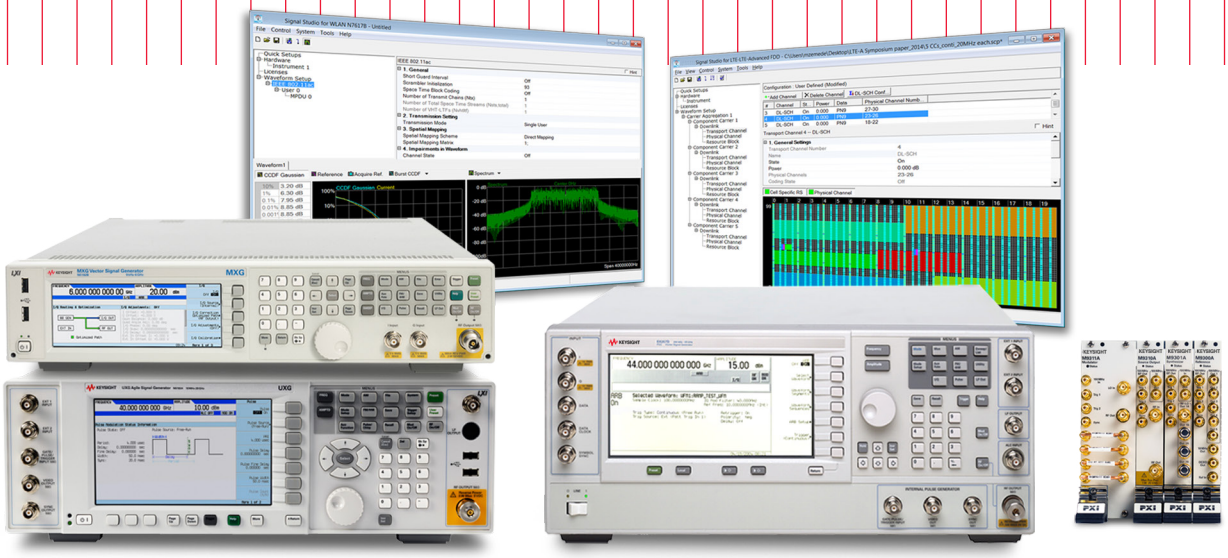
Keysight Technologies
Signal Generator Selection Guide



KEYSIGHT TECHNOLOGIES

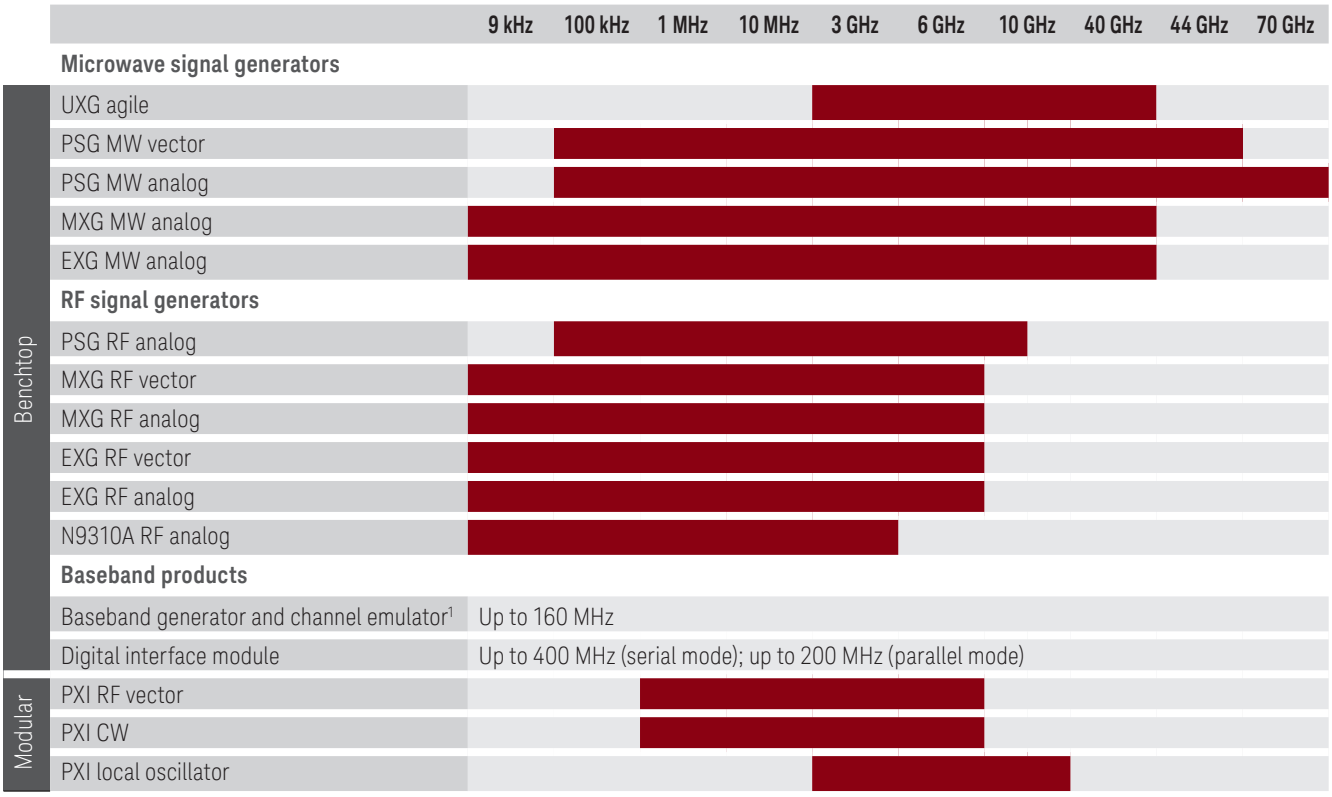
Introduction

Keysight Technologies, Inc. offers the widest selection of signal generators from baseband to 67 GHz, with frequency extensions to 1.1 THz. From basic to advanced functionality, each signal generator delivers benchmark performance in its class to address the requirements in design and manufacture of radio transceivers and their components; and applications ranging from low-frequency navigation signals, through cellular mobile radio, to millimeter wave radar, and satellite systems. Each offers synthesized frequency accuracy and stability, excellent calibrated level accuracy, and remote programmability.

Modulation capabilities vary from general-purpose AM, FM and digital I/Q to standard-specific formats such as GSM, W-CDMA, HSPA, LTE, LTE-Advanced, GPS, and WLAN. Keysight provides signal generators in multiple form factors, including benchtop and modular PXI.

This selection guide provides an overview and side-by-side comparisons to help you determine which signal generator is right for you. It is intended to supplement online selection tools available at www.keysight.com/find/sg.

Frequency coverage for Keysight signal generators



1. Additional high-performance baseband arbitrary waveform generators with up to 5 GHz analog bandwidth can be found at: www.keysight.com/find/arbs

Product Categories

Benchtop and modular PXI signal generators

Benchtop signal generators are well-suited for R&D or design verification, where analysis and troubleshooting benefit from interactive analysis. Benchtop models range from RF to microwave with a broad range of capabilities so you can select which generator best suites your needs.

Modular PXI signal generators are ideal for applications that require multi-channel measurement capabilities, fast measurement speed, and a small footprint. They also offer scalability and flexibility to configure solutions with a shared processor, chassis and other modular instruments. The PXI vector signal generator can be used with the same software applications as bench top signal generators, providing measurement consistency and compatibility throughout the product development cycle.

Vector signal generators

Vector signal generators or digital signal generators have a built-in I/Q modulator to upconvert complex modulation formats such as QPSK and 1024QAM. When combined with an IQ baseband generator, virtually any signal can be emulated and transmitted within the information bandwidth supported by the system.

Analog signal generators

Analog signal generators supply sinusoidal continuous wave (CW) signals with optional capability to add AM, FM, ΦM and pulse modulation. The maximum frequency range for analog signal generators spans from RF to microwave. Most generators feature step/list sweep modes for passive device characterization or calibration.

Agile signal generators

Agile signal generators are optimized for speed to quickly change frequency, amplitude, and phase of the signal. They also have the unique capability to be phase coherent at all frequencies, all of the time. This attribute, along with extensive pulse modulation and wideband chirp capabilities, is ideal for electronic warfare (EW) and radar applications.

Baseband generator and channel emulator

Baseband generators (BBG) output complex I/Q signals such as QPSK, and can have several modes of operation:

- Waveform playback mode to play repetitive signals for component testing
- Real-time mode to transmit non-repeating/dynamic signals for receiver test
- Digital IQ input or output mode to stimulate FPGAs, DACs or ADCs

Channel emulators are used to simulate the medium through which RF waves propagate. They can replicate multi-path and multi-channel fading for SISO or MIMO transceivers typically used to test the sensitivity, throughput or function of devices under test.

Signal creation software

Signal creation software products enable the generation of a wide range of application-specific test signals using vector signal generators. They can easily create signals to evaluate the performance of radio designs and the components that comprise them under various parametric and functional test conditions at baseband, RF and microwave frequencies. Keysight's Signal Studio software runs on a PC and embedded software runs directly on the signal generator.

Key Specifications Comparison– Agile and Vector Signal Generators

	Benchtop				Modular
Specifications	**UXG**	**PSG MW**	**MXG RF**	**EXG RF**	**PXI RF**
Model number	**N5193A**	**E8267D**	**N5182B**	**N5172B**	**M9381A**
Performance	*****	*****	****	***	****
Frequency range (min. to max.)	10 MHz to 40 GHz	100 kHz to 44 GHz	9 kHz to 6 GHz	9 kHz to 6 GHz	1 MHz to 6 GHz
Frequency switching (list mode)	370 ns	9 ms	800 µs	800 µs	< 10 to 240 µs
Sweep mode	Normal, list, fast CW	Step, list, ramp	Step, list	Step, list	Step, list
Output power (minimum)	-130 dBm	–130 dBm	–144 dBm	–144 dBm	–130 dBm
Output power (maximum; at 1 GHz)	+10 dBm	+22 dBm (at 20 GHz)	+24 dBm	+21 dBm	+19 dBm
Level accuracy (at 1 GHz)	±1.5 dB	± 0.8 dB (at 20 GHz)	± 0.6 dB	± 0.6 dB	± 0.4 dB
SSB phase noise (at 1 GHz; 20 kHz offset)	–144 dBc/Hz (at 10 kHz offset)	–143 dBc/Hz (at 10 kHz offset)	–146 dBc/Hz	–122 dBc/Hz	–122 dBc/Hz
Harmonics (at 1 GHz)	–50 dBc	–55 dBc	–35 dBc	–35 dBc	–34 dBc
Non-harmonics (at 1 GHz)	–70 dBc	–88 dBc	–96 dBc	–72 dBc	–70 dBc nominal
AM rate	DC to 10 MHz	DC to 100 kHz	DC to 50 kHz	DC to 50 kHz	6.2 MHz
FM deviation (maximum)	5% of carrier frequency or 600 MHz, whichever is less	1 to 128 MHz	1 to 16 MHz	2.5 to 40 MHz	1.24 MHz
PM phase deviation (maximum in normal mode)	5% of (carrier frequency)/(modulation frequency) or 600 MHz/(modulation frequency) or 12π, whichever is less	1 to 800 rad	0.5 to 8 rad	1.25 to 20 rad	10 rads
Narrow pulse width	10 ns	20 ns	20 ns	20 ns	20 ns
EVM (LTE)	N/A	0.8%	0.2%	0.2%	0.32%; 0.25% @ 900 MHz
ACPR (3GPP W-CDMA TM1 64 DPCH)	N/A	–64 dBc (16QAM, 10 GHz)	–73 dBc	–73 dBc	–70 dBc
Internal baseband generator RF BW	N/A	80 MHz	160 MHz	120 MHz	160 MHz
External I/Q modulator RF BW	N/A	Up to 2 GHz	Up to 200 MHz	Up to 200 MHz	N/A
Waveform playback memory	N/A	64 Msa	1024 Msa	512 Msa	1024 MSa
Baseband generator mode	N/A	Waveform playback and real-time IQ	Waveform playback and real-time	Waveform playback and real-time	Waveform playback
Phase coherent frequency switching	Standard	N/A	N/A	N/A	N/A
Wide chirp capability	10% of carrier frequency	N/A	N/A	N/A	N/A
Pulse descriptor word capability	Standard	N/A	N/A	N/A	N/A

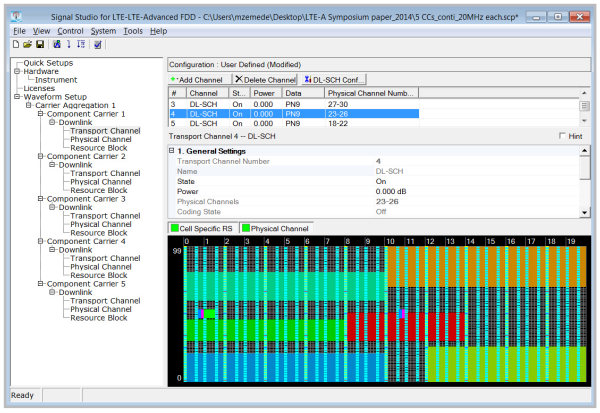
Key Specifications Comparison—Analog Signal Generators

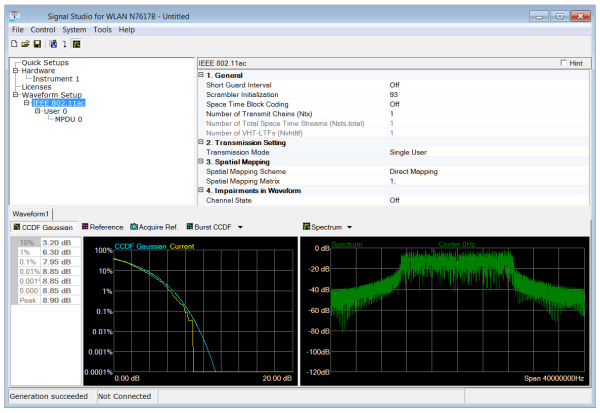
	Benchtop							Modular	
Specifications	**PSG MW**	**MXG MW**	**EXG MW**	**PSG RF**	**MXG RF**	**EXG RF**	**RF**	**PXI local oscillator**	**PXI CW source**
Model number	**E8257D**	**N5183B**	**N5173B**	**E8663D**	**N5181B**	**N5171B**	**N9310A**	**M9302A**	**M9380A**
Performance	*****	****	****	****	****	***	**	**	**
Frequency range (min. to max.)	100 kHz to 70 GHz	9 kHz to 40 GHz	9 kHz to 40 GHz	100 kHz to 9 GHz	9 kHz to 6 GHz	9 kHz to 6 GHz	9 kHz to 3 GHz	3 GHz to 10 GHz	1 MHz to 6 GHz
Frequency switching (list mode)	9 ms	600 µs	600 µs	9 ms	800 µs	800 µs	10 ms	500 µs	5 ms
Sweep mode	list, step, ramp	list, step	list, step	list, step, ramp	list, step	list, step	list, step	N/A	N/A
Output power (minimum)	–135 dBm	–130 dBm	–130 dBm	–135 dBm	–144 dBm	–144 dBm	–127 dBm	N/A	–130 dBm
Output power (at 1 GHz)	+26 dBm (at 20 GHz)	+20 dBm (at 20 GHz)	+20 dBm (at 20 GHz)	+23 dBm	+24 dBm	+21 dBm	+13 dBm	+16 dBm	+19 dBm
Level accuracy	± 0.8 dB (at 20 GHz)	± 0.7 dB (at 10 GHz)	± 0.7 dB (at 10 GHz)	± 0.6 dB	± 0.6 dB	± 0.6 dB	± 1.0 dB	± 2 dB	± 0.4 dB
SSB phase noise (1 GHz, 20 kHz offset)	–126 dBc/Hz (at 10 GHz, 10 kHz offset)	–124 dBc/Hz (at 10 GHz)	–101 dBc/Hz (at 10 GHz)	–143 dBc/Hz (at 10 kHz offset)	–146 dBc/Hz	–122 dBc/Hz	–95 dBc/Hz	–115 dBc/Hz (10 GHz, 10 kHz offset)	–122 dBc/Hz
Harmonics (at 1 GHz)	–55 dBc	–55 dBc (at 10 GHz)	–55 dBc (at 10 GHz)	–55 dBc	–35 dBc	–35 dBc	–30 dBc	–20 dBc	–29 dBc
Non-harmonics (at 1 GHz)	–88 dBc	–100 dBc	–72 dBc	–88 dBc	–96 dBc	–72 dBc	–50 dBc	–70 dBc	–70 dBc
AM rate	DC to 100 kHz	DC to 100 kHz	DC to 100 kHz	DC to 100 kHz	DC to 50 kHz	DC to 50 kHz	20 Hz to 20 kHz	N/A	N/A
FM deviation (maximum)	1 to 128 MHz	1 to 128 MHz	2.5 to 320 MHz	1 to 16 MHz	1 to 16 MHz	2.5 to 40 MHz	100 kHz	N/A	N/A
PM phase deviation (maximum, in normal mode)	1 to 1280 rad	0.5 to 64 rad	1.25 to 160 rad	1 to 160 rad	0.5 to 8 rad	1.25 to 20 rad	10 rad	N/A	N/A
Narrow pulse width	20 ns	20 ns	20 ns	20 ns	20 ns	20 ns	100 µs	N/A	N/A

Applications, Core Capabilities, and Software Comparison

	Benchtop			Modular	Benchtop					
Applications and signal creation software	**UXG**	**PSG MW**	**MXG and EXG RF**	**PXI RF**	**PSG MW**	**MXG and EXG MW**	**MXG and EXG RF**	**PSG RF**	**N9310 RF**	**PXB**
	Agile	**Vector**			**Analog**					**Baseband**
Instrument embedded capabilities										
USB power meter			●			●	●			
Step/list sweep	●	●	●	●	●	●	●	●	●	●
Ramp sweep		●			●			●		
AM, FM, PM, pulse	●	●	●	●	●	●	●	●	●	
LF function generator	●	●	●		●	●	●	●	●	
Real-time custom modulation (PSK, QAM, FSK)		●	●							
Phase noise impairments			●							
Multitone, NPR		●	●							
Noise (AWGN)		●	●							●
Pulse Train	●		●			●	●			
BERT			●							
SystemVue, MATLAB	●	●	●	●						●
Real-time fading										●
Signal Studio software										
Cellular communications										
LTE & LTE-Advanced FDD/TDD, W-CDMA/HSPA+, cdma2000®, 1xEV-DO, GSM/EDGE/Evo, TD-SCDMA		●	●	●						●
Wireless networking										
WLAN 802.11a/b/g/j/p/n/ac/ah, Mobile WiMAX™, *Bluetooth*®		●	●	●						●
Fixed WiMAX		●	●	●						
Audio/video broadcast										
DVB-T/H/T2/S/S2, DVB-C (J.83 Annex A/C), J.83 Annex B (DOCSIS DS), ISDB-T/Tmm, ATSC, ATCS-M/H, DTMB (CTTB), CMMB		●	●	●						●
T-DMB, DAB/DAB+/DMB-audio, FM stereo with RDS/RBDS			●	●						●
Detection, positioning, tracking, navigation										
Pulse building		●	●							
Multitone distortion, NPR		●	●							●
GPS, GLONASS, Galileo, Beidou, SBAS, QZSS		●	●	●						●
Wideband waveform center software										
Wireless HD, WiGig, 802.11ad		●								

Signal Studio Software





Simplify signal creation

Whether you are working on a single radio format or integrating multiple formats into a single device, easy access to the right test signals streamlines validation and helps ensure interoperability. Accelerate your work with Keysight Signal Studio software, a flexible suite of signal-creation tools that reduces the time you spend on signal simulation. Its performance-optimized reference signals, validated by Keysight, enhance the characterization and verification of your devices.

Configure Signal Studio to match your requirements:

- Choose basic or advanced levels of capability with scalable option structure
- Select the license type that fits your specific use case and budget, including fixed, transportable, and 5- or 50-pack waveforms
- Connect to a wide range of Keysight instruments

Leverage and customize built-in signals with flexible signal generation, additive impairments, graphs, convenient connectivity and automation, and embedded and online documentation. Control your vector signal generator directly from the software GUI and/or instrument front panel.

Connect your vector source to Signal Studio—and simplify signal creation.

Free Trial License

Free 30-day trials of Signal Studio software are available to evaluate the user interface and generate signals. Redeem a trial license online at **www.keysight.com/find/SignalStudio_trial**

General purpose
- Jitter injection
- Multitone, NPR
- Waveform download utility
- Power amplifier test
- Custom modulation

Cellular communications
- LTE & LTE-Advanced FDD/TDD
- W-CDMA/HSPA+, cdma2000, 1xEV-DO, GSM/EDGE/Evo, TD-SCDMA
- Test case manager

Wireless connectivity
- WLAN 802.11a/b/g/j/p/n/ac/ad/ah
- DFS
- Mobile WiMax, Fixed WiMax
- *Bluetooth*, *Bluetooth* Low Energy
- Wi-SUN 802.15.4g

Audio/video broadcasting
- DVB-T/H/T2/C/S/S2
- ATSC, ATSC-M/H, J.83B (DOCSIS)
- ISDB-T/TSB/TB/Tmm
- DTMB(CTTB), CMMB
- DAB/DAB+/DMB/T-DMB
- AM, FM, FM Stereo RDS/RBDS

Detection, positioning, tracking, and navigation
- Pulse building
- GPS, GLONASS, Galileo, Beidou, SBAS, QZSS, radar

www.keysight.com/find/SignalStudio

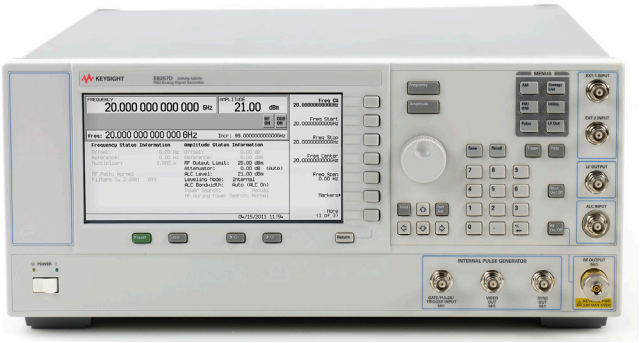
PSG Signal Generators

The PSG is the industry's most trusted microwave signal generator, with thousands of units deployed in hundreds of programs around the world. With metrology-grade performance and evolving capabilities across RF and microwave frequencies, it continues to enable new designs that stay ahead of emerging threats.

PSG microwave signal generator E8267D vector

- Test advanced receivers with realistic wideband radar, EW, and SATCOM waveforms up to 44 GHz
- Flexible, integrated 80 MHz AWG, real-time and base-band generator to simulate cellular, wireless, GPS and custom communications
- Exercise advanced EW, radar, and satellite systems with Signal Studio, a vector PSG, and a wideband AWG such as the Keysight M8190A for up to 2 GHz bandwidth
- Test phased-array systems and direction-finding receivers with multiple phase-coherent signals generated by linking up to 16 vector PSGs

www.keysight.com/find/E8267D



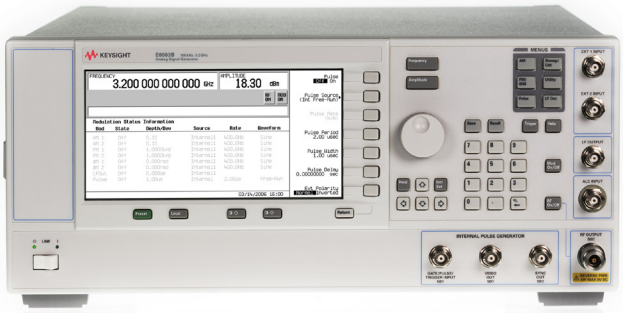
PSG microwave signal generator E8257D analog

- Meet test system needs across a wide range: 20, 31.8, 40, 50, and 67 GHz models available (add frequency extender modules to cover up to 1.1 THz)
- Test high-power devices and overcome test system losses with options capable of generating more than 1 W (+30 dBm) of output power
- Address the demanding needs of Doppler radar, ADC, and receiver-blocking tests with extremely low phase noise: -91 dBc/Hz at 100 Hz offset and –126 dBc/Hz at 10 kHz offset (10 GHz)
- Test your DUT with the highest quality signals—the PSG combines metrology-grade frequency and level accuracy with excellent distortion and spurious characteristics

www.keysight.com/find/E8257D

Key specifications	E8267D MW vector	E8257D MW analog
Frequency range (min. to max.)	100 kHz to 44 GHz	100 kHz to 70 GHz
Frequency switching	9 ms	9 ms
Output power (at 20 GHz)	+22 dBm	+26 dBm
Level accuracy	± 0.6 dB	± 0.6 dB
SSB phase noise (10 GHz; 10 kHz offset)	–126 dBc/Hz	–126 dBc/Hz
Harmonics	–55 dBc	–55 dBc
EVM (QPSK)	0.8%	N/A
ACPR (16 QAM)	–64 dBc	N/A
Internal baseband generator RF BW	80 MHz	N/A

PSG Signal Generator (continued)



PSG RF signal generator E8663D analog

The E8663D PSG RF analog signal generator provides the industry's lowest phase noise in a commercially-available signal generator. With optional analog modulation (AM, FM, ØM, and pulse) capability, superior level accuracy, and high output power, the E8663D is the right choice for demanding applications such as radar system development, satellite communications evaluation, or when a very low noise local oscillator or reference signal is needed. Built on the outstanding legacy of the 8663A, the E8663D delivers improved performance and is fully code-compatible with its predecessor for seamless upgrades to existing test systems. Enhanced narrow pulse modulation and high output power are optionally available.

www.keysight.com/find/E8663D

Key specifications	
Frequency range (min. to max.)	100 kHz to 9 GHz
Frequency switching	9 ms
Output power	+23 dBm
Level accuracy	± 0.6 dB
SSB phase noise (1 GHz; 10 kHz offset)	–143 dBc/Hz
Harmonics	–55 dBc

Millimeter Wave Accessories for the PSG Signal Generator

Millimeter wave sources are essential instruments for developing almost all millimeter-wave systems. Easily extend the frequency range of your E8257D or E8267D PSG signal generators with these multiplier modules from select partners.

Millimeter-wave source modules from OML, Inc.

The E8257DSxx-Series of external, frequency banded millimeter-wave source modules provide synthesized frequency performance, millimeter-wave test signals for waveguide bands from 50 to 500 GHz.

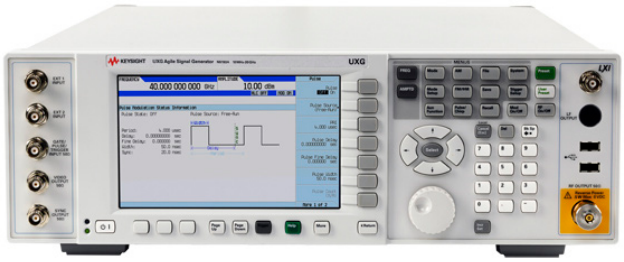
Signal generator frequency extension modules from VDI, Inc.

The E8257DVxx-Series of signal generator frequency extension modules provide high power, synthesized frequency performance millimeter-wave test signals for waveguide bands from 50 GHz to 1.1 THz.

www.keysight.com/find/sg_mmwave

X-Series Signal Generators

Crafted to create signals capable of testing your very best devices and designs, the X-Series signal generators offer industry-leading performance and low cost of ownership. A proven, scalable platform combined with cost-effective calibration and internal diagnostics allows you to buy the capabilities you need today and easily upgrade to meet future requirements.



UXG agile signal generator N5193A

The UXG agile signal generator creates realistic, multi-emitter threat simulations for EW test. Off the shelf, the UXG is a powerful building block as a dependable LO or a scalable threat simulator. By blurring the lines between analog and vector technologies, the UXG lowers the barrier between new intelligence and up-to-date signal scenarios.

Key specifications	N5193B UXG
Frequency range (min. to max.)	10 MHz to 20 GHz or 40 GHz
Frequency switching speed	370 ns
Frequency/amplitude/phase update speed	180 ns
Output power	–130 to +10 dBm
Harmonics	–50 dBc
Non-harmonics	–70 dBc
Phase noise	–126 dBc at 10 GHz, 10 kHz offset
Minimum pulse width	10 ns

- Using direct digital synthesis (DDS) and a Keysight-proprietary digital-to-analog converter (DAC), the UXG can update frequency, amplitude, and phase settings in as little as 180 ns, with built-in phase repeatability
- It is the first source to directly accept pulse descriptor words (PDWs), reducing test programming time by quickly generating long pulse trains while allowing individual pulse control
- The UXG can simulate advanced radar signals, generating pulses as narrow as 10 ns with 3 ns rise/fall times and an 90 dB on/off ratio and chirps as wide as 10 to 25 percent of the carrier frequency
- An optional attenuator provides 80 dB of agile amplitude changes and 120 dB of overall amplitude range to mimic antenna scan patterns

www.keysight.com/find/N5193A

X-Series Signal Generators (continued)

MXG microwave signal generator N5183B analog

The MXG is the pure and precise alternative to the analog PSG, with advantages in size and speed. It delivers the performance you need to perform module- and system-level testing—fast—in only two rack units.

- Meet test system needs up to 13, 20, 31.8, or 40 GHz
- Address demanding tests of radar modules and systems with best-in-class phase noise of ≤ 124 dBc/Hz (10 kHz offset) with –75 dBc spurious (at 10 GHz)
- Save space and maintain test rigor with near-PSG performance levels in just two rack units
- Accelerate your calibration process with best-in-class switching speed of less than 600 µs

www.keysight.com/find/N5183B

EXG microwave signal generator N5173B analog

The EXG is the cost-effective choice when you need to balance budget and performance. In just two rack units, it provides the essential signals that address parametric testing of broadband filters, amplifiers, receivers, and more.

- Perform basic LO upconversion or CW blocking with low cost coverage to 13, 20, 31.8, or 40 GHz
- Characterize broadband microwave components such as filters and amplifiers with the best combination of output power (+20 dBm at 20 GHz), low harmonics (≤ 55 dBc), and full step attenuation)
- Use as a high-stability system reference with standard high-performance OCXO at an aging rate of less than ± 5 x 10-10 parts per day
- Shrink your test stand with optional integrated multi-function generator and USB power sensor interface

www.keysight.com/find/N5173B

Key specifications	N5183B MXG microwave analog	N5173B EXG microwave analog
Frequency range (min. to max.)	9 Hz to 40 GHz	9 Hz to 40 GHz
Frequency switching	600 us	600 us
Output power (20 GHz)	+20 dBm	+ 20 dBm
Level accuracy (10 GHz)	± 0.7 dB	± 0.7 dB
SSB phase noise (10 GHz)	–124 dBc/Hz	–101 dBc/Hz
Harmonics (10 GHz)	–55 dBc	–55 dBc

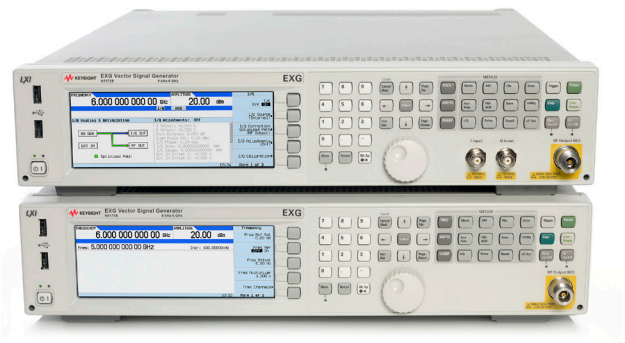
X-Series Signal Generators (continued)

MXG RF signal generators N5182B vector and N5181B analog

To help you reach better performance, the MXG X-Series vector and analog signal generators are fine-tuned to be your “golden transmitter” in R&D. Whether you’re pushing for a linear RF chain or an optimized link budget, the MXG delivers what you need: phase noise, ACPR, channel coding, and much more. Reveal the true performance of your devices and test your designs within and beyond their limits with the MXG.

- Test radar receiver sensitivity or characterize ADC with industry-leading phase noise
- Characterize nonlinear PA behavior with industry-leading ACPR and output power
- Test 802.11ac with < 0.4% EVM, or characterize multi-carrier PAs with < ± 0.2 dB flatness across 160 MHz bandwidth
- Go beyond standard application requirements with sophisticated real-time and waveform-based Signal Studio software

www.keysight.com/find/N5182B
www.keysight.com/find/N5181B



EXG RF signal generators N5172B vector and N5171B analog

To help you achieve faster throughput and greater uptime, the cost-effective EXG X-Series signal generators are optimized for manufacturing test. With analog and vector models, the EXG provides the signals you’ll need for basic parameter testing of components and functional verification of receivers. Get “just enough” test at the right price with the EXG.

- Maximize test margins on the production line with industry-leading ACPR
- Maximize throughput with < 800 µs simultaneous switching of frequency, power and waveform type
- Enable rapid, accurate tests using Signal Studio’s predefined, standards-based waveforms
- Shrink your test stand with two rack-unit height and integrated multi-function generator and USB power sensor interface

www.keysight.com/find/N5172B
www.keysight.com/find/N5171B

Key specifications	MXG RF vector N5182B	MXG RF analog N5181B	EXG RF vector N5172B	EXG RF analog N5171B
Frequency range (min. to max.)	9 kHz to 6 GHz	9 kHz to 6 GHz	9 kHz to 6 GHz	9 kHz to 6 GHz
Frequency switching	800 µs	800 µs	800 µs	800 µs
Output power	+24 dBm	+24 dBm	+21 dBm	+21 dBm
Level accuracy	± 0.6 dB	± 0.6 dB	± 0.6 dB	± 0.6 dB
SSB phase noise (1 GHz; 20 kHz offset)	–146 dBc/Hz	–146 dBc/Hz	–122 dBc/Hz	–122 dBc/Hz
Harmonics	–35 dBc	–35 dBc	–35 dBc	–35 dBc
EVM (LTE)	0.2%	N/A	0.2%	N/A
ACPR (3GPP W-CDMA TM1 64 DPCH)	–73 dBc	N/A	–73 dBc	N/A
Internal baseband generator RF BW	160 MHz	N/A	120 MHz	N/A

RF Analog Signal Generator

RF signal generator N9310A analog

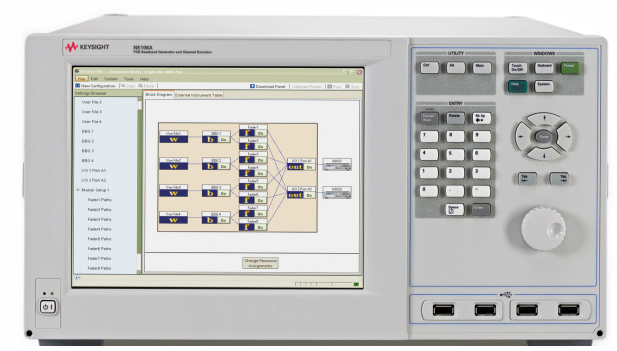
The N9310A is a general-purpose RF signal generator covering a frequency range from 9 kHz to 3 GHz. Ideal for manufacturing, education, and service maintenance, it delivers affordable, reliable performance. If your application only requires a simple continuous wave (CW) source, the N9310A RF signal generator provides just enough functionality at the lowest price.

- Optimized for low-cost consumer electronics manufacturing test, education, and service and repair
- Optional I/Q modulator 40 MHz bandwidth (ext. I/Q inputs only)
- USB interface, with flash memory support

www.keysight.com/find/N9310A

Key specifications	
Frequency range (min. to max.)	9 kHz to 3 GHz
Frequency switching	10 ms
Output power	+13 dBm
Level accuracy	± 1.0 dB
SSB phase noise (1 GHz; 20 kHz offset)	–95 dBc/Hz
Harmonics	–30 dBc

Baseband Generator and Interface Module



PXB baseband generator and channel emulator N5106A

The PXB lets you customize test cases and validate designs under real-world conditions with the broadest range of test parameters. Create fully-parameterized signals for established and evolving standards with Keysight Signal Studio. In addition, the PXB lets you model the signal-propagation environment with fully-parameterized, real-time channel emulation (fading). With the largest playback memory available, you can run longer test sequences to better approximate real-world signals. You can also capture signals up to 512 Msa from your own device for post processing.

With less instrumentation to manage, the PXB simplifies test setup. You need only one box for multi-format baseband generation, real-time fading and signal capture. With it, you can construct over 20 configurations to meet your test needs. These configurations, along with external instrument connections, can be redefined in seconds using the PXB user interface.

- Up to 160 MHz modulation and signal capture bandwidth
- 512 Msa playback and signal capture memory per channel
- Up to six BBGs and 16 faders for interference, diversity and MIMO test

www.keysight.com/find/N5106A

Digital signal interface module N5102A

The N5102A digital signal interface module provides fast and flexible digital inputs and outputs for the MXG and EXG X-Series vector signal generators, E8267D PSG vector signal generator and N5106A PXB baseband generator and channel emulator. In output mode, you can deliver realistic, complex-modulated signals such as LTE, HSPA, W-CDMA, GPS, WLAN, digital video, custom pulses, and many others directly to your digital devices and subsystems. In the input mode, the interface module ports your digital input to the signal generator's baseband system, providing a quick and easy way of upconverting to calibrated analog IF, RF, or µW frequencies.

In both operating modes, the interface module adapts to your device with the logic type, data format, clock features, and signaling you require. With its 3-meter extension cable and a selection of connector types, the interface module connects easily to your device, in most cases eliminating the need for custom fixtures.

- Up to 400 MHz in serial mode, 200 MHz in parallel mode
- Provision for internal, external, or device clocking
- Independent data input and output rates; adjustable clock phase and skew

www.keysight.com/find/N5102A

PXI Signal Generators

PXIe vector signal generator M9381A

Optimized for RF device design validation and manufacturing test environments, the M9381A PXI VSG delivers a combination of speed, performance, and multi-channel capability. Built on a flexible, scalable modular platform, the M9381A PXI VSG is the low-risk way to manage change and be ready for tomorrow—today.

- Fast amplitude and frequency switching to reduce test time
- Scalable platform fits up to 4 channels in one chassis, and 8 channels in multi-chassis configuration
- Channels time synchronized to within 1 ns and phase coherent to within 1 degree
- Up to 160 MHz RF bandwidth
- Easily integrate into test environments with IVI-COM, IVI-C, LabVIEW, and MATLAB drivers

www.keysight.com/find/M9381A

PXIe CW source M9380A

With high output power and accurate amplitude control, the M9380A PXIe CW source is a compact, cost-effective analog source, ideal for LO substitution, interference injection, and wireless component test. With fast PXI architecture and multiple drivers and programmatic interfaces, the M9380A is designed for high-speed automated test.

www.keysight.com/find/M9380A

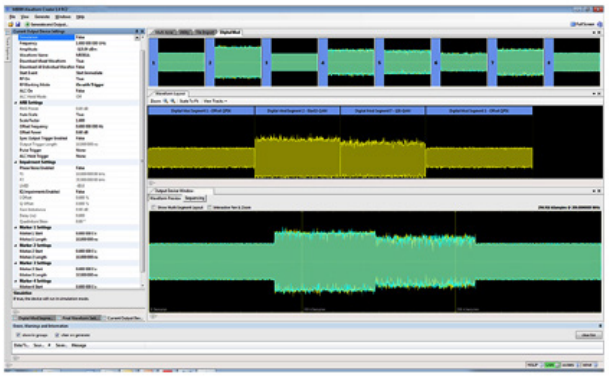
Keysight Quality and Support in PXI

Keep measurement quality while reducing your cost of ownership with Keysight's unique RF modular calibration and fast core exchange strategy. Keysight PXI signal generators are factory calibrated, shipped with ISO-9002, NIST traceable Cal certificate, and include a 3-year warranty.

www.keysight.com/find/pxi-vsg

Key specifications	M9381A PXIe vector	M9380A PXIe CW source
Frequency range (min. to max.)	1 MHz to 6 GHz	1 MHz to 6 GHz
Frequency switching	< 10 to 240 µs	5 ms
Output power (at 1 GHz)	+19 dBm	+19 dBm
Level accuracy	± 0.4 to 1 dB	± 0.4 to 1 dB
SSB phase noise (1 GHz; 20 kHz offset)	–122 dBc/Hz	–122 dBc/Hz
Harmonics	< –34 dBc	< –29 dBc
EVM (LTE)	0.32%	N/A
ACPR (3GPP W-CDMA TM1 64 DPCH)	–70 dBc	N/A
Internal baseband generator RF BW	160 MHz	N/A

PXI Signal Generators (continued)



PXI local oscillator M9302A

The M9302A PXI local oscillator (LO) is optimized for fast settling time to allow for fast frequency down conversion in aerospace and defense applications, such as radar and wideband signal capture, and in wireless communications applications. The M9302A is a two-slot 3U PXI VCO-based 3 GHz to 10 GHz LO. The fast switching time and low phase noise of this LO make it an ideal component of a microwave vector signal analyzer. When integrated in the Keysight M9392A PXI vector signal analyzer, then combined with 89600 VSA software, the M9302A provides a complete signal analyzer solution enabling analysis of communications, radar and avionics signals to 26.5 GHz in a modular open-system standard.

- ± 0.5 ppm frequency temperature stability (0 to 50 °C)
- 0.1 Hz tuning resolution
- PXI 2-slot 3U

www.keysight.com/find/M9302A

Key specifications	
Frequency range (min. to max.)	3 to 10 GHz
Frequency switching	1 ms
Output power	+16 dBm
Level accuracy	± 2 dB
SSB phase noise (10 GHz; 10 kHz offset)	–115 dBc/Hz
Harmonics	–20 dBc

Waveform Creator

The M9099 Waveform Creator is a software application focused on easy development of complex baseband and vector signals used in the validation and test of digital communications products. Built around a “drag and drop” graphical user interface, Waveform Creator allows quick development of multi-format, multi-track waveforms with waveform segments displaced in frequency and time. Its modularity supports multiple waveform types and VSG/AWG instruments to be plugged in, supporting expansion to include both current and future waveform types and instruments.

Waveform Creator options:
- Digital modulation
- DOCSIS 3.1
- SystemVue
- File-based write

www.keysight.com/find/m9099

Migrating from Legacy Signal Generators

Carefully planned instrument migration and modernization can maximize your test-system efficiency, performance, and readiness, while minimizing risk and potential disruptions, keeping you at the leading edge in the competitive marketplace. The Keysight PSG and X-Series signal generators are designed as evolutionary replacements to their in-class predecessors. Take advantage of their performance, flexibility, speed, and modern connectivity in replacing legacy Keysight signal generators.

PSG MW vector E8267D 100 kHz to 44 GHz	**PSG MW analog E8257D** 100 kHz to 70 GHz	**MXG/EXG MW analog N5183B/N5173B** 9 kHz to 40 GHz	**PSG RF analog E8663D** 100 kHz to 9 GHz	**MXG RF vector N5182B** 9 kHz to 6 GHz	**MXG RF analog N5181B** 9 kHz to 6 GHz	**EXG RF vector N5172B** 9 kHz to 6 GHz	**EXG RF analog N5171B** 9 kHz to 6 GHz
8780A E2500B	8340A/B 8341A/B 83620A/B 83622A/B 83623B/L 83624A/B 83630B/L 83640B/L 83650B/L 83711A/B 83712A/B 83731A/B 83732A/B 83751A/B 83752A/B	N5183A 8672A 8763A/B/C/D 8340A/B 8341A/B 83620A/B 83622A/B 83623B/L 83624A/B 83630B/L 83640B/L 83711A/B 83712A/B 83731A/B 83732A/B 83751A/B 83752A/B	8662A/B 8643A 8644B 8645A 8664A 8665A/B	E4438C ESG-DP Series E4434B E4435B E4436B E4437B	E4428C ESG-AP Series E4423B E4424B E4425B E4426B 8672A 8763A/B/C/D 8662A/B 8643A 8644B 8645A 8664A 8665A/B	N5182A ESG-D Series E4430B E4431B E4432B E4433B	N5181A ESG-A Series E4400B E4420B E4421B E4422B 8647A 8648A/B/C/D 8656B 8657A/B/D/J

Migrate to the X-Series RF signal generators
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www.lxistandard.org
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