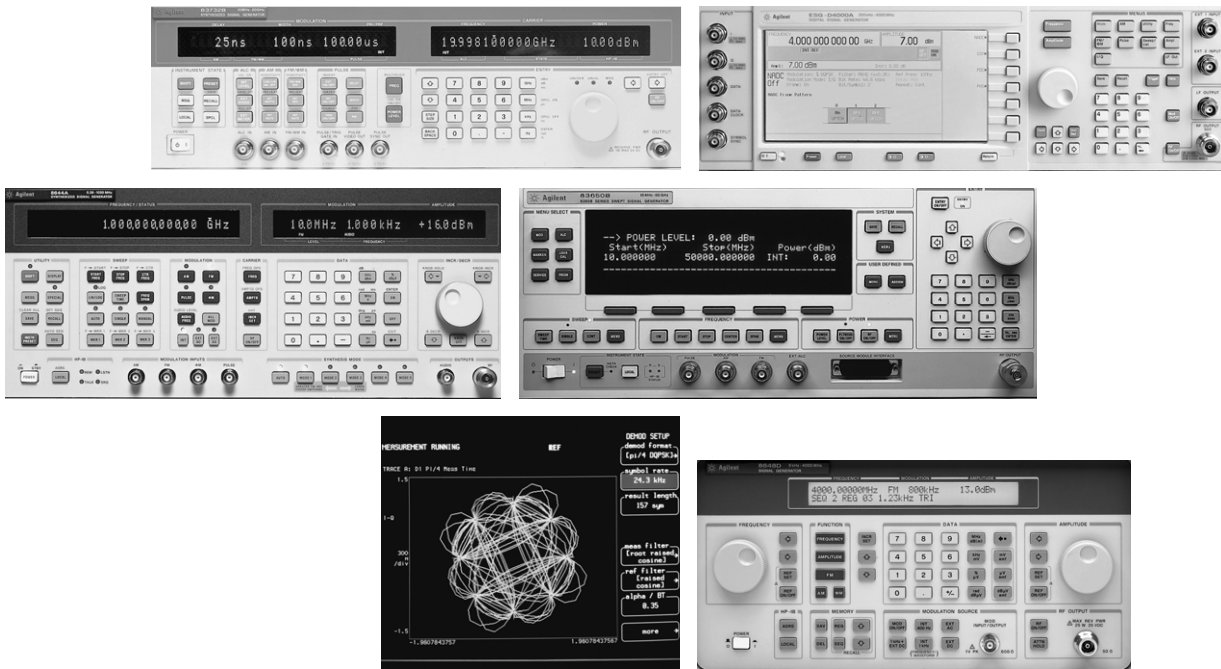


Agilent Signal Generators RF and Microwave Models Catalog

From dc to 110 GHz, a signal generator
for every application and budget.



- Economy RF signal generators**
- High-performance RF signal generators**
- Microwave CW generators**
- Microwave signal generators/sweepers**
- Microwave synthesized sweepers**
- Millimeter sources**
- Frequency-agile/complex signal simulators**



Agilent Technologies
Innovating the HP Way

Signal generators for every application and budget

Agilent Technologies signal generators give you greater measurement confidence with their high-performance frequency accuracy, spectral purity, and modulation. With frequency ranges from dc to 110 GHz, Agilent signal generators test low-frequency navigation signals, cellular mobile

radio, or millimeter-wave satellite systems. Designed for R&D, automated manufacturing, portable installation, or maintenance, Agilent signal generators provide the performance, reliability, quality, and support you demand.

Economy RF signal generators

Frequency range	Model	Key features/applications
250 kHz to 4 GHz	E4400B, E4420B E4421B, and E4422B (analog)	Excellent level accuracy, expandable architecture, built-in function generator, electronic attenuator, and step sweep at an economical price
250 kHz to 4 GHz	E4430B, E4431B E4432B, and E4433B (analog and digital)	Built-in modulation formats for CDMA, GSM, NADC, PDC, PHS, DECT, and TETRA applications. Custom formats include FSK, QAM, PSK, MSK, and an I/Q table editor
9 kHz to 4 GHz	8648A/B/C/D	Low-cost synthesized signal generator series for manufacturing and service applications

High-performance RF signal generators

Frequency range	Model	Key features/applications
252 kHz to 2.06 GHz	8643A and 8644B	Performance signal generators for RF design and manufacturing
10 kHz to 1.28 GHz	8662A	Low, close-in noise
100 kHz to 2.56 GHz	8663A	Low, close-in noise with complex modulation
100 kHz to 6 GHz	8664A and 8665A/B	Performance signal generator for up to 6 GHz testing

The right performance, features, and price

Microwave CW generators

Frequency range	Model	Key features/applications
10 MHz to 20 GHz	83711B and 83712B	Synthesized CW generator

Microwave signal generators/sweepers

Frequency range	Model	Key features/applications
10 MHz to 20 GHz	83731B and 83732B	High-performance receiver test at an affordable price
10 MHz to 50 GHz	8360 B-series	General-purpose swept signal generators for receiver and component test, full network-analyzer compatibility

Microwave synthesized sweepers

Frequency range	Model	Key features/applications
10 MHz to 20 GHz	83751A/B, 83752A/B	Synthesized sweeper with fully phase-locked analog sweep, simple modulation, and scalar-analyzer compatibility
10 MHz to 50 GHz	8360B/L	High-performance sweeper for receiver and component test, full network-analyzer compatibility

Millimeter sources

Frequency range	Model	Key features/applications
26.5 to 110 GHz	83554A, 83555A, 83556A, 83557A, and 83558A	Efficient, programmable frequency multipliers

Frequency agile/complex signal simulators

Frequency range	Model	Key features/applications
252 kHz to 2.06 GHz	8645A	High-performance signal generator for testing frequency-agile radios and surveillance receivers

Economy RF signal generators

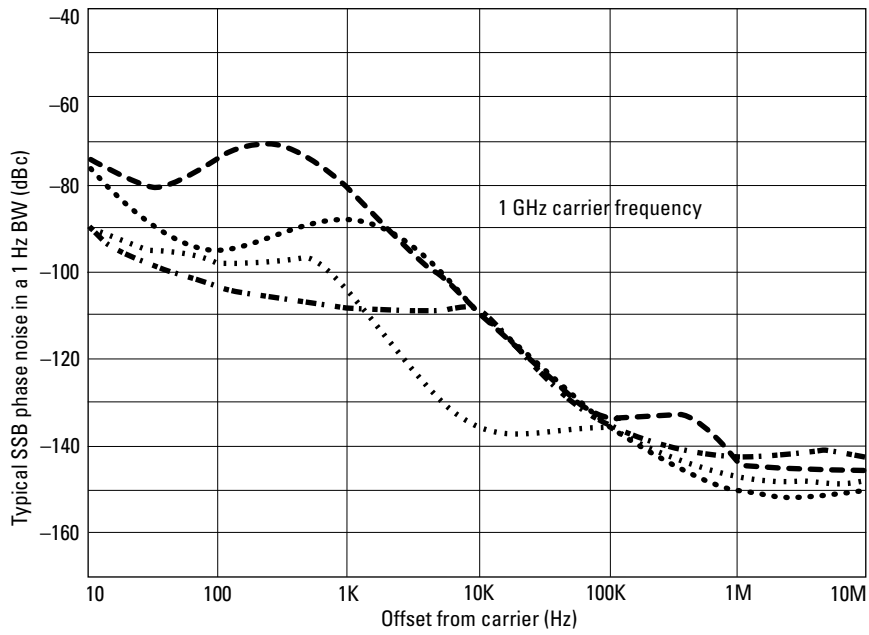
Agilent's RF signal generators supply a host of comprehensive, powerful features for testing both analog and digital communications systems. In addition, flexible options provide enhanced capabilities for simulating the performance of a communication system to meet the requirements of

nearly all current and proposed air interface standards. Agilent's RF signal generators let you alter nearly every aspect of a digital signal or signal-operating environment. You can also customize the instrument's configuration to create experimental signals.

	ESG-A/AP series ¹ (analog)		ESG-D/DP series ² (digital)		8648A/B/C/D
Frequency					
Range	250 kHz to 4 GHz		250 kHz to 4 GHz		9 kHz to 4 GHz
Resolution (Hz)	0.01		0.01		1 (10 Hz display)
Accuracy	Same as time base		Same as time base		±3x10 ⁻⁶ Hz (±1.5x10 ⁻⁶ optional)
Aging rate	±1x10 ⁻⁶ /year		±1x10 ⁻⁶ /year		±2x10 ⁻⁶ /year
High-stability option	±0.1x10 ⁻⁶ /year		±0.1x10 ⁻⁶ /year		±0.1x10 ⁻⁶ /year
Output level					
Range (dBm)	+13 to -136 (+17 dBm optional)		+13 to -136 (+17 dBm optional)		+10 to -136 (+20 dBm optional)
Accuracy (dB)	±0.5, (±0.9 >2 GHz)		±0.5, (±0.9 >2 GHz)		±1 (±2 dB >2.5 GHz)
Spectral purity level					
	ESG-A	ESG-AP	ESG-D	ESG-DP	
Harmonics (dBc)	<-30	<-30	<-30	<-30	<-30
Spurious (dBc)	<-53 to <-65	<-65 to <-80	<-53 to <-65	<-65 to <-80	<-48 to <-60
Residual FM at 1 GHz (0.3 to 3 kHz BW)	2 Hz	1 Hz	2 Hz	1 Hz	<7 Hz (typical <4 Hz)
SSB phase noise	See chart		See chart		See chart
Modulation					
AM rate	dc to 10 kHz		dc to 10 kHz		dc to 25 kHz
FM rate	dc to 10 MHz		dc to 10 MHz		dc to 150 kHz
Max. deviation	±10 to ±40 MHz		±10 to ±40 MHz		100 to 200 kHz
ΦM	Yes		Yes		Yes
Digital	No		<15 modulation types including MSK, FSK, QAM, PSK and an I/Q table editor		No
Pulse Waveforms	Yes Sine, square, ramp, triangle, pulse, noise		Yes Sine, square, ramp, triangle, pulse, noise		Yes, optional Sine, square, triangle, ramp
Sweep					
Sweep modes	Digital		Digital		—
Start/stop	Yes		Yes		—
CF/ΔF	No		No		—
Additional features					
	<ul style="list-style-type: none"> • Electronic attenuator • Internal function generator • Dual-tone sinewaves with the low frequency generator • dc FM • Upgradable to digital • Pulse modulation 		<ul style="list-style-type: none"> • Electronic attenuator • Broadband I/Q inputs • Internal function generator • Optional W-CDMA, cdma2000, CDMA, GSM, NADC, PDC, PHS, DECT, Bluetooth™, TETRA formats • dc FM • Upgradable options 		<ul style="list-style-type: none"> • Electronic attenuator • dc FM • 300 storage registers • 10 sequences • Remote and memory interfaces • Internal diagnostics • Pager encoder, optional

1. ESG-A series (E4400B/E4420B/E4421B/E4422B) and ESG-AP series (E4423B/E4424B/E4425B/E4426B).

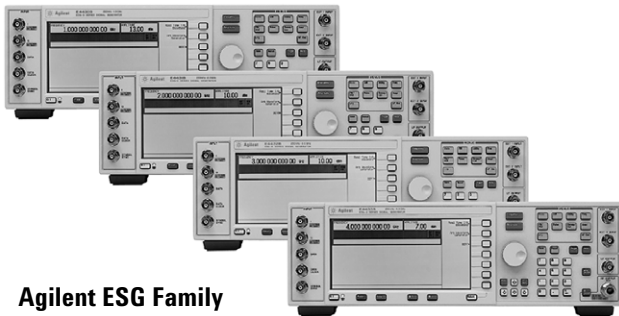
2. ESG-D series (E4430B/E4431B/E4432B/E4433B) and ESG-DP series (E4434B/E4435B/E4436B/E4437B).



- 8648A/B/C/D Opt. 1E5
- 8647A
- ESG-A/D Opt. 1E5
- ESG-AP/DP



Agilent 8648A/B/C/D



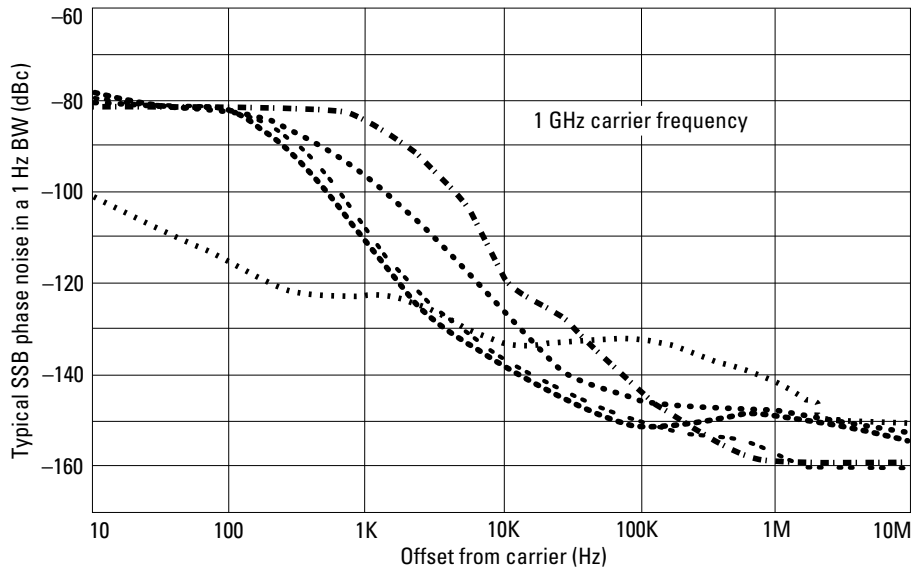
Agilent ESG Family

High-performance RF signal generators

Spectral purity is the critical measure of performance for RF signal generators. Agilent's high-performance signal generators excel in spectral purity and are ideal for in-channel and out-of-channel receiver

testing, radar, satellite communication, and phase-noise measurement applications. You'll also find that many special capabilities such as pulse modulation are standard features in Agilent signal generators.

	8643A	8644B	8662A/63A	8664A/65A/B
Frequency				
Range	252 kHz to 1.03 GHz, 2.06 GHz optional	252 kHz to 1.03 GHz, 2.06 GHz optional	10 kHz to 2.56 GHz	100 kHz to 6 GHz
Resolution (Hz)	0.01	0.01	0.2 to 0.4	0.01
Accuracy	Same as time base	Same as time base	Same as time base	Same as time base
Aging rate	$\pm 1.5 \times 10^{-9}$ /day	$\pm 1.5 \times 10^{-9}$ /day	$\pm 5 \times 10^{-10}$ /day	$\pm 1.5 \times 10^{-9}$ /day
High-stability option	$\pm 3.0 \times 10^{-10}$ /day	$\pm 3.0 \times 10^{-10}$ /day	None	$\pm 3.0 \times 10^{-10}$ /day
Output level				
Range (dBm)	+13 to -137	+16 to -137	+13 to -140	+13 to -139.9
Accuracy (dB)	± 1	± 1	± 1	± 1 to ± 3
Spectral purity level				
Harmonics (dBc)	<-25	<-25	<-30	<-30
Spurious (dBc)	<-100	<-100	<-84, <-78	<-100
Residual FM at 1 GHz (0.3 to 3 kHz BW)	<2 Hz	<1 Hz	0.1 Hz	<7.5 Hz
SSB phase noise	See chart	See chart	See chart	See chart
Modulation				
AM rate	dc to 100 kHz	dc to 100 kHz	dc to 10 kHz	dc to 10 kHz
FM rate	dc to 100 kHz	dc to 100 kHz	dc to 100 kHz	dc to 800 kHz
Max. deviation	± 1 MHz	± 10 MHz	± 200 , ± 400 kHz	± 5 MHz to ± 20 MHz
Φ M	No	No	No/Yes, 8663A optional	No
Digital	No	No	BPSK	No
Pulse	Yes	Yes	No/Yes, 8663A	Yes
Waveforms	Sine, triangle, square, ramp, Gaussian	Sine, triangle, square, ramp, Gaussian	—	Sine, triangle, square, ramp, Gaussian
Sweep				
Sweep modes	Digital	Digital	Digital	Digital
Start/stop	Yes	Yes	Yes	Yes
CF/ Δ F	Yes	Yes	Yes	Yes
Additional features				
	<ul style="list-style-type: none"> Complex audio waveform generation Electronic attenuator Self-diagnostics Digitized dc FM Specified VOR/ILS performance, optional 2 GHz counter, optional 	<ul style="list-style-type: none"> Lowest SSB phase noise at channel offsets Complex audio waveform generation Self-diagnostics Digitized dc FM 2 GHz counter, optional 	<ul style="list-style-type: none"> Auxiliary low-noise 640 MHz output Lowest close-in SSB phase noise Alternate sweep capabilities 	<ul style="list-style-type: none"> Complex audio waveform generation Self-diagnostics Module support Digitized dc FM Variable phase increments



- 8644B, 7032A Opt. 004
- 8643A and 8645A
- 8662/3A
- 8664A/65A/65B Opt. 004
- 8664A/65A/65B



Agilent 8643A/44B



Agilent 8664A/65A/B



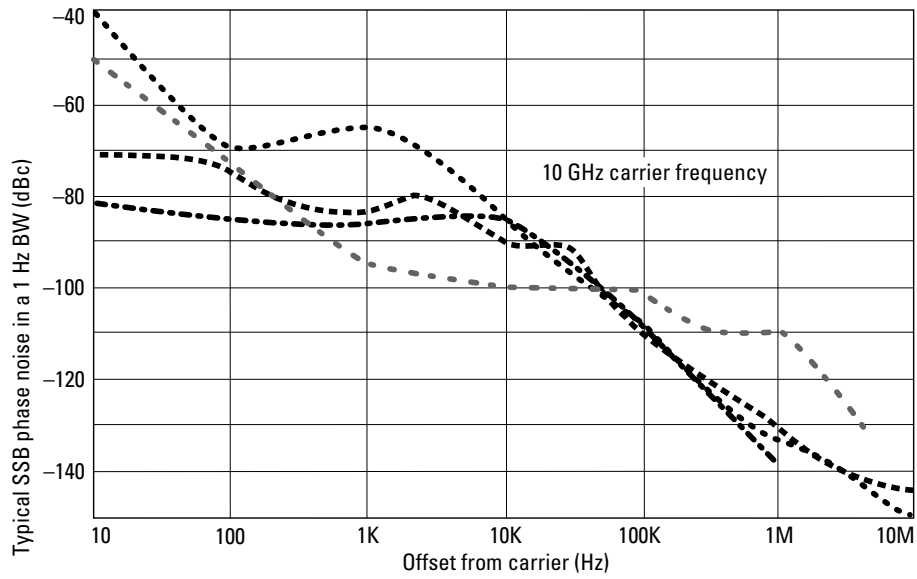
Agilent 8662A/63A

Microwave sources

Agilent offers a wide selection of microwave sources for a variety of applications. Most models combine the speed of a sweep oscillator with the excellent frequency resolution, level control, signal purity, and modulation capabilities typical of a

high-performance synthesized signal generator. Agilent microwave sources are ideal for the demanding requirements of signal simulation, local oscillator, and stimulus/response component or subsystem test applications.

	CW generators 83711B/12B	Signal generators/sweepers 8360 B-Series	83731B/32B	Synthesized sweepers 8360B/L	83751/52/A/B	Millimeter sources 83554/5/6/7/8
Frequency						
Range	10 MHz to 20 GHz	10 MHz to 50 GHz	10 MHz to 20 GHz	10 MHz to 50 GHz	10 MHz to 20 GHz	26.5 to 110 GHz
Resolution (kHz)	1 (1 Hz optional)	1 (1 Hz optional)	1 (1 Hz optional)	1 (1 Hz optional)	.001 (CW), 1 (swept)	Same as driver source
Accuracy	Same as time base	Same as time base	Same as time base	Same as time base	Same as time base	Same as driver source
Stability	1.0x10 ⁻⁹ /day	<5x10 ⁻¹⁰ /day	1.0x10 ⁻⁹ /day	<5x10 ⁻¹⁰ /day	10x10 ⁻⁹ /day	—
High-stability option	1.5x10 ⁻⁹ /day	—	1.5x10 ⁻⁹ /day	—	5x10 ⁻¹⁰ /day	—
Output level						
Range (dBm)	+13 to -110	+20 to -110	+13 to -110	+20 to -110	+17 to -85	-5 up to +4
Accuracy (dB)	±2.5	±1.7	±2.5	±1.7	±1.5	±2.5
User flatness (level) correction	Yes	Yes	Yes	Yes	Yes	—
Spectral purity level						
Harmonics (dBc)	<-50	<-50 (<-60 optional)	<-55	<-50 (<-60 optional)	-45, -20 (B models)	-20
Spurious (dBc)	<-60	<-60	<-60	<-60	-50	—
SSB phase noise	See chart	See chart	See chart	See chart	See chart	—
Modulation						
AM rate	—	dc to 100 kHz	dc to 100 kHz	dc to 100 kHz	100 kHz	dc to 100 kHz
FM Rate	—	100 kHz to 8 MHz	1 kHz to 1 MHz	100 kHz to 8 MHz	50 kHz to 10 MHz	—
Deviation (MHz)	—	±8	<±10	±8	±1 to ±7	—
Pulse modulation	—	Yes	Yes	Yes	Yes	Yes
Pulse width	—	1 μs	<25 ns	1 μs	2 μs	1 μs
Rate	—	10 Hz minimum	dc to >3 MHz	10 Hz minimum	15 Hz to 500 kHz	100 Hz to 500 kHz
Delay (ns)	—	80 (40 ns optional)	<100	80 (40 ns optional)	—	—
On-off (dB)	—	80	>80	80	60	>80
Rise/fall (ns)	—	<25 std.(<10 optional)	<10	<25 std.(<10 optional)	100 rise, 50 fall	50
Pulse modes	—	—	—	—	—	—
Free run	—	Yes	Yes	Yes	Yes	—
Triggered with variable delay	—	Optional	Yes	Optional	—	—
Doublet	—	No	Yes	No	—	—
Gated	—	Yes	Yes	Yes	—	—
Sweep						
Sweep types	—	Analog (lock and roll)	None	Analog (lock and roll)	Analog (fully synthesized)	Dependent on driver
Digital, list, ramp	—	—	Digital, list, ramp	Step, ramp	source	source
Start/stop	—	Yes	—	Yes	Yes	—
CF/ΔF	—	Yes	—	Yes	Yes	Yes
Markers	—	5	—	5	10	5
Additional features						
	<ul style="list-style-type: none"> Recommended LO for noise figure test User level correction -110 dB step attenuator (Option 1E1) 	<ul style="list-style-type: none"> Network analyzer compatible mm source module compatible Built-in pulse modulation generator Internal modulation generator (Option 002) Frequency coverage and modulation upgradable 	<ul style="list-style-type: none"> Built-in multimode pulse generator Analog phase modulation (Option 800) Linear AM Step attenuator Internal modulation generator (S, R, T, Sq, GN, UN) (Option 1E2) 	<ul style="list-style-type: none"> Network analyzer compatible mm source module compatible Built-in pulse modulation generator Internal modulation generator (Option 002) Frequency coverage and modulation upgradable 	<ul style="list-style-type: none"> Superior swept frequency accuracy Scalar analyzer compatible mm source module compatible 	<ul style="list-style-type: none"> With 8360B/L synthesized sweeper: <ul style="list-style-type: none"> Internal/external leveling Programmable Frequency markers



- 8360B/L
- 83752A/B
- . - . - . 83711B/12B/31B/32
- . - . - . E6432A



Agilent 8360B/L



Agilent 83752A/B

Agilent 83711/12

Agilent 83731/32

Frequency-agile/complex signal simulators

The Agilent family of Frequency-Agile Signal Simulators (FASS) generates the complex, yet realistic, test signals needed for today's sophisticated signal simulation and system test. Whether you are simulating advanced EW threats, radar target returns, satellite transponder traffic, or the multiple-signal environments of a cellular radio, FASS combines powerful modulation capability with digitally generated signal precision.

8645A

Frequency

Range	252 kHz to 2.06 GHz
Resolution (Hz)	0.01
Accuracy	Same as time base
Aging rate	$\pm 2 \times 10^{-6}$ /year
High-stability option	$\pm 3 \times 10^{-10}$ /year

Output level

Range (dBm)	+16 to -137
Accuracy (dB)	± 1

Spectral purity level

Harmonics (dBc)	<-30
Spurious (dBc)	<-100
Residual FM at 1 GHz: (0.3 to 3 kHz BW)	<2 Hz
SSB phase noise	See chart

Modulation

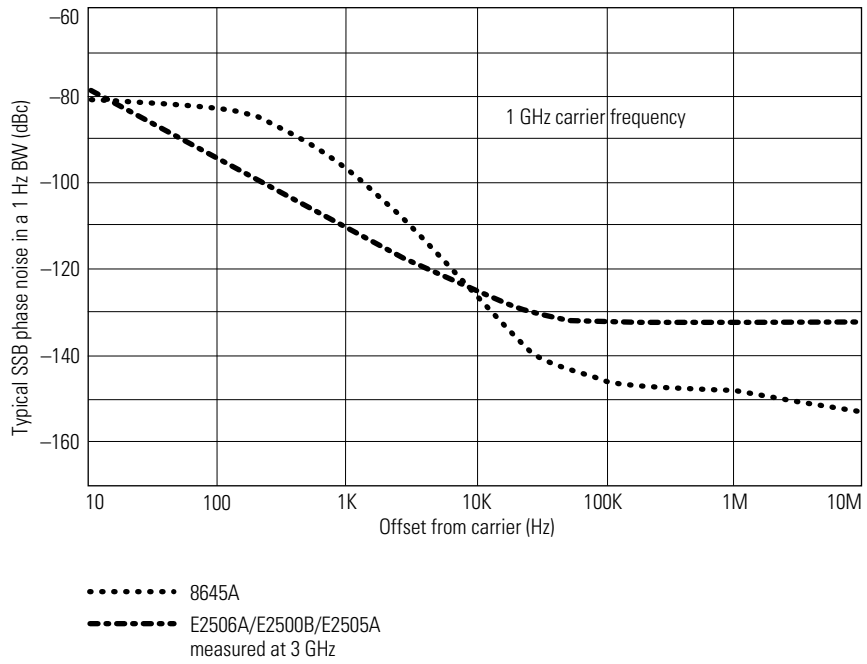
AM rate	dc to 100 kHz
FM rate	dc to 10 MHz
Max. deviation (MHz)	± 10
ΦM	No
Digital	No
Pulse	Yes
Internal modulation	Yes
Waveforms	Sine, square, ramp, Gaussian

Sweep

Sweep modes	Analog, digital
Start/stop	Yes
CF/ ΔF	Yes

Additional features

- <15 μ m sec switching speed
- Complex audio waveform generation
- Self-diagnostics
- Digitized dc FM
- Variable phase increments



Agilent 8645A

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."

Our Promise

"Our Promise" means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

"Your Advantage" means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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Innovating the HP Way