M9484C VXG and V3080A
Vector signal generator and frequency extender

Introduction

This data sheet provides key features and specifications for the M9484C VXG vector signal generator and the V3080A vector signal generator frequency extender.
# Table of Contents

About the M9484C VXG Vector Signal Generator .................................................................................................................. 3
Definitions and Conditions ......................................................................................................................................................... 4
Frequency .................................................................................................................................................................................. 5
Frequency Reference ............................................................................................................................................................... 5
Power .......................................................................................................................................................................................... 8
Spectral Purity ........................................................................................................................................................................... 11
Pulse Modulation (Option PMR or PME) ........................................................................................................................................... 15
Analog Modulation ...................................................................................................................................................................... 16
Vector Modulation (Options Bxx, Rxx) ........................................................................................................................................... 17
Internal Baseband Generator (Options Bxx, Rxx) ...................................................................................................................................... 19
Error Vector Magnitude (EVM) ...................................................................................................................................................... 22
Distortion Performance (Adjacent Channel Power Ratio) ................................................................................................................ 24
Remote Programming ................................................................................................................................................................. 25
General Specifications ................................................................................................................................................................. 25
Related Literature ....................................................................................................................................................................... 27
About the M9484C VXG Vector Signal Generator

You’re designing the next RF breakthrough and ensuring that your design delivers maximum throughput, robust links, and data handling capabilities. This introduces a new set of design and test challenges, including more bandwidths, frequency bands, and system complexity.

Keysight has created the ultimate VXG signal generator to take your designs to the widest bandwidths, highest frequencies, and multichannel applications. With this fully integrated, calibrated, and synchronized solution, you don’t need to worry about the errors caused by additional connections and instruments. Through integration with PathWave Signal Generation software, create performance-optimized reference signals and reduce the time you spend on signal simulation.

Figure 1. M9484C VXG signal generator with two 54 GHz channels.
Definitions and Conditions

Specification

Specifications represent warranted performance of a calibrated instrument that has been stored for a minimum of 2 hours within the operating temperature of 0 to 50 °C, unless otherwise stated, and after a 45-minute warm-up period. The specifications include measurement uncertainty. Data represented in this document are specifications unless otherwise noted.

Typical

Typical (typ) 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 90 percent confidence level at room temperature (approximately 25 °C). Typical performance does not include measurement uncertainty.

Nominal

Nominal (nom) values indicate the expected mean or average performance, or an attribute whose performance is by design, such as the 50-ohm connector. This data is not warranted and is measured at room temperature (approximately 25 °C).

Measured

Measured (meas) describes an attribute measured during the design phase for purposes of communicating expected performance, such as amplitude drift vs. time. This data is not warranted and is measured at room temperature (approximately 25 °C).

All of the above apply when using the instrument in its default settings unless otherwise stated.

Data contained within this document does not apply to V3080A unless otherwise stated.
Frequency

Frequency options

<table>
<thead>
<tr>
<th>Option</th>
<th>CW frequency range</th>
<th>RF output connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>M9484C-506</td>
<td>9 kHz to 6 GHz</td>
<td>Type-N (f)</td>
</tr>
<tr>
<td>M9484C-508</td>
<td>9 kHz to 8.5 GHz</td>
<td>Type-N (f)</td>
</tr>
<tr>
<td>M9484C-514</td>
<td>9 kHz to 14 GHz</td>
<td>3.5 mm (m)</td>
</tr>
<tr>
<td>M9484C-520</td>
<td>9 kHz to 21.6 GHz</td>
<td>3.5 mm (m)</td>
</tr>
<tr>
<td>M9484C-532</td>
<td>9 kHz to 31.8 GHz</td>
<td>1.85 mm (m)</td>
</tr>
<tr>
<td>M9484C-544</td>
<td>9 kHz to 44 GHz</td>
<td>1.85 mm (m)</td>
</tr>
<tr>
<td>M9484C-554</td>
<td>9 kHz to 54 GHz</td>
<td>1.85 mm (m)</td>
</tr>
<tr>
<td>V3080A-F06¹</td>
<td>10 MHz to 67 GHz</td>
<td>1.0 mm (m)</td>
</tr>
<tr>
<td>V3080A-F07¹</td>
<td>10 MHz to 75 GHz</td>
<td>1.0 mm (m)</td>
</tr>
<tr>
<td>V3080A-F09¹</td>
<td>10 MHz to 90 GHz</td>
<td>1.0 mm (m)</td>
</tr>
<tr>
<td>V3080A-F11¹</td>
<td>10 MHz to 100 GHz (overrange to 110 GHz)</td>
<td>1.0 mm (m)</td>
</tr>
</tbody>
</table>

Frequency resolution

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CW</td>
<td>0.00001 Hz</td>
</tr>
</tbody>
</table>

Phase adjustments

<table>
<thead>
<tr>
<th></th>
<th>± 180°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase offset range</td>
<td>± 180°</td>
</tr>
<tr>
<td>Phase offset resolution</td>
<td>0.001°</td>
</tr>
</tbody>
</table>

Relative phase adjustments (Option PCH)²

<table>
<thead>
<tr>
<th></th>
<th>± 180°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative phase offset range</td>
<td>± 180°</td>
</tr>
<tr>
<td>Relative phase offset resolution</td>
<td>0.001°</td>
</tr>
<tr>
<td>Relative phase repeatability</td>
<td>0.0001° (nom)³</td>
</tr>
</tbody>
</table>

Frequency switching speed⁴

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz to 54 GHz</td>
<td>3.0 ms (meas)</td>
</tr>
</tbody>
</table>

Frequency Reference

Frequency accuracy

<table>
<thead>
<tr>
<th></th>
<th>± (time since last adjustment x aging rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculation</td>
<td>± temperature effects</td>
</tr>
<tr>
<td></td>
<td>± calibration accuracy</td>
</tr>
<tr>
<td>Aging rate⁵</td>
<td>First year 0.05 ppm/year, after 72-hour warm-up</td>
</tr>
<tr>
<td></td>
<td>Second year 0.03 ppm/year, after 72-hour warm-up</td>
</tr>
<tr>
<td>Temperature effects (nom)</td>
<td>20 to 30 °C &lt; ± 10 ppb</td>
</tr>
<tr>
<td></td>
<td>Full temperature range &lt; ± 50 ppb</td>
</tr>
<tr>
<td>Initial achievable calibration accuracy⁶</td>
<td>± 5 x 10⁻⁸</td>
</tr>
</tbody>
</table>

Warm up (nom)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes over +20 to +30 °C, with respect to 1 hour</td>
<td>&lt; ± 0.1 ppm</td>
</tr>
<tr>
<td>15 minutes over +20 to +30 °C, with respect to 1 hour</td>
<td>&lt; ± 0.01 ppm</td>
</tr>
</tbody>
</table>

¹ V3080A requires an M9484C with option AL2 and 532, 544, or 554. If option 532 or 544 are selected, settable frequency will stop at the specified maximum frequency for that option and resume at 52.8 GHz when the V3080A is connected.
² Channel 1 relative to channel 2, for example.
³ When tuning from f1 to f2 and back to f1.
⁴ Time from receipt of SCPI command to frequency within 0.1 ppm of final frequency or within 100 Hz, whichever is greater, and amplitude within 1 dB of final amplitude.
⁵ Not verified by Keysight N7800A TME Calibration and Adjustment Software. Daily aging rate may be verified as a supplementary chargeable service, on request.
⁶ At time of shipment.
**External reference input**

<table>
<thead>
<tr>
<th></th>
<th>10 MHz, 100 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>10 MHz, 100 MHz</td>
</tr>
<tr>
<td>Option 1ER</td>
<td>1 MHz to 110 MHz flexible reference</td>
</tr>
<tr>
<td>Input frequency setting resolution (1ER)</td>
<td>0.1 Hz</td>
</tr>
<tr>
<td>Wide locking range</td>
<td>± 1.0 ppm (nom), optimized for best phase stability</td>
</tr>
<tr>
<td>Narrow locking range</td>
<td>± 0.6 ppm (nom), optimized for best close-in phase noise</td>
</tr>
<tr>
<td>Amplitude</td>
<td>-3 dBm to +20 dBm (nom)</td>
</tr>
<tr>
<td>Connector</td>
<td>BNC female</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω (nom)</td>
</tr>
</tbody>
</table>

**External reference input PLL synchronization bandwidths**

<table>
<thead>
<tr>
<th>External reference frequency</th>
<th>Narrow</th>
<th>Synchronization loop bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz</td>
<td>0.015 Hz</td>
<td>70 Hz</td>
</tr>
<tr>
<td>100 MHz</td>
<td>0.015 Hz</td>
<td>70 Hz</td>
</tr>
<tr>
<td>Flexible Reference (1ER) 1 – 110 MHz</td>
<td>0.015 Hz</td>
<td>70 Hz</td>
</tr>
</tbody>
</table>

**Reference outputs**

<table>
<thead>
<tr>
<th></th>
<th>10 MHz out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplitude</td>
<td>≥ 5 dBm, 7 dBm (typ), square wave</td>
</tr>
<tr>
<td>Connector</td>
<td>BNC female</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω (nom)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>19.2 GHz out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplitude</td>
<td>+7.3 dBm (nom) sine wave</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA female</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω (nom)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2.4 GHz out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplitude</td>
<td>+7.3 dBm (nom) sine wave</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA female</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω (nom)</td>
</tr>
</tbody>
</table>

**Measured SSB Phase Noise of References (option 600)**

- Does not include a guard band for performance distribution, measurement uncertainty, or environmental variables.
- Available on instruments with options 514, 520, 532, 544, or 554.
### Auxiliary fixed LO (Option AL2)

<table>
<thead>
<tr>
<th>User selectable outputs</th>
<th>Frequency</th>
<th>Amplitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.4 GHz</td>
<td>+11 dBm (meas.)</td>
</tr>
<tr>
<td></td>
<td>4.8 GHz</td>
<td>+7.5 dBm (meas.)</td>
</tr>
<tr>
<td></td>
<td>9.6 GHz</td>
<td>+6 dBm (meas.)</td>
</tr>
<tr>
<td></td>
<td>19.2 GHz</td>
<td>-2 dBm (meas.)</td>
</tr>
</tbody>
</table>

#### Connector
- APC 3.5 mm

#### Impedance
- 50 Ω (nom.)

---

#### Measured SSB Phase Noise of Auxiliary Fixed LO at 9.6 GHz (options M9484C-AL2, M9484C-600)

![Phase Noise Chart](chart.png)

---

9 Available on M9484C with options 532, 544, or 554. Required to pair M9484C with V3080A.
## Power

### Output parameters

<table>
<thead>
<tr>
<th>Settable range</th>
<th>Standard</th>
<th>Options 1EA, 1EB, or 1EC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-135 dBm to +20 dBm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-135 dBm to +30 dBm</td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>0.01 dB</td>
<td></td>
</tr>
<tr>
<td>Output impedance</td>
<td>50 Ω (nom)</td>
<td></td>
</tr>
<tr>
<td>Maximum reverse power</td>
<td>+30 dBm, 0 VDC (nom)</td>
<td></td>
</tr>
<tr>
<td>Attenuator type</td>
<td>Electronic</td>
<td></td>
</tr>
</tbody>
</table>

**Maximum output power, temperature range 22 to 28 °C, () = typical**

### Frequency range

#### Options 506 and 508

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>Standard</th>
<th>Option 1EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 kHz to 1 MHz</td>
<td>(+12 dBm)</td>
<td>(+12 dBm)</td>
</tr>
<tr>
<td>&gt; 1 MHz to 10 MHz</td>
<td>+10 dBm</td>
<td>+10 dBm (+12 dBm)</td>
</tr>
<tr>
<td>&gt; 10 MHz to 4 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+24 dBm)</td>
</tr>
<tr>
<td>&gt; 4 GHz to 8.5 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+23 dBm)</td>
</tr>
</tbody>
</table>

#### Options 514 and 520

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>Standard</th>
<th>Option 1EB</th>
<th>Harmonic filters enabled (selectable with option 1EH)¹⁰</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 kHz to 1 MHz</td>
<td>(0 dBm)</td>
<td>(0 dBm)</td>
<td>(0 dBm)</td>
</tr>
<tr>
<td>&gt; 1 MHz to 10 MHz</td>
<td>+10 dBm</td>
<td>+10 dBm (+12 dBm)</td>
<td>+10 dBm (+12 dBm)</td>
</tr>
<tr>
<td>&gt; 10 MHz to 4 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+24 dBm)</td>
<td>+12 dBm (+13 dBm)</td>
</tr>
<tr>
<td>&gt; 4 GHz to 8.5 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+23 dBm)</td>
<td>+7 dBm (+9 dBm)</td>
</tr>
<tr>
<td>&gt; 8.5 GHz to 14.7 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+23 dBm)</td>
<td>+8.5 dBm (+10 dBm)</td>
</tr>
<tr>
<td>&gt; 14.7 GHz to 19 GHz</td>
<td>+18 dBm</td>
<td>+19 dBm (+22 dBm)</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 19 GHz to 21.6 GHz</td>
<td>+17 dBm</td>
<td>+17 dBm (+22 dBm)</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Options 532, 544, and 554

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>Standard</th>
<th>Option 1EC</th>
<th>Harmonic filters enabled (selectable with option 1EH)¹⁰</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 kHz to 1 MHz</td>
<td>(0 dBm)</td>
<td>(0 dBm)</td>
<td>(0 dBm)</td>
</tr>
<tr>
<td>&gt; 1 MHz to 10 MHz</td>
<td>+10 dBm</td>
<td>+10 dBm (+12 dBm)</td>
<td>+10 dBm (+12 dBm)</td>
</tr>
<tr>
<td>&gt; 10 MHz to 4 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+21 dBm)</td>
<td>+10 dBm (+12 dBm)</td>
</tr>
<tr>
<td>&gt; 4 GHz to 8.5 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+21 dBm)</td>
<td>+5 dBm (+8 dBm)</td>
</tr>
<tr>
<td>&gt; 8.5 GHz to 14.7 GHz</td>
<td>+18 dBm</td>
<td>+20 dBm (+21 dBm)</td>
<td>+8.5 dBm (+10 dBm)</td>
</tr>
<tr>
<td>&gt; 14.7 GHz to 19 GHz</td>
<td>+18 dBm</td>
<td>+19 dBm (+20 dBm)</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 19 GHz to 21.6 GHz</td>
<td>+17 dBm</td>
<td>+17 dBm (+18 dBm)</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 21.6 GHz to 22.5 GHz</td>
<td>+18 dBm</td>
<td>+18 dBm (+20 dBm)</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 22.5 GHz to 32 GHz</td>
<td>+18 dBm</td>
<td>+22 dBm (+23 dBm)</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 32 GHz to 43 GHz</td>
<td>+15 dBm</td>
<td>+19 dBm (+21 dBm)</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 43 GHz to 50 GHz</td>
<td>+11 dBm</td>
<td>+17 dBm (+19 dBm)</td>
<td>-</td>
</tr>
<tr>
<td>&gt; 50 GHz to 54 GHz</td>
<td>+10 dBm</td>
<td>+12 dBm (+14 dBm)</td>
<td>-</td>
</tr>
</tbody>
</table>

¹⁰ Refer to standard, 1EB, or 1EC column for frequencies above 14.5 GHz.
Harmonic filters not enabled (selectable with option 1EH). For CW operation; level range not valid when vector modulation is on.

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>+15 dBm or maximum specified power to -60 dBm</th>
<th>&lt; -60 dBm to -90 dBm</th>
<th>&lt; -90 dBm to -110 dBm</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 12 MHz to 6 GHz</td>
<td>&lt; ±1.6 dB (±0.3 dB)</td>
<td>&lt; ±1.4 dB (±0.3 dB)</td>
<td>&lt; ±1.8 dB (±0.5 dB)</td>
</tr>
<tr>
<td>&gt; 6 MHz to 8.5 GHz</td>
<td>&lt; ±1.1 dB (±0.3 dB)</td>
<td>&lt; ±1.6 dB (±0.5 dB)</td>
<td>&lt; ±2.5 dB (±1 dB)</td>
</tr>
<tr>
<td>&gt; 8.5 GHz to 17 GHz</td>
<td>&lt; ±1.2 dB (±0.3 dB)</td>
<td>&lt; ±2.1 dB (±0.8 dB)</td>
<td>&lt; ±2.6 dB (±1 dB)</td>
</tr>
<tr>
<td>&gt; 17 GHz to 20 GHz</td>
<td>&lt; ±1.7 dB (±0.5 dB)</td>
<td>&lt; ±2.7 dB (±1 dB)</td>
<td>&lt; ±2.6 dB (±1 dB)</td>
</tr>
<tr>
<td>&gt; 20 GHz to 37 GHz</td>
<td>&lt; ±1.3 dB (±0.3 dB)</td>
<td>&lt; ±1.8 dB (±0.5 dB)</td>
<td>&lt; ±2.6 dB (±0.7 dB)</td>
</tr>
<tr>
<td>&gt; 37 GHz to 44 GHz</td>
<td>&lt; ±1.3 dB (±0.3 dB)</td>
<td>(±1.5 dB)</td>
<td>(±1.5 dB)</td>
</tr>
<tr>
<td>&gt; 44 GHz to 50 GHz</td>
<td>&lt; ±2.1 dB (±0.7 dB)</td>
<td>(±1.5 dB)</td>
<td>(±1.5 dB)</td>
</tr>
<tr>
<td>&gt; 50 GHz to 54 GHz</td>
<td>&lt; ±2.2 dB (±0.7 dB)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Absolute level accuracy\(^{(1)}\) (CW), temperature range from +22 °C to +28 °C, ALC on, () = typical

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>+10 dBm or maximum specified power to -60 dBm</th>
<th>&lt; -60 dBm to -90 dBm</th>
<th>&lt; -90 dBm to -110 dBm</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 1 MHz to 12 MHz</td>
<td>&lt; ±1.5 dB (±0.5 dB)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>&gt; 12 MHz to 6 GHz</td>
<td>&lt; ±1.6 dB (±0.3 dB)</td>
<td>&lt; ±1.7 dB (±0.4 dB)</td>
<td>&lt; ±1.8 dB (±0.4 dB)</td>
</tr>
<tr>
<td>&gt; 6 MHz to 8.5 GHz</td>
<td>&lt; ±1.5 dB (±0.5 dB)</td>
<td>&lt; ±1.6 dB (±0.5 dB)</td>
<td>&lt; ±2.5 dB (±1 dB)</td>
</tr>
<tr>
<td>&gt; 8.5 GHz to 17 GHz</td>
<td>&lt; ±1.7 dB (±0.5 dB)</td>
<td>&lt; ±2.7 dB (±1.1 dB)</td>
<td>&lt; ±2.6 dB (±1.1 dB)</td>
</tr>
<tr>
<td>&gt; 17 GHz to 20 GHz</td>
<td>&lt; ±2.5 dB (±1 dB)</td>
<td>&lt; ±2.7 dB (±1.1 dB)</td>
<td>&lt; ±2.6 dB (±1.1 dB)</td>
</tr>
<tr>
<td>&gt; 20 GHz to 37 GHz</td>
<td>&lt; ±1.6 dB (±0.5 dB)</td>
<td>&lt; ±1.8 dB (±0.5 dB)</td>
<td>&lt; ±3.1 dB (±0.8 dB)</td>
</tr>
<tr>
<td>&gt; 37 GHz to 44 GHz</td>
<td>&lt; ±1.6 dB (±0.5 dB)</td>
<td>(±2 dB)</td>
<td>(±2 dB)</td>
</tr>
<tr>
<td>&gt; 44 GHz to 50 GHz</td>
<td>&lt; ±2.6 dB (±0.8 dB)</td>
<td>(±2 dB)</td>
<td>(±2 dB)</td>
</tr>
<tr>
<td>&gt; 50 GHz to 54 GHz</td>
<td>&lt; ±2.7 dB (±0.8 dB)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Absolute level accuracy\(^{(1)}\) (CW), temperature range from +22 °C to +28 °C, ALC off, () = typical

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>3GPP W-CDMA Test model 1 with 64 DPCH, 4 carrier</th>
<th>5G NR 8cc x 100 MHz (800 MHz), 256QAM, 120 kHz SCS, NRB = 66</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 MHz to 8.5 GHz</td>
<td>±0.4 dB (nom)</td>
<td>±0.8 dB (nom)</td>
</tr>
<tr>
<td>&gt; 8.5 GHz to 20 GHz</td>
<td>±0.5 dB (nom)</td>
<td>±1 dB (nom)</td>
</tr>
<tr>
<td>&gt; 20 GHz to 54 GHz</td>
<td>±1 dB (nom)</td>
<td>±1.5 dB (nom)</td>
</tr>
</tbody>
</table>

VSWR (meas)\(^{(2)}\)

<table>
<thead>
<tr>
<th>Options 506, 508</th>
<th>Options 514, 520</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>High power path</td>
</tr>
<tr>
<td>240 MHz to 6 GHz</td>
<td>1.8 (level ≥ +7 dBm)</td>
</tr>
<tr>
<td>6 GHz to 8.5 GHz</td>
<td>1.9 (level ≥ +1 dBm)</td>
</tr>
</tbody>
</table>

Amplitude switching speed\(^{(3)}\)

| -110 dBm to +15 dBm     | 2.8 ms (meas) |

---

11 When harmonic filters are enabled (selectable with option 1EH), specification ≤ 7.25 GHz is ±2.0 dB at all power levels. For frequencies <35 MHz specifications ≤ -70 dBm do not apply.

12 Harmonic filters not enabled (selectable with option 1EH). For CW operation; level range not valid when vector modulation is on.

13 Time from receipt of SCPI command to amplitude within 1 dB of final amplitude. For frequencies ≥ 10 MHz.
Phase linearity vs power (with vector modulation on)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Power range</th>
<th>Phase linearity vs power</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz to 10 GHz</td>
<td>+20 dBm to -80 dBm</td>
<td>1° RMS (nom)</td>
</tr>
<tr>
<td>&gt; 10 GHz to 20 GHz</td>
<td>+20 dBm to -80 dBm</td>
<td>2° RMS (nom)</td>
</tr>
<tr>
<td>&gt; 20 GHz to 54 GHz</td>
<td>+15 dBm to -18 dBm</td>
<td>3° RMS (nom)</td>
</tr>
</tbody>
</table>

Levelling modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALC on</td>
<td>Power leveling with internal temperature stabilized detector feedback loop</td>
</tr>
<tr>
<td>ALC off</td>
<td>Temperature compensated power control</td>
</tr>
<tr>
<td>Auto</td>
<td>Automatic selection of ALC on or off depending on instrument settings</td>
</tr>
</tbody>
</table>

Spectral Purity

Harmonics, measured using vector CW signal, temperature range from +22 °C to +28 °C

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Standard (+10 dBm)</th>
<th>Option 1EH (+5 dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz to &lt; 3.75 GHz</td>
<td>-30 dBc</td>
<td>-55 dBc</td>
</tr>
<tr>
<td>3.75 GHz to &lt; 5.5 GHz</td>
<td>-30 dBc</td>
<td>-50 dBc</td>
</tr>
<tr>
<td>5.5 GHz to &lt; 7.25 GHz</td>
<td>-30 dBc</td>
<td>-55 dBc</td>
</tr>
<tr>
<td>7.25 GHz to &lt; 15 GHz</td>
<td>-30 dBc17</td>
<td>-53 dBc</td>
</tr>
<tr>
<td>15 GHz to &lt; 21.6 GHz</td>
<td>-55 dBc</td>
<td>-55 dBc</td>
</tr>
<tr>
<td>21.6 GHz to 27 GHz</td>
<td>-55 dBc17</td>
<td>-55 dBc17</td>
</tr>
</tbody>
</table>

Non-harmonics, +10 dBm or maximum specified power, whichever is lower, temperature range from +22 °C to +28 °C

<table>
<thead>
<tr>
<th>Frequency</th>
<th>&gt; 300 Hz offset</th>
<th>Line-related (≤ 300 Hz offset)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 MHz to &lt; 7.25 GHz</td>
<td>-60 dBc</td>
<td>-57 dBc (typ)</td>
</tr>
<tr>
<td>7.25 GHz to &lt; 21.6 GHz</td>
<td>-50 dBc19</td>
<td>-48 dBc (typ)</td>
</tr>
<tr>
<td>21.6 GHz to &lt; 42.5 GHz</td>
<td>-50 dBc</td>
<td>-40 dBc (typ)</td>
</tr>
<tr>
<td>42.5 GHz to &lt; 50 GHz</td>
<td>-45 dBc</td>
<td>-38 dBc (typ)</td>
</tr>
<tr>
<td>50 GHz to 54 GHz</td>
<td>-40 dBc</td>
<td>-35 dBc (typ)</td>
</tr>
</tbody>
</table>

Fixed spurs with harmonic filters enabled (selectable with option 1EH), unless otherwise stated

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Level (constant over set power level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC – 1 MHz</td>
<td>-70 dBm (typ), present in all modes of operation</td>
</tr>
<tr>
<td>2.4 GHz</td>
<td>-70 dBm (typ)</td>
</tr>
<tr>
<td>3.6 GHz</td>
<td>-75 dBm (typ)</td>
</tr>
<tr>
<td>4.8 GHz</td>
<td>-75 dBm (typ)</td>
</tr>
<tr>
<td>8.4 GHz</td>
<td>-75 dBm (typ)</td>
</tr>
<tr>
<td>19.2 GHz</td>
<td>-100 dBm (typ)</td>
</tr>
</tbody>
</table>

Subharmonics

None

---

14 Power alignment is a routine that offsets initial ALC off factory calibration to be in line with local ambient temperature and provides sufficient range for ALC on leveling. It should be run at regular intervals or whenever the operating temperature changes more than ± 5 °C from the previous alignment temperature.

15 Performance is unspecified for harmonics beyond the specified frequency range. CW signal enabled with vector modulation. Specifications may degrade when vector modulation is not used.

16 Option 1EH cannot be combined with frequency options 506 or 508.

17 Standard harmonic specification applies ≤ +5 dBm between 7.25 GHz and 15 GHz. Standard harmonic specification applies ≤ 0 dBm between 21.6 GHz and 27 GHz. 1EH harmonic specification applies ≤ 0 dBm from 3.75 GHz to < 5.5 GHz and from 21.6 GHz to 27 GHz.

18 Excludes fixed spurs with harmonic filters enabled.

19 Performance may degrade in enhanced SNR mode. With harmonic filters enabled (selectable with option 1EH), specification applies at a maximum power of +5 dBm.
**Absolute SSB phase noise (CW in enhanced SNR mode at +10 dBm) (dBc/Hz) (Options ST6, 600), temperature range 22 to 28 °C, () = typical**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>1 Hz</th>
<th>10 Hz</th>
<th>100 Hz</th>
<th>1 kHz</th>
<th>10 kHz</th>
<th>100 kHz</th>
<th>1 MHz</th>
<th>10 MHz</th>
<th>100 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 MHz</td>
<td>-82  (-91)</td>
<td>-110 (-117)</td>
<td>-125 (-130)</td>
<td>-145 (-150)</td>
<td>-153 (-158)</td>
<td>-153 (-158)</td>
<td>-152 (-158)</td>
<td>-153 (-158)</td>
<td>-153 (-158)</td>
</tr>
<tr>
<td>1 GHz</td>
<td>-62  (-72)</td>
<td>-90  (-97)</td>
<td>-105 (-110)</td>
<td>-135 (-139)</td>
<td>-144 (-148)</td>
<td>-151 (-155)</td>
<td>-153 (-159)</td>
<td>-154 (-159)</td>
<td>-154 (-159)</td>
</tr>
<tr>
<td>2 GHz</td>
<td>-56  (-65)</td>
<td>-84  (-91)</td>
<td>-99  (-104)</td>
<td>-129 (-133)</td>
<td>-138 (-143)</td>
<td>-146 (-150)</td>
<td>-152 (-158)</td>
<td>-154 (-159)</td>
<td>-155 (-160)</td>
</tr>
<tr>
<td>3 GHz</td>
<td>-52  (-62)</td>
<td>-80  (-87)</td>
<td>-95  (-101)</td>
<td>-126 (-130)</td>
<td>-135 (-140)</td>
<td>-143 (-147)</td>
<td>-150 (-156)</td>
<td>-154 (-159)</td>
<td>-155 (-160)</td>
</tr>
<tr>
<td>6 GHz</td>
<td>-46  (-56)</td>
<td>-75  (-81)</td>
<td>-89  (-95)</td>
<td>-123 (-127)</td>
<td>-132 (-137)</td>
<td>-140 (-143)</td>
<td>-148 (-154)</td>
<td>-152 (-157)</td>
<td>-152 (-157)</td>
</tr>
<tr>
<td>10 GHz</td>
<td>-42  (-51)</td>
<td>-71  (-77)</td>
<td>-84  (-90)</td>
<td>-118 (-121)</td>
<td>-129 (-132)</td>
<td>-133 (-136)</td>
<td>-139 (-144)</td>
<td>-143 (-149)</td>
<td>-142 (-148)</td>
</tr>
<tr>
<td>20 GHz</td>
<td>-39  (-48)</td>
<td>-65  (-71)</td>
<td>-80  (-85)</td>
<td>-114 (-118)</td>
<td>-124 (-129)</td>
<td>-131 (-134)</td>
<td>-140 (-145)</td>
<td>-145 (-150)</td>
<td>-146 (-152)</td>
</tr>
<tr>
<td>30 GHz</td>
<td>-36  (-46)</td>
<td>-59  (-67)</td>
<td>-72  (-79)</td>
<td>-112 (-117)</td>
<td>-123 (-128)</td>
<td>-130 (-133)</td>
<td>-137 (-145)</td>
<td>-143 (-149)</td>
<td>-138 (-145)</td>
</tr>
<tr>
<td>40 GHz</td>
<td>-35  (-44)</td>
<td>-59  (-65)</td>
<td>-70  (-77)</td>
<td>-110 (-115)</td>
<td>-122 (-127)</td>
<td>-126 (-130)</td>
<td>-137 (-145)</td>
<td>-143 (-148)</td>
<td>-138 (-145)</td>
</tr>
<tr>
<td>50 GHz</td>
<td>-34  (-41)</td>
<td>-57  (-63)</td>
<td>-67  (-75)</td>
<td>-108 (-112)</td>
<td>-120 (-123)</td>
<td>-122 (-125)</td>
<td>-133 (-140)</td>
<td>-143 (-148)</td>
<td>-138 (-145)</td>
</tr>
<tr>
<td>54 GHz</td>
<td>-33  (-40)</td>
<td>-54  (-62)</td>
<td>-63  (-73)</td>
<td>-106 (-111)</td>
<td>-120 (-123)</td>
<td>-122 (-125)</td>
<td>-133 (-140)</td>
<td>-142 (-148)</td>
<td>-135 (-142)</td>
</tr>
</tbody>
</table>

**Absolute SSB phase noise (CW in enhanced SNR mode at +10 dBm) (dBc/Hz) (Options ST5, 500), temperature range 22 to 28 °C, () = typical**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>1 Hz</th>
<th>10 Hz</th>
<th>100 Hz</th>
<th>1 kHz</th>
<th>10 kHz</th>
<th>100 kHz</th>
<th>1 MHz</th>
<th>10 MHz</th>
<th>100 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 MHz</td>
<td>-80  (-83)</td>
<td>-99  (-101)</td>
<td>-119 (-122)</td>
<td>-140 (-144)</td>
<td>-150 (-155)</td>
<td>-153 (-158)</td>
<td>-152 (-158)</td>
<td>-153 (-158)</td>
<td>-153 (-158)</td>
</tr>
<tr>
<td>1 GHz</td>
<td>-60  (-63)</td>
<td>-78  (-81)</td>
<td>-99  (-102)</td>
<td>-124 (-127)</td>
<td>-137 (-140)</td>
<td>-142 (-144)</td>
<td>-152 (-157)</td>
<td>-154 (-159)</td>
<td>-153 (-159)</td>
</tr>
<tr>
<td>2 GHz</td>
<td>-54  (-57)</td>
<td>-73  (-76)</td>
<td>-93  (-96)</td>
<td>-119 (-121)</td>
<td>-131 (-134)</td>
<td>-136 (-138)</td>
<td>-149 (-153)</td>
<td>-154 (-159)</td>
<td>-153 (-159)</td>
</tr>
<tr>
<td>3 GHz</td>
<td>-51  (-54)</td>
<td>-69  (-72)</td>
<td>-90  (-92)</td>
<td>-115 (-117)</td>
<td>-128 (-130)</td>
<td>-132 (-134)</td>
<td>-146 (-150)</td>
<td>-153 (-158)</td>
<td>-153 (-159)</td>
</tr>
<tr>
<td>6 GHz</td>
<td>-44  (-48)</td>
<td>-62  (-66)</td>
<td>-83  (-86)</td>
<td>-109 (-111)</td>
<td>-121 (-124)</td>
<td>-125 (-127)</td>
<td>-140 (-144)</td>
<td>-152 (-156)</td>
<td>-152 (-157)</td>
</tr>
<tr>
<td>10 GHz</td>
<td>-40  (-43)</td>
<td>-58  (-61)</td>
<td>-79  (-82)</td>
<td>-105 (-107)</td>
<td>-118 (-120)</td>
<td>-122 (-124)</td>
<td>-134 (-139)</td>
<td>-142 (-147)</td>
<td>-140 (-147)</td>
</tr>
<tr>
<td>20 GHz</td>
<td>-34  (-37)</td>
<td>-52  (-55)</td>
<td>-73  (-76)</td>
<td>-99  (-101)</td>
<td>-112 (-114)</td>
<td>-116 (-118)</td>
<td>-130 (-135)</td>
<td>-143 (-148)</td>
<td>-143 (-150)</td>
</tr>
<tr>
<td>30 GHz</td>
<td>-29  (-33)</td>
<td>-48  (-51)</td>
<td>-69  (-72)</td>
<td>-95  (-97)</td>
<td>-108 (-111)</td>
<td>-113 (-115)</td>
<td>-127 (-132)</td>
<td>-139 (-145)</td>
<td>-136 (-143)</td>
</tr>
<tr>
<td>40 GHz</td>
<td>-27  (-31)</td>
<td>-46  (-49)</td>
<td>-67  (-70)</td>
<td>-93  (-95)</td>
<td>-106 (-108)</td>
<td>-110 (-112)</td>
<td>-125 (-129)</td>
<td>-140 (-145)</td>
<td>-137 (-144)</td>
</tr>
<tr>
<td>50 GHz</td>
<td>-26  (-29)</td>
<td>-43  (-47)</td>
<td>-65  (-68)</td>
<td>-91  (-93)</td>
<td>-104 (-107)</td>
<td>-108 (-111)</td>
<td>-123 (-127)</td>
<td>-139 (-144)</td>
<td>-138 (-144)</td>
</tr>
<tr>
<td>54 GHz</td>
<td>-26  (-29)</td>
<td>-43  (-46)</td>
<td>-63  (-66)</td>
<td>-89  (-92)</td>
<td>-102 (-105)</td>
<td>-106 (-109)</td>
<td>-121 (-126)</td>
<td>-138 (-143)</td>
<td>-135 (-141)</td>
</tr>
</tbody>
</table>
Measured SSB Phase Noise with Modulation (option ST6)

Measured Option ST5 vs. ST6 SSB Phase Noise at 10 GHz
# Pulse Modulation (Option PMR or PME)

Pulse modulation\(^{20}\), temperature range 22 to 28 °C, () = typ

<table>
<thead>
<tr>
<th>Pulse paths</th>
<th>Internal pulse generator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum pulse width ((T_w)) with duty cycle ≤ 50%, ALC on or off</td>
<td>Option PMR</td>
</tr>
<tr>
<td></td>
<td>Option PME</td>
</tr>
<tr>
<td>On/off ratio(^{21})</td>
<td>80 dB</td>
</tr>
<tr>
<td>Rise/fall times ((T_r) and (T_f)), ALC on or off</td>
<td>10 ns (6 ns)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level accuracy relative to CW</th>
<th>ALC state</th>
<th>ALC on</th>
<th>ALC off</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 MHz to 20 GHz</td>
<td>± 0.6 dB</td>
<td>± 0.5 dB</td>
<td></td>
</tr>
<tr>
<td>&gt; 20 GHz to 45 GHz</td>
<td>± 1 dB</td>
<td>± 0.7 dB</td>
<td></td>
</tr>
<tr>
<td>&gt; 45 GHz to 54 GHz</td>
<td>± 1.5 dB</td>
<td>± 1 dB</td>
<td></td>
</tr>
</tbody>
</table>

| Width compression | 100 MHz to 45 GHz | ± 2 ns |
| | > 45 GHz to 54 GHz | ± 3 ns |

| Video feed-through (\(V_f\)) | 100 MHz to < 1 GHz | < 50 mV p-p (< 25 mV p-p) |
| | ≥ 1 GHz to 54 GHz | < 25 mV p-p (< 12 mV p-p) |

| Pulse overshoot | 100 MHz to 45 GHz | < 10% |
| | > 45 GHz to 54 GHz | < 20% |

| External pulse input | No analog pulse inputs allowed |

---

20 Specifications apply for center frequencies > 100 MHz. Cannot be used in combination with vector modulation.
21 On/off ratio excludes spurs.
Internal pulse generator (Option PMR or PME)

Modes
- Square, free run, pulse train (Option 320, SCPI only), adjustable doublet, triggered

Square wave rate
(50 MHz)/k from 0.1 Hz to 25 MHz where k is an integer (nom)

Signal routing
- Pulse trigger input: Trig 1
- Pulse sync output: Event 1
- Pulse video output: Event 2

<table>
<thead>
<tr>
<th></th>
<th>Option PMR</th>
<th>Option PME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse period (PRI) (Tp)</td>
<td>Free run: 30 ns to 42 s</td>
<td>40 ns to 42 s</td>
</tr>
<tr>
<td></td>
<td>Triggered modes: 4.01 µs to 42 s</td>
<td>4.01 µs to 42 s</td>
</tr>
<tr>
<td>Pulse width (Tw)</td>
<td>Free run: 20 ns to 42 s – 10 ns</td>
<td>30 ns to 42 s – 10 ns</td>
</tr>
<tr>
<td></td>
<td>Triggered modes: -42 s – 10 ns to 42s – 30 ns</td>
<td>-42 s – 10 ns to 42s – 40 ns</td>
</tr>
<tr>
<td>Settable delay</td>
<td>Free run: 0 to 42s – 30 ns</td>
<td>0 to 42s – 40 ns</td>
</tr>
<tr>
<td></td>
<td>Triggered modes:</td>
<td></td>
</tr>
<tr>
<td>Sync trigger width</td>
<td>20 ns to 42 s – 10 ns</td>
<td>30 ns to 42 s – 10 ns</td>
</tr>
<tr>
<td></td>
<td>Number of pulse patterns: 2047</td>
<td>2047</td>
</tr>
<tr>
<td></td>
<td>On time range: 20 ns to 42 s – 10 ns</td>
<td>30 ns to 42 s – 10 ns</td>
</tr>
<tr>
<td></td>
<td>Off time range: 10 ns to 42 s – 20 ns</td>
<td>10 ns to 42 s – 30 ns</td>
</tr>
</tbody>
</table>

Pulse train generator (Option 320, SCPI only) 22
- Number of pulse patterns: 2047
- On time range: 20 ns to 42 s – 10 ns
- Off time range: 10 ns to 42 s – 20 ns

Analog Modulation

I/Q based analog modulation (N7642APPC)

This section describes the functionality provided by N7642APPC PathWave Signal Generation for I/Q based amplitude modulation. External inputs are not supported. See user documentation for additional details.

Amplitude modulation

<table>
<thead>
<tr>
<th>Waveform</th>
<th>Sine, dual-sine, triangle, ramp up, ramp down, square</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Rate</td>
<td>Sine: 1 Hz to (maximum baseband bandwidth / 2) 23</td>
</tr>
<tr>
<td></td>
<td>All other waveforms: 1 Hz to (maximum baseband bandwidth / 16) 23</td>
</tr>
<tr>
<td>AM Depth</td>
<td>0 to 100%</td>
</tr>
</tbody>
</table>

Frequency modulation

<table>
<thead>
<tr>
<th>Waveform</th>
<th>Sine, dual-sine, triangle, ramp up, ramp down, square</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM Rate</td>
<td>Sine: 1 Hz to (maximum baseband bandwidth / 4) 23</td>
</tr>
<tr>
<td></td>
<td>All other waveforms: 1 Hz to (maximum baseband bandwidth / 16) 23</td>
</tr>
<tr>
<td>FM Deviation</td>
<td>0 Hz to 50 MHz</td>
</tr>
</tbody>
</table>

Phase modulation

<table>
<thead>
<tr>
<th>Waveform</th>
<th>Sine, dual-sine, triangle, ramp up, ramp down, square</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM Rate</td>
<td>Sine: 1 Hz to (maximum baseband bandwidth / 4) 23</td>
</tr>
<tr>
<td></td>
<td>All other waveforms: 1 Hz to (maximum baseband bandwidth / 16) 23</td>
</tr>
<tr>
<td>PM Deviation</td>
<td>0 to 10 radians</td>
</tr>
</tbody>
</table>

LF output (Option AN1)

<table>
<thead>
<tr>
<th>Waveform</th>
<th>Sine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate range</td>
<td>0.1 Hz to 10 MHz</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 Hz</td>
</tr>
<tr>
<td>Frequency accuracy</td>
<td>Same as RF reference source (nom)</td>
</tr>
<tr>
<td>LF audio output</td>
<td>-5 V to 5 V peak into 50 Ω (nom)</td>
</tr>
</tbody>
</table>

22 Requires option PMR or PME.
23 See RF (I+Q) bandwidth table for available modulation bandwidth.
Vector Modulation (Options Bxx, Rxx)

Internal I/Q baseband generator adjustments

<table>
<thead>
<tr>
<th>Adjustments</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal I and Q offset</td>
<td>± 20% (0.1% resolution)</td>
</tr>
<tr>
<td>Internal I/Q quadrature angle</td>
<td>± 20° (0.001° resolution)</td>
</tr>
<tr>
<td>Internal I/Q gain balance</td>
<td>± 10 dB (0.001 dB resolution)</td>
</tr>
<tr>
<td>Internal I/Q time skew</td>
<td>± 33.33 ns (100 fs resolution)</td>
</tr>
<tr>
<td>I/Q common delay range</td>
<td>0 to 16.667 ns</td>
</tr>
<tr>
<td>I/Q common delay resolution</td>
<td>100 fs</td>
</tr>
</tbody>
</table>

I/Q baseband output (Option AN1 and DIQ)

<table>
<thead>
<tr>
<th>Type</th>
<th>Single ended (AN1), differential (DIQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output impedance</td>
<td>Single ended 50 Ω (nom)</td>
</tr>
<tr>
<td></td>
<td>Differential 100 Ω (nom)</td>
</tr>
<tr>
<td>Frequency range</td>
<td>DC to 1.2 GHz (nom) for each output (2.4 GHz composite IQ)</td>
</tr>
<tr>
<td>Common mode I/Q offset</td>
<td>± 1.5 V (50 µV resolution) (meas)</td>
</tr>
<tr>
<td>Differential mode I or Q offset</td>
<td>± 1.5 V (50 µV resolution) (meas)</td>
</tr>
</tbody>
</table>

| Single ended amplitude per port | Up to 200 MHz 1.9 Vp-p or 0.95 Vp into 50 Ω (nom) |
|                                | Up to 600 MHz 1.6 Vp-p or 0.8 Vp into 50 Ω (nom) |
|                                | Up to 1.2 GHz 1 Vp-p or 0.5 Vp into 50 Ω (nom)   |

| SFDR without harmonics (sine)  | 100 MHz or 1 GHz single tone at 500 mV -70 dBc (meas) |
| SFDR with harmonics (sine)     | 100 MHz single tone at 500 mV -60 dBc (meas)          |
| Noise floor                    | 1 GHz tone at 900 mV Vpeak, 10 MHz offset, measured on I channel output -155 dBC/Hz (meas) |

Figure 1. (Left) Measured IQ output, 100 MHz tone spectrum. (Right) Measured IQ output, 1 GHz tone spectrum.

Internal real-time complex digital I/Q filters

Factory channel corrections – corrects the linear phase and amplitude response of the RF outputs of the signal generator using factory calibration arrays.

Frequency response over available modulation bandwidth

<table>
<thead>
<tr>
<th>Center frequency</th>
<th>Amplitude</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 MHz to 21.6 GHz</td>
<td>±0.25 dB (meas)</td>
<td>±5° (meas)</td>
</tr>
<tr>
<td>&gt; 21.6 GHz to 35 GHz</td>
<td>±0.25 dB (meas)</td>
<td>±5° (meas)</td>
</tr>
<tr>
<td>&gt; 35 GHz to 54 GHz</td>
<td>±0.5 dB (meas)</td>
<td>±10° (meas)</td>
</tr>
</tbody>
</table>

24 See RF (I+Q) bandwidth table for available modulation bandwidth.
User defined automatic channel response correction and S-parameter de-embedding (N7653APPC)

Methods for fixture error removal
- Scatter parameters de-embedding/embedding files generated by a network analyzer or simulation
- Automatic channel response correction using a power sensor or spectrum analyzer (amplitude and phase correction)
- Scaler user flatness (absolute power correction)

Scatter parameters
- File format: .s2p, .csv
- Number of cascadeable calibration sets: 4

Automated channel response correction (512 taps)\(^\text{25}\)
- Recommended maximum amplitude for error correction: ± 5 dB across modulation bandwidth

User flatness
- File format: .uflat, .csv
- Entry modes: USB or LAN direct power meter control

Instrument nonlinear correction (N7653APPC)
- Improve the characteristics of the generated signal by digitally predistorting the waveform to reduce distortion components.

\(^{25}\) Automated routine uses power sensor to correct for linear phase and amplitude response of DUT (equalizer). See User Documentation for more details.
Internal Baseband Generator (Options Bxx, Rxx)

Definitions

Channel or port
The number of physical RF outputs.

Signal
By default, each channel can generate one signal (e.g., one waveform file). When option 8SG is included, each
channel can generate up to 8 signals, which are summed and played out of the single RF output.

Group
A group can contain 1 to 8 signals assigned to a channel.

Internal Baseband Generator (Options Bxx, Rxx)

<table>
<thead>
<tr>
<th>Channels</th>
<th>In phase (I), quadrature (Q)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAC resolution</td>
<td>14 bits</td>
</tr>
<tr>
<td>Waveform granularity</td>
<td>1 sample</td>
</tr>
<tr>
<td>Frequency offset</td>
<td>± half of maximum baseband bandwidth</td>
</tr>
<tr>
<td>Signal attenuation</td>
<td>0 to -100 dB</td>
</tr>
<tr>
<td>Sample rate resolution</td>
<td>10 µHz</td>
</tr>
<tr>
<td>Interpolated DAC rate</td>
<td>Fixed 3 GHz</td>
</tr>
</tbody>
</table>

RF (I + Q) bandwidth\(^27\) and sample rate

<table>
<thead>
<tr>
<th>Option</th>
<th>RF (I + Q) bandwidth (nom)</th>
<th>Sample rate (nom)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option B1X</td>
<td>160 MHz</td>
<td>200 MSa/s</td>
</tr>
<tr>
<td>Option B2X</td>
<td>250 MHz</td>
<td>300 MSa/s</td>
</tr>
<tr>
<td>Option B5X</td>
<td>500 MHz</td>
<td>600 MSa/s</td>
</tr>
<tr>
<td>Option R10</td>
<td>1 GHz</td>
<td>1.2 GS/s</td>
</tr>
<tr>
<td>Option R25</td>
<td>2.5 GHz</td>
<td>3 GS/s</td>
</tr>
</tbody>
</table>

RF (I + Q) bandwidth\(^27\) and sample rate, limited options

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Option R1E</th>
<th>Option R2E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RF (I + Q) bandwidth</td>
<td>Sample rate (nom)</td>
</tr>
<tr>
<td>10 MHz to &lt; 5.75 GHz</td>
<td>1 GHz</td>
<td>1.2 GS/s</td>
</tr>
<tr>
<td>5.75 GHz to &lt; 31.25 GHz</td>
<td>1 GHz</td>
<td>1.2 GS/s</td>
</tr>
<tr>
<td>31.25 GHz to &lt; 31.85 GHz</td>
<td>1 GHz</td>
<td>1.2 GS/s</td>
</tr>
<tr>
<td>31.85 GHz to 36.96 GHz</td>
<td>550 MHz</td>
<td>1.2 GS/s</td>
</tr>
<tr>
<td>&gt; 36.95 GHz to 37.55 GHz</td>
<td>1 GHz</td>
<td>1.2 GS/s</td>
</tr>
<tr>
<td>&gt; 37.55 GHz to &lt; 54 GHz</td>
<td>1 GHz</td>
<td>1.2 GS/s</td>
</tr>
</tbody>
</table>

Arbitrary waveform memory

| Maximum arbitrary waveform playback memory | Standard 256 MSa |
|                                            | Option M05 512 MSa |
|                                            | Option M10 1024 MSa |
|                                            | Option M20 2048 MSa |
|                                            | Option M40 4096 MSa |
| Maximum storage capacity including other user data | 32 GB shared with operating systems (nom) |

Waveform segments

| Segment length | 512 samples to maximum arbitrary waveform playback memory |
| Memory allocation blocking factor | 256 samples |

Waveform sequences

| Maximum number of segments per sequence | 65,280 |
| Maximum number of repetitions | \(^{29}\) |

\(^{26}\) When AWGN or CW Interferer are enabled, option 8SG provides 7 signals.

\(^{27}\) Lower edge of modulated signal is not recommended to extend below 10 MHz. Upper edge of modulated signal is not recommended to extend above 8.5 GHz (option 508), 21 GHz (option 520), or 54 GHz (option 554).

\(^{28}\) Waveforms with fewer samples will be repeated or extended as selected.

\(^{29}\) Sequence memory is shared with all signals on a channel. The consumption is non-uniform based on size of waveforms, trigger type, and nested sequences.
## Triggers

<table>
<thead>
<tr>
<th>Trigger types</th>
<th>Continuous, single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger sources</td>
<td>Trigger key, external, bus (LAN, GPIB), global trigger (option PCH)</td>
</tr>
<tr>
<td>Trigger modes</td>
<td>Continuous, Single Free run, trigger and run, reset and run</td>
</tr>
<tr>
<td>Trigger features</td>
<td>External trigger playback synchronization</td>
</tr>
<tr>
<td>Trigger delay range</td>
<td>0 to 41 s</td>
</tr>
<tr>
<td>Trigger delay resolution</td>
<td>333 ps</td>
</tr>
<tr>
<td>I/Q delay range</td>
<td>See Internal I/Q baseband adjustment generator section</td>
</tr>
<tr>
<td>I/Q delay resolution</td>
<td>See Internal I/Q baseband adjustment generator section</td>
</tr>
<tr>
<td>Trigger jitter</td>
<td>± 1.67 ns (1/300 MHz clock rate)</td>
</tr>
<tr>
<td>Trigger latency</td>
<td>7.945 µs to stop, 41.9533 µs to start of playback for sample rates &gt; 1.7 MSa/s</td>
</tr>
<tr>
<td>Trigger RF electrical latency</td>
<td>Variable depending on attenuator path and cabling</td>
</tr>
</tbody>
</table>

### Multi-channel baseband synchronization primary/secondary (Option PCH)

| Global trigger coarse delay range | 0 to 41 s |
| Global trigger coarse delay resolution | 10 ns |
| Global trigger jitter            | ± 10 ns (nom) relative to asynchronous external system trigger event |
| Channel-to-channel relative trigger repeatability | < ± 5 ps (nom) |

### Markers

Markers are defined in a segment during the waveform generation process. Markers can be routed to the external outputs. See User’s Documentation for more information.

| Marker polarity       | Positive |
| Number of markers     | 4 |
| Marker routing        | Event 1-3, Trig 1-3, Trig A-C, A/I/O 1-12 via aux connector |
| Marker to waveform jitter (event outputs) | < 52 ps (nom) (sample rate is a submultiple of 3 GHz) |
| Marker to waveform jitter (trigger outputs) | < 1.67 ns (nom) |
| Marker edge update rate | 1.67 ns |
| Marker combining (option 8SG) | Multiple markers can be combined on one output connector via an OR operation |

### AWGN (Option 403)

<table>
<thead>
<tr>
<th>Type</th>
<th>Real-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modes of operation</td>
<td>Standalone signal or digitally added to signals</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>1.6 Hz to maximum baseband bandwidth, 0.8 Hz resolution</td>
</tr>
<tr>
<td>Crest factor</td>
<td>Standalone signal 21.8 dB (nom) Digitally added to signals 18.5 dB (nom)</td>
</tr>
<tr>
<td>Randomness</td>
<td>Standalone signal 6 hours Digitally added to signals 194 years at 2.5 GHz bandwidth</td>
</tr>
<tr>
<td>Carrier-to-noise ratio</td>
<td>± 100 dB when added to signal</td>
</tr>
<tr>
<td>Carrier-to-noise ratio formats</td>
<td>C/N, Eb/No</td>
</tr>
</tbody>
</table>

### CW interferer (Option 403)

<table>
<thead>
<tr>
<th>Type</th>
<th>Real-time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modes of operation</td>
<td>Standalone signal or digitally added to signals</td>
</tr>
<tr>
<td>Power control</td>
<td>Absolute, relative to signal power</td>
</tr>
<tr>
<td>Frequency offset</td>
<td>± half of maximum baseband bandwidth</td>
</tr>
</tbody>
</table>

---

30 Contact Keysight for sample rates ≤ 1.7 MSa/s  
31 With option 8SG, each of the 8 signals can support independently tunable AWGN.  
32 When AWGN is enabled, option 8SG provides 7 signals.  
33 When CW interferer is enabled, option 8SG provides 7 signals.  
34 For maximum baseband bandwidth and sample rate, see RF (I+Q) bandwidth and sample rate.
**Multitone and single tone (N7621APPC)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Arbitrary waveform file</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of tones</td>
<td>Multitone mode 2 to 200001</td>
</tr>
<tr>
<td></td>
<td>Single tone mode(^{36}) 1</td>
</tr>
<tr>
<td>Tone spacing</td>
<td>100 Hz to Floor ([\text{maximum baseband bandwidth}^{36}] / [(\text{number of tones}) - 1] / 100) * 100</td>
</tr>
<tr>
<td>Phase (per tone)</td>
<td>Random, fixed (remote command only)</td>
</tr>
</tbody>
</table>

**Eight virtual signal generators (Option 8SG)**

| Combined signal sample rate | \(\leq 3\) GSa/s |
| Combined signal bandwidth  | \(\leq\) maximum baseband bandwidth\(^{36}\) |
| Individual signal sample rate | \(\leq\) maximum sample rate\(^{36}\) |
| Individual signal frequency offset | \(\pm\) half of maximum baseband bandwidth\(^{36}\) |
| Individual signal attenuation | 0 to -100 dB |

**Signal descriptor word streaming (including pulse descriptor word (PDW))\(^{37}\)**

**Option SDW**

SDW option enables agile control of frequency, amplitude, phase, time, and waveform inside the instantaneous bandwidth of the baseband. Each SDW (PDW) will address an IQ waveform segment or create the IQ in real time, including pulse modulation. The SDW packets can be streamed from a file or over LAN for dynamic long duration scenarios.

**Virtual channels**

Enables the simultaneous stream of SDW channels within IF bandwidth

| Option 2CH | Enables up to 2 simultaneous SDW streams |
| Option 4CH | Enables up to 4 simultaneous SDW streams |
| Option 8CH | Enables up to 8 simultaneous SDW streams |

---

\(^{35}\) Single tone generates a single CW tone at a specified offset to the channel’s RF frequency.

\(^{36}\) For maximum baseband bandwidth and sample rate, see RF (I+Q) bandwidth and sample rate.

\(^{37}\) Signal descriptor word streaming (SDW) and virtual channel options (2CH, 4CH, and 8CH) are controlled for export under the International Traffic in Arms Regulations (ITAR). A license from the U.S. Department of State is required prior to the export of these options from the United States.
## Error Vector Magnitude (EVM)

### EVM for 5G NR FR1 bands, -10 dBm to +5 dBm, Option ST6

<table>
<thead>
<tr>
<th>Frequency</th>
<th>100 MHz, 256QAM, 60 kHz SCS, NRB = 135</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 GHz</td>
<td>0.17% (meas)</td>
</tr>
<tr>
<td>4.5 GHz</td>
<td>0.21% (meas)</td>
</tr>
</tbody>
</table>

### EVM for 5G NR FR2 bands and IFs, -10 dBm to +5 dBm, Option ST6

<table>
<thead>
<tr>
<th>Frequency</th>
<th>100 MHz, 64QAM, 60 kHz SCS</th>
<th>400 MHz, 256QAM, 120 kHz SCS, NRB = 264</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 GHz</td>
<td>0.35% (meas)</td>
<td>0.63% (meas)</td>
</tr>
<tr>
<td>12 GHz</td>
<td>0.35% (meas)</td>
<td>0.63% (meas)</td>
</tr>
<tr>
<td>24 GHz</td>
<td>0.35% (meas)</td>
<td>0.63% (meas)</td>
</tr>
<tr>
<td>28 GHz</td>
<td>0.35% (meas)</td>
<td>0.63% (meas)</td>
</tr>
<tr>
<td>39 GHz</td>
<td>0.40% (meas)</td>
<td>0.71% (meas)</td>
</tr>
<tr>
<td>42 GHz</td>
<td>0.58% (meas)</td>
<td>0.79% (meas)</td>
</tr>
</tbody>
</table>

### EVM for WLAN, -10 dBm to 0 dBm, Option ST6

<table>
<thead>
<tr>
<th>Frequency</th>
<th>802.11be, 320 MHz, MCS13, 300 µs, Ch Estimation Seq Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 GHz</td>
<td>-50 dB (meas)</td>
</tr>
</tbody>
</table>

### Measured EVM performance vs. power

5G NR, FR2, 100 MHz, 64 QAM, 60 kHz SCS (option ST6)
Measured EVM performance vs. frequency
5G NR, FR2, 100 MHz, 64 QAM, 60 kHz SCS (option ST6)

Measured EVM performance vs. power
WLAN 802.11be, 320 MHz, MCS13, 300 µs, Ch Estimation Seq Only
Distortion Performance (Adjacent Channel Power Ratio)

3GPP LTE-FDD distortion performance, -10 dBm to +5 dBm\(^3\), \(\delta = \text{typ}\)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Offset(^\text{39})</th>
<th>10 MHz E-TM 1.1 QPSK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800 to 2200 MHz</td>
<td>Adjacent (10 MHz)</td>
<td>-64 dBc (-68 dBc)</td>
</tr>
<tr>
<td></td>
<td>Alternate (20 MHz)</td>
<td>-65 dBc (-68 dBc)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Options 506, 508</th>
<th>Options 514, 520, 532, 544, 554</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800 to 2200 MHz</td>
<td>-63 dBc (-67 dBc)</td>
<td>-63 dBc (-67 dBc)</td>
</tr>
</tbody>
</table>

5G NR FR1 bands distortion performance, -10 dBm to +5 dBm, Options 506, 508, 514, 520

Frequency | 100 MHz, 256QAM, 120 kHz SCS, NRB = 135 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.4 GHz</td>
<td>-56 dBc (meas)</td>
</tr>
</tbody>
</table>

5G NR FR2 bands and IFs distortion performance, -10 dBm to +5 dBm, Options 514, 520

<table>
<thead>
<tr>
<th>Frequency</th>
<th>100 MHz, 256QAM, 120 kHz SCS, NRB = 66</th>
<th>400 MHz, 256QAM, 120 kHz SCS, NRB = 264</th>
<th>8cc x 100 MHz (800 MHz), 256QAM, 120 kHz SCS, NRB = 66</th>
<th>14cc x 100 MHz (1.4 GHz), 256QAM, 60 kHz SCS, NRB = 66</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 GHz to 14 GHz</td>
<td>-53 dBc (meas)</td>
<td>-48 dBc (meas)</td>
<td>-47 dBc (meas)</td>
<td>-43 dBc (meas)</td>
</tr>
</tbody>
</table>

**Measured 10 MHz LTE E-TM 1.1 QPSK ACLR**

This is rms power. Convert from rms to peak envelope power with the following equation: PEP = rms power + crest factor (for example, 3GPP test model 1 with 64 DPCH has a crest factor 11.5 dB, therefore at +5 dBm rms, the PEP = 5 dBm + 11.5 dB = +16.5 dBm PEP).

ACPR measurement configuration: reference channel integration BW: 9.015 MHz, offset channel integration bandwidth: 9.015 MHz.
Remote Programming

Interfaces
GPIB (IEEE-488.2, 1987) with listen and talk, and 1000BaseT LAN interface

Control languages
SCPI version 1999.0

IEEE-488 functions
SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT0, C0, E2

Keysight IO libraries
Keysight’s IO Library Suite helps you quickly establish an error-free connection between your PC and instruments – regardless of the vendor. It provides robust instrument control and works with the software development environment you choose.

General Specifications

Environmental specifications and regulatory compliance (nom)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Operating</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>1 and 2-channel configurations (Opt. 001, 002)</td>
<td>5 to 50 °C</td>
</tr>
<tr>
<td></td>
<td>4-channel configurations (Opt. 004)</td>
<td>5 to 40 °C</td>
</tr>
<tr>
<td>Type tested maximum relative humidity</td>
<td>95% RH up to 40 °C, decreases linearly to 57% RH at 50 °C</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>3,000 m (Up to 10,000 feet approx.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,572 m (Up to 15,000 feet)</td>
<td></td>
</tr>
<tr>
<td>EMC</td>
<td>Complies with European EMC Directive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– IEC/EN 61326-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– CISPR Pub 11 Group 1, class A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– AS/NZS CISPR 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– ICES/NMB-001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This ISM device complies with Canadian ICES-001.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cet appareil ISM est conforme a la norme NMB-001 du Canada.</td>
<td></td>
</tr>
</tbody>
</table>

Environmental testing
Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation and end-use. Those stresses include but are not limited to temperature, humidity, shock, vibration, altitude and power-line conditions. Test methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.

Power requirements (nom)

<table>
<thead>
<tr>
<th>Number of channels</th>
<th>Maximum frequency</th>
<th>Power requirements</th>
<th>Typical power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Opt. 001)</td>
<td>6 GHz or 8.5 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 506 or 508)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>550 W</td>
</tr>
<tr>
<td></td>
<td>14 GHz or 20 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 514 or 520)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>600 W</td>
</tr>
<tr>
<td></td>
<td>31.8 GHz, 44 GHz, or 54 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 532, 544, or 554)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>800 W</td>
</tr>
<tr>
<td>2 (Opt. 001 and 002)</td>
<td>6 GHz or 8.5 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 506 or 508)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>750 W</td>
</tr>
<tr>
<td></td>
<td>14 GHz or 20 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 514 or 520)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>860 W</td>
</tr>
<tr>
<td></td>
<td>31.8 GHz, 44 GHz, or 54 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 532, 544, or 554)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>1200 W</td>
</tr>
<tr>
<td>4 (Opt. 001, 002, 003, and 004)</td>
<td>6 GHz or 8.5 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 506 or 508)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>1200 W</td>
</tr>
<tr>
<td></td>
<td>14 GHz or 20 GHz</td>
<td>100/120 VAC, 50/60/400 Hz, 1350 W Max</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(opt. 514 or 520)</td>
<td>220/240 VAC, 50/60 Hz, 2000W Max.</td>
<td>1500 W</td>
</tr>
</tbody>
</table>

40 From 40 °C to 50 °C, the maximum % relative humidity follows the line of constant dew point.
### M9484C physical specifications (nom)

<table>
<thead>
<tr>
<th>Weight</th>
<th>Configuration</th>
<th>One channel (001)</th>
<th>Two channels (002)</th>
<th>Four channels (004)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Options 506, 508</td>
<td></td>
<td>61.4 lbs.</td>
<td>66.0 lbs.</td>
<td>76.2 lbs.</td>
</tr>
<tr>
<td>Options 514, 520</td>
<td></td>
<td>63.0 lbs.</td>
<td>67.6 lbs.</td>
<td>77.8 lbs.</td>
</tr>
<tr>
<td>Options 532, 544, 554</td>
<td></td>
<td>64.5 lbs.</td>
<td>73.2 lbs.</td>
<td>-</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Height</th>
<th>Width with strap handles</th>
<th>Width without strap handles</th>
<th>Length including connectors and jumper cables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>194.6 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width with strap handles</td>
<td>461.5 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width without strap handles</td>
<td>444.3 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length including connectors and jumper cables</td>
<td>635.0 mm</td>
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<td></td>
<td></td>
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</tbody>
</table>

### V3080A physical specifications (nom)

| Weight | 0.62 kg |
| Dimensions | Height | 81 mm |
| Width | 48 mm |
| Length | 116 mm |

### Display (nom)

| Resolution | 1280 x 768 pixels |
| Size | 10.6 in (26.9 cm) diagonal |

### Data storage (nom)

| Internal | Removable solid-state drive (256 GB) |
| External | Supports USB 3.0/2.0 compatible memory devices |
### Related Literature

<table>
<thead>
<tr>
<th>Publication title</th>
<th>Publication number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M9484C VXG Configuration Guide</td>
<td>3121-1509EN</td>
</tr>
<tr>
<td>M9484C VXG Signal Generator Startup Guide</td>
<td>M9484-90001</td>
</tr>
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</table>

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