

# N9010B EXA X-Series Signal Analyzer, Multi-touch

## Introduction

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



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# Included in Base Product

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

They include:

- Spectrum analyzer measurement application
- Quad-core, high-performance processor, 16 GB RAM, with flash calibration file memory
- Removable M.2 NVMe solid-state drive
- Frequency reference
- Mechanical attenuator
- 25 MHz analysis bandwidth
- Microsoft Windows 11 operating system
- Benchtop configuration
- Multi-language user interface
- User guide
- Power cord

## Get More Information

For a summary of specifications, refer to the N9010B EXA data sheet (literature number 5992-1256EN).

A full set of specifications are available in the N9010B EXA Signal Analyzer Specification Guide at [www.keysight.com/find/exa\\_specifications](http://www.keysight.com/find/exa_specifications).

# Configure Your Keysight EXA Signal Analyzer

This step-by-step process will help you configure your new EXA X-Series signal analyzer as well as add millimeter-wave capabilities. Tailor the performance to meet your requirements.

## Step 1. Select Maximum Frequency Range (Required Option)

| Description                        | Option Number | Additional Information |
|------------------------------------|---------------|------------------------|
| Frequency range, 10 Hz to 3.6 GHz  | N9010B-503    |                        |
| Frequency range, 10 Hz to 7 GHz    | N9010B-507    |                        |
| Frequency range, 10 Hz to 13.6 GHz | N9010B-513    |                        |
| Frequency range, 10 Hz to 26.5 GHz | N9010B-526    |                        |
| Frequency range, 10 Hz to 32 GHz   | N9010B-532    |                        |
| Frequency range, 10 Hz to 44 GHz   | N9010B-544    |                        |

## Step 2. Add a Preamplifier

Preamplifiers improve the noise floor for low-level signal detection

| Description                       | Option Number | Additional Information                                                   |
|-----------------------------------|---------------|--------------------------------------------------------------------------|
| Preamplifier, 100 kHz to 3.6 GHz  | N9010B-P03    | Compatible with frequency range options 503, 507, 513, 526, 532, and 544 |
| Preamplifier, 100 kHz to 7 GHz    | N9010B-P07    | Compatible with frequency range options 507, 513, 526, 532, and 544      |
| Preamplifier, 100 kHz to 13.6 GHz | N9010B-P13    | Compatible with frequency range options 513 and 526                      |
| Preamplifier, 100 kHz to 26.5 GHz | N9010B-P26    | Compatible with frequency range option 526                               |
| Preamplifier, 100 kHz to 32 GHz   | N9010B-P32    | Compatible with frequency range option 532                               |
| Preamplifier, 100 kHz to 44 GHz   | N9010B-P44    | Compatible with frequency range option 544                               |

## Step 3. Choose Frequency Reference

| Description                          | Option Number | Additional Information                                                                           |
|--------------------------------------|---------------|--------------------------------------------------------------------------------------------------|
| Frequency reference                  | Standard      | Aging rate: $\pm 1 \times 10^{-6}$ /year                                                         |
| Precision frequency reference 10 MHz | N9010B-PFR    | Reduces frequency drift for more accurate measurements; aging rate: $\pm 1 \times 10^{-7}$ /year |

## Step 4. Choose an Attenuator

| Description                         | Option Number | Additional Information                                                  |
|-------------------------------------|---------------|-------------------------------------------------------------------------|
| Mechanical attenuator               | Standard      | 10 dB steps, 0 to 60 dB                                                 |
| Fine step attenuator                | N9010B-FSA    | Allows 2 dB steps for the full 60 dB range of the mechanical attenuator |
| Electronic attenuator up to 3.6 GHz | N9010B-EA3    | In addition to the mechanical attenuator; 1 dB steps, 0 to 24 dB        |

## Step 5. Choose Analysis Bandwidth

| Description                  | Option Number         | Additional Information                                                                                                                                                                   |
|------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25 MHz analysis bandwidth    | Standard (N9010B-B25) | Useful for most cellular communications, wireless connectivity, and audio/video broadcasting measurement applications                                                                    |
| 40 MHz analysis bandwidth    | N9010B-B40            | Extends the analysis (demod) bandwidth to 40 MHz (Option MPB required for measurements at frequency > 3.6 GHz); also enables fast sweep capability licensed as N9010B-FS1 and N9010B-FS2 |
| Microwave preselector bypass | N9010B-MPB            | Required for wide analysis bandwidth measurements with Option B40 at frequency > 3.6 GHz; also enables fast sweep capability licensed as N9010B-FS1 and N9010B-FS2                       |

## Step 6. Choose Performance

| Description                                | Option Number | Additional Information                                                                                                                                                                                                    |
|--------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Digital processor with 2 GB capture memory | N9010B-DP2    | Comes standard with Option B40; also enables fast sweep capability licensed as N9010B-FS1 and N9010B-FS2                                                                                                                  |
| Noise floor extension                      | N9010B-NF2    | Improves analyzer's DANL performance (instrument alignment-based processes)                                                                                                                                               |
| External mixing                            | N9010B-EXM    | Provides external mixing with Keysight and third-party mixers <sup>1</sup> ; single port for LO out and IF in (SMA female); compatible with Options 532 and 544 only                                                      |
| APC 3.5 mm connector                       | N9010B-C35    | 3.5 mm connector on 26.5 GHz EXA (compatible with Option 526 only); eliminates amplitude response errors due to modes otherwise seen with Type-N connector above 18 GHz; refer to N9010B specifications guide for details |

1. When used with the Keysight 11970 Series external mixers, an external diplexer is required. Recommended diplexer can be purchased from Keysight as N9029AE13, or from OML Inc. as DPL.313B.

## Step 7. Add Instrument Features

**Note:** Keysight offers 4 license types for the measurement applications and instrument features, in 2 license terms: Perpetual or Time-based.

### License types:

- **Node-locked:** Allows you to use the license on one instrument/computer at a time
- **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 the networked instruments/computers from a server, one at a time. For concurrent access, multiple licenses may be purchased
- **USB Portable:** Allows you to access the license from one instrument/computer to another by end-user only with certified USB dongle, purchased separately

### License terms:

- **Perpetual:** License can be used in perpetuity. For perpetual license holders, a separate support contract is required to access Keysight technical support and software updates
- **Subscription:** License is time limited to a defined period, such as 12-months. A valid support contract is included in the pricing for Subscription licenses.

For detailed information, we strongly recommend you visit the X-Series measurement application collection page: [www.keysight.com/find/xseriesapps](http://www.keysight.com/find/xseriesapps)

| Description              | Option Number | Additional Information                                                                                                                                |
|--------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enhanced display package | N90EMEDPB     | Includes spectrogram, trace zoom, and zone span                                                                                                       |
| Basic precompliance EMI  | N90EMEMCB     | Perform basic EMI precompliance measurements with CISPR 16-1-1 detectors and bandwidths; tune and listen, and measure at marker are also available    |
| Time domain scan         | N90EMTDSB     | Improves scan speed for EMC pre-compliance tests; requires N6141EM0E pre-compliance measurement application and Option DP2, or B40                    |
| External source control  | N90EMESCB     | External source control for selected Keysight EXG, MXG, and PSG signal generators for scalar stimulus-response measurements; supports external mixing |
| Fast power               | N90EMFP2B     | Accelerates the power measurements such as ACPR; requires Option B40                                                                                  |

## Step 8. Select Operating System

| Description                 | Option Number | Additional Information |
|-----------------------------|---------------|------------------------|
| Windows 11 operating system | Standard      | Licensed as N9010B-W11 |

## Step 9. Add Security Features

| Description                                                              | Option Number | Additional Information                                                                                                                                     |
|--------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Additional removable M.2 NVMe solid-state drive (SSD), for PCD processor | N9010B-SS9    | Provides a fully imaged, removable solid-state drive-in addition to the one installed in the instrument, with Windows 11 operating system                  |
| Security features, exclude launch program                                | N9010B-SF1    | Prevents the launching of Windows programs from the instrument application                                                                                 |
| Security features, prohibit saving results                               | N9010B-SF2    | Prevents the saving/recall of measurement results or user configurations to/from instrument's data storage                                                 |
| Security feature, secure RAM disk boot                                   | N9010B-SF3    | Allows the instrument to boot the Windows OS into volatile memory, which ensures that, after a power cycle, all information from the previous boot is lost |

## Step 10. Add Rear Panel Output Utilities

| Description                | Option Number                       | Additional Information                                                                                                                                                                                                 |
|----------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Second IF output           | N9010B-CR3                          | Wideband IF out; output center frequency depends on IF BW option (25/40); output on Aux IF connector at rear panel                                                                                                     |
| Arbitrary IF output        | N9010B-CRP                          | IF out 10 to 75 MHz (in 500 kHz steps); output on Aux IF connector at rear panel                                                                                                                                       |
| Y-axis screen video output | N9010B-YAS                          | Screen video (0–1-volt open circuit) on rear panel analog out                                                                                                                                                          |
| Real-time link             | Standard when B40 or DP2 is ordered | The LVDS connector allows EXA to connect to X-COM data recorder or data streaming (up to 40 MHz BW), and to the N5106A PXB baseband generator and channel emulator; requires Option B40 or DP2; licensed as N9010B-RTL |

## Step 11. Choose Measurement Application or Software and License Type

**Note:** Keysight offers 4 license types for the measurement applications and instrument features, in 2 license terms: Perpetual or Subscription.

### License types:

- **Node-locked:** Allows you to use the license on one instrument/computer at a time
- **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 the networked instruments/computers from a server, one at a time. For concurrent access, multiple licenses may be purchased
- **USB Portable:** Allows you to access the license from one instrument/computer to another by end-user only with certified USB dongle, purchased separately

### License terms:

- **Perpetual:** License can be used in perpetuity. For perpetual license holders, a separate support contract is required to access Keysight technical support and software updates
- **Subscription:** License is time limited to a defined period, such as 12-months. A valid support contract is included in the pricing for Subscription licenses.

For detailed information, we strongly recommend you visit the X-Series measurement application collection page: [www.keysight.com/find/xseriesapps](http://www.keysight.com/find/xseriesapps)

| Description                       | Model Number                      | Additional Information                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General Purpose</b>            |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Spectrum Analyzer and IQ Analyzer | Standard                          | Traditional spectrum analysis plus many new and enhanced functions                                                                                                                                                                                                                                                                                                                                                                                                         |
| Power Suite                       | N90EMPSMB                         | Power measurements based on industry specifications                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Analog demodulation               | E9063EM0E                         | 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                       | E9068EM0E                         | Adds one-button measurements for analyzing phase noise in frequency domain (log plot) and time domain (spot frequency), supports external mixing                                                                                                                                                                                                                                                                                                                           |
| Noise figure                      | E9069EM0E (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 |



| Description                                     | Model Number | Additional Information                                                                                                                                                                                             |
|-------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vector modulation analysis Digital Demodulation | E9054EM0E    | 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          | E9054EM1E    | Performs one-button custom OFDM modulation analysis measurement with user-defined settings or recalling 89600 VSA or Signal Studio output files                                                                    |
| Pulse analysis                                  | E9067EM0E    | Characterize pulsed RF signals in the time domain, with phase, frequency and statistical analysis of large pulse sets                                                                                              |
| EMI                                             | E6141EM0E    | Performs pre-compliance conducted and radiated emission measurements                                                                                                                                               |
| Remote language compatibility                   | E9061EM0E    | Adds capability to emulate HP/Agilent 8566/68 and 856xE/EC spectrum analyzers                                                                                                                                      |
| SCPI command language compatibility             | E9062EM0E    | 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                                    | E9071EM0E    | Standard-based, one-button GSM/EDGE/EDGE Evolution measurements                                                                                                                                                    |
|                                                 | E9071EMXE    | Adds single acquisition combined measurement, a SCPI-command based measurement optimized for high-volume, high-throughput manufacturing; requires N9071EM0E; not compatible with Options DP2, B40, MPB, 532 or 544 |
| W-CDMA/HSPA+                                    | E9073EM0E    | Standard-based, one-button W-CDMA, HSPA and HSPA+ measurements                                                                                                                                                     |
|                                                 | E9073EMXE    | Adds single acquisition combined measurement, a SCPI-command based measurement optimized for high-volume, high-throughput manufacturing; requires N9073EM0E; not compatible with Options DP2, B40, MPB, 532 or 544 |
| LTE/LTE-Advanced FDD                            | E9080EM0E    | Standard-based, one-button LTE/LTE-Advanced FDD measurements                                                                                                                                                       |
| NB-IoT and eMTC FDD                             | E9080EM3E    | Standard-based, one-button NB-IoT/eMTC measurements                                                                                                                                                                |
| LTE V2X                                         | E9080EM4E    | Standard-based, one-button LTE-V2X transmitter measurements                                                                                                                                                        |
| LTE/LTE-Advanced TDD                            | E9082EM0E    | Standard-based, one-button LTE/LTE-Advanced TDD measurements                                                                                                                                                       |
| Multi-standard radio                            | E9083EM0E    | Standard -based, one-button MSR measurements on any combination of LTE-FDD, LTE-TDD, W-CDMA/HSPA/HSPA+, GSM/EDGE/EDGE Evo, cdma2000, 1xEV-DO and TD-SCDMA signals                                                  |

| Description                   | Model Number | Additional Information                                                                                             |
|-------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Wireless Connectivity</b>  |              |                                                                                                                    |
| WLAN 802.11 a/b/g/j/p/n/af/ah | E9077EM0E    | Standard-based, one-button 802.11 a/b/g/j/p/n/af/ah measurement                                                    |
| <i>Bluetooth®</i>             | E9081EM0E    | Standard-based, one-button <i>Bluetooth</i> (BR/EDR, Low Energy 4.0/4.2 and <i>Bluetooth</i> 5) measurements       |
| Short Range Comm and IoT      | E9084EM0E    | Standard-based, one-button LoRa CSS measurement, 802.15.4 for ZigBee measurement and G.9959 for Z-Wave measurement |

## Step 12. Choose 89600 VSA Software Licenses

| Description                                            | Model Number                        | Additional Information                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic vector signal analysis and hardware connectivity | 89601200C<br>(required core option) | Provides the tools and user interface that make up the 89600 VSA software including time and frequency domain measurement, hardware connectivity, recordings, and playback<br>Channel quality modulation analysis                                                                                                                                                |
| <b>General Purpose</b>                                 |                                     |                                                                                                                                                                                                                                                                                                                                                                  |
| Digital demodulation analysis                          | 89601AYAC                           | Analysis of >40 modulation formats, including custom APSK and presets for communication formats like GSM/EDGE, ZigBee FSK, <i>Bluetooth®</i> BR, APCO25 and SOQPSK<br>Proprietary and pre-standard, customized IQ constellation signals<br>TEDS modulation analysis<br>Channel response measurements such as phase/magnitude response and multi-tone group delay |
| Custom OFDM modulation analysis                        | 89601BHFC                           | Proprietary and pre-standard OFDM formats                                                                                                                                                                                                                                                                                                                        |
| PowerSuite measurement                                 | 89601PSMC                           | PowerSuite measurement for ACP and EVM                                                                                                                                                                                                                                                                                                                           |
| <b>Cellular Communication</b>                          |                                     |                                                                                                                                                                                                                                                                                                                                                                  |
| 5G NR modulation analysis                              | 89601BHNC                           | 5G NR modulation analysis<br>Pre-5G modulation analysis                                                                                                                                                                                                                                                                                                          |
| LTE/LTE-A FDD modulation analysis                      | 89601BHGC                           | LTE FDD modulation analysis<br>LTE-Advanced FDD modulation analysis                                                                                                                                                                                                                                                                                              |
| LTE/LTE-A TDD modulation analysis                      | 89601BHHC                           | LTE TDD modulation analysis<br>LTE-Advanced TDD modulation analysis                                                                                                                                                                                                                                                                                              |
| 3G modulation analysis bundle                          | 89601B7NC                           | W-CDMA/HSPA+ modulation analysis<br>TD-SCDMA/HSPA modulation analysis<br>cdma2000 modulation analysis<br>1xEV-DO and 1xEV-DV modulation analysis                                                                                                                                                                                                                 |

| Description                               | Model Number | Additional Information                                                    |
|-------------------------------------------|--------------|---------------------------------------------------------------------------|
| <b>Wireless Connectivity</b>              |              |                                                                           |
| Wireless connectivity modulation analysis | 89601B7RC    | WLAN 802.11 a/b/g/j/p modulation analysis<br>WiMax modulation analysis    |
| High throughput WLAN modulation analysis  | 89601BHXC    | WLAN 802.11 n/ac modulation analysis<br>WLAN 802.11ax modulation analysis |
| IoT modulation analysis                   | 89601BHTC    | NB-IoT modulation analysis<br>RFID modulation analysis                    |
| <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                     |

## Step 13. Choose Physical Instrument Configuration

| Description             | Option Number | Additional Information                                                                                                                                                                                     |
|-------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bench top configuration | Standard      | Provides two side carrying straps, four rear feet, and four bottom feet with a tilt stand                                                                                                                  |
| Portable configuration  | N9010B-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 |

## Step 14. Choose accessories

| Description                                             | Option Number | Additional Information                                                                                                                                                                                                                                        |
|---------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| User guide                                              | Standard      | <p>US - English localization</p> <p>All user documentation is included in the EXA's embedded help system</p> <p>User documentation can be downloaded from:<br/> <a href="http://www.keysight.com/find/exa_manuals">www.keysight.com/find/exa_manuals</a> </p> |
| Front panel cover                                       | CV1117A       | Protective cover for front panel                                                                                                                                                                                                                              |
| Power cord                                              | Standard      | Dependent upon region of use                                                                                                                                                                                                                                  |
| Adapter, 2.4 mm (F) to 2.9 mm (F)                       | Standard      | Ship standard only for Option 532                                                                                                                                                                                                                             |
| Adapter, 2.4 mm (F) to 2.4 mm (F)                       | Standard      | Ship standard only for Option 544                                                                                                                                                                                                                             |
| Rack mount                                              | 1CM113A       | Adds rack mount flanges to the EXA                                                                                                                                                                                                                            |
| Front handles                                           | 1CN103A       | Adds front handles to the EXA                                                                                                                                                                                                                                 |
| Rack mount with handles                                 | 1CP105A       | Adds rack mount flanges and handles to the EXA                                                                                                                                                                                                                |
| Rack slide                                              | 1CR013A       | Adds a non-tilting rack slide to the EXA                                                                                                                                                                                                                      |
| USB DVD-ROM/CD-R/RW drive                               | 1DVR001A      | Enhances the usability of the Windows operating system                                                                                                                                                                                                        |
| Mouse, USB interface                                    | 1MSE001A      |                                                                                                                                                                                                                                                               |
| Minimum loss pad, 50 to 75 $\Omega$ (type-N to BNC)     | MLP001A       | <p>50 <math>\Omega</math> type-N male to 75 <math>\Omega</math> BNC female adapter</p> <p>Frequency range: 9 MHz to 2 GHz</p> <p>Input/output return loss: 20 and 11 dB</p> <p>Insertion loss: 5.7 dB</p>                                                     |
| V-Band waveguide Harmonic Mixers, 50 to 75 GHz          | M1970V-001    | Requires Option EXM and Option 532 or 544; USB mixer with smart features                                                                                                                                                                                      |
| Extended V-Band waveguide Harmonic Mixers, 50 to 80 GHz | M1970V-002    | Requires Option EXM and Option 532 or 544; USB mixer with smart features                                                                                                                                                                                      |
| E-Band waveguide Harmonic Mixers, 60 to 90 GHz          | M1970E        | Requires Option EXM and Option 532 or 544; USB mixer with smart features                                                                                                                                                                                      |
| W-Band waveguide Harmonic Mixers, 75 to 110 GHz         | M1970W        | Requires Option EXM and Option 532 or 544; USB mixer with smart features                                                                                                                                                                                      |
| E-band waveguide harmonic mixer, 60 to 90 GHz           | M1971E-001    | Requires Option EXM and Option 532 or 544; USB mixer with smart features and 3 signal paths                                                                                                                                                                   |
| Extended E-band waveguide harmonic mixer, 55 to 90 GHz  | M1971E-003    | Requires Option EXM and Option 532 or 544; USB mixer with smart features and 3 signal paths                                                                                                                                                                   |
| V-band waveguide harmonic mixer, 55 to 75 GHz           | M1971V        | Requires Option EXM and Option 532 or 544; USB mixer with smart features and 3 signal paths                                                                                                                                                                   |

| Description                                    | Option Number | Additional Information                                                                      |
|------------------------------------------------|---------------|---------------------------------------------------------------------------------------------|
| W-band waveguide harmonic mixer, 75 to 110 GHz | M1971W        | Requires Option EXM and Option 532 or 544; USB mixer with smart features and 3 signal paths |
| 26 to 40 GHz waveguide harmonic mixer          | 11970A        | Requires Option EXM and N9029BE13 diplexer                                                  |
| 33 to 50 GHz waveguide harmonic mixer          | 11970Q        | Requires Option EXM and N9029BE13 diplexer                                                  |
| 40 to 60 GHz waveguide harmonic mixer          | 11970U        | Requires Option EXM and N9029BE13 diplexer                                                  |
| 50 to 75 GHz waveguide harmonic mixer          | 11970V        | Requires Option EXM and N9029BE13 diplexer                                                  |
| 75 to 110 GHz waveguide harmonic mixer         | 11970W        | Requires Option EXM and N9029BE13 diplexer                                                  |
| LO/IF diplexer                                 | N9029BE13     | Ordering convenience; required for 11970 Series external mixers                             |
| 50 to 75 GHz frequency extension module        | N9029BV-W15   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 60 to 90 GHz frequency extension module        | N9029BV-W12   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 75 to 110 GHz frequency extension module       | N9029BV-W10   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 90 to 140 GHz frequency extension module       | N9029BV-W08   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 110 to 170 GHz frequency extension module      | N9029BV-W06   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 140 to 220 GHz frequency extension module      | N9029BV-W05   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 170-260 GHz frequency extension module         | N9029BV-W04   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 220 to 330 GHz frequency extension module      | N9029BV-W03   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 260 to 400 GHz frequency extension module      | N9029BV-W2B   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 330 to 500 GHz frequency extension module      | N9029BV-W02   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 550 to 750 GHz frequency extension module      | N9029BV-W1B   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| 750 to 1100 GHz frequency extension module     | N9029BV-W01   | VDI signal analyzer frequency extension module; requires Option EXM                         |
| USB external preamplifier, 10 MHz to 4 GHz     | U7227A        |                                                                                             |

| Description                                | Option Number | Additional Information |
|--------------------------------------------|---------------|------------------------|
| USB external preamplifier, 0.1 to 26.5 GHz | U7227C        |                        |
| USB external preamplifier, 2 to 50 GHz     | U7227F        |                        |

## Step 15. Add Calibration, Technical Training, Support, and Upgrade Services

| Description                                                          | Option Number | Additional Information                                                                                                                                                                                     |
|----------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Commercial calibration certificate with test data                    | N9010B-UK6    | Calibration certificate only available at time of instrument purchase; only provides measurement results                                                                                                   |
| Keysight Calibration + Uncertainties + Guardbanding (accredited cal) | N9010B-AMG    | Provides ISO 17025A accredited calibration from factory                                                                                                                                                    |
| ANSI Z540-1 -1994 Calibration                                        | N9010B-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, 3 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                                                                                                                                                                  |

# 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 EXA
4. Begin using the new capability<sup>1 2</sup>

Installation and testing information is available at: [www.keysight.com/find/exa\\_upgrades](http://www.keysight.com/find/exa_upgrades)

Upgrades for analysis bandwidth depend on the vintage of the instrument and the options already installed. More than one option may be required to achieve desired wider analysis bandwidth.

Use our web-based calculator to find the upgrade options you may need: [www.keysight.com/find/BW-selector](http://www.keysight.com/find/BW-selector)

## You Can Upgrade!

Options can be added after your initial purchase. All of our X-Series application options are license-key upgradeable.

<sup>1</sup> 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 two years of the initial calibration date of the analyzer, this option is fully calibrated with no further adjustment or verification testing.

<sup>2</sup> If this analyzer has been adjusted as part of a repair or calibration during its first two years, or if the analyzer is more than two years 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.

| Description                                   | Upgrade Number | Requirements (EXA must already include the following) | Additional Information                                                                                                       |
|-----------------------------------------------|----------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Increase frequency from 3.6 to 7 GHz          | N9010BU-F01    | 503                                                   |                                                                                                                              |
| Increase frequency from 3.6 to 13.6 GHz       | N9010BU-F02    | 503                                                   |                                                                                                                              |
| Increase frequency from 3.6 to 26.5 GHz       | N9010BU-F03    | 503                                                   |                                                                                                                              |
| Increase frequency from 3.6 to 32 GHz         | N9010BU-F04    | 503                                                   |                                                                                                                              |
| Increase frequency from 3.6 to 44 GHz         | N9010BU-F05    | 503                                                   |                                                                                                                              |
| Increase frequency from 7 to 13.6 GHz         | N9010BU-F06    | 507                                                   |                                                                                                                              |
| Increase frequency from 7 to 26.5 GHz         | N9010BU-F07    | 507                                                   |                                                                                                                              |
| Increase frequency from 7 to 32 GHz           | N9010BU-F08    | 507                                                   |                                                                                                                              |
| Increase frequency from 7 to 44 GHz           | N9010BU-F09    | 507                                                   |                                                                                                                              |
| Increase frequency from 13.6 to 26.5 GHz      | N9010BU-F10    | 513                                                   |                                                                                                                              |
| Increase frequency from 13.6 to 32 GHz        | N9010BU-F11    | 513                                                   |                                                                                                                              |
| Increase frequency from 13.6 to 44 GHz        | N9010BU-F12    | 513                                                   |                                                                                                                              |
| Increase frequency from 26.5 to 32 GHz        | N9010BU-F13    | 526                                                   |                                                                                                                              |
| Increase frequency from 26.5 to 44 GHz        | N9010BU-F14    | 526                                                   |                                                                                                                              |
| Increase frequency from 32 to 44 GHz          | N9010BU-F15    | 532                                                   | Includes 44 GHz preamp                                                                                                       |
| Increase analysis bandwidth from 25 to 40 MHz | N9010BU-B40    | 503, 507, 513, or 526                                 | Includes hardware and license key; also adds microwave preselector bypass; not compatible with Options 532 or 544            |
| Increase analysis bandwidth from 25 to 40 MHz | N9010BU-BUN    | 532 or 544                                            | Includes hardware and license key; also adds microwave preselector bypass; not compatible with Options 503, 507, 513, or 526 |
| Add preamplifier, 3.6 GHz                     | N9010BU-P03    | None                                                  |                                                                                                                              |



| Description                                    | Upgrade Number | Requirements (EXA must already include the following) | Additional Information                                                                                       |
|------------------------------------------------|----------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Add preamplifier, 7 GHz                        | N9010BU-P07    | 507, 513, 526, 532, or 544                            | Not compatible with Option 503                                                                               |
| Add preamplifier, 13.6 GHz                     | N9010BU-P13    | 513 or 526                                            | Not compatible with Option 503, 507, 532, or 544                                                             |
| Add preamplifier, 26.5 GHz                     | N9010BU-P26    | 526                                                   | Only compatible with Option 526                                                                              |
| Add preamplifier, 32 GHz                       | N9010BU-P32    | 532                                                   | Only compatible with option 532                                                                              |
| Add preamplifier, 44 GHz                       | N9010BU-P44    | 544                                                   | Only compatible with Option 544                                                                              |
| Upgrade to the precision frequency reference   | N9010BU-PFR    | None                                                  |                                                                                                              |
| Add time domain scan capability                | N9010BU-TDS    | N6141EM0E and DP2 or B40                              | For EMC pre-compliance tests only. Also orderable at N90EMTDSB (requires F/W revision A.21.04 onward)        |
| Add basic EMI precompliance features           | N9010BU-EMC    | None                                                  | Also orderable at N90EMEMCB (requires F/W revision A.21.04 onward)                                           |
| Add external mixing                            | N9010BU-EXM    | 532 or 544                                            | Includes additional hardware                                                                                 |
| Add second IF output                           | N9010BU-CR3    | B40, DP2 or MPB, or CRP, 532, or 544                  |                                                                                                              |
| Add arbitrary IF output                        | N9010BU-CRP    | Front end controller with hardware ID 41 or 75        | Press System, Show, Hardware to determine hardware Id                                                        |
| Add second IF output and arbitrary IF output   | N9010BU-HL3    | None                                                  | Includes hardware and license key                                                                            |
| Add fast power                                 | N9010BU-FP2    | B40                                                   | For fast power measurements such as ACPR. Also orderable at N90EMFP2B (requires F/W revision A.21.04 onward) |
| Add noise floor extension                      | N9010BU-NF2    | None                                                  | Instrument alignment based                                                                                   |
| Add security features, exclude launch program  | N9010BU-SF1    | None                                                  | Prevents the launching of Windows programs from the instrument application                                   |
| Add security features, prohibit saving results | N9010BU-SF2    | None                                                  | Prevents the saving/recall of measurement results or user configurations to/from instrument's data storage   |

| Description                                    | Upgrade Number                     | Requirements (EXA must already include the following) | Additional Information                                                                                                                                     |
|------------------------------------------------|------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Add security feature, secure RAM disk boot     | N9010BU-SF3                        | PC9, PCB, or PCD                                      | Allows the instrument to boot the Windows OS into volatile memory, which ensures that, after a power cycle, all information from the previous boot is lost |
| Add Y-axis screen video output                 | N9010BU-YAS                        | None                                                  |                                                                                                                                                            |
| Add enhanced display package                   | N9010BU-EDP                        | None                                                  | Also orderable at N90EMEDPB (requires F/W revision A.21.04 onward)                                                                                         |
| Add removable solid-state drive (SSD)          | N9094BU-SS1<br>(under N9010BU)     | PC7, or PC7S                                          | Provides additional removable solid-state drive, with Windows 10 operating system                                                                          |
| Add removable solid-state drive (SSD)          | N9094BU-SS2<br>(under N9010BU)     | PC9                                                   | Provides additional removable solid-state drive, with Windows 10 operating system                                                                          |
| Add removable M.2 NVMe solid-state drive (SSD) | N9094BU-SS3<br>(under N9010BU)     | PCB                                                   | Provides additional removable solid-state drive, with Windows 10 operating system                                                                          |
| Add removable solid-state drive (SSD)          | N9094BU-SS6<br>(under N9010BU)     | PC9                                                   | Provides additional removable solid-state drive, with Windows 11 operating system                                                                          |
| Add removable M.2 NVMe solid-state drive (SSD) | N9094BU-SS7<br>(under N9010BU)     | PCB                                                   | Provides additional removable M.2 NVMe solid-state drive, with Windows 11 operating system                                                                 |
| Add removable M.2 NVMe solid-state drive (SSD) | N9094BU-SS9<br>(under N9010BU)     | PCD                                                   | Provides additional removable M.2 NVMe solid-state drive, with Windows 11 operating system                                                                 |
| Upgrade operating system to Windows 10         | N9094BU-SS1/W10<br>(under N9010BU) | PC7, W7X                                              | Provides a removable solid-state drive with Windows 10 operating system                                                                                    |
| Upgrade operating system to Windows 11         | N9094BU-SS6/W11<br>(under N9010BU) | PC9, W10                                              | Provides additional removable solid-state drive, with Windows 11 operating system                                                                          |

| Description                                                                                           | Upgrade Number                     | Requirements (EXA must already include the following) | Additional Information                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upgrade operating system to Windows 11                                                                | N9094BU-SS7/W11<br>(under N9010BU) | PCB, W10                                              | Provides additional removable M.2 NVMe solid-state drive, with Windows 11 operating system                                                               |
| Upgrade operating system to Windows 11                                                                | N9094BU-PC9/W11<br>(under N9010BU) | PC7, W7X or W10                                       | Upgrade to PC9, quad-core, high performance processor, 16 GB RAM, with flash calibration file memory and removable solid-state drive                     |
| Upgrade operating system to Windows 11                                                                | N9094BU-PCB/W11<br>(under N9010BU) | PC7, W7X or W10                                       | Upgrade to PCB, quad-core, high performance processor, 16 GB RAM, with flash calibration file memory and removable M.2 NVMe solid-state drive, version 1 |
| Upgrade operating system to Windows 11                                                                | N9094BU-PCD/W11<br>(under N9010BU) | PC7, W7X or W10                                       | Upgrade to PCD, quad-core, high performance processor, 16 GB RAM, with flash calibration file memory and removable M.2 NVMe solid-state drive, version 2 |
| Upgrade to PC7S, quad-core, high-performance processor, 16 GB RAM, with flash calibration file memory | N9094BU-PCS<br>(under N9010BU)     | PC7                                                   | Upgrade to dual-core, high-performance processor, 16 GB RAM, with flash calibration file memory and removable solid-state drive                          |
| Upgrade to PC9, quad-core, high-performance processor, 16 GB RAM, with flash calibration file memory  | N9094BU-PC9<br>(under N9010BU)     | PC7, or PC7S                                          | Upgrade to PC9, quad-core, high-performance processor, 16 GB RAM, with flash calibration file memory and removable solid-state drive                     |
| Upgrade to PCB, quad-core, high-performance processor, 16 GB RAM, with flash calibration file memory  | N9094BU-PCB<br>(under N9010BU)     | PC7, PC7S, or PC9                                     | Upgrade to PCB, quad-core, high performance processor, 16 GB RAM, with flash calibration file memory and removable M.2 NVMe solid-state drive, version 1 |
| Upgrade to PCD, quad-core, high-performance processor, 16 GB RAM, with flash calibration file memory  | N9094BU-PCD<br>(under N9010BU)     | PC7, PC7S, or PC9                                     | Upgrade to PCD, quad-core, high performance processor, 16 GB RAM, with flash calibration file memory and removable M.2 NVMe solid-state drive, version 2 |
| Portable configuration                                                                                | N9010BU-PRC                        | None                                                  | Not compatible with 1CP105A, 1CM113A, 1CN103A, 1CR013A                                                                                                   |
| USB DVD-ROM/CD-R/RW drive                                                                             | N9010BU-DVR                        | None                                                  |                                                                                                                                                          |
| Electronic attenuator, 3.6 GHz                                                                        | N9010BU-EA3                        | None                                                  |                                                                                                                                                          |
| Fine step attenuator                                                                                  | N9010BU-FSA                        | None                                                  |                                                                                                                                                          |

| Description                                         | Upgrade Number | Requirements (EXA must already include the following) | Additional Information                           |
|-----------------------------------------------------|----------------|-------------------------------------------------------|--------------------------------------------------|
| Minimum loss pad, 50 to 75 $\Omega$ (type-N to BNC) | MLP001A        | None                                                  |                                                  |
| Mouse, USB interface                                | 1MSE001A       | None                                                  |                                                  |
| Rack mount kit                                      | 1CM113A        | None                                                  | Not compatible with Option PRC, 1CP105A, 1CN103A |
| Front handle kit                                    | 1CN103A        | None                                                  | Not compatible with Option PRC, 1CP105A, 1CM113A |
| Rack mount and handle kit                           | 1CP105A        | None                                                  | Not compatible with Option PRC, 1CN103A, 1CM113A |
| Rack slide kit                                      | 1CR013A        | None                                                  | Not compatible with Option PRC                   |

# Related Literature

## Keysight EXA Signal Analyzers

| Publication title                                             | Publication Number |
|---------------------------------------------------------------|--------------------|
| X-Series Signal Analyzers - Brochure                          | 5992-1316EN        |
| N9010B EXA X-Series Signal Analyzer, Multi-touch - Data Sheet | 5992-1256EN        |
| X-Series Measurement Applications - Brochure                  | 5989-8019EN        |

For more information on accessories go to: [www.keysight.com/find/accessories](http://www.keysight.com/find/accessories)

Other calibration options may be available; for more information on calibration go to: [www.keysight.com/find/calibration](http://www.keysight.com/find/calibration)

For more information on training and application support services go to: [www.keysight.com/find/training](http://www.keysight.com/find/training)



Figure 1. EXA bench top configuration

Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at [www.keysight.com](http://www.keysight.com).



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