Agilent E8241A/44A/51A/54A
PSG Series
Performance Signal Generator

Product Overview

- Excellent phase noise performance
- High output power
- Superior specified level accuracy

The PSG series is ideally suited for design and test systems with high frequencies, wide bandwidths and complex modulation formats. Broadband component manufacturers can now quicken design time, simplify test, reduce measurement uncertainty, and streamline production by incorporating Agilent PSGs into their design and production cycles.

The PSG series provides 20 dBm at 20 GHz and 14 dBm at 40 GHz, eliminating the need for external amplifiers and reducing overall equipment and test costs during production test for MMDS, LMDS, point-to-point radios use microwave sources as LOs and to test converters, transceivers, ODU’s and radios.

Agilent’s PSG consists of two series. The microwave PSG – L Series is optimized to local oscillator (LO) needs at industry leading cost and performance. Agilent microwave PSG – A Series is optimized to meet analog modulation needs. Both series are available in 20 GHz and 40 GHz models.

Microwave Synthesized Signal Generators
250 kHz to 110 GHz
Microwave PSG – L Series

Optimized to meet your local oscillator (LO) needs

**Agilent E8241A** 250 kHz to 20 GHz
**Agilent E8244A** 250 kHz to 40 GHz

- Widest frequency range with 0.01 Hz frequency resolution
  - Standard 250 kHz to 20 GHz
  - 250 kHz to 40 GHz
- Highest power available
  - Standard +13 at 20 GHz
  - +9 at 40 GHz
  - Optional +20 at 20 GHz
  - +14 at 40 GHz
- Lowest phase noise
  - Standard –110 dBc at 20kHz offset at 10 GHz carrier
  - Optional –101 at 1 kHz offset at 10 GHz carrier
- Long warranty
  - 3-year standard and 5-year optional
- Excellent level accuracy
  - (0.7 & 0.9 dB)
- Digital sweep functions (list and step)
- Easy frequency extension to 110 GHz using Agilent’s 83550-Series mm-heads
- User flatness power correction
- No manual field service adjustments. All adjustments can be made with covers on.
- Extensive self-tests to quickly isolate instrument failures
Microwave PSG – A Series

Optimized to meet your analog modulation needs with all of the features of the PSG-L Series.

Agilent E8251A  250 kHz – 20 GHz
Agilent E8254A  250 kHz – 40 GHz

• DC synthesized FM
• Simultaneous AM/FM or ΦM/pulse with flexible input selection and additional LF output 0.5 Hz to 1 MHz
• Dual internal modulation generator with these waveforms; sine, square, triangle, positive and negative ramp, Gaussian noise, uniform noise, swept sine and dual sine up to 1 MHz rates.
• Pulse modulator with 80 dB on/off ratio with a 10 ns risetime (>3.2 GHz) for radar and EMC applications
• Internal pulse generation with free-run triggered doublet and gated modes

<table>
<thead>
<tr>
<th>Modes</th>
<th>AM Deviation</th>
<th>FM Deviation</th>
<th>ΦM Deviation</th>
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</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>Bandwidth dc to 10 MHz</td>
<td>Bandwidth dc to 100 kHz (1 MHz)</td>
<td></td>
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<tr>
<td>Linear (&gt;90%)</td>
<td>16 MHz at 20 GHz</td>
<td>160 radians at 20 GHz</td>
<td></td>
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<tr>
<td>Exponential (&gt;25 dB)</td>
<td>32 MHz at 40 GHz</td>
<td>320 radians at 40 GHz</td>
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<table>
<thead>
<tr>
<th>Internal pulse generator</th>
<th>14 MHz max PRF¹</th>
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<tbody>
<tr>
<td>Pulse modulation (&lt;3.2 GHz)</td>
<td>10 Hz to 1 MHz PRF</td>
</tr>
<tr>
<td>Pulse modulation (&gt;3.2 GHz)</td>
<td>10 Hz to 28 MHz PRF</td>
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</tbody>
</table>

¹ Pulse repetition frequency
The performance you demand

Reduce cost of test and simplify test configurations

High output power

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>20 GHz models</th>
<th>Option 1EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 kHz to 3.2 GHz</td>
<td>+13 to –20 dBm</td>
<td>+16 to –20 dBm</td>
</tr>
<tr>
<td>&gt;3.2 to 20 GHz</td>
<td>+13 to –20 dBm</td>
<td>+20 to –20 dBm</td>
</tr>
<tr>
<td>&gt;20 to 40 GHz</td>
<td>+9 to –20 dBm</td>
<td>+14 to –20 dBm</td>
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Wide output power range with optional step attenuator

<table>
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<tr>
<th>Frequency range</th>
<th>20 GHz models</th>
<th>Option 1EA</th>
</tr>
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<tbody>
<tr>
<td>250 kHz to 3.2 GHz</td>
<td>+11 to –135 dBm</td>
<td>+15 to –135 dBm</td>
</tr>
<tr>
<td>&gt;3.2 to 20 GHz</td>
<td>+11 to –135 dBm</td>
<td>+18 to –135 dBm</td>
</tr>
<tr>
<td>&gt;20 to 40 GHz</td>
<td>+7 to –135 dBm</td>
<td>+12 to –135 dBm</td>
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CW level accuracy with option 1E1 (dB)

Specifications apply over the 15 to 35 deg. C temperature range and are degraded typically 0.3 dB outside of that range.

The use of Type-N RF connectors above 18 GHz degrades specification typically by 0.2 dB. Level accuracy is not specified below -110 dBm.

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>&gt;+10 dBm</th>
<th>+10 to –10 dBm</th>
<th>–10 to –70 dBm</th>
<th>–70 to –90 dBm</th>
<th>–90 to –110 dBm</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 kHz to 2 GHz</td>
<td>±0.6 dBm</td>
<td>±0.6 dBm</td>
<td>±0.7 dBm</td>
<td>±0.8 dBm</td>
<td>±1.4 dBm</td>
</tr>
<tr>
<td>&gt;2 to 20 GHz</td>
<td>±0.8 dBm</td>
<td>±0.8 dBm</td>
<td>±0.9 dBm</td>
<td>±1.0 dBm</td>
<td>±1.7 dBm</td>
</tr>
<tr>
<td>&gt;20 to 40 GHz</td>
<td>±1.0 dBm</td>
<td>±0.9 dBm</td>
<td>±1.2 dBm</td>
<td>±2.0 dBm</td>
<td></td>
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The frequency coverage you need

Direct millimeter head interface for banded frequency solution to 110 GHz

The PSG series comes standard with a millimeter head interface that is compatible with Agilent’s 83550 series millimeter heads for coverage to 110 GHz. All four models of the PSG series with Option 1EA have enough power to drive millimeter heads directly which eliminates the need for an external amplifier.

The PSG series provides the extra power required eliminating the need for external amplifiers. The PSG series also provides the broad frequency coverage available with a microwave source. This reduces your need for an addition RF source to test at low frequencies. Both of these features simplify test setups and reduce costs.

Reduce test uncertainties and improve manufacturing yields

• Unparalleled level and amplitude accuracy
• User flatness correction
• Extended frequency coverage down to 250 kHz
• Frequency resolution (0.01 Hz)
• High output power

Agilent’s PSG series test reduces measurement uncertainty and improves overall throughput. The superior level accuracy of the PSG series (±0.7 dB) reduces test uncertainties and improves production throughput. The user flatness feature allows you to calibrate the instrument’s power to the input port of your device under test (DUT), at the frequencies you test, to help reduce uncertainties introduced by transmission lines. Extended frequency and resolution allow full characterization of your products. The high output power allows you to eliminate amplifiers and uncertainties and improve yields.
The phase noise performance you demand

Agilent’s PSG series can help you to test uncertainties with its improved phase noise performance. The standard products provide a 20 dB improvement at 10 kHz offset over the 8360 series. From 1 kHz out to 100 MHz offset. The PSG series offers a 2–5 improvement with a noise floor around 160 dBm.

Improved close to carrier performance

Option UNJ improves the time base and reference section, reducing close to carrier phase noise. It extends the improved performance at 10 kHz to less than 1 kHz offset.
The connectivity you need

Gain speed and throughput

Flexibility
The PSG series comes standard with a LAN connection that allows you to communicate with SCPI commands.

<table>
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<tr>
<th>Connectivity Speed</th>
<th>Speed</th>
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<tbody>
<tr>
<td>LAN</td>
<td>Ethernet 10 Base-T (~300KB/sec top)</td>
</tr>
<tr>
<td>RS-232</td>
<td>57600 baud</td>
</tr>
<tr>
<td>GPIB</td>
<td>~100KB/sec</td>
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Automation
The PSG series offers a flexible automation environment allowing you to reduce test time and reduce the cost of test

- Control the signal generator using SCPI commands. Or, gain the speed and connectivity advantage of the VXI Plug & Play Driver.
- Code execution via an external PC through LAN, GPIB, or RS-232.
- Develop code in languages: Visual Basic, Visual C++, Agilent-VEE, or LabView™.
- The power correction feature allows for automated user-flatness corrections to ensure calibration of power and frequency at any point in your list or step sweep

Easy to use interface
The PSG series has an easy-to-use, menu-driven user interface. The seven by three and an half inches display screen allows you to view up to 22 parameters at once. The information you need to know is easily found with extensive help files and online help.

Save/Recall allows you to save states and register for later use. This feature allows for easy and quick recall of test setups, frequency lists, and correction arrays.
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         (fax) (61 3) 9210 5947
Australia: (tel) 0 800 738 378
           (fax) 64 4 495 8950
Asia Pacific: (tel) (65) 375 8100
             (fax) (65) 836 0252

Warranty
Standard warranty is three years. Extended five year warranty is available with Option W50.