

Advanced Test Equipment Rentals www.atecorp.com 800-404-ATEC (2832)





N9030A PXA X-Series Signal Analyzer

Data Sheet

LXI class C certified

Available frequncy ranges						
N9030A-503	3 Hz to 3.6 GHz					
N9030A-508	3 Hz to 8.4 GHz					
N9030A-513	3 Hz to 13.6 GHz					
N9030A-526	3 Hz to 26.5 GHz					
N9030A-543	3 Hz to 43 GHz					
N9030A-544	3 Hz to 44 GHz					
N9030A-550	3 Hz to 50 GHz					



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Agilent's future-ready PXA signal analyzer is the evolutionary replacement for your current highperformance 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.

This PXA signal analyzer data sheet is a summary of the complete specifications and conditions. The complete PXA Signal Analyzer Specification Guide can be obtained from the web at:

www.agilent.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	\pm [(time since last adjustment x agin	g 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 × 10 ⁻⁸		
Example frequency reference accuracy 1 year after last adjustment 20 to 30 °C	$= \pm (1 \times 1 \times 10^{-7} + 1.5 \times 10^{-8} + 4 \times 1)$ $= \pm 1.55 \times 10^{-7}$	0-8)	
Residual FM Center frequency = 1 GHz 10 Hz RBW, 10 Hz VBW	≤ (0.25 Hz x N) p-p in 20 ms nomin See band table above for N (LO mu		
Frequency readout accuracy (start, s	top, center, marker)		
± (marker frequency x frequency reference a	ccuracy + 0.10% x span + 5% x RBW +	+ 2 Hz + 0.5 x horizontal resolution 1)	
Marker frequency counter			
Accuracy	± (marker frequency x frequency re	ference 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 mod			
Range	0 Hz (zero span), 10 Hz to maximum	n frequency of instrument	
Resolution	2 Hz		
Accuracy Swept FFT	± (0.1% x span + horizontal resolut ± (0.1% x span + horizontal resolut		

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 Span ≥ 10 Hz, swept	± 0.01% nominal
Accuracy	Span \geq 10 Hz, Swept Span \geq 10 Hz, FFT	\pm 40% nominal
	Span = 0 Hz	\pm 0.01% nominal
Sweep trigger	Free run, line, video, external 1, exte	ernal 2, RF burst, periodic timer
Trigger Delay	Span = 0 Hz or FFT	–150 to +500 ms
	Span ≥ 10 Hz, swept	0 to 500 ms
	Resolution	0.1 µs
Time gating		
Gate methods	Gated LO; gated video; gated FFT	
Gate length range (except method = FFT) Gate delay range	1 µs to 5.0 s 0 to 100.0 s	
Gate delay lange 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	3 MHz
Bandwidth accuracy (power)	1 Hz to 100 kHz	± 0.5% (± 0.022 dB)
RBW range	110 kHz to 1.0 MHz (< 3.6 GHz CF)	± 1.0% (± 0.044 dB)
	1.1 to 2 MHz (< 3.6 GHz CF)	± 0.07 dB nominal
	2.2 to 3 MHz (< 3.6 GHz CF) 4 to 8 MHz (< 3.6 GHz CF)	± 0.10 dB nominal ± 0.20 dB nominal
Bandwidth accuracy (–3.01 dB)	4 10 0 10112 (< 3.0 0112 01)	
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	10 MHz
	Option B25	25 MHz
	Option B40	40 MHz
	Option B1X	160 MHz
Video bandwidth (VBW)		
Range	1 Hz to 3 MHz (10% steps), 4, 5, 6, 8	3 MHz, and wide open (labeled 50 MHz)
Accuracy	± 6% nominal (in swept mode and z	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	
	43 ms nominal 69 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	Displayed average noise	e level (DANL) to maximum	safe input level
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 Full attenuation range (mechanical + electronic)	0 to 24 dB, 1 dB steps 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 \geq 30 dB
DC volts DC coupled AC coupled	± 0.2 Vdc ± 100 Vdc (For frequenc	y Option 503, 508, 513, or 52	26)
Display range			
Log scale	0.1 to 1 dB/division in 0 1 to 20 dB/division in 1	.1 dB steps dB steps (10 display divisio	ns)
Linear scale	10 divisions		
Scale units	dBm, dBmV, dBµV, dBm	A, dBµA, V, W, A	
Frequency response		Specification	95th percentile (≈ 2σ)
(10 dB input attenuation, 20 to 30 °	C, preselector centering app	lied above 3.6 GHz)	
RF/MW (Option 503, 508, 513, 526)	3 Hz to 10 MHz 10 to 20 MHz 20 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 22.0 GHz 22.0 to 26.5 GHz	\pm 0.46 dB \pm 0.35 dB \pm 0.35 dB \pm 1.5 dB \pm 2.0 dB \pm 2.0 dB \pm 2.5 dB	± 0.16 dB ± 0.39 dB ± 0.45 dB ± 0.62 dB ± 0.82 dB
Millimeter-Wave (Option 543, 544, 550)	3 Hz to 20 MHz 20 to 50 MHz 50 MHz to 3.6 GHz 3.5 to 5.2 GHz 5.2 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17.1 GHz 17.0 to 22.0 GHz 22.0 to 26.5 GHz 26.4 to 34.5 GHz 34.4 to 50 GHz	\pm 0.46 dB \pm 0.35 dB \pm 0.35 dB \pm 1.7 dB \pm 1.5 dB \pm 2.0 dB \pm 2.0 dB \pm 2.0 dB \pm 2.5 dB \pm 2.5 dB \pm 3.2 dB	\pm 0.19 dB \pm 0.15 dB \pm 0.70 dB \pm 0.57 dB \pm 0.54 dB \pm 0.64 dB \pm 0.72 dB \pm 0.71 dB \pm 0.93 dB \pm 1.24 dB
Preamp on (0 dB attenuation) (Opti	on P03, P08, P13, P26, P43, I	P44, P50)	
RF/MW (Option 503, 508, 513, 526)	9 to 100 kHz 100 kHz to 50 MHz 50 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17.1 GHz 17.0 to 22.0 GHz 22.0 to 26.5 GHz	\pm 0.68 dB \pm 0.55 dB \pm 2.0 dB \pm 2.3 dB \pm 2.5 dB \pm 3.0 dB \pm 3.5 dB	$\begin{array}{c} \pm \ 0.36 \ dB \\ \pm \ 0.26 \ dB \\ \pm \ 0.28 \ dB \\ \pm \ 0.64 \ dB \\ \pm \ 0.76 \ dB \\ \pm \ 0.95 \ dB \\ \pm \ 1.41 \ dB \\ \pm \ 1.61 \ dB \end{array}$

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 awitching und			Additional information
Input attenuation switching unc	ertainty	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 accura		1. 10 to 50 dBm all cottings out	a acualed avecant
(10 dB attenuation, 20 to 30 °C, 1 H	Iz ≤ RBW ≤ 1 MHz, input signa		p-coupled except
	$z \le RBW \le 1 MHz$, input signance level, any scale, $\sigma = nominante$	al standard deviation)	o-coupled except
(10 dB attenuation, 20 to 30 °C, 1 H	iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz	al standard deviation) ± 0.24 dB	
(10 dB attenuation, 20 to 30 °C, 1 H	iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon	se)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen	Iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies 10 Hz to 3.6 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app	se) rox. 2σ)
(10 dB attenuation, 20 to 30 °C, 1 H	iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon	se) rox. 2σ)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50)	Iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app	se) rox. 2σ)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50)	Iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app	se) rox. 2σ)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati	Iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon	se) rox. 2σ) se)
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(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati	Iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies io (VSWR) 50 MHz 10 MHz to 3.6 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati	Iz ≤ RBW ≤ 1 MHz, input signa nce level, any scale, σ = nomina At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies io (VSWR) 50 MHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati	$dz \le RBW \le 1$ MHz, input signation ince level, any scale, $\sigma = nomina$ At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies io (VSWR) 50 MHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.178 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati	$dz \le RBW \le 1$ MHz, input signation incellevel, any scale, $\sigma = nomina$ At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies io (VSWR) 50 MHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17.1 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.178 (95th percentile) 1.204 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati	$z \le RBW \le 1$ MHz, input signa acce level, any scale, $\sigma = nomina$ At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies io (VSWR) 50 MHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17.1 GHz 17.0 to 26.5 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.178 (95th percentile) 1.204 (95th percentile) 1.331 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati	$dz \le RBW \le 1$ MHz, input signation incelevel, any scale, $\sigma = nomina$ At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies io (VSWR) 50 MHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17.1 GHz 17.0 to 26.5 GHz 26.4 to 34.5 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile) NA	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.178 (95th percentile) 1.204 (95th percentile) 1.331 (95th percentile) 1.321 (95th percentile)
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(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati (10 dB input attenuation) Preamp on (0 dB input attenuation)	$dz \le RBW \le 1$ MHz, input signa acce level, any scale, $\sigma = nomina$ At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies io (VSWR) 50 MHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17.1 GHz 17.0 to 26.5 GHz 26.4 to 34.5 GHz 34.4 to 50 GHz 10 MHz to 3.6 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile) NA NA 1.45 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.204 (95th percentile) 1.331 (95th percentile) 1.321 (95th percentile) 1.378 (95th percentile) 1.378 (95th percentile) 1.393 nominal
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati (10 dB input attenuation) (10 dB input attenuation) Preamp on (0 dB input attenuation) (Option P03. P08, P13, P26, P43,	$dz \le RBW \le 1$ MHz, input signation incelevel, any scale, $\sigma = nomina$ At 50 MHz At all frequencies 10 Hz to 3.6 GHz At all frequencies 50 MHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17.1 GHz 17.0 to 26.5 GHz 26.4 to 34.5 GHz 34.4 to 50 GHz 10 MHz to 3.6 GHz 3.5 to 8.4 GHz	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile) NA NA 1.45 (95th percentile) 1.54 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.204 (95th percentile) 1.331 (95th percentile) 1.321 (95th percentile) 1.378 (95th percentile) 1.393 nominal 1.50 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati (10 dB input attenuation) (10 dB input attenuation) Preamp on (0 dB input attenuation) (Option P03. P08, P13, P26, P43,	$\begin{aligned} z &\leq \text{RBW} &\leq 1 \text{ MHz, input signa} \\ \text{ace level, any scale, } \sigma &= \text{nomina} \\ \text{At 50 MHz} \\ \text{At all frequencies} \\ 10 \text{ Hz to 3.6 GHz} \\ \text{At all frequencies} \\ \hline \text{At all frequencies} \\ \hline \text{o (VSWR)} \\ \hline \hline \\ \hline $	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile) NA NA 1.45 (95th percentile) 1.54 (95th percentile) 1.57 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.204 (95th percentile) 1.331 (95th percentile) 1.378 (95th percentile) 1.378 (95th percentile) 1.393 nominal 1.50 (95th percentile) 1.310 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati (10 dB input attenuation) (10 dB input attenuation) Preamp on (0 dB input attenuation) (Option P03. P08, P13, P26, P43,	$\begin{aligned} z &\leq \text{RBW} &\leq 1 \text{ MHz, input signa} \\ \text{ace level, any scale, } \sigma &= \text{nomina} \\ \text{At 50 MHz} \\ \text{At all frequencies} \\ 10 \text{ Hz to 3.6 GHz} \\ \text{At all frequencies} \\ \end{aligned}$	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile) NA NA 1.45 (95th percentile) 1.54 (95th percentile) 1.57 (95th percentile) 1.48 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.204 (95th percentile) 1.331 (95th percentile) 1.378 (95th percentile) 1.378 (95th percentile) 1.393 nominal 1.50 (95th percentile) 1.310 (95th percentile) 1.330 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43,	$\begin{aligned} z &\leq \text{RBW} &\leq 1 \text{ MHz, input signa} \\ \text{ace level, any scale, } \sigma &= \text{nomina} \\ \text{At 50 MHz} \\ \text{At all frequencies} \\ 10 \text{ Hz to 3.6 GHz} \\ \text{At all frequencies} \\ \end{aligned}$	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile) NA NA 1.45 (95th percentile) 1.54 (95th percentile) 1.48 (95th percentile) 1.48 (95th percentile) 1.54 (95th percentile) 1.54 (95th percentile) 1.54 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.204 (95th percentile) 1.321 (95th percentile) 1.321 (95th percentile) 1.378 (95th percentile) 1.393 nominal 1.50 (95th percentile) 1.310 (95th percentile) 1.330 (95th percentile) 1.330 (95th percentile) 1.339 (95th percentile)
(10 dB attenuation, 20 to 30 °C, 1 H Auto Swp Time = Accy, any referen Preamp on (Option P03, P08, P13, P26, P43, P44 and P50) Input voltage standing wave rati (10 dB input attenuation) (10 dB input attenuation) Preamp on (0 dB input attenuation) (Option P03. P08, P13, P26, P43,	$\begin{aligned} z &\leq \text{RBW} &\leq 1 \text{ MHz, input signa} \\ \text{ace level, any scale, } \sigma &= \text{nomina} \\ \text{At 50 MHz} \\ \text{At all frequencies} \\ 10 \text{ Hz to 3.6 GHz} \\ \text{At all frequencies} \\ \end{aligned}$	al standard deviation) ± 0.24 dB ± (0.24 dB + frequency respon ± 0.19 dB (95th Percentile app ± (0.36 dB + frequency respon Freq Opt 503, 508, 513, 526 1.07:1 nominal 1.139 (95th percentile) 1.290 (95th percentile) 1.388 (95th percentile) 1.403 (95th percentile) 1.475 (95th percentile) NA NA 1.45 (95th percentile) 1.54 (95th percentile) 1.57 (95th percentile) 1.48 (95th percentile)	se) rox. 2σ) se) Freq Opt 543, 544, 550 1.025:1 nominal 1.134 (95th percentile) 1.152 (95th percentile) 1.204 (95th percentile) 1.331 (95th percentile) 1.378 (95th percentile) 1.378 (95th percentile) 1.393 nominal 1.50 (95th percentile) 1.310 (95th percentile) 1.330 (95th percentile)

Resolution bandwidth switch	ing uncertainty (refer	enced 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 Linear scale Accuracy	–170 to +30 dBm in 0. 707 pV to 7.07 V with 0 dB	01 dB steps 0.11% (0.01 dB) resolution
Display scale switching unce	rtainty	
Switching between linear and log	0 dB	
Log scale/div switching	0 dB	
Display scale fidelity		
Between –10 dBm and –80 dBm input mixer level	± 0.10 dB total	± 0.04 dB typical
Below –18 dBm input mixer level	± 0.07 dB	± 0.02 dB typical
Trace detectors		
Normal, peak, sample, negative pea	k, log power average, RMS	S average, and voltage average
Preamplifier		
Frequency range ¹	Option P03 Option P08 Option P13 Option P26 Option P43 Option P44 Option P50	9 kHz to 3.6 GHz 9 kHz to 8.4 GHz 9 kHz to 13.6 GHz 9 kHz to 26.5 GHz 9 kHz to 43 GHz 9 kHz to 44 GHz 9 kHz to 50 GHz
Gain	9 kHz to 3.6 GHz 3.6 to 26.5 GHz 26.5 to 50 GHz	+20 dB nominal +35 dB nominal +40 dB nominal

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

Dynamic Range Specifications

1 dB gain compression (two-to	ne)	Maximum p	ower at input	mixer	
(At 1 kHz RBW with 100 kHz tone spa					
	20 to 40 MHz 40 to 200 MHz 200 MHz to 3.6 GHz 3.6 to 16 GHz 16 to 26.5 GHz	–3 dBm +1 dBm +3 dBm +1 dBm –1 dBm		0 dBm typic +3 dBm typ +5 dBm typ +4 dBm typ +2 dBm typ	ical ical ical ical
Preamp on (Option P03, P08, P13, P26, P43, P44, and P50)	26.5 to 50 GHz 10 MHz to 3.6 GHz 3.6 to 26.5 GHz Tone spacing 100 Tone spacing > 70 Freq Option ≤ 52 Freq Option > 52 26.5 to 50 GHz) MHz 26		0 dBm nom -14 dBm no -28 dBm no -10 dBm no -20 dBm no -30 dBm no	ominal ominal ominal ominal
Displayed average noise level (Specificatio	n	Typical	
(Input terminated, sample or average detection					o 1 Hz, 20 to 30 °C)
RF/MW (Option 503, 508, 513, 526)		Normal ¹ /LNP			VP enabled ²
Preamp off	3 Hz to 9 kHz 9 to 100 kHz 100 kHz to1 MHz 1 to 10 MHz 10 MHz to 1.2 GHz 1.2 to 2.1 GHz 2.1 to 3.0 GHz 3.0 to 3.6 GHz 3.5 to 4.2 GHz 4.2 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 16.9 GHz 16.9 to 20.0 GHz 20.0 to 26.5 GHz	-146 dBm/NA -150 dBm/NA -155 dBm/NA -155 dBm/NA -153 dBm/NA -152 dBm/NA -151 dBm/NA -147 dBm/-1! -149 dBm/-1! -143 dBm/-1! -143 dBm/-1! -143 dBm/-1!	A A 53 dBm 55 dBm 55 dBm 52 dBm 51 dBm	152 dBm/+ 151 dBm/+ 147 dBm/+ 145 dBm/+	NA typical NA typical NA typical NA typical NA typical NA typical
Preamp on Option P03, P08, P13, P26	100 to 200 kHz 200 to 500 kHz 0.5 to 1 MHz	–157 dBm/NA –160 dBm/NA –164 dBm/NA	۱.	–160 dBm/ –163 dBm/ –166 dBm/	NA typical
Option P03, P08, P13, P26 Option P03, P08, P13, P26 Option P03, P08, P13, P26 Option P08, P13, P26 ³ Option P13, P26 ³ Option P26 ³ Option P26 ³ Option P26 ³	1 to 10 MHz 10 MHz to 2.1 GHz 2.1 to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 16.9 GHz 16.9 to 20.0 GHz 20.0 to 26.5 GHz	-164 dBm/NA -165 dBm/NA -163 dBm/NA -164 dBm/NA -163 dBm/NA -161 dBm/NA -159 dBm/NA -155 dBm/NA		-167 dBm/ -166 dBm/ -164 dBm/ -166 dBm/ -165 dBm/ -162 dBm/ -161 dBm/ -157 dBm/	NA typical NA typical NA typical NA typical NA typical NA typical
DANL with Noise Floor Extension	on (NFE) on		Improve		h percentile
RF/MW (Option 503, 508, 513, 526)			Preamp Off		LNP enabled ^{2, 3}
Band 0, f > 20 MHz Band 1 Band 2 Band 3 Band 4			10 dB 4 dB 7 dB 8 dB 6 dB	9 dB 8 dB 8 dB 8 dB 8 dB 5 dB	NA 5 dB 9 dB 9 dB 7 dB
Examples of effective DANL Frequency 20 to 30 °C Mid-Band 0 (1.8 GHz) Mid-Band 1 (5.95 GHz) Mid-Band 2 (10.95 GHz)	–162 dBm –172 –158 dBm –172 –157 dBm –170	dBm –160 dBm dBm –161 dBm	3		
Mid-Band 3 (15.3 GHz) Mid-Band 4 (21.75 GHz)	–152 dBm –166 –145 dBm –162				

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.

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					ment @ 951	th 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				6 dB	5 dB	6 dB
Band 2				8 dB	8 dB	8 dB
Band 3				9 dB	8 dB	10 dB
Band 4				7 dB	6 dB	8 dB
Band 5				6 dB	6 dB	6 dB
Band 6				6 dB	5 dB	7 dB
Example of effective DANL	Preamp Off	Preamp On	LNP enabled ^{1, 2}			
Frequency 20 to 30 °C						
Mid-Band 0 (1.8 GHz)	–162 dBm	—172 dBm	N/A			
Mid-Band 1 (5.95 GHz)	–151 dBm	—165 dBm	–158 dBm			
Mid-Band 2 (10.95 GHz)	–152 dBm	—165 dBm	–158 dBm			
Mid-Band 3 (15.3 GHz)	–152 dBm	—165 dBm	–158 dBm			
Mid-Band 4 (21.75 GHz)	—149 dBm	—163 dBm	–155 dBm			
Mid-Band 5 (30.4 GHz)	—144 dBm	—160 dBm	—151 dBm			
Mid-Band 6 (42.7 GHz)	—139 dBm	—154 dBm	–147 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.

Residual responses (Input terminated and 0 dB attenuation) 200 Hitz to 84 GHz Zero span or FFT or other frequencies -100 dBm - -100 dBm nominal (Mixer level at -10 dBm) Turned Freq (I) Excitation Freq 10 MHz to 35 GHz 10 MHz to 36 GHz 10 MHz to 30 GHz 10 NHz to 22 GHz 10 MHz to 30 GHz 10 NHz to 20 GHz 10 MHz to 30 GHz 10 D to 22 GHz 10 MHz to 30 GHz 10 D dBm 10	(Input terminated and 0 dB attenuation) Zero span or FFT or other frequencies -100 dBm nominal Image responses Tunede freq (f) Excitation Freq Response (Mixer level at -10 dBm) 10 MHz to 3.6 GHz 10 MHz to 3.6 GHz 10 MHz to 3.6 GHz 10 MHz to 3.6 GHz 13.5 to 17.1 GHz f+45 MHz 1+645 MHz -80 dBc -112 dBc to 10 dBc (Mixer level at -30 dBm) 25 to 13.6 GHz 15 to 17.1 GHz f+645 MHz 1+645 MHz -74 dBc 94 dBc ty 17.0 to 22 GHz f+645 MHz 1+645 MHz -70 dBc 92 dBc ty 17.0 to 22 GHz (Mixer level at -30 dBm) 26 to 13.4 5 GHz 34.4 to 46 GHz 44 to 50 GHz f+645 MHz 1+645 MHz -70 dBc ty 27 to 28.5 GHz -75 dBc -79 dBc ty 27 to 28.5 GHz Carrier frequency ≤ 26.5 GHz First RF order -10 dBm -80 dBc + 20log(N ¹) Including IF feedthroug (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (f ≥ 10 MHz from carrier) -68 dBc ² + 20log(N ¹) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (f ≥ 10 MHz from carrier) <th></th>	
Imput terminated and 0 dB atternation) Zero span or FFT or other frequencies -100 dBm nominal Image responses Tund Freq (f) Excitation Freq F45 MHz -80 dBc -110 dBc typical IMixer fevel at -10 dBm) 10 MHz to 255 GHz 10 MHz to 35 GHz F45 MHz -80 dBc -110 dBc typical IM MHz to 35 GHz 154 SH MHz -80 dBc -110 dBc typical 10 MHz to 35 GHz 154 SH MHz -73 dBc 89 dBc 97 dBc IM Sto 171 GHz 1454 SH MIZ -74 dBc -84 dBc typical 170 to 22 GHz 1464 SH MIZ -73 dBc 97 dBc 147 dBc IM Sto 13 SG CHZ 1464 SH MIZ -73 dBc 98 dBc -73 dBc typical 25 to 34 SG CHZ 1464 SH MIZ -75 dBc 79 dBc typical 34 to 04 GHz 146 dBc -93 dBc -75 dBc -75 dBc Carrier frequency > 24 SG CHZ -90 dBc -90 dBc -75 dBc -75 dBc First RF order -10 dBm -90 dBc nominal -10 dBm -90 dBc		
Image responses Tuned Freq (f) Excitation Freq Response (Mixer level at -10 dBm) 10 MHz to 26.5 GHz 14.45 MHz -80 dBc -112 dBc typical 10 MHz to 3.6 GHz 14.45 MHz -80 dBc -112 dBc typical 10 MHz to 3.6 GHz 14.465 MHz -80 dBc -112 dBc typical 13.5 to 17.0 GHz 14.465 MHz -74 dBc -80 dBc typical 17.0 to 22 GHz 14.465 MHz -74 dBc -70 dBc typical 12.5 to 13.5 GHz 14.465 MHz -74 dBc -70 dBc typical 22 to 25.5 GHz 14.465 MHz -74 dBc -70 dBc typical 14.4 to 50 GHz 14.645 MHz -76 dBc -76 dBc typical 14.4 to 50 GHz 14.645 MHz -76 dBc -76 dBc typical 14.5 to MHz from carrier) -10 dBm -80 dBc + 20log(N') Including ligher order mixer responses (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal - Higher RF order -30 dBm -90 dBc nominal - (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal - Higher RF order		
(Mixer level at -10 dBm) 10 MHz to 24.5 GHz 446 MHz -80 dBc -112 dBc typical 10 MHz to 38 GHz 14 0 MHz to 38 GHz 14 0 MHz -80 dBc -112 dBc typical 13 5to 17.1 GHz 14 0 MHz 14 0 MHz -80 dBc -112 dBc typical 13 5to 17.1 GHz 14 045 MHz -80 dBc -80 dBc typical -80 dBc 17.1 to 22 GHz 14 045 MHz -78 dBc -80 dBc typical -80 dBc 17.1 to 22 GHz 14 045 MHz -78 dBc -80 dBc -90 dBc typical 17.1 to 22 GHz 14 045 MHz -80 dBc -80 dBc -80 dBc -90 dBc typical 17.1 to 22 GHz 14 045 MHz -80 dBc	(Mixer level at -10 dBm) 10 MHz to 26.5 GHz 10 MHz to 3.6 GHz 10 MHz to 3.6 GHz 10 MHz to 3.6 GHz 13.5 to 13.8 GHz 13.5 to 13.8 GHz 13.5 to 13.8 GHz 13.5 to 17.1 GHz 14.645 MHz 13.5 to 17.1 GHz 14.645 MHz 17.0 to 22 GHz 14.645 MHz 14.645 MHz 15.0 GHz 14.645 MHz 17.0 dBm 10.6 GHz 14.645 MHz 15.0 GHz 14.645 MHz 15.0 GHz 14.645 MHz 15.0 GHz 14.645 MHz 15.0 GHz 14.645 MHz 15.0 GHz 14.645 MHz 15.0 GHz 14.0 GHz 14.0 GHz 14.0 GHz 14.0 GHz 14.0 GHz 14.0 GHz 14.0 GHz 14.0 GHz 15.0 GHz 15.0 GHz 15.0 GHz 15.0 GHz 15.0 GHz 10.0 MHz from carrier) Higher RF order 12.0 GHz 15.0 GHz 15.0 GHz 15.0 GHz 10.0 100 MHz 10.0 10.0 CHz 10.0 10.0 CHz 10.0 MHz 10.0 MHz 10.0 10.0 CHz 10.0 MHz 10.0 10.0 CHz 10.0 MHz 10.0 MHz 10.0 MHz 10.0 10.0 CHz 1	
10 MHz to 3.6 GHz 10 MHz to 3.6 GHz 35 to 13.6 GHz 13 5 to 17.1 GHz 14 465 MHz 22 to 22 GHz 17 0 to 22 GHz 17 0 to 22 GHz 17 0 to 22 GHz 12 to 22 GHz 14 465 MHz 22 to 22 GHz 14 465 MHz 23 40 GHz 14 465 GHz 14 465 GHz 14 465 GHz 14 465 GHz 14 465 GHz 14 465 GHz 14 645 MHz 10 GHz 14 645 GHz 14 645 MHz 10 GHz 10 MHz from carrier) Higher RF order (f ≥ 10 MHz from carrier) Higher RF order (f	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	
10 MHz to 3.6 GHz 14-645 MHz -80 dBc -101 dBc typical 3.5 to 13.6 GHz 14-645 MHz -74 dBc	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	pical
35 to 13.6 GHz 1446 MHz -74 Bbc -87 dBc typical 135 to 12.6 GHz 14463 MHz -74 Bbc -82 dBc typical (Mixer level at -30 dBm) 26.5 to 34.5 GHz 144645 MHz -70 dBc -82 dBc typical 22 to 26.5 GHz 144645 MHz -68 dBc -70 dBc typical -88 dBc -	35 to 13.6 GHz f+645 MHz -78 dBc -87 dBc ty 13.5 to 17.1 GHz 13 5 to 17.1 GHz f+645 MHz -74 dBc -84 dBc ty 17.0 to 22 GHz (Mixer level at -30 dBm) 26.5 to 34.5 GHz f+645 MHz -68 dBc -79 dBc ty 17.0 to 22 GHz (Mixer level at -30 dBm) 26.5 to 34.5 GHz f+645 MHz -68 dBc -79 dBc ty 44 to 50 GHz f+645 MHz -76 dBc -94 dBc ty 44 to 50 GHz Chrer spurious responses Mixer level Response -75 dBc nd -75 dBc nd Carrier frequency 26.5 GHz First RF order -10 dBm -80 dBc + 20log(N ¹) Including IF feedthroug (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal -68 dBc ² + 20log(N ¹) (Do the fr order -30 dBm -90 dBc nominal -10 ta 13.0 GHz -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -57 dBc/NA -73 dBc ² + 20log(N ¹) (nominal) -57 dBc/NA (Option 503, 508, 513, 526) -15 ta 25 GHz -15 dBm -77 dBc/NA -73 dBc ² + 20log(N ¹) (nominal) Second harmon	
13.5 to 17.1 GHz 174 for 2 GHz 174 for 3 GHZ <th1< td=""><td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td><td></td></th1<>	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	
17.0 to 22 GHz 17.4 to 20 GHZ 17.4 to	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	
Image: style	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	
(Mixer level at -30 dBm) 26.5 to 34.5 GHz 34.4 to 44 GHz 44 to 50 GHz 44 to 50 GHz Fr4645 MHz Fr4645 MHz Fr465 MHz -79 dBc typical -79 dBc typical -70 dBc typical -7		
34.4 to 44 GHz 4+645 MHz -57 dBc - 79 dBc typical 44 to 50 GHz -75 dBc nominal Other spurious responses Mixer level Response Carrier frequency ≤ 26.5 GHz First RF order -10 dBm -80 dBc + 20log(N ¹) Including IF feedthrough, LO harmonic mixing responses (f ≥ 10 MHz from carrier) -40 dBm -80 dBc + 20log(N ¹) Including higher order mixer responses Carrier frequency > 26.5 GHz -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -73 dBc² + 20log(N ¹) (nominal) Second harmonic distortion SHI RF/MW 10 to 100 MHz -15 dBm -57 dBc/NA 10 to 100 MHz -15 dBm -77 dBc/-101 dBc 10 to 100 MHz -15 dBm -77 dBc/-101 dBc 10 to 100 MHz -15 dBm -77 dBc/-101 dBc 10 to 100 MHz -15 dBm -77 dBc/-105 dBc +62 dBm/NA	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	
Other spurious responses Mixer level Response Carrier frequency ≤ 26.5 GHz First RF order -10 dBm -80 dBc + 20log(N ¹) Including IF feedthrough, L0 harmonic mixing responses (f ≥ 10 MHz from carrier) -40 dBm -80 dBc + 20log(N ¹) Including higher order mixer responses (f ≥ 10 MHz from carrier) -40 dBm -80 dBc + 20log(N ¹) Including higher order mixer responses (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal L0-related spurious responses -68 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -68 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -10 t10 0 MHz -15 dBm -57 dBc/NA +42 dBm/NA (0ption 503, 508, 513, 526) 10 to 100 MHz -15 dBm -77 dBc/-101 dBc +62 dBm/48 dBm Preamp on (0ption 503, 508, 513, 526) 10 to 100 MHz -15 dBm -77 dBc/-101 dBc +62 dBm/A9 dBm Preamp on (0ption 503, 508, 513, 526) 10 to 1325 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/AA (0ption 503, 508, 513, 526) 10 to 100 MHz <td< td=""><td>Other spurious responses Mixer level Response Carrier frequency $\leq 26.5 \text{ GHz}$ First RF order -10 dBm -80 dBc + 20log(N⁻¹) Including IF feedthroug (f \geq 10 MHz from carrier) Higher RF order -40 dBm -80 dBc + 20log(N⁻¹) Including higher order (f \geq 10 MHz from carrier) -30 dBm -90 dBc nominal Carrier frequency > 26.5 GHz -30 dBm -90 dBc nominal (f \geq 10 MHz from carrier) -30 dBm -90 dBc nominal L0-related spurious responses -88 dBc⁻² + 20log(N⁻¹) -73 dBc⁻² + 20log(N⁻¹) (nominal) Second harmonic distortion (SHI) -80 dBc - 15 dBm -57 dBc/NA (0ption 503, 508, 513, 526) 10 to 100 MHz -15 dBm -77 dBc/-95 dBc 25 to 4 GHz -15 dBm -77 dBc/-101 dBc 2.5 to 4 GHz -15 dBm Preamp on 10 MHz to 1.8 GHz -15 dBm -70 dBc/-105 dBc 2.5 to 4 GHz Option P03, P08, P13, P26) 10 to 100MHz -15 dBm -78 dBc nominal Millimeter Wave Mixer level Distortion 10 MHz to 1.8 GHz -50 dBc/NA (0ption P03, P08, P13, P26) 10 to 100MHz -15 dBm</td><td></td></td<>	Other spurious responses Mixer level Response Carrier frequency $\leq 26.5 \text{ GHz}$ First RF order -10 dBm -80 dBc + 20log(N ⁻¹) Including IF feedthroug (f \geq 10 MHz from carrier) Higher RF order -40 dBm -80 dBc + 20log(N ⁻¹) Including higher order (f \geq 10 MHz from carrier) -30 dBm -90 dBc nominal Carrier frequency > 26.5 GHz -30 dBm -90 dBc nominal (f \geq 10 MHz from carrier) -30 dBm -90 dBc nominal L0-related spurious responses -88 dBc ⁻² + 20log(N ⁻¹) -73 dBc ⁻² + 20log(N ⁻¹) (nominal) Second harmonic distortion (SHI) -80 dBc - 15 dBm -57 dBc/NA (0ption 503, 508, 513, 526) 10 to 100 MHz -15 dBm -77 dBc/-95 dBc 25 to 4 GHz -15 dBm -77 dBc/-101 dBc 2.5 to 4 GHz -15 dBm Preamp on 10 MHz to 1.8 GHz -15 dBm -70 dBc/-105 dBc 2.5 to 4 GHz Option P03, P08, P13, P26) 10 to 100MHz -15 dBm -78 dBc nominal Millimeter Wave Mixer level Distortion 10 MHz to 1.8 GHz -50 dBc/NA (0ption P03, P08, P13, P26) 10 to 100MHz -15 dBm	
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First RF order (f ≥ 10 MHz from carrier) Higher RF order (f ≥ 10 MHz from carrier) -40 dBm -80 dBc + 20log(N ¹) Including Iif Feedthrough, L0 harmonic mixing responses Carrier frequency > 26.5 GHz First RF order -30 dBm -90 dBc nominal - (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal - (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal - (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal - L0-related spurious responses (200 Hz ≤ 1 < 10 dHz from carrier)	First RF order (f \geq 10 MHz from carrier) Higher RF order (f \geq 10 MHz from carrier)-10 dBm-80 dBc + 20log(N1) Including IF feedthroug (N1) Including higher order (A dBmCarrier frequency > 26.5 GHz First RF order (f \geq 10 MHz from carrier)-30 dBm-90 dBc nominalCarrier frequency > 26.5 GHz First RF order (f \geq 10 MHz from carrier)-30 dBm-90 dBc nominalLO-related spurious responses (200 Hz \leq f < 10 MHz from carrier). Mixer level at -10 dBm Line-related spurious responses-68 dBc ² + 20log(N1)Second harmonic distortion(SHI)Second harmonic distortionSource frequency 1.75 to 2.5 GHz 2.5 to 4 GHzMixer level -15 dBmDistortion ³ RF/MW (Option 503, 508, 513, 526)10 to 100 MHz 1.75 to 2.5 GHz 2.5 to 4 GHz -15 dBm-77 dBc/-101 dBc -15 dBm-77 dBc/-101 dBc -15 dBmPreamp on (Option P03, P08, P13, P26)10 MHz to 1.8 GHz 1.8 to 13.25 GHz-15 dBm -78 dBc nominal-78 dBc nominal -15 dBmMillimeter-Wave (Option 543, 544, 550)10 to 100MHz 1.8 GHz 1.8 to 13.25 GHz 3 to 5 GHz-15 dBm -77 dBc/-105 dBc -15 dBm-78 dBc nominal -78 dBc nominal -15 dBmMillimeter-Wave (Option 543, 544, 550)10 to 100MHz 1.8 GHz 3 to 5 GHz 3 to 5 GHz -15 dBm-77 dBc/-99 dBc -15 dBm -77 dBc/-105 dBc -15 dBmMillimeter-Wave (Option 543, 544, 550)10 to 100MHz 1.8 GHz 3 to 5 GHz -15 dBm -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-105 dBc -15	
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Higher RF order (r ≥ 10 MHz from carrier) Carrier frequency > 28.5 GHz First RF order 30 dBm -90 dBc nominal (r ≥ 10 MHz from carrier) (r ≥ 10 MHz from carrier) (r ≥ 10 MHz from carrier) 30 dBm -90 dBc nominal L0-related spurious responses (200 Hz ≤ r 10 MHz from carrier), Mixer level at -10 dBm 80 dBc ² + 20log(N ¹) L0-related spurious responses (200 Hz ≤ r 10 MHz from carrier), Mixer level at -10 dBm 68 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (Gption 503, 508, 513, 526) -68 dBc ² + 20log(N ¹) (nominal) RF/MW (Option 503, 508, 513, 526) 10 to 100 MHz -15 dBm -57 dBc/NA +42 dBm/NA 10 to 100 MHz -15 dBm -77 dBc/-95 dBc +62 dBm/+80 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/H80 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/H80 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/H80 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/H80 dBm 10 to 13.25 GHz -15 dBm -77 dBc/-105 dBc +42 dBm/H80 dBm 10 to 13.25 GHz -15 dBm -77 dBc/-205 dBc +47 dBm/+90 dBm 10 to 100MHz <td>Higher RF order (f \geq 10 MHz from carrier) Carrier frequency > 26.5 GHz First RF order (f \geq 10 MHz from carrier) Higher RF order (f \geq 10 MHz from carrier)-30 dBm-90 dBc nominalL0-related spurious responses (200 Hz \leq f < 10 MHz from carrier). Mixer level at -10 dBm Line-related spurious responses-68 dBc 2 + 20log(N 1)-73 dBc 2 + 20log(N 1) (nominal)Second harmonic distortion (0ption 503, 508, 513, 526)-68 dBc 2 + 20log(N 1)Distortion 3RF/MW (0ption 503, 508, 513, 526)10 to 100 MHz 0.1 to 1.8 GHz 4 to 6.5 GHz 0.5 to 10 GHz-15 dBm -77 dBc/-95 dBc 2.5 to 4 GHz -15 dBm-77 dBc/-95 dBc 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc -105 dBc -77 dBc/-105 dBc 2.5 to 4 GHz -15 dBmPreamp on (0ption 503, 908, P13, P26)10 to 100MHz 10 to 100MHz -15 dBm-78 dBc nominal -78 dBc nominal -77 dBc/-95 dBc 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-95 dBc 2.5 to 3 GHz -15 dBm -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -79 dBc/-105 dBc -15 dBm -77 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -77 dBc/-99 dBc -99 dBc -15 dBm -77 dBc/-95 dBc -79 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -79 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -79 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -70 dBc/-105 dBc -15 dBm -70 dBc/-105 dBc -15 dBm -70</td> <td>n, LO harmonic mixing responses</td>	Higher RF order (f \geq 10 MHz from carrier) Carrier frequency > 26.5 GHz First RF order (f \geq 10 MHz from carrier) Higher RF order (f \geq 10 MHz from carrier)-30 dBm-90 dBc nominalL0-related spurious responses (200 Hz \leq f < 10 MHz from carrier). Mixer level at -10 dBm Line-related spurious responses-68 dBc 2 + 20log(N 1)-73 dBc 2 + 20log(N 1) (nominal)Second harmonic distortion (0ption 503, 508, 513, 526)-68 dBc 2 + 20log(N 1)Distortion 3 RF/MW (0ption 503, 508, 513, 526)10 to 100 MHz 0.1 to 1.8 GHz 4 to 6.5 GHz 0.5 to 10 GHz-15 dBm -77 dBc/-95 dBc 2.5 to 4 GHz -15 dBm-77 dBc/-95 dBc 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc -105 dBc -77 dBc/-105 dBc 2.5 to 4 GHz -15 dBmPreamp on (0ption 503, 908, P13, P26)10 to 100MHz 10 to 100MHz -15 dBm-78 dBc nominal -78 dBc nominal -77 dBc/-95 dBc 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-105 dBc -15 dBm -77 dBc/-95 dBc 2.5 to 3 GHz -15 dBm -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -78 dBc nominal -79 dBc/-105 dBc -15 dBm -77 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -77 dBc/-99 dBc -99 dBc -15 dBm -77 dBc/-95 dBc -79 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -79 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -79 dBc/-99 dBc -15 dBm -77 dBc/-99 dBc -70 dBc/-105 dBc -15 dBm -70	n, LO harmonic mixing responses
(f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal First RF order -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal Higher RF order -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal Line-related spurious responses -73 dBc² + 20log(N¹) (nominal) Second harmonic distortion (SHI) Second harmonic distortion (SHI) -57 dBc² NA RF/MW 10 to 100 MHz -15 dBm (0ption 503, 508, 513, 526) 10 to 100 MHz -15 dBm 1.75 to 2,5 GHz -15 dBm -77 dBc²-105 dBc 4 to 6,5 GHz -15 dBm -77 dBc²-105 dBc 6,5 to 10 GHz -15 dBm -77 dBc²-105 dBc 10 to 13.25 GHz -15 dBm -77 dBc²-105 dBc 10 to 12.5 GHz -15 dBm -77 dBc²-105 dBc 10 to 13.25 GHz -15 dBm -77 dBc²-105 dBc 10 to 13.25 GHz -15 dBm -77 dBc²-105 dBc 10 to 12.5 GHz -15 dBm -77 dBc²-105 dBc 10 to 100MHz -15 dBm -77 dBc²-105 dBc 10 to 100MHz -15 dBm<	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
Carrier frequency > 26.5 GHz First RF order -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal Higher RF order -30 dBm -90 dBc nominal (f ≥ 10 MHz from carrier) -68 dBc² + 20log(N¹) -57 dBc² + 20log(N¹) (nominal) L0-related spurious responses -73 dBc² + 20log(N¹) (nominal) -68 dBc² + 20log(N¹) (nominal) Second harmonic distortion (SHI) -73 dBc² + 20log(N¹) (nominal) Second harmonic distortion (SHI) -73 dBc² + 20log(N¹) (nominal) RF/MW 10 to 100 MHz -15 dBm -57 dBc/NA +42 dBm/NA (0ption 503, 508, 513, 526) 0.1 to 18 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/+80 dBm 1.75 to 2.5 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/+80 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/+80 dBm 0.1 to 13.25 GHz -15 dBm -70 dBc/-105 dBc +52 dBm/+80 dBm 0.1 to 13.25 GHz -15 dBm -70 dBc/-105 dBc +52 dBm/+80 dBm 0.1 to 13.25 GHz -15 dBm -70 dBc/-105 dBc +53 dBm/+90 dBm 0.5 to 10 GHz <td>$\begin{array}{c} \mbox{Carrier frequency > 26.5 GHz} \\ \mbox{First RF order} \\ \mbox{(}f \geq 10 \ MHz \ from \ carrier) \\ \mbox{Higher RF order} \\ \mbox{(}f \geq 10 \ MHz \ from \ carrier) \\ \mbox{Lo-related spurious responses}$</td> <td>nixer responses</td>	$\begin{array}{c} \mbox{Carrier frequency > 26.5 GHz} \\ \mbox{First RF order} \\ \mbox{(}f \geq 10 \ MHz \ from \ carrier) \\ \mbox{Higher RF order} \\ \mbox{(}f \geq 10 \ MHz \ from \ carrier) \\ \mbox{Lo-related spurious responses} $	nixer responses
First RF order (f ≥ 10 MHz from carrier) Higher RF order (g ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal L0-related spurious responses (200 Hz ≤ f < 10 MHz from carrier). Mixer level at -10 dBm -68 dBc ² + 20log(N ¹) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (ption 503, 508, 513, 526) -68 dBc ² + 20log(N ¹) (nominal) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (Option 503, 508, 513, 526) -05 dBc + 2 dBc + 2 dBc/ NA 10 to 100 MHz -15 dBm -57 dBc/NA + 42 dBm/NA - 50 dBc + 42 dBm/NA - 15 dBm RF/MW (Option 503, 508, 513, 526) 10 to 100 MHz -15 dBm -77 dBc/-95 dBc +62 dBm/48 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/48 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/480 dBm 2.5 to 4 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/490 dBm 6.5 to 10 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/490 dBm 0 to 103 25 GHz -15 dBm -70 dBc/-105 dBc +62 dBm/490 dBm 10 to 12 325 GHz -15 dBm -70 dBc/-105 dBc +62 dBm/490 dBm (Option 543, 544, 550) 10 to 100 MHz -15 dBm -50 dBc +57 dBm/480 dBm	First RF order -30 dBm -90 dBc nominal (f \ge 10 MHz from carrier) -30 dBm -90 dBc nominal Higher RF order -30 dBm -90 dBc nominal (f \ge 10 MHz from carrier) -68 dBc ² + 20log(N ¹) -68 dBc ² + 20log(N ¹) L0-related spurious responses -68 dBc ² + 20log(N ¹) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (SHI) -15 dBm -57 dBc/NA (0ption 503, 508, 513, 526) 10 to 100 MHz -15 dBm -77 dBc/-105 dBc 0.1 to 1.8 GHz -15 dBm -77 dBc/-105 dBc -55 dBc -15 dBm -78 dBc nominal (0ption 503, 508, 513, 526) 10 to 13.25 GHz -15 dBm -78 dBc nominal -15 dBm -60 dBc/NA 1.175 to 2.5 GHz -15 dBm -78 dBc/-105 dBc -15 dBm -78 dBc/-105 dBc -57 dBc//A -10	
If ≥ 10 MHz from carrier) Higher RF order (f ≥ 10 MHz from carrier) -30 dBm -90 dBc nominal L0-related spurious responses (200 Hz ≤ f < 10 MHz from carrier), Mixer level at -10 dBm -68 dBc ² + 20log(N ¹) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (arrier), Mixer level at -10 dBm -73 dBc ² + 20log(N ¹) (nominal) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion (Option 503, 508, 513, 526) 10 to 100 MHz -15 dBm -57 dBc/NA +42 dBm/NA 1,75 to 2,5 GHz -15 dBm -73 dBc ² + 20log(N ¹) (nominal) -57 dBc/NA +42 dBm/NA (Option 503, 508, 513, 526) 10 to 100 MHz -15 dBm -77 dBc/-101 dBc +62 dBm/+80 dBm 2, 5 to 4 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/+80 dBm -55 to 16 GHz +15 dBm -77 dBc/-105 dBc +62 dBm/+80 dBm 2, 5 to 4 GHz -15 dBm -70 dBc/-105 dBc +42 dBm/NA +10 dBm nominal (Option P03, P08, P13, P26) 10 MHz to 1.8 GHz -15 dBm -57 dBc/NA +42 dBm/NA (Option 543, 544, 550) 10 to 100MHz -15 dBm -57 dBc/NA +42 dBm/NA (Option 543, 544, 550) 10 to 100MHz -15 dBm	$ \begin{array}{ c c c c c c } \hline \mbox{to the dot normal} & \mbox{to the dot normal} \\ \hline \mbox{to to normal} \\ \hline \mbox{to to 10 MHz} \\ \hline \mbox{to 10 0 MHz} \\ \hline \mbox{to 12 S GHz} \\ \hline \mbox{to 13 BC} \\ \hline to 13 BC$	
Higher RF order (f ≥ 10 MHz from carrier) 30 dBm -90 dBc nominal L0-related spurious responses Carrier), Mixer level at -10 dBm -68 dBc ² + 20log(N ¹) -68 dBc ² + 20log(N ¹) Second harmonic distortion Carrier), Mixer level at -10 dBm -73 dBc ² + 20log(N ¹) (nominal) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion Corrier), Mixer level at -10 dBm -73 dBc ² + 20log(N ¹) (nominal) -73 dBc ² + 20log(N ¹) (nominal) Second harmonic distortion Corrier), Mixer level at -10 dBm -15 dBm -57 dBc/NA +42 dBm/NA (0ption 503, 508, 513, 526) 10 to 100 MHz -15 dBm -57 dBc/-101 dBc +62 dBm/+80 dBm 17.5 to 2.5 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/+80 dBm -68 dBc/-105 dBc +62 dBm/+80 dBm 10 to 12.5 GHz -15 dBm -77 dBc/-101 dBc +62 dBm/+80 dBm -68 dBc/-105 dBc +62 dBm/+80 dBm 10 to 13.25 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/+80 dBm -69 dBc nominal +13 dBm nominal (Option P03, P08, P13, P26) 10 to 100MHz -15 dBm -57 dBc/NA +42 dBm/NA 110 to 100MHz -15 dBm -57 dBc/-95 dBc +57 dBm/+80 dBm +10 dBm nom	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
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3 to 5 GHz -15 dBm -77 dBc/-99 dBc +62 dBm/+84 dBm 5 to 6.5 GHz -15 dBm -77 dBc/-105 dBc +62 dBm/+90 dBm 6.5 to 10 GHz -15 dBm -70 dBc/-105 dBc +55 dBm/+90 dBm 10 to 13.25 GHz -15 dBm -62 dBc/-105 dBc +47 dBm/+90 dBm 13.25 to 25 GHz -15 dBm -65 dBc/-105 dBc +50 dBm/+90 dBm 9 Preamp on (Option P03, P08, Preamp level Distortion SHI	3 to 5 GHz -15 dBm -77 dBc/-99 dBc 5 to 6.5 GHz -15 dBm -77 dBc/-105 dBc 6.5 to 10 GHz -15 dBm -70 dBc/-105 dBc 10 to 13.25 GHz -15 dBm -62 dBc/-105 dBc	
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6.5 to 10 GHz -15 dBm -70 dBc/-105 dBc +55 dBm/+90 dBm 10 to 13.25 GHz -15 dBm -62 dBc/-105 dBc +47 dBm/+90 dBm 13.25 to 25 GHz -15 dBm -65 dBc/-105 dBc +50 dBm/+90 dBm Preamp on (Option P03, P08, Preamp level Distortion SHI	6.5 to 10 GHz -15 dBm -70 dBc/-105 dBc 10 to 13.25 GHz -15 dBm -62 dBc/-105 dBc	
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13.25 to 25 GHz -15 dBm -65 dBc/-105 dBc (nom.) +50 dBm/+90 dBm (nom.) Preamp on (Option P03, P08, Preamp level Distortion SHI		
Preamp on (Option P03, P08, Preamp level Distortion SHI		
		/ / /
	P13, P26, P43, P44, P50)	
10 MHz to 1.8 GHz	10 MHz to 1.8 GHz	+33 dBm/NA (nominal)
1.8 to 13.25 GHz -50 dBm -60 dBm/NA (nominal) +10 dBm/NA (nominal)	1.8 to 13.25 GHz -50 dBm -60 dBm/NA (nomina) +10 dBm/NA (nominal)
13.25 to 25 GHz50 dBm50 dBm /NA (nominal)0 dBm /NA (nominal)	13.25 to 25 GHz -50 dBm -50 dBm/NA (nomina) 0 dBm/NA (nominal)

N is the LO multiplication factor. Refer to page 4 for the N value verses frequency ranges.
 Nominally –40 dBc under large magnetic (0.38 Gauss rms) or vibrational (0.21 g rms) environmental stimuli.
 Normal path/LNP enabled (requires Option LNP).

Third-order intermodulation	distortion (TOI)			
(two –16 dBm tones at input mixe	r with tone separation >	5 times IF prefilte	r bandwidth, 20 to 30 °C)	
		ТОІ		
	10 to 150 MHz 150 to 600 MHz 0.6 to 1.1 GHz 1.1 to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 17 GHz 17 to 26.5 GHz 26.5 to 50 GHz	+13 dBm +18 dBm +20 dBm +21 dBm +15 dBm +15 dBm +11 dBm +10 dBm	+16 dBm typical +21 dBm typical +22 dBm typical +23 dBm typical +22 dBm typical +23 dBm typical +17 dBm typical +17 dBm nominal +13 dBm nominal	
Preamp on (Option P03, P08, P13, P26, P43, P44, and P50)				
Tones at preamp input (two –45 dBm) (two –45 dBm) (two –50 dBm)	10 to 500 MHz 500 MHz to 3.6 GHz 3.6 to 26.5 GHz		+4 dBm nominal +4.5 dBm nominal –15 dBm nominal	

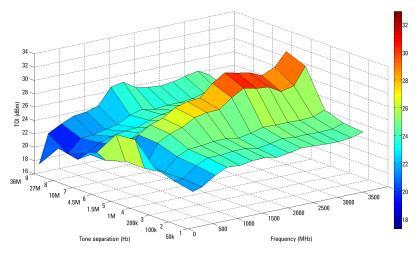
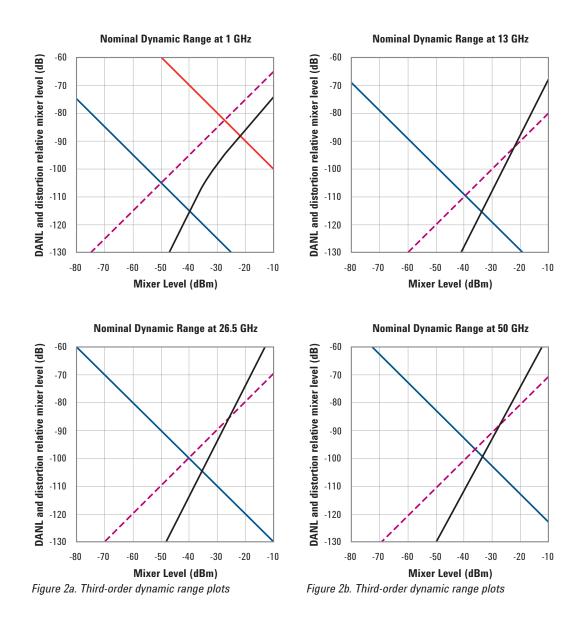


Figure 1. Nominal TOI performance versus frequency and tone separation



DANL (30 kHz RBW)
 DANL (1 Hz RBW)
 OANL (1 Hz RBW)
 OANL (1 Hz RBW)

------ 3rd Order Intermodulation

Phase noise	Offset	Specification	Typical
Noise sidebands	10 Hz		–75 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

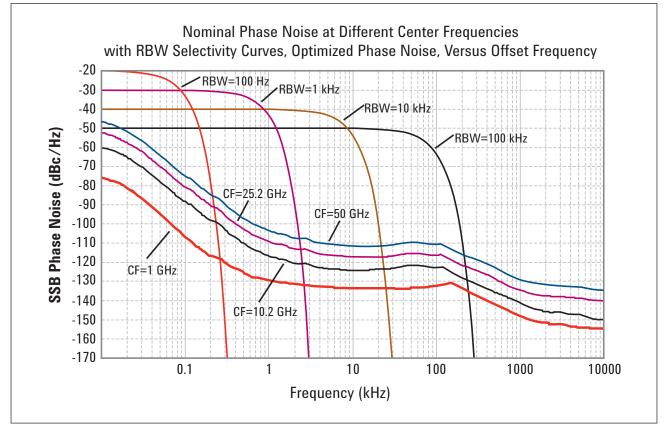


Figure 3. Nominal PXA phase noise at various center frequencies

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 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	n 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) BTS	± 0.09 dB ± 0.18 dB	± 0.16 dB ± 0.31 dB	
Dynamic range (typical) Without noise correction With noise correction	82.5 dB 83.5 dB (88 dB 1)	–87 dB –89 dB	
Offset channel pairs measured	1 to 6		
Multi-carrier ACP			
Accuracy, 3GPP W-CDMA (ACPR) (4 carriers, 5 MHz offset, BTS, UUT ACPR range at –42 to –48 dB, optimal mixer level at –21 dBm)	± 0.13 dB		
Multiple number of carriers measured	Up to 12		
Power statistics CCDF			
Histogram resolution	0.01 dB		
Harmonic distortion			
Maximum harmonic number	10th		
Result	Fundamental power (dBm), relative harmonics power (dBc), total harmonic distortion in %		
Intermod (TOI)	Measure the third-order products and intercepts from two tones		
Burst power			
Methods	Power above threshold, p	power within burst width	
Results	Single burst output powe within burst, burst width	r, average output power, maximum power, minimum power	
Spurious emission	·		
3GPP W-CDMA table-driven spurious signals	s; search across regions		
Dynamic range (1 to 3.6 GHz) Absolute sensitivity (1 to 3.6 GHz)	97.1 dB –86.4 dBm	(101.9 dB typical) (–90.4 dBm typical)	
Spectrum emission mask (SEM)			
cdma2000® (750 kHz offset)			
Relative dynamic range	81.6 dB	(86.4 dB typical)	
Absolute sensitivity	–101.7 dBm	(–105.7 dBm typical)	
Relative accuracy	± 0.08 dB		
3GPP W-CDMA (2.515 MHz offset)			
Relative dynamic range	85.4 dB	(89.8 dB typical)	
Absolute sensitivity Relative accuracy	–101.7 dBm ± 0.08 dB	(–105.7 dBm typical)	
neiative accuracy	± 0.00 uD		

1. Nominal value base on hand-measured results from early production units. These observations were done near 2 GHz, the common W-CDMA operating region.

General Specifications

Temperature range					
Operating	0 to 55 °C				
Storage	-40 to +70 °C				
Altitude					
	4,500 meters (approx 15,000 feet)				
EMC					
Complies with European EMC Directive • IEC/EN 61326-1 or IEC/EN 61326-2 • CISPR Pub 11 Group 1, class A ¹ • AS/NZS CISPR 11:2002 • ICES/NMB-001 This ISM device complies with Canadia Cet appareil ISM est conforme à la nor Safety	2-1 an ICES-001				
 IEC/EN 61010-1 2nd Edition Canada: CSA C22.2 No. 61010-1 USA: UL 61010-1 2nd Edition 	Directive 73/23/EEC, amended by 93/68/EEC				
Acoustic 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				
Acoustic noise - more informati	on				
(Values given are per ISO 7779 standa	rd 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					
against the environmental stresses of	e tested in accordance with the Agilent Environmental Test Manual and verified to be robust storage, transportation, and end-use; those stresses include, but are not limited to, tempera- e, and power line conditions; test methods are aligned with IEC 60068-2 and levels are similar				
Power requirements					
Voltage and frequency (nominal)	100 to 120 V 50/60/400 Hz				

Voltage and frequency (nominal)	100 to 120 V, 50/60/400 Hz 220 to 240 V, 50/60 Hz
Power consumption	
On	630 W (Maximum)
Stanby	40 W

1. The N9030A is in full compliance with CISPR 11, Class A emissions and is declared as such. In addition, the N9030A has been type tested and shown to meet CISPR 11, Class B emissions limits. Information regarding the Class B emission performance of the N9030A is provided as a convenience to the user and is not intended to be a regulatory declaration.

Display				
Resolution Size	1024 x 768, XGA 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 Shipping	22 kg (48 lbs) nominal 34 kg (75 lbs) nominal			
Dimensions				
Height Width Length	177 mm (7.0 in) 426 mm (16.8 in) 556 mm (21.9 in)			
Warranty				
The PXA signal analyzer is supplied with a one-year standard 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	
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
Probe power	
Voltage/current	+15 Vdc, ± 7% at 150 mA max nominal
	-12.6 Vdc, $\pm 10\%$ 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 "¼ inch")
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
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	\pm 5 x 10 ⁻⁶ of specified external reference input frequency
Trigger 1 and 2 inputs	
Connector	BNC female
Impedance	> 10 k Ω nominal
Trigger level range	-5 to $+5$ V (TTL) factory preset
Trigger 1 and 2 outputs	
Connector	BNC female
Impedance	50 Ω nominal
····podditoo	
Level	
Level Sync (reserved for future use)	0 to 5 V (CMOS) nominal
Sync (reserved for future use)	0 to 5 V (CMOS) nominal
Sync (reserved for future use) Connector	
Sync (reserved for future use) Connector Monitor output	0 to 5 V (CMOS) nominal BNC female
Sync (reserved for future use) Connector Monitor output Connector	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB
Sync (reserved for future use) Connector Monitor output Connector Format	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB
Sync (reserved for future use) Connector Monitor output Connector Format Resolution	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB
Sync (reserved for future use) Connector Monitor output Connector Format Resolution Noise source drive +28 V (pulsed)	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB 1024 x 768
Sync (reserved for future use) Connector Monitor output Connector Format Resolution Noise source drive +28 V (pulsed) Connector	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB 1024 x 768 BNC female
Sync (reserved for future use) Connector Monitor output Connector Format Resolution Noise source drive +28 V (pulsed)	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB 1024 x 768 BNC female On 28.0 ± 0.1 V (60 mA maximum)
Sync (reserved for future use) Connector Monitor output Connector Format Resolution Noise source drive +28 V (pulsed) Connector Output voltage	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB 1024 x 768 BNC female On 28.0 ± 0.1 V (60 mA maximum) Off < 1 V
Sync (reserved for future use) Connector Monitor output Connector Format Resolution Noise source drive +28 V (pulsed) Connector Output voltage SNS series noise source	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB 1024 x 768 BNC female On 28.0 ± 0.1 V (60 mA maximum)
Sync (reserved for future use) Connector Monitor output Connector Format Resolution Noise source drive +28 V (pulsed) Connector Output voltage	0 to 5 V (CMOS) nominal BNC female VGA compatible, 15-pin mini D-SUB XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB 1024 x 768 BNC female On 28.0 ± 0.1 V (60 mA maximum) Off < 1 V

Rear panel	
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 Output current	USB Type-B female 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 \leq 25 MHz with Option B40	322.5 MHz 250 MHz
with Option 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 Preselected band	100 MHz (nominal)
	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	$25 \pm 1 \text{ mV/dB}$ nominal		
Log fidelity			
Range	57 dB nominal		
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, represent	ing 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 $\Omega)$					
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 $\Omega)$					
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 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, Ha (K-B 70 dB, K-B 90 dB			an, Blackman-Harri	s, Kaiser Bessel
Analysis bandwidth (waveform m			,		
Standard instrument	10 Hz to 10 MHz				
Option B25	10 Hz to 25 MHz				
Option B40	10 Hz to 40 MHz				
Option B1X	10 Hz to 160 MHz				
IF frequency response (sta	ndard 10 MHz IF path))			
IF frequency response (demodula	tion and FFT response rela	tive to the cente	r frequency)		
Freq (GHz)	Analysis	Max error	Midwidth	Slope (dB/	RMS (nominal)
	BW (MHz)		error (95th	MHz) (95th	· · · /
	()		percentile)	percentile)	
≤ 3.6	≤ 10	± 0.20 dB	± 0.12 dB	± 0.10 dB	0.02 dB
3.6 to 26.5	\leq 10 preselected				0.23 dB
3.6 to 26.5	\leq 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	\leq 10 preselected off ¹	± 0.30 dB	± 0.12 dB	± 0.10 dB	0.024 dB

IF phase linearity					
Center freq (GHz)	Span (MHz)	Preselector	Peak-to-peak (nominal)	RMS (nominal)	
≥ 0.02, < 3.6	≤ 10	NA	0.06°	0.012°	
≥ 3.6 to ≤ 26.5	≤ 10	Off 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	(DANL + IF Gain effect) + 2.25 dB				
frequency					
Data acquisition (standard 1	0 MHz IF path)				
Time record length					
Analysis tool					
IQ analyzer	4,000,000 IQ sample	Pairs			
	Data packing		89600 VSA software or N9064A VXA		
Advanced tools	32-bit	64-bit	- 89600 VSA SOΠV	vare or N9064A VXA	
Length (IQ sample pairs)	536 MSa (2 ²⁹ Sa)	268 MSa (2 ²⁸ Sa)	2 GB total memo	pry	
Length (time units)	Samples/(span x 1.2	28)			
Sample rate					
At ADC	100 Msa/s				
IQ pairs	Span dependent				
ADC resolution	16 bits				

Option B25 25 MHz analysis bandwidth (Option B25 is automatically included in Option 40 or B1X)

IF frequency response (B25	•				
IF frequency response (demodulat	ion and FFT response rela	tive 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 ≥ 3.6	≤ 25 ≤ 25	NA Off ¹	0.48° 0.85°		0.12° 0.20°
Dynamic range (B25 IF path					
Full scale (ADC clipping)					
Default settings, signal at CF (IF gain = Low) Band 0 Bands 1 through 4	–8 dBm mixer level n –7 dBm mixer level n				
High gain setting, signal at CF (IF gain = High) Band 0 Bands 1 through 4	–18 dBm mixer level –17 dBm mixer level				
Effect of signal frequency \neq CF	Up to ± 3 dB nomina	I			
Data acquisition (B25 IF pat	h)				
Time record length					
Analysis tool					
IQ analyzer	4,000,000 IQ sample Pa	iirs			
, ,	Data pac	king			
Advanced tools	32-bit 64-bit		- 89600 VSA software or N9064A VXA		XA
Length (IQ sample pairs)	536 MSa (2 ²⁹ Sa)	268 MSa (2 ²⁸ Sa)	2 GB total men	lory	
Length (time units)	Samples/(span x 1.28)	, , ,	1	*	
Sample rate					
At ADC	100 Msa/s				
IQ pairs	Span dependent				
ADC resolution	16 bits				

Option B40 40 MHz analysis bandwidth (Option B40 is automatically included in Option B1X)

IF frequency response (B40 I	F path)				
IF frequency response				Relative to center	er frequency
Center freq. (GHz)	Span (MHz)	Preselector		Typical	RMS (nominal)
$\geq 0.03, < 3.6$ $\geq 3.6, \leq 8.4$ $> 8.4, \leq 26.5$ $\geq 26.5, < 34.4$ $\geq 34.4, < 50$	≤ 40 ≤ 40 ≤ 40 ≤ 40 ≤ 40	NA Off ¹ Off ¹ Off ¹ Off ¹	± 0.4 dB ± 0.4 dB ± 0.7 dB ± 0.8 dB ± 1.0 dB	± 0.25 dB ± 0.16 dB ± 0.20 dB ± 0.25 dB ± 0.35 dB	0.05 dB 0.05 dB 0.05 dB 0.1 dB 0.1 dB
IF phase linearity (deviation f			1.0 00	± 0.00 uB	0.1 0.5
Center freq (GHz)	Span (MHz)	Preselector		Peak-to-peak (nominal)	RMS (nominal)
≥ 0.03, < 3.6 ≥ 3.6	≤ 40 ≤ 40	NA Off ¹		0.16° 1.5°	0.041° 0.35°
EVM (EVM measurement floor for a	an 802.11g OFDM sign	al, using 89600B s	oftware equalization	n, channel estimation	and data EQ)
2.4 GHz 5.8 GHz with Option MPB				–52.0 dB (0.25% –49.1 dB (0.35%	
Dynamic range (B40 IF path)					
SFDR (Spurious-free dynamic range) Signal frequency within ±12 MHz of center Signal frequency anywhere within analysis BW	–80 dBc nominal				
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 Bands 1 through 4	–8 dBm mixer leve –7 dBm mixer leve				
Default settings, signal at CF (IF gain = Low: IF gain offset = 0 dB) Band 0	–7 dBm mixer leve –18 dBm mixer lev	el nominal vel nominal, subjec	t to gain limitations t to gain limitations		

Option B40 40 MHz analysis bandwidth

T 11 11				
Time record length				
Analysis tool				
IQ analyzer	4,000,000 IQ sample	4,000,000 IQ sample pairs		
Advanced tools	Data p	backing	- 89600 VSA software or N9064A VXA	
	32-bit	64-bit		
Length (IQ sample pairs)	536 MSa (2 ²⁹ Sa)	268 MSa (2 ²⁸ Sa)	2 GB total memory	
Length (time units)	Samples/(span x 1.2	Samples/(span x 1.28)		
Sample rate				
At ADC	200 Msa/s	200 Msa/s		
IQ pairs	Span dependent	Span dependent		
ADC resolution	12 bits	12 bits		

I/O Analyzer (continued)

Option B1X 160 MHz analysis bandwidth

IF frequency response (B1X IF path	ı)				
IF frequency response				Relative to cente	r frequency
Center freq. (GHz)	Span (MHz)	Preselector		Typical	RMS (nominal)
≥ 0.1, < 3.6	≤ 80 ≤ 140 ≤ 160	NA NA NA	± 0.6 dB ± 0.6 dB	± 0.17 dB ± 0.25 dB ± 0.2 dB (nom)	0.05 dB 0.05 dB 0.07 dB
≥ 3.6, ≤ 8.4	≤ 80 ≤ 140 ≤ 160	Off ¹ Off ¹ Off ¹	± 0.73 dB ± 0.8 dB	± 0.2 dB ± 0.35 dB ± 0.3 dB (nom)	0.05 dB 0.05 dB 0.07 dB
> 8.4, ≤ 26.5	≤ 80 ≤ 140 ≤ 160	Off ¹ Off ¹ Off ¹	± 1.10 dB ± 1.30 dB	± 0.50 dB ± 0.75 dB ± 0.5 dB (nom)	0.1 dB 0.1 dB 0.12 dB
≥ 26.5, ≤ 50	≤ 80 ≤ 140	Off ¹ Off ¹	± 1.20 dB ± 1.40 dB	± 0.45 dB ± 0.65 dB	0.12 dB 0.12 dB
IF phase linearity (deviation from n	nean phase line	earity)			
Center freq (GHz)	Span (MHz)	Preselector		Peak-to-peak (nominal)	RMS (nominal)
≥ 0.03, < 3.6 ≥ 3.6,	≤ 140 ≤ 160 ≤ 140 ≤ 160	NA NA Off ¹ Off ¹		0.9° 1.7° 1.6° 2.8°	0.20° 0.42° 0.39° 0.64°
EVM (EVM measurement floor)	Customized se	ttings required, p	preselector bypassed	(Option MPB) abov	ve Band 0
Case 1: 62.5 Msymbol/s, 160AM signal, R				, , ,	
Band 0, 1.8 GHz Band 1, 5.95 GHz	0.8% nominal 1.1% nominal				
Case 2: 104.167 Msymbol/s, 160AM signa	l, RRC filter alpha	of 0.35, non-equ	alized, with approxin	nately 140 MHz occ	upied bandwidth
Band 1, 5.95 GHz Band 2, 15.3 GHz Band 4, 26 GHz	3.0% nominal, 2.5% nominal, 3.5% nominal,	(unequalized)	0.5% nominal, (0.6% nominal, (1.6% nominal, (equalized)	
Effect of signal frequency \neq CF	Up to ± 3 dB n	ominal			

Option B1X 160 MHz analysis bandwidth

Dynamic range (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 \pm 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 Band 1 through 4	–8 dBm mixer level –7 dBm mixer level			
High gain setting, signal at CF (IF gain = High) Band 0 Band 1 through 4	–18 dBm mixer level nominal, subject to gain limitations –17 dBm mixer level nominal, subject to gain limitations			
Effect of signal frequency \neq CF	Up to ± 3 dB nominal			
Data acquisition (B1X IF path)				
Time record length				
Analysis tool				
IQ analyzer	4,000,000 IQ sample (pairs		
Advanced tools	Data packing		89600 VSA software or N9064A VXA	
Advanced tools	32-bit	64-bit		
Length (IQ sample pairs)	536 MSa (2 ²⁹ Sa)	268 MSa (2 ²⁸ Sa)	2 GB total memory	
Length (time units)	Samples/(span x 1.28	3)		
Sample rate				
At ADC	400 Msa/s			
IQ pairs	Span dependent			
ADC resolution	14 bits			

Related Literature

Agilent PXA signal analyzers

Brochure	5990-3951EN
Configuration guide	5990-3953EN

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

Additional information, including literature, can be found at the Agilent website:

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For other unlisted countries: www.agilent.com/find/contactus Revised: January 6, 2012

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