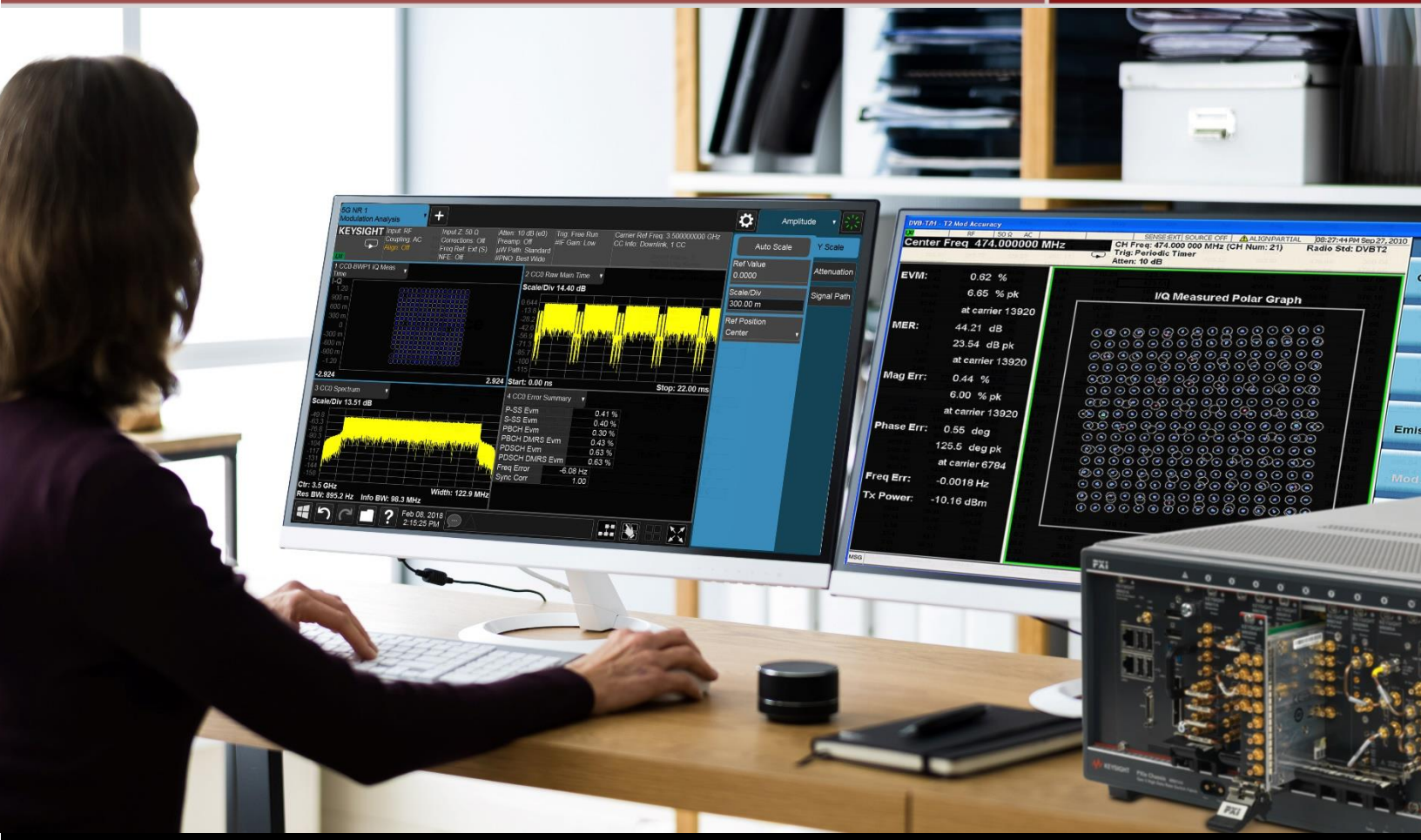
PRODUCT BROCHURE



X-Series Measurement Applications

KEYSIGHT

Table of Contents

Transform your Signal Analyzer with X-Series Measurement Applications

Speed your time-to-insight with over 25 applications.

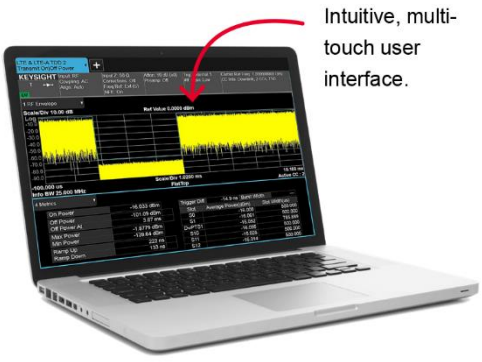
Address ever-changing measurement needs with over 25 signal analysis applications for cellular communications, wireless connectivity, digital video, and general purpose measurements. Characterize device performance from parametric – phase noise, noise figure, pulse – to the latest wireless standards-compliant measurements including 5G, LTE, IoT, and WLAN.

What are X-Series Measurement Applications?

They are software solutions, providing ready-to-use measurements for signal analysis. The application runs either inside benchtop X-Series Signal Analyzers or on a PC for connection to benchtop or PXIe instruments.

Typical measurements

- Spectrum
- Channel power
- ACPR/ACLR
- Occupied bandwidth
- Spectrum emission mask
- Power vs Time
- CCDF
- Error Vector Magnitude (EVM)
- Modulation analysis



Intuitive, multi-touch user interface.

Confirm all setups with a single look.

Run the same measurements on different form-factor instruments – benchtop and PXIe.

X-Series Measurement Applications

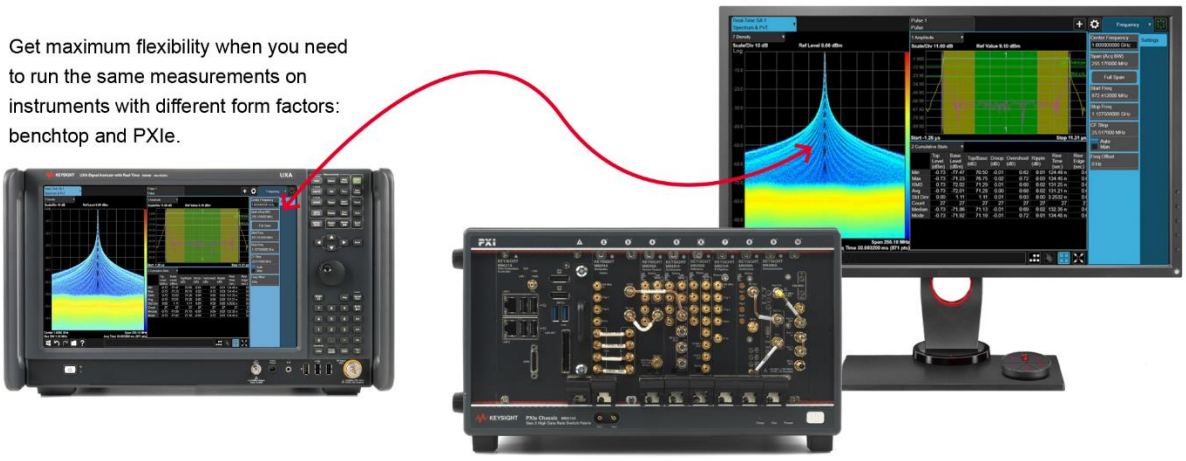
The X-Series measurement applications increase the capability and functionality of Keysight X-Series signal analyzers and PXIe modular instruments to speed time to insight. They provide essential measurements for specific tasks in general-purpose, cellular communications, wireless connectivity applications, covering established standards or modulation types.

A consistent measurement framework

Realize measurement integrity across your organization with consistent operation and test methods, proven algorithms, applications, and accurate results. Your team can leverage the test system software through all phases of product. Whether you run the applications on the benchtop X-Series signal analyzer or PXIe instruments, you'll get the same results from the development lab into manufacturing.

Tip 1: Built-In Help

Instead of searching through hundreds of pages in a manual, just press the Help key to access a comprehensive help system inside the X-Series analyzers—any key, any menu, anytime. This includes handy SCPI programming commands.



Learn more about 89600 VSA software: www.keysight.com/find/89600vsa

X-Series measurement application software and compatible instruments

Below is a list of X-Series Measurement Application software products and supported instruments. Click the hyperlinked product number in the leftmost column for product-specific information. Keysight supports the tiered X-app models with N-models for UXA/PXA/PXE/PXI VSA/CXA-m, E-models for MXA/EXA/MXE/VXT, and W-models for CXA. The higher-tiered X-app models can run at the lower platforms, which means N-models can run on all platforms, E-models can run on MXA/EXA/MXE/VXT and CXA, and W-models can only run on CXA.

Cellular communications

Models		Benchtop			PXIe			
Current model	Description	Multi-touch UI	X-Series B models	X-Series A models	M9421A PXIe VXT	M9410/11/15/16A PXIe VXT	M9391/93A PXIe VSA	M9290A CXA-m
N/E/W9071EM0E	GSM/EDGE/Evo	●	●[2]		●	●	●	●
N9071EM0D	GSM/EDGE/Evo			●				
N9072EM0D	cdma2000			●				
N/E/W9072EM0E	cdma2000	●[5]	●		●		●	
N/E/W9073EM0E	W-CDMA/HSPA+	●	●[2]			●	●	●
N9073EM0D	W-CDMA/HSPA+			●	●			
N9076EM0D	1xEV-DO			●				
N/E/W9076EM0E	1xEV-DO	●[5]	●		●		●	
N9079EM0D	TD-SCDMA/HSPA			●				
N/E/W9079EM0E	TD-SCDMA/HSPA	●[5]	●		●		●	
N/E/W9080EM0E	LTE/LTE-Advanced FDD	●	●[2]		●	●	●	●
N9080EM0D	LTE/LTE-Advanced FDD			●				
N/E/W9080EM3E	NB-IoT & eMTC	●	●[2]		●	●	●	●
N/E/W9080EM4E	LTE-V2X	●	●[2]		●	●	●	
N/E/W9082EM0E	LTE/LTE-Advanced TDD	●	●		●	●	●	●
N9082EM0D	LTE/LTE-Advanced TDD			●				
N9083EM0D	Multi-Standard Radio (MSR)			●				
N/E9083EM0E	Multi-Standard Radio (MSR)	●	●[2]					
N/E9085EM0E	5G NR (New Radio)	●	●[3]		●	●	●	
N/E9085EM4E	NR V2X	●	●		●	●		

Wireless connectivity

Models		Benchtop			PXIe			
Current Model	Description	Multi- Touch UI	X-Series B models	X-Series A models	M9421A PXIe VXT	M9410/11/15/ 16A PXIe VXT	M9391/93A PXIe VSA	M9290A CXA-m
N9075EM0D	Mobile WiMAX™		●		●			
N/E/W9077EM0E	WLAN 802.11a/b/g/j/p/n/af/ah	●	●[2]			●	●[1]	
N9077EM0D	WLAN 802.11a/b/g/j/p/n/af/ah		●		●			
N/E9077EM1E	WLAN 802.11ac/ax	●	●[2]			●	●[1]	
N9077EM1D	WLAN 802.11ac/ax		●		●			
N/E9077EM2E	WLAN 802.11be	●	●					
N/E/W9081EM0E	Bluetooth®	●	●[2]			●	●[1]	●
N9081EM0D	Bluetooth®		●		●			
N/E/W9084EM0E	Short Range Comm and IoT	●	●[2]		●	●		

1. Those NxxxxEMxE licenses installed in this instrument can enable both multi-touch UI and traditional UI X-Series measurement applications. NxxxxEMxD license can only enable the traditional UI X-Series measurement application.
2. Currently this measurement application has only been qualified for UXA N9041B Input Port 1.
3. This measurement can support UXA N9041B input Port 1 and Port 2.
4. Please visit www.keysight.com/find/X-Series_apps_platform for more information.
5. This multi-touch measurement application only supports remote control through SCPI command.

You Can Upgrade!

All of our X-Series application options are license-key upgradeable.

Digital video

Models		Benchtop			PXIe		
Current model	Description	Multi-touch UI	X-Series B models	X-Series A models	M9421A PXIe VXT	M9391/93A PXIe VSA	M9290A CXA-m
N6152EM0D	Digital Cable TV		●[8]	●			
N6153EM0D	DVB-T/H/T2/T2-Lite		●[8]	●			
N6155EM0D	ISDB-T/Tmm		●[8]	●			
N6156EM0D	DTMB(CTTB)		●[8]	●			

General purpose

		Benchtop				PXIe			
Current model	Description	Multi-touch UI	X-Series B models	X-Series A models	MXE EMI PXE EMI receiver	M9421A PXIe VXT	M9410/11/15 /16A PXIe VXT	M9391/93A PXIe VSA	M9290A CXA-m
N/E/W9054EM0E	VMA Digital Demodulation	●	●			●	●	●[1]	
N/E/W9054EM1E	VMA Custom OFDM	●	●			●	●	●[1]	
N/E9055EM0E	Power Amplifier	●	●						
N/E9056EM0E	Channel Quality/ Group Delay	●	●						
N/E9056EM1E	Channel Quality/ Noise Power Ratio	●	●						
N/E9061EM0E	Remote Language Compatibility	●	●[5]						
N9061EM0D	Remote Language Compatibility			●					
N/E/W9062EM0E	SCPI Compatibility	●	●[5]		●[4]				●
N9062EM0D	SCPI Compatibility			●					
N/E/W9063EM0E	Analog Demodulation	●	●[5]		●[4]	●	●	●[1]	●
N9063EM0D	Analog Demodulation			●					
N9064EM0D	VXA Vector Signal Analysis			●					
N/E/W9067EM0E	Pulse Analysis	●	●[5]					●[1]	
N/E/W9068EM0E	Phase Noise	●	●[5]		●			●[1]	●
N9068EM0D	Phase Noise			●					
N/E/W9069EM0E	Noise Figure	●	●[6,7]		●	●	●	●[1]	●
N9069EM0D	Noise Figure			●					
N9091EM0E	Measuring receiver	●	●[3]						
N9092EM0E	Avionics	●	●[3]						
N9093EM0E	Radio Test Basic Analog	●				●[2]			
N9093EM1E	Radio Test Basic Digital	●				●[2]			
N6141EM0E	EMI/EMC	●	●[5]		Include				
N6141EM1D	EMI/EMC			●					
N6171A	MATLAB		●	●	●				●

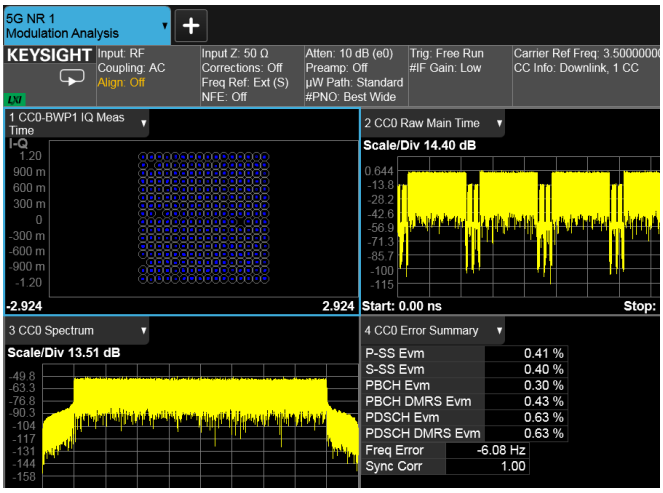
1. Those NxxxxEMxE licenses installed in this instrument can enable both multi-touch UI and traditional UI X-Series measurement applications. NxxxxEMxD license can only enable the traditional UI X-Series measurement application.
2. Only available as part of the M8920A Radio Test Set, not as standalone VXT.
3. This X-Series measurement application is only available on N9030B PXA.
4. N9048B PXE EMI receiver is based on the N9030B which supports the multi-touch UI. Phase noise and noise figure are not supported yet with N9048B PXE.
5. Currently this measurement application has only been qualified for UXA N9041B Input 1 Port.
6. N8973/4/5/6B noise figure analyzer with multi-touch UI includes the noise figure measurement application.
7. This measurement can support UXA N9041B input Port 1 and Port 2.
8. This is traditional GUI X-series measurement application running inside the N90x0B xSA which needs switch from default multi-touch GUI program to the traditional GUI program.
9. N9055EM0E only supports analysis bandwidth 512 MHz or above.

Cellular Communications

The cellular communications measurement applications cover a full range of technologies—from existing 2G/3G/LTE to evolving 5G communication systems. These measurement applications adhere to the 3GPP and other standards, and closely track and follow standards as they change, allowing you to stay on the leading edge of your design and manufacturing challenges. Here are a few examples of X-Series measurement applications for cellular communications.

5G NR (New Radio)

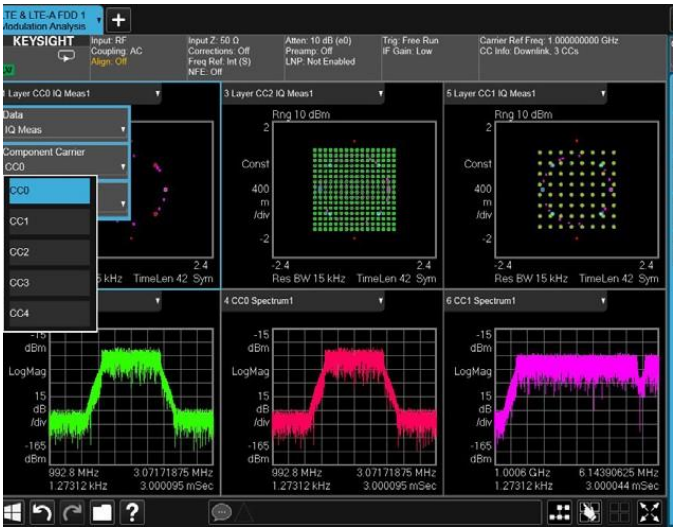
- Provide one-button power spectrum measurements and modulation analysis of 5G NR based on 3GPP NR specification Rel-15, Rel-16, Rel-17 and Rel-18 (TS 38.xxx)
- All numerologies (μ = 0 – 4)
- CP-OFDM for downlink and uplink
- Support up to 5 component carriers by sequential acquisitions
- Show multiple results of constellation, spectrum, error summary, frame summary, EVM vs. subcarrier, detected RB allocation, In-band emission, Power vs. slot/symbol, TAE
- Channel decoding for downlink PBCH/PDCCH/PDSCH and uplink PUCCH/PUSCH
- Support Dynamic Spectrum Sharing (DSS) co-exist with LTE carrier
- Support Rel16 defined eMIMO and eDSS
- Support Rel17 NR-TM 2b & 3.1b (1024QAM)
- Support Rel17 FR-2 800/1600/2000 MHz
- Support Rel17 reduced capabilities (RedCap) devices
- Support Rel18: new FR1 3MHz



LTE/LTE-advanced FDD

- Perform single and multi-carrier LTE/LTE-Advanced FDD base station (eNB) and user equipment (UE) transmitter tests
- Analyze carrier-aggregated signals up to 5 contiguous/non-contiguous component carriers of downlink and uplink
- Transmitter characteristics measurements, including:
  - Base station: EVM, frequency error, DL RS power, RSTP, OSTP, time alignment error (TAE), SEM, ACLR, CACLR
  - User equipment: EVM, frequency error, in-band emissions, SEM, on/off time mask, ACLR, CACLR

    Multiple color-coded result views; EVM vs. subcarrier, symbol, slot, resource block
- Transport layer channel decoding



To learn more about other X-Apps for cellular communications, click below:

- LTE/LTE-A TDD
- LTE-V2X
- Multi-Standard Radio (MSR)
- W-CDMA/HSPA+
- GSM/EDGE/Evo
- cdma2000/cdmaOne
- 1xEV-DO
- TD-SCDMA/HSPA
- NR V2X

Want to learn more?

- 5G NR (New Radio)
- LTE, LTE-A FDD/TDD NB-IoT eMTC

Wireless Connectivity

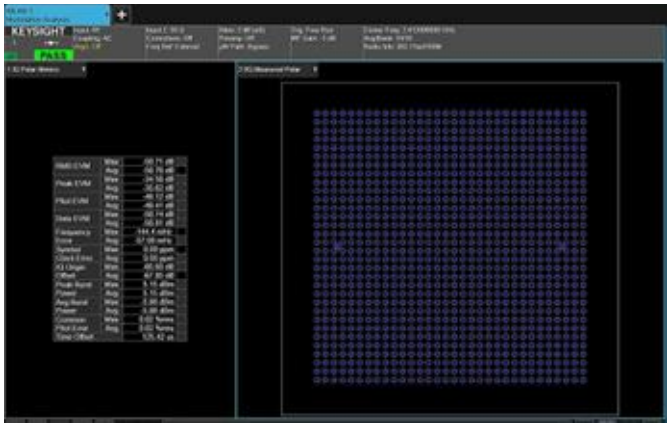
X-Series measurement application offers various technologies – from the latest 802.11 WLAN standards through Bluetooth along with 802.15.4 ZigBee and Mobile WiMAX. As technology advances, X-Series measurement applications are also advancing to enable you to continue tackling increasingly complex design and manufacturing test challenges.

WLAN 802.11a/b/g/j/p/n/af/ah

- Comply IEEE 802.11a/b/g/j/p/n/af/ah standard
- One button, standard-based measurement with pass/fail test
  - IQ demodulation measurements: modulation accuracy, power vs. time, spectral flatness, statistics CCDF, IQ impairments per subcarrier
  - Swept spectrum measurements: spectrum emission mask, spurious emissions, occupied bandwidth, channel power
- Legacy/mixed/greenfield mode for 802.11n signals
- Custom demodulation settings for analyzing 802.11j, turbo-mode, 802.11p signals

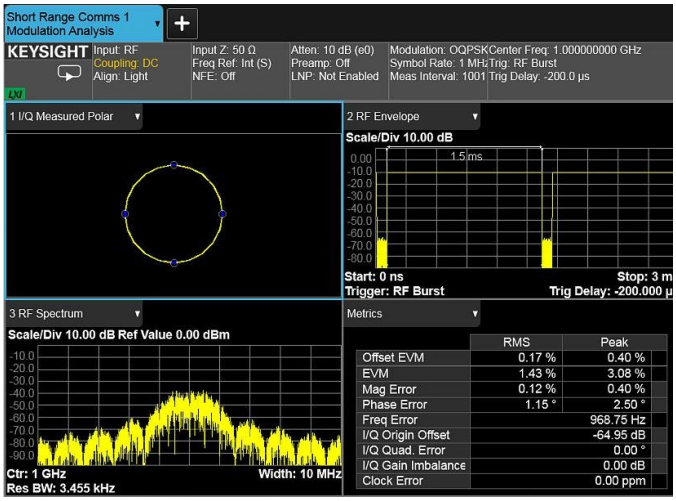
WLAN 802.11ac/ax and 11be

- Comply IEEE 802.11ac/ax and 802.11be standards
- One button, standard-based measurement with pass/fail test
  - IQ demodulation measurements: modulation accuracy, power vs. time, spectral flatness, statistics CCDF, IQ impairments per subcarrier
  - Swept spectrum measurements: spectrum emission mask, spurious emissions, occupied bandwidth, channel power
- Cover the fulfilled 802.11ac/ax and 802.11be signal profiles with
- 20/40/80/160/320 MHz, 80+80 MHz with data modulation format up to 4096QAM
- Modulation analysis: up to 8x8 MIMO EVM measurement (available with PXIe VXT)
- Support cross-correlated EVM with MIMO using two receivers to improve EVM performance by removing contribution of noise added in receiver from EVM computation



Short range comms and IoT

- Compliant with ZigBee (802.15.4 BPSK and O-QPSK), HRP UWB (802.15.4/4z/4ab), Z-Wave (ITU G.9959) and LoRa™ CSS RF transmitter tests
- Provide one-button measurements with pass/fail per the standards
  - Transmitter tests of channel power, adjacent carrier power (ACP), spectrum emission mask (SEM)
  - Modulation accuracy: various demodulation results including demodulated bits and decoded results, IQ measurement in time, frequency, polar, and eye diagram
- Visualize signal quality parameters of demodulation errors and responses for troubleshooting
- Transport layer channel decoding



To learn more about other X-Apps for wireless communications, click below:

- WLAN 802.11a/b/g/j/p/n/af/ah
- WLAN 802.11ac/ax
- WLAN 802.11be
- Short Range Comms and IoT
- Mobile WiMAX
- Bluetooth™

Want to learn more?

Click on the buttons below to download a technical overview for the following X-Series Measurement Applications:

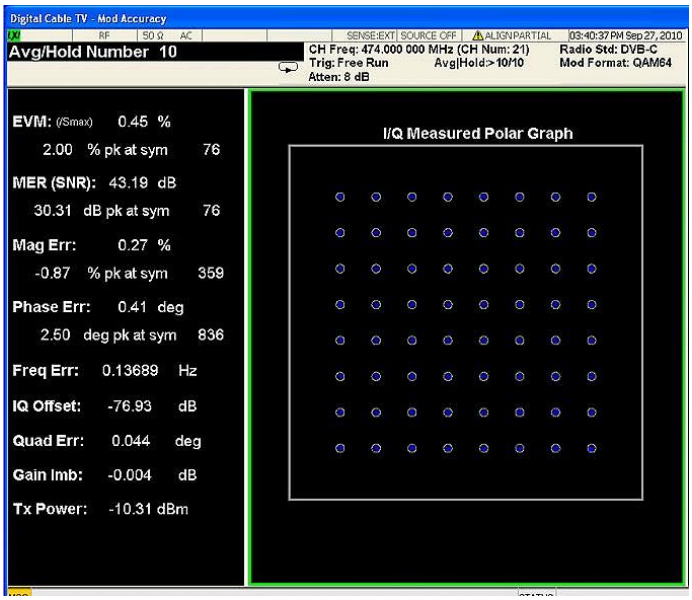
- WLAN 802.11
- Bluetooth™
- Short Range Comms and IoT

Digital Video

The digital video measurement applications transform X- Series signal analyzers and modular instruments into one-button, standards- based testers for modulators, transmitters, amplifiers, tuners, and gap-fillers/ repeaters. These measurement applications cover a full range of digital video technologies—from digital cable TV to DVB-T/H/T2/T2-Lite to DTMB (CTTB), and ISDB-T/Tmm.

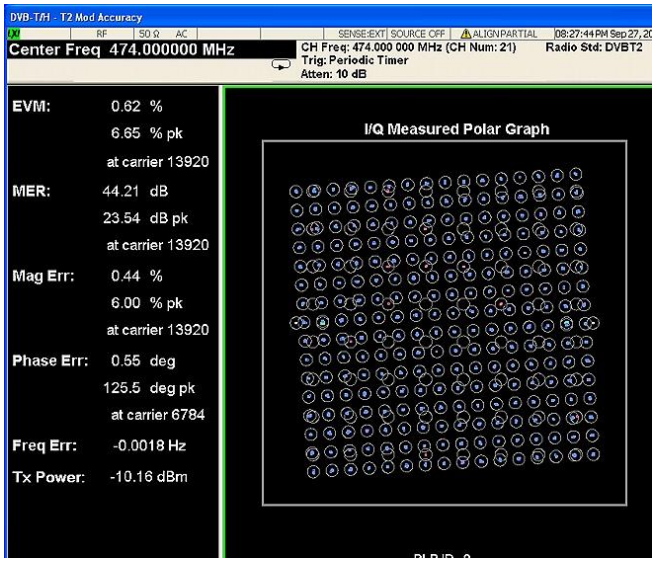
Digital cable TV

- J.83/A(DVB-C), J.83/B (DOCSIS DS) and J.83/C (ISDB-C) standards
- One button, transmitter measurements, including:
  - Power measurements: channel power, ACP, CCDF, SEM
  - Modulation accuracy: MER/EVM, BER, frequency error, amplitude error, phase error, quadrature error, amplitude imbalance
  - Channel frequency response and channel impulse response
- Customize with advanced settings; symbol rate, adaptive equalizer, measurement interval, out-of-band filtering, filter alpha, and BER count



DVB-T/H/T2/T2-Lite

- DVB-T, DVB-H, DVB-T2 (Version 1.1.1, 1.2.1, and 1.3.1) and DVB-T2-Lite standards
- One button, transmitter measurements, including:
  - Power measurement: channel power, shoulder attenuation, ACP, CCDF, SEM
  - DVB-T/H modulation accuracy: MER/EVM, BER, amplitude error, phase error, frequency error, clock error, TPS decoding, MER monitor
  - DVB-T2 modulation accuracy: MER/EVM, BER for specified PLP, amplitude error, L1 signaling decoding, MER monitor
  - Channel frequency response and channel impulse response
  - Single frequency network (SFN) measurements including pre-, post-, and 0 dB-, and out-of-GI echo scenarios
- Auto detection or manual settings of DVB-T/H/T2/T2-Lite signals



To learn more about other X-Apps for wireless communications, click below:

- Digital Cable TV
- DVB-T/HT2-Lite
- DTMB(CTTB)
- ISDB-T/Tmm

Want to learn more?

Click on the buttons below to download a technical overview for the following X-Series Measurement Applications:

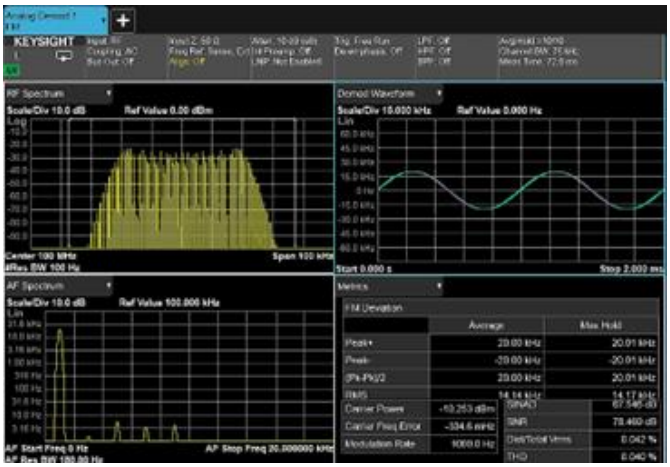
- Digital Cable TV
- DVB-T/H/T2-Lite
- DTMB
- ISDB-T/Tmm

General Purpose

The X-Series signal analyzers and modular instruments offer a variety of general-purpose measurement applications for use in the development and manufacturing of RF and microwave transceivers and the components that comprise them. They cover a full range of solutions from phase noise measurements for oscillator tests, to noise figure test of amplifiers, to analog and digital demodulation on standards-based or propriety formats using the measurement applications supporting more than 30 demodulators.

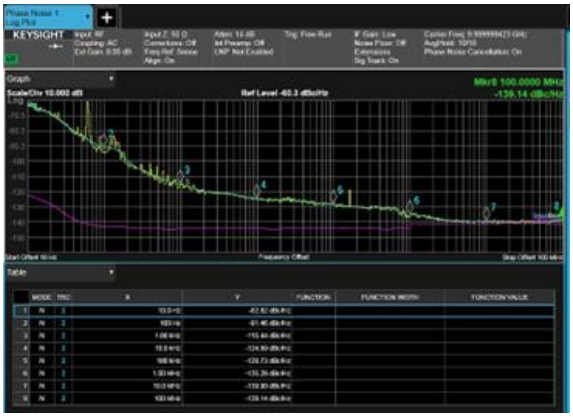
Analog demodulation

- Demodulate AM/FM/PM signals as well as FM stereo/RDS signals
- Display modulation metrics: AM depth, FM/PM deviation, THD, and SINAD audio filters
- Play the modulating signal over a speaker (tune & listen)
- Multiple measurement views:
  - RF spectrum, demodulated waveform, AF spectrum with demod metrics tables
  - MPX, mono, stereo, left, right
  - RDS/RBDS decoding results
- Analog output calibrated for AM, FM, and PM



Phase noise

- Analyze phase noise in frequency domain (log plot) and time domain (spot frequency)
  - Log plot: view entire phase noise behavior in frequency domain across decades of offset frequencies
  - Spot frequency: monitor phase noise fluctuation vs. time at a user-specified single offset frequency
- Characterize phase noise related behaviors from different angles for various applications with multiple markers
- Utilize signal tracking for a simultaneous view of phase noise and delta frequency in time domain

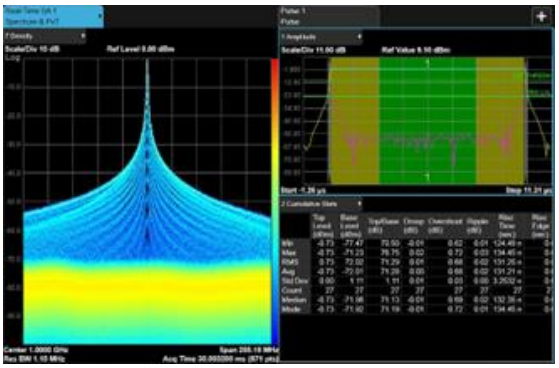


Noise figure

- Characterize noise figure and gain of connectorized devices and system blocks with graph, meter, and table layouts
- Measure noise figure/factor, gain, Y-factor, effective temperature, and hot/cold power density
- Support Keysight SNS, 346, USB smart Series noise sources
- Provide fully specified measurements with optional internal preamp in instruments; improved specifications with external USB preamp U7227x Series
- Estimate the overall noise figure uncertainty using the built-in uncertainty calculator
- Support V/E-Band with N9042B+V3050A
- Support V/E/W/D/H-Band noise figure measurement with external down-converter

Pulse

- Verify all key pulse signal modulation performance indicators relating to power, droop, overshoot, ripple, time (rise/fall/width/PRI), frequency, phase, and FM modulation in comprehensive pulse table
- Visualize pulse signal modulation characteristics and impairment errors with multiple time-synchronized amplitude, phase, and frequency (FM) trace results including flexible trace overlay capability.
- Quickly view statistical variance performance data for each reported pulse metric, accumulated over single or multiple acquisitions, using the pulse cumulative statistics table, graphical histogram, and trend line trace plots
- Integrate with popular real-time analysis on X-Series signal analyzers (UXA, PXA, MXA) with frequency mask trigger

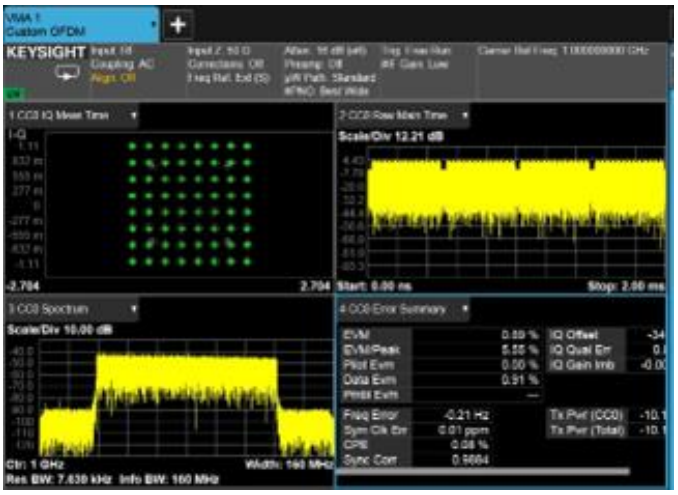


VMA vector modulation analysis digital demodulation

- Perform digital modulation analysis of single carrier signal with standard-based and flexible digital modulation
- Provide a wide range of modulation formats along with customization from FSK, PSK, QAM, MSK, ASK, APSK, VSB, etc.
- Show the modulation quality results and measurement traces including raw main time, I/Q meas time, I/Q meas spectrum, EVM time, EVM spectrum, demod results, and demodulated bits
- Convenient standard presets of popular formats, including NADC, EDGE, PDC, PHS, DVB(16/32/64/256QAM), DVB-S2/S2X, TETRA, APCO-25, DMR, dPMR, Wi-SUN (FSK and O-QPSK), WLAN 802.11ay, WPAN 802.15.3D, DECT, VDL Mode 2, MIL-STD CPM, and SOQPSK-TG

VMA custom OFDM

- Make OFDM modulation analysis with customizable parameters for proprietary and non-standardized OFDM signals
- Provide a standard preset of 5GTF (Verizon), 3GPP LTE, WLAN 802.11a, Wi-SUN OFDM, DAB, CDR, DOCSIS (DS/US), DVB-T/H, ISDB-T, and DRM to quickly perform EVM measurements
- Configure OFDM formats, including FDD and TDD, MIMO and multi-user systems
- Characterize and visualize signal quality in multiple domain traces with color-coding such as EVM vs. subcarrier (frequency domain), EVM vs. symbol (time domain), IQ constellation, IQ error by utilizing markers coupling functionality



To learn more about other general-purpose X-Apps, click below:

- Analog Demod
- EMC
- VMA Digital Demod
- VMA Custom OFDM
- Pulse
- Phase Noise
- Noise Figure
- SCPI Language Compatibility
- Remote Language Compatibility
- Measuring receiver
- Avionics
- Radio test basic analog
- Radio test basic digital
- Power Amplifier
- Channel Quality/Group Delay
- MATLAB

Want to learn more?

Click on the buttons below to download a technical overview for the following X-Series Measurement Applications:

- EMC
- Pulse
- VMA Digital Demod | VMA Custom OFDM
- Power Amplifier
- Channel Quality/Group Delay
- Channel Quality/Noise Power Ratio (NPR)
- Measuring Receiver
- Analog Demod
- Phase Noise
- Noise Figure

Flexible Licensing Terms

Each of the following license types are offered as perpetual or time-based (subscription) licenses are offered, as shown in the table below. A valid support contract is included in the pricing for time-based licenses. For perpetual license holders, 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, which is purchased separately.	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) 200% of node-locked (floating, single region) 250% 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 licenses	Allows license holder access to Keysight technical support and all software upgrades.	15% of perpetual for 12 months of support

Benefits of flexible license types (transportable, floating, USB portable)

- Maximize the flexibility of your test assets by sharing measurement applications between your X-Series signal analyzers and PXIe instruments
- Save money and increase your return on test asset investments as project needs change by purchasing fewer applications per instrument
- Save time by transporting the licenses to the test bench nearest you, instead of physically moving the test equipment or DUT
- Use the same application at different X-Series performance levels in different time zones, departments, and/or test benches
- Keep up with your changing project needs by transporting measurement application licenses; use a simple Keysight server connection with an instrument or a PC to check-in/out licenses

Try before you buy!

Evaluate a full-featured version of our X-Series measurement application with our FREE trial. Redeem one 30-day trial license of each measurement application online at:
http://www.keysight.com/find/X-Series_apps_trial

Hardware configurations

To learn more about compatible platforms and required configurations, please visit:
http://www.keysight.com/find/X-Series_apps_platform

X-Series Measurement Application Ordering Information

Software license type	Software license	Support subscription
Node-locked perpetual	SW1000-LIC-01	SW1000-SUP-01
Node-locked time-based	SW1000-SUB-01	Included
Transportable perpetual	SW1000-LIC-01	SW1000-SUP-01
Transportable time-based	SW1000-SUB-01	Included
Floating perpetual (single site)	SW1000-LIC-01	SW1000-SUP-01
Floating time-based (single site)	SW1000-SUB-01	Included
Floating perpetual (regional)	SW1000-LIC-01	SW1000-SUP-01
Floating time-based (regional)	SW1000-SUB-01	Included
Floating perpetual (worldwide)	SW1000-LIC-01	SW1000-SUP-01
Floating time-based (worldwide)	SW1000-SUB-01	Included
USB portable perpetual	SW1000-LIC-01	SW1000-SUP-01
USB portable time-based	SW1000-SUB-01	Included

For time-based licenses, KeysightCare support is included. For perpetual licenses, KeysightCare support subscription may be purchased using the following model numbers. For example, a one-month

One month software support subscription extensions[3]

Support subscription	Description
SW1000-SUP-01	Perpetual KeysightCare support (1 month to 60 months)
SW1000-B2S	Back to KeysightCare support fee (Perpetual support only, one time fee) Minimum of 12 months required for a renewal

1. Support subscription for all perpetual licenses can be extended with monthly extensions.

Additional Information

- X-Series measurement application:
  - www.keysight.com/find/X-Series_Apps
  - www.keysight.com/find/X-Series_apps_platform
  - www.keysight.com/find/X-Series_apps_software
- X-Series signal analyzers:
  - www.keysight.com/find/X-Series
- EMI Receiver
  - www.keysight.com/find/MXE
  - www.keysight.com/find/PXE
- PXIe VSA vector signal analyzer
  - www.keysight.com/find/m9391a
  - www.keysight.com/find/m9393a
- PXIe VXT vector transceiver
  - www.keysight.com/find/vxt
  - www.keysight.com/find/m9410a
  - www.keysight.com/find/m9415a
- PXIe CXA-m signal analyzer
  - www.keysight.com/find/cxa-m

PathWave X-Series Measurement Application Subscription Bundles

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

Another more flexible X-Series measurement application subscription bundle is named as Pick Any 3 or 5 applications as you need, in which you can choose any 3 or 5 X-Series measurement application licenses list as the following table. The supported X-Series measurement application licenses list is subjective to change according to the new application launch or discontinuance of some applications.

Description	Model number	PathWave X-Series measurement application licenses included
5G and 4G Bundle	N9089B01E	• N9080EM0E: LTE/LTE-A FDD • N9080EM3E: NB-IoT/eMTC • N9082EM0E: LTE/LTE-A TDD • N9085EM0E: 5G NR
Wireless Connectivity Bundle	N9089B02E	• N9077EM0E: WLAN 802.11a/b/g/j/p/n/af/ah • N9077EM1E: WLAN 802.11ac/ax • N9077EM2E: WLAN 802.11be • N9081EM0E: Bluetooth • N9084EM0E: Short Range Comm and IoT
General Purpose Bundle	N9089B03E	• N9054EM0E: VMA Digital Demodulation • N9054EM1E: VMA Custom OFDM • N9063EM0E: Analog Demodulation • N9068EM0E: Phase Noise • N9069EM0E: Noise Figure
2G and 3G Bundle	N9089B04E	• N9071EM0E: GSM/EDGE • N9072EM0E: cdma2000 (SCPI command only) • N9073EM0E: W-CDMA/HSPA+ • N9076EM0E: 1xEV-DO (SCPI command only) • N9079EM0E: TD-SCDM/HSPA (SCPI command only)
Cellular V2X Bundle	N9089B05E	• N9080EM4E: LTE-V2X • N9085EM4E: NR-V2X
Pick Any 3 or 5 X-apps Bundle	N9089BAXE	Pick any 3 or 5 from Keysight X-Series measurement application licenses • N6141EM0E, N9054EM0E, N9054EM1E, N9055EM0E • N9056EM0E, N9056EM1E, N9063EM0E, N9065EM0E, • N9065EM1E, N9067EM0E, N9068EM0E, N9069EM0E • N9071EM0E, N9072EM0E, N9073EM0E, N9076EM0E • N9077EM0E, N9077EM1E, N9077EM2E, N9079EM0E • N9080EM0E, N9080EM3E N9080EM4E, N9081EM0E • N9082EM0E, N9083EM0E, N9084EM0E, N9085EM0E • N9085EM4E, N9091EM0E, N9092EM0E, N9093EM0E • N9093EM1E
Pick Any 3 or 5 X-apps and Signal Studio Waveform Playback Bundle	N7689EAYC	Pick the combination of any 3 or 5 X-apps and Signal Studio waveform playback licenses from the following list • PathWave signal generation list inside N7689EAXC • PathWave signal generation list inside N9089BAXE
Pick Any 3 or 5 X-apps and Signal Studio PC Application Bundle	N7689PAYC	Pick the combination of any 3 or 5 X-apps and Signal Studio PC Application licenses from the following list • PathWave signal generation list inside N7689EAYC • PathWave X-Series measurement application list inside N9089BAXE

1. Those subscription bundles only support the node-locked license type.
2. The subscription duration can be chosen from 12-month or 36 months.

Hardware Configuration

To optimize X-Series measurement applications, Keysight recommends a minimum level of instrument hardware functionality at each instrument performance point. Supported instruments include:

Benchtop:

- UXA N9040/41B/42B [1]
- UXA N9042B+V3080A (up to 110 GHz)
- PXA N9030A/B N9032B
- MXA N9020A/B N9021B
- EXA N9010A/B
- CXA N9000A/B
- PXE N9048B
- MXE N9038B

PXIe:

- VSA (6 GHz) M9391A
- VSA (50 GHz) M9393A
- CXA-m M9290A
- VXT M9421A/M9410A/M9411A/M9415A/M9416A
- VXT M9410E/M9411E/M9415E/M9416E

N90x0A/B X-Series signal analyzer

Capability	Instrument option	Benefit
Analysis bandwidth	10 or 25 MHz as default or higher	Required: Wider analysis bandwidth options such as 25/40/85/125/160/255/510 MHz or 1/1.5/2/4 GHz can be selected depending on the specified signal analyzer model
Precision frequency reference	-PFR	Recommended: For enhanced frequency accuracy and repeatability for lower measurement uncertainty
Electronic attenuator	-EA3	Recommended: Fast and reliable attenuation changes ideal for manufacturing without the wear associated with mechanical attenuators up to 3.6 GHz in 1 dB steps
Pre-amplifier	3.6 GHz (-P03) or higher	Recommended: For maximizing the measurement sensitivity
Fine resolution step attenuator	-FSA	Recommended: Useful for maximizing useable dynamic range to see signals
Analog baseband I/Q inputs	-BBA on PXA and MXA only	Optional: To extend measurements at baseband if required by device under test
External Mixer	-EXM	Recommend: For mmWave measurement up to 110 GHz

1. Currently most measurement applications have only been qualified for UXA N9041B Input 1 Port. Some measurement applications like 5G NR, EMI, VMA and noise figure can support UXA N9041B Input 1 and Input 2 port.

M9421A PXIe VXT vector transceiver

Description	Model-option	Additional information
Frequency range 3.8 or 6 GHz	M9421A-504, or 506	One required
Analysis bandwidth 40, 80 or 160 MHz	M9421A-B40/B80/B1X	One required
Memory 256 or 512 MSa	M9421A-M02/M05	One required
Half duplex port	M9421A-HDX	Optional
High output power	M9421A-1EA	Optional
True MIMO measurement	M9421A-MMO	Optional
Multi-test sync for MIMO	M9421A-MTS	Optional (require MMO)

M9410/11A PXIe VXT vector transceiver

Description	Model-option	Additional information
Frequency range 6 GHz	M9410A/M9411A-001	One required
Analysis bandwidth 300, 600 MHz or 1.2 GHz	M9410A/M9411A-B3X/B6X/B12	One required
Memory 256 or 512 MSa	M9410A/M9411A-M02/M05	One required
Half duplex port	M9410A/M9411A-HDX	Optional
High output power	M9410A/M9411A-1EA	Optional
Timing synchronization for MMO	M9410A/M9411A-MMO	Optional
Calibration for spectrum analyzer	SAA	One required

M9415A/M9416A PXIe VXT vector transceiver

Description	Model-option	Additional information
Frequency range 6, 8, 12 GHz	F06/F08/F12	One required
Analysis bandwidth 400, 800 MHz or 1.2 GHz	B4X/B8X/B12	One required
Memory 256 or 512 MSa	M02/M05	One required
Timing sync for WLAN MIMO	MMO	One required
Calibration for spectrum analyzer	SAA	One required

M9391/93A PXIe VSA vector signal analyzer

Description	Model-option	Additional information
Frequency range 3 or 6 GHz	M9391A-F03, or F06	One required for M9391A
Frequency range 8.4, 14, 18, or 27 GHz Frequency extension to 43.5 or 50 GHz	M9393A-F08, F14, F18, or F27 M9393A-FRZ or FRX	One required for M9393A Optional (requires M9393A-F27)
Analysis bandwidth 40, 100 or 160 MHz	M9391A/M9393A-B04, B10 or B16	One required
Memory 128, 512 or 1024 MSa	M9391A/M9393A-M01, M05 or M10	One required
Frequency reference 10 MHz and 100 MHz	M9391A/M9393A-300	One required

M9290A CXA-m PXIe signal analyzer

Description	Model-option	Additional information
Frequency range 3, 7.5, 13.6 or 26.5 GHz	M9290A-F03, F07, F13, or F26	One required
Analysis bandwidth 25 MHz	M9290A-B25	Optional
Preamplifier, 3, 7.5, 13.6 or 26.5 GHz	M9290A-P03, P07, P13 or P26	One required
Fine resolution step attenuator	M9290A-FSA	Optional
Precision frequency reference	-PFR	Optional

N9048B PXE and N9038B MXE EMI receiver

Capability	Instrument-Option	Additional information
Analysis bandwidth	25 MHz as default or higher	Required: Wider analysis bandwidth options as 40 MHz
Precision frequency reference	-PFR	Recommended: For enhanced frequency accuracy and repeatability for lower measurement uncertainty
Pre-amplifier	3.6 GHz (-P03) or higher	Recommended: For maximizing the measurement sensitivity