HSA1000 Series
Handheld Spectrum Analyzer
User Manual

■**HSA1016**
■**HSA1016-TG**
■**HSA1036**
■**HSA1036-TG**
■**HSA1075**
■**HSA1075-TG**

Notice: -TG models are with tracking generator

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.

In order 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 customers 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.** Use only the power cord supplied with the product and certified to use in your country.
- **Power Grounded.** The main plug should be inserted in a power socket outlet only if provided with a protective earth contact.
- **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 instrument 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, 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, knob, interfaces and other parts on the panels.

2. Safety Terms and Symbols

Safety Terms

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):

Refer to Manual

Conforms to European Union directives

This product complies with the WEEE Directive (2002/96/EC) marking equipment. The affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.

3. Document Overview

- **Quick Start**
  This chapter states the matters need to attention before first power on, how to power on at first time, introduces spectrum analyzer's front/rear panel and user interface, explains how to use the instrument with a measurement example demonstration.
- **Menu Interpretation**
  This chapter offers spectrum analyzer's front panel menu and button interpretation.
- **Specification**
  This chapter lists spectrum analyzer'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 analyzer and how to maintain device.

Convention on button and menu key format:
Button character + bold bracket, e.g. 【FREQ】stands for FREQ bottom softkey.
Submenu words+bracket, e.g.[Center frequency] stands for 【FREQ】function's center frequency item, that is common called softkey menu item.

Related document:
Related documents including: Quick guide, User manual, programme guide and etc.

4. Quick Start

This chapter states the matters need to attention before first power on, and how to power on at first time, introduces spectrum analyzer's front/top panel and user interface, explains how to use the instrument with a measurement example demonstration.

4.1 General Inspection

When you receive your new instrument, it is recommended that you check the instrument following these steps:

1.Check for transportation damage.
If it is found that the packaging carton or the foamed plastic protection cushion has suffered serious damage, do not throw it away until the complete device and its accessories have been electrically and mechanically checked.

2.Check the Accessories
The supplied accessories are described in the "*Appendix A: Enclosure*" of this Manual. Please ensure that all the listed accessories are present and undamaged, if any problems are found please contact your distributor or our local office.

3.Check the Complete Instrument
If there is any physical damage, operational fault, or performance issue please contact your distributor or our local office. If there is any damage to the instrument please ensure you keep the original packaging. Ideally you should always keep the original packaging if the instrument must be returned for repair.

4.2 Safety Precaution before Operation

4.2.1 Power Supply Requirements

The analyzer allows the use of either an internal lithium battery pack, or AC-DC adapter shipped with the analyzer for its power supply.

The lithium battery is 7.4V, 9100 mAh.

The table below lists the requirement of the AC-DC adapter.

Table 4- 1 AC-DC adapter requirement

AC-DC adapter parameter	Compatible range
Input Voltage	100 V - 240 VAC, 50/60 Hz
Output Voltage	12 - 15 VDC
Max. Power	45 W

4.2.2 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 mat 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 to 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

Note: Keep the air vents always clear of obstructions for proper ventilation and cooling of the instrument.

CAUTION

Use only the original AC-DC adapter or originally supplied battery for the power source.

The maximum RF input level of an average continuous power is 30 dBm (or 50 VDC signal input). Avoid connecting a signal into the analyzer that exceeds the maximum level.

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

4.4 Front Panel Overview

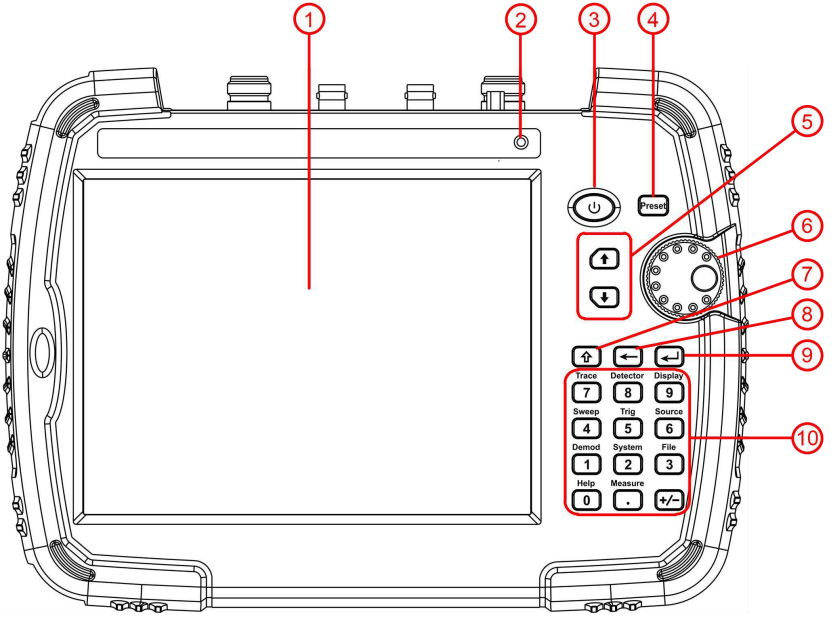


Figure 4- 1 Front panel

NO.	Description
①	LCD touchscreen.
②	**Light Sensor**: Adjusts the screen backlight according to the environmental light. This state can be specified in 【Display】→ [ScreenSetting>] → [Brightness Auto].
③	**Power key**: Long push to turn on the analyzer, push to turn on/off the LCD display, long push to turn off the analyzer.
④	**Preset key**: Resets the analyzer to a known state. This state can be specified in 【System】→ [PowerOn/Preset>] → [Preset>].
⑤	**Arrow keys.**
⑥	**Rotary knob.**
⑦	**Shift key**: Press the Shift key to active it, the light is on. When the Shift key is active, pressing a number key will execute the upper function. Long press the Shift key to active it persistently. To switch to the brief active status, short press the Shift key.
⑧	**Backspace key**: Deletes the last character from input.
⑨	**Enter key**: Confirms a parameter selection or configuration.
⑩	**Function / numeric keypad.**

4.5 Top Panel Overview

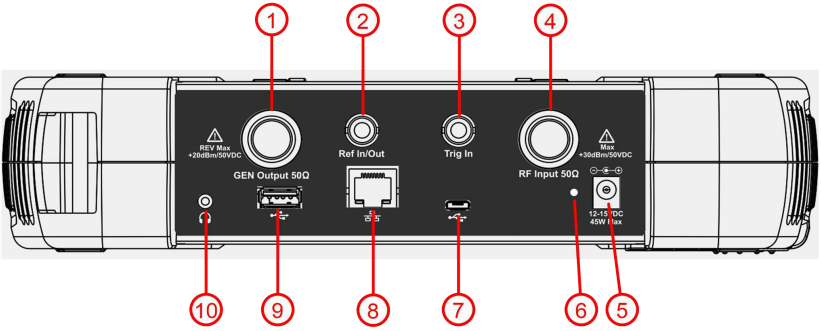


Figure 4-2 Top panel

NO.	Name	Description
①	GEN Output connector (50 Ω)	N type female connector. The output for the built-in tracking generator.
②	10MHz IN/OUT	BNC, female connector. The BNC input or output of the 10 MHz reference clock.
③	EXT Trig In connector	BNC, female connector. Connects to an external TTL signal. The TTL signal is used to trigger the analyzer's internal sweep.
④	RF Input connector (50 Ω)	N type female connector. Connector for RF input. ⚠ **CAUTION** Input voltage at RF input port must not be higher than 50 V DC to avoid damage to the attenuator and input mixer tracking generator. When input attenuator is higher than 10 dB, the RF port input signal must be less than +30 dBm.
⑤	External power connector	Provides input for the DC power source via an AC-DC adapter.
⑥	LED indicator	Green light when external DC power is connected. Red light when the battery is charging. Blinking light when charge suspend or battery absent.
⑦	USB Device interface	MICRO-USB type. Connects to a PC. This USB interface supports PictBridge printer and remote-control connection.
⑧	LAN interface	Through this interface, the analyzer can be connected to your local network for remote control.
⑨	Mouse keyboard and other USB device interface	Type A. Connects to a USB memory stick.
⑩	Headphone jack	Insert the headset to listen to the sound after signal demodulation.

4.6 Rear Panel Overview

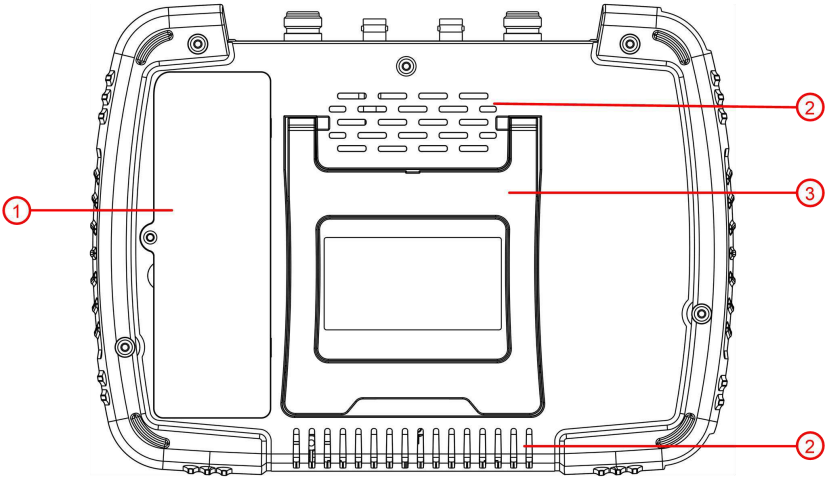


Figure 4-3 Rear panel

NO.	Name
①	Battery compartment
②	Air vents
③	Tilt stand

4.7 User Interface Overview

Figure below illustrates the user interface, with touch screen menu keys, top bar, and measurement settings and results around the graph area.

Figure 4-4 User interface

NO.	Name	Description	Related Key
①	External reference	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	Source	Show the source type as CW (Continuous Wave) or TG (Tracking Generator), press to turn on/off the source output.	【Source】→ [Output] and [Source GEN]

⑤	Trigger type	Set the trigger type to **Auto**, **Video**, **Pos** (external positive edge), **Neg** (external negative edge).	【Trig】
⑥	Continuous peak search	Open/close continuous peak search.	【Marker】→ [Peak＞]
⑦	Automatic search	In automatic search mode.	【Auto】
⑧	USB sign	USB access mark.	
⑨	Audio demodulation	Open audio demodulation.	【Mode】→ [Modulation＞]
⑩	Remote control	In remote control mode.	
⑪	FFT mode	When the resolution bandwidth is set to less than 3kHz, it is automatically transferred to FFT mode.	
⑫	LAN interface communicatio n sign	LAN internet interface communication sign.	
⑬	UNCAL sign	Measurements not calibrated.	
⑭	Date/Time	Display system Date/Time，click to call the modify date screen.	【System】 →[Setting＞] →[Date/Time ＞]
⑮	Menu title	The current menu belongs to the function, click to call out the shortcut menu.	
⑯	Marker value	Display current marker value and amplitude value(when zero sweep is time).When marker function open,display respond marker value.	【Marker】

⑰	Trace 1	Display current trace1 type is refresh,the detection is a positive peak.	
⑱	Trace 2	Display current trace2 type is maximum hold ,the detection is a positive peak.	
⑲	Trace 3	Display current trace3 type is minimum hold,the detection is negative peak.	
⑳	Trace 4	Display current trace4 type is average,the detection is positive peak.	
㉑	Menu item	Current function menu item.	Menu item
㉒	Sweep time	System sweep time.	【Sweep】→[Sweep Time]
㉓	Stop frequent	Display stop frequent.	**FREQ**→ [Stop Freq]
㉔	Mouse cursor	Displays when using an external mouse.	
㉕	Sweep	Display sweep value.	【Sweep】→[Sweep]
㉖	Touch screen digital input keyboard	Click to modify the input parameter position to call.	
㉗	Video bandwidth	Display video bandwidth.	**BW**→ [VBW]
㉘	Center frequency	Display center frequency	**FREQ**→ [Center Freq]
㉙	Start frequency	Display start frequency.	**FREQ**→ [Start Freq]
㉚	Resolution bandwidth	Display resolution bandwidth.	**BW**→[RBW]

㉛	Frequent Marker	Display current activated marker，drag the marker to change the marker position.	**Marker**
㉜	Amplitude scale	Amplitude display scale setting ratio.	【AMPTD】→ [Scale/div]
㉝	Amplitude Scale Type	Amplitude Scale Type can choose **Log** (logarithmic) or **Line** (linear).	【AMPTD】→ [Scale Type]
㉞	Attenuation	Displays the RF input attenuator Settings as manual or automatic.	【AMPTD】→ [Attenuation]
㉟	Reference level	Reference level setting value.	【AMPTD】→ [Ref Unit]

Note：

1~7 can be switched with a touch screen or mouse click；

1~20 can touch the screen or click the mouse to call to modify the current trace interface；

22、27、30、34 If * is displayed before the display, the item is in the manually set state；

21~35 Click to call out the number input keyboard interface.

4.8 Function Keys

There are 6 function softkeys on the interface screen and 11 function hardkeys on the front panel.

4.8.1 Function Softkeys

There are 6 function softkeys horizontally arranged along the bottom of the interface screen. Press one of the function softkeys to show the submenu along the right side of the display.

Figure 4-5 Function softkeys

Softkeys	Description
FREQ	Activates the center-frequency function, and accesses the frequency function menu.

Span	Activates the frequency sweep span function, and set Full Span\Zero Span\Last Span.	
AMPTD	Activates the reference level function, and accesses the amplitude softkeys, with which you set functions that affect data on the vertical axis.	
Auto	Searches the signal automatically within the full frequency range.	
BW	Activates the RBW (resolution bandwidth) function, and accesses the softkeys that control the bandwidth functions and averaging.	
Marker	[Marker]	Accesses the marker control keys that select the type and number of markers and turns them on and off.
	[MarkerFctn]	Maker measure function menu, such as N dB bandwidth measure, marker noise, frequency counting and filed.
	[Marker→]	Accesses the marker function softkeys that allow you to set other system parameters based on the current marker value.
	[Peak]	Places a marker on the highest peak, and accesses the Peak functions menu.

4.8.2 Function Hardkeys

Pressing the ⇧ **Shift** key and then press the number key and the function represented by the number key will be displayed in the menu on the right side of the screen interface.

Shift key:

- Press the Shift key to active it, the light is on.
- When the Shift key is active, pressing a number key will execute the upper function.
- Long press the Shift key to active it persistently.
- To switch to the brief active status, short press the Shift key.

Figure 4-6 Shift key and function hardkeys

Hardkeys	Description
【Trace】	The trace measurement and display mode can be set, and the related trace can be operated.
【Detector】	Set the detection mode.
【Display】	Set the parameters displayed on the screen.
【Sweep】	The system is set to single or continuous scanning mode. Users can also set the scanning mode and scanning time.
【Trig】	Set the triggering mode and related parameters of the sweep frequency.
【Source】	Trace source Settings.
【Mode】	Switch between scanning spectrum mode, real-time spectrum mode, network division mode, demodulation mode and other modes.

【System】	System parameter setting and instrument calibration operation menu.
【File】	Browse, delete, export, load, power on, and reset stored files..
【Help】	On the spectrum analyzer help menu, click this key once to open the system help function, and then click again to disable the help function.
【Measure】	The expanded measurement functions based on the spectrometer platform include adjacent channel power measurement, channel power measurement, occupied bandwidth measurement, etc. For specific measurement function parameter Settings, refer to the measurement Settings menu.

4.9 Parameter Input

The active parameter value can be entered using the numeric keypad, knob, and arrow keys.

4.9.1 Numeric keypad

Enters a specific value, the submenu typically shows the selectable units. Press the desired unit or press ↵ Enter key to complete the entry.

Figure 4-7 Numeric keypad

1. Number keys
   Numbers 0-9 are available to be used.
2. . Decimal point
   A decimal point "." will be inserted at the cursor position when this key is pressed.
3. +/- Sign key
   Sign key "+/-" is to toggle the sign of a parameter. When pressed the first time, a "-" will be inserted and changed into "+" following the second press.
4. ← Backspace key
   (1) During the process of parameter editing, this key will delete the characters on the left side of the cursor.
   (2) While in the process of file name editing, pressing this key will delete characters that have been entered.
5. ↵ Enter key
   When pressed, the system will complete the input process and insert a default measurement unit for the parameter automatically.

4.9.2 Rotary knob

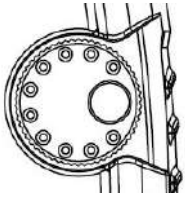


Figure 4-8 The rotary knob

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

4.9.3 Arrow keys

Figure 4-9 Arrow keys

The arrow keys have following functions:

1) Increase or decrease the parameter value at specific steps while editing a parameter.
   Note: Press **FREQ**→[**CF Step**] to set the center frequency step.
2) Move the cursor though the directory tree in the【File】function.

4.10 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 **Shift** key, then【**Help**】key; a prompt about how to obtain help information will be shown

2.Page up and down

If there is more than one page of information, you can read the complete information by using the arrow keys or dragging via touch screen.

3.Close the current help information

Press **Shift** key, then【**Help**】key again to close help.

4.Acquire the softkey help

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

5.Acquire the help information of any function hardkey

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

4.11 Touchscreen Controls

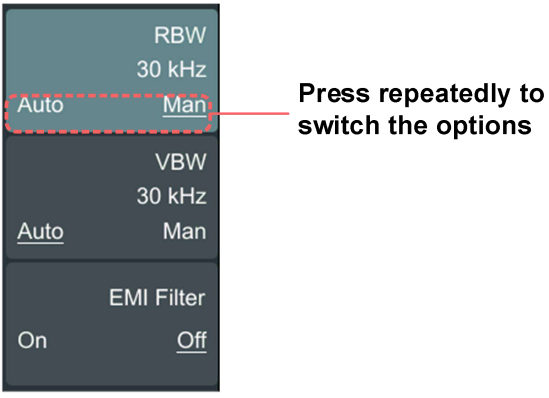
The LCD display is touchable and you can control the analyzer with different gestures.

The touch screen control is described below. You can also use the buttons/knobs in brackets to do the same thing.

- Click on the screen at the top of the tag can switch the corresponding state. See User Interface Overview for details on page 11.

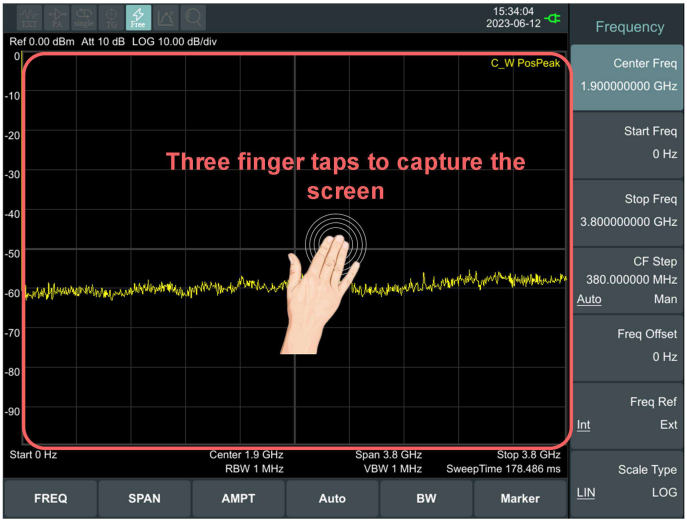
- **Select a menu softkey**: Touch the menu softkeys in the bottom, or in the right.

- **Switch menu items**: If there are options that can be switched in the menu, you can repeatedly touch the area of the menu item to switch.



- **Scroll the list**: If there is a scroll bar in the file system window, you can swipe up and down to scroll the list.

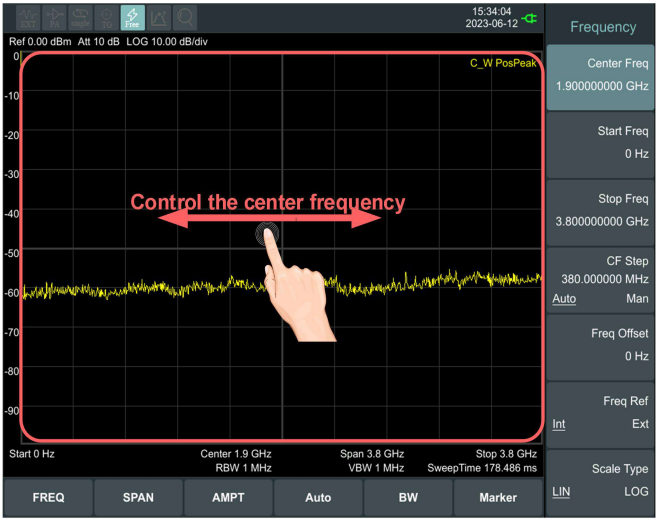
- **Capture the screen** (【System】→ [Save/Recall>] → [Screen Pixmap>]): Double-tap in the display area to quickly capture a PNG image of the current screen display. If a USB device is inserted, the image will be saved to USB device, otherwise the local memory. A file name is automatically created using the current date and time stamp.



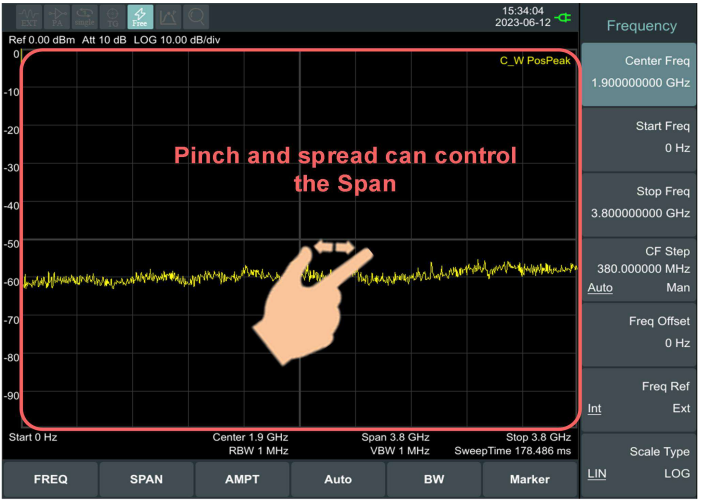
- **Move the active marker to the desired frequency** (**Marker** → [Marker >] → turn the knob): When a marker is active, hold down the marker and drag it to the desired position to release.

- **Set the reference level** (**AMPTD** → [Ref Level]): Swipe up or down in the display area.

- **Set the center or start frequency** (**FREQ**→ [Center Freq] or [Start Freq]): Swipe left or right in the display area.



- **Set the Span** (**Span**→[Span]):In the trace display area, place two fingers horizontally on the touch screen and close or separate to reduce the increase of the sweep width and achieve the effect of horizontally enlarging or shrinking the trace.



- **Set the Scale/Div** (**AMPTD** → [Scale/Div]): In the display area, pinch and spread vertically to change the Scale/Div.

4.12 External keyboard control

Plug the keyboard into the USB Host port (Type A) on the top panel. You can control and input through the keyboard. The keys

correspond to the following:

【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

【N】 Preset
【H】 Help
【J】 Measure
【F1~F7】Menu button 1-7
【F9】GHz/dBm【F10】MHz/dB【F11】kHz/dBmV【F12】Hz/mv
【0~9】 0~9
【Backspace】 <-
【Esc】 X
【Enter】 enter

4.13 Basic Measurement

Basic measurements include, input signal frequency and amplitude display, marked by a frequency marker.

Follow these five simple steps below to implement input signal measurement.

a) Find the signal frequency at full sweep width;
b) Set the center frequency according to the signal frequency in step 1;
c) Setting span and resolution bandwidth;
d) Activate marker;
e) Adjust amplitude parameter.

For example, to measure a 100 MHz, -10 dBm 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** connector on the top of the spectrum analyzer. Set the parameters as follows:

Frequency	100 MHz
Amplitude	-10 dBm

2. Setting parameters

1) Press 【Preset】 on the front panel to restore the analyzer to its factory-defined state. The Spectrum analyzer will display the spectrum from 9kHz to the maximum span width. The signal generated will display as a vertical line at 100MHz. Refer to Figure 4- 10.

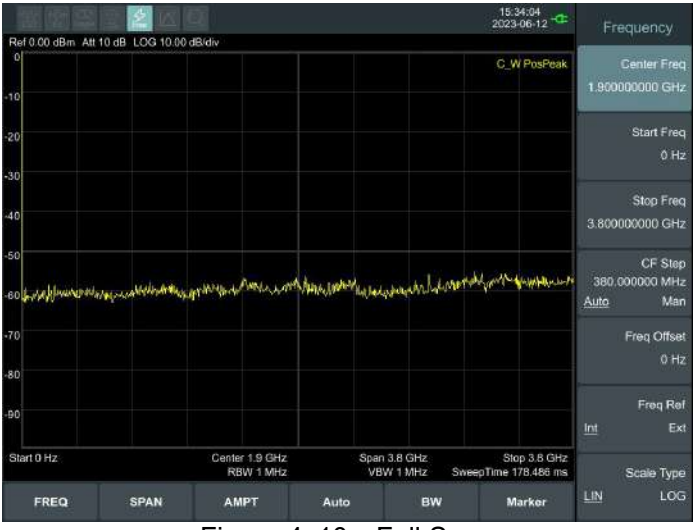


Figure 4- 10 Full Span

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** softkey on the bottom, select [**Center Freq**] on the right submenu. Input "**100**" and select the unit as **MHz** on the right softkeys. The number keys can be used to set the exact value, the knob and arrow keys can also be used to set the center frequency.

3) Setting frequency span

—Press 【**Span**】 softkey, input "**1**" and press **MHz** as its unit, or press ↓ button reduce to 1 MHz.

—Press **BW** softkey, set [**RBW**] to **Man**, and input "**30**" and press **kHz** as its unit, or press ↓ button reduce to 30kHz.

—Press【**Detector**】key, set the detection type to **Pos Peak**.

Figure 4- 11 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.

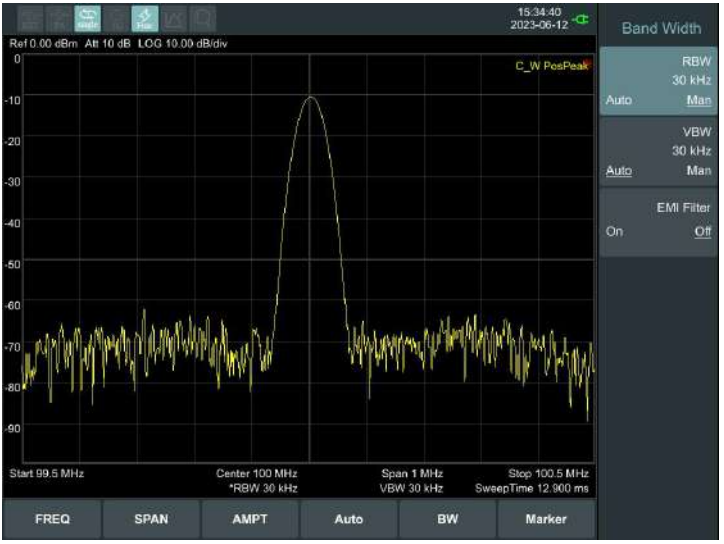


Figure 4- 11 Set frequency span

4) Activate marker

—Press **Marker** softkey on the bottom,the button is located at the bottom of the screen. Then select [**Marker** >] softkey on the right screen. And press the softkey to select [Marker 1 2 3 4 5 6 7 8], select Marker 1, the marker is located at horizontal center by default, that is the signal peak point or its neighbor.

—Press **Marker** softkey on the bottom, the button is located at the bottom of the screen.Then select [**Peak** >] on the right screen. And 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 reference level will be shown at the top of the display grid. To get a better dynamic range, the real signal peak point should be located at or near the top of display grid (reference level). The reference level is also the maximum value on Y axis.Here the dynamic range is increased by reducing the reference level.

Press **AMPTD** softkey on the bottom ,the button is located at the bottom of the screen, and press the [**Ref Level**] softkey on the right screen. The reference level can be input at the top left of the display grid. Input "**-10**" using the numeric keypad and set

the unit to **dBm**. Also can use step button or knob to adjust.

The reference level is set at -10 dBm, which is the signal peak value near the top of the grid. The balance between the signal peak value and noise is dynamic range.

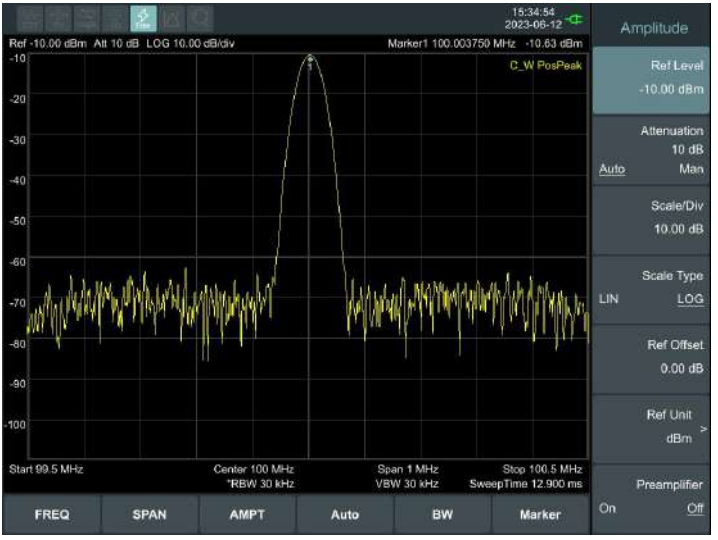


Figure 4- 12 Set reference level

5. Menu Interpretation

This chapter provides you with the information on the function softkeys and hardkeys of the spectrum analyzer.

5.1 【FREQ】 bottom softkey

Key access: [**FREQ**] softkey at the bottom of the screen

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

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.
- You can modify this parameter using the numeric keys, knob, or direction keys.
- 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".
- You can modify this parameter using the numeric keys, knob, or direction keys.
- 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 Manual]

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 if the sweep width is zero, the step automatically defaults to 1Hz; in Manual mode, you can set the step using the numeric, step keys or knob. Then activate 【Center Frequency】, press step, center frequency will change as setting step.
- 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.

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

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 frequency steps to increase center frequency by 300MHz, which reaches 900MHz. [Frequency Step Auto Manual] shows the auto or manual mode to setting the steps. When step is under manual mode, press [Frequency Step Auto Manual] 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 0Hz), you can modify this parameter using the numeric keys, knob or direction keys. `

5.1.6 [Freq Ref Int Ext]

Set the reference frequency as internal or external input, this is regarded as whole device reference.

5.1.7 [Scale Type Lin Log]

Setting the scale type can switch the frequency axis to linear or logarithmic, the default is linear.

5.2 【Span】 bottom softkey

Key access: [**Span**] softkey at the bottom of the screen

Set the spectrum analyzer to span mode. When press 【Span】 softkey, [Span], [Full Span], [Zero Span] and [Last Span] submenu

will be available along the right side of the display. You can modify span using the numeric keys, knob or direction 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 manual span mode, the span can be set down to 0 Hz, that is zero span mode. And up to the full span described in "Specification". When it is set to the maximum span, it enters full span mode.
- 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.
- You can modify this parameter using the numeric keys, knob, or direction keys.

5.2.2 [Full Span]

Sets the spectrum analyzer to center frequency/sweep mode, and span of the analyzer 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.

5.2.4 [Last Span]

Changes the span to the previous span setting.

5.3 【AMPTD】 bottom softkey

Key access: [AMPTD] softkey at the bottom of the screen

Sets the amplitude parameters of the analyzer. Through these parameters, signals under measurement can be displayed at an optimal view with minimum error. The amplitude submenu includes [Ref Level], [Attenuation Auto Manual], [Scale/Div], [Scale Type Lin Log], [Ref Offset], [Ref Unit], and [Preamp 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, knob, 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'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. 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, knob, or direction 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]

Sets the logarithmic units per vertical grid division on the display. Select 1,2,4 or 10dB log amplitude scale. It's 10dB/div by default. Every activated marker is with dBm as unit, difference between two markers is treated as marker difference under dB unit.

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.

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

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], [W] or [V].

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 1μW 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】 bottom softkey

Key access: [Auto] softkey at the bottom of the screen

Searches for signals automatically throughout the full frequency range, adjusts the frequency and amplitude to their optimum and realizes one-key signal search and auto setting of parameters. Key points: some parameters such as reference level, scale, and input attenuation may be changed during the auto tune.

5.5 【BW】 bottom softkey

Key access: [BW] softkey at the bottom of the screen

Sets the RBW (Resolution Bandwidth) and VBW (Video Bandwidth) parameters of the analyzer. The setting menu includes [RBW Auto Man], [VBW Auto Man], [EMI On Off].

5.5.1 [RBW Auto Man]

Adjust the resolution bandwidth ranging from 10Hz to 1MHz. Use

numeric key, step key or knob to switch resolution bandwidth. The underline under Auto or Manual means Auto mode or Manual mode. Press [RBW Auto Manual] to have Auto underlined. 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 affected 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 30MHz by sequence step. You can modify this parameter by numeric key, step key or knob. The underline under Auto or Manual means Auto mode or Manual mode. Press [VBW Auto Manual] to have Auto underlined 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 affected 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 On Off]

Pop out the menu for EMI measurement bandwidth.

5.6 【Marker】 bottom softkey

Key access: [Marker] softkey at the bottom of the screen

Markers are diamond- shaped characters that identify points of traces. The submenu on the right of the screen includes 【Marker>】, 【MarkerFctn>】, 【Marker→>】, 【Peak>】.

5.6.1【Marker >】 right softkey

Key access:
[Marker] bottom softkey → [Marker >] right softkey

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 8 pairs of markers to be displayed simultaneously, but only one pair or one single marker can be active at a time. You can use the numeric keys, knob 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.

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

Selects one marker, the default is Marker1, and place the marker at the center of the trace. If a delta marker is activated, this softkey changes to the menu under the [Delta] function.

If there is already a marker, this command will not produce any operation. If there are already two markers (e.g. in [Delta] mode), [Marker] changes the active marker to a new single marker.

Frequency and amplitude information can be obtained from the marker (time and amplitude information when the span is set as Zero Span), and these values are displayed in the active function area and in the upper right corner of the screen. You can use the knob, touch screen, or the numeric keys to move the active marker.

The marker reads data from the current active track (this track may be track A or track B). If both tracks are active or both tracks are in static display mode, the marker will read data from track A.

Touchscreen Control: When a marker is active, single-tap in the display area (at any level) to quickly move the marker to the desired frequency.

5.6.1.2 [Trace 1 2 3 4 5]

In the trace measurement, the marker used to activate the traces.

5.6.1.3 [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 marker number such as "1" on the trace.

Key points:

- If no active marker exists currently, a sing frequency marker will be activated automatically at the center frequency of current trace.
- You can use the knob or 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.

5.6.1.4 [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.

Key points:

- If a single marker already exists, the reference marker will be activated at the position of current marker.
  If no marker is active at the present, the reference marker and delta marker will appear at the center frequency location.
- The location of the Reference Marker is fixed (both in the X-axis and the Y-axis), while the Delta Marker is active. You can use the knob, touch screen, or the numeric keys to move the delta marker.
- The frequency (or time) and amplitude differences between the two markers will show in the active area and in the upper right corner of the display. The displayed amplitude difference is expressed in dB, or is the linear unit in terms of the corresponding scale.
- If [Delta] has been activated, press [Delta] again to move the reference marker to the active delta marker position.
- Two ways to enable a certain point as a reference marker:
  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 marker to achieve the delta measurement.
  b) Open a Delta Marker and place the delta marker onto a point, then press [Delta] again to locate the reference marker to this point, then you can modify the location of the delta point to achieve the delta measurement.

5.6.1.5 [Off]

Turn off the selected markers.

5.6.1.6 [All Off]

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

5.6.1.7 [Marker Table On Off]

Turns on or off the display of the marker table.

5.6.2【MarkerFctn >】right softkey

Key access:
[Marker] bottom softkey → [MarkerFctn >] right softkey

Accesses the marker function setting menu.

5.6.2.1 [Function Off]

Turn off marker measurement function.

5.6.2.2 [NdB On Off]

Enables the N dB bandwidth measurement or sets the value of N. The N dB bandwidth 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, knob or direction keys to modify the value of N, 3 dB at default.

5.6.2.3 [Marker Noise On Off]

Turn on or off the marker noise function. The function of marker noise is applied to the selected marker, and reads the noise Power Spectral Density at the marked point. When turned on, the average noise level at the marked point is normalized to 1 Hz bandwidth for noise power.

5.6.2.4 [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.

1) [**Freq Count On Off**]
Turn on or off the frequency counter function. This function is invalid when the tracking generator is activated. The count value is displayed in the upper right corner of the screen.
2) [**BW**]

Sets the frequency counter resolution. The allowed values are 1 Hz, 10 Hz, 100 Hz and 1 kHz. Changing the counter resolution can change the counter accuracy. The higher the resolution, the higher the counting accuracy.

5.6.2.5 [FIELD>]

After the antenna is connected, it is used to measure the field strength of the air signal.

1) [FIELD On Off]

Open or close Filed measurement.

2) [Antenna Gain On Off]

Open or close Antenna Gain.

3) [UNIT]

Set filed measurement amplitude unit V ,dbuV，V/m，dbuV/m.

When Filed measurement is closed,unit V ,dbuV;

When Filed measurement is opening,unit V/m，dbuV/m.

4)[Antenna Set]

Enter Antenna Set submenu.

- **Recall >**
  Recall antenna source,antenna 1 to antenna 6.
- **New**
  Click to add new antenna factor.
- **Delete**
  Click to delete antenna factor.
- **Frequency**
  Set antenna factor frequency range.
- **Factor**
  Set antenna factor parameters.
- **Save**
  Save the set antenna factor parameters.

5.6.3【Marker→ >】

Key access:

[Marker] bottom softkey, and then [Marker→ >] right softkey

Use the current marker readings to set the parameters (such as Center frequency, Reference level).

5.6.3.1 [Mkr→ >CF]

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

- In Normal marker mode, the center frequency will be set to the frequency of the current marker.
- In Delta marker mode, the center frequency will be set to the frequency at which the Delta Marker is located.
- The function is not available in zero span mode.

5.6.3.2 [Mkr→ >CF Step]

Sets the center frequency step of the analyzer to the frequency of the current marker.

- In Normal marker mode, the center frequency step will be set to the frequency of current marker.
- In Delta marker mode, the center frequency step will be set to the frequency at which the Delta Marker is located.
- The function is not available in zero span mode.

5.6.3.3 [Mkr→ >Start]

Sets the start frequency of the analyzer to the frequency of the current marker.

- In Normal marker mode, the start frequency will be set to the frequency of the current marker.
- In Delta marker mode, the start frequency will be set to the frequency at which the Delta Marker is located.
- The function is not available in zero span mode.

5.6.3.4 [Mkr→ >Stop]

Sets the stop frequency of the analyzer to the frequency of the current marker.

- In Normal marker mode, the stop frequency will be set to the frequency of the current marker.
- In Delta marker mode, the stop frequency will be set to the

frequency at which the Delta Marker is located.

- The function is not available in zero span mode.

5.6.3.5 [Mkr→>Ref Level]

Sets the reference level of the analyzer to the amplitude of the current marker.

- In Normal marker mode, the reference level will be set to the amplitude of the current marker.
- In Delta marker mode, the reference level will be set to the amplitude at which the Delta Marker is located.

5.6.3.6 [MkrΔ→>Span]

Sets the span of the analyzer to the frequency difference between the two markers in Delta marker mode.

5.6.3.7 [MkrΔ→>CF]

Sets the center frequency of the analyzer to the frequency difference between the two markers in Delta marker mode.

5.6.4【Peak >】

Key access:
[Marker] bottom softkey → [Peak >] right softkey

Accesses the Peak setting menu.
Key Points:
The spurious signal at the zero frequency caused by LO feed through is ignored.

5.6.4.1 [Max Peak]

Place a frequency marker at the highest point of the trace, and display the frequency and amplitude of the marker in the upper right corner of the screen.

5.6.4.2 [Peak-Peak]

Peak search and minimum search are performed at the same time, and marked with "difference pair" frequency label, wherein peak search results are marked with difference frequency label and minimum search results are marked with reference frequency

label..

5.6.4.3 [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.

5.6.4.4 [Left Peak]

Searches the nearest peak located to the left of the current marker. The peak is then identified with a marker.

5.6.4.5 [Right Peak]

Searches the nearest peak located to the right of the current marker. The peak is then identified with a marker.

5.6.4.6 [Cont Peak On Off]

Enables or disables the Cont Max search, the default is Off. When enabled, the system will always execute a peak search automatically .

5.6.4.7 [Peak Setup >]

Used to move the peak point to the Peak setup screen.

- [Peak Excursion]

Set peak altitude.

- [Peak Mode Max Min]

Set peak mode is max or min.

- [Sort Freq Ampt]

Set the peak list to be sorted by frequency or amplitude.

- [Peak List On Off]

Enable or disable the peak value list. When the peak list is opened, the trace will display all the frequency markers that meet the peak conditions in order, and below the trace color list of all the frequency markers that meet the peak conditions.

- [Return]

Return to the upper-level menu.

5.7 【Trace】 hardkey

Key access:
Press ⇧ Shift key, then **Trace** hardkey (**7** in numeric keypad).

As the sweep signal is displayed as a trace on the screen, you can set parameters about the trace using this key. The analyzer allows for up to five traces to be displayed at one time. Press this key to access the menu for trace. It includes [Trace 1 2 3 4 5], [Clear Write], [Max Hold], [Min Hold], [Blank], [View], [Operations >], [1 ↔ 2], [2-DL → 2], [2 ↔ 3], [1 → 3] and [2 → 3].

5.7.1 [Trace 1 2 3 4 5]

Select trace, the analyzer offers 1,2,3,4,5 trace. The selected trace number in the menu will be underlined.

5.7.2 [State >]

Set the status of the spectrum trace type.

1) [Clear&Write]

Refresh the current spectrum curve to display the latest spectrum trace.

2) [Max Hold]

Maintains the maximum for each point of the trace, and updates each trace point if a new maximum level is detected in successive sweeps.

3) [Min Hold]

Maintains the minimum for each point of the trace, and updates each trace point if a new minimum level is detected in successive sweeps.

4) [Average]

Average the current trace. Each point of the trace shows the result of averaging the data after multiple scans. This type of trace displays smoothly. The average number of traces is 100 by default and the maximum is 1000.

5) [View]

Holds and displays current trace for observation. The trace register is not updated as the analyzer sweeps.

6) [Blank]

Clear the trace on screen. The selected trace register stores the trace data, and will not be updated as the analyzer sweeps.

7) [Return]

Return to the upper-level menu.

5.7.3 [Operations>]

Enter the trace math submenu.

1) [1 ↔ 2]
Exchange the trace register 1 data with the trace register 2, and place them in display mode.

2) [2-DL → 2]
Subtracts the display line value from the trace register 2. This function executes once when activated. Press [2-DL → 2] again to execute it the second time. When this function activated, the display line will also be activated.

3) [2 ↔ 3]
Exchange the trace register 2 data with the trace register 3, and place them in display mode.

4) [1 → 3]
Change the trace register 1 data to the trace register 3, and place the trace register 3 data in display mode.

5) [2 → 3]
Change the trace register 2 data to the trace register 3, and place the trace register 3 data in display mode.

6) [Return]

Return to the upper-level menu.

5.8 【Detector】 hardkey

Key access:
Press ⇧ Shift key, then **Detector** hardkey (**8** in numeric keypad).

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. The submenu includes[Trace 1 2 3 4 5], [Pos Peak], [Neg Peak], [Normal], [Sample], [RMS Avg], [Voltage 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.
- When 【**BW**】bottom softkey→[EMI Filter]→[EMI Filter] 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.

5.8.1 [Trace 1 2 3 4 5]

Select the trace, the spectrum analyzer provides 1, 2, 3, 4, 5 traces, the selected trace number and the status menu item in which the trace is located will be underlined. Where the color of the number corresponds to the color of the trace.

5.8.2 [Pos Peak]

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

5.8.3 [Neg Peak]

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

5.8.4 [Sample]

Chooses any point data from the sampling data segment and displays at the corresponding pixel. This mode is usually used for video averaging and noise frequency Maker.

5.8.5 [Normal]

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

5.8.6 [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.

5.8.7 [More >]

Enter detection more menu.

5.8.7.1 [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.

5.8.7.2 [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.

5.8.7.3 [Return]

Return to the upper-level menu.

5.9 【Display】 hardkey

Key access:
Press ⇧ Shift key, then **Display** hardkey (**9** in numeric keypad).

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.

5.9.1 [Full Screen]

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

5.9.2 [Display Line On Off]

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

5.9.3 [Ampt Graticule On Off]

Turn on or Off amplitude scale function.

5.9.4 [Label On Off]

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

5.9.5 [Menu Hide On Off]

Set the hiding time of right menu (off, or 5 – 60 seconds). The right menu is hided after the specified time when no keys or touch screen operation.

5.9.6 [Brightness]

Toggle the screen brightness between **Auto** and **Man**. When it is set to **Auto**, the brightness adjusts according to the environment automatically with the built-in light sensor. When it is set to **Man**, you can set a fixed brightness value manually (0 - 100).

5.9.7 [Screen Sleep]

Turn on/off the sleeping mode which turns off the LCD display after a user-defined idle time (1 to 60 minutes). Press the power key to re-activate the LCD display after the LCD display sleeping mode has been triggered.

5.10 【Sweep】 hardkey

Key access:
Press ⇧ Shift key, then **Sweep** hardkey (**4** in numeric keypad).

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

5.10.1 [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, knob, or direction keys.

5.10.2 [Sweep Single]

Press to set the sweep mode to single sweep. In this mode, pressing [Seep Single] enables a sweep.

5.10.3 [Sweep Cont]

Press [Sweep Cont] to set the sweep mode to continuous sweep. The analyzer performs one sweep after another as soon as it is triggered.

5.11 【Trig】 hardkey

Key access:
Press ⇧ Shift key, then **Trig** hardkey (**5** in numeric keypad).

Sets the trigger mode and other associated parameters, submenu includes [Auto Run], [Video], [External **>**].

5.11.1 [Free]

Set the trigger mode to free run mode. In this mode, new sweep starts as soon as possible after the current sweep ends.

5.11.2 [Video]

In Video mode, a trigger signal will be generated when the system detects a video signal in which the voltage exceeds the specified video trigger level.
Use the numeric keys, knob or direction keys to set the trigger level in Video mode. The screen will display corresponding line Triger Level and the value.

5.11.3 [External >]

In this mode, an external signal (TTL signal) is input from the [Trig In] connector at the top panel, of which the edge conditions should meet with the user settings to generate trigger signals.
Press [External >] to access the submenu, select [Positive Edge] or [Negative Edge] as the trigger condition.

5.12 【Source】 hardkey

Key access:
Press ⇧ Shift key, then **Source** hardkey (**6** in numeric keypad).

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 top panel. Press the key to access the submenu includes [Output On Off], [Source GEN CW TG], [Output Level], [Output FREQ], [OF Step], [Network Meas >]. The source is turned off in the power-on and reset states.

5.12.1 [Track Gen On Off]

Enable or disable the trace source. The RF output and spectrum reception are fully synchronized on the frequency scan, and the tracking source frequency cannot be set separately.

5.12.2[Output Level]

Sets the output power of the tracking source signal.

5.12.3 [Reference]

When normalization is turned on, the vertical position of the trace on the screen can be adjusted by adjusting the reference level value.

5.12.4 [Position]

When normalization is turned on, the vertical position of the normalized reference level on the screen can be adjusted by adjusting the reference position.
Note:

- Similar to the function achieved by the normalized reference level, when set to 0%, the normalized reference level is located at the bottom of the screen grid, and when set to 100%, it is located at the top of the screen grid.

- You can modify this parameter using numeric keys, knobs, or arrow keys.

5.12.5 [Do Normalize]

This soft menu is used to track the user field calibration of the source network measurement. After connecting the instrument RF output to the RF input, the display displays a straight line on the 0dB scale after pressing the "Perform Normalization" soft menu. Note: Normalization must be turned off before performing this operation.

5.12.6 [Normalize On Off]

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

5.13 【Demod】 hardkey

Key access:
Press ⇧ Shift key, then **Demod** hardkey (**1** in numeric keypad).

Enter the demodulation settings, the spectrum analyzer supports audio demodulation and AM, FM analog demodulation.

5.13.1 [Spectrum]

Enter the spectrum analysis mode.

5.13.2 [Demod]

Enter Audio Demodulation submenu.

5.13.2.1 [Demod Mode >]

Enter the demodulation mode submenu, including FM, AM.

5.13.2.2 [Sound]

When the audio demodulation is on, adjust the headphone output volume.

5.13.2.3 [Carrier Freq]

Set the frequency of audio demodulation.

5.13.2.4 [Return]

Return the upper-level menu.

5.13.3 [Modulation >]

Enter the analog demodulation submenu.

5.13.3.1 [AM >]

Enter AM demodulation submenu.

1) [Carrier Freq]

Set the carrier frequency of the AM modulation signal.

2) [IF BW]

Set the demodulation bandwidth .

3)[Setup >]

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

a) [Time Axis >]

Set timeline parameters.

●[Ref.Value]

Set the start reference time in the timeline.

●[Position]

Sets the waveform's reference position in the timeline.

●[Scale/Div Auto Man]

Set each scale automatically or manually.

●[Return]

Return to the upper-level menu.

b) [Depth Axis >]

Set the depth axis parameters.

●[Ref.Value]

Sets the reference offset position, expressed as a vertical percentage.

●[Position]

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

●[Scale/Div Auto Man]

Set each scale automatically or manually.

●[Return]

Return to the upper-level menu.

c) [AF Trigger >]
Set AF triggering conditions.
●[AF Trigger On Off]
Set AF trigger is open or close.
●[Edge Neg Pos]
Set positive edge or negative edge.
●[Trigger Mode]
Set trigger mode is single trigger or continue trigger.
●[Trigger Level]
Set trigger amplitude.
●[Trigger Delay]
Set trigger delay time.
●[Return]
Return to the upper-level menu.

4) [Date Reset]

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

5) [Return]

Return to the upper-level menu.

5.13.3.2 [FM >]

Enter FM demodulation submenu.

1) [Carrier Freq]

Set the carrier frequency of the FM modulation signal.

2) [IF BW]

Set the demodulation bandwidth .

3)[Setup >]

Set the time axis, depth axis and AF trigger of AM modulation.
a) [Time Axis >]
Set timeline parameters.
●[Ref.Value]
Set the start reference time in the timeline.
●[Position]
Sets the waveform's reference position in the timeline.
●[Scale/Div Auto Man]

Set each scale automatically or manually.
●[Return]
Return to the upper-level menu.
b) [Deviation Axis >]
Set the deviation axis parameters.
●[Ref.Deviation]
Sets the reference offset position, expressed as a vertical percentage.
●[Position]
Set the reference position of the waveform on the deviation axis.
●[Scale/Div Auto Man]
Set each scale automatically or manually.
●[Return]
Return to the upper-level menu.
c) [AF Trigger >]
Set AF triggering conditions.
●[AF Trigger On Off]
Set AF trigger is open or close.
●[Edge Neg Pos]
Set positive edge or negative edge.
●[Trigger Mode]
Set trigger mode is single trigger or continue trigger.
●[Trigger Level]
Set trigger amplitude.
●[Trigger Delay]
Set trigger delay time.
●[Return]
Return to the upper-level menu.

4) [Date Reset]

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

5) [Return]

Return to the upper-level menu.

5.14 【System】 hardkey

Key access:
Press Shift key, then **System** hardkey (**2** in numeric keypad).

The menu for system parameter settings includes [System >], [Setting >], [PowerOn/Preset >], [Save/Recall >]. For first time you use the spectrum analyzer, set the system settings, the system will store the settings, restart the machine after power off won't change the settings.

5.14.1 [System >]

Access system information, firmware update, and option submenu.

5.14.1.1 [System Info]

Display the current system information, such as serial number, firmware version, temperature, MAC address, etc.

5.14.1.2 [Firmware Update]

To update your instrument firmware, do the following:

1. Create a folder named "spectrum" (lowercase) on the root directory of the USB memory device, and copy the firmware file onto this folder.
2. Insert the USB memory device into the top panel USB connector on your instrument. Press Shift key, then **System** hardkey. Press [**System** >], and press [**Firmware Update**] to execute firmware update.
3. The analyzer will perform the update process. The upgrade procedure will take approximately 30 seconds. During the update process, do not remove the USB memory device, do not power off the instrument or press any key. If the update process fails, please report the problem to your distributor or our technical support.
4. Once the upgrade is completed, the instrument will automatically restart.

5.14.1.3 [Option >]

Access the option submenu. TG, EMI, CW can be selected as option.

5.14.2 [Setting >]

Access the submenu for setting the analyzer, including [LAN >], [Shutdown], [Language >], [Date/Time >].

5.14.2.1 [LAN >]

Access the submenu for LAN port configuring. The analyzer supports LAN port connection for data transfer.

1) **[IP]**
   Sets the IP address of the LAN port.
2) **[Mask]**
   Sets the subnet mask parameter.
3) **[Gate]**
   Sets the 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.

5.14.2.2 [Shutdown On Off]

Enable/disable the automatic shutdown function. When this function is enabled, the spectrometer will automatically shut down within a customized period of time (time range: 5 minutes to 30 days). You can set the time using the number buttons, knobs, or up and down buttons.

5.14.2.3 [Language >]

Selects the screen menu language.

5.14.2.4 [Date/Time >]

Sets the date, time, and display format of the analyzer.

- **[Date Set]**
  Set the date for the analyzer. Use the numeric keys to enter the date. The format is YYYMMDD.
  E.g. June 22th, 2012 should be entered as 20120622.
- **[Time Set]**
  Set the time for the analyzer. Use the numeric keys to enter the

time. The format is HHMMSS.
E.g. 16:55:30 should be entered as 165530.

- **[Date/Time On Off]**
  Turn on or off date/time display.

5.14.3 [PowerOn/Preset>]

Sets the analyzer power on setting or preset setting.

1. [Power Set >]
Select power-on settings as [Factory] and [User].

2. [Preset >]
Select preset setting as [Factory] and [User].

[**Factory**]
Restores the analyzer to its factory- defined settings. The factory default settings are in Table 5-2.

[**User**]
Restores the analyzer to a user-defined setting.
To save the current system setting as a user-defined setting, press Shift key, then **System** hardkey, press [**Save/Recall** >] and select the [**User State**] menu item.

Table 5- 2 [Factory] Settings

Parameter	**Value**		
Frequency			
	1.6G	3.6G	7.5G
Center Frequency	800.000000MHz	1.800000000GHz	3.750000000GHz
Start Frequency	0kHz		
Stop Frequency	1.600000000GHz	3.600000000GHz	7.500000000GHz
Frequency Step	Auto 160.000000MHz	Auto 360.000000MHz	Auto 750.000000MHz
Frequency Offset	0Hz		
Frequency Reference	Internal		
SPAN			
	1.6G	3.6G	7.5G

Sweep	1.600000000GHz	3.600000000GHz	7.500000000GHz
AMPTD			
Reference Level	0.00dBm		
Attenuator	Auto 10 dB		
Scale/Div	10.00dB		
Scale Type	Log		
Ref Offset	0.00dB		
Ref Unit	dBm		
Preamplifier	Off		
BW			
RBW	Auto 1MHz		
VBW	Auto 1MHz		
EMI	Off		
Detector			
Trace	1		
Detector Type	Pos Peak		
Sweep			
Sweep Time	1.6G	3.6G	7.5G
	Auto 76.731ms	Auto 169.144ms	Auto 202.972ms
Sweep Mode	Continuous Sweep		
Source			
Source TG	Off		
Network Meas	Off		
Trace			
Trace	1		
Trace Type	Clear Write		
Trace 1 Operations	1<- ->2		
Trig			

Trigger Type	Auto
Peak	
Peak Search	Off
Peak altitude	10.00dB
Search mode	Max
Sort mode	Amplitude
Peak table	Off
Marker Fctn	
NdB	Off
Marker Noise	Off
Frequency Count	Off
Marker	
Marker	1
Trace	1
Marker Table	Off
Meas	
Time Spectrum	Off
ACPR	Off
Channel Power	Off
OBW	Off
Pass-Fail	Off
Meas Setup	
Channel Bandwidth	1.000000MHz
Channel Internal	2.000000MHz
Channel Nums	3

Power Percent	99.00%

5.14.4 【Save/Recall >】

Accesses the menu to save/recall the screenshot, trace data, IAStrace data or user state.

5.14.4.1 [Save >]

Save screen shots, trace data, or user status.

●[Screen Pixmap >]

Enter screenshot save submenu, you can choose to save screenshots to local memory or USB disk, the image file format is PNG. The file name is automatically created using the current date and time.

When [**Save to USB**] is selected, the screenshot will be saved in a folder named spectrum (created automatically) in USB disk.

●[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 trace data saved successfully is displayed on the screen.

●[User State >]

Save the current system setting as a user self-defined setting to local memory. The user setting file can be used as the power-on setting or preset setting.

●[Limit Line]

Save the limit line file. The save location is local. The limit line file format is sp. The progress box (pop-up window) in the middle of the screen displays information about saving the limit line.

Note: Save limit line can only be loaded when area measurement is enabled (Measure →Pass-Fail > → Area Measurement >).

5.14.4.2 [Recall >]

Accesses the submenu to recall the screenshot, trace data, or user state.

- **[Type >]**

  You can choose to call back the screen image, trace data, user configuration, scatter map, or all file types to the local. The image file format is bmp, trace data file format is csv, user configuration file is user, and scatter map file is sp. The progress box in the middle of the screen displays information about the loading success.

- **[Sort >]**

  Select screen images, trace data, user profiles, scatter plots, or all files to view relevant information by name, by time, by size, as desired.

- **[First Page]**

  Go to the first page of current directory.

- **[Prev Page]**

  Go to the previous page.

- **[Next Page]**

  Go to the next page.

- **[Load >]**

  Recall the selected file.

- **[Return]**

  Return the upper-level menu.

5.14.4.3 [QuickSaveSet]

Set up to quickly save screenshots, trace data, or user status. The required document type is determined by the Settings file type in System -- Save/Recall > -- QuickSaveSet >. In general, you can save a file type of screen capture, trace data, or user status to memory or an external USB flash drive (inserted).

5.15 【File】 hardkey

Key access:

Press ⇧ Shift key, then **File** hardkey (**3** key in numeric keypad).

Access the file management menu.

5.15.1 [Storage Int Ext]

Select a file storage location: internal or external.

5.15.2 [Type >]

Select the file type you wish to view under the directory, includes screen image, trace data, user states, or display all.

- **Screens (*.png)**
  A screen file is the captured graphic of the screen.
- **Trace Datas (*.csv)**
  A trace file records trace data.
- **User States (*.user)**
  A user state file records the current controls and settings of the analyzer.

5.15.3 [First Page]

Go to the first page of current directory.

5.15.4 [Prev Page]

Go to the previous page.

5.15.5 [Next Page]

Go to the next page.

5.15.6 [Last Page]

Go to the last page of current directory.

5.15.7 [Operations >]

Access the submenu for file operations, includes [Sort >], [Delete >], [Export >], [Load >] , [Set as Power On] , [Set as Preset].

5.15.7.1 [Sort >]

The files can be sorted in order by name, date&time, or size.
Selects the item by which folders and files are sorted in the file list.

5.15.7.2 [Delete >]

Press [**Delete Select**] to delete the selected file.

Press [**Delete Page**] to delete the files in current page.

Press [**Delete All**] to delete all the files.

5.15.7.3 [Export >]

When a USB disk is inserted, you can export the files in the local memory to the USB disk.

Press [**Select**] to export the selected file to USB disk.

Press [**Page**] to export the files in current page to USB disk.

Press [**All**] to export all the files to USB disk.

5.15.7.4 [Load >]

Recall the selected file.

5.15.7.5 [Set as Power On]

When the user state file (the type is user) is selected in the left list, you can press [**Set as Power On**] to set this user state as power-on setting.

5.15.7.6 [Set as Preset]

When the user state file (the type is user) is selected in the left list, you can press [**Set as Preset**] to set this user state as preset setting.

5.16 【Help】 hardkey

Key access:

Press ⇧ Shift key, then **Help** hardkey (**0** key in numeric keypad).

On the spectrum analyzer 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.

5.17 【Measure】 hardkey

Key access:

Press ⇧ Shift key, then **Measure** hardkey (**point** key in numeric keypad).

Provide a variety of advanced measurement functions, accesses

the 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 the adjacent channel power measurement. Press 【Meas Setup】 to pop up the parameters of the adjacent channel power measurement soft menu. The adjacent channel power is used to measure the ratio of the adjacent channel power of the transmitter. The absolute value of the main channel power and the absolute value of the adjacent channel power are obtained by the linear power integration method, so that the adjacent channel power ratio is gained.

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) [UpLineEdit>]

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

6) [LowLineEdit>]

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

7) [Return]
Return to the previous menu.

5.17.7 [More＞]

Enter the more measurement function menu.It includes harmonic measurement,phase noise measurement and TOI measurement.

5.17.7.1 [Harmonic＞]

Enter the harmonic measurement menu.
H[dBc] = PH [dBm] - P_C [dBm]

H[dBc]:Harmonic distortion value;
PH[dBm]:Harmonic distortion signal level;
P_C [dBm]:Fundamental signal level.
THD = sqrt(sum[W] / P_C [W]) * 100%;
THD denotes total harmonic distortion and sum denotes power of individual harmonic signals.

Parameter	Description
Harmonic	The harmonic of the fundamental frequency
Frequency	A multiple of the fundamental frequency
Amplitude	The amplitude of the harmonic frequency in dBm
dBc	Harmonic distortion value, the amplitude of the harmonic frequency relative to the fundamental frequency
THD	Total harmonic distortion in % or dBc
Bar chart	The frequencies listed in the table correspond to the amplitudes, with the number 1 representing the fundamental frequency and the remaining numbers representing the individual harmonic frequencies.The trace of this mode is only used as a rough reference to facilitate the observation of the position of all harmonics, which is not consistent with the amplitude in the bar charts and tables, and the specific data are mainly in tables or bar charts. If the frequency value of the tenth harmonic exceeds the upper limit of the spectrum meter measurement, the harmonic position will deviate from the bar chart.

1) [Harmonic On Off]
Enable or disenable the harmonic measurement mode.
2) [Fundamental Freq]
Set the fundamental frequency,when the harmonic measurement mode is turned on, the center frequency in the spectrum mode is set according to the number of harmonics.
3) [Number of Harmonics]
Set the number of harmonics that can be displayed, up to the tenth harmonic can be displayed. When the fundamental frequency is

set, the upper limit of the number of harmonics will vary due to the limited measurement range of the spectrum instrument.

4) [RBW Auto Man]

Adjust the resolution bandwidth ranging from 1Hz-1MHz. Use numeric key, step key or knob to switch resolution bandwidth. The underline under Auto or Manual means Auto mode or Manual mode. Press [RBW Auto Man] and hold it until underline under Auto has been highlighted. Then the resolution bandwidth is under automatic 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) [Return]

Return to the previous menu.

5.17.7.2 [Phase Noise＞]

Enter the phase noise measurement mode menu.

P_{Offset} [dBc] = P_{SSB} [dBm] - P_C [dBm] - 10 * log(1.2 * RBW) + 2.5

P_{Offset} denotes phase noise power at the frequency offset;

P_{SSB} denotes single-sideband phase noise power;

P_C denotes carrier power;

RBW denotes resolving bandwidth.

Parameter	Description
Position	Combine the phase noise values of each frequency band at 6 frequency points to obtain a complete phase noise trace, and plot the trace on a logarithmic scale.
Frequency Offset	Adjust the stop frequency in spectrum mode based on the starting frequency offset and stop frequency offset, obtain the amplitude values at various frequency points within this frequency band, and calculate the phase noise values.
Source	In spectrum mode, the original trace data

trace	obtained for the start and stop frequencies is referred to as the yellow trace.
Average trace	The trace data resulting from averaging the original trace data ten times is labeled as the blue trace.

1) [Phase Noise On Off]
Enable or disenable the phase noise measurement mode.
2) [Auto Tune]
Searches for signals automatically throughout the full frequency range, adjusts the frequency and amplitude to their optimum and realizes one-key signal search and auto setting of parameters.
Key points: some parameters such as reference level, scale, and input attenuation may be changed during the auto tune.
3) [Carrier Freq]
Set the carrier frequency, when the phase noise measurement mode is on, set the carrier frequency to the starting frequency in the spectrum mode.
4) [Start Offset]
The starting frequency offset value is fixed, and the phase noise value at this frequency offset is measured in increments of a factor of 10.
5) [Stop Offset]
The stop frequency offset value is fixed as the upper limit of the frequency offset value.
6) [Return]
Return to the previous menu.

5.17.7.3 [TOI＞]

Enter the TOI measurement mode menu.
$f_{lowTOI} = 2 f_1 - f_2$
$f_{highTOI} = 2 f_2 - f_1$
f_{lowTOI} denotes low third order intermodulation frequency;
$f_{highTOI}$ denotes high third order intermodulation frequency;
f_1 denotes low monophonic frequencies;
f_2 denotes high monophonic frequencies.
[C／IM] = 10 * log(P_C [dBm] / P_{IM} [dBm])
[C／IM] denotes third order intermodulation distortion ratio;
P_C denotes fundamental output power;
P_{IM} denotes third order intermodulation product output power.

Parameter	Description
Marker	1,2,3,4 marker corresponding to f_{lowTOI},f_1 ,f_2 , $f_{highTOI}$ respectively.
Frequency	f_{lowTOI},f_1 f_2 ,$f_{highTOI}$ corresponding frequency.
Amplitude	f_{lowTOI},f_1 , f_2 ,$f_{highTOI}$ corresponding amplitude.
dBc	The relative amplitude of [C/IM], f_1, and f_2 to the amplitudes of f_{lowTOI} and $f_{highTOI}$.
Trace	Draw traces based on the data obtained by scanning the start and stop frequency in spectrum mode,and obtain four frequency markers from the peak list. If the calculated high and low third order intermodulation frequencies exceed the scan range, they will be displayed as *."

1) [TOI On Off]
Enable or disenable the TOI measurement mode.
2) [Low Monophonic Freq]
Press[Low Monophonic Freq Auto Man] and hold it until underline under Auto has been highlighted. Then the low monophonic frequency is under auto mode.According to the peaklist, select the frequency corresponding to the amplitude of the second peak as the low single-tone frequency.When switched to manual mode, the frequency is set by the user.
3) [High Monophonic Freq]
Press[High Monophonic Freq Auto Man] and hold it until underline under Auto has been highlighted. Then the high monophonic frequency is under auto mode.According to the peaklist, select the frequency corresponding to the amplitude of the maximum peak as the high single-tone frequency.When switched to manual mode, the frequency is set by the user.
4) [Return]
Return to the previous menu.

5.17.7.4 [SEM＞]

Enter the spectrum emission template measurement menu.

Parameter	Description
Offset	Indicate the number of offsets. Up to 5 offsets can be configured, each represented by a different

	color.
Start	Starting frequency of this offset.
Stop	Stop frequency of this offset.
RBW	RBW of this offset.
Lower Freq	The frequency point corresponding to the maximum amplitude in the lower frequency segment of the offset trace data.
Higher Freq	The frequency point corresponding to the maximum amplitude in the higher frequency segment of the offset trace data.
Peak(dBm P/F)	The maximum value within the frequency band, green "P" indicates that this offset segment passed the template, while red "F" indicates that this offset segment failed to pass the template.
Channel IBW	Calculate the power value within the test main channel.
Total Power	Calculate the reference value based on the total power within the channel, the channel integrated bandwidth, and the channel resolution bandwidth.
PSD	Calculate the reference value based on the total power within the channel and the channel RBW.

1) [SEM]

Enable or disenable the spectrum emission template measurement.

2) [Center Freq]

Set the center frequency value.

3) [Ref Level]

Set the reference level value.

4) [Userconfig Mask>]

a）[Channel Setup>]

Set the parameter of the main channel.

●[Channel IBW]

Set the channel integrated bandwidth,it is used to calculate the power within the main channel.

●[Channel Span]

Set the channel span value.

●[RBW]

Set the resolution bandwidth value.

●[Measure Ref Type]

Select the TotalPwr or PSD as the reference value.

●[Total Pwr Ref]

Set the total power reference value of carrier waveform,when switch into automatic mode,calculate the reference value based on the total power within the channel,the channel integrated bandwidth and the channel resolution bandwidth.Under the manual mode,the reference value is set by user.

●[PSD Ref]

Set the power spectral density reference value,when switch into automatic mode,calculate the reference value based on the total power within the channel and the channel integrated bandwidth. Under the manual mode,the reference value is set by user.

●[Return]

Return to the previous menu.

b）[Offset Setup>]

Set the frequency,power and other template parameters of selected offset.

●[Select Offset]

Select the offset index.

●[Offset Limit]

Enable or disenable the offset limit.If the offset is off or the start frequency is equal to the stop frequency when it is on, the offset segment trace and template are not displayed.

●[Start Freq]

Set the starting frequency of the selected offset.

●[Stop Freq]

Set the stop frequency of the selected offset.

●[RBW]

Set the resolution bandwidth of the selected offset.

●[More>]

◆[Pass/Fail Mask]

Select to use Absolute or Relative templates.

◆[Abs Start Ampt]

Set the absolute start amplitude of the selected offset.

◆[Abs Stop Ampt]

Set the absolute stop amplitude of the selected offset.When switch into automatic,set to the same value as the absolute starting amplitude.Under manual mode,the reference is set by user.

◆[Rel Start Ampt]

Set the relative start amplitude of the selected offset.

◆[Rel Stop Ampt]

Set the relative stop amplitude of the selected offset.When switch into automatic,set to the same value as the relative starting amplitude.Under manual mode,the reference is set by user.

◆[Return]

Return to the previous menu.

●[Return]

Return to the previous menu.

c）[Preset]

Restore the user configuration template parameters to their initial state.

d）[Return]

Return to the previous menu.

5) [Stationary Mask>]

User can select stationary as spectrum emission template.

a）[3GPP>]

Set 3GPP as spectrum emission template.

●[3GPP]

Enable or disenable the 3GPP template.

●[Channel Setup>]

Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>]:a)[Channel Setup>] for detail.

●[Offset Setup>]

Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>],b)[Offset Setup>] for detail.

●[Duplex Mode>]

◆[Duplex Mode]

Select FDD or TDD as the duplex mode.

◆[FDD Config>]

[Transmission]

Select BS or UE as the transmission mode.

[Max Out Pwr]

Select the maximum output power with the options P >= 43,39 <= P < 43,31 <= P < 39,P < 31.

[Add Max Out Pwr]

When the maximum output power is selected P < 31,it will has additional option None,6 <= P < 20,P < 6.

[Return]

Return to the previous menu.

◆[TDD Config>]

[Transmission]

Select BS or UE as the transmission mode.

[Chip Rate]
Select the chip rate with the options 1.28M,3.84M,7.68M.
[Max Out Pwr]
Select the maximum output power with the options P >= 43,39 <= P < 43,31 <= P < 39,P < 31;P >= 34,26 <= P < 34,P < 26.When the chip rate is 1.28M, the last three terms are selected, and when the chip rate is 3.84M and 7.68M, the first four terms are selected.
[Return]
Return to the previous menu.

◆**[Return]**
Return to the previous menu.

●**[Return]**
Return to the previous menu.

b）[802.11b>]
Set 802.11b as the spectrum emission template.

●**[802.11b]**
Enable or disenable the 802.11b template.

●**[Channel Setup>]**
Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>]:a)[Channel Setup>] for detail.

●**[Offset Setup>]**
Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>],b)[Offset Setup>] for detail.

●**[Return]**
Return to the previous menu.

c）[802.11g>]
Set 802.11g as the spectrum emission template.

●**[802.11g]**
Enable or disenable the 802.11g template.

●**[Channel Setup>]**
Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>]:a)[Channel Setup>] for detail.

●**[Offset Setup>]**
Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>],b)[Offset Setup>] for detail.

●**[Modulation>]**
Select modulation mode:OFDM or DSSS/PBCC/CCK.

●**[Return]**
Return to the previous menu.

d）[802.11n>]

Set 802.11n as the spectrum emission template.

●[802.11n]

Enable or disenable the 802.11n template.

●[Channel Setup>]

Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>]:a)[Channel Setup>] for detail.

●[Offset Setup>]

Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>],b)[Offset Setup>] for detail.

●[Channel IBW>]

The channel bandwidth is chosen to be 20M or 40M.

●[Return]

Return to the previous menu.

e）[802.16>]

Set 802.16 as the spectrum emission template.

●[802.16]

Enable or disenable the 802.16 template.

●[Channel Setup>]

Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>]:a)[Channel Setup>] for detail.

●[Offset Setup>]

Please refer to 5.17.7.4[SEM>],4)[Userconfig Mask>],b)[Offset Setup>] for detail.

●[Channelization>]

The channelization parameter is chosen to be 10M or 20M.

●[Return]

Return to the previous menu.

f）[Return]

Return to the previous menu.

6) [Return]

Return to the previous menu.

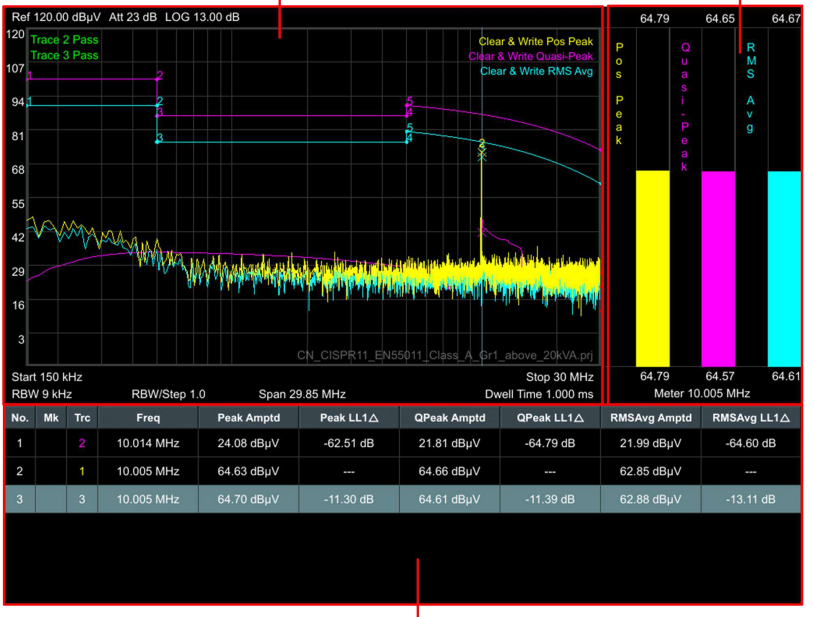
6. EMI Measurement mode

6.1 EMI Measurement mode interface

Press [⇧] Shift key, then **Demod** hardkey (**1** in numeric keypad) and select **[EMI]** to enter the EMI measurement mode interface,as shown in the below figure.

Scan Spectrogram, and its configuration information

Meter Results, and its configuration information



Signal list and its final measurement results are displayed

Figure 6-1 EMI measurement interface

6.2 Basic Control

6.2.1 [FREQ]

Press [FREQ] to enter frequency menu.

6.2.1.1[Meter Freq]

Set the meter frequency.

Parameter	Description
Default value	165MHz
Range	0 Hz ~ Full Span
Unit	GHz 、MHz、kHz、Hz
Knob step	Step=Span/200;the minimum value is 1Hz
The arrow keys step	Span/10
Association	None

6.2.1.2[Center Freq]

Set the center frequency of the current sweep.

Key points：

- The value of center frequency and sweep width will be modified together when the span does not reach the minimum value (please refer to the "[SPAN]" description of P30 for parameter modification caused by span change), and the stop frequency will be changed if the span continues to increase after it reaches the minimum value.

Parameter	Description
Default value	165MHz
Range	50 Hz ~ (full span - 50 Hz)
Unit	GHz 、MHz、kHz、Hz
Knob step	Step=frequency step/100
The arrow keys step	Frequency step
Association	Start frequency, stop frequency

6.2.1.3[Start Freq]

Set the start frequency.

Parameter	Description
Default value	30MHz
Range	0 Hz ~ (full span - 100 Hz)
Unit	GHz 、MHz、kHz、Hz
Knob step	Step=frequency step/100
The arrow keys step	Frequency step
Association	Center frequency, stop frequency and related parameters

6.2.1.4[Stop Freq]

Set the stop frequency.

Parameter	Description
Default value	300MHz
Range	100 Hz ~ full step
Unit	GHz 、MHz、kHz、Hz
Knob step	Step=frequency step/100
The arrow keys step	Frequency step
Association	Start frequency, center frequency and related parameters

6.2.1.5[Freq Step]

Set the frequency step.

Parameter	Description
Default value	Span/10
Range	1 Hz ~ full span
Unit	GHz 、MHz、kHz、Hz
Knob step	1MHz

The arrow keys step	1, 2, 5 multiple steps
Association	Span and related parameters

6.2.1.6[Freq Offset]

Set the frequency offset.

Parameter	Description
Default value	0Hz
Range	-9 GHz ~ 9 GHz
Unit	GHz 、MHz、kHz、Hz
Knob step	1MHz
The arrow keys step	1, 2, 5 multiple steps
Association	Span and related parameters

6.2.1.7[Freq Ref]

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

6.2.2 [SPAN]

Press [SPAN] to enter the span menu.The change of span will cause the change of frequency parameters. When the span is changed, it stops the running sequence.

6.2.2.1[Span]

Set the span.Under the same CISPR configuration, a larger span results in a correspondingly larger number of scan points.
For example, the CISPR segmentation configuration parameters are as follows:
Start Freq =150kHz Stop Freq =30MHz
RBW=9kHz RBW/Step =1.0

Max_{span} = 800 * (RBW / RBW/Step)
The start frequency of the system scan is S_1 = 1MHz,stop frequency of the system scan is S_2=20MHz
n = (S_2 - S_1) / Max_{span}
Max_{span} denotes the maximum sweep width of a segment
n represents the number of frequency bands spanned, and one number of scan points represents the size of the frequency interval of one RBW/ RBW/Step
Key points:

- Adjusting the span will automatically modify the start and stop frequency of the spectrum analyzer.
- When manually setting the span, the minimum setting is 100 Hz. Setting the span to the maximum value puts the spectrum analyzer into full span mode.
- Changing the span will automatically modify the frequency step if it is in automatic mode.
- The maximum value of n is 100, and its maximum sweep width is 100* $Max_{span.}$

Parameter	Description
Default value	270MHz
Range	100 Hz ~ full span
Unit	GHz 、MHz、kHz、Hz
Knob step	Step = frequency step /100
The arrow keys step	1, 2, 5 multiple steps
Association	Start frequency, stop frequency, and CISPR configuration

6.2.2.2 [CISPR Band>]

Access the file list and load the CISPR configuration file. Prior to conducting EMI scans, it is mandatory to load a CISPR configuration; otherwise, scanning will not be permitted.

6.2.3 [AMPTD]

Press [AMPTD] to enter the amplitude menu.Sets the amplitude

parameters of the analyzer. Through these parameters, signals under measurement can be displayed at an optimal view with minimum error.After the amplitude parameter is changed, the span starts again.

6.2.3.1[Ref Level]

Set the reference level, which represents the maximum power/level that can be displayed on the current grid. This value is also shown in the top left corner of the screen. Changing the reference level will modify the front-end parameters, and its setting must satisfy the condition:
Reference level ≤ Input Attenuation - Preamplifier - 20 dBm.
The reference level is a critical parameter of the spectrum analyzer, indicating the upper limit of the dynamic range of the current spectrum analyzer. When the energy of the signal under test exceeds the reference level, nonlinear distortion or even overload warnings may occur.
It is important to understand the nature of the signal under test and carefully select the reference level to achieve optimal measurement results and protect the spectrum analyzer.

Parameter	Description
Default value	0 dBm
Range	-120 dBm ~ 30dBm
Unit	dBm、dBμW、dBμA、dBmV、dBμV、W、V
Knob step	Low knob step = (scale/div) /100 Quick knob step = (scale/div) /10
The arrow keys step	Scale/div
Association	Attenuator, preamplifier, and related parameters

Note:The maximum reference level may be different for different machine models, please refer to the Specification for details.

6.2.3.2 [Attenuation]

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).
Reference Level≤Input attenuation-Preamplifier-20 dBm
The input attenuation can be set to automatic and manual attenuation modes:

- The attenuation value in automatic mode is automatically adjusted according to the preamplifier state and the current reference level value
- The preamplifier is turned on in manual mode, and the input attenuation can be set to a maximum of 40dB. When the set parameters do not satisfy the above formula, it is guaranteed by adjusting the reference level.

Parameter	Description
Default value	10 dB
Range	0 dB ~ 40 dB
Unit	dB
Knob step	1 dB
The arrow keys step	10 dB
Association	Reference level, preamplifier, and related parameters

6.2.3.3 [Scale/Div]

Sets the vertical scale size per grid to adjust the current range of magnitudes that can be displayed. This feature is only available if the scale type is logarithmic.Note the following points during use:
Adjust the current range of magnitudes that can be displayed by setting different scales. The range of signal amplitudes that can currently be displayed:
Minimum value:Reference level-10*Current scale
Maximum value:Reference level.

Parameter	Description
Default value	10 dB
Range	0.01 dB ~ 1000 dB

Unit	dB
Knob step	Low knob step=0.01dB Quick knob step=0.1dB
The arrow keys step	1, 2, 5 multiple steps
Association	Reference level

6.2.3.4[Scale Type]

Sets the Scale Type of Y-axis to LIN or LOG, the default is LOG.

- The scale value is immutable under the linear scale, and the display range is 0% to 100% of the reference level.
- 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 "V" 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.

6.2.3.5[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.

- 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.

Parameter	Description
Default value	0 dB
Range	-120 dB ~ 120 dB

Unit	dB
Knob step	Slow knob step=0.01dB Quick knob step=0.1dB
The arrow keys step	Scale/div
Association	None

6.2.3.6[Ref Unit>]

Please refer to 6.5.3.3 [Measure mode] for detail.

6.2.3.7[Preamplifier]

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.
When the preamplifier enable, the PA appears in the left status area of the screen.

6.3 Scan Settings

6.3.1 [BW]

Press [BW] to enter bandwidth menu.

6.3.1.1[Scan RBW>]

Please refer to 6.5.3.2 CISPR Edit “4）RBW” for detail.

6.3.1.2[Meter RBW]

Set the meter resolution bandwidth.

Parameter	Description
Default value	9 kHz
Range	200Hz、9kHz、120kHz、1MHz
Unit	MHz、kHz、Hz
Knob step	Step up one gear

The arrow keys step	Step up one gear
Association	None

6.3.2 [Trace]

Press Shift key, then **Trace** hardkey (**7** in numeric keypad) to enter the trace menu.As the sweep signal is displayed as a trace on the screen.

6.3.2.1[Trace]

Up to three traces can be displayed, corresponding to 1, 2, and 3. Each trace is colored differently (trace 1- yellow, trace 2- purple, trace 3- light blue).

6.3.2.2[State>]

1) [Clear&Write]
Each point of the trace takes the data after real-time scanning.
2) [Max Hold]
Each point of the trace keeps displaying the maximum value of multiple scans, and updates the data display when a new maximum value is generated.
3) [Min Hold]
Each point of the trace keeps displaying the minimum value of multiple scans, and updates the data display when a new minimum value is generated.
4) [Average]
Set the trace average.

Parameter	Description
Default value	50
Range	2 ~ 50
Unit	None
Knob step	1
The arrow keys step	10

Association	None

5) [View]
Stop updating trace data to facilitate observation and reading. Traces that are loaded to the system from storage devices or remotely.The default type is view.
6) [Blank]
Clear the trace on screen. But the trace stock will keep still without refreshing.
7) [Return]
Return to the previous menu.

6.3.3 [Detector]

The detection type supports three detection types:Positive peak, Quasi-Peak,and RMS Average.

6.3.4 [Sweep]

Press Shift key, then **Sweep** hardkey (**4** in numeric keypad) to enter sweep menu.

6.3.4.1[Scan>]

1) [Scan Mode>]
The default is Sweep cont, sweep continuous only after Meas Setup-> Sequence -> Scan and then start measurement,the scanning process is performed sweep continuous. Single scan, the scan will stop after the completion of the number of scans.
2) [Sweep Count]
Valid only if scan mode is set to sweep single.
3) [Select Section]
According to the CISPR configuration file, select the current section, which defaults to 1.
4) [RBW/Step]
Please refer to 6.5.3.2 CISPR Band “4）RBW” for detail.
5) [Dwell Time]
Please refer to 6.5.3.2 CISPR Band “6）More” for detail.
6) [Return]
Return to the previous menu.

6.3.4.2[Meter>]

1) [Meter Mode>]
The default is Sweep cont, sweep continuous only after Meas Setup-> Sequence -> Scan and then start measurement, the scanning process is performed sweep continuous. Single scan, the scan will stop after the completion of the number of scans.
2) [Dwell Time]
Please refer to 6.5.7.2 Dwell Time for detail.
3) [Return]
Return to the previous menu.

6.4 Marker Settings

Press [Marker] to enter the marker menu.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 markers to be displayed at one time, but only one single marker is active every time.
- You can use the numeric keys, knob 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.

6.4.1 [Marker]

6.4.1.1[Marker]

A total of eight different cursors can be set, and each trace can have multiple cursors.

6.4.1.2[Trace]

Up to three traces can be displayed, corresponding to 1, 2, and 3. Each trace is colored differently (trace 1- yellow, trace 2- purple, trace 3- light blue).

6.4.1.3[Normal]

Please refer to P38 “【Marker】 bottom softkey” for detail.

6.4.1.4[Delta]

Please refer to P38 “【Marker】 bottom softkey” for detail.

6.4.1.5[Off]

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

6.4.1.6[All Off]

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

6.4.1.7[Marker Table]

Turns on or off the display of all marker table.Open the list of frequency, the list of all open frequency will be displayed in the color of the frequency trace at the bottom of the screen, including the frequency sequence number, frequency type, frequency trace, frequency time and frequency amplitude.It is used to observe the spectrum information of multiple frequency.

6.4.2 [Marker→]

Press [Marker→] to enter Marker→ menu.

6.4.2.1[Marker]

The default is 1, and the currently selected marker will be displayed in the upper right corner of the scanning interface. Set the marker function for the current marker.

6.4.2.2 [Mkr→List]

The frequency corresponding to the current marker is added to the peak list.

6.4.2.3 [Mkr→Meter]

The frequency measured by the Meter is set to the frequency corresponding to the current marker.

6.4.2.4 [Meter→Mkr]

The frequency of the current selected marker is set to the Meter frequency.

6.4.3 [Peak]

Press [Peak] to enter Peak menu.

6.4.3.1[Mkr→CF]

The center frequency is set to the frequency value corresponding to the current cursor.

6.4.3.2[Peak-Peak]

The current cursor is set to the difference state, and the reference is marked as the frequency at the minimum amplitude value, and the Marker is marked as the frequency at the maximum amplitude value.

6.4.3.3[Next Peak]

Search for the peak value on the trace that is currently under the highest grid, and find the peak value that has the smallest difference in magnitude with it. Mark it with a cursor.

6.4.3.4[Left Peak]

Search for the peak value on the trace that is to the left of the current peak value, and find the peak value that has the closest distance to it. Mark it with a cursor.

6.4.3.5[Right Peak]

Search for the peak value on the trace that is to the right of the current peak value, and find the peak value that has the closest distance to it. Mark it with a cursor.

6.4.3.6[Cont Peak]

Automatic research extreme amplitude.

6.5 Measurement Settings

Press ⇧ Shift key, then **Measure** hardkey (**.** in numeric keypad) to enter measurement menu.

6.5.1 [Sequence>]

Setting different processes results in variations in the measured content.

6.5.1.1[Scan Only]

Measurements related only to scan.

6.5.1.2[Search Only]

Search the current trace and it is meaningful to search only after the trace scan is completed, otherwise the measured signal will be inaccurate.

6.5.1.3[Scan&Search&Meas]

The sequence of operations is scanning, searching, and then measuring.

6.5.1.4[Scan&Search]

Combine scanning and searching for measurement purposes.

6.5.1.5[Search&Meas]

Combine searching and measuring for measurement purposes.

6.5.1.6[Meas]

Measure each frequency in the peak signal list sequentially. If the measurement result exceeds the corresponding limit line frequency value, display the difference in the list as red.

6.5.2 [Start/Pause]

To start the measurement, import the required CISPR configuration file([Meas Setup]->[Scan Config]->[CISPR Band]),after importing the file, you can also change its related configuration, and finally press the [Start] button to scan([Meas Setup]->[start]),according to the CISPR Band in the scan configuration, the test is started or stopped after selecting the process. When the scan is completed, enter the Meter for measurement.

6.5.3 [Scan Config>]

6.5.3.1[CISPR Band>]

Enter the list of file,import CISPR file,a CISPR profile must be loaded before EMI scan, otherwise scanning is not allowed.

6.5.3.2[CISPR Edit>]

User is required to load a CISPR configuration file from the file list,

which describes the frequency range, dwell time, peak value settings for scanning, as well as the corresponding limit lines for different detectors.

1）[Select Section]
According to CISPR configure file and select section,the default section is 1.

2）[Start Freq]
Edit the start frequency of the current segment.

Parameter	Description
Default value	CISPR configuration file Settings
Range	0 Hz ~ (full span - 100 Hz)
Unit	GHz 、MHz、kHz、Hz
Knob step	Current segment span/200
The arrow keys step	Current segment span/10
Association	stop frequency

3）[Stop Freq]
Edit the stop frequency of the current segment.

Parameter	Description
Default value	CISPR configuration file Settings
Range	100 Hz ~ (full span)
Unit	GHz 、MHz、kHz、Hz
Knob step	Current segment span/200
The arrow keys step	Current segment span/10
Association	start frequency

4）[RBW]
Set the RBW under the currently selected section.

Parameter	Description

Default value	CISPR configuration file Settings
Range	200Hz、9kHz、120kHz、1MHz
Unit	MHz、kHz、Hz
Knob step	Step up one gear
The arrow keys step	Step up one gear
Association	None

5）[RBW/Step]

Set the RBW/Step under the currently selected section.

Max RBW=Scan Points *（RBW / RBW Step）

Parameter	Description
Default value	CISPR configuration file Settings
Range	0.1、0.3、0.5、1、2、3
Unit	None
Knob step	Step up one gear
The arrow keys step	Step up one gear
Association	None

6）[More>]

e）[Dwell Time]

Set the dwell time under the currently selected section.

Parameter	Description
Default value	CISPR configuration file Settings
Range	1ms ~ 1s
Unit	s、ms、μs、ns
Knob step	Step = one-tenth of the current unit For example:120ms step=1ms*0.1

The arrow keys step	Step in integer multiples of 1, 2, and 5
Association	None

f）[Peak Setup>]

●[Peak Threshold]

Specify the minimum value of peak amplitude, where only peaks exceeding the peak limit value can be considered as valid peaks.
Set the peak threshold under the currently selected section.

Parameter	Description
Default value	CISPR configuration file Settings
Range	-180dBm ~ 30dBm
Unit	dBm、dBμW、dBμA、dBmV、dBμV、W、V
Knob step	1dBm
The arrow keys step	Step in integer multiples of 1, 2, and 5
Association	None

●[Peak Offset]

Specify the difference between the peak value and the amplitude of the adjacent local minima on both sides. Peaks with a difference greater than the peak offset are considered as valid peaks.
Set the peak threshold under the currently selected section.

Parameter	Description
Default value	CISPR configuration file Settings
Range	0dB ~ 120dB
Unit	dB
Knob step	1dB
The arrow keys step	10dB
Association	None

●[Peak Number]

Specify maximum peak number of current section.
Set the peak number under the currently selected section.

Parameter	Description
Default value	CISPR configuration file Settings
Range	1 ~ 20
Unit	None
Knob step	1
The arrow keys step	5
Association	None

●[Return]
Return to the previous menu.
g）[Return]
Return to the previous menu.
7）[Return]
Return to the previous menu.

6.5.3.3[Measure mode]

Measure mode is divide into near filed measurement and far field measurement.
Near filed measurement:the measurement unit is dBm,dBμW, dBμA,dBmV,dBμV,W,V.
Far field measurement:the measurement unit is dBμV/m,dBμA/m or dBpT.

6.5.3.4[Limit Edit>]

1）[Limit]
The default limit is 1，the index 1 in the menu list serves as the limit line for positive peaks, 2 serves as the limit line for quasi-peaks, and 3 serves as the limit line for average values.Different CISPR configuration have different limit lines, and the user can also edit the limit lines for different detectors separately.
2）[Pos Peak Limit>]
a）[Limit Edit>]
Add, insert, delete, clear the list of limit lines, and modify the

frequency and amplitude of a screen point.

b）[Save Line]

Save the currently selected limit line.

c）[Load Line>]

Retrieve the limit lines saved internally in the device.

d）[Return]

Return to the previous menu.

3）[Offset X/Y]

All limits are biased in amplitude and frequency.

4）[Return]

Return to the previous menu.

6.5.3.5[Antennae Config>]

Set the far field measurement configuration.

1）[Edit>]

Set the antenna factor.

2）[Save Antennae]

Save as an.ant file.

3）[Load Antennae>]

Load the saved.ant file.

4）[Return]

Return to the previous menu.

6.5.3.6[Save CISPR]

Save the current CISPR configuration, including but not limited to start frequency, stop frequency, scan section, limit lines, etc.

6.5.4 [Peak Setup>]

6.5.4.1[Select Section]

According to CISPR configure file to select current section,and the default is 1.

6.5.4.2[Peak Threshold]

Please refer to 6.5.3 [Scan Config] for detail.

6.5.4.3[Peak Offset]

Please refer to 6.5.3 [Scan Config] for detail.

6.5.4.4[Peak Number]

Please refer to 6.5.3 [Scan Config] for detail.

6.5.5 [Meas Config>]

6.5.5.1[Meas Signal>]

1）[Current Signal]
Only the currently signal in the peak list is measured, valid if and only if the process is a measurement.
2）[All Signal]
All signals in the peak list are measured and valid if and only if the process is a measurement.
3）[Marker Signal]
Only the marker signal in the peak list is measured, valid if and only if the process is a measurement

6.5.5.2[Select Detector]

The default selection is 1,1 is used only as a positive peak detector, 2 as a quasi-peak detector, and 3 as an RMS average detector.

6.5.5.3[Pos Peak>]

1）[Switch]
Enable or disenable the positive detector.
2）[Dwell Time]
Set the dwell time of current detector.

Parameter	Description
Default value	CISPR configuration file Settings
Range	1ms ~ 1s
Unit	s、ms、μs、ns
Knob step	Step = one-tenth of the current unit Foe example:120ms step=1ms*0.1
The arrow keys step	Step in integer multiples of 1, 2, and 5
Association	None

3）[Return]

Return to the previous menu.

6.5.6 [List Control>]

6.5.6.1[Select Signal]

The default current signal is 1,the index is used as the current signal.When different signals are selected, the Meter Freq will change accordingly.

6.5.6.2[Marker Signal]

Mark the current signal.

6.5.6.3[Clean Marker]

Clear the mark of the current signal.

6.5.6.4[Marker All]

Mark all signals in the peak signal list.

6.5.6.5[Clan All Marker]

Clean the marker of all signal in the peak signals.

6.5.6.6[More>]

1）[Delete Signal]
Removes the current signal from the list.
2）[Delete All]
Removes all signals from the signal list.
3）[Delete Marker]
Remove all marked signals.
4）[Sort>]
a）[Frequency]
Sort all signals in the signal list by frequency.
b）[Detector Result]
Detector result 1:Sort the magnitude of positive peak values;
Detector result 2:Sort the magnitude of true RMS values;
Detector result 3:Sort the magnitude of average effective voltage.
c）[Difference Result]
Difference result 1:Sort the magnitude of positive peak difference;
Difference result 2:Sort the magnitude of true RMS difference;
Difference result 3:Sort the magnitude of average effective voltage

difference.

d）[Return]

Return to the previous menu.

5）[Sequence]

The list of peak signals is sorted in ascending or descending order

6）[Return]

Return to the previous menu.

6.5.7 [Meter Config>]

6.5.7.1[Meter Mode>]

Set the scanning mode of Meter measurement, which is divided into single and continuous sweep.

1) [Sweep Signal]

Sweep will stop after sweeping the metering frequency only once.

2) [Sweep Cont]

The measurement frequency is sweep continuously.

3) [Return]

Return to the previous menu.

6.5.7.2[Dwell Time]

Set the dwell time of meter mode.

Parameter	Description
Default value	10 ms
Range	1ms ~ 1s
Unit	s、ms、μs、ns
Knob step	Step = one-tenth of the current unit For example:120ms step=1ms*0.1
The arrow keys step	Step in integer multiples of 1, 2, and 5
Association	None

6.5.7.3[Reset MaxHold]

Reset the historical maximum values measured by the meters of the three types of detectors.

6.5.7.4[Close All]

All the detector interfaces in the Meter measurement are closed, and the measurement results are not displayed.

6.5.7.5[Detector Config>]

1）[Meter Select]
The default choice is 1 as the current measurement. Set different metering parameters.
2）[Meter Switch]
Enable or disenable the current selected meter detector.
3）[Meter Detector>]
The default menu button list: Meter 1 corresponds to the positive peak detector, Meter 2 corresponds to the true RMS detector, and Meter 3 corresponds to the average voltage detector. You can switch the current meter selection to any of the three detectors mentioned.
4）[Meter Limit>]
a）[Limit Switch]
Whether to display the limit values of the current measurement.
b）[Limit Value]
Set the limit values for the current meter detector. Used to determine if the amplitude at this meter frequency under measurement conditions exceeds the limit standards.
c）[Limit To Value]
Read limit line data under the meter detector according to the meter frequency.
d）[Return]
Return to the previous menu.
5）[Return]
Return to the previous menu.

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:

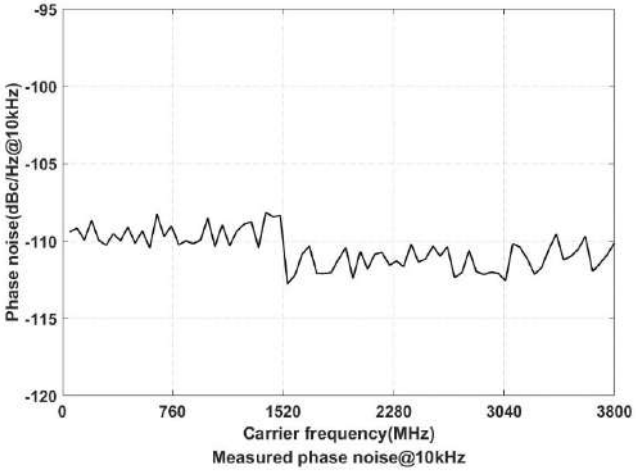
- The instrument has been preheated for 30 minutes before use.
- The instrument is in the calibration cycle and has been self-calibrated.

"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.

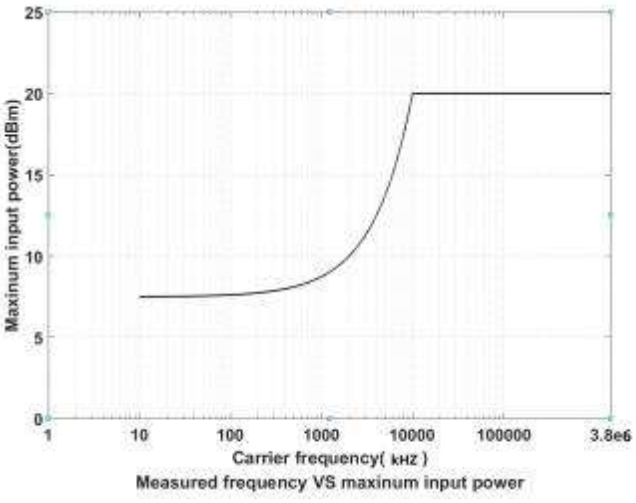
Frequency		
Frequency Range	HSA1016（TG）	9 kHz to 1.600000000 GHz
	HSA1036（TG）	9 kHz to 3.600000000 GHz
	HSA1075（TG）	9 kHz to 7.500000000 GHz
Frequency	1 Hz	
Internal Frequency Reference		
Reference	10 MHz	
Reference Frequency Accuracy	± [（days since last calibrate × freq aging rate）+ temperature stability + initial accuracy]	
Temperature stability	<1 ppm	
Aging rate	0℃ to 50℃，reference is 25℃	
	<0.5 ppm	
Reference Frequency	<1 ppm/year	
Frequency reading accuracy		
Reference	10.000000 MHz	
Reference Frequency Accuracy	± [（days since last calibrate × freq aging rate）+ temperature stability + initial accuracy]	
Frequency counter		
Counter resolution	1 Hz，10 Hz，100 Hz，1 kHz	

Counter uncertainty		±（frequency indication × frequency reference accuracy + counter resolution）
Frequency Span		
Span Range		0 Hz，100 Hz to max frequency of instrument
Span Uncertainty		± span / (sweep points-1)
SSB Phase Noise（20℃ to 30℃，fc=1GHz）		
Carrier Offset	10 kHz	< -106 dBc/Hz （Typical）
	100 kHz	< -104 dBc/Hz（Typical）
	1 MHz	< -115 dBc/Hz（Typical）



Residual frequency modulation 20℃ to 30℃，RBW=VBW= 1 kHz	
Residual frequency modulation	＜ 50 Hz（nominal）
Bandwidth	
Resolution Bandwidth （ -3 dB）	1 Hz to 1 MHz，step by 1-3-5-10
RBW Accuracy	< 5%（nominal）

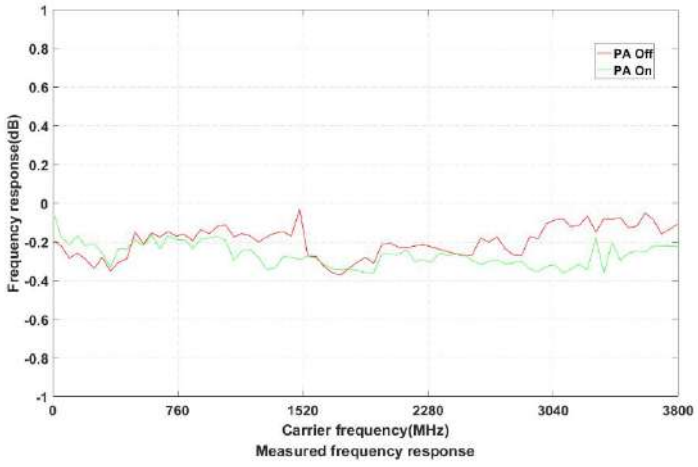
Resolution Filter Shape Factor（60 dB：3 dB）		＜5（nominal）
Video Bandwidth （-3 dB）		10 Hz to 3MHz，step by 1-3-5-10
Resolution Bandwidth （-6 dB ）（ EMI option）		200 Hz，9 kHz，120 kHz，1 MHz
Amplitude		
Measurement range		
Range	HSA1016（TG）	DANL to +10 dBm，100 kHz~ 10 MHz，Preamp Off DANL to +20 dBm，10 MHz~ 1.6 GHz，Preamp Off
	HSA1036（TG）	DANL to +10 dBm，100 kHz~ 10 MHz，Preamp Off DANL to +20 dBm，10 MHz~ 3.6 GHz，Preamp Off
	HSA1075（TG）	DANL to +10 dBm，100 kHz~ 10 MHz，Preamp Off DANL to +20 dBm，10 MHz~ 7.5 GHz，Preamp Off
Maximum input voltage		
DC voltage		50V
Continuous wave RF power		Attenuator is 40 dB +20 dBm（100 mW）
Maximum damage level		+30 dBm（1 W）



Displays the average noise level（DANL）

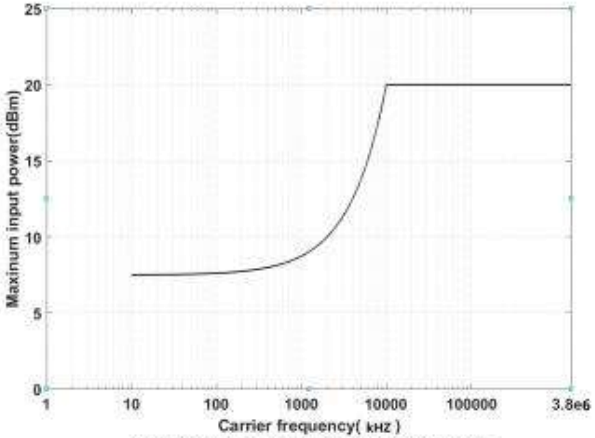
Frequency		Attenuator is 0 dB，Resolution Bandwidth and Video Bandwidth are 100 Hz，sample detection，trace average number	
Pr ea mp Off	HSA1016（TG）	9 kHz to 1 MHz	-95 dBm（Typical）, <-88 dBm
		1 MHz to 500 MHz	-140 dBm（Typical）, <-130 dBm
		500 MHz to 1.6 GHz	-138 dBm（Typical）, <-128 dBm
	HSA1036（TG）	9 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
	HSA1075（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 7.5 GHz	-129 dBm (Typical)， <-119 dBm
Pr ea	HSA1016（TG）	100 kHz to 1 MHz	-135 dBm （Typical）, <-128 dBm

mp On		1 MHz to 500 MHz	-160 dBm Typical），<-150dBm
		500 MHz to 1.6 GHz	-158 dBm (Typical)， <-148 dBm
	HSA1036（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
	HSA1075（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 7.5 GHz	-149 dBm (Typical)， <-139 dBm
Display level			
Log scale		0.01 dB to 1000 dB	
Line scale		0 to reference level	
Display point		801	
Trace number		5	
Detection mode		Pos detection，Neg detection，Normal，Sample，RMS，Average voltage	
		Quasi-peak value（EMI option）	
Trace function		Clear write, Max Hold, Min Hold, Average, View, Close, trace operation	
Scale unit		dBm，dBμW，dBpW，dBmV，dBμV，W，V	
Frequency response			
Preamp Off		fc ≥ 9 kHz，attenuator is 10 dB，Relative to 50 MHz，20℃ to 30℃	
		＜ 0.7 dB	
Preamp On		fc ≥ 100 kHz，attenuator is 10 dB，Relative to 50 MHz，20℃ to 30℃	
		＜ 1.0 dB	



Measured frequency response

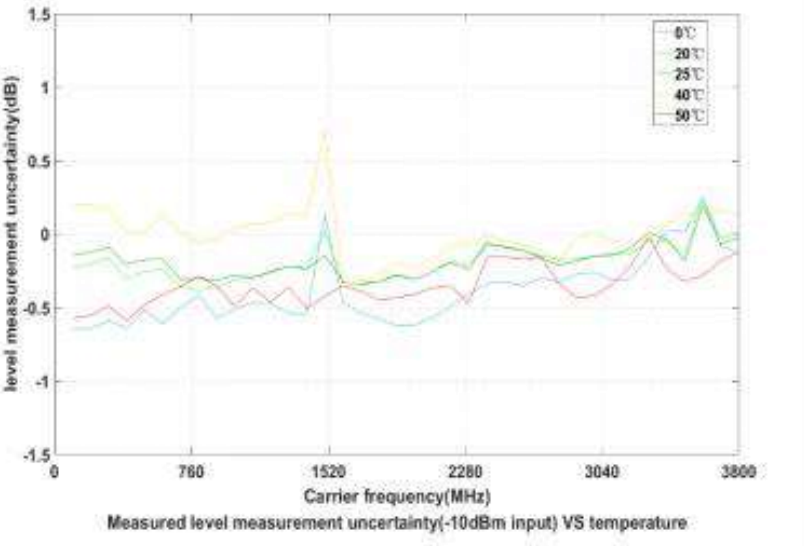
Input attenuation error	
Setting range	0 dB to 40 dB，step by 1 dB
Switching uncertainty	fc= 50 MHz，relative to 10 dB，20℃ to 30℃
	＜0.5 dB



Measured frequency VS maxinum input power

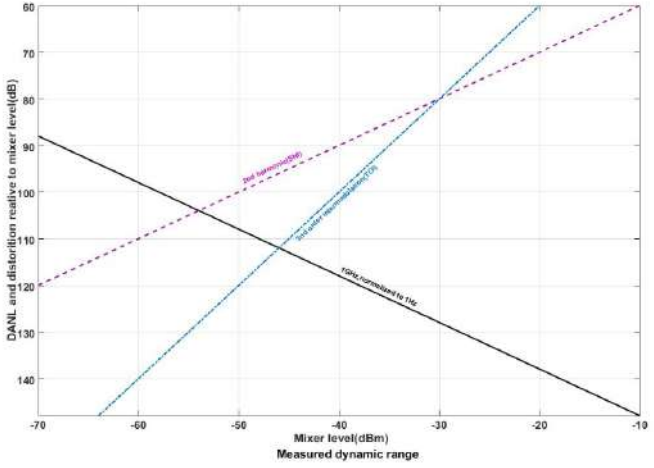
Absolute amplitude accuracy

Uncertainty	fc= 50 MHz，Peak detector，Preamp off，attenuator is 10 dB，Input signal level =-10 dBm，20℃ to 30℃		
	＜0.4 dB		
Resolution bandwidth switch			
Uncertainly	Relative to 10 kHz RBW		
	＜0.1 dB		
Reference level			
Range	-80dBm to +30 dBm，step by 1 dB		
Resolution	Log scale	0.01 dB	
	Line scale	4 digits	
Preamp			
Gain	HSA1016（TG）	100 kHz to 1.6 GHz	20 dB（nominal）
	HSA1036（TG）	100 kHz to 3.6GHz	
	HSA1075（TG）	100 kHz to 7.5 GHz	
Level measurement uncertainly（95% Confidence degree，S/N>20 dB，resolution bandwidth and Videobandwidth are1 kHz，Preamp off，attenuator is 10 dB）			
Level measurement uncertainly	＜0.7 dB		



Radio frequency input VSWR（Set attenuator≥10dB）			
VSWR	HSA1016（TG）	300 kHz to 1.6 GHz	＜1.8（nominal）
	HSA1036（TG）	300 kHz to 3.6 GHz	
	HSA1075（TG）	300 kHz to 7.5 GHz	

Distortion	
Second harmonic cut-off point	
Second harmonic cut-off point（SHI）	fc ≥ 50 MHz，input signal level is -20 dBm，attenuator is 10 dB
	＞ +45 dBm
Third order intermodulation cut-off point	
Third order intermodulation cut-off point（TOI）	fc ≥ 50 MHz，two magnitudes are -20 dBm，frequency interval 200 kHz Two-tone signal input mixer，attenuator is 0 dB
	＞ +14 dBm（Typical）
1dB Gain compression	
Input the 1dB compression point of the mixer（P1dB）	fc ≥ 50 MHz，attenuator is 0 dB
	＞ -2dBm（nominal）



Spurious response

Residual response	Input port connected to 50 Ω load，attenuator is 0 dB，20℃ to 30℃	
	<-90 dBm，Typical	
Medium	＜ -60 dBm	
System dependent sideband	Local oscillator correlation，A/D transformation correlation，harmonics and subharmonics of the first oscillator are related	
	＜ -60 dBc	
Input dependent spurious	Mixer level is -30 dBm	
	＜ -80 dBm	
Sweep		
Sweep Time	Sweep bandwidth≥ 100 Hz： 10 ms to 3000 s	
Sweep Time uncertainly	Sweep bandwidth≥ 100 Hz ：5%（nominal） Zero Sweep（Sweep time set vakue >1 ms）： 5%	
Sweep Mode	Continuous, Single	
Trigger		
Trigger source	liberty，video，external	
External trigger	5 V TTL level	
Trace source（option）		
Trace source output		
Frequency range	HSA1016（TG）	100 kHz to 1.6 GHz
	HSA1036（TG）	100 kHz to 3.6 GHz
	HSA1075（TG）	100 kHz to 7.5 GHz
Output level range	-40 dBm to 0 dBm	
Output level resolution	1 dB	
Output flatness	Relative to 50 MHz	

		±3 dB（nominal）
Tracking source stray		Harmonic stray：-20 dBc（Typical）（Output power of the tracking source is -10 dBm时）； Non-Harmonic stray：-20 dBc（Typical）（utput power of the tracking source is -10 dBm时）；
Tracking source to Input isolation		-60 dBm（utput power of the tracking source is 0 dBm）
Input/Output		
Front panel connector		
Radio frequency input	Resistance	50 Ω，nominal
	Connector	N-type negative head
Trace source output	Resistance	50 Ω，nominal
	Connector	N-type negative head
Internal/External reference		
Internal reference	Frequency	10 MHz
	Output level	+3 dBm to +10 dBm，+8 dBm（Typical）
	Resistance	50 Ω（nominal）
	Connector	BNC negative head
External reference	Frequency	10 MHz ± 5 ppm
	Output level	0 dBm to + 10 dBm
	Resistance	50 Ω（nominal）
	Conne	BNC negative head

	ctor	
External trigger output		
External trigger input	Resistance	1 kΩ（nominal）
	Connector	BNC negative head
Audio interface	Resistance	30 Ω（nominal）
	Connector	3.5 mm
Communication interface		
USB master terminal		
USB Host	Connector	A plug
	Treaty	USB 2.0
USB device end		
USB Devise	Connector	Micro USB
	Treaty	2.0 version
LAN		10/100Base，RJ-45
General technical specification		
Display		
Display type		TFT LCD
Display resolution		1024*768
Screen size		8 inches
Screen color		65536
Mass storage		
Mass storage		Flash disk (internal storage 50 MByte), USB flash
Environment		
Temperature	Operating temperature range	0 ℃ to 50 ℃
	Storage	-20 ℃ to 70 ℃

	temperature range	
Humidity	0℃ to 30℃	≤ 95% relative humidity
	30℃ to 40℃	≤ 75% relative humidity
Altitude	Altitude operation	3000 below
Appearance		
Dimension		265 mm (width)×190 mm (high)×58 mm (depth)
Weight		Approx. 2.5 kg (main engine)
Calibration interval time		
Recommended calibration interval		18 months

8. Troubleshooting

Typical issues that may occur when using your spectrum analyzer:

- Power on malfunction
- No signal displays
- Wrong measurement results or poor frequency or amplitude precision.

1. Power on malfunction

Power on malfunction can include a situation where the screen is still dark (no display) after switch on.

If the screen is still dark after power on, please check:

1) If the power supply has been connected correctly and if the power supply voltage range is within the specification.

2) If the power switch has been turned on.

2. No signal displays

If there is no signal display at any wave band. Please try the following: set a signal generator at 30 MHz frequency and -10 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 shake a lot or the frequency readout exceeds the error range during measurements, check if the signal source is stable. If so, check if spectrum analyzer reference is precise. Select internal or external frequency reference according to measurement conditions: press **FREQ** bottom softkey → [**Freq Ref Int Ext**]. 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.

9. Appendix

Appendix A: Enclosure

(The accessories subject to final delivery.)

Standard Accessories

Power Cord

CD Rom

Quick Guide

USB Cable

AC-DC Adapter

GPS Antenna

Metal Case

N-BNC joint

Options

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)

Carrying Case

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

Inspect the instrument and probes as often as operating conditions require.

To clean the instrument exterior, perform the following steps:

Wipe the dust from the instrument surface with a soft cloth. Take care not to scratch the transparent LCD protection screen when cleaning.

WARNING

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

Appendix C: USB Disk Requirements

USB disk requirements:

Max capacity 4G, NTFS file system is not supported.

If the USB disk doesn't work properly, format your USB disk and then try again.

Appendix D: PC Software Requirements

The PC software support Windows 11 \Windows 10 \ Windows 8 \ Windows 7 \ Windows Vista \ Windows 2000;the PC software does not support Windows XP.