Agilent E8663B
Analog Signal Generator

Data Sheet

The Agilent E8663B is a fully synthesized signal generator with low phase noise and high output power.

Specifications 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, nominal, or measured, provide additional (non-warranted) information at 25 °C, which may be useful in the application of the product.

Definitions

Specifications (spec): Represents warranted performance for instruments with a current calibration.

Typical (typ): Represents characteristic performance which is non-warranted. Describes performance that will be met by a minimum of 80% of all products.

Nominal (nom): Represents characteristic performance which is non-warranted. Represents the value of a parameter that is most likely to occur; the expected mean or mode of all instruments.

Measured: Represents characteristic performance which is non-warranted. Represents the value of a parameter measured on an instrument during design verification.

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Specifications

Frequency

Range [1]		
Option 503	100 kHz to 3.2 GHz	
Option 509	100 kHz to 9 GHz	
Resolution		
CW	0.001 Hz	
All sweep modes	0.01 Hz	
CW switching speed [2, 3]	< 11 ms (typ) (7 ms (nom))	
Phase offset	Adjustable in nominal 0.1 ° increments	
Frequency bands		
Band	**Frequency range**	**N**[4]
1	100 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 9 GHz	1
Accuracy	± aging rate ± temperature effects ± line voltage effects (nom)	
Internal timebase reference oscillator		
Aging rate	$< \pm 3 \times 10^{-8}$/year or $< \pm 2.5 \times 10^{-10}$/day after 30 days	
Temperature effects (typ)	$< \pm 4.5 \times 10^{-9}$ 0 to 55 °C	
Line voltage effects (typ)	$< \pm 2 \times 10^{-10}$ for ±10% change	
External reference frequency	10 MHz only	
Lock range	±1.0 ppm	
Reference output		
Frequency	10 MHz	
Amplitude	> +4 dBm into 50 Ω load (typ)	
External reference input		
Amplitude	5 dBm ±5 dB[5]	
Input impedance	50 Ω (nom)	

Step (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 (see "Output" section)
Dwell time	1 ms to 60 s
Number of points	2 to 65535 (step sweep) 2 to 1601 per table (list sweep)
Triggering	Auto, external, single, or GPIB
Settling time	
Frequency	< 8 ms (typ)[6]
Amplitude	< 5 ms (typ)

1. Performance is unspecified below 250 kHz.
2. Time from GPIB trigger to frequency within 0.1 ppm of final frequency above 250 MHz or within 100 Hz below 250 MHz.
3. Add 19 ms (typical) when switching from greater than 3.2 GHz to less than 3.2 GHz (Option 509 only).
4. N is a factor used to help define certain specifications within the document.
5. To optimize phase noise use 5 dBm ± 2 dB.
6. 19 ms (typ) when stepping from greater than 3.2 GHz to less than 3.2 GHz (Option 509 only).

Output

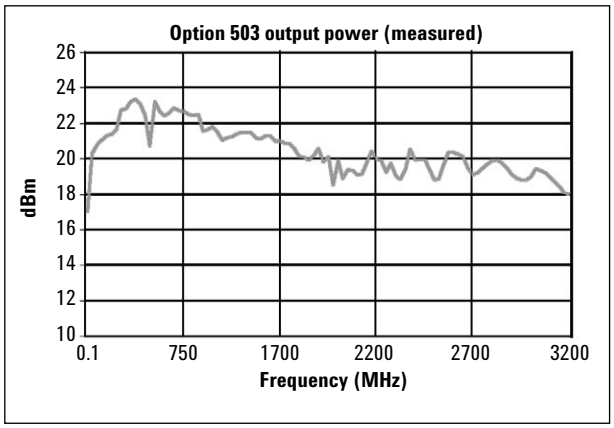
Power[1] (dBm)

Frequency range	**Spec. (typ)**
Option 503 and 509:	
100 to 250 kHz	–135 to +10 (nom)
250 kHz to 3.2 GHz	–135 to +15 (+18)
250 kHz to 3.2 GHz with Option UNW	–135 to +10 (+13)
> 3.2 GHz to 9 GHz	–135 to +21 (+22)

Step attenuator[2]

Options 503 and 509	0 dB and 5 dB to 115 dB in 10 dB steps

Maximum available power (measured)



Attenuator hold range

Minimum From –20 dBm to maximum specified output power with step attenuator in 0 dB position.

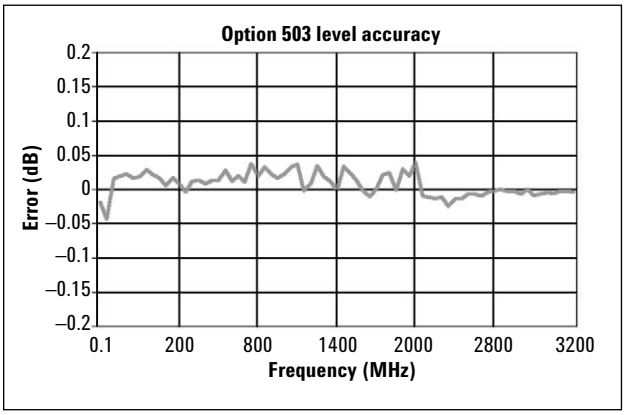
Amplitude switching speed[3]

ALC on or off (without power search)	< 3 ms (typ)

1. Maximum power specifications are warranted from 15 to 35 °C, and are typical from 0 to 15 °C. Maximum power over the 35 to 55 °C range typically degrades less than 2 dB.
2. The step attenuator provides coarse power attenuation to achieve low power levels. Fine power level adjustment is provided by the ALC (Automatic Level Control) within the attenuator hold range.
3. To within 0.1 dB of final amplitude within one attenuator range. Add 10 to 50 ms when using power search.

Level accuracy[1] (dB)					
Frequency	**> +10 dBm**	**+10 to 0 dBm**	**0 to –10 dBm**	**–10 to –70 dBm**	**–70 to –90 dBm**
100 to 250 kHz	±0.6 (nom)	±0.6 (nom)	±0.6 (nom)	±0.7 (nom)	±0.8 (nom)
250 kHz to 2 GHz	±0.6	±0.6	±0.6	±0.7	±0.8
> 2 to 9 GHz	±0.8	±0.8	±0.8	±0.9	±1.0

Level accuracy (measured)



Resolution	0.01 dB
Temperature stability	0.01 dB/°C (typ)
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	Remote power meter[2], remote bus, manual (user edit/view)
Output impedance	50 Ω (nom)
SWR (internally leveled)	
250 kHz to 2 GHz	< 1.4:1 (typ)
> 2 GHz to 9 GHz	< 1.6:1 (typ)
Leveling modes	Internal leveling, external detector leveling, millimeter source module, ALC off
External detector leveling	
Range	–0.2 mV to –0.5 V (nom) (–36 dBm to +4 dBm using Agilent 33330D/E detector)
Bandwidth	Selectable 0.1 to 100 kHz (nom) (Note: not intended for pulsed operation)
Maximum reverse power	1/2 Watt, 0 V_{DC}

1. Specifications apply in CW and list/step sweep modes over the 15 to 35 °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.
2. Compatible with Agilent EPM Series (E4418B and E4419B) power meters.

Spectral purity

Harmonics[1]	(dBc at +10 dBm or maximum specified output power, whichever is lower)	
< 10 MHz	–28 dBc (typical below 1 MHz)	
10 MHz to 2 GHz	–30 dBc	
> 2 GHz to 9 GHz	–55 dBc	
Harmonics (measured)		
Sub-harmonics[2]	(dBc at +10 dBm or maximum specified output power, whichever is lower)	
100 kHz to 9 GHz	None	
Non-harmonics	(dBc at +10 dBm or maximum specified output power, whichever is lower, for offsets > 300 Hz	
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 9 GHz	–62	–70

Absolute SSB phase noise (dBc/Hz) (CW)[3]

	Offset from carrier					
Frequency	**1 Hz**	**10 Hz**	**100 Hz**	**1 kHz**	**10 kHz**	**100 kHz**
	Spec (typ)	**Spec (typ)**	**Spec (typ)**	**Spec (typ)**	**Spec (typ)**	**Spec (typ)**
250 kHz to 250 MHz[4]	–58 (–66)	–87 (–94)	–104 (–120)	–121 (–128)	–128 (–132)	–130 (–133)
> 250 to 500 MHz[4]	–61 (–72)	–88 (–98)	–108 (–118)	–126 (–132)	–132 (–136)	–136 (–141)
> 500 MHz to 1 GHz[4]	–57 (–65)	–84 (–93)	–101 (–111)	–121 (–130)	–130 (–134)	–130 (–135)
> 1 to 2 GHz[4]	–51 (–58)	–79 (–86)	–96 (–106)	–115 (–124)	–124 (–129)	–124 (–129)
> 2 to 3.2 GHz	–46 (–54)	–74 (–82)	–92 (–102)	–111 (–120)	–120 (–124)	–120 (–124)
> 3.2 to 9 GHz	–37 (–44)	–65 (–72)	–81 (–92)	–101 (–109)	–110 (–114)	–110 (–115)

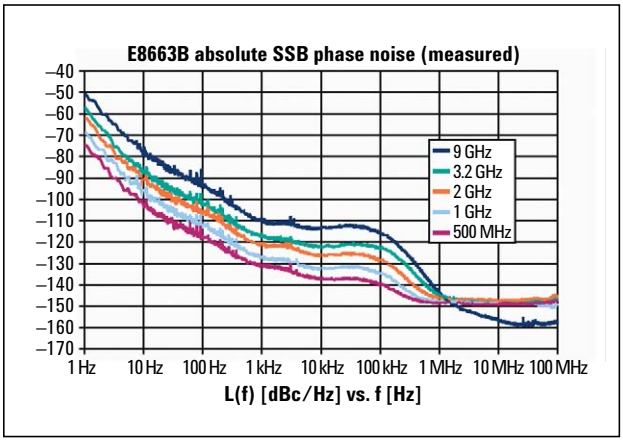
Residual SSB phase noise (dBc/Hz) (CW)[3]

	Offset from carrier					
Frequency	**1 Hz**	**10 Hz**	**100 Hz**	**1 kHz**	**10 kHz**	**100 kHz**
	Spec (typ)	**Spec (typ)**	**Spec (typ)**	**Spec (typ)**	**Spec (typ)**	**Spec (typ)**
250 kHz to 250 MHz[4]	(–94)	–100 (–107)	–110 (–118)	–120 (–126)	–128 (–132)	–130 (–133)
> 250 to 500 MHz[4]	(–101)	–105 (–112)	–115 (–122)	–124 (–131)	–132 (–136)	–136 (–141)
> 500 MHz to 1 GHz[4]	(–94)	–100 (–107)	–110 (–118)	–120 (–126)	–130 (–134)	–130 (–134)
> 1 to 2 GHz[4]	(–89)	–96 (–101)	–104 (–112)	–114 (–120)	–124 (–129)	–124 (–129)
> 2 to 3.2 GHz	(–85)	–92 (–97)	–100 (–108)	–110 (–116)	–120 (–124)	–120 (–124)
> 3.2 to 9 GHz	(–74)	(–87)	(–98)	(–106)	(–114)	(–115)

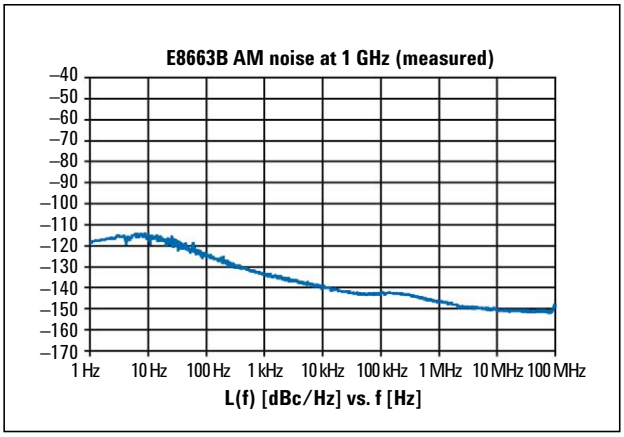
1. Specifications are typical for harmonics beyond specified frequency range (beyond 50 GHz for Option 567).
2. Sub-harmonics are defined as Carrier Freq / N).
3. Phase noise specifications are warranted from 15 to 35 °C.
4. Measured at +10 dBm or maximum specified power, whichever is less.

Measured phase noise with E5500 and plotted without spurs

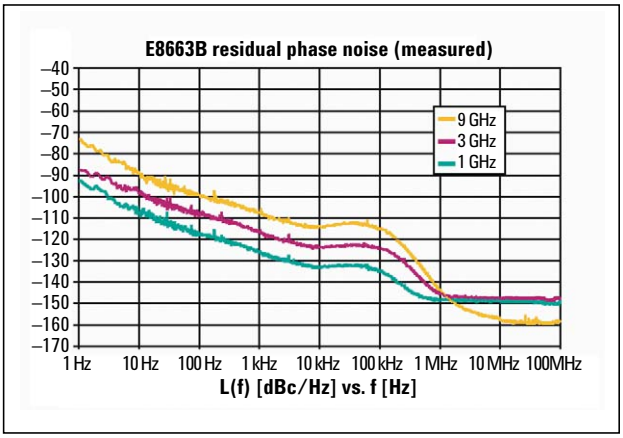
Standard phase noise



AM noise



Residual phase noise



Residual FM	
(RMS, 50 Hz to 15 kHz bandwidth)	
CW mode	< N x 4 Hz (typ)
Broadband noise	(CW mode at +10 dBm or maximum specified output power, whichever is lower, for offsets > 10 MHz)
> 2.4 to 9 GHz	< –148 dBc/Hz (typ)

Measured RMS jitter[1]

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	23	151
622 MHz	622 MB/s	1 kHz to 5 MHz	19	30
2.488 GHz	2488 MB/s	5 kHz to 20 MHz	56	22

Frequency modulation

Maximum deviation[2]	**Frequency**	**Maximum deviation**
	250 kHz to 250 MHz	2 MHz
	> 250 to 500 MHz	1 MHz
	> 500 MHz to 1 GHz	2 MHz
	> 1 GHz to 2 GHz	4 MHz
	> 2 GHz to 3.2 GHz	8 MHz
	> 3.2 GHz to 9 GHz	16 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	(at 100 kHz deviation)	
Path [coupling]	**1 dB bandwidth**	**3 dB bandwidth (typ)**
FM path 1 [DC]	DC to 100 kHz	DC to 10 MHz
FM path 2 [DC]	DC to 100 kHz	DC to 1 MHz
FM path 1 [AC]	20 Hz to 100 kHz	5 Hz to 10 MHz
FM path 2 [AC]	20 Hz to 100 kHz	5 Hz to 1 MHz
DC FM[3] **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.	

1. Calculated from phase noise performance in CW mode only at +10 dBm. For other frequencies, data rate, or bandwidths, please contact your sales representative.
2. Through any combination of path1, path2, or path1 + path2.
3. At the calibrated deviation and carrier frequency, within 5 °C of ambient temperature at time of user calibration.

Phase modulation

Maximum deviation[1]	Frequency	Normal BW mode	High BW mode
	250 kHz to 250 MHz	20 rad	2 rad
	> 250 to 500 MHz	10 rad	1 rad
	> 500 MHz to 1 GHz	20 rad	2 rad
	> 1 GHz to 2 GHz	40 rad	4 rad
	> 2 GHz to 3.2 GHz	80 rad	8 rad
	> 3.2 GHz to 9 GHz	160 rad	16 rad
Resolution	0.1% of set deviation		
Deviation accuracy	< ±5% of deviation + 0.01 radians (1 kHz rate, normal BW mode)		
Modulation frequency response			
	Normal BW mode	**High BW mode**	
Rates (3 dB BW)	DC to 100 kHz	DC to 1 MHz (typ)[2]	
Distortion	< 1 % (1 kHz rate, Total Harmonic Distortion (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.		

Amplitude modulation [3] (Typical)

Depth	Linear mode	Exponential (log) mode (downward modulation only)
Maximum:		
ALC On:	> 90%	> 20 dB
ALC Off with Power Search[4] or ALC On with Deep AM[5]:	> 95 %	> 40 dB
Settable:	0 to 100 % (0 to 100 %/volt sensitivity)	0 to 40 dB (0 to 40 dB/volt sensitivity)
Resolution:	0.1%	0.01 dB
Accuracy (ALC On, 1kHz rate):	< ±(6% of setting + 1%)	< ± (2% of setting +0.2dB)
Ext sensitivity	± 1 V_{peak} for indicated depth	–1 V for indicated depth
Rates (3 dB bandwidth, 30% depth)		
DC Coupled	0 to 100 kHz	
AC coupled	10 Hz to 100 kHz (useable to 1 MHz)	
Distortion (1 kHz rate, ALC On, linear mode, Total Harmonic Distortion)		
30% AM	< 1.5%	
60% AM	< 2%	
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.	

1. Through any combination of path1, path2, or path1 + path2.
2. Path 1 is useable to 4 MHz for external inputs less than 0.3 V peak.
3. AM specifications are typical. For carrier frequencies below 2 MHz, AM is useable but not specified. Unless otherwise stated, specifications apply with ALC on and envelope peaks within ALC operating range (–20 dBm to maximum specified power, excluding step-attenuator setting).
4. ALC Off is used for narrow pulse modulation and/or high AM depths, with envelope peaks below ALC operating range. Carrier power level will be accurate after a Power Search is executed.
5. ALC On with Deep AM provides high AM depths together with closed-loop internal leveling. This mode can be used with a repetitive AM waveform (frequency > 10 Hz) with peaks > –5 dBm (nominal, excluding step-attenuator setting).

External modulation inputs
(Ext1 & Ext2)

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

Internal modulation source

Dual function generators provide 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[1]
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 internal1or internal2 when used for AM, FM, or ΦM.
Amplitude	0 to 3 V_{peak}, (nom) into 50 Ω
Output impedance	50 Ω (nom)
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. Internal2 is not available when using swept sine or dual sine modes.

Pulse modulation[1, 2]

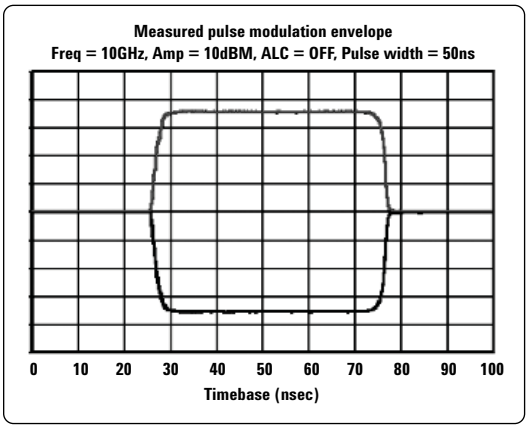
	500 MHz to 3.2 GHz	Above 3.2 GHz
On/Off ratio	80 dB (typ)	80 dB
Rise/Fall times (Tr, Tf)	100 ns (typ)	6 ns (typ)
Minimum pulse width		
Internally leveled	2 us	1 us
Level hold (ALC off with power search)	0.5 us	0.15 us
Repetition frequency		
Internally leveled	10 Hz to 250 kHz	10 Hz to 500 kHz
Level hold (ALC off with power search)	dc to 1 MHz	dc to 3 MHz
Level accuracy (relative to CW)		
Internally leveled	±0.5 dB	±0.5 dB
Level hold (ALC off with power search)	±0.5 dB (typ)	±0.5 dB (typ)
Width compression (RF width relative to video out)	±50 ns (typ)	±5 ns (typ)
Video feed-through[3]	< 200 mv (typ)	< 2 mv (typ)
Video delay (ext input to video)	50 ns (nom)	50 ns (nom)
RF delay (video to RF output)	270 ns (nom)	35 ns (nom)
Pulse overshoot	< 10% (typ)	< 10% (typ)
Input level	+1 V_{peak} = RF On	+1 V_{peak} = RF On
Input impedance	50 Ω (nom)	50 Ω (nom)

Narrow pulse modulation[1, 2] (Option UNW)

	10 MHz to 3.2 GHz	Above 3.2 GHz
On/Off ratio	80 dB	80 dB
Rise/Fall times (Tr, Tf)	10 ns (8 ns typical)	10 ns (6 ns typical)
Minimum pulse width		
Internally leveled	1 us	1 us
Level hold (ALC off with power search)	20 ns	20 ns
Repetition frequency		
Internally leveled	10 Hz to 500 kHz	10 Hz to 500 kHz
Level hold (ALC off with power search)	dc to 5 MHz	dc to 10 MHz
Level accuracy (relative to CW)		
Internally leveled	±0.5 dB	±0.5 dB (0.15 dB typical)
Level hold (ALC off with power search)	±1.3 dB (typ)	±0.5 dB (typ)

1. With ALC off, specs apply after the execution of power search. Specifications apply with Atten Hold Off (default mode for instruments with attenuator), or ALC level between –5 and +10 dBm or maximum specific power, whichever is lower. Above 50 GHz, pulse modulation is useable; however performance is not warranted.
2. Power search is a calibration routine that improves level accuracy with ALC off. The instrument microprocessor momentarily closes the ALC loop to find the modulator drive setting necessary to make the quiescent RF level equal to an entered value, then opens the ALC loop while maintaining that modulator drive setting. When executing power search, RF power will be present for typically 10 to 50 ms; the step attenuator can be set to automatically switch to maximum attenuation to protect sensitive devices. Power search can be configured to operate either automatically or manually at the carrier frequency, or over a user-definable frequency range.
3. With attenuator in 0 dB position. Video feed-through decreases with attenuator setting.

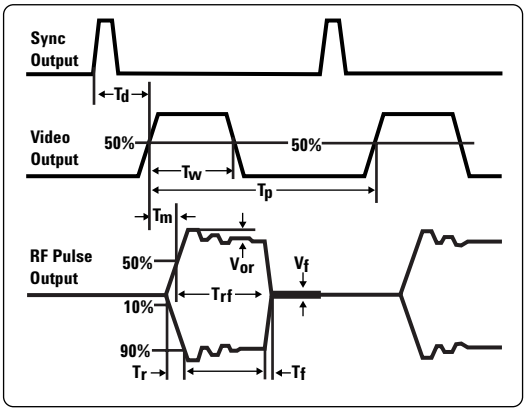
	10 MHz to 3.2 GHz	Above 3.2 GHz
Width compression (RF width relative to video out)	±5 ns (typ)	±5 ns (typ)
Video feed-through[1]	< 125 mv (typ)	< 2 mv (typ)
Video delay (ext input to video)	50 ns (nom)	50 ns (nom)
RF delay (video to RF output)	45 ns (nom)	35 ns (nom)
Pulse overshoot	< 15% (typ)	< 10% (typ)
Input level	+1 V_{peak} = RF On	+1 V_{peak} = RF On
Input impedance	50 Ω (nom)	50 Ω (nom)



Internal pulse generator
(With or without Option UNW)

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



1. With attenuator in 0 dB position. Video feed-through decreases with attenuator setting.

Simultaneous modulation

All modulation types (FM, AM, ΦM, and pulse modulations) 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.

Remote programming

Interfaces	GPIB (IEEE-488.2,1987) with listen and talk, RS-232, and 10BaseT LAN interface.
Control languages	SCPI version 1997.0. The E8663B will emulate the applicable commands for the Agilent 8662A/63A signal generators, providing general compatibility with ATE systems and the Agilent E5500 phase noise test system.
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 commitment to quality.
Agilent IO Libraries	Agilent's IO Library Suite ships with the E8663B to help 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

Power requirements	100 to 120 VAC, 50 to 60 Hz 220 to 240 VAC, 50 to 60 Hz < 250 W typical, 650 W maximum
Operating temperature range	0 to 55 °C
Storage temperature range[1]	–40 to 70 °C
Altitude	< 4,572 m (15,000 ft.)
Environmental testing	Samples of this product have been tested in accordance with the Agilent 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.[2]
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 and sweep list files. There is 14 MB of flash memory available in the E8663B. Depending on how the memory is used, a maximum of 1000 instrument states can be saved.
Security	Display blanking Memory clearing functions (see Application Note *Security of Agilent Signal Generators Issues and Solutions*, literature number 5989-1091EN)
Compatibility	Agilent 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 515 mm D (7" H x 16.8" W x 20.3" D in.)
Recommended calibration cycle	24 months

1. Storage below –20 °C instrument states may be lost.
2. As is the case with all signal generation equipment, phase noise specifications are not warranted in a vibrating environment.

Input/Output Descriptions

Front panel connectors

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

RF output **Option 503 and 509**	Output impedance 50 Ω (nom) Type-N
ALC input	Used for negative external detector leveling. Nominal input impedance 120 kΩ, damage level ±15 V.
LF output	Outputs the internally generated LF source. Nominal output impedance 50 Ω.
External input 1	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	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	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	Outputs a signal that follows the RF output in all pulse modes. TTL-level compatible, nominal source impedance 50 Ω.
Pulse sync out	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 10 MHz) 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.
1 GHz output	Provides a 1 GHz low noise frequency reference output.
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 (nom) at the end of sweep, regardless of sweep width. During CW operation, supplies a voltage proportional to the output frequency, +10 volts (nom) corresponding to the maximum specified frequency. Output impedance: < 1 Ω (nom), can drive 2000 Ω.

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

Stop sweep In/Out	Open-collector, TTL-compatible input/output. In 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. 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	Non-functional.
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	Supplies –5 V (nom) level when the RF frequency is at a marker frequency.
10 MHz EFC	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 MΩ.

Options, Accessories, and Related Products

Model/option	Description
E8663B-503	Frequency range from 100 kHz to 3.2 GHz
E8663B-509	Frequency range from 100 kHz to 9 GHz
E8663B-UNW	Narrow pulse modulation
E8663B-1EM	Moves all front panel connectors to the rear panel
E8663B-1EZ	Extended support life
E8663B-1CN	Front handle kit
E8663B-1CM	Rackmount flange kit
E8663B-1CP	Rackmount flange and front handle kit
E8663B-UK6	Commercial calibration certificate and test data
E8663B-CD1	CD-ROM containing the English documentation set
E8663B-ABA	Printed copy of the English documentation set
E8663B-0BW	Printed copy of the assembly-level service guide
8120-8806	Master/slave interface cable
9211-2656	Transit case
9211-7481	Transit case with wheels

Web Resources

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www.agilent.com/find/buy/alternatives

For more accessory information, visit:
www.agilent.com/find/accessories

For additional description of Agilent's IO Libraries Suite features and installation requirements, please go to:
www.agilent.com/find/iosuite/database

Related Agilent Literature

Security of Agilent Signal Generators
Issues and Solutions, Literature number 5989-1091EN

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