N9041B UXA X-Series Signal Analyzer, Multi-touch

Introduction

This N9041B UXA configuration guide will help you determine which performance options, measurement applications, accessories, and services to include with your N9041B UXA or to add as upgrades to an existing N9041B UXA.

For more information

For a summary of specifications, refer to the N9041B data sheet,

N9041B UXA X-Series Signal Analyzer, Multi-touch, literature number 5992-1822EN.

KEYSIGHT

Table of Contents

Included in Base Product

The “standard” options and accessories come with the UXA base instrument at no additional charge and do not need to be ordered.

They include:

- Spectrum analyzer software application
- Getting Started Guide
- UXA start-up assistance
- RF input (Input 1) for frequency range of 2 Hz to 50 GHz (2.4 mm connector, male)
- RF Input (Input 2) for frequency range of 2 Hz to 90 or 110 GHz (1.0 mm connector, male)
- Enhanced phase noise
- Fast sweep capability
- 25 MHz IF analysis bandwidth
- 1 GHz bandwidth auxiliary IF output
- Enhanced display package
- External mixing for frequency coverage extension up to 1.1 THz
- Microwave preselector bypass for frequencies between 3.6 and 50 GHz
- Low noise path for improved sensitivity between 3.6 and 50 GHz
- Low frequency enabled
- Fine step mechanical attenuator up to 50 GHz
- Digital processor with 2 GB capture memory
- LO/IM nulling
- Noise Floor Extension; instrument alignment
- Precision frequency reference
- Real-time data link for real-time IQ data streaming up to 40 MHz
- Hex-core, high-performance processor, 32 GB RAM, with flash calibration file memory
- Removable M.2 NVMe solid-state drive
- Microsoft Windows 11 operating system
- Country-specific power cord
- Front and rear panel covers for protection during transit
- A millimeter-wave (mmW) connector kit that contains adaptors and a torque wrench. See the accessories section of this document for additional information

Configure Your Keysight UXA Signal Analyzer

This step-by-step process will help you configure your UXA signal analyzer. Tailor the performance to meet your requirements.

For a summary of specifications, refer to the UXA signal analyzer data sheet (5992-1822EN)

Step 1. Select maximum frequency range (required option)

Description	Option number	Additional information
Frequency range, 2 Hz to 90 GHz	N9041B-590	Input 2 (1.0 mm connector, male), provides continuous sweep from 2 Hz to 90 GHz
Frequency range, 2 Hz to 110 GHz	N9041B-5CX	Input 2 (1.0 mm connector, male), provides continuous sweep from 2 Hz to 110 GHz
Frequency range, 2 Hz to 50 GHz	Standard	Input 1 (2.4 mm connector, male), provides continuous sweep from 2 Hz to 50 GHz

Step 2. Add a preamplifier

Description	Option number	Additional information
Preamplifier, 100 kHz to 50 GHz	N9041B-P50	Improves sensitivity up to 50 GHz for both input 1 and 2

Step 3. Choose an attenuator

Description	Option number	Additional information
Mechanical attenuator (1)	Standard	2 dB steps, 0 to 70 dB; licensed as N9041B-FSA; up to 50 GHz
Electronic attenuator up to 3.6 GHz	N9041B-EA3	Add in addition to the mechanical attenuator; 1 dB steps, 0 to 24 dB
Mechanical attenuator (2)	Standard	Adjustable to 0, 6, 14, or 20 dB; for Input 2 only

Step 4. Choose analysis bandwidth

Description	Option number	Additional information
25 MHz analysis bandwidth	Standard	Licensed as N9041B-B25
40 MHz analysis bandwidth	N9041B-B40	Extends the analysis bandwidth to 40 MHz
1 GHz analysis bandwidth	N9041B-H1G	Extends the analysis bandwidth to 1 GHz; provides rear panel IF2 output connector (IF=750 MHz)
Microwave preselector bypass	Standard	Bypass the microwave preselector for wider bandwidth IF; licensed as N9041B-MPB; up to 50 GHz

Step 5. Choose performance options

Description	Option number	Additional information
Digital processor with 2 GB capture memory	Standard	Licensed as N9041B-DP2
Digital processor with 4 GB capture memory	Standard	Standard in instruments when Option H1G is installed; supports analysis bandwidth up to 255 MHz; licensed as N9041B-DP4
Enhanced phase noise performance	Standard	DDS-based LO assembly; licensed as N9041B-EP0
External mixing	Standard	Provides external mixing with Keysight and third-party mixers; single port[1] for LO out and IF in (SMA female); licensed as N9041B-EXM
Fast sweep capability	Standard	Improves sweep speed in swept-tune mode; licensed as N9041B-FS1/FS2[2]
LO/IM nulling	Standard	Minimizes the LO feed-thru and the intermodulation distortion; licensed as N9041B-NUL
Low noise path	Standard	Improves sensitivity (DANL) in frequency bands above 3.6 GHz without degrading dynamic range; licensed as N9041B-LNP
Full bypass path	Standard when H1G is ordered	Bypass the microwave preselector and enable the low noise path for improved sensitivity on Input 1 from 3.6 GHz to 50 GHz. Standard in instruments when Option H1G is installed; licensed as N9041B-FBP
Noise Floor Extension	Standard	Improves displayed average noise level (DANL), instrument alignment-based implementation; licensed as N9041B-NF2
Precision frequency reference	Standard	Aging rate: ± 1 x 10^{-7}/year; licensed as N9041B-PFR

1. When used with Keysight 11970 Series external mixers, an external diplexer is required. Recommended diplexer can be purchased from Keysight as N9029AE13, or from OML Inc. as DPL313B.
2 The FS1 improves the sweep speed by up to 50x and the FS2 further gains speed improvements for the narrower resolution bandwidth (RBW) settings

Step 6. Add real-time spectrum analysis

Description	Model number	Additional information
Real-time analysis, basic detection	N9041RT1B	Includes frequency mask trigger (FMT), time qualified trigger (TQT); minimum 17.17 µs signal duration for 100% probability of intercept (POI) with full amplitude accuracy; requires N9041B-H1G (255 MHz max real-time BW)
Real-time analysis, optimum detection	N9041RT2B	Includes FMT, TQT triggers; minimum 3.517 µs signal duration for 100% probability of intercept (POI) with full amplitude accuracy; requires N9041B-H1G (255 MHz max real-time BW); node-locked license only
Frequency mask trigger, basic detection	N90EMFT1B	Enables frequency mask triggering with N9067C pulse application and 89600 VSA software to detect signals as short as 15 µs duration; included in N9041RT1B (Option RT1); requires N9041B-H1G
Frequency mask trigger, optimum detection	N90EMFT2B	Enables frequency mask triggering with N9067C pulse application and 89600 VSA software to detect signals as short as 3.6 µs duration; included in N9041RT2B (Option RT2); requires N9041B-H1G; node-locked license only

Step 7. Add optional features including security

Description	Option number	Additional information
Enhanced display package	Standard	Includes spectrogram, trace zoom, and zone span in SA mode; licensed as N90E1EDPB
Basic EMI precompliance	N90EMEMCB	Perform EMI precompliance measurements with CISPR 16-1-1 detectors and bandwidths: tune and listen, and measure at marker are also available. Currently only qualified for Input 1.
Fast power up to 255 MHz bandwidth	N90EMFP2B	Accelerates the power measurements such as ACPR; requires Option B40 or H1G
Resolution bandwidth extended	N90EMRBEB	Extends the maximum RBW in Zero Span; requires Option H1G
External digitizer control	N9041B-EDC	Provides integrated control of an external IF digitizer (oscilloscope) up to 8 GHz bandwidth above 50 GHz input frequency within the IQ Analyzer or 89600 VSA (2018 Update 1.0 and later); requires N9041B-CRW; Currently only qualified for Input 2.
Additional removable M.2 NVMe solid-state drive (SSD), for PCA processor	N9041B-SS7	Provides a fully imaged, removable SSD in addition to the one installed in instruments, with Windows 11 operating system
Security features, exclude launch programs	N9041B-SF1	Prevents the launching of Windows programs from the instrument application

Description	Option number	Additional information
Security features, prohibit saving results	N9041B-SF2	Prevents instrument application from saving/recall of measurement results or user configurations to/from instrument's data storage
Security feature, secure RAM disk boot	N9041B-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 8. Add rear panel output utilities

Description	Option number	Additional information
Second IF output	Standard	Wideband IF out; center frequency depends on IF path; output on Aux IF connector at rear panel; licensed as N9041B-CR3
Ultra-wide bandwidth IF output	N9041B-CRW	Provides up to 5 GHz IF BW, for start frequency above 50 GHz
Arbitrary IF out	N9041B-CRP	IF out 10 to 75 MHz (in 500 kHz steps); output on Aux IF connector at rear panel
Aux log video out	N9041B-ALV	Fast rise time video out; output on Aux IF connector
Y-axis video out	N9041B-YAV	Screen video (0-1 volt open circuit); log video and linear video
Real time data link	Standard	The LVDS connector allows UXA connect to X-COM data recorder for data streaming (up to 40 MHz BW), and to the N5106A PXB baseband generator and channel emulator; licensed as N9041B-RTL

Step 9. 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

Description	Model number	Additional information
General purpose		
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	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. Currently only qualified for Input 1.
Phase noise	N9068EM0E	Adds one-button measurements for analyzing phase noise in frequency domain (log plot) and time domain (spot frequency), supports external mixing

Description	Model number	Additional information
Noise figure	N9069EM0E	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. Currently only qualified for Input 1.
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
Power Amplifier	N9055EM0E	Characterizes power amplifier (PA) with pre-distortion applied in RF and millimeter wave, with simple and integrated multi-touch user interface; Also supports ET (Envelop Tracking) with dual-channel VXG
Pulse analysis	N9067EM0E	Characterize pulsed RF signals in the time domain, with phase, frequency and statistical analysis of large pulse sets; enables fixed and variable length gated acquisition for capturing pulses of varying pulse width and PRI (requires 4 GB capture memory Option DP4); Currently only qualified for Input 1.
EMI	N6141EM0E	Performs pre-compliance conducted and radiated emission measurements. Currently only qualified for Input 1.
Remote language compatibility	N9061EM0E	Adds capability to emulate HP/Agilent 8566/68 and 856xE/EC spectrum analyzers. Currently only qualified for Input 1.
SCPI command language compatibility	N9062EM0E	Adds capability to emulate the R&S FSP/FSU/FSE/FSL/FSV spectrum analyzers or ESU EMI receiver. Currently only qualified for Input 1.
MATLAB software	N6171A	

Description	Model number	Additional information
Cellular communications (currently only qualified for Input 1)		
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
Multi-standard radio	N9083EM0E	Standard -based, one-button MSR measurements on any combination of LTE-FDD, W-CDMA/HSPA/ HSPA+, and GSM/EDGE/EDGE Evo signals
5G NR (New Radio)	N9085EM0E	Standard-based, one-button 5G NR (New Radio) downlink and uplink measurements
Wireless connectivity (currently only qualified for Input 1)		
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
WLAN 802.11ac/ax	N9077EM1E	Standard-based, one-button 802.11ac/ax measurement
WLAN 802.11be	N9077EM2E	Standard-based, one-button WLAN 802.11be measurements
Bluetooth®	N9081EM0E	Standard-based, one-button Bluetooth (BR/EDR, Low Energy 4.0/4.2 and Bluetooth 5/5.1) measurements; supports Qualcomm Bluetooth High Speed Link as QBHSL
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

Step 10. Choose 89600 VSA software licenses

Description	Model number	Additional information
Basic vector signal analysis and hardware connectivity	89601200C (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 Channel quality modulation analysis9601200C
General purpose		
Digital demodulation analysis	89601AYAC	Analysis of >40 modulation formats, including custom APSK and presets for communication formats like GSM/EDGE, ZigBee FSK, Bluetooth® BR, APCO25 and SOQPSK Proprietary and pre-standard, customized IQ constellation signals TEDS modulation analysis Channel response measurements such as phase/magnitude response and multi-tone group delay
Custom OFDM modulation analysis	89601BHFC	Proprietary and pre-standard OFDM formats
Direct data connectivity	89601101C	Push IQ data into the 89600 VSA software through API programming
PowerSuite measurement	89601PSMC	PowerSuite measurement for ACP and EVM
Cellular communication		
5G NR modulation analysis	89601BHNC	5G NR modulation analysis Pre-5G modulation analysis
LTE/LTE-A FDD modulation analysis	89601BHGC	LTE FDD modulation analysis LTE-Advanced FDD modulation analysis
LTE/LTE-A TDD modulation analysis	89601BHHC	LTE TDD modulation analysis LTE-Advanced TDD modulation analysis
3G modulation analysis bundle	89601B7NC	W-CDMA/HSPA+ modulation analysis TD-SCDMA/HSPA modulation analysis cdma2000 modulation analysis 1xEV-DO and 1xEV-DV modulation analysis
Channel sounding signal analysis	89601CSDC	Performs channel sounding measurement

Description	Model number	Additional information
Wireless connectivity		
Wireless connectivity modulation analysis	89601B7RC	WLAN 802.11a/b/g/j/p modulation analysis WiMax modulation analysis
High throughput WLAN modulation analysis	89601BHXC	WLAN 802.11n/ac modulation analysis WLAN 802.11ax modulation analysis proprietary and pre-standard OFDM formats
IoT modulation analysis	89601BHTC	NB-IoT modulation analysis RFID modulation analysis
Radar analysis		
Pulse analysis	89601BHQC	Pulsed modulated radar signal analysis
FMCW radar analysis	89601BHPC	For multi-chirp linear FM modulated signals or automotive radar
Other standard formats		
DOCSIS modulation analysis	89601BHMC	DOCSIS3.1 downstream and upstream modulation analysis
Multi-vendor hardware connectivity	89601301C	Connect multi-vendor hardware for modulation analysis

Step 11. Choose accessories

Description	Model number	Additional information
User guide	Standard	US – English localization All user documentation is included in the embedded context- sensitive help system inside the UXA User documentation can be downloaded from: www.keysight.com/find/uxa_manuals
Front-panel protective cover	Standard	
Rear-panel protective cover	Standard	
Power cord	Standard	Country specific
Connector kit Connector kit includes: 1.0 mm (f) to 1.0 mm (f) test port adapter 1.0 mm (f) to 1.85 mm (f) test port adapter 2.4 mm (f) to 2.4 mm (f) Adapter 2.4 mm (f) to 2.92 mm (f) Torque wrench Connector vise	Standard	Provides mechanical protections to the input connectors For Input 2 connector For Input 2 connector For Input 1 connector For Input 1 connector For Input 2; 14 mm jaws (4 inch-lb/10 inch-lb) For Input 2 connector (when customer supplied 1 mm adapters are used (not used for Keysight rugged adapters)
Front-panel protective cover	Standard	

Description	Model number	Additional information
Rear-panel protective cover	Standard	
Power cord	Standard	Country specific
Mouse, USB interface	1MSE001A	Enhances usability of the VSA software
USB DVD-ROM/CD-R/RW drive	1DVR001A	Enhances the usability of the Windows operating system
Rack mount kit	N9041B-2CM	Adds rack mount flanges and rails to the UXA
Rack mount kit with handles	N9041B-2CP	Adds rack mount flanges, rails and handles to the UXA
Minimum loss pad, 50 to 75 Ω (type-N to BNC)	MLP001A	50 Ω type-N male to 75 Ω BNC female adapter Frequency range: 9 MHz to 2 GHz Input/output return loss: 20/11 dB Insertion loss: 5.7 dB
Narrow IF bandwidth waveguide harmonic mixer		Capable of analyzing signals with bandwidth up to 300 MHz
V-band waveguide harmonic mixer, 50 to 75 GHz	M1970V-001	Requires Option EXM; USB mixer with smart features
Extended V-band waveguide harmonic mixer, 50 to 80 GHz	M1970V-002	Requires Option EXM; USB mixer with smart features
E-band waveguide harmonic mixer, 60 to 90 GHz	M1970E	Requires Option EXM; USB mixer with smart features
W-band waveguide harmonic mixer, 75 to 110 GHz	M1970W	Requires Option EXM; USB mixer with smart features
Wide IF bandwidth waveguide harmonic mixer		Capable of analyzing signals with wider bandwidth up to 3 GHz
E-band waveguide harmonic mixer, 60 to 90 GHz	M1971E-001	Requires Option EXM; USB mixer with smart features and 3 signal paths
E-band waveguide harmonic mixer, 55 to 90 GHz	M1971E-003	Requires Option EXM; USB mixer with smart features and 3 signal paths
V-band waveguide harmonic mixer, 50 to 75 GHz	M1971V	Requires Option EXM; USB mixer with smart features and 3 signal paths
W-band waveguide harmonic mixer, 75 to 110 GHz	M1971W	Requires Option EXM; 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

Description	Model number	Additional information
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	External preamplifier with smart “plug-and-play” features
USB external preamplifier, 0.1 to 26.5 GHz	U7227C	External preamplifier with smart “plug-and-play” features
USB external preamplifier, 2 to 50 GHz	U7227F	External preamplifier with smart “plug-and-play” features
USB thermocouple power sensor, DC to 120 GHz	U8489A	USB power sensor with 1.0 mm (m) connector for signal power level verification

Step 12. Add a calibration plan

Description	Model number	Additional information
Commercial calibration certificate with test data	N9041B-UK6	Calibration certificate only available at time of instrument purchase; only provides measurement results
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	

For more information on the USB smart harmonic external mixers, go to
www.keysight.com/find/smartmixer

For more information on the USB external preamplifiers, go to
www.keysight.com/find/usb-preamp

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

For more information on training and application support services go to:
www.keysight.com/find/training

Instrument Upgrades

Fast license-key upgrades for 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 UXA
4. Begin using the new capability [1, 2]

You Can Upgrade!

Options can be added after your initial purchase.

Most **X-Series** options are license-key upgradeable.

Installation, calibration, and verification information is available at: www.keysight.com/find/uxa_upgrades

Upgrades to wider analysis bandwidths (> 40 MHz) require hardware and license key. Instruments are required to be shipped back to the Keysight factory for upgrade and calibrations.

A web-based calculator at the following URL assists you in finding what upgrade options for analysis bandwidth you need: www.keysight.com/find/BW-selector

Description	Upgrade number	Requirements (UXA must already include the following)	Additional information
Increase frequency from 90 to 110 GHz	N9041BU-F22	590	Includes additional hardware, return to Keysight factory
Increase analysis bandwidth from 10 or 25 MHz to 40 MHz	N9041BU-B40	None	License key only
Increase analysis bandwidth from 25 or 40 MHz to 1 GHz	N9041BU-H1G	None	Includes additional hardware, return to Keysight factory; full bypass path (FBP) is included

[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.

Description	Upgrade number	Requirements (UXA must already include the following)	Additional information
Add full bypass path	N9041BU-FBP	H1G	Return to Keysight factory
Real-time analysis, basic detection (255 MHz max real-time BW)	N9041BU-RT1	H1G	License key only; includes FMT, TQT; minimum 17.17 µs signal duration for 100% POI with full amplitude accuracy. Also orderable at N9041RT1B (requires F/W revision A.21.04 onward)
Real-time analysis, optimum detection (255 MHz max real-time BW)	N9041BU-RT2	H1G	License key only; includes FMT, TQT; minimum 3.517 µs signal duration for 100% POI with full amplitude accuracy. Also orderable at N9041RT1B (requires F/W revision A.21.04 onward)
Frequency mask trigger, basic detection	N9041BU-FT1	H1G	License key only. Also orderable at N90EMFT1B (requires F/W revision A.21.04 onward)
Frequency mask trigger, optimum detection	N9041BU-FT2	H1G	License key only. Also orderable at N90EMFT2B (requires F/W revision A.21.04 onward)
Add electronic attenuator to 3.6 GHz	N9041BU-EA3	None	License key only; 1-dB steps, 0 to 24 dB range
Add preamplifier, 50 GHz	N9041BU-P50	None	License key only
Add ultra-wide bandwidth IF output	N9041BU-CRW	None	Provides up to 5 GHz IF BW for start frequency above 50 GHz; license key only
Add auxiliary log video out	N9041BU-ALV	None	License key only
Add arbitrary IF output	N9041BU-CRP	None	License key only
Add Y-axis video output	N9041BU-YAV	None	License key only
Add fast power up to 255 MHz bandwidth	N9041BU-FP2	B40 or H1G	License key only; for fast power measurements such as ACPR. Also orderable at N90EMFP2B (requires F/W revision A.21.04 onward)
Add precompliance EMI features	N9041BU-EMC	None	License key only (Currently only qualified for Input 1). Also order- able at N90EMEMCB (requires F/W revision A.21.04 onward)
Add external digitizer control	N9041BU-EDC	CRW	License key only; provides integrated control of an external IF digitizer (oscilloscope) up to 8 GHz bandwidth above 50 GHz input frequency within the IQ Analyzer or 89600 VSA (2018 Update 1.0 and later); requires N9041B-CRW; Currently only qualified for Input 2.

Description	Upgrade number	Requirements (UXA must already include the following)	Additional information
Add resolution bandwidth extended	N9041BU-RBE	H1G	License key only. Also orderable at N90EMRBEB (requires F/W revision A.21.04 onward)
Add security features, exclude launch programs	N9041BU-SF1	None	License key only; prevents the launching of Windows programs from the instrument application
Add security features, prohibit saving results	N9041BU-SF2	None	License key only; prevents instrument application from saving/recall of measurement results or user configurations to/from instrument's data storage
Add security features, secure RAM disk boot	N9041BU-SF3	PC8, or PCA	License key only; 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
USB DVD-ROM/CD-R/RW drive	1DVR001A	None	
65-key USB keyboard	1KBD001A	None	
USB mouse	1MSE001A	None	
Minimum loss pad, 50 to 75 Ω (type-N to BNC)	MLP001A	None	50 Ω type-N male to 75 Ω BNC female adapter; frequency range: 9 MHz to 2 GHz; input/output return loss: 20/11 dB; insertion loss: 5.7 dB; includes additional hardware
Additional removable solid-state drive (SSD)	N9094BU-SS1 (under N9041BU)	PC6, or PC6S	Spare SSD for security environment or for a backup, with Windows 10 operating system
Additional removable solid-state drive (SSD)	N9094BU-SS2 (under N9041BU)	PC8	Spare SSD for security environment or for a backup, with Windows 10 operating system
Additional removable M.2 NVMe solid-state drive (SSD)	N9094BU-SS3 (under N9041BU)	PCA	Spare SSD for security environment or for a backup, with Windows 10 operating system
Add removable solid-state drive (SSD)	N9094BU-SS6 (under N9041BU)	PC8	Provides additional removable solid-state drive, with Windows 11 operating system
Add removable solid-state drive (SSD)	N9094BU-SS7 (under N9041BU)	PCA	Provides additional removable M.2 NVMe solid-state drive, with Windows 11 operating system

Description	Upgrade number	Requirements (UXA must already include the following)	Additional information
Upgrade operating system to Windows 11	N9094BU-SS6/W11 (under N9041BU)	PC8, W10	Provides additional removable solid-state drive, with Windows 11 operating system
Upgrade operating system to Windows 11	N9094BU-SS7/W11 (under N9041BU)	PCA, W10	Provides additional removable M.2 NVMe solid-state drive, with Windows 11 operating system
Upgrade operating system to Windows 11	N9094BU-PC8/W11 (under N9040BU)	PC6, W10	Upgrade to PC8, hex-core, high performance processor, 32 GB RAM, with flash calibration file memory and removable solid-state drive
Upgrade operating system to Windows 11	N9094BU-PCA/W11 (under N9040BU)	PC6, W10	Upgrade to PCA, hex-core, high performance processor, 32 GB RAM, with flash calibration file memory and removable M.2 NVMe solid-state drive
Upgrade to PC8, hex-core, high-performance processor, 32 GB RAM, with flash calibration file memory	N9094BU-PC8 (under N9041BU)	PC6, or PC6S	Upgrade to PC8, hex-core, high performance processor, 32 GB RAM, with flash calibration file memory and removable solid-state drive
Upgrade to PCA, hex-core, high-performance processor, 32 GB RAM, with flash calibration file memory	N9094BU-PCA (under N9041BU)	PC6, PC6S, or PC8	Upgrade to PCA, hex-core, high performance processor, 32 GB RAM, with flash calibration file memory and removable M.2 NVMe solid-state drive
Rack mount kit	N9041BU-2CM	None	Rack mount flanges and rails to the UXA
Rack mount kit with handles	N9041BU-2CP	None	Rack mount flanges, rails and handles to the UXA
Frequency mask trigger, basic detection	N9041BU-FT1	H1G	License key only. Also orderable at N90EMFT1B (requires F/W revision A.21.04 onward)
Frequency mask trigger, optimum detection	N9041BU-FT2	H1G	License key only. Also orderable at N90EMFT2B (requires F/W revision A.21.04 onward)