



CXA



## CXA X-Series Signal Analyzer N9000A

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

Data Sheet



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## 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.  $2\sigma$ ) 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](http://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	$\pm$ [(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	$\leq 0.25$ Hz p-p in 20 ms nominal $\leq 10$ Hz p-p in 20 ms nominal	

**Frequency readout accuracy (start, stop, center, marker)**  
 $\pm$  (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	$\pm$ (marker frequency x frequency reference accuracy + 0.100 Hz)	
Delta counter accuracy	$\pm$ (delta frequency x frequency reference accuracy + 0.141 Hz)	
Counter resolution	0.001 Hz	
Frequency span (FFT and swept mode)		
Range	0 Hz (zero span), 10 Hz to maximum frequency of instrument	
Resolution	2 Hz	
Accuracy		
Swept	$\pm$ (0.25 % x span + horizontal resolution)	
FFT	$\pm$ (0.10 % x span + horizontal resolution)	
Sweep time and triggering		
Range	Span = 0 Hz Span $\geq$ 10 Hz	1 $\mu$ s to 6000 s 1 ms to 4000 s
Accuracy	Span $\geq$ 10 Hz, swept Span $\geq$ 10 Hz, FFT Span = 0 Hz	$\pm$ 0.01 % nominal $\pm$ 40 % nominal $\pm$ 1 % nominal
Trigger	Free run, line, video, external 1, RF burst, periodic timer	
Trigger delay	Span = 0 Hz or FFT Span $\geq$ 10 Hz, swept Resolution	-150 to +500 ms 1 $\mu$ s to 500 ms 0.1 $\mu$ s
Time gating		
Gate methods	Gated LO; gated video; gated FFT	
Gate length range (except method = FFT)	100.0 ns 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 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)	$\pm$ 1.0 % ( $\pm$ 0.044 dB) nominal $\pm$ 2.0 % ( $\pm$ 0.088 dB) nominal $\pm$ 0.07 dB nominal $\pm$ 0.15 dB nominal $\pm$ 0.25 dB nominal
Bandwidth accuracy (-3.01 dB)	1 Hz to 1.3 MHz	$\pm$ 2 % nominal
RBW range		
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 <sup>1</sup> required)
EMI bandwidth (MIL STD 461E compliant)	10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz	(Option EMC or W6141A <sup>1</sup> required)
Analysis bandwidth <sup>2</sup>		
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	$\pm$ 6 % nominal	
Measurement speed <sup>3</sup>		
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
MW (Option 513/526)	Preamp on	100 kHz to 7.5 GHz	Displayed average noise level (DANL) to +15 dBm
	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	0 to 50 dB in 10 dB steps	
	Option FSA	0 to 50 dB in 2 dB steps	
MW (Option 513, 526)	Standard	0 to 70 dB in 10 dB steps	
	Option FSA	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 $\geq$ 20 dB, preamp off	
	10 dBm (10 mW)	Input attenuation $\geq$ 20 dB, preamp on	
MW (Option 513, 526)	+30 dBm (1 W)	Input attenuation $\geq$ 10 dB, preamp off	
	+30 dBm (1 W)	Input attenuation $\geq$ 20 dB, preamp on	
Peak pulse power			
	+50 dBm (100 W)	< 10 $\mu$ s pulse width, < 1 % duty cycle, input attenuation $\geq$ 30 dB	
DC volts			
RF (Option 503, 507)	AC coupled	$\pm$ 50 Vdc	
MW (Option 513, 526)	AC coupled	$\pm$ 50 Vdc	
	DC coupled	$\pm$ 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, dB $\mu$ V, dBmA, dB $\mu$ A, V, W, A		
Frequency response		Specification	95th percentile ( $\approx$ 2 $\sigma$ )
(10 dB input attenuation, 20 to 30 °C, $\sigma$ = nominal standard deviation)			
RF (Option 503, 507)	9 kHz to 10 MHz	$\pm$ 0.60 dB	$\pm$ 0.45 dB
	10 MHz to 3 GHz	$\pm$ 0.75 dB	$\pm$ 0.55 dB
	3 to 5.25 GHz	$\pm$ 1.45 dB	$\pm$ 1.00 dB
	5.25 to 7.5 GHz	$\pm$ 1.65 dB	$\pm$ 1.20 dB
MW (Option 513, 526)	9 kHz to 10 MHz	$\pm$ 0.8 dB	$\pm$ 0.5 dB
	10 MHz to 3 GHz	$\pm$ 0.65 dB	$\pm$ 0.4 dB
	3 to 7.5 GHz	$\pm$ 1.5 dB	$\pm$ 0.5 dB
	7.5 to 13.6 GHz	$\pm$ 2.0 dB	$\pm$ 0.8 dB
	13.6 to 19 GHz	$\pm$ 2.0 dB	$\pm$ 1.0 dB
	19 to 26.5 GHz	$\pm$ 2.5 dB	$\pm$ 1.3 dB
Preamp on			
RF (Option 503, 507) (P03, P07)	100 kHz to 3 GHz	$\pm$ 0.70 dB	
	3 to 5.25 GHz	$\pm$ 0.85 dB	
	5.25 to 7.5 GHz	$\pm$ 1.35 dB	
MW (Option 513, 526) (P03, P07, P13, P26)	100 kHz to 3 GHz	$\pm$ 0.7 dB	
	3 to 13.6 GHz	$\pm$ 1.0 dB	
	13.6 to 19 GHz	$\pm$ 1.1 dB	
	19 to 26.5 GHz	$\pm$ 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			
<b>(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)</b>			
	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		–170 to +23 dBm in 0.01 dB steps	
Linear scale		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 dBm nominal	
		7.5 to 13.6 GHz		+3 dBm nominal	
		13.6 to 26.5 GHz		+0 dBm nominal	
	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	
	<b>Image responses</b>	10 MHz to 26.5 GHz	-10 dBm	-60 dBc typical	
	<b>LO-related spurious</b>	10 MHz to 3 GHz	-10 dBm	-64 dBc typical	
	<b>Other spurious responses</b>				
		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

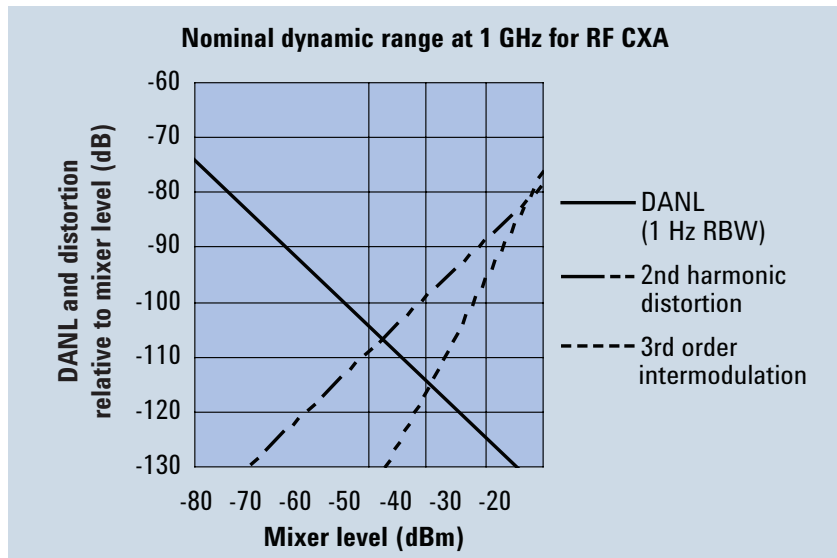


Figure 1. Nominal dynamic range for Options 503 and 507 – Band 0, for second and third order distortion, 10 MHz to 3 GHz

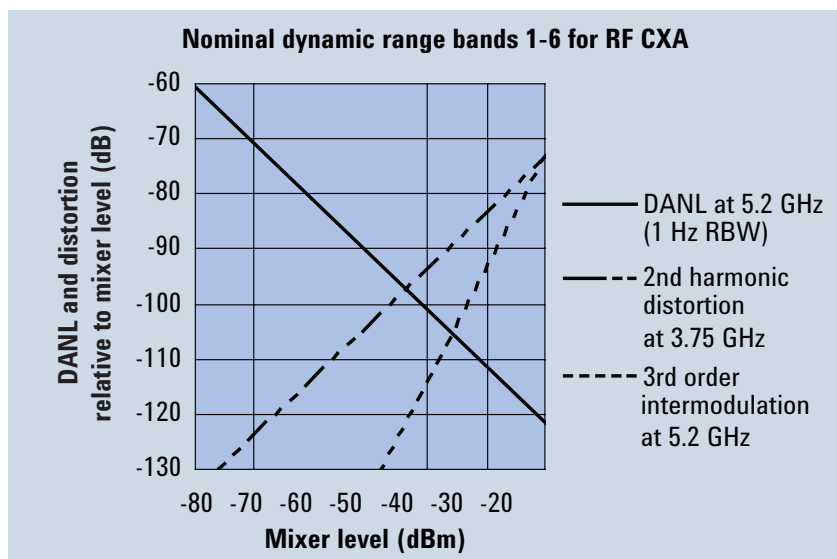


Figure 2. Nominal dynamic range for Options 503 and 507 – Bands 1 to 6, for second and third order distortion, 3 GHz to 7.5 GHz

# Nominal dynamic range for Options 513 and 526

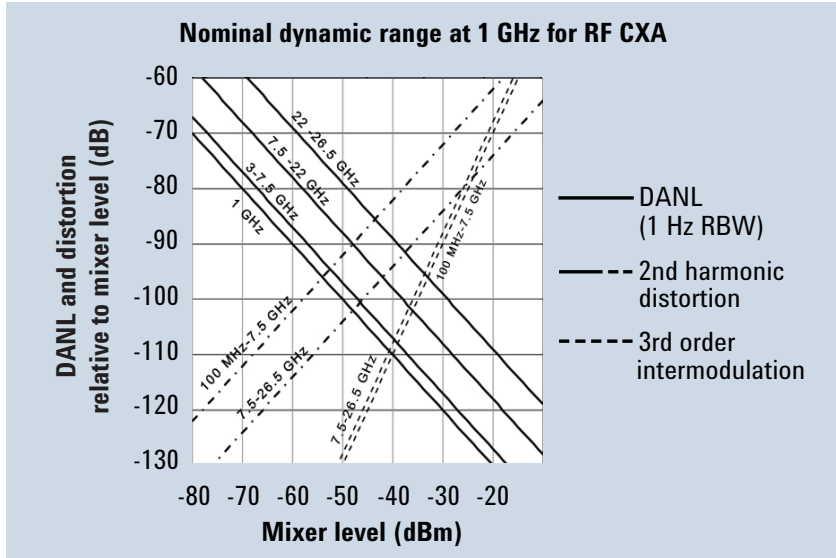


Figure 3. Nominal dynamic range for option 513/526, for second and third order distortion, 100 MHz to 26.5 GHz

Phase noise <sup>1</sup>	Offset	Specification	Typical
<b>Noise sidebands (20 to 30 °C, CF = 1 GHz)</b>			
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.

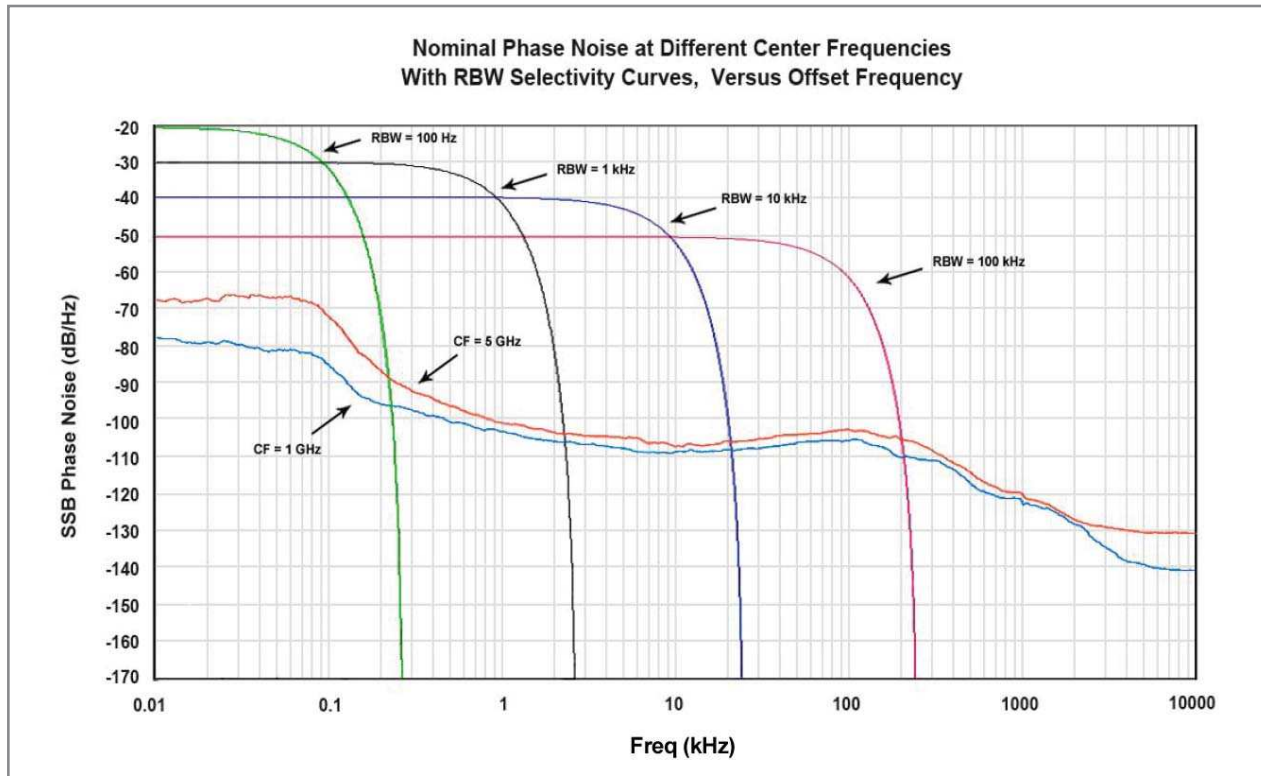


Figure 4. Nominal phase noise at different center frequencies for RF CXA (Option 503 or 507)

Phase noise <sup>1</sup>	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.

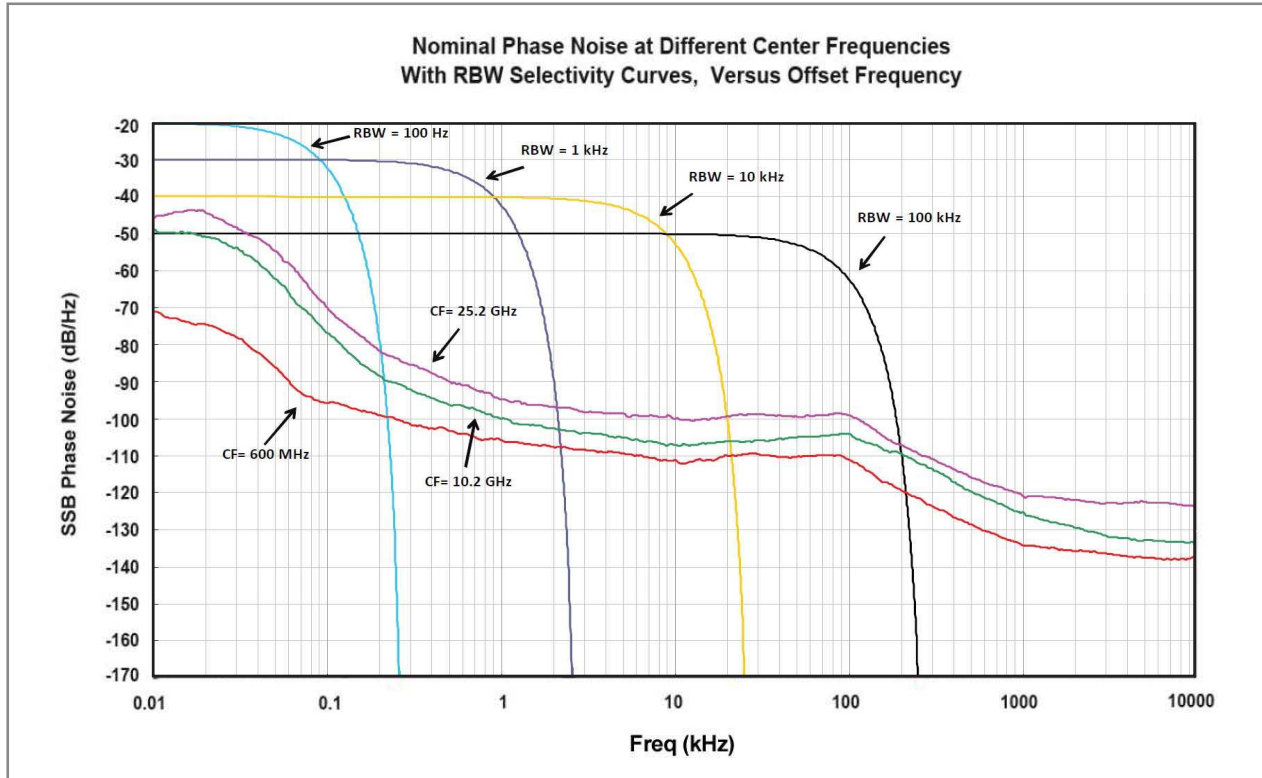


Figure 5. Nominal phase noise at different center frequencies for MW CXA (Option 513 or 526)

# 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 <sup>1</sup>	9 kHz to 3 GHz	
Option T06 <sup>1</sup>	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 ( $\approx 2\sigma$ )
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 <sup>1</sup>	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 $\Omega$ nominal
RF input (Option C75) Connector	Type-N female, 75 $\Omega$ nominal
RF output (Option T03 or T06) Connector	Type-N female, 50 $\Omega$ nominal
Probe power Voltage/current	+15 Vdc, $\pm 7\%$ at 150 mA max. nominal –12.6 Vdc, $\pm 10\%$ at 150 mA max. nominal
USB 2.0 ports Master (2 ports) Standard Connector Output current	Compatible with USB 2.0 USB Type-A female 0.5 A nominal
Rear panel	
10 MHz out Connector Output amplitude Frequency	BNC female, 50 $\Omega$ nominal $\geq 0$ dBm nominal 10 MHz $\pm$ (10 MHz x frequency reference accuracy)
Ext Ref In Connector Input amplitude range Input frequency Frequency lock range	BNC female, 50 $\Omega$ nominal –5 to 10 dBm nominal 10 MHz $\pm$ nominal $\pm 5 \times 10^{-6}$ of specified external reference input frequency
Trigger 1 input Connector Impedance Trigger level range	BNC female > 10 k $\Omega$ nominal –5 to 5 V
Trigger 1 output Connector Impedance Level	BNC female 50 $\Omega$ nominal 5 V TTL nominal
Monitor output Connector Format Resolution	VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB 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 Connector Output current Slave (1 port) Standard Connector Output current	Compatible with USB 2.0 USB Type-A female 0.5 A nominal Compatible with USB 2.0 USB Type-B female 0.5 A nominal
GPIO interface Connector GPIO codes GPIO mode	IEEE-488 bus connector SH1, AH1, T6, SR1, RL1, PP0, DC1, C1, C2, C3, C28, DT1, L4, C0 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 $\Omega$ nominal
Wideband IF output, Option CR3 <sup>1</sup>	
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	4,000,000 IQ sample pairs		
IQ analyzer			
Sample rate	90 MSa/s		
ADC resolution	14 Bits		

## Related Literature

*Brochure* 5990-3927EN

*Configuration Guide* 5990-4341EN

For more information or literature resources please visit the web:  
[www.agilent.com/find/cxa](http://www.agilent.com/find/cxa)

## Web

Product page:  
[www.agilent.com/find/N9000A](http://www.agilent.com/find/N9000A)

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