

Keysight N9038A

MXE EMI Receiver

3 Hz to 3.6, 8.4, 26.5, and 44 GHz

Data Sheet



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Keep the test queue flowing

In EMC testing, success depends on tools that can help you do more in less time—today and tomorrow. That’s why Keysight Technologies, Inc. created the MXE: it’s a standards-compliant EMI receiver and diagnostic signal analyzer built on an upgradeable platform. In the lab and on the bench, it provides the accuracy, repeatability, and reliability you need to test with confidence. Equip your team with the MXE, and keep the test queue flowing.

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 specifications and conditions for the MXE EMI receiver. For the complete specifications guide, visit:
www.keysight.com/find/mxe_specifications

Get more information

This data sheet is a summary of the specifications and conditions which are available in the MXE EMI Receiver Specification Guide (N9038-90010).

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 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 526 | 3 Hz to 26.5 GHz | 10 MHz to 26.5 GHz |
| Option 544 | 3 Hz to 44 GHz | – |
| Input 2 | 3 Hz to 1 GHz | 10 MHz to 1 GHz |
| 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 | 17.0 to 26.5 GHz |
| 5 | 4 | 26.4 to 34.5 GHz |
| 6 | 8 | 34.4 to 44 GHz |
| Frequency reference | | |
| Accuracy | ± [(time since last adjustment x aging rate) + temperature stability + calibration accuracy] | |
| Total aging | ± 1 x 10 ⁻⁷ / year | |
| | ± 1.5 x 10 ⁻⁷ / 2 years | |
| Temperature stability | | |
| 20 to 30 °C | ± 1.5 x 10 ⁻⁸ | |
| Full temperature range | ± 5 x 10 ⁻⁸ | |
| Achievable initial calibration accuracy | ± 4 x 10 ⁻⁸ | |
| Residual FM | ≤ (0.25 Hz x N) p-p in 20 ms (nominal) | |
| Frequency readout accuracy (start, stop, center, marker) | | |
| ± (marker frequency x frequency reference accuracy + 0.25 % x span + 5 % x RBW + 2 Hz + 0.5 x horizontal resolution ¹) | | |
| Marker frequency counter | | |
| Accuracy | ± (marker frequency x frequency reference accuracy + 0.100 Hz) | |
| Delta counter accuracy | ± (delta frequency x frequency reference accuracy + 0.141 Hz) | |
| Counter resolution | 0.001 Hz | |
| Frequency span (FFT and swept mode) | | |
| Range | 0 Hz (zero span), 10 Hz to maximum frequency of instrument | |
| Resolution | 2 Hz | |
| Accuracy | | |
| Stepped/Swept | ± (0.25 % x span + horizontal resolution) | |
| FFT | ± (0.1% x span + horizontal resolution) | |

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

| Sweep time and triggering | | | |
|--|---|---|--------------------------------------|
| Range | Span = 0 Hz Span ≥ 10 Hz | 1 μs to 6000 s 1 ms to 4000 s | |
| Accuracy | Span ≥ 10 Hz, swept Span ≥ 10 Hz, FFT Span = 0 Hz | ± 0.01 % (nominal) ± 40 % (nominal) ± 0.01 % (nominal) | |
| 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 4,000,001 | | |
| 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 | 1.89 GHz (-3 dB corner frequency) |

| Analysis bandwidth¹ | | |
|---|--|------------------|
| Maximum bandwidth | Option B25 Standard | 25 MHz 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 speed² | | |
| | Standard | |
| 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 (μ W) | 47 ms (nominal) | |
| Measurement/mode switching | 39 ms (nominal) | |
| Time domain sweep times | | |
| CISPR band B, 150 kHz to 30 MHz, RBW = 9 kHz, measurement time = 100 ms, peak detector | 11.4 s (nominal) | |
| CISPR band B, 150 kHz to 30 MHz, RBW = 9 kHz, measurement time = 1 s, quasi-peak detector | 181.4 s (nominal) | |
| CISPR band C/D, 30 MHz to 1 GHz, RBW = 120 kHz, measurement time = 10 ms, peak detector | 2.1 s (nominal) | |
| CISPR band C/D, 30 MHz to 1 GHz, RBW = 9 kHz, measurement time = 10 ms, peak detector | 12.6 s (nominal) | |
| CISPR band C/D, 30 MHz to 1 GHz, RBW = 120 kHz, measurement time = 1 s, quasi-peak detector | 210.9 s (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, dBpW | | | | |
| Frequency response | | Specification | | 95th percentile ($\approx 2\sigma$) | |
| | | Option 503, 508, or 526 (RF/ μ W) | Option 544 (mmW) | Option 503, 508, or 526 (RF/ μ W) | Option 544 (mmW) |
| (10 dB input attenuation, 20 to 30 °C, preselector centering applied, σ = nominal standard deviation) | | | | | |
| RF preselector off, preamp off | 3 Hz to 20 Hz | | | \pm 0.25 dB (nominal) | \pm 0.25 dB (nominal) |
| | 20 Hz to 10 MHz ¹ | \pm 0.6 dB | \pm 0.6 dB | \pm 0.22 dB | \pm 0.25 dB |
| | 10 to 50 MHz | \pm 0.65 dB | \pm 0.65 dB | \pm 0.22 dB | \pm 0.21 dB |
| | 50 MHz to 3.6 GHz | \pm 0.65 dB | \pm 0.65 dB | \pm 0.22 dB | \pm 0.15 dB |
| | 3.5 to 5.2 GHz | \pm 1.5 dB | \pm 1.6 dB | \pm 0.47 dB | \pm 0.6 dB |
| | 5.2 to 8.4 GHz | \pm 1.5 dB | \pm 1.5 dB | \pm 0.47 dB | \pm 0.57 dB |
| | 8.3 to 13.6 GHz | \pm 1.5 dB | \pm 1.5 dB | \pm 0.46 dB | \pm 0.54 dB |
| | 13.5 to 17.1 GHz | \pm 1.5 dB | \pm 1.5 dB | \pm 0.53 dB | \pm 0.64 dB |
| | 17 to 18 GHz | \pm 1.5 dB | \pm 1.7 dB | \pm 0.57 dB | \pm 0.72 dB |
| | 18 to 22 GHz | \pm 1.7 dB | \pm 1.7 dB | \pm 0.64 dB | \pm 0.72 dB |
| | 22 to 26.5 GHz | \pm 1.7 dB | \pm 1.7 dB | \pm 0.61 dB | \pm 0.71 dB |
| | 26.4 to 34.5 GHz | | \pm 2.5 dB | | \pm 0.93 dB |
| | 34.4 to 44 GHz | | \pm 3.2 dB | | \pm 1.24 dB |
| RF preselector off, preamp on (0 dB attenuation) | 100 kHz to 3.6 GHz | \pm 0.75 dB | | \pm 0.29 dB | |
| | 100 kHz to 10 MHz | | \pm 0.75 dB | | \pm 0.43 dB |
| | 10 to 50 MHz | | \pm 0.75 dB | | \pm 0.29 dB |
| | 50 MHz to 3.6 GHz | | \pm 0.75 dB | | \pm 0.31 dB |
| | 3.5 to 8.4 GHz | \pm 1.85 dB | | \pm 0.63 dB | |
| | 3.5 to 5.2 GHz | | \pm 2.2 dB | | \pm 0.9 dB |
| | 5.2 to 8.4 GHz | | \pm 1.85 dB | | \pm 0.7 dB |
| | 8.3 to 13.6 GHz | \pm 1.95 dB | \pm 1.95 dB | \pm 0.64 dB | \pm 0.79 dB |
| | 13.5 to 17.1 GHz | \pm 1.8 dB | \pm 1.8 dB | \pm 0.81 dB | \pm 0.88 dB |
| | 17 to 18 GHz | \pm 2.0 dB | | \pm 0.95 dB | |
| | 18 to 22 GHz | \pm 2.85 dB | | \pm 1.23 dB | |
| | 17 to 22 GHz | | \pm 2.85 dB | | \pm 1.07 dB |
| | 22 to 26.5 GHz | \pm 2.6 dB | \pm 2.6 dB | \pm 1.37 dB | \pm 1.03 dB |
| | 26.4 to 34.5 GHz | | \pm 3.0 dB | | \pm 1.35 dB |
| | 34.4 to 44 GHz | | \pm 4.1 dB | | \pm 1.69 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 ($\approx 2\sigma$) | |
|---|-------------------------------|---------------------------------------|------------------|---------------------------------------|------------------------|
| | | Option 503, 508, or 526 (RF/ μ W) | Option 544 (mmW) | Option 503, 508, or 526 (RF/ μ W) | Option 544 (mmW) |
| RF preselector on, preamp off | 3 Hz to 20 Hz | | | ± 0.3 dB (nominal) | ± 0.3 dB (nominal) |
| | 20 Hz to 300 MHz ¹ | ± 0.65 dB | ± 0.65 dB | ± 0.30 dB | ± 0.3 dB |
| | 300 MHz to 1 GHz | ± 0.65 dB | ± 0.65 dB | ± 0.28 dB | ± 0.28 dB |
| | 1 to 3.6 GHz | ± 0.85 dB | ± 0.85 dB | ± 0.36 dB | ± 0.36 dB |
| | 3.5 to 8.4 GHz | ± 1.5 dB | | ± 0.47 dB | |
| | 3.5 to 5.2 GHz | | ± 1.6 dB | | ± 0.6 dB |
| | 5.2 to 8.4 GHz | | ± 1.5 dB | | ± 0.57 dB |
| | 8.3 to 13.6 GHz | ± 1.5 dB | ± 1.5 dB | ± 0.46 dB | ± 0.54 dB |
| | 13.5 to 17.1 GHz | ± 1.5 dB | ± 1.5 dB | ± 0.53 dB | ± 0.64 dB |
| | 17 to 18 GHz | ± 1.5 dB | ± 1.7 dB | ± 0.57 dB | ± 0.72 dB |
| | 18 to 22 GHz | ± 1.7 dB | ± 1.7 dB | ± 0.64 dB | ± 0.72 dB |
| | 22 to 26.5 GHz | ± 1.7 dB | ± 1.7 dB | ± 0.61 dB | ± 0.71 dB |
| | 26.4 to 34.5 GHz | | ± 2.5 dB | | ± 0.93 dB |
| | 34.4 to 44 GHz | | ± 3.2 dB | | ± 1.24 dB |
| RF preselector on, preamp on (0 dB attenuation) | 1 kHz to 30 MHz ¹ | ± 0.8 dB | ± 0.8 dB | ± 0.36 dB | ± 0.36 dB |
| | 30 to 300 MHz ¹ | ± 0.7 dB | ± 0.70 dB | ± 0.29 dB | ± 0.29 dB |
| | 300 MHz to 1 GHz | ± 0.65 dB | ± 0.65 dB | ± 0.30 dB | ± 0.30 dB |
| | 1 to 2.75 GHz | ± 0.95 dB | ± 0.95 dB | ± 0.45 dB | ± 0.45 dB |
| | 2.75 to 3.6 GHz | ± 1.15 dB | ± 1.15 dB | ± 0.55 dB | ± 0.55 dB |
| | 3.5 to 8.4 GHz | ± 1.85 dB | | ± 0.63 dB | |
| | 3.5 to 5.2 GHz | | ± 2.2 dB | | ± 0.9 dB |
| | 5.2 to 8.4 GHz | | ± 1.85 dB | | ± 0.7 dB |
| | 8.3 to 13.6 GHz | ± 1.95 dB | ± 1.95 dB | ± 0.64 dB | ± 0.79 dB |
| | 13.5 to 17.1 GHz | ± 1.8 dB | ± 1.8 dB | ± 0.81 dB | ± 0.88 dB |
| | 17 to 18 GHz | ± 2.0 dB | ± 2.85 dB | ± 0.95 dB | ± 1.07 dB |
| | 18 to 22 GHz | ± 2.85 dB | ± 2.85 dB | ± 1.23 dB | ± 1.07 dB |
| | 22 to 26.5 GHz | ± 2.6 dB | ± 2.6 dB | ± 1.37 dB | ± 1.03 dB |
| | 26.4 to 34.5 GHz | | ± 3.0 dB | | ± 1.35 dB |
| 34.4 to 44 GHz | | ± 4.1 dB | | ± 1.69 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 | |
|---|-----------------------|--------------------------------------|-------------------------|
| Attenuation > 2 dB, preamp off | 50 MHz | ± 0.20 dB | ± 0.08 dB (typical) |
| Relative to 10 dB (reference setting) | (reference frequency) | | |
| Absolute amplitude accuracy | | Specifications | |
| (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) | | | |
| RF preselector off and on, preamp off and on | | | |
| RF input 1 to 44 GHz | At 50 MHz | ± 0.33 dB | ± 0.25 dB |
| | At all frequencies | $\pm (0.33$ dB + frequency response) | |
| RF input 2 to 1 GHz | At 50 MHz | ± 0.36 dB | ± 0.27 dB |
| | At all frequencies | $\pm (0.36$ dB + frequency response) | |

| Input voltage standing wave ratio (VSWR) | | Input attenuation 0 dB | Input attenuation ≥ 10 dB |
|--|----------------------------------|---|--|
| RF preselector off, preamp on and off | | | |
| DC coupled | 1 to 18 GHz | 3.0:1 | 2.0:1 |
| | 18 to 26.5 GHz | 3.0:1 | 2.0:1 |
| | 26.5 to 40 GHz | 3.0:1 | 2.5:1 |
| | 40 to 44 GHz | – | – |
| AC coupled | 1 to 18 GHz | 3.0:1 | 2.0:1 |
| | 18 to 26.5 GHz | 3.0:1 | 2.4:1 |
| RF preselector on, preamp on and off | | | |
| DC coupled | 9 kHz to 1 GHz | 2.0:1 | 1.2:1 |
| | 1 to 26.5 GHz | 3.0:1 | 2.0:1 |
| | 26.5 to 40 GHz | 3.0:1 | 2.5:1 |
| | 40 to 44 GHz | – | – |
| AC coupled | 50 MHz to 1 GHz | 2.0:1 | 1.2:1 |
| | 1 to 18 GHz | 3.0:1 | 2.0:1 |
| | 18 to 26.5 GHz | 3.0:1 | 2.4:1 |
| 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 | | |
| Total measurement uncertainty¹ | | 95th percentile ($\approx 2\sigma$) | |
| Signal level 0 to 90 dB below reference point, RF attenuation 0 to 40 dB, RBW ≤ 3 MHz, 20° to 30° C: AC coupled 10 MHz to 26.5 GHz DC coupled 9 kHz to 40 GHz | | | |
| | | Option 503, 508, or 526 (RF/μW) | Option 544 (mmW) |
| RF preselector off, preamp off | 1 kHz to 2 GHz | ± 0.50 dB | ± 0.50 dB |
| | 2 to 3.6 GHz | ± 0.60 dB | ± 0.60 dB |
| | 3.6 to 8 GHz | ± 0.80 dB | ± 1.70 dB |
| | 8 to 18 GHz | ± 1.10 dB | ± 1.30 dB |
| | 18 to 26.5 GHz | ± 1.60 dB | ± 1.60 dB |
| | 26.5 to 40 GHz | | ± 1.70 dB |
| | 40 to 44 GHz | | ± 2.30 dB |
| RF preselector off, preamp on | 100 kHz to 2 GHz | ± 0.60 dB | ± 0.60 dB |
| | 2 to 3.6 GHz | ± 0.60 dB | ± 0.60 dB |
| | 3.6 to 8 GHz | ± 1.10 dB | ± 1.80 dB |
| | 8 to 18 GHz | ± 1.30 dB | ± 1.30 dB |
| | 18 to 26.5 GHz | ± 1.90 dB | ± 1.90 dB |
| | 26.5 to 40 GHz | | ± 1.90 dB |
| | 40 to 44 GHz | | ± 2.40 dB |

1. Specified for instruments with prefixes MY/SG5322 or greater.

| Total measurement uncertainty¹ (continued) | | 95th percentile ($\approx 2\sigma$) | |
|--|--------------------------------------|---|---------------|
| RF preselector on, preamp off | 9 kHz to 2 GHz | ± 0.50 dB | ± 0.50 dB |
| | 2 to 3.6 GHz | ± 0.50 dB | ± 0.50 dB |
| | 3.6 to 8 GHz | ± 0.80 dB | ± 1.70 dB |
| | 8 to 18 GHz | ± 1.10 dB | ± 1.30 dB |
| | 18 to 26.5 GHz | ± 1.60 dB | ± 1.60 dB |
| | 26.5 to 40 GHz | | ± 1.70 dB |
| | 40 to 44 GHz | | ± 2.30 dB |
| RF preselector on, preamp on | 9 kHz to 2 GHz | ± 0.50 dB | ± 0.50 dB |
| | 2 to 3.6 GHz | ± 0.70 dB | ± 0.70 dB |
| | 3.6 to 8 GHz | ± 1.10 dB | ± 1.80 dB |
| | 8 to 18 GHz | ± 1.30 dB | ± 1.30 dB |
| | 18 to 26.5 GHz | ± 1.90 dB | ± 1.90 dB |
| | 26.5 to 40 GHz | | ± 1.90 dB |
| | 40 to 44 GHz | | ± 2.40 dB |
| 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 | | | |
| RF preselector off | 100 kHz to 3.6 GHz | +20 dB (nominal) | |
| | 3.6 to 26.5 GHz | +35 dB (nominal) | |
| | 26.5 to 44 GHz | +40 dB (nominal) | |
| RF preselector on | 9 kHz to 3.6 GHz | +20 dB (nominal) | |
| | 3.6 to 26.5 GHz | +35 dB (nominal) | |
| | 26.5 to 44 GHz | +40 dB (nominal) | |
| Amplitude probability distribution | | Meets CISPR16-1-1:2010 requirements | |
| Dynamic range | > 70 dB | | |
| Amplitude accuracy | < ± 2.7 dB | | |
| Maximum measureable time period (no dead time) | 2 minutes | | |
| Minimum measureable probability | 10^{-7} | | |
| Amplitude level assignment | 1000 levels | | |
| Sampling rate | ≥ 10 MSa/s (within a 1 MHz RBW) | | |
| Amplitude resolution | 0.1881 dB | | |

1. Specified for instruments with prefixes MY/SG5322 or greater.

Dynamic Range Specifications

| 1 dB gain compression | | Specification | | | Typical | |
|--|---------------------------------|---------------------------------------|---------------------|------------------------------------|-------------------|--|
| | | | | Maximum power at mixer | | |
| | Frequency range | Option 503, 508, or 526 (RF/μW) | Option 544 (mmW) | Option 503, 508, or 526 (RF/μW) | Option 544 (mmW) | |
| RF Input 1 to 44 GHz (RF Input 2 to 1 GHz, performance = RF Input 1 performance + 9 dB) | | | | | | |
| RF preselector on and off, preamp off | 9 kHz to 10 MHz | | | +4 dBm (nominal) | +4 dBm (nominal) | |
| | 10 to 500 MHz | 0 dBm | 0 dBm | +3 dBm (typical) | +3 dBm (typical) | |
| | 500 MHz to 3.6 GHz | +1 dBm | +1 dBm | +5 dBm (typical) | +5 dBm (typical) | |
| | 3.6 to 26.5 GHz | 0 dBm | 0 dBm | +4 dBm (typical) | +4 dBm (typical) | |
| | 26.4 to 44 GHz | | -1 dBm | | +2 dBm (nominal) | |
| RF preselector off, preamp on | 10 MHz to 3.6 GHz | | | -13 dBm (nominal) | -13 dBm (nominal) | |
| | 3.6 to 26.5 GHz | | | | | |
| | Tone spacing 100 kHz to 20 MHz | | | -26 dBm (nominal) | -30 dBm (nominal) | |
| | Tone spacing > 70 MHz | | | -16 dBm (nominal) | -16 dBm (nominal) | |
| | 26.4 to 44 GHz | | | | -30 dBm (nominal) | |
| RF preselector on, preamp on | 9 kHz to 10 MHz | | | -16 dBm (nominal) | -16 dBm (nominal) | |
| | 10 to 2 GHz | | | -18 dBm (typical) | -21 dBm (typical) | |
| | 2 GHz to 3.6 GHz | | | -16 dBm (typical) | -17 dBm (typical) | |
| | 3.6 to 26.5 GHz | | | | | |
| | Tone spacing, 100 kHz to 20 MHz | | | -26 dBm (nominal) | -30 dBm (nominal) | |
| | Tone spacing > 70 MHz | | | -16 dBm (nominal) | -16 dBm (nominal) | |
| | 26.4 to 44 GHz | | | | -30 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 | | |
| RF preselector off, preamp off | 3 Hz to 10 Hz | - | | -97 dBm (nominal) ³ | | |
| | 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 | | |
| | Option 544 | -145 dBm | | -153 dBm | | |
| | 8.3 to 13.6 GHz | -147 dBm | | -158 dBm | | |
| | Option 544 | -147 dBm | | -156 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 | | |
| 26.4 to 34.5 GHz | -141 dBm | | -148 dBm | | | |
| 34.4 to 44 GHz | -135 dBm | | -143 dBm | | | |
| RF 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 | | |
| | Option 544 | -161 dBm | | -166 dBm | | |
| | 8.3 to 13.6 GHz | -162 dBm | | -173 dBm | | |
| | Option 544 | -161 dBm | | -170 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 | | |
| | 26.4 to 34.5 GHz | -156 dBm | | -164 dBm | | |
| | 34.4 to 44 GHz | -150 dBm | | -158 dBm | | |

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

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

3. No NFE at this frequency.

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 |
|----------------------------------|---------------------|---------------|------------------------------------|
| RF preselector on, preamp off | 3 to 10 Hz | – | –92 dBm (nominal) ² |
| | 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 |
| | Option 544 | –145 dBm | –153 dBm |
| | 8.3 to 13.6 GHz | –147 dBm | –158 dBm |
| | Option 544 | –147 dBm | –156 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 |
| | 26.4 to 34.5 GHz | –141 dBm | –148 dBm |
| | 34.4 to 44 GHz | –135 dBm | –143 dBm |
| RF 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 |
| | Option 544 | –161 dBm | –166 dBm |
| | 8.3 to 13.6 GHz | –162 dBm | –173 dBm |
| | Option 544 | –161 dBm | –170 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 |
| | 26.4 to 34.5 GHz | –156 dBm | –164 dBm |
| | 34.4 to 44 GHz | –150 dBm | –158 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 |
|----------------------------------|------------------------------------|------------------------------------|
| RF preselector on, preamp off | 3 to 10 Hz (1 Hz RBW) ³ | + 17 dBuV ² (nominal) |
| | 20 Hz (1 Hz) ³ | +9 dBuV ² |
| | 100 Hz (10 Hz) ³ | +10 dBuV ² |
| | 1 kHz (100 Hz) ³ | +9 dBuV ² |
| | 9 kHz (200 Hz) | -2 dBuV |
| | 100 kHz (200 Hz) | -13 dBuV |
| | 1 to 3 MHz (9 kHz) | -11 dBuV |
| | 3 to 30 MHz (9 kHz) | -13 dBuV |
| | 30 to 300 MHz (120 kHz) | -3 dBuV |
| | 300 to 600 MHz (120 kHz) | -6 dBuV |
| | 600 MHz to 1 GHz (120 kHz) | -4 dBuV |
| | 1 to 2 GHz (1 MHz) | +6 dBuV |
| | 2 to 2.5 GHz (1 MHz) | +3 dBuV |
| | 2.5 to 3 GHz (1 MHz) | +4 dBuV |
| | 3 to 3.6 GHz (1 MHz) | +6 dBuV |
| | 3.5 to 8.4 GHz (1 MHz) | +8 dBuV |
| | Option 544 | +14 dBuV |
| | 8.3 to 13.6 GHz (1 MHz) | +9 dBuV |
| | Option 544 | +11 dBuV |
| | 13.5 to 17.1 GHz (1 MHz) | +16 dBuV |
| 17.0 to 20.0 GHz (1 MHz) | +15 dBuV | |
| 20.0 to 26.5 GHz (1 MHz) | +21 dBuV | |
| 26.4 to 34.5 GHz (1 MHz) | +19 dBuV | |
| 34.4 to 44 GHz (1 MHz) | +24 dBuV | |
| RF preselector on, preamp on | 1 kHz (100 Hz RBW) ³ | -4 dBuV ² |
| | 9 kHz (200 Hz) | -24 dBuV |
| | 100 kHz (200 Hz) | -35 dBuV |
| | 1 to 2 MHz (9 kHz) | -31 dBuV |
| | 2 to 30 MHz (9 kHz) | -20 dBuV |
| | 30 to 600 MHz (120 kHz) | -8 dBuV |
| | 600 to 800 MHz (120 kHz) | -8 dBuV |
| | 800 MHz to 1 GHz (120 kHz) | -9 dBuV |
| | 1 to 2 GHz (1 MHz) | +3 dBuV |
| | 2 to 2.75 GHz (1 MHz) | -1 dBuV |
| | 2.75 to 3.6 GHz (1 MHz) | +2 dBuV |
| | 3.5 to 8.4 GHz (1 MHz) | -5 dBuV |
| | Option 544 | -1 dBuV |
| | 8.3 to 13.6 GHz (1 MHz) | -6.0 dBuV |
| | Option 544 | -4 dBuV |
| | 13.5 to 17.1 GHz (1 MHz) | -4 dBuV |
| | 17.0 to 20.0 GHz (1 MHz) | +2 dBuV |
| | 20.0 to 26.5 GHz (1 MHz) | +5 dBuV |
| | 26.4 to 34.5 GHz (1 MHz) | +3 dBuV |
| | 34.4 to 44 GHz (1 MHz) | +9 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; RF preselector on and off | | | |
| | Source frequency | Specification | Typical |
| 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 $f \pm 645$ MHz Mixer level -10 dBm | 10 MHz to 3.6 GHz | -80 dBc | -108 dBc |
| | 3.5 to 13.6 GHz | -78 dBc | -88 dBc |
| | 13.5 to 17.1 GHz | -74 dBc | -85 dBc |
| | 17.0 to 22 GHz | -70 dBc | -82 dBc |
| | 22 to 26.5 GHz | -68 dBc | -78 dBc |
| | 26.5 to 34.5 GHz ³ 34.4 to 44 GHz ³ | -70 dBc -60 dBc | -94 dBc -79 dBc |
| LO related spurious ($f > 600$ MHz from carrier) | 10 MHz to 3.6 GHz | | -90 dBc + 20xlogN ² |
| Other spurious $f \geq 10$ MHz from carrier | Carrier frequency ≤ 26.5 GHz | -80 dBc + 20xlogN ² | |
| | Carrier frequency > 26.5 GHz | | -90 dBc (nominal) |
| 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 | Typical |
| RF preselector off, preamp off | 10 MHz to 1.0 GHz | +45 dBm | +54 dBm |
| | 1.0 to 1.8 GHz | +41 dBm | +50 dBm |
| | 1.8 to 6.8 GHz | +65 dBm | +68 dBm |
| | Option 544 1.8 to 3 GHz | +58 dBm | +64 dBm |
| | 3 to 6.8 GHz | +60 dBm | +69 dBm |
| | 6.8 to 11 GHz | +55 dBm | +64 dBm |
| | 11 to 13.25 GHz | +50 dBm | +60 dBm |
| | 13.2 to 22 GHz (Option 544) | +44 dBm | +51 dBm |
| RF 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) |
| | 13.2 to 22 GHz (Option 544) | | +0 dBm (nominal) |
| RF preselector on, preamp off | 10 to 30 MHz | +47 dBm | +50 dBm |
| | 30 to 500 MHz | +57 dBm | +63 dBm |
| | 500 MHz to 1GHz | +45 dBm | +47 dBm |
| | 1 to 1.6 GHz | +58 dBm | +70 dBm |
| | 1.6 to 1.8 GHz | +46 dBm | +52 dBm |
| | 1.8 to 6.8 GHz | +65 dBm | +68 dBm |
| | Option 544 1.8 to 3 GHz | +58 dBm | +64 dBm |
| | 3 to 6.8 GHz | +60 dBm | +69 dBm |
| | 6.8 to 11 GHz | +55 dBm | +64 dBm |
| | 11 to 13.25 GHz | +50 dBm | +60 dBm |
| 13.2 to 22 GHz (Option 544) | +44 dBm | +51 dBm | |
| RF 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) |
| | 1.8 to 13.25 GHz | | +10 dBm (nominal) |
| Preamp power = -50 dBm | 13.2 to 22 GHz (Option 544) | | +0 dBm (nominal) |

1. RF2 performance = RF1 performance +11 dB
2. N is the LO multiplication factor
3. Mixer level -30 dBm

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) |
|--|-----------------------------|----------------------|-----------------------|
| RF 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 |
| | 26.4 to 44 GHz | +10 dBm | +13 dBm |
| RF preselector off, preamp on | 10 to 500 MHz | | +4 dBm (nominal) |
| | 500 MHz to 3.6 GHz | | +5 dBm (nominal) |
| | 3.6 to 26.5 GHz | | -15 dBm (nominal) |
| | 26.4 to 44 GHz | | -17 dBm (nominal) |
| RF preselector on, preamp off | 10 to 30 MHz | +12 dBm | +16 dBm |
| | 30 MHz to 1 GHz | +12.5 dBm | +15 dBm |
| | 1 to 1.5 GHz | +12.5 dBm | +14 dBm |
| | 1.5 to 3.6 GHz | +14.5 dBm | +16 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 |
| | 26.4 to 44 GHz (Option 544) | +10 dBm | +13 dBm |
| RF preselector on, preamp on | 10 to 30 MHz | -9 dBm | -5 dBm |
| | 30 MHz to 1 GHz | -9 dBm | -4 dBm |
| | 1 to 2 GHz | -4 dBm | -2 dBm |
| | 2 to 3.6 GHz | -6 dBm | -3 dBm |
| | 3.6 to 26.5 GHz | | -15 dBm (nominal) |
| | 26.4 to 44 GHz (Option 544) | | -17 dBm (nominal) |
| Phase noise² | Offset | Specification | Typical |
| Noise sidebands (20 to 30 °C, CF = 1 GHz) | 10 Hz | - | -80 dBc/Hz (nominal) |
| | 100 Hz | -91 dBc/Hz | -100 dBc/Hz |
| | 1 kHz | | -112 dBc/Hz (nominal) |
| | 10 kHz | -113 dBc/Hz | -114 dBc/Hz |
| | 100 kHz | -116 dBc/Hz | -117 dBc/Hz |
| | 1 MHz | -135 dBc/Hz | -136 dBc/Hz |
| | 10 MHz | | -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.

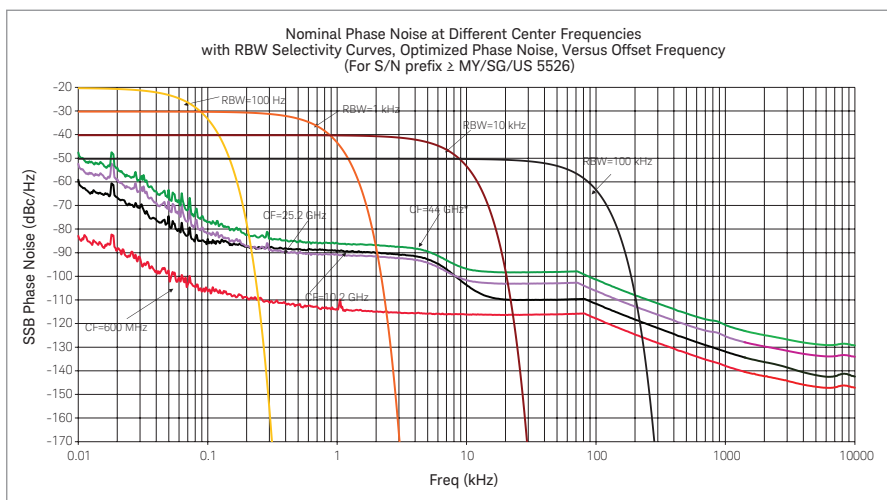


Figure 1. Nominal phase noise at different center frequencies

PowerSuite Measurement Specifications

| Channel power | | |
|--|---|--------------------|
| Amplitude accuracy, W-CDMA or IS95 (20 to 30 °C, at-tenuation = 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) | | |
| Without noise correction | -73 dB | -79 dB |
| With noise correction | -78 dB | -82 dB |
| 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 | 85 dB (typical) |
| Absolute sensitivity | -100.7 dBm | |
| Relative accuracy | ± 0.12 dB | |
| 3GPP W-CDMA (2.515 MHz offset) | | |
| Relative dynamic range (30 kHz RBW) | 81.9 dB | 88.2 dB (typical) |
| Absolute sensitivity | -100.7 dBm | |
| 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 Keysight Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation, and end-use; those stresses include, but are not limited to, temperature, humidity, shock, vibration, altitude, and power line conditions; test methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3 | |

1. The use of Noise Floor Extension (NFE) is required to meet the "isolated pulse" test case in Bands B, C, and D. In addition, when making measurements in Band B below 160 kHz using time domain scans or making measurements using meters in monitor spectrum, NFE is also required to meet the 1 Hz pulse repetition frequency (prf) test case for the quasi-peak detector (QPD) and for the 5 Hz prf test case for the RMS-avg detector.

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 3-year warranty

Calibration cycle

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

Inputs and Outputs

Front panel

| | |
|------------------------------|---|
| RF input | |
| RF Input 1 Connector | Type-N female, 50 Ω (nominal) (standard) 3.5 mm male, 50 Ω (Opt C35) 2.4 mm male, 50 Ω (Option 544 only) |
| RF Input 2 Connector | Type-N female, 50 Ω (nominal) (standard) |
| External Mixing (Option EXM) | |
| Connection port | |
| Connector | SMA, female |
| Impedance | 50 Ω , nominal |
| Functions | Triplexed for LO output, IF input, and mixer bias |
| Mixer bias range | ± 10 mA in 10 μ A step |
| IF input center frequency | |
| IF BW path ≤ 25 MHz | 322.5 MHz (note - please use the proper \leq sign) |
| 85 MHz BW IF path | 300 MHz |
| LO output frequency range | 3.75 to 14.0 GHz |
| 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 | Compatible with USB 2.0 |
| Connector | USB Type-A female |
| Output current | 0.5 A (nominal) |
| Headphone jack | |
| Connector | Miniature stereo audio jack 3.5 mm |

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 | For use with Keysight Technologies' SNS series noise sources |
| 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 |
| Aux I/O connector | |
| Connector | 25-pin D-SUB |

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

Analysis bandwidth

| | |
|------------|-----------------|
| Standard | 10 Hz to 10 MHz |
| Option B25 | 10 Hz to 25 MHz |
| Option B85 | 10 Hz to 85 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) | Microwave preselector | Max. error | RMS (nominal) |
|------------------------|------------|-----------------------|------------|---------------|
| ≤ 3.6 | ≤ 10 | NA | ± 0.40 dB | 0.04 dB |
| 3.6 < f ≤ 26.5 | ≤ 10 | On | | 0.25 dB |
| f > 26.5 | ≤ 10 | On | | 0.35 dB |

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

| Center frequency (GHz) | Span (MHz) | Microwave preselector | Peak-to-peak (nominal) | RMS (nominal) |
|------------------------|------------|-----------------------|------------------------|---------------|
| 0.02 < f ≤ 3.6 | ≤ 10 | NA | 0.4° | 0.1° |
| 3.6 < f ≤ 26.5 | ≤ 10 | On | 1.0° | 0.2° (nom) |

Data acquisition (10 MHz IF path)

| | |
|--------------------|---------------------------|
| Time record length | |
| – IQ analyzer | 4,000,000 IQ sample pairs |
| Sample rate at ADC | 100 MSa/s |
| ADC resolution | 16 bits |

I/Q Analyzer – Option B25

25 MHz analysis bandwidth

IF frequency response

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

| Center frequency (GHz) | Span (MHz) | Microwave preselector | Max. error | RMS (nominal) |
|------------------------|------------|-----------------------|------------|---------------|
| ≤ 3.6 | 10 to ≤ 25 | NA | ± 0.45 dB | 0.051 dB |
| 3.6 < f ≤ 44 | 10 to ≤ 25 | On | | 0.45 dB |

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

| Center frequency (GHz) | Span (MHz) | Microwave preselector | Peak-to-peak (nominal) | RMS (nominal) |
|------------------------|------------|-----------------------|------------------------|---------------|
| 0.02 ≤ f < 3.6 | ≤ 25 | NA | 0.6° | 0.14° |
| 3.6 ≤ f ≤ 26.5 | ≤ 25 | On | 4.5° | 1.2° |

Data acquisition (25 MHz IF path)

| | | | | |
|-------------------------------|---------------------------|---------|--------|--|
| Time record length (IQ pairs) | | | | |
| – IQ analyzer | 4,000,000 IQ sample pairs | | | |
| – 89600 VSA software | Data packing | | | |
| | 32-bit | 64-bit | Memory | |
| | 536 MSa | 268 MSa | 2 GB | |
| Sample rate at ADC | 100 MSa/s | | | |
| ADC resolution | 16 bits | | | |

I/Q Analyzer – Option B85

85 MHz analysis bandwidth

| IF frequency response | | | | | |
|---|------------|--|--------------|--|---------------|
| IF frequency response (20 to 30 °C) | | | | Relative to center frequency | |
| Center freq. (GHz) | Span (MHz) | Microwave preselector | | Typical | RMS (nominal) |
| $0.15 \leq f < 3.6$ | ≤ 85 | NA | ± 0.6 dB | ± 0.17 dB | 0.05 dB |
| IF phase linearity (deviation from mean phase linearity, nominal) | | | | | |
| Center freq. (GHz) | Span (MHz) | Microwave preselector | | Peak-to-peak (nominal) | RMS (nominal) |
| $0.03 \leq f < 3.6$ | ≤ 85 | NA | | 1.6° | 0.54° |
| Dynamic range | | | | | |
| SFDR (Spurious-free dynamic range) | | | | | |
| – Signal frequency and spurious response anywhere within 85 MHz BW | | –76 dBc, nominal | | | |
| Full scale (ADC clipping) | | | | | |
| Default settings, signal at CF (IF gain = Low: IF gain offset = 0 dB) | | | | | |
| – Band 0 | | –8 dBm mixer level, nominal | | | |
| – Band 1 through 4 | | –7 dBm mixer level, nominal | | | |
| High gain setting, signal at CF (IF gain = High) | | | | | |
| – Band 0 | | –18 dBm mixer level nominal, subject to gain limitations | | | |
| – Band 1 through 4 | | –17 dBm mixer level nominal, subject to gain limitations | | | |
| Effect of signal frequency \neq CF | | Up to ± 3 dB, nominal | | | |
| Data acquisition (85 MHz IF path) | | | | | |
| Time record length | | | | | |
| – IQ analyzer | | 4,000,000 IQ sample pairs | | | |
| Data packing | | | | | |
| – 89600 VSA software | | 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 1.25) | | | |
| Sample rate | | | | | |
| – At ADC | | 400 MSa/s | | | |
| – IQ pairs | | Span dependent | | | |
| ADC resolution | | 14 bits | | | |

Real-Time Spectrum Analyzer (RTSA) ¹

Option RT1

| Real-time analysis | |
|---|---|
| Real-time analysis bandwidth | |
| – Option RT1 | Up to 85 MHz \leq 3.6GHz, Up to 40 MHz $>$ 3.6 GHz |
| Minimum signal duration with 100% probability of intercept (POI) at full amplitude accuracy | |
| – Option RT1 | 3.7 μ s |
| Minimum acquisition time | 104 μ s Spectrogram view only |
| FFT rate | 292,969/s |
| Supported triggers | Level, Level with time qualified (TQT), Line, External, RF burst, Frame, Frequency mask (FMT), FMT with TQT |

1. For additional RTSA specifications, please refer to Option RT1 Chapter in the MXE Signal Analyzer specifications guide (part number: N9038-90010)

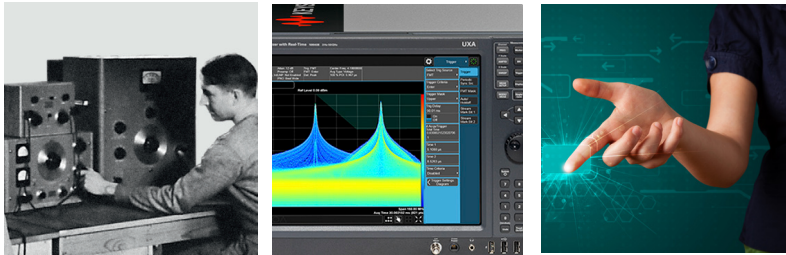
Related Literature

Keysight MXE EMI receiver

| Publication title | Publication number |
|--|--------------------|
| <i>MXE EMI Receiver, Configuration Guide</i> | 5990-7419EN |
| <i>MXE EMI Receiver, Brochure</i> | 5990-7422EN |

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