

Keysight N9040B

UXA X-Series Signal Analyzer

LXI Class Certified

Available frequency ranges

N9040B-508 3 Hz to 8.4 GHz
N9040B-513 3 Hz to 13.6 GHz
N9040B-526 3 Hz to 26.5 GHz

This data sheet provides a summary of the key performance parameters for UXA signal analyzers. The data presented are preliminary, non-warranted, and subject to change.

Data Sheet
Preliminary

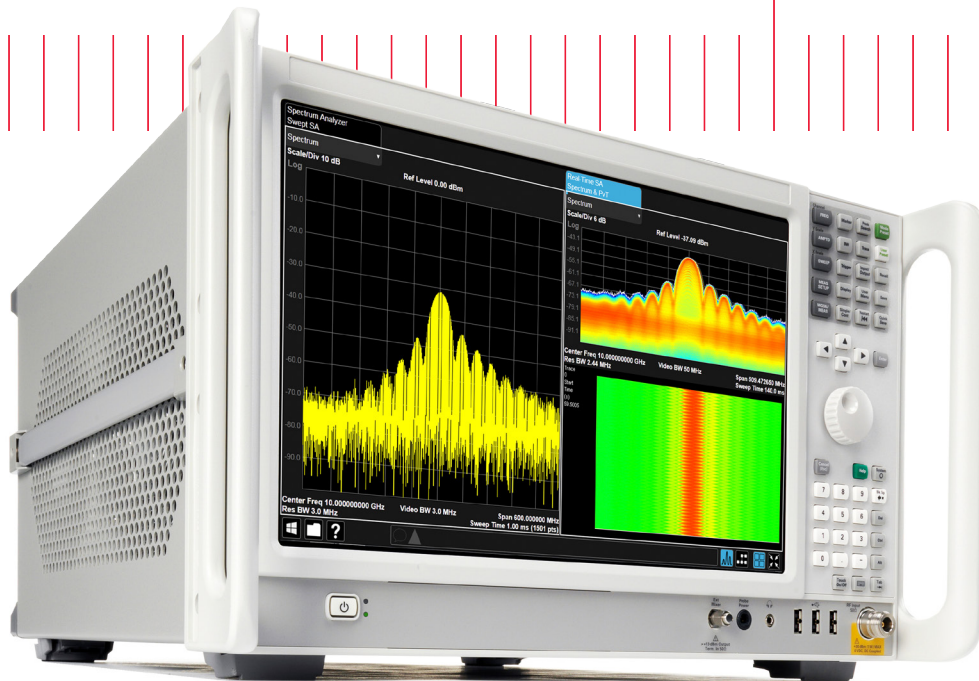


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Frequency and Time Specifications

Frequency range	DC coupled	AC coupled
Option 508	3 Hz to 8.4 GHz	10 MHz to 8.4 GHz
Option 513	3 Hz to 13.6 GHz	10 MHz to 13.6 GHz
Option 526	3 Hz to 26.5 GHz	10 MHz to 26.5 GHz
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

Frequency reference		
Accuracy	± [(time since last adjustment x aging rate) + temperature stability + calibration accuracy]	
Aging rate	Standard ± 1 x 10 ⁻⁷ / year ± 1.5 x 10 ⁻⁷ / 2 years	w/ J7023A AFR ± 1 x 10 ⁻⁹ / year
Temperature stability 20 to 30 °C Full temperature range	Standard ± 1.5 x 10 ⁻⁸ ± 5 x 10 ⁻⁸	w/ J7023A AFR ± 5 x 10 ⁻¹⁰
Achievable initial calibration accuracy	Standard ± 4 x 10 ⁻⁸	w/ J7023A AFR ± 5 x 10 ⁻¹¹
Example frequency reference accuracy (standard) 1 year after last adjustment	= ± (1 x 1 x 10 ⁻⁷ + 5 x 10 ⁻⁸ + 4 x 10 ⁻⁸) = ± 1.9 x 10 ⁻⁷	
Residual FM Center frequency = 1 GHz 10 Hz RBW, 10 Hz VBW	≤ (0.25 Hz x N) p-p in 20 ms nominal See band table above for N (LO multiple)	

Frequency readout accuracy (start, stop, center, marker)	
± (marker frequency x frequency reference accuracy + 0.25% x span + 5 % x RBW + 2 Hz + 0.5 x horizontal resolution ¹)	

¹ Horizontal resolution is span/(sweep points - 1).

Frequency and Time Specifications (continued)

Marker frequency counter

Accuracy	\pm (marker frequency x frequency reference accuracy + 0.100 Hz)
Delta counter accuracy	\pm (delta frequency x frequency reference accuracy + 0.141 Hz)
Counter resolution	0.001 Hz

Frequency span (FFT and swept mode)

Range	0 Hz (zero span), 10 Hz to maximum frequency of instrument
Resolution	2 Hz
Accuracy	
Swept	\pm (0.25% x span + horizontal resolution)
FFT	\pm (0.1% x span + horizontal resolution)

Sweep time and triggering

Range	Span = 0 Hz	1 μ s to 6000 s
	Span \geq 10 Hz	1 ms to 4000 s
Accuracy	Span \geq 10 Hz, swept	\pm 0.01% nominal
	Span \geq 10 Hz, FFT	\pm 40% nominal
	Span = 0 Hz	\pm 0.01% nominal
Sweep trigger	Free run, line, video, external 1, external 2, RF burst, periodic timer	
Trigger Delay	Span = 0 Hz or FFT	-150 to +500 ms
	Span \geq 10 Hz, swept	0 to 500 ms
	Resolution	0.1 μ s

Time gating

Gate methods	Gated LO; gated video; gated FFT
Gate length range (except method = FFT)	1 μ s to 5.0 s
Gate delay range	0 to 100.0 s
Gate delay jitter	33.3 ns p-p nominal

Sweep (trace) point range

All spans	1 to 40001
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Resolution bandwidth (RBW)

Range (-3.01 dB bandwidth)	1 Hz to 3 MHz (10% steps), 4, 5, 6, 8 MHz	
Bandwidth accuracy (power)		
RBW range	1 Hz to 100 kHz	\pm 0.5% (\pm 0.022 dB)
	110 kHz to 1.0 MHz (< 3.6 GHz CF)	\pm 1.0% (\pm 0.044 dB)
	1.1 to 2 MHz (< 3.6 GHz CF)	\pm 0.07 dB nominal
	2.2 to 3 MHz (< 3.6 GHz CF)	\pm 0.10 dB nominal
	4 to 8 MHz (< 3.6 GHz CF)	\pm 0.20 dB nominal
Bandwidth accuracy (-3.01 dB)		
RBW range	1 Hz to 1.3 MHz	\pm 2% nominal
Selectivity (-60 dB/-3 dB)	4.1:1 nominal	
EMI bandwidth (CISPR compliant)	200 Hz, 9 kHz, 120 kHz, 1 MHz	(Option EMC required)
EMI bandwidth (MIL STD 461E compliant)	10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz	(Option EMC required)

Frequency and Time Specifications (continued)

Analysis bandwidth ²		
Maximum bandwidth	Standard	10 MHz
	Option B25	25 MHz
	Option B40	40 MHz
	Option B2X	255 MHz
	Option B5X	510 MHz
Video bandwidth (VBW)		
Range	1 Hz to 3 MHz (10% steps), 4, 5, 6, 8 MHz, and wide open (labeled 50 MHz)	
Accuracy	± 6% nominal (in swept mode and zero span)	

² Analysis bandwidth is the instantaneous bandwidth available around a center frequency over which the input signal can be digitized for further analysis or processing in the time, frequency, or modulation domain.

Amplitude Accuracy and Range Specifications

Amplitude range	
Measurement range	Displayed average noise level (DANL) to maximum safe input level
Input mechanical attenuator range (3 Hz to 26.5 GHz)	0 to 70 dB in 2 dB steps
Electronic attenuator (Option EA3)	
Frequency range	3 Hz to 3.6 GHz
Attenuation range	
Electronic attenuator range	0 to 24 dB, 1 dB steps
Full attenuation range (mechanical + electronic)	0 to 94 dB, 1 dB steps
Maximum safe input level	
Average total power (with and without preamp)	+30 dBm (1 W)
Peak pulse power	< 10 μ s pulse width, < 1% duty cycle +50 dBm (100 W) and input attenuation \geq 30 dB
DC volts	
DC coupled	\pm 0.2 Vdc
AC coupled	\pm 100 Vdc
Display range	
Log scale	0.1 to 1 dB/division in 0.1 dB steps 1 to 20 dB/division in 1 dB steps (10 display divisions)
Linear scale	10 divisions
Scale units	dBm, dBmV, dB μ V, dBmA, dB μ A, V, W, A

Frequency response	Specifications	95th percentile ($\approx 2\sigma$)	
(10 dB input attenuation, 20 to 30 °C, preselector centering applied above 3.6 GHz)			
Option 508, 513, 526	3 Hz to 10 MHz	\pm 0.46 dB	
	10 to 20 MHz	\pm 0.35 dB	
	20 MHz to 3.6 GHz	\pm 0.35 dB	\pm 0.16 dB
	3.5 to 8.4 GHz	\pm 1.5 dB	\pm 0.39 dB
	8.3 to 13.6 GHz	\pm 2.0 dB	\pm 0.45 dB
	13.5 to 22.0 GHz	\pm 2.0 dB	\pm 0.62 dB
	22.0 to 26.5 GHz	\pm 2.5 dB	\pm 0.82 dB
Preamp on (0 dB attenuation) (Option P08, P13, P26)			
	9 to 100 kHz	\pm 0.36 dB	
	100 kHz to 50 MHz	\pm 0.68 dB	\pm 0.26 dB
	50 MHz to 3.6 GHz	\pm 0.55 dB	\pm 0.28 dB
	3.5 to 8.4 GHz	\pm 2.0 dB	\pm 0.64 dB
	8.3 to 13.6 GHz	\pm 2.3 dB	\pm 0.76 dB
	13.5 to 17.1 GHz	\pm 2.5 dB	\pm 0.95 dB
	17.0 to 22.0 GHz	\pm 3.0 dB	\pm 1.41 dB
	22.0 to 26.5 GHz	\pm 3.5 dB	\pm 1.61 dB

Amplitude Accuracy and Range Specifications (continued)

Input attenuation switching uncertainty		Specifications	Supplemental information
Relative to 10 dB and preamp off			
At 50 MHz (reference frequency)	attenuation 12 to 40 dB	± 0.14 dB	± 0.03 dB typical
	attenuation 2 to 8 dB	± 0.18 dB	± 0.05 dB typical
	attenuation 0 dB		± 0.05 dB nominal
Attenuation > 2 dB			
3 Hz to 3.6 GHz			± 0.3 dB nominal
3.5 to 8.4 GHz			± 0.5 dB nominal
8.3 to 13.6 GHz			± 0.7 dB nominal
13.5 to 26.5 GHz			± 0.7 dB nominal
26.4 to 50 GHz			± 1.0 dB nominal

Total absolute amplitude accuracy		Specifications
(10 dB attenuation, 20 to 30°C, 1 Hz \leq RBW \leq 1 MHz, input signal -10 to -50 dBm, all settings auto-coupled except Auto Swp Time = Accy, any reference level, any scale, σ = nominal standard deviation)		
	At 50 MHz	± 0.24 dB
	At all frequencies	$\pm (0.24 \text{ dB} + \text{frequency response})$
	10 Hz to 3.6 GHz	± 0.19 dB (95th Percentile approx. 2σ)
Preamp on (Option P08, P13, and P26)	At all frequencies	$\pm (0.36 \text{ dB} + \text{frequency response})$

Input voltage standing wave ratio (VSWR)		
(10 dB input attenuation)	50 MHz	1.07:1 nominal
	10 MHz to 3.6 GHz	1.139 (95th percentile)
	3.5 to 8.4 GHz	1.290 (95th percentile)
	8.3 to 13.6 GHz	1.388 (95th percentile)
	13.5 to 17.1 GHz	1.403 (95th percentile)
	17.0 to 26.5 GHz	1.475 (95th percentile)
Preamp on (0 dB input attenuation) (Option P03, P08, P13, and P26)	10 MHz to 3.6 GHz	1.45 (95th percentile)
	3.5 to 8.4 GHz	1.54 (95th percentile)
	8.3 to 13.6 GHz	1.57 (95th percentile)
	13.5 to 17.1 GHz	1.48 (95th percentile)
	17.0 to 26.5 GHz	1.54 (95th percentile)

Amplitude Accuracy and Range Specifications (continued)

Resolution bandwidth switching uncertainty (referenced to 30 kHz RBW)

1 Hz to 1.5 MHz RBW	± 0.03 dB
1.6 MHz to 2.7 MHz RBW	± 0.05 dB
3 MHz RBW	± 0.10 dB
4, 5, 6, 8 MHz RBW	± 0.30 dB

Reference level

Range	± 0.03 dB
Log scale	-170 to +30 dBm in 0.01 dB steps
Linear scale	707 pV to 7.07 V with 0.11% (0.01 dB) resolution

Accuracy	0 dB
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Display scale switching uncertainty

Switching between linear and log	0 dB
Log scale/div switching	0 dB

Display scale fidelity

Between -10 dBm and -80 dBm input mixer level	± 0.10 dB total	± 0.04 dB typical
Below -18 dBm input mixer level	± 0.07 dB	± 0.02 dB typical

Trace detectors

Standard	Normal, peak, sample, negative peak, log power average, RMS average, and voltage average
With Option EMC	Add quasi-peak to above

Preamplifier

Frequency range ⁴	Option P08	9 kHz to 8.4 GHz
	Option P13	9 kHz to 13.6 GHz
	Option P26	9 kHz to 26.5 GHz
Gain	9 kHz to 3.6 GHz	+20 dB nominal
	3.6 to 26.5 GHz	+35 dB nominal

⁴ Below 100 kHz, only 95th percentile (approx. 2σ) value for frequency response is provided

Dynamic Range Specifications

1 dB gain compression (two-tone)		Maximum power at input mixer	
(At 1 kHz RBW with 100 kHz tone spacing, 20 to 30 °C)			
	20 to 40 MHz	-3 dBm	0 dBm typical
	40 to 200 MHz	+1 dBm	+3 dBm typical
	200 MHz to 3.6 GHz	+3 dBm	+5 dBm typical
	3.6 to 16 GHz	+1 dBm	+4 dBm typical
	16 to 26.5 GHz	-1 dBm	+2 dBm typical
Preamp On (Option 508, 513, or 526)	10 MHz to 3.6 GHz		-14 dBm nominal
	3.6 to 26.5 GHz		
	Tone spacing 100 kHz to 20 MHz		-28 dBm nominal
	Tone spacing > 70 MHz		-10 dBm nominal

Displayed average noise level (DANL) ⁵	Specifications	Typical
(Input terminated, sample or average detector, averaging type = Log, 0 dB input attenuation, IF Gain = High, 1 Hz RBW, 20 to 30 °C)		
	LNP Off/LNP On ⁶	LNP Off/LNP On
	3 Hz to 9 kHz	-100 dBm/NA typical
	9 to 100 kHz	-146 dBm/NA typical
	100 kHz to 1 MHz	-150 dBm/NA typical
	1 to 10 MHz	-155 dBm/NA typical
	10 MHz to 1.2 GHz	-155 dBm/NA typical
	1.2 to 2.1 GHz	-153 dBm/NA typical
	2.1 to 3.0 GHz	-152 dBm/NA typical
	3.0 to 3.6 GHz	-151 dBm/NA typical
	3.5 to 4.2 GHz	-147 dBm/-153 dBm
	4.2 to 8.4 GHz	-150 dBm/-155 dBm
	8.3 to 13.6 GHz	-149 dBm/-155 dBm
	13.5 to 16.9 GHz	-145 dBm/-151 dBm
	16.9 to 20.0 GHz	-142 dBm/-150 dBm
	20.0 to 26.5 GHz	-135 dBm/-148 dBm
Preamp On (Option 508, 513, or 526)	100 to 200 kHz	-157 dBm/NA
	200 to 500 kHz	-160 dBm/NA
	0.5 to 1 MHz	-164 dBm/NA
	1 to 10 MHz	-164 dBm/NA
	10 MHz to 2.1 GHz	-165 dBm/NA
	2.1 to 3.6 GHz	-163 dBm/NA
	3.5 to 8.4 GHz	-164 dBm/NA
	8.3 to 13.6 GHz	-163 dBm/NA
	13.5 to 16.9 GHz	-161 dBm/NA
	16.9 to 20.0 GHz	-159 dBm/NA
	20.0 to 26.5 GHz	-155 dBm/NA

⁵ With the NFE (Noise Floor Extension) "Off".

⁶ LNP (Low Noise Path) requires option LNP which is standard for the UX A.

⁷ At higher frequency bands (beyond 3.6 GHz), Preamp "On" supersedes "LNP enabled". LNP cannot operate simultaneously with preamp.

Dynamic Range Specifications (continued)

Displayed average noise level (DANL) with noise floor extension (NFE) on	Improvement @ 95th percentile		
	Preamp Off	Preamp On	LNP On
Band 0, $f > 20$ MHz	9 dB	10 dB	
Band 1	10 dB	9 dB	10 dB
Band 2	10 dB	10 dB	10 dB
Band 3	9 dB	10 dB	10 dB
Band 4	9 dB	8 dB	9 dB
Examples of effective DANL (1 Hz RBW)	Preamp Off	Preamp On	LNP On
Mid-Band 0 (1.8 GHz)	-161 dBm	-171 dBm	NA
Mid-Band 1 (5.95 GHz)	-158 dBm	-172 dBm	-162 dBm
Mid-Band 2 (10.95 GHz)	-159 dBm	-168 dBm	-162 dBm
Mid-Band 3 (15.3 GHz)	-152 dBm	-165 dBm	-160 dBm
Mid-Band 4 (21.75 GHz)	-149 dBm	-160 dBm	-160 dBm

Residues, images, and spurious responses			
Residual responses (Input terminated and 0 dB attenuation)		200 kHz to 8.4 GHz Zero span or FFT or other frequencies	-100 dBm -100 dBm nominal
Image responses (Mixer level at -10 dBm)	Tuned Freq (f)	Excitation Freq	Response
	10 MHz to 26.5 GHz	f+45 MHz	-80 dBc -118 dBc typical
	10 MHz to 3.6 GHz	f+10,245 MHz	-80 dBc -112 dBc typical
	10 MHz to 3.6 GHz	f+645 MHz	-80 dBc -101 dBc typical
	3.5 to 13.6 GHz	f+645 MHz	-78 dBc -87 dBc typical
	13.5 to 17.1 GHz	f+645 MHz	-74 dBc -84 dBc typical
	17.0 to 22 GHz	f+645 MHz	-70 dBc -82 dBc typical
	22 to 26.5 GHz	f+645 MHz	-68 dBc -79 dBc typical
Other spurious responses	Mixer level	Response	
Carrier frequency ≤ 26.5 GHz			
First RF order ($f \geq 10$ MHz from carrier)	-10 dBm	-80 dBc + 20log(N ⁹) Including IF feedthrough, LO harmonic mixing responses -165 dBm	
Higher RF order ($f \geq 10$ MHz from carrier)	-40 dBm	-80 dBc + 20log(N ⁹) Including higher order mixer responses	
LO-related spurious responses (200 Hz $\leq f < 10$ MHz from carrier), Mixer level at -10 dBm		-68 dBc ⁸ + 20log(N ⁹)	
Line-related spurious responses		-73 dBc + 20log(N ⁹) (nominal)	

⁸ Nominally -40 dBc under large magnetic (0.38 Gauss rms) or vibrational (0.21 g rms) environmental stimuli.

⁹ N is the LO multiplication factor. Refer to page 4 for the N value verses frequency ranges.

Dynamic Range Specifications (continued)

Second harmonic distortion (SHI)				
	Source frequency	Mixer level	Distortion (LNP Off/LNP On)	SHI (LNP Off/LNP On)
	10 to 100 MHz	-15 dBm	-57 dBc/NA	+42 dBm/NA
	0.1 to 1.8 GHz	-15 dBm	-60 dBc/NA	+45 dBm/NA
	1.75 to 2.5 GHz	-15 dBm	-77 dBc/-95 dBc	+62 dBm/+80 dBm
	2.5 to 4 GHz	-15 dBm	-77 dBc/-101 dBc	+62 dBm/+86 dBm
	4 to 6.5 GHz	-15 dBm	-77 dBc/-105 dBc	+62 dBm/+90 dBm
	6.5 to 10 GHz	-15 dBm	-70 dBc/-105 dBc	+55 dBm/+90 dBm
	10 to 13.25 GHz	-15 dBm	-62 dBc/-105 dBc	+47 dBm/+90 dBm
	Source frequency	Preamp level	Distortion	SHI
Preamp On (Option P08, P13, or P26)	10 MHz to 1.8 GHz	-45 dBm	-78 dBc nominal	+33 dBm nominal
	1.8 to 13.25 GHz	-50 dBm	-60 dBc nominal	+10 dBm nominal

Third-order intermodulation distortion (TOI) (two -16 dBm tones at input mixer with tone separation > 5 times IF prefilter bandwidth, 20 to 30 °C)			
	10 to 150 MHz	+13 dBm	+16 dBm typical
	150 to 600 MHz	+18 dBm	+21 dBm typical
	0.6 to 1.1 GHz	+20 dBm	+22 dBm typical
	1.1 to 3.6 GHz	+21 dBm	+23 dBm typical
	3.5 to 8.4 GHz	+17 dBm	+23 dBm typical
	8.3 to 13.6 GHz	+17 dBm	+23 dBm typical
	13.5 to 17.1 GHz	+15 dBm	+20 dBm typical
	17.0 to 26.5 GHz	+16 dBm	+22 dBm typical
Preamp On (Option P08, P13, or P26)			
Tones at preamp input			
(two -45 dBm)	10 to 500 MHz		+4 dBm nominal
(two -45 dBm)	500 MHz to 3.6 GHz		+4.5 dBm nominal
(two -50 dBm)	3.6 to 26.5 GHz		-15 dBm nominal

Phase noise			
	Offset	Specifications	Typical
Noise sidebands (20 to 30 °C, CF = 1 GHz)	100 Hz		-112 dBc/Hz typical
	1 kHz		-129 dBc/Hz typical
	10 kHz		-136 dBc/Hz typical
	100 kHz		-142 dBc/Hz typical
	1 MHz		-147 dBc/Hz typical
	10 MHz		-157 dBc/Hz typical

General Specifications

Temperature range

Operating	0 to 55 °C
Storage	-40 to +70 °C

Altitude

4,500 meters (approx. 15,000 feet)

EMC

Complies with European EMC Directive 2004/108/EC

- IEC/EN 61326-1 or IEC/EN 61326-2-1
- CISPR Pub 11 Group 1, class A 1
- AS/NZS CISPR 11:2002
- ICES/NMB-001

This ISM device complies with Canadian ICES-001

Cet appareil ISM est conforme à la norme NMB-001 du Canada

Safety

Complies with European Low Voltage Directive 2006/95/EC

- IEC/EN 61010-1 3rd Edition
- Canada: CSA C22.2 No. 61010-1-12
- USA: UL 61010-1 3rd Edition

Acoustic statement (European Machinery Directive 2002/42/EC, 1.7.4.2u)

Acoustic noise emission

LpA < 70 dB

Operator position

Normal position

Per ISO 7779

Acoustic noise - more information

Values given are per ISO 7779 standard in the "Operator Sitting" position)

Ambient temperature

< 40 °C

Nominally under 55 dBA Sound Pressure. 55 dBA is generally considered suitable for use in quiet office environment

≥ 40 °C

Nominally under 65 dBA Sound Pressure. 65 dBA is generally considered suitable for use in noisy office environment

Environmental stress

Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation, and end-use; those stresses include, but are not limited to, temperature, humidity, shock, vibration, altitude, and power line conditions; test methods are aligned with IEC 60068-2 and levels are similar to MILPRF-28800F Class 3.

Power requirements

Voltage and frequency	100 to 120 V, 50/60/400 Hz 220 to 240 V, 50/60 Hz
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Power consumption

On	600 W (Maximum)
Standby	25 W

General Specifications (continued)

Display

Resolution	1,280 x 800
Size	357 mm (14.1 in.) diagonal (nominal)

Data storage

Internal	Removable solid state drive (\geq 80 GB) and secure digital (SD) memory device
External	Supports USB 3.0/2.0 compatible memory devices

Weight (Basic configuration)

Net	30.9 kg (68 lbs) nominal
Shipping	39.5 kg (87 lbs) nominal

Dimensions

Height	279.4 mm (11 in)
Width	457.2 mm (18 in)
Length	508 mm (20 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

Inputs and Outputs

Front panel

RF input Connector	
Standard	Type-N female, 50 Ω nominal
Option C35 (with Option 526 only)	APC 3.5 mm male, 50 Ω nominal
Probe power	+15 Vdc, \pm 7% at 150 mA max nominal
Voltage/current	-12.6 Vdc, \pm 10% at 150 mA max nominal
USB ports	
Master (3 ports)	
Standard	Compatible with USB 2.0
Connector	USB Type-A female
Output current	0.5 A nominal
Headphone jack	Miniature stereo audio jack (3.5 mm, also known as "1/8 inch")
External mixing	
Connection port	
Connector	SMA, female
Impedance	50 Ω nominal
Functions	Triplexed for mixer bias, IF input and LO output
Mixer bias range	\pm 10 mA in 10 μ A step
IF input center frequency	
Narrowband IF path	322.5 MHz
40 MHz BW IF path	250.0 MHz
255 MHz BW IF path	750.0 MHz
510 MHz BW IF path	877.1 MHz
LO output frequency range	3.75 to 14.0 GHz

Rear panel

10 MHz out	
Connector	BNC female, 50 Ω nominal
Output amplitude	\geq 0 dBm nominal
Frequency	10 MHz + (10 MHz x frequency reference accuracy)
Ext Ref In	
Connector	BNC female, 50 Ω nominal
Input amplitude range	-5 to 10 dBm nominal
Input frequency	1 to 50 MHz nominal (selectable to 1 Hz resolution)
Frequency lock range	\pm 5 x 10 ⁻⁶ of specified external reference input frequency
Trigger 1 and 2 inputs	
Connector	BNC female
Impedance	> 10 k Ω nominal
Trigger level range	-5 to +5 V (TTL) factory preset
Trigger 1 and 2 outputs	
Connector	BNC female
Impedance	50 Ω nominal
Level	0 to 5 V (CMOS) nominal
Sync (reserved for future use)	
Connector	BNC female
Monitor output 1	
Connector	VGA compatible, 15-pin mini D-SUB
Format	XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB
Resolution	1,280x800

Monitor output 2	
Connector	DVI compatible, pin
Format	DVI
Resolution	1,280x800
Noise source drive +28 V (pulsed)	
Connector	BNC female
Output voltage	On 28.0 ± 0.1 V (60 mA maximum) Off < 1 V
SNS series noise source	For use with the Agilent/Keysight SNS Series noise sources
Digital bus	
Connector	MDR-80
Analog out	
Connector	BNC female
USB ports	
Master (3 ports)	
Standard	Two ports are compatible with USB 3.0; one with USB 2.0
Connector	USB Type-A female
Output current	0.5 A nominal
Slave (1 port)	
Standard	Compatible with USB 3.0
Connector	USB Type-B female
Output current	0.5 A nominal
GPIB interface	
Connector	IEEE-488 bus connector
GPIB codes	SH1, AH1, T6, SR1, RL1, PP0, DC1, C1, C2, C3, C28, DT1, L4, C0
GPIB mode	Controller or device
LAN TCP/IP interface	
Standard	1000Base-T
Connector	RJ45 Ethertwist
IF output	
Connector	SMA female, shared by the second IF out (wideband, standard) and Opt CRP, and ALV
Impedance	50 Ω nominal
2nd IF output	
Center frequency	
SA mode or I/Q analyzer with IF BW ≤ 25 MHz	322.5 MHz
with Option B40	250 MHz
with Option B2X	750 MHz
with Option B5X	877.1 MHz
Conversion gain	-1 to +4 dB (nominal) plus RF frequency response
Bandwidth	
Low band	Up to 160 MHz (nominal)
High band, with preselector	Depends on center frequency
High band, with preselector bypassed	Up to 700 MHz (nominal); expandable to 900 MHz with corrections

Other Optional Output

Option ALV log video out

General port specifications		
Connector	SMA female	Shared with other options
Impedance		50 Ω nominal
Fast log video output		
Output voltage	Open-circuit voltages shown	
Maximum	1.6 V at -10 dBm nominal	
Slope	25 \pm 1 mV/dB nominal	
Log fidelity		
Range	49 dB (nominal) with input frequency at 1 GHz	
Accuracy within range	\pm 1.0 dB nominal	
Rise time	15 ns nominal	
Fall time		
Bands 1-4 with Option MPB	40 ns nominal best case,	
Other cases	Depends on bandwidth	

Option CRP programmable IF output

General port specifications		
Connector	SMA female	Shared with other options
Impedance		50 Ω nominal
Programmable IF output		
Center frequency		
Range	10 to 75 MHz (user selectable)	
Resolution	0.5 MHz	
Conversion gain	-1 to +4 dB (nominal) plus RF frequency response	
Bandwidth		
Output at 70 MHz		
Low band or high band with preselector bypassed	100 MHz (nominal)	
Preselected band	Depends on RF center frequency	
Lower output frequencies	Subject to folding	
Residual output signals	\leq -88 dBm (nominal)	

Other Optional Output (continued)

Option YAV Y-axis output

General port specifications

Connector Impedance	SMA female	Shared with other options 50 Ω nominal
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Screen video

Operating conditions		"Lin" is linear in voltage
Display scale types	Log or Lin	
Log scales	All (0.1 to 20 dB/div)	
Modes	Spectrum analyzer only	
Gating	Gating must be off	
Output scaling	0 to 1.0 V open circuit, representing bottom to top of screen	
Offset		
Gain accuracy	$\pm 1\%$ of full scale nominal $\pm 1\%$ of output voltage nominal	

Log video (Log envelope) output

Amplitude range (terminated with 50 Ω)	
Maximum	V nominal for -10 dBm at the mixer
Scale factor	1 V per 192.66 dB
Bandwidth	Set by RBW
Operating conditions	Select Sweep Type = SweptSpectrum analyzer only

Linear video output

Amplitude range (terminated with 50 Ω)	
Maximum	1.0 V nominal for signal envelope at the reference level
Minimum	0 V
Scale factor	If carrier level is set to half the reference level in volts, the scale factor is 200% of carrier level per volt. Regardless of the carrier level, the scale factor is 100% of reference level per volt.
Bandwidth	Set by RBW
Operating conditions	Select Sweep Type = Swept

I/Q Analyzer

Frequency					
Frequency span					
Standard	10 Hz to 10 MHz				
Option B25	10 Hz to 25 MHz				
Option B40	10 Hz to 40 MHz				
Option B2X	10 Hz to 255 MHz				
Option B5X	10 Hz to 510 MHz				
Resolution bandwidth (spectrum measurement)					
Range					
Overall	100 mHz to 3 MHz				
Span = 1 MHz	50 Hz to 3 MHz				
Span = 10 kHz	1 Hz to 10 kHz				
Span = 100 Hz	100 mHz to 100 Hz				
Window shapes	Flat Top, Uniform, Hanning, Hamming, Gaussian, Blackman, Blackman-Harris, Kaiser Bessel (K-B 70 dB, K-B 90 dB and K-B 110 dB)				
Analysis bandwidth (waveform measurement)					
Standard instrument	10 Hz to 10 MHz				
Option B25	10 Hz to 25 MHz				
Option B40	10 Hz to 40 MHz				
Option B2X	10 Hz to 255 MHz				
Option B5X	10 Hz to 510 MHz				
IF frequency response (standard 10 MHz IF path)					
IF frequency response (demodulation and FFT response relative to the center frequency)					
Frequency (GHz)	Analysis BW (MHz)	Max error	Midwidth error (95th percentile)	Slope (dB/MHz) (95th percentile)	RMS (nominal)
≤ 3.6	≤ 10	± 0.20 dB	± 0.12 dB	± 0.10 dB	0.02 dB
3.6 to 26.5	≤ 10 (preselector On)				0.23 dB
3.6 to 26.5	≤ 10 (preselector Off ¹⁰)	± 0.25 dB	± 0.12 dB	± 0.10 dB	0.02 dB
IF phase linearity					
Center freq (GHz)	Span (MHz)	Preselector	Peak-to-peak (nominal)	RMS (nominal)	
≥ 0.02, < 3.6	≤ 10	NA	0.06°	0.012°	
≥ 3.6 to ≤ 26.5	≤ 10	Off ¹⁰	0.10°	0.022°	
≥ 3.6	≤ 10	On	0.11°	0.024°	
Dynamic range (standard 10 MHz IF path)					
Clipping-to-noise dynamic range			Excluding residuals and spurious responses		
Clipping level at mixer			Center frequency ≥ 20 MHz		
IF gain = Low	-10 dBm		-8 dBm nominal		
IF gain = High	-20 dBm		-17.5 dBm nominal		
Noise density at mixer at center frequency	(DANL + IF Gain effect) + 2.25 dB				

10 MPB (microwave preselector bypass) is enabled. All UXAs ship with MPB as a standard feature.

I/Q Analyzer (continued)

Data acquisition (standard 10 MHz IF path)			
Time record length			
Analysis tool			
IQ analyzer	4,000,000 IQ sample pairs		
Advanced tool	Data packing		With 89600 VSA
	32-bit	64-bit	
Length (IQ sample pairs)	536 MSa (2 ²⁹ Sa)	268 MSa (2 ²⁸ Sa)	2 GB total memory
Length (time units)	Samples/(span x 1.28)		
Sample rate			
At ADC	100 Msa/s		
IQ pairs	Span dependent		
ADC resolution	16 bits		

Option B25 25 MHz analysis bandwidth (Option B25 is automatically included in Option B40, B2X or B5X)

IF frequency response (25 MHz IF path)					
IF frequency response (demodulation and FFT response relative to the center frequency)					
Freq (GHz)	Analysis BW (MHz)	Max error	Midwidth error (95th percentile)	Slope (dB/MHz) (95th percentile)	RMS (nominal)
< 3.6	10 to ≤ 25	± 0.30 dB	± 0.12 dB	± 0.05 dB	0.02 dB
3.6 to 26.5	10 to ≤ 25				0.50 dB
3.6 to 26.5	10 to ≤ 25 (preselector On ¹¹)				0.03 dB
	10 to ≤ 25 (preselector Off ¹¹)	± 0.40 dB			
IF phase linearity					
Center freq (GHz)	Span (MHz)	Preselector	Peak-to-peak (nominal)	RMS (nominal)	
≥ 0.02, < 3.6	≤ 25	NA	0.48°	0.12°	
≥ 3.6	≤ 25	Off ¹¹	0.85°	0.20°	

Dynamic range (25 MHz IF path)	
Full scale (ADC clipping)	
Default settings, signal at CF	
(IF gain = Low)	
Band 0	-8 dBm mixer level nominal
Bands 1 through 4	-7 dBm mixer level nominal
High gain setting, signal at CF	
(IF gain = High)	
Band 0	-18 dBm mixer level nominal, subject to gain limitations
Bands 1 through 4	-17 dBm mixer level nominal, subject to gain limitations
Effect of signal frequency ≠ CF	Up to ± 3 dB nominal

¹¹ MPB (microwave preselector bypass) is enabled. All UXAs ship with MPB as a standard feature.

I/Q Analyzer (continued)

Data acquisition (25 MHz IF path)			
Time record length			
Analysis tool			
IQ analyzer	4,000,000 IQ sample pairs		
Advanced tool	Data packing		With 89600 VSA
	32-bit	64-bit	
Length (IQ sample pairs)	536 MSa (2 ²⁹ Sa)	268 MSa (2 ²⁸ Sa)	2 GB total memory
Length (time units)	Samples/(span x 1.28)		
Sample rate			
At ADC	100 Msa/s		
IQ pairs	Span dependent		
ADC resolution	16 bits		

Option B40 40 MHz analysis bandwidth (Option B40 is automatically included in Option B2X or B5X)

IF frequency response (40 MHz IF path)					
IF frequency response (relative to center)					
Freq (GHz)	Span (MHz)	Preselector		Typical	RMS (nominal)
≥ 0.03, < 3.6	≤ 40	NA	± 0.4 dB	± 0.25 dB	0.05 dB
≥ 3.6, ≤ 8.4	≤ 40	Off ¹²	± 0.4 dB	± 0.16 dB	0.05 dB
> 8.4, ≤ 26.5	≤ 40	Off ¹²	± 0.7 dB	± 0.20 dB	0.05 dB

IF phase linearity				
Center freq (GHz)	Span (MHz)	Preselector	Peak-to-peak (nominal)	RMS (nominal)
≥ 0.03, < 3.6	≤ 40	NA	0.48°	0.12°
≥ 3.6	≤ 40	Off ¹²	0.85°	0.20°

Dynamic range (40 MHz IF path)	
SFDR	
(Spurious-free dynamic range)	
Signal frequency within ± 12 MHz of center	-80 dBc nominal
Signal frequency anywhere within analysis BW	
Spurious response within ± 18 MHz of center	-79 dBc nominal
Response anywhere within analysis BW	-77 dBc nominal
Full scale (ADC clipping)	
Default settings, signal at CF (IF gain = Low)	
Band 0	-8 dBm mixer level nominal
Bands 1 through 4	-7 dBm mixer level nominal
High gain setting, signal at CF (IF gain = High)	
Band 0	-18 dBm mixer level nominal, subject to gain limitations
Bands 1 through 4	-17 dBm mixer level nominal, subject to gain limitations
Effect of signal frequency ≠ CF	Up to ± 3 dB nominal

¹² MPB (microwave preselector bypass) is enabled. All UXAs ship with MPB as a standard feature.

I/Q Analyzer (continued)

Data acquisition (40 MHz IF path)			
Time record length			
Analysis tool			
IQ analyzer	4,000,000 IQ sample pairs		
Advanced tool	Data packing		With 89600 VSA software
	32-bit	64-bit	
Length (IQ sample pairs)	536 MSa (2 ²⁹ Sa)	268 MSa (2 ²⁸ Sa)	2 GB total memory
Length (time units)	Samples/(span x 1.28)		
Sample rate			
At ADC	200 Msa/s		
IQ pairs	Span dependent		
ADC resolution	12 bits		

Option B2X 255 MHz analysis bandwidth

IF frequency response (255 MHz IF path)		
Freq (GHz)	Span (MHz)	Relative to center
≥ 0.3, < 8.4	≤ 255	± 0.7 dB nominal
Dynamic range (255 MHz IF path)		
SFDR (Spurious-free dynamic range)		-75 dBc nominal
IF residual responses across 255 MHz		-112 dBfs
Two-tone intermodulation distortion		-65 dBc
ADC resolution		14 bits

Option B5X 510 MHz analysis bandwidth

IF frequency response (510 MHz IF path)		
Freq (GHz)	Span (MHz)	Relative to center
≥ 0.4, < 8.4	≤ 510	± 0.7 dB nominal
Dynamic range (510 MHz IF path)		
SFDR (Spurious-free dynamic range)		-75 dBc nominal
IF residual responses across 255 MHz		-95 dBfs
Two-tone intermodulation distortion		-65 dBc
ADC resolution		14 bits

Real-time Spectrum Analyzer (RTSA)

Option RT1 real-time spectrum analyzer, basic detection,
or RT2 Real-time spectrum analyzer, optimal detection

Real-time analysis

Real-time analysis bandwidth		
Option RT1	Up to 509.5 MHz	Analysis BW option determines the max real-time BW
Option RT2	Up to 509.5 MHz	Analysis BW option determines the max real-time BW
Minimum detectable signal duration with > 60 dB StM ¹³ ratio		
Option RT1	11.42 ns	
Option RT2	3.33 ns	
Minimum signal duration with 100% probability of intercept (POI) at full amplitude accuracy		For Frequency Mask Triggering (FMT)
Option RT1	17.3 μ s	Signal is at mask level
Option RT2	3.517 μ s	Signal is at mask level
Minimum acquisition time	100 μ s	
FFT rate	292,969/s	
Supported Detectors	Peak, Negative Peak, Sample, Average	
Number of Traces	6	
Number of Markers	12	
Supported Markers	Normal, Delta, Noise, Band Power	
Supported triggers	Level, Level with Time Qualified (TQT), Line, External, RF burst, Frame, Frequency Mask (FMT), FMT with TQT	

¹³ "StM" = "Signal-to-Mask"

Related Literature

UXA Brochure, 5992-0089EN

UXA Configuration Guide, 5992-0043EN

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