Agilent E8247C/57C PSG CW and Analog Signal Generators

Data Sheet

All specifications and characteristics apply over a 0 to 55 °C range (unless otherwise stated) and apply after a 45 minute warm-up time. Supplemental characteristics, denoted as typical or nominal, provide additional (non-warranted) information.

PSG Signal Generators

	Option 520 250 kHz to 20 GHz	Option 540 250 kHz to 40 GHz
CW only	E8247C	E8247C
Analog	E8257C	E8257C
Vector	E8267C	

(See E8267C data sheet for PSG vector signal generator specifications)

Definitions

Specifications (spec): represent warranted performance.

Typical (typ): performance is not warranted. It applies at 25 °C. A minimum of 80% of all products meet typical performance.

Nominal (nom): values are not warranted. They represent the value of a parameter that is most likely to occur; the expected or mean value. They are included to facilitate the application of the product.

Standard (std): No options are included when referring to the signal generator unless noted otherwise.

Agilent Technologies

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Specifications

Frequency

Range[1]		
Option 520	250 kHz to 20 GHz	
Option 540	250 kHz to 40 GHz	
Resolution		
CW	0.001 Hz[2]	
All Sweep modes	0.01 Hz	
Accuracy	Aging rate ± temperature effects ± line voltage effects	
Switching speed[3]	< 12 ms (typical)	
Phase offset	Adjustable in nominal 0.1 ° increments.	
Frequency bands		
Band	**Frequency range**	**N #**
1	250 kHz to 250 MHz	1/8
2	> 250 to 500 MHz	1/16
3	> 500 MHz to 1 GHz	1/8
4	> 1 to 2 GHz	1/4
5	> 2 to 3.2 GHz	1/2
6	> 3.2 to 10 GHz	1
7	> 10 to 20 GHz	2
8	> 20 to 40 GHz	4
Internal timebase reference oscillator		
	Standard	**Option UNR**
Aging rate	< ±1 x 10^{-7}/year or < ±4.5 x 10^{-9}/day after 45 days	< ±3 x10^{-8}/year or < ±2.5 x 10^{-10}/day after 30 days
Temperature effects (typical)	< ±5 x 10^{-8} 0 to 55 °C	< ±4.5 x 10^{-9} 0 to 55 °C
Line voltage effects (typical)	< ±2 x 10^{-9} for +5% –10% change	< ±2 x 10^{-10} for ±10% change
External reference frequency	1, 2, 2.5, 5, 10 MHz (within 0.2 ppm)	10 MHz only (within 1 ppm)
Reference output		
Frequency	10 MHz	
Amplitude	> +4 dBm into 50 Ω load (typical)	
External reference input		
Amplitude	> –3 dBm	
Opt UNR	5 dBm ±5 dB[4]	
Input impedance	50 Ω (nominal)	

1. Useable to 100 kHz.
2. In ramp sweep mode (Option 007), resolution is limited with narrow spans and slow sweep speeds. Refer to ramp sweep specifications for more information.
3. To within 0.1 ppm of final frequency above 250 MHz or within 100 Hz below 250 MHz.
4. To optimize phase noise use 5 dBm ± 2 dB.

Digital sweep

Operating modes	Step sweep of frequency or amplitude or both (start to stop) List sweep of frequency or amplitude or both (arbitrary list)
Sweep range	
Frequency sweep	Within instrument frequency range
Amplitude sweep	Within attenuator hold range
Dwell time	1 ms to 60 s
Number of points	2 to 1601 (step sweep) 2 to 1601 per table (list sweep)
Triggering	Auto, external, single, or GPIB

Ramp (analog) sweep
(Option 007)[1]

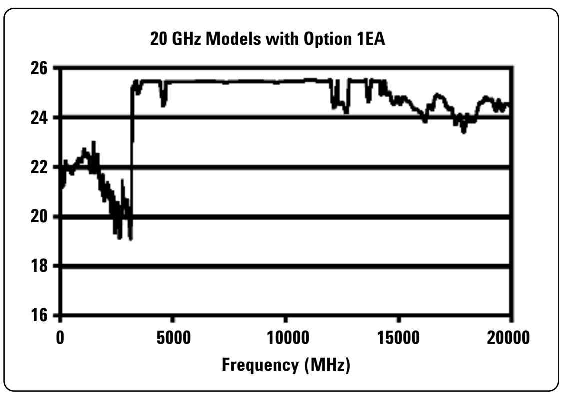
Operating modes	Synthesized frequency sweep (start/stop), (center/span), (swept CW)		
	Power (amplitude) sweep (start/stop)		
	Manual sweep RPG control between start and stop frequencies		
	Alternate sweep Alternates successive sweeps between current and stored states		
Sweep span range	Settable from minimum[2] to full range		
Maximum sweep rate	**Start frequency**	**Maximum sweep rate**	**Max span for 100ms sweep**
	250 kHz to < 0.5 GHz	25 MHz/ms	2.5 GHz
	0.5 to < 1 GHz	50 MHz/ms	5 GHz
	1 to < 2 GHz	100 MHz/ms	10 GHz
	2 to < 3.2 GHz	200 MHz/ms	20 GHz
	≥ 3.2 GHz	400 MHz/ms	36.8 GHz
Frequency accuracy	± 0.05% of span ± timebase (at 100 ms sweep time, for sweep spans less than maximum values given above) Accuracy improves proportionally as sweep time increases[3]		
Sweep time	(forward sweep, not including bandswitch and retrace intervals)		
Resolution	1 ms		
Manual mode	Settable 10 ms to 99 seconds		
Auto mode	Set to minimum value determined by maximum sweep rate and 8757D setting		
Triggering	Auto, external, single, or GPIB		
Markers	10 independent continuously variable frequency markers		
Display	Z-axis intensity or RF amplitude pulse		
Functions	M1 to center, M1/M2 to start/stop, marker delta		
Two-tone (master/slave) measurements[4]	Two PSG's can synchronously track each other, with independent control of start/stop frequencies		
Network analyzer compatibility	Fully compatible with Agilent 8757D scalar network analyzer[5] Also useable with Agilent 8757A/C/E scalar network analyzers for making basic swept measurements.[6]		

1. During Ramp sweep operation, AM and Pulse Modulation are useable but not specified; FM, Phase Modulation, Wideband AM and I/Q modulation are not useable.
2. Minimum settable sweep span is proportional to carrier frequency and sweep time. Actual sweep span may be slightly different than desired setting for spans less than [0.00004% of carrier frequency or 140 Hz] x [sweep time in seconds]. Actual span will always be displayed correctly.
3. Typical accuracy for sweep times > 100 ms can be calculated from the equation: [(0.005% of span)/(sweep time in seconds)] ± timebase. Accuracy is not specified for sweep times < 10 ms.
4. For Master/Slave operation use Agilent Technologies part #8120-8806 Master/Slave interface cable.
5. When measuring low-pass devices in AC mode, dynamic range may be reduced up to 10dB below 3.2 GHz
6. GPIB system interface is not supported with 8757A/C/E, only with 8757D. As a result, some features of 8757A/C/E, such as frequency display, pass-through mode, and alternate sweep, do not function with PSG signal generators.

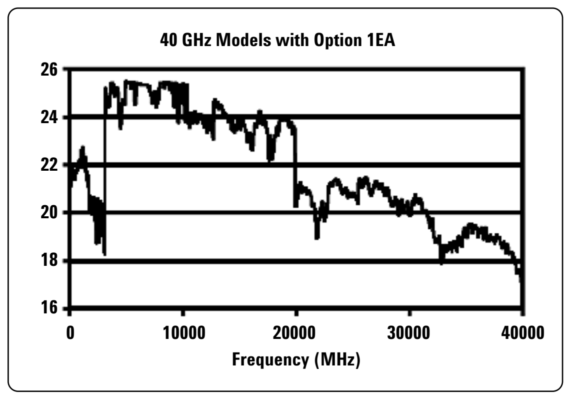
Output

Power[1] (dBm)		
Frequency range	**Standard**	**Option 1EA**
20 GHz models		
250 kHz to 3.2 GHz	–20 to +13	–20 to +16
250 kHz to 3.2 GHz (with Option 1E6)	–20 to +13	–20 to +13
> 3.2 to 20 GHz	–20 to +13	–20 to +20
40 GHz models		
250 kHz to 3.2 GHz	–20 to +9	–20 to +15
250 kHz to 3.2 GHz (with Option 1E6)	–20 to +9	–20 to +12
> 3.2 to 20 GHz	–20 to +9	–20 to +18
> 20 to 40 GHz	–20 to +9	–20 to +14
20 GHz models with step attenuator (Option 1E1)		
250 kHz to 3.2 GHz	–135 to +11	–135 to +15
250 kHz to 3.2 GHz (with Option 1E6)	–135 to +11	–135 to +12
> 3.2 to 20 GHz	–135 to +11	–135 to +18
40GHz models with step attenuator (Option 1E1)		
250 kHz to 3.2 GHz	–135 to +7	–135 to +14
250 kHz to 3.2 GHz (with Option 1E6)	–135 to +7	–135 to +11
> 3.2 to 20 GHz	–135 to +7	–135 to +16
> 20 to 40 GHz	–135 to +7	–135 to +12
Step attenuator	0 dB and 5 to 115 dB in 10 dB steps[3] (Option 1E1)	

20 GHz models with Option 1EA
Measured maximum available power



40 GHz models with Option 1EA
Measured maximum available power



Attenuator hold range	(Same as max power sweep range)
Minimum	From –20 dBm to maximum specified output power with step attenuator in 0 dB position. Can be offset using Option 1E1 attenuator.
Amplitude switching speed[2]	
CW or analog modulation	< 5 ms (typical)
When using power search	< 25 ms (typical)

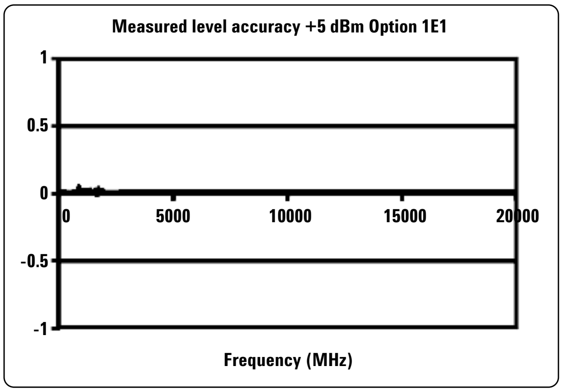
Level accuracy[3] (dB)			
Frequency	**> +10 dBm**	**+10 to –10 dBm**	**–10 to –20 dBm**
250 kHz to 2 GHz	±0.6	±0.6	±1.4
2 GHz to 20 GHz	±0.8	±0.8	±1.2
> 20 to 40 GHz	±1.0	±0.9	±1.3

1. Maximum power specification is warranted from 15 to 35º C, and is typical from 0 to 15º C. Maximum power over the 35 to 55º C range typically degrades less than 2 dB.
2. To within 0.1 dB of final amplitude within one attenuator range
3. Specifications apply in CW and List/Step sweep modes over the 15 to 35º C temperature range. Degradation outside this range, for power levels > –10 dBm, is typically < 0.3 dB. In Ramp sweep mode (with Option 007), specifications are typical. For instruments with Type-N connectors (Option 1ED), specifications are degraded typically 0.2 dB above 18 GHz.

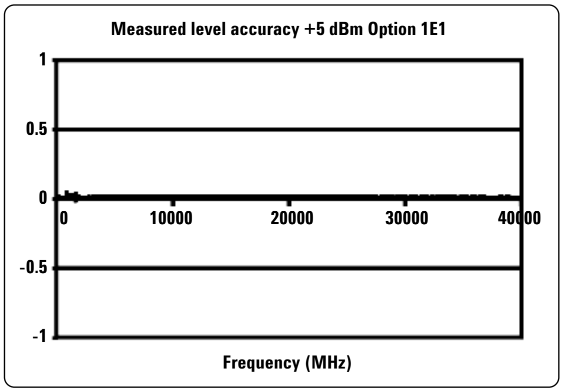
Level accuracy with step attenuator[1] (dB)

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	±1.0	±2.0	

20 GHz level accuracy



40 GHz level accuracy



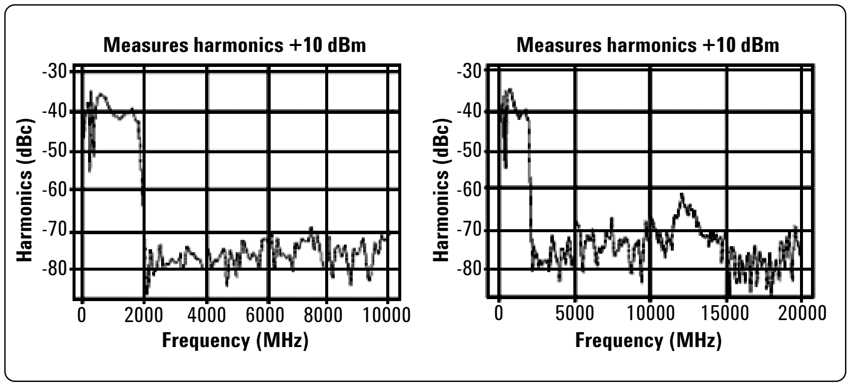
Resolution	0.01 dB
Temperature stability	0.01 dB/°C (typical)
User flatness correction	
Number of points	2 to 1601 points/table
Number of tables	Up to 10,000, memory limited
Path loss	Arbitrary, within attenuator range
Entry modes (user edit/view)	Remote power meter[2], remote bus, manual
Output impedance	50 Ω (nominal)
SWR (internally leveled) (typical)	
250 kHz to 2 GHz	< 1.4:1
> 2 GHz to 20 GHz	< 1.6:1
> 20 GHz to 40 GHz	< 1.8:1
Leveling modes	Internal leveling, external detector leveling, millimeter source module, ALC Off
External detector leveling	
Range	–0.2 mV to –0.5 V (nominal) (–36 dBm to +4 dBm using Agilent 33330D/E detector)
Bandwidth	10 kHz (typical) (Note: not intended for pulsed operation)
Maximum reverse power	1/2 Watt (nominal)

1. Specifications apply in CW and List/Step sweep modes over the 15 to 35º C temperature range, with attenuator hold off (normal operating mode). Degradation outside this range, for ALC power levels > –10 dBm, is typically < 0.3 dB. In Ramp sweep mode (with Option 007), specifications are typical. For instruments with type-N connectors (Option 1ED), specifications are degraded typically 0.2 dB above 18 GHz. Level accuracy is not specified below –110 dBm.
2. Compatible with Agilent Technologies EPM Series (E4418B and E4419B) power meters.

Spectral purity

Harmonics [1]	(dBc at +10 dBm or maximum specified output power, whichever is lower)
< 1 MHz	–28 dBc (typical)
1 MHz to 2 GHz	–28 dBc
> 2 GHz to 20 GHz	–55 dBc
> 20 GHz to 40 GHz	–50 dBc (typical)

20 GHz measured harmonics . . . . .40 GHz measured harmonics



Sub-harmonics [2]	(dBc at +10 dBm or maximum specified output power, whichever is lower)	
250 kHz to 10 GHz	None	
> 10 GHz to 20 GHz	< –60 dBc	
> 20 GHz to 40 GHz	< –50 dBc	
Non-harmonics	(dBc at +10 dBm or maximum specified output power, whichever is lower, for offsets > 3 KHz [> 300 Hz with Option UNR]) [3]	
Frequency	**Spec**	**Typical**
250 kHz to 250 MHz	–65	–72 for > 10 kHz offsets
> 250 MHz to 1 GHz	–80	–88
> 1 to 2 GHz	–74	–82
> 2 to 3.2 GHz	–68	–76
> 3.2 to 10 GHz	–62	–70
> 10 to 20 GHz	–56	–64
> 20 to 40 GHz	–50	–58
SSB phase noise (CW)	Offset from Carrier (dBc/Hz)	
Frequency	**20 kHz**	**20 kHz (typical)**
250 kHz to 250 MHz	–130	–134
> 250 to 500 MHz	–134 [4]	–138
> 500 MHz to 1 GHz	–130	–134
> 1 to 2 GHz	–124	–128
> 2 to 3.2 GHz	–120	–124
> 3.2 to 10 GHz	–110	–113
> 10 to 20 GHz	–104	–108
> 20 to 40 GHz	–98	–102

1. Specifications for harmonics beyond maximum instrument frequencies are typical.
2. Specifications for sub-harmonics beyond maximum instrument frequencies are typical.
3. Performance is typical for spurs at frequencies above the maximum operating frequency of the instrument. Specifications apply for CW mode only. Performance typically is –60 dBc between 200 and 250 MHz.
4. For instruments with serial number prefixes below MY4330 or US4330, the specification is –136 dBc/Hz.

Frequency	Option UNR: Enhanced SSB phase noise (CW) Offset from carrier (dBc/Hz) 100 Hz spec (typical)	1 kHz spec (typical)	10 kHz spec (typical)	100 kHz spec (typical)
250 kHz to 250 MHz	–94 (–115)	–110 (–123)	–128 (–132)	–130 (–133)
> 250 to 500 MHz	–100 (–110)	–124 (–130)	–132 (–136)	–136 (–141)
> 500 MHz to 1 GHz	–94 (–104)	–118 (–126)	–130 (–135)	–130 (–135)
> 1 to 2 GHz	–88 (–98)	–112 (–120)	–124 (–129)	–124 (–129)
> 2 to 3.2 GHz	–84 (–94)	–108 (–116)	–120 (–125)	–120 (–125)
> 3.2 to 10 GHz	–74 (–84)	–98 (–106)	–110 (–115)	–110 (–115)
> 10 to 20 GHz	–68 (–78)	–92 (–100)	–104 (–107)	–104 (–109)
> 20 to 40 GHz	–62 (–72)	–86 (–94)	–98 (–101)	–98 (–103)

Residual FM

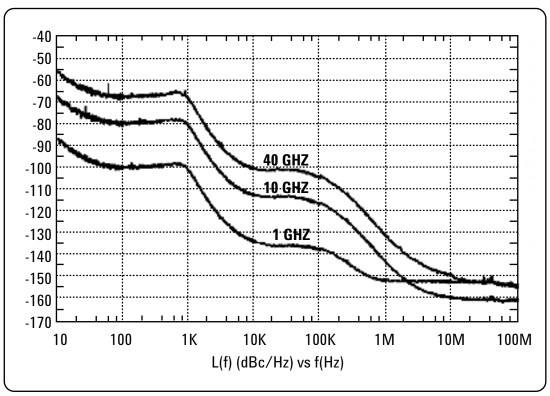
CW mode	< N x 6 Hz (typical)
Option UNR	< N x 4 Hz (typical)
Ramp sweep mode: (rms, 50 Hz to 15 kHz bandwidth)	< N x 1 kHz (typical)

Broadband noise (CW mode at +10 dBm output, for offsets > 10 MHz)

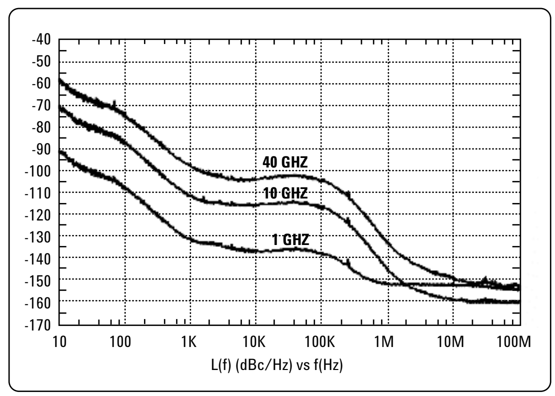
> 2.4 to 20 GHz	< –148 dBc/Hz (typical)
> 20 to 40 GHz	< –141 dBc/Hz (typical)

Measured phase noise

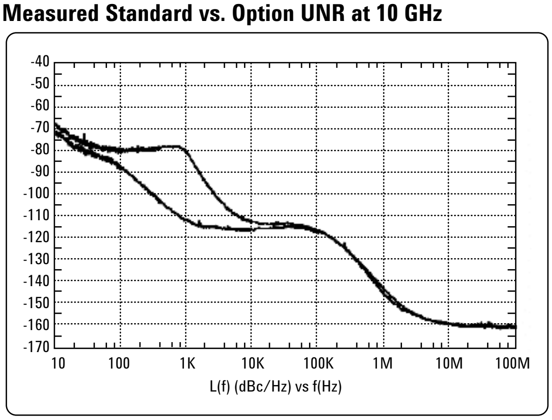
Standard product



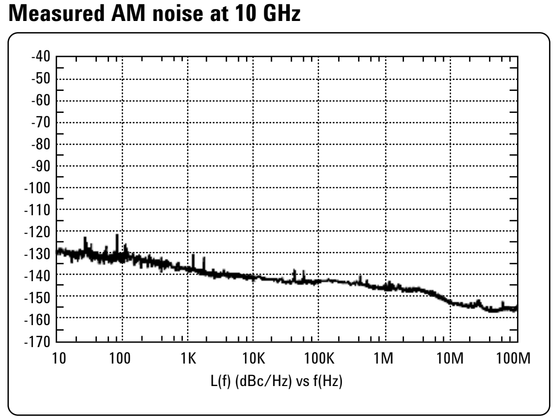
Option UNR



Measured Standard vs. Option UNR at 10 GHz



Measured AM noise at 10 GHz



Typical rms jitter:[1]

Standard

Carrier frequency	SONET/SDH data rates	rms jitter bandwidth	Unit intervals (μUI)	Time (fs)
155 MHz	155 MB/s	100 Hz to 1.5 MHz	48	303
622 MHz	622 MB/s	1 kHz to 5 MHz	34	50
2.488 GHz	2488 MB/s	5 kHz to 15 MHz	65	25
9.953 GHz	9953 MB/s	20 kHz to 80 MHz	173	16

Option UNR

Carrier frequency	SONET/SDH data rates	rms jitter bandwidth	Unit intervals (μUI)	Time (fs)
155 MHz	155 MB/s	100 Hz to 1.5 MHz	47	297
622 MHz	622 MB/s	1 kHz to 5 MHz	26	40
2.488 GHz	2488 MB/s	5 kHz to 15 MHz	66	25
9.953 GHz	9953 MB/s	20 kHz to 80 MHz	161	15

Frequency modulation
(E8257C only)

Maximum deviation	N x 8 MHz	
Resolution	0.1% of deviation or 1 Hz, whichever is greater	
Deviation accuracy	< ± 3.5% of FM deviation + 20 Hz (1 kHz rate, deviations < N x 800 kHz)	
Modulation frequency response		
Path	**Rates (at 100 kHz deviation)**	
	1 dB Bandwidth	**3 dB Bandwidth (typical)**
FM 1	dc/20 Hz to 100 kHz	dc/5 Hz to 10 MHz
FM 2	dc/20 Hz to 100 kHz	dc/5 Hz to 1 MHz
dc FM[2] **carrier offset**	±0.1% of set deviation + (N x 8 Hz)	
Distortion	< 1% (1 kHz rate, deviations < N x 800 kHz)	
Sensitivity	±1 V_{peak} for indicated deviation	
Paths	FM1 and FM2 are summed internally for composite modulation. Either path may be switched to any one of the modulation sources: Ext1, Ext2, internal1, internal2. The FM2 path is limited to a maximum rate of 1 MHz. The FM2 path must be set to a deviation less than FM1.	

Phase modulation
(E8257C only)

Maximum deviation	N x 80 radians (N x 8 radians in high-bandwidth mode)	
Resolution	0.1% of set deviation	
Deviation accuracy	< ±5% of deviation + 0.01 radians (1 kHz rate, normal BW mode)	
Modulation frequency response		
Mode	**Maximum deviation**	**Rates (3 dB BW)**
Normal BW	N x 80 rad	dc to 100 kHz
High BW	N x 8 rad	dc to 1 MHz (typical)
Distortion	< 1 % (1 kHz rate, THD, dev < N x 80 rad, normal BW mode)	
Sensitivity	±1 V_{peak} for indicated deviation	
Paths	ΦM1 and ΦM2 are summed internally for composite modulation. Either path may be switched to any one of the modulation sources: Ext1, Ext2, internal1, internal2. The ΦM2 path must be set to a deviation less than ΦM1.	

1. Calculated from phase noise performance in CW mode only at +0 dBm. For other frequencies, data rate, or bandwidths, please contact your sales representative.
2. At the calibrated deviation and carrier frequency, within 5 °C of ambient temperature at time of user calibration.

Amplitude modulation (f_c > 2 MHz)[1] (typical) (E8257C only)

Depth	Linear mode	Exponential (log) mode (Downward modulation only)
Maximum	> 90%	> 20 dB
Settable[2]	0 to 100 %	0 to 40 dB
Resolution	0.1%	0.01 dB
Accuracy (1 kHz rate)	< ±(6 % of setting + 1 %)	< ±(2% of setting + 0.2 dB)
Ext sensitivity	±1 V_{peak} for indicated depth	–1 V for indicated depth

Rates (3 dB bandwidth, 30% depth)	dc/10 Hz to 100 kHz (typical) (useable to 1 MHz)
Distortion (1 kHz rate, linear mode, THD)	
30% AM	< 1.5%
90% AM	< 4 %
Paths	AM1 and AM2 are summed internally for composite modulation. Either path may be switched to any one of the modulation sources: Ext1, Ext2, internal1, internal2.

External modulation inputs (Ext1 & Ext2) (E8257C only)

Modulation types	AM, FM, and ΦM
Input impedance	50 or 600 Ω (nominal) switched
High/low indicator (100 Hz to 10 MHz BW, ac coupled inputs only)	Activated when input level error exceeds 3% (nominal)

Simultaneous modulation (E8257C only)

All modulation types may be simultaneously enabled except: FM with ΦM, and linear AM with exponential AM. AM, FM, and ΦM can sum simultaneous inputs from any two sources (Ext1, Ext2, internal1, or internal2) Any given source (Ext1, Ext2, internal1, or internal2) may be routed to only one activated modulation type.

Internal modulation source (E8257C only)

Dual function generators provides two independent signals (internal1 and internal2) for use with AM, FM, ΦM, or LF Out.

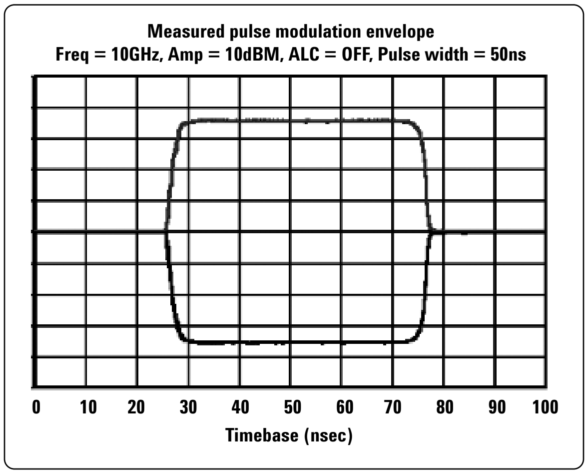
Waveforms	Sine, square, positive ramp, negative ramp, triangle, Gaussian noise, uniform noise, swept sine, dual sine[3]
Rate range	
Sine	0.5 Hz to 1 MHz
Square, ramp, triangle	0.5 Hz to 100 kHz
Resolution	0.5 Hz
Accuracy	Same as timebase
LF out	
Output	Internal1 or internal2. Also provides monitoring of internal1 or internal2 when used for AM, FM, or ΦM.
Amplitude	0 to 3 V_{peak}, (nominal) into 50 Ω
Output impedance	50 Ω (nominal)
Swept sine mode: (frequency, phase continuous)	
Operating modes	Triggered or continuous sweeps
Frequency range	1 Hz to 1 MHz
Sweep rate	0.5 Hz to 100 kHz sweeps/s, equivalent to sweep times 10 us to 2 s
Resolution	0.5 Hz (0.5 sweep/s)

1. For f_c < 2 MHz AM is usable but not specified. AM specifications apply with ALC on, and envelope peaks < maximum specified power. For instruments without Option 1E1 attenuator, specs apply for carrier amplitude > –2 dBm.
2. For AM depth settings > 90% or > 20 dB, deep AM mode or 1 kHz ALC BW is recommended.
3. Internal2 is not available when using swept sine or dual sine modes.

Pulse modulation[1]

(E8257C only)

	Standard > 3.2 GHz	Standard 500 MHz to 3.2 GHz	Option 1E6 10 MHz to 3.2 GHz
On/off ratio	80 dB (typical)	80 dB	80 dB
Rise/fall times (Tr, Tf)	10 ns (6 ns typical)	100 ns (typical)	10 ns (8 ns typical)
Pulse width			
Internally leveled	≥ 1µs	≥ 2 µs (typical)	≥ 1µs
Level hold (ALC Off with power search)[2]	≥ 20 ns (typical)	≥ 0.5 µs (typical)	≥ 20 ns (typical)
Repetition frequency			
Internally leveled	10 Hz to 500 kHz (typical)	10 Hz to 250 kHz (typical)	10 Hz to 500 kHz (typical)
Level hold (ALC Off with power search)[2]	dc to 10 MHz (typical)	dc to 1 MHz (typical)	dc to 10 MHz (typical)
Level accuracy (relative to CW)			
Internally leveled	±0.5 dB ±0.15 (typical)	±0.5 dB	±0.5 dB
Level hold	≤ 20 GHz ±0.8 dB (typical)	±0.5 dB (typical)	±1.0 dB (typical)
(ALC Off with power search)[2]	≤ 40 GHz ±1.2 dB (typical)		
Width compression	±5 ns (typical)	±50 ns (typical)	±5 ns (typical)
Video feed-through[3]	< 2 mV (typical)	< 200 mV (typical)	< 125 mV (typical)
Video delay (Ext input to Video)	40 ns (nominal)	40 ns (nominal)	40 ns (nominal)
RF delay (Tm) (Video to RF output)	35 ns (nominal)	280 ns (nominal)	45 ns (nominal)
Pulse overshoot (Vor)	< 10% (typical)	< 10% (typical)	< 1GHz 20% (typical) ≥ 1GHz 10% (typical)
Input level	+1 V_{peak} = RF On	+1 V_{peak} = RF On	+1 V_{peak} = RF On
Input impedance	50 Ω (nominal)	50 Ω (nominal)	50 Ω (nominal)



1. With ALC off, specs apply after the execution of power search. For instruments without a step attenuator, specs apply between 0 and +10 dBm. For instruments with the step attenuator, specs apply with Atten Hold Off, or ALC level between 0 and +10 dBm.
2. Power search is a calibration routine that improves level accuracy in ALC-off mode. Un-pulsed RF power will be present typically up to 50 ms when executing power search.
3. With attenuator in 0 dB position. Video feed-through decreases with attenuator setting.

Internal pulse generator
(E8257C only)

Modes	Free-run, triggered, triggered with delay, doublet, and gated. Triggered with delay, doublet, and gated require external trigger source.
Period (PRI) (Tp)	70 ns to 42 s (Repetition frequency: 0.024 Hz to 14.28 MHz)
Pulse width (Tw)	10 ns to 42 s
Delay (Td)	
Free-run mode	0 to ±42 s
Triggered with delay and doublet modes	75 ns to 42s with ±10 ns jitter
Resolution	10 ns (width, delay, and PRI)

Td Video delay (variable)

Tw Video pulse width (variable)

Tp Pulse period (variable)

Tm RF delay

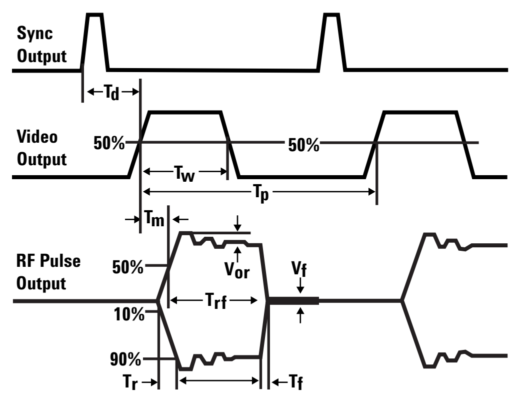
Trf RF pulse width

Tf RF pulse fall time

Tr RF pulse rise time

Vor Pulse overshoot

Vf Video feedthrough



Remote programming

Interfaces	GPIB (IEEE-488.2,1987) with listen and talk, RS-232, and 10BaseT LAN interface.
Control languages	SCPI version 1997.0. Also will emulate most applicable Agilent 836xxB, Agilent 837xxB, and Agilent 8340/41B commands, providing general compatibility with ATE systems which include these signal generators.
IEEE-488 functions	SH1, AH1, T6, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT0, C0, E2.
ISO compliant	This family of signal generators is manufactured in an ISO-9001 registered facility in concurrence with Agilent Technologies commitment to quality.

General specifications

Power requirements	90 to 132 VAC 50 to 60 Hz or 365 to 435 Hz; 195 to 267 VAC 50 to 60 Hz, (automatically selected), 300 W maximum.
Operating temperature range	0 to 55 °C
Storage temperature range[1]	–40 to 71 °C
Shock and vibration	
Operating random vibration	5 to 500 Hz, 0.21 g rms
Survival swept sine vibration	5 to 500 Hz, 0.75 g
Survival random vibration	5 to 500 Hz, 2.09 g rms
Functional shock (half-sine, 30 g, 11 ms) and bench drop test	Meets the requirements of MIL-PRF-28800F for class 3 equipment.
EMC	Meets the conducted and radiated interference and immunity requirements of IEC/EN 61326-1. Meets radiated emission requirements of CISPR Pub 11/1997 Group 1 class A.
Storage registers	Memory is shared by instrument states, user data files, sweep list files, and waveform sequences. Depending on the number and size of these files, up to 800 storage registers and 10 register sequences are available.
Security	Display blanking.
Compatibility	Agilent Technologies 83550 Series millimeter heads, Agilent Technologies 8757D Scalar Network Analyzers, Agilent Technologies EPM Series Power Meters.
Self-test	Internal diagnostic routine tests most modules (including microcircuits) in a preset condition. For each module, if its node voltages are within acceptable limits, then the module “passes” the test.
Weight	< 22 kg (48 lb.) net, < 30 kg (68 lb.) shipping.
Dimensions	178 mm H x 426 mm W x 498 mm D (7” H x 16.8” W x 19.6” D in.).
Recommended calibration cycle	24 months

1. Storage below –20 °C instrument states may be lost.

Input/Output Descriptions

Front panel connectors

(All connectors are BNC female unless otherwise noted.)[1]

RF output	Nominal output impedance 50 Ω.
For 20 GHz models	Precision APC-3.5 male, or Type-N with Option 1ED.
For 40 GHz models	Precision 2.4 mm male; plus 2.4 - 2.4 mm and 2.4 - 2.9 mm female adaptors also included.
ALC input	Used for negative external detector leveling. Nominal input impedance 120 kΩ, damage level ±15 V.
LF output (E8257C only)	Outputs the internally generated LF source. Nominal output impedance 50 Ω.
External input 1 (E8257C only)	Drives either AM, FM, or ΦM. Nominal input impedance 50 or 600 Ω, damage levels are 5 V_{rms} and 10 V_{peak}.
External input 2 (E8257C only)	Drives either AM, FM, or ΦM. Nominal input impedance 50 or 600 Ω, damage levels are 5 V_{rms} and 10 V_{peak}.
Pulse/trigger gate input (E8257C only)	Accepts input signal for external fast pulse modulation. Also accepts external trigger pulse input for internal pulse modulation. Nominal impedance 50 Ω. Damage levels are 5 V_{rms} and 10 V_{peak}.
Pulse video out (E8257C only)	Outputs a signal that follows the RF output in all pulse modes. TTL-level compatible, nominal source impedance 50 Ω.
Pulse sync out (E8257C only)	Outputs a synchronizing pulse, nominally 50 ns width, during internal and triggered pulse modulation. TTL-level compatible, nominal source impedance 50 Ω.

Rear panel connectors

(All connectors are BNC female unless otherwise noted.)[1]

Auxiliary interface (Dual mode)	Used for RS-232 serial communication and for Master/Slave source synchronization. (9-pin subminiature female connector).
GPIB	Allows communication with compatible devices.
LAN	Allows 10BaseT LAN communication
10 MHz input	Accepts an external reference (timebase) input (at 1, 2, 2.5, 5, 10 MHz for standard and 10 MHz only for Option UNR) Nominal input impedance 50 Ω. Damage levels > +10 dBm
10 MHz output	Outputs internal or external reference signal. Nominal output impedance 50 Ω. Nominal output power +8 dBm
Sweep output (Dual mode)	Supplies a voltage proportional to the RF power or frequency sweep ranging form 0 volts at the start of sweep to +10 volts (nominal) at the end of sweep, regardless of sweep width. When connected to an Agilent 8757D Scalar Network Analyzer (Option 007), generates a selectable number of equally spaced 1 us pulses (nominal) across a ramp (analog) sweep. Number of pulses can be set form 101 to 1601 by remote control from the 8757D. Output impedance: < 1 Ω, can drive 2000 Ω.

1. Digital inputs and output are 3.3 V CMOS unless indicated otherwise. Inputs will accept 5 V CMOS, 3V CMOS, or TTL voltage levels.
2. Digital inputs and output are 3.3 V CMOS unless indicated otherwise. Inputs will accept 5 V CMOS, 3V CMOS, or TTL voltage levels.

Stop sweep In/Out	Open-collector, TTL-compatible input/output. In ramp sweep operation, provides low level (nominally 0 V) during sweep retrace and bandcross intervals, and high level during the forward portion of the sweep. Sweep will stop when grounded externally, sweep will resume when allowed to go high.
Trigger output (Dual mode)	Outputs a TTL signal. High at start of dwell, or when waiting for point trigger; low when dwell is over or point trigger is received, In ramp sweep mode, provides 1601 equally-spaced 1us pulses (nominal) across a ramp sweep. When using LF Out, provides 2 us pulse at start of LF sweep.
Trigger input	Accepts TTL signal for triggering point-to-point in manual sweep mode, or to trigger start of LF sweep. Damage levels ≥ +10 V or ≤ –4 V.
Source module interface	Provides bias, flatness correction, and leveling connections to the Agilent model 83550 Series mm-wave source modules.
Source settled	Provides an output trigger that indicates when the signal generator has settled to a new frequency or power level. High indicates source not settled, Low indicates source settled.
Z-axis Blank/Markers	During Ramp Sweep, supplies + 5 V (nominal) level during retrace and bandswitch intervals. Supplies – 5 V (nominal) level when the RF frequency is at a marker frequency.
10 MHz EFC	(Option UNR only) Accepts an external DC voltage, ranging from –5 V to +5 V, for electronic frequency control (EFC) of the internal 10 MHz reference oscillator. This voltage inversely tunes the oscillator about its center frequency approximately –0.07 ppm/V. The nominal input impedance is greater than 1 M.

Options, Accessories, and Related Products

Model/option	Description
E8247C/57C-520	Frequency range 250 kHz to 20 GHz
E8247C/57C-540	Frequency range 250 kHz to 40 GHz
E8247C/57C-UNR	Enhanced close-in phase noise
E8257C-1E6	Narrow pulse modulation below 3.2 GHz
E8247C/57C-007	Ramp (analog) sweep
E8247C/57C-1ED	Type-N (f) connector (20 MHz models only)
E8247C/57C-1EM	Moves all connectors to rear panel
E8247C/57C-1CM	Rack mount kit
E8247C/57C-1CN	Front handle kit
E8247C/57C-1CP	Rack mount kit with front handle kit
E8247C/57C-H30	Frequency upconversion of RF signals
E8247C/57C-HEH	Inprove low band harmonics (from 10 MHz to 2.0 GHz)
83554A	Millimeter-wave source module (26.5 to 40 GHz)
83555A	Millimeter-wave source module (33 to 50 GHz)
83556A	Millimeter-wave source module (40 to 60 GHz)
83557A	Millimeter-wave source module (50 to 75 GHz)
83558A	Millimeter-wave source module (75 to 110 GHz)
8120-8806	Master/slave interface cable
9211-2656	Standard transit case
9211-7481	Tote-style transit case (includes wheels and telescoping handle)

Web Resources

www.agilent.com/find/psg

Related Agilent Literature

PSG Signal Generators, Brochure
Literature number 5989-1324EN

E8267C PSG Vector Signal Generator, Data Sheet
Literature number 5988-6632EN

PSG Self Guided Demo
Literature number 5988-2414EN

E8247C/57C PSG CW and Analog Signal Generatos, Configuration Guide
Literature number 5988-7879EN

E8267C PSG Vector Signal Generator, Configuration Guide
Literature number 5988-7541EN

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

PSG Two-Tone and Multitone Application Note AN 1410
Literature number 5988-7689EN

www.agilent.com

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