CXA X-Series Signal Analyzer N9000A

9 kHz to 3.0, 7.5, 13.6, or 26.5 GHz

Data Sheet

Anticipate ___Accelerate ___Achieve

Agilent Technologies

Table of Contents

Master the essentials

A great low-cost signal analyzer surpasses the basics and delivers crucial functionality. That's the strength of the CXA signal analyzer, the leading low-cost tool for essential signal characterization. Its capabilities provide a foundation for cost-effective testing and seamless integration with the other X-Series models. The CXA is also an excellent teaching tool for RF and microwave technologies and signal analysis. Get must-have capability with X-Series expandability in the CXA–and master the essentials.

Definitions and Conditions

Specifications describe the performance of parameters covered by the product warranty and apply to temperature ranges 5 to 50 °C, unless otherwise noted.

95th percentile values indicate the breadth of the population (approx. 2 σ) 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 are not covered by the product warranty.

The analyzer will meet its specifications when:

- It is within its calibration cycle
- Under auto couple control, except when Auto Sweep Time Rules = Accy
- 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 more information

This CXA signal analyzer data sheet is a summary of the complete specifications and conditions for N9000A CXA signal analyzers (including N9000AEP Express CXA signal analyzers), which are available in the CXA Signal Analyzer Specification Guide. The CXA Signal Analyzer Specification Guide can be obtained on the web at:

www.agilent.com/find/cxa_manuals

For ordering information, refer to the CXA Signal Analyzer Configuration Guide (5990-4341EN).

Frequency and Time Specifications

Frequency range	DC coupled		AC coupled
Option 503	NA		9 kHz to 3.0 GHz
Option 507	NA		9 kHz to 7.5 GHz
Option 513	9 kHz to 13.6 GHz		10 MHz to 13.6 GHz
Option 526	9 kHz to 26.5 GHz		10 MHz to 26.5 GHz
	Band	LO multiple (N)	AC coupled
RF (Option 503, 507)	0	1	9 kHz to 3.0 GHz
	1	1	2.95 to 3.80 GHz
	2	1	3.70 to 4.55 GHz
	3	1	4.45 to 5.30 GHz
	4	1	5.20 to 6.05 GHz
	5	1	5.95 to 6.80 GHz
	6	1	6.70 to 7.50 GHz
	Band	LO multiple (N)	AC coupled
MW (Option 513, 526)	0	1	9 kHz to 3.08 GHz
	1	2	2.95 to 7.58 GHz
	2	2	7.45 to 9.55 GHz
	3	2	9.45 to 12.60 GHz
	4	2	12.50 to 13.05 GHz
	4	4	12.95 to 13.80 GHz
	5	4	13.40 to 15.55 GHz
	6	4	15.45 to 19.35 GHz
	7	4	19.25 to 21.05 GHz
	8	4	20.95 to 22.85 GHz
	9	4	22.75 to 24.25 GHz
	10	4	24.15 to 26.55 GHz
Frequency reference			
Accuracy	± [(time since last adjustment x aging rate) + temperature stability + calibration accuracy]		
Aging rate	Option PFR $\pm 1 \times 10^{-7}$ / year $\pm 1.5 \times 10^{-7}$ / 2 years		Standard $\pm 1 \times 10^{-6}$ / year
Temperature stability 20 to 30 °C Full temperature range	Option PFR $\pm 1.5 \times 10^{-8}$ $\pm 5 \times 10^{-8}$		Standard $\pm 2 \times 10^{-6}$ $\pm 2 \times 10^{-6}$
Achievable initial calibration accuracy	Option PFR $\pm 4 \times 10^{-8}$		Standard $\pm 1.4 \times 10^{-6}$
Example frequency reference accuracy (with Option PFR) 1 year after last adjustment	$= \pm (1 \times 1 \times 10^{-7} + 5 \times 10^{-8} + 4 \times 10^{-8})$ $= \pm 1.9 \times 10^{-7}$		
Residual FM Option PFR Standard	 ≤ 0.25 Hz p-p in 20 ms nominal ≤ 10 Hz p-p in 20 ms nominal		
Frequency readout accuracy (start, stop, center, marker)			
± (marker frequency x frequency reference accuracy + 0.25 % x span + 5 % x RBW + 2 Hz + 0.5 x horizontal resolution 1)			

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

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	 ± (0.25 % x span + horizontal resolution) ± (0.10 % x span + horizontal resolution)	
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 ± 1 % nominal
Trigger	Free run, line, video, external 1, RF burst, periodic timer	
Trigger delay	Span = 0 Hz or FFT Span ≥ 10 Hz, swept Resolution	–150 to +500 ms 1 µs 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 100.0 ns 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)	1 Hz to 3 MHz (10 % steps), 4, 5, 6, 8 MHz	
Bandwidth accuracy (power)	1 Hz to 750 kHz 820 kHz to 1.2 MHz (< 3 GHz CF) 1.3 to 2.0 MHz (< 3 GHz CF) 2.2 to 3 MHz (< 3 GHz CF) 4 to 8 MHz (< 3 GHz CF)	± 1.0 % (± 0.044 dB) nominal ± 2.0 % (± 0.088 dB) nominal ± 0.07 dB nominal ± 0.15 dB nominal ± 0.25 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 or W6141A [1] required)
EMI bandwidth (MIL STD 461E compliant)	10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz	(Option EMC or W6141A [1] required)
Analysis bandwidth [2]		
Maximum bandwidth	Option B25 Standard	25 MHz 10 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	
Measurement speed [3]		
Local measurement and display update rate	11 ms (90/s) nominal	
Remote measurement and LAN transfer rate	6 ms (167/s) nominal	
Marker peak search	5 ms nominal	
Center frequency tune and transfer	22 ms nominal	
Measurement/mode switching	75 ms nominal	

1. *Not available on microwave CXA (Option 513 or 526).*
2. *Analysis bandwidth is the instantaneous bandwidth available around a center frequency over which the input signal can be digitized for further analysis or processing in the time, frequency, or modulation domain.*
3. *Sweep points = 101.*

Amplitude Accuracy and Range Specifications

Amplitude range			
Measurement range			
RF (Option 503, 507)	Preamp off	100 kHz to 1 MHz	Displayed average noise level (DANL) to +20 dBm
		1 MHz to 7.5 GHz	Displayed average noise level (DANL) to +23 dBm
	Preamp on	100 kHz to 7.5 GHz	Displayed average noise level (DANL) to +15 dBm
MW (Option 513/526)	Preamp off	100 kHz to 26.5 GHz	Displayed average noise level (DANL) to +23 dBm
	Preamp on	100 kHz to 26.5 GHz	Displayed average noise level (DANL) to +23 dBm
Input attenuator range			
RF (Option 503, 507)	Standard Option FSA	0 to 50 dB in 10 dB steps 0 to 50 dB in 2 dB steps	
MW (Option 513, 526)	Standard Option FSA	0 to 70 dB in 10 dB steps 0 to 70 dB in 2 dB steps	
Maximum safe input level			
Average total power			
RF (Option 503, 507)	+30 dBm (1 W)	Input attenuation ≥ 20 dB, preamp off	
	10 dBm (10 mW)	Input attenuation ≥ 20 dB, preamp on	
MW (Option 513, 526)	+30 dBm (1 W)	Input attenuation ≥ 10 dB, preamp off	
	+30 dBm (1 W)	Input attenuation ≥ 20 dB, preamp on	
Peak pulse power			
	+50 dBm (100 W)	< 10 µs pulse width, < 1 % duty cycle, input attenuation ≥ 30 dB	
DC volts			
RF (Option 503, 507)	AC coupled	±50 Vdc	
MW (Option 513, 526)	AC coupled	±50 Vdc	
	DC coupled	±0.2 Vdc	
Display range			
Log scale	0.1 to 1 dB/division in 0.1 dB steps 1 to 20 dB/division in 1 dB steps (10 display divisions)		
Linear scale	10 divisions		
Scale units	dBm, dBmV, dBµV, dBmA, dBµA, V, W, A		

Frequency response		Specification	95th percentile (≈ 2σ)
(10 dB input attenuation, 20 to 30 °C, σ = nominal standard deviation)			
RF (Option 503, 507)	9 kHz to 10 MHz	± 0.60 dB	± 0.45 dB
	10 MHz to 3 GHz	± 0.75 dB	± 0.55 dB
	3 to 5.25 GHz	± 1.45 dB	± 1.00 dB
	5.25 to 7.5 GHz	± 1.65 dB	± 1.20 dB
MW (Option 513, 526)	9 kHz to 10 MHz	± 0.8 dB	± 0.5 dB
	10 MHz to 3 GHz	± 0.65 dB	± 0.4 dB
	3 to 7.5 GHz	± 1.5 dB	± 0.5 dB
	7.5 to 13.6 GHz	± 2.0 dB	± 0.8 dB
	13.6 to 19 GHz	± 2.0 dB	± 1.0 dB
	19 to 26.5 GHz	± 2.5 dB	± 1.3 dB
Preamp on			
RF (Option 503, 507) (P03, P07)	100 kHz to 3 GHz		± 0.70 dB
	3 to 5.25 GHz		± 0.85 dB
	5.25 to 7.5 GHz		± 1.35 dB
MW (Option 513, 526) (P03, P07, P13, P26)	100 kHz to 3 GHz		± 0.7 dB
	3 to 13.6 GHz		± 1.0 dB
	13.6 to 19 GHz		± 1.1 dB
	19 to 26.5 GHz		± 2.5 dB

Input attenuation switching uncertainty		Specifications	Additional information
Attenuation > 2 dB, preamp off Relative to 10 dB (reference setting)	50 MHz (reference frequency) 100 kHz to 3.0 GHz 3.0 to 7.5 GHz 7.5 to 26.5 GHz	± 0.32 dB	± 0.15 dB typical ± 0.30 dB nominal ± 0.50 dB nominal ± 0.70 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 At all frequencies 100 kHz to 10 MHz 10 MHz to 2.0 GHz 2.0 to 3.0 GHz	± 0.40 dB ± (0.40 dB + frequency response) ± 0.60 dB (95th Percentile ≈ 2σ) ± 0.50 dB (95th Percentile ≈ 2σ) ± 0.60 dB (95th Percentile ≈ 2σ)	
Preamp on (Option P03/P07/P13/P26)		± (0.39 dB + frequency response) nominal	

Input voltage standing wave ratio (VSWR) (≥ 10 dB attenuation)			
		Option 503, 507	Option 513, 526
	10 MHz to 3 GHz	< 1.5 nominal	< 1.3 nominal
	3 to 7.5 GHz	< 2.0 nominal	< 1.4 nominal
	7.5 to 26.5 GHz	N/A	< 1.9 nominal

Resolution bandwidth switching uncertainty (referenced to 30 kHz RBW)	
1 Hz to 3 MHz RBW	± 0.15 dB
4, 5, 6, 8 MHz RBW	± 1.0 dB

Reference level	
Range Log scale Linear scale	 –170 to +23 dBm in 0.01 dB steps Same as log (707 pV to 3.16 V)
Accuracy	0 dB

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

Display scale fidelity		
–80 dBm ≤ input mixer level < –15 dBm	± 0.15 dB total	
–15 dBm ≤ input mixer level < –10 dBm	± 0.30 dB	± 0.15 dB typical

Trace detectors
Normal, peak, sample, negative peak, log power average, RMS average, and voltage average

Preamplifier (Option P03/P07/P13/P26)		
Frequency range	Option P03 Option P07 Option P13 Option P26	100 kHz to 3.0 GHz 100 kHz to 7.5 GHz 100 kHz to 13.6 GHz 100 kHz to 26.5 GHz
Gain	100 kHz to 26.5 GHz	+20 dB nominal
Noise figure	100 kHz to 26.5 GHz	DANL + 176.24 dB nominal

Dynamic Range Specifications

	1 dB gain compression (two-tone)		Total power at input mixer
RF (Option 503, 507)	Preamp off	50 MHz to 7.5 GHz	+2 dBm nominal
	Preamp on (Option P03/P07)	50 MHz to 7.5 GHz	–19 dBm nominal
MW (Option 513/526)	Preamp off	50 MHz to 7.5 GHz 7.5 to 13.6 GHz 13.6 to 26.5 GHz	+7 dBm noiminal +3 dBm noiminal +0 dBm noiminal
	Preamp on	50 MHz to 26.5 GHz	–19 dBm nominal

Displayed average noise level (DANL)			
(Input terminated, sample or average detector, averaging type = Log, 0 dB input attenuation, IF Gain = High, 20 to 30 °C)			
		Parentheses indicate typical performance	
		Preamplifier OFF	**Preamplifier ON**
RF (Option 503/507)	9 kHz to 1 MHz	(–120) dBm	(–139) dBm
	1 to 10 MHz	–130 (–137) dBm	–149 (–157) dBm
	10 MHz to 1.5 GHz	–148 (–150) dBm	–161 (–163) dBm
	1.5 to 2.2 GHz	–144 (–147) dBm	–160 (–163)dBm
	2.2 to 3 GHz	–140 (–143) dBm	–158 (–161) dBm
	3 to 4.5 GHz	–137 (–140) dBm	–155 (–159) dBm
	4.5 to 6 GHz	–133 (–136) dBm	–152 (–156) dBm
	6 to 7.5 GHz	–128 (–131) dBm	–148 (–152) dBm
MW (Option 513/526)	1 to 10 MHz	–143, (–148) dBm	–153, (–158) dBm
	10 MHz to 1.5 GHz	–147, (–150) dBm	–160, (–163) dBm
	1.5 to 6 GHz	–143, (–147) dBm	–158, (–161) dBm
	6 to 7.5 GHz	–141, (–145) dBm	–155, (–160) dBm
	7.5 to 13.6 GHz	–139, (–142) dBm	–155, (–160) dBm
	13.6 to 20 GHz	–134, (–140) dBm	–153, (–157) dBm
	20 to 24 GHz	–132, (–138) dBm	–151, (–155) dBm
	24 to 26.5 GHz	–124, (–129) dBm	–142 (–147) dBm

Spurious responses				
RF (Option 503, 507)	Residual responses (Input terminated and 0 dB attenuation, 20 to 30 °C)	200 kHz to 7.5 GHz (swept) Zero span or FFT or other frequencies	–90 dBm –100 dBm nominal	
	Input related spurious	10 MHz to 7.5 GHz	–60 dBc typical	
MW (Option 513, 526)		**Tuned frequency (f)**	**Mixer level**	**Response**
	Image responses	10 MHz to 26.5 GHz	–10 dBm	–60 dBc typical
	LO-related spurious	10 MHz to 3 GHz	–10 dBm	–64 dBc typical
	Other spurious responses			
	First RF order (f ≥ 10 MHz from carrier)		–10 dBm	–65 dBc
	High RF order (f ≥ 10 MHz from carrier)		–30 dBm	–65 dBc

Second harmonic distortion (SHI)		
	Source frequency	**SHI (nominal)**
RF/MW (Option 503, 507, 513, 526)	10 MHz to 3.75 GHz	+42 dBm
MW (Option 513, 526)	3.75 to 13.25 GHz	+54 dBm

Third-order intermodulation distortion (TOI)			
Parentheses indicate typical performance			
RF (Option 503, 507)	Preamp off (Two –20 dBm tones at input mixer spaced by 100 kHz, 0 dB attenuation, 20 to 30 °C)	10 to 400 MHz	+10 (+14) dBm
		400 MHz to 3 GHz	+13 (+17) dBm
		3 to 7.5 GHz	+13 (+15) dBm
MW (Option 513/526)	Preamp off (Two –20 dBm tones at input mixer spaced by 100 kHz, 0 dB attenuation, 20 to 30 °C)	10 to 500 MHz	+11 dBm, (+15) dBm
		500 MHz to 2 GHz	+12 dBm, (+15) dBm
		2 to 3 GHz	+11 dBm, (+15) dBm
		3 to 7.5 GHz	+12 dBm, (+17) dBm
		7.5 to 13.6 GHz	+11 dBm, (+15) dBm
		13.6 to 26.5 GHz	+10 dBm, (+14) dBm
Option P03/P07/P13/ P26	Preamp on (Two –45 dBm tones at the preamp input, spaced by 100 kHz, 0 dB attenuation, 20 to 30 °C)	10 MHz to 26.5 GHz	–8 dBm nominal

Nominal dynamic range for Options 503 and 507

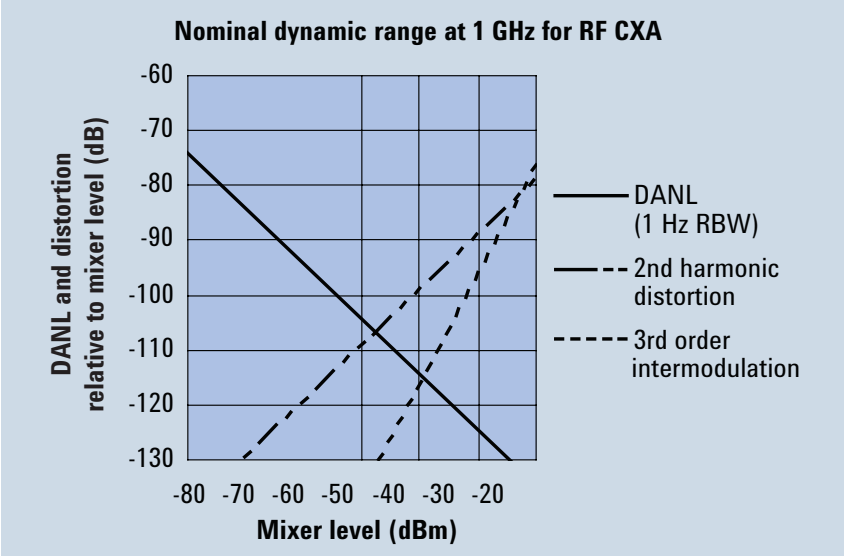

Figure 1. Nominal dynamic range for Options 503 and 507 – Band 0, for second and third order distortion, 10 MHz to 3 GHz

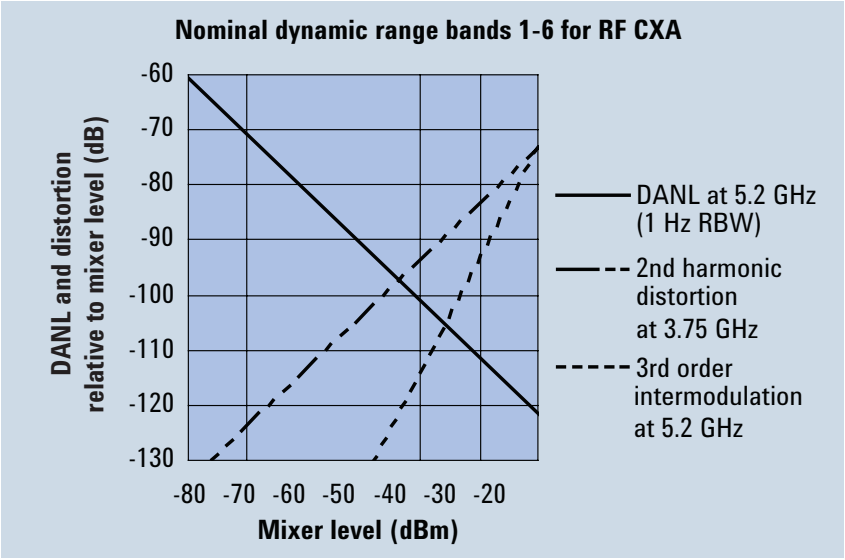

Figure 2. Nominal dynamic range for Options 503 and 507 – Bands 1 to 6, for second and third order distortion, 3 GHz to 7.5 GHz

Nominal dynamic range for Options 513 and 526

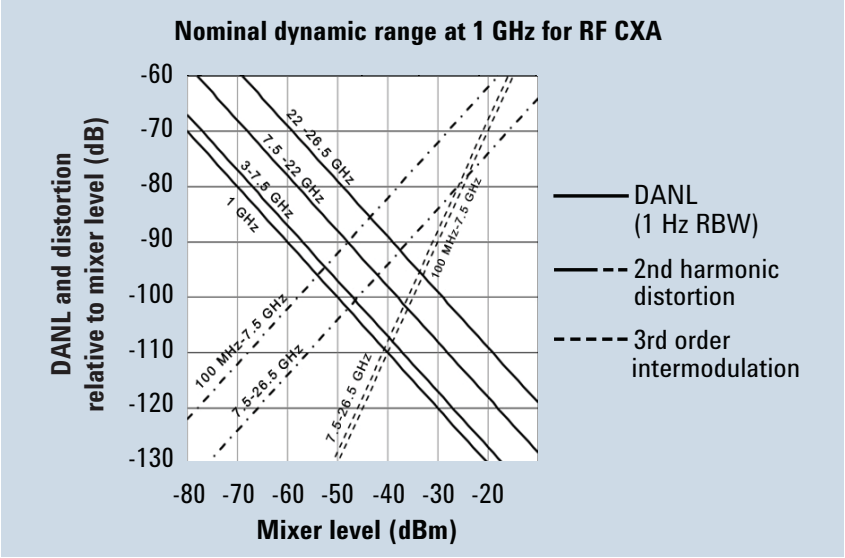

Figure 3. Nominal dynamic range for option 513/526, for second and third order distortion, 100 MHz to 26.5 GHz

Phase noise [1]	Offset	Specification	Typical
Noise sidebands (20 to 30 °C, CF = 1 GHz)			
RF (Option 503, 507)	1 kHz	–94 dBc/Hz	–98 dBc/Hz nominal
	10 kHz	–99 dBc/Hz	–102 dBc/Hz
	100 kHz	–102 dBc/Hz	–104 dBc/Hz
	1 MHz	–120 dBc/Hz	–121 dBc/Hz
	10 MHz		–143 dBc/Hz nominal

1. For nominal phase noise values with the RF CXA (Option 503 or 507), refer to Figure 4.

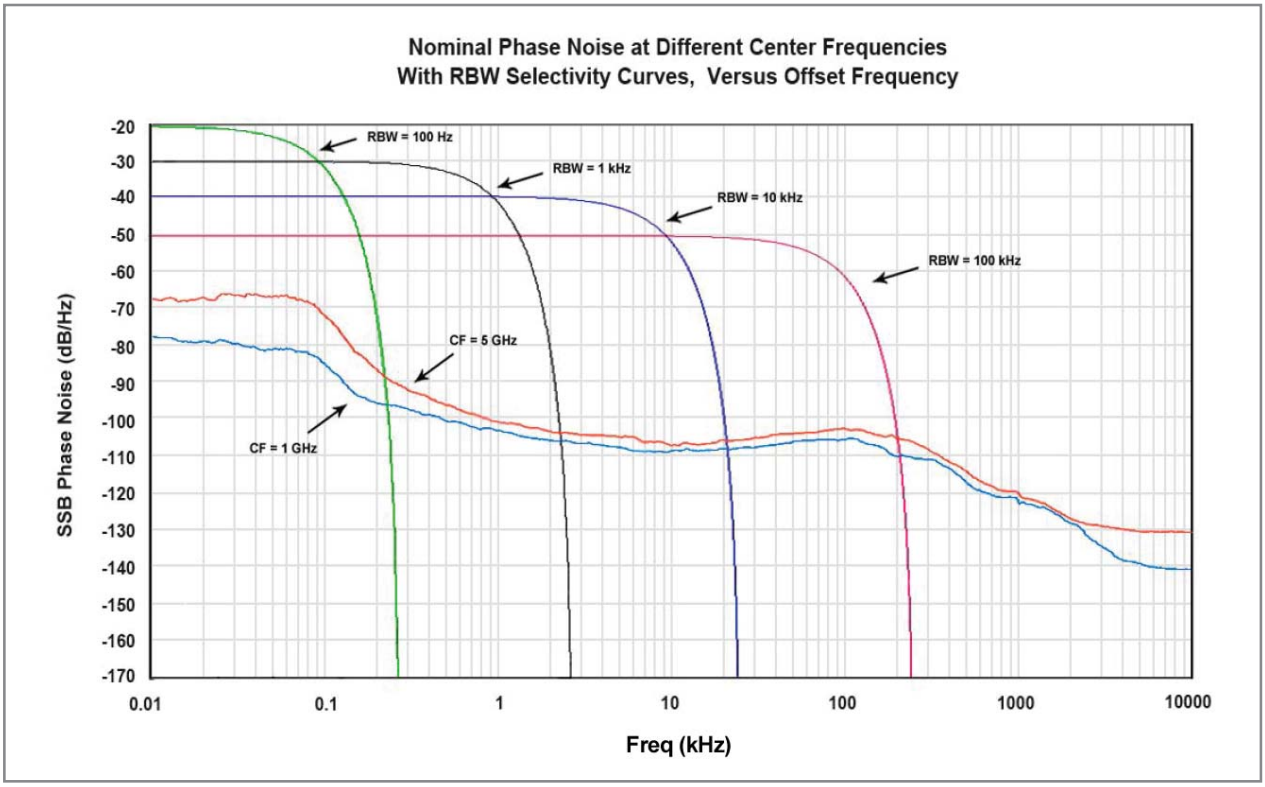

Figure 4. Nominal phase noise at different center frequencies for RF CXA (Option 503 or 507)

Phase noise [1]	Offset	Specification	Typical
MW (Option 513, 526)	1 kHz	–98 dBc/Hz	–103 dBc/Hz
	10 kHz	–102 dBc/Hz	–110 dBc/Hz
	100 kHz	–108 dBc/Hz	–110 dBc/Hz
	1MHz	–130 dBc/Hz	–130 dBc/Hz
	10 MHz		–145 dBc/Hz nominal

1. For nominal phase noise values with the MW CXA (Option 513 or 526), refer to Figure 5.

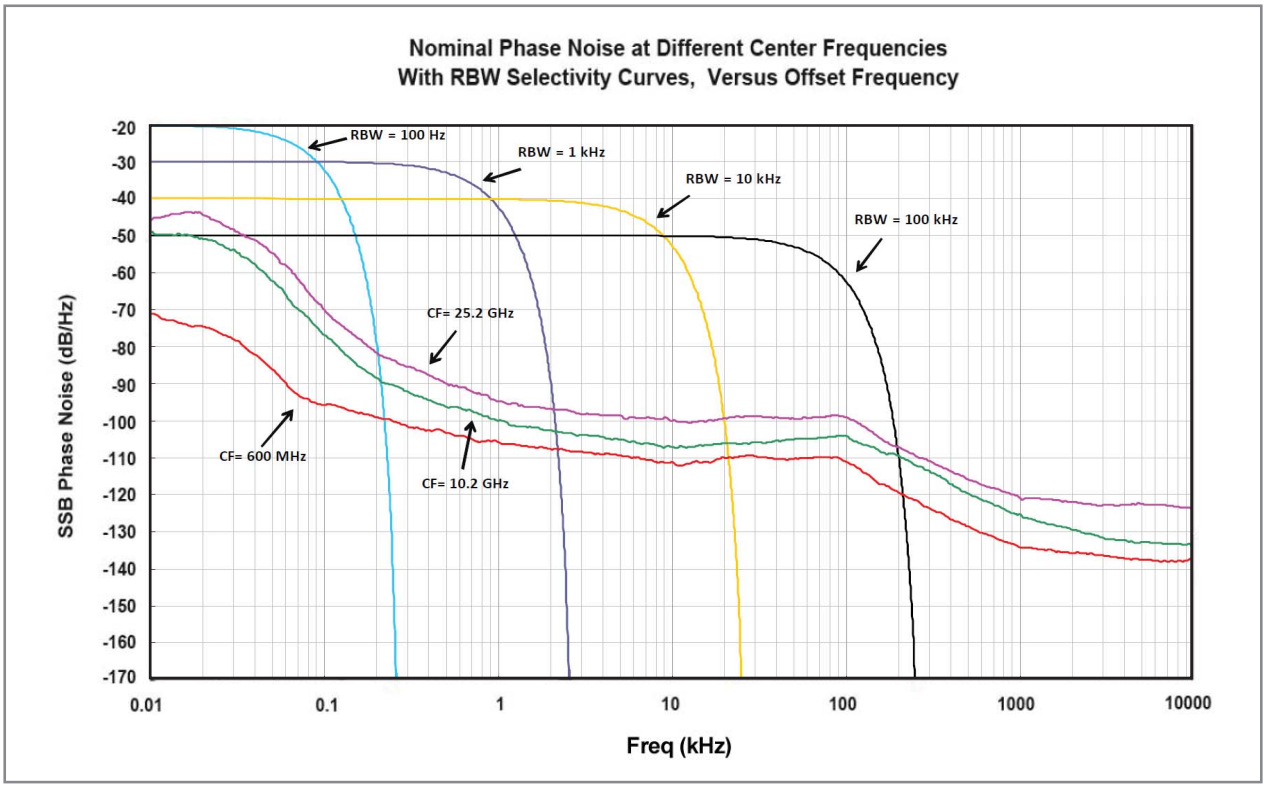

Figure 5. Nominal phase noise at different center frequencies for MW CXA (Option 513 or 526)

PowerSuite Measurement Specifications

Channel power			
Amplitude accuracy, W-CDMA or IS95 (20 to 30 °C, attenuation = 10 dB)	± 1.33 dB (± 0.61 dB 95th percentile)		
Occupied bandwidth			
Frequency accuracy	± [span/1000] nominal		
Adjacent channel power			
Accuracy, W-CDMA (ACLR) (at specific mixer levels and ACLR ranges)		Adjacent	Alternate
MS		± 0.76 dB	± 0.65 dB
BTS		± 1.41 dB	± 1.62 dB
Dynamic range (typical)			
RF (Option 503, 507)	Without noise correction	–63 dB	–67 dB
	With noise correction	–66 dB	–72 dB
MW (Option 513, 526)	Without noise correction	–66 dB	–69 dB
	With noise correction	–73 dB	–78 dB
Offset channel pairs measured	1 to 6		
Multiple number of carriers measured	Up to 12		
Power statistics CCDF			
Histogram resolution	0.01 dB		
Harmonic distortion			
Maximum harmonic number	10th		
Results	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			
W-CDMA (1 to 3.0 GHz) table-driven spurious signals; search across regions			
Dynamic range	83.9 dB	(86.7 dB typical)	
Absolute sensitivity	–78.4 dBm	(–84.4 dBm typical)	
Spectrum emission mask (SEM)			
cdma2000® (750 kHz offset)			
Relative dynamic range (30 kHz RBW)	67.4 dB	(72.7 dB typical)	
Absolute sensitivity	–93.7 dBm	(–99.7 dBm typical)	
Relative accuracy	± 0.09 dB		
3GPP W-CDMA (2.515 MHz offset)			
Relative dynamic range (30 kHz RBW)	74.3 dB	(80.3 dB typical)	
Absolute sensitivity	–93.7 dBm	(–99.7 dBm typical)	
Relative accuracy	± 0.11 dB		

Tracking Generator Specifications

Output frequency		
Frequency range		
Option T03[1]	9 kHz to 3 GHz	
Option T06[1]	9 kHz to 6 GHz	
Resolution	1 Hz	
Output power level		
Range	–50 to 0 dBm	
Resolution	0.1 dB	
Absolute accuracy (at 50 MHz, –10 dBm, 20 to 30 °C)	± 0.55 dB	
Output flatness (referenced to 50 MHz, –10 dBm, 20 to 30 °C)	Specification	95th percentile (≈ 2σ)
9 kHz to 100 kHz	± 1.5 dB	± 1.2 dB
100 kHz to 3.0 GHz	± 1.2 dB	± 0.8 dB
3.0 GHz to 6.0 GHz	± 1.5 dB	± 1.2 dB
Level accuracy		
9 kHz to 100 kHz		± 1.0 dB nominal
100 kHz to 3.0 GHz		± 0.5 dB nominal
3.0 GHz to 6.0 GHz		± 0.8 dB nominal
Output power sweep		
Range	–50 to 0 dBm	
Resolution	0.1 dB	
Maximum safe reverse level		
Average total power	+30 dBm (1 W)	
AC coupled	± 50 Vdc	
Phase noise		
Noise sidebands (CF = 1 GHz)	Offset	
	10 kHz	–102 dBc/Hz nominal
	100 kHz	–104 dBc/Hz nominal
	1 MHz	–120 dBc/Hz nominal
Spurious outputs (0 dBm output)		
Harmonic Spurs		
100 kHz to 3 GHz	< –35 dBc	
3 GHz to 6 GHz	< –30 dBc	
Non-harmonic spurs		
9 kHz to 10 MHz		< –35 dBc nominal
10 MHz to 6 GHz	< –35 dBc	
Dynamic range		
	Maximum output power – displayed average noise level	110 dBc nominal
Output VSWR		
9 kHz to 6 GHz	< 1.5:1 nominal	

1. Not available on microwave CXA (Option 513 or 526).

75 Ω Input Specifications

Frequency range		
Option C75[1]	1 MHz to 1.5 GHz	
Maximum safe input level		
Average continuous power or Peak pulse power	+72.5 dBmV (0.25 W) +63 dBmV (25 mW)	Input attenuation ≥ 20 dB, preamp off Input attenuation ≥ 20 dB, preamp on (Option P03/P07)
AC coupled	± 50 Vdc	
Frequency response (10 dB input attenuation)		
Preamp off	1 MHz to 10 MHz 10 MHz to 1.5 GHz	± 0.6 dB nominal ± 0.75 dB nominal
1 dB gain compression (two-tone)		**Total power at input mixer**
Preamp off	50 MHz to 1.5 GHz	+57 dBmV nominal
Preamp on (Option P03/P07)	50 MHz to 1.5 GHz	+35 dBmV nominal
Displayed average noise level (DANL)		
(Input terminated, sample or average detector, averaging type = Log, 0 dB input attenuation, IF Gain = High, nominal)		
Preamp off	1 to 10 MHz 10 MHz to 1.5 GHz	–89 dBmV –97 dBmV
Preamp on (Option P03/P07)	1 to 10 MHz 10 MHz to 1.5 GHz	–108 dBmV –113 dBmV
Second harmonic distortion (SHI)		
Preamp off (Input level +28.75 dBmV, input attenuation 10 dB)	10 to 750 MHz	+95 dBmV nominal
Preamp on (Option P03/P07) (Input level +8.75 dBmV, input attenuation 10 dB)	10 to 750 MHz	+63 dBmV nominal
Third-order intermodulation distortion (TOI)		
Preamp off (Two +28.75 dBmV tones at input mixer spaced by 100 kHz, 0 dB attenuation)	10 MHz to 1.5 GHz	+62 dBmV nominal
Preamp on (Option P03/P07) (Two +3.75 dBmV tones at input mixer spaced by 100 kHz, 0 dB attenuation)	10 MHz to 1.5 GHz	+40 dBmV nominal
Input voltage standing wave ratio (VSWR)		
Preamp off (10 dB attenuation)	1 MHz to 1.5 GHz	< 1.4:1 nominal
Preamp on (Option P03/P07) (0 dB attenuation)	1 MHz to 1.5 GHz	< 1.4:1 nominal

1. *Not available on microwave CXA (Option 513 or 526).*

General Specifications

Temperature range	
Operating	5 to 50 °C
Storage	–40 to 70 °C

EMC

Complies with European EMC Directive 2004/108/EC
- IEC/EN 61326-1 or IEC/EN 61326-2-1
- CISPR Pub 11 Group 1, class A
- 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 73/23/EEC, amended by 93/68/EEC
- IEC/EN 61010-1 2nd Edition
- Canada: CSA C22.2 No. 61010-1
- USA: UL 61010-1 2nd Edition

Audio noise	
Acoustic noise emission	Geraeuschemission
LpA < 70 dB	LpA < 70 dB
Operator position	Am Arbeitsplatz
Normal position	Normaler Betrieb
Per ISO 7779	Nach DIN 45635 t.19

Environmental stress

Samples of this product have been type tested in accordance with the Agilent 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 (nominal)	100 to 120 V, 50/60/400 Hz 220 to 240 V, 50/60 Hz
Power consumption	
On	270 W maximum
Standby	20 W

Display	
Resolution	1024 x 768, XGA
Size	213 mm (8.4 in.) diagonal (nominal)

Data storage	
Internal	80 GB nominal (removable solid state drive)
External	Supports USB 2.0 compatible memory devices

Weight (without options)	
Net	15.4 kg (34.0 lbs)
Shipping	27.4 kg (60.4 lbs)

Dimensions	
Height	177 mm (7.0 in)
Width	426 mm (16.8 in)
Length	368 mm (14.5 in)

Warranty

The CXA signal analyzer is supplied with a one-year warranty

Calibration cycle

The recommended calibration cycle is one year; calibration services are available through Agilent service centers

Inputs and Outputs

Front panel	
RF input	
Connector	Type-N female, 50 Ω nominal
RF input (Option C75)	
Connector	Type-N female, 75 Ω nominal
RF output (Option T03 or T06)	
Connector	Type-N female, 50 Ω 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
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	10 MHz ± nominal
Frequency lock range	± 5 x 10^{-6} of specified external reference input frequency
Trigger 1 input	
Connector	BNC female
Impedance	> 10 kΩ nominal
Trigger level range	–5 to 5 V
Trigger 1 output	
Connector	BNC female
Impedance	50 Ω nominal
Level	5 V TTL nominal
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
SNS Series noise source	
Analog out	
Connector	BNC female
USB 2.0 ports	
Master (4 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

Rear panel (continued)	
LAN TCP/IP interface	
Standard	1000Base-T
Connector	RJ45 Ethertwist
Sync (reserved for future use)	
Connector	BNC female
IF output	
Connector	SMA female
Impedance	50 Ω nominal
Wideband IF output, Option CR3[1]	
Center frequency	
SA mode or I/Q analyzer	322.5 MHz
Conversion gain	–4 to +7 dB (nominal) plus RF frequency response
Bandwidth	
Low band	Up to 120 MHz (nominal)
High band	Up to 40 MHz (nominal)

1. Not available on microwave CXA (Option 513 or 526).

I/Q Analyzer

Frequency

Frequency span	
Standard instrument	10 Hz to 10 MHz
Option B25	10 Hz to 25 MHz

Resolution bandwidth (spectrum measurement)

Range	
Overall	100 mHz to 3 MHz
Span = 1 MHz	50 Hz to 1 MHz
Span = 10 kHz	1 Hz to 10 kHz
Span = 100 Hz	100 mHz to 100 Hz

Window shapes

Flat top, Uniform, Hanning, Gaussian, Blackman, Blackman-Harris, Kaiser Bessel (K-B 70 dB, K-B 90 dB and K-B 110 dB)

Analysis bandwidth

Standard instrument	10 Hz to 10 MHz
Option B25	10 Hz to 25 MHz

IF frequency response (standard 10 MHz IF path)

IF frequency response (demodulation and FFT response relative to the center frequency, 20 to 30 °C)

Center frequency (GHz)	Span (MHz)	Max. error	RMS (nominal)
≤ 3.0	≤ 10	± 0.45 dB	0.03 dB
3.0 < f ≤ 7.5	≤ 10	± 0.45 dB	0.25 dB

IF phase linearity (deviation from mean phase linearity, nominal)

Center frequency (GHz)	Span (MHz)	Peak-to-peak	RMS
≤ 3.0	≤ 10	± 0.5 °	0.2 °
3.0 < f ≤ 7.5	≤ 10	± 1.5 °	0.4 °

Data acquisition (standard 10 MHz IF path)

Time record length	4,000,000 IQ sample pairs
Sample rate	30 MSa/s
ADC resolution	14 Bits

Option B25 25 MHz analysis bandwidth

IF frequency response (demodulation and FFT response relative to the center frequency, 20 to 30 °C)

Center frequency (GHz)	Span (MHz)	Max. error	RMS (nominal)
≤ 3.0	10 to ≤ 25	± 0.45 dB	0.03 dB
3.0 < f ≤ 7.5	10 to ≤ 25	± 0.45 dB	0.65 dB

IF phase linearity (deviation from mean phase linearity, nominal)

Center frequency (GHz)	Span (MHz)	Peak-to-peak	RMS
0.02 ≤ f < 3.0	10 to ≤ 25	± 0.8 °	± 0.3 °
3.0 < f ≤ 7.5	10 to ≤ 25	± 1.5 °	± 0.4 °

Data acquisition (B25 IF path)

Time record length	
IQ analyzer	4,000,000 IQ sample pairs
Sample rate	90 MSa/s
ADC resolution	14 Bits

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Related Literature

Brochure 5990-3927EN

Configuration Guide 5990-4341EN

For more information or literature resources please visit the web:
www.agilent.com/find/cxa

Web

Product page:
www.agilent.com/find/N9000A

X-Series measurement applications:
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X-Series signal analyzers:
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