USG303A USB CONTROLLED SIGNAL GENERATOR

Product Features

- 20-30GHz Wide Frequency Range
- Low Phase Noise
- Ultra-Low Spur <-70 dBc
- High Output Power: +5dBm
- Wide Output Power Range > 60dB
- Fine Step Size: 0.05 dB
- USB/LAN Controlled Port
- Host GUI Software
- Robust Compacted Aluminum Enclosure
- Low Cost and High Efficient for Lab and Manufacture Applications

WavesLine USG series USB controlled signal generators cover frequencies from 0.05 MHz to 30 GHz with low phase noise, high output power, small step size, ultra-low spur and wide output tuning range.

USG303A is a broadband (20-30GHz), high performance, low cost RF CW Signal Generator that designed for Automated Test Equipment (ATE), 5G, Manufacture setup, Lab Testing and various application. USG303A's ultra-low spur level is suitable for Intermodulation Distortion (IMD) test, and also low phase noise & fine power tuning give the advantage for P1, IP3 test in ATE system.

USG303A functions with USB/LAN connection to host computer, and easily controlled by various Virtual Instrument software and coding languages. GUI software can track and control multi-connected signal generators, and simplify multiple-signal test setups. Each unit stores settings in internal memory, allows it to power up in a specific instrument state.

Applications

- Lab/Production Testing
- Automated Test Equipment (ATE)
- Portable LO Source for IMD/P1dB Test
- Integrated/Customized Test Setups

Absolute Maximum Ratings

Parameter	Ratings
Operation Temperature	0°C ~ 60°C
Storage Temperature	-30°C ~ 80°C
AC Vmax	240VAC

Electrical Specifications

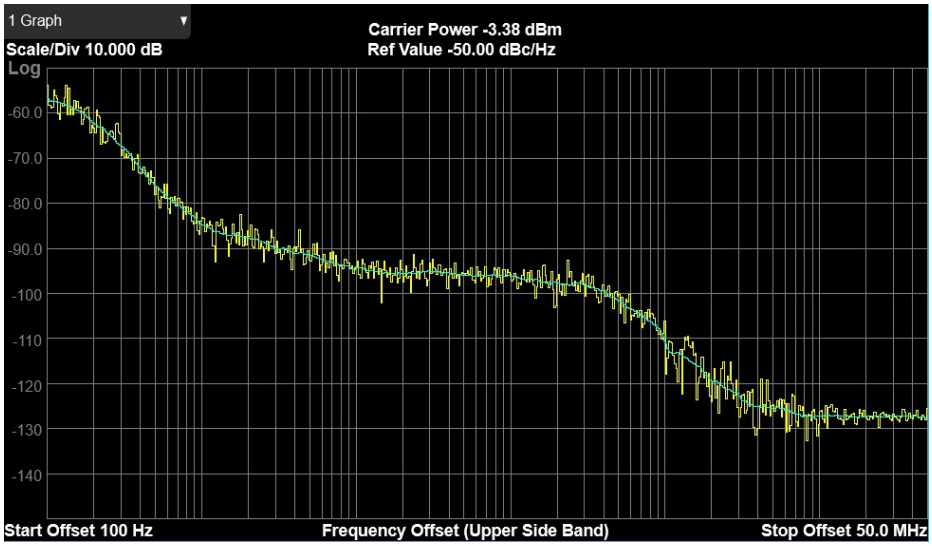
Parameter	Specification				Condition
	Min.	Typ.	Max.	Unit	
RF Performance					
Operation Frequency	20		30	GHz	
Frequency Resolution		2		Hz	
Output Power Step		0.05		dB	0.02 dB Operational
Max. Output Power		>2.5		dBm	20GHz
		>5			24GHz
		>5			26GHz
		>5			28GHz
		>5			30GHz
Power Range		>40		dBm	20-24GHz
		>60			24-30GHz
Absolute Power Accuracy		±1.0		dBm	
Phase Noise @ 20GHz		-97		dBc/Hz	10k offset
		-100		dBc/Hz	100k offset
		-114		dBc/Hz	1M offset
Phase Noise @ 24GHz		-96		dBc/Hz	10k offset
		-99		dBc/Hz	100k offset
		-112		dBc/Hz	1M offset
Phase Noise @ 28GHz		-95		dBc/Hz	10k offset
		-98		dBc/Hz	100k offset
		-109		dBc/Hz	1M offset
Phase Noise @ 30GHz		-94		dBc/Hz	10k offset
		-97		dBc/Hz	100k offset
		-108		dBc/Hz	1M offset
½ Harmonics		-65		dBc	+0dBm @20GHz
		-61		dBc	+0dBm @24GHz
		-62		dBc	+0dBm @26GHz
		-43		dBc	+0dBm @28GHz
		-30		dBc	+0dBm @30GHz

3/2 Harmonics		-12		dBc	+0dBm @20GHz
		-38		dBc	+0dBm @24GHz
		-37		dBc	+0dBm @26GHz
		-52		dBc	+0dBm @28GHz
		-33		dBc	+0dBm @30GHz
2nd Harmonics		-36		dBc	+0dBm @20GHz
		-57		dBc	+0dBm @24GHz
None Harmonic Spur		<-70		dBc	
Reference Frequency		10		MHz	Internal or External
AC/DC Performance					
Power Supply Voltage	100		240	VAC	
Power Supply Current		50		mA	220VAC
Interface					
RF Output	2.92 Female				
REF IN	SMA Female				
REF Out	SMA Female				
USB	USB 2.0 Type B				
LAN	RJ45				
Software Control* **					
Control Software	EXE, Windows OS, .Net Framework 4.8***				
Devices Driver	Windows Driver***				
Windows API	Wrapped in DLL*** and Example Program				
Outline					
Outline Dimensions	200 mm[W] x 290 mm[L] x 55 mm[H]				

All Above Performances are measured at 23-25 degree C room temperature when USG device is powered for 1 hour until device temperature is balanced.

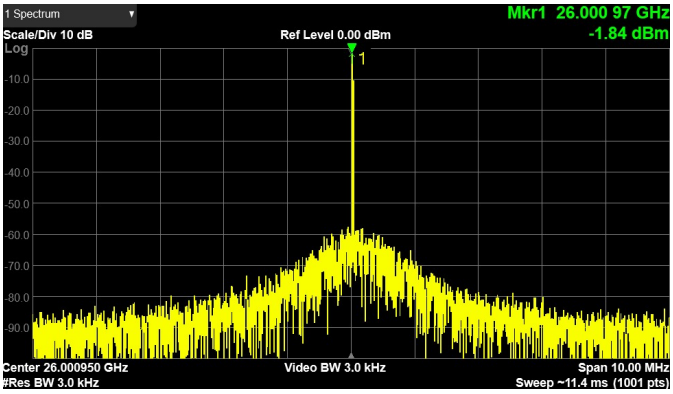
** Lower output power settings may degrade power accuracy especially when output frequency is also working at high band.*
*** USB Type B*
**** Other platform support is available; please contact our sales representative for more detailed information*

Typical Phase Noise [Internal Reference]

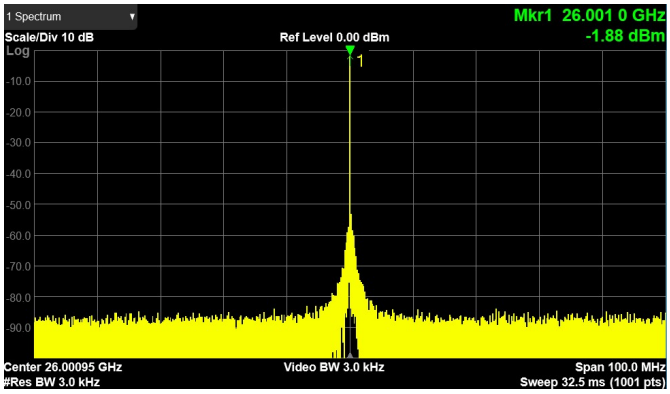


Phase Noise at 30GHz Output

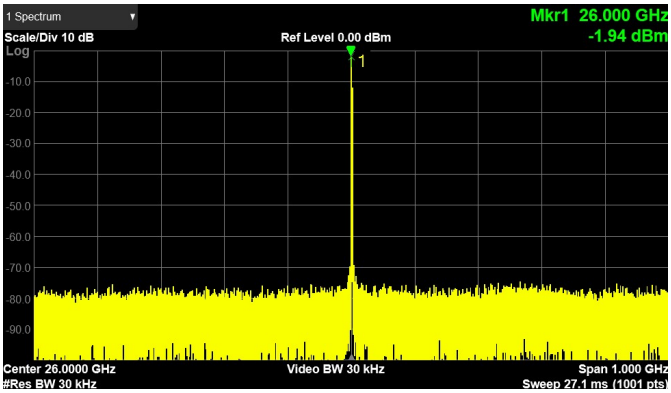
Typical Spur Spectrum [26.001GHz Output]



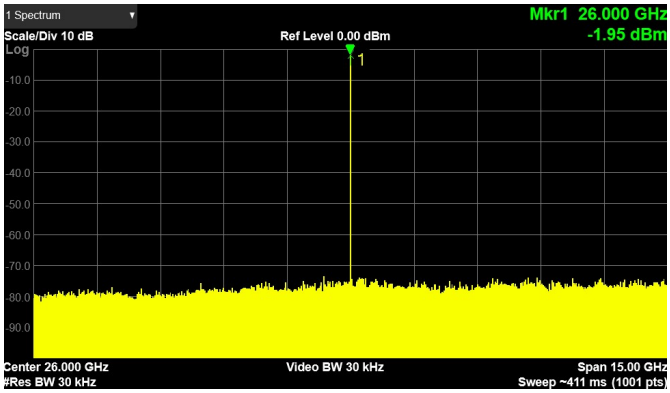
10MHz Span



100MHz Span



1GHz Span



15GHz Span

Controlling the Signal Generator

The driver is developed over USB CDC protocol, which treats the USB device as a virtual serial port (COM) that can be easily controlled. Windows 10 (or higher) is able to recognize USG device and no drivers are required.

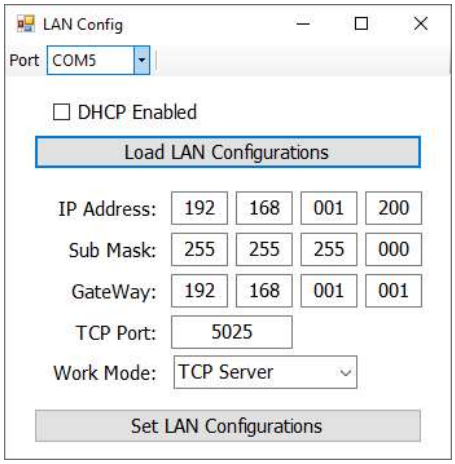
Waves-Line Control Software (wsCWS for USG303A) is an easy-to-use application software to control USG device from host computer.

In an attempt to minimize customers' efforts in controlling the device via USB, Waves-Line offers easy-to-use dynamic link library (dll), which wraps a variety of functions such as, checking active ports that device is attached to, opening/closing connections to device, writing command to device, reading response from device and etc. The dll is wrapped to work over Microsoft .Net Framework 4.8[①].

Control Software (wsCWS.exe)

LAN Interface

The USG303A LAN interface works as TCP Server that can be controlled with IEEE488.2 protocol. The USG303A LAN settings can be configured by LAN Config Tool.



Command Format

Commands written to device must be in string formats, and all return values are in string format as well. The USG device control command are listed below.

Note: All the commands should end with char 0x0A ("\n" in C language).

***IDN?**

Query device information, it returns device information in string format.

FREQ[space]*value*

Set Frequency value, it returns the value when settings are done.

return: Value in unit of Hz;

FREQ? Query device Frequency Setting

return: Value in unit of Hz;

POWR[space]*value*

Set power value, it returns the value when settings are done.

return: Value in unit of dB;

POWR? Query device Power Setting

return: Value in unit of dB;

OUTP[space]*1|0*

RF Power On/Off

1: RF ON

0: RF Off

return: 1 or 0

OUTP? Query device Output Setting

return: 1 or 0

EXREF[space]*1|0*

1: Lock to external 10MHz Reference

0: Use Internal Reference

return: 1 or 0

Example Program:

```
FREQ 26000000000<CR> //Set Frequency to 26GHz
                     //wait USG device to return "26000000000"
POWR -10<CR>         //Apply -10dB Power to 26GHz
                     //wait USG device to return "-10"
OUTP 1<CR>           //Turn Output On
                     //wait USG device to return "1".
```