# Spectrum Analyzer

GSP-818

## Quick Start Guide

GW INSTEK PART NO.

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 right 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 when operating the GSP-818, and when keeping it in storage. Read the following before operating the GSP-818 to ensure your safety and to keep the GSP-818 in the best possible condition.

## Safety Symbols

These safety symbols may appear in this manual or on the GSP-818.

| | |
|---|---|
|  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 GSP-818 or to other properties. |
|  | DANGER High Voltage |
|  | Attention Refer to the Manual |
|  | Protective Conductor Terminal |
|  | Earth (ground) 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 GSP-818.
- Avoid severe impact or rough handling that leads to damaging the GSP-818.
- Do not discharge static electricity to the GSP-818.
- Do not block or obstruct the cooling fan vent openings.
- Do not perform measurement at circuits directly connected to Mains (Note below).
- Do not disassemble the GSP-818 unless you are qualified as service personnel.
- The equipment is not for measurements performed for CAT II, III and IV.

(Measurement categories) EN 61010-1:2010 specifies the measurement categories and their requirements as follows. The GSP-818 falls under category I.

- Measurement category IV is for measurement performed at the source of low-voltage installation.
- Measurement category III is for measurement performed in the building installation.
- Measurement category II is for measurement performed on the circuits directly connected to the low voltage installation.
- 0 is for measurements performed on circuits not directly connected to Mains.

| | |
|---|---|
| Power Supply<br>⚠ WARNING | • AC Input voltage range: 100-240Vac; Frequency: 50/60Hz<br>• Connect the protective grounding conductor of the AC power cord to an earth ground, to avoid electrical shock. |
| Cleaning the GSP-818 | • Disconnect the power cord before cleaning.<br>• Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid.<br>• Do not use chemicals or cleaners 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)<br>• Temperature: 0°C to 40°C<br>• Altitude: Up to 2000m<br>• Transient Overvoltage on the main supply is 2500V.<br>(Pollution Degree) EN 61010-1:2010 specifies the pollution degrees and their requirements as follows. THE GSP-818 falls under degree 2.<br>Pollution refers to "addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity".<br>• Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.<br>• Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.<br>• Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled. |

Storage environment

- Location: Indoor
- Relative Humidity: < 80%
- Temperature: −20°C to 70°C

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.

## Power cord for the United Kingdom

When using the GSP-818 in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons

⚠WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

| | |
|---|---|
| Green/ Yellow: | Earth |
| Blue: | Neutral |
| Brown: | Live (Phase) |


As the colours of the wires in main leads may not correspond with the coloured marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with either the letter E, the earth symbol ⏚ or coloured Green/Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.

The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, a cable of 0.75mm2 should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any exposed wiring from a cable, plug or connection that is engaged in a live socket is extremely hazardous. If a cable or plug is deemed hazardous, turn off the mains power and remove the cable, any fuses and fuse assemblies. All hazardous wiring must be immediately destroyed and replaced in accordance to the above standard.

# USER NOTICE

This chapter helps you in preparing the spectrum analyzer for use and provides the information to start using the spectrum analyzer correctly.

## Safety Precaution before Operation

### Check Power Supply

The analyzer is equipped with a three-wire power cord in accordance with international safety standards. The product must be grounded properly before being powered on, as floating or improper ground may cause damage to the instrument or personal injury.

Make sure the grounding conductor of the spectrum analyzer is grounded before turning on the instrument. After which the AC power cord can be connected. Do not use a non-ground power cord.

### Allowed Variation Range of Supply Power Parameters

The spectrum analyzer is compatible with 100V~240V, 50Hz-60Hz AC power. The table below lists the power requirement to run the spectrum analyzer.

| Power Supply Parameter | Compatible Range |
|---|---|
| Voltage | 100 - 240 VAC |
| Frequency | 50 - 60 Hz ±10% |
| Power | 22 W |

To prevent or lower the risk of damage to the spectrum analyzer from power interference between instruments, especially from peak

pulses produced by large power consumption instruments, a 220V/110V AC regulated power supply is recommended.

### Power Cord Selection

The analyzer is equipped with a three-wire power cord in accordance with international safety standards. This cable grounds the analyzer cabinet when connected to an appropriate power line outlet. The cable must be rated greater than 250Vac and 2A.

⚠ WARNING

Improper grounding may cause damage to the instrument, or result in personal injury. Make sure the grounding conductor of the spectrum analyzer is grounded before turning on the instrument.

Always use a well-grounded power source. Do not use an external power cable, power cord or an auto transformer without grounded protection. If this product is to be powered via an external auto transformer for voltage reduction, ensure that its common terminal is connected to a neutral (earthed pole) of the power supply.

Make sure the supply power is stable before turning on the analyzer to protect it from damage. Refer to "First Time to Power on" on page 11.

## Electro-static Discharge (ESD) Protection

ESD is an issue often ignored by users. Damage from ESD on the instrument is unlikely to occur immediately but will significantly reduce the reliability of it. Therefore, ESD precautions should be implemented in the work environment, and applied daily.

Generally, there are two steps to manage ESD protection:

1. Conductive table mats to connect hands via wrist bands
2. Conductive ground mat to connect feet via ankle straps

Implement both protection methods will provide a good level of anti-static protection. If used alone, the protection will not be as reliable. To ensure user's safety, anti-static components should offer at least 1MΩ isolation resistance.

⚠ WARNING The above ESD protections measures cannot be used when working with over 500V!

Make good use of anti-static technology to protect components from damage:

1. Quickly ground the internal and external conductor of the coaxial cable before it is connected with the spectrum analyzer.
2. Staff must wear anti-static gloves before touching the connector cord or doing any assemble work.
3. Assure all the instruments are grounded properly to avoid static storage.

## First Time to Power on

Connect the three-pin AC power cord into the instrument. Insert the plug into a power socket provided with a protective ground.

⚠ WARNING Check the power source before turning on the spectrum analyzer, to protect the device from damage.

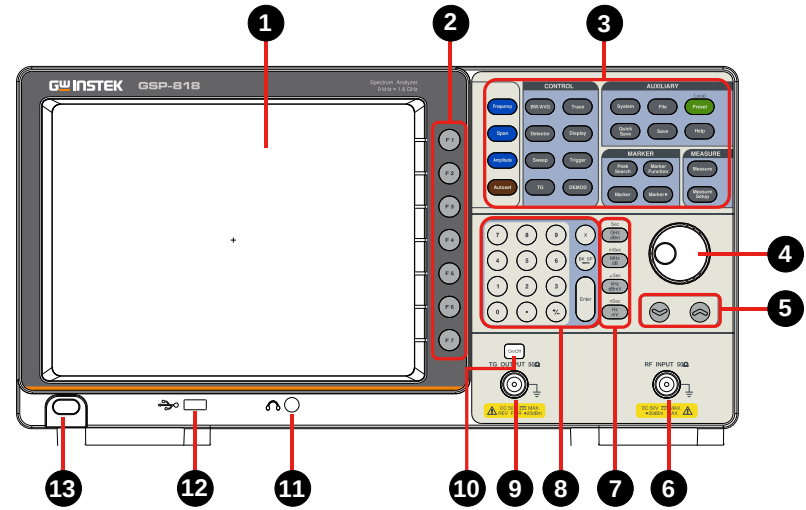
Steps

1. Press the power switch ⏻ on the bottom left of the front panel.
2. Self-initialization takes about 30 seconds, after the boot screen the spectrum analyzer will default to the scanning curve.
3. After power on, let the spectrum analyzer warm up for 30 minutes for stabilization to obtain the most accurate results.

# GETTING STARTED

This chapter introduces the front / rear panel, the user interface and explains how to use the instrument with a measurement example demonstration.

# Front Panel Overview




1. LCD

   800x600 color LCD display. The display shows the soft keys for the current function, frequency, amplitude and marker information.

2. Menu soft keys

   The F1 to F7 function keys directly correspond to the soft keys on the right-hand side of display.

3. Function keys

   See page 17 for details.

4. Knob

   During parameter editing, turn the knob clockwise to increase, or counterclockwise to decrease the parameter values at specified steps.

5. Arrow keys

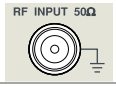
   

   (1) Increase or decrease the parameter value at specific steps while editing a parameter.

   (2) Move the cursor though the directory

tree in the **File** function

6. RF Input connector




The RF input may be connected to a device via a N type connector.

Note

When input attenuator is higher than 10 dB, the RF port input signal must be less than +30 dBm.

Input voltage at RF input port must not be higher than 50 V DC to avoid damage to the attenuator and input mixer tracking generator.

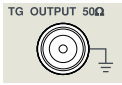
7. Unit keys


Unit keys include GHz/dBm/s, MHz/dB/ms, kHz/dBmV/µs and Hz/mV/ns. After entering the desired numbers, choose an appropriate unit to complete the input. The specific meaning of unit is decided by the type of input parameter ("frequency", "amplitude" or "time").

8. Numeric keypad

See page 20 for details.

9. TG output connector




The output of the tracking generator can be connected to a receiver through an N type male connector, users can purchase this option if required.

10. TG output On/Off button


When the TG function is enabled, the backlight of button turns on and turns off when the function is disabled.

11. Earphone interface

3.5mm stereo headphone jack (wired for mono operation)

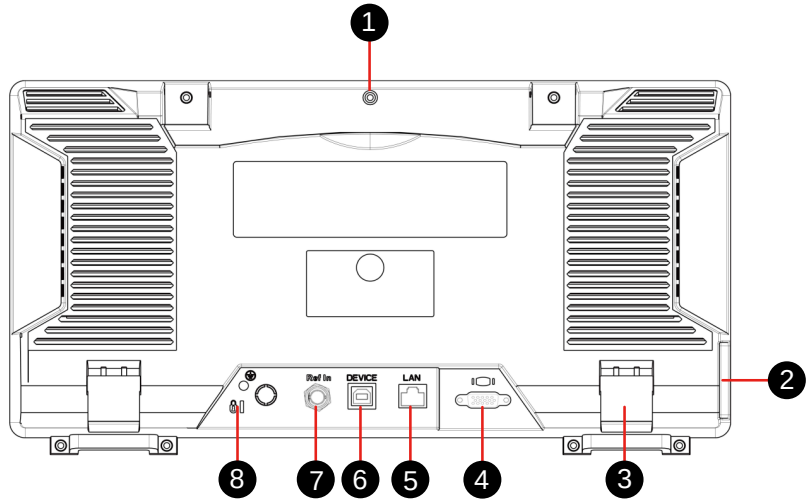
12. USB Host port

The analyzer may serve as a "host" device to connect to external USB devices. This interface is available for USB storage devices.

13. Power key

Push to turn on, long push to turn off

# Rear Panel




1. Handle — Stow the handle for mobile use.

2. AC power connector — AC: frequency 50Hz±10%, single-phase alternative 220V±15% or 110V±15%

3. Stool — To adjust the angle of the device

4. VGA port —  provides a VGA signal output which is used through a VGA cable or with a projector

5. LAN interface — 

Through this interface, the analyzer can be connected to your local network for remote control. An integrated testing system can be built quickly, as the analyzer conforms to the LXI C Device class instrument standards.

6. USB Device interface — 

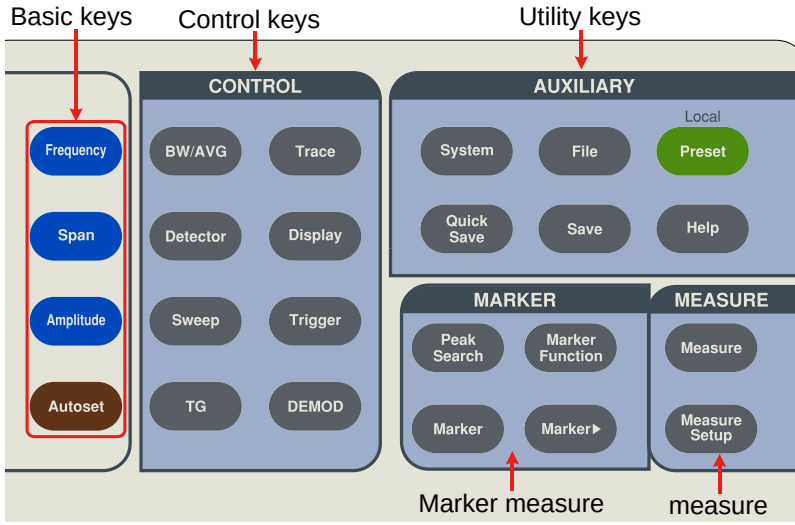
This configurable USB port permits external USB devices. It supports PictBridge printer and remote-control connection.

7. 10MHz IN/OUT — 

The BNC input or output of the 10 MHz reference clock

| | |
|---|---|
| 8. Lock hole | You can lock the spectrum analyzer to a fixed location using the security lock (please buy it yourself) to secure the spectrum analyzer. |

# Front Panel Function Key




| Keys | Description |
|---|---|
| Basic keys | |
| Frequency | Activates the center-frequency function, and accesses the frequency function menu. |
| Span | Activates the frequency sweep span function, and set Full Span\Zero Span\Last Span. |
| Amplitude | Activates the reference level function, and accesses the amplitude softkeys, with which you set functions that affect data on the vertical axis. |
| Autoset | Searches the signal automatically within the full frequency range. |

Control keys

| | |
|---|---|
| BW/AVG | Activates the RBW (resolution bandwidth) function, and accesses the softkeys that control the bandwidth functions and averaging. |
| Trace | Accesses the softkeys that allow you to store and manipulate trace information. |
| Detector | Accesses the softkeys that allow you to configure detector functions. |
| Display | Accesses the softkeys that allow you to control what is displayed on the analyzer, including the display line, graticule and label. |
| Sweep | Accesses the softkeys that allow you to set the sweep time, select the sweep mode of the analyzer. |
| Trigger | Accesses the softkeys that allow you to select the trigger mode of the analyzer. |
| TG | Accesses the softkeys that allow you to set the tracking generator. |
| DEMOD | Accesses the softkeys that allow you to set the demodulation. |

Marker measure keys

| | |
|---|---|
| Peak Search | Places a marker on the highest peak, and accesses the Peak functions menu. |
| Marker | Accesses the marker control keys that select the type and number of markers and turns them on and off. |
| Marker▶ | Accesses the marker function soft keys that allow you to set other system parameters based on the current marker's value. |
| Marker Function | Accesses the menu of special functions, such as noise marker, N dB bandwidth measure and frequency counting. |

Advanced measure keys


Accesses the softkeys that let you make transmitter power measurements such as ACPR(adjacent channel power), channel power, and OBW(occupied bandwidth), etc.


Sets the parameters for the selected measurement function.

Utility keys


Sets the system parameters, and accesses the calibration menu.


Accesses the softkeys that allow you to configure the file system of the analyzer.


Resets the analyzer to the factory settings or user state. This state can be specified in 【System】→ [PowerOn/Preset►] →[Preset►].


Save the contents of the current screen quickly.

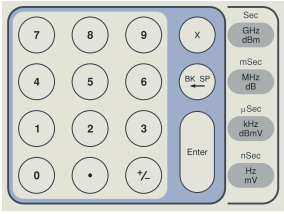

Accesses the soft keys that allow you to save current screen, trace data, or user state.


Press the Help key to activate the help system. Press the Help key again to exit.

# Parameter Input

Specific parameter values are able to be entered using the numeric keypad, knob, and directional keys.

## Numeric Keypad




| | | |
|---|---|---|
| Numeric keys | | Numbers 0-9 are available to be used. |
| Decimal point | • | A decimal point "." will be inserted at the cursor position when this key is pressed. |
| Sign key | +/- | Sign key "+/-" is to toggle the sign of a parameter. When pressed the first time, a "-" will be inserted and changed into "+" following the second press. |
| Cancel key | X | (1) During the editing process this key will clear the inputs in the active area and exit editing mode at the same time.<br>(2) Turn off the display in the active area.<br>(3) Exit current test mode while in keyboard test. |
| Back key | BK SP | (1) During the process of parameter editing, this key will delete the characters on the left side of the cursor.<br>(2) While in the process of file name editing, pressing this key will delete characters that have been entered. |

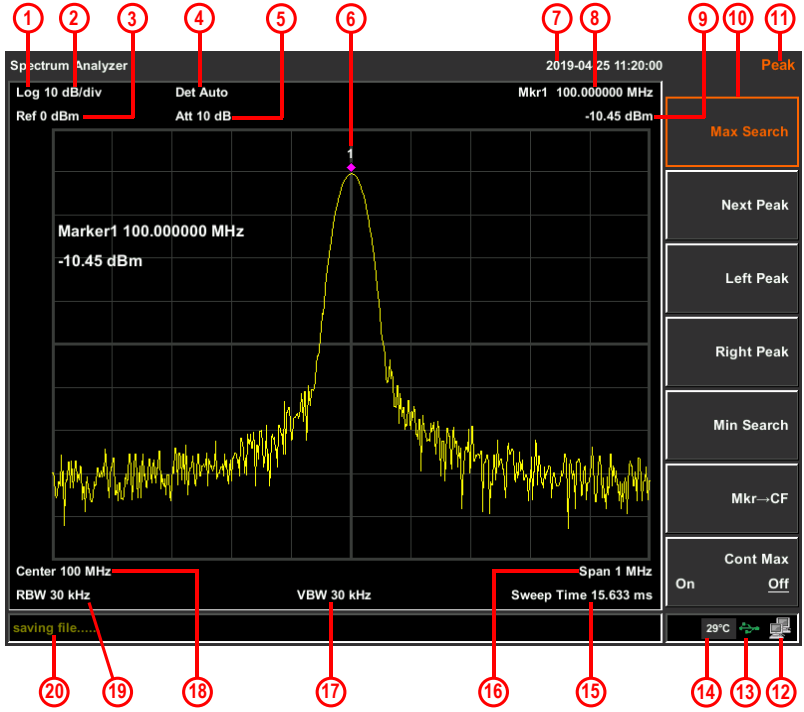
Enter key


When pressed, the system will complete the input process and insert a default measurement unit for the parameter automatically.

Unit keys


Unit keys include GHz/dBm/Sec, MHz/dB/mSec, kHz/dBmV/µSec and Hz/mV/nSec. After entering the desired numbers, choose an appropriate unit to complete the input. The specific meaning of unit is decided by the type of input parameter ("frequency", "amplitude" or "time").

# User Interface




| No. | Name | Description | Related Key |
|---|---|---|---|
| 1. | Amplitude Division Type | Can choose logarithmic or linear | Amplitude → [Scale Type] |
| 2 | Amplitude Division | Display division scale | Amplitude → [Scale/Div] |
| 3. | Reference level | Reference level | Amplitude → [Ref Level] |
| 4. | Detection type | Display detection type | Detector |
| 5. | Attenuation | Display input attenuation setting | Amplitude → [Attenuation] |

| | | | |
|---|---|---|---|
| 6. | Marker | Display current activated marker | Marker |
| 7. | Date/time | Display system date and time | System → [Date/Time] |
| 8.9. | Marker readout | Display frequency and amplitude of current marker | Marker |
| 10. | Menu item | Menu item of current function | |
| 11. | Menu title | Function of current menu belongs to. | |
| 12. | LAN access sign | LAN access sign | |
| 13. | USB storage device | Show if USB storage device is inserted; | |
| 14. | Temperature sign | Display device internal temperature | |
| 15. | Sweep Time | System sweep time | Sweep → [Sweep Time] |
| 16. | Span | Display span width | Span → [Span] |
| 17. | Video bandwidth | Display video bandwidth | BW/AVG → [VBW] |
| 18. | Center frequency | Display center frequency | Frequency → [Center Freq] |
| 19. | Resolution bandwidth | Display resolution bandwidth | BW/AVG → [RBW] |
| 20. | System status | Display spectrum analyzer status | |

# Build-in Help

The built-in help provides information that refers to every function key and menu key on the front panel. Users can view this help information if required.

# Basic Measurement

Basic measurements include, input signal frequency and amplitude display, marked by a frequency marker. Follow these four simple steps below to implement input signal measurement.

Steps

1. Setting center frequency
2. Setting span and resolution bandwidth
3. Activate marker
4. Setting amplitude

For example, to measure a 100MHz -20dBM signal, you must turn on the spectrum analyzer and ensure it is warmed up for 30 minutes to ensure measurement accuracy.

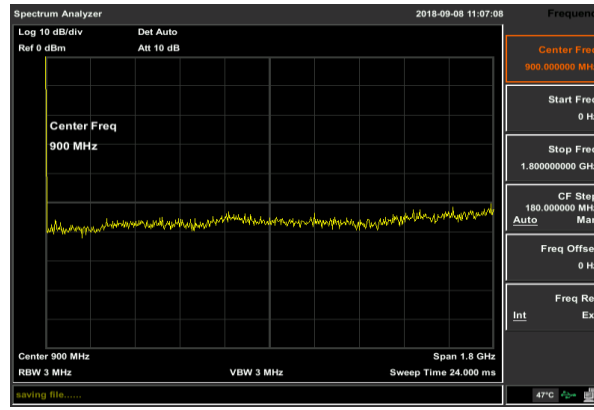
Equipment connection

1. Connect the output terminal of signal generator to the RF Input 50Ω terminal of spectrum analyzer. Set the parameters as follows:

| | |
|---|---|
| Frequency | 100 MHz |
| Amplitude | -20 dBm |

Setting parameters

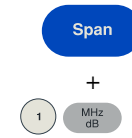
1. Press the **Preset** button to restore the analyzer to its factory defined state. The spectrum analyzer will display the spectrum from 9kHz to the maximum span width. The signal generated will display as a vertical line at 100MHz.




To clearly observe the signal, reduce the frequency span to 1 MHz and set the center frequency to 100MHz.

2. Setting Center Frequency
Press the **Frequency** button and select **Center frequency** on corresponding pop up menu. Input "100" and select the unit as MHz on the numeric keypad. The keys can be used to set the exact value but the knob and directional keys can also be used to set the center frequency.


3. Setting Frequency Span
Press the **Span** button, input "1" and select MHz as its unit using the numeric keypad or press ↓ button to decrease to 1MHz.

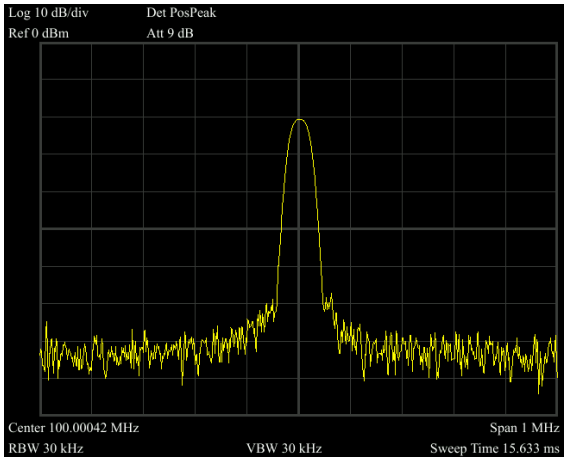



4. Press the **BW/AVG** button and set **resolution bandwidth** to manual. Input 30 and select kHz as its unit using the numeric keypad or press ↓ button to decrease to 30kHz.

5. Press the **Detector** button and set the detection type to positive peak.




The signal at a higher resolution




Please note that resolution bandwidth, video bandwidth and frequency span are self-adapted. They adjust to certain values according to frequency span. Sweep time can be self-adapted too.

Activate Marker

1. Press the **Marker** button in the function area. Press the soft key to select Marker 1 2 3 4 5. Select Marker 1 and the marker is located at horizontal center by default. That is the signal peak point or its neighbor.

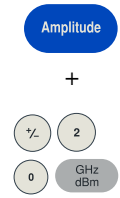



2. Press **Peak Search** button and enter the next level menu. Select **Max Search**. Frequency and amplitude values are read by the marker and shown on the top right of the display area.

Setting amplitude

1. The reference level will be shown at the top of the display grid. To get a better dynamic range, the real signal peak point should be located at or near the top of display grid (reference level). The reference level is also the maximum value on Y axis. Here we reduce to 20dB reference level to increase the dynamic range.

2. Press the **Amplitude** button. The amplitude setting menu will pop up and the **reference level** soft key will be activated. The reference level can be input at the top left of the display grid. Input **-20** using the numeric keypad and set the unit to **dBm**. You can also use the ↓ key or the knob for adjustment.
The reference level is set at -20dBM, which is the signal peak value near the top of the grid. The balance between the signal peak value and noise is dynamic range.



# APPENDIX

## Specifications

This chapter lists the technical specifications and general technical specifications of the spectrum analyzer. Unless otherwise stated, the technical specifications apply to the following conditions:

- The instrument has been preheated for 30 minutes before use.
- The instrument is in the calibration cycle and has been self-calibrated.

"Typical" and "nominal" for this product are defined as follows:

- Typical: Refers to the performance of the product under certain conditions.
- Nominal: Refers to the approximate value under product application process.

| Model | GSP-818 |
|---|---|
| **Frequency** | |
| Range | 9 kHz to 1.8 GHz |
| Resolution | 1 Hz |
| **Frequency Span** | |
| Span Range | 0 Hz, 100 Hz to max. frequency of instrument |
| Span Uncertainty | ±span / (sweep points-1) |
| **Internal Frequency Reference** | |
| Span Range | 10.000000 MHz |
| Reference Frequency Accuracy | ±[(days from last calibrate × freq aging rate) + temperature stability + initial accuracy ] |

| | |
|---|---|
| Temperature stability | <2.5ppm (15°C to 35°C) |
| Aging rate | <1ppm/year |
| SSB Phase Noise (20°C to 30°C, fc=1 GHz, RBW= 1 kHz, VBW=10 Hz, Average ≥ 40) | |
| 10 kHz | < -82 dBc/Hz |
| 100 kHz | < -98 dBc/Hz(Typical) |
| 1 MHz | < -110 dBc/Hz(Typical) |
| Bandwidth | |
| Resolution Bandwidth | 10Hz to 500kHz (1-10 steps by sequence), 1MHz, 3MHz |
| RBW Uncertainty | < 18%, typical (RBW is 3MHz)<br>< 5%, typical (RBW ≤ 1 MHz) |
| Resolution Filter Shape Factor (60 dB: 3 dB) | <5: 1 typical (digital and close to Gaussian shape) |
| Video Bandwidth (VBW) | 10 Hz to 3 MHz |
| Amplitude | |
| Amplitude and level | |
| Amplitude measurement range | DANL to +10 dBm, 100 kHz to 1 MHz, Preamp Off<br>DANL to +20 dBm, 1 MHz to 1.8 GHz, Preamp Off |
| Reference Level | -80 dBm to +30 dBm, 0.01dB by step |
| Preamp | 20 dB, nominal, 100 kHz to 1.8 GHz |
| Input Attenuation | 0 to 40 dB, in 1 dB step |
| Max Input DC Current | 50 VDC |
| Max continuous power | +30dBm, average continuous power |
| Display Average Noise Level (Input Attenuation= 0 dB, RBW=1 Hz and RBW normalizes to 1 Hz) | |
| Preamp Off | |
| 100 kHz to 1 MHz | -117 dBm (Typical) |
| 1 MHz to 10 MHz | -130 dBm (Typical) |
| 10 MHz to 1 GHz | -130 dBm (Typical) |
| 1 GHz to 1.8 GHz | -128 dBm (Typical) |

| | |
|---|---|
| Preamp On | |
| 100 kHz to 1 MHz | -140 dBm (Typical) |
| 1 MHz to 10 MHz | -150 dBm (Typical) |
| 10 MHz to 1 GHz | -150 dBm (Typical) |
| 1 GHz to 1.8 GHz | -148 dBm (Typical) |
| Frequency response (20°C to 30°C, 30% to 70% relative humidity, input attenuation=10 dB, reference frequency=50 MHz) | |
| Preamp Off (fc ≥100 kHz) | ±0.8 dB ; ±0.4 dB, Typical |
| Preamp On (fc ≥100 MHz) | ±0.9 dB ; ±0.5 dB, Typical |
| Difference and Accuracy | |
| RBW Switch Uncertainty | Reference: 10 kHz RBW at 50 MHz<br>Log resolution=±0.2 dB, Lin resolution=±0.01 Nominal |
| Input Attenuation Uncertainty | 20°C ~30°C, fc=50 MHz, Preamplifier Off, 10 dB RF attenuation, input signal 0~40 dB ±0.5 dB |
| Absolute Amplitude Uncertainty | 20°C to 30°C, fc=50 MHz, Span=200 kHz, RBW=10 kHz, VBW=10 kHz, peak detector, 10 dB RF attenuation, 95% confidence level |
| Preamp Off | ±0.4 dB, input signal level -20 dBm |
| Preamp On | ±0.5 dB, input signal level -40 dBm |
| Uncertainty | Input signal range 0 dBm to -50 dBm<br>±1.5 dB |
| VSWR | Input 10 dB RF attenuation, 1MHz to 1.8GHz<br><1.5, Nominal |
| Distortion and spurious response | |
| Second harmonic intercept | fc ≥ 50 MHz, Preamp off, signal input -20 dBm, 0 dB RF attenuation, 20°C to 30°C<br>-65 dBc |
| Third-order intermodulation | fc ≥ 50 MHz, Input double tone level -20 dBm, frequency interval 100 kHz, input attenuation 0 dB, preamplifier off, 20°C to 30°C<br>+10 dBm |
| 1 dB Gain Compression | fc ≥ 50 MHz, 0 dB RF attenuation, Preamp off , 20°C to 30°C<br>>+2 dBm, Nominal |
| Residual response | connect 50 Ω load at input port, 0 dB input attenuation, 20°C to 30°C<br><-85 dBm, from 100 kHz to 1.5 GHz<br><-80 dBm, from 1.5 GHz to 1.8 GHz |

| | |
|---|---|
| Input related spurious | -30 dBm signal at input mixer, 20°C to 30°C<br><-60 dBc |

| | |
|---|---|
| **Sweep** | |
| Time | |
| None-zero Span | 10 ms to 3000 s |
| Zero Span | 1 ms to 3000 s |
| Span Mode | Continue, Single |
| **Tracking Generator (Only apply to - Opt. 01 Tracking Generator)** | |
| Tracking Generator Output | |
| Frequency Range | 100 kHz to 1.8GHz |
| Output power level range | -30 dBm to 0 dBm |
| Output power level resolution | 1 dB |
| Output flatness | ± 3 dB |
| Maximum safe reverse level | Average total power: 30 dBm, DC : ±50 VDC |
| **Demodulation** | |
| Audio Demodulation | |
| Frequency Range | 100 kHz to 1.8 GHz |
| Demodulation Type | FM/AM |
| AM Measurement | |
| Frequency Range | 10MHz to 1.8GHz |
| Modulation rate | 20Hz to 100kHz |
| Modulation Rate Accuracy | 1Hz, nominal(Modulation rate < 1 kHz)<br><0.1% modulation rate, nominal(Modulation rate ≥ 1 kHz) |
| Depth | 5% to 95% |
| Depth Accuracy | ±4%, nominal |
| FM Measurement | |
| Frequency Range | 10 MHz to 1.8 GHz |
| Modulation rate | 20 Hz to 100 kHz |
| Modulation Rate Accuracy | 1Hz, nominal(Modulation rate < 1 kHz)<br><0.1% modulation rate, nominal(Modulation rate ≥ 1 kHz) |
| Deviation | 20 Hz to 200 kHz |
| Deviation Accuracy | ±4%, nominal |
| **Frequency Counter** | |
| Counter Resolution | 1Hz, 10Hz, 100Hz, 1kHz |
| Accuracy | ±(frequency indication × frequency reference accuracy+ counter resolution |

| Inputs and Outputs | |
|---|---|
| RF Input | |
| Impedance | 50 Ω, Typical |
| Connector | N Type Female |
| Tracking Generator Output | |
| Impedance | 50 Ω, Typical |
| Connector | N Type Female |
| Reference Input | |
| Connector | BNC Female |
| 10MHz Reference Amplitude | 0 dBm to +10 dBm |
| USB | |
| USB Host | |
| Connector | A Plug |
| Protocol | USB 2.0 (Host End) |
| USB Device | |
| Connector | B Plug |
| Protocol | 2.0 Version |
| VGA | |
| Connector | 15-pins D-SUB(female) |
| Resolution | 800*600, 60 Hz |
| **General Specification** | |
| Display | |
| Type | TFT LCD |
| Resolution | 800*600 |
| Size | 10.4 inches |
| Color | 65536 |
| Remote Control | |
| USB | USB TMC |
| LAN | 10/100Base, RJ-45 |
| Mass Memory | |
| Internal Memory | 256M Bytes |
| Temperature | |
| Operating Temperature Range | 0 °C to 40°C |
| Storage Temperature Range | -20°C to 70°C |
| Appearance | |
| Dimensions | 421 mm (Width)×221 mm (Height)×115 mm (Depth) |
| Weight | Approx. 5.0 kg (without package) |

# Declaration of Conformity

We
**GOOD WILL INSTRUMENT CO., LTD.**
declare that the below mentioned product
Type of Product: **Spectrum Analyzer**
Model number: **GSP-818**

satisfies all the technical relations application to the product within the scope of council:
**Directive:** 2014/30/EU; 2014/35/EU; 2011/65/EU; 2012/19/EU
The above product is in conformity with the following standards or other normative documents:

◎ **EMC**

| **EN 61326-1**<br>**EN 61326-2-1** | Electrical equipment for measurement, control and laboratory use -- EMC requirements (2013) |
|---|---|
| Conducted & Radiated Emission<br>EN55011: 2009+A1: 2010 Class A | Electrical Fast Transients<br>EN 61000-4-4: 2012 |
| Current Harmonics<br>EN 61000-3-2: 2014 | Surge Immunity<br>EN 61000-4-5: 2006 |
| Voltage Fluctuations<br>EN 61000-3-3: 2013 | Conducted Susceptibility<br>EN 61000-4-6: 2014 |
| Electrostatic Discharge<br>EN 61000-4-2: 2009 | Power Frequency Magnetic Field<br>EN 61000-4-8: 2010 |
| Radiated Immunity<br>EN 61000-4-3: 2006 +A1:2008+A2:2010 | Voltage Dip/ Interruption<br>EN 61000-4-11: 2004 |

◎ **Safety**

| **Low Voltage Equipment Directive 2014/35/EU** | |
|---|---|
| Safety Requirements | EN 61010-1: 2010<br>EN 61010-2-030: 2010 |

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