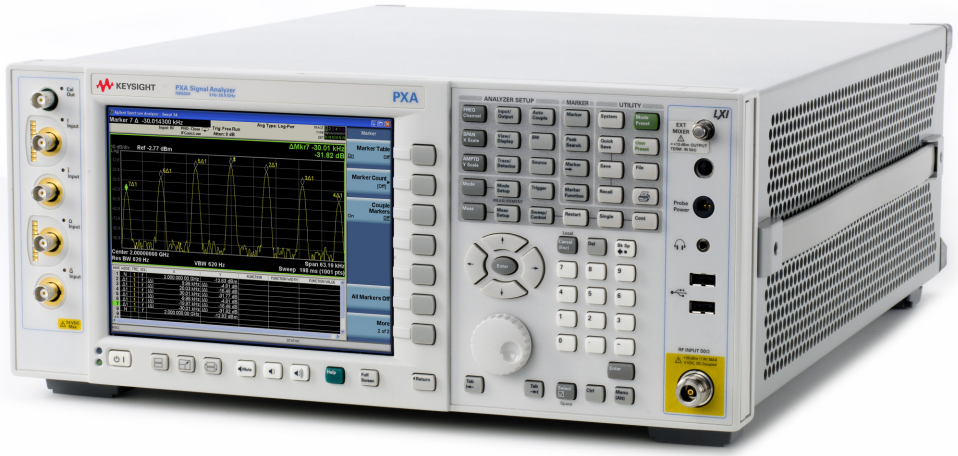
Keysight Technologies

PXA X-Series Signal Analyzer N9030A

3 Hz to 3.6, 8.4, 13.6, 26.5, 43, 44, or 50 GHz

Data Sheet



KEYSIGHT TECHNOLOGIES

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This data sheet is a summary of the specifications and conditions for N9030A PXA signal analyzers. For the complete specifications guide, visit: **www.keysight.com/find/pxa_specifications**

Drive your evolution

The Keysight Technologies, Inc. future-ready PXA signal analyzer is the evolutionary replacement for your current high-performance analyzer. It helps you sustain past achievements, enhance current designs and accelerate future innovations.

Its performance, flexibility, capability and compatibility enable you to address demanding applications in aerospace, defense, commercial communications and more.

- Reveal new levels of signal detail with outstanding RF performance
- Increase test throughput and protect your system investments
- Refresh legacy systems with a highly compatible replacement

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.

For the complete specifications guide, visit:
www.keysight.com/find/pxa_specifications

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 543		3 Hz to 43 GHz	NA
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 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	
Frequency span (FFT and swept mode)			
Range		0 Hz (zero span), 10 Hz to maximum frequency of instrument	
Resolution		2 Hz	
Accuracy Swept FFT		 ± (0.1% x span + horizontal resolution) ± (0.1% x span + horizontal resolution)	

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

Sweep time and triggering		
Range	Span = 0 Hz Span ≥ 10 Hz	1 µs to 6000 s 1 ms to 4000 s
Accuracy	Span ≥ 10 Hz, swept Span ≥ 10 Hz, FFT Span = 0 Hz	± 0.01% nominal ± 40% nominal ± 0.01% nominal
Sweep trigger	Free run, line, video, external 1, external 2, RF burst, periodic timer	
Trigger Delay	Span = 0 Hz or FFT Span ≥ 10 Hz, swept Resolution	–150 to +500 ms 0 to 500 ms 0.1 µs
Time gating		
Gate methods Gate length range (except method = FFT) Gate delay range Gate delay jitter	Gated LO; gated video; gated FFT 1 µs to 5.0 s 0 to 100.0 s 33.3 ns p-p nominal	
Sweep (trace) point range		
All spans	1 to 40001	
Resolution bandwidth (RBW)		
Range (–3.01 dB bandwidth) Standard With Option B85 and Option RBE With Option B1X and Option RBE	 1 Hz to 3 MHz (10% steps), 4, 5, 6, 8 MHz 10, 15, 20, 25, 30, 40, 50, 60, and 70 MHz, in Spectrum Analyzer mode and zero span 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 100, and 133 MHz, in Spectrum Analyzer mode and zero span	
Bandwidth accuracy (power) RBW range	1 Hz to 100 kHz 110 kHz to 1.0 MHz (< 3.6 GHz CF) 1.1 to 2 MHz (< 3.6 GHz CF) 2.2 to 3 MHz (< 3.6 GHz CF) 4 to 8 MHz (< 3.6 GHz CF)	± 0.5% (± 0.022 dB) ± 1.0% (± 0.044 dB) ± 0.07 dB nominal ± 0.10 dB nominal ± 0.20 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	Standard Option B25 Option B40 Option B85 Option B1X	10 MHz 25 MHz 40 MHz 85 MHz 160 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)	
Measurement speed [2]	**Standard**	
Local measurement and display update rate	10 ms (100/s) nominal	
Remote measurement and LAN transfer rate	10 ms (100/s) nominal	
Marker peak search	2.5 ms nominal	
Center frequency tune and transfer (RF)	43 ms nominal	
Center frequency tune and transfer (µW)	69 ms nominal	
Measurement/mode switching	40 ms nominal	

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.
2. Sweep points = 101.

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 543, 544, 550)	Displayed average noise level (DANL) to +20 dBm		
Input 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 +50 dBm (100 W) and input attenuation ≥ 30 dB		
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	± 0.45 dB
	13.5 to 22.0 GHz	± 2.0 dB	± 0.62 dB
	22.0 to 26.5 GHz	± 2.5 dB	± 0.82 dB
Millimeter-Wave (Option 543, 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, P43, P44, P50)			
RF/MW (Option 503, 508, 513, 526)	9 to 100 kHz		± 0.36 dB
	100 kHz to 50 MHz	± 0.68 dB	± 0.26 dB
	50 MHz to 3.6 GHz	± 0.55 dB	± 0.28 dB
	3.5 to 8.4 GHz	± 2.0 dB	± 0.64 dB
	8.3 to 13.6 GHz	± 2.3 dB	± 0.76 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

Frequency response		**Specification**	**95th percentile (≈ 2σ)**
Millimeter-Wave	9 to 100 kHz		± 0.40 dB
(Option 543, 544, 550)	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	± 0.03 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			
(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, P43, 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 543, 544, 550**
(10 dB input attenuation)	50 MHz	1.07:1 nominal	1.025:1 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	1.403 (95th percentile)	1.204 (95th percentile)
	17.0 to 26.5 GHz	1.475 (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, P43, P44, and P50)	10 MHz to 3.6 GHz	1.45 (95th percentile)	1.393 nominal
	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)

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	
Display scale switching uncertainty		
Switching between linear and log	0 dB	
Log scale/div switching	0 dB	
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		
Normal, peak, sample, negative peak, log power average, RMS average, and voltage average		
Preamplifier		
Frequency range [1]	Option P03	9 kHz to 3.6 GHz
	Option P08	9 kHz to 8.4 GHz
	Option P13	9 kHz to 13.6 GHz
	Option P26	9 kHz to 26.5 GHz
	Option P43	9 kHz to 43 GHz
	Option P44	9 kHz to 44 GHz
	Option P50	9 kHz to 50 GHz
Gain	9 kHz to 3.6 GHz	+20 dB nominal
	3.6 to 26.5 GHz	+35 dB nominal
	26.5 to 50 GHz	+40 dB nominal

1. 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, P43, 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)		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	–152 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	–155 dBm/NA	–157 dBm/NA typical
	1.2 to 2.1 GHz	–153 dBm/NA	–155 dBm/NA typical
	2.1 to 3.0 GHz	–152 dBm/NA	–154 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			
Option P03, P08, P13, P26	100 to 200 kHz	–157 dBm/NA	–160 dBm/NA typical
	200 to 500 kHz	–160 dBm/NA	–163 dBm/NA typical
	0.5 to 1 MHz	–164 dBm/NA	–166 dBm/NA typical
Option P03, P08, P13, P26	1 to 10 MHz	–164 dBm/NA	–167 dBm/NA typical
Option P03, P08, P13, P26	10 MHz to 2.1 GHz	–165 dBm/NA	–166 dBm/NA typical
Option P03, P08, P13, P26	2.1 to 3.6 GHz	–163 dBm/NA	–164 dBm/NA typical
Option P08, P13, P26 [3]	3.5 to 8.4 GHz	–164 dBm/NA	–166 dBm/NA typical
Option P13, P26 [3]	8.3 to 13.6 GHz	–163 dBm/NA	–165 dBm/NA typical
Option P26 [3]	13.5 to 16.9 GHz	–161 dBm/NA	–162 dBm/NA typical
Option P26 [3]	16.9 to 20.0 GHz	–159 dBm/NA	–161 dBm/NA typical
Option P26 [3]	20.0 to 26.5 GHz	–155 dBm/NA	–157 dBm/NA typical

DANL with Noise Floor Extension (Option NFE[4]) improvement

DANL improvement exceeds 9 dB with 95% confidence in the average of all bands, paths (normal, preamp, low noise path and microwave preselector bypass), frequency options and signal path options (LNP and MPB).

Examples of effective DANL Frequency 20 to 30 °C	Preamp Off	Preamp On	LNP enabled [2, 3]
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

1. With the NFE (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. Beginning January 2015, all PXAs ship standard with the second-generation of NFE (instrument alignment based) installed as N9030A-NF2.

Millimeter-Wave (Option 543, 544, 550)		Normal [1]/LNP enabled [2]	Normal [1]/LNP enabled [2]
Preamp off	3 Hz to 9 kHz		–100 dBm/NA nominal
	9 to 100 kHz	–146 dBm/NA	–152 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	–155 dBm/NA	–157 dBm/NA typical
	1.2 to 2.1 GHz	–153 dBm/NA	–155 dBm/NA typical
	2.1 to 3 GHz	–152 dBm/NA	–154 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	–153 dBm/NA typical
	4.2 to 6.6 GHz	–144 dBm/–152 dBm	–147 dBm/–154 dBm typical
	6.6 to 8.4 GHz	–147 dBm/–154 dBm	–148 dBm/–155 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	–149 dBm/–152 dBm typical
	14 to 17 GHz	–145 dBm/–151 dBm	–146 dBm/–153 dBm typical
	17 to 22.5 GHz	–141 dBm/–149 dBm	–148 dBm/–152 dBm typical
	22.5 to 26.5 GHz	–139 dBm/–146 dBm	–146 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			
Option P03, P08, P13, P26, P43, P44, P50 [3]	100 to 200 kHz	–157 dBm/NA	–160 dBm/NA typical
	200 to 500 kHz	–160 dBm/NA	–163 dBm/NA typical
	500 kHz to 1 MHz	–162 dBm/NA	–165 dBm/NA typical
	1 to 10 MHz	–164 dBm/NA	–167 dBm/NA typical
	10 MHz to 2.1 GHz	–164 dBm/NA	–166 dBm/NA typical
	2.1 to 3.6 GHz	–163 dBm/NA	–164 dBm/NA typical
Option P08, P13, P26, P43, P44, P50 [3]	3.5 to 8.4 GHz	–161 dBm/NA	–163 dBm/NA typical
Option P13, P26, P43, P44, P50 [3]	8.3 to 13.6 GHz	–161 dBm/NA	–163 dBm/NA typical
Option P26, P43, P44, P50 [3]	13.5 to 17 GHz	–161 dBm/NA	–163 dBm/NA typical
	17 to 20 GHz	–160 dBm/NA	–163 dBm/NA typical
	20 to 26.5 GHz	–158 dBm/NA	–161 dBm/NA typical
Option P43, P44, P50 [3]	26.4 to 30 GHz	–157 dBm/NA	–159 dBm/NA typical
	30 to 34 GHz	–155 dBm/NA	–158 dBm/NA typical
	33.9 to 37 GHz	–153 dBm/NA	–157 dBm/NA typical
	37 to 40 GHz	–152 dBm/NA	–156 dBm/NA typical
	40 to 43 GHz	–149 dBm/NA	–154 dBm/NA typical
Option P44, P50 [3]	43 to 44 GHz	–149 dBm/NA	–154 dBm/NA typical
Option P50 [3]	44 to 46 GHz	–149 dBm/NA	–154 dBm/NA typical
	46 to 50 GHz	–146 dBm/NA	–150 dBm/NA typical

1. With the NFE (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.

DANL with Noise Floor Extension (NFE) on				**Improvement @ 95th percentile**		
Millimeter-Wave (Option 543, 544, 550)				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	9 dB	12 dB
Band 6				11 dB	8 dB	11 dB
Example of effective DANL Frequency 20 to 30 °C	Preamp Off	Preamp On	LNP enabled [1, 2]			
Mid-Band 0 (1.8 GHz)	–160 dBm	–172 dBm	N/A			
Mid-Band 1 (5.95 GHz)	–154 dBm	–164 dBm	–157 dBm			
Mid-Band 2 (10.95 GHz)	–155 dBm	–167 dBm	–157 dBm			
Mid-Band 3 (15.3 GHz)	–154 dBm	–167 dBm	–157 dBm			
Mid-Band 4 (21.75 GHz)	–152 dBm	–165 dBm	–157 dBm			
Mid-Band 5 (30.4 GHz)	–148 dBm	–160 dBm	–157 dBm			
Mid-Band 6 (42.7 GHz)	–143 dBm	–156 dBm	–150 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.

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	**Tuned Freq (f)**	**Excitation Freq**	**Response**	
(Mixer level at –10 dBm)	10 MHz to 26.5 GHz 10 MHz to 3.6 GHz 10 MHz to 3.6 GHz 3.5 to 13.6 GHz 13.5 to 17.1 GHz 17.0 to 22 GHz 22 to 26.5 GHz	f+45 MHz f+10,245 MHz f+645 MHz f+645 MHz f+645 MHz f+645 MHz f+645 MHz	–80 dBc –118 dBc typical –80 dBc –112 dBc typical –80 dBc –101 dBc typical –78 dBc –87 dBc typical –74 dBc –84 dBc typical –70 dBc –82 dBc typical –68 dBc –79 dBc typical	
(Mixer level at –30 dBm)	26.5 to 34.5 GHz 34.4 to 44 GHz 44 to 50 GHz	f+645 MHz f+645 MHz f+645 MHz	–68 dBc –84 dBc typical –57 dBc –79 dBc typical –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), Mixer level at –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]**	**SHI [3]**
RF/MW (Option 503, 508, 513, 526)	10 to 100 MHz 0.1 to 1.8 GHz 1.75 to 2.5 GHz 2.5 to 4 GHz 4 to 6.5 GHz 6.5 to 10 GHz 10 to 13.25 GHz	–15 dBm –15 dBm –15 dBm –15 dBm –15 dBm –15 dBm –15 dBm	–57 dBc/NA –60 dBc/NA –77 dBc/–95 dBc –77 dBc/–101 dBc –77 dBc/–105 dBc –70 dBc/–105 dBc –62 dBc/–105 dBc	+42 dBm/NA +45 dBm/NA +62 dBm/+80 dBm +62 dBm/+86 dBm +62 dBm/+90 dBm +55 dBm/+90 dBm +47 dBm/+90 dBm
		Preamp level	**Distortion**	**SHI**
Preamp on (Option P03, P08, P13, P26)	10 MHz to 1.8 GHz 1.8 to 13.25 GHz	–45 dBm –50 dBm	–78 dBc nominal –60 dBc nominal	+33 dBm nominal +10 dBm nominal
Millimeter-Wave		**Mixer level**	**Distortion [3]**	**SHI [3]**
(Option 543, 544, 550)	10 to 100MHz 100 M to 1.8 GHz 1.8 to 2.5 GHz 2.5 to 3 GHz 3 to 5 GHz 5 to 6.5 GHz 6.5 to 10 GHz 10 to 13.25 GHz 13.25 to 25 GHz	–15 dBm –15 dBm –15 dBm –15 dBm –15 dBm –15 dBm –15 dBm –15 dBm –15 dBm	–57 dBc/NA –60 dBc/NA –72 dBc/–95 dBc –72 dBc/–99 dBc –77 dBc/–99 dBc –77 dBc/–105 dBc –70 dBc/–105 dBc –62 dBc/–105 dBc –65 dBc/–105 dBc (nom.)	+42 dBm/NA +45 dBm/NA +57 dBm/+80 dBm +57 dBm/+84 dBm +62 dBm/+84 dBm +62 dBm/+90 dBm +55 dBm/+90 dBm +47 dBm/+90 dBm +50 dBm/+90 dBm (nom.)
Preamp on (Option P03, P08, P13, P26, P43, P44, P50)		**Preamp level**	**Distortion**	**SHI**
	10 MHz to 1.8 GHz 1.8 to 13.25 GHz 13.25 to 25 GHz	–45 dBm –50 dBm –50 dBm	–78 dBc (nominal) –60 dBm (nominal) –50 dBm (nominal)	+33 dBm (nominal) +10 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).

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, 543, 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 543, 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, P43, 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

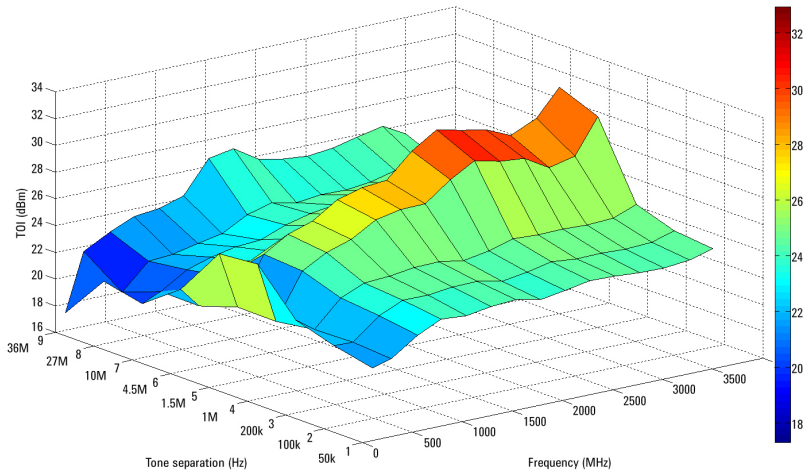
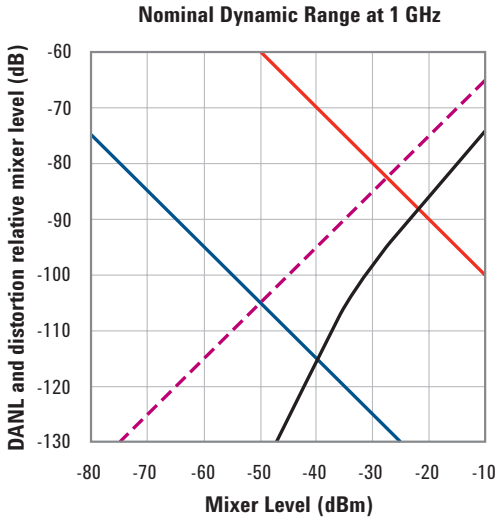
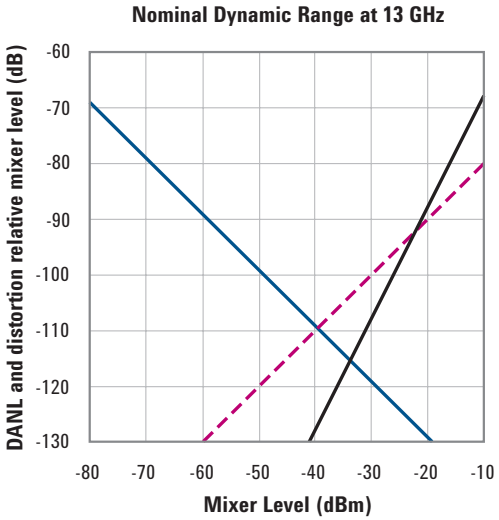


Figure 1. Nominal TOI performance versus frequency and tone separation





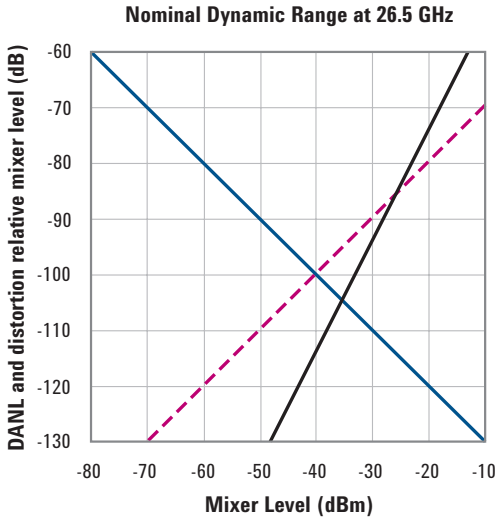


Figure 2a. Third-order dynamic range plots

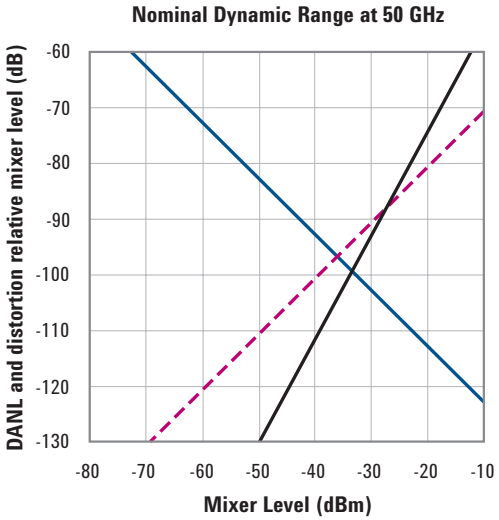


Figure 2b. Third-order dynamic range plots

DANL (30 kHz RBW)
DANL (1 Hz RBW)
2nd Harmonic Distortion
3rd Order Intermodulation

Phase noise	Offset	Specification	Typical
Noise sidebands	10 Hz		–80 dBc/Hz nominal
(20 to 30 °C, CF = 1 GHz)	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

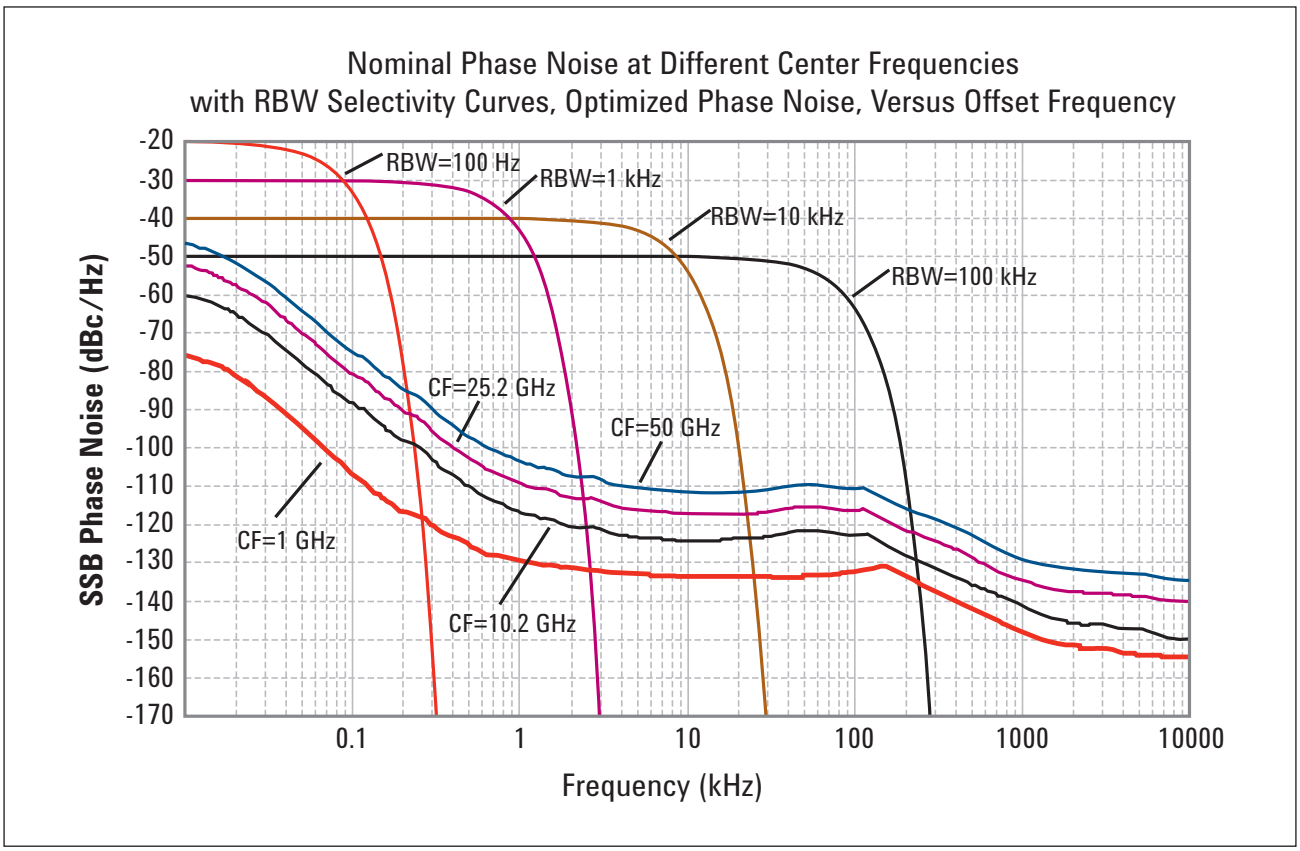


Figure 3. Nominal PXA phase noise at various center frequencies

Option MPB, microwave preselector bypass [1]	
Frequency range	
N9030A-508	3.6 to 8.4 GHz
N9030A-513	3.6 to 13.6 GHz
N9030A-526	3.6 to 26.5 GHz
N9030A-543	3.6 to 43 GHz
N9030A-544	3.6 to 44 GHz
N9030A-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 N9030A PXA specification guide for more details.

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)	± 0.08 dB	± 0.09 dB
BTS	± 0.20 dB	± 0.18 dB
Dynamic range (typical)		
Without noise correction	–82.5 dB	–87 dB
With noise correction	–83.5 dB	–89.5 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 –15 dBm)	± 0.09 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)	88.8 dB	(92.1 dB typical)
Absolute sensitivity (1 to 3.6 GHz)	–88.5 dBm	(–91.5 dBm typical)
Spectrum emission mask (SEM)		
cdma2000® (750 kHz offset)		
Relative dynamic range	85.9 dB	(89.5 dB typical)
Absolute sensitivity	–103.7 dBm	(–106.7 dBm typical)
Relative accuracy	± 0.06 dB	
3GPP W-CDMA (2.515 MHz offset)		
Relative dynamic range	87.9 dB	(92.6 dB typical)
Absolute sensitivity	–103.7 dBm	(–106.7 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 or IEC/EN 61326-2-1 – CISPR 11 Group 1, Class A – 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
Power consumption	
On	630 W (Maximum)
Stanby	40 W

Display	
Resolution	1024 x 768, XGA
Size	213 mm (8.4 in.) diagonal (nominal)
Data storage	
Internal	Removable solid state drive (80 GB)
External	Supports USB 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 543, 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 2.0 ports	
Master (2 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”)

1. For additional specifications, please refer to Chapter BAA in the N9030A 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.

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	
Narrowband IF path	322.5 MHz
40 MHz BW IF path	250.0 MHz
85 or 160 MHz BW IF path	300 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	
Connector	VGA compatible, 15-pin mini D-SUB
Format	XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB
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 Keysight SNS Series noise sources
Digital bus	
Connector	MDR-80

Rear panel	
Analog out	
Connector	BNC female
USB 2.0 ports	
Master (3 ports)	
Standard	Compatible with USB 2.0
Connector	USB Type-A female
Output current	0.5 A nominal
Slave (1 port)	
Standard	Compatible with USB 2.0
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 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
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 [1]	Up to 700 MHz (nominal); expandable to 900 MHz with corrections
Arbitrary 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	
Standard instrument	10 Hz to 10 MHz
Option B25	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
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 B85	10 Hz to 85 MHz
Option B1X	10 Hz to 160 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

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[1]	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	

Data acquisition (standard 10 MHz IF path)

Time record length			
Analysis tool			
IQ analyzer	4,000,000 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 B25 25 MHz analysis bandwidth (Option B25 is automatically included in Option B40, B85 or B1X)

IF frequency response (B25 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

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 [1]	0.85°	0.20°

Dynamic range (B25 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 (B25 IF path)

Time record length

Analysis tool			
IQ analyzer	4,000,000 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 or B1X)

IF frequency response (B40 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)					
Center freq (GHz)	**Span (MHz)**	**Preselector**		**Peak-to-peak (nominal)**	**RMS (nominal)**
≥ 0.03, < 3.6	≤ 40	NA		0.16°	0.041°
≥ 3.6	≤ 40	Off [1]		1.5°	0.35°
EVM (EVM measurement floor for an 802.11g OFDM signal, using 89600B 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 (B40 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: IF gain offset = 0 dB)					
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				

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

Option B40 40 MHz analysis bandwidth

Data acquisition (B40 IF path)			
Time record length			
Analysis tool			
IQ analyzer	4,000,000 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 (B85 or B1X 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)
Effect of signal frequency ≠ CF	Up to ± 3 dB nominal	

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

Option B85 85 MHz or B1X 160 MHz analysis bandwidth

Dynamic range (B85 or B1X 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 (B85 or B1X IF path)			
Time record length			
Analysis tool			
IQ analyzer	4,000,000 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	14 bits		

Real-time spectrum analyzer (RTSA) [1]

Option RT1 or RT2

Real-time analysis		
Real-time analysis bandwidth		
Option RT1	Up to 160 MHz	Analysis BW option determines the max real-time bandwidth
Option RT2	Up to 160 MHz	Analysis BW option determines the max real-time bandwidth
Minimum detectable signal duration with > 60 dB StM [2] ratio		
Option RT1	11.42 ns	
Option RT2	5.0 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	

1. For additional RTSA specifications, please refer to Option RT1/RT2 Chapter in the N9030A PXA Signal Analyzer specifications guide
2. StM = "Signal-to-Mask"

Related Literature

Keysight PXA signal analyzers	
Brochure	5990-3951EN
Configuration guide	5990-3953EN

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