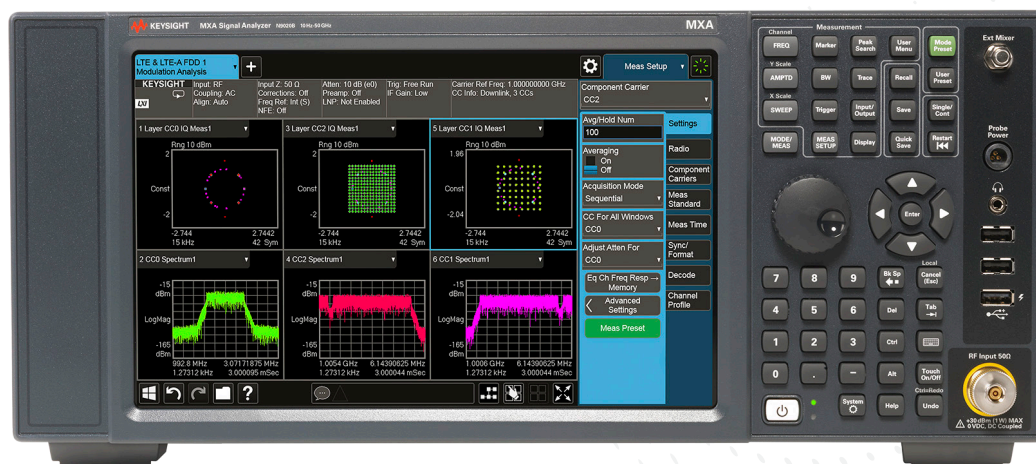


N9020B MXA X-Series Signal Analyzer, Multi-touch

10 Hz to 3.6, 8.4, 13.6, 26.5, 32, 44, or 50 GHz



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TECHNOLOGIES

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Quickly adapt to evolving test requirements

Every device demands decisions that require tradeoffs in your goals—customer specs, throughput, yield. With a highly flexible signal analyzer, you can manage and minimize those tradeoffs. Keysight Technologies Inc.'s mid-performance MXA is the optimum choice for wireless as you take new-generation devices to market. It has the flexibility to quickly adapt to evolving test requirements, today and tomorrow.

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 analyzer 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 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. If Auto Align is set to Light, performance is not warranted, and nominal performance will degrade to become a factor of 1.4 wider for any specification subject to alignment, such as amplitude tolerances

Get More Information

This MXA signal analyzer data sheet is a summary of the specifications and conditions for N9020B MXA signal analyzers. A full set of specifications are available in the MXA Signal Analyzer Specification Guide at www.keysight.com/find/mxa_specifications.

For ordering information, refer to the N9020B MXA Signal Analyzer Configuration Guide (literature number 5992-1256EN).

Frequency and Time Specifications

| Frequency range | | DC coupled | AC coupled |
|--|-----------------|--|---|
| Option 503 | | 10 Hz to 3.6 GHz | 10 MHz to 3.6 GHz |
| Option 508 | | 10 Hz to 8.4 GHz | 10 MHz to 8.4 GHz |
| Option 513 | | 10 Hz to 13.6 GHz | 10 MHz to 13.6 GHz |
| Option 526 | | 10 Hz to 26.5 GHz | 10 MHz to 26.5 GHz |
| Option 532 | | 10 Hz to 32 GHz | NA |
| Option 544 | | 10 Hz to 44 GHz | NA |
| Option 550 | | 10 Hz to 50 GHz | NA |
| Band | LO multiple (N) | | |
| 0 | 1 | 10 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 | |
| Frequency reference | | | |
| Accuracy | | \pm [(time since last adjustment x aging rate) + temperature stability + calibration accuracy] | |
| Aging rate | | Option PFR $\pm 1 \times 10^{-7}$ / year $\pm 1.5 \times 10^{-7}$ / 2 years | Standard $\pm 1 \times 10^{-6}$ / year |
| Temperature stability | | Option PFR | Standard |
| – 20 to 30 °C | | $\pm 1.5 \times 10^{-8}$ | $\pm 2 \times 10^{-6}$ |
| – Full temperature range | | $\pm 5 \times 10^{-8}$ | $\pm 2 \times 10^{-6}$ |
| Achievable initial calibration accuracy | | Option PFR $\pm 4 \times 10^{-8}$ | Standard $\pm 1.4 \times 10^{-6}$ |
| Example frequency reference accuracy (with Option PFR) | | $= \pm (1 \times 1 \times 10^{-7} + 5 \times 10^{-8} + 4 \times 10^{-8})$ | |
| 1 year after last adjustment | | $= \pm 1.9 \times 10^{-7}$ | |
| Residual FM | | | |
| – Option PFR | | $\leq (0.25 \text{ Hz} \times N)$ p-p in 20 ms, nominal | |
| – Standard | | $\leq (10 \text{ Hz} \times N)$ p-p in 20 ms, nominal | |
| | | See band table above for N (LO multiple) | |
| Frequency readout accuracy (start, stop, center, marker) | | | |
| \pm (marker frequency x frequency reference accuracy + 0.25 % x span + 5 % x RBW + 2 Hz + 0.5 x horizontal resolution ¹) | | | |
| Marker frequency counter | | | |
| Accuracy | | \pm (marker frequency x frequency reference accuracy + 0.100 Hz) | |
| Delta counter accuracy | | \pm (delta frequency x frequency reference accuracy + 0.141 Hz) | |
| Counter resolution | | 0.001 Hz | |
| Frequency span (FFT and swept mode) | | | |
| Range | | 0 Hz (zero span), 10 Hz to maximum frequency of instrument | |
| Resolution | | 2 Hz | |
| Accuracy | | | |
| – Swept | | $\pm (0.25 \% \times \text{span} + \text{horizontal resolution})$ | |
| – FFT | | $\pm (0.10 \% \times \text{span} + \text{horizontal resolution})$ | |

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

Frequency and Time Specifications (continued)

| Sweep time and triggering | | |
|---|---|--|
| Range | Span = 0 Hz Span \geq 10 Hz | 1 μ s to 6000 s 1 ms to 4000 s |
| Accuracy | Span \geq 10 Hz, swept Span \geq 10 Hz, FFT Span = 0 Hz | \pm 0.01 %, nominal \pm 40 %, nominal \pm 0.01 %, nominal |
| Trigger | Free run, line, video, external 1, external 2, RF burst, periodic timer | |
| Trigger delay | Span = 0 Hz or FFT Span \geq 10 Hz, swept Resolution | -150 to +500 ms 0 to 500 ms 0.1 μ s |
| Time gating | | |
| - Gate methods | Gated LO; gated video; gated FFT | |
| - Gate length range (except method = FFT) | 100.0 ns to 5.0 s | |
| - Gate delay range | 0 to 100.0 s | |
| - Gate delay jitter | 33.3 ns p-p, nominal | |
| Sweep (trace) point range | | |
| All spans | 1 to 100,001 | |
| Resolution bandwidth (RBW) | | |
| Range (-3.01 dB bandwidth) | | |
| - Standard | 1 Hz to 3 MHz (10 % steps), 4, 5, 6, 8 MHz | |
| - With Option B85 or B1A, and Option RBE | 10, 15, 20, 25, 30, 40, 50, 60, and 70 MHz, in Spectrum Analyzer mode and zero span | |
| - With Option B1X and Option RBE | 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 100, and 133 MHz, in Spectrum Analyzer mode and zero span | |
| 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) | \pm 1.0 % (\pm 0.044 dB) \pm 2.0 % (\pm 0.088 dB) \pm 0.07 dB, nominal \pm 0.15 dB, nominal \pm 0.25 dB, nominal |
| Bandwidth accuracy (-3.01 dB) | | |
| - RBW range | 1 Hz to 1.3 MHz | \pm 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 (standard) | (Option EMC required) |
| Analysis bandwidth ¹ | | |
| Maximum bandwidth | Option B1X Option B1A Option B85 Option B40 Option B25 (standard) | 160 MHz 125 MHz 85 MHz 40 MHz 25 MHz |
| Video bandwidth (VBW) | | |
| Range | 1 Hz to 3 MHz (10 % steps), 4, 5, 6, 8 MHz, and wide open (labeled 50 MHz) | |
| Accuracy | \pm 6 %, nominal | |

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.

Amplitude Accuracy and Range Specifications

| Amplitude range | | | |
|--|--|--|---------------|
| Measurement range | | | |
| Preamp Off | Displayed average noise level (DANL) to +30 dBm | | |
| Preamp On | Displayed average noise level (DANL) to +30 dBm | | |
| Input attenuator range | 0 to 70 dB in 2 dB steps | | |
| Electronic attenuator (Option EA3) | | | |
| Frequency range | 10 Hz to 3.6 GHz | | |
| Attenuation range | | | |
| – Electronic attenuator range | 0 to 24 dB, 1 dB steps | | |
| – Full attenuation range (mechanical + electronic) | 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 μ s pulse width, < 1 % duty cycle +50 dBm (100 W) and input attenuation \geq 30 dB | | |
| DC volts | | | |
| – DC coupled | \pm 0.2 Vdc | | |
| – AC coupled | \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 | | |
| Frequency response | Specification | 95th percentile (\approx 2σ) | |
| (10 dB input attenuation, 20 to 30 °C, preselector centering applied, σ = nominal standard deviation) | | | |
| RF/MW | 20 Hz to 10 MHz | \pm 0.6 dB | \pm 0.28 dB |
| (Option 503, 508, 513, 526) | 10 MHz ¹ to 3.6 GHz | \pm 0.45 dB | \pm 0.17 dB |
| | 3.5 to 8.4 GHz | \pm 1.5 dB | \pm 0.48 dB |
| | 8.3 to 13.6 GHz | \pm 2.0 dB | \pm 0.47 dB |
| | 13.5 to 22.0 GHz | \pm 2.0 dB | \pm 0.52 dB |
| | 22.0 to 26.5 GHz | \pm 2.5 dB | \pm 0.71 dB |
| Millimeter-Wave | 20 Hz to 10 MHz | \pm 0.6 dB | \pm 0.28 dB |
| (Option 532, 544, 550) | 10 to 50 MHz | \pm 0.45 dB | \pm 0.21 dB |
| | 50 MHz to 3.6 GHz | \pm 0.45 dB | \pm 0.2 dB |
| | 3.5 to 5.2 GHz | \pm 1.7 dB | \pm 0.67 dB |
| | 5.2 to 8.4 GHz | \pm 1.5 dB | \pm 0.47 dB |
| | 8.3 to 13.6 GHz | \pm 2.0 dB | \pm 0.47 dB |
| | 13.5 to 17.1 GHz | \pm 2.0 dB | \pm 0.52 dB |
| | 17.0 to 22.0 GHz | \pm 2.0 dB | \pm 0.66 dB |
| | 22.0 to 26.5 GHz | \pm 2.5 dB | \pm 0.79 dB |
| | 26.4 to 34.5 GHz | \pm 2.5 dB | \pm 1.07 dB |
| | 34.4 to 50 GHz | \pm 3.2 dB | \pm 1.4 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.

Amplitude Accuracy and Range Specifications (continued)

| Preamp on (0 dB attenuation) (Option P03, P08, P13, P26, P32, P44, P50) | | | |
|---|---|--------------------|------------------------|
| RF/MW (Option 503, 508, 513, 526) | 100 kHz to 3.6 GHz | ± 0.75 dB | ± 0.28 dB |
| | 3.5 to 8.4 GHz | ± 2.0 dB | ± 0.67 dB |
| | 8.3 to 13.6 GHz | ± 2.3 dB | ± 0.73 dB |
| | 13.5 to 17.1 GHz | ± 2.5 dB | ± 0.97 dB |
| | 17.0 to 22.0 GHz | ± 2.8 dB | ± 1.36 dB |
| | 22.0 to 26.5 GHz | ± 3.5 dB | ± 1.48 dB |
| | Millimeter-Wave (Option 532, 544, 550) | 100 kHz to 3.6 GHz | ± 0.75 dB |
| 3.5 to 5.2 GHz | | ± 2.0 dB | ± 0.67 dB |
| 5.2 to 8.4 GHz | | ± 2.0 dB | ± 0.51 dB |
| 8.3 to 13.6 GHz | | ± 2.3 dB | ± 0.73 dB |
| 13.5 to 17.1 GHz | | ± 2.5 dB | ± 0.97 dB |
| 17.0 to 22.0 GHz | | ± 2.8 dB | ± 1.36 dB |
| 22.0 to 26.5 GHz | | ± 3.5 dB | ± 1.48 dB |
| 26.4 to 34.5 GHz | | ± 3.0 dB | ± 1.48 dB |
| 34.4 to 50 GHz | | ± 4.1 dB | ± 1.69 dB |
| 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 |
| | 20 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 |

Amplitude Accuracy and Range Specifications (continued)

| Total absolute amplitude accuracy | | Specifications | |
|---|----------------------------------|---|------------------------|
| (10 dB attenuation, 20 to 30 °C, 1 Hz ≤ RBW ≤ 1 MHz, input signal -10 to -50 dBm, all settings auto-coupled except Auto Swp Time = Accy, any reference level, any scale, σ = nominal standard deviation) | | | |
| | At 50 MHz | ± 0.33 dB | |
| | At all frequencies | ± (0.33 dB + frequency response) | |
| | 20 Hz to 3.6 GHz | ± 0.23 dB (95th Percentile ≈ 2 σ) | |
| Preamp on (Option P03, P08, P13, P26, P32, P44 and P50) | At all frequencies | ± (0.39 dB + frequency response) | |
| Input voltage standing wave ratio (VSWR) (≥ 10 dB input attenuation) | | 95th Percentile | |
| | | Freq Opt 503, 508, 513, 526 | Freq Opt 532, 544, 550 |
| | 10 MHz to 3.6 GHz | 1.142 | 1.147 |
| | 3.5 to 8.4 GHz | 1.33 | 1.221 |
| | 8.3 to 13.6 GHz | 1.48 | 1.276 |
| | 13.5 to 17.1 GHz | 1.46 | 1.285 |
| | 17.0 to 26.5 GHz | 1.55 | 1.430 |
| | 26.4 to 34.5 GHz | NA | 1.424 |
| | 34.4 to 50 GHz | NA | 1.533 |
| Preamp on (0 dB attenuation) | 10 MHz to 3.6 GHz | 1.80 | 1.450 |
| | 3.5 to 8.4 GHz | 1.68 | 1.522 |
| | 8.3 to 13.6 GHz | 1.69 | 1.430 |
| | 13.5 to 17.1 GHz | 1.66 | 1.432 |
| | 17.0 to 26.5 GHz | 1.66 | 1.562 |
| | 26.4 to 34.5 GHz | NA | 1.375 |
| | 34.4 to 50 GHz | NA | 1.483 |
| Resolution bandwidth switching uncertainty (referenced to 30 kHz RBW) | | | |
| | 1 Hz to 1.5 MHz RBW | ± 0.05 dB | |
| | 1.6 MHz 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 | | | |
| Preamplifier | | | |
| Frequency range | Option P03 | 100 kHz to 3.6 GHz | |
| | Option P08 | 100 kHz to 8.4 GHz | |
| | Option P13 | 100 kHz to 13.6 GHz | |
| | Option P26 | 100 kHz to 26.5 GHz | |
| | Option P32 | 100 kHz to 32 GHz | |
| | Option P44 | 100 kHz to 44 GHz | |
| | Option P50 | 100 kHz to 50 GHz | |
| Gain | 100 kHz to 3.6 GHz | +20 dB, nominal | |
| | 3.6 to 26.5 GHz | +35 dB, nominal | |
| | 26.5 to 50 GHz | +40 dB, nominal | |
| Noise figure | 100 kHz to 3.6 GHz | 11 dB, nominal | |
| | 3.6 to 8.4 GHz | 9 dB, nominal | |
| | 8.4 to 13.6 GHz | 10 dB, nominal | |
| | 13.6 to 50 GHz | DANL + 176.24 dB, nominal | |

Dynamic Range Specifications

| 1 dB gain compression (two-tone) | | Total power at input mixer | |
|---|---|----------------------------|-------------------|
| | 20 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 |
| | 26.5 to 50 GHz | 0 dBm | 0 dBm, nominal |
| Preamp on (Option P03, P08, P13, P26, P32, P44, P50) | 10 MHz to 3.6 GHz | | -14 dBm, nominal |
| | 3.6 to 26.5 GHz | | |
| | – Tone spacing 100 kHz to 20 MHz | | -26 dBm, nominal |
| | – Tone spacing > 70 MHz | | |
| | Freq Option ≤ 526 | | -16 dBm, nominal |
| Freq Option > 526 | | -20 dBm, nominal | |
| | 26.5 to 50 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, 1 Hz RBW, 20 to 30 °C) | | | |
| | | Specification | Typical |
| RF/MW (Option 503, 508, 513, 526) | 10 Hz | | -95 dBm, nominal |
| | 20 Hz | | -105 dBm, nominal |
| | 100 Hz | | -110 dBm, nominal |
| | 1 kHz | | -120 dBm, nominal |
| | 9 kHz to 1 MHz | | -130 dBm |
| | 1 to 10 MHz | -150 dBm | -153 dBm |
| | 10 MHz to 2.1 GHz | -151 dBm | -154 dBm |
| | 2.1 to 3.6 GHz | -149 dBm | -152 dBm |
| | 3.6 to 8.4 GHz | -149 dBm | -153 dBm |
| | 8.3 to 13.6 GHz | -148 dBm | -151 dBm |
| | 13.5 to 17.1 GHz | -144 dBm | -147 dBm |
| | 17.0 to 20.0 GHz | -143 dBm | -146 dBm |
| | 20.0 to 26.5 GHz | -136 dBm | -142 dBm |
| | Preamp on, RF/MW (Option 503, 508, 513, 526) | 100 kHz to 1 MHz | |
| 1 to 10 MHz | | -161 dBm | -163 dBm |
| 10 MHz to 2.1 GHz | | -163 dBm | -166 dBm |
| 2.1 to 3.6 GHz | | -162 dBm | -164 dBm |
| 3.6 to 8.4 GHz | | -162 dBm | -166 dBm |
| 8.3 to 13.6 GHz | | -162 dBm | -165 dBm |
| 13.5 to 17.1 GHz | | -159 dBm | -163 dBm |
| 17.0 to 20.0 GHz | | -157 dBm | -161 dBm |
| 20.0 to 26.5 GHz | -152 dBm | -157 dBm | |
| Millimeter-Wave (Option 532, 544, 550) ¹ | 10 Hz | | -95 dBm, nominal |
| | 20 Hz | | -105 dBm, nominal |
| | 100 Hz | | -110 dBm, nominal |
| | 1 kHz | | -120 dBm, nominal |
| | 9 kHz to 1 MHz | | -135 dBm |
| | 1 MHz to 1.2 GHz | -154 dBm | -155 dBm |
| | 1.2 to 2.1 GHz | -152 dBm | -154 dBm |
| | 2.1 to 3.6 GHz | -150 dBm | -152 dBm |
| | 3.5 to 4.2 GHz | -144 dBm | -147 dBm |
| | 4.2 to 6.6 GHz | -146 dBm | -149 dBm |
| | 6.6 to 8.4 GHz | -148 dBm | -150 dBm |
| | 8.3 to 13.6 GHz | -148 dBm | -150 dBm |
| | 13.5 to 20 GHz | -145 dBm | -148 dBm |
| | 20 to 26.5 GHz | -142 dBm | -145 dBm |
| | 26.4 to 34 GHz | -140 dBm | -144 dBm |
| | 33.9 to 40 GHz | -136 dBm | -140 dBm |
| | 40 to 44 GHz | -135 dBm | -140 dBm |
| | 44 to 46 GHz | -135 dBm | -140 dBm |
| 46 to 50 GHz | -133 dBm | -137 dBm | |

1. Without Option B40, B85, B1A, B1X, DP2, or MPB. When any of these options are installed, performance may change. Please refer to the MXA specifications guide for more details.

Dynamic Range Specifications (continued)

| | | | |
|--|-------------------|----------|----------|
| Preamp on, Millimeter-Wave (Option 532, 544, 550) | 100 kHz to 1 MHz | -149 dBm | -151 dBm |
| | 1 to 10 MHz | -163 dBm | -165 dBm |
| | 10 MHz to 1.2 GHz | -164 dBm | -166 dBm |
| | 1.2 to 2.1 GHz | -163 dBm | -165 dBm |
| | 2.1 to 3.6 GHz | -162 dBm | -164 dBm |
| | 3.5 to 7 GHz | -161 dBm | -162 dBm |
| | 7 to 20 GHz | -161 dBm | -162 dBm |
| | 20 to 26.5 GHz | -159 dBm | -161 dBm |
| | 26.4 to 32 GHz | -158 dBm | -160 dBm |
| | 32 to 34 GHz | -156 dBm | -159 dBm |
| | 33.9 to 40 GHz | -154 dBm | -157 dBm |
| | 40 to 44 GHz | -150 dBm | -155 dBm |
| 44 to 46 GHz | -150 dBm | -155 dBm | |
| 46 to 50 GHz | -150 dBm | -153 dBm | |

DANL with Noise Floor Extension (Option NF2) improvement

DANL improvement exceeds 9 dB with 95% confidence in the average of all bands, paths (normal, preamp, low noise path and microwave preselector bypass), frequency options and signal path option (MPB).

DANL with Noise Floor Extension (Option NF2) on RF/MW (Option 503, 508, 513, 526)

| Frequency | 95th percentile | |
|--------------------|-----------------|-----------|
| | Preamp Off | Preamp On |
| Band 0, f > 20 MHz | -162 dBm | -172 dBm |
| Band 1 | -160 dBm | -170 dBm |
| Band 2 | -160 dBm | -170 dBm |
| Band 3 | -156 dBm | -170 dBm |
| Band 4 | -148 dBm | -164 dBm |

Millimeter-Wave (Option 532, 544, 550)¹

| | | |
|--------------------|----------|----------|
| Band 0, f > 20 MHz | -163 dBm | -174 dBm |
| Band 1 | -160 dBm | -172 dBm |
| Band 2 | -161 dBm | -173 dBm |
| Band 3 | -161 dBm | -174 dBm |
| Band 4 | -158 dBm | -171 dBm |
| Band 5 | -157 dBm | -169 dBm |
| Band 6 | -152 dBm | -165 dBm |

Spurious responses

| | | |
|---|---------------------------------------|--------------------------------|
| Residual responses (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 (-108 dBc, typical) |
| | 3.5 to 13.6 GHz | -78 dBc (-87 dBc, typical) |
| | 13.5 to 17.1 GHz | -74 dBc (-85 dBc, typical) |
| | 17.0 to 22 GHz | -70 dBc (-81 dBc, typical) |
| | 22 to 26.5 GHz | -68 dBc (-77 dBc, typical) |
| | 26.5 to 34.5 GHz | -70 dBc (-94 dBc, typical) |
| | 34.4 to 44 GHz | -60 dBc (-79 dBc, typical) |
| | 44 to 50 GHz | -75 dBc, nominal |
| LO related spurious (f > 600 MHz from carrier) | 10 MHz to 3.6 GHz | -90 dBc, typical |
| Other spurious f ≥ 10 MHz from carrier | | -80 dBc + 20xlogN ² |

1. Without Option B40, B85, B1A, B1X, DP2, or MPB. When any of these options are installed, performance may change. Please refer to the MXA specifications guide for more details.

2. N is the LO multiplication factor.

Dynamic Range Specifications (continued)

| Second harmonic distortion (SHI) | | | | |
|---|-------------------------|---------------------|-------------------|----------------------|
| | Source frequency | Mixer level | Distortion | SHI |
| RF/MW (Option 503, 508, 513, 526) | 10 MHz to 1.0 GHz | -15 dBm | -60 dBc | +45 dBm |
| | 1.0 to 1.8 GHz | -15 dBm | -56 dBc | +41 dBm |
| | 1.75 to 6.5 GHz | -15 dBm | -80 dBc | +65 dBm |
| | 6.5 to 11 GHz | -15 dBm | -70 dBc | +55 dBm |
| | 11 to 13.25 GHz | -15 dBm | -65 dBc | +50 dBm |
| Millimeter-Wave (Option 532, 544, 550) | 10 MHz to 1.0 GHz | -15 dBm | -60 dBc | +45 dBm |
| | 1.0 to 1.8 GHz | -15 dBm | -56 dBc | +41 dBm |
| | 1.75 to 3 GHz | -15 dBm | -72 dBc | +57 dBm |
| | 3 to 6.5 GHz | -15 dBm | -80 dBc | +65 dBm |
| | 6.5 to 11 GHz | -15 dBm | -70 dBc | +55 dBm |
| | 11 to 13.25 GHz | -15 dBm | -65 dBc | +50 dBm |
| | 13.2 to 25 GHz | -15 dBm | -65 dBc, nominal | +50 dBm, nominal |
| | | Preamp level | Distortion | SHI |
| Preamp on (Option P03, P08, P13, P26, P32, P44, P50) | 10 MHz to 1.8 GHz | -45 dBm | -78 dBc, nominal | +33 dBm, nominal |
| | 1.8 to 13.25 GHz | -50 dBm | -60 dBc, nominal | +10 dBm, nominal |
| | 13.25 to 25 GHz | -50 dBm | -50 dBc, nominal | 0 dBm, nominal |
| Third-order intermodulation distortion (TOI) | | | | |
| (Two -18 dBm tones at input mixer with tone separation > 5 times IF prefilter bandwidth, 20 to 30 °C, see Specifications Guide for IF prefilter bandwidths) | | | | |
| | | Distortion | TOI | TOI (typical) |
| RF/MW (Option 503, 508, 513, 526) | 10 to 100 MHz | -84 dBc | +12 dBm | +17 dBm |
| | 100 to 400 MHz | -90 dBc | +15 dBm | +20 dBm |
| | 400 MHz to 1.7 GHz | -92 dBc | +16 dBm | +20 dBm |
| | 1.7 to 3.6 GHz | -92 dBc | +16 dBm | +19 dBm |
| | 3.6 to 26.5 GHz | -90 dBc | +15 dBm | +18 dBm |
| Millimeter-Wave (Option 532, 544, 550) | 10 to 100 MHz | -88 dBc | +14 dBm | +17 dBm |
| | 100 MHz to 3.95 GHz | -92 dBc | +16 dBm | +19 dBm |
| | 3.95 to 8.4 GHz | -90 dBc | +15 dBm | +18 dBm |
| | 8.3 to 13.6 GHz | -90 dBc | +15 dBm | +21 dBm |
| | 13.5 to 17.1 GHz | -84 dBc | +12 dBm | +16 dBm |
| | 17 to 26.5 GHz | -82 dBc | +11 dBm | +17 dBm |
| | 26.4 to 34.5 GHz | -82 dBc | +11 dBm | +18 dBm |
| 34.4 to 50 GHz | -80 dBc | +10 dBm | +18 dBm, nominal | |
| Preamp on, RF/MW (Tones at preamp input) | | | | |
| two -45 dBm | 10 MHz to 500 MHz | -98 dBc, nominal | | +4 dBm, nominal |
| two -45 dBm | 500 MHz to 3.6 GHz | -100 dBc, nominal | | +5 dBm, nominal |
| two -50 dBm | 3.6 to 26.5 GHz | -70 dBc, nominal | | -15 dBm, nominal |
| Preamp on, Millimeter-Wave (Tones at preamp input) | | | | |
| two -45 dBm | 10 MHz to 3.6 GHz | -90 dBc, nominal | | 0 dBm, nominal |
| two -50 dBm | 3.6 to 26.5 GHz | -64 dBc, nominal | | -18 dBm, nominal |

| Phase noise ¹ | 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. For nominal values at other center frequencies, refer to Figure 1 and Figure 2.

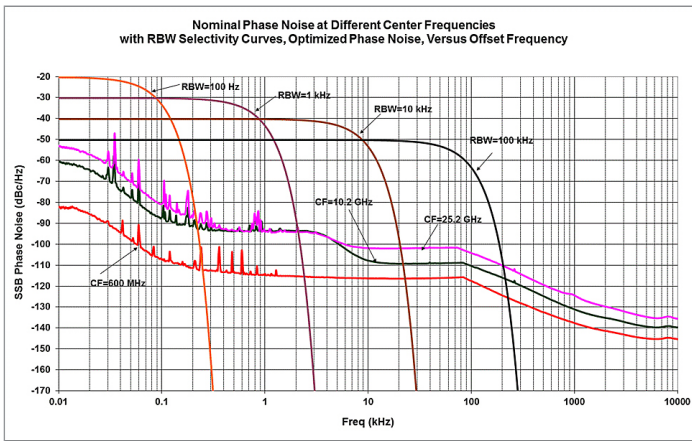


Figure 1. Nominal phase noise at different center frequencies, RF/MW (Option 503, 508, 513, 526)

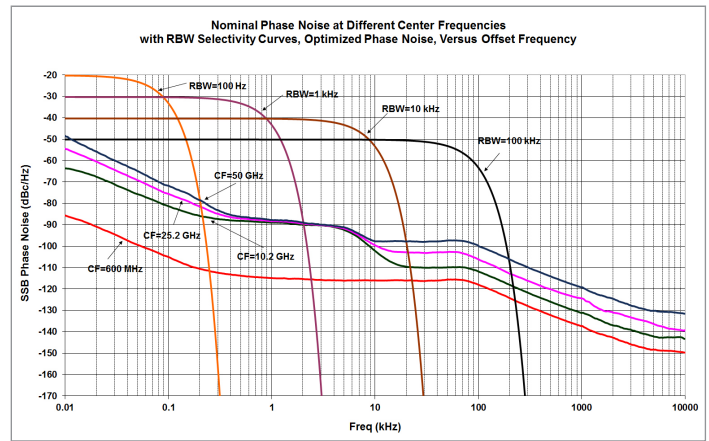


Figure 2. Nominal phase noise at different center frequencies, Millimeter-Wave (Option 532, 544, 550)

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 | | |
| | Adjacent | Alternate |
| Accuracy, W-CDMA (ACLR) (at specific mixer levels and ACLR ranges) | | |
| – MS | ± 0.14 dB | ± 0.18 dB |
| – BTS | ± 0.49 dB | ± 0.42 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) | 10 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 | 81.3 dB | (82.2 dB, typical) |
| – Absolute sensitivity | -84.5 dBm | (-89.5 dBm, typical) |
| Spectrum emission mask (SEM) | | |
| cdma2000® (750 kHz offset) | | |
| – Relative dynamic range (30 kHz RBW) | 78.6 dB | (84.8 dB, typical) |
| – Absolute sensitivity | -99.7 dBm | (-104.7 dBm, typical) |
| – Relative accuracy | ± 0.12 dB | |
| 3GPP W-CDMA (2.515 MHz offset) | | |
| – Relative dynamic range (30 kHz RBW) | 81.9 dB | (88.1 dB, typical) |
| – Absolute sensitivity | -99.7 dBm | (-104.7 dBm, typical) |
| – Relative accuracy | ± 0.15 dB | |

General Specifications

Temperature range

| | |
|-----------|--------------|
| Operating | 0 to 55 °C |
| Storage | -40 to 70 °C |

EMC

Complies with the essential requirements of the European EMC Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61326-1 or IEC/EN 61326-2-1
- CISPR 11 Group 1, Class A
- AS/NZS CISPR 11:2002
- ICES/NMB-001

This ISM device complies with Canadian ICES-001

Cet appareil ISM est conforme à la norme NMB-001 du Canada

Safety

Complies with European Low Voltage Directive 2006/95EC

- IEC/EN 61010-1 3rd Edition
- Canada: CSA C22.2 No. 61010-1-12
- U.S.A.: UL 61010-1 3rd Edition

Acoustic statement (European Machinery Directive 2002/42/EC, 1.7.4.2u)

- Acoustic noise emission
- LpA < 70 dB
- Operator position
- Normal position
- Per ISO 7779

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 MILPRF-28800F Class 3.

Power requirements

| | | |
|-----------------------|--|---|
| Voltage and frequency | 100/120 V, 50/60/400 Hz 220/240 V, 50/60 Hz | The instruments can operate with mains supply voltage fluctuations up to ± 10% of the nominal voltage |
|-----------------------|--|---|

Power consumption

- On 465 W maximum
- Standby 20 W

Display

| | |
|------------|--|
| Resolution | 1280 x 768 |
| Size | 269 mm (10.6 in.) diagonal (nominal) capacitive multi-touch screen |

Data storage

| | |
|----------|---|
| Internal | ≥ 160 GB nominal (removable solid state drive) |
| External | Supports USB 2.0 or 3.0 compatible memory devices |

Weight (without options)

| | |
|--|-------------------------|
| Net | |
| - RF/MW (Option 503, 508, 513, 526) | 18 kg (40 lbs), nominal |
| - Millimeter-Wave (Option 532, 544, 550) | 20 kg (44 lbs), nominal |

Shipping

- RF/MW (Option 503, 508, 513, 526) 30 kg (66 lbs), nominal
- Millimeter-Wave (Option 532, 544, 550) 32 kg (71 lbs), nominal

Dimensions

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

Calibration cycle

The recommended calibration cycle is two years; calibration services are available through Keysight service centers

Inputs and Outputs

| Front panel | |
|---|---|
| RF input connector | |
| – Standard (Option 503, 508, 513, 526) | Type-N female, 50 Ω nominal |
| – Standard (Option 532, 544, 550) | 2.4 mm male, 50 Ω nominal |
| 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 μA step |
| – IF input center frequency | |
| – Narrowband IF path | 322.5 MHz |
| – 40 MHz BW IF path | 250.0 MHz |
| – 85, 125, or 160 MHz BW IF path | 300 MHz |
| – LO output frequency range | 3.75 to 14.0 GHz |
| Analog baseband IQ inputs (Option BBA) ¹ | |
| – Connectors (I, Q, I-Bar, Q-Bar, and Cal Out) | BNC female |
| – Cal Out | |
| – Signal | AC coupled square wave |
| – Frequency | Selectable between 1 kHz and 250 kHz |
| – Input impedance (4 connectors: I, Q, I-, Q-) | 50 Ω, 1 MΩ (selectable, nominal) |
| – Probes supported ² | |
| – Active probe | 1130A, 1131A, 1132A, 1134A |
| – Passive probe | 1161A |
| – Input return loss | –35 dB (0 to 10 MHz, nominal) |
| – 50 Ω impedance only selected | –30 dB (10 to 40 MHz, nominal) |
| Probe power | |
| – Voltage/current | +15 Vdc, ±7 % at 150 mA max, nominal –12.6 Vdc, ±10 % at 150 mA max, nominal |
| USB ports | |
| – Host (3 ports) | |
| – Standard | Compatible with USB 2.0 |
| – Connector | USB type-A female |
| – Output current | |
| – Port marked with lightning bolt | 1.2 A (nominal) |
| – Ports not marked with lightning bolt | 0.5 A (nominal) |
| Rear panel | |
| 10 MHz out | |
| – Connector | BNC female, 50 Ω, nominal |
| – Output amplitude | ≥ 0 dBm, nominal |
| – Frequency | 10 MHz ± (10 MHz x frequency reference accuracy) |
| Ext Ref In | |
| – Connector | BNC female, 50 Ω, nominal |
| – Input amplitude range | –5 to 10 dBm, nominal |
| – Input frequency | 1 to 50 MHz, nominal |
| – Frequency lock range | ± 2 x 10 ⁻⁶ of specified external reference input frequency |
| Trigger 1 and 2 inputs | |
| – Connector | BNC female |
| – Impedance | > 10 kΩ, nominal |
| – Trigger level range | –5 to 5 V |

1. For additional specifications, please refer to the MXA specifications guide.

2. For more details, please refer to the Keysight Probe Configuration Guides, literature numbers 5968-7141EN and 5989-6162EN; probe heads are necessary to attach to your device properly and probe connectivity kits such as E2668B, E2669A, or E2675A are required.

Inputs and Outputs (continued)

| Rear panel | |
|--|--|
| Trigger 1 and 2 outputs | |
| – Connector | BNC female |
| – Impedance | 50 Ω , nominal |
| – Level | 5 V TTL, nominal |
| Monitor output | |
| – Connector | VGA compatible, 15-pin mini D-SUB |
| – Format | XGA (60 Hz vertical sync rates, non-interlaced) Analog RGB |
| – Resolution | 1024 x 768 |
| Noise source drive +28 V (pulsed) | |
| – Connector | BNC female |
| SNS Series noise source | |
| Analog out | |
| – Connector | BNC female (used with N9063A analog demod app and Option YAS) |
| USB ports | |
| – Host, super speed | 2 ports |
| – Compatibility | USB 3.0 |
| – Connector | USB Type A (female) |
| – Output current | 0.9 A, nominal |
| – Host, stacked with LAN | 1 port |
| – Compatibility | USB 2.0 |
| – Connector | USB Type A (female) |
| – Output current | 0.5 A, nominal |
| – Device | 1 port |
| – Compatibility | USB 3.0 |
| – Connector | USB type-B (female) |
| – Output current | 0.9 A, nominal |
| 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 | 1000 Base-T |
| – Connector | RJ45 Ethertwist |
| IF output | |
| – Connector | SMA female, shared by Option CR3 and CRP |
| – Impedance | 50 Ω , nominal |
| Wideband IF output, Option CR3 | |
| Center frequency | |
| – SA mode or I/Q analyzer | |
| – with IF BW \leq 25 MHz | 322.5 MHz |
| – with Option B40 | 250 MHz |
| – with Option B85, B1A, or B1X | 300 MHz |
| Conversion gain | –1 to +4 dB (nominal) plus RF frequency response |
| Bandwidth | |
| – Low band | Up to 140 MHz (nominal) |
| – High band, with preselector | Depends on center frequency |
| – High band, with preselector bypassed ¹ | Up to 410 MHz |
| Programmable 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 | 100 MHz (nominal) |
| – Low band or high band with preselector bypassed ¹ | Depends on RF center frequency |
| – Preselected band | |
| – Lower output frequencies | Subject to folding |
| Residual output signals | \leq –88 dBm (nominal) |

1. Option MPB installed and enabled.

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 (standard) | 10 Hz to 25 MHz |
| Option B40 | 10 Hz to 40 MHz |
| Option B85 | 10 Hz to 85 MHz |
| Option B1A | 10 Hz to 125 MHz |
| Option B1X | 10 Hz to 160 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) | 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 |
| 26.5 < f ≤ 50 | ≤ 10 | On | | 0.35 dB |
| 3.6 < f ≤ 50 | ≤ 10 | Off ¹ | ± 0.45 dB | 0.04 dB |

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

| Center frequency (GHz) | Span (MHz) | Preselector | Peak-to-peak | RMS |
|------------------------|------------|------------------|--------------|-------|
| ≤ 3.6 | ≤ 10 | NA | 0.4 ° | 0.1 ° |
| > 3.6 | ≤ 10 | On | 1.0 ° | 0.2 ° |
| > 3.6 | ≤ 10 | Off ¹ | 0.4 ° | 0.1 ° |

Data acquisition (10 MHz IF path)

Time record length

| | |
|---------------|---------------------------|
| – IQ analyzer | 4,000,000 IQ sample pairs |
|---------------|---------------------------|

Sample rate at ADC

| | |
|--------------------------|-----------|
| – Option DP2, B40 or MPB | 100 MSa/s |
| – None of the above | 90 MSa/s |

ADC resolution

| | |
|--------------------------|---------|
| – Option DP2, B40 or MPB | 16 bits |
| – None of the above | 14 bits |

Option B25 (standard) 25 MHz analysis bandwidth

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

| Center frequency (GHz) | Span (MHz) | Preselector | Max. error | RMS (nominal) |
|------------------------|------------|------------------|------------|---------------|
| ≤ 3.6 | 10 to ≤ 25 | NA | ± 0.45 dB | 0.051 dB |
| > 3.6 | 10 to ≤ 25 | On | | 0.45 dB |
| > 3.6 | 10 to ≤ 25 | Off ¹ | ± 0.45 dB | 0.05 dB |

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

| Center frequency (GHz) | Span (MHz) | Preselector | Peak-to-peak | RMS |
|------------------------|------------|------------------|--------------|--------|
| 0.02 ≤ f < 3.6 | ≤ 25 | NA | 0.6 ° | 0.14 ° |
| > 3.6 | ≤ 25 | On | 4.5 ° | 1.2 ° |
| > 3.6 | ≤ 25 | Off ¹ | 1.9 ° | 0.42 ° |

1. Option MPB is installed and enabled.

I/Q Analyzer (continued)

| Data acquisition (25 MHz IF path) | | | |
|--|---|-----------------------|---------------|
| Time record length (IQ pairs) | | | |
| – IQ Analyzer | 4,000,000 IQ sample pairs | | |
| 89600 software | 32-bit packing | 64-bit packing | Memory |
| Option DP2, B40 or MPB | 536 MSa | 268 MSa | 2 GB |
| None of the above | 4,000,000 IQ sample pairs (independent of data packing) | | |
| Sample rate at ADC | | | |
| – Option DP2, B40 or MPB | 100 MSa/s | | |
| – None of the above | 90 MSa/s | | |
| ADC resolution | | | |
| – Option DP2, B40 or MPB | 16 bits | | |
| – None of the above | 14 bits | | |

I/Q Analyzer – Option B40

40 MHz analysis bandwidth, Option B40 is automatically included in Option B85, B1A or B1X

| Option B40 40 MHz analysis bandwidth | | | | |
|---|-------------------------------|-----------------------|----------------------------|--------------------------------|
| IF frequency response (demodulation and FFT response relative to the center frequency, 20 to 30 °C) | | | | |
| Center frequency (GHz) | Span (MHz) | Preselector | | RMS (nominal) |
| $0.03 \leq f < 3.6$ | ≤ 40 | NA | ± 0.45 dB | ± 0.08 dB |
| $3.6 \leq f \leq 8.4$ | ≤ 40 | Off ¹ | ± 0.35 dB | ± 0.08 dB |
| $8.4 < f \leq 26.5$ | ≤ 40 | Off ¹ | ± 0.46 dB | ± 0.08 dB |
| $26.5 < f \leq 34.4$ | ≤ 40 | Off ¹ | ± 0.67 dB | ± 0.1 dB |
| $34.4 < f \leq 50$ | ≤ 40 | Off ¹ | ± 0.71 dB | ± 0.1 dB |
| IF phase linearity (deviation from mean phase linearity, nominal) | | | | |
| Center frequency (GHz) | Span (MHz) | Preselector | Peak-to-peak | RMS |
| $0.02 \leq f < 3.6$ | 40 | NA | 0.4° | 0.1° |
| ≥ 3.6 | 40 | Off ¹ | 6° | 1.8° |
| Dynamic range (40 MHz IF path) | | | | |
| SFDR (Spurious-free dynamic range) | | | | |
| – Signal frequency within ± 12 MHz of center | –77 dBc, nominal | | | |
| Signal frequency anywhere within analysis BW | | | | |
| – Spurious response within ± 18 MHz of center | –74 dBc, nominal | | | |
| – Response anywhere within analysis BW | –74 dBc, nominal | | | |
| Data acquisition (40 MHz IF path) | | | | |
| Time record length (IQ pairs) | | | | |
| – IQ Analyzer | 4,000,000 samples (I/Q pairs) | | | |
| 89600 VSA software | 32-bit packing | 64-bit packing | | |
| Length (IQ sample pairs) | 536 MSa | 268 MSa | 2 GB total memory, nominal | |
| Length (time units) | | | | Samples/(Span x 1.25), nominal |
| Sample rate | | | | |
| – At ADC | 200 MSa/s | | | |
| – IQ pairs | Span x 1.25, nominal | | | |
| ADC resolution | | | | |
| | 12 bits | | | |

1. Option MPB is installed and enabled.

I/Q Analyzer – Option B85/B1A/B1X

85/125/160 MHz analysis bandwidth

| IF frequency response | | | | | |
|--|--|--|------------------------------|------------------------------------|---------------|
| IF frequency response (20 to 30 °C) | | | Relative to center frequency | | |
| Center freq. (GHz) | Span (MHz) | Preselector | | Typical | RMS (nominal) |
| ≥ 0.15, < 3.6 | ≤ 85 | NA | ± 0.6 dB | ± 0.17 dB | 0.05 dB |
| | ≤ 140 | NA | ± 0.6 dB | ± 0.25 dB | 0.05 dB |
| | ≤ 160 | NA | | ± 0.2 dB, nominal | 0.07 dB |
| ≥ 3.6, ≤ 8.4 | ≤ 85 | Off ¹ | ± 0.73 dB | ± 0.2 dB | 0.06 dB |
| | ≤ 140 | Off ¹ | ± 0.8 dB | ± 0.35 dB | 0.06 dB |
| | ≤ 160 | Off ¹ | | ± 0.3 dB, nominal | 0.07 dB |
| > 8.4, ≤ 26.5 | ≤ 85 | Off ¹ | ± 1.10 dB | ± 0.50 dB | 0.2 dB |
| | ≤ 140 | Off ¹ | ± 1.40 dB | ± 0.76 dB | 0.2 dB |
| | ≤ 160 | Off ¹ | | ± 0.5 dB, nominal | 0.12 dB |
| > 26.5, ≤ 50 | ≤ 85 | Off ¹ | ± 1.20 dB | ± 0.45 dB | 0.12 dB |
| > 26.5, ≤ 50 | ≤ 140 | Off ¹ | ± 1.40 dB | ± 0.65 dB | 0.12 dB |
| > 26.5, ≤ 50 | ≤ 160 | Off ¹ | | ± 0.65 dB, nominal | 0.12 dB |
| IF phase linearity (deviation from mean phase linearity, nominal) | | | | | |
| Center freq. (GHz) | Span (MHz) | Preselector | | Peak-to-peak | RMS |
| ≥ 0.03, < 3.6 | ≤ 85 | NA | | 1.6° | 0.54° |
| | ≤ 140 | NA | | 3.9° | 0.85° |
| | ≤ 160 | NA | | 4.7° | 1.23° |
| ≥ 3.6 | ≤ 85 | Off ¹ | | 4.2° | 0.93° |
| | ≤ 160 | Off ¹ | | 5.3° | 1.73° |
| EVM (EVM measurement floor) | | Customized settings required, preselector bypassed (Option MPB) is installed and enabled | | | |
| Case 1: 802.11ac OFDM signal, 80 MHz bandwidth, MCS8, using 89600 VSA software equalization on, pilot phase tracking post EQ on | | | | | |
| Carrier frequency, 5.21 GHz; input power, 0 dBm | 0.23% (-52.7 dB), nominal | | | (EQ on preamble, pilots, and data) | |
| | 0.35% (-49.1 dB), nominal | | | (EQ on preamble only) | |
| Case 2: 802.11ac OFDM signal, 160 MHz bandwidth, MCS8, using 89600 VSA software equalization on, pilot phase tracking post EQ on | | | | | |
| Carrier frequency, 5.25 GHz; input power, 0 dBm | 0.30% (-50.4 dB), nominal | | | (EQ on preamble, pilots, and data) | |
| | 0.40% (-47.9 dB), nominal | | | (EQ on preamble only) | |
| Dynamic range | | | | | |
| SFDR (Spurious-free dynamic range) | | | | | |
| – Signal frequency within ± 12 MHz of center | –72 dBc, nominal | | | | |
| – Signal frequency anywhere within analysis BW | | | | | |
| – Spurious response within ± 63 MHz of center | –71 dBc, nominal | | | | |
| – Response anywhere within analysis BW | –69 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 ≠ CF | Up to ± 3 dB, nominal | | | | |

1. Option MPB is installed and enabled.

I/Q Analyzer – Option B85/B1A/B1X (continued)

85/125/160 MHz analysis bandwidth

| Data acquisition (85/125/160 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 or RT2

| Real-time analysis | | | |
|---|---|---|--|
| Real-time analysis bandwidth | | | |
| – Option RT1 | Up to 160 MHz | Analysis BW option determines the max real-time bandwidth | |
| – Option RT2 | Up to 160 MHz | Analysis BW option determines the max real-time bandwidth | |
| Minimum detectable signal duration with > 60 dB StM ² ratio | | | |
| – Option RT1 | 11.42 ns | | |
| – Option RT2 | 5.0 ns | | |
| Minimum signal duration with 100% probability of Frequency Mask Triggering (FMT) at full amplitude accuracy | | | |
| – Option RT1 | 17.3 μs | Signal is at mask level | |
| – Option RT2 | 3.57 μs | Signal is at mask level | |
| Minimum acquisition time | 100 μs | | |
| 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/RT2 Chapter in the MXA Signal Analyzer specifications guide (part number: N9020-90113)

2. StM = "Signal-to-Mask"



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