

# N9010B EXA X-Series Signal Analyzer, Multi-touch

10 Hz to 3.6, 7.0, 13.6, 26.5, 32, or 44 GHz

## Cost-Effective Millimeter-Wave Signal Analysis

Whether you're focused on time-to-market, time-to-volume, or cost of test, your choice of economy class signal analyzer should help you save both time and money. That's the idea that drives the Keysight Technologies, Inc. EXA signal analyzer—your first, best choice when you need maximum value in signal analysis up to millimeter-wave frequencies. It helps you find the answer faster, whether you're seeking tighter design margins or shorter test times.

This data sheet is a summary of the specifications and conditions for EXA signal analyzers.



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# 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. 2 s) 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.

# 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 507                                               |                                            | 10 Hz to 7 GHz                                                                                                                     | 10 MHz to 7 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                                       |
| Band                                                     | LO multiple (N)                            |                                                                                                                                    |                                          |
| 0                                                        | 1                                          | 10 Hz to 3.6 GHz                                                                                                                   |                                          |
| 1                                                        | 1                                          | 3.5 to 7.0 GHz                                                                                                                     |                                          |
| 1                                                        | 1                                          | 3.5 to 8.4 GHz                                                                                                                     |                                          |
| 2                                                        | 2                                          | 8.4 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 44 GHz                                                                                                                     |                                          |
| Frequency reference                                      |                                            |                                                                                                                                    |                                          |
| Accuracy                                                 |                                            | ± [(time since last adjustment x aging rate) + temperature stability + calibration accuracy]                                       |                                          |
| Aging rate                                               | Option PFR<br>±1 x 10 <sup>-7</sup> / year |                                                                                                                                    | Standard<br>±1 x 10 <sup>-6</sup> / year |
|                                                          | ±1.5 x 10 <sup>-7</sup> / 2 years          |                                                                                                                                    |                                          |
| Temperature stability                                    |                                            | Option PFR                                                                                                                         | Standard                                 |
| 20 to 30 °C                                              |                                            | ±1.5 x 10 <sup>-8</sup>                                                                                                            | ±2 x 10 <sup>-6</sup>                    |
| Full temperature range                                   |                                            | ±5 x 10 <sup>-8</sup>                                                                                                              | ±2 x 10 <sup>-6</sup>                    |
| Achievable initial calibration accuracy                  | Option PFR                                 |                                                                                                                                    | Standard                                 |
|                                                          | ±4 x 10 <sup>-8</sup>                      |                                                                                                                                    | ±1.4 x 10 <sup>-6</sup>                  |
| Example frequency reference accuracy (with Option PFR)   |                                            | = ± (1 x 10 <sup>-7</sup> + 5 x 10 <sup>-8</sup> + 4 x 10 <sup>-8</sup> )                                                          |                                          |
| 1 year after last adjustment                             |                                            | = ±1.9 x 10 <sup>-7</sup>                                                                                                          |                                          |
| Residual FM                                              |                                            |                                                                                                                                    |                                          |
| Option PFR                                               |                                            | ≤ (0.25 Hz x N) p-p in 20 ms nominal                                                                                               |                                          |
| Standard                                                 |                                            | ≤ (10 Hz x N) p-p in 20 ms nominal                                                                                                 |                                          |
|                                                          |                                            | See band table above for N (LO multiple)                                                                                           |                                          |
| 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 <sup>1</sup> ) |                                          |
| 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                                                 | Swept                                      | ± (0.25 % x span + horizontal resolution)                                                                                          |                                          |
|                                                          | FFT                                        | ± (0.10 % x span + horizontal resolution)                                                                                          |                                          |

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

| Sweep time and triggering               |                                             |                                                                            |                       |
|-----------------------------------------|---------------------------------------------|----------------------------------------------------------------------------|-----------------------|
| Range                                   |                                             | Span = 0 Hz                                                                | 1 μs to 6000 s        |
|                                         |                                             | Span ≥ 10 Hz                                                               | 1 ms to 4000 s        |
| Accuracy                                |                                             | Span ≥ 10 Hz, swept                                                        | ±0.01% nominal        |
|                                         |                                             | Span ≥ 10 Hz, FFT                                                          | ±40% nominal          |
|                                         |                                             | Span = 0 Hz                                                                | ±0.01% nominal        |
| Trigger                                 |                                             | Free run, line, video, external 1, external 2, RF burst, periodic timer    |                       |
| Trigger delay                           |                                             | Span = 0 Hz or FFT                                                         | –150 to +500 ms       |
|                                         |                                             | Span ≥ 10 Hz, swept                                                        | 0 to 500 ms           |
|                                         |                                             | Resolution                                                                 | 0.1 μs                |
| Time gating                             |                                             |                                                                            |                       |
| Gate methods                            |                                             | Gated LO; gated video; gated FFT                                           |                       |
| Gate length range (except method = FFT) |                                             | 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, and 8 MHz                             |                       |
|                                         | With one or more of Option B40, DP2, or MPB | 1 Hz to 3 MHz (10 % steps), 4, 5, 6, 8, and 10 MHz                         |                       |
| Bandwidth accuracy (power)              |                                             | 1 Hz to 750 kHz                                                            | ±1.0 % (±0.044 dB)    |
|                                         |                                             | 820 kHz to 1.2 MHz (< 3.6 GHz CF)                                          | ±2.0 % (±0.088 dB)    |
|                                         |                                             | 1.3 to 2 MHz (< 3.6 GHz CF)                                                | ±0.07 dB nominal      |
|                                         |                                             | 2.2 to 3 MHz (< 3.6 GHz CF)                                                | 0 to –0.2 dB nominal  |
|                                         |                                             | 4 to 10 MHz (< 3.6 GHz CF)                                                 | 0 to –0.4 dB nominal  |
| Bandwidth accuracy (–3.01 dB)           | RBW range                                   | 1 Hz to 1.3 MHz                                                            | ±2 % nominal          |
| Selectivity (–60 dB/–3 dB)              |                                             | 4.1:1 nominal                                                              |                       |
| EMI bandwidth (CISPR compliant)         |                                             | 200 Hz, 9 kHz, 120 kHz, 1 MHz                                              | (Option EMC required) |
| EMI bandwidth (MIL STD 461 compliant)   |                                             | 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz                               | (Option EMC required) |
| Analysis bandwidth <sup>1</sup>         |                                             |                                                                            |                       |
| Maximum bandwidth                       |                                             | Option B40                                                                 | 40 MHz                |
|                                         |                                             | Standard                                                                   | 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                                |                                             | ±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                                |            | Displayed average noise level (DANL) to +23 dBm                                               |
|--------------------------------------------------|------------|-----------------------------------------------------------------------------------------------|
| Input attenuator range (10 Hz to 44 GHz)         |            |                                                                                               |
| Standard                                         |            | 0 to 60 dB in 10 dB steps                                                                     |
| Option FSA                                       |            | 0 to 60 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 84 dB, 1 dB steps                                                                        |
| Maximum safe input level                         |            |                                                                                               |
| Average total power (with and without preamp)    |            | +30 dBm (1 W)                                                                                 |
| Peak pulse power                                 |            | < 10 $\mu$ 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 $\mu$ V, dBmA, dB $\mu$ A, V, W, A                                              |

| Frequency range                                                                                                                                                                                                           |                              | Specification                                       | 95th percentile ( $\approx 2\sigma$ ) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------|---------------------------------------|
| (10 dB input attenuation, 20 to 30 °C, preselector centering applied, $\sigma$ = nominal standard deviation)                                                                                                              |                              |                                                     |                                       |
| RF/MW (Option 503, 507, 513, 526)                                                                                                                                                                                         | 9 kHz to 10 MHz              | $\pm 0.8$ dB                                        | $\pm 0.4$ dB                          |
|                                                                                                                                                                                                                           | 10 MHz to 3.6 GHz            | $\pm 0.6$ dB                                        | $\pm 0.21$ dB                         |
|                                                                                                                                                                                                                           | 3.5 to 7.0 GHz               | $\pm 2.0$ dB                                        | $\pm 0.69$ dB                         |
|                                                                                                                                                                                                                           | 7.0 to 13.6 GHz              | $\pm 2.5$ dB                                        | $\pm 0.48$ dB                         |
|                                                                                                                                                                                                                           | 13.5 to 22.0 GHz             | $\pm 3.0$ dB                                        | $\pm 0.79$ dB                         |
|                                                                                                                                                                                                                           | 22.0 to 26.5 GHz             | $\pm 3.2$ dB                                        | $\pm 1.10$ dB                         |
| Millimeter-wave (Option 532, 544)                                                                                                                                                                                         | 9 kHz to 10 MHz              | $\pm 0.6$ dB                                        | $\pm 0.28$ dB                         |
|                                                                                                                                                                                                                           | 10 to 50 MHz                 | $\pm 0.45$ dB                                       | $\pm 0.21$ dB                         |
|                                                                                                                                                                                                                           | 50 MHz to 3.6 GHz            | $\pm 0.45$ dB                                       | $\pm 0.20$ dB                         |
|                                                                                                                                                                                                                           | 3.5 to 5.2 GHz               | $\pm 1.7$ dB                                        | $\pm 0.91$ dB                         |
|                                                                                                                                                                                                                           | 5.2 to 8.4 GHz               | $\pm 1.5$ dB                                        | $\pm 0.61$ dB                         |
|                                                                                                                                                                                                                           | 8.3 to 13.6 GHz              | $\pm 2.0$ dB                                        | $\pm 0.61$ dB                         |
|                                                                                                                                                                                                                           | 13.5 to 17.1 GHz             | $\pm 2.0$ dB                                        | $\pm 0.67$ dB                         |
|                                                                                                                                                                                                                           | 17.0 to 22.0 GHz             | $\pm 2.0$ dB                                        | $\pm 0.78$ dB                         |
|                                                                                                                                                                                                                           | 22.0 to 26.5 GHz             | $\pm 2.5$ dB                                        | $\pm 0.72$ dB                         |
|                                                                                                                                                                                                                           | 26.4 to 34.5 GHz             | $\pm 2.5$ dB                                        | $\pm 1.11$ dB                         |
|                                                                                                                                                                                                                           | 34.4 to 44 GHz               | $\pm 3.2$ dB                                        | $\pm 1.42$ dB                         |
| <b>Preamp on (P03, P07, P13, P26)</b>                                                                                                                                                                                     |                              |                                                     |                                       |
| RF/MW (Option 503, 507, 513, 526)                                                                                                                                                                                         | 100 kHz to 3.6 GHz           |                                                     | $\pm 0.28$ dB nominal                 |
|                                                                                                                                                                                                                           | 3.6 to 7.0 GHz               |                                                     | $\pm 0.67$ dB nominal                 |
|                                                                                                                                                                                                                           | 7.0 to 26.5 GHz              |                                                     | $\pm 0.80$ dB nominal                 |
| <b>Preamp on (P03, P07, P32, P44)</b>                                                                                                                                                                                     |                              |                                                     |                                       |
| Millimeter-wave (Option 532, 544)                                                                                                                                                                                         | 100 kHz to 3.6 GHz           |                                                     | $\pm 0.28$ dB nominal                 |
|                                                                                                                                                                                                                           | 3.5 to 8.4 GHz               |                                                     | $\pm 0.67$ dB nominal                 |
|                                                                                                                                                                                                                           | 8.4 to 26.5 GHz              |                                                     | $\pm 0.80$ dB nominal                 |
|                                                                                                                                                                                                                           | 26.4 to 44 GHz               |                                                     | $\pm 0.80$ dB nominal                 |
| <b>Input attenuation switching uncertainty</b>                                                                                                                                                                            |                              | <b>Specifications</b>                               | <b>Additional information</b>         |
| Attenuation > 2 dB, preamp off                                                                                                                                                                                            | 50 MHz (reference frequency) | $\pm 0.20$ dB                                       | $\pm 0.08$ dB typical                 |
|                                                                                                                                                                                                                           | 9 kHz to 3.6 GHz             | $\pm 0.20$ dB                                       | $\pm 0.08$ dB typical                 |
|                                                                                                                                                                                                                           | 3.5 to 7.0 GHz               |                                                     | $\pm 0.3$ dB nominal                  |
|                                                                                                                                                                                                                           | 6.9 to 13.6 GHz              |                                                     | $\pm 0.5$ dB nominal                  |
|                                                                                                                                                                                                                           | 13.5 to 26.5 GHz             |                                                     | $\pm 0.7$ dB nominal                  |
|                                                                                                                                                                                                                           | > 26.5 GHz                   |                                                     | $\pm 0.7$ dB nominal                  |
| <b>Relative to 10 dB (reference setting)</b>                                                                                                                                                                              |                              |                                                     |                                       |
| <b>Total absolute amplitude accuracy</b>                                                                                                                                                                                  |                              |                                                     |                                       |
| (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, $\sigma$ = nominal standard deviation) |                              |                                                     |                                       |
|                                                                                                                                                                                                                           | At 50 MHz                    | $\pm 0.40$ dB                                       |                                       |
|                                                                                                                                                                                                                           | At all frequencies           | $\pm (0.40 \text{ dB} + \text{frequency response})$ |                                       |
|                                                                                                                                                                                                                           | 9 kHz to 3.6 GHz             | $\pm 0.27$ dB (95th percentile $\approx 2\sigma$ )  |                                       |
| Preamp on                                                                                                                                                                                                                 | 100 kHz to 3.6 GHz           | $\pm (0.39 \text{ dB} + \text{frequency response})$ |                                       |

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 voltage standing wave ratio (VSWR) ( $\geq 10$ dB input attenuation)               |                            |                                                |  |
|------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------|--|
|                                                                                          | Options 503, 507, 513, 526 | Options 532, 544                               |  |
| 10 MHz to 3.6 GHz                                                                        | < 1.2:1 nominal            | 1.2:1 nominal                                  |  |
| 3.6 to 26.5 GHz                                                                          | < 1.9:1 nominal            | 1.5:1 nominal                                  |  |
| 26.5 to 44 GHz                                                                           | N/A                        | < 1.8:1 nominal                                |  |
| Resolution bandwidth switching uncertainty (referenced to 30 kHz RBW)                    |                            |                                                |  |
| 1 Hz to 3 MHz RBW                                                                        | $\pm 0.10$ dB              |                                                |  |
| 4, 5, 6, 8, 10 MHz RBW                                                                   | $\pm 1.0$ dB               |                                                |  |
| Reference level                                                                          |                            |                                                |  |
| Range                                                                                    | Log scale                  | –170 to +23 dBm in 0.01 dB steps               |  |
|                                                                                          | Linear scale               | Same as Log (707 pV to 3.16 V)                 |  |
| Accuracy                                                                                 | 0 dB                       |                                                |  |
| Display scale switching uncertainty                                                      |                            |                                                |  |
| Switching between linear and log                                                         | 0 dB                       |                                                |  |
| Log scale/div switching                                                                  | 0 dB                       |                                                |  |
| Display scale fidelity                                                                   |                            |                                                |  |
| Between –10 dBm and –80 dBm input mixer level                                            | $\pm 0.15$ dB total        |                                                |  |
| Trace detectors                                                                          |                            |                                                |  |
| Normal, peak, sample, negative peak, log power average, RMS average, and voltage average |                            |                                                |  |
| Preamplifier (Option P03, P07, P13, P26, P32, P44)                                       |                            |                                                |  |
| Frequency range                                                                          | Option P03                 | 100 kHz to 3.6 GHz                             |  |
|                                                                                          | Option P07                 | 100 kHz to 7 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                              |  |
| Gain                                                                                     | 100 kHz to 3.6 GHz         | +20 dB nominal                                 |  |
|                                                                                          | 3.6 to 7.0 GHz             | +35 dB nominal                                 |  |
|                                                                                          | > 7 GHz                    | +40 dB nominal                                 |  |
| Noise figure                                                                             | 100 kHz to 3.6 GHz         | 8 to 12 dB nominal (proportional to frequency) |  |
|                                                                                          | 3.6 to 8.4 GHz             | 9 dB nominal                                   |  |
|                                                                                          | 8.4 to 13.6 GHz            | 10 dB nominal                                  |  |
|                                                                                          | > 13.6 GHz                 | DANL + 176.24 dB nominal                       |  |



# Dynamic Range Specifications

| 1 dB gain compression (two-tone)                                                                                          |                                 |                             |          |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------|----------|
|                                                                                                                           |                                 | Total power at mixer input  |          |
| RF/MW (Option 503, 507, 513, 526)                                                                                         | 20 MHz to 26.5 GHz              | +9 dBm nominal              |          |
|                                                                                                                           |                                 | Total power at mixer input  |          |
| Millimeter-wave (Option 532, 544)                                                                                         | 20 MHz to 26.5 GHz              | +6 dBm nominal              |          |
|                                                                                                                           | 26.5 to 44 GHz                  | 0 dBm nominal               |          |
|                                                                                                                           |                                 | Total power at preamp input |          |
| Preamp on                                                                                                                 | 10 MHz to 3.6 GHz               | −14 dBm nominal             |          |
|                                                                                                                           | 3.6 to 26.5 GHz                 |                             |          |
|                                                                                                                           | Tone spacing: 100 kHz to 20 MHz | −28 dBm nominal             |          |
|                                                                                                                           | Tone spacing: > 70 MHz          | −20 dBm nominal             |          |
|                                                                                                                           | > 26.5 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) |                                 |                             |          |
|                                                                                                                           |                                 | Specification               | Typical  |
| RF/MW (Option 503, 507, 513, 526)                                                                                         | 1 to 10 MHz                     | −147 dBm                    | −149 dBm |
|                                                                                                                           | 10 MHz to 2.1 GHz               | −148 dBm                    | −150 dBm |
|                                                                                                                           | 2.1 to 3.6 GHz                  | −147 dBm                    | −149 dBm |
|                                                                                                                           | 3.5 to 7.0 GHz                  | −147 dBm                    | −149 dBm |
|                                                                                                                           | 7.0 to 13.6 GHz                 | −143 dBm                    | −147 dBm |
|                                                                                                                           | 13.5 to 20 GHz                  | −137 dBm                    | −142 dBm |
|                                                                                                                           | 20 to 26.5 GHz                  | −134 dBm                    | −140 dBm |
| Preamp on, RF/MW (Option 503, 507, 513, 526)                                                                              | 10 MHz to 2.1 GHz               | −161 dBm                    | −163 dBm |
|                                                                                                                           | 2.1 to 3.6 GHz                  | −160 dBm                    | −162 dBm |
|                                                                                                                           | 3.5 to 7.0 GHz                  | −160 dBm                    | −162 dBm |
|                                                                                                                           | 7.0 to 13.6 GHz                 | −160 dBm                    | −163 dBm |
|                                                                                                                           | 13.5 to 17.1 GHz                | −157 dBm                    | −160 dBm |
|                                                                                                                           | 17.0 to 20.0 GHz                | −155 dBm                    | −159 dBm |
|                                                                                                                           | 20.0 to 26.5 GHz                | −150 dBm                    | −156 dBm |
| Millimeter-wave (Option 532, 544) <sup>1</sup>                                                                            | 9 kHz to 1 MHz                  | —                           | −130 dBm |
|                                                                                                                           | 1 MHz to 1.2 GHz                | −152 dBm                    | −155 dBm |
|                                                                                                                           | 1.2 to 2.1 GHz                  | −151 dBm                    | −154 dBm |
|                                                                                                                           | 2.1 to 3.6 GHz                  | −149 dBm                    | −152 dBm |
|                                                                                                                           | 3.5 to 4.2 GHz                  | −144 dBm                    | −147 dBm |
|                                                                                                                           | 4.2 to 8.4 GHz                  | −145 dBm                    | −150 dBm |
|                                                                                                                           | 8.3 to 13.6 GHz                 | −147 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 |
| 34.4 to 44 GHz                                                                                                            | −135 dBm                        | −140 dBm                    |          |

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

| Displayed Average Noise Level (DANL)                                                                             |                   |           |          |
|------------------------------------------------------------------------------------------------------------------|-------------------|-----------|----------|
| Preamp on, millimeter-wave<br>(Option 532, 544) <sup>1</sup>                                                     | 100 kHz to 1 MHz  | –145 dBm  | –148 dBm |
|                                                                                                                  | 1 to 10 MHz       | –161 dBm  | –165 dBm |
|                                                                                                                  | 10 MHz to 1.2 GHz | –164 dBm  | –165 dBm |
|                                                                                                                  | 1.2 to 2.1 GHz    | –163 dBm  | –164 dBm |
|                                                                                                                  | 2.1 to 3.6 GHz    | –162 dBm  | –163 dBm |
|                                                                                                                  | 3.5 to 7 GHz      | –160 dBm  | –162 dBm |
|                                                                                                                  | 7 to 20 GHz       | –160 dBm  | –162 dBm |
|                                                                                                                  | 20 to 26.5 GHz    | –158 dBm  | –160 dBm |
|                                                                                                                  | 26.5 to 32 GHz    | –156 dBm  | –159 dBm |
|                                                                                                                  | 32 to 34 GHz      | –156 dBm  | –159 dBm |
|                                                                                                                  | 33.9 to 40 GHz    | –153 dBm  | –155 dBm |
|                                                                                                                  | 40 to 44 GHz      | –149 dBm  | –153 dBm |
| DANL with noise floor extension improvement (Option NF2)                                                         |                   |           |          |
| DANL improvement exceeds 7 dB with 95% confidence in the average of all bands, with and without the preamplifier |                   |           |          |
| RF/MW (Option 503, 507, 513, 526)                                                                                |                   |           |          |
| Example of effective DANL at 18 to 30 °C                                                                         |                   |           |          |
| Frequency                                                                                                        | Preamp Off        | Preamp On |          |
| Mid-Band 0 (1.8 GHz)                                                                                             | –156 dBm          | –170 dBm  |          |
| Mid-Band 1 (5.9 GHz)                                                                                             | –155 dBm          | –168 dBm  |          |
| Mid-Band 2 (10.95 GHz)                                                                                           | –153 dBm          | –168 dBm  |          |
| Mid-Band 3 (15.3 GHz)                                                                                            | –147 dBm          | –165 dBm  |          |
| Mid-Band 4 (21.75 GHz)                                                                                           | –145 dBm          | –157 dBm  |          |
| Millimeter-Wave (Option 532, 544) <sup>1</sup>                                                                   |                   |           |          |
| Example of effective DANL at 18 to 30 °C                                                                         |                   |           |          |
| Frequency                                                                                                        | Preamp Off        | Preamp On |          |
| Mid-Band 0 (1.8 GHz)                                                                                             | –157 dBm          | –169 dBm  |          |
| Mid-Band 1 (5.9 GHz)                                                                                             | –152 dBm          | –166 dBm  |          |
| Mid-Band 2 (10.95 GHz)                                                                                           | –154 dBm          | –165 dBm  |          |
| Mid-Band 3 (15.3 GHz)                                                                                            | –153 dBm          | –164 dBm  |          |
| Mid-Band 4 (21.75 GHz)                                                                                           | –148 dBm          | –164 dBm  |          |
| Mid-Band 5 (30.4 GHz)                                                                                            | –145 dBm          | –160 dBm  |          |
| Mid-Band 6 (42.7 GHz)                                                                                            | –142 dBm          | –154 dBm  |          |

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

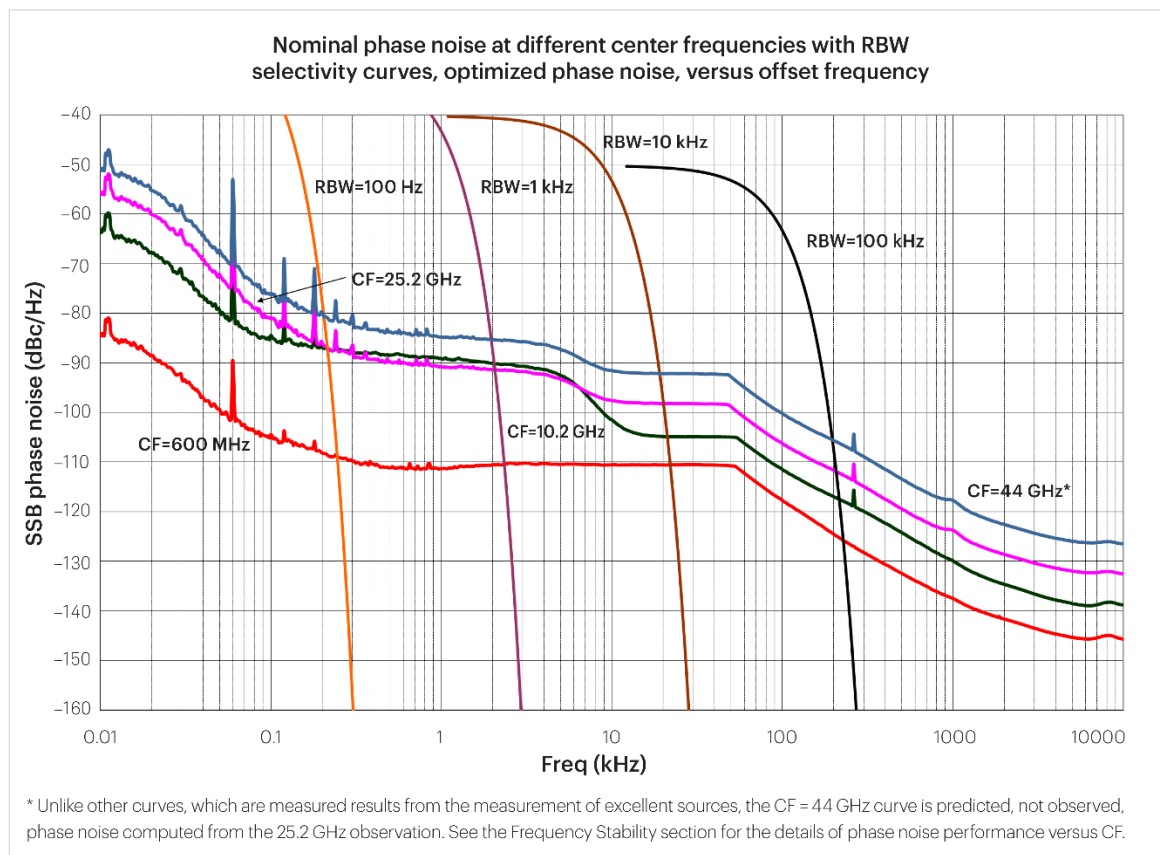
| Spurious responses                                                |                            |                                                                                         |                                        |
|-------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------|----------------------------------------|
| Residual responses<br>(Input terminated and 0 dB attenuation)     | 200 kHz to 8.4 GHz (swept) | –100 dBm                                                                                |                                        |
|                                                                   | Zero span or FFT or other  | –100 dBm nominal                                                                        |                                        |
|                                                                   | Tuned frequency (f)        | Mixer level                                                                             | Response                               |
| Image responses<br>(Excitation freq. = f + 645 MHz)               | 10 MHz to 3.6 GHz          | –10 dBm                                                                                 | –80 dBc (–107 dBc typical)             |
|                                                                   | 3.6 to 13.6 GHz            | –10 dBm                                                                                 | –75 dBc (–87 dBc typical)              |
|                                                                   | 13.6 to 17.1 GHz           | –10 dBm                                                                                 | –71 dBc (–85 dBc typical)              |
|                                                                   | 17.1 to 22 GHz             | –10 dBm                                                                                 | –68 dBc (–82 dBc typical)              |
|                                                                   | 22 to 26.5 GHz             | –10 dBm                                                                                 | –66 dBc (–78 dBc typical)              |
|                                                                   | 26.5 to 34.5 GHz           | –30 dBm                                                                                 | –70 dBc (–94 dBc typical)              |
|                                                                   | 34.5 to 44 GHz             | –30 dBm                                                                                 | –60 dBc (–79 dBc typical)              |
| LO related spurious (f > 600 MHz from carrier, 10 MHz to 3.6 GHz) | 10 MHz to 3.6 GHz          |                                                                                         | –90 dBc + 20 logN <sup>1</sup> typical |
| Other spurious response                                           | Mixer level                | Response                                                                                |                                        |
| Carrier frequency ≤ 26.5 GHz                                      |                            |                                                                                         |                                        |
| First RF order (f ≥ 10 MHz from carrier)                          | –10 dBm                    | –68 dBc + 20log(N <sup>1</sup> ) Including IF feedthrough, LO harmonic mixing responses |                                        |
| Higher RF order (f ≥ 10 MHz from carrier)                         | –40 dBm                    | –80 dBc + 20log(N <sup>1</sup> ) Including higher order mixer responses                 |                                        |
| Carrier frequency > 26.5 GHz                                      |                            |                                                                                         |                                        |
| First RF order (f ≥ 10 MHz from carrier)                          | –30 dBm                    | –90 dBc nominal                                                                         |                                        |
| Higher RF order (f ≥ 10 MHz from carrier)                         | –30 dBm                    | –90 dBc nominal                                                                         |                                        |
| Second Harmonic Distortion (SHI)                                  |                            |                                                                                         |                                        |
|                                                                   | Source frequency           | SHI (nominal)                                                                           |                                        |
| RF/MW (Option 503, 507, 513, 526)                                 | 10 MHz to 1.8 GHz          | +45 dBm                                                                                 |                                        |
|                                                                   | 1.75 to 7.0 GHz            | +65 dBm                                                                                 |                                        |
|                                                                   | 7.0 to 11.0 GHz            | +55 dBm                                                                                 |                                        |
|                                                                   | 11.0 to 13.25 GHz          | +50 dBm                                                                                 |                                        |
| Millimeter-wave (Option 532, 544)                                 | 10 MHz to 1.8 GHz          | +45 dBm                                                                                 |                                        |
|                                                                   | 1.8 to 6.5 GHz             | +65 dBm                                                                                 |                                        |
|                                                                   | 6.5 to 10 GHz              | +60 dBm                                                                                 |                                        |
|                                                                   | 10 to 13.25 GHz            | +55 dBm                                                                                 |                                        |
|                                                                   | 13.25 to 22 GHz            | +50 dBm                                                                                 |                                        |

1. N is the LO multiplication factor

**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)

|                                              |                                                 | TOI           | TOI (typical)       |
|----------------------------------------------|-------------------------------------------------|---------------|---------------------|
| RF/MW (Option 503, 507, 513, 526)            | 100 to 400 MHz                                  | +13 dBm       | +17 dBm             |
|                                              | 400 MHz to 3.6 GHz                              | +14 dBm       | +18 dBm             |
|                                              | 3.6 to 13.6 GHz                                 | +14 dBm       | +18 dBm             |
|                                              | 13.6 to 26.5 GHz                                | +12 dBm       | +16 dBm             |
| Preamp on, RF/MW (Option 503, 507, 513, 526) | 30 MHz to 3.6 GHz (two –45 dBm tones at preamp) |               | 0 dBm nominal       |
|                                              | 3.6 to 26.5 GHz (two –50 dBm tones at preamp)   |               | –18 dBm nominal     |
| Millimeter-wave (Option 532, 544)            | 10 to 100 MHz                                   | +12 dBm       | +17 dBm             |
|                                              | 100 MHz to 3.95 GHz                             | +15 dBm       | +19 dBm             |
|                                              | 3.95 to 8.4 GHz                                 | +15 dBm       | +18 dBm             |
|                                              | 8.3 to 13.6 GHz                                 | +15 dBm       | +18 dBm             |
|                                              | 13.5 to 17.1 GHz                                | +11 dBm       | +17 dBm             |
|                                              | 17.0 to 26.5 GHz                                | +10 dBm       | +17 dBm (nominal)   |
|                                              | 26.5 to 44 GHz                                  | —             | +13 dBm (nominal)   |
| Preamp on, millimeter-wave (Option 532, 544) | 30 MHz to 3.6 GHz (two –45 dBm tones at preamp) |               | 0 dBm (nominal)     |
|                                              | 3.6 to 26.5 GHz (two –50 dBm tones at preamp)   |               | –18 dBm (nominal)   |
| Phase noise                                  | Offset                                          | Specification | Typical             |
| Noise sidebands<br>(20 to 30 °C, CF = 1 GHz) | 100 Hz                                          | –87 dBc/Hz    | –102 dBc/Hz         |
|                                              | 1 kHz                                           | —             | –110 dBc/Hz nominal |
|                                              | 10 kHz                                          | –107 dBc/Hz   | –109 dBc/Hz         |
|                                              | 100 kHz                                         | –115 dBc/Hz   | –118 dBc/Hz         |
|                                              | 1 MHz                                           | –134 dBc/Hz   | –136 dBc/Hz         |
|                                              | 10 MHz                                          | —             | –147 dBc/Hz nominal |



**Figure 1.** Nominal phase noise at different center frequencies

| Option MPB, microwave preselector bypass <sup>1</sup> |                 |
|-------------------------------------------------------|-----------------|
| Model                                                 | Frequency range |
| N9010B-507                                            | 3.6 to 7 GHz    |
| N9010B-513                                            | 3.6 to 13.6 GHz |
| N9010B-526                                            | 3.6 to 26.5 GHz |
| N9010B-532                                            | 3.6 to 32 GHz   |
| N9010B-544                                            | 3.6 to 44 GHz   |

1. When Option MPB is installed and enabled, some aspects of the analyzer performance changes. Please refer to the EXA specification guide for more details.

# PowerSuite Measurement Specifications

| Channel power                                                              |                                                                                             |                    |
|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------|
| Amplitude accuracy, W-CDMA or IS95<br>(20 to 30 °C, attenuation = 10 dB)   | ± 1.04 dB (± 0.27 dB 95th percentile)                                                       |                    |
| Occupied bandwidth                                                         |                                                                                             |                    |
| Frequency accuracy                                                         | ± [span/1000] nominal                                                                       |                    |
| Adjacent channel power                                                     |                                                                                             |                    |
| Accuracy, W-CDMA (ACLR)<br>(at specific mixer levels and ACLR ranges)      | Adjacent                                                                                    | Alternate          |
| MS                                                                         | ±0.17 dB                                                                                    | ±0.22 dB           |
| BTS                                                                        | ±0.70 dB                                                                                    | ±0.57 dB           |
| Dynamic range (typical)                                                    |                                                                                             |                    |
| Without noise correction                                                   | −68 dB                                                                                      | −74 dB             |
| With noise correction                                                      | −73 dB                                                                                      | −76 dB             |
| Offset channel pairs measured                                              | 1 to 6                                                                                      |                    |
| ACP measurement and transfer time<br>(fast method)                         | 10 ms nominal (σ = 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, |                    |
| Spurious emission                                                          |                                                                                             |                    |
| W-CDMA (1 to 3.6 GHz) table-driven spurious signals; search across regions |                                                                                             |                    |
| Dynamic range                                                              | 80.4 dB                                                                                     | 82.9 dB typical    |
| Absolute sensitivity                                                       | −82.5 dBm                                                                                   | −86.5 dBm typical  |
| Spectrum emission mask (SEM)                                               |                                                                                             |                    |
| cdma2000® (750 kHz offset)                                                 |                                                                                             |                    |
| Relative dynamic range (30 kHz RBW)                                        | 76.2 dB                                                                                     | 82.8 dB typical    |
| Absolute sensitivity                                                       | −97.7 dBm                                                                                   | −101.7 dBm typical |
| Relative accuracy                                                          | ±0.12 dB                                                                                    |                    |
| 3GPP W-CDMA (2.515 MHz offset)                                             |                                                                                             |                    |
| Relative dynamic range (30 kHz RBW)                                        | 79.3 dB                                                                                     | 84.9 dB typical    |
| Absolute sensitivity                                                       | −97.7 dBm                                                                                   | −101.7 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 and the UK Electromagnetic Compatibility Regulations 2016 as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):                                                                                                                                                                               |                                                                    |                                                                                                       |
| <ul style="list-style-type: none"><li>• IEC/EN 61326-1 or IEC/EN 61326-2-1</li><li>• CISPR 11 Group 1, Class A</li><li>• AS/NZS CISPR 11:2002</li><li>• ICES/NMB-001</li></ul>                                                                                                                                                                                                                                                         |                                                                    |                                                                                                       |
| This ISM device complies with Canadian ICES-001                                                                                                                                                                                                                                                                                                                                                                                        |                                                                    |                                                                                                       |
| Cet appareil ISM est conforme à la norme NMB-001 du Canada                                                                                                                                                                                                                                                                                                                                                                             |                                                                    |                                                                                                       |
| Safety                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                    |                                                                                                       |
| Complies with the essential requirements of the European Low Voltage Directive a well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity)                                                                                                                                                                                                                                   |                                                                    |                                                                                                       |
| <ul style="list-style-type: none"><li>• IEC/EN 61010-1</li><li>• Canada: CSA C22.2 No. 61010-1</li><li>• U.S.A.: UL 61010-1</li></ul>                                                                                                                                                                                                                                                                                                  |                                                                    |                                                                                                       |
| 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                                            | The instruments can operate with mains supply voltage fluctuations up to ± 10% of the nominal voltage |
|                                                                                                                                                                                                                                                                                                                                                                                                                                        | 220/240 V, 50/60 Hz                                                |                                                                                                       |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                               | ≥ 80 GB nominal (removable solid-state drive)                      |                                                                                                       |
| External                                                                                                                                                                                                                                                                                                                                                                                                                               | Supports USB 2.0 or 3.0 compatible memory devices                  |                                                                                                       |
| Weight (without options)                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                    |                                                                                                       |
| Net                                                                                                                                                                                                                                                                                                                                                                                                                                    | 18 kg (40 lbs) nominal                                             |                                                                                                       |
| Shipping                                                                                                                                                                                                                                                                                                                                                                                                                               | 30 kg (66 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, 507, 513, or 526)                                                  |                                      | Type-N female, 50 Ω nominal                                |
| Standard (Option 532 or 544)                                                             |                                      | 2.4 mm male, 50 Ω 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                                              |
| External mixing, Option EXM (available only with EXA millimeter wave, Option 532 or 544) |                                      |                                                            |
| Connection port                                                                          | Connector                            | SMA, female                                                |
|                                                                                          | Impedance                            | 50 Ω nominal                                               |
|                                                                                          | Functions                            | Triplexed for mixer bias, IF input and LO output           |
| Mixer bias range                                                                         |                                      | ±10 mA in 10 µA step                                       |
| IF input center frequency                                                                | Narrowband IF path                   | 322.5 MHz                                                  |
|                                                                                          | 40 MHz IF path                       | 250 MHz                                                    |
| LO output frequency range                                                                |                                      | 3.75 to 14.0 GHz                                           |
| Rear panel                                                                               |                                      |                                                            |
| 10 MHz out                                                                               | Connector                            | BNC female, 50 Ω nominal                                   |
|                                                                                          | Output amplitude                     | ≥ 0 dBm nominal                                            |
|                                                                                          | Frequency                            | 10 MHz ± (10 MHz x frequency reference accuracy)           |
| Ext Ref In                                                                               | Connector                            | BNC female, 50 Ω nominal                                   |
|                                                                                          | Input amplitude range                | –5 to 10 dBm nominal                                       |
|                                                                                          | Input frequency                      | 10 MHz nominal                                             |
| Trigger 1 and 2 inputs                                                                   | Frequency lock range                 | ±5 x 10–6 of specified external reference input frequency  |
|                                                                                          | Connector                            | BNC female                                                 |
|                                                                                          | Impedance                            | > 10 kΩ nominal                                            |
| Trigger 1 and 2 outputs                                                                  | Trigger level range                  | –5 to 5 V                                                  |
|                                                                                          | Connector                            | BNC female                                                 |
|                                                                                          | Impedance                            | 50 Ω nominal                                               |
| Monitor output                                                                           | Level                                | 5 V TTL nominal                                            |
|                                                                                          | Connector                            | VGA compatible, 15-pin mini D-SUB                          |
|                                                                                          | Format                               | XGA (60 Hz vertical sync rates, non-interlaced) analog RGB |
|                                                                                          | Resolution                           | 1024 x 768                                                 |



| Rear panel                                                     |                                                                    |                                                                |
|----------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------|
| Noise source drive<br>+28 V (pulsed)                           | Connector                                                          | BNC female                                                     |
| SNS Series noise source connector                              |                                                                    | For use with Keysight SNS Series noise sources                 |
| Analog out                                                     | Connector                                                          | BNC female (used with N9063A analog demod app and Option YAS)  |
| USB ports                                                      |                                                                    |                                                                |
| Host, super speed<br>2 ports                                   | Compatibility                                                      | USB 3.0                                                        |
|                                                                | Connector                                                          | USB Type-A female                                              |
|                                                                | Output current                                                     | 0.9 A nominal                                                  |
| Host, stacked with LAN<br>1 port                               | Compatibility                                                      | USB 2.0                                                        |
|                                                                | Connector                                                          | USB Type-A female                                              |
|                                                                | Output current                                                     | 0.5 A nominal                                                  |
| Device 1 port                                                  | Standard                                                           | USB 3.0                                                        |
|                                                                | Connector                                                          | USB Type-B female                                              |
|                                                                | Output current                                                     | 0.9 A nominal                                                  |
| GPIB interface                                                 | Connector                                                          | IEEE-488 bus connector                                         |
|                                                                | GPIB codes                                                         | SH1, AH1, T6, SR1, RL1, PP0, DC1, C1, C2, C3, C28, DT1, L4, C0 |
|                                                                | GPIB mode                                                          | Controller or device                                           |
| LAN TCP/IP interface                                           | Standard                                                           | 1000Base-T                                                     |
|                                                                | Connector                                                          | RJ45 Ethertwist                                                |
| IF output                                                      | Connector                                                          | SMA female, shared by Option CR3 and CRP                       |
|                                                                | Impedance                                                          | 50 Ω nominal                                                   |
| Wideband IF output, Option CR3                                 |                                                                    |                                                                |
| Center frequency                                               |                                                                    |                                                                |
| SA mode or I/Q analyzer with IF BW ≤ 25 MHz<br>with Option B40 | 322.5 MHz                                                          |                                                                |
|                                                                | 250 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 <sup>1</sup>              | Up to 410 MHz (nominal)                                            |                                                                |
| 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<br>center                                     | Low band or high band<br>with preselector<br>bypassed <sup>1</sup> | 100 MHz (nominal)                                              |
|                                                                | Preselected band                                                   | Depends on RF center frequency                                 |
| Lower output frequencies                                       |                                                                    | Subject to folding                                             |
| Residual output signals                                        |                                                                    | ≤ −88 dBm (nominal)                                            |

1. Option MPB installed and enabled

# I/Q Analyzer

| Frequency                                                                                                            |                        |                            |              |                  |
|----------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------|--------------|------------------|
| Frequency span                                                                                                       | Standard               | 10 Hz to 10 MHz            |              |                  |
|                                                                                                                      | Option B25 (standard)  | 10 Hz to 25 MHz            |              |                  |
|                                                                                                                      | Option B40             | 10 Hz to 40 MHz            |              |                  |
| Resolution bandwidth (spectrum measurement)                                                                          |                        |                            |              |                  |
| Range                                                                                                                | Overall                | 100 MHz to 3 MHz           |              |                  |
|                                                                                                                      | Span = 1 MHz           | 50 Hz to 1 MHz             |              |                  |
|                                                                                                                      | Span = 10 kHz          | 1 Hz to 10 kHz             |              |                  |
|                                                                                                                      | Span = 100 Hz          | 100 MHz to 100 Hz          |              |                  |
| Window shapes                                                                                                        |                        |                            |              |                  |
| Flat top, Uniform, Hanning, Gaussian, Blackman, Blackman-Harris, Kaiser Bessel (K-B 70 dB, K-B 90 dB and K-B 110 dB) |                        |                            |              |                  |
| Analysis bandwidth                                                                                                   |                        |                            |              |                  |
| Standard                                                                                                             |                        | 10 Hz to 10 MHz            |              |                  |
| Option B25 (standard)                                                                                                |                        | 10 Hz to 25 MHz            |              |                  |
| Option B40                                                                                                           |                        | 10 Hz to 40 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              |
| < 3.6                                                                                                                | ≤ 10                   | N/A                        | ±0.40 dB     | 0.04 dB nominal  |
| ≥ 3.6                                                                                                                | ≤ 10                   | On                         |              | 0.25 dB nominal  |
| ≥ 3.6                                                                                                                | ≤ 10                   | Off <sup>1</sup>           | ±0.45 dB     | 0.04 dB nominal  |
| > 26.5 (Option 532 or 544)                                                                                           | ≤ 10                   | On                         |              | 0.35 dB nominal  |
| IF phase linearity (deviation from mean phase linearity, nominal)                                                    |                        |                            |              |                  |
| Center frequency (GHz)                                                                                               | Span (MHz)             | Preselector                | Peak-to-peak | RMS              |
| < 3.6                                                                                                                | ≤ 10                   | N/A                        | 0.4°         | 0.1°             |
| ≥ 3.6                                                                                                                | ≤ 10                   | Off <sup>1</sup>           | 0.4°         | 0.1°             |
| ≥ 3.6 (Option ≤ 526)                                                                                                 | ≤ 10                   | On                         | 1.0°         | 0.2°             |
| Data acquisition (10 MHz IF path)                                                                                    |                        |                            |              |                  |
| Time record length                                                                                                   |                        |                            |              |                  |
| IQ analyzer                                                                                                          | Option DP2, B40 or MPB | 32,000,001 IQ sample pairs |              |                  |
|                                                                                                                      | None of the above      | 5,000,000 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              |
| ≤ 3.6                                                                                                                | 10 to ≤ 25             | N/A                        | ±0.45 dB     | 0.051 dB nominal |
| > 3.6                                                                                                                | 10 to ≤ 25             | On                         |              | 0.45 dB nominal  |
| > 3.6                                                                                                                | 10 to ≤ 25             | Off <sup>1</sup>           | ±0.45 dB     | 0.071 dB nominal |

1. Option MPB is installed and enabled

| 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                                                    | N/A              | 0.6°                            | 0.14°   |
| ≥ 3.6                                                                                                        |                        | ≤ 25                                                    | Off <sup>1</sup> | 1.9°                            | 0.4°    |
| ≥ 3.6 (Option ≤ 526)                                                                                         |                        | ≤ 25                                                    | On               | 4.5°                            | 1.2°    |
| Data acquisition (25 MHz IF path)                                                                            |                        |                                                         |                  |                                 |         |
| Time record length (IQ pairs)                                                                                |                        |                                                         |                  |                                 |         |
| IQ analyzer                                                                                                  | Option DP2, B40 or MPB | 32,000,001 IQ sample pairs                              |                  |                                 |         |
|                                                                                                              | None of the above      | 5,000,000 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                                                                                            |                        | 5,000,000 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                                                 |                  |                                 |         |
| Option B40 40 MHz analysis bandwidth                                                                         |                        |                                                         |                  |                                 |         |
| IF frequency response (demodulation and FFT response relative to the center frequency, 20 to 30 °C), nominal |                        |                                                         |                  |                                 |         |
| Center frequency (GHz)                                                                                       |                        | Span (MHz)                                              | Preselector      | Max. error                      | RMS     |
| 0.03 ≤ f < 3.6                                                                                               |                        | ≤ 40                                                    | N/A              | ±0.3 dB                         | 0.08 dB |
| 3.6 ≤ f ≤ 26.5                                                                                               |                        | ≤ 40                                                    | Off <sup>1</sup> | ±0.25 dB                        | 0.08 dB |
| > 26.5                                                                                                       |                        | ≤ 40                                                    | Off <sup>1</sup> | ±0.25 dB                        | 0.12 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                                                                                               |                        | 40                                                      | N/A              | 0.2°                            | 0.05°   |
| ≥ 3.6                                                                                                        |                        | 40                                                      | Off <sup>1</sup> | 5°                              | 1.4°    |
| Data acquisition (40 MHz IF path)                                                                            |                        |                                                         |                  |                                 |         |
| Time record length (IQ pairs) IQ analyzer                                                                    |                        | 32,000,001 IQ sample pairs                              |                  |                                 |         |
| 89600 VSA software                                                                                           |                        | 32-bit packing                                          | 64-bit packing   | 2 GB total memory (nominal)     |         |
| Length (IQ sample pairs)                                                                                     |                        | 536 MSa                                                 | 268 MSa          |                                 |         |
| Length (time units)                                                                                          |                        |                                                         |                  | Samples/(span x 1.28) (nominal) |         |
| Sample rate                                                                                                  | At ADC                 | 200 MSa/s                                               |                  |                                 |         |
|                                                                                                              | IQ pairs               |                                                         |                  | Span x 1.28 (nominal)           |         |
| ADC resolution                                                                                               |                        | 12 bits                                                 |                  |                                 |         |

1. Option MPB is installed and enabled



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