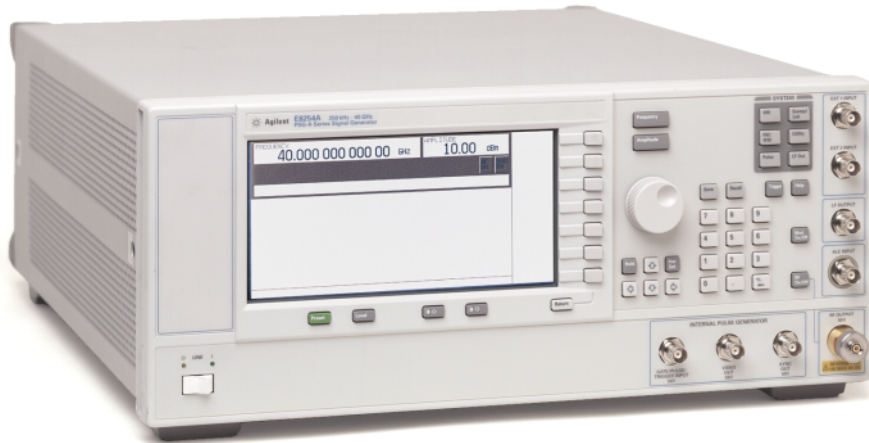


# Agilent E8241A/44A/51A/54A PSG Series Performance Signal Generator

## Product Overview

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



## Microwave Synthesized Signal Generators 250 kHz to 110 GHz

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 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

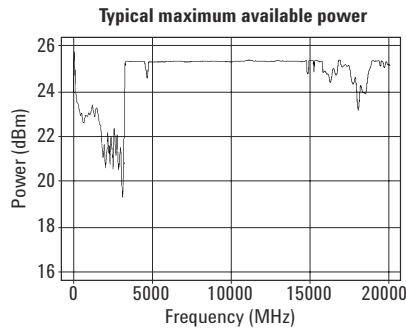
- DC synthesized FM
- Simultaneous AM/FM or  $\Phi$ M/pulse with flexible input selection and additional LF output 0.5 Hz to 1MHz
- Dual internal modulation generator with these waveforms; sine, square, triangle, positive and negative ramp, Gaussian noise, uniform noise, swept sine and dual sine up to 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

AM	FM	$\Phi$ M
Bandwidth 100 kHz (1 MHz)	Bandwidth dc to 10 MHz	Bandwidth dc to 100 kHz (1 MHz)
Modes	Deviation	Deviation
Linear (>90%)	16 MHz at 20 GHz	160 radians at 20 GHz
Exponential (>25 dB)	32 MHz at 40 GHz	320 radians at 40 GHz
Internal pulse generator	14 MHz max PRF <sup>1</sup>	
Pulse modulation (<3.2 GHz)	10 Hz to 1 MHz PRF	
Pulse modulation (>3.2 GHz)	10 Hz to 20 MHz PRF	

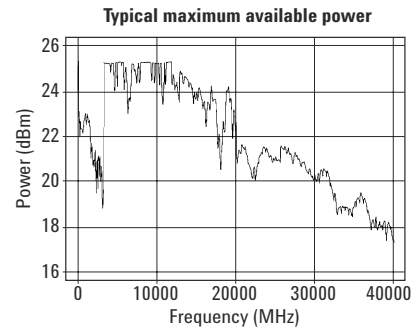
<sup>1</sup> Pulse repetition frequency

# The performance you demand

## Reduce cost of test and simplify test configurations



20 GHz models with option 1EA power versus frequency



40 GHz models with option 1EA power versus frequency

### High output power

Frequency range	20 GHz models		40 GHz models	
	Standard (dBm)	Option 1EA (dBm)	Standard (dBm)	Option 1EA (dBm)
250 kHz to 3.2 GHz	+13 to -20	+16 to -20	+9 to -20	+15 to -20
>3.2 to 20 GHz	+13 to -20	+20 to -20	+9 to -20	+18 to -20
>20 to 40 GHz			+9 to -20	+14 to -20

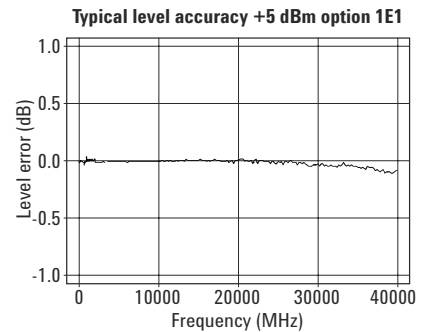
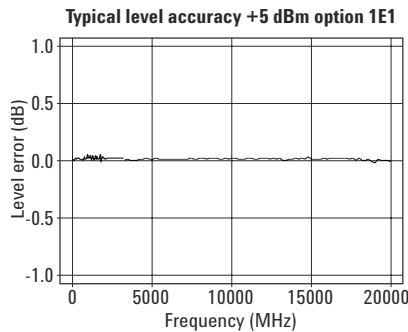
### Wide output power range with optional step attenuator

Frequency range	20 GHz models		40 GHz models	
	Standard (dBm)	Option 1EA (dBm)	Standard (dBm)	Option 1EA (dBm)
250 kHz to 3.2 GHz	+11 to -135	+15 to -135	+7 to -135	+14 to -135
>3.2 to 20 GHz	+11 to -135	+18 to -135	+7 to -135	+16 to -135
>20 to 40 GHz			+7 to -135	+12 to -135

### 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.

Frequency	>+10 dBm	+10 to -10 dBm	-10 to -70 dBm	-70 to -90 dBm	-90 to -110 dBm
250 kHz to 2 GHz	±0.6	±0.6	±0.7	±0.8	±1.4
>2 to 20 GHz	±0.8	±0.8	±0.9	±1.0	±1.7
>20 to 40 GHz	±1.0	±0.9	±1.2	±2.0	



## 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.



Option 1EA provides direct extension to millimeter frequencies without amplifiers.

### 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 ( $\pm 0.7$  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.



Directly manage the power meter from the source.

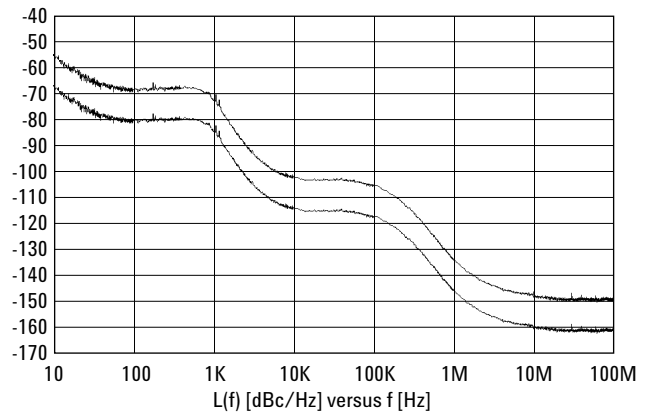
# The phase noise performance you demand

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.

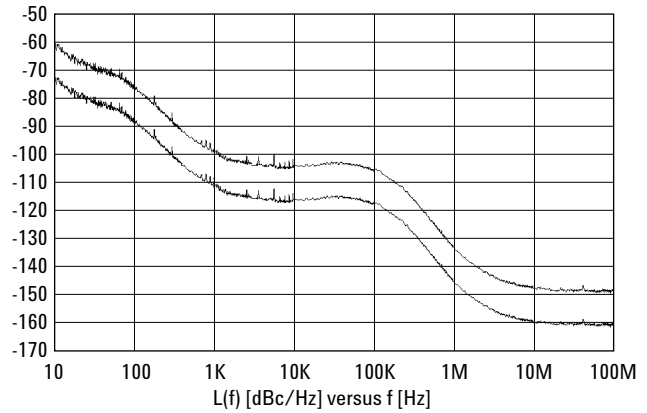
## Improved close to carrier performance

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.

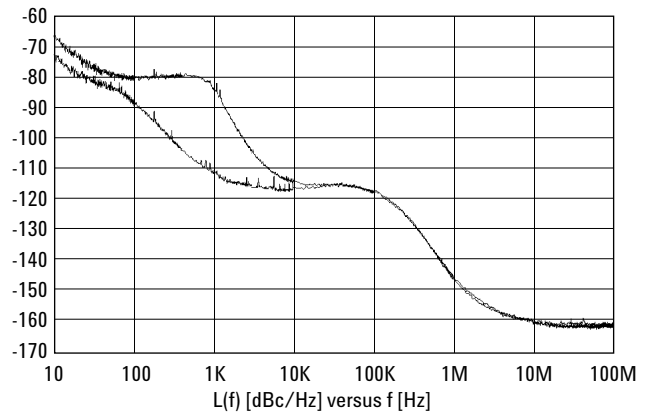
Standard typical performance at 10 GHz versus standard at 40 GHz from 10 Hz to 100 MHz



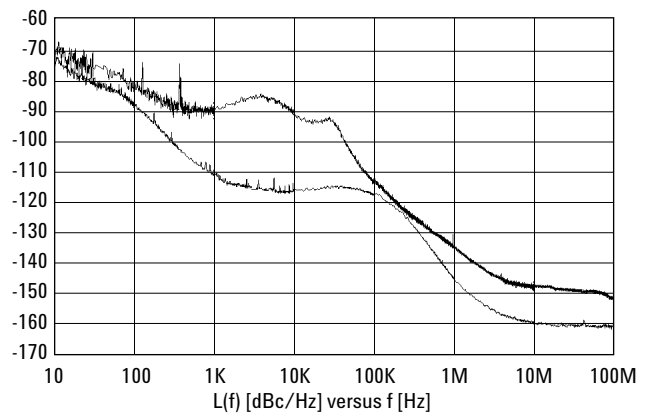
Option UNJ typical performance at 10 GHz and 40 GHz



Standard typical performance versus option UNJ at 10 GHz from 10 Hz to 100 MHz



Option UNJ typical performance versus 8360 at 10 GHz



# 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.

### Connectivity Speed

LAN	Ethernet 10 Base-T (~300KB/sec top)
RS-232	57600 baud
GPIB	~100KB/sec

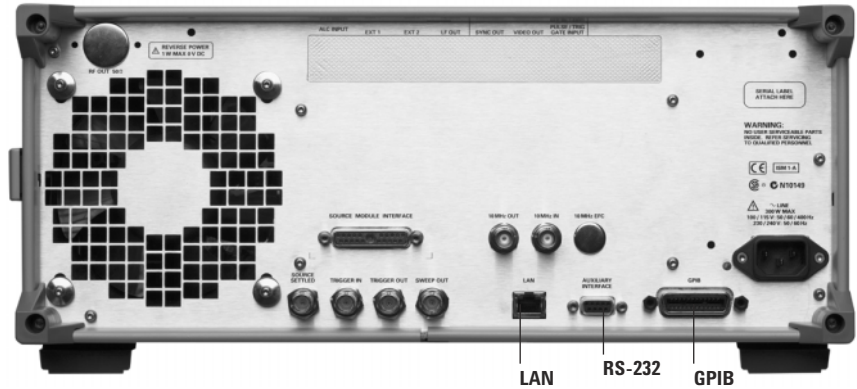
### Automation

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.



Rear panel of PSG series.

**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.**

FREQUENCY		40.000 000 000 00 GHz		AMPLITUDE		-135.00 dBm		AM Type		EXP	
								AM Path		I/B	
								AM		On	
								AM Depth		0.1 %	
								AM Source		(Internal 1)	
								AM Rate		400.0 Hz	
								More		(1 of 2)	
Modulation Status Information											
Mod	State	Depth/Dev	Source	Rate	Waveform						
AM 1	Off	0.1%	Internal1	400.0Hz	Sine						
AM 2	Off	0.1%	Internal1	400.0Hz	Sine						
AM I/B	Off	20.00dB/V	I Input								
FM 1	Off	1.0000kHz	Internal1	400.0Hz	Sine						
FM 2	Off	1.0000kHz	Internal1	400.0Hz	Sine						
GM 1	Off	0.000rad	Internal1	400.0Hz	Sine						
GM 2	Off	0.000rad	Internal1	400.0Hz	Sine						
LFDut	Off	0.000Vp	Internal1								
Pulse	Off	1.00us	Internal	2.00us	Free-Run						
Burst	Off		Ext1 DC								
I/Q	Off										

**Find out more go to:**  
[www.agilent.com/find/psg](http://www.agilent.com/find/psg)

### **Related Agilent literature**

*PSG Series Product Overview*  
literature number 5988-2411EN

*PSG Series Data Sheet*  
literature number 5988-2412EN

*PSG Series Product Note:  
User Flatness correction*  
literature number 5988-2410EN

*PSG Series Product Note:  
Self Guided Demo*  
literature number 5988-2414EN

*PSG Series Configuration Guide*  
literature number 5988-2413EN

*PSG Series Product Note:  
Millimeter Head*  
literature number 5988-2567EN

*PSG Series Product Note:  
Programming Conversion Guide*  
literature number 5988-2568EN

### **Warranty**

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

### **Agilent Technologies' Test and Measurement Support, Services, and Assistance**

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

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