Keysight Technologies

PXA X-Series Signal Analyzer, Multi-touch N9030B

3 Hz to 3.6, 8.4, 13.6, 26.5, 44, or 50 GHz

Data Sheet

KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

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This data sheet is a summary of the specifications and conditions for PXA signal analyzers. For the complete specifications guide, visit:
www.keysight.com/find/pxa_specifications

Accelerate signal insight with outstanding all-around signal analysis

The PXA is the benchmark for performance that accelerates innovation in demanding applications. With measurement options that range from excellent to exceptional, the PXA puts you in the lead.

Analyze the latest signals with up to 510 MHz analysis bandwidth and better than 78 dBc SFDR, and reveal previously hidden signals with Noise Floor Extension (NFE). To see your device's true behavior, get industry-leading phase noise performance by adding the Keysight-proprietary DDS-based LO.

Simplify migration from legacy Agilent/HP spectrum analyzers with backward code compatibility and compact 4U form-factor.

Definitions and Conditions

Specifications describe the performance of parameters covered by the product warranty and apply to temperature ranges 0 to 55 °C, unless otherwise noted.

95th percentile values indicate the breadth of the population (approx. 2σ) of performance tolerances expected to be met in 95 percent of the cases with a 95 percent confidence, for any ambient temperature in the range of 20 to 30 °C. In addition to the statistical observations of a sample of instruments, these values include the effects of the uncertainties of external calibration references. These values are not warranted. These values are updated occasionally if a significant change in the statistically observed behavior of production instruments is observed.

Typical describes additional product performance information that is not covered by the product warranty. It is performance beyond specifications that 80 percent of the units exhibit with a 95 percent confidence level over the temperature range 20 to 30 °C. Typical performance does not include measurement uncertainty.

Nominal values indicate expected performance, or describe product performance that is useful in the application of the product, but is not covered by the product warranty.

The analyzer will meet its specifications when:

- The analyzer is within its calibration cycle.
- Under auto couple control, except that Auto Sweep Time Rules = Accy.
- For signal frequencies < 10 MHz, DC coupling applied.
- The analyzer has been stored at an ambient temperature within the allowed operating range for at least two hours before being turned on, if it had previously been stored at a temperature range inside the allowed storage range but outside the allowed operating range.
- The analyzer has been turned on at least 30 minutes with Auto Align set to Normal, or if Auto Align is set to Off or Partial, alignments must have been run recently enough to prevent an Alert message. If the Alert condition is changed from “Time and Temperature” to one of the disabled duration choices, the analyzer may fail to meet specifications without informing the user. If Auto Align is set to Light, performance is not warranted, and nominal performance will degrade to become a factor of 1.4 wider for any specification subject to alignment, such as amplitude tolerances.

The term “mixer level” is used as a condition for many specifications in this document. This term is a conceptual quantity that is defined as follows: Mixer Level (dBm) = RF Input Power Level (dBm) - (Electronic + Mechanical) Attenuation (dBm).

Frequency and Time Specifications

Frequency range		DC coupled	AC coupled
Option 503		3 Hz to 3.6 GHz	10 MHz to 3.6 GHz
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
Option 544		3 Hz to 44 GHz	NA
Option 550		3 Hz to 50 GHz	NA
Band	**LO multiple (N)**		
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	
Precision frequency reference			
Accuracy		± [(time since last adjustment x aging rate) + temperature stability + calibration accuracy]	
Aging rate		± 1 x 10^{-7} / year ± 1.5 x 10^{-7} / 2 years	
Temperature stability 20 to 30 °C Full temperature range		 ± 1.5 x 10^{-8} ± 5 x 10^{-8}	
Achievable initial calibration accuracy		± 4 x 10^{-8}	
Example frequency reference accuracy 1 year after last adjustment 20 to 30 °C		= ± (1 x 1 x 10^{-7} + 1.5 x 10^{-8} + 4 x 10^{-8}) = ± 1.55 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 reference (Option EP0)			
Accuracy		± [(time since last adjustment x aging rate) + temperature stability + calibration accuracy]	
Aging rate		± 3 x 10^{-8} / year	
Temperature stability Full temperature range		 ± 4.5 x 10^{-9}	
Achievable initial calibration accuracy		± 3.1 x 10^{-8}	
Example frequency reference accuracy 1 year after last adjustment		± (3 x 10^{-8} + 4.5 x 10^{-9} + 3.1 x 10^{-8}) = ± 6.6 x 10^{-8}	
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 + 0.10% x span + 5% x RBW + 2 Hz + 0.5 x horizontal resolution [1])			
Marker frequency counter			
Accuracy		± (marker frequency x frequency reference accuracy + 0.100 Hz)	
Delta counter accuracy		± (delta frequency x frequency reference accuracy + 0.141 Hz)	
Counter resolution		0.001 Hz	

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

Frequency and Time Specifications (continued)

Frequency span (FFT and swept mode)		
Range	0 Hz (zero span), 10 Hz to maximum frequency of instrument	
Resolution	2 Hz	
Accuracy		
Swept	± (0.1% x span + horizontal resolution)	
FFT	± (0.1% x span + horizontal resolution)	
Sweep time and triggering		
Range	Span = 0 Hz	1 µs to 6000 s
	Span ≥ 10 Hz	1 ms to 4000 s
Accuracy	Span ≥ 10 Hz, swept	± 0.01% nominal
	Span ≥ 10 Hz, FFT	± 40% nominal
	Span = 0 Hz	± 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 ≥ 10 Hz, swept	0 to 500 ms
	Resolution	0.1 µs
Time gating		
Gate methods	Gated LO; gated video; gated FFT	
Gate length range (except method = FFT)	1 µs 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	
Resolution bandwidth (RBW)		
Range (–3.01 dB bandwidth)	1 Hz to 3 MHz (10% steps), 4, 5, 6, 8 MHz	
Bandwidth accuracy (power)	1 Hz to 100 kHz	± 0.5% (± 0.022 dB)
RBW range	110 kHz to 1.0 MHz (< 3.6 GHz CF)	± 1.0% (± 0.044 dB)
	1.1 to 2 MHz (< 3.6 GHz CF)	± 0.07 dB nominal
	2.2 to 3 MHz (< 3.6 GHz CF)	0 to –0.2 dB nominal
	4 to 8 MHz (< 3.6 GHz CF)	0 to –0.4 dB nominal
Bandwidth accuracy (–3.01 dB)		
RBW range	1 Hz to 1.3 MHz	± 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)
Analysis bandwidth [1]		
Maximum bandwidth	Option B25 (standard)	25 MHz
	Option B40	40 MHz
	Option B85	85 MHz
	Option B1X	160 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)	

1. 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			
Preamp Off	Displayed average noise level (DANL) to +30 dBm		
Preamp On			
RF (Opt 503)	Displayed average noise level (DANL) to +30 dBm		
Microwave (Opt 508, 513, 526)	Displayed average noise level (DANL) to +24 dBm		
Millimeter-wave (Opt 544, 550)	Displayed average noise level (DANL) to +20 dBm		
Input mechanical attenuator range (3 Hz to 50 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 µs pulse width, < 1% duty cycle, input attenuation ≥ 30 dB)	+50 dBm (100 W)		
DC volts			
DC coupled	± 0.2 Vdc		
AC coupled	± 100 Vdc (For frequency Option 503, 508, 513, or 526)		
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, dBµV, dBmA, dBµA, V, W, A		
Frequency response		**Specification**	**95th percentile (≈ 2σ)**
(10 dB input attenuation, 20 to 30 °C, preselector centering applied above 3.6 GHz)			
RF/MW (Option 503, 508, 513, 526)	3 Hz to 10 MHz	± 0.46 dB	
	10 to 20 MHz	± 0.35 dB	
	20 MHz to 3.6 GHz	± 0.35 dB	± 0.16 dB
	3.5 to 8.4 GHz	± 1.5 dB	± 0.39 dB
	8.3 to 13.6 GHz	± 2.0 dB	± 0.56 dB
	13.5 to 22.0 GHz	± 2.0 dB	± 0.81 dB
	22.0 to 26.5 GHz	± 2.5 dB	± 0.82 dB
Millimeter-Wave (Option 544, 550)	3 Hz to 20 MHz	± 0.46 dB	
	20 to 50 MHz	± 0.35 dB	± 0.19 dB
	50 MHz to 3.6 GHz	± 0.35 dB	± 0.15 dB
	3.5 to 5.2 GHz	± 1.7 dB	± 0.70 dB
	5.2 to 8.4 GHz	± 1.5 dB	± 0.57 dB
	8.3 to 13.6 GHz	± 2.0 dB	± 0.54 dB
	13.5 to 17.1 GHz	± 2.0 dB	± 0.64 dB
	17.0 to 22.0 GHz	± 2.0 dB	± 0.72 dB
	22.0 to 26.5 GHz	± 2.5 dB	± 0.71 dB
	26.4 to 34.5 GHz	± 2.5 dB	± 0.93 dB
	34.4 to 50 GHz	± 3.2 dB	± 1.24 dB
Preamp on (0 dB attenuation) (Option P03, P08, P13, P26, P44, P50)			
RF/MW (Option 503, 508, 513, 526)	9 to 100 kHz		± 0.38 dB
	100 kHz to 50 MHz	± 0.68 dB	± 0.34 dB
	50 MHz to 3.6 GHz	± 0.55 dB	± 0.30 dB
	3.5 to 8.4 GHz	± 2.0 dB	± 0.69 dB
	8.3 to 13.6 GHz	± 2.3 dB	± 0.71 dB
	13.5 to 17.1 GHz	± 2.5 dB	± 0.95 dB
	17.0 to 22.0 GHz	± 3.0 dB	± 1.41 dB
	22.0 to 26.5 GHz	± 3.5 dB	± 1.61 dB

Amplitude Accuracy and Range Specifications (continued)

Millimeter-Wave (Option 544, 550)	9 to 100 kHz		± 0.40 dB
	100 kHz to 50 MHz	± 0.68 dB	± 0.34 dB
	50 MHz to 3.6 GHz	± 0.60 dB	± 0.31 dB
	3.5 to 5.2 GHz	± 2.0 dB	± 0.81 dB
	5.2 to 8.4 GHz	± 2.0 dB	± 0.70 dB
	8.3 to 13.6 GHz	± 2.3 dB	± 0.79 dB
	13.5 to 17.1 GHz	± 2.5 dB	± 0.88 dB
	17.0 to 22.0 GHz	± 3.0 dB	± 1.07 dB
	22.0 to 26.5 GHz	± 3.5 dB	± 1.03 dB
	26.4 to 34.5 GHz	± 3.0 dB	± 1.35 dB
	34.4 to 50 GHz	± 4.1 dB	± 1.69 dB
Input attenuation switching uncertainty		**Specifications**	**Additional information**
Relative to 10 dB and preamp off			
At 50 MHz (reference frequency)	Attenuation 12 to 40 dB	± 0.14 dB	± 0.04 dB typical
	Attenuation 2 to 8 dB	± 0.18 dB	± 0.06 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			
(10 dB attenuation, 20 to 30 °C, 1 Hz ≤ RBW ≤ 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	± (0.24 dB + frequency response)	
	10 Hz to 3.6 GHz	± 0.19 dB (95th Percentile approx. 2σ)	
Preamp on (Option P03, P08, P13, P26, P44 and P50)	At all frequencies	± (0.36 dB + frequency response)	
Input voltage standing wave ratio (VSWR)			
		Freq Opt 503, 508, 513, 526	**Freq Opt 544, 550**
(10 dB input attenuation)	50 MHz	1.07 nominal	1.025 nominal
	10 MHz to 3.6 GHz	1.139 (95th percentile)	1.134 (95th percentile)
	3.5 to 8.4 GHz	1.290 (95th percentile)	1.152 (95th percentile)
	8.3 to 13.6 GHz	1.388 (95th percentile)	1.178 (95th percentile)
	13.5 to 17.1 GHz	1.41 (95th percentile)	1.204 (95th percentile)
	17.0 to 26.5 GHz	1.48 (95th percentile)	1.331 (95th percentile)
	26.4 to 34.5 GHz	NA	1.321 (95th percentile)
	34.4 to 50 GHz	NA	1.378 (95th percentile)
Preamp on (0 dB input attenuation) (Option P03. P08, P13, P26, P44, and P50)	10 MHz to 3.6 GHz	1.71 (95th percentile)	1.393 (95th percentile)
	3.5 to 8.4 GHz	1.54 (95th percentile)	1.50 (95th percentile)
	8.3 to 13.6 GHz	1.57 (95th percentile)	1.310 (95th percentile)
	13.5 to 17.1 GHz	1.48 (95th percentile)	1.330 (95th percentile)
	17.0 to 26.5 GHz	1.54 (95th percentile)	1.339 (95th percentile)
	26.4 to 34.5 GHz	NA	1.41 (95th percentile)
	34.4 to 50 GHz	NA	1.42 (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		
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 [1]	
Display scale switching uncertainty		
Switching between linear and log	0 dB [1]	
Log scale/div switching	0 dB [1]	
Display scale fidelity		
Between –10 dBm and –18 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 [2]	Option P03 Option P08 Option P13 Option P26 Option P44 Option P50	9 kHz to 3.6 GHz 9 kHz to 8.4 GHz 9 kHz to 13.6 GHz 9 kHz to 26.5 GHz 9 kHz to 44 GHz 9 kHz to 50 GHz
Gain	100 kHz to 3.6 GHz 3.6 to 26.5 GHz 26.5 to 50 GHz	+20 dB nominal +35 dB nominal +40 dB nominal

1. Only affects the display, not the measurement, so it causes no additional error in measurement results from trace data or markers.
2. 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
	26.5 to 50 GHz		0 dBm nominal
Preamp on (Option P03, P08, P13, P26, P44, and P50)	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		
	Freq Option ≤ 526		–10 dBm nominal
	Freq Option > 526		–20 dBm nominal
	26.5 to 50 GHz		–30 dBm nominal

Displayed average noise level (DANL)[4]		**Specification**	**Typical**
(Input terminated, sample or average detector, averaging type = Log, 0 dB input attenuation, IF Gain = High, 1 Hz RBW, 20 to 30 °C)			
RF/MW (Option 503, 508, 513, 526)		**Normal [1]/LNP enabled [2]**	**Normal [1]/LNP enabled [2]**
Preamp off	3 Hz to 9 kHz		–100 dBm/NA typical
	9 to 100 kHz	–146 dBm/NA	–151 dBm/NA typical
	100 kHz to1 MHz	–150 dBm/NA	–156 dBm/NA typical
	1 to 10 MHz	–155 dBm/NA	–158 dBm/NA typical
	10 MHz to 1.2 GHz	–154 dBm/NA	–155 dBm/NA typical
	1.2 to 2.1 GHz	–153 dBm/NA	–155 dBm/NA typical
	2.1 to 3.0 GHz	–151 dBm/NA	–153 dBm/NA typical
	3.0 to 3.6 GHz	–151 dBm/NA	–153 dBm/NA typical
	3.5 to 4.2 GHz	–147 dBm/–153 dBm	–150 dBm/–156 dBm typical
	4.2 to 8.4 GHz	–150 dBm/–155 dBm	–152 dBm/–157 dBm typical
	8.3 to 13.6 GHz	–149 dBm/–155 dBm	–151 dBm/–157 dBm typical
	13.5 to 16.9 GHz	–145 dBm/–152 dBm	–147 dBm/–155 dBm typical
	16.9 to 20.0 GHz	–143 dBm/–151 dBm	–145 dBm/–153 dBm typical
	20.0 to 26.5 GHz	–137 dBm/–150 dBm	–140 dBm/–152 dBm typical
Preamp on [3]			
	100 to 200 kHz	–157 dBm/NA	–159 dBm/NA typical
	200 to 500 kHz	–160 dBm/NA	–161 dBm/NA typical
	0.5 to 1 MHz	–162 dBm/NA	–164 dBm/NA typical
	1 to 10 MHz	–164 dBm/NA	–165 dBm/NA typical
	10 MHz to 2.1 GHz	–165 dBm/NA	–166 dBm/NA typical
	2.1 to 3.6 GHz	–163 dBm/NA	–164 dBm/NA typical
	3.5 to 8.4 GHz	–164 dBm/NA	–166 dBm/NA typical
	8.3 to 13.6 GHz	–163 dBm/NA	–164 dBm/NA typical
	13.5 to 16.9 GHz	–161 dBm/NA	–162 dBm/NA typical
	16.9 to 20.0 GHz	–159 dBm/NA	–161 dBm/NA typical
	20.0 to 26.5 GHz	–155 dBm/NA	–157 dBm/NA typical

DANL with Noise Floor Extension (Option NF2) on			95th percentile	
DANL improvement		Preamp Off	Preamp On	LNP enabled [2, 3]
	Band 0, f > 20 MHz	9 dB	10 dB	NA
	Band 1	10 dB	9 dB	10 dB
	Band 2	10 dB	10 dB	10 dB
	Band 3	9 dB	9 dB	10 dB
	Band 4	10 dB	8 dB	10 dB
DANL with Noise Floor Extension		Preamp Off	Preamp On	LNP enabled [2, 3]
	Band 0, f > 20 MHz	–163 dBm	–174 dBm	NA
	Band 1	–162 dBm	–174 dBm	–166 dBm
	Band 2	–162 dBm	–173 dBm	–167 dBm
	Band 3	–156 dB	–172 dBm	–164 dBm
	Band 4	–150 dBm	–166 dBm	–162 dBm

1. With Option NF2 (Noise Floor Extension) “Off”.
2. LNP (Low Noise Path) requires option LNP.
3. At higher frequency bands (beyond 3.6 GHz), Preamp “On” supersedes “LNP enabled”. LNP cannot operate simultaneously with preamp.
4. With standard LO. Instruments with DDS LO (Option EP0) may see a few dB degradation in DANL. See specifications guide for details.

Dynamic Range Specifications (continued)

Displayed average noise level (DANL)[1]		Specification	Typical
Millimeter-Wave (Option 544, 550)		**Normal [2]/LNP enabled[3]**	**Normal [2]/LNP enabled[3]**
Preamp off	3 Hz to 9 kHz		–100 dBm/NA nominal
	9 to 100 kHz	–146 dBm/NA	–151 dBm/NA typical
	100 kHz to 1 MHz	–150 dBm/NA	–156 dBm/NA typical
	1 to 10 MHz	–155 dBm/NA	–158 dBm/NA typical
	10 MHz to 1.2 GHz	–154 dBm/NA	–155 dBm/NA typical
	1.2 to 2.1 GHz	–153 dBm/NA	–155 dBm/NA typical
	2.1 to 3 GHz	–151 dBm/NA	–153 dBm/NA typical
	3 to 3.6 GHZ	–151 dBm/NA	–153 dBm/NA typical
	3.5 to 4.2 GHz	–143 dBm/–150 dBm	–147 dBm/–154 dBm typical
	4.2 to 6.6 GHz	–144 dBm/–152 dBm	–148 dBm/–155 dBm typical
	6.6 to 8.4 GHz	–147 dBm/–154 dBm	–149 dBm/–156 dBm typical
	8.3 to 13.6 GHz	–147 dBm/–153 dBm	–149 dBm/–156 dBm typical
	13.5 to 14 GHz	–143 dBm/–150 dBm	–146 dBm/–152 dBm typical
	14 to 17 GHz	–145 dBm/–151 dBm	–148 dBm/–153 dBm typical
	17 to 22.5 GHz	–141 dBm/–149 dBm	–146 dBm/–152 dBm typical
	22.5 to 26.5 GHz	–139 dBm/–146 dBm	–143 dBm/–150 dBm typical
	26.4 to 34 GHz	–138 dBm/–146 dBm	–142 dBm/–149 dBm typical
	33.9 to 37 GHz	–134 dBm/–141 dBm	–139 dBm/–147 dBm typical
	37 to 40 GHz	–132 dBm/–140 dBm	–138 dBm/–145 dBm typical
	40 to 46 GHz	–130 dBm/–140 dBm	–135 dBm/–145 dBm typical
	46 to 49 GHz	–130 dBm/–138 dBm	–135 dBm/–142 dBm typical
	49 to 50 GHz	–128 dBm/–138 dBm	–133 dBm/–142 dBm typical
Preamp on[4]			
	100 to 200 kHz	–157 dBm	–159 dBm typical
	200 to 500 kHz	–159 dBm	–161 dBm typical
	500 kHz to 1 MHz	–162 dBm	–164 dBm typical
	1 to 10 MHz	–164 dBm	–165 dBm typical
	10 MHz to 2.1 GHz	–164 dBm	–166 dBm typical
	2.1 to 3.6 GHz	–163 dBm	–164 dBm typical
	3.5 to 8.4 GHz	–161 dBm	–163 dBm typical
	8.3 to 13.6 GHz	–161 dBm	–163 dBm typical
	13.5 to 17 GHz	–162 dBm	–164 dBm typical
	17 to 20 GHz	–160 dBm	–163 dBm typical
	20 to 26.5 GHz	–158 dBm	–161 dBm typical
	26.4 to 30 GHz	–157 dBm	–159 dBm typical
	30 to 34 GHz	–155 dBm	–158 dBm typical
	33.9 to 37 GHz	–153 dBm	–157 dBm typical
	37 to 40 GHz	–152 dBm	–156 dBm typical
	40 to 43 GHz	–149 dBm	–154 dBm typical
	44 to 46 GHz	–149 dBm	–154 dBm typical
	46 to 50 GHz	–146 dBm	–150 dBm typical

1. With standard LO. Instruments with DDS LO (Option EP0) may see a few dB degradation in DANL. See specifications guide for details.
2. With Option NF2 (Noise Floor Extension) “Off”.
3. LNP (Low Noise Path) requires option LNP.
4. At higher frequency bands (beyond 3.6 GHz), Preamp “On” supersedes “LNP enabled”. LNP cannot operate simultaneously with preamp.

Dynamic Range Specifications (continued)

DANL with Noise Floor Extension (Option NF2) on		95th percentile	
DANL Improvement	Preamp Off	Preamp On	LNP enabled [1, 2]
Band 0, f > 20 MHz	10 dB	9 dB	N/A
Band 1	9 dB	9 dB	10 dB
Band 2	9 dB	8 dB	9 dB
Band 3	9 dB	8 dB	10 dB
Band 4	10 dB	9 dB	11 dB
Band 5	11 dB	8 dB	12 dB
Band 6	11 dB	7 dB	11 dB
DANL with Noise Floor Extension	Preamp Off	Preamp On	LNP enabled [1, 2]
Band 0, f > 20 MHz	–163 dBm	–174 dBm	N/A
Band 1	–160 dBm	–172 dBm	–165 dBm
Band 2	–161 dBm	–173 dBm	–164 dBm
Band 3	–161 dBm	–174 dBm	–164 dBm
Band 4	–158 dBm	–171 dBm	–161 dBm
Band 5	–157 dBm	–168 dBm	–161 dBm
Band 6	–149 dBm	–161 dBm	–152 dBm

1. LNP (Low Noise Path) requires option LNP.
2. At higher frequency bands (beyond 3.6 GHz), Preamp “On” supersedes “LNP enabled”. LNP cannot operate simultaneously with preamp.

Dynamic Range Specifications (continued)

Residuals, 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 [4]	**Tuned Freq (f)**	**Excitation Freq**	**Response RF/MW (Opt 503, 508, 513, 526)**		**mmW (Opt 544, 550)**	
(Mixer level at –10 dBm)	10 MHz to 26.5 GHz	f+45 MHz	–80 dBc	–118 dBc typical	–80 dBc	–118 dBc typical
	10 MHz to 3.6 GHz	f+10,245 MHz	–80 dBc	–112 dBc typical	–80 dBc	–112 dBc typical
	10 MHz to 3.6 GHz	f+645 MHz	–80 dBc	–101 dBc typical	–80 dBc	–101 dBc typical
	3.5 to 13.6 GHz	f+645 MHz	–78 dBc	–87 dBc typical	–80 dBc	–102 dBc typical
	13.5 to 17.1 GHz	f+645 MHz	–74 dBc	–84 dBc typical	–80 dBc	–102 dBc typical
	17.0 to 22 GHz	f+645 MHz	–70 dBc	–82 dBc typical	–80 dBc	–100 dBc typical
	22 to 26.5 GHz	f+645 MHz	–68 dBc	–79 dBc typical	–80 dBc	–97 dBc typical
(Mixer level at –30 dBm)	26.5 to 34.5 GHz	f+645 MHz			–70 dBc	–94 dBc typical
	34.4 to 44 GHz	f+645 MHz			–60 dBc	–79 dBc typical
	44 to 50 GHz	f+645 MHz				–75 dBc nominal
Other spurious responses	**Mixer level**	**Response**				
Carrier frequency ≤ 26.5 GHz						
First RF order (f ≥ 10 MHz from carrier)	–10 dBm	–80 dBc + 20log(N [1]) Including IF feedthrough, LO harmonic mixing responses				
Higher RF order (f ≥ 10 MHz from carrier)	–40 dBm	–80 dBc + 20log(N [1]) Including higher order mixer responses				
Carrier frequency > 26.5 GHz						
First RF order (f ≥ 10 MHz from carrier)	–30 dBm	–90 dBc nominal				
Higher RF order (f ≥ 10 MHz from carrier)	–30 dBm	–90 dBc nominal				
LO-related spurious responses (200 Hz ≤ f < 10 MHz from carrier)	–10 dBm	–68 dBc [2] + 20log(N [1])				
Line-related spurious responses		–73 dBc [2] + 20log(N [1]) (nominal)				
Second harmonic distortion (SHI)						
	Source frequency	**Mixer level**	**Distortion [3] (LNP Off/LNP On)**		**SHI [3] (LNP Off/LNP On)**	
RF/MW (Option 503, 508, 513, 526)	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	
Millimeter-Wave (Option 544, 550)	10 to 100MHz	–15 dBm	–57 dBc/NA		+42 dBm/NA	
	100 M to 1.8 GHz	–15 dBm	–60 dBc/NA		+45 dBm/NA	
	1.8 to 2.5 GHz	–15 dBm	–72 dBc/–95 dBc		+57 dBm/+80 dBm	
	2.5 to 3 GHz	–15 dBm	–72 dBc/–99 dBc		+57 dBm/+84 dBm	
	3 to 5 GHz	–15 dBm	–77 dBc/–99 dBc		+62 dBm/+84 dBm	
	5 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	
	13.25 to 25 GHz	–15 dBm	–65 dBc/–105 dBc (nom.)		+50 dBm/+90 dBm (nom.)	
		Preamp level	**Distortion**		**SHI**	
Preamp on (Option P03, P08, P13, P26, P44, P50)	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	
	13.25 to 25 GHz	–50 dBm	–50 dBm nominal		0 dBm nominal	

1. N is the LO multiplication factor. Refer to page 4 for the N value verses frequency ranges.
2. Nominally –40 dBc under large magnetic (0.38 Gauss rms) or vibrational (0.21 g rms) environmental stimuli.
3. Normal path/LNP enabled (requires Option LNP).
4. With standard LO. Instruments with DDS LO (option EP0) may see a few dB degradation in DANL. See specifications guide for details.

Dynamic Range Specifications (continued)

Third-order intermodulation distortion (TOI)			
(two –16 dBm tones at input mixer with tone separation > 5 times IF prefilter bandwidth, 20 to 30 °C)			
For all frequency options (Option 503, 508, 513, 526, 544, and 550)	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
For RF/MW only (Option 503, 508, 513, and 526)	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
For Millimeter-Wave only (Option 544 and 550)	3.5 to 8.4 GHz	+16 dBm	+23 dBm typical
	8.3 to 13.6 GHz	+16 dBm	+23 dBm typical
	13.5 to 17.1 GHz	+13 dBm	+17 dBm typical
	17.0 to 26.5 GHz	+13 dBm	+20 dBm typical
	26.5 to 50 GHz		+13 dBm nominal
Preamp on (Option P03, P08, P13, P26, P44, and P50)			
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

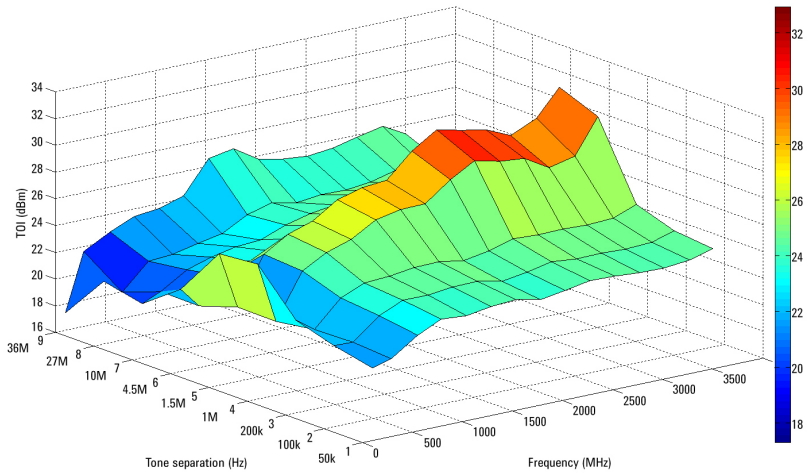

Figure 1. Nominal TOI performance versus frequency and tone separation

Dynamic Range Specifications (continued)

Phase noise	Offset	Specification	Typical
Noise sidebands (20 to 30 °C, CF = 1 GHz)			
Standard LO	10 Hz		–80 dBc/Hz nominal
	100 Hz	–94 dBc/Hz	–100 dBc/Hz typical
	1 kHz	–121 dBc/Hz	–125 dBc/Hz typical
	10 kHz	–129 dBc/Hz	–132 dBc/Hz typical
	30 kHz	–130 dBc/Hz	–132 dBc/Hz typical
	100 kHz	–129 dBc/Hz	–131 dBc/Hz typical
	1 MHz	–145 dBc/Hz	–146 dBc/Hz typical
	10 MHz	–155 dBc/Hz	–158 dBc/Hz typical
DDS LO (Option EP0)	10 Hz	–90 dBc/Hz	–95 dBc/Hz typical
	100 Hz	–107 dBc/Hz	–112 dBc/Hz typical
	1 kHz	–125 dBc/Hz	–129 dBc/Hz typical
	10 kHz	–134 dBc/Hz	–136 dBc/Hz typical
	100 kHz	–139 dBc/Hz	–141 dBc/Hz typical
	1 MHz	–145 dBc/Hz	–146 dBc/Hz typical
	10 MHz	–155 dBc/Hz	–157 dBc/Hz typical
Option MPB, microwave preselector bypass [1]			
Frequency range			
N9030B-508	3.6 to 8.4 GHz		
N9030B-513	3.6 to 13.6 GHz		
N9030B-526	3.6 to 26.5 GHz		
N9030B-544	3.6 to 44 GHz		
N9030B-550	3.6 to 50 GHz		

1. When Option MPB is installed and enabled, some aspects of the analyzer performance change. Please refer to the PXA specification guide for more details.

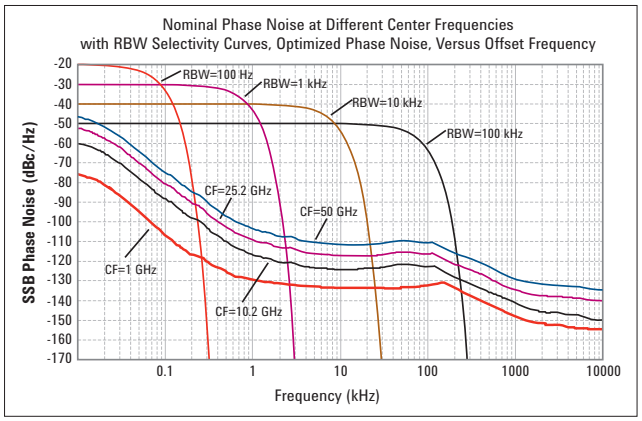

Figure 3. Nominal PXA phase noise at various center frequencies with standard LO

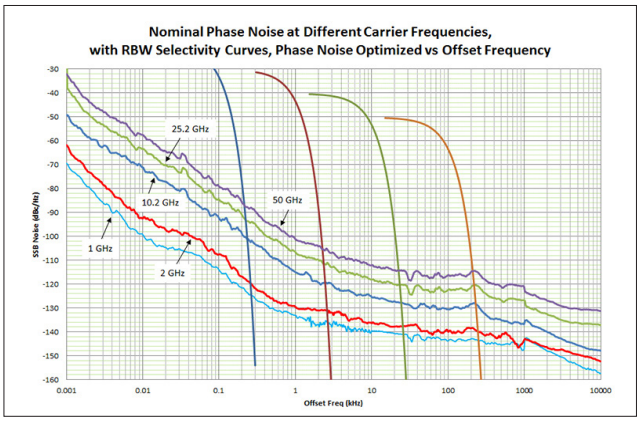

Figure 4. Nominal PXA phase noise at various center frequencies with DDS LO (Option EP0)

PowerSuite Measurement Specifications

Channel power		
Amplitude accuracy, W-CDMA or IS95 (20 to 30 °C, attenuation = 10 dB)	± 0.61 dB (± 0.19 dB 95th percentile)	
Occupied bandwidth		
Frequency accuracy	± [span/1000] nominal	
Adjacent channel power		
Accuracy, 3GPP W-CDMA (ACLR) (at specific mixer levels and ACLR ranges)	Adjacent	Alternate
MS (UE)	± 0.09 dB	± 0.16 dB
BTS	± 0.18 dB	± 0.31 dB
Dynamic range (typical)		
Without noise correction	–81.5 dB	–87 dB
With noise correction	–82.5 dB	–88 dB
Offset channel pairs measured	1 to 6	
Multi-carrier ACP		
Accuracy, 3GPP W-CDMA (ACPR) (4 carriers, 5 MHz offset, BTS, UUT ACPR range at –42 to –48 dB, optimal mixer level at –21 dBm)	± 0.13 dB	
Multiple number of carriers measured	Up to 12	
Power statistics CCDF		
Histogram resolution	0.01 dB	
Harmonic distortion		
Maximum harmonic number	10th	
Result	Fundamental power (dBm), relative harmonics power (dBc), total harmonic distortion in %	
Intermod (TOI)	Measure the third-order products and intercepts from two tones	
Burst power		
Methods	Power above threshold, power within burst width	
Results	Single burst output power, average output power, maximum power, minimum power within burst, burst width	
Spurious emission		
3GPP W-CDMA table-driven spurious signals; search across regions		
Dynamic range (1 to 3.6 GHz)	97.1 dB	(101.9 dB typical)
Absolute sensitivity (1 to 3.6 GHz)	–86.4 dBm	(–90.4 dBm typical)
Spectrum emission mask (SEM)		
cdma2000® (750 kHz offset)		
Relative dynamic range	81.6 dB	(86.4 dB typical)
Absolute sensitivity	–101.7 dBm	(–105.7 dBm typical)
Relative accuracy	± 0.08 dB	
3GPP W-CDMA (2.515 MHz offset)		
Relative dynamic range	85.4 dB	(89.8 dB typical)
Absolute sensitivity	–101.7 dBm	(–105.7 dBm typical)
Relative accuracy	± 0.08 dB	

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 the essential requirements of the European EMC Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

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

This ISM device complies with Canadian ICES-001.
Cet appareil ISM est conforme a la norme NMB-001 du Canada

South Korean Class A EMC declaration

This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.
A 급 기기 (업무용 방송통신기자재)이 기 기는 업무용 (A 급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을 주 의하시기 바라 며, 가 정외의 지역에서 사용하는 것을 목적으 로 합니다.

Safety

Complies with the essential requirements of the European Low Voltage Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61010-1
- Canada: CSA C22.2 No. 61010-1
- USA: UL std no. 61010-1

Acoustic statement (European Machinery Directive)

Acoustic noise emission
LpA < 70 dB
Operator position
Normal operation mode 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
Power consumption	
On	630 W (Maximum)
Standby	40 W

1. The N9030B is in full compliance with CISPR 11, Class A emissions and is declared as such. In addition, the N9030B has been type tested and shown to meet CISPR 11, Class B emissions limits. Information regarding the Class B emission performance of the N9030B is provided as a convenience to the user and is not intended to be a regulatory declaration.

General Specifications (continued)

Display	
Resolution	1280 x 768
Size	269 mm (10.6 in.) diagonal (nominal) capacitive multi-touch screen
Data storage	
Internal	Removable solid state drive (≥ 80 GB) and secure digital (SD) memory device
External	Supports USB 3.0/2.0 compatible memory devices
Weight (without options)	
Net	22 kg (48 lbs) nominal
Shipping	34 kg (75 lbs) nominal
Dimensions	
Height	177 mm (7.0 in)
Width	426 mm (16.8 in)
Length	556 mm (21.9 in)
Warranty	
The PXA 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 (Option 503, 508, 513, 526)	Type-N female, 50 Ω nominal
Option C35 (with Option 526 only)	APC 3.5 mm male, 50 Ω nominal
Standard (Option 544, 550)	2.4 mm male, 50 Ω nominal
Analog baseband IQ inputs (Option BBA) [1]	
Connectors (I, Q, I-Bar, Q-Bar, and Cal Out)	BNC female
Cal Out	
Signal	AC coupled square wave
Frequency	Selectable between 1 kHz and 250 kHz
Input impedance (4 connectors: I, Q, I-, Q-)	50 Ω, 1 MΩ (selectable, nominal)
Probes supported [2]	
Active probe	1130A, 1131A, 1132A, 1134A
Passive probe	1161A
Input return loss	–5 dB (0 to 10 MHz, nominal)
50 Ω impedance only selected	–0 dB (10 to 40 MHz. nominal)
Probe power	
Voltage/current	+15 Vdc, ± 7% at 150 mA max nominal
	–12.6 Vdc, ± 10% at 150 mA max nominal
USB ports	
Host (3 ports)	
Standard	Compatible with USB 2.0
Connector	USB Type-A female
Output current	
Port marked with lightning bolt	1.2 A (nominal)
Ports not marked with lightning bolt	0.5 A
Headphone jack	Miniature stereo audio jack (3.5 mm, also known as “1/8 inch”)

1. For additional specifications, please refer to Chapter BBA in the PXA Signal Analyzer specification guide
2. For more details, please refer to the Keysight Probe Configuration Guides, literature numbers 5968-7141EN and 5989-6162EN; probe heads are necessary to attach to your device properly and probe connectivity kits such as E2668B, E2669A. or E2675A are required.

Inputs and Outputs (continued)

External mixing, Option EXM	
Connection port	
Connector	SMA, female
Impedance	50 Ω nominal
Functions	Triplexed for mixer bias, IF input and LO output
Mixer bias range	± 10 mA in 10 uA step
IF input center frequency	
≤ 25 MHz IF path	322.5 MHz
40 MHz BW IF path	250.0 MHz
85 or 160 MHz BW IF path	300 MHz
255 MHz BW IF path	750.0 MHz
510 MHz BW IF path	877.1484375 MHz
LO output frequency range	3.75 to 14.0 GHz
Rear panel	
10 MHz out	
Connector	BNC female, 50 Ω nominal
Output amplitude	≥ 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	± 2 x 10^{-6} of specified external reference input frequency
Trigger 1 and 2 inputs	
Connector	BNC female
Impedance	> 10 kΩ 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	1024 x 768
Monitor output 2	
Connector	Mini DisplayPort
Resolution	1024 x 768
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

Inputs and Outputs (continued)

Rear panel	
Analog out	
Connector	BNC female
USB ports	
Host, super speed	2 ports (stacked with each other)
Standard	Compatible with USB 3.0
Connector	USB Type-A female
Output current	0.9 A
Host	1 port (stacked with LAN)
Standard	USB 2.0
Connector	USB Type-A female
Output current	0.5 A
Device	
Standard	Compatible with USB 3.0
Connector	USB Type-B female
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 Opts CR3, CRP, and ALV
Impedance	50 Ω nominal
2nd IF output, Option CR3	
Center frequency	
SA mode or I/Q analyzer with IF BW ≤ 25 MHz	322.5 MHz
with Option B40	250 MHz
with Option B85/B1X	300 MHz
with Option B2X	750 MHz
with Option B5X	877.1484375 MHz
Conversion gain	–1 to +4 dB (nominal) plus RF frequency response
Bandwidth	
Low band	
IF Path ≤ 160 MHz	Up to 160 MHz (nominal)
IF Path 255 MHz	Up to 255 MHz (nominal)
IF Path 510 MHz	Up to 510 MHz (nominal)
High band, with preselector	Depends on center frequency
High band, with preselector bypassed [1]	Up to 700 MHz (nominal); expandable to 900 MHz with corrections
Programmable IF output, Option CRP	
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	≤ –88 dBm (nominal)

1. The maximum bandwidth is not centered around the IF output center frequency.

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 ± 1 mV/dB nominal	
Log fidelity		
Range	49 dB (nominal) with input frequency at 1 GHz	
Accuracy within range	± 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 YAV Y-Axis output

General port specifications		
Connector	BNC female	Shared with other options
Impedance		50 Ω nominal
Screen video		
Operating conditions		
Display scale types	Log or Lin	"Lin" is linear in voltage
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	± 1% of full scale nominal	
Gain accuracy	± 1% of output voltage nominal	
Delay between RF input to analog output	71.7 µs +2.56/RBW + 0.159/VBW nominal	
Log video (Log envelope) output		
Amplitude range (terminated with 50 Ω)		
Maximum	1.0 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 = Swept	
Linear video (AM Demod) 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	
Option B25 (standard)	10 Hz to 25 MHz
Option B40	10 Hz to 40 MHz
Option B85	10 Hz to 85 MHz
Option B1X	10 Hz to 160 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)	
Option B25 (standard)	10 Hz to 25 MHz
Option B40	10 Hz to 40 MHz
Option B85	10 Hz to 85 MHz
Option B1X	10 Hz to 160 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)

Freq (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 preselected				0.23 dB
3.6 to 26.5	≤ 10 preselector off[1]	± 0.25 dB	± 0.12 dB	± 0.10 dB	0.02 dB
26.5 to 50	≤ 10 preselected				0.12 dB
26.5 to 50	≤ 10 preselected off[1]	± 0.30 dB	± 0.12 dB	± 0.10 dB	0.024 dB

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

IF phase linearity						
			Peak-to-peak (nominal)		RMS (nominal)	
Center freq (GHz)	Span (MHz)	Preselector	Std LO	DDS LO	Std LO	DDS LO
≥ 0.02, < 3.6	≤ 10	NA	0.06°	0.14°	0.012°	0.032°
≥ 3.6 to ≤ 26.5	≤ 10	Off[1]	0.10°	0.27°	0.022°	0.057°
≥ 3.6	≤ 10	On	0.11°	0.93°	0.024°	0.22°

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	

Data acquisition (standard 10 MHz IF path)			
Time record length			
Analysis tool			
IQ analyzer	8,000,000 IQ sample Pairs		Waveform measurement
Advanced tools	Data packing		89600 VSA software or fast capture
	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/Sample rate (IQ pair)		
Sample rate			
IQ pairs	Span x 1.25		
ADC resolution	16 bits		

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

IF frequency response (standard 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 preselected				0.50 dB
3.6 to 26.5	10 to ≤ 25 preselector off [1]	± 0.40 dB			0.03 dB
26.5 to 50	10 to ≤ 25 preselected				0.31 dB
26.5 to 50	10 to ≤ 25 preselector off [1]	± 0.40 dB			0.02 dB

IF phase linearity

			Peak-to-peak (nominal)		RMS (nominal)	
Center freq (GHz)	Span (MHz)	Preselector	Std LO	DDS LO	Std LO	DDS LO
≥ 0.02, < 3.6	≤ 25	NA	0.48°	0.41°	0.12°	0.11°
≥ 3.6	≤ 25	Off [1]	0.85°	1.0°	0.20°	0.27°

Dynamic range (standard 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)	–18 dBm mixer level nominal, subject to gain limitations
Band 0	–17 dBm mixer level nominal, subject to gain limitations
Bands 1 through 4	
Effect of signal frequency ≠ CF	Up to ± 3 dB nominal

Data acquisition (standard 25 MHz IF path)

Time record length

Analysis tool			
IQ analyzer	8,000,000 IQ sample pairs		Waveform measurement
Advanced tools	Data packing		89600 VSA software or fast capture
	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/Sample rate (IQ pair)		

Sample rate

IQ pairs	Span x 1.25
ADC resolution	16 bits

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

Option B40 40 MHz analysis bandwidth (Option B40 is automatically included in Option B85, B1X, B2X, or B5X)

IF frequency response (40 MHz IF path)

IF frequency response (relative to center frequency)

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 [1]	± 0.4 dB	± 0.16 dB	0.05 dB
> 8.4, ≤ 26.5	≤ 40	Off [1]	± 0.7 dB	± 0.20 dB	0.05 dB
≥ 26.5, < 34.4	≤ 40	Off [1]	± 0.8 dB	± 0.25 dB	0.1 dB
≥ 34.4, < 50	≤ 40	Off [1]	± 1.0 dB	± 0.35 dB	0.1 dB

IF phase linearity (deviation from mean phase linearity)

			Peak-to-peak (nominal)		RMS (nominal)	
Center freq (GHz)	Span (MHz)	Preselector	Std LO	DDS LO	Std LO	DDS LO
≥ 0.03, < 3.6	≤ 40	NA	0.16°	0.36°	0.041°	0.083°
≥ 3.6	≤ 40	Off [1]	1.5°	1.0°	0.35°	0.24°

EVM (EVM measurement floor for an 802.11g OFDM signal, using 89600 VSA software equalization, channel estimation and data EQ)

2.4 GHz	–52.0 dB (0.25%) nominal
5.8 GHz with Option MPB	–49.1 dB (0.35%) nominal

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)	**Std LO/DDS LO**
Default settings, signal at CF (IF gain = Low: IF gain offset = 0 dB)	
Band 0	–8 dBm mixer level nominal
Bands 1 through 4	–7 dBm/–6 dBm mixer level nominal
High gain setting, signal at CF (IF gain = High)	
Band 0	–18 dBm/–16 dBm mixer level nominal, subject to gain limitations
Bands 1 and 2	–17 dBm/–9 dBm mixer level nominal, subject to gain limitations
Band 3 and 4	–17 dBm/–6 dBm mixer level nominal, subject to gain limitations
Effect of signal frequency ≠ CF	Up to ± 3 dB nominal

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

Option B40 40 MHz analysis bandwidth

Data acquisition (40 MHz IF path)			
Time record length			
Analysis tool			
IQ analyzer	8,000,000 IQ sample pairs		Waveform measurement
Advanced tools	Data packing		89600 VSA software or fast capture
	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/Sample rate (IQ pair)		
Sample rate			
IQ pairs	Span x 1.25		
ADC resolution	12 bits		

Option B85 85 MHz or B1X 160 MHz analysis bandwidth

IF frequency response (85 or 160 MHz IF path)

IF frequency response (relative to center frequency)

Center freq. (GHz)	Span (MHz)	Preselector		Typical	RMS (nominal)
≥ 0.1, < 3.6	≤ 85	NA	± 0.6 dB	± 0.17 dB	0.05 dB
	≤ 140	NA	± 0.6 dB	± 0.25 dB	0.05 dB
	≤ 160	NA		± 0.2 dB (nom)	0.07 dB
≥ 3.6, ≤ 8.4	≤ 85	Off [1]	± 0.73 dB	± 0.2 dB	0.05 dB
	≤ 140	Off [1]	± 0.8 dB	± 0.35 dB	0.05 dB
	≤ 160	Off [1]		± 0.3 dB (nom)	0.07 dB
> 8.4, ≤ 26.5	≤ 85	Off [1]	± 1.10 dB	± 0.50 dB	0.1 dB
	≤ 140	Off [1]	± 1.30 dB	± 0.75 dB	0.1 dB
	≤ 160	Off [1]		± 0.5 dB (nom)	0.12 dB
≥ 26.5, ≤ 50	≤ 85	Off [1]	± 1.20 dB	± 0.45 dB	0.12 dB
	≤ 140	Off [1]	± 1.40 dB	± 0.65 dB	0.12 dB

IF phase linearity (deviation from mean phase linearity)

Center freq (GHz)	Span (MHz)	Preselector	Peak-to-peak (nominal)	RMS (nominal)
≥ 0.03, < 3.6	≤ 140	NA	0.9°	0.20°
≥ 3.6,	≤ 160	NA	1.7°	0.42°
	≤ 140	Off [1]	1.6°	0.39°
	≤ 160	Off [1]	2.8°	0.64°

EVM (EVM measurement floor)	**Customized settings required, preselector bypassed (Option MPB) above Band 0**	
Case 1: 62.5 Msymbol/s, 16QAM signal, RRC filter alpha of 0.2, non-equalized, with approximately 75 MHz occupied bandwidth		
Band 0, 1.8 GHz	0.8% nominal	
Band 1, 5.95 GHz	1.1% nominal	
Case 2: 104.167 Msymbol/s, 16QAM signal, RRC filter alpha of 0.35, non-equalized, with approximately 140 MHz occupied bandwidth		
Band 1, 5.95 GHz	3.0% nominal, (unequalized)	0.5% nominal, (equalized)
Band 2, 15.3 GHz	2.5% nominal, (unequalized)	0.6% nominal, (equalized)
Band 4, 26 GHz	3.5% nominal, (unequalized)	1.6% nominal, (equalized)

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

Option B85 85 MHz or B1X 160 MHz analysis bandwidth

Dynamic range (85 or 160 MHz IF path)			
SFDR (Spurious-free dynamic range)			
Signal frequency within ± 12 MHz of center	–75 dBc nominal		
Signal frequency anywhere within analysis BW			
Spurious response within ± 63 MHz of center	–74 dBc nominal		
Response anywhere within analysis BW	–72 dBc nominal		
Full scale (ADC clipping)			
Default settings, signal at CF (IF gain = Low: IF gain offset = 0 dB)			
Band 0	–8 dBm mixer level nominal		
Band 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		
Band 1 through 4	–17 dBm mixer level nominal, subject to gain limitations		
Effect of signal frequency ≠ CF	Up to ± 3 dB nominal		
Data acquisition (85 or 160 MHz IF path)			
Time record length			
Analysis tool			
IQ analyzer	8,000,000 IQ sample pairs		Waveform measurement
Advanced tools	Data packing		89600 VSA software or fast capture
	32-bit	64-bit	
Length (IQ sample pairs)	536 MSa (2^{29} Sa)	268 MSa (2^{28} Sa)	2 GB total memory
Length (IQ sample pairs)	1073 MSa (2^{30} Sa)	536 MSa (2^{29} Sa)	4 GB total memory (Option DP4)
Length (time units)	Samples/Sample rate (IQ pair)		
Sample rate			
IQ pairs	Span x 1.25		
ADC resolution	14 bits		

I/Q Analyzer (continued)

Option B2X 255 MHz analysis bandwidth (Option B2X is automatically included with Option B5X)

IF frequency response (255 MHz IF path)

Center Freq (GHz)	Span (MHz)	Preselector	Specification	Typical	RMS (nominal)
≥ 0.4, < 3.6	≤ 255	NA	± 0.75 dB	± 0.3 dB	0.1 dB
> 3.6, ≤ 8.4	≤ 255	Off[1]	± 0.85 dB	± 0.34 dB	0.1 dB
> 8.4	≤ 255	Off[1]		± 0.6 dB nominal	0.2 dB

IF phase linearity (255 MHz IF path)

Center Freq (GHz)	Span (MHz)	Preselector	Pk-to-pk (nominal)	RMS (nominal)
≥ 0.4, < 3.6	≤ 255	NA	3°	0.6°
≥ 3.6, < 26.5	≤ 255	Off[1]	2°	0.5°

Dynamic range (255 MHz IF path)

Spurious-free dynamic range (SFDR) Anywhere within the analysis BW	–78 dBc nominal	
Full scale (ADC clipping)	Mixer level	
Default setting, signal at CF Band 0 Bands 1 through 2 Bands 3 through 4	RF/MW (Opt 508, 513, 526) +3 dBm nominal +4 dBm nominal +1 dBm nominal	
High gain setting, signal at CF Band 0 Bands 1 through 2 Bands 3 through 4	 -4 dBm nominal +2.5 dBm nominal +1 dBm nominal	
Effect of signal frequency ≠ CF	Up to ± 4 dB nominal	
IF residual responses across the full BW Band 0 Band 1	Preselector off[1]	 –110 dBFS nominal –108 dBFS nominal
Third-order intermodulation distortion (Two tones of equal level, 1 MHz separation, each tone -23 dB relative to full scale (ADC clipping), IF gain = high)		
Band 0 Bands 1 through 4	Preselector off[1]	–85 dBc nominal –85 dBc nominal

Noise density

Band	Frequency (GHz)	IF gain = Low	IF gain = High
0	1.80	–144 dBm/Hz	–145 dBm/Hz
1	6.00	–141 dBm/Hz	–141 dBm/Hz
2	10.80	–140 dBm/Hz	–140 dBm/Hz
3	15.15	–137 dBm/Hz	–137 dBm/Hz
4	21.80	–135 dBm/Hz	–135 dBm/Hz

Data acquisition (255 MHz IF path)

Time record length

IQ analyzer	8,000,000 IQ sample pairs		Waveform measurement
Advanced tools	Data packing		89600 VSA or fast capture
	32-bit	64-bit	
Length (IQ sample pairs)	1073 MSa (2^{30} Sa)	536 MSa (2^{29} Sa)	4 GB total memory (Option DP4)
Maximum IQ capture time (89600 VSA and fast capture)	Length of IQ sample pairs/sample rate (IQ pairs)		
Sample rate (IQ pairs)	Minimum of (1.25 x IFBW, 300 Msa/s)		
ADC resolution	14 bits		

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

I/Q Analyzer (continued)

Option B5X 510 MHz analysis bandwidth

IF frequency response (510 MHz IF path)

Center Freq (GHz)	Span (MHz)	Preselector	Specification	Typical	RMS (nominal)
≥ 0.6, < 3.6	≤ 500	NA	± 1.0 dB	± 0.41 dB	0.06 dB
> 3.6, ≤ 8.4	≤ 500	Off[1]	± 1.25 dB	± 0.42 dB	0.3 dB
> 8.4, ≤ 26.5	≤ 510	Off[1]		± 0.8 dB nominal	

IF phase linearity (510 MHz IF path)

Center Freq (GHz)	Span (MHz)	Preselector	Pk-to-pk (nominal)	RMS (nominal)
≥ 0.4, < 3.6	≤ 510	NA	5°	1°
≥ 3.6, < 26.5	≤ 510	Off	6°	1.4°

Dynamic range (510 MHz IF path)

Spurious-free dynamic range (SFDR) Anywhere within the analysis BW	–78 dBc nominal		
Full scale (ADC clipping)		Mixer level	
Default setting, signal at CF Band 0 Bands 1 through 2 Bands 3 through 4		RF/MW (Opt 508, 513, 526) +2 dBm nominal +3 dBm nominal +1 dBm nominal	
High gain setting, signal at CF Band 0 Bands 1 through 2 Bands 3 through 4		 –3.5 dBm nominal –1 dBm nominal +1 dBm nominal	
Effect of signal frequency ≠ CF	Up to ± 4 dB nominal		
IF residual responses across the full BW Band 0 Band 1	Preselector off[1]		–104 dBFS nominal –103 dBFS nominal
Third-order intermodulation distortion (Two tones of equal level, 1 MHz separation, each tone -23 dB relative to full scale (ADC clipping), IF gain = high)			
Band 0 Bands 1 through 4	Preselector off[1]		–85 dBc nominal –82 dBc nominal

Noise density

Band	Frequency (GHz)	IF gain = Low	IF gain = High
0	1.80	–144 dBm/Hz	–144 dBm/Hz
1	6.00	–140 dBm/Hz	–142 dBm/Hz
2	10.80	–140 dBm/Hz	–141 dBm/Hz
3	15.15	–137 dBm/Hz	–137 dBm/Hz
4	21.80	–135 dBm/Hz	–135 dBm/Hz

Data acquisition (510 MHz IF path)

Time record length

IQ analyzer	8,000,000 IQ sample pairs		Waveform measurement
Advanced tools	Data packing		89600 VSA or fast capture
	32-bit	64-bit	
Length (IQ sample pairs) IFBW ≤255.176 MHz IFBW >255.176 MHz	 1073 MSa (2^{30} Sa) 2,147 MSa (2^{30} Sa)	 536 MSa (2^{29} Sa) 1073 MSa (2^{30} Sa)	 4 GB total memory 8 GB total memory (Option DP4)
Maximum IQ capture time (89600 VSA and fast capture)	Length of IQ sample pairs/sample rate (IQ pairs)		
Sample rate (IQ pairs)	Minimum of (1.25 x IFBW, 300 Msa/s)		
ADC resolution	14 bits		

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

Real-time spectrum analyzer (RTSA) [1]

Option RT1 or RT2

Real-time analysis		
Real-time analysis bandwidth		
Option RT1	Up to 509.47 MHz	Analysis BW option determines the max real-time bandwidth
Option RT2	Up to 509.47 MHz	Analysis BW option determines the max real-time bandwidth
Minimum detectable signal duration with > 60 dB StM [2] ratio		
Option B85	11.42 ns	
Option B1X	5.0 ns	
Option B2X or B5X	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 µs	Signal is at mask level
Option RT2	3.57 µs	Signal is at mask level
Minimum acquisition time	100 µs	
FFT rate	292,969/s	

Option RTS

Real-time I/Q data streaming[3]		
Output stream resolution	16-bit I + jQ	
IQ streaming bandwidth	Up to 255 MHz	
Electrical interface	LVDS	
Sample rate	Varies continuously based on RTSA span setting	
Max IQ streaming bandwidth and sample rate		
B1X	160 MHz	200 Msamples/s
B2X or B5X	255 MHz	300 Msamples/s
Supported data recorder	X-COM Systems IQC5255B	
Capture time	< 3 hours at 255 MHz bandwidth	
Data tagging	Event markers, IRIG-B GPS	

1. For additional RTSA specifications, please refer to Option RT1/RT2 Chapter in the PXA Signal Analyzer specifications guide
2. StM = "Signal-to-Mask"
3. Use with X-COM Systems IQC5255B data recorder to capture rare events and play back at RF using integrated control software on the PXA.

Related Literature

Keysight PXA signal analyzers	
Brochure	5992-1316EN
Configuration guide	5992-1318EN

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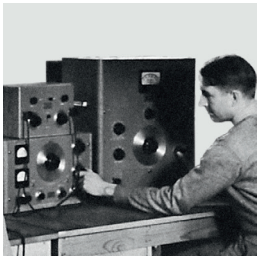

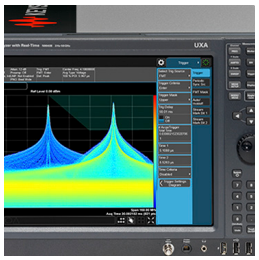

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