

Keysight Technologies

UXA X-Series Signal Analyzer, Multi-touch N9041B

3 Hz to 90 or 110 GHz

Data Sheet



Unlocking Measurement Insights



Get real results up to 110 GHz

The UXA, the flagship of our X-Series signal analyzers, now delivers wider, deeper views of millimeter-wave signals. With the Keysight Technologies, Inc. UXA's leading-edge measurement and analysis, you can gain a new level of insight into millimeter-wave applications such as 5G, 802.11ad and automotive radar.

- Continuous frequency coverage from 3 Hz to 110 GHz
- Displayed average noise level as low as -150 dBm/Hz above 50 GHz
- Maximum analysis bandwidth of 5 GHz
 - 1 GHz fully integrated instantaneous bandwidth
 - 5 GHz external IF output to a Keysight oscilloscope

To eliminate compromises, the N9041B UXA provides two input connectors. The dedicated 1.0 mm input connector is machined to exact tolerances to ensure continuous sweeps and valid measurements up to 110 GHz. A robust and economical 2.4 mm input connector covers measurements up to 50 GHz.

As you reach up to millimeter-wave frequencies, it's easy to underestimate the challenges. We're ready to help you get real results up to 110 GHz with the new N9041B UXA.

This data sheet for the N9041B UXA X-Series signal analyzer provides **preliminary** characteristics for performance above 50 GHz, using input 2 described in the Inputs section below, unless otherwise noted. Below 50 GHz, the performance is similar to the N9040B UXA (Option 550). You may refer to the N9040B UXA data sheet, literature number **5992-0090EN** for additional information, however, the N9040B specifications are not warranted for the N9041B.

Definitions and Conditions

All of the characteristics in this data sheet are nominal.

Nominal values indicate expected performance, or describe product performance that is useful in the application of the product, over the temperature range 20 to 30 °C, but is not covered by the product warranty.

Inputs

Front panel: Two inputs are provided standard. Select one input to be active at a time.

Input 1 (right)

3 Hz to 50 GHz

2.4 mm male, 50 Ω nominal

Performance is similar to N9040B-550, with ~1-2 dB additional loss (nominal).

For more information, see the N9040B UXA data sheet, literature number **5992-0090EN**.

Input 2 (left)

3 Hz to 110 GHz (Opt 5CX)

3 Hz to 89.9875¹ GHz (Opt 590)

1.0 mm male, 50 Ω nominal

Performance up to 50 GHz is similar to N9040B-550, with ~3-4 dB additional loss (nominal).

For more information, see the N9040B UXA data sheet, literature number **5992-0090EN**.

1. The maximum frequency for Option 590 depends on the licensed bandwidth option selected: Option B25 up to 89.9875 GHz, Option B40 up to 89.980, and Option H1G up to 89.500.

Frequency and Time

Frequency range			
3 Hz to 89.9875 ¹ GHz		Option 590	
3 Hz to 110 GHz		Option 5CX	
Frequency band	LO multiple (N)	Frequency range	
0	1	3 Hz to 3.6 GHz	
1	1	3.5 to 8.4 GHz	
2	2	8.3 to 13.6 GHz	
3	2	13.5 to 17.1 GHz	
4	4	17 to 26.5 GHz	
5	4	26.4 to 34.5 GHz	
6	8	34.4 to 50 GHz	
7	8	50 to 75 GHz	Input 2 only
8	16	75 to 89.9875 ¹ GHz (Option 590) 75 to 110 GHz (Option 5CX)	Input 2 only

Amplitude Accuracy and Range

Attenuator, Input 2: 0, 6, 14, or 20 dB; for full frequency range			
Input 2 attenuator default state is 20 dB (maximum) to protect analyzer from excessive input levels. Additional attenuation is available at inputs 1 and 2 under 50 GHz.			
Preamplifier, Input 2: Preamplifier (Opt P50) available for inputs 1 and 2 under 50 GHz			
Amplitude range, Input 2, nominal ²	50 to 90/110 GHz		
Maximum safe input level	+25 dBm for 20 dB attenuation (maximum and default) +5 dBm for 0 dB attenuation (minimum)		
1 dB Gain compression (P1dB), single CW signal, 20 dB atten	+20 dBm		
1 dB Gain compression (P1dB), single CW signal, 0 dB atten	0 dBm		
DANL, 0 dB atten ³	-150 dBm/Hz		
Dynamic range P1dB to DANL ³	Up to 150 dB		
Amplitude flatness and accuracy			
Frequency response, nominal			
Band 7	50 to 75 GHz	± 1.8 dB	
Band 8	75 to 110 GHz	± 2.0 dB	
Absolute amplitude accuracy at reference frequency (50 MHz)		0.12 dB	

Residuals, images, and spurious responses	
Images, spurs (excluding LO sidebands), and residuals will be nominally attenuated to the noise floor, in swept spectrum analyzer mode, for input signals up to 2.2 GHz modulation bandwidth.	

1. The maximum frequency for Option 590 depends on the licensed bandwidth option selected: Option B25 up to 89.9875 GHz, Option B40 up to 89.980, and Option H1G up to 89.500.
2. Default attenuation is 20 dB, and should be reduced only when confident of input power level.
3. DANL conditions: Inputs terminated, sample or average detector, averaging type = Log, 0 dB input attenuation, normalized to 1 Hz.

I/Q Analyzer

Analysis bandwidth	Input and frequency range	Number of bits	SFDR
25 MHz (Option B25 standard)	3 Hz to 50 GHz (input 1) 3 Hz to 89.9875 GHz (input 2, Option 590) 3 Hz to 110 GHz (input 2, Option 5CX)	16	-100 dBc
40 MHz (Option B40)	25 MHz to 50 GHz (input 1) ~25 MHz to 89.980 GHz (input 2, Option 590) ~25 MHz to 110 GHz (input 2, Option 5CX)	16	-80 dBc
255 MHz (Option B2X ¹)	150 MHz to 50 GHz (input 1) ~150 MHz to 89.5 GHz (input 2, Option 590) ~150 MHz to 110 GHz (input 2, Option 5CX)	14	-78 dBc
1 GHz (Option H1G)	600 MHz to 50 GHz (input 1) ~600 MHz to 89.5 GHz (input 2, Option 590) ~600 MHz to 110 GHz (input 2, Option 5CX)	12	-56 dBc
5 GHz BW using external IF output (Option CRW) ²	50 to 90/110 GHz (input 2)	9 ³	TBD ³

General

Temperature range	20-30 °C
Power requirements	650 W, maximum
Display	
Resolution	1280 x 800
Size	357 mm (14.1 in.) diagonal (nominal) capacitive multi-touch screen
Weight (Basic configuration)	
Net	32 kg (71 lbs)
Shipping	41 kg (90 lbs)
Dimensions	
Height	280 mm (11 in)
Width	560 mm (18 in)
Length	556 mm (22 in)
Warranty	
The UXA signal analyzer is supplied with a 3-year standard warranty	
Calibration cycle	
The recommended calibration cycle is one year. Calibration services are available through Keysight service centers	
External mixers supported (Option EXM)	
Keysight M1971-series smart mixers	
11970-series harmonic mixers	
N9029AV-series frequency extension modules up to 1.1 THz from VDI	
N9029AE-series harmonic mixers up to 325 GHz from OML	

- Option B2X is not separately orderable. It is included with Option H1G.
- External IF output provides an IF output to the rear panel, with ~5 GHz modulation BW available. Conversion loss ~10 dB (nom). Input 2 only, at frequencies >50 GHz. For use with external oscilloscopes or digitizers.
- When used with Keysight DSOS804A oscilloscope and 89600 VSA software, provides an integrated user experience.

Ordering Information

Base product includes:

- 25 MHz analysis bandwidth
- Wideband IF output
- Enhanced display package
- External mixing
- Microwave preselector bypass
- Low noise path
- Low frequency enabled
- Fine step mechanical attenuator
- Digital processor with 2 GB capture memory
- Enhanced phase noise
- Fast sweep
- LO/IM nulling
- Noise floor extension; instrument alignment
- Precision frequency reference
- Real-time data link (up to 40 MHz BW)
- Intel Core i7 CPU module, 16 GB RAM
- Microsoft Windows Embedded Standard (WES) operating system
- Spectrum analyzer application
- Country-specific power cord
- Getting started guide

Description	Product number	Additional information
Frequency range		
3 Hz to 89.9875 ¹ GHz	N9041B-590	
3 Hz to 110 GHz	N9041B-5CX	
Analysis bandwidth		
25 MHz	Standard	Installed as N9041B-B25
40 MHz	N9041B-B40	Extends the analysis bandwidth to 40 MHz
1 GHz	N9041B-H1G	Extends the analysis bandwidth to 1 GHz; also includes a 255 MHz BW path (B2X), which is required for RT1 or RT2 (RTSA), and for FT1 or FT2 plus 4 GB capture memory (DP4).
5 GHz using external IF output	N9041B-CRW	
Preamplifier		
100 kHz to 50 GHz	N9041B-P50	Available to both inputs up to 50 GHz
Connectors		
IF output, rear panel, programmable	N9041B-CRP	Variable IF center frequency
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 spectrum analysis		
Real-time analysis, basic detection	N9041B-RT1	Up to 255 MHz when H1G/B2X installed
Real-time analysis, optimum detection	N9041B-RT2	Up to 255 MHz when H1G/B2X installed
Frequency mask trigger, basic detection	N9041B-FT1	Included with option RT1
Frequency mask trigger, optimum detection	N9041B-FT2	Included with option RT2
Other		
Electronic attenuator up to 3.6 GHz	N9041B-EA3	Add in addition to the mechanical attenuator; 1 dB steps, 0 to 24 dB
Basic EMI precompliance	N9041B-EMC	Perform EMI precompliance measurements with CISPR 16-1-1 detectors and bandwidths: tune and listen, and measure at marker are also available

1. The maximum frequency for Option 590 depends on the licensed bandwidth option selected: Option B25 up to 89.9875 GHz, Option B40 up to 89.980, and Option H1G up to 89.500.

Software & Applications

Application	Product number	Supported paths, additional information
89600 VSA software	89601B	Input 1 & 2, full frequency range Supports analysis of IQ data captured by oscilloscope from wide IF output (Input 2, >50 GHz).
Swept spectrum analyzer	Standard	Input 1 & 2, full frequency range PowerSuite includes channel power, occupied bandwidth, spectral emission mask (SEM), and more.
IQ analyzer	Standard	Input 1 & 2, full frequency range
Phase noise	N9068C	Input 1 & 2, full frequency range
Signal Optimizer		
Base calibration	K3101A	Supports input 1, runs in external PC
Digital modulation	K3102A	
5G candidate modulation on LTE FDD	K3103A	
5G candidate modulation on OFDM	K3104A	
Analog demodulation	N9063C	Supports input 1
Noise figure	N9069C	Supports input 1, preamplifier required
Pulse	N9067C	Supports input 1
LTE/LTE-Advanced FDD	N9080C	Supports input 1
LTE/LTE-Advanced TDD	N9082C	Supports input 1
W-CDMA/HSPA+	N9073C	Supports input 1
WLAN 802.11a/b/g/j/p/n/ac/af/ah	N9077C	Supports input 1
Short range communications	N9084C	Supports input 1

Accessories

Description	Product number	Additional information
1.0 mm (f) to 1.0 mm (f) connector	Standard	For additional connectors, order product number 11920B
1.0 mm (f) to 1.85 mm (f) connector	Standard	For additional connectors, order product number 11921F
2.4 mm (f) to 2.4 mm (f) connector	Standard	For additional connectors, order product number 11900B
2.4 mm (f) to 2.92 mm (f) connector	Standard	For additional connectors, order product number 11904B
Waveguide adapter, W-Band WR-10 to 1.0mm (f), 75 to 110 GHz	W281C	
Waveguide adapter, W-Band WR-10 to 1.0mm (m), 75 to 110 GHz	W281D	
Waveguide adapter, V-Band WR-15 to 1.0mm (f), 50 to 75 GHz	V281C	
Waveguide adapter, V-Band WR-15 to 1.0mm (m), 50 to 75 GHz	V281C	
Power sensor, waveguide WR-10, for EPM meters	W8486A	
Power sensor, waveguide WR-12, for EPM meters	E8486A	
Power sensor, waveguide WR-15, for EPM meters	V8486A	
1.0 mm test port cables	11500I, 11500J, 11500K, 11500L	1.0 mm cables also available from other suppliers (e.g., Gore, Sage Millimeter)

Warranty & Calibration Plans

Warranty Plans		
Description	Option number	Additional information
Return-to-Keysight warranty, 3 years	Standard	3-year warranty is included at no additional charge
Warranty Assurance Plan, Return-to-Keysight, 5 years	R-51B-001-5Z	
Warranty Assurance Plan, Return-to-Keysight, 7 years	R-51B-001-7Z	
Warranty Assurance Plan, Return-to-Keysight, 10 years	R-51B-001-10Z	

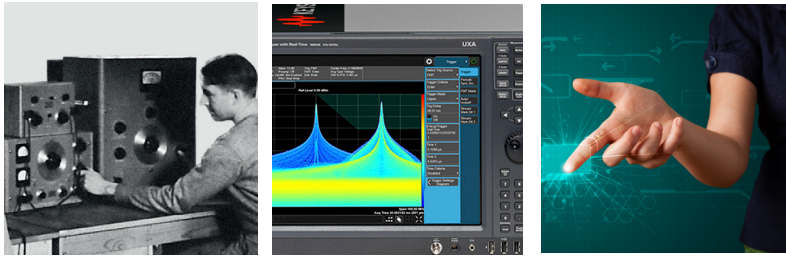
Calibration Plans		
Description	Option number	Additional information
Commercial calibration certificate with test data	N9041B-UK6	Calibration certificate only available at time of instrument purchase; only provides measurement results
Calibration Assurance Plan, Return-to-Keysight, 3 years	R-50C-011-3	
Calibration Assurance Plan, Return-to-Keysight, 5 years	R-50C-011-5	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, 7 years	R-50C-011-7	
Calibration Assurance Plan, Return-to-Keysight, 10 years	R-50C-011-10	

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

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