzer (VSA) capabilities that enable in-channel measurements such as error vector magnitude (EVM), requiring both magnitude and phase information. The signal analyzer's versatility comes from the implementation of a fully-digital IF replacing the analog IF used in traditional spectrum analyzers.

Benchtop

Benchtop spectrum and signal analyzers are well-suited for R&D or design verification where analysis and troubleshooting benefit from interactive analysis. Keysight's benchtop analyzers range from low cost to industry-leading performance with the broadest range of measurement capabilities so you can choose the analyzer that best suits your needs.

Modular PXI

Modular signal analyzers are ideal for applications that require fast, high quality measurements, such as high-volume manufacturing, where quality control, product conformance and test optimization are essential. Modular solutions offer speed, scalability and repeatability, along with the flexibility to configure a solution with a shared processor, frame/chassis, display, and interface. Benefit from Keysight's measurement expertise, software, and PXI integration to create an application-focused modular solution, including multi-channel or multi-measurement capability.

Handheld

Whether you're looking for value or precision, RF or microwave, we offer rugged, accurate, fast, and easy-to-use handheld spectrum analyzers to address challenges faced by field technicians and engineers. Handheld analyzers are optimized for long battery life and minimal weight.

Applications and measurement software

Available for a broad range of communication standards and modulation types, Keysight offers PC- and instrument-based applications and software that work with our benchtop and modular analyzers to address measurement needs from in-depth troubleshooting, to standard-compliant design validation, to high-speed pass/fail testing. Achieve greater efficiency, minimize development time and reduce risk through measurement integrity that ensures consistent, reliable results that correlate across your product lifecycle.

Free trial license
Download the 89600 VSA software and use if for 30 days to make measurements with your analysis hardware, or use our recorded demo signals. **www.keysight.com/find/vsa_trial**

Key Specifications Comparison

Specifications	Benchtop					
	UXA	PXA	MXA	EXA	CXA	BSA
	N9040B	N9030A	N9020A	N9010A	N9000A	N9320B, N9322C
Performance	★★★★★★	★★★★★	★★★★	★★★	★★	★
Frequency range, min-max	3 Hz to 26.5 GHz	3 Hz to 50 GHz	10 Hz to 26.5 GHz	10 Hz to 44 GHz	9 kHz to 26.5 GHz	9 kHz to 7 GHz
Analysis bandwidth Standard RF Optional RF Optional baseband	10 MHz 25, 40, 255, 510 MHz	10 MHz 25, 40, 85, 160 MHz 25, 40 MHz	25 MHz 40, 85, 125, 160 MHz 25, 40 MHz	25 MHz 40 MHz	10 MHz 25 MHz	1 MHz
Overall amplitude accuracy (95%)	± 0.16 dB	± 0.19 dB	± 0.23 dB	± 0.27 dB	± 0.50 dB	± 0.50 dB, ± 0.60 dB
Dynamic range, max third order at 1 GHz	119 dB	119 dB	116 dB	112 dB 116 dB[1]	111 dB	76 dB, 83 dB
Displayed average noise level (DANL) @ 1 GHz	–171 dBm	–171 dBm	–166 dBm	–163 dBm –165 dBm[1]	–163 dBm	–145 dBm, –152 dBm
@ 4 GHz	–172 dBm	–172 dBm	–166 dBm	–162 dBm	–159 dBm –161 dBm[2]	— –151 dBm
Third order intercept (TOI) @ 1 GHz	22 dBm	22 dBm	20 dBm	18 dBm 19 dBm[1]	17 dBm 15 dBm[2]	13 dBm, 15 dBm
Phase noise @ 1 GHz 10 kHz offset	–136 dBc/Hz	–132 dBc/Hz	–114 dBc/Hz	–105 dBc/Hz –106 dBc/Hz[1]	–110 dBc/Hz	–90 dBc/Hz,
1 MHz offset	–146 dBc/Hz	–146 dBc/Hz	–136 dBc/Hz	–137 dBc/Hz	–130 dBc/Hz	–112 dBc/Hz, –121 dBc/Hz
Standard attenuator range/step	70 dB/2 dB	70 dB/2 dB	70 dB/2 dB	60 dB/10 dB	50 dB/10 dB 70 dB/10 dB[2]	70 dB/1 dB, 50 dB/1 dB
Resolution bandwidth	1 Hz to 8 MHz	1 Hz to 8 MHz	1 Hz to 8 MHz	1 Hz to 8 MHz	1 Hz to 8 MHz	10 Hz to 1 MHz

1. For N9010A Option 532 or 544
2. For N9000A Option 513 or 526

Key Specifications Comparison

Specifications	Modular			Handheld	
	PXI RF VSA	PXI μW VSA	CXA-m	FieldFox	HSA
	M9391A	M9393A	M9290A	N993xA N991xA-233	N934xB/C
Performance	★★★★	★★★★★	★★★	★★★	★★
Frequency range, min-max	1 MHz to 6 GHz	9 kHz to 27 GHz	10 Hz to 26.5 GHz	5 kHz to 26.5 GHz	9 kHz to 20 GHz

Analysis bandwidth
  Standard RF
  Optional RF
 	
  Optional baseband
	40 MHz
	100 MHz
	160 MHz
		40 MHz
		100 MHz
		160 MHz
			10 MHz
			25 MHz
				25 MHz	2 MHz

Overall amplitude accuracy (95%)	± 0.45 dB	± 0.25 dB	± 0.6 dB	± 0.5 dB	± 1.50 dB
Dynamic range, max third order at 1 GHz	119 dB (@ 2 GHz)	120 dB	111 dB	113 dB	96 dB

Displayed average noise level (DANL)
  @ 1 GHz
  @ 4 GHz
	
	–161 dBm
	–160 dBm
		
		–168 dBm
		–166 dBm
			
			–163 dBm
			–163 dBm
				
				–154 dBm
				–154 dBm
					
					–155 dBm
					–150 dBm

Third order intercept (TOI) @ 1 GHz	18 dBm	31 dBm	16 dBm	15 dBm	11 dBm

Phase noise @ 1 GHz
  10 kHz offset
 	
  1 MHz offset
	–119 dBc/Hz
	
	–134 dBc/Hz
		–110 dBc/Hz
		
		–134 dBc/Hz
			–110 dBc/Hz
			
			–132 dBc/Hz
				–111 dBc/Hz
				
				–113 dBc/Hz
					–89 dBc/Hz
					(30 kHz offset)
					–119 dBc/Hz

Standard attenuator range/step	70 dB/1 dB	42 dB/0.25 dB	70 dB/10 dB	30 dB/5 dB	50 dB/1 dB
Resolution bandwidth	—	1 Hz to 31.25 MHz	1 Hz to 8 MHz	1 Hz to 5 MHz	10 Hz to 3 MHz
Battery				●	●

Capability Comparison

Measurements/applications	Benchtop					
	UXA	PXA	MXA	EXA	CXA	BSA
General purpose						
AM/FM tune and listen		●	●	●	●	●
Analog demodulation		●	●	●	●	●
EMI precompliance		●	●	●	●	
Enhanced display package (spectrogram plus)	●	●	●	●	●	●
Stimulus/response measurement		●	●	●	●	●
Flexible digital modulation analysis		●	●	●	●	●
MATLAB	●	●	●	●	●	
Noise figure		●	●	●	●	
Phase noise	●	●	●	●	●	
Pulse		●	●	●	●	
Real-time spectrum analysis	●	●	●			
Remote language compatibility for 856xE/EC and 8566/68		●	●	●		
SCPI language compatibility		●	●	●	●	●
Cellular communications						
1xEV-DO		●	●	●	●	
cdma2000®/cdmaOne		●	●	●	●	
GSM/EDGE/EVO		●	●	●	●	
iDEN/WiDEN/MotoTalk		●	●	●		
LTE FDD and TDD		●	●	●	●	
LTE-Advanced FDD and TDD		●	●	●		
Multi-standard radio (MSR)		●	●	●	●	
TD-SCDMA/HSPA		●	●	●	●	
W-CDMA/HSPA+		●	●	●	●	
Wireless connectivity						
Bluetooth®		●[1]	●[1]	●[1]	●[1]	
Fixed WiMAX™			●	●		
Mobile WiMAX™		●	●	●	●	
WLAN 802.11a/b/g/n/ac		●	●	●	●	
ZigBee		●[1]	●[1]	●[1]	●[1]	
Digital video						
CMMB		●	●	●	●	
Digital cable TV		●	●	●	●	
DTMB (CTTB)		●	●	●	●	
DVB-T/H/T2		●	●	●	●	
ISDB-T/T_{SB}/ T_{mm}		●	●	●	●	
PowerSuite one-button measurements						
Channel power	●	●	●	●	●	●
Occupied bandwidth	●	●	●	●	●	●
Multicarrier, multi-offset ACP	●	●	●	●	●	●
Multicarrier power	●	●	●	●	●	
CCDF	●	●	●	●	●	
Harmonic distortion	●	●	●	●	●	
Burst power	●	●	●	●	●	
Intermodulation (TOI)	●	●	●	●	●	●
Spurious emissions	●	●	●	●	●	
Spectrum emission mask	●	●	●	●	●	●

1. VXA vector signal analysis measurement application provides digital demodulation with standard presets

Capability Comparison

Measurements/applications	Modular			Handheld		
	PXI RF VSA	PXI µW VSA	CXA-m	FieldFox	HSA	89600 VSA software
General purpose						
AM/FM tune and listen				●	●	
Analog demodulation	●	●	●		●	●
EMI precompliance						
Enhanced display package (spectrogram plus)			●	●	●	●
Stimulus/response measurement	●	●		●	●	●
Flexible digital modulation analysis	●	●			●	●
MATLAB	●	●	●			
Noise figure			●			
Phase noise			●			
Pulse				●		●
Real-time spectrum analysis						
Remote language compatibility for 856xE/EC and 8566/68						
SCPI language compatibility	●	●	●	●	●	●
Cellular communications						
1xEV-DO	●	●				●
cdma2000/cdmaOne	●	●				●
GSM/EDGE/EVO	●	●				●
iDEN/WiDEN/MotoTalk						
LTE FDD and TDD	●	●				●
LTE-Advanced FDD and TDD	●	●				●
Multi-standard radio (MSR)						●
TD-SCDMA/HSPA	●	●				●
W-CDMA/HSPA+	●	●				●
Wireless connectivity						
Bluetooth	●[1]	●[1]				●
Fixed WiMAX	●	●				●
Mobile WiMAX						●
WLAN 802.11a/b/g/n/ac	●	●				●
ZigBee	●[1]	●[1]				●
Digital video						
CMMB						
Digital cable TV						
DTMB (CTTB)						
DVB-T/H/T2						●
ISDB-T/T_{SB}/ T_{mm}						●
PowerSuite one-button measurements						
Channel power			●	●	●	
Occupied bandwidth			●	●	●	
Multicarrier, multi-offset ACP			●	●	●	
Multicarrier power			●			
CCDF			●			
Harmonic distortion			●			
Burst power			●			
Intermodulation (TOI)			●			
Spurious emissions			●			
Spectrum emission mask			●	●	●	

1. VXA vector signal analysis measurement application provides digital demodulation with standard presets

Benchtop

X-Series Signal Analysis

We can't predict the future, but Keysight can help you shape it with our future-ready test assets. The X-Series is an evolutionary approach to signal analysis that spans instrumentation, measurements, and software. It gives you the flexibility to satisfy your business and technical requirements across multiple products and programs --now and in the future. The X-Series creates a consistent framework that enables your teams to move at a faster pace. Stay ready, stay in sync, and arrive ahead with the Keysight X-Series.

Future-ready instruments

X-Series signal analyzers are ready to evolve as technology changes. With X-Series instruments, you can move along the performance curve today and tomorrow without rewriting your test code, while optimizing price and performance for whichever technologies you're pursuing. With upgradeable hardware and license-key upgrades for adding functionality or measurement applications, you can keep your test assets current and extend instrument longevity. Take advantage of:

– Upgradeable CPU, memory, solid state drives, I/O ports
– Performance enhancements with Windows 7
– Optional real-time spectrum analysis and bandwidth
– New standard features, including fast sweep (depending on hardware configuration) and enhanced phase noise and third-order intercept (TOI)

Consistent measurement framework

Proven algorithms, 100% code-compatibility, and a common UI across the X-Series create a consistent measurement framework for signal analysis that ensures repeatable results and measurement integrity through all phases of product development. A common, familiar user-interface means increased efficiency and productivity --when you learn how to use one X-Series analyzer, you know how to use them all.

Software and applications

Save time and money with a shared library of applications to measure your signals, whether you're engaged in cellular, wireless connectivity, MILCOM, SATCOM, or general purpose testing. Each application can be easily upgraded as new features and technologies are introduced. With the open Windows OS you can run software such as MATLAB or 89600 VSA. See pages 16 and 17.
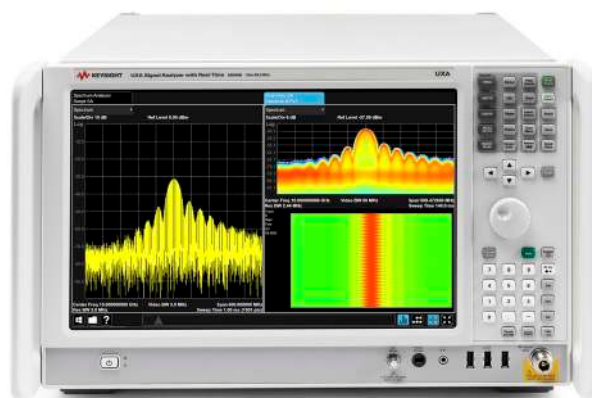

UXA
N9040B

The UXA is the flagship product of the X-Series signal analyzers. By providing a wider, deeper view of wideband and elusive signals, it allows you to take your design farther. The large streamlined touch-driven display with flexible measurement displays simplifies measurement setup and analysis. The high-performance wide analysis bandwidth can be combined with real time spectrum analysis (RTSA) and industry-leading phase noise to see the real performance of your DUT.

– Wide analysis bandwidth to 510 MHz with 78 dB spurious-free dynamic range allows analysis of radar and wide bandwidth comms signals
– Industry-leading phase noise of –136 dBc/Hz at 10 kHz offset and –142 dBc/Hz at 100 kHz offset for 1 GHz carrier
– Trigger, capture and analyze elusive signals with RTSA and 89600 VSA software over full analysis bandwidth

www.keysight.com/find/N9040B

Benchtop (continued)

X-Series Signal Analyzers
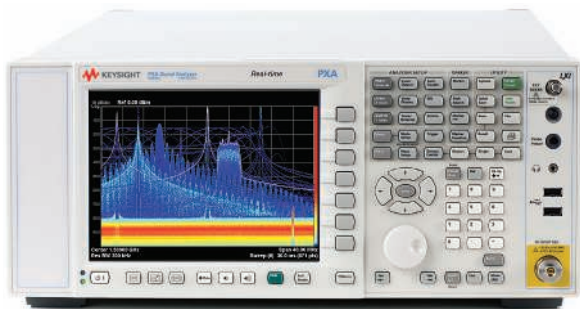
PXA
N9030A

The high-performance PXA signal analyzer is the evolutionary replacement for other performance signal analyzers. Advanced performance, flexibility and expandability enable users to meet demanding applications in aerospace, defense, commercial communications, and more. Remote language compatibility features make it easy to replace existing spectrum analyzers. Adding real-time spectrum analysis (RTSA) capability to new or existing PXAs lets you see, capture and understand the most elusive signals.

– Keysight's exclusive noise floor extension (NFE) technology delivers –172 dBm effective noise floor
– Excellent phase noise performance (–132 dBc/Hz at 10 kHz offset) and third-order intercept (up to +23 dBm)
– Analyze the most complex signals with 160 MHz analysis bandwidth and upgradable RTSA capability

MXA
N9020A

The midrange MXA is the optimum choice as you develop new wireless devices and deliver them to manufacturing and the marketplace. It has the flexibility to quickly adapt to your evolving test requirements, today and tomorrow. Address multiple formats, generations and devices with the MXA -- and accelerate in wireless. The MXA's enhanced phase noise, optional wide bandwidth, real-time, and fast sweep capability make the MXA highly versatile.

– Best-in-class phase noise performance (–114 dBc/Hz at 10 kHz offset)
– Optional 85, 125, or 160 MHz analysis bandwidth to analyze complex signals within your budget
– Upgradable RTSA capability to capture elusive signals

www.keysight.com/find/PXA

www.keysight.com/find/MXA

Key specifications	UXA	PXA	MXA	EXA	CXA
Frequency range	3 Hz to 26.5 GHz	3 Hz to 50 GHz	10 Hz to 26.5 GHz	10 Hz to 44 GHz	9 kHz to 26.5 GHz
Phase noise, 1 GHz (10 kHz offset)	–136 dBc/Hz	–132 dBc/Hz	–114 dBc/Hz	–105 dBc/Hz –106 dBc/Hz[1]	–110 dBc/Hz
Maximum third order dynamic range, 1 GHz	119 dB	119 dB	116 dB	112 dB 116 dB[1]	111 dB
Displayed average noise level, 1 GHz	–171 dBm	–171 dBm	–166 dBm	–163 dBm –165 dBm[1]	–163 dBm
Standard attenuator range/step	70 dB/2 dB	70 dB/2 dB	70 dB/2 dB	60 dB/10 dB	50 dB/10 dB 70 dB/10 dB[2]
Overall amplitude accuracy	± 0.16 dB	± 0.19 dB	± 0.23 dB	± 0.27 dB	± 0.50 dB

1. For N9010A Option 532 or 544
2. For N9000A Option 513 or 526

Benchtop (continued)

X-Series Signal Analyzers (continued)
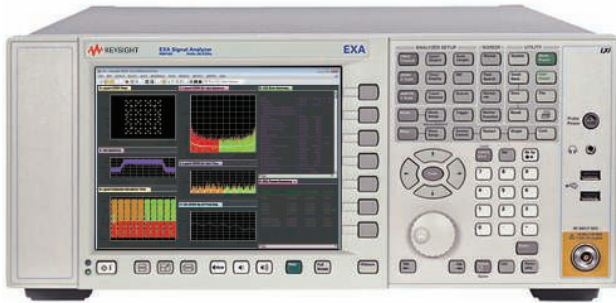
EXA
N9010A

From RF to millimeter wave, whether you're pushing to enhance a product or improve test throughput, your general-purpose signal analyzer should be ready for a wide range of challenges. That's what drives the Keysight EXA signal analyzer—the fast, flexible way to cover diverse needs with a single tool. With the most recent enhancements in phase noise, dynamic range, and sweep speed, the EXA provides a solid mix of speed and performance, and offers the versatility of X-Series measurement applications.

– Widest frequency coverage in its class - 10 Hz to 44 GHz and beyond
– Fast sweep and fast power measurement maximize and enhance yield
– Up to 40 MHz analysis bandwidth

www.keysight.com/find/EXA
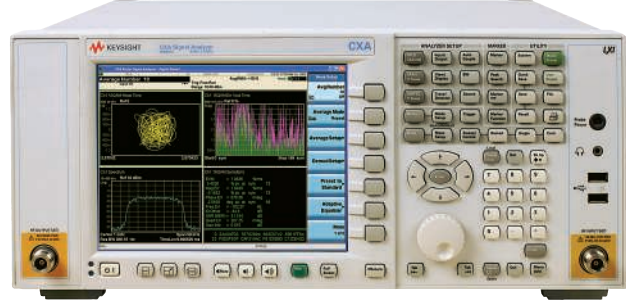
CXA
N9000A

A great low-cost signal analyzer surpasses the basics and delivers crucial functionality. That's the strength of the CXA signal analyzer, the leading low-cost tool for essential signal characterization up to 26.5 GHz. Its capabilities provide a foundation for cost-effective testing and seamless integration with the other X-Series models. The CXA is also an excellent teaching tool for RF and microwave technologies and signal analysis.

– Reduce costs and improve throughput in manufacturing test
– Built-in tracking generator for component characterization
– Up to 25 MHz analysis bandwidth
– Additional 75-ohm RF input connector for cable TV measurement

www.keysight.com/find/CXA

Benchtop (continued)

Basic Spectrum Analyzers (BSA)
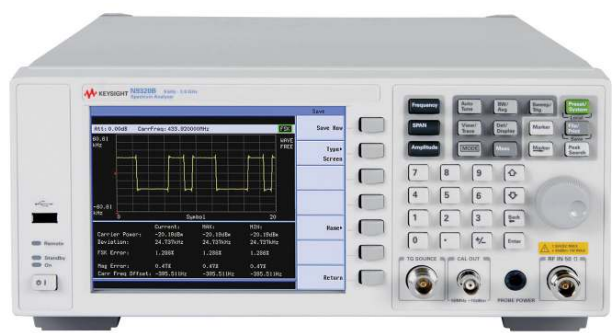
BSA
N9320B

Whatever type of consumer or general-purpose RF electronic devices or components you are manufacturing, spectrum analysis provides essential information on their performance, characteristics, and interaction. And in today's competitive world, you need this analysis to be dependable and affordable.

The N9320B spectrum analyzer is ideal for consumer electronics manufacturing, and bench repair. It provides:

- Fast sweep speed in narrow resolution bandwidths
- Rugged body, large display, and 3U height
- AM/FM tune and listen
- AM/FM, ASK/FSK demodulation analysis
- Tracking generator: 100 kHz to 3 GHz

BSA
N9322C

Given the dynamic nature of RF devices, using the N9322C spectrum analyzer that can evolve with your needs is simply prudent. Beyond its feature rich standard base, the N9322C supports an array of value-added capabilities that can be added when needed.

- Time gated sweep
- Tracking generator with built-in VSWR bridge
- Power meter mode, supporting Keysight U2000 Series/ U2020 X-Series USB power sensors
- AM/FM, and ASK/FSK signal analysis
- Signal monitoring with spectrogram recording and playback
- Channel scanner for simultaneous channel power measurement of up to 20 channels
- AM/FM IBOC and xDSL measurements with enhanced DANL and phase noise performance

www.keysight.com/find/n9320b

www.keysight.com/find/n9322c

Key specifications	N9320B	N9322C
Frequency range	9 kHz to 3 GHz	9 kHz to 7 GHz
Phase noise at 1 GHz, 10 kHz offset	–90 dBc/Hz	–90 dBc/Hz
Maximum third order dynamic range, 1 GHz	76 dB	83 dB
Displayed average noise level, 1 GHz	–145 dBm	–152 dBm
Standard attenuator range/step	70 dB, in 1 dB steps	50 dB, in 1 dB steps
Overall amplitude accuracy	± 0.5 dB	± 0.6 dB

Modular

PXI Vector Signal Analyzers

PXIe RF vector signal analyzer M9391A

In the evolution of modular RF test solutions, the M9391A PXI VSA is the next logical step in signal analysis. Optimized for RF device design validation and manufacturing test environments, the PXI VSA delivers proven results faster with raw hardware speed and X-Series measurement applications. Built on a flexible, modular platform, the M9391A PXI VSA is the low-risk way to manage change and be ready for tomorrow - today.

– Fast amplitude and frequency switching to reduce test time
– Scalable platform fits up to 4 channels in one chassis, and 8 channels in multi-chassis configuration
– Channels time synchronized to within 1 ns and phase coherent to within 1 degree
– Up to 160 MHz analysis bandwidth
– Easily integrate into test environments with IVI-COM, IVI-C, LabVIEW and MATLAB drivers

www.keysight.com/find/M9391A

PXIe performance µW vector signal analyzer M9393A

The M9393A is the realization of our microwave measurement expertise in modular form. It integrates hardware speed and accuracy with stepped FFT based spectrum analysis to measure harmonics and spurs to 27 GHz. The M9393A PXI VSA's extensible modular architecture enables you to tailor your system to fit specific needs today and tomorrow.

– Characterize spurs and harmonics with 27 GHz sweep in 1 second at 10 kHz resolution bandwidth
– Quickly test multiple frequencies with tuning as fast as 135 µs
– Compact multi-channel analysis with up to 4 time-synchronous channels in one 18-slot PXI chassis
– Up to 160 MHz analysis bandwidth

www.keysight.com/find/M9393A

Key specifications	M9391A	M9393A	M9290A
Frequency range	1 MHz to 6 GHz	9 kHz to 27 GHz	10 Hz to 26.5 GHz
Phase noise, 1 GHz (10 kHz offset), nominal	–119 dBc/Hz	–110 dBc/Hz	–110 dBc/Hz
Maximum third order dynamic range, 1 GHz	18 dBm	31 dBm	16 dBm
Displayed average noise level, 1 GHz, nominal	–161 dBm	–168 dBm	–163 dBm (typical)
Standard attenuator range/step	70 dB/1 dB	42 dB/0.25 dB	70 dB/10 dB
Overall amplitude accuracy, typical	± 0.45 dB	± 0.13 dB	± 0.4 dB
Chassis slot compatibility	PXIe, PXI Hybrid	PXIe, PXI Hybrid	PXIe, PXI Hybrid
Size	4-slot	5-slot	4-slot

Modular (continued)

PXIe Signal Analyzer

CXA-m PXIe signal analyzer
M9290A

In test system development, one of your crucial requirements is doing more in less space -- but this often means tradeoffs between footprint and precision in signal analysis. The Keysight X-Series has been expanded to include the CXA-m, a PXIe signal analyzer that offers fully-specified performance up to 26.5 GHz. It lets you handle RF and microwave signals in four slots, and you can leverage your existing code. The CXA-m supports testing of components, boards and systems in a variety of applications.

– See consistent results across your product life cycle with proven X-Series measurement science
– Optimize the balance between speed, sensitivity and accuracy with swept and FFT modes
– Reduce time and effort in system deployment with ready-to-use drivers and SCPI commands
– Simplify the transition from box instruments to PXI by providing code compatibility

www.keysight.com/find/M9290A

Handheld

FieldFox Handheld Analyzers

FieldFox spectrum and combination analyzers N9935/36/37/38A and N9913/14/15/16/17/18A

Measuring up and earning a spot in your kit is the driving idea behind Keysight's FieldFox portable analyzers, available in frequencies up to 26.5 GHz. Carry the precision of our microwave models: they deliver Keysight-quality measurements wherever you need to go. Boost your readiness with an RF unit: every operating mode is flexible enough to meet the needs of novices and experts alike. And count on the durability of handheld analyzers designed to withstand your toughest working conditions.

- Get precision measurements that agree with benchtop results
- Meets MIL-PRF-28800F Class 2 and MIL-STD-810G, Method 511.5, Procedure 1, operation in explosive environments (type tested)
- Meets IP53 dust and water ingress tests (type tested)
- Compact and lightweight (3.0 kg/6.6 lbs.)

www.keysight.com/find/FieldFox

FieldFox spectrum analyzers

FieldFox spectrum analyzers are optimized to excel in the dynamic spectral environment seen commonly in the field.

- Unprecedented amplitude accuracy of ± 0.5 dB with InstAlign - no warm up required
- Interference analysis and spectrogram
- Full-band tracking generator and preamplifier

FieldFox combination analyzers

For maximum functionality, FieldFox combination analyzers integrate the measurement capabilities needed in a single, compact instrument.

- Make measurements quickly with CalReady and QuickCal; no need for a cal kit
- Base is a cable and antenna analyzer; Option 233 adds spectrum analyzer capability
- Optional vector network analyzer capability for full two-port S-parameters

Key specifications	FieldFox spectrum analyzers N9935/36/37/38A with Opt 233	FieldFox combination analyzers N9913/14/15/16/17/18A
Frequency range (min. to max.)	5 kHz to 26.5 GHz	5 kHz to 26.5 GHz
Phase noise, 1 GHz (10 kHz offset)	–111 dBc/Hz	–111 dBc/Hz
Maximum third order dynamic range, 1 GHz	113 dB	113 dB
Displayed average noise level, 1 GHz	–154 dBm	–154 dBm
Standard attenuator range/step	30 dB/5 dB	30 dB/5 dB
Overall amplitude accuracy	± 0.5 dB	± 0.5 dB

Handheld (continued)

Handheld Spectrum Analyzers (HSA)

HSA
N9340B, N9342C, N9343C, N9344C

If you are making essential spectrum analyzer measurements in the field, the Keysight HSA family makes your job easier. Covering frequencies up to 20 GHz, the HSAs have the features you need for operating in tough field environments and the measurement performance gives you confidence the job's been done right. The Keysight HSA portable analyzers let you automate routine tasks to save time and ensure consistent results.

– Built-in tracking generator and cable and antenna tester[1]
– Spectrum monitor and interference analyzer
– Innovative task planner enables routine test automation[2]
– Channel scanner[2]
– High accuracy power measurement with Keysight U2000 Series USB power sensor
– Peak power and pulse profiling with Keysight U2020 X-series power sensors[2]
– Built-in GPS receiver and GPS antenna[2]
– AM/FM and ASK/FSK modulation analysis

www.keysight.com/find/hsa

Key specifications	N9340B	N9342C	N9343C	N9344C
Frequency range	9 kHz to 3 GHz	9 kHz to 7 GHz	9 kHz to 13.6 GHz	9 kHz to 20 GHz
Phase noise, 30 kHz offset	–87 dBc/Hz	–89 dBc/Hz	–89 dBc/Hz	–89 dBc/Hz
Maximum third order dynamic range, 1 GHz	89 dB	96 dB	95 dB	95 dB
Displayed average noise level, 1 GHz	–159 dBm	–162 dBm	–155 dBm	–155 dBm
Standard attenuator range/step	51 dB/1 dB	50 dB/1 dB	50 dB/5 dB	50 dB/5 dB
Overall amplitude accuracy	± 1.5 dB	± 1.5 dB	± 1.3 dB	± 1.3 dB

1. Cable and antenna tester is currently only available on N9342C.
2. Currently available only on N9342C/N9343C/N9344C

Applications and Measurement Software
89600 Software

89600 VSA software
89601B

The 89600 VSA software's comprehensive set of demodulation and vector signal analysis tools enable exploration of virtually every facet of a signal and optimization of the most advanced designs. As you assess tradeoffs, 89600 VSA software helps you see through the complexity.

Measure your signal: supports more than 75 signal types
 – AM, FM, PM, BPSK, QPSK, QAM, FSK, VSB, SOQPSK, APCO 25, and custom APSK, custom OFDM, and custom IQ
 – LTE/LTE-A FDD/TDD, W-CDMA/HSPA+, GSM/EDGE Evo, cmda2000, TD-SCDMA
 – 802.11a/b/g/n/ac, WiMAX, *Bluetooth*, Zigbee, RFID, Wi-SUN
 – Pulse and FMCW radar analysis, channel quality measurements

Explore virtually every facet of the most complex signals
 – Verify signal performance quickly with multiple simultaneous views in time, frequency and modulation domains
 – Pinpoint answers to signal problems with advanced troubleshooting tools such as trace-to-trace marker coupling, record/playback, and multi-measurements
 – Produce consistent, comparable results in simulation, prototype and design validation
 – Select the right front-end for your application from > 40 supported measurement platforms
 – Characterize spurs and harmonics with fast stepped spectrum measurements

www.keysight.com/find/89601B
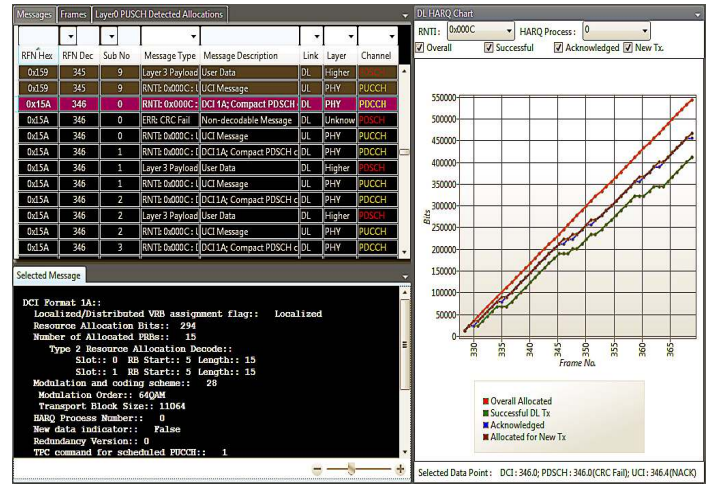
89600 WLA software
89620B

Deepen your understanding of link behavior with Keysight's 89600 WLA software, the MAC-layer complement to the 89600 VSA. Wireless-link analysis decodes control messages and correlates them with the PHY-layer signals they manage, giving you greater visibility into the complexities of MAC/PHY interaction. Expand your toolkit with 89600 WLA—and see inside the link.

Get greater visibility into LTE protocol/PHY interaction
 – Decode and verify MAC, RLC, and RRC-layer messages across multiple radio frames
 – Seamlessly connect to the 89600 VSA software to troubleshoot devices at the PHY and protocol layers simultaneously
 – Use charting capability to view power control, timing advance, HARQ and DCI information
 – Save and recall message files or copy to text editor for documentation and sharing of results between groups

www.keysight.com/find/89620B

Applications and Measurement Software (continued)

X-Series Measurement Applications

X-Series measurement applications increase the capability and functionality of your Keysight signal analyzer to speed your time to insight. They provide essential measurements for more than 40 standards or modulation types. The applications are identical across all of the analyzers, both benchtop and modular. The only difference is the level of performance achieved by the hardware you select. Choose the level of performance necessary for your application and have full assurance that the calculations and algorithms are the same across your signal analyzers, from development into manufacturing.

- **General purpose:** analog demodulation, EMI, FM stereo/RDS, MATLAB, noise figure, phase noise, pulse, remote language compatibility, SCPI language compatibility, VXA vector signal analysis
- **Cellular communication:** 1xEV-DO, cdma2000/cdmaOne, GSM/EDGE/EVO, iDEN/WiDEN/MotoTalk, LTE/LTE-A FDD/TDD, MSR, TD-SCDMA/HSPA, W-CDMA/HSPA+

- **Wireless connectivity:** Mobile WiMAX, *Bluetooth*, Fixed WiMAX, WLAN 801.11a/b/g/n/ac, WiSUN (MR-FSK), ZigBee
- **Digital video:** CMMB, digital cable TV, DTMB (CTTB), DVB-T/H/T2, ISDB-T/Tb/TSB/Tmm

For X-Series signal analyzers:
www.keysight.com/find/X-Series_apps

For modular signal analyzers:
www.keysight.com/find/m90Xa

Choosing Measurement Software and Applications

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

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. Use the 89600 VSA software with a variety of Keysight hardware platforms to pinpoint the answers to signal problems in R&D.

www.keysight.com/find/89600

Migration

Migrating from Legacy Spectrum Analyzers

Whether you are working in the aerospace and defense or communications industries, technologies evolve but one thing stays the same: the need to ensure readiness of your test system.

Carefully planned instrument migration and modernization can maximize your test-system efficiency, performance, and readiness, while minimizing risk and potential disruptions, keeping you at the leading edge in the competitive marketplace. The Keysight X-Series signal analyzers were designed as evolutionary replacements to their in-class benchtop predecessors. Take advantage of the X-Series' performance, flexibility, speed, modern connectivity, and backward compatibility in replacing the legacy HP/Keysight spectrum analyzers to achieve seamless migration and avoid the need to rewrite test software.
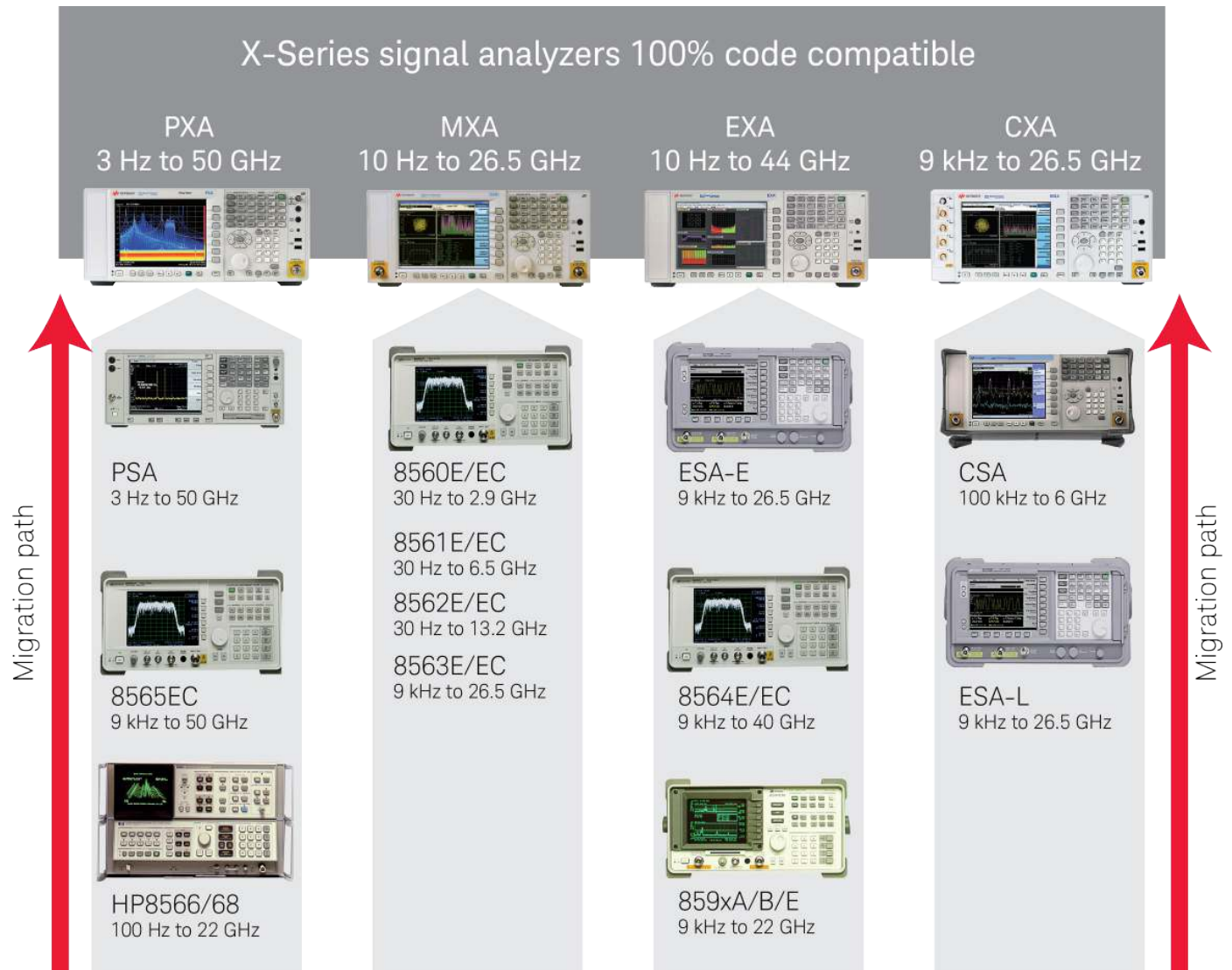
Which migration path is right for you?

Visit our signal analyzer migration page to learn more about migrating from legacy spectrum analyzers to the X-Series signal analyzer that's right for you.
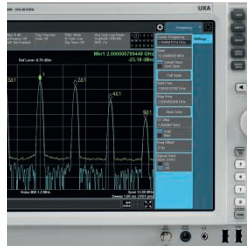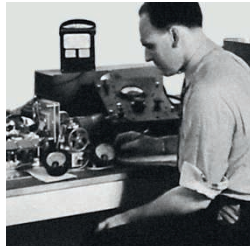www.keysight.com/find/SA_migration

If you are interested in moving to a handheld spectrum analyzer, please visit www.keysight.com/find/hsa

If you are considering converting your test sytems to modular, please visit www.keysight.com/find/pxi

X-Series signal analyzers 100% code compatible

PXA	MXA	EXA	CXA
3 Hz to 50 GHz	10 Hz to 26.5 GHz	10 Hz to 44 GHz	9 kHz to 26.5 GHz

Migration path

PXA

PSA
3 Hz to 50 GHz

8565EC
9 kHz to 50 GHz

HP8566/68
100 Hz to 22 GHz

MXA

8560E/EC
30 Hz to 2.9 GHz

8561E/EC
30 Hz to 6.5 GHz

8562E/EC
30 Hz to 13.2 GHz

8563E/EC
9 kHz to 26.5 GHz

EXA

ESA-E
9 kHz to 26.5 GHz

8564E/EC
9 kHz to 40 GHz

859xA/B/E
9 kHz to 22 GHz

CXA

CSA
100 kHz to 6 GHz

ESA-L
9 kHz to 26.5 GHz

Migration path

From Hewlett-Packard through Agilent to Keysight

For more than 75 years, we've been helping you unlock measurement insights. Our unique combination of hardware, software and people can help you reach your next breakthrough. Unlocking measurement insights since 1939.

1939   THE FUTURE

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