

SG10XX Series Microwave Analog Signal Generator



Overview

The SG10XX series microwave analog signal generator is a microwave signal generator with ultra-low phase noise and high power output. The product covers frequencies from 9kHz to 12, 24, 40, 45 and 67GHz, with a frequency resolution as low as 0.001Hz, and has a narrow pulse modulation function, which can realize multi-channel coherent signal output. A single machine can support up to 8 channels, and the frequency and power of each channel can be adjusted independently and in linkage, supporting dual-tone signal output.

The SG10XX series microwave analog signal generator has outstanding performance in application fields that require excellent phase noise, large dynamic output power range, multi-channel synchronous testing and portability. It is a microwave analog signal generator with extremely high cost performance.

Features:

- Balance product performance and purchase budget
- Maximum output power: $\geq +20\text{dBm}$ (typical, @10GHz)
- Phase noise $< -115\text{dBc/Hz}$ (typical, 10GHz, 1kHz offset)
- Multi-channel coherent output
- With narrow pulse modulation function
- Highly integrated, compact size

Application:

- Low phase noise signal source for R&D
- Local oscillator replacement
- Component testing
- Receiver sensitivity test

Technical indicators

Frequency Range

	Model	Frequency Range
Single Channel	SG1012A	9kHz $\leq f \leq$ 12GHz
	SG1024A	9kHz $\leq f \leq$ 24GHz
	SG1040A	9kHz $\leq f \leq$ 40GHz
	SG1045A	9kHz $\leq f \leq$ 45GHz
	SG1067A	9kHz $\leq f \leq$ 67GHz
Multi Channel	Channels	2-3 (Can be expanded to 8 channels)
	Frequency	9kHz to 12GHz, 24GHz, 40GHz, 45GHz, 67GHz (Please consult us for specific configuration)
	Channel Isolation	$> 80\text{dB}$
Resolution	0.001Hz	

Unless otherwise specified, the 5kHz specifications in this publication are obtained with option SLF1.

Frequency Reference

Oscillator Aging Rate(2)	After 30 days $< \pm 1\text{ppm/year}$ (nominal value)
Calibration Accuracy $\pm 0.01\text{ppm}$ (nominal value)	
Temperature Effect $< \pm 0.05\text{ppm}$, -20°C to $+70^\circ\text{C}$	
(2) The aging rate is determined by design and has a direct relationship with the OCXO.	

Internal reference output

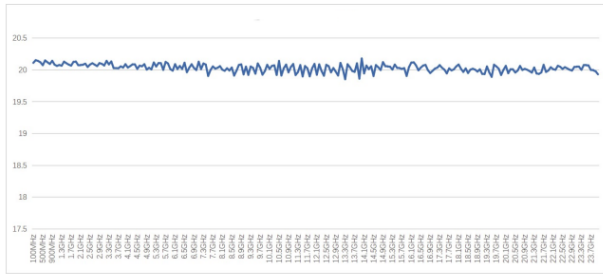
Frequency	10MHz
Power	$+10 \pm 2\text{dBm}$, 50 Ω Load

External reference input

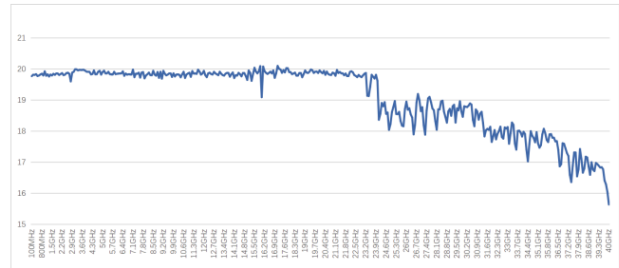
Input frequency	10MHz
Lock range	$\pm 1\text{ppm}$
Power	$+5 \pm 3\text{dBm}$
Impedance	50 Ω
Waveform	Sine wave or square wave

Output parameters

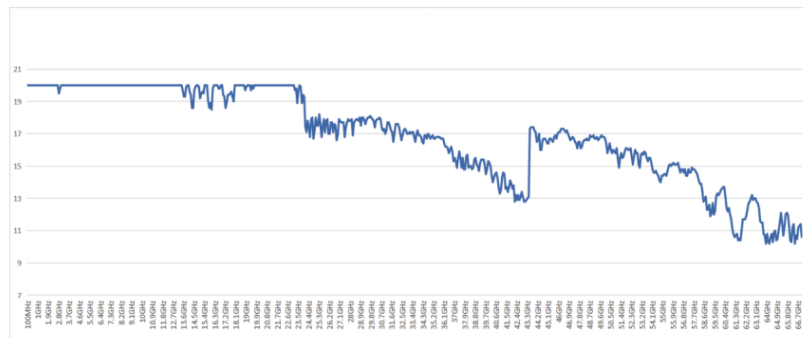
	Freq.	Model					
		SG1012A	SG1024A	SG1040A	SG1045A	SG1067A	Multi-channel
Output power Max.(dBm)	9kHz ⁽²⁾ < f ≤ 100MHz	≥+15	≥+15	≥+15	≥+15	≥+15	≥+15
	100MHz < f ≤ 12GHz	≥+18	≥+18	≥+18	≥+18	≥+16	≥+18
	12GHz < f ≤ 20GHz	-	≥+18	≥+18	≥+18	≥+16	≥+18
	20GHz < f ≤ 24GHz	-	≥+18	≥+17	≥+17	≥+14	≥+17
	24GHz < f ≤ 36GHz	-	-	≥+15	≥+15	≥+14	≥+15
	36GHz < f ≤ 40GHz	-	-	≥+13	≥+13	≥+12	≥+13
	40GHz < f ≤ 45GHz	-	-	-	≥+13	≥+10	-
	45GHz < f ≤ 55GHz	-	-	-	-	≥+12	-
	55GHz < f ≤ 60GHz	-	-	-	-	≥+9	-
	60GHz < f ≤ 67GHz	-	-	-	-	≥+7	-
Output power Min. (dBm)		-120	-120	-110	-90	-90	-
Resolution		0.01dB					
Amplitude switching speed		≤20ms					
Maximum reverse power		0.5W, 0VDC					



SG1024A maximum output power diagram

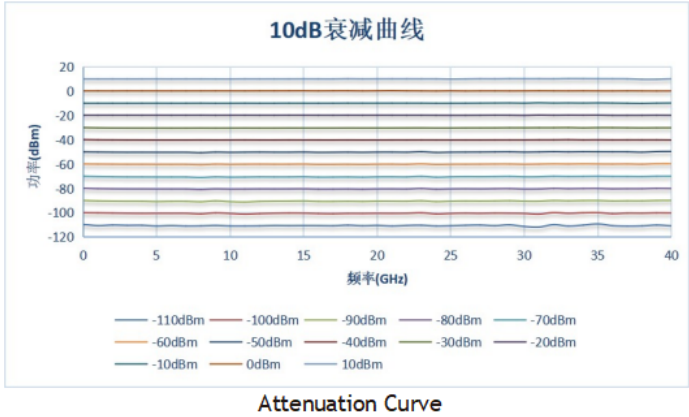


SG1040A maximum output power diagram



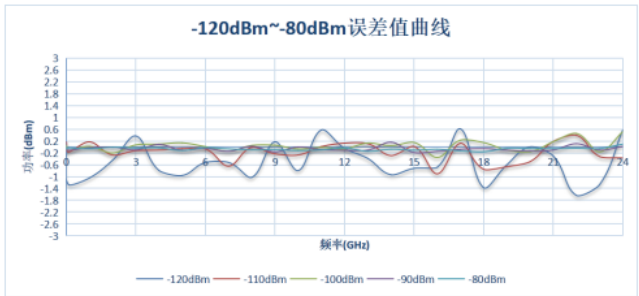
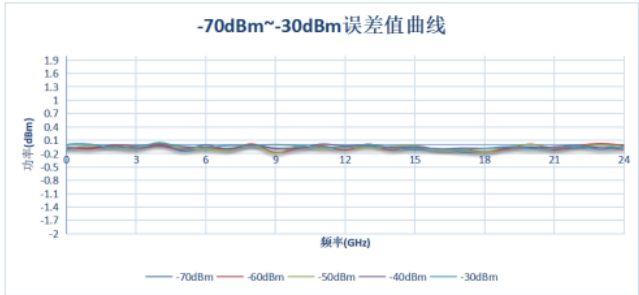
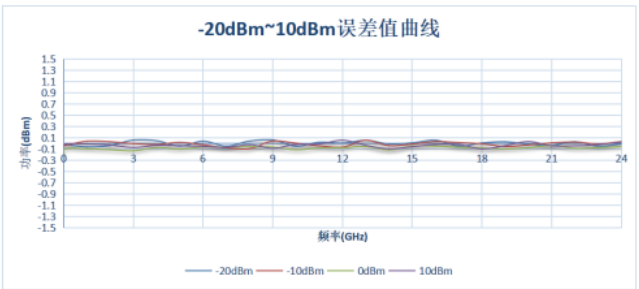
SG1067A maximum output power diagram

Power accuracy			
Freq.	>-20dBm	-70dBm<P≤-20dBm	<-70dBm
9kHz ⁽¹⁾ <f≤10MHz	≤±1dB	≤±1.3dB	≤±2.0dB
10MHz<f≤3GHz	≤±0.5dB	≤±0.7dB	≤±2.0dB
3GHz<f≤20GHz	≤±0.5dB	≤±0.9dB	≤±2.5dB
20GHz<f≤40GHz	≤±1.0dB	≤±1.3dB	-
40GHz<f≤50GHz	≤±1.3dB	≤±1.5dB	-
50GHz<f≤67GHz	≤±1.8dB	≤±2.0dB	-



SWR

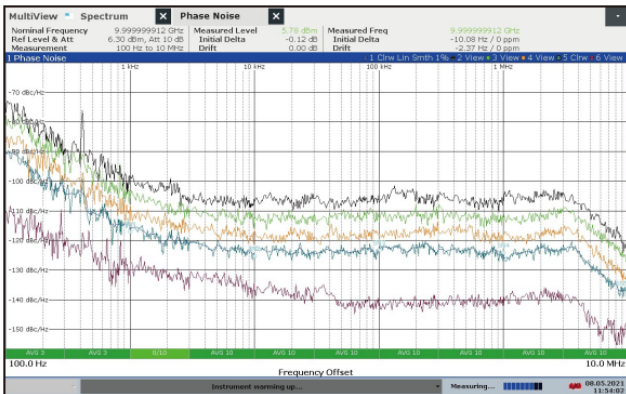
Freq.	10dB
≤2GHz	<1.40:1
2GHz<f≤24GHz	<1.50:1
24GHz<f≤40GHz	<1.60:1
40GHz<f≤67GHz	<1.80:1



Absolute SSB phase noise as standard⁽³⁾(dBc/Hz)

Freq.	Offset					
	100Hz	1kHz	10kHz	100kHz	1MHz	10MHz
1GHz	≤-105	≤-130	≤-138	≤-138	≤-136	≤-145
10GHz	≤-85	≤-112	≤-118	≤-118	≤-120	≤-138
20GHz	≤-80	≤-106	≤-112	≤-112	≤-114	≤-132
40GHz	≤-74	≤-100	≤-106	≤-106	≤-108	≤-126
67GHz	≤-70	≤-95	≤-101	≤-101	≤-102	≤-121

⁽³⁾ At room temperature, the output power is 0dBm.



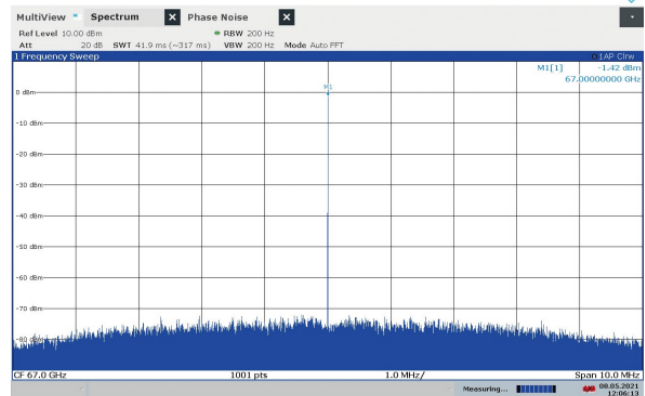
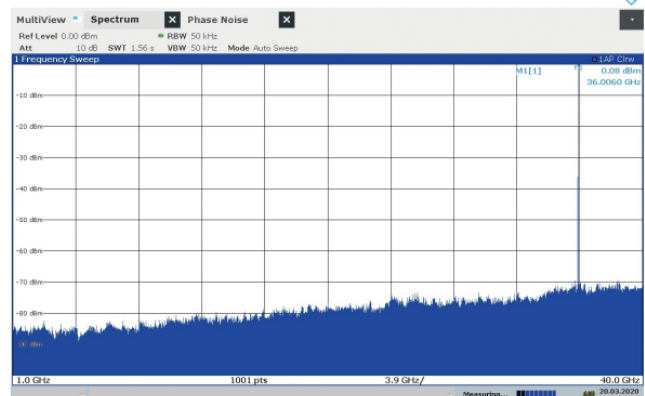
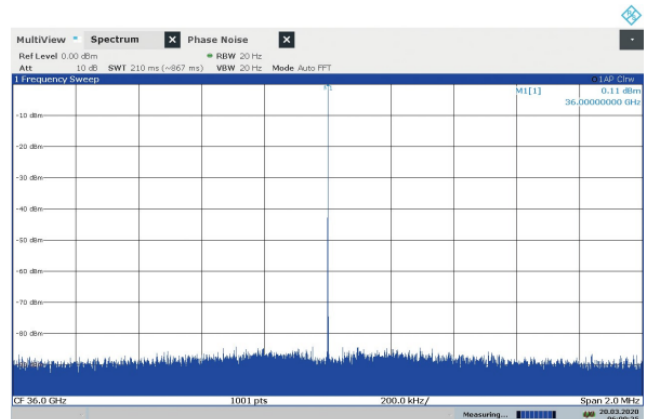
— Phase noise@65GHz — Phase noise@40GHz 实测相噪曲线
— Phase noise@20GHz — Phase noise@10GHz
— Phase noise@1GHz

Harmonic

Freq.	+10dBm
9kHz ⁽¹⁾ <f≤10MHz	<-30dBc
10MHz<f≤200MHz	<-40dBc
200MHz<f≤2GHz	<-55dBc
2GHz<f≤23GHz	<-55dBc

Sub-harmonics

Freq.	Output power+10dBm
9kHz ⁽¹⁾ <f≤12GHz	<-85dBc
12GHz<f≤24GHz	<-70dBc
24GHz<f≤40GHz	<-65dBc
40GHz<f≤67GHz	<-60dBc



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Non-harmonic

Freq.	power 0dBm, Offset >3kHz
9kHz ⁽¹⁾ <f≤10MHz	<-65dBc
10MHz<f≤250MHz	<-75dBc
250MHz<f≤6GHz	<-80dBc
6GHz<f≤12GHz	<-75dBc
12GHz<f≤24GHz	<-70dBc
24GHz<f≤40GHz	<-65dBc
40GHz<f≤67GHz	<-60dBc

Pulse Modulation

General Features

On-off ratio	> 80dB
Minimum pulse width	50ns
Minimum cycle	100ns

External pulse input

input impedance	DC coupled, high impedance
Level Logic (CMOS)	3.3V

Internal pulse generator

Square wave rate	0.1Hz to 25MHz
Pulse period	100ns to 10s
Pulse Width	50ns to 10s
Resolution	5ns
Adjustable trigger delay	5ns to 10s
Level Logic (CMOS)	3.3V

General technical indicators

Power Requirements	85~264VAC, 50~60Hz, 100W	
range of working temperature	0 to 50°C	
Weight (excluding protective pads)	Single Channel	≤10kg
	Multi Channel	Dual Channel ≤16kg
		Three channels ≤20kg
Dimensions (excluding protective pads)	Single Channel	2U: 88mm high * 320mm wide * 400mm deep
	Multi Channel	2U: 88mm high * 483mm wide * 559mm deep (dual or three-channel, each channel is below 24GHz)
		3U: 134mm high * 483mm wide * 559mm deep (three-channel, output above 24GHz)
Recommended calibration cycle	12 months	
ISO compliant	The instrument is manufactured in an ISO-9001 certified factory and complies with SALUKI's internal quality standards.	

Instrument Port

Programmable port

LAN	RJ45 connector, LAN connector provides remote control function
RS422	DB9 connector, serial communication interface, provides remote control function
GPIO interface (optional)	Standard GPIO interface, providing remote control function

Input and Output

Debug interface DEBUG	DB15 connector, power calibration and firmware update functions are available through dedicated connector
External trigger input TRIG IN	BNC-K connector, sweep or modulation trigger input interface, 3.3V-COMS logic level, input high impedance
Internal trigger output TRIG OUT	BNC-K connector, synchronous pulse trigger output
External 10MHz reference input REF 10MHz IN	BNC-K connector, receives 10MHz reference signal, used for frequency locking internal time base, rated input power is +2 to +8dBm, impedance is 50Ω, sine wave or square wave
Internal 10MHz reference output REF 10MHz OUT	BNC-K connector, output 10MHz reference signal. Output power is +10±1dBm, output impedance is 50Ω
RF OUT	3.5mm (SG1012A/SG1024A), output impedance 50Ω
	2.92mm (SG1040A), output impedance 50Ω
	2.4mm (SG1045A), output impedance 50Ω
	1.85mm (SG1067A), output impedance 50Ω
PULSE IN	BNC-K connector, external modulation pulse input port, 3.3V-COMS logic level, input high impedance
PULSE OUT	BNC-K connector, output internally generated pulse signal, 3.3V-COMS logic level, output impedance is low resistance

Ordering Information

Main Machine

Model	Description
SG1012A	10MHz-12GHz Single Channel
SG1024A	10MHz-24GHz Single Channel
SG1040A	10MHz-40GHz Single Channel
SG1045A	10MHz-45GHz Single Channel
SG1067A	10MHz-67GHz Single Channel
SG1024D	Dual Channel
SG10420D	
SG1040D	
SG1024T	Three channels
SG104220T	
SG104420T	
SG1040T	

Options

Model	Description
CL	1.6GHz clock input and output
LF	9kHz-10MHz low frequency output