VSA800P Series Spectrum Analysis Module User Manual

■VSA815P(TG)

■VSA836P(TG)

■VSA880P(TG)

Note： The "TG" in the model indicates the presence of a tracking generator function.

For product support, visit:www.owon.com.hk/download

※：The illustrations, interface, icons and characters in the user manual may be slightly different from the actual product. Please refer to the actual product.

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General Warranty

We warrant that the product will be free from defects in materials and workmanship for a period of 3 years from the date of purchase of the product by the original purchaser from our company. The warranty period for accessories is 12 months. This warranty only applies to the original purchaser and is not transferable to a third party.

If the product proves defective during the warranty period, we will either repair the defective product without charge for parts and labour, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by our company for warranty work may be new or reconditioned like new. All replaced parts, modules and products become the property of our company.

To obtain service under this warranty, the customer must notify our company of the defect before the expiration of the warranty period. Customer shall be responsible for packaging and shipping the defective product to the designated service centre, a copy of the customer's proof of purchase is also required.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. We shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than our company representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of not our supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

Please contact the nearest Sales and Service Offices for services.

Excepting the after-sales services provided in this summary or the applicable warranty statements, we will not offer any guarantee for maintenance definitely declared or hinted, including but not limited to the implied guarantee for marketability and special-purpose acceptability. We should not take any responsibilities for any indirect, special or consequent damages.

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1. General Safety Requirements

Before use, please read the following safety precautions to avoid any possible bodily injury and to prevent this product or any other connected products from damage. To avoid any contingent danger, ensure this product is only used within the ranges specified.

- **Use Proper Power Cord.**The actual current of this product is 1.5A. Please use a power adapter with a rated current of no less than 3A. For the specific power supply interface, please inform us in advance when ordering the product.
- **Product Grounded.** This instrument is grounded through the power cord grounding conductor. To avoid electric shock, the grounding conductor must be grounded. The product must be grounded properly before any connection with its input or output terminals.
- **Check all Terminal Ratings.** To avoid fire or shock hazard, check all ratings and markings on this product. Refer to the user manual for more information about ratings before connecting to the instrument.
- **Use Proper Overvoltage Protection.** Make sure that no overvoltage (such as that caused by a thunderstorm) can reach the product, or else the operator might expose to danger of electrical shock.
- **Do not operate without covers**. Do not operate the instrument with covers or panels removed.
- **Avoid exposed circuit**. Be careful when working on exposed circuitry to avoid risk of electric shock or other injury.
- **Do not operate if any damage.** If you suspect damage to

the instrument, have it inspected by qualified service personnel before further use. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by qualified service personnel.

- **Use your Oscilloscope in a well-ventilated area.** Make sure the instrument installed with proper ventilation.
- **Do not operate in damp conditions.** In order to avoid short circuiting to the interior of the device or electric shock, please do not operate in a humid environment.
- **Do not operate in an explosive atmosphere.** In order to avoid damages to the device or personal injuries, it is important to operate the device away from an explosive atmosphere.
- **Keep product surfaces clean and dry.** To avoid the influence of dust or moisture in air, please keep the surface of device clean and dry.
- **Electrostatic Prevention.** Operate the instrument in an electrostatic discharge protective environment to avoid damage induced by static discharges. Always ground both the internal and external conductors of cables to release static before making connections.
- **Protect the Input Terminals of Instrument.** Do not bend or hit the input terminals and the connected devices, (such as filter, attenuator, etc.) as such stress may cause damages to devices and the instrument. Do not mix the use of 50Ω and 75Ω connectors and/or cables.
- **Do Not Overload the Input.** To avoid damaging the instrument, the signals at input terminal must be less than 50V DC voltage components and 30 dBm (1 W) AC (RF) components.
- **Appropriate Use of Power Meter.** If you are not sure of the characteristics of signal under measure, follow these

recommendations to ensure safe operations: if a RF power meter is available, use it to measure the power level of this signal first; or add a rated external attenuator between signal cable and input terminal of the instrument. Maximum attenuation, reference level and maximum span frequency should be selected, so as to make the signals displayed within the screen.

- **Know About the Specification Conditions of the Instrument.** For maximum performance of the instrument, use the analyzer under specified conditions.
- **Handling Safety.** Please handle with care during transportation to avoid damages to buttons, interfaces and other parts on the panels.

2. Safety Terms and Symbols

Terms in this manual (The following terms may appear in this manual):

WARNING
Warning indicates conditions or practices that could result in injury or loss of life.

CAUTION
Caution indicates the conditions or practices that could result in damage to this product or other property.

Terms on the product (The following terms may appear on this product):

DANGER	Indicates an immediate hazard or injury possibility.
WARNING	Indicates a possible hazard or injury.
CAUTION	Indicates potential damage to the instrument or other property.

Symbols on the product (The following symbols may appear on the product):


Hazardous Voltage


Chassis Ground


Refer to Manual

Introduction to the spectrum analysis module:

The spectrum analysis module offers exceptional performance in a compact form factor, with technical specifications superior to those of mainstream portable spectrum analyzers. It can be connected to a PC for displaying test results, providing a convenient and fast testing experience with just a mouse click. Additionally, it can be integrated into your system to develop spectrum analysis-related functions. The modular design of the spectrum analysis module greatly enhances testing convenience for users while also reducing costs. With the use of standard USB and LAN communication interfaces, it allows for easy measurement and operation. Utilizing the provided complete SCPI command set, it enables the rapid construction and upgrade of integrated testing systems.

Features:

- Provides testing functions of mainstream portable spectrum analysis modules with superior technical specifications.
- Frequency range: 9kHz ~ upper limit
- Resolution bandwidth: 1Hz ~ 1MHz
- +12V single power supply
- Universal USB and LAN interfaces for easy control
- User-friendly PC-based measurement software
- Compact size

Functions:

- Phase noise testing
- Signal identification function
- Modulated signal measurement

Key Technologies:

The spectrum analysis module employs key technologies such as digital intermediate frequency (IF) technology, RF integration technology, digital filtering technology, high-speed data acquisition technology, electromagnetic compatibility (EMC) technology, graphic processing, embedded system software design technology, and low-power design. These ensure that the product achieves technical specifications superior to similar products.

3. Document Overview

- **Quick Start**
  This chapter introduces the checks and precautions to be taken before the initial power-up of the module, the installation of the host software, the process of initial power-on, and how to perform basic measurements.
- **Menu interpretation**
  This chapter primarily provides an introduction to the key functions and offers a functional mapping diagram of the relevant menu buttons on the module's host software panel.
- **Remote Control**
  This chapter introduces the methods for remote control of the spectrum analysis module.
- **Specification Parameter**
  This chapter lists spectrum analysis module’s specification parameter.
- **Trouble Shooting**
  This chapter helps to implement the troubleshooting and deal with after sale repair.
- **Appendix**
  This chapter introduces accessories of spectrum analysis module and how to maintain device.

Convention on button and menu key format:

Button: Button character + bold bracket, e.g. [FREQ]stands for FREQ button.

Menu key words+bracket, e.g.[Center frequency] stands for

[FREQ]function’s center frequency item, that is common called softkey menu item.

Related Document：

- The main user documentation for this product includes the quick guide, user manual, programming manual, data sheet, and others.

4. Quick Start

4.1 Initial Inspection

1) Check if the package is damaged.
2) Remove the module from the packaging and check if it has been damaged during transportation.
3) Verify that all accessories and documents are included with the instrument by referring to the packing list.

If the packaging or cushioning materials are damaged, first check if the module and accessories inside the box are complete, then proceed to perform electrical performance tests on the spectrum analysis module.

If the module is damaged during transportation or accessories are missing, please notify us, and we will arrange repairs or replacements as soon as possible according to your requirements. Please retain the shipping materials for future use in repackaging and shipping. For repair procedures, refer to Chapter 8 "Warranty"

4.2 Safety Precaution before Operation

4.2.1 Check Power Supply

The spectrum analysis module power adapter uses a power cord interface and complies with international safety standards. Before powering on the spectrum analysis module, it is essential to ensure that the ground is properly connected. Floating ground or poor

grounding may result in module damage and even cause personal injury.
Make sure the grounding conductor of the spectrum analysis module is grounded before turning on the instrument. After which the AC power cord can be connected. Do not use a non-ground power cord.

4.2.2 Allowed Variation Range of Supply Power Parameters

The spectrum analysis module power adapter uses 220V, 50Hz AC power. Table 4-1 lists the power requirements for the +5V power adapter when the module is operating normally.

Table 4- 1 Working Power Variation Range

Power Supply Parameter	Compatible Range
Voltage	220V±10％
Frequency	50Hz±5％
Max. Power Consumption	20W

To prevent or lower the risk of damage to the spectrum analysis module from power interference between instruments, especially from peak pulses produced by large power consumption instruments, a 220V AC regulated power supply is recommended.

4.2.3 Selection of +12V Power Adapter

It is recommended to use the dedicated +12V power adapter provided by our company, or a +5V power adapter that is certified and tested in the country of use. The actual current for this product is 1.5A, and a power adapter with a rated current of no less than

4A should be used.

WARNING

Make sure the supply power is stable before turning on the analyzer to protect it from damage. Refer to "First Time to Power on" section 3.

4.2.4 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.

4.3 First Time to Power on

Simply connect the spectrum analysis module power adapter to a compliant AC power source using a suitable power cord; no additional installation is required.

WARNING

Check the power source before turning on the spectrum analysis module, to protect the device from damage.

WARNING

When the module is placed in a rack for operation, it is essential to ensure proper airflow both inside and outside the module. If the total heat power in the rack exceeds 800 watts, forced ventilation measures must be implemented.

1) Correctly connect the cables and power on the adapter to start the module.

2) The spectrum analysis module will take approximately fifty seconds to execute startup procedures such as configuring hardware parameters. Afterward, the user can connect to and use the module via a PC host.

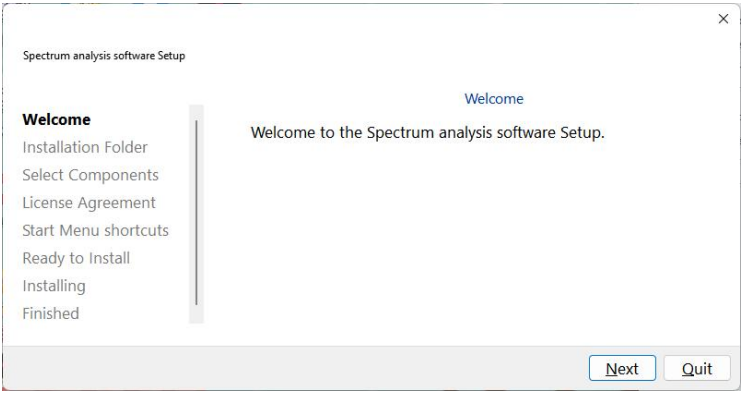
3) Allow the spectrum analysis module to warm up for 30 minutes.

4.4 Host Software Installation and System Connection

4.4.1 Install the Host Software

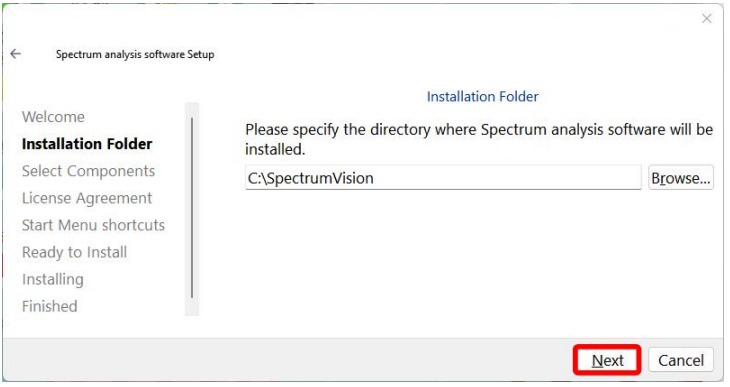
(1) Download the host computer installation package from the official website, and double-click the package SpectrumVision .

(2) Enter the welcome interface, click **"Next"**.



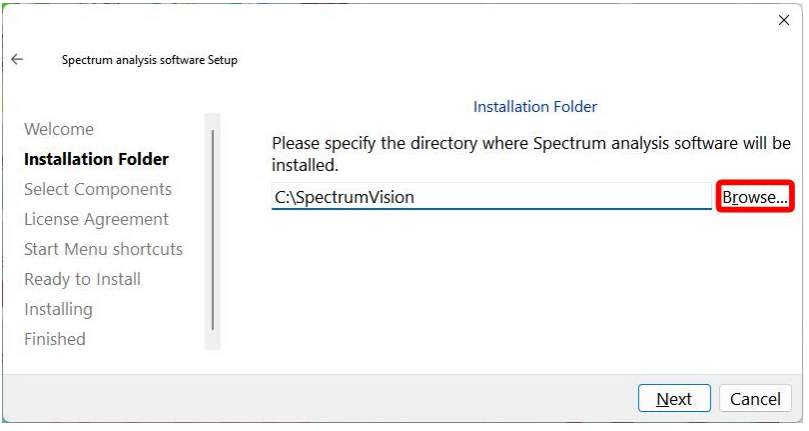
(3) Enter the installation folder interface, where you can choose whether to change the installation path.

1) If you do not need to change the installation location of the software, you can directly click **"Next"**.

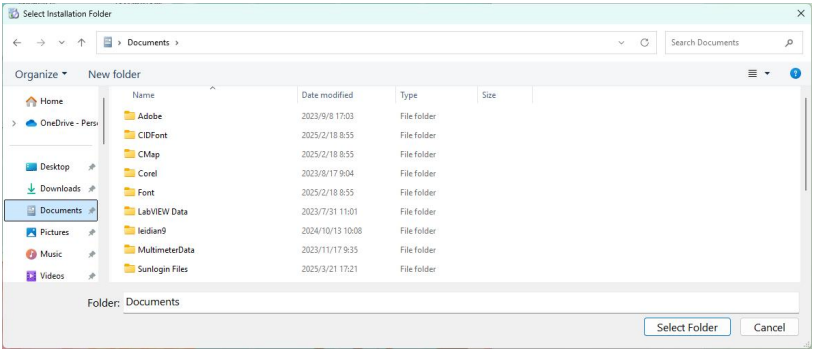


2) If you need t o change the installation location of the software, please follow the steps below.

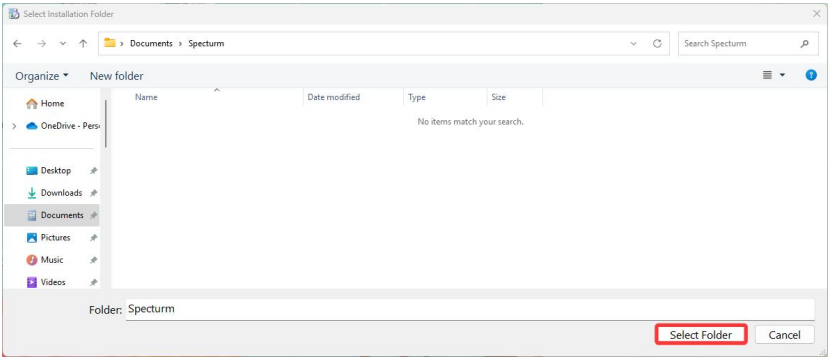
① Click **"Browse"** as shown in the following figure.

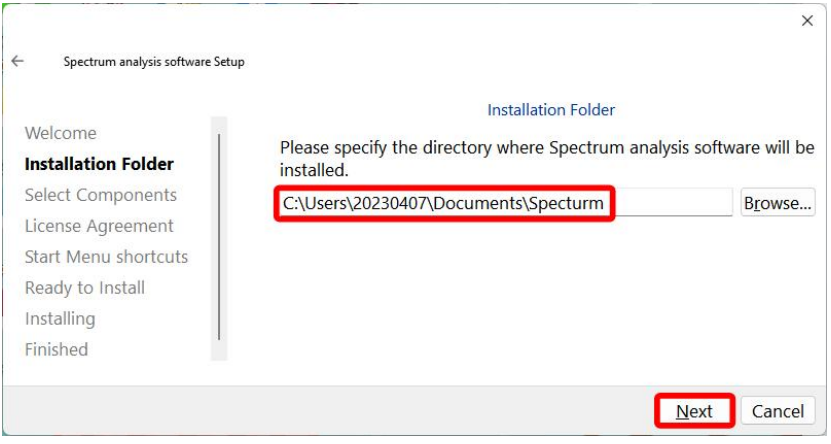


② Enter the interface for selecting the installation folder, where you can choose the software installation location, as shown in the figure below.

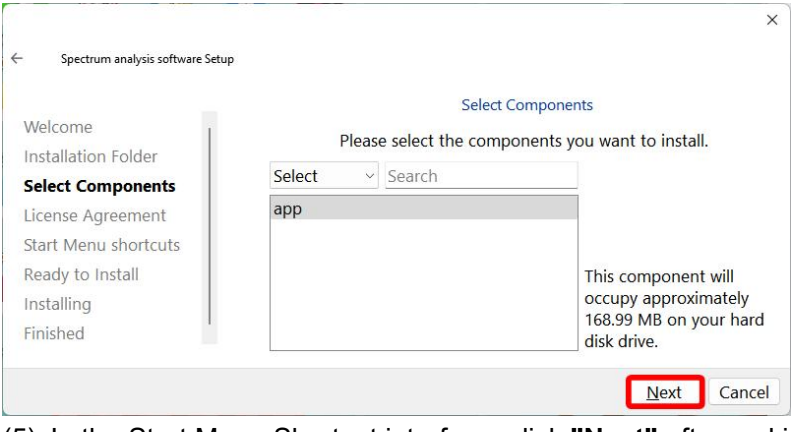


③ Click **"Select Folder"** to save the installation location of the software. Click **"Next"** to enter the component selection interface, as shown in the following figure.

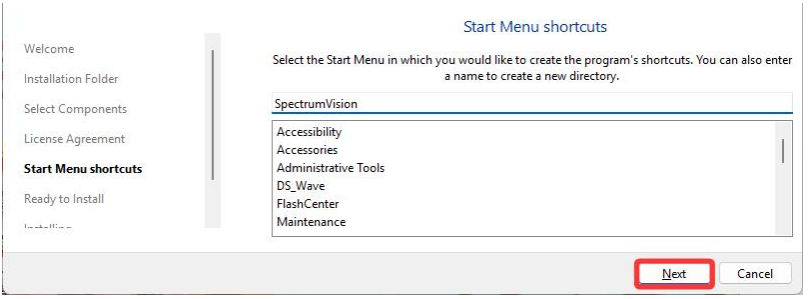




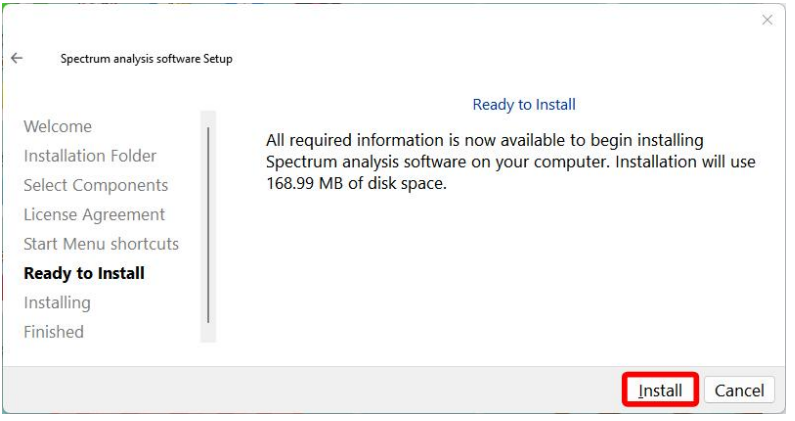
(4) Click **"Next"** to enter the Start Menu Shortcut interface, as shown in the figure below.



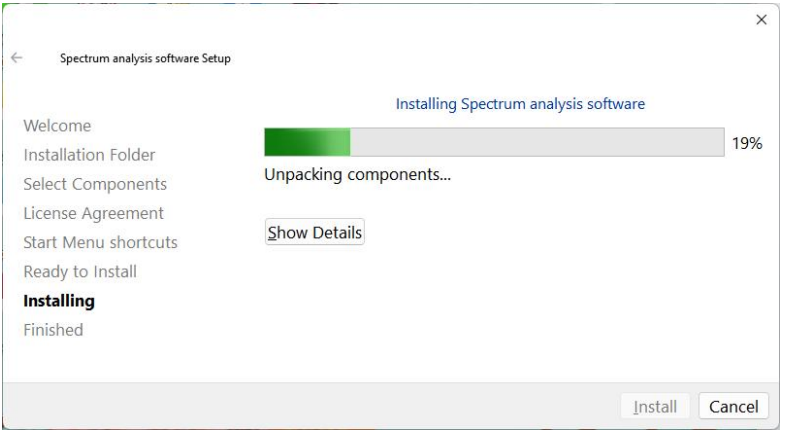
(5) In the Start Menu Shortcut interface, click **"Next"** after making your selections to enter the install interface, as shown in the figure below.



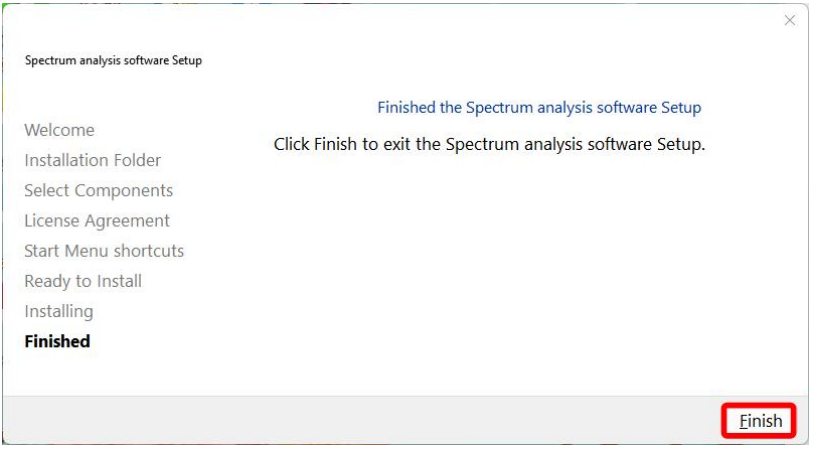
(6) Click **"Install"** to enter the install interface, as shown in the figure below.



(7) Enter the installing interface, as shown in the figure below.



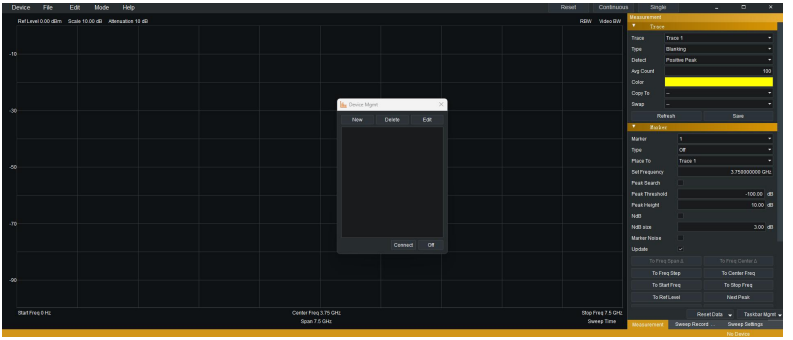
(8) Click **"Finish"** to exit the installation wizard, and the PC software is successfully installed, as shown in the figure below.



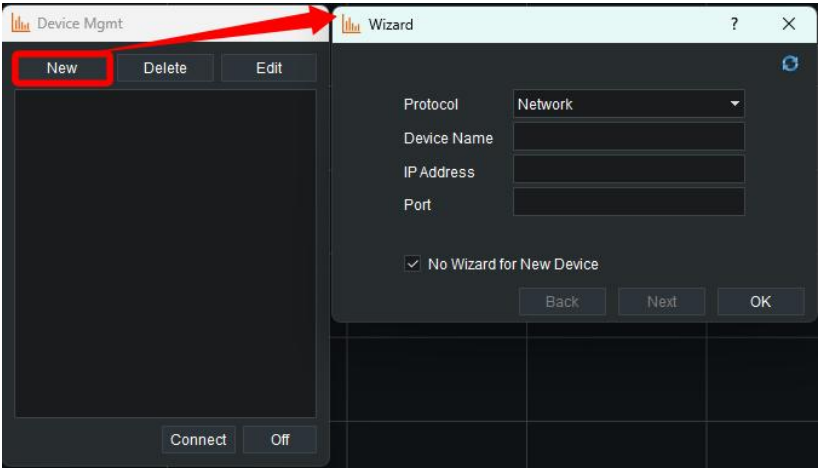
4.4.2 Connect the Host Software

4.4.2.1 Use Network to connect the Host Software

(1) Double-click to open the host computer software and enter the host interface.

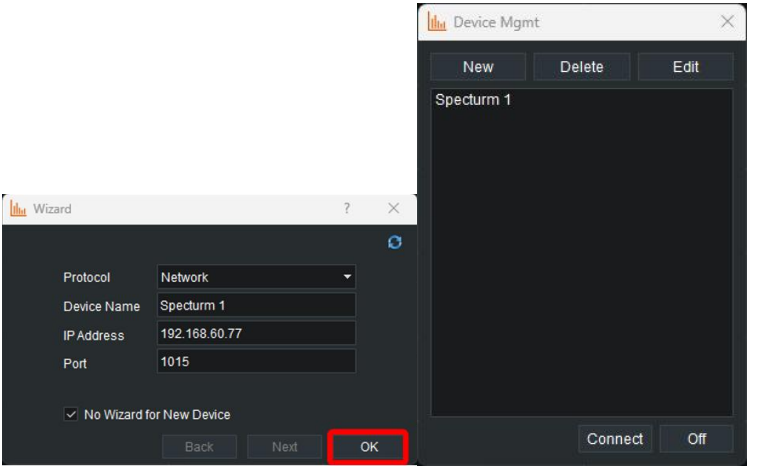


(2) In Device Manager, click **"New"** to open the Add Device Wizard.

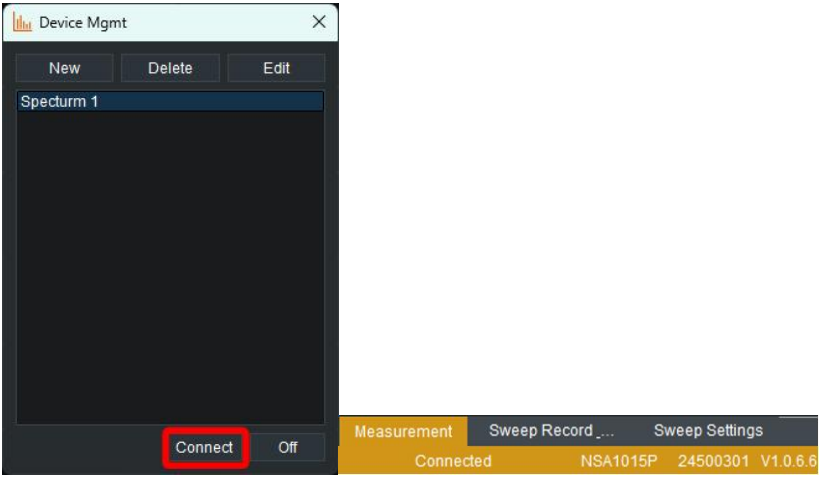


(3) First, connect the network cable through the LAN port and the computer to the same local area network (LAN).Then,select **"Network"** from the protocol dropdown menu, enter the device name, IP address, and port number. After entering the

information, click **"OK"** to add the device.



(4) Select the device name to connect, click **"Connect"** and once **"Connected"** appears at the bottom right corner, the connection is complete.



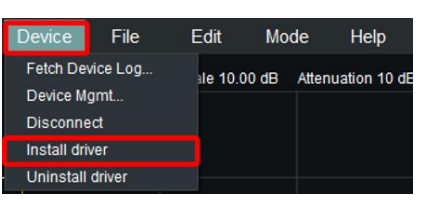
4.4.2.2 Use USB to connect the Host Software

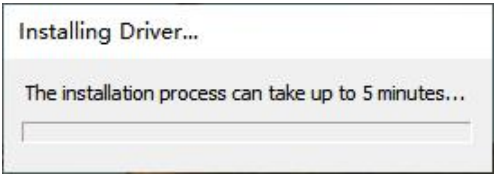
Connect the device to the computer using a USB cable, and run the host software as an administrator.

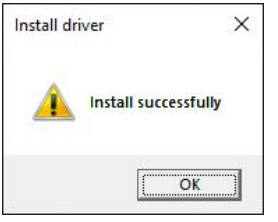
How to Install Driver

To connect to the host computer via USB, you need to install the corresponding driver first.

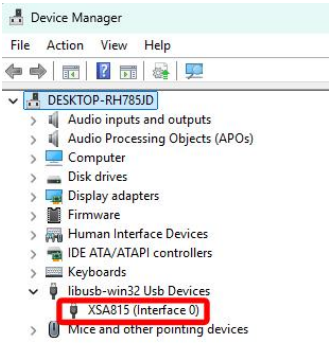
(1) Click **"Device"** in the top left corner, select **"Install driver"** and wait for a moment until the installation is complete.





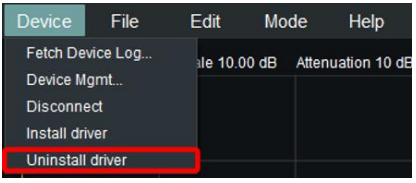


(2) Connect the USB to the computer and open Device Manager to see the connected device.



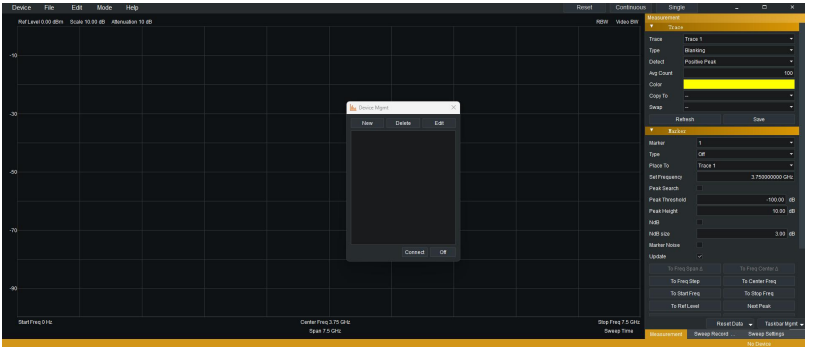
How to Uninstall Driver

(1)Click **"Device"** in the top left corner, select **"Uninstall driver"** and wait for a moment until the uninstallation is complete(Run the host computer software as an administrator).

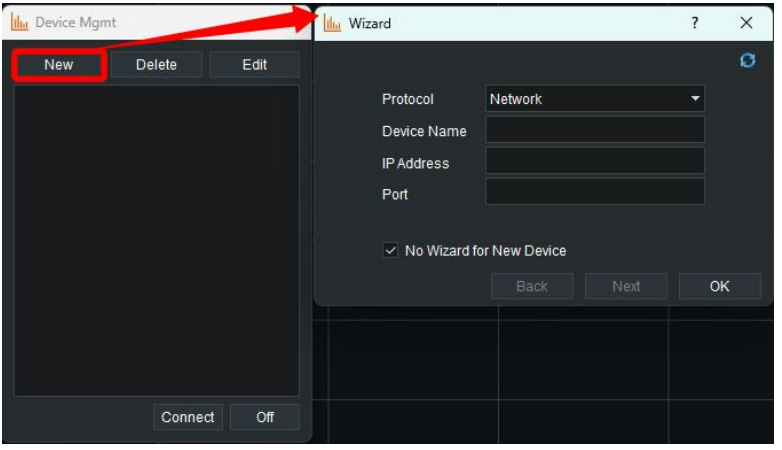


How to Connect the Host Computer

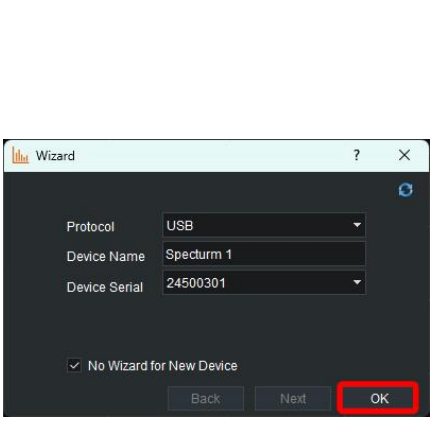
(1) Double-click to open the host software and enter the host interface.

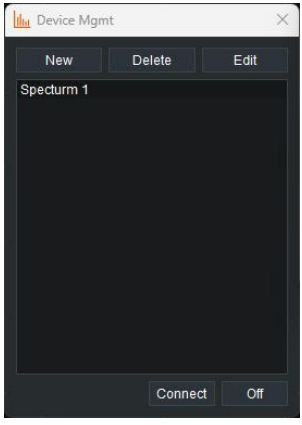


(2) In Device Manager, click **"New"** to open the Add Device Wizard.

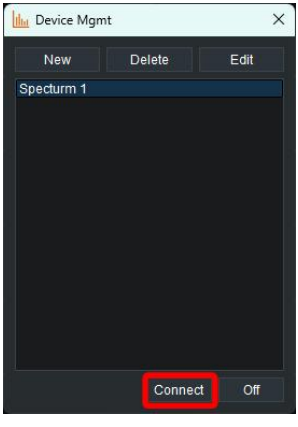


(3) Select **"USB"** from the protocol dropdown menu, enter the device name, and choose the device serial number. After entering the information, click **"OK"** to add the device.





(4) Select the device name to connect, click **"Connect"** and once **"Connected"** appears in the bottom right corner, the connection is complete.



4.4.2.3Use Web to connect the Host Software

1) Connect the spectrum analyzer module and the computer to the same local area network (LAN) using an Ethernet cable through the LAN port.

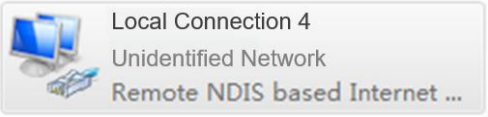


Figure 4- 1 Local connection interface

2) Open the network adapter settings and modify the computer's IP address configuration as shown in the following image.

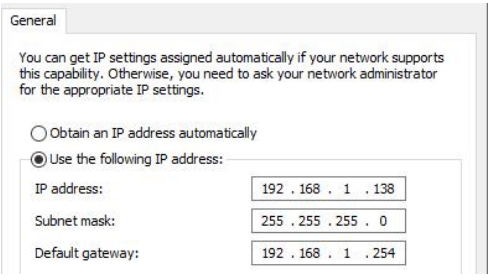


Figure 4- 2 IP address configuration

3) Log in to the spectrum analyzer, open a web browser and enter the IP address of the spectrum analyzer module (the default address is 192.168.1.13). Press Enter to connect. After a successful connection, the spectrum analyzer display will appear, and it can be operated using the keyboard and mouse. You can switch menus by clicking the shortcut menu in the top-left corner, as shown in Figure 4-3. Alternatively, you can use the corresponding keys on the keyboard.

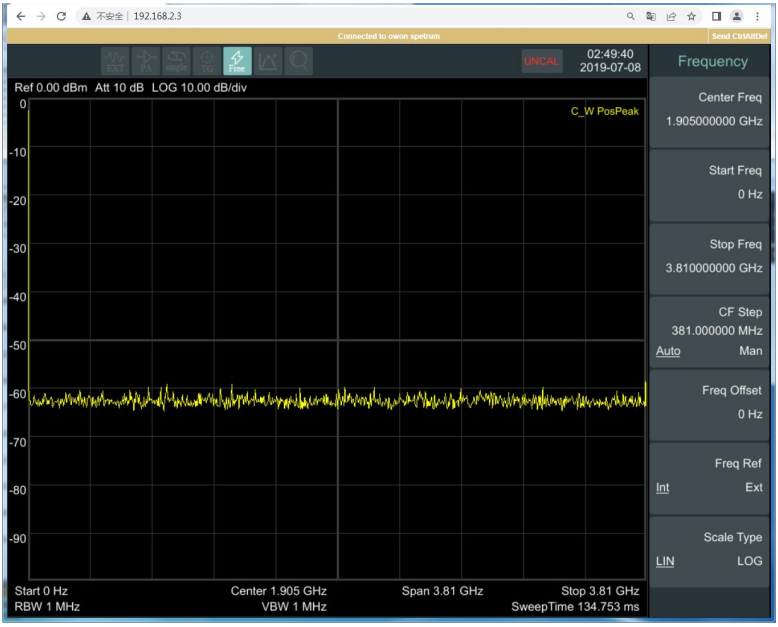


Figure 4- 3 Host Software interface

The corresponding keyboard keys are as follows:

[F] Frequency

[S] Span

[A] Amplitude

[R] Auto Tune

[B] Band Width

[D] Detector

[W] Sweep

[O] Track Gen

[T] Trace

[V] Display

[I] Trig
[M] Mode

[Y] System
[Q] Quick Save
[P] Peak
[K] Marker

[X] File
[L] Save/Recall
[E] Marker Fctn
[C] Marker To

[N] Preset
[H] Help
[J] Measure
[U] Measure Set
[F1~F7] F1~F7 [F9] GHz/dBm [F10] MHz/dB
[F11] kHz/dBmV [F12] GHz/mv
[0~9] 0~9
[Backspace] <-
[Esc] X
[Enter] enter

4) To change the IP address of the spectrum analyzer, you can open the config.ini file located in the removable disk, modify the IP address and gateway address, and save the changes. After restarting the spectrum analysis module, the new settings will take effect, as shown in Figure 4-4. (Note: If the IP address subnet is changed, the USB0 network adapter's IP address

should be set to the same subnet, as described in Step 2.)

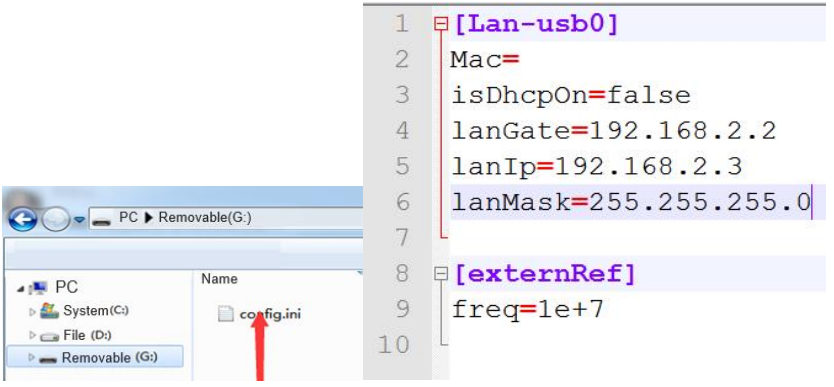


Figure 4-4 Change IP address

5) Firmware upgrade: After extracting the firmware upgrade package, place the spe.update file onto the USB drive (52MB). Right-click the drive, select "Eject USB," and then restart the spectrum analyzer. After restarting, go to the menu [System] -> [System Info] to check the version. Once the version is updated to the new one, the firmware upgrade is complete.

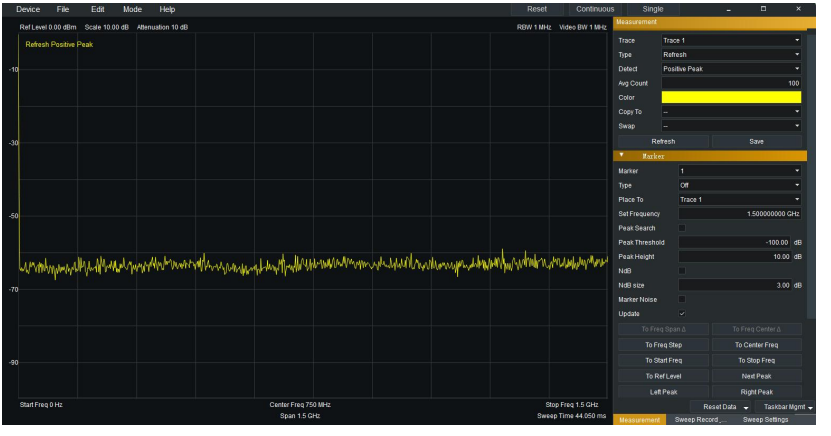
4.4.3 Use the Host Software

Note:

- When the host computer is successfully connected, the buttons on the instrument panel will be disabled, and all operations must be performed through the software interface.
- **Network connection method:** To restore operation of the instrument panel, press the Preset button on the instrument panel(Press “N” key in the keyboard). At this time, the software interface will be disabled.

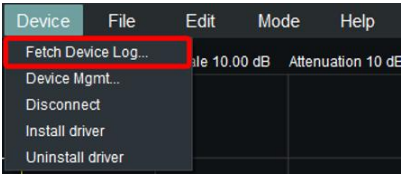
- **USB connection method:** To restore operation of the instrument panel, first click "Disconnect" on the host computer interface, then press the Preset button on the instrument panel(Press “N” key in the keyboard). At this time, the software interface will be disabled.
- To restore software operation of the instrument, please reconnect to the host computer.

(1) Once the connection is successful, the current waveform will be displayed.

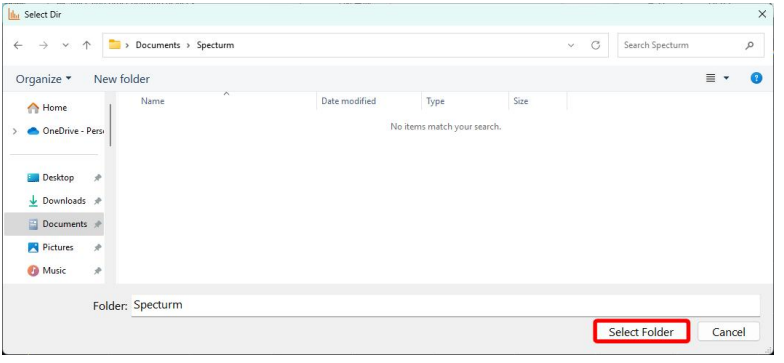


To Retrieve the Device Log

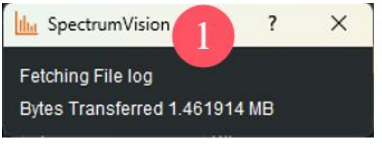
(1) Click **"Device"** in the top left corner, then select **"Fetch Device Log..."** to retrieve the device log.

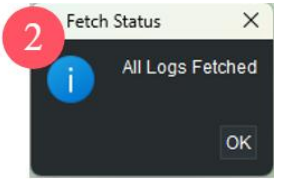


(2) Select a folder to store the log, and after choosing the folder, click **"Select Folder"**



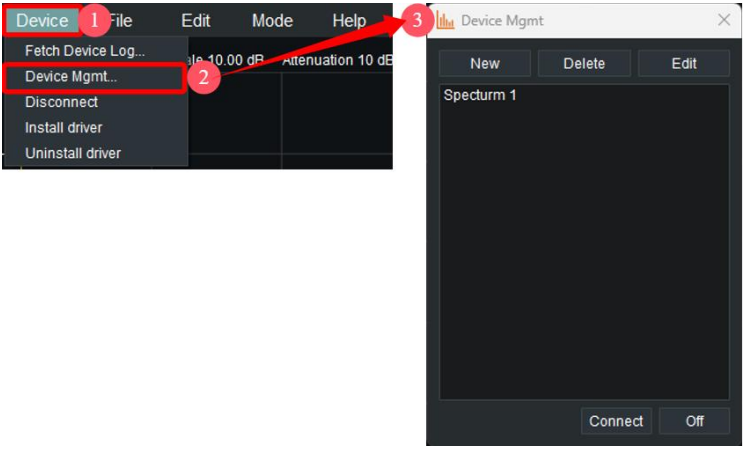
(3) The host computer will automatically begin retrieving all logs. Once the retrieval is successful, a prompt will appear saying **"All Logs Fetch"**





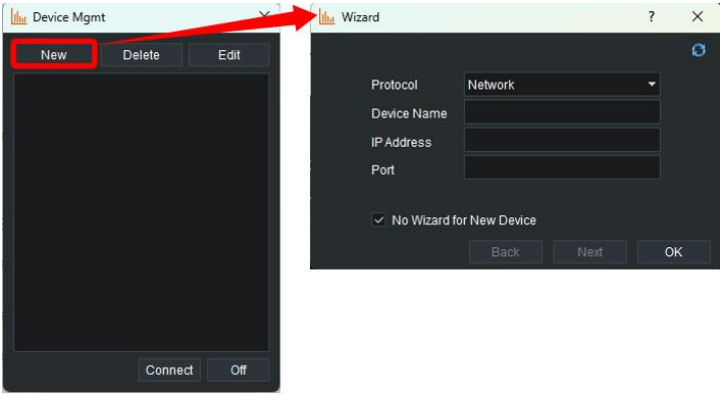
To Perform Device Management Settings

(1)Click **"Device"** in the top left corner, then select **"Device Mgmt..."** to bring up the Device Manager interface.

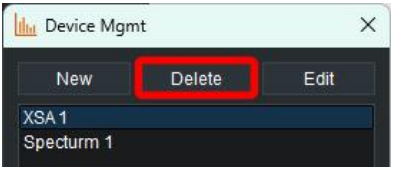


(2)In the Device Management interface, you can create, delete, edit, and connect devices.

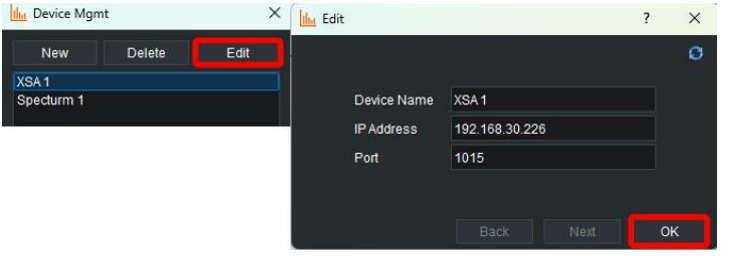
① Click **"New"** and follow the prompts in the wizard to complete the device addition.



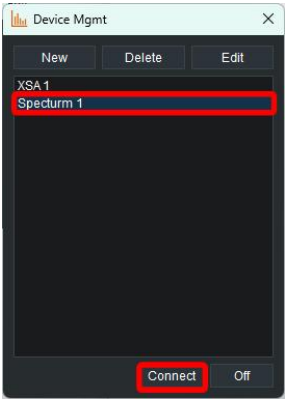
② Select the device you want to delete and click **"Delete"** to remove the device.



③ Select the device you want to modify, click **"Edit"** make the necessary changes, and then click **"OK"** to save the device information.

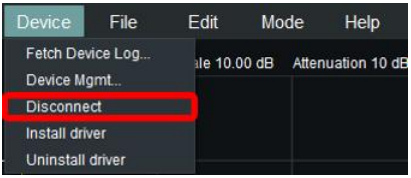


④ Click on the device you want to connect to and click **"Connect"** to establish the connection.



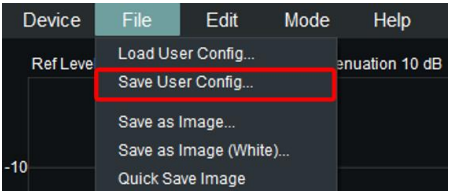
To Disconnect

(1)Click **"Device"** in the top left corner and select **"Disconnect"** to disconnect the device.

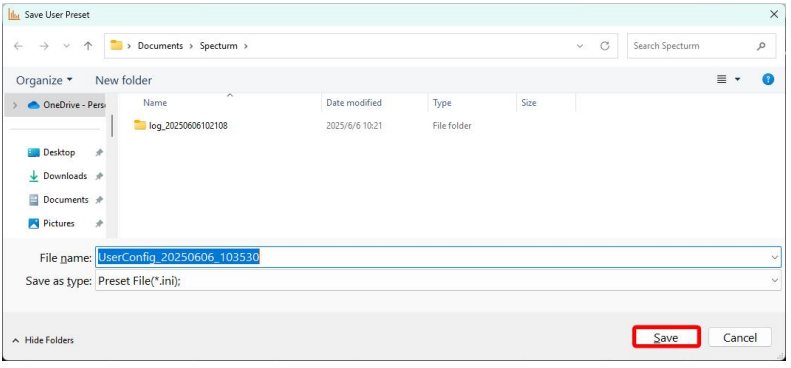


To Save/Load User Configuration

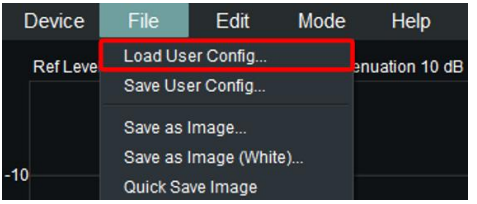
(1) Click **"File"** in the top left corner and select **"Save User Config..."** to save the user configuration.



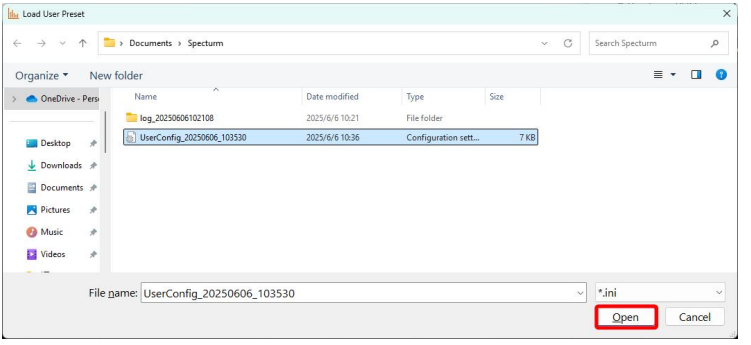
(2) Choose the file save path and click **"Save"** to save the current user configuration.



(3) Click **"File"** in the top left corner and select **"Load User Config..."** to load the user configuration.

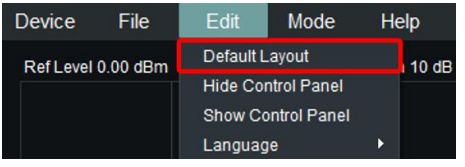


(4) Locate the saved user configuration file, select it, and click **"Open"** to load the saved user configuration.

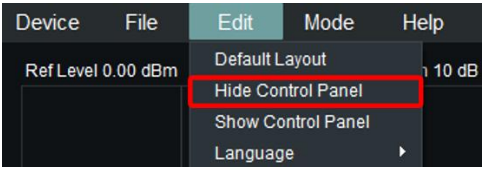


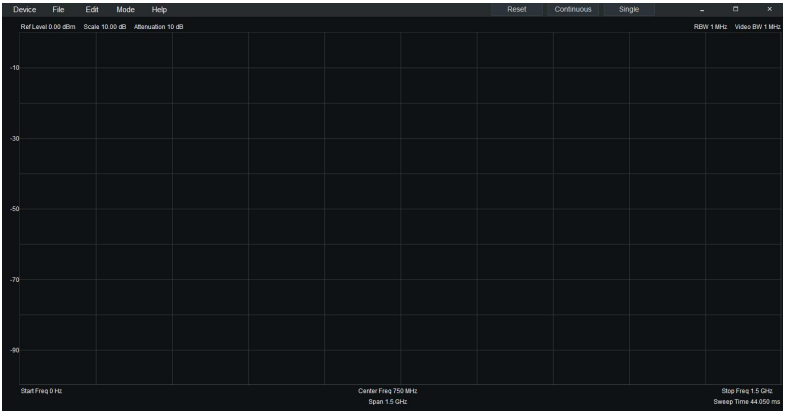
To Perform Panel Settings

(1) Click **"Edit"** in the top left corner and select **"Default Layout"** to restore the default interface of the host system.

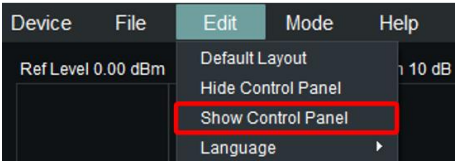


(2) Click **"Edit"** in the top left corner and select **"Hide Control Panel"** to hide the control panel on the right side.

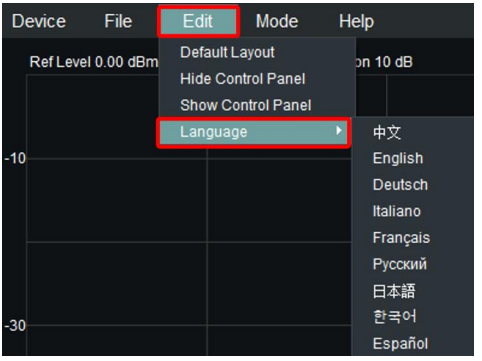




(3) Click **"Edit"** in the top left corner and select **"Show Control Panel"** to reopen the right-side panel if it was previously hidden.



(4) Click **"Edit"** in the top left corner and select **"Language"** to choose your desired language.



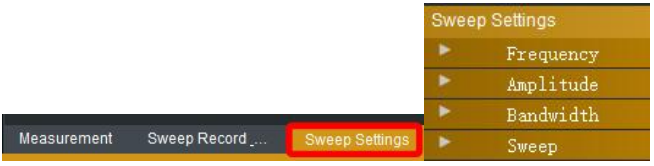
To Perform Parameter Setting

(1)Click the **"Measurement"** button in the bottom right corner to enter the measurement menu, which includes options for Trace, Marker, Peak List, Channel Power, Occupied BW, Trace Math, Window Meas, and Other Meas.

(2)Click the **"Sweep Record ..."** button in the bottom right corner to enter the scan record and playback menu, which includes options for Playback and Record.

(3)Click the **"Sweep Settings"** in the bottom right corner to enter

the scan settings menu, which includes options for Frequency, Amplitude, Bandwidth, and Sweep.



4.4.4 Attention Options

1.When establishing a LAN or USB connection, check if the port and IP settings are correct, ensure the cables are properly connected, and verify that the instrument is powered on and functioning properly.

Method to confirm the instrument is powered on: The indicator light is on, which means the device has started normally.

4.5 User Interface

Before accessing the user interface, connect the module to the computer using an Ethernet cable. Then, open a web browser on the computer, enter the spectrum analyzer's IP address in the URL bar, and press "Enter" to access the user interface of the spectrum analyzer.

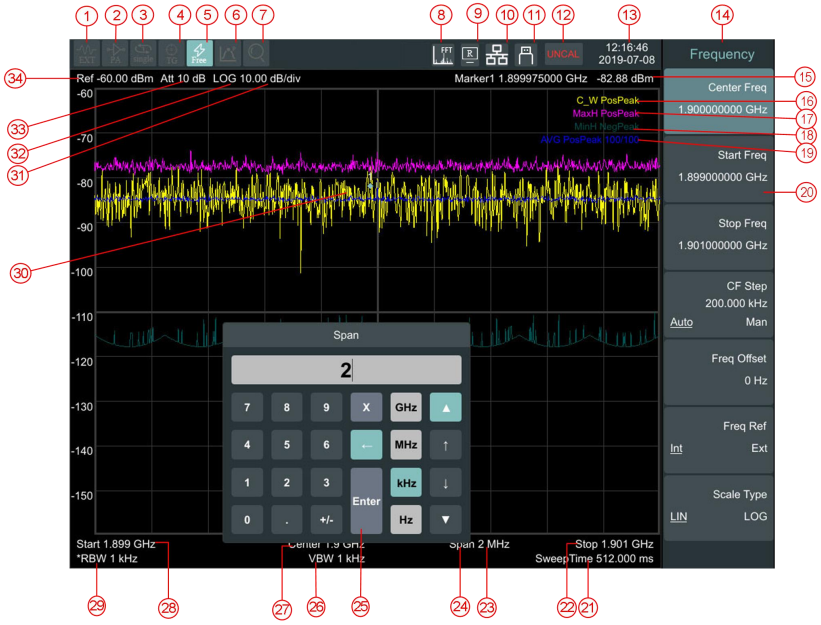


Figure 4- 5 User interface

Table 4- 2 Description

NO.	Name	Description	Related Key
①	Reference frequency	Set the reference frequency as **Int** (internal) or **Ext** (external) input	**FREQ** → [Freq Ref]
②	Preamplifier	Turn on/off the preamplifier	**AMPTD**→ [Preamplifier]
③	Sweep status	Set the sweep status to **Single** or **Cont** (continuous)	[Sweep]→ [Sweep Single] or [Sweep Cont]

④	Tracking generator	Press to turn on/off the source output	[TG]→ [Track GEN]
⑤	Trigger type	Set the trigger type to **Auto**, **Video**, **Pos** (external positive edge), **Neg** (external negative edge)	[Trig]
⑥	Continuous peak search	Enable/Disable continuous peak search	**[**Peak**]**→ [Cont Peak]
⑦	Automatic search	Searching automatically	**[**Auto**]**
⑧	USB storage device	Show if USB storage device is inserted	
⑨	Remote control	Turn on remote control	
⑩	FFT mode	When RBW is set to less than 3kHz, automatically switch to FFT mode	
⑪	LAN access sign	LAN access sign	
⑫	UNCAL sign	Measurement is not calibrated	
⑬	Date/Time	Display the date/time of system. Click to display the interface of date modification	**[**System**]**→[Setting＞] → [Date/Time＞]

⑭	Menu title	Function of current menu belongs to，Click to call the shortcut menu	
⑮	Marker readout	Display the frequency value (time during zero scan span) and amplitude value of current frequency standard. Display the frequency standard function of response when the frequency standard function can be enabled	[Marker]
⑯	Trace 1	Display the current type of trace 1 is refresh, and peak is detected positive	
⑰	Trace 2	Display the current type of trace 2 is refresh, and peak is detected positive	
⑱	Trace 3	Display the current type of trace 3 is refresh, and peak is detected positive	
⑲	Trace 4	Display the current type of trace 4 is refresh, and peak is detected positive	
⑳	Menu item	Menu item of current function	

㉑	Sweep Time	System sweep time	[＜SETUP] →[Sweep]→[Sweep time]
㉒	Stop frequency	Display stop frequency	[FREQ]→ [Stop Freq]
㉓	Mouse cursor	Show when using an external mouse	
㉔	Span	Display span width	[Span]→[Span]
㉕	Digital input keyboard of touch screen	Call out by clicking the position where the input parameter needs modifying	
㉖	Video bandwidth	Display video bandwidth	[＜SETUP]→ [BW] →[VBW]
㉗	Center frequency	Display center frequency	[FREQ]→ [Center Freq]
㉘	Start frequency	Display start frequency	[FREQ]→ [Start Freq]
㉙	Resolution bandwidth	Display resolution bandwidth	[＜SETUP]→ [BW]→[RBW]
㉚	Marker	Display current activated marker	[＜Marker]→ [Marker]
㉛	Amplitude Scale	Display amplitude scale	[AMPTD]→ [Scale/Div]
㉜	Amplitude Scale Type	**Log** (logarithmic) or **Line** (linear)	[AMPTD]→ [Scale Type]
㉝	Attenuation	Display input attenuation setting	[AMPTD]→ [Attenuation]

㉞	Reference level	Reference level	[AMPTD]→ [Ref Level]

Note:

1~7 can be switched by clicking with the mouse;

1~19 can be called up to modify the current trace interface by clicking with the mouse;

22, 26, 29, 33: If there is a "*" before the display, it indicates that the item is in manual setting mode;

26~29: Clicking will bring up the digital input keyboard interface.

4.6 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.

1. **How to acquire built-in help**

   Press [Help], and a prompt on how to receive help will pop up in the center of the screen.

2. **Page up and down**

   When the help information is displayed across multiple pages, click and drag the scroll bar to view more help information.

3. **Acquire the help information of any function key**

   A message about how to obtain help information will be shown, press any function key to get the corresponding help.

4. **Close the current help information**

   Press [Help] again to close help.

4.7 Web keyboard control

In web control, keyboard control and input can be used, with the corresponding keys as follows:

[F] Frequency
[S] Span
[A] Amplitude
[R] Automatic research

[B] Bandwidth
[D] Detector
[W] Sweep
[O] Tracking source

[T] Trace
[V] Display
[I] Trigger
[M] Mode

[Y] System
[Q] Quick Save
[P] Peak
[K] Marker

[X] File
[L] Save/Recall
[E] Marker Function
[C] Marker→

[N] Preset
[H] Help
[J] Measurement
[U] Measurement Setting
[F1~F7] F1~F7
[F9] GHz/dBm [F10] MHz/dB
[F11] kHz/dBmV [F12] Hz/mv
[0~9] 0~9
[Backspace] <-
[Esc] X
[Enter] enter

4.8 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.
Basic:

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

For example, to measure a 100MHz -10dBm signal, you must turn on the spectrum analyzer and ensure it is warmed up for 30 minutes to ensure measurement accuracy.

1. Equipment connection:

Connect the output terminal of signal generator to the **RF Input 50Ω** terminal of spectrum analysis module. Set the parameters as follows:

Frequency 100 MHz

Amplitude -10 dBm

2. Setting parameters:

1) Press [Preset] to restore the analyzer to its factory-defined state. The spectrum analysis module will display the spectrum from 9kHz to the maximum span width. The signal generated will display as a vertical line at 100MHz. Refer to Figure 4-6.

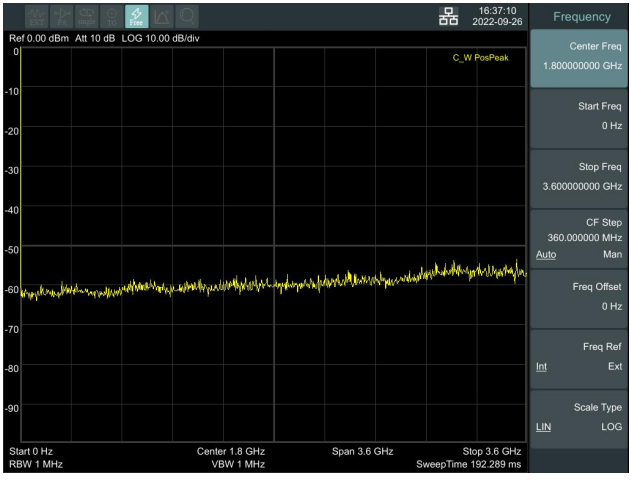


Figure 4-6 Full Span

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

2) Setting Center Frequency

Press "FREQ", select [Center frequency] on corresponding pop up menu. Input "100" and select the unit as MHz on the numeric keypad.

3) Setting Frequency Span

Press [SPAN], input "**1**" and select **MHz** as its unit using the numeric keypad; or press [↓] to decrease to 1MHz.

Figure 4-7 shows 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.

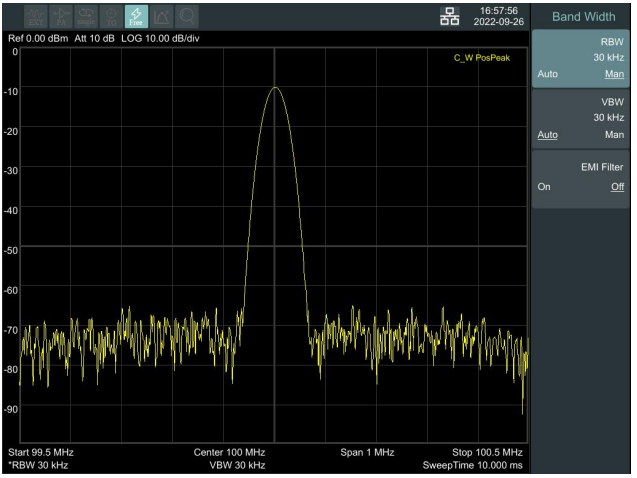


Figure 4-7 Set frequency span

4) Activate Marker

Press **Peak**, 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.

5) Setting amplitude

The amplitude of the top horizontal line in the measurement chart displayed on the host computer is generally referred to as the reference level.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.

Press [AMPTD], 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 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.

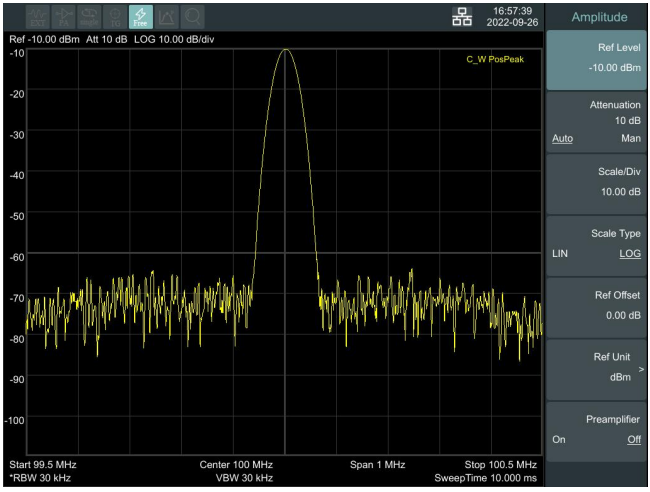
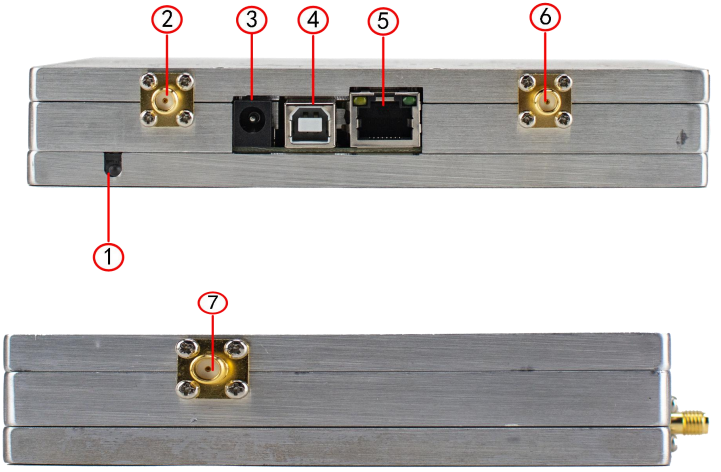


Figure 4- 8 Set reference level

4.9 Module Interface Description



No.	Module	Description
①	Power Supply indicator	
②	RF IN(RF input 50Ω)	The RF input is equipped with an SMA straight connector, which is connected to the device under test via a cable.
③	Power supply input	9V-12V DC port
④	USB Device port	When the intermediate frequency module is connected to an external USB device as a "slave device," data needs to be transmitted through this interface. For example, when

		connecting to a PC or printer, this interface is used.
⑤	LAN port	The intermediate frequency module can be connected to the local area network through this interface for remote control. The instrument complies with the LXI Class C standard, enabling rapid test system setup and easy system integration. This serial port allows connection to other host devices.
⑥	TG OUT	Tracking source output interface
⑦	REF CLK-IN/OUT	Clock source input/output interface

Attention

When the input attenuator setting is no less than 10 dB, the maximum input signal power at the RF input port is +23 dBm.

5. Menu Interpretation

This section provides you with the information on using the front panel of the spectrum analysis module.

5.1 [FREQ]Frequency

The frequency range of a channel can be expressed by either of two groups of parameters: Start Frequency and Stop Frequency; or Center Frequency and Span. If any such parameter is changed, the others would be adjusted automatically in order to ensure the coupling relationship among them:

$$f_{center} = (f_{stop} + f_{start}) / 2 \quad (5\text{-}1)$$

$$f_{span} = f_{stop} - f_{start} \quad (5\text{-}2)$$

f_{center}, f_{stop}, f_{start} and f_{span} denotes the center frequency, the stop frequency, the start frequency and the span respectively.

5.1.1 [Center Freq]

Sets the center frequency of the sweep. When pressed, the frequency mode is switched to Center Freq and Span in order to enter the desired parameter data.

Key Points:

- The start and stop frequencies vary with the center frequency when the span is constant.

- Changing the center frequency horizontally shifts the current sweep channel and the adjustment is limited by the specified frequency range.
- In Zero Span mode, the start frequency, stop frequency and center frequency are always equal. If one is changed the others are updated to match.
- This parameter can be modified through the soft keyboard interface and by dragging the trace.This parameter can be modified through the soft keyboard interface and by dragging the trace.

5.1.2 [Start Freq]

Sets the start frequency of the sweep. When pressed, the frequency mode is switched to Start Freq and Stop Freq in order to enter the desired parameter data.

Key Points:

- The span and center frequency are changed automatically according to the start frequency. The change of the span would have influence on other system parameters. For more details, please refer to "Span".
- In Zero Span mode, the start frequency, stop frequency and center frequency are always equal. If one is changed the others are updated to match.
- This parameter can be modified through the soft keyboard interface and by dragging the trace.
- If start freq is larger than stop freq when setting, then stop freq will increase automatically to the same value of start freq.

5.1.3 [Stop Freq]

Sets the stop frequency of the sweep. When pressed, the frequency mode is switched to Start Freq and Stop Freq in order to enter the desired parameter data.

Key Points:

- Modifying the stop frequency changes the span and center frequency, and the change of span influences other system parameters, see "Span".
- This parameter can be modified through the soft keyboard interface and by dragging the trace.
- If stop freq is larger than start freq when setting, then start freq will decrease automatically to the same value of stop freq.

5.1.4 [CF Step Auto Man]

Sets the step of center frequency. Changing the center frequency in a fixed step continuously switches the channel to be measured.

Key Points:

- The frequency step type could be "Manual" or "Auto". In Auto mode, the CF step is 1/10 of span if it is in Non-zero span mode or equals 1Hz while in Zero span mode.In manual mode, the step size of the center frequency can be modified. At this point, when [Center Freq] is activated and the arrow keys are pressed, the center frequency will change by the set step size.
- After you set an appropriate frequency step and select center frequency, you can use using up and down direction keys to switch between measurement channels in a specified step in order to sweep the adjacent channels manually.
- This parameter can be modified through the soft keyboard interface and by dragging the trace.

Frequency step lends itself to detect the harmonic waves and bandwidths that are beyond the current span.
For example, for order of harmonic of a 300 MHz signal, you can use set both the center frequency and frequency step to 300 MHz, and press the up direction key continuously to increase the center frequency to 600MHz, that is secondary harmonic. Press arrow to increase center frequency by 300MHz, which reaches 900MHz. [CF Step Auto Man] shows the auto or manual mode to setting the steps. When step is under manual mode, press [CF Step Auto Man] to return to auto mode.

5.1.5 [Freq Offset]

You can set a frequency offset to displayed frequency value, including freq marker value. This movement won't influence sweep frequency range.
While this function activated (frequency offset isn't 0), you can modify this parameter using the numeric keys.

5.1.6 [Freq Ref Int Ext]

Set the reference frequency as internal or external input, this is regarded as module reference. If the external signal is not locked according to judgment after switching to external, the prompt "external reference not locked" will pop up and it will switch back to internal automatically.

5.1.7 [Scale LIN log]

Set the scale type the frequency axis to linear or logarithmic; linear is the default.

5.2 [SPAN]

Set the spectrum analyzer to span mode. When press [SPAN], [Span],[Full Span],[Zero Span] and [Last Span] will be available to configure. You can modify span using the numeric keys. Use numeric key or [Zero Span] to clear span.

5.2.1 [Span]

Sets the frequency range of the sweep. When pressed, the frequency mode is switched to Center Freq/Span.

Key points:

- The start and stop frequencies are changed with the span automatically.
- In non-zero span mode, the span can be set down to 100 Hz. And up to the full span described in "Specification". When it is set to the maximum span, it enters full span mode.
- Zero Span Setting: In non-FFT mode (RBW greater than 3K), set the zero span to 0Hz by manually entering the value. You can also enter the zero span mode by pressing the Zero Span menu or using the SCPI command.
- Modifying the span in non-zero span mode may cause an automatic change in both CF step and RBW if they were in Auto mode, and the change of RBW may influence VBW (in Auto VBW mode).
- In non-zero span mode, variation in the span, RBW or VBW would cause a change in sweep time.
- This parameter can be modified through the soft keyboard interface and by dragging the trace.

5.2.2 [Full Span]

Set the sweep width to the maximum.

5.2.3 [Zero Span]

Sets the span of the analyzer to 0 Hz. Both the start and stop frequencies will equal the center frequency and the horizontal axis will denote time. The analyzer here is measuring the time domain characteristics of amplitude, located at the corresponding frequency point. This will help to observe the signal (especially for modulated signal) at time domain. In FFT mode (RBW < 5k), it is not possible to set the zero span. The zero span mode displays the time domain characteristics of fixed frequency components of the signal, and it is different from the non-zero span mode in many ways. The following functions are not available in the zero span mode: [Marker] -> [Center Frequency], [Marker] -> [Frequency Step], [Marker] -> [Start Frequency], [Marker] -> [Stop Frequency], [Delta Marker] -> [Center Frequency], [Delta Marker] -> [Span].

5.2.4 [Last Span]

Changes the span to the previous span setting.

5.3 [AMPTD]Amplitude

Sets the amplitude parameters of the analyzer module. Through these parameters, signals under measurement can be displayed at an optimal view with minimum error. The pop out amplitude menu includes [Ref Level], [Attenuation Auto Manual], [Scale/Div], [Scale Type Lin Log], [Ref Offset], [Ref Unit], and [Preamplifier On Off].

5.3.1 [Ref Level]

Activate reference level function and sets the maximum power or voltage for display window.

Key points:

- This value is affected by a combination of maximum mixing level, input attenuation, and preamplifier. When you adjust it, the input attenuation is adjusted under a constant max mixing level, meeting:

$$L_{Ref} - a_{RF} + a_{PA} \leq L_{mix} \quad (5\text{-}3)$$

L_{Ref}, a_{RF}, a_{PA} and L_{mix} denotes the reference level, the input attenuation, the preamplifier, and the max mixing level, respectively.

- You can modify this parameter using the numeric keys or direction keys.

Reference level located at the top of axis grid. Measurement near the reference level would gain better accuracy, but input signal amplitude should not exceed the reference level; if it exceeds, the signal will be compressed and distorted, result in wrong measurement. Analyzer module's input attenuation is related with reference level, it can self-adjust to avoid signal compression. Minimum reference level is -80dBm at Log scale under 0dB attenuation.

5.3.2 [Attenuation Auto Man]

Sets the front attenuator of the RF input in order to permit big signals (or small signals) to pass from the mixer with low distortion (or low noise). It only works under internal mixer mode to adjust input

attenuator insider analyzer module. In Auto mode, input attenuator is related with reference level.

Key points:

- When the preamplifier is On, the input attenuation could be set up to 40 dB. You can adjust the reference level to ensure that the specified parameters meet the requirement.
- Modifying the reference level may cause an automatic change in attenuation value; But the change of attenuation value won't influence reference level.
- You can modify this parameter using the numeric keys.

Attenuator adjustment is to make the maximum signal amplitude pass from mixer less than or equal to -10dBm. E.g. if the reference level is +12dBm, the attenuator value is 22dB, then the input level in mixer is -18dBm (12-22-8=-18), its mainly purpose is to avoid signal compression. Switch [Input Atten Auto Manual] to manual mode, adjust the attenuator manually. The highlight under auto or manual stands for auto coupling and manual coupling. When attenuator is under manual mode, press [Input Atten Auto Manual] will match the attenuator and reference level again.

Note: Maximum input signal amplitude of input attenuator (10dB input attenuation at least) is +30dBm, higher power signal will damage input attenuator or mixer.

5.3.3 [Scale/Div]

Set the vertical axis scale per division. This function is only available when the scale type is logarithmic. The logarithmic amplitude scale can be set from 0.01 to 1000 dB. The default value is 10 dB per division.

Key points:

- By changing the scale, the displayed amplitude range is adjusted.
- The amplitude that can be displayed is from reference level minus 10 times the current scale value to the reference level.
- This parameter can be modified through the soft keyboard interface and by dragging the trace.

5.3.4 [Scale Type Lin Log]

Sets the Scale Type of Y-axis to Lin or Log, the default is Log. It only works under internal mixer mode. In general, select mV as Lin amplitude scale unit. Of course there would be other units for select.

Key points:

- In Log scale type: the Y-axis denotes the logarithmic coordinates, the value shown at top of the grid is the reference level and the grid size is equal to the scale value. The unit of Y-axis will be automatically switched into the default "dBm" when the scale type is changed from Lin to Log.
- In Lin scale type: the Y-axis denotes the linear coordinates, the value shown at the top of the grid is the reference level and the bottom of the grid shows 0 V. The grid size is 10% of the Reference level and the Scale/Div is invalid. The unit of Y-axis will be automatically switched into the default "mV" when the scale type is changed from Log to Lin.
- Other than as mentioned above, the unit of Y-axis is independent of the Scale Type.

5.3.5 [Ref Offset]

Assigns an offset to the reference level to attempt to compensate for gains or losses generated between the device under measurement and the analyzer.

Key points:

- The changing of this value changes both the readout of the reference level and the amplitude readout of the marker, but will not impact the position of the curve on the screen.
- You can modify this parameter using the numeric keys.
- This offset use dB as absolute unit, will not change with selected scale and unit.

5.3.6 [Ref Unit>]

Sets the unit of the Y-axis to[dBm] , [dBμW], [dBpW], [dBmV], [dBμV], [V] or [W]

Key points:

1) [dBm]
   Choose decibel equals to 1mW as amplitude unit.
2) [dBμW]
   Choose decibel equals to 1μW as amplitude unit.
3) [dBpW]
   Choose decibel equals to 1pW as amplitude unit.
4) [dBmV]
   Choose decibel equals to 1mV as amplitude unit.
5) [dBμV]
   Choose decibel equals to 1μV as amplitude unit.
6) [W]
   Choose Watts as amplitude unit.
7) [V]
   Choose Voltage as amplitude unit.

5.3.7 [Preamplifier On Off]

Sets the status of preamplifier located at the front of the RF signal path. Turning on the preamplifier reduces the displayed average noise level in order to distinguish small signals from the noise when working with small signals.

5.4 [Auto]

Automatically search for stable signals across the entire frequency range and adjust the frequency and amplitude parameters to the optimal state. With one click, the signal search and automatic parameter settings are achieved. If no signal is found or the signal is unstable, the search fails and returns to the previous state.
Key points: some parameters such as reference level, scale, and input attenuation may be changed during the auto tune.

5.5 [BW]Bandwidth

Soft key entry: Click [＜ Settings] → [Bandwidth]
Sets the RBW (Resolution Bandwidth) and VBW (Video Bandwidth) parameters of the analyzer. Pop out the setting menu includes [RBW Auto Man], [VBW Auto Man], [EMI Filter On Off].

5.5.1 [RBW Auto Man]

Adjust the resolution bandwidth ranging from 1Hz-1MHz. Use numeric key to switch resolution bandwidth. The underline under Auto or Manual means Auto mode or Manual mode. Press [Resolution Bandwidth Auto Manual] and hold it until underline

under Auto has been highlighted. Then the resolution bandwidth is under auto coupling mode.

Key points:

- Reducing the value of RBW will increase the frequency resolution, but may also cause sweeps to take longer (Sweep Time is effected by a combination of RBW and VBW when it is in Auto mode).
- RBW decreases with the span (non-zero span) in Auto RBW mode.

5.5.2 [VBW Auto Man]

Sets the desired video bandwidth in order to remove the band noise. Set the video resolution displays in function area, ranging from 10Hz to 1MHz by sequence step. You can modify this parameter by numeric key . The underline under Auto or Manual means Auto mode or Manual mode. Press [VBW Auto Manual] and hold it in manual until the underline highlighted under Auto to return auto mode.

Key points:

- Reducing the VBW to smooth the spectrum line and differentiate small signals from the noise. However, this may cause a longer sweep time. (Sweep Time is effected by a combination of RBW and VBW when it is in Auto mode).
- VBW varies with RBW when it is set to Auto.

5.5.3 [EMI Filter On Off]

Turn on or off EMI measurement resolution bandwidth.
Currently, when opening an EMI filter (-6 dB bandwidth), the resolution bandwidth can only be 200 Hz,9 kHz, 120 kHz, or 1 MHz.

At this time, the detection method can be selected as "quasi-peak".

5.6 [Trace]

Soft key entry: Click [＜ Settings] → [Trace]

As the sweep signal is displayed as a trace on the screen, you can set parameters about the trace using this key. The analyzer module allows for up to five traces to be displayed at one time, and press this key to check the menu for trace line settings and operations.

5.6.1 [Trace 1 2 3 4 5]

Select trace. The spectrum analysis module provides traces 1, 2, 3, 4 and 5, and the number and state menu item of the selected trace will be underlined. In particular, the color of number corresponds to the color of trace.

5.6.2 [State＞]

Set the refresh state type of spectral traces.

5.6.2.1 [Clear & Write]

Refresh the current spectrum curve by collecting real-time scanned data at each point of the trace to display the analyzer trace.

5.6.2.2 [Max Hold]

Maintains the maximum for each point of the trace. It continuously receive scan data and select positive peak value detect mode.

5.6.2.3 [Min Hold]

Maintains the minimum for each point of the trace. It continuously

receive scan data and select negative peak value detect mode.

5.6.2.4 [Average]

Average the current trace. Each point of the trace displays the averaged result of multiple scans, resulting in a smoother display of this type of trace. Times of trace: 100 on average (by default) and 1,000 at maximum.

5.6.2.5 [View]

Stops updating trace data and display current trace for observation.

5.6.2.6 [Blank]

Clear the trace on screen. But the trace stock will keep still without refreshing.

5.6.2.7 [Return]

Return to the previous menu.

5.6.3 [Operations＞]

Enter trace math related sub menu.

5.6.3.1 [1 ←→ 2]

Exchange the trace stock 1 data with trace stock 2 and place them in display mode.

5.6.3.2 [2-DL → 2]

Deduct display line value in trace stock 2. This function execute once when activated. Press [2 - DL → 2] again to execute it the second time. When this function activated, display line will also be activated.

5.6.3.3 [2 ←→ 3]

Exchange the trace stock 2 data with trace stock 3 and place them in display mode.

5.6.3.4 [1→3]

Exchange the trace stock 1 data with trace stock 3 and place them in display mode.

5.6.3.5 [2→3]

Exchange the trace stock 2 data with trace stock 3 and place them in display mode.

5.6.3.6[Return]

Return to the previous menu.

5.7 [Detector]

Soft key entry: Click [＜ Settings] → [Detector]
While displaying a wider span, each pixel contains spectrum information associated with a larger subrange. That is, several samples may fall on one pixel. Which of the samples will be represented by the pixel depends on the selected detector type. Press this key to pop out the relevant menu includes:[Trace 1 2 3 4 5], [Pos Peak], [Neg Peak],[Sample] , [Normal], [Voltage Avg],[RMS Avg] , [Quasi-Peak].

Key points:
●Selects an appropriate type according to the application in order to ensure the accuracy of the measurement for your application.
●**Soft key entry:** click **[＜ Settings]**→[BW]→[EMI Filter On Off] is

On, [Quasi-Peak] is available.

Table 5- 1 Detector type comparison

Detector Type	Measurement
Pos Peak	Positive peak *detector* ensures that no peak signal is missed, which is useful for measuring signals that are very close to the base noise.
Neg Peak	Negative peak detector is used in most cases with the self-test of the spectrum analyzer and is rarely used in the measurement. It is able to restore the modulation envelope of the AM signal well.
Normal	Display pos peak and neg peak alternately when noise is detected, or it only display pos peak.
Sample	Sampling detector is conducive to measurement noise signal. Compared with the standard detection method, it can measure noise better.
RMS Avg	RMS Average detector averages rms levels to calculate the true average power. It is best for measuring the power of complex signals.
Voltage Avg	Voltage Average detector averages the linear voltage data of the envelope signal measured during the bucket interval. It is useful for observing rise and fall behavior of AM or pulse-modulated signals.
Quasi-Peak	Quasi-peak detector is a weighted form of peak detection. The measured value drops as the repetition rate of the measured signal decreases. It is used in EMI testing.

5.7.1 [Trace 1 2 3 4 5]

Select trace. The spectrum analysis module provides traces 1, 2, 3, 4 and 5, and the number and state menu item of the selected trace will be underlined. In particular, the color of number corresponds to the color of trace.

5.7.2 [Pos Peak]

Searches the maximum from the sampling data segment and displays it at the corresponding pixel. Positive peak detector will be selected when [Max Hold] pressed.

5.7.3 [Neg Peak]

Searches the minimum from the sampling data segment and displays it at the corresponding pixel.

5.7.4 [Sample]

Set the detector to the sampling detector mode. This mode is usually used for video averaging and noise frequency Maker.

5.7.5 [Normal]

When noise is detected, the positive and negative peaks are alternately displayed, otherwise only positive peaks are displayed.

5.7.6 [Voltage Avg]

Set the detector to the Voltage Average detector mode. This mode calculates the average voltage of all the samples in the sample bucket.

5.7.7 [More＞]

Enter detect more menus.

5.7.7.1 [RMS Avg]

Set the detector to the RMS Average detector mode. This mode calculates the RMS average power of all the samples in the sample bucket.

5.7.7.2 [Quasi-Peak]

Set the detector to the Quasi-Peak detector mode. This mode is available when EMI filter is turned on. The quasi-peak detector is a peak detector that is weighted by the duration and repetition rate of the signal, as specified by the CISPR 16-1-1 standard. Quasi-peak detection is characterized by a fast charge time and slow decay time.

5.7.7.3 [Return]

Return to the previous menu.

5.8 [Display]

Soft key entry: Click [＜ Settings] → [Display]
Controls the screen display of the analyzer, such as full screen, setting the on or off for window zoom, display line, amplitude scale, grid and label.

5.8.1 [Full Screen]

Set to full-screen display graphical interface, press any key to exit.

5.8.2 [Display Line On Off]

When this menu is on, an adjustable horizontal reference line is activated on the screen.

5.8.3 [Ampt Graticule On Off]

Turn on or Off amplitude scale function.

5.8.4 [Label On Off]

Defines the content displayed or hidden in the comments that appear in the display grid area.

5.8.5 [Menu Hide On Off]

Display and hide the menu at the right side of the screen. When the menu hiding is enabled, the menu will be hidden if there is no any button operation within the preset menu hiding time (optional menu hiding time: 5-50 s). Recover menu display by pressing any button.

5.8.6 [Brightness]

Set screen brightness display within 1%~100%.

5.8.7 [Screen Sleep]

Set the time for enabling or disabling automatic screen off function. When the automatic screen off function is enabled, the screen will be off automatically if there is no any operation within the set automatic screen off time (optional screen off time: 1-60 min). Recover screen display by pressing any button.

5.9 [Sweep]

Soft key entry: Click [＜ Settings] → [Sweep]

Sets parameters about the Sweep time and mode including [Sweep Time Auto Man], [Sweep Single], [Sweep Cont].

5.9.1 [Sweep Time Auto Man]

Sets the time interval for the analyzer to complete a sweep.

- In non-zero span, the analyzer uses the shortest sweep time on the basis of the current RBW and VBW settings if Auto is selected.
- You can modify this parameter using the numeric keys.

5.9.2 [Sweep Single]

Press [Single Sweep] to set the sweep mode to Single. Press [Single Scan] to restart the scan when the next trigger signal arrives.

5.9.3 [Sweep Cont]

Press [Continuous Scan] to activate the sweep scan mode.Allows you to set continuous scan mode.

5.10 [Trig]

Soft key entry: Click [＜ Settings] → [Trig]
Sets the trigger type and other associated parameters, menu includes [Free], [Video].

5.10.1 [Free]

Set the trigger mode to the free trigger mode so that the scan trigger is as fast as possible with the spectrum analysis module. It meets the trigger conditions at any time, that is, continue to generate a trigger signal.

5.10.2 [Video]

This indicates a trigger signal will be generated when the system detects a video signal in which the voltage exceeds the specified video trigger level.

5.11 [Source]

Soft key entry: Click [＜ Settings] → [Source]

When the Source is turned on, an independent signal or a signal with the same frequency of the current sweep signal will be output from the GEN OUTPUT 50Ω terminal on the front panel. Press the key will pop out related menu includes [Track Gen On Off], [Output Level], [Network Meas>]. The source is turned off in the power-on and reset states.

5.11.1 [Track Gen On Off]

Select the tracking generator to be on or off. The RF output and spectrum reception are fully synchronized in frequency scanning, and the tracking source frequency cannot be set independently.

5.11.2 [Output Level]

Set the output power of CW or TG source.

5.11.3 [Reference]

After enabling normalization, adjust the vertical position of trace on the screen by adjusting the reference level value.

5.11.4 [Position]

After enabling normalization, adjust the vertical position of normalized reference level on the screen by adjusting the reference position.

Note:

- It is similar to the function realized by normalized reference level, which is at the bottom of the screen grid when it is 0% or at the top of the screen grid when it is 100%.
- The parameter can be changed via numeric buttons.

5.11.5 [Do Normalize]

This soft menu is used to track the user's field calibration of the source network measurements. After connecting the instrument's RF output to the RF input, press the "normalized" soft menu and the display shows a straight line on the 0dB scale.

Note: Disable normalization before the operation above.

5.11.6[Normalize On Off]

This soft-menu is used to turn normalization on or off after executing normalization.

5.12 [Mode]

Soft key entry: Click [＜ Settings] → [Mode]

Select the operating mode of spectrum analyzer from [spectrum analysis], [audio demodulation>] and [demodulation analysis>] to enter demodulation setting. This spectrometer supports audio demodulation and AM/FM analog demodulation. The functions of

menus and buttons differ under different modes.

5.12.1 [Spectrum]

Enter the operation mode of spectrum analysis.

5.12.2 [Demod＞]

Enter audio demodulation mode to select AM or FM analog demodulation mode.

5.12.2.1[AM＞]

Enter AM demodulation soft menu.

1)[Carrier Freq]

Set the carrier frequency of the AM modulation signal.

2) [IF BW]

Set the demodulation bandwidth of the AM modulated signal.

3)[Setup＞]

Set the time axis, depth axis and AF trigger of AM modulation.

a)[Time Axis►]

Set the time axis parameters.

●[Ref.Value]

Set the starting reference time on the time axis.

●[Position]

Set the reference position of the waveform on the time axis.

●[Scale/Div Auto Man]

Automatically or manually set the grid division scale.

●[Return]

Return to the previous menu.

b)[Depth Axis►]

Set the depth axis parameters.

●[Ref Depth]

Set the reference offset position as a vertical percentage.

●[Position]

Set the reference position of the waveform on the depth axis.

●[Scale/Div Auto Man]

Automatically or manually set the grid division scale.

●[Return]

Return to the previous menu.

c)[AF Trigger►]

Set the AF triggering conditions.

●[AF Trigger On Off]

Set the AF trigger to be On or Off.

●[Edge Pos Neg]

Set the trigger to rising or falling edge.

●[Trigger Mode]

Set the triggering mode to single trigger or continuously trigger.

●[Trigger Level]

Set the trigger level as a percentage of the depth.

●[Trigger Delay]

Set the trigger delay time.

●[Return]

Return to the previous menu.

4)[Data Reset]

Set the maximum, minimum, and average data reset under the AM modulated signal.

5)[Return]

Return to the previous menu.

5.12.2.2[FM＞]

Enter FM demodulation soft menu.

1)[Carrier Freq]

Set the carrier frequency of the FM modulation signal.

2) [IF BW]

Set the demodulation bandwidth of the FM modulated signal.

3)[Setup＞]

Set the time axis, depth axis and AF trigger of FM modulation.

a)[Time Axis►]

Set the time axis parameters.

●[Ref.Value]

Set the starting reference time on the time axis.

●[Position]

Set the reference position of the waveform on the time axis.

●[Scale/Div Auto Man]

Automatically or manually set the grid division scale.

●[Return]

Return to the previous menu.

b)[Depth Axis►]

Set the depth axis parameters.

●[Ref Depth]

Set the reference offset position as a vertical percentage.

●[Position]

Set the reference position of the waveform on the depth axis.

●[Scale/Div Auto Man]

Automatically or manually set the grid division scale.

●[Return]

Return to the previous menu.

c)[AF Trigger►]

Set the AF triggering conditions.

●[AF Trigger On Off]

Set the AF trigger to be On or Off.

- [Edge Pos Neg]
  Set the trigger to rising or falling edge.
- [Trigger Mode]
  Set the triggering mode to single trigger or continuously trigger.
- [Trigger Level]
  Set the trigger level as a percentage of the depth.
- [Trigger Delay]
  Set the trigger delay time.
- [Return]
  Return to the previous menu.

4)[Data Reset]

Set the maximum, minimum, and average data reset under the FM modulated signal.

5)[Return]

Return to the previous menu.

5.13 [Peak]

Soft key entry: Click [＜ Marker]→[Peak]

Executes peak searching immediately and opens the Peak setting menu.

Key Points:

- If Max is selected from the Peak Search option, it will search and mark the maximum on the trace.
- The peak search of Next Peak, Peak Right, Peak Left or peaks in the peak table must meet the specified parameter condition.
- The spurious signal at the zero frequency caused by LO feed through is ignored.

5.13.1 [Mkr→CF]

Used to move the peak point to the center frequency point.

5.13.2 [Peak→Peak]

Execute peak search and a min. search at the same time and mark “difference pair” frequency standard. In particular, mark peak search result with the difference frequency standard and the min. search result with the reference frequency standard.

5.13.3 [Next Peak]

Searches the peak whose amplitude is the closest to that of the current peak. The peak is then identified with a marker. When this key is pressed repeatedly, you can quickly find a lower peak.

5.13.4 [Left Peak]

Searches the nearest peak located to the left side of the current peak and meets the current peak and peak thresholds condition. The peak is then identified with a marker.

5.13.5 [Right Peak]

Searches the nearest peak located to the right side of the current peak and meets the current peak and peak thresholds condition. The peak is then identified with a marker.

5.13.6 [Cont Peak On Off]

Set the peak search form, off by default. On mode will automatically search for the peak.

5.13.7 [Peak Setup＞]

Enter peak setup interface.

5.13.7.1[Peak Excursion]

Set Peak Excursion.

5.13.7.2[Peak Mode Max Min]

Set the search under max. or min. value mode.

5.13.7.3[Sort Freq Ampt]

Set the sorting of peak value list by frequency or amplitude.

5.13.7.4[Peak List On Off]

Enable or disable peak list. If the peak value list is enabled, all the frequency standard marks meeting the peak value requirements will be displayed on the trace according to sorting mode. All the frequency standard lists meeting the peak value requirements will be listed below with trace color.

5.13.7.5[Return]

Return to the previous menu.

5.14 [Marker]

Soft key entry: Click [< Marker]→[Marker]

The marker appears as a rhombic sign (shown below) for identifying the point on the trace. We can easily readout the parameters of the marked point on the trace, such as the amplitude, frequency and sweep time.

Key points:

- The analyzer allows for up to eight groups of markers to be displayed at one time, but only one pair or one single marker is active every time.

- You can use the numeric keys or direction keys to enter the desired frequency or time when any marker type menu is active, so as to view the readouts of different points on the trace.

5.14.1 [Marker 1 2 3 4 5 6 7 8]

Switch frequency standards selected at present. Press this menu item to switch the frequency standards selected at present and display them with underline.

5.14.2 [Trace 1 2 3 4 5]

Display the trace serial number of the present frequency standard. Press this menu item to switch and modify the trace that the present frequency standard belongs to, such as modifying frequency standard 1 to the frequency standard of trace 2.

5.14.3 [Normal]

One of the marker types, which is used to measure the values of X (Frequency or Time) or Y (Amplitude) at certain point of the trace. When selected, a marker will appear with its own digital ID such as "1" on the trace.

Key points:

- If no active marker exists currently, a one will be enabled automatically at the center frequency of current trace.
- You can use the numeric keys to move the marker. The readouts of the marker will be displayed on the upper right of the screen.
- The readout resolution of the X-axis corresponds to the span and sweep points. For higher resolution, add sweep points or reduce the span.

5.14.4 [Delta]

One of the marker types, which is used to measure the delta values of X (Frequency or Time) and Y (Amplitude) between the Reference point and certain point on the trace. When selected, a pair of markers appears on the trace, which are the Reference Marker and the Delta Marker. Will be in the active area and the display area of the upper right corner, showing the amplitude delta value between the two markers and frequency difference. If a single marker already exists, [Delta] will place a static marker and an active marker to the original position and a single marker position. Use the number keys to move the marker. If there are two markers, press [Delta] directly. However, if [Delta] has been activated, press [Delta] to place the still frequency scale to the active marker. The displayed amplitude difference is expressed in dB, or is the linear unit in terms of the corresponding scale.

Key points:

- The Reference Marker will be activated at the position of current marker, or else both the reference marker and Delta Marker will be simultaneously activated at the center frequency location if no marker is active at the present.
- The location of the Reference Marker is always fixed (both in the X-axis and the Y-axis), while the Delta Marker is active. You can use the numeric keys or direction keys to change the location of Delta Marker.
- The delta of both the Frequency/Time and the amplitude between the two markers are displayed at the upper right of the screen.

Two ways to enable a certain point as the reference:

a) Open a "Normal" marker and locate it onto a point and then switch the marker type into "Delta", creating a new reference, then you can modify the location of the delta point to achieve the delta

measurement.

b) Open a Delta Marker and place it onto a point, then reselect the Delta menu to locate the marker you opened onto this points, then you can modify the location of the delta point to achieve the delta measurement.

5.14.5 [Off]

The marker information displayed on the screen and functions based on the marker will be turned off and won't show up again.

5.14.6 [All Off]

Turns off all the opened markers and the related functions. The marker won't show again.

5.14.7 [Marker Table On Off]

Turns on or off the display of all marker table.Open the frequency marker list, and a list of all opened frequency markers will be displayed at the bottom of the screen in the color of the corresponding trace. This includes the marker number, marker type, trace location, marker frequency, time, and marker amplitude. It is used to observe the spectral information of multiple frequency markers.

5.15 [Marker→]

Soft key entry: Click [＜ Marker]→[Marker→]

A soft menu associated with the marker function is popped out for setting the other system parameters (such as Center frequency, Reference level) by current marker readings. These menus relate

to the frequency of the spectrum analysis module, whether the sweep width and marker are in normal or delta marker mode.

5.15.1 [Mkr->CF]

Sets the center frequency of the analyzer module based on the frequency of the current marker. This feature quickly moves the signal to the center of the screen.

- If Normal is selected, the center frequency will be set to the frequency of the current marker.
- If Delta Marker is selected, the center frequency will be set to the frequency at which the Delta Marker is located.
- The function is invalid in Zero span mode.

5.15.2 [Mkr->CF Step]

Sets the center frequency step of the analyzer module based on the frequency of the current marker.

- If Normal is selected, the center frequency step will be set to the frequency of current marker.
- If Delta Marker is selected, this function is invalid.
- The function is invalid in Zero span mode.

5.15.3 [Mkr->Start]

Sets the stop frequency of the analyzer module based on the frequency of the current marker.

- If Normal is selected, the stop frequency will be set to the frequency of the current marker.
- If Delta Marker is selected, this function is invalid.
- The function is invalid in Zero span mode.

5.15.4 [Mkr->Stop]

Sets the stop frequency of the analyzer based on the frequency of the current marker.

- If Normal is selected, the stop frequency will be set to the frequency of the current marker.
- If Delta Marker is selected, this function is invalid.
- The function is invalid in Zero span mode.

5.15.5 [Mkr->Ref Level]

Sets the reference level of the analyzer module based on the amplitude of the current marker.

- If Normal is selected, the reference level will be set to the amplitude of the current marker.
- If Delta Marker is selected, this function is invalid.

5.15.6 [MkrΔ->Span]

Changes the span of the analyzer to the frequency difference between the two markers.

5.15.7 [MkrΔ->CF]

Set the center frequency of spectrometer to make it equal to the frequency standard difference.

5.16 [Marker Fctn]Marker Function

Soft key entry: Click [＜ Marker]→[Marker Function]

Executes specific marker soft menu.

5.16.1 [Function Off]

Turn off marker measurement function.

5.16.2 [NdB On Off]

Enables the N dB BW measurement or sets the value of N. The N dB BW denotes the frequency difference between points that are located on both sides of the current marker while the amplitude falls off (N<0) or rises (N>0) N dB separately,

Key points:

- When the measurement starts, the analyzer will search the two points which are located at both sides of the current point and are N dB amplitudes smaller or greater than the current point, and display the frequency difference between the two points.
- You can use the numeric keys or direction keys to modify the value of N, 3 at default.

5.16.3 [Marker Noise On Off]

Turn on or off the frequency noise function. The function of marking noise is applied to the selected cursor, and then the noise Power Spectral Density at the cursor is read. When turned on, the average noise level read at the frequency scale is normalized to 1 Hz bandwidth for noise power.

5.16.4 [Freq Count＞]

Activate the frequency counter function and display the count results in the upper right corner of the screen. The counter counts only the signals that are displayed on the screen. The frequency count also pops up an additional counter function for the soft menu, including [Freq Count On Off].

1) [Freq Count On Off]

Turn on or off the frequency counter mode. This function is invalid

when the trace signal generator is activated. The count value is displayed in the upper right corner of the screen.

2) [Resolution]

Counter resolution is divided into 1 kHz, 100 Hz, 10 Hz, 1Hz. Changing the counter resolution can change the counter accuracy. The higher the resolution, the higher the counting accuracy.

3) [Return]

Return to the previous menu.

5.17 [Meas]Measurement

Soft key entry: Click [＜ Meas]→[Measure]

Provide a variety of advanced measurement functions, pop-up spectrum analyzer built-in and user-defined measurement function soft menu, turn on or off the time spectrum, adjacent channel power measurement, channel power measurement, occupied bandwidth, Pass-Fail measurement menu.

5.17.1 [Measure off]

You can directly close the currently running measurement function, you can also choose to close the measurement menu.

5.17.2 [Time Spec On Off]

Turn on time spectrum measure mode.

5.17.3 [ACPR On Off]

Turn on or off channel power measurements. Press [Meas Setup]

to pop up the channel power measurement parameter settings soft menu. The channel power is used to measure the transmitter channel power, according to the user set the channel bandwidth, through the linear power integration method to obtain the absolute value of the main channel power.

5.17.4 [Chanel Power On Off]

Turn on or off channel power measurements. Press [Meas Setup] to pop up the channel power measurement parameter settings soft menu. The channel power is used to measure the transmitter channel power, according to the user set the channel bandwidth, through the linear power integration method to obtain the absolute value of the main channel power.

5.17.5 [OBW On Off]

Turn on or off the occupied bandwidth measurement. Press [Meas Setup] to pop up the parameter setting soft menu for occupying the bandwidth measurement. Occupied Bandwidth is a measure of the bandwidth occupied by the transmitter signal can be measured from the total power ratio within the in-band power span, with a default value of 99% (the user can set this value).

5.17.6 [Pass-Fail＞]

Enter the pass / fail measurement function soft menu. Pass / fail measurement has two modes of window measurement and area measurement.

5.17.6.1[Window Meas＞]

Enter Window measurement soft menu.

1) [Window Meas On Off**]**

Turn on or off window measurement mode.

2) [Limit Line On Off**]**

Turns the amplitude line on or off, and the amplitude line turns on when the window measurement is on.

3) [Freq Line On Off**]**

Turns the frequency line on or off, and the frequency line turns on when the window measurement is on.

4) [Limit Set Up Low**]**

Used to edit the upper and lower limit on the amplitude line.

5) [Freq Set Start Stop**]**

Start and stop frequencies for scanning line for editing.

6) [Window Sweep On Off**]**

Turns window sweep on or off. When the window sweep is on, only the window formed by the intersection of the amplitude line and the frequency line is scanned. The peripheral stops scanning; the full frequency is scanned when it is closed.

7) [Return**]**

Return to the previous menu.

5.17.6.2[Limit Meas＞]

Enter limit measurement soft menu.

1) [Limit Meas On Off**]**

Turn on or off limit measurement mode.

2) [Line Up On Off**]**

When the upper limit line is turned on or off, the upper limit line is opened by default when the area measurement is on.

3) [Line Low On Off**]**

When the lower limit line is turned on or off, the lower limit line is opened by default when the area measurement is on.

4) [Shift X/Y Freq Ampt**]**

Frequency: For the actual measurement, the edited area as a whole superimposed on a frequency, so that it can implement left or right shift, easy to measure. Does not affect the frequency and marker of the spectrum analyzer settings.

Amplitude: The region has been edited on the whole superimposed on a degree, so that it can move up or down, easy to measure. Does not affect the amplitude setting of the spectrum analyzer.

5) [UpLine Edit＞**]**

Upper line editing is used to edit the control line above the trace, depending on the trace.

6) [LowLine Edit＞**]**

Lower line editing is used to edit the control line above the trace, depending on the trace.

7) [Return**]**

Return to the previous menu.

5.18 [Meas Setup]

Soft key entry: Click [< Meas]→[Meas Setup]

Measurement setting menu for the corresponding measurement parameter settings when adjacent channel power, channel power, occupied bandwidth measurement mode is turned on.

5.18.1 [Channel BW]

Set the bandwidth of the channel power measurement, and set the total display power percentage of bandwidth.

5.18.2 [Channel Interval]

Set the center frequency difference of the primary channel to the adjacent channel.

5.18.3 [Channel Nums]

Set the number of upper and lower adjacent channels measured by adjacent channel power.

5.18.4 [Power Percent]

Set the power ratio of occupied bandwidth.

5.19 [System]

Soft key entry: Click [< System]→[System]

A soft menu for system parameter settings pops up. Including [System >], [Setting >], [Power On / Preset >]. For first time

you use the spectrum analysis module, set the date and time, the system will store the settings, restart the machine after power off won't change the settings.

5.19.1 [System＞]

Soft menus of system information, which includes [System Info], [Option＞]

5.19.1.1[System Info]

Pop up the system information and system log soft menu.

5.19.1.2[Option＞]

Enter option TG ,EMI or touch screen function configuration.

5.19.2 [Setting＞]

Enter setting menu.

5.19.2.1 [LAN＞]

Pop out the relative menu for network configuring.

1) [IP]

Used to set the IP address of the LAN port.

2) [Mask]

Set the subnet mask parameter.

3) [Gate]

Set default gateway address.

4) [DHCP On Off]

One of the setting methods of IP address. The DHCP server assigns an IP address, subnet mask and gateway to the analyzer on the basis of the current network status.

5.19.2.2 [Shutdown On Off]

Enable or disable the automatic shutdown time of the spectrometer. When the spectrometer is idle, execute automatic shutdown according to the time parameters set.

5.19.2.3 [Language>]

To set the system language.
Used to set the device date, time, and their format.

5.19.2.4 [Date/Time>]

1) [Date/Time On Off]

Turn on or off Date/Time display.

2) [Date Set]

Set the display date for spectrum analysis module. Format is YYYY.MM.DD. E.g. June 22th,2012 should display as 2012.06.22.

3) [Time Set]

Set the display time for spectrum analyzer. Format is HH.MM.SS. E.g. 16:55:30 should display as 16.55.30.

4) [Return]

Return to the previous menu.

5.19.3 [PowerOn/Preset>]

Used to set the analyzer module power on parameters or reset parameters.

5.19.3.1 [Power Set>]

Power-on parameter settings include [Factory] and [User].

5.19.3.2 [Preset>]

Power-on parameter settings include [Factory] and [User].

Note: To save the current system configuration as a user-defined configuration, press the [Save/Recall] panel key and select the [User Status] menu item.

Table 5- 2 [Factory] Settings

Parameter	Value	
Frequency		
Center Frequency	1.5G	750.000000MHz
	3.6G	1.800000000GHz
	8.0G	4.000000000GHz
Start Frequency	0Hz	
Stop Frequency	1.5G	1.500000000GHz
	3.6G	3.600000000GHz
	8.0G	8.000000000GHz
Frequency Step	1.5G	Auto 150.000000MHz
	3.6G	Auto 360.000000MHz
	8.0G	Auto 800.000000 MHz
Frequency Offset	0Hz	
Frequency Reference	Internal	
Scale Type	LIN	
SPAN		
Sweep	1.5G	1.500000000GHz
	3.6G	3.600000000GHz
	8.0G	8.000000000GHz
AMPTD		
Reference Level	0.00dBm	
Attenuator	Auto 10 dB	
Scale/div	10.00dB	

Scale Type	LOG
Reference Offset	0.00dB
Unit	dBm
Preamp	Off
BW	
Resolution Bandwidth	Auto 1MHz
Video Bandwidth	Auto 1MHz
Trace Average	Off
Detector	
Trace	1
Detect Type	Pos Peak
Sweep	
Sweep Time	Auto 202.972ms
Sweep Mode	Continuous Sweep
Source	
Tracking Source	Off
Network Meas	Off
Trace	
Trace	1
Trace Type	Clear Write
Trace 1 Math	1<- ->2
Trig	
Trigger Type	Auto
Mode	
Peak	
Peak Search	Off
Peak Excursion	10.00dB
Peak Mode	Max

Sort	Amplitude
Peak List	Off
Marker Fctn	
NdB	Off
Marker Noise	Off
Frequency Count	Off
Marker	
Marker	1
Trace	1
Marker List	Off
Meas	
Time Spectrum	Off
Adjacent Power	Off
Channel Power	Off
Occupied Bandwidth	Off
Pass-Fail	Off
Meas Setup	
Channel Bandwidth	1.000000 MHz
Channel Gap	2.000000 MHz
Adjacent Number	3
Occupied Bandwidth	0.99

5.20 [File]

Pop up file management soft menu.

5.20.1[Storage Int Ext]

Select file storage location: Internal or external.

5.20.2 [Type＞]

To check file type under directory, Screens, trace data ,User States, Limit Line and All.

5.20.3 [First Page]

Display first page of current directory.

5.20.4 [Prev Page]

Display Previous page of the current directory.

5.20.5 [Next Page]

Display next page of current directory.

5.20.6 [Last Page]

Display last page of current directory.

5.20.7 [Operations＞]

Enter file operation soft menu, including [Sort ＞], [Delete ＞], [Export＞], [Load], [Set as Power On], [Set as Preset].

5.21 [Preset]

Press the [**Preset**] key on the front panel to restore the factory default settings or user-defined settings with one key. By default, the factory default settings are restored with the [**Preset**] key.

5.22 [Help]

spectrum analysis module help menu, press this key once to open the system help, press any key to display the help content, and press this key again to close the help function.

5.23 [Save/Recall]

Soft key entry: Click [＜ System]→[Save/Recall]

Save, recall or set to quickly save screenshot, trace data, user state or save limit line＞.

5.23.1 [Save＞]

It's available to save screenshot, trace data, or user state.

5.23.1.1 [Screen Pixmap＞]

Enter screenshot save soft menu, you can choose to save screenshots to local or flash memory, the image file format is bmp, the lower left corner of the screen status display bar will display the saved screenshots information.

5.23.1.2 [Trace Data＞]

Enter the trace data save soft menu, you can choose to save the trace data to the local or flash memory, trace data file format is csv, the bottom left corner of the screen status display trace data saving information.

5.23.1.3 [User State＞]

Save the current system configuration as a user self-defined

configuration. Save it in local. The information on saving the user status will display in the status bar of the bottom left corner of the screen.

5.23.1.4 [Limit Line＞]

Save the limit line file at local site. The format of limit line file is sp. A progress display box (pop-up window) in the middle of the screen will display relevant information about saved limit lines.
Note: The limit line must be loaded in area measurement mode (＜ Meas → Meas → Pass-Fail＞ → Limit Meas＞).

5.23.2 [Recall＞]

Recall screenshot, trace data, user state or all related information.

5.23.2.1 [Type＞]

You can choose to save screen images, trace data, user configurations, scatter plots, or all file types to the local drive. The image file format is bmp, the trace data file format is csv, the user configuration file is user, and the scatter plot file is sp. A progress box will appear in the center of the screen, displaying relevant information about the successful loading.

5.23.2.2 [Sort＞]

Select screenshot, trace data, user state or all files to view related information in the required order of name, time, or size.

5.23.2.3 [First Page]

Display the first page of the current directory.

5.23.2.4 [Prev Page]

Display the previous page of the current directory.

5.23.2.5 [Next Page]

Display the next page of the current directory.

5.23.2.6 [Load＞]

Load the relevant information of the selected file.

5.23.2.7 [Return]

Return to the previous menu.

5.23.3 [Quick Save Set＞]

Set the file type for quick save as screenshot, trace data or user state.

5.23.3.1 [Screen Pixmap]

Set the file type for quick save as screenshot.

5.23.3.2 [Trace Data]

Set the file type for quick save as trace data.

5.23.3.3 [User State]

Set the file type for quick save as user state.

5.23.3.4 [Limit Line]

Set the file type for quick save as user state.

5.24 [Quick/Save]

Shortcut key for saving screenshots, trace data or user state. The type of file is set in the [**Save Setup＞**] menu of the [**Save/Recall**] key. Generally, you can select the file save type as screenshots, trace data or user state, and save it to the internal memory.

6. Remote Control

The spectrum analysis module primarily offers the following remote control methods:
User-defined programming control
Users can programmatically control the spectrum analysis module using standard SCPI (Standard Commands for Programmable Instruments) commands. For detailed information on commands and programming, please refer to the product's "Programming Manual."
This chapter includes the following content:
- Control via USB
- Control via LAN

6.1 Control via USB

1. Connect Device
Connect the spectrum analysis module to your PC via USB for remote control.
2. Install USB Driver
After correctly connecting the spectrum analysis module to the PC and powering it on (the spectrum analysis module will automatically configure the USB interface), the PC will pop up the Hardware Update Wizard dialog box. Please follow the prompts in the wizard to install the drivers.
3.View Device Resources
The detected resources will appear under the "NI-VISA USB Devices" directory, and the USB interface information will be

displayed as shown in the figure below:

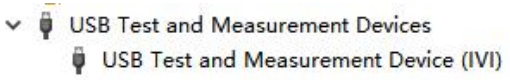


Figure 6- 1 View USB Device Resources

4.Communication Test

Double-click to open the remote NIVASA USB control terminal. Through "View --> SCPI Commands," open the remote command control panel, where you can send commands and read data. As shown in the figure below:

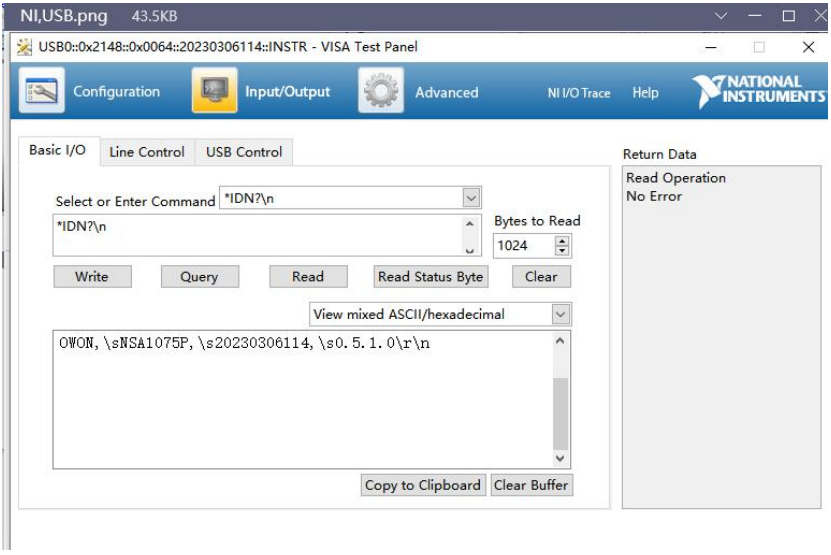


Figure 6- 2 Read and write commands via USB

6.2 Control via LAN

1.Connect Device

Connect the spectrum analysis module to your local area network

(LAN) via the LAN interface: In NIVISA, create a new network device, enter the module's spectrum analyzer network IP, select it, and connect.

2.Communication Test

Double-click to open the NIVISA LAN control terminal, then open the remote command control panel, where you can send commands and read data. As shown in the figure below:

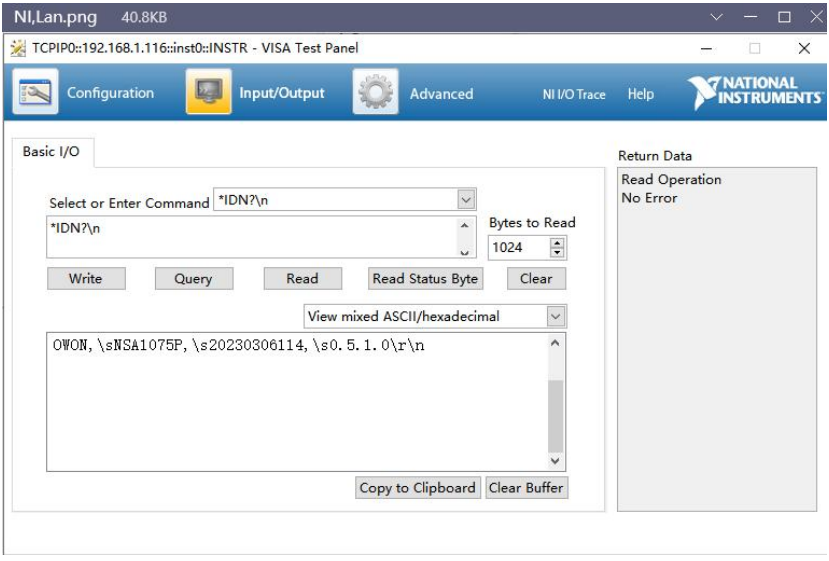


Figure 6- 3 Send commands and read data through the panel

7. Specification

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:

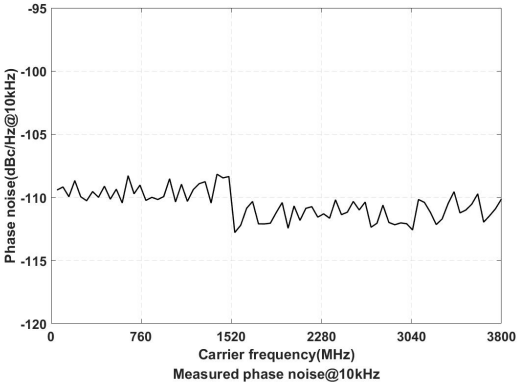
- The instrument has been preheated for 30 minutes before use.
- The instrument is in the calibration cycle and has been self-calibrated.

"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.

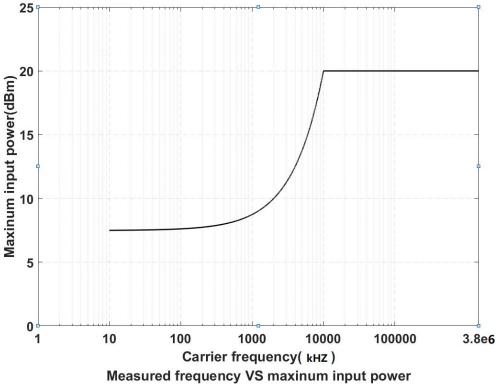
Frequency		
Frequency Range	VSA815P(TG)	9 kHz to 1.500000000 GHz
	VSA836P(TG)	9 kHz to 3.600000000 GHz
	VSA880P(TG)	9 kHz to 8.000000000 GHz
Frequency	1 Hz	
Internal Reference Frequency		
Reference Frequency	10 MHz	
Reference Frequency Accuracy	±[(days since last calibrate × freq aging rate) + temperature stability + initial accuracy]	
Initial calibration accuracy	<1 ppm	

Temperature stability		0℃ to 50℃, reference to 25℃ < 0.5 ppm
Aging rate		<1 ppm/year
Temperature		0℃ to 50℃, reference to 25℃
Frequency Reading Accuracy		
Reference frequency		10.000000 MHz
Reference frequency accuracy		± [(Time since last calibration × frequency aging rate) + temperature stability + initial accuracy]
Frequency Counter		
Resolution		1 Hz, 10 Hz, 100 Hz, 1 kHz
Uncertainty		±(frequency indication × reference frequency accuracy + counter resolution)
Frequency Span		
Range		0 Hz, 100 Hz to maximum frequency of
Uncertainty		± span / (number of sweep points - 1)
SSB Phase Noise (20℃ to 30℃,fc=1 GHz)		
Carrier Offset	10 kHz	< -106 dBc/Hz (typical)
	100 kHz	< -104 dBc/Hz (typical)
	1 MHz	< -115dBc/Hz (typical)



Residual FM (20˚C to 30˚C, RBW = VBW = 1 kHz)	
Residual FM	< 50 Hz (nominal)
Bandwidth	
Resolution Bandwidth(-3dB)	1 Hz to 1 MHz (1-3-5-10 steps by sequence)
RBW accuracy	< 5%, typical
Resolution Filter Shape Factor (60 dB : 3 dB)	< 5 typical
Video Bandwidth (-3 dB)	10 Hz to 3 MHz(1-3-5-10 steps by sequence)
Resolution bandwidth (-6 dB) (EMI)	200 Hz, 9 kHz, 120 kHz, 1 MHz
Amplitude	
Measurement Range	

Range	VSA815P (TG)	DANL to +10 dBm, 100 kHz~ 10 MHz, Preamp Off DANL to +20 dBm, 10 MHz~ 1.5 GHz, Preamp Off
	VSA836P (TG)	DANL to +10 dBm, 100 kHz~ 10 MHz, Preamp Off DANL to +20 dBm, 10 MHz~ 3.6 GHz,
	VSA880P (TG)	DANL to +10 dBm, 100 kHz~ 10 MHz, Preamp Off DANL to +20 dBm, 10 MHz~ 8GHz,
Max Input Level		
Input DC	50V	
Continuous power	Attenuator = 40 dB	
	+20 dBm(100 mW)	
Max. damage level	+30 dBm(1 W)	

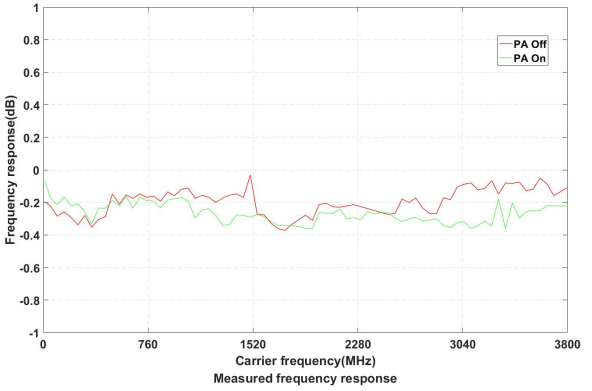


Display Average Noise Level(DANL)

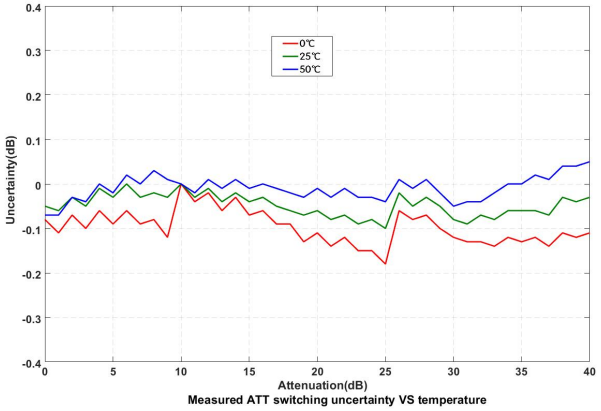
Frequency		attenuation = 0 dB, RBW = VBW = 100 Hz, sample detector, trace average ≥ 50, 20℃ to 30℃, input impendence = 50 Ω	
Preamp Off	VSA 815P (TG)	9 kHz to 1 MHz	-95 dBm (Typical), <-88 dBm
		1 MHz to 500 MHz	-140 dBm (Typical), <-130 dBm
		500 MHz to 1.5 GHz	-138 dBm (Typical), <-128 dBm
	VSA 836P (TG)	9 kHz to 1 MHz	-95 dBm (Typical), <-88 dBm
		1 MHz to 500 MHz	-140 dBm (Typical), <-130dBm
		500 MHz to 3.6 GHz	-138 dBm (Typical), <-128 dBm
	VSA 880P (TG)	9 kHz to 1 MHz	-95 dBm (Typical), <-88 dBm
		1 MHz to 500 MHz	-140 dBm (Typical), <-130dBm
		500 MHz to 3.6 GHz	-138 dBm (Typical), <-128 dBm
		3.6 GHz to 6 GHz	-134 dBm (Typical), <-124 dBm
		6 GHz to 8 GHz	-129 dBm (Typical), <-119 dBm
Preamp On	VSA 815P (TG)	100 kHz to 1 MHz	-135 dBm (Typical), <-128 dBm
		1 MHz to 500 MHz	-160 dBm (Typical), <-150dBm
		500 MHz to 1.5 GHz	-158 dBm (Typical), <-148 dBm

	VSA 836 (TG)	100 kHz to 1 MHz	-135 dBm (Typical), <-128 dBm
		1 MHz to 500 MHz	-160 dBm (Typical), <-150dBm
		500 MHz to 3.6 GHz	-158 dBm (Typical), <-148 dBm
	VSA 880 (TG)	100 kHz to 1 MHz	-135 dBm (Typical), <-128 dBm
		1 MHz to 500 MHz	-160 dBm (Typical), <-150dBm
		500 MHz to 3.6 GHz	-158 dBm (Typical), <-148 dBm
		3.6 GHz to 6 GHz	-154 dBm (Typical), <-144 dBm
		6 GHz to 8GHz	-149 dBm (Typical), <-139 dBm
Level Display			
Logarithmic level axis		0.01 dB to 1000 dB	
Linear level axis		0 to reference level	
Number of display points		801	
Number of traces		5	
Trace detectors		Positive-peak, negative-peak, normal, sample, RMS, voltage average	
		Quasi-peak(EMI option)	

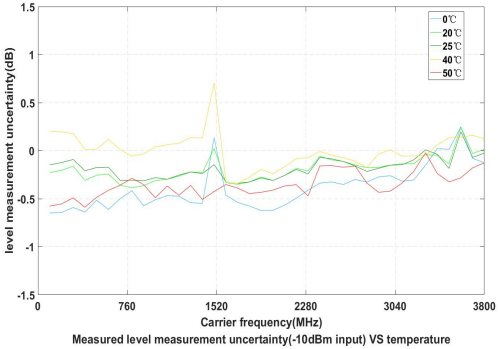
Trace functions	Clear write, max hold, min hold, average, view, blank, trace math
Units of level axis	dBm, dBμW, dBpW, dBmV, dBμV, W, V
Frequency response	
Preamp Off	fc ≥ 9 kHz, attenuation=10 dB, relative to 50 MHz, 20℃ to 30℃
	＜ 0.7 dB
Preamp On	fc ≥ 100 kHz, attenuation=10 dB, relative to 50 MHz, 20℃ to 30℃
	＜ 1.0 dB



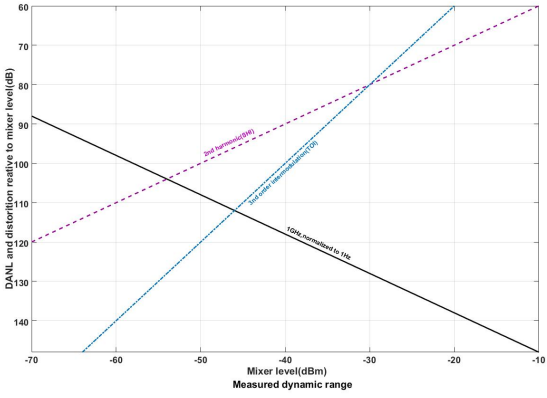
Input Attenuation Switching Uncertainty	
Setting range	0 dB to 40 dB, step by 1 dB
Switching uncertainty	fc= 50 MHz, relative to 10 dB, 20℃ to 30℃
	＜0.5 dB



Absolute Amplitude Uncertainty			
Uncertainty	fc = 50 MHz, peak detector, preamplifier off, attenuation = 10 dB, input signal level = -10dBm, 20℃ to 30℃		
	＜0.4 dB		
RBW Switching Uncertainty			
Uncertainty	relative to 10 kHz RBW		
	＜0.1 dB		
Reference Level			
Range	-80 dBm to +30 dBm, in 1 dB step		
Resolution	Log scale	0.01 dB	
	linear scale	4 digits	
Preamplifier			
Gain	VSA815P (TG)	100 kHz to 1.5 GHz	20 dB (nominal)
	VSA836P (TG)	100 kHz to 3.6GHz	

	VSA880P (TG)	100 kHz to 8 GHz	
Level Measurement Uncertainty (95% confidence level, S/N > 20 dB, RBW = VBW = 1 kHz, preamplifier off, attenuation = 10 dB)			
Level Measurement Uncertainty		＜0.7 dB	
			
RF Input VSWR (attenuation ≥ 10 dB)			
VSWR	VSA815P(TG)	300 kHz to 1.5 GHz	＜1.8 (nominal)
	VSA836P(TG)	300 kHz to 3.6 GHz	
	VSA880P(TG)	300 kHz to 8 GHz	

Distortion	
Second harmonic distortion	fc ≥ 50 MHz, signal input -20 dBm, attenuation = 10 dB
	＞ +45 dBm
Third-order intermodulation	fc ≥ 50 MHz, two -20 dBm tones at input mixer spaced by 200 kHz, attenuation = 0 dB
	＞ +14 dBm(Typical)
1 dB Gain Compression	
1dB compression of input mixer (P1dB)	fc ≥ 50 MHz, attenuation = 0 dB
	＞ -2dBm(nominal)



Spurious Response	
Residual response	connect 50 Ω load at input port, 0 dB input attenuation, 20℃ to 30℃
	<-90 dBm, typical
Intermediate frequency	＜ -60 dBm
System related sidebands	referenced to local oscillators, referenced to A/D conversion, referenced to subharmonic of first LO, referenced to harmonic of first LO
	＜ -60 dBc
Input related spurious	-30 dBm signal at input mixer
	＜ -80 dBm
Sweep	
Sweep Time	Span≥ 100 Hz: 10 ms to 3000 s Zero Span: 33.33 μs to 3000 s
Sweep time uncertainty	Span≥ 100 Hz :5%(Nominal) Zero Span(weep time setting value >1 ms):

		5%(Nominal)	
Sweep Mode		Continuous, Single	
Trigger			
Trigger Source		Free, Video	
Tracking Generator (Option)			
Tracking Generator Output			
Frequency Range		VSA815P(TG)	100 kHz to 1.5 GHz
		VSA836P(TG)	100 kHz to 3.6 GHz
		VSA880P(TG)	100 kHz to 8.0 GHz
Output power level		-40 dBm to 0 dBm	
Output power level		1 dB	
Output flatness		Relative to 50 MHz	
		±3 dB(nominal)	
Tracking generator spurious		Harmonic spurious: -20 dBc(typical) (Tracking generator output power = -10 dBm)； Non-harmonic spurious: -20 dBc(typical) (Tracking generator output power = -10 dBm)；	
Tracking generator to input terminal		-60 dBm (Tracking generator output power = 0 dBm)	
Input/Output			
Front panel connector			
RF input	Impedance	50 Ω(nominal)	
	Connector	SMA female	
Tracking	Impedance	50 Ω(nominal)	

	Connector	SMA female
Internal/External Reference		
Internal reference	Frequency	10 MHz
	Output level	+3 dBm to +10 dBm，+8 dBm (typical)
	Impedance	50 Ω(nominal)
	Connector	SMA female
External reference	Frequency	10 MHz ± 5 ppm
	Output level	0 dBm to + 10 dBm
	Impedance	50 Ω(nominal)
	Connector	SMA female
Communication port		
USB Device		
USB Device	Connector	B plug
	Protocol	2.0 version
LAN		10/100Base，RJ-45
General technical specification		
Large capacity storage		
Large capacity storage		Flash drive (internal storage 50MB)
Power Supply		
Input voltage range, DC 100 V to 240 V		9V-12V
Power Consumption		<12W, 50 Hz to 60 Hz
Environment		
Temperature	Working temperature	0 ℃ to 50 ℃
	Storage temperature	-20 ℃ to 70 ℃

Humidity	0℃ to 30℃	≤ 95% relative humidity
	30℃ to 40℃	≤ 75% relative humidity
Altitude	Operating height	Up to 3000m
Appearance		
Dimension		162mm(L)*119mm(W)*27.5mm(H)
Weight		Approx. 0.7kg
Calibration interval time		
Calibration interval time		18 months

8. Warranty

8.1 Troubleshooting

Typical issues that may occur when using your spectrum analysis module:

- The host computer cannot connect.
- No signal display.
- Signal loss of lock.
- Wrong measurement results or poor frequency or amplitude precision.

1. The host computer cannot connect

The spectrum analysis module cannot connect to the computer, and the host software is not functioning properly.

1） First, check if the network cable and USB cable are functioning correctly.

2） Check the computer to ensure the port address and settings are correct.

3） If the cables and parameters are fine, it can be determined that the issue is with the module. Please contact the manufacturer.

2. No signal display

If there is no signal display at any wave band. Please try the following: set a signal generator at 20 MHz frequency and -20 dBm power and connect it to the spectrum analyzer RF input connector. If there is still no signal display, there may be a problem with the

spectrum analyzer hardware circuit. Please contact us for service.

3. Wrong measurement results or poor signal frequency precision

If the display contents shakes a lot or the frequency readout exceeds the error range during measurements, check if the signal source is stable. If so, check if spectrum analysis module reference is precise. Select internal or external frequency reference according to measurement conditions: press [FREQ]→[Frequency reference Internal External].If the frequency is still not precise, then the spectrum analyzer LO has lost its phase lock, please contact us for service.

4. Wrong measurement results or poor readout amplitude precision

If signal amplitude readout is not precise, perform a calibration. If amplitude readout is still not precise, then it may be a problem with internal circuit, please contact us for service.

8.2 Spectrum Analyzer Repair

When it is difficult to solve your spectrum analysis module's problem, you can contact us by phone or fax. When it's confirmed that the instrument is damaged and need return to repair, you need to wrap the spectrum analysis module with the original packaging material and the packing box, follow the steps below to package:

1) Write a detailed description of the malfunction of the spectrum analysis module, put it in the box together with the spectrum analysis module.

2)Put the instrument in a dustproof / antistatic plastic bag to reduce possible damage.
3)Place pads in four corners of mother packaging carton, then put the instrument into the mother carton.
4)Seal the carton with tape and tighten it with nylon tape.
5)Mark the carton with words of "Fragile! Do not touch! Carefully".
6)Ship by type of precise instruments.
7)Keep all the copies of shipping sheets.

CAUTION

The use of other materials to package the spectrum analyzer may damage the instrument. Do not use polystyrene pellets as packaging materials, they can not adequately fit the instrument, and can be sucked into fan by the generated electrostatic, causing the spectrum analyzer damage.

9. Appendix

Appendix A: Enclosure

(The accessories subject to final delivery.)

Standard Accessories：

Power Cord

Adaptor

USB Cable

Optional Accessories:

N-N Cable

N-SMA Cable

SMA-SMA Cable

SMA Adaptor

N-SMA Adaptor

Near Field Probe includes: Four near-field probes, N-SMA adapter, SMA-SMA cable (Frequency range: 30 MHz – 3 GHz)

Appendix B: General Care and Cleaning

General Care

Do not store or leave the instrument where the liquid crystal display could be exposed to direct sunlight for long periods of time.

Caution

To avoid any damage to the instrument or probes, do not exposed it to any sprays, liquids, or solvents.

Cleaning

To clean the instrument exterior, perform the following steps:

Wipe the dust from the instrument surface with a soft cloth.

WARNING

Before re applying power, ensure that the instrument is completely dry, avoiding any electric shock or electrical short circuit resulting from moisture.