

# N9000B CXA X-Series Signal Analyzer, Multi-touch

This configuration guide will help you determine which performance options, measurement applications, accessories, and services to include with your new multi-touch CXA or to add as upgrades to an existing CXA.



# Configure Your Keysight CXA Signal Analyzer

This step-by-step process will help you configure your new CXA X-Series signal analyzer. Tailor the performance to meet your requirements.

## Included in base product

Standard options and accessories come with the CXA base model at no additional charge and do not need to be ordered. They include:

- Spectrum analyzer measurement application
- Dual-core, high-performance processor, 8 GB RAM, removable solid-state drive
- Frequency reference
- 10 MHz analysis bandwidth
- Enhanced phase noise
- Microsoft Windows 10 operating system
- Benchtop configuration
- Multi-language user interface
- User guide
- Power cord
- Front panel cover for protection during transit

## Get More Information

For a summary of specifications, refer to the N9000B CXA data sheet (literature number 5992-1274EN).

A full set of specifications are available in the N9000B CXA Signal Analyzer Specification Guide

| Description  | Option number | Additional information  |
|--|---------------|---|
| <b>Step 1. Select maximum frequency range (required option; frequency range not upgradeable)</b> |               |   |
| Frequency range, 9 kHz to 3.0 GHz  | N9000B-503    |   |
| Frequency range, 9 kHz to 7.5 GHz  | N9000B-507    |   |
| Frequency range, 9 kHz to 13.6 GHz   | N9000B-513    |   |
| Frequency range, 9 kHz to 26.5 GHz   | N9000B-526    |   |
| <b>Step 2. Add a preamplifier</b>  |               |   |
|  |               | Preamplifiers improve the noise floor for low-level signal detection; +20 dB: 100 kHz to 26.5 GHz   |
| Preamplifier, 100 kHz to 3.0 GHz   | N9000B-P03    | Compatible with N9000B-503, N9000B-507, N9000B-513, and N9000B-526  |
| Preamplifier, 100 kHz to 7.5 GHz   | N9000B-P07    | Compatible with N9000B-507, N9000B-513, and N9000B-526  |
| Preamplifier, 100 kHz to 13.6 GHz  | N9000B-P13    | Compatible with N9000B-513 and N9000B-526   |
| Preamplifier, 100 kHz to 26.5 GHz  | N9000B-P26    | Compatible with N9000B-526  |
| <b>Step 3. Choose frequency reference</b>  |               |   |
| Frequency reference  | Standard      | Aging rate: $\pm 1 \times 10^{-6}$ /year  |
| Precision frequency reference  | N9000B-PFR    | Reduces frequency drift for more accurate measurements; aging rate: $\pm 1 \times 10^{-7}$ /year  |
| <b>Step 4. Choose an attenuator</b>  |               |   |
| Mechanical attenuator  | Standard      | 10 dB steps, 0 to 50 dB, for N9000B-503 and N9000B-507<br>10 dB steps, 0 to 70 dB, for N9000B-513 and N9000B-526  |
| Fine resolution step attenuator  | N9000B-FSA    | Allows 2 dB steps for the full range of the attenuator  |
| <b>Step 5. Choose analysis bandwidth</b>   |               |   |
| 10 MHz analysis bandwidth  | Standard      | Useful for most 2G and 3G measurement applications  |
| 25 MHz analysis bandwidth  | N9000B-B25    | Extends the analysis (demod) bandwidth from 10 to 25 MHz; useful for most cellular communications, wireless connectivity, and audio/video broadcasting measurement applications |
| <b>Step 6. Add a tracking generator</b>  |               |   |
| Tracking generator, 9 kHz to 3.0 GHz   | N9000B-T03    | Compatible with N9000B-503, N9000B-507 only   |
| Tracking generator, 9 kHz to 6.0 GHz   | N9000B-T06    | Compatible with N9000B-507 only   |
| <b>Step 7. Choose performance</b>  |               |   |
| Enhanced phase noise   | Standard      | Licensed as N9000B-EP4  |

## Configure Your Keysight CXA Signal Analyzer (Continued)

| Description   | Model number                      | Additional information  |
|---|-----------------------------------|---|
| <b>Step 8. Add instrument features</b>  |                                   |   |
| Enhanced display package  | N90EMEDPB <sup>1</sup>            | Includes spectrogram, trace zoom, and zone span   |
| Basic precompliance EMI   | N90EMEMCB <sup>1</sup>            | Performs EMI precompliance measurements with CISPR 16-1-1 detectors and bandwidths. Other associated features available from the standard spectrum analyzer mode, such as CISPR band presets, and measure at marker, further enhance the EMI precompliance test flow. See also <b>the differences between N90EMEMCB and N6141EM0E EMI measurement application</b>   |
| External source control   | N90EMESCB <sup>1</sup>            | External source control for selected Keysight EXG, MXG and PSG signal generators; Includes 3 BNC cables and 1 cross-over LAN cable. This feature is compatible with N9000B option 503 or 507 only   |
| <b>Step 9. Choose operating system</b>  |                                   |   |
| Windows 10 operating system   | Standard                          | Licensed as N9000B-W10  |
| <b>Step 10. Add security features</b>   |                                   |   |
| Additional, removable solid-state drive   | N9000B-SS1                        | Provides a fully-imaged, removable solid-state drive in addition to the one installed in the instrument, with Windows 10 operating system   |
| Exclude launch program  | N9000B-SF1                        | Prevents the launching of Windows programs from the instrument application  |
| Prohibit saving results   | N9000B-SF2                        | Prevents the saving/recall of measurement results or user configurations to/from instrument's data storage  |
| <b>Step 11. Add rear panel output utilities</b>   |                                   |   |
| Second IF output  | N9000B-CR3                        | Wideband IF out; output on Aux IF connector at rear panel; compatible with N9000B-503 and N9000B-507 only   |
| <b>Step 12. Choose measurement application or software and license type</b>   |                                   |   |
| 1. Note: Keysight offers 4 license types for the measurement applications and instrument features, in 2 license terms: Perpetual or Time-based.<br>License types:                       |                                   |   |
| – <b>Node-locked:</b> Allows you to use the license on one instrument/computer at a time  |                                   |   |
| – <b>Transportable:</b> 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 |                                   |   |
| – <b>Floating:</b> Allows you to access the license on the networked instruments/computers from a server, one at a time. For concurrent access, multiple licenses may be purchased      |                                   |   |
| – <b>USB Portable:</b> Allows you to access the license from one instrument/computer to another by end-user only with certified USB dongle, purchased separately                        |                                   |   |
| License terms:  |                                   |   |
| – <b>Perpetual:</b> License can be used in perpetuity. For perpetual license holders, a separate support contract is required to access Keysight technical support and software updates |                                   |   |
| – <b>Time-based:</b> License is time limited to a defined period, such as 12-months. A valid support contract is included in the pricing for time-based licenses.                       |                                   |   |
| Spectrum analyzer   | Standard                          | Traditional spectrum analysis plus many new and enhanced functions; power measurements based on industry specifications; licensed as N9060EM1E  |
| Analog demodulation   | N9063EM0E                         | Adds one-button measurement for AM/FM/PM demodulation with metrics, tune and listen, and AF spectrum; supports audio output (output voltage proportional to frequency deviation). FM Stereo and RDS are included  |
| Phase noise   | N9068EM0E                         | Adds one-button measurements for analyzing phase noise in frequency domain (log plot) and time domain (spot frequency), supports external mixing  |
| Noise figure  | N9069EM0E (requires preamplifier) | Adds one-button measurements for noise figure, gain, and related metrics; requires preamplifier to meet specifications; works with Keysight U1831C USB noise source, N400xA Series smart noise sources and 346 Series noise sources; supports U7227 USB external preamplifiers Includes the advanced NF measurement features including external LO control over GPIB/LAN/USB, multi-stage converter tests with system LO, and manual mode to simulate the legacy NF meter |
| Vector modulation analysis Digital Demodulation   | N9054EM0E                         | Performs one-button flexible modulation analysis measurements with FSK, PSK, QAM, MSK, ASK, APSK, VSB etc. and popular format preset  |
| Vector modulation analysis Custom OFDM  | N9054EM1E                         | Performs one-button custom OFDM modulation analysis measurement with user-defined settings or recalling 89600 VSA or Signal Studio output files   |
| Pulse analysis  | N9067EM0E                         | Characterize pulsed RF signals in the time domain, with phase, frequency and statistical analysis of large pulse sets   |

## Configure Your Keysight CXA Signal Analyzer (Continued)

| Description   | Model number                     | Additional information   |
|---|----------------------------------|--|
| <b>Step 12. Choose measurement application or software and license type (Continued)</b> |                                  |  |
| EMI   | N6141EM0E                        | Performs pre-compliance conducted and radiated emission measurements   |
| SCPI command language compatibility   | N9062EM0E                        | Adds capability to emulate the R&S FSP/FSU/FSE/FSL/FSV spectrum analyzers or ESU EMI receiver  |
| MATLAB software   | N6171A                           |  |
| <b>Cellular communications</b>  |                                  |  |
| GSM/EDGE/Evo  | N9071EM0E                        | Standard-based, one-button GSM/EDGE/EDGE Evolution measurements  |
| W-CDMA/HSPA+  | N9073EM0E                        | Standard-based, one-button W-CDMA, HSPA and HSPA+ measurements   |
| LTE/LTE-Advanced FDD  | N9080EM0E                        | Standard-based, one-button LTE/LTE-Advanced FDD measurements   |
| NB-IoT & eMTC FDD   | N9080EM3E                        | Standard-based, one-button NB-IoT/eMTC measurements  |
| LTE V2X   | N9080EM4E                        | Standard-based, one-button LTE-V2X transmitter measurements  |
| LTE/LTE-Advanced TDD  | N9082EM0E                        | Standard-based, one-button LTE/LTE-Advanced TDD measurements   |
| <b>Wireless connectivity</b>  |                                  |  |
| WLAN 802.11a/b/g/j/p/n/af/ah  | N9077EM0E                        | Standard-based, one-button 802.11a/b/g/j/p/n/af/ah measurement   |
| Bluetooth®  | N9081EM0E                        | Standard-based, one-button Bluetooth (BR/EDR, Low Energy 4.0/4.2 and Bluetooth 5) measurements   |
| Short range comm and IoT  | N9084EM0E                        | Standard-based, one-button LoRa CSS measurement, 802.15.4 for ZigBee measurement and G.9959 for Z-Wave measurement   |
| <b>Step 13. Choose 89600 VSA software licenses</b>                                      |                                  |  |
| Basic vector signal analysis and hardware connectivity                                  | 89601200C (required core option) | <ul style="list-style-type: none"> <li>– Provides the tools and user interface that make up the 89600 VSA software including time and frequency domain measurement, hardware connectivity, recordings and playback</li> <li>– Channel quality modulation analysis</li> </ul>   |
| <b>General purpose</b>  |                                  |  |
| Digital demodulation analysis   | 89601AYAC                        | <ul style="list-style-type: none"> <li>– Analysis of &gt;40 modulation formats, including custom APSK and presets for communication formats like GSM/EDGE, ZigBee FSK, Bluetooth® BR, APCO25 and SOQPSK</li> <li>– Proprietary and pre-standard, customized IQ constellation signals</li> <li>– TEDS modulation analysis</li> <li>– Channel response measurements such as phase/magnitude response and multi-tone group delay</li> </ul> |
| Custom OFDM modulation analysis   | 89601BHFC                        | – Proprietary and pre-standard OFDM formats  |
| <b>Cellular communication</b>   |                                  |  |
| 5G NR modulation analysis   | 89601BHNC                        | <ul style="list-style-type: none"> <li>– 5G NR modulation analysis</li> <li>– Pre-5G modulation analysis</li> </ul>  |
| LTE/LTE-A FDD modulation analysis   | 89601BHGC                        | <ul style="list-style-type: none"> <li>– LTE FDD modulation analysis</li> <li>– LTE-Advanced FDD modulation analysis</li> </ul>  |
| LTE/LTE-A TDD modulation analysis   | 89601BHHC                        | <ul style="list-style-type: none"> <li>– LTE TDD modulation analysis</li> <li>– LTE-Advanced TDD modulation analysis</li> </ul>  |
| 3G modulation analysis bundle   | 89601B7NC                        | <ul style="list-style-type: none"> <li>– W-CDMA/HSPA+ modulation analysis</li> <li>– TD-SCDMA/HSPA modulation analysis</li> <li>– cdma2000 modulation analysis</li> <li>– 1xEV-DO and 1xEV-DV modulation analysis</li> </ul>   |
| <b>Wireless connectivity</b>  |                                  |  |
| Wireless connectivity modulation analysis   | 89601B7RC                        | <ul style="list-style-type: none"> <li>– WLAN 802.11a/b/g/j/p modulation analysis</li> <li>– WiMax modulation analysis</li> </ul>  |
| High throughput WLAN modulation analysis  | 89601BHXC                        | <ul style="list-style-type: none"> <li>– WLAN 802.11n/ac modulation analysis</li> <li>– WLAN 802.11ax modulation analysis</li> </ul>   |
| IoT modulation analysis   | 89601BHTC                        | <ul style="list-style-type: none"> <li>– NB-IoT modulation analysis</li> <li>– RFID modulation analysis</li> </ul>   |
| <b>Radar analysis</b>   |                                  |  |
| Pulse analysis  | 89601BHQC                        | – Pulsed modulated radar signal analysis   |
| FMCW radar analysis   | 89601BHPC                        | – For multi-chirp linear FM modulated signals or automotive radar  |
| <b>Other standard formats</b>   |                                  |  |
| DOCSIS modulation analysis  | 89601BHMC                        | – DOCSIS3.1 downstream and upstream modulation analysis  |
| Multi-vendor hardware connectivity  | 89601301C                        | – Connect multi-vendor hardware for modulation analysis  |

## Configure Your Keysight CXA Signal Analyzer (Continued)

| Description  | Model number  | Additional information   |
|--|---------------|--|
| <b>Step 14. Choose physical instrument configuration</b> |               |  |
| Bench top configuration                                  | Standard      | Provides two side carrying straps, four rear feet, and four bottom feet with a tilt stand  |
| Portable configuration                                   | N9000B-PRC    | Provides a convenient, pivoting carrying handle as well as rubber protective corners and end guards; this configuration is intended for applications requiring more rugged packaging, such as in the field                               |
| <b>Step 15. Choose accessories</b>                       |               |  |
| Mouse, USB interface                                     | Standard      | Every CXA is shipped with a USB mouse which enhances the usability of the Windows operating system   |
| User guide   | Standard      | US – English localization<br>All user documentation is included in the CXA's embedded help system<br>User documentation can be downloaded from: <a href="http://www.keysight.com/find/cxa_manuals">www.keysight.com/find/cxa_manuals</a> |
| Power cord   | Standard      | Dependent upon region of use   |
| Documentation DVD  | N9060EM1E-ABA | US - English localization  |
| Rack mount   | 1CM113A       | Adds rack mount flanges to the CXA   |
| Front handles  | 1CN103A       | Adds front handles to the CXA  |
| Rack mount with handles                                  | 1CP105A       | Adds rack mount flanges and handles to the CXA   |
| Rack slide   | 1CR013A       | Adds a non-tilting rack slide to the CXA   |
| USB DVD-ROM/CD-R/RW drive                                | 1DVR001A      | Enhances the usability of the Windows operating system   |
| Mouse, USB interface                                     | 1MSE001A      |  |
| Front panel protection cover                             | Standard      |  |
| Minimum loss pad, 50 to 75 $\Omega$ (type-N to BNC)      | MLP001A       | 50 $\Omega$ type-N male to 75 $\Omega$ BNC female adapter<br>Frequency range: 9 MHz to 2 GHz<br>Input/output return loss: 20 and 11 dB<br>Insertion loss: 5.7 dB   |
| USB external preamplifier, 10 MHz to 4 GHz               | U7227A        | Brings reliable gain and low noise figure to measurement systems, and improves the overall system performance  |
| USB external preamplifier, 0.1 to 26.5 GHz               | U7227C        | Brings reliable gain and low noise figure to measurement systems, and improves the overall system performance  |
| Near field probes  | N9311X-100    | Includes 4 pieces of H-field probes, for detecting EMI emissions   |

## Configure Your Keysight CXA Signal Analyzer (Continued)

| Description  | Option number | Additional information   |
|--|---------------|--|
| <b>Step 16. Add calibration, technical training, support, and upgrade services</b> |               |  |
| Commercial calibration certificate with test data                                  | N9000B-UK6    | Calibration certificate only available at time of instrument purchase; only provides measurement results   |
| Keysight Cal + uncertainties + guardbanding (accredited cal)                       | N9000B-AMG    | Provides ISO 17025A accredited calibration from factory  |
| ANSI Z540-1-1994 calibration   | N9000B-A6J    | Provides ANSI Z540 compliant calibration from factory  |
| Calibration Assurance Plan, Return-to-Keysight, 3 years                            | R-50C-011-3   | Keysight tests your instrument against its original specifications and automatically makes adjustments if outside of specified parameters; pre- and post-adjustment measurement data reports also provided |
| Calibration Assurance Plan, Return-to-Keysight, 5 years                            | R-50C-011-5   |  |
| Calibration Assurance Plan, Return-to-Keysight, 7 years                            | R-50C-011-7   |  |
| Calibration Assurance Plan, Return-to-Keysight, 10 years                           | R-50C-011-10  |  |
| Service: remote scheduled productivity assistance                                  | PS-S10-100    | Hourly phone-in technical support service designed to help you understand and operate your equipment through convenient phone and Web access   |
| Service: 1-day start-up assistance   | PS-S20-01     | Training on how to operate your instrument effectively (recommended)   |
| Service: Productivity assistance   | PS-S20-100    | Daily instrument and application consulting using your equipment and device under test   |
| Service: Custom engineering service  | PS-X10-100    | Application-specific technical assistance  |



N9311X-100 (Near field probes)



CXA bench top configuration

# Instrument Upgrades

Fast license-key upgrades for performance options that do not require additional hardware:

1. Place an order for the upgrade with Keysight and request to receive the option upgrade entitlement certificate and a one-time software upgrade license through email
2. Redeem the certificate through the Web by following the instructions on the certificate
3. Install the license file and latest software in the CXA
4. Begin using the new capability <sup>1,2</sup>

You can upgrade!

Options can be added after your initial purchase.

Most X-Series options are license-key upgradeable.



| Description                                    | Upgrade number | Requirements CXA must already include the following | Additional information  |
|--|----------------|---|---|
| Increase analysis bandwidth from 10 to 25 MHz  | N9000BU-B25    | None  |   |
| Add preamplifier, 3 GHz                        | N9000BU-P03    | None  |   |
| Add preamplifier, 7.5 GHz                      | N9000BU-P07    | 507, 513 or 526                                     | Not compatible with Option 503  |
| Add preamplifier, 13.6 GHz                     | N9000BU-P13    | 513 or 526  | Not compatible with Option 503 or 507   |
| Add preamplifier, 26.5 GHz                     | N9000BU-P26    | 526   | Not compatible with Option 503, 507, or 513   |
| Add fine resolution step attenuator            | N9000BU-FSA    | None  |   |
| Upgrade to the precision frequency reference   | N9000BU-PFR    | None  |   |
| Add tracking generator, 3 GHz                  | N9000BU-T03    | None  | Requires hardware and license key; not compatible with Options 513 or 526   |
| Add tracking generator, 6 GHz                  | N9000BU-T06    | None  | Requires hardware and license key; not compatible with Options 503, 513, or 526   |
| Add basic EMI precompliance features           | N9000BU-EMC    | None  | Also orderable at N90EMEMCB (requires F/W revision A.21.04 onward)  |
| Add external source control                    | N9000BU-ESC    | None  | Adds feature to control selected Keysight EXG, MXG, and PSG signal generators; includes 3 BNC cables and 1 cross-over LAN cable; not compatible with Options 513 or 526. Also orderable at N90EMESCB (requires F/W revision A.21.04 onward) |
| Add second IF output                           | N9000BU-CR3    | None  | Requires hardware and license key; not compatible with Options 513 or 526   |
| Add enhanced display package                   | N9000BU-EDP    | None  | Also orderable at N90EMEDPB (requires F/W revision A.21.04 onward)  |
| Add security features, exclude launch program  | N9000BU-SF1    | None  | Prevents the launching of Windows programs from the instrument application  |
| Add security features, prohibit saving results | N9000BU-SF2    | None  | Prevents the saving/recall of measurement results or user configurations to/from instrument's data storage  |
| Add removable solid state drive                | N9000BU-SS1    | None  | Provides a fully-imaged, removable solid-state drive, with Windows 10 operating system  |
| Upgrade operating system to Windows 10         | N9000BU-SS1    | PC7, W7X  | Provides a removable solid-state drive with Windows 10 operating system   |

1. At the time of manufacture, the hardware related to many of these options was fully adjusted and the option performance was verified to be within its warranted specifications. Within one year of the initial calibration date of the analyzer, this option is fully calibrated with no further adjustment or verification testing.
2. If this analyzer has been adjusted as part of a repair or calibration during its first year, or if the analyzer is more than one year old, additional adjustment and performance verification tests are required to ensure that some newly installed options are functioning properly. However, the completion of these tests does not guarantee that the analyzer meets all warranted specifications.



## Instrument Upgrades (Continued)

| Description                               | Upgrade number | Requirements CXA must already include the following) | Additional information |
|---|----------------|--|------------------------|
| Korean version of Getting Started Guide   | N9000BU-AB1    | None   |                        |
| Chinese version of Getting Started Guide  | N9000BU-AB2    | None   |                        |
| Spanish version of Getting Started Guide  | N9000BU-ABE    | None   |                        |
| French version of Getting Started Guide   | N9000BU-ABF    | None   |                        |
| Japanese version of Getting Started Guide | N9000BU-ABJ    | None   |                        |
| Russian version of Getting Started Guide  | N9000BU-AKT    | None   |                        |

## Related Literature

### Keysight CXA signal analyzers

| Publication title  | Publication number |
|--|--------------------|
| <i>N9000B CXA X-Series Signal Analyzer, Multi-touch - Data Sheet</i> | 5992-1274EN        |
| <i>X-Series Signal Analyzers - Brochure</i>                          | 5992-1316EN        |
| <i>X-Series Measurement Applications - Brochure</i>                  | 5989-8019EN        |