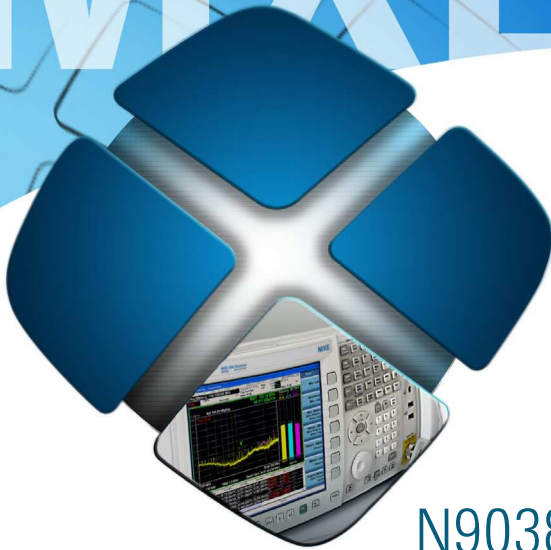




MXE



N9038A MXE EMI Receiver 20 Hz to 8.4 and 26.5 GHz

Data Sheet



Table of Contents

Definitions and Conditions	3
Frequency and Time Specifications	4
Amplitude Accuracy and Range Specifications	7
Dynamic Range Specifications	10
PowerSuite Measurement Specifications	15
General Specifications	16
Inputs and Outputs	18
I/Q Analyzer.....	20

Express your insight

When you're testing a new product, the designers are counting on your expertise and advice. That's why the Agilent MXE is more than a CISPR-compliant EMI receiver. We've also included X-Series signal analysis and graphical measurement tools that make it easy to examine signal details. With these diagnostic capabilities, the MXE complements your knowledge and helps you advise the designers if a device fails compliance testing. Equip your lab with the MXE—and express your insight.

Definitions and Conditions

Specifications describe the performance of parameters covered by the product warranty and apply to the full temperature range of 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 are not covered by the product warranty.

The receiver will meet its specifications when:

- It is within its calibration cycle
- Under auto couple control, except when Auto Sweep Time Rules = Accy
- Signal frequencies < 10 MHz, with DC coupling applied
- The receiver has been stored at an ambient temperature within the allowed operating range for at least two hours before being turned on
- The receiver 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 receiver may fail to meet specifications without informing the user

This data sheet is a summary of the complete specifications and conditions, which are available in the MXE EMI Receiver Specification Guide. The MXE EMI Receiver Specification Guide can be obtained on the Web at:

www.agilent.com/find/mxe_specifications

For ordering information, refer to the MXE EMI Receiver Configuration Guide (5990-7419EN).

Frequency and Time Specifications

Frequency range	DC coupled	AC coupled
Input 1		
Option 508	20 Hz to 8.4 GHz	10 MHz to 8.4 GHz
Option 526	20 Hz to 26.5 GHz	10 MHz to 26.5 GHz
Input 2	20 Hz to 1 GHz	10 MHz to 1 GHz
Band	LO multiple (N)	
0	1	20 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	17.0 to 26.5 GHz
Frequency reference		
Accuracy	$\pm [(time\ since\ last\ adjustment\ \times\ aging\ rate) + temperature\ stability + calibration\ accuracy]$	
Total aging	$\pm 1 \times 10^{-7} / year$	
	$\pm 1.5 \times 10^{-7} / 2\ years$	
Temperature stability		
20 to 30 °C	$\pm 1.5 \times 10^{-8}$	
Full temperature range	$\pm 5 \times 10^{-8}$	
Achievable initial calibration accuracy	$\pm 4 \times 10^{-8}$	
Example frequency reference accuracy 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	$\leq (0.25\ Hz \times N)\ p-p\ in\ 20\ ms\ (nominal)$	
Frequency readout accuracy (start, stop, center, marker)		
$\pm (\text{marker frequency} \times \text{frequency reference accuracy} + 0.25\ \% \times \text{span} + 5\ \% \times \text{RBW} + 2\ Hz + 0.5 \times \text{horizontal resolution}^1)$		
Marker frequency counter		
Accuracy	$\pm (\text{marker frequency} \times \text{frequency reference accuracy} + 0.100\ Hz)$	
Delta counter accuracy	$\pm (\text{delta frequency} \times \text{frequency reference accuracy} + 0.141\ Hz)$	
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		
Stepped / Swept	$\pm (0.25\ \% \times \text{span} + \text{horizontal resolution})$	
FFT	$\pm (0.10\ \% \times \text{span} + \text{horizontal resolution})$	

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

Sweep time and triggering			
Range	Span = 0 Hz Span ≥ 10 Hz	1 μs to 6000 s 1 ms to 4000 s	
Accuracy	Span ≥ 10 Hz, swept Span ≥ 10 Hz, FFT Span = 0 Hz	± 0.01 % (nominal) ± 40 % (nominal) ± 0.01 % (nominal)	
Trigger	Free run, line, video, external 1, external 2, RF burst, periodic timer		
Trigger delay	Span = 0 Hz or FFT Span ≥ 10 Hz, swept Resolution	-150 to +500 ms 0 μs to 500 ms 0.1 μs	
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)			
EMI bandwidths (CISPR compliant)	200 Hz, 9 kHz, 120 kHz, 1 MHz		
EMI bandwidths (Mil STD 461 compliant)	10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz		
Range (-3.01 dB bandwidth)	1 Hz to 3 MHz (10 % steps, E24 series, 24 per decade), 4, 5, 6, 8 MHz		
Bandwidth accuracy (power)	1 Hz to 750 kHz 820 kHz to 1.2 MHz (< 3.6 GHz CF) 1.3 to 2 MHz (< 3.6 GHz CF) 2.2 to 3 MHz (< 3.6 GHz CF) 4 to 8 MHz (< 3.6 GHz CF)	± 1.0 % (± 0.044 dB) ± 2.0 % (± 0.088 dB) ± 0.07 dB (nominal) ± 0.15 dB (nominal) ± 0.25 dB (nominal)	
Bandwidth accuracy (-3.01 dB)	1 Hz to 1.3 MHz	± 2 % (nominal)	
Selectivity (-60 dB/-3 dB)	4.1:1 (nominal)		
RF preselector filters	Filter band	Filter type	6 dB BW (nominal)
	20 Hz to 150 kHz	Fixed lowpass	310 kHz
	150 kHz to 1 MHz	Fixed bandpass	1.7 MHz
	1 to 2 MHz	Fixed bandpass	2.4 MHz
	2 to 5 MHz	Fixed bandpass	7.5 MHz
	5 to 8 MHz	Fixed bandpass	10 MHz
	8 to 11 MHz	Fixed bandpass	9.5 MHz
	11 to 14 MHz	Fixed bandpass	9.5 MHz
	14 to 17 MHz	Fixed bandpass	10 MHz
	17 to 20 MHz	Fixed bandpass	9.5 MHz
	20 to 24 MHz	Fixed bandpass	9.5 MHz
	24 to 30 MHz	Fixed bandpass	9.0 MHz
	30 to 70 MHz	Tracking bandpass	10 MHz
	70 to 150 MHz	Tracking bandpass	24 MHz
	150 to 300 MHz	Tracking bandpass	28 MHz
	300 to 600 MHz	Tracking bandpass	50 MHz
	600 MHz to 1 GHz	Tracking bandpass	60 MHz
	1 to 2 GHz	Tracking bandpass	180 MHz
	2 to 3.6 GHz	Fixed highpass	N/A

Analysis bandwidth ¹		
Maximum bandwidth	Option B25	25 MHz
	Standard	10 MHz
Video bandwidth (VBW)		
Range	1 Hz to 3 MHz (10 % steps, E24 series 24 per decade), 4, 5, 6, 8 MHz, and wide open (labeled 50 MHz)	
Accuracy	± 6 % (nominal)	
Measurement speed ²		
Local measurement and display update rate	4 ms (250/s) (nominal)	
Remote measurement and LAN transfer rate	5 ms (200/s) (nominal)	
Marker peak search	1.5 ms (nominal)	
Center frequency tune and transfer (RF)	20 ms (nominal)	
Center frequency tune and transfer (μW)	47 ms (nominal)	
Measurement/mode switching	39 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 level (DANL) to maximum safe input level		
Input attenuator range	0 to 70 dB in 2 dB steps		
Maximum safe input level (with and without preamp)			
	RF Input 1	RF Input 2	
Average total power	+30 dBm (1 W)	+30 dBm (1 W)	
Peak pulse power	+45 dBm (31.6 W)	+50 dBm (100 W)	< 10 μ s pulse width, < 1 % duty cycle and input attenuation \geq 30 dB
Surge power		+2k W	(10 μ s pulse width)
DC volts			
DC coupled	\pm 0.2 Vdc	\pm 0.2 Vdc	
AC coupled	\pm 100 Vdc	\pm 100 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 μ V, dBmA, dB μ A, V, W, A dBuV/m, dBuA/m, dBpT, dBG		
Frequency response		Specification	95th percentile (\approx 2 σ)
(10 dB input attenuation, 20 to 30 °C, preselector centering applied, σ = nominal standard deviation)			
Preselector off, preamp off	20 kHz to 10 MHz ¹	\pm 0.6 dB	\pm 0.22 dB
	10 MHz to 3.6 GHz ¹	\pm 0.65 dB	\pm 0.22 dB
	3.5 to 8.4 GHz	\pm 1.5 dB	\pm 0.47 dB
	8.3 to 13.6 GHz	\pm 1.5 dB	\pm 0.46 dB
	13.5 to 17.1 GHz	\pm 1.5 dB	\pm 0.53 dB
	17.0 to 18.0 GHz	\pm 1.5 dB	\pm 0.57 dB
	18.0 to 22.0 GHz	\pm 1.7 dB	\pm 0.64 dB
	22.0 to 26.5 GHz	\pm 1.7 dB	\pm 0.61 dB
Preselector off, preamp on (0 dB attenuation)	100 kHz to 3.6 GHz ¹	\pm 0.75 dB	\pm 0.29 dB
	3.5 to 8.4 GHz	\pm 1.85 dB	\pm 0.63 dB
	8.3 to 13.6 GHz	\pm 1.95 dB	\pm 0.64 dB
	13.5 to 17.1 GHz	\pm 1.8 dB	\pm 0.81 dB
	17.0 to 18.0 GHz	\pm 2.0 dB	\pm 0.95 dB
	18.0 to 22.0 GHz	\pm 2.85 dB	\pm 1.23 dB
	22.0 to 26.5 GHz	\pm 2.6 dB	\pm 1.37 dB

1. DC coupling required to meet specifications below 50 MHz. With AC coupling, specifications apply at frequencies of 50 MHz and higher. Statistical observations at 10 MHz with AC coupling show that most instruments meet the DC-coupled specifications, however, a small percentage of instruments are expected to have errors exceeding 0.5 dB at 10 MHz at the temperature extreme. The effect at 20 to 50 MHz is negligible but not warranted.

Frequency response (continued)		Specification	95th percentile ($\approx 2\sigma$)
Preselector on, preamp off	20 Hz to 300 MHz ¹	± 0.65 dB	± 0.30 dB
	300 MHz to 1 GHz	± 0.65 dB	± 0.28 dB
	1 to 3.6 GHz	± 0.85 dB	± 0.36 dB
	3.5 to 8.4 GHz	± 1.5 dB	± 0.47 dB
	8.3 to 13.6 GHz	± 1.5 dB	± 0.46 dB
	13.5 to 17.1 GHz	± 1.5 dB	± 0.53 dB
	17.0 to 18.0 GHz	± 1.5 dB	± 0.57 dB
	18.0 to 22.0 GHz	± 1.7 dB	± 0.64 dB
Preselector on, preamp on (0 dB attenuation)	22.0 to 26.5 GHz	± 1.7 dB	± 0.61 dB
	1 kHz to 30 MHz ¹	± 0.8 dB	± 0.36 dB
	30 to 300 MHz ¹	± 0.7 dB	± 0.29 dB
	300 MHz to 1 GHz	± 0.65 dB	± 0.30 dB
	1 to 2.75 GHz	± 0.95 dB	± 0.45 dB
	2.75 to 3.6 GHz	± 1.15 dB	± 0.55 dB
	3.5 to 8.4 GHz	± 1.85 dB	± 0.63 dB
	8.3 to 13.6 GHz	± 1.95 dB	± 0.64 dB
	13.5 to 17.1 GHz	± 1.8 dB	± 0.81 dB
	17.0 to 18.0 GHz	± 2.0 dB	± 0.95 dB
18.0 to 22.0 GHz	± 2.85 dB	± 1.23 dB	
22.0 to 26.5 GHz	± 2.6 dB	± 1.37 dB	

1. DC coupling required to meet specifications below 50 MHz. With AC coupling, specifications apply at frequencies of 50 MHz and higher. Statistical observations at 10 MHz with AC coupling show that most instruments meet the DC-coupled specifications, however, a small percentage of instruments are expected to have errors exceeding 0.5 dB at 10 MHz at the temperature extreme. The effect at 20 to 50 MHz is negligible but not warranted.

Input attenuation switching uncertainty		Specifications	Additional information
Attenuation > 2 dB, preamp off Relative to 10 dB (reference setting)	50 MHz (reference frequency)	± 0.20 dB	± 0.08 dB (typical)
Total absolute amplitude accuracy		Specification	95th percentile ($\approx 2\sigma$)
(10 dB attenuation, 20 to 30 °C, 1 Hz \leq RBW \leq 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)			
Preselector off and on, preamp off and on			
RF Input 1 to 26.5 GHz	At 50 MHz	± 0.33 dB	± 0.17 dB
	At all frequencies	$\pm (0.33$ dB + frequency response)	
RF Input 2 to 1 GHz	At 50 MHz	± 0.36 dB	± 0.20 dB
	At all frequencies	$\pm (0.36$ dB + frequency response)	

Input voltage standing wave ratio (VSWR)		Input attenuation 0 dB	Input attenuation ≥ 10 dB
Preselector off, preamp on and off	1 to 18 GHz	3.0:1	2.0:1
Preselector on, preamp on and off			
DC coupled	9 kHz to 1 GHz	2.0:1	1.2:1
	1 to 18 GHz	3.0:1	2.0:1
AC coupled	50 MHz to 1 GHz	2.0:1	1.2:1
	1 to 18 GHz	3.0:1	2.0:1
Resolution bandwidth switching uncertainty (referenced to 30 kHz RBW)			
1 Hz to 1.5 MHz RBW	± 0.05 dB		
1.6 to 3 MHz RBW	± 0.10 dB		
4, 5, 6, 8 MHz RBW	± 1.0 dB		
Reference level			
Range			
Log scale	-170 to +30 dBm in 0.01 dB steps		
Linear scale	Same as log (707 pV to 7.07 V)		
Accuracy	0 dB		
Display scale switching uncertainty			
Switching between linear and log	0 dB		
Log scale/div switching	0 dB		
Display scale fidelity			
Between -10 dBm and -80 dBm input mixer level	± 0.10 dB total		
Trace detectors			
Normal, peak, sample, negative peak, log power average, RMS average, and voltage average			
CISPR detectors: quasi-peak, EMI-avg, RMS-avg			
Preamplifier			
Gain			
Preselector off	100 kHz to 3.6 GHz	+20 dB (nominal)	
	3.6 to 26.5 GHz	+35 dB (nominal)	
Preselector on	9 kHz to 3.6 GHz	+20 dB (nominal)	
	3.6 to 26.5 GHz	+35 dB (nominal)	

Dynamic Range Specifications

1 dB gain compression (two-tone)			
RF Input 1; RF2 Input to 1 GHz; RF Input 2 performance = RF Input 1 performance +9 dB 5 to 50 °C			
Total power at input mixer			
		Specification	Typical
Preselector on and off, preamp off	9 kHz to 10 MHz		+4 dBm (nominal)
	10 to 500 MHz	0 dBm	+3 dBm (typical)
	500 MHz to 3.6 GHz	+1 dBm	+5 dBm (typical)
	3.6 to 26.5 GHz	0 dBm	+4 dBm (typical)
Preselector off, Preamp on	10 MHz to 3.6 GHz		-10 dBm (nominal)
	3.6 to 26.5 GHz		
	Tone spacing 100 kHz to 20 MHz		-26 dBm (nominal)
	Tone spacing > 70 MHz		-16 dBm (nominal)
Preselector on, Preamp on	9 kHz to 10 MHz		-16 dBm (nominal)
	10 to 500 MHz		-18 dBm (typical)
	500 MHz to 3.6 GHz		-16 dBm (typical)
	3.6 to 26.5 GHz		
	Tone spacing 100 kHz to 20 MHz		-26 dBm (nominal)
	Tone spacing > 70 MHz		-16 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)			
RF Input 1; RF Input 2 to 1 GHz; RF Input 2 performance = RF Input 1 performance +11 dB			
		Specification	Typical including NFE ¹
Preselector off, preamp off	20 Hz ²	-97 dBm	—
	100 Hz ²	-106 dBm	—
	1 kHz ²	-118 dBm	—
	9 kHz	-119 dBm	—
	100 kHz	-131 dBm	—
	1 MHz	-150 dBm	—
	10 MHz to 2.1 GHz	-150 dBm	-158 dBm
	2.1 to 3.6 GHz	-148 dBm	-157 dBm
	3.5 to 8.4 GHz	-148 dBm	-159 dBm
	8.3 to 13.6 GHz	-147 dBm	-158 dBm
	13.5 to 17.1 GHz	-141 dBm	-151 dBm
	17.0 to 20.0 GHz	-142 dBm	-152 dBm
	20.0 to 26.5 GHz	-135 dBm	-146 dBm
Preselector off, preamp on	100 kHz	-144 dBm	—
	1 MHz	-162 dBm	—
	10 MHz to 2.1 GHz	-163 dBm	-175 dBm
	2.1 to 3.6 GHz	-161 dBm	-173 dBm
	3.5 to 8.4 GHz	-164 dBm	-172 dBm
	8.3 to 13.6 GHz	-162 dBm	-173 dBm
	13.5 to 17.1 GHz	-160 dBm	-171 dBm
	17.0 to 20.0 GHz	-158 dBm	-165 dBm
	20.0 to 26.5 GHz	-155 dBm	-162 dBm

1. Typical DANL including NFE = Typical DANL-DANL improvement with NFE

2. Specified for instruments with prefixes MY/SG5213 or greater. Nominal for instruments with earlier prefixes.

Displayed average noise level (DANL) (continued)

(Input terminated, sample or average detector, averaging type = Log, 0 dB input attenuation, IF Gain = High, 20 to 30 °C)

RF Input 1; RF Input 2 to 1 GHz; RF Input 2 performance = RF Input 1 performance +11 dB

		Specification	Typical including NFE ¹
Preselector on, preamp off	20 Hz ³	-92 dBm	-100 dBm ²
	100 Hz ³	-101 dBm	-109 dBm ²
	1 kHz ³	-114 dBm	-120 dBm ²
	9 kHz	-118 dBm	-132 dBm
	100 kHz	-130 dBm	-143 dBm
	1 to 3 MHz	-147 dBm	-158 dBm
	3 to 30 MHz	-150 dBm	-160 dBm
	30 to 300 MHz	-151 dBm	-161 dBm
	300 to 600 MHz	-153 dBm	-164 dBm
	600 MHz to 1 GHz	-151 dBm	-162 dBm
	1 to 2 GHz	-150 dBm	-161 dBm
	2 to 2.5 GHz	-152 dBm	-164 dBm
	2.5 to 3 GHz	-151 dBm	-163 dBm
	3 to 3.6 GHz	-148 dBm	-161 dBm
	3.5 to 8.4 GHz	-148 dBm	-159 dBm
	8.3 to 13.6 GHz	-147 dBm	-158 dBm
	13.5 to 17.1 GHz	-141 dBm	-151 dBm
17.0 to 20.0 GHz	-142 dBm	-152 dBm	
20.0 to 26.5 GHz	-135 dBm	-146 dBm	
Preselector on, preamp on	1 kHz ³	-119 dBm	-133 dBm ²
	9 kHz	-143 dBm	-154 dBm
	100 kHz	-154 dBm	-165 dBm
	1 to 2 MHz	-166 dBm	-178 dBm
	2 to 30 MHz	-158 dBm	-167 dBm
	30 to 600 MHz	-159 dBm	-166 dBm
	600 to 800 MHz	-157 dBm	-166 dBm
	800 MHz to 1 GHz	-158 dBm	-167 dBm
	1 to 2 GHz	-156 dBm	-164 dBm
	2 to 2.75 GHz	-160 dBm	-168 dBm
	2.75 to 3.6 GHz	-157 dBm	-165 dBm
	3.5 to 8.4 GHz	-164 dBm	-172 dBm
	8.3 to 13.6 GHz	-162 dBm	-173 dBm
	13.5 to 17.1 GHz	-160 dBm	-171 dBm
	17.0 to 20.0 GHz	-158 dBm	-165 dBm
20.0 to 26.5 GHz	-155 dBm	-162 dBm	

1. Typical DANL including NFE = Typical DANL-DANL improvement with NFE.

2. No NFE factor at this frequency.

3. Specified for instruments with prefixes MY/SG5213 or greater. Nominal for instruments with earlier prefixes.

Indicated noise in CISPR BW

Calculated from DANL data; EMI-AVG detector, 0 dB input attenuation; indicated RBW is CISPR RBW

RF Input 1; RF Input 2 to 1 GHz; RF Input 2 performance = RF Input 1 performance +11 dB

		Typical including NFE ¹
Preselector on, preamp off	20 Hz (1 Hz RBW) ³	+7 dBuV ²
	100 Hz (10 Hz) ³	+8 dBuV ²
	1 kHz (100 Hz) ³	+7 dBuV ²
	9 kHz (200 Hz RBW)	-1.0 dBuV
	100 kHz (200 Hz)	-12.0 dBuV
	1 to 3 MHz (9 kHz)	-12.0 dBuV
	3 to 30 MHz (9 kHz)	-13.0 dBuV
	30 to 300 MHz (120 kHz)	-3.0 dBuV
	300 to 600 MHz (120 kHz)	-6.0 dBuV
	600 MHz to 1 GHz (120 kHz)	-4.0 dBuV
	1 to 2 GHz (1 MHz)	+6.0 dBuV
	2 to 2.5 GHz (1 MHz)	+3.0 dBuV
	2.5 to 3 GHz (1 MHz)	+4.0 dBuV
	3 to 3.6 GHz (1 MHz)	+6.0 dBuV
	3.5 to 8.4 GHz (1 MHz)	+6.0 dBuV
	8.3 to 13.6 GHz (1 MHz)	+9.0 dBuV
13.5 to 17.1 GHz (1 MHz)	+14.0 dBuV	
17.0 to 20.0 GHz (1 MHz)	+16.0 dBuV	
20.0 to 26.5 GHz (1 MHz)	+22.0 dBuV	
Preselector on, preamp on	1 kHz (100 Hz RBW) ³	-6 dBuV ²
	9 kHz (200 Hz RBW)	-23.0 dBuV
	100 kHz (200 Hz)	-34.0 dBuV
	1 to 2 MHz (9 kHz)	-31.0 dBuV
	2 to 30 MHz (9 kHz)	-20.0 dBuV
	30 to 600 MHz (120 kHz)	-8.0 dBuV
	600 to 800 MHz (120 kHz)	-9.0 dBuV
	800 MHz to 1 GHz (120 kHz)	-9.0 dBuV
	1 to 2 GHz (1 MHz)	+3.0 dBuV
	2 to 2.75 GHz (1 MHz)	-1.0 dBuV
	2.75 to 3.6 GHz (1 MHz)	+3.0 dBuV
	3.5 to 8.4 GHz (1 MHz)	-5.0 dBuV
	8.3 to 13.6 GHz (1 MHz)	-6.0 dBuV
	13.5 to 17.1 GHz (1 MHz)	-4.0 dBuV
17.0 to 20.0 GHz (1 MHz)	+2.0 dBuV	
20.0 to 26.5 GHz (1 MHz)	+5.0 dBuV	

1. Typical Indicated Noise including NFE = Typical DANL+ Bandwidth and Log corrections-DANL improvement with NFE

2. No NFE factor at this frequency.

3. Specified for instruments with prefixes MY/SG5213 or greater. Nominal for instruments with earlier prefixes.

Spurious responses

RF Input 1; preselector on and off

Residual responses ¹ (Input terminated and 0 dB attenuation)	200 kHz to 8.4 GHz (swept)	-100 dBm
	Zero span or FFT or other frequencies	-100 dBm (nominal)
Image responses	10 MHz to 3.6 GHz	-80 dBc (-107 dBc typical)
	3.5 to 13.6 GHz	-78 dBc (-88 dBc typical)
	13.5 to 17.1 GHz	-74 dBc (-85 dBc typical)
	17.0 to 22 GHz	-70 dBc (-82 dBc typical)
	22 to 26.5 GHz	-68 dBc (-78 dBc typical)
LO related spurious (f > 600 MHz from carrier)	10 MHz to 3.6 GHz	-90 dBc + 20xlogN ² (typical)
Other spurious f ≥ 10 MHz from carrier		-80 dBc + 20xlogN ²

Second harmonic distortion (SHI)

RF Input 1; input power -9 dBm, input attenuation 6 dB; RF Input 2 to 1 GHz. RF Input 2 performance = RF Input 1 performance +9 dB

	Source frequency	Specification (5 to 50 °C)	Typical
Preselector off, preamp off	10 MHz to 1.25 GHz	+45 dBm	+54 dBm
	1.25 to 1.8 GHz	+41 dBm	+50 dBm
	1.75 to 7 GHz	+65 dBm	+68 dBm
	7 to 11 GHz	+55 dBm	+64 dBm
	11 to 13.25 GHz	+50 dBm	+60 dBm
Preselector off, preamp on Preamp power = -45 dBm Preamp power = -50 dBm	10 MHz to 1.8 GHz		+33 dBm (nominal)
	1.8 to 13.25 GHz		+10 dBm (nominal)
Preselector on, preamp off	10 to 30 MHz	+47 dBm	+50 dBm
	30 to 500 MHz	+57 dBm	+63 dBm
	500 MHz to 1GHz	+46 dBm	+48 dBm
	1 to 1.6 GHz	+58 dBm	+70 dBm
	1.6 to 1.8 GHz	+46 dBm	+52 dBm
	1.75 to 6.5 GHz	+65 dBm	+68 dBm
	6.5 to 11 GHz	+55 dBm	+64 dBm
	11 to 13.25 GHz	+50 dBm	+60 dBm
Preselector on, preamp on, Input power = -9 dBm Attenuation = 26 dB	10 to 300 MHz		+53 dBm (nominal)
	300 to 500 MHz		+58 dBm (nominal)
	500 MHz to 1 GHz		+47 dBm (nominal)
	1 to 1.6 GHz		+53 dBm (nominal)
	1.6 to 1.8 GHz		+30 dBm (nominal)
Input power = -25 dBm, Attenuation = 20 dB	1.8 to 13.25 GHz		+10 dBm (nominal)

Third-order intermodulation distortion (TOI)

(Two -14 dBm tones at input and 4 dB of input attenuation; tone separation > 5 times IF prefilter bandwidth, 20 to 30 °C, see Specifications Guide for IF prefilter bandwidths); RF Input 1; RF Input 2 to 1 GHz; RF Input 2 performance = RF Input 1 performance +9 dB

		TOI	TOI (typical)
Preselector off, preamp off	10 to 100 MHz	+12 dBm	+17 dBm
	100 to 400 MHz	+15 dBm	+20 dBm
	400 MHz to 1.7 GHz	+16 dBm	+20 dBm
	1.7 to 3.6 GHz	+16 dBm	+19 dBm
	3.5 to 8.4 GHz	+15 dBm	+18 dBm
	8.3 to 13.6 GHz	+15 dBm	+18 dBm
	13.5 to 26.5 GHz	+10 dBm	+14 dBm

1. RF2 performance = RF1 performance +11 dB

2. N is the LO multiplication factor.

Preselector off, preamp on Two -45 dBm tones at preamp input ¹	10 to 500 MHz 500 MHz to 3.6 GHz 3.6 to 26.5 GHz		+4 dBm (nominal) +5 dBm (nominal) -15 dBm (nominal)
Preselector on, preamp off	10 to 30 MHz 30 MHz to 1 GHz 1 to 1.5 GHz 1.5 to 3.6 GHz 3.5 to 8.4 GHz 8.3 to 13.6 GHz 13.5 to 26.5 GHz	+12 dBm +12.5 dBm +12.5 dBm +14.5 dBm +15 dBm +15 dBm +10 dBm	+16 dBm +15 dBm +14 dBm +16 dBm +18 dBm +18 dBm +14 dBm
Preselector on, preamp on Two -14 dBm tones at the input with 22 dB input attenuation	10 to 30 MHz 30 MHz to 1 GHz 1 to 2 GHz 2 to 3.6 GHz	-9 dBm -9 dBm -4 dBm -6 dBm	-5 dBm -4 dBm -2 dBm -3 dBm
Two tones, each at -50 dBm at the preamp ¹	3.6 to 26.5 GHz		-15 dBm (nominal)
Phase noise²	Offset	Specification	Typical
Noise sidebands (20 to 30 °C, CF = 1 GHz)	100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz	-84 dBc/Hz -103 dBc/Hz -106 dBc/Hz -115 dBc/Hz -135 dBc/Hz	-88 dBc/Hz -101 dBc/Hz (nominal) -106 dBc/Hz -117 dBc/Hz -137 dBc/Hz -148 dBc/Hz (nominal)

1. Preamp input power = input power - input attenuation (-9 dB for input 2).

2. For nominal values, refer to Figure 1.

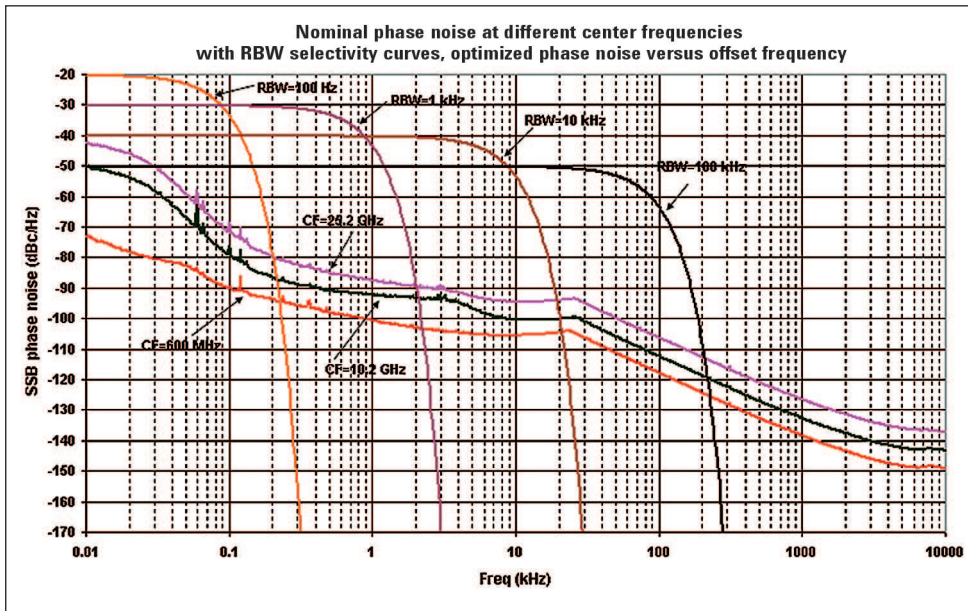


Figure 1. Nominal phase noise at different center frequencies

PowerSuite Measurement Specifications

Channel power		
Amplitude accuracy, W-CDMA or IS95 (20 to 30 °C, attenuation = 10 dB)	± 0.82 dB (± 0.23 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	± 0.14 dB	± 0.21 dB
BTS	± 0.49 dB	± 0.44 dB
Dynamic range (typical)	-73 dB	-79 dB
Without noise correction	-78 dB	-82 dB
With noise correction		
Offset channel pairs measured	1 to 6	
ACP measurement and transfer time (fast method)	14 ms (nominal) ($\sigma = 0.2$ dB)	
Multiple number of carriers measured	Up to 12	
Power statistics CCDF		
Histogram resolution	0.01 dB	
Harmonic distortion		
Maximum harmonic number	10th	
Result	Fundamental power (dBm), relative harmonics power (dBc), total harmonic distortion in %	
Intermod (TOI)	Measure the third-order products and intercepts from two tones	
Burst power		
Methods	Power above threshold, power within burst width	
Results	Single burst output power, average output power, maximum power, minimum power within burst, burst width	
Spurious emission		
W-CDMA (1 to 3.6 GHz) table-driven spurious signals; search across regions		
Dynamic range	96.7 dB	101.7 dB (typical)
Absolute sensitivity	-85.4 dBm	
Spectrum emission mask (SEM)		
cdma2000® (750 kHz offset)		
Relative dynamic range (30 kHz RBW)	78.9 dB	
Absolute sensitivity	-100.7 dBm	85.0 dB (typical)
Relative accuracy	± 0.12 dB	
3GPP W-CDMA (2.515 MHz offset)		
Relative dynamic range (30 kHz RBW)	81.9 dB	
Absolute sensitivity	-100.7 dBm	88.2 dB (typical)
Relative accuracy	± 0.12 dB	

General Specifications

Temperature range	
Operating	0 to 55 °C
Storage	-40 to 70 °C
EMC	
Complies with European EMC Directive 2004/108/EC <ul style="list-style-type: none"> • IEC/EN 61326-2-1 • CISPR Pub 11 Group 1, class B • AS/NZS CISPR 11 • ICES/NMB-001 	
This ISM device complies with Canadian ICES-001 Cet appareil ISM est conforme à la norme NMB-001 du Canada	
Radio disturbance measuring apparatus	
CISPR 16-1-1	The features in this instrument comply with the performance requirements of this basic standard ¹
Safety	
Complies with European Low Voltage Directive 2006/95/EC <ul style="list-style-type: none"> • IEC/EN 61010-1 2nd Edition • Canada: CSA C22.2 No. 61010-01-04 • USA: UL 61010-1 2nd Edition 	
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 MIL-PRF-28800F Class 3	

1. Noise Floor Extension (NFE) required for isolated pulse in bands C and D only.

Power requirements	
Voltage and frequency (nominal)	100 to 120 V, 50/60/400 Hz 220 to 240 V, 50/60 Hz
Power consumption	
On	450 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	24 kg (52 lbs) (nominal)
Shipping	36 kg (79 lbs) (nominal)
Dimensions	
Height	177 mm (7.0 in)
Width	431 mm (17.0 in)
Length	535 mm (21.0 in)
Warranty	
The MXE EMI receiver 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	
RF Input 1 Connector	Type-N female, 50 Ω (nominal) (Standard) 3.5 mm female (Opt C35)
RF Input 2 Connector	Type-N female, 50 Ω (nominal) (Standard)
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	Compatible with USB 2.0 USB Type-A female
Output current	0.5 A (nominal)

Rear panel	
10 MHz out	
Connector	BNC female, 50 Ω (nominal)
Output amplitude	≥ 0 dBm (nominal)
Frequency	10 MHz \times (1+ 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)
Frequency lock range	$\pm 5 \times 10^{-6}$ 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
Trigger 1 and 2 outputs	
Connector	BNC female
Impedance	50 Ω (nominal)
Level	0 to 5 V (CMOS)

Rear panel (continued)	
Monitor output	
Connector	VGA compatible, 15-pin mini D-SUB
Format	XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB
Resolution	1024 x 768
Noise source drive +28 V (pulsed)	
Connector	BNC female
SNS Series noise source	
Analog out	
Connector	BNC female (used by Option YAS)
USB 2.0 ports	
Master (4 ports)	
Standard	Compatible with USB 2.0
Connector	USB Type-A female
Output current	0.5 A (nominal)
Slave (1 port)	
Standard	Compatible with USB 2.0
Connector	USB Type-B female
GPIO interface	
Connector	IEEE-488 bus connector
GPIO codes	SH1, AH1, T6, SR1, RL1, PP0, DC1, C1, C2, C3, C28, DT1, L4, C0
GPIO mode	Controller or device
LAN TCP/IP interface	
Standard	1000Base-T
Connector	RJ45 Ethertwist

I/Q Analyzer

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, Hamming, 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)
≤ 3.6	≤ 10	± 0.40 dB	0.04 dB
3.6 < f ≤ 26.5	≤ 10		0.25 dB

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

Center frequency (GHz)	Span (MHz)	Peak-to-peak	RMS
≤ 3.6	≤ 10	± 0.5°	0.2°
3.6 < f ≤ 26.5	≤ 10	± 1.5°	0.4°

Data acquisition (10 MHz IF path)

Time record length			
IQ analyzer	4,000,000 IQ sample pairs		
89600 VSA software or N9064A	32-bit packing	64-bit packing	Memory
	62.5 MSa	31.25 MSa	256 MB
Sample rate	90 MSa/s		
ADC resolution	14 bits		

Option B25 25 MHz analysis bandwidth

IF frequency response (B25 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)
≤ 3.6	10 to ≤ 25	± 0.45 dB	0.051 dB
3.6 < f ≤ 26.5	10 to ≤ 25		0.45 dB

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

Center frequency (GHz)	Span (MHz)	Peak-to-peak	RMS
0.02 ≤ f < 3.6	≤ 25	± 0.5 °	0.2 °
3.6 ≤ f ≤ 26.5	≤ 25	± 1.5 °	0.4 °

Data acquisition (B25 IF path)

Time record length (IQ pairs)			
IQ analyzer	4,000,000 IQ sample pairs		
89600 VSA software or N9064A	32-bit packing	64-bit packing	Memory
	62.5 MSa	31.25 MSa	256 MB
Sample rate	90 MSa/s		
ADC resolution	14 bits		



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