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:	10 MHz to 18 GHz
Output power range:	-20 to +18 dBm
Lightning fast - Maximum switching speed:	TBD
Ultra-low phase noise - single sideband phase noise	-106 dBc/Hz (typical) 18 GHz, 10 kHz offset
Ultra-low jitter	55 fs (typical)
External pulse modulation	
10/100 MHz reference input	
Excellent amplitude accuracy	+/-0.50 dB
Superior reliability – MTBF	>200,000 hours

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

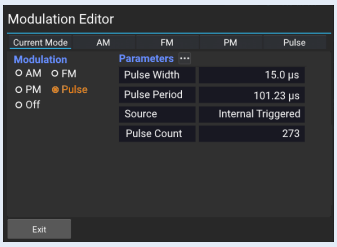
6 SGX1018 Additional Signal Generation Capabilities (beyond CW)

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.



Modulation

The SGX100x can be externally modulated to provide AM, FM, θM, or pulse modulation on its RF output. In addition, the signal generator has internal pulse modulation capability.

Specifications

PARAMETER	MIN	TYPICAL	MAX	COMMENTS
Frequency Range	**10 MHz**		**18 GHz**	**Settable from 5 MHz to 20.48 GHz**
Frequency Step Size		**0.001 Hz**		
Phase Offset	**0 deg**		**+360 deg**	
Switching Speed (Frequency)		**TBD**		
Internal Time Base Reference				
Oscillator Aging Rate		± 1 ppm/yr		1st year. ±0.5 ppm/yr each subsequent year
Temperature Effects		± 1 ppm		0° C to 55° C
Reference Output				
Frequency		100 MHz		
Amplitude	+2 dBm		+ 6 dBm	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
100MHz External Amplitude	+ 2 dBm		+6 dBm	Internal OXCO shuts off with 100 MHz Ext. Ref.
Waveform				Sine
Digital Sweep Modes				
Operating Modes				Step sweep (linear, internal)
				List sweep (arbitrary list of freq steps)
				Simultaneous amplitude and frequency sweep (list)
Sweep Range	10 MHz		20.48 GHz	
Dwell Time	100 µs		100 s	1 µs increments
Number of Points (STEP)	2		65535	
Number of Points (LIST)	2		3201	
Triggering				Free Run, External Trigger

Specifications

PARAMETER	MIN	TYPICAL	MAX	COMMENTS
Output Power (Calibrated)				
10 MHz to 12 GHz	-10 dBm		+ 18 dBm	Settable from -20 dBm to +25 dBm
12 GHz to 18 GHz	-10 dBm		+ 16 dBm	Settable from -20 dBm to +25 dBm
Resolution		0.01 dB		
SWR (return loss)				
10 MHz < f < 6 GHz		1.33 (-17.0 dB)		
6 GHz < f < 18 GHz		1.43 (-15.0 dB)		
Maximum Reverse Power				
Max DC Voltage		25 VDC		
> 100 kHz		10 mW (+16 dBm)		
Switching Speed (Amplitude)			100 µs	Settling to within 0.1 dB
Absolute Level Accuracy				
10 MHz < f < 6 GHz		± 0.5 dB		25° C to 35° C
6 GHz < f < 12 GHz				
-10 to +5 dBm		± 0.5 dB		
+5 to +18 dBm		± 1.0 dB		
12 GHz < f < 18 GHz				
-10 to +5 dBm		± 0.6 dB		
+5 to 16 dBm		± 1.1 dB		
Single Sideband Phase Noise				
2.0 GHz, 10 kHz offset		≤ -128 dBc/Hz		
4.0 GHz, 10 kHz offset		≤ -122 dBc/Hz		
8.0 GHz, 10 kHz offset		≤ -114 dBc/Hz		
12.0 GHz, 10 kHz offset		≤ -110 dBc/Hz		
18.0 GHz, 10 kHz offset		≤ -106 dBc/Hz		
Harmonics (CW mode)		-30 dBc		
Sub-Harmonics (CW mode)				
10 MHz to 8 GHz		-60 dBc		
8 GHz to 18 GHz		-50 dBc		
Non-Harmonics/Spurious Broadband (CW mode)				
10 MHz to 8 GHz		-60 dBc		
8 GHz to 18 GHz		-50 dBc		
Jitter RMS (at 18 GHz)		55 fs		5 kHz < BW < 20 MHz

Output Power Data

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

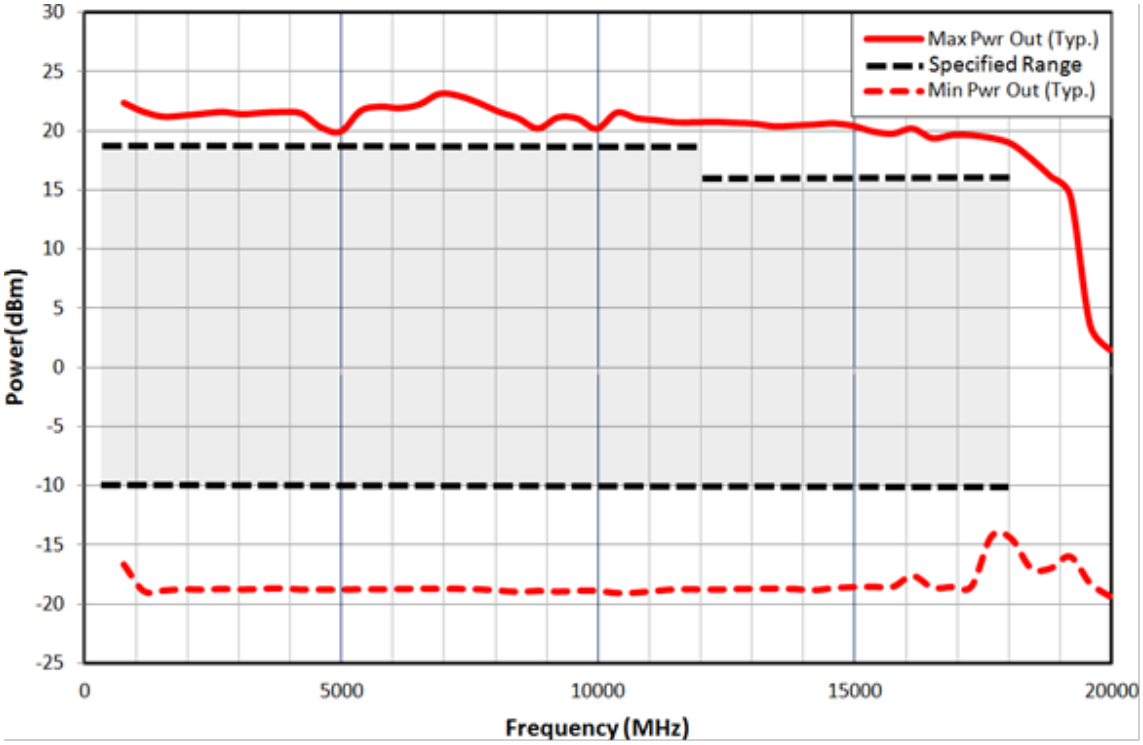


Figure 1: Maximum and Minimum Amplitude Thresholds

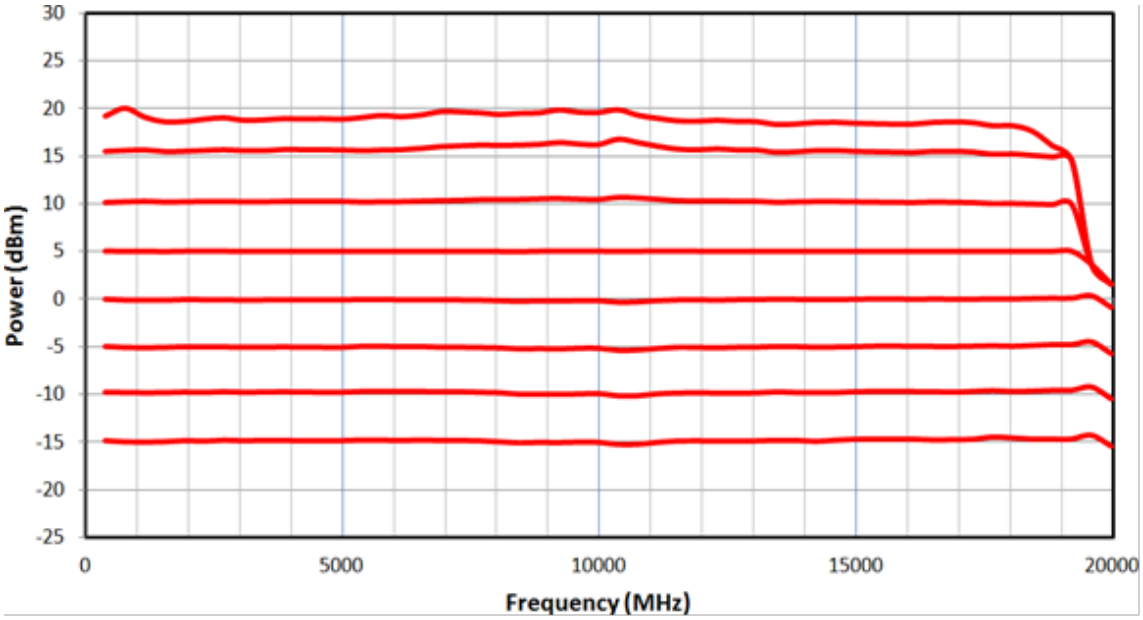


Figure 2: Calibrated Output Power vs. Frequency

Phase Noise Data

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

Standard OCXO

FIGURE 3:

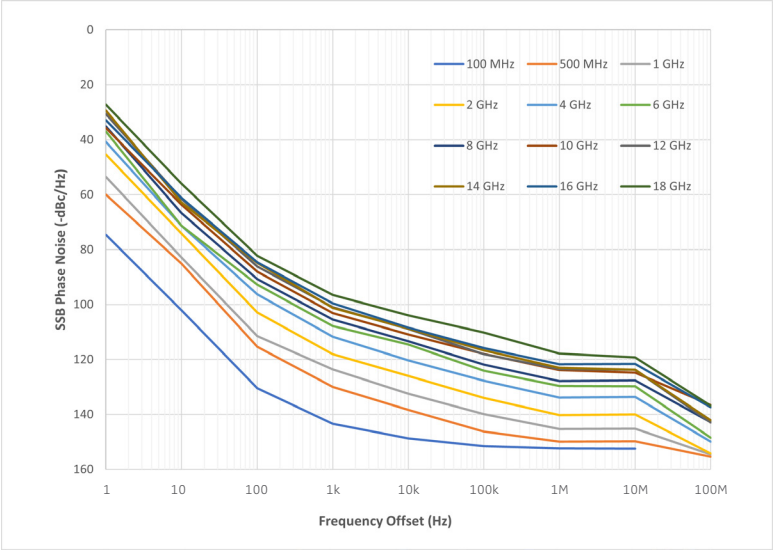
Phase Noise Performance

Standard OCXO

1 GHz – 18 GHz

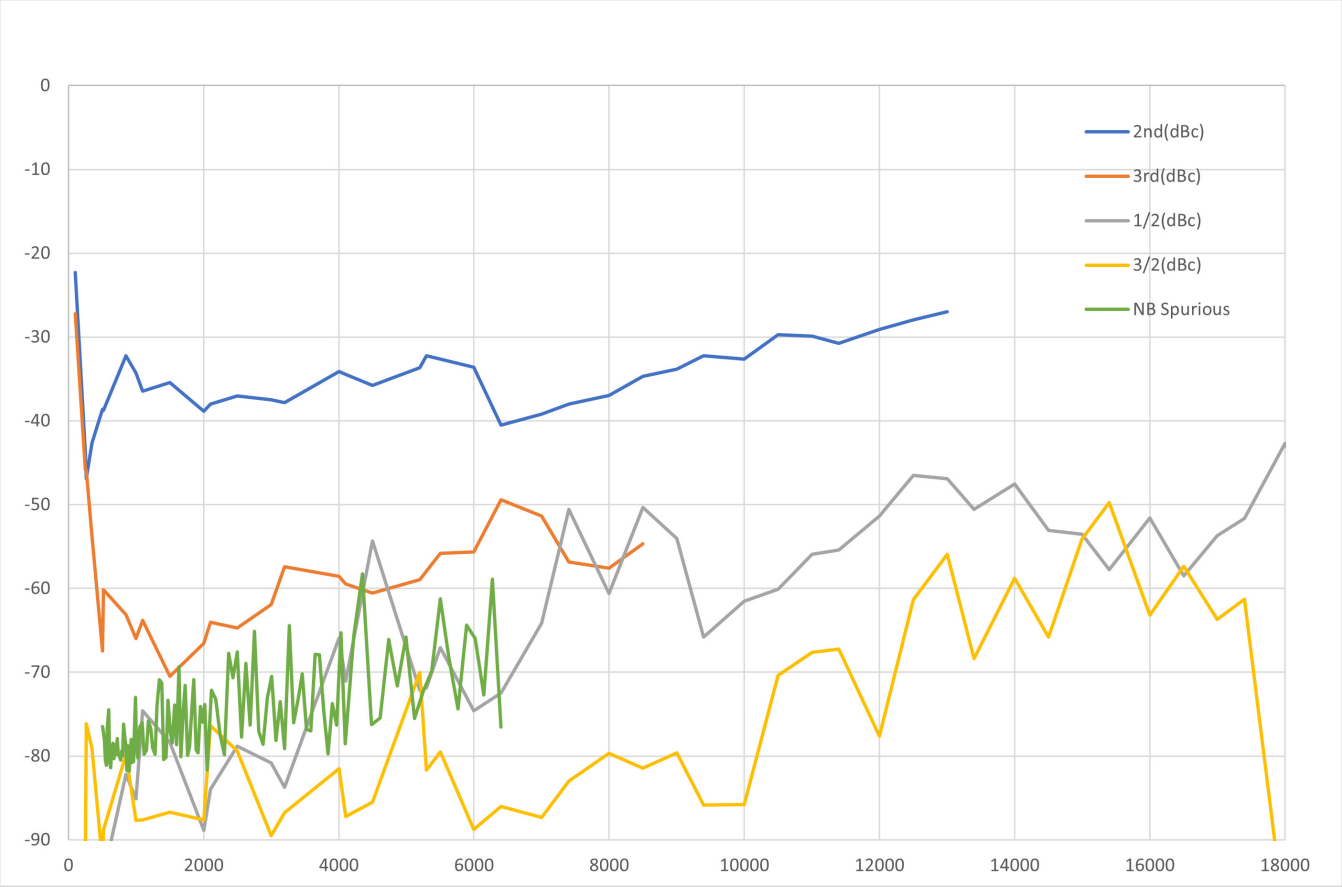
P_{OUT} Setting: +10 dBm

Offset: 10 Hz - 40 MHz



Spectral Purity Data

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



HARMONICS

2nd Harmonic
3rd Harmonic

Harmonics Performance

10 MHz – 18 GHz

P_{OUT} Setting: +10 dBm

RBW: 3 kHz

VBW: 3 kHz

SUB-HARMONICS

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

Sub-Harmonic Performance

10 MHz – 18 GHz

P_{OUT} Setting: +10 dBm

RBW: 3 kHz

VBW: 3 kHz

NARROWBAND NON-HARMONICS / SPURIOUS

Maximum Spurious Response

Narrowband Maximum Spurious Performance

10 MHz – 18 GHz

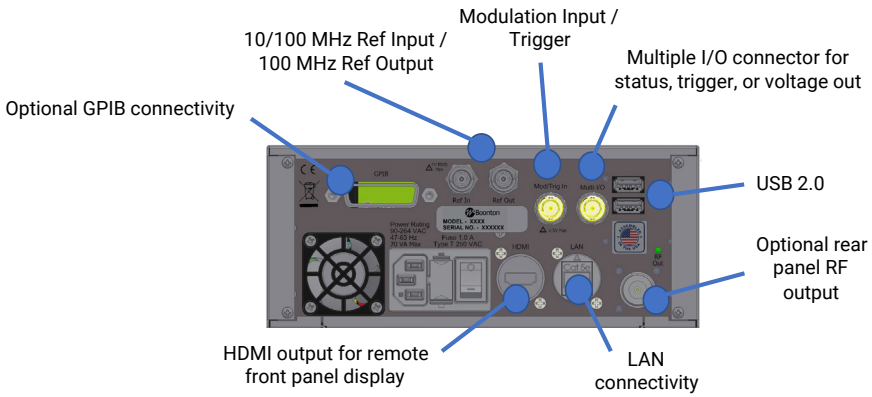
P_{OUT} Setting: +10 dBm

RBW: 3 kHz

VBW: 3 kHz

Specifications, Continued

Inputs/Outputs (front panel)	USB	2 ports USB2.0: Type A receptacle
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		50 Ω, 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
Modulation Input / Trigger		+/- 5V max ; 50 Ω, BNC(f); DC-coupled
Reference Input		1V RMS max ; 50 Ω, BNC(f); AC-coupled
Reference Output		100 MHz ; 50 Ω, BNC(f); AC-coupled
HDMI		
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 2011/65/EU, WEEE Directive 2012/19/EU
		Environmental MIL-PRF-28800F, Class 3
Dimensions (excluding connectors)	H x W x D	3.5x8.3x11.2 (in), 89x211x284 (mm)
Weight		7 lbs, 3.2 kg
Power Requirements		90 to 260 VAC, 47 to 60 Hz; 90 to 135 VAC, 47 to 400 Hz; 30 W (35 VA) max
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)
Shock		Withstands ±30 G, 11 ms impulse in X, Y, and Z axes
Vibration		Withstands 2 G sine, 5 to 55 Hz; 2 G random, 5 to 500 Hz
Warranty		3 years



Specification — Modulation (External Stimulus)

PARAMETER	PERFORMANCE	COMMENTS
PULSE MODULATION (Analog)		
Rise time (T_r)	<20 ns	
Fall time (T_f)	<20 ns	
On/Off Ratio		
10 MHz to 2 GHz	> 60 dB	
2 GHz to 5 GHz	> 50 dB	
5 GHz to 12 GHz	> 90 dB	
Minimum Pulse Width	50 ns	
ALC Loop Deviation (ALC disabled)	1dB difference from ALC enabled	
External Trigger Threshold	+1.2 V	+/- 5% into 50 Ω

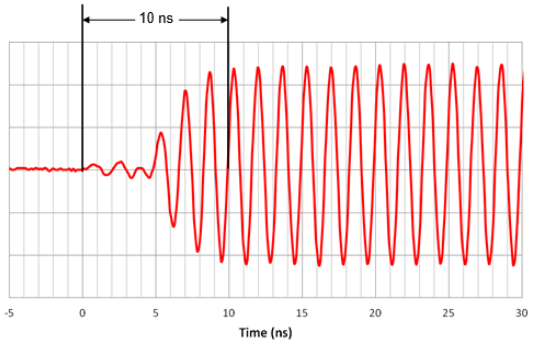


Figure 5: External Pulse Modulation Rise time

Ordering information

SGX1018	RF Signal Generator (10 MHz to 18 GHz)

Options

SGX-GPIB	GPIB Control (internally installed)
SGX-RRF	Moves RF output the rear panel

Included Accessories

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

Optional Accessories

SGX-RMK	19" Rack Mount Kit
SGX-TCASE	Transit case

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Note: Specifications, terms and conditions are subject to change without prior notice.

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ISO 17025