SDG8000A Series Arbitrary Waveform Generator

Data Sheet

EN01B

SIGLENT TECHNOLOGIES CO., LTD.

SDG8002A
SDG8004A

Product Overview

SDG8000A series function/arbitrary waveform generator, maximum 4 analog output channels, 16-bit vertical resolution, maximum 12 GSa/s (interpolation) sampling rate, output frequency up to 5 GHz and maximum modulation bandwidth up to 2 GHz. Maximum storage space of 4G points per channel, providing longer playing time without sacrificing signal bandwidth. With SiglQPro, it can also provide waveform output of communication signals such as Bluetooth, WIFI and LTE. In addition, SDG8000A also provides high-speed serial code signal (Hss)output, supports complex multi-layer sequence wave output, and has the functions of multipulse, multitone and chirp, which meets a wide range of test requirements in communication, industrial and scientific research fields.

Key Features

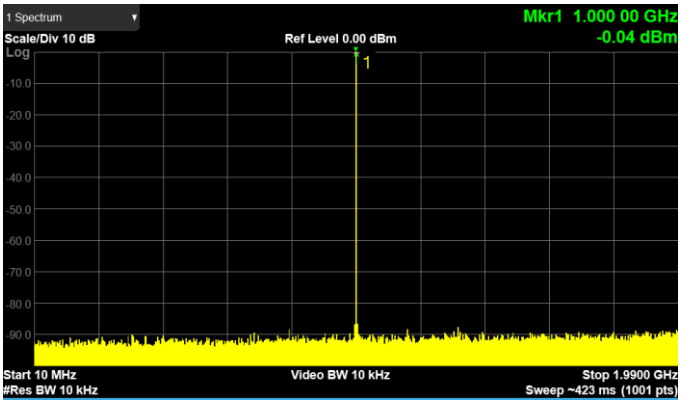
- 2/4 channels, maximum output frequency is 4 GHz (10 GSa/s sampling rate)/5 GHz (12 GSa/s sampling rate).
- 16-bit vertical resolution
- Using TrueArb technology, arbitrary waveforms can be output point by point. Without losing waveform details, low-jitter waveforms can be output at a sampling rate of 100 Sa/s ~ 5 GSa/s
- Supports multi-layer sequence wave playback function, with a maximum waveform memory of 4 Gpts per channel
- Using EasyPulse technology, it can output low-jitter square/pulses, and the pulse wave can achieve fine adjustment of pulse width, rising/falling edges, with extremely high adjustment resolution and adjustment range
- Support single-ended and differential output modes.
- Support multi pulse output function, which can be used to measure the switching parameters of power devices and evaluate their dynamic characteristics
- Support multi-tone and chirp functions
- Supports PRBS up to 1.25 Gbps
- Rich analog and digital modulation functions
- Sweep and Burst functions
- Harmonic function
- Waveform Combining function
- It can output vector signals with a bandwidth of up to 2 GHz
- Support Bluetooth, OFDM, IOT, LTE and WIFI signal output.
- 196 built-in arbitrary waveforms
- Standard interfaces: USB Host, USB Device (USBTMC), LAN (VXI-11); optional GPIB
- Built-in 250 GByte SSD hard disk
- Built-in WebServer supports instrument control via web browser
- 7-inch display touch screen

Models and Key Specifications

Model	SDG8002A	SDG8004A
Max output frequency	4 GHz@10G Sampling rate, 5 GHz@12G Sampling rate	4 GHz@10G Sampling rate 5 GHz@12G Sampling rate
Number of channels	2	4
Sampling rate	10 GSa/s (interpolation), optional 12 GSa/s (interpolation)	
Vertical resolution	16bits	
Arbitrary waveform length	2 Gpts, optional 4 Gpts	
Display	7-inch display touch screen	
Interface	Standard interfaces: USB Host, USB Device (USBTMC), LAN (VXI-11); optional GPIB	

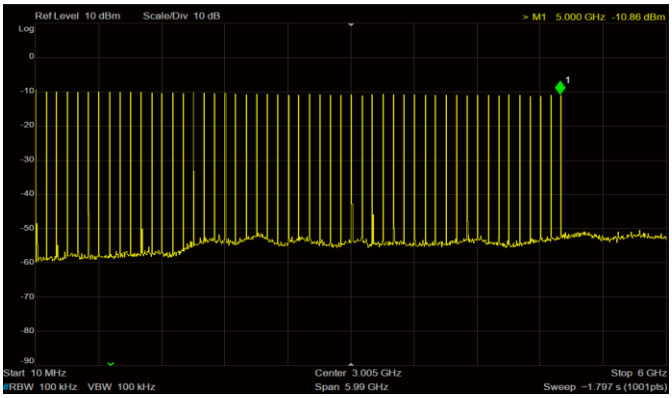
Characteristics

High quality restore signal

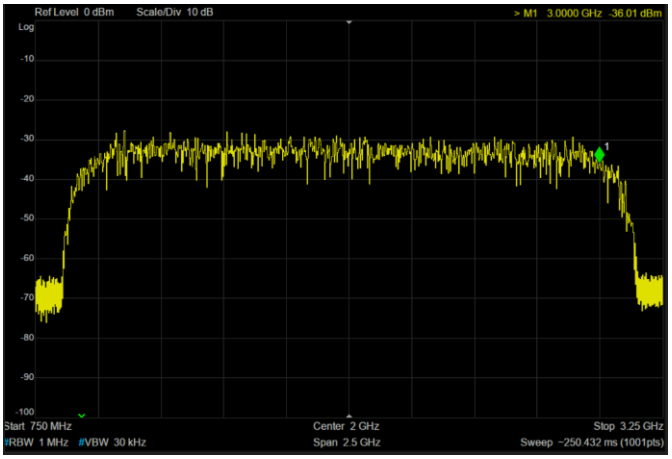


SDG8000A supports 10 G (interpolation) or 12 G (interpolation) sampling rate.
16-bit vertical resolution, high quality restored signal.

Higher frequency, larger signal bandwidth

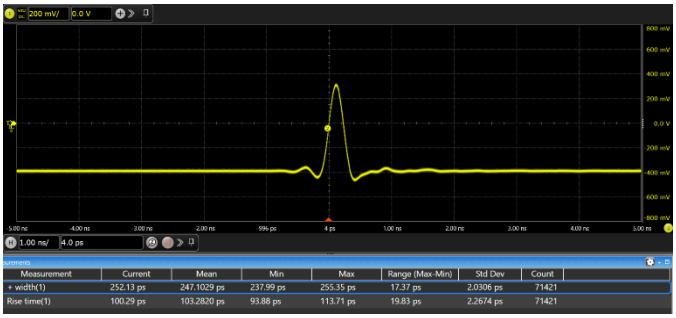


This instrument features a built-in digital modulator that enables direct RF output up to 5 GHz, eliminating the need for an external modulator. Combined with the powerful SiglQPro software, this setup offers a streamlined way to create and output signals for a wide range of communication standards, including 5G NR, LTE, WLAN, Bluetooth, and IoT.



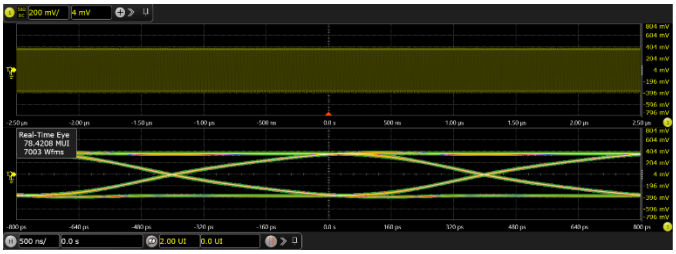
The maximum baseband data rate of SDG8000A is 5 GSa/s, and the maximum modulation bandwidth of the signal can reach 2 GHz by using an internal modulator. When the baseband signal is output and an external modulator is used, the signal bandwidth of 4 GHz can be supported.

Narrower pulse output



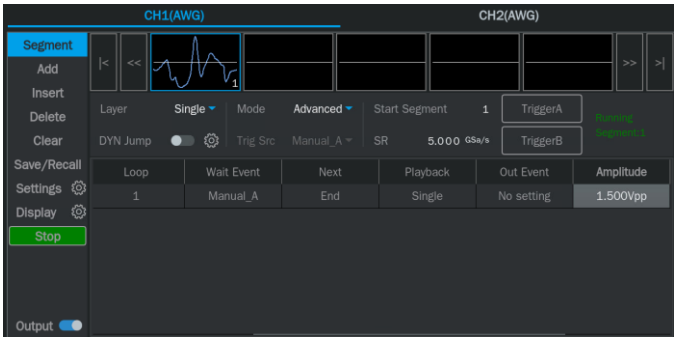
With its high data rate, the SDG8000A can generate narrow pulses as low as 250 ps, making it ideal for demanding pulse test applications in areas such as semiconductor and automotive.

High speed serial data output(Hss)



SDG8000A supports high-speed serial code output with low jitter up to 1.25 Gbps, and can simulate high-speed serial digital communication test.

Larger waveform storage space

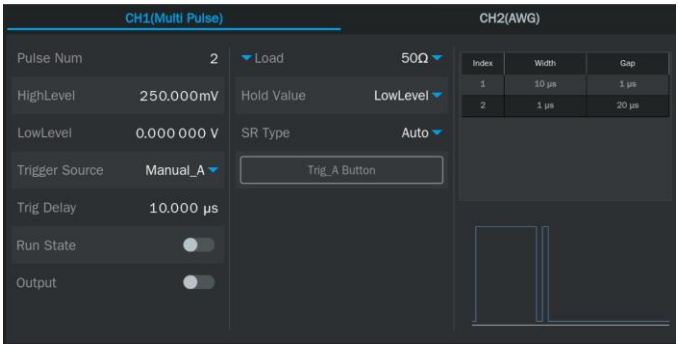


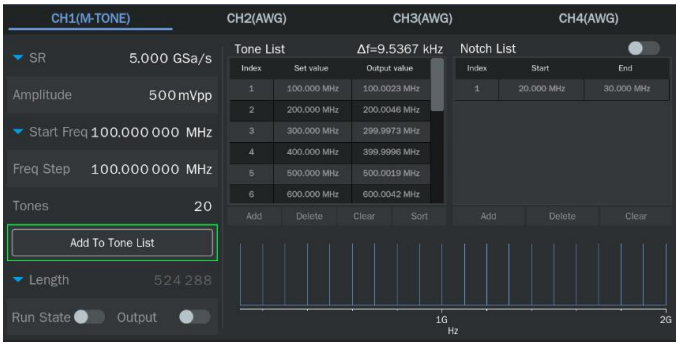
The maximum waveform storage space per channel is 4 Gpts. Under the maximum sampling rate, the waveform can be played for 800 ms without sacrificing signal bandwidth, which meets the test requirements of complex scenes.

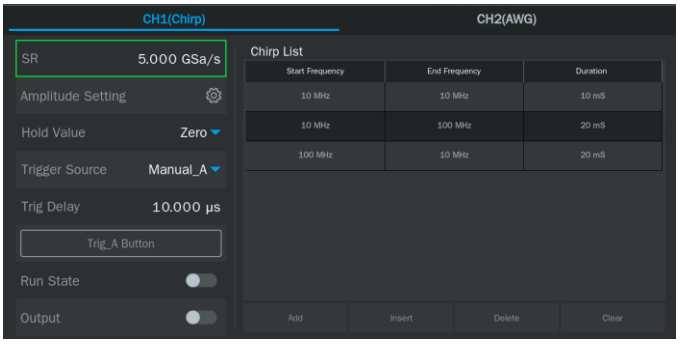
Powerful multi-level sequence playback function

SDG8000A supports the editing and playing functions of segment, sequence and scenario multi-level sequence waves, as well as flexible playing control settings, which makes it easier to create complex sequence waves.

Built-in multi-pulse, multi-tone and Chirp functions







Built-in multi-pulse, multi-tone and chirp functions make professional testing easier.

Specifications

The data in this manual can be used only if the instrument is in the calibration period, stored in the indoor temperature environment for at least two hours, and preheated for 40 minutes. Unless otherwise specified, the data in this manual are all technical indicators including measurement uncertainty.

Technical index: indicates the guaranteed parameter performance of the product, which is applicable to the ambient temperature range at room temperature, unless otherwise specified.

Typical value: indicates the typical performance that can be achieved by 80% of the test results at room temperature (about 25℃). This data is not guaranteed data, and does not contain measurement uncertainty.

Nominal value: indicates the expected average performance or performance characteristics of the design, such as 50 Ω connector. This data is not guaranteed data, and is measured at room temperature (about 25℃), and does not contain the measurement uncertainty.

General Indicators		
Parameter	SDG8002A	SDG8004A
Number of channels	2	4
Sampling rate	10 GSa/s, optional 12 GSa/s (IQ mode only)	10 GSa/s, optional 12 GSa/s (IQ mode only)
Vertical resolution	16 bit @ (0 Marker) 15 bit @ (1 Marker) 14 bit @ (2 Marker)	16 bit @ (0 Marker) 15 bit @ (1 Marker) 14 bit @ (2 Marker)
Number of marker	2 per channel	2 per channel
Waveform storage depth	2 G/ channel is standard, and 4 G/ channel is optional.	2 G/ channel is standard, and 4 G/ channel is optional.
Output interface	SMA	SMA
Maximum output frequency	4 GHz @ 10 GSa/s,5 GHz @ 12 GSa/s	4 GHz @ 10 GSa/s, 5 GHz @ 12 GSa/s
Operation mode	AWG,AFG,IQ	AWG,AFG,IQ

Analog Output Characteristics			
Output path	Parameter		Conditions
DC-HBW	Amplitude	25 mVpp ~ 750 mVpp, Single-ended, 50 ohm termination impedance 50 mVpp ~ 1.5 Vpp, Differential, 100 ohm termination impedance	
	Accuracy	±2%, set value > 100 mVpp ±(5%*|set value|+2 mV), Set value≤100 mVpp	10 kHz, sine
	Offset	0 V±5 mV, not settable	
	Analog bandwidth	750 mVpp, DC ~ 2 GHz (-3 dB), DC ~ 4 GHz (-6 dB)（typical value）	5 GHz filter
	Risetime	≤125 ps @ 750 mVpp Single ended output, 20% ~ 80%	5 GHz filter
DC-AMP	Amplitude	50 mVpp ~ 1.5 Vpp, Single-ended, 50 ohm termination impedance 100 mVpp ~ 3 Vpp, Differential, 100 ohm termination impedance	
	Accuracy	±2%, set value > 100 mVpp ±（5%*| set value |+2 mV）, set value≤100 mVpp	10 kHz, sine

	Offset Range	±1 V, Single-ended, 50 ohm termination impedance	
	Offset Accuracy	± （2%*| set value |+10 mV） , Single-ended, 50 ohm termination impedance	
	Analog bandwidth	1.5 Vpp,DC ~ 2 GHz (-3 dB), DC ~ 2.6 GHz (-6 dB)（typical value）	5 GHz filter
	Risetime	≤150 ps @ 1.5 Vpp Single ended output, 20% ~ 80%	5 GHz filter
AC-DIR	Amplitude	-30 dBm ~ -5 dBm, Single-ended, 50 ohm termination impedance	
	Accuracy	±0.5 dB	10 MHz, sine
	Offset Range	±5 V	
	Offset Accuracy	± （2%*| set value |+20 mV） , Single-ended, 50 ohm termination impedance	
	Analog bandwidth	-5dBm, 10 MHz ~ 1.7 GHz (-3 dB), 10 MHz ~ 4 GHz (-13 dB), 10 MHz ~ 5 GHz (-18 dB) (typical value)	5 GHz filter
AC-AMP	Amplitude	-85 dBm ~ +10 dBm, Single-ended, 50 ohm termination impedance	
	Accuracy	±0.5 dB, ≥-30dBm ±1.5 dB, ＜-30dBm	10 MHz, sine
	Offset Range	±5 V	
	Offset Accuracy	± （2%*| set value |+20 mV） , Single-ended, 50 ohm termination impedance	
	Analog bandwidth	10dBm, 10 MHz ~ 2 GHz （-3 dB）, 10 MHz ~ 3.8 GHz （-6 dB）, 10 MHz ~ 5 GHz （-13 dB） (typical value)	5 GHz filter
Channel isolation		≤-70 dBc	
Inter-channel skew		<15ps	Same output path
P/N terminal skew of DC channel		<10ps	

Voltage Standing Wave Ratio VSWR （5 G filter, nominal value）		
Output path	Indicator	Conditions
DC-HBW	DC~1 GHz ≤1.6 : 1	
	1 GHz ~ 3 GHz ≤1.9 : 1	
	3 GHz ~ 4 GHz ≤2.1 : 1	
	4 GHz ~ 5 GHz ≤1.8 : 1	
DC-AMP	DC~1 GHz ≤1.6 : 1	
	1 GHz ~ 2.6 GHz ≤2.0 : 1	
AC-DIR	10 MHz ~1 GHz ≤1.6 : 1	
	1 GHz ~ 3 GHz ≤1.8 : 1	
	3 GHz ~ 4 GHz ≤2.1 : 1	
	4 GHz ~ 5 GHz ≤2.2 : 1	
AC-AMP	10 MHz~300 MHz ≤1.8 : 1	

	300 MHz ~ 2 GHz ≤1.6 : 1	
	2 GHz ~ 3 GHz ≤2.0 : 1	
	3 GHz ~ 4GHz ≤2.0 : 1	
	4 GHz ~ 5 GHz ≤2.4 : 1	

Phase Noise		
Frequency	Indicator	Conditions
100 MHz	-139 dBc/Hz@10 kHz offset	
1 GHz	-120 dBc/Hz@10 kHz offset	
2 GHz	-114 dBc/Hz@10 kHz offset	
4 GHz	-108 dBc/Hz@10 kHz offset	

Harmonic distortion test conditions: unless otherwise specified, the output power is 10 MHz. The digital power at other frequencies is the same as that at 10 MHz, and the actual analog output power is attenuated according to the channel characteristics. Test with 5G filter.

Second Harmonic Distortion (typical value)			
Output path	Parameter		Conditions
DC-HBW (barron)	< -56 dBc	10 MHz ≤ f ≤1 GHz	12 G sampling rate 750 mVpp
	< -50 dBc	1 GHz < f ≤ 1.5 GHz	
	< -55 dBc	1.5 GHz < f ≤ 3 GHz	
	< -60 dBc	3 GHz < f ≤ 5 GHz	
DC-AMP (barron)	< -51 dBc	10 MHz ≤ f ≤ 500 MHz	12 G sampling rate 1.5 Vpp
	< -51 dBc	500 MHz < f ≤ 1 GHz	
	< -52 dBc	1 GHz < f ≤ 2 GHz	
	< -70 dBc	2 GHz < f ≤ 2.6 GHz	
DC-HBW (single end)	< -37 dBc	10 MHz ≤ f ≤ 500 MHz	12 G sampling rate 750 mVpp
	< -37 dBc	500 MHz < f ≤ 1.5 GHz	
	< -38 dBc	1.5 GHz < f ≤ 3 GHz	
	< -42 dBc	3 GHz < f ≤ 3.5 GHz	
	< -47 dBc	3.5 GHz < f ≤ 4 GHz	
	< -50 dBc	4 GHz < f ≤ 5 GHz	
DC-AMP (single end)	< -36 dBc	10 MHz ≤ f ≤500 MHz	12 G sampling rate 1.5 Vpp
	< -33 dBc	500 MHz < f ≤ 1 GHz	
	< -32 dBc	1 GHz < f ≤ 2 GHz	
	< -60 dBc	2 GHz < f ≤ 2.6 GHz	
AC-DIR	< -67 dBc	10 MHz ≤ f ≤500 MHz	12 G sampling rate -5 dBm
	< -56 dBc	500 MHz < f ≤ 1 GHz	
	< -47 dBc	1 GHz < f ≤ 1.5 GHz	
	< -52 dBc	1.5 GHz < f ≤ 3 GHz	
	< -80 dBc	3 GHz < f ≤ 5 GHz	
AC-AMP	< -37 dBc	10 MHz ≤f ≤50 MHz	Nonlinear compensation,10G

	< -45 dBc	50 MHz < f ≤ 500 MHz	sampling rate 10 dBm
	< -44 dBc	500 MHz < f ≤ 1 GHz	
	< -28 dBc	1 GHz < f ≤ 3 GHz	12 G sampling rate 10 dBm
	< -30 dBc	3 GHz < f ≤ 4.5 GHz	
	< -35 dBc	4.5 GHz < f ≤ 5 GHz	

Third Harmonic Distortion (typical value)			
Output path	Parameter		Conditions
DC-HBW (barron)	< -52 dBc	10 MHz ≤ f ≤500 MHz	12 G sampling rate 750 mVpp
	< -45 dBc	500 MHz < f ≤ 1.5 GHz	
	< -49 dBc	1.5 GHz < f ≤ 3GHz	
	< -55 dBc	3 GHz < f ≤ 4 GHz	
	< -80 dBc	4 GHz < f ≤ 5 GHz	
DC-AMP (barron)	< -44 dBc	10 MHz ≤f ≤500 MHz	12 G sampling rate 1.5 Vpp
	< -43 dBc	500 MHz < f ≤ 1 GHz	
	< -46 dBc	1 GHz < f ≤ 1.3 GHz	
	< -75 dBc	1.3 GHz < f ≤ 2.6 GHz	
DC-HBW (single end)	< -50 dBc	10 MHz ≤f ≤500 MHz	12 G sampling rate 750 mVpp
	< -43 dBc	500 MHz < f ≤ 1.5 GHz	
	< -47 dBc	1.5 GHz < f ≤ 3GHz	
	< -53 dBc	3 GHz < f ≤ 4 GHz	
	< -80 dBc	4 GHz < f ≤ 5 GHz	
DC-AMP (single end)	< -42 dBc	10 MHz ≤f ≤500 MHz	12 G sampling rate 1.5 Vpp
	< -41 dBc	500 MHz < f ≤ 1 GHz	
	< -45 dBc	1 GHz < f ≤ 1.3 GHz	
	< -74 dBc	1.3 GHz < f ≤ 2.6 GHz	
AC-DIR	< -60 dBc	10 MHz ≤f ≤500 MHz	12 G sampling rate -5 dBm
	< -58 dBc	500 MHz < f ≤ 1 GHz	
	< -55 dBc	1 GHz < f ≤ 2 GHz	
	< -80 dBc	2 GHz < f ≤ 5 GHz	
AC-AMP	< -41 dBc	10 MHz ≤f ≤50 MHz	12 G sampling rate 10 dBm
	< -43 dBc	50 MHz < f ≤ 500 MHz	
	< -41 dBc	500 MHz < f ≤ 1 GHz	
	< -42 dBc	1 GHz < f ≤ 2 GHz	
	< -50 dBc	2 GHz < f ≤ 3 GHz	
	< -60 dBc	3 GHz < f ≤ 4 GHz	
	< -80 dBc	4 GHz < f ≤ 5 GHz	

SFDR test conditions: Unless otherwise specified, the output power refers to the output power at 10 MHz. The digital power at other frequencies is the same as that at 10 MHz, and the actual analog output power is attenuated according to the channel characteristics.

SFDR（typical value）					
DC-HBW（Barron,0dBm）					
	Frequency	In band performance		Adjacent band performance	
		Measuring range	Indicators (dBc)	Measuring range	Indicators (dBc)
10 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-80	1.25 GHz ＜f ≤ 5 GHz	-55
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-72	1.25 GHz ＜f ≤ 5 GHz	-51
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-71	1.25 GHz ＜f ≤ 5 GHz	-49
	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-64	10 MHz ＜f ≤ 1.25 GHz	-64
				2 GHz ＜f ≤ 5 GHz	-47
	2 GHz ＜f ≤ 3.5 GHz	2 GHz ＜f ≤ 3.5 GHz	-43	10 MHz ＜f ≤ 2 GHz	-40
				3.5 GHz ＜f ≤ 5 GHz	-53
	3.5 GHz ＜f ≤ 4 GHz	3.5 GHz ＜f ≤ 4 GHz	-52	10 MHz ＜f ≤ 3.5 GHz	-38
				4 GHz ＜f ≤ 5 GHz	-51
12 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-80	1.25 GHz ＜f ≤ 6 GHz	-78
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-72	1.25 GHz ＜f ≤ 6 GHz	-65
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-72	1.25 GHz ＜f ≤ 6 GHz	-60
	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-71	10 MHz ＜f ≤ 1.25 GHz	-64
				2 GHz ＜f ≤ 6 GHz	-55
	2 GHz ＜f ≤ 3.5 GHz	2 GHz ＜f ≤ 3.5 GHz	-50	10 MHz ＜f ≤ 2 GHz	-49
				3.5 GHz ＜f ≤ 6 GHz	-54
	3.5 GHz ＜f ≤ 4 GHz	3.5 GHz ＜f ≤ 4 GHz	-67	10 MHz ＜f ≤ 3.5 GHz	-48
				4 GHz ＜f ≤ 6 GHz	-58
	4 GHz ＜f ≤ 5 GHz	4 GHz ＜f ≤ 5 GHz	-63	10 MHz ＜f ≤ 4 GHz	-43
				5 GHz ＜f ≤ 6 GHz	-65
DC-AMP（Barron,0dBm）					
	Frequency	In band performance		Adjacent band performance	
		Measuring range	Indicators (dBc)	Measuring range	Indicators (dBc)
10 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-78	1.25 GHz ＜f ≤ 5 GHz	-76
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-63	1.25 GHz ＜f ≤ 5 GHz	-63
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-63	1.25 GHz ＜f ≤ 5 GHz	-63
	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-50	10 MHz ＜f ≤ 1.25 GHz	-60
				2 GHz ＜f ≤ 5 GHz	-53
	2 GHz ＜f ≤ 2.6 GHz	2 GHz ＜f ≤ 2.6 GHz	-43	10 MHz ＜f ≤ 2 GHz	-58
				2.6 GHz ＜f ≤ 5 GHz	-80

12 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-78	1.25 GHz ＜f ≤ 6 GHz	-75
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-63	1.25 GHz ＜f ≤ 6 GHz	-64
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-63	1.25 GHz ＜f ≤ 6 GHz	-64
	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-63	10 MHz ＜f ≤ 1.25 GHz	-60
				2 GHz ＜f ≤ 6 GHz	-64
	2 GHz ＜f ≤ 2.6 GHz	2 GHz ＜f ≤ 2.6 GHz	-65	10 MHz ＜f ≤ 2 GHz	-57
				2.6 GHz ＜f ≤ 6 GHz	-80

AC-DIR（-5 dBm）

	Frequency	In band performance		Adjacent band performance	
		Measuring range	Indicators (dBc)	Measuring range	Indicators (dBc)
10 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-80	1.25 GHz ＜f ≤ 5 GHz	-67
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-73	1.25 GHz ＜f ≤ 5 GHz	-68
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-70	1.25 GHz ＜f ≤ 5 GHz	-68
	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-58	10 MHz ＜f ≤ 1.25 GHz	-58
				2 GHz ＜f ≤ 5 GHz	-62
	2 GHz ＜f ≤ 3.5 GHz	2 GHz ＜f ≤ 3.5 GHz	-53	10 MHz ＜f ≤ 2 GHz	-48
				3.5 GHz ＜f ≤ 5 GHz	-55
	3.5 GHz ＜f ≤ 4 GHz	3.5 GHz ＜f ≤ 4 GHz	-68	10 MHz ＜f ≤ 3.5 GHz	-45
				4 GHz ＜f ≤ 5 GHz	-55
12 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-80	1.25 GHz ＜f ≤ 6 GHz	-78
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-72	1.25 GHz ＜f ≤ 6 GHz	-68
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-68	1.25 GHz ＜f ≤ 6 GHz	-63
	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-73	10 MHz ＜f ≤ 1.25 GHz	-63
				2 GHz ＜f ≤ 6 GHz	-53
	2 GHz ＜f ≤ 3.5 GHz	2 GHz ＜f ≤ 3.5 GHz	-40	10 MHz ＜f ≤ 2 GHz	-49
				3.5 GHz ＜f ≤ 6 GHz	-51
	3.5 GHz ＜f ≤ 4 GHz	3.5 GHz ＜f ≤ 4 GHz	-62	10 MHz ＜f ≤ 3.5 GHz	-38
				4 GHz ＜f ≤ 6 GHz	-51
	4 GHz ＜f ≤ 5 GHz	4 GHz ＜f ≤ 5 GHz	-55	10 MHz ＜f ≤ 4 GHz	-27
				5 GHz ＜f ≤ 6 GHz	-60

AC-AMP（0 dBm）

	Frequency	In band performance		Adjacent band performance	
		Measuring range	Indicators (dBc)	Measuring range	Indicators (dBc)
10 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-72	1.25 GHz ＜f ≤ 5 GHz	-65
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-60	1.25 GHz ＜f ≤ 5 GHz	-59
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-57	1.25 GHz ＜f ≤ 5 GHz	-58

	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-57	10 MHz ＜f ≤ 1.25 GHz	-57
				2 GHz ＜f ≤ 5 GHz	-50
	2 GHz ＜f ≤ 3.5 GHz	2 GHz ＜f ≤ 3.5 GHz	-53	10 MHz ＜f ≤ 2 GHz	-53
				3.5 GHz ＜f ≤ 5 GHz	-47
	3.5 GHz ＜f ≤ 4 GHz	3.5 GHz ＜f ≤ 4 GHz	-61	10 MHz ＜f ≤ 3.5 GHz	-53
				4 GHz ＜f ≤ 5 GHz	-46
12 Gsa/s	100 MHz	10 MHz ＜f ≤ 1.25 GHz	-74	1.25 GHz ＜f ≤ 6 GHz	-69
	10 MHz ＜f ≤ 625 MHz	10 MHz ＜f ≤ 1.25 GHz	-65	1.25 GHz ＜f ≤ 6 GHz	-62
	625 MHz ＜f ≤ 1.25 GHz	10 MHz ＜f ≤ 1.25 GHz	-57	1.25 GHz ＜f ≤ 6 GHz	-57
	1.25 GHz ＜f ≤ 2 GHz	1.25 GHz ＜f ≤ 2 GHz	-57	10 MHz ＜f ≤ 1.25 GHz	-57
				2 GHz ＜f ≤ 6 GHz	-51
	2 GHz ＜f ≤ 3.5 GHz	2 GHz ＜f ≤ 3.5 GHz	-44	10 MHz ＜f ≤ 2 GHz	-52
				3.5 GHz ＜f ≤ 6 GHz	-48
	3.5 GHz ＜f ≤ 4 GHz	3.5 GHz ＜f ≤ 4 GHz	-57	10 MHz ＜f ≤ 3.5 GHz	-40
				4 GHz ＜f ≤ 6 GHz	-50
	4 GHz ＜f ≤ 5 GHz	4 GHz ＜f ≤ 5 GHz	-53	10 MHz ＜f ≤ 4 GHz	-32
				5 GHz ＜f ≤ 6 GHz	-58

AWG Mode

AWG characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Sampling rate	100		5 G	Sa/s	10 GSa/s (Interpolation)
Rising/falling time			125	ps	20%~80%,10 kHz,750 mVpp,50 Ω, DC-HBW, 5 G filter
Waveform length	1024		2 G (option 4G)	pts	When it is less than 2048, it must be an integer multiple of 16.
Vertical resolution	Without Marker output, 16 bit; Marker 1 output, 15 bit; Marker 2 output, 14 bit				
Mode	Continuous, Triggered, Gated Ext1/2, Advanced				
Interpolation mode	0-order hold, linear, sinc, sinc13, sinc27				
Sequence restriction	The maximum number of scenario is 512. The maximum number of Sequence is 4096. The maximum number of Segment is 16384.				
Trigger source	Auto, manual, external, timer				

IQ Mode

IQ characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Sampling rate	500		5 G	Sa/s	10 GSa/s, base band
	500		2.5 G		10 GSa/s, Intermediate Frequency (IF)
	500		2 G		12 GSa/s, Intermediate Frequency (IF)
modulation bandwidth			2 G	Hz	10 GSa/s, Intermediate Frequency (IF)
			1.6 G		12 GSa/s, Intermediate Frequency (IF)
Output frequency			4 G	Hz	10 GSa/s
			5 G		12 GSa/s
Waveform length	1024		2 G（option 4 G）	pts	When it is less than 2048, it must be an integer multiple of 16.
Vertical resolution	Without Marker output, 16 bit； Marker 1 output, 15 bit；Marker 2 output, 14 bit				
Modulation type	2ASK, 4ASK, 8ASK, BPSK, QPSK, 8PSK, DBPSK, DQPSK, OQPSK, D8PSK, 8QAM, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 2FSK, 4FSK, 8FSK, 16FSK, MSK, MultiTone, OFDM, customize				Supported by SiglQPro
Signal protocol type	BlueTooth, Iot, LTE TDD, LTE FDD, 5G NR, IEEE.802.11.be, IEEE.802.11.ax				Supported by SiglQPro

AFG Mode

The following data are measured by DC-AMP and 2G filter, unless otherwise specified.

Sine characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Frequency	1 μ		2 G	Hz	DC-HBW
	1 μ		2 G	Hz	DC-AMP
	10 M		2 G	Hz	AC-DIR
	10 M		2 G	Hz	AC-AMP
Harmonic distortion				dBc	See harmonic distortion table.
Non-harmonic spur				dBc	See SFDR table.
Total Harmonic Distortion (THD)		0.2	0.5	%	0 dBm,10 Hz ~ 20 kHz
Amplitude flatness	-0.5		+0.5	dB	≥-30 dBm,compare to 1 MHz in DC, compare to 10 MHz in AC.
	-1.5		+1.5		＜-30 dBm, compare to 1 MHz in DC, compare to 10 MHz in AC.

Square characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Frequency	1 μ		500 M	Hz	
Rising/falling time	500		650	ps	10% ~ 90%, 100 kHz, 1 Vpp, 50 Ω
Overshoot			10	%	100 kHz, 1 Vpp, 0 V offset, 50 Ω
Duty cycle	0.001		99.999	%	This parameter is limited by the frequency setting.
Jitter (rms), period-to-period			10	ps	1 Vpp, 50 Ω, > 100 kHz

Pulse characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Frequency	1 μ		500 M	Hz	
Width	500 ps		period -500 ps		
Width accuracy			±(0.01%+ 0.15 ns)		
Rising/falling time	250 ps		75 s		10% ~ 90%, 1 Vpp, 50 Ω
Overshoot			10	%	100 kHz, 1 Vpp, 50 Ω, edge 500 ps
Duty cycle	0.001		99.999	%	This parameter is limited by the frequency setting.
Jitter (rms), period-to-period			10	ps	>100 kHz, 1 Vpp, 500 ps, 50 Ω

Noise characteristics					
Parameter	Min	Typ	Max	Unit	Condition
-3 dB bandwidth		2 G		Hz	
Bandwidth range	10 M		2G	Hz	

Ramp characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Frequency	1 μ		50 M	Hz	
Symmetry	0		100	%	
linearity			1	%	10%~90% of Vpp,10 kHz, 0.75 Vpp, 50% symmetry. DC-HBW

Arb characteristics					
Parameter	Min	Typ	Max	Unit	Condition
DDS mode					
Frequency	1 μ		100 M	Hz	5 GSa/s
Waveform length	32768			pts	
Rising/falling time		200		ps	10% ~ 90%, 1 Vpp step signal, 50 Ω

PRBS characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Bit rate	20 m		1.25 G	bps	
Sequence length	2^m-1, m = 3,4,…,32				
Rising/falling time	250 ps		1 μs		10% ~ 90%,1 Vpp,50 Ω

Dc characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Range	-1		+1	V	50 Ω
Accuracy	± (2%*|set value|+10 mV)				

Harmonic characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Harmonic number			20		
Harmonic type	Even, Odd, All				

Modulation characteristics					
AM					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation source	Internal/External/Channel				
Modulating wave	Sine, Square, Ramp, Noise, Arb				
Modulation depth	0		120	%	10 kHz sine
Modulation frequency	1 m		5 M	Hz	Source = Internal
FM					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				

Modulation source	Internal/External/Channel				
Modulation wave	Sine, Square, Ramp, Noise, Arb				
Frequency deviation	0		0.5*BW		BW is the max. output frequency. Limited by frequency setting
Modulation frequency	1 m		5 M	Hz	Source = Internal
PM					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation source	Internal/External/Channel				
Modulation wave	Sine, Square, Ramp, Noise, Arb				
Phase deviation	0		360	°	
Modulation frequency	1 m		5 M	Hz	Source = Internal
ASK					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation source	Internal/External				
Modulation wave	Square with 50% duty cycle				
Keying frequency	1 m		5 M	Hz	Source = Internal
FSK					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation source	Internal/External				
Modulation wave	Square with 50% duty cycle				
Keying frequency	1 m		5 M	Hz	Source = Internal
PSK					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Modulation source	Internal/External				
Modulation wave	Square with 50% duty cycle				
Keying frequency	1 m		5 M	Hz	Source = Internal
PWM					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Pulse				
Modulation source	Internal/External				
Modulation wave	Sine, Square, Ramp, Noise, Arb				
Modulation frequency	1 m		5 M	Hz	Source = Internal

Burst characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Pulse, Noise, Arb				
Type	Count (1-1000000 Cycles), Infinite, Gated				
Carrier frequency	2 m		BW	Hz	BW is the max. output frequency
Phase	-360		360	°	
Internal period	1 µ		1000	s	
Trigger source	Internal, External, Manual				
Gated source	Internal/External				
Trigger delay			100	s	

Sweep characteristics					
Parameter	Min	Typ	Max	Unit	Condition
Carrier	Sine, Square, Ramp, Arb				
Sweep mode	Frequency, Amplitude, Frequency and Amplitude				
Sweep type	Linear, Log, Step				
Direction	Up, Down, Up_Down				
Carrier frequency	1 µ		BW	Hz	BW is the max. output frequency
Sweep time	10 µ		1000	s	
Trigger source	Internal, External, Manual				

Frequency and maximum output amplitude/power (sine)		
Output path	Frequency	Maximum amplitude/power
DC-HBW single end,50Ω	f≤1.5 GHz	750 mVpp
	1.5 GHz < f≤1.8 GHz	660 mVpp
	1.8 GHz < f≤2.8 GHz	600 mVpp
	2.8 GHz < f≤3.3 GHz	460 mVpp
	3.3 GHz < f≤4 GHz	440 mVpp
	4 GHz < f≤4.5 GHz	360 mVpp
	4.5 GHz < f≤5 GHz	200 mVpp
DC-AMP single end,50Ω	f≤1.5 GHz	1.5 Vpp
	1.5 GHz < f≤2 GHz	1.3 Vpp
	2 GHz < f≤2.3 GHz	1.2 Vpp
	2.3 GHz < f≤2.6 GHz	1 Vpp

AC-DIR 50Ω	f≤1.4 GHz	-5 dBm
	1.4 GHz < f≤1.7 GHz	-7 dBm
	1.7 GHz < f≤2 GHz	-9 dBm
	2 GHz < f≤2.5 GHz	-10 dBm
	2.5 GHz < f≤3 GHz	-13 dBm
	3 GHz < f≤4 GHz	-16 dBm
	4 GHz < f≤4.5 GHz	-18 dBm
	4.5 GHz < f≤5 GHz	-22 dBm
AC-AMP 50Ω	f≤1.6 GHz	10 dBm
	1.6 GHz < f≤2 GHz	9 dBm
	2 GHz < f≤2.6 GHz	8 dBm
	2.6 GHz < f≤3.3 GHz	7 dBm
	3.3 GHz < f≤3.8 GHz	6 dBm
	3.8 GHz < f≤4 GHz	5 dBm
	4 GHz < f≤4.4 GHz	4 dBm
	4.4 GHz < f≤5 GHz	0 dBm

Clock characteristics					
Standard time base					
Parameter	Min	Typ	Max	Unit	Condition
Accuracy	-1		+1	ppm	25 ℃
	-2		+2	ppm	0 ~ 50 ℃
1-year aging rate	-0.5		+0.5	ppm	
20-year aging rate	-3.0		+3.0	ppm	
OCXO option					
Parameter	Min	Typ	Max	Unit	Condition
Frequency		10M		Hz	
Initial accuracy	-100		+100	ppb	25 ℃
Temperature stability	-1		+1	ppb	0 ~ 50 ℃
1-year aging rate	-50		+50	ppb	
10 MHz input					
Parameter	Min	Typ	Max	Unit	Condition
Frequency		10		MHz	The deviation is ±5 ppm.
Amplitude	-5		5	dBm	

Input impedance		50		Ω	AC coupling
10 MHz output					
Parameter	Min	Typ	Max	Unit	Condition
Frequency		10		MHz	
Amplitude	3		10	dBm	
Output impedance		50		Ω	
Sampling clock input					
Parameter	Min	Typ	Max	Unit	Condition
Frequency		5 G		Hz	10 GSa/s
		6 G		Hz	12 GSa/s
Amplitude	5		10	dBm	
Input impedance		50		Ω	AC coupling
Sampling clock output					
Parameter	Min	Typ	Max	Unit	Condition
Frequency		5 G		Hz	10 GSa/s
		6 G		Hz	12 GSa/s
Amplitude	3		10	dBm	
Output impedance		50		Ω	AC coupling
Sync clock output					
Parameter	Min	Typ	Max	Unit	Condition
Frequency	Fs/16（5 GHz）or Fs/24（6 GHz）				Fs is the sampling clock frequency.
Amplitude	3		10	dBm	
Output impedance	30	50	70	Ω	AC coupling

Auxiliary in/out characteristics					
Trigger input					
Parameter	Min	Typ	Max	Unit	Condition
Amount	2				
Input range	-5		5	V	
Input impedance	50Ω,10 kΩ				
Width	20			ns	
Trigger to analog output delay		1050		ns	AFG square
Trigger jitter		400		ps	10 GSa/s
Trigger output					

Parameter	Min	Typ	Max	Unit	Condition
Amount	1/channel				
VOH	3.8		5	V	IOH = 8 mA
VOL	-0.5		0.44	V	IOL = 8 mA
Output impedance	30	50	70	Ω	
Frequency			10	MHz	
Sync input					
Parameter	Min	Typ	Max	Unit	Condition
Input range	-5		5	V	
Input impedance	50 Ω, 10 kΩ			Ω	
Width	20			ns	
sync output					
Parameter	Min	Typ	Max	Unit	Condition
VOH	3.8		5	V	IOH = 8 mA
VOL	-0.5		0.44	V	IOL = 8 mA
Output impedance	30	50	70	Ω	
Frequency			10	MHz	
External modulation input					
Parameter	Min	Typ	Max	Unit	Condition
Frequency	0		1	MHz	
Input impedance		11		kΩ	
Amplitude at 100% modulation		10		Vpp	
Mark output					
Parameter	Min	Typ	Max	Unit	Condition
Amount	2/channel				
Output range	0.2		2	V	50 Ω
Output impedance		50		Ω	
Width	800			ps	
Time delay adjustment range	-500		500	ns	
Time delay adjustment resolution	200			ps	

Code jump input characteristics					
Trigger input					
Parameter	Min	Typ	Max	Unit	Condition
Interface type	DB25				
VIH	2		5	V	
VIL	-0.5		0.8	V	
Input impedance		10		kΩ	
Target quantity	256				
Polarity of strobe signal	Rising edge, falling edge				
Width of strobe signal	50			ns	
Data setup/hold time	5			ns	
DB25 Pin arrangement					
Pin number	Signal description		Pin number		Signal description
1	Gnd		14		Gnd
2	Data Bit 7, Input		15		Gating signal, input
3	Data Bit 6, Input		16		Retention
4	Gnd		17		Gnd
5	Data Bit 5, Input		18		Retention
6	Data Bit 4, Input		19		Retention
7	Gnd		20		Gnd
8	Data Bit 3, Input		21		Retention
9	Data Bit 2, Input		22		Retention
10	Gnd		23		Gnd
11	Data Bit 1, Input		24		Retention
12	Data Bit 0, Input		25		Retention
13	Gnd				

General characteristics					
Power					
Parameter	Min	Typ	Max	Unit	Condition
Voltage	100 - 240 Vrms (± 10%),50/60 Hz				
Power consumption		250	300	W	
Display					
Parameter	Min	Typ	Max	Unit	Condition
Display size	7.0			Inch	
Resolution	1280 x 800			Pixel	
Colour		24		Bit	
Contrast		600:1			
Brightness		500		cd/m2	
Display type	Capacitive				
Environment					
Parameter	Min	Typ	Max	Unit	Condition
Operating temperature	0		50	℃	
Storage temperature	-20		60	℃	
Operating humidity	5		90	%	≤30 ℃
	5		50		30 ℃ ~ 50 ℃
Non-operating humidity	5		95	%	
Operating altitude			3048	m	≤30 ℃
Non- operating altitude			15000	m	
EMC/EMI	EMC directive (2014/30/EU) , IEC 61326-1:2021				
Safety	UL 61010-1:2012 R6.23； CAN/CSA-C22.2 No. 61010-1-12 + Gl1 + Gl2（R2017） + A1				
RoHS	EU 2015/863				
Calibrate					
Parameter	Min	Typ	Max	Unit	Condition
Calibrate interval		1		year	
Mechanical					
Parameter	Min	Typ	Max	Unit	Condition
Dimensions	W×H×D = 426 mm×132.5 mm×468 mm				
Net weight		12.2		kg	
Gross weight		19.5		kg	

Ordering Information

Product Model	Description
SDG8002A	2-channel, 16-bit, 5 GSa/s (10 GSa/s, twice interpolation), 2 Gpts storage depth.
SDG8004A	4-channel, 16-bit, 5 GSa/s (10 GSa/s, twice interpolation), 2 Gpts storage depth.

Optional Configurations	Model
SDG8000-Multi-Level SEQ	Complex multi-level sequence wave generation function (software)
SDG8000-DCAMP	DC amplified output (software)
SDG8000-ACAMP	AC Amplified Output (Software)
SDG8000-4GPTS	4G point waveform storage space (software)
SDG8000-HSS	High-speed serial waveform function (software)
SDG8000-MTONENL	Multi-tone and Chirp function (software)
SDG8000-IQ	IQ Vector Signal Generation Function (Software)
SiglQPro-BT	Bluetooth signal generation function (software, SDG8000-IQ is required)
SiglQPro-IOT	IoT signal generation function (software, SDG8000-IQ is required)
SiglQPro-OFDM	OFDM signal generation function (software, SDG8000-IQ is required)
SiglQPro-5G NR	5G NR signal generation function (software, SDG8000-IQ is required)
SiglQPro-LTE FDD	LTE FDD signal generation function (software, SDG8000-IQ is required)
SiglQPro-LTE TDD	LTE TDD signal generation function (software, SDG8000-IQ is required)
SiglQPro-IEEE.802.11.be	IEEE.802.11.be signal generation function (software, SDG8000-IQ is required)
SiglQPro-IEEE.802.11.ax	IEEE.802.11.ax signal generation function (software, SDG8000-IQ is required)

Standard Configurations	Quantity
USB Cable	1
Wireless Mouse	1
SMA Cable	2
50 Ohm connector	4（SDG8002A），8（SDG8004A）
Power Cord	1
Quick Start	1
Calibration Certificate	1

Optional Configurations	Model
USB-GPIB Adapter	USB-GPIB
OCXO	10M_OCXO_L
Dynamic Jump Interface Cable	DynamicPort-Cable

About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, spectrum analyzers, function/arbitrary waveform generators, RF/MW signal generators, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement

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