Signal and Tracking Generator

USG Series

USER MANUAL

REVISION 1.1 January 2014

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

The information in this manual was correct at the time of printing. However, Good Will continues to improve products and reserves the rights to change specification, equipment, and maintenance procedures at any time without notice.

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Table of Contents

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow during operation and storage. Read the following before any operation to insure your safety and to keep the instrument in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the instrument.

 WARNING	Warning: Identifies conditions or practices that could result in injury or loss of life.
 CAUTION	Caution: Identifies conditions or practices that could result in damage to the instrument or to other properties.
	DANGER High Voltage
	Attention Refer to the Manual
	Earth (ground) Terminal
	Frame or Chassis Terminal
	Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Safety Guidelines

General Guideline ⚠ CAUTION	• Do not place any heavy object on the instrument. • Avoid severe impact or rough handling that leads to damaging the instrument. • Do not discharge static electricity to the instrument. • Use only mating connectors, not bare wires, for the terminals. • Do not disassemble the instrument unless you are qualified. • Ensure reverse power to the USG output terminal does not exceed +30dBm. • Ensure the DC voltage connected to the USG output terminal does not exceed beyond the range of -25Vdc to +25Vdc.
Power Supply ⚠ WARNING	• 5V DC (USB power)
Cleaning	• Disconnect all cables or devices from the instrument before cleaning. • Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid. • Do not use chemicals containing harsh material such as benzene, toluene, xylene, and acetone.
Operation Environment	• Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below) • Temperature: 5°C to 45°C • Humidity: 65% @ 50°C

Storage environment	• Location: Indoor • Temperature: -20°C to 60°C; 65°C @ 70% RH
Disposal 	Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

GETTING STARTED

This chapter provides a brief overview of the USB Signal Generator (hereafter referred to as 'USG'), the package contents, instructions for first time use and an introduction to the signal generator display and tracking generator function.

USG Series Introduction

The USG series signal and tracking generators can be operated as standalone continuous wave generators, or when paired to a PC and the GSP-730 spectrum analyzer, they can be used as tracking generators.

As continuous wave generators, the USG can be configured using any java supported PC or an Android device. The device can generate continuous wave, sweep, power sweep and frequency hopping waveforms.

As a tracking generator, the USG can be connected to a PC using dedicated software (Primary RF) to synchronize the USG with the GSP-730 spectrum analyzer.

Series lineup

The USG series consists of 5 models, spanning a number of different frequency ranges.

Model	Frequency	Phase Noise
USG-LF44	34.5 MHz to 4.4 GHz	< -97dBc/Hz@1GHz, 10kHz
USG-0103	100 MHz to 300 MHz	< -100dBc/Hz@200MHz, 10kHz
USG-0818	800 MHz to 1.8 GHz	< -97dBc/Hz@1.3GHz, 10kHz
USG-2030	2.0 GHz to 3.0 GHz	< -93dBc/Hz@2.5GHz, 10kHz
USG-3044	3.0 GHz to 4.4 GHz	< -88dBc/Hz@3.7GHz, 10kHz

Main Features

Performance	• Five models supporting a frequency range from 34.5 MHz to 4.4 GHz • 10kHz resolution • -30 dBm to 0 dBm output power
Features	• Signal generator operation supports a plethora

of control devices:
Any java-enabled PC: Windows, Mac or Linux PCs.
Any android device that supports USB OTG (USB On The Go) operation (via Google Play).

- Continuous wave, sweep wave, frequency hopping wave, power sweep wave.

Package Contents and Standard Accessories

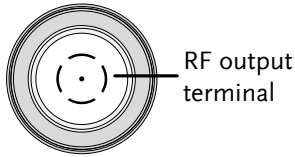
Standard Accessories	Part number	Description
	Region dependant	User manual CD
	Region dependant	USB A to Mini USB cable

Optional Accessories

Standard Accessories	Part number	Description
	ADP-003	N female to SMA female adaptor

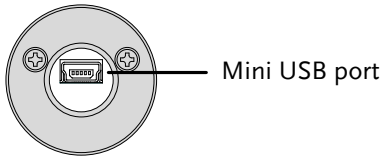
Appearance

Front Face



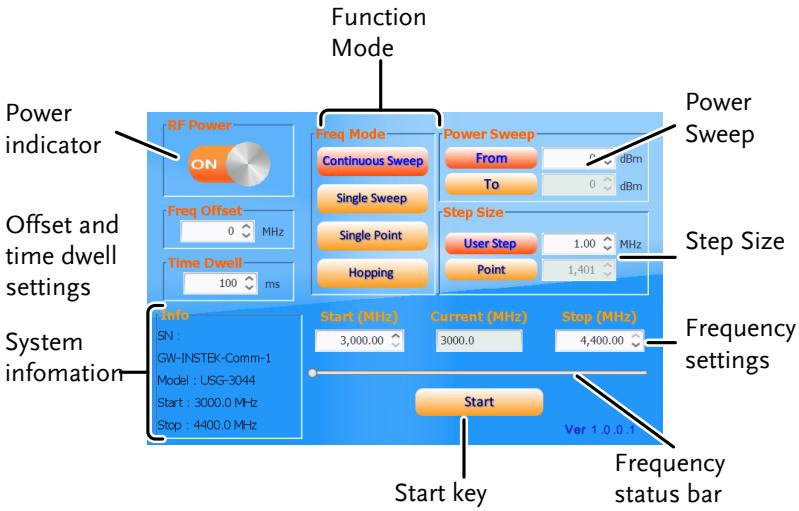
RF Output Terminal	RF output port. Accepts RF outputs. • Output: 0 ~ -30dBm • Input impedance: 50Ω • N-type: male

Rear Face



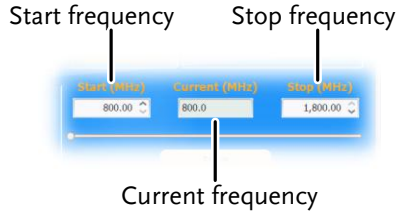
Mini USB port	Used to connect to a PC or Android device for configuration or control. When connected to power, the mini USB port will be lit red.

Signal Generator Display - Java



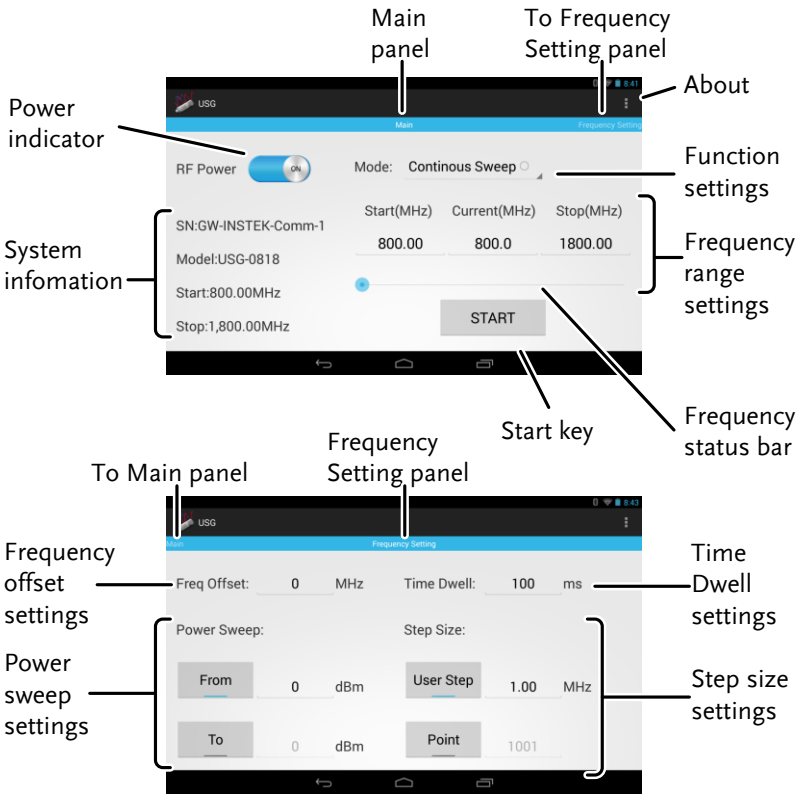
Power Indicator	Turns the RF output on or off.
Function Mode	Chooses the type of function to be performed by the USG: Continuous Sweep, Single Sweep, Single Point or Hopping
Power Sweep	Sets the Start and Stop power level settings. The *From* setting set the initial power level at the start of the sweep and the *To* setting sets the final power level at the end of the sweep.
Step Size	Sets the sweep step settings

Frequency Settings	Sets the basic start and stop frequency parameter settings. It also displays the instantaneous (current) output frequency, as shown below.



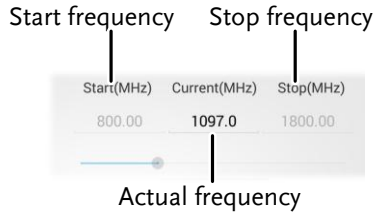
Frequency Status Bar	When the output is on, the point on the frequency status bar indicates the instantaneous frequency that is being output. When the output is off, the status bar can set the start and stop frequencies.
Start key	Pressing Start will output the selected function.
System Information	The system information states the serial number, model and frequency range specifications.
Frequency Offset Settings	Offsets the frequency by ±50 kHz.
Time Dwell Settings	The time dwell settings determine how long the signal will stay (dwell) at each frequency point.
Step Size	The User Step and Point (inversely related) set the step resolution of the single and continuous sweep functions in hertz and number of points, respectively.

Signal Generator Display – Android App



Power Indicator	Turns the RF output on or off.
System Information	The system information states the serial number, model and frequency range specifications.
Main panel	Indicates that the interface is in the Main panel.
To Frequency Setting panel	Indicates that swiping to the left will go to the Frequency Setting panel.

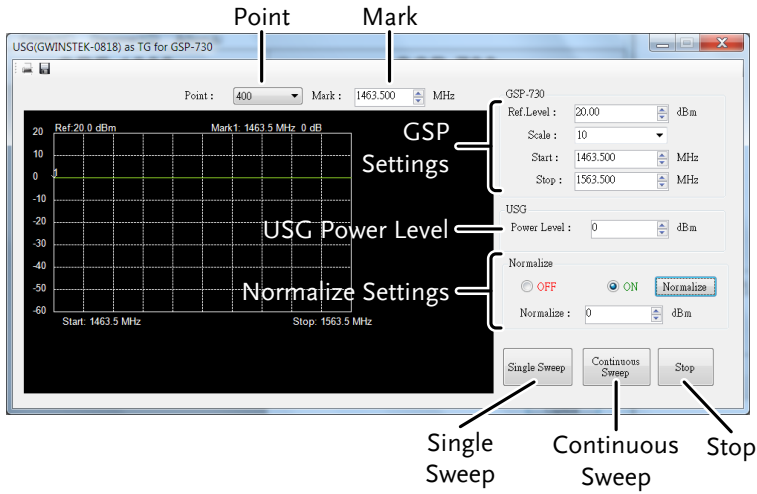
Function Settings	Chooses the type of function to be performed by the USG: Continuous Sweep, Single Sweep, Single Point or Hopping.
Frequency Range Settings	Sets the basic start and stop frequency parameter settings. It also displays the instantaneous (current) output frequency, as shown below.



Frequency Status Bar	When the output is on, the point on the frequency status bar indicates the instantaneous frequency that is being output. When the output is off, the status bar can set the start and stop frequencies.
Start key	Pressing Start will output the selected function.
About	Pressing About will display the GNU lesser GPL license requirements.
To Main panel	Indicates that swiping to the right will go to the Main panel.
Frequency Setting panel	Indicates that the interface is in the Frequency Setting panel.
Frequency Offset Settings	Offsets the frequency by ±50 kHz.
Power Sweep Settings	Sets the start and stop power level settings. The *From* setting sets the initial power level at the start of the sweep, and the *To* setting sets the final power level at the end of the sweep.

Time Dwell Settings	The time dwell settings determine how long the signal will stay (dwell) at each frequency point.
Step Size Settings	The User Step and Point (inversely related) set the step resolution of the single and continuous sweep functions in hertz and number of points, respectively.

Primary RF – Tracking Generator Function



Point	Sets the number of frequency points for sweep.
Mark	Sets the marker frequency.
GSP Settings	Sets the reference level, scale and start and stop frequencies.
Power Level	Sets the USG output power level.
Normalize Settings	Normalizes the USG output.
Single Sweep	Outputs a single sweep.
Continuous Sweep	Outputs a continuous sweep.
Stop	Stops the sweep output.

First Time Use Instructions

The following instructions will go over all installation instructions that are required to operate the USG from a PC or from an android device.

Installing the USG USB Driver

Description	The USG connects via USB to a PC using a virtual COM port driver. For Linux and OS X systems, the USG device is recognized as a virtual COM port device automatically. *A device driver does not need to be installed for these systems.* For Microsoft Windows operating systems, the USG will be recognized as a virtual COM port device only after the USB driver is installed.
Requirements	Operating System: Windows XP, Vista, 7, 8*
⚠ Note	*Please note that for Windows 8, "Device driver signature enforcement" must first be disabled before the driver can be installed. See page 18 for details.

Steps

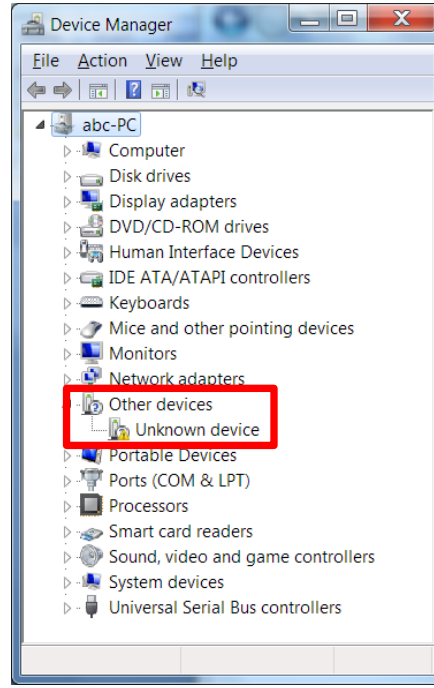
1. Connect the USG to the PC using the USB Type A - Mini-B cable.

   If the PC asks for the driver, please go to step 5.

2. Open the Windows Device Manager. On Windows 7 for example:

   Start>Control Panel>Hardware and Sound>Device Manager

3. From the device tree go to: *Other devices*>*USB Serial Port*



The yellow error sign indicates that a driver has not been installed.

4. Right-click USB Serial Port and select *Update Driver Software*.

5. Select *Browse* my computer for driver software when prompted.

   Manually select the *USG Driver* from the User Manual CD when prompted.

   If the Windows Security pop-up appears, choose *Install this driver software anyway*.

6. The USG will now become available in the device tree under PORTS (COM & LPT).

Disabling the Device Driver Signature Enforcement in Windows 8

Description	To install the USG USB driver on Windows 8 systems, you must first disable "Device driver signature enforcement". This procedure is shown below.
⚠ Note	Applicable to Windows 8 only!

Steps

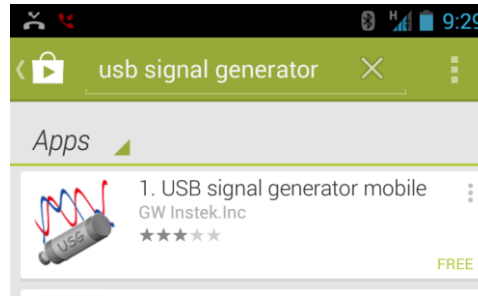
1. Go to the Charms bar → Click on Settings → Click on Power → Hold the SHIFT key and click Restart → Click Troubleshoot → Advanced Options → Startup Settings → Restart → Select 7) Disable driver signature enforcement.
2. The PC will now restart.
3. After the PC restarts, it will now be possible to install the USG USB driver on Windows 8 using the procedure shown previously.

Installing the USG Software from Google Play

Description	The USG software for controlling the USG as a signal generator can be found on the Google Play store.
⚠ Note	Supported for Android 4.0 and above only.

Steps

1. Open Google Play on your Android device.
2. Enter *USB Signal Generator* in the Google Play search bar.



3. Install the USB Signal generator mobile app (GW Instek.Inc.)
4. The USG app will now be available in your App Draw.

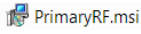
- By default, the USG app will automatically load each time the USG is attached to your USB device.

Tracking Generator Software Installation (Primary RF)

Description	Primary RF is used in conjunction with the USG as a tracking generator for the GSP-730.
⚠ Note: Requirements	Only Windows operating systems (Windows XP, Vista, 7, 8) can be used with the Primary RF software.
⚠ Note: USB Drivers	Before the tracking generator software can be installed, the USG USB driver must first be installed. See page 16 for details. Note that the USB driver for the GSP-730's USB interface will be automatically installed when installing the Primary RF software.
⚠ Note: NI 488.2 Software	The tracking generator function requires National Instruments NI 488.2 software to be installed. This software is available on the NI website, www.ni.com.

Driver installation

1. Open the User Manual CD and click on PrimaryRF.msi.

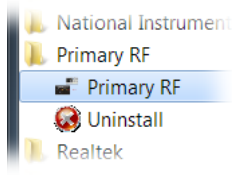


2. The Primary RF Setup Wizard will appear.

   Follow the prompts until it is all installed.

   Note: If the Windows Security pop-up appears, choose *Install this driver software anyway*.

3. Primary RF will now be available in the Windows Start Menu.



OPERATION

Signal Generator Function

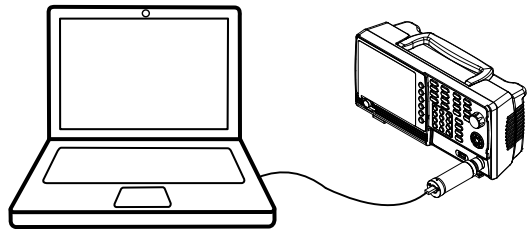
The signal generator function can be controlled with PC using a java program (using Windows, Mac OS X or Linux operating systems) or with an Android device.

Setup ~ PC

Description	The following chapter will show how to run the Java based application and the how to connect the USG to the PC. Any Windows, Mac OS X or Linux PC that can install the Java runtime library can be used to operate the signal generator function.
⚠ Note	The Java runtime needs to be installed before continuing. Visit www.java.com to download and install the Java Runtime.
⚠ Note	For Windows, the USG USB driver must first be installed. See page 16 for details. Mac OS X and Linux systems do not need to install this driver.

Connection

1. Connect the USG to the RF port of the GSP-730.
2. Connect the PC to the USG using a Type A-mini USB cable.



3. Open USG_GUI_v1001.jar file (accessible on the User Manual CD).

- The USG_GUI_v1001 file doesn't need to be installed.

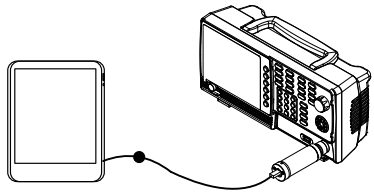
4. If it is not already, turn the RF power on for the USG.

Setup ~ Android Device

Description	The following chapter will show how to start up and connect the USG to an Android device.
⚠ Note	Install the USB signal generator software before connecting the USB to your Android device. See page 18.

Connection

1. Connect the USG to the RF port of the GSP-730.
2. Connect the Android device to a USB OTG cable.
3. Connect the OTG cable to the USG using a Type A-mini USB cable.



4. By default, the USG app should load up when the Android device is connected to the USG.

   - If the app does not automatically load up, go to the app drawer and run the USB signal generator app.

5. If it is not already, turn the RF power on for the USG.

Note

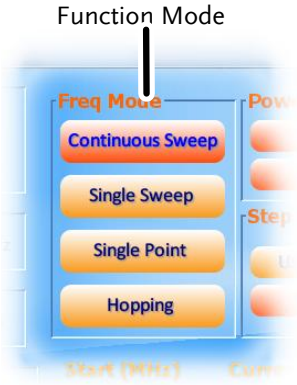
If the USB cable is not connected properly, the system information in the Main panel will show "NONE". In this case, re-insert the USB cable and the OTG cable.

Frequency Function Mode

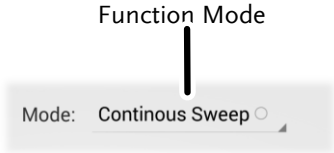
Description

There are four different frequency modes that can be selected.

Java App Display



Android App Display



Steps

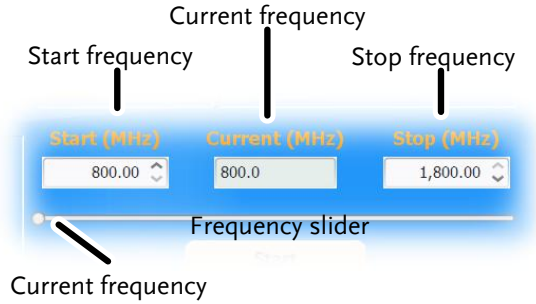
1. In the *Freq Mode* panel(Java)/*Mode* drop-down list(Android), select the frequency function mode:

Continuous Sweep:	Outputs a continuous sweep
Single Sweep:	Outputs a single sweep
Single Point:	Outputs a single frequency
Hopping:	Frequency hops between two frequencies

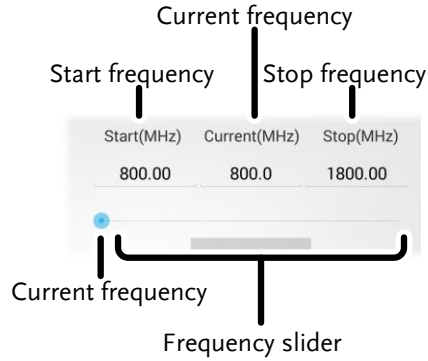
Selecting the Frequency

Description	Sets the Start and Stop frequency for the USG.

Java App Display



Android App Display



Steps

1. At the bottom of the screen set the Start and Stop frequencies for the continuous sweep, single sweep and hopping frequency modes.

   For the Single Point frequency mode, only the Start frequency can be set.

Note

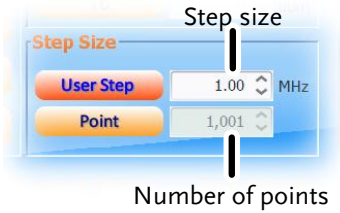
The settable frequency range is limited by the USG model type.

Selecting the Frequency Step Size

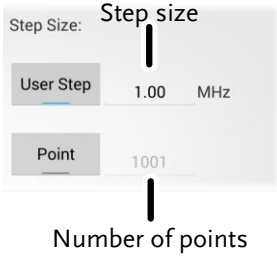
Description

The step size settings determine the number of frequency points for the sweep modes.

Java App Display



Android App Display



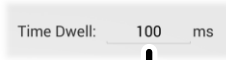
Steps

1. To set the span of each step of a sweep, press *User Step*.
2. To set the number of discrete steps in a sweep, press *Point*.

- The number or points or the frequency span of each step depends on the USG model.

User Step range	0.01MHz~ 100 MHz
Point range	(Frequency span of USG model / User Step range) + 1 = Point range

Time Dwell

Description	The Time Dwell setting determines the amount of time between each point in a sweep.
Java App Display	 Time Dwell
Android App Display	 Time Dwell
Steps	1. Press Time Dwell to set the amount of time between each step in milliseconds. • The Time Dwell setting range depends on the on the USG model. Time Dwell 1ms~ 1000ms
Note	The minimum step time is automatically set by the PC software. A 1ms Time Dwell can only be achieved with a fast system.

Frequency Offset

Description	The Frequency Offset setting will offset the frequency by ±0.05 MHz.
Java App Display	 Freq Offset
Android App Display	 Frequency Offset
Steps	1. Press Freq Offset to set an offset to the frequency settings. Offset ± 0.05 MHz

Selecting the Power Sweep

Description

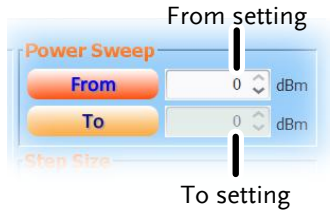
Sets the power level for the start and stop frequencies.

For the sweep functions, sets the power level from the Start frequency to the Stop frequency.

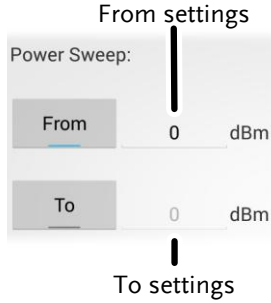
For the Single Point function, the *From* setting sets the initial power level and the *To* setting, if needed, sets the final power level.

For the Hopping function, the *From* setting sets the power level of the Start Frequency and the *To* setting set the power level at the Stop frequency.

Java App Display



Android App Display



Steps

1. To set the initial power level, press *From*.
2. To set the final power level press *To*.
   - If you only want one power level, only set the *From* setting.

Power level range 0dBm ~ -30dBm

Turning the Output On

Steps

After all the settings have been set press Start to turn on the output on.

For the single sweep function, press Start for each single sweep.

Java App Display

Android App Display

Tracking Generator Function (Primary RF Software)

The Primary RF software can be used as a tracking generator for the GSP-730 to track the frequency response of a DUT.

⚠ Note

Please note that the Primary RF software has multiple functions and can be used for purposes other than as tracking generator software for the GSP-730. The other software functions are beyond the scope of this manual and will not be detailed.

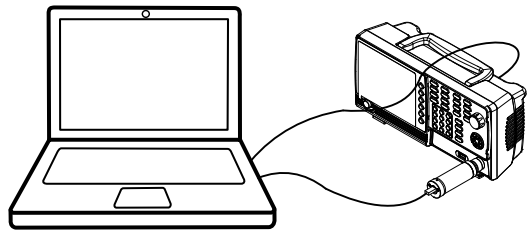
Setup

Description

The following chapter will show how to connect the USG to the GSP-730 and to the host PC when using the USG as a tracking generator. To use the USG as a tracking generator, the Primary RF software must be used. See page 20 for installation details.

Connection

1. Connect the USG to the RF port of the GSP-730.
2. Connect the PC to the USG using a Type A-mini USB cable.
3. Connect the PC to the rear-panel USB B port on the GSP-730 using a Type A-Type B USB cable.



Tracking Generator Setup

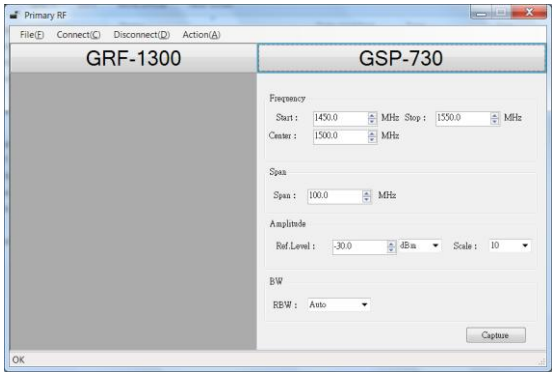
Description

The section will describe how to use the USG as a tracking generator for the GSP-730.

Operation

1. Launch PrimaryRF.
2. Click on the large GSP-730 button at the top of the window.

   The spectrum analyzer settings will be shown* when the connection to the GSP-730 is working.

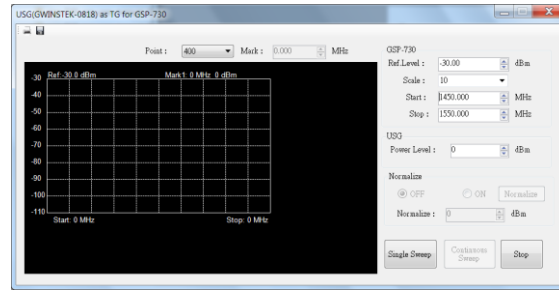


Note

*Note: The above GSP-730 frequency and amplitude settings as well as the Capture function are not used for the tracking generator function and are thus not used in this manual. Using these functions is beyond the scope of this user manual.

3. Press *Action(A)* and select *USG as TG for GSP-730*.

   A new window will open for the tracking generator options.



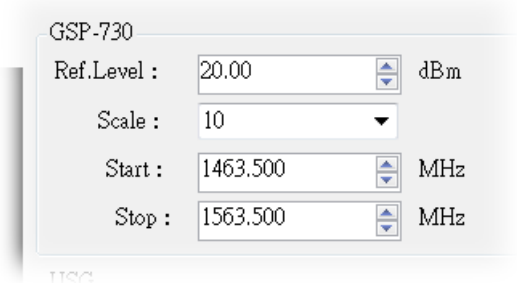
4. Press *Point* and set the number of frequency points that will be used in the sweep.

5. Press *Mark* and set the marker frequency.

- *The marker frequency and amplitude will be shown at the top of the grid.*

6. Under the GSP-730 panel set the basic spectrum analyzer settings:

   - *Ref.Level: -40 ~ 20 dBm*
   - *Scale: 1~10*
   - *Start frequency: Dependent on the connected USG model*
   - *Stop Frequency: Dependent on the connected USG model*



7. Set the USG power level:

   - *Power Level: 0 ~ -30 dBm*

Normalizing the Tracking Generator

Description	The tracking generator should first be normalized before a DUT is connected to the USG.
Operation	1. Setup Primary RF as shown above.

2. Press *Single Sweep* and perform a single sweep.

   - *It may take some time to complete a full sweep, depending on the fixed RBW (1MHz) and span 100MHz settings.*

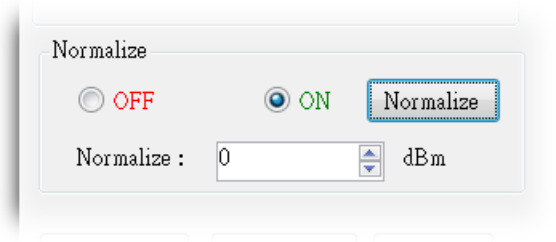
   - *The Normalize panel will be selectable after the first sweep is performed.*

3. Press *Normalize* after a full sweep has been performed. The Normalize radio button will then automatically be set to *ON*.

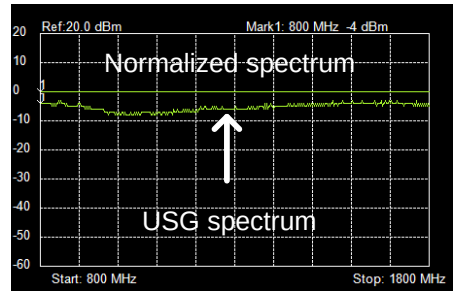
   - *This will normalize the USG output for the Primary RF software.*

4. Set the normalized amplitude level.

   - *Normalize: 0 ~ -30dBm.*



Display



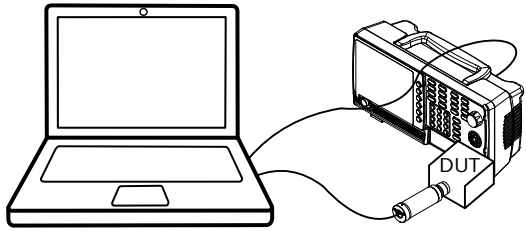
Note

Before performing normalization, make sure the USG has been on for at least 30 minutes to eliminate drift from effecting the normalization.

Using the Tracking Generator

Description

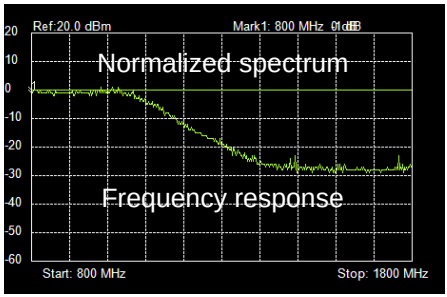
After normalization is performed, the USG can be used to measure the frequency response of a DUT.



Operation

1. Remove the USG from the GSP-730 and put the DUT between the USG and the GSP-730 RF ports.
2. Press *Sweep* or *Continuous* sweep to get the frequency response of the DUT.

Display



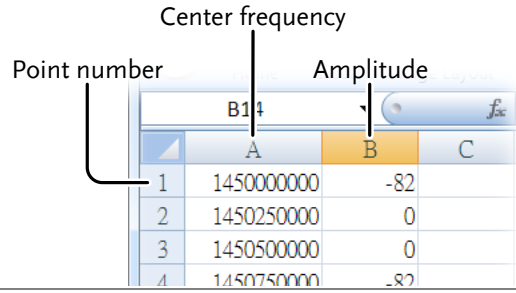
Example: Low pass filter frequency response.

Save Results - CSV

Description

The spectrum results on GSP-730 can be saved as a CSV file.

CSV File Format



Operation

1. Perform either a sweep or a continuous sweep, as shown above. See page 38 for details.

2. After the sweep has completed, press the disk drive icon on the top left-hand side.

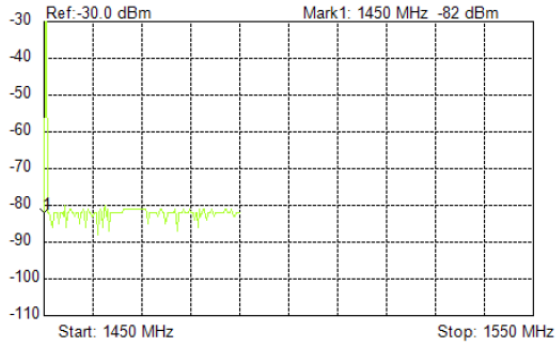
3. A pop-up window will now appear. Choose a file name and directory and select *Save*.

Save Results - Print

Description

The spectrum results on the GSP-730 can be saved as a PDF or printed.

Print Format



Results are printed in an inverted color format.

Operation

1. Perform either a sweep or a continuous sweep, as shown above. See page 38 for details.
2. After the sweep has completed, press the print icon on the top left-hand side.

Print icon

3. A pop-up window will now appear. Choose a printer or choose to save as a PDF.
4. Press *Print* to print the results.

FAQ

- The USG will not connect to the PC.
- Primary RF will not allow me to connect to the GSP-730.
- The performance does not match the specification.

The USG will not connect to the PC.

If you are running a Windows system, make sure that the USG USB driver has been installed correctly, see page 16 for details. If you are running Windows 8, please make sure that "Device driver signature enforcement" is disabled before installing the driver, see page 18 for details.

Primary RF will not allow me to connect to the GSP-730.

Make sure that all the USB cables from the USG and GSP-730 are connected correctly, then make sure that the NI.488.2 software is installed before Primary RF is installed. See page 20 for installation details.

The performance does not match the specification.

Make sure the device is powered On for at least 30 minutes, within +20°C~+30°C. This is necessary to stabilize the unit to match the specification.

For more information, contact your local dealer or GWInstek at www.gwinstek.com / marketing@goodwill.com.

APPENDIX

USG Specifications

The specifications apply when the USG is powered on for at least 30 minutes to warm-up to a temperature of 20˚C to 30˚C, unless specified otherwise.

USG-LF44

Frequency Range	34.5 MHz to 4.4 GHz	
Output Power	-30 dBm to 0 dBm	in 1 dB steps
Internal Reference	25 MHz	aging ±1 ppm at first year
Frequency Accuracy	± 100 Hz	at 100 MHz, 0 dBm Output
Resolution	10 kHz	
Output Control	On / Off	
On / Off Isolation	≤ -75 dBc	
Mode Control	Fixed Frequency / Single Sweep / CW Sweep / Hopping	
Step Dwell	≤ 1000 ms in 1* ms steps	
Frequency Offset	-50 kHz to 50 kHz in 10 kHz steps	
Amplitude Absolute Accuracy	0 dBm ± 1 dB typical	at 2200MHz, 0 dBm Output
Output Flatness	± 3.5 dB, ref. to 2200MHz	at 0 dBm Output
Phase noise	< -97 dBc/Hz	10 kHz offset @ 1.0 GHz, typical -100 dBc/Hz
	< -107 dBc/Hz	100 kHz offset @ 1.0 GHz, typical -110dBc/Hz
2nd Harmonics		0 dB Attenuation
	≤ -15 dBc, typical	34.5 MHz to 2.0 GHz, fundamental
	≤ -10 dBc, typical	2.0 GHz to 3.0 GHz, fundamental
	≤ -25 dBc, typical	3.0 GHz to 4.4 GHz, fundamental

3rd Harmonics		0 dB Attenuation
	≤ -5 dBc, typical	34.5 MHz to 2.0 GHz, fundamental
	≤ -20 dBc, typical	2.0 GHz to 3.0 GHz, fundamental
	≤ -40 dBc, typical	3.0 GHz to 4.4 GHz, fundamental
Spurious related to Resolution settings (Single Point Mode)	≤ -30 dBc, typical	Resolution < 1 MHz
	≤ -65 dBc, typical	Resolution ≥ 1 MHz
Spurious related to the fundamental output (Single Point Mode)	≤ -60 dBc, typical	

USG-0103

Frequency Range	100 MHz to 300 MHz	
Output Power	-30 dBm to 0 dBm	in 1 dB steps
Internal Reference	25 MHz	aging ±1 ppm at first year
Frequency Accuracy	± 100 Hz	at 100MHz, 0 dBm Output
Resolution	10 kHz	
Output Control	On / Off	
On / Off Isolation	≤ -75 dBc	
Mode Control	Fixed Frequency / Single Sweep / CW Sweep / Hopping	
Step Dwell	≤ 1000 ms in 1* ms steps	
Frequency Offset	-50 kHz to 50 kHz in 10 kHz steps	
Amplitude Absolute Accuracy	-1.2 dBm ± 1 dB typical	at 150 MHz, 0 dBm Output
Output Flatness	± 1 dB, ref. to 150 MHz	at 0 dBm Output
Phase noise	< -100 dBc/Hz, typical	10 kHz offset @ 200 MHz
	< -110 dBc/Hz	100 kHz offset @ 200 MHz
2nd Harmonics		0 dB Attenuation
	≤ -45 dBc, typical	> 100 MHz, fundamental
3rd Harmonics		0 dB Attenuation
	≤ -7dBc, typical	≤ 150 MHz, fundamental
	≤ -35 dBc, typical	> 150 MHz, fundamental
Spurious related to Resolution settings (Single Point Mode)	≤ -30 dBc, typical	Resolution < 1 MHz
	≤ -65 dBc, typical	Resolution ≥ 1 MHz
Spurious related to the fundamental output (Single Point Mode)	≤ -60 dBc, typical	

USG-0818

Frequency Range	800 MHz to 1.8 GHz	
Output Power	-30 dBm to 0 dBm	in 1 dB steps
Internal Reference	25 MHz	aging ±1 ppm at first year
Frequency Accuracy	± 800 Hz	at 800MHz, 0 dBm Output
Resolution	10 kHz	
Output Control	On / Off	
On / Off Isolation	≤ -75 dBc	
Mode Control	Fixed Frequency / Single Sweep / CW Sweep / Hopping	
Step Dwell	≤ 1000 ms in 1* ms steps	
Frequency Offset	-50 kHz to 50 kHz in 10 kHz steps	
Amplitude Absolute Accuracy	-0.8 dBm ± 1 dB typical	at 1000 MHz, 0 dBm Output
Output Flatness	± 1 dB, ref. to 1000MHz	at 0 dBm Output
Phase noise	< -97 dBc/Hz < -102 dBc/Hz	10 kHz offset @ 1.3 GHz 100 kHz offset @ 1.3 GHz
2nd Harmonics	 ≤ -25 dBc, typical	0 dB Attenuation >800 MHz, fundamental
3rd Harmonics	 ≤ -25 dBc, typical ≤ -35 dBc, typical	0 dB Attenuation ≤900 MHz, fundamental >900 MHz, fundamental
Spurious related to Resolution settings (Single Point Mode)	≤ -30 dBc, typical ≤ -65 dBc, typical	Resolution < 1 MHz Resolution ≥ 1 MHz
Spurious related to the fundamental output (Single Point Mode)	≤ -65 dBc, typical	

USG-2030

Frequency Range	2.0 GHz to 3.0 GHz	
Output Power	-30 dBm to 0 dBm	in 1 dB steps
Internal Reference	25 MHz	aging ±1 ppm at first year
Frequency Accuracy	± 2 kHz	at 2 GHz, 0 dBm Output
Resolution	10 kHz	
Output Control	On / Off	
On / Off Isolation	≤ -75 dBc	
Mode Control	Fixed Frequency / Single Sweep / CW Sweep / Hopping	
Step Dwell	≤ 1000 ms in 1* ms steps	
Frequency Offset	-50 kHz to 50 kHz in 10 kHz steps	

Amplitude Absolute Accuracy	0 dBm ± 1 dB typical	at 2500 MHz, 0 dBm Output
Output Flatness	± 1 dB, ref. to 2500MHz	at 0 dBm Output
Phase noise	< -93 dBc/Hz < -100 dBc/Hz	10 kHz offset @ 2.5 GHz 100 kHz offset @ 2.5 GHz
2nd Harmonics	≤ -30 dBc, typical	0 dB Attenuation 2.0 GHz to 3.0 GHz, fundamental
3rd Harmonics	≤ -45 dBc, typical	0 dB Attenuation 2.0 GHz to 3.0 GHz, fundamental
Spurious related to Resolution settings (Single Point Mode)	≤ -30 dBc, typical ≤ -65 dBc, typical	Resolution < 1MHz Resolution ≥ 1MHz
Spurious related to the fundamental output (Single Point Mode)	≤ -65 dBc, typical	

USG-3044

Frequency Range	3.0 GHz to 4.4 GHz	
Output Power	-30 dBm to 0 dBm	in 1 dB steps
Internal Reference	25 MHz	aging ±1 ppm at first year
Frequency Accuracy	± 3 kHz	at 3 GHz, 0 dBm Output
Resolution	10 kHz	
Output Control	On / Off	
On / Off Isolation	≤ -75 dBc	
Mode Control	Fixed Frequency / Single Sweep / CW Sweep / Hopping	
Step Dwell	≤ 1000 ms in 1* ms steps	
Frequency Offset	-50 kHz to 50 kHz in 10 kHz steps	
Amplitude Absolute Accuracy	1 dBm ± 1 dB typical	at 3300 MHz, 0 dBm Output
Output Flatness	± 2 dB, ref. to 3300MHz	at 0 dBm Output
Phase noise	< -88 dBc/Hz < -94 dBc/Hz	10 kHz offset @ 3.7 GHz 100 kHz offset @ 3.7 GHz
2nd Harmonics	≤ -25 dBc, typical	0 dB Attenuation 3.0 GHz to 4.4 GHz, fundamental
3rd Harmonics	≤ -40 dBc, typical	0 dB Attenuation 3.0 GHz to 4.4 GHz, fundamental

Spurious related to Resolution settings (Single Point Mode)	≤ -30 dBc, typical	Resolution < 1MHz
	≤ -65 dBc, typical	Resolution ≥ 1MHz
Spurious related to the fundamental output (Single Point Mode)	≤ -65 dBc, typical	

*: Minimum step depands on the computer being used. This min. step will be automatically adjusted by the PC software. 1ms is achieved on a faster system.

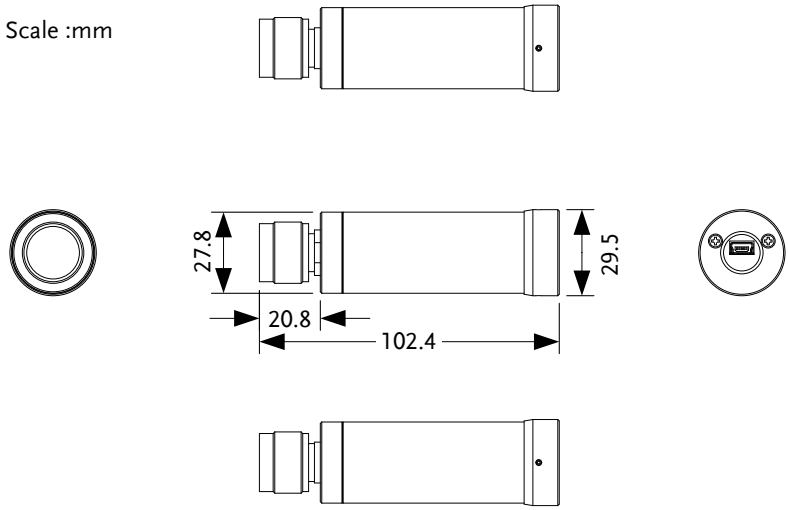
Common Specifications

Software for PC:		
a. Primary RF supports operating system: Windows 2000/XP/Vista/7/8		
b. Java USG Control Panel: Windows 2000/XP/Vista/7/8 Linux/OS X		
Software for mobile device:		
For Android 4.0 and higher with OTG*		
Interface	USB 2.0	
USB Connector Type	Mini-B	
Supply Voltage	5V	nominal
RF Connector Type	N-type male	
Impedance	50 ohm	nominal
Output VSWR	< 1.5:1	Output level @ -30dBm
Max. DC voltage connected to output	+/-25VDC	
Max. Reverse Power	+30dBm	

*Warning: Some Android devices with OTG support cannot run the USG app due to the OTG driver modifications by vendors.

USG Dimensions

Scale :mm



Declaration of Conformity

We

GOOD WILL INSTRUMENT CO., LTD.
No. 7-1, Jhongsing Rd, Tucheng Dist., New Taipei City 236, Taiwan

GOOD WILL INSTRUMENT (SUZHOU) CO., LTD.
No. 69 Lushan Road, Suzhou New District Jiangsu, China.

declare that the below mentioned products

Type of Product: USB Signal Generator
Model Number: USG-LF44, USG-0103, USG-0818, USG-2030, USG-3044
are herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility (2004/108/EEC).

For the evaluation regarding the Electromagnetic Compatibility, the following standards were applied:

◎ EMC

EN 61326-1: **EN 61326-2-1:**	Electrical equipment for measurement, control and laboratory use –- EMC requirements (2006)
Conducted and Radiated Emissions EN 55011:2009+A1:2010 Group 1 Class A	Electrostatic Discharge EN 61000-4-2: 2009
----------	Radiated Immunity EN 61000-4-3: 2006+A1: 2008+A2 :2010
----------	Voltage Dip/ Interruption EN 61000-4-11: 2004

INDEX