Boonton

Datasheet

SGX1018

RF Signal Generator

SGX1018 RF Signal Generator

The SGX1018 utilizes a unique non-PLL (phase locked loop) design with a digital front-end and direct, proprietary back end. The design enables a distinctive combination of features and performance.

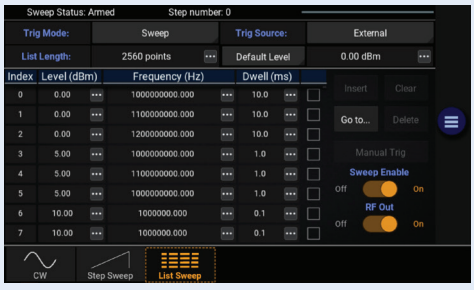
Key Features

Frequency range:	100 MHz to 18 GHz
Output power range:	-10 to +17 dBm
Lightning fast - Frequency switching speed: (list/step sweep modes)	350 µs
Ultra-low phase noise - single sideband phase noise	-106 dBc/Hz 18 GHz, 10 kHz offset
Ultra-low jitter	<110 fs

SGX1018 RF Signal Generator – Front Panel

1. USB ports for peripherals
2. At-a-glance display of key synthesis parameters
3. RF output (option to move to rear panel)
4. Multi-touch display with intuitive user interface.
5. Quick access to freq and amp settings and to turn RF output on/off

6 SGX1018 Additional Signal Generation Capabilities (beyond CW)



Sweep Mode

The RF output signal can be swept up or down between frequency points with a user-defined number of points and dwell time.

List Mode

Users can import a .csv file with a list of frequencies and power levels to which the instrument can be set via an external trigger or set of triggers.

Specifications

PARAMETER	MIN	TYPICAL	MAX	COMMENTS
Frequency Range	100 MHz		18 GHz	Settable from 10 MHz to 20.48 GHz
Frequency Step Size		0.001 Hz		Nominal
Switching Speed (Frequency)		350 µs		List/Step Sweep Mode. Nominal
Internal Time Base Reference				
Oscillator Aging Rate		± 1 ppm/yr		1st year. ±0.5 ppm/yr each subsequent year, nominal
Temperature Effects		± 1 ppm		0° C to 55° C, nominal
Reference Output				
Frequency		100 MHz		
Amplitude	+2 dBm		+ 6 dBm	Into 50 Ω, nominal
External Reference Input				
Input Frequency		10 or 100 MHz		Software Select 10 MHz, 100 MHz or No Ext. Ref.
10MHz Lock Range		+/- 4 ppm	+/- 1 ppm	20 Hz Locking BW, Internal OCXO remains on
10MHz External Amplitude	0 dBm		+ 10 dBm	20 Hz Locking BW, Internal OCXO remains on, nominal
100MHz External Amplitude	+ 2 dBm		+6 dBm	Internal OXCO shuts off with 100 MHz Ext. Ref., nominal
Waveform				Sine
Digital Sweep Modes				
Operating Modes				Step sweep (linear, internal)
				List (simultaneous amplitude and frequency step changes)
Sweep Range	10 MHz		20.48 GHz	
Dwell Time	100 µs		100 s	1 µs increments
Number of Points (Step sweep)	2		65535	
Number of Points (List)	2		2560	
Triggering				Free Run, Sweep, and Point
Trigger Source				External, Bus, and Key

Specifications

PARAMETER	MIN	TYPICAL	MAX	COMMENTS
Output Power (Calibrated)				
100 MHz to 10 GHz	-10 dBm		+ 17 dBm	Settable from -20 dBm to +20 dBm
10 GHz to 18 GHz	-10 dBm		+ 15 dBm	Settable from -20 dBm to +20 dBm
Resolution		0.01 dB		Nominal
SWR (return loss)				
100 MHz < f < 6 GHz		1.33 (-17.0 dB)		Measured
6 GHz < f < 18 GHz		1.43 (-15.0 dB)		Measured
Maximum Reverse Power				
Max DC Voltage		25 VDC		
> 100 kHz		10 mW (+16 dBm)		
Absolute Level Accuracy				
100 MHz -10 GHz				20° C to 30° C
-10 dBm to 0 dBm			± 3.0 dB	
0 dBm to +14 dBm			± 1.5 dB	
+14 dBm to +17 dBm			± 2.0 dB	
10 GHz - 18 GHz				
-10 dBm to 0 dBm			± 3.0 dB	
0 dBm to +10 dBm			± 1.5 dB	
+10 dBm to +15 dBm			± 2.5 dB	
Single Sideband Phase Noise				Refer to typical data: Page 7
2.0 GHz, 10 kHz offset		≤ -125 dBc/Hz	≤ -119 dBc/Hz	
4.0 GHz, 10 kHz offset		≤ -119 dBc/Hz	≤ -113 dBc/Hz	
8.0 GHz, 10 kHz offset		≤ -113 dBc/Hz	≤ -107 dBc/Hz	
12.0 GHz, 10 kHz offset		≤ -110 dBc/Hz	≤ -104 dBc/Hz	
18.0 GHz, 10 kHz offset		≤ -106 dBc/Hz	≤ -100 dBc/Hz	
Harmonics (CW mode)		(2^{nd}/3^{rd})	(2^{nd}/3^{rd})	Refer to typical data: Page 8
500 MHz to 5 GHz		-35/-55 dBc	-25/-45 dBc	@ 0 dBm
5 GHz to 10 GHz		-35/-50 dBc	-20/-40 dBc	@ 0 dBm
10 GHz to 18 GHz		-25/-45 dBc	-15/-35 dBc	@ 0 dBm
				(3rd harmonic level, nominal only above 16.6 GHz)
Sub-Harmonics (CW mode)		(½ / 3/2)	(½ / 3/2)	Refer to typical data: Page 9
100 MHz to 18 GHz		-60/-70 dBc	-35/-45 dBc	@ 0 dBm
Non-Harmonics/Spurious Broadband (CW mode)				Refer to typical data: Page 10
100 MHz to 4 GHz		-75 dBc	-50 dBc	@ 0 dBm
4 GHz to 8 GHz		-65 dBc	-40 dBc	@ 0 dBm
8 GHz to 16 GHz		-60 dBc	-35 dBc	@ 0 dBm
16 GHz to 18 GHz		-55 dBc	-30 dBc	@ 0 dBm
Jitter RMS*				
155 MHz		70 fs		100 Hz to 1.5 MHz
622 MHz		60 fs		1 kHz to 5 MHz
2.488 GHz		95 fs		5 kHz to 20 MHz
9.953 GHz		110 fs		10 kHz to 80 MHz

*Calculated from measured phase noise data in CW mode at nominal +10 dBm

Output Power Data

The data contained in this section demonstrates the typical output power performance of the SGX1018.

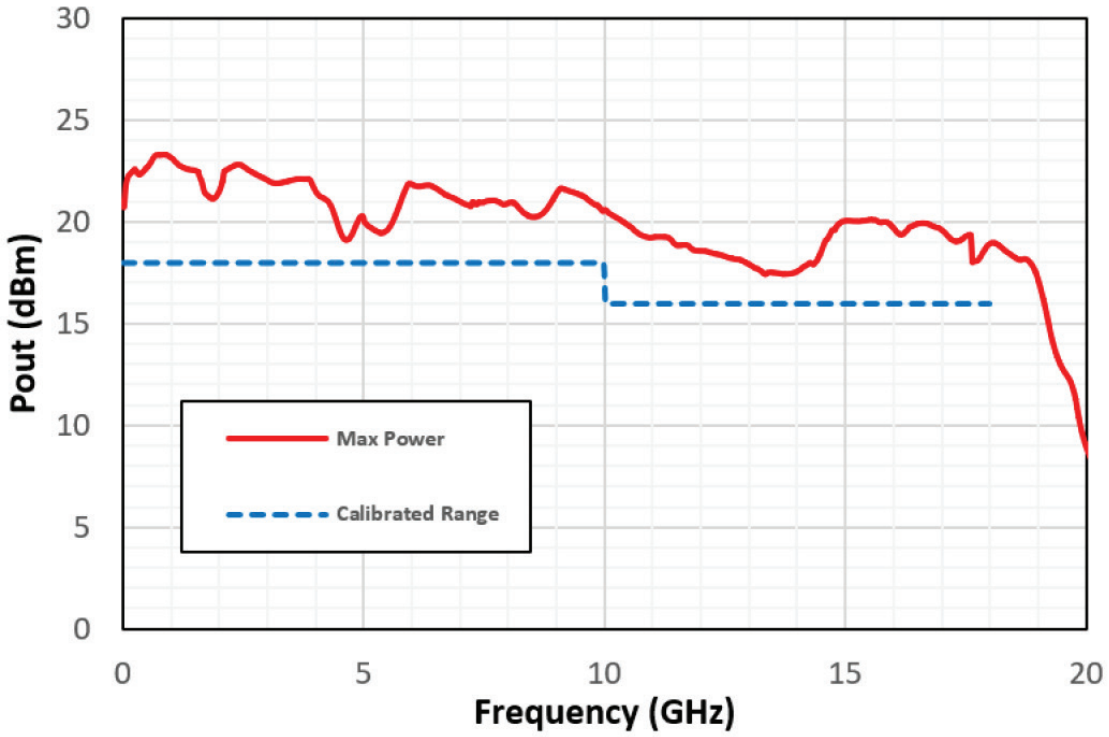


Figure 1: Maximum and Minimum Amplitude Thresholds

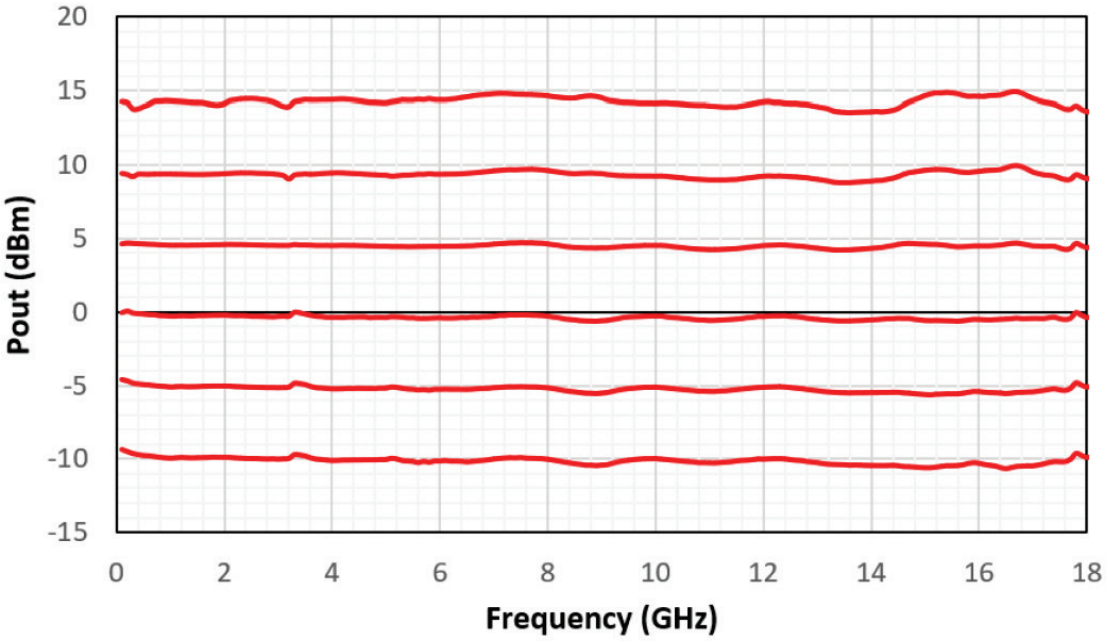


Figure 2: Calibrated Output Power vs. Frequency

Phase Noise Data

The data contained in this section demonstrates the typical phase noise performance of the SGX1018.

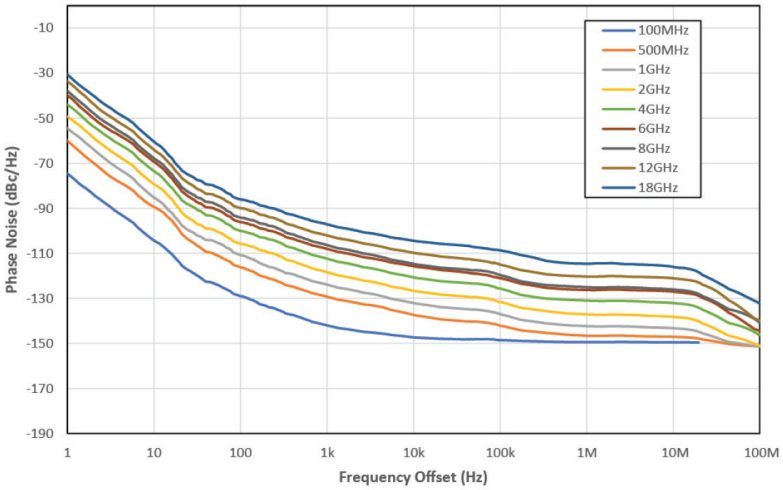
Phase Noise

FIGURE 3:

Typical Phase Noise Performance

100 MHz – 18 GHz

P_{OUT} Setting: +10 dBm



Spectral Purity Data

The data contained in this section demonstrates the typical spectral purity performance of the SGX1018.

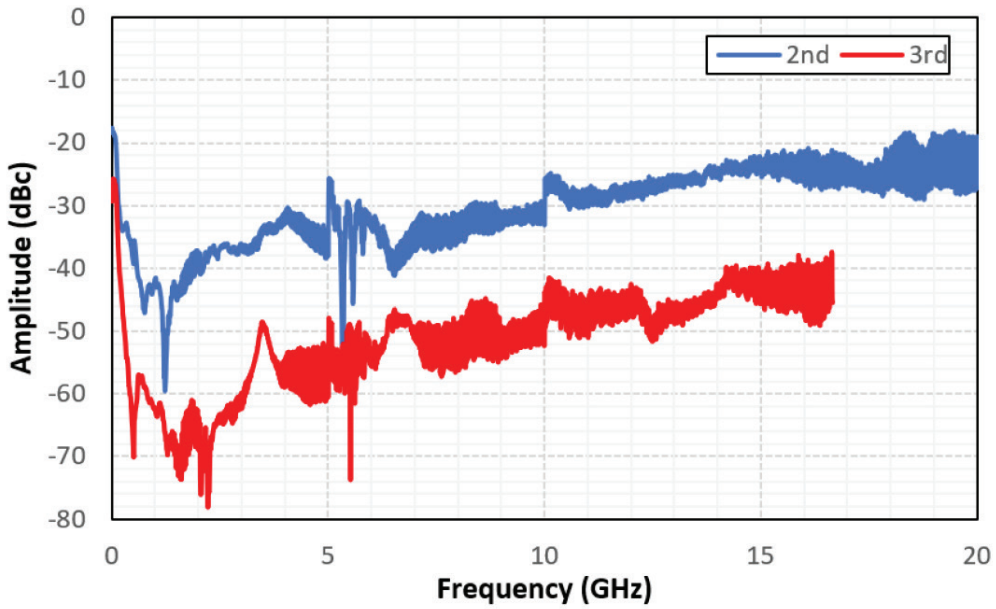
HARMONICS

2nd Harmonic
3rd Harmonic

Harmonics Performance

10 MHz – 20 GHz

P_{OUT} Setting: 0 dBm



Spectral Purity Data

The data contained in this section demonstrates the typical spectral purity performance of the SGX1018.

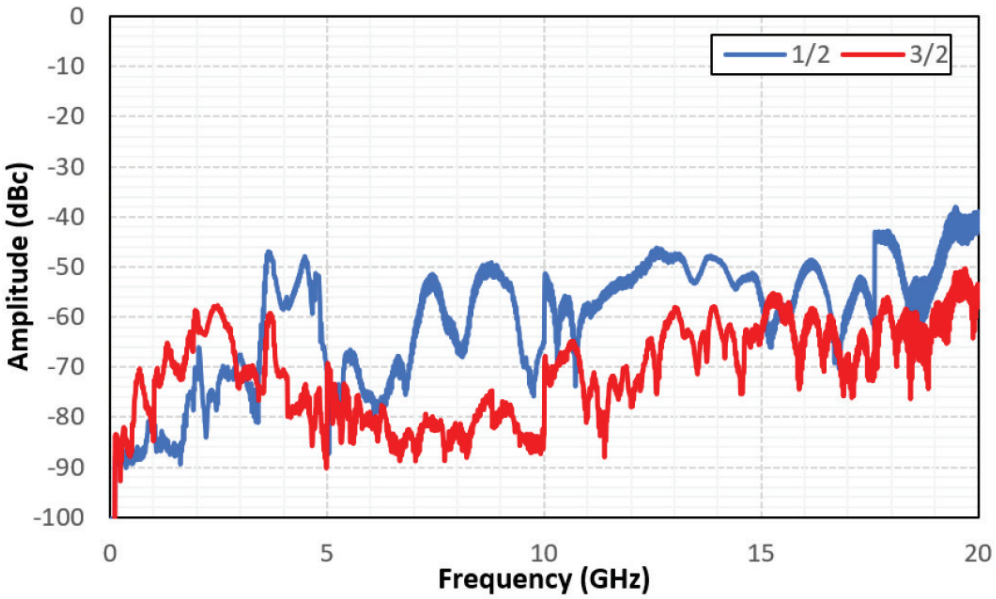
SUB-HARMONICS

$^{1}/_{2}$ Sub-Harmonic
$^{3}/_{2}$ Sub-Harmonic

Sub-Harmonic Performance

10 MHz – 20 GHz

P_{OUT} Setting: 0 dBm



Spectral Purity Data

The data contained in this section demonstrates the typical spectral purity performance of the SGX1018.

NARROWBAND NON-HARMONICS / SPURIOUS

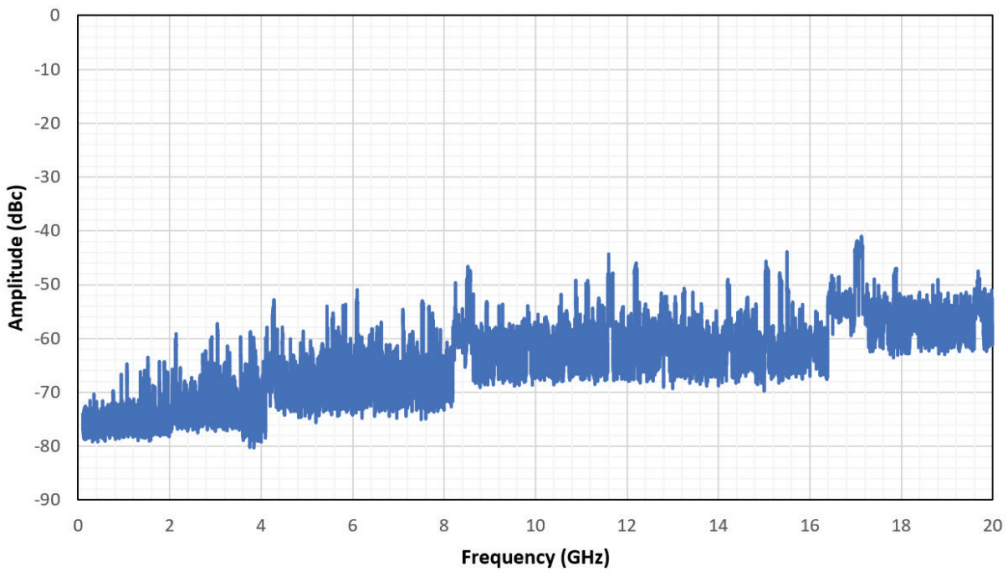
Maximum Spurious Response

Narrowband Maximum Spurious Performance

10 MHz – 20 GHz

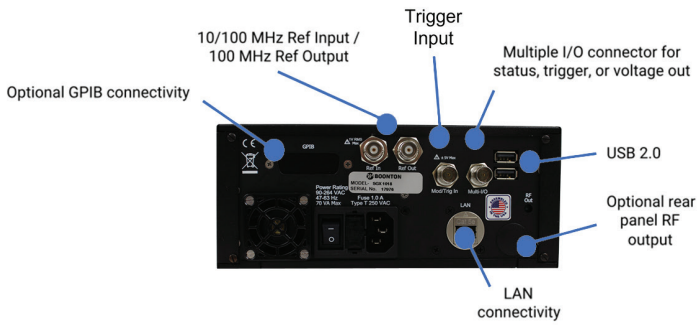
P_{OUT} Setting: +10 dBm

Spectrum Analyzer Bandwidth Settings: 10 MHz Span, 10 kHz RBW, 10 kHz VBW



Specifications, Continued

	USB	2 ports USB2.0: Type A receptacle
Inputs/Outputs (front panel)		
RF Output		50 Ω, N-type (f)
Inputs/Outputs (rear panel)	LAN	RJ-45 modular socket
	USB	2 ports USB2.0: Type A receptacle
RF Output (optional)		50 Ω, N-type (f)
Multi I/O Connector		BNC(f); DC-coupled
	User Selectable	Status, trigger, or voltage output
	Range	0 to 10 V (Analog unipolar)
		-10 V to +10 V (Analog bipolar)
		0 or 5 V (Logic)
	Accuracy	±200 mV (±100 mV typical)
	Linearity	0.1% typical
Trigger		+/- 5V max ; 50 Ω, BNC(f); DC-coupled
Reference Input		1V RMS max ; 50 Ω, BNC(f); AC-coupled
Reference Output		100 MHz ; BNC(f); AC-coupled
Remote Control	Command Set	SCPI-1999.0
	LAN	Ethernet:10/100/1000 BaseT; HiSLIP
	GPIB (optional)	
Regulatory Compliance		CE compliance with the following European Union directives
		Low Voltage Directive 2014/35/EU
		Electromagnetic Compatibility Directive (EMC) 2014/30/EU
		RoHS Directive EU 2015/863, WEEE Directive 2012/19/EU
Construction		Manufactured to the intent of MIL-PRF-28800F, Class 3
Dimensions (excluding connectors)	H x W x D	3.5 x 8.3 x 11.2 (in), 89 x 211 x 284 (mm
Weight		7 lbs, 3.2 kg
AC Power		
Rated Voltage		100 to 240 VAC
Voltage Range		90 to 264 VAC
Rated Frequency		50/60 Hz
Frequency Range		47 to 63 Hz
Power Consumption		60 W (70 VA) max, 30 W (35 VA) nominal with no external peripheral devices attached
This instrument is designed for indoor use only		
Operating Temperature		0 to 50 °C (32 to 122 °F)
Storage Temperature		-40 to +70 °C (-40 to 158 °F)
Humidity		95% maximum, non-condensing
Altitude		Operation up to 15,000 feet (4575 m)
Warranty		3 years



Ordering information

SGX1018	RF Signal Generator (100 MHz to 18 GHz)

Options

SGX-GPIB	GPIB Control (internally installed)
SGX-RRF	Moves RF output the rear panel
SGX1K-SECURE	Removes internal microSD and enables boot from USB drive (included)
SGX1K-2SECOP	Installation SGX1K-SECURE post initial purchase (retrofit); requires return to factory

Included Accessories

Information Card (provides information on where to find latest manual versions)

Optional Accessories

SGX1K-RMK	19" Rack Mount Kit (includes handles & hardware for mounting one or two generators)
SGX1K-TCASE	Transit case
SGX1K- RSSD	Additional external USB drive for secure operation

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ISO 17025

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