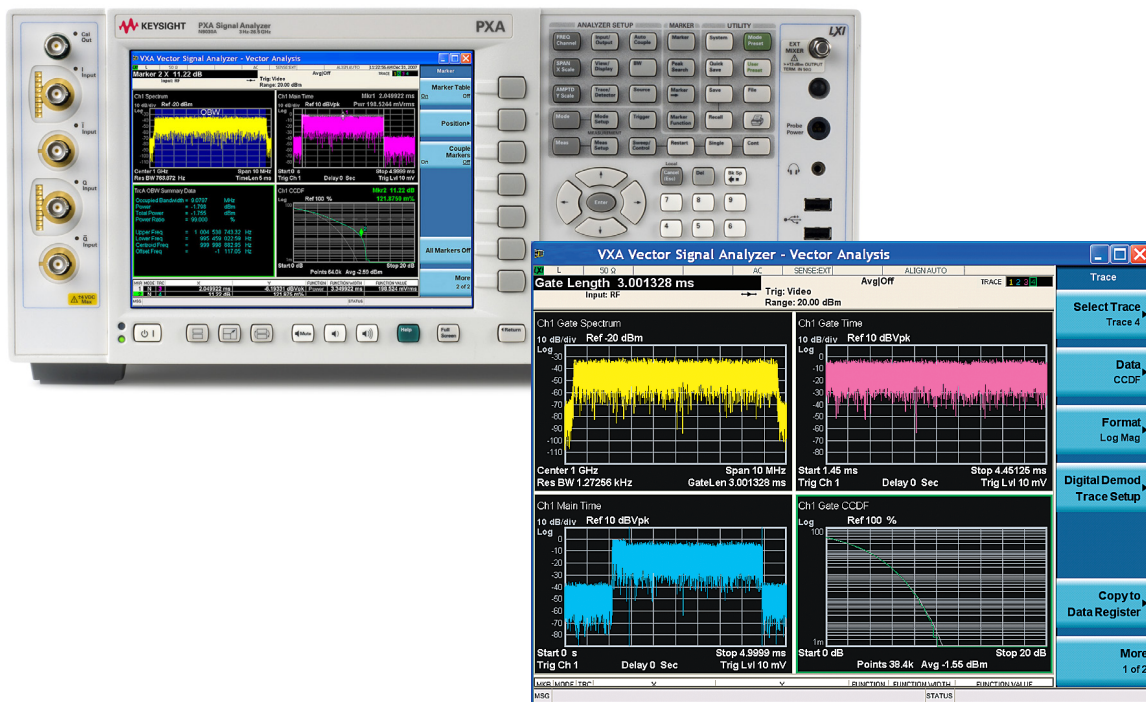


# Keysight

## VXA Vector Signal Analysis X-Series Measurement App, Traditional UI N9064EMOD

### Technical Overview



- FFT-based spectrum analysis
- Time-domain analysis tools for burst analysis
- Flexible modulation analysis
- Hardkey/softkey manual user interface or SCPI remote user interface
- Built-in, context-sensitive help
- Flexible licensing provides the option of using perpetual or time based licenses with one or multiple signal analyzers

## VXA Vector Signal Analysis Measurement Application

The VXA vector signal analysis measurement application transforms the X-Series signal analyzers into vector signal analyzers by providing a wide range of measurements, demodulation types, and filters to perform comprehensive signal analysis, helping you thoroughly test your designs, ensure product quality, and optimize without compromise.

X-Series measurement applications can help you:

- Gain more insight into device performance with intuitive display and graphs for your application. Select from our library of over 25 different measurement applications.
- Ensure that your design meets the latest standard. Updates are made to the X-Series measurement applications as standards evolve.
- Apply the same measurement science across multiple hardware platforms for consistent measurement results over your design cycle from R&D to production.
- Choose the license structure that meets your business needs. We provide a range of license types (node-locked, transportable, floating or USB portable) and license terms (perpetual or time-based).

### More about signal analysis

The VXA measurement application is a general-purpose FFT-based spectrum analysis application, with a wide selection of demodulation types and filters to perform flexible digital modulation analysis.

- Bring comprehensive vector signal analysis to the test rack
- Troubleshoot signals with powerful time domain capability
- Use analog demodulation to identify unintentional modulations
- Test when no commercial test standard is available
- Utilize flexible digital modulation analysis capability

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## Vector Signal Analysis Measurement Details

### Bringing comprehensive vector signal analysis to the test rack

The vector signal analysis (Option 1FP) is the foundation of all measurement options in the VXA measurement application and is a required option. Each measurement is available simultaneously, in either one, two, three or four user-selected separate trace displays. You have full control of trace data format and scaling.

- Spectrum, instantaneous spectrum
- Time, instantaneous time, raw time
- Time gating
- Time averaging, including continuous repeat max hold, exponential max hold, RMS (video), RMS (video) exponential, time, time exponential
- Band power
- Power spectral density (PSD)
- Power statistics (including gated):
  - Complementary cumulative distribution function (CCDF)
  - Cumulative distribution function (CDF)
  - Probability distribution function (PDF)
- Auto correlation
- Occupied bandwidth (OBW)
- Adjacent channel power (ACP)
- Analog demodulation: AM/FM/PM (includes spectrum, time, gated time, PSD, power statistics)
- Frequency counter
- Signal tracking
- Marker coupling
- Ability to save traces

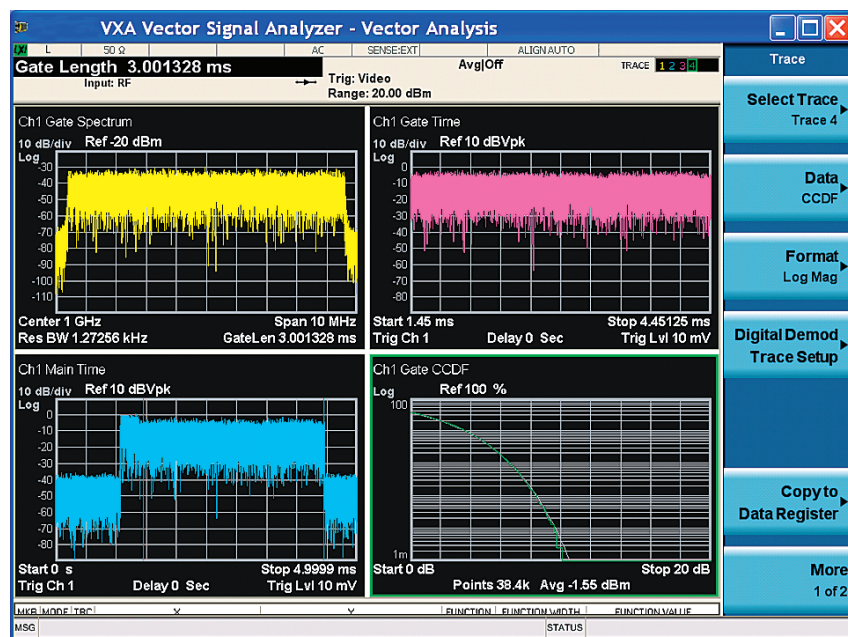


Figure 1. Basic vector signal analysis: The spectrum, time, and CCDF of the gated signal are shown, as well as the full time domain signal (Trace 2, lower left).

Vector Signal Analysis Measurement Details (continued)

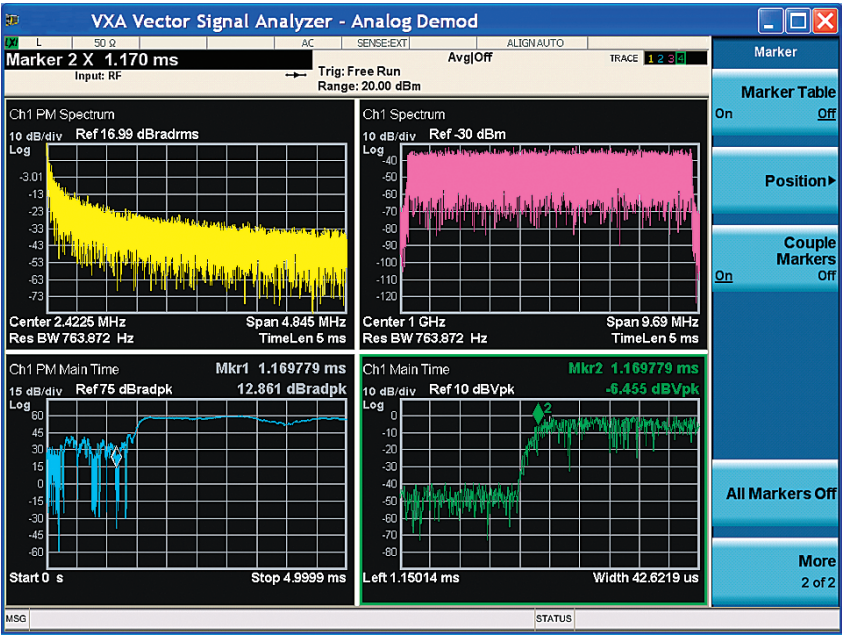


Figure 2. Analog demodulation: PM demodulation showing phase stability of the burst at turn-on; by coupling markers to an expanded time domain trace, we can see that data is sent prior to the phase settling out to a stable value after the burst turn-on occurs.

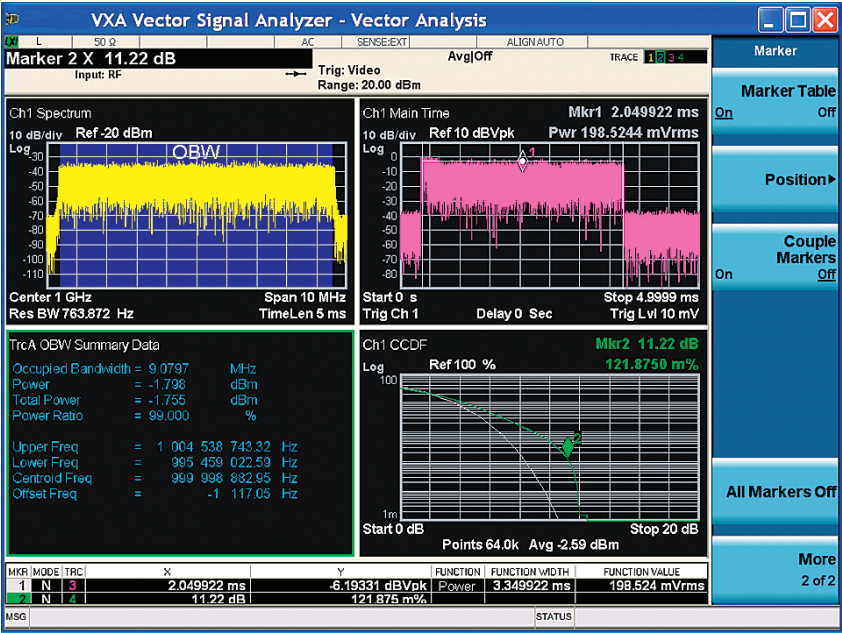


Figure 3. 2x2 grid display showing multiple measurements, markers, and marker table for at-a-glance signal analysis.

## Top Features

### View detailed frequency behavior

The VXA measurement application gives you a complete set of tools to maximize the resolution of your spectrum display and the accuracy of the data displayed:

- Up to 409601 frequency points across whatever frequency span you select provides unprecedented frequency resolution to locate the most difficult problem; RBWs of less than 1 millihertz are available
- Automatic selection of highest frequency resolution for a given measurement
- Four different FFT window functions to choose from to meet specific measurement needs—Gaussian filter for high dynamic range measurements, or flat top filter for highest amplitude accuracy measurements
- Use the X-axis scaling feature for a better view of the area of interest on the signal; save this display or paste the measurement result into a report to the design team

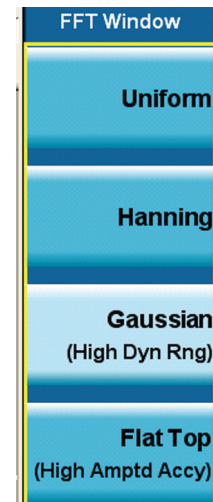


Figure 4. The FFT window filter is applied to each frequency bin, similar to the filter that a spectrum analyzer uses as it sweeps across the frequency span of the measurement; however, with VXA, the filters are applied simultaneously to all frequencies and can be changed.

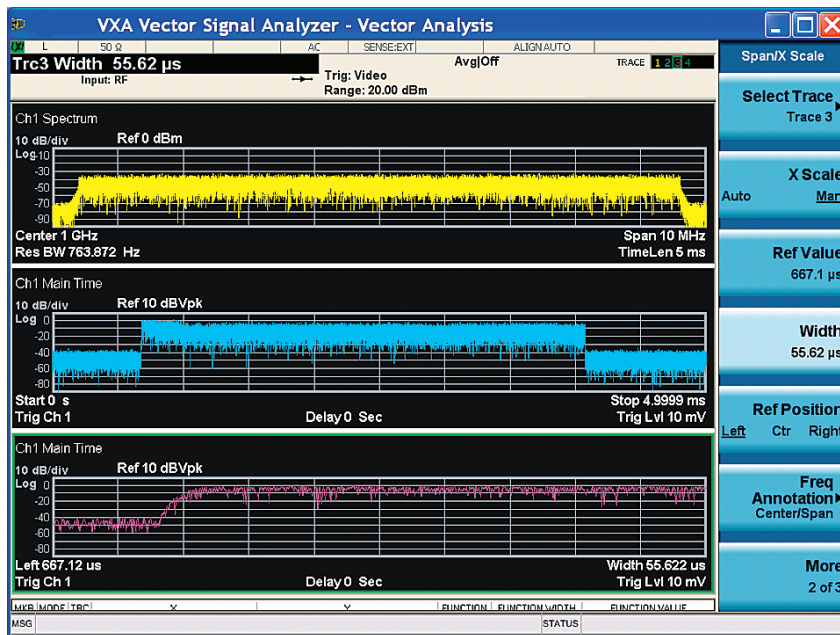


Figure 5. High-resolution frequency and time domain traces; Trace 3 shows the same time with the x-axis expanded to improve resolution of burst turn-on.

### Enhance your time to insight for baseband signal quality

PXA or MXA signal analyzers with Option BBA installed expands the baseband analysis capability for troubleshooting and design verification of RF devices.



## Flexible Digital Modulation Analysis

### Add powerful analysis options

The flexible digital modulation analysis option, Option 2FP, adds the capability to visualize system performance rapidly and intuitively. Teamed with an Keysight X-Series signal analyzer, you can increase the speed of your measurement tasks with the flexibility this option offers:

- Customize modulation analysis formats including PSK, QAM (16 to 1024QAM), MSK, EDGE, FSK, VSB, DVBQAM, APSK, SOQPSK
- A complete set of more than 30 modulation quality measurements, including overall EVM, peak EVM, EVM vs. symbol time, EVM spectrum, time, spectrum, constellation diagram, vector diagram, IQ parameters, frequency and clock error, channel/impulse response with EQ filter, zero crossing error, and symbol clock error
- Convenient measurement presets to cover popular communication formats, such as CDMA, GSM/EDGE, *Bluetooth*®, Zigbee, TETRA, APCO25, and Wi-SUN (MR-FSK PHY)

### Testing when no commercial test standard is available

Testing proprietary and custom signals is a challenge. Turnkey test software for those signals is seldom available off-the-shelf, so you have to design and implement the tests yourself. The flexible digital modulation analysis option will help you with that task. It covers the various demands of “do it yourself” testing for single carrier, single modulation signals with a deep set of flexible modulation analysis tools that you can tweak to meet your needs. In addition, these flexible tools are SCPI programmable.

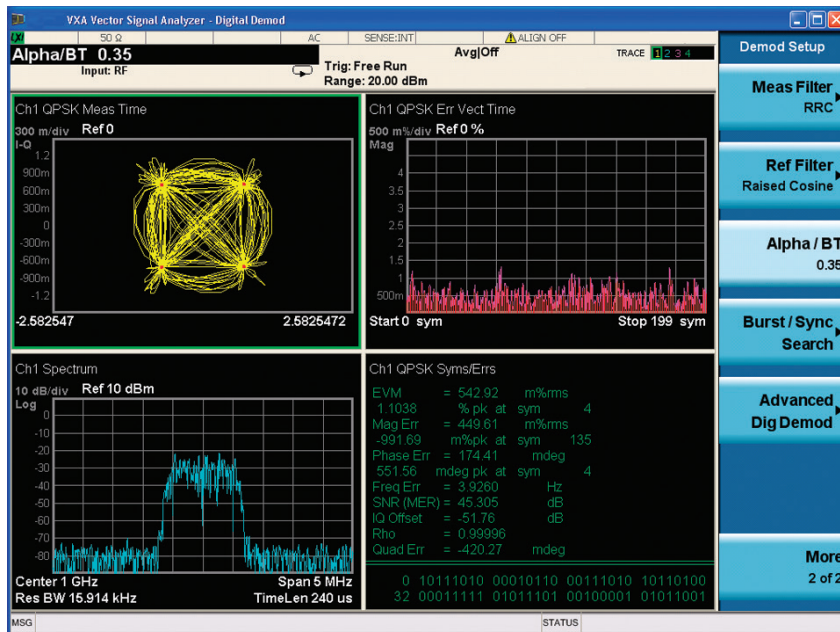


Figure 6. QPSK modulation analysis in default quad view: Trace 1 (upper left), IQ constellation; Trace 2 (lower left), spectrum; Trace 3 (upper right), error vector magnitude versus time (symbol) trace; Trace 4 (lower right), Symbols/Error table.

## Key Features of Digital Modulation Analysis

| Standard presets (for single carrier)        |                                                                                                                                                                                                                        |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cellular                                     | CDMA (base, mobile), CDPD, EDGE, GSM, NADC, PDC, PHS (PHP), W-CDMA                                                                                                                                                     |
| Wireless networking                          | Bluetooth (Basic Rate), HIPERLAN/1 (HBR, LBR), WLAN (802.11b), ZigBee (802.15.4, 868/915/2450 MHz), Wi-SUN (802.15.4g, MR-FSK PHY)                                                                                     |
| Digital video                                | DTV (8, 16), DVB (16, 32, 64, 128, 256), DVB (16APSK, 32APSK)                                                                                                                                                          |
| Other                                        | APCO 25, APCO 25 P2 (HCPM), APCO 25 P2 (HDQPSK), DECT, TETRA, VDL Mode 3, MIL-STD 188-181C, SOQPSK-TG                                                                                                                  |
| Modulation formats                           |                                                                                                                                                                                                                        |
| FSK                                          | 2, 4, 8, 16 level (including GFSK)                                                                                                                                                                                     |
|                                              | MSK (including GMSK)                                                                                                                                                                                                   |
|                                              | BPSK, QPSK, OQPSK, DQPSK, D8PSK, $\pi/4$ DQPSK, 8PSK, $3\pi/8$ 8PSK (EDGE), $\pi/8$ D8PSK, SOQPSK                                                                                                                      |
| QAM (absolute encoding)                      | 16, 32, 64, 128, 256, 512, 1024                                                                                                                                                                                        |
| QAM (differential encoding per DVB standard) | 16, 32, 64, 128, 256                                                                                                                                                                                                   |
| APSK                                         | 16, 16 w/DVB, 32, 32 w/DVB                                                                                                                                                                                             |
| VSB                                          | 8, 16                                                                                                                                                                                                                  |
| Filter types                                 | Raised cosine, square-root raised cosine, IS-95 compatible, Gaussian, EDGE, 1REC, 3RC, SOQPSK-TG, low pass, rectangular, half-sine, none                                                                               |
| Alpha/BT                                     | Continuously adjustable from 0.05 to 10 user-defined filters                                                                                                                                                           |
| Adaptive equalizer                           | Decision directed, LMS, feed-forward, equalization with adjustable convergence rate; removes the effects of linear distortion (i.e. non-flat frequency response, multipath, etc.) from modulation quality measurements |
| Symbol rate                                  | Rate = Frequency span / $(1+\alpha)$ ; maximum symbol rate limited only by the measurement span                                                                                                                        |
| Advanced analysis setup                      | Burst search                                                                                                                                                                                                           |
|                                              | Pulse search                                                                                                                                                                                                           |
|                                              | Sync search (with user-selected synchronization word)                                                                                                                                                                  |
|                                              | Adjustable search length and offset timing                                                                                                                                                                             |
|                                              |                                                                                                                                                                                                                        |
| Measurements/displays                        | Eye diagram                                                                                                                                                                                                            |
|                                              | Trellis diagram                                                                                                                                                                                                        |
|                                              | Polar diagram                                                                                                                                                                                                          |
|                                              | Constellation and vector (shows trajectory between symbol times) diagram                                                                                                                                               |
|                                              | I and Q versus time                                                                                                                                                                                                    |
|                                              | Error vector magnitude                                                                                                                                                                                                 |
|                                              | EVM versus symbol time                                                                                                                                                                                                 |
|                                              | EVM versus frequency                                                                                                                                                                                                   |
|                                              | Magnitude and phase error                                                                                                                                                                                              |
|                                              | Frequency error (carrier offset frequency)                                                                                                                                                                             |
|                                              | IQ origin offset                                                                                                                                                                                                       |
|                                              | Quadrature error                                                                                                                                                                                                       |
|                                              | Gain imbalance                                                                                                                                                                                                         |
|                                              | Amplitude droop (PSK and MSK formats)                                                                                                                                                                                  |
|                                              | SNR (8/16VSB and QAM formats)                                                                                                                                                                                          |
|                                              | Symbols table (demodulated bits)                                                                                                                                                                                       |
|                                              | Error table with tabular EVM and IQ errors                                                                                                                                                                             |
|                                              | Equalizer channel frequency response                                                                                                                                                                                   |
|                                              | Equalizer impulse response                                                                                                                                                                                             |
|                                              | Symbol clock error                                                                                                                                                                                                     |
|                                              | Zero crossing error                                                                                                                                                                                                    |

## Key Specifications

### Definitions

- Specifications describe the performance of parameters covered by the product warranty.
- 95th percentile values indicate the breadth of the population ( $\approx 2\sigma$ ) of performance tolerances expected to be met in 95% of cases with a 95% confidence. These values are not covered by the product warranty.
- Typical values are designated with the abbreviation "typ." These are performance beyond specification that 80% of the units exhibit with a 95% confidence. These values are not covered by the product warranty.
- Nominal values are designated with the abbreviation "nom." These values indicate expected performance, or describe product performance that is useful in the application of the product, but is not covered by the product warranty.
- PXA specifications apply to analyzers with frequency options of 526 and lower. For analyzers with higher frequency options, specifications are not warranted but performance will nominally be close to that shown in this section.

Note: Data subject to change

### N9064EM0D VXA vector signal analysis

| Description                                                                                                                       | PXA                                                                                                             | MXA                                                                                                             | EXA                                       | CXA                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------|
| Maximum frequency                                                                                                                 | 50 GHz                                                                                                          | 26.5 GHz                                                                                                        | 44 GHz                                    | 26.5 GHz                                                    |
| External mixing support with Option EXM                                                                                           | Yes                                                                                                             | Yes                                                                                                             | Yes                                       | N/A                                                         |
| Center frequency tuning resolution                                                                                                | 10 $\mu$ Hz                                                                                                     | 1 mHz                                                                                                           | 1 mHz                                     | 1 mHz                                                       |
| Frequency span                                                                                                                    | 10 MHz (standard);<br>25 MHz (Option B25)<br>40 MHz (Option B40)<br>85 MHz (Option B85)<br>160 MHz (Option B1X) | 25 MHz (standard)<br>40 MHz (Option B40)<br>85 MHz (Option B85)<br>125 MHz (Option B1A)<br>160 MHz (Option B1X) | 25 MHz (standard)<br>40 MHz (Option B40)  | 10 MHz (standard)<br>25 MHz (Option B25)                    |
| Frequency point per span                                                                                                          | Calibrated points: 51 ~ 409, 601; Displayed points: 51 ~ 524, 288                                               |                                                                                                                 |                                           |                                                             |
| Absolute amplitude accuracy (Freq < 3.6 GHz)                                                                                      | $\pm 0.19$ dB, 95%<br>confidence accuracy                                                                       | $\pm 0.23$ dB, 95%<br>confidence accuracy                                                                       | $\pm 0.27$ dB, 95%<br>confidence accuracy | $\pm 0.50$ dB, (Freq<br>< 3 GHz) 95%<br>confidence accuracy |
| Third-order intermodulation distortion, two<br>-20 dBfs tones, 400 MHz to 13.6 GHz, (7.5 GHz<br>for CXA) tone separation > 15 kHz | -90 dBc (nom)                                                                                                   | -90 dBc (nom)                                                                                                   | -84 dBc (nom)                             | -66 dBc (nom)                                               |
| Resolution bandwidth                                                                                                              | RBWs range from less than 1 Hz to greater than 2.8 MHz (standard); Greater than 7 MHz<br>(with Option B25)      |                                                                                                                 |                                           |                                                             |
| RBW filter shapes                                                                                                                 | Flat top, Gaussian top, Hanning, Uniform                                                                        |                                                                                                                 |                                           |                                                             |
| Analog demodulation types                                                                                                         | AM, FM, PM                                                                                                      |                                                                                                                 |                                           |                                                             |

## Key Specifications (continued)

### X-Series signal analyzers

| Accuracy                       | PXA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MXA                  | EXA                  | CXA                  | BBIQ <sup>1</sup>    |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|
| Conditions                     | Modulation formats include BPSK, D8PSK, DQPSK, QPSK, (16/32/64/128/256/512/1024) QAM, (16/32/64/128/256)DVBQAM, $\pi/4$ -DQPSK, 8-PSK. EVM normalization reference set to constellation maximum. Transmit filter is root raised cosine with $\alpha=0.35$ . Center frequency 1 GHz. Signal amplitude of -16 dBm, analyzer range set to -10 dBm. Result length set to at least 150 symbols, or $3 \times \{\text{Number of ideal state locations}\}$ . RMS style averaging with a count of 10. Phase noise optimization adjusted based on symbol rate of measurement. Available span dependent on analyzer hardware bandwidth options. |                      |                      |                      |                      |
| Residual errors                | Symbol rate/Span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                      |                      |                      |
| Residual EVM                   | 1 Msps/5 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $\leq 0.5\%$ rms     | $\leq 0.7\%$ rms     | $\leq 0.7\%$ rms     | $\leq 0.5\%$ rms     |
|                                | 10 Msps/25 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.5\%$ rms     | $\leq 0.7\%$ rms     | $\leq 0.7\%$ rms     | $\leq 0.5\%$ rms     |
|                                | 25 Msps/40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.7\%$ rms     | $\leq 1.1\%$ rms     | $\leq 1.1\%$ rms     | $\leq 0.6\%$ rms     |
|                                | 100 Msps/160 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $\leq 1.0\%$ rms     | $\leq 1.3\%$ rms     | —                    | —                    |
| Magnitude error                | 1 Msps/5 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $\leq 0.4\%$ rms     | $\leq 0.5\%$ rms     | $\leq 0.5\%$ rms     | $\leq 0.5\%$ rms     |
|                                | 10 Msps/25 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.5\%$ rms     | $\leq 0.5\%$ rms     | $\leq 0.5\%$ rms     | $\leq 0.5\%$ rms     |
|                                | 25 Msps/40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.6\%$ rms     | $\leq 0.8\%$ rms     | $\leq 0.8\%$ rms     | $\leq 0.6\%$ rms     |
|                                | 100 Msps/160 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $\leq 0.9\%$ rms     | $\leq 1.0\%$ rms     | —                    | —                    |
| Phase error                    | 1 Msps/5 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $\leq 0.5^\circ$ rms | $\leq 0.6^\circ$ rms | $\leq 0.6^\circ$ rms | $\leq 0.6^\circ$ rms |
|                                | 10 Msps/25 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.6^\circ$ rms | $\leq 0.6^\circ$ rms | $\leq 0.6^\circ$ rms | $\leq 0.6^\circ$ rms |
|                                | 25 Msps/40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.6^\circ$ rms | $\leq 1.1^\circ$ rms | $\leq 1.1^\circ$ rms | $\leq 0.6^\circ$ rms |
|                                | 100 Msps/160 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $\leq 1.0^\circ$ rms | $\leq 1.3^\circ$ rms | —                    | —                    |
| Frequency error                | Added to frequency accuracy if applicable $\leq \text{Symbol rate} / 500,000$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                      |                      |                      |
| I/Q origin offset <sup>1</sup> | $\leq -60$ dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                      |                      |                      |
| Accuracy                       | PXA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MXA                  | EXA                  | CXA                  | BBIQ <sup>1</sup>    |
| Conditions                     | Modulation formats include MSK and MSK2. Transmit filter is gaussian with BT=0.3. Center frequency 1 GHz. Signal amplitude of -16 dBm. Analyzer range set to -10 dBm. Result length set to 150 symbols. RMS style averaging with a count of 10. Available span dependent on analyzer hardware bandwidth options.                                                                                                                                                                                                                                                                                                                      |                      |                      |                      |                      |
| Residual errors                | Symbol rate/Span                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                      |                      |                      |
| Residual EVM                   | 10 Msps/25 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.5\%$ rms     | $\leq 0.9\%$ rms     | $\leq 0.9\%$ rms     | $\leq 1.0\%$ rms     |
|                                | 80 Msps/160 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $\leq 1.4\%$ rms     | $\leq 1.8\%$ rms     | —                    | —                    |
| Phase error                    | 10 Msps/25 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | $\leq 0.4^\circ$ rms | $\leq 0.5^\circ$ rms | $\leq 0.5^\circ$ rms | $\leq 0.5^\circ$ rms |
|                                | 80 Msps/160 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $\leq 1.3^\circ$ rms | $\leq 1.3^\circ$ rms | —                    | —                    |

1. I+jQ measurements performed using signal amplitude and analyzer range near 0 dBm, with a 0 Hz center frequency. I/Q origin offset metric does not include impact of analyzer DC offsets.

For a complete list of specifications refer to the appropriate specifications guide.

PXA: [www.keysight.com/find/pxa\\_specifications](http://www.keysight.com/find/pxa_specifications)

MXA: [www.keysight.com/find/mxa\\_specifications](http://www.keysight.com/find/mxa_specifications)

EXA: [www.keysight.com/find/exa\\_specifications](http://www.keysight.com/find/exa_specifications)

CXA: [www.keysight.com/find/cxa\\_specifications](http://www.keysight.com/find/cxa_specifications)

PXIe:

VSA up to 6 GHz: [www.keysight.com/find/m9391a](http://www.keysight.com/find/m9391a)

VSA up to 50GHz: [www.keysight.com/find/m9393a](http://www.keysight.com/find/m9393a)

VXT: [www.keysight.com/find/m9421a](http://www.keysight.com/find/m9421a)

CXA-m: [www.keysight.com/find/m9290a](http://www.keysight.com/find/m9290a)

## Ordering Information

### Flexible licensing and configuration

- **Perpetual:** License can be used in perpetuity.
- **Time-based:** License is time limited to a defined period, such as 12-months.
- **Node-locked:** Allows you to use the license on one specified instrument/computer.
- **Transportable:** Allows you to use the license on one instrument/computer at a time. This license may be transferred to another instrument/computer using Keysight's online tool.
- **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.
- **USB portable:** Allows you to move the license from one instrument/computer to another by end-user only with certified USB dongle, purchased separately.
- **Software support subscription:** Allows the license holder access to Keysight technical support and all software upgrades

### You Can Upgrade!

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



### VXAX Vector Signal Analysis measurement application (N9064EM0D)

| Model         | Software License Type   | Support Contract         | Support Subscription (12-month) <sup>2</sup> |
|---------------|-------------------------|--------------------------|----------------------------------------------|
| N9064EM0D-1FP | Node-locked perpetual   | R-Y5C-001-A <sup>2</sup> | R-Y6C-001-L <sup>2</sup>                     |
| N9064EM0D-1FL | Node-locked 12-month    | R-Y4C-001-L <sup>1</sup> | Included                                     |
| N9064EM0D-1TP | Transportable perpetual | R-Y5C-004-D <sup>2</sup> | R-Y6C-004-L <sup>2</sup>                     |
| N9064EM0D-1TL | Transportable 12-month  | R-Y4C-004-L <sup>1</sup> | Included                                     |
| N9064EM0D-1NP | Floating perpetual      | R-Y5C-002-B <sup>2</sup> | R-Y6C-002-L <sup>2</sup>                     |
| N9064EM0D-1NL | Floating 12-month       | R-Y4C-002-L <sup>1</sup> | Included                                     |
| N9064EM0D-1UP | USB portable perpetual  | R-Y5C-005-E <sup>2</sup> | R-Y6C-005-L <sup>2</sup>                     |
| N9064EM0D-1UL | USB portable 12-month   | R-Y4C-005-L <sup>1</sup> | Included                                     |

### 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: [www.keysight.com/find/X-Series\\_apps\\_trial](http://www.keysight.com/find/X-Series_apps_trial)

### Hardware Configurations

To learn more about compatible platforms and required configurations, please visit: [www.keysight.com/find/X-Series\\_apps\\_platform](http://www.keysight.com/find/X-Series_apps_platform)

### Software Models & Options

To learn more about X-Series measurement application licensing, model numbers and options, please visit:

[www.keysight.com/find/X-Series\\_apps\\_model](http://www.keysight.com/find/X-Series_apps_model)

### One month software support subscription extensions <sup>3</sup>

| Model                  | Description                                                        |
|------------------------|--------------------------------------------------------------------|
| R-Y6C-501 <sup>3</sup> | 1-month of software support subscription for node-locked license   |
| R-Y6C-502 <sup>3</sup> | 1-month of software support subscription for floating license      |
| R-Y6C-504 <sup>3</sup> | 1-month of software support subscription for transportable license |
| R-Y6C-505 <sup>3</sup> | 1-month of software support subscription for USB portable license  |

1. All time-based X-Series measurement application licenses includes a 12-month support contract which also includes the 12-month software support subscription as same duration.
2. Support contract must bundle software support subscription for all perpetual licenses in the first year. All software upgrades and Keysight support are provided for software licenses with valid support subscription.
3. After the first year, software support subscription may be extended with annual or monthly software support subscription extensions for perpetual licenses.

## Hardware Configuration

For optimizing the LTE and LTE-Advanced FDD/TDD measurement application, Keysight recommends a minimum level of instrument hardware functionality at each instrument performance point. Supported instruments include:

### Benchtop:

- PXA N9030A
- EXA N9010A
- MXA N9020A
- CXA N9000A

### PXIe:

- VSA (6 GHz) M9391A
- VXT M9420/21A
- VSA (50 GHz) M9393A
- CXA-m M9290A

### N90x0A X-Series signal analyzer

| Capability                      | Instrument Option                 | Benefit                                                                                                                                                               |
|---------------------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analysis bandwidth              | 10 or 25 MHz as default or higher | <b>Required:</b> Wider analysis bandwidth options such as 25/40/85/160 MHz can be selected depending on the specified signal analyzer model                           |
| Precision frequency reference   | -PFR                              | <b>Recommended:</b> For enhanced frequency accuracy and repeatability for lower measurement uncertainty                                                               |
| Electronic attenuator           | -EA3                              | <b>Recommended:</b> 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          | <b>Recommended:</b> For maximizing the measurement sensitivity                                                                                                        |
| Fine resolution step attenuator | -FSA                              | <b>Recommended:</b> Useful for maximizing useable dynamic range to see signals                                                                                        |
| Analog baseband I/Q inputs      | -BBA on PXA and MXA only          | <b>Optional:</b> To extend measurements at baseband if required by device under test                                                                                  |

### 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 | M9393A-F08, F14, F18, or F27  | One required for M9393A        |
| Frequency extension to 43.5 or 50 GHz  | M9393A-FRZ or FRX             | 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                   |

### M9420/21A PXIe VXT vector transceiver

| Description                          | Model-Option              | Additional information |
|--------------------------------------|---------------------------|------------------------|
| Frequency range 3.8 or 6 GHz         | M9420A/M9421A-504, or 506 | One required           |
| Analysis bandwidth 40, 80 or 160 MHz | M9420A/M9421A-B40/B80/B1X | One required           |
| Memory 256 or 512 MSa                | M9420A/M9421A-M02/M05     | One required           |
| Half duplex port                     | M9420A/M9421A-HDX         | Optional               |
| High output power                    | M9420A/M9421A-1EA         | Optional               |

### 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               |

## Related Literature

| Description                                                                                                         | Publication number |
|---------------------------------------------------------------------------------------------------------------------|--------------------|
| N9064A & W9064A Vector Signal Analysis, Self-Guided Demonstration                                                   | 5990-6159EN        |
| N9064A & W9064A Vector Signal Analysis, Measurement Guide                                                           | N9064-90004        |
| User's and Programmer's Reference guide is available in the library section of the N9064A and W9064A product pages. |                    |

## Web

Product page:

[www.keysight.com/find/N9064D](http://www.keysight.com/find/N9064D)

X-Series measurement applications:

[www.keysight.com/find/X-Series\\_Apps](http://www.keysight.com/find/X-Series_Apps)

X-Series signal analyzers:

[www.keysight.com/find/X-Series](http://www.keysight.com/find/X-Series)

PXIe VXT vector transceiver:

[www.keysight.com/find/VXT](http://www.keysight.com/find/VXT)

PXIe VSA vector signal analyzer:

[www.keysight.com/find/M9391A](http://www.keysight.com/find/M9391A)

[www.keysight.com/find/M9393A](http://www.keysight.com/find/M9393A)

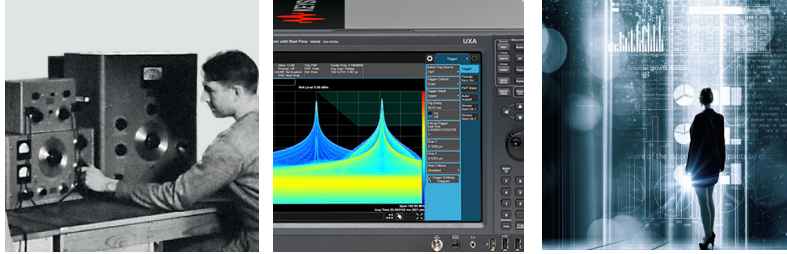
PXIe CXA-m signal analyzer:

[www.keysight.com/find/m9290a](http://www.keysight.com/find/m9290a)

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