SALUKI TECHNOLOGY

S3532/S3533 Series Spectrum Analyzers

User Manual

(Applies to S3532A、S3532B、S3533A、S3533B)

SALUKI TECHNOLOGY INC.

Catalog

Security Requirements

General Safety Summary

Understand the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid possible danger, be sure to use this product in accordance with regulations.

Use the correct power cord

Only use the power cord approved for this product in the country where you are using it.

Ensure the product is well grounded

This product is grounded through the protective grounding wire of the power supply. To prevent shock, the grounding wire must be well grounded to the earth; before connecting to any input and output terminals of this product, be sure to ground this device properly.

Use the correct power adapter

Use the AC/DC power adapter provided by our company to power the product. Other types of AC/DC power adapters are not allowed. Otherwise, the user will be responsible for all consequences arising therefrom.

Use the correct power supply

Different countries or regions have different power standards. Please check carefully whether the power required by this product is consistent with the local power standard, otherwise the device will be burned out.

Correct use of power fuse

Only fuses with the specified specifications for this product are allowed to be used.

View All Terminal Ratings

To avoid fire and shock from excessive current, please check all rated values and markings on the product. Please refer to the product manual for detailed information on rated values before connecting the product.

Use appropriate overvoltage protection

Make sure that no high voltage (such as that caused by lightning) is applied to the product, otherwise the operator may be at risk of electric shock.

Do not open the cover to operate

Do not operate this product with the metal casing of the instrument opened or the fixing screws loose.

If you suspect a product malfunction, do not operate it.

If you suspect that the product is faulty, please contact a maintenance personnel authorized by SALUKI for inspection. Any maintenance, adjustment or parts replacement must be performed by maintenance personnel authorized by SALUKI. Unauthorized disassembly will result in the warranty period being void.

Maintain good ventilation

In an environment with poor ventilation conditions, the internal temperature of the instrument will rise, which may cause damage to the instrument. Maintain good ventilation conditions during use and check and clean the ventilation passages regularly.

Do not operate in a wet environment

To avoid the risk of short circuit or electric shock in the instrument's internal circuit, do not operate the instrument in a humid environment.

Do not operate in flammable or explosive environments

To avoid instrument damage or personal injury, do not operate the instrument in a flammable or explosive environment.

Please keep the product surface clean and dry

To prevent dust or moisture in the air from affecting the performance of the receiver, please keep the surface of the product clean and dry.

Anti-static protection

Static electricity can damage the instrument, so the test should be performed in an anti-static area as much as possible. Before connecting the cable to the instrument, its inner and outer conductors should be grounded briefly to release static electricity.

Pay attention to handling safety

To prevent the instrument from slipping during transportation and causing damage to interfaces and other parts, please pay attention to transportation safety.

Daily care and cleaning

General Maintenance

Do not place the instrument in a place exposed to sunlight for a long time. Please store the instrument in a cool and dry place if it is not used for a long time.

Be careful

Do not allow any corrosive liquid to stick to the instrument to avoid damaging it.

Clean

Please clean the instrument regularly according to usage. The method is as follows:

- Disconnect the power supply and turn off the instrument.
- Use a damp but non-dripping soft cloth (mild detergent or water can be used) to wipe the dust off the outside of the instrument.
- You can also use a neutral computer cleaning paste to wipe the dust off the outside of the instrument.
- Use a soft cloth or cotton wool dipped in anhydrous alcohol to wipe the outside of the instrument, ports, connectors, etc.

Warning **Before reconnecting the power supply, please make sure that the instrument is completely dry to avoid short circuit or even personal injury caused by moisture.**

Safety terms and Symbols

Terms in this manual. The following terms may appear in this manual:

Warning
Statement identifies conditions and actions that could endanger the life of operators.

Notice
Statement identifies conditions and actions that could cause damage to the product or loss of data.

Terms on the Product. The following terms may appear on the Product:

Danger This means that if you do this, it may cause immediate harm to you.

Warning Indicates that performing this operation may cause potential harm to you.

Notice Indicates that performing this operation may cause damage to the product or other devices connected to it.

Symbols on the product. The following symbols may appear on the product:

Work Environment

Temperature

- Working ambient temperature:0℃~+40℃
- Storage temperature:-30℃~+70℃

Relative humidity

- ≥+10℃, humidity ≤95%RH
- ≥+30℃, humidity ≤75%RH
- ≥+40℃, humidity ≤45%RH

Altitude

- 0～4600 m

Note: The above three working environment requirements are only for the instrument operating environment and are not technical indicators.

Ventilation and heat dissipation requirements

In order to ensure that the working environment temperature of the instrument is within the temperature range required by the working environment, the heat dissipation space requirements of the instrument should be met:

- Heat dissipation distance of the rear of the instrument ≥150mm
- Heat dissipation distance between the left and right sides of the instrument ≥ 100mm

Electrostatic Requirements

Please correctly apply the following anti-static measures to reduce electrostatic damage:

- Ensure that all instruments are properly grounded
- Before connecting the coaxial cable to the instrument, discharge the inner and outer conductors of the cable by contacting them with the ground.
- Operators must wear anti-static wrist straps or take other anti-static measures before touching connectors, wires or performing assembly operations.

Confirm the power supply

Mainland China must meet the following requirements:

- Voltage：AC220±10%
- Frequency：50～60Hz

Preventing mutual interference through power supply

To prevent multiple devices, especially instruments and high-power devices, from being connected to the same power grid, it is recommended to use an AC regulated power supply to power the instrument, as the pulse interference generated by the high-power devices may cause the instrument to malfunction or even be damaged.

Confirm the power cord

The instrument uses a three-core power cord interface, which complies with national standards. It is necessary to confirm that the power protection ground wire has been reliably connected to the ground. Floating ground or poor grounding may cause damage to the instrument. It is strictly forbidden to use a power cord without a protective ground. Before turning on the power, confirm that the power cable is in good condition and complete, and use the power cord to connect the instrument power plug and a well-grounded three-core power socket.

1. Users must read

Welcome to use the S3532 / S3533 series spectrum analyzer produced by SALUKI! Please check and verify the items in the package according to the following steps after unpacking, and read the "Precautions before Powering on" section of this manual before use, so as to find problems as early as possible and prevent accidents. If you find any problems, please contact us and we will solve them as soon as possible.

1.1 Initial inspection

1) Inspect the box for damage.

2) Take the spectrum analyzer out of the packaging box and check whether the instrument has been damaged during transportation.

3) Verify that all accessories and documents are included with the instrument by checking the packing list. If the packing box or the shock-absorbing material inside the box is damaged, first check that the instrument and accessories inside the box are intact before testing the electrical performance of the spectrum analyzer.

4) If the instrument is damaged or the accessories are missing during transportation, please inform us and we will repair or replace it as soon as possible according to your requirements. Please keep the shipping materials for future packaging and transportation. For handling methods, please refer to Chapter 6 "Returning the Spectrum Analyzer for Repair".

1.2 Safety precautions before use

1.2.1 Check the power supply

Before turning on the analyzer, make sure that the AC power ground wire is reliably grounded before plugging the power cord into a standard three-core socket. Never use a power cord without a protective ground. A floating ground or poor grounding may damage the spectrum analyzer or even cause personal injury.

1.2.2 Allowable variation range of power supply parameters

The power cord of the S3532 / S3533 series spectrum analyzers uses 110V/220V, 50Hz AC. Table 1-1 lists the power requirements for the S3532A spectrum analyzer

when it is working normally.

In order to prevent or reduce the mutual interference caused by multiple devices through the power supply, especially the spike pulse interference generated by high-power devices, which may cause damage to the spectrum analyzer hardware, it is best to use a 110V/220V AC regulated power supply.

Table 1-1 Operating power supply range

Power supply parameters	Applicable scope
Voltage	110V/220V
Frequency	50Hz ~ 60Hz
Maximum power consumption	30W

1.2.3 Power cord selection

It is recommended to use the dedicated power cord provided by our company, or a 110V/220V AC power cord approved and tested in the country where you are located.

Warning

Before powering on the spectrum analyzer, please verify that the power supply voltage is normal to avoid damage to the equipment. For the first power-on, please read Section 3 of this chapter, “First Power-On of the Spectrum Analyzer.”

1.2.4 Electrostatic protection

Electrostatic protection is an issue that is often ignored by users. The damage it causes to the instrument is often not immediately apparent, but it will greatly reduce the reliability of the instrument. Therefore, electrostatic protection measures should be taken as much as possible under conditions, and correct anti-static measures should be adopted in daily work.

Usually we take two anti-static measures:

1) Conductive table mat and wrist set.

2) Conductive floor mat and ankle combination.

The above two can provide good anti-static protection when used together. If used alone, only the former can provide protection. To ensure user safety, the anti-static component must provide at least 1MΩ isolation resistance from the ground.

Warning The above anti-static measures cannot be used in situations where the voltage exceeds 500V！

Correctly apply anti-static technology to reduce damage to components:

1) Before connecting the coaxial cable to the spectrum analyzer for the first time, briefly touch the inner and outer conductors of the cable to ground.
2) Workers must wear anti-static wrist straps before touching the connector core wires or doing any assembly.
3) Ensure that all instruments are properly grounded to prevent static electricity accumulation.

1.3 Initial Power-up of the Spectrum Analyzer

The S3532 / S3533 Series spectrum analyzers can be powered via the power cord.

Warning

Before using the instrument, please make sure that the AC power voltage meets the instrument input voltage requirements. This may cause damage to the equipment. Before plugging the AC socket into the instrument, please make sure that the power cord is qualified. Otherwise, the instrument may be damaged.

2. Quick Start

This chapter introduces the interface and user interface of the spectrum analyzer, the precautions for first-time use, and demonstrates its usage through a measurement example.

2.1 Front Panel Description

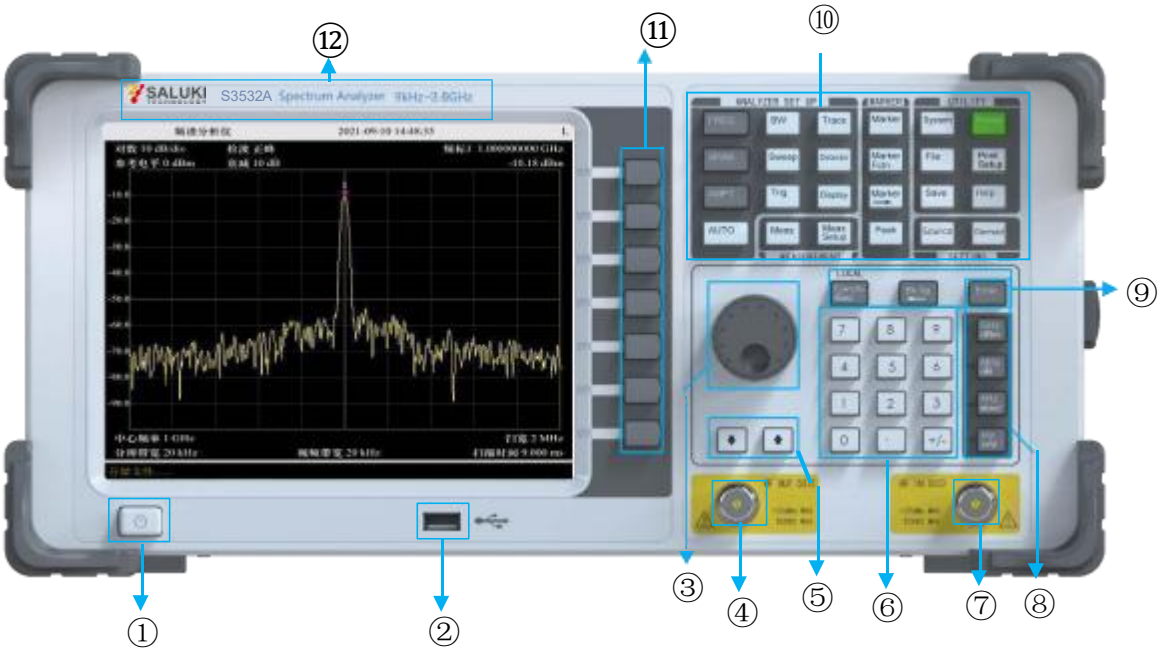


Figure 2-1 Front Panel View

Table 2-1 Front Panel Description

No.	Description	No.	Description
①	Power switch	⑦	RF input
②	Device USB port	⑧	Unit keyboard area
③	Knob	⑨	Confirm key
④	Tracking source output	⑩	Function key area
⑤	Up and down arrow keys	⑪	Soft menu key area

⑥	Numeric keypad area	⑫	Logo and product model

2.1.1 Front panel function keys

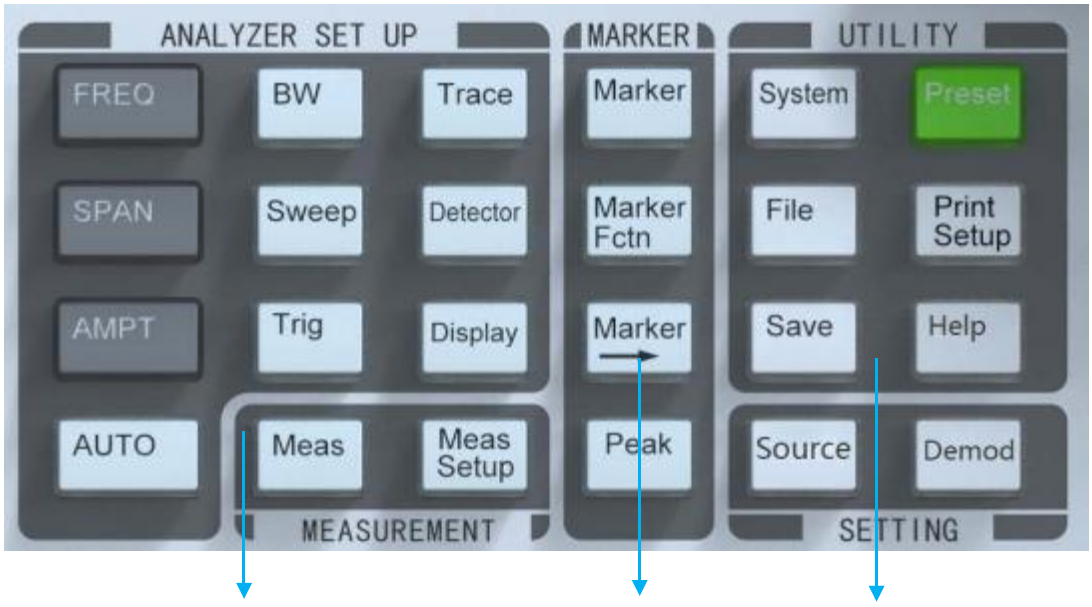


Figure 2-2 Front panel function keys

Table 2-1 Brief description of function keys

Function keys	Functional Description
Common function keys	
FREQ	Set the center, start and end frequencies, and a soft menu for setting the frequency function will pop up.
SPAN	Activate the frequency span, set the spectrum analyzer to the center frequency span mode, and a soft menu for setting the span will pop up.
AMPT	Activate the reference level function and set parameters such as reference level, RF attenuator, scale, etc.

Parameter setting keys	
BW	Set the resolution bandwidth and video bandwidth related parameters of the spectrum analyzer.
Sweep	Set the sweep mode.
Trace	Set the trace parameters of the sweep signal.
Detector	Set the detection method.
AUTO	Automatically locate the signal in the entire frequency band.
Cursor measurement keys	
Peak	Open the peak search setup menu and execute the peak search function at the same time.
Marker	Use the cursor to read the amplitude, frequency or sweep time of each point on the trace. Noise cursor, frequency count, N(x)dB bandwidth.
Marker →	Use the current cursor value to set other corresponding parameters of the instrument.
System function keys	
Preset	Set the spectrum analyzer to reset state.
System	Set system related parameters.
Save	File management menu.

2.1.2 Parameter input interface

Parameter input can be completed through the numeric keyboard, knob and direction keys.

1) Arrow keys

Figure 2-3 Arrow keys

The function of the direction keys is: when entering parameters, the up and down keys indicate that the parameter value increases or decreases in a certain step.

2) Numeric Keypad

Figure 2-4 Numeric Keypad

a) Number keys: Use the number keys 0-9 to directly input the required parameter value.

b) Decimal point: Click this key to insert a decimal point "." at the current cursor position.

c) Sign key: The sign key "+/-" is used to change the parameter sign. First click this key, the parameter sign is "-", click this key again, the sign switches to "+".

3) Confirm keyboard

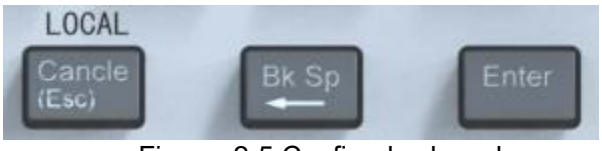


Figure 2-5 Confirm keyboard

a) Cancel key: Cancel the currently entered parameters.

b) Backspace key:

<1> During parameter input, pressing this key will delete the character to the left of the cursor;

<2>When editing a file name, click this key to delete the entered characters.

c) Confirm key: Used in the process of inputting parameters. Clicking this key will end the parameter input and add the default unit value to the parameter.

2.2 Rear Panel Description

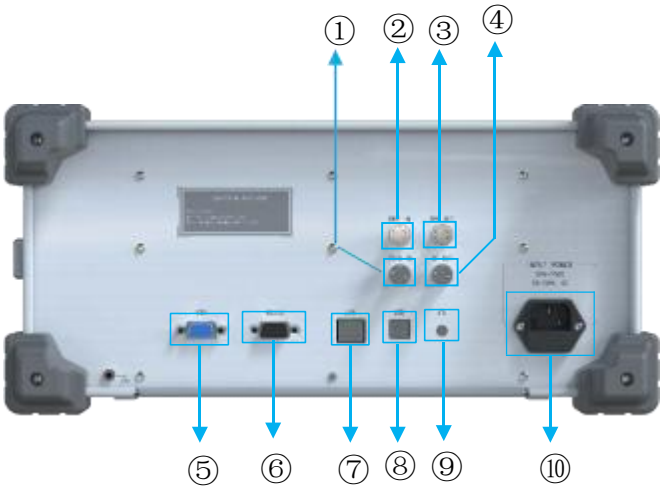


Figure 2-6 Rear Panel View

Table 2-3 Rear panel markings

No.	Description	No.	Description
①	External trigger input	⑥	RS232
②	External reference 10MHz input	⑦	LAN
③	10MHz output	⑧	USB Host
④	IF output	⑨	Headphone jack
⑤	VGA signal output	⑩	110V/220V Power Input

2.2.1 AC Power Connector

AC power input: AC voltage 100V-240V, frequency 50/60Hz.

2.2.2 External 10MHz input

The reference clock input is connected via a BNC cable.

2.2.3 Headphone port

This port can be used to listen to the audio demodulation supported by the spectrum analyzer.

2.2.4 USB interface

The spectrum analyzer can act as a "host device" to connect to external devices via a USB cable and control the external devices.

2.2.5 VGA interface

The spectrum analyzer can be used as a "master device" to provide a video signal output.

2.2.6 Network port

This interface can connect the spectrum analyzer to the local area network for remote control, quickly build a test system, and easily achieve system integration.

2.2.7 Serial Port

This interface can connect the spectrum analyzer to external devices to implement serial interface control.

2.3 User Interface

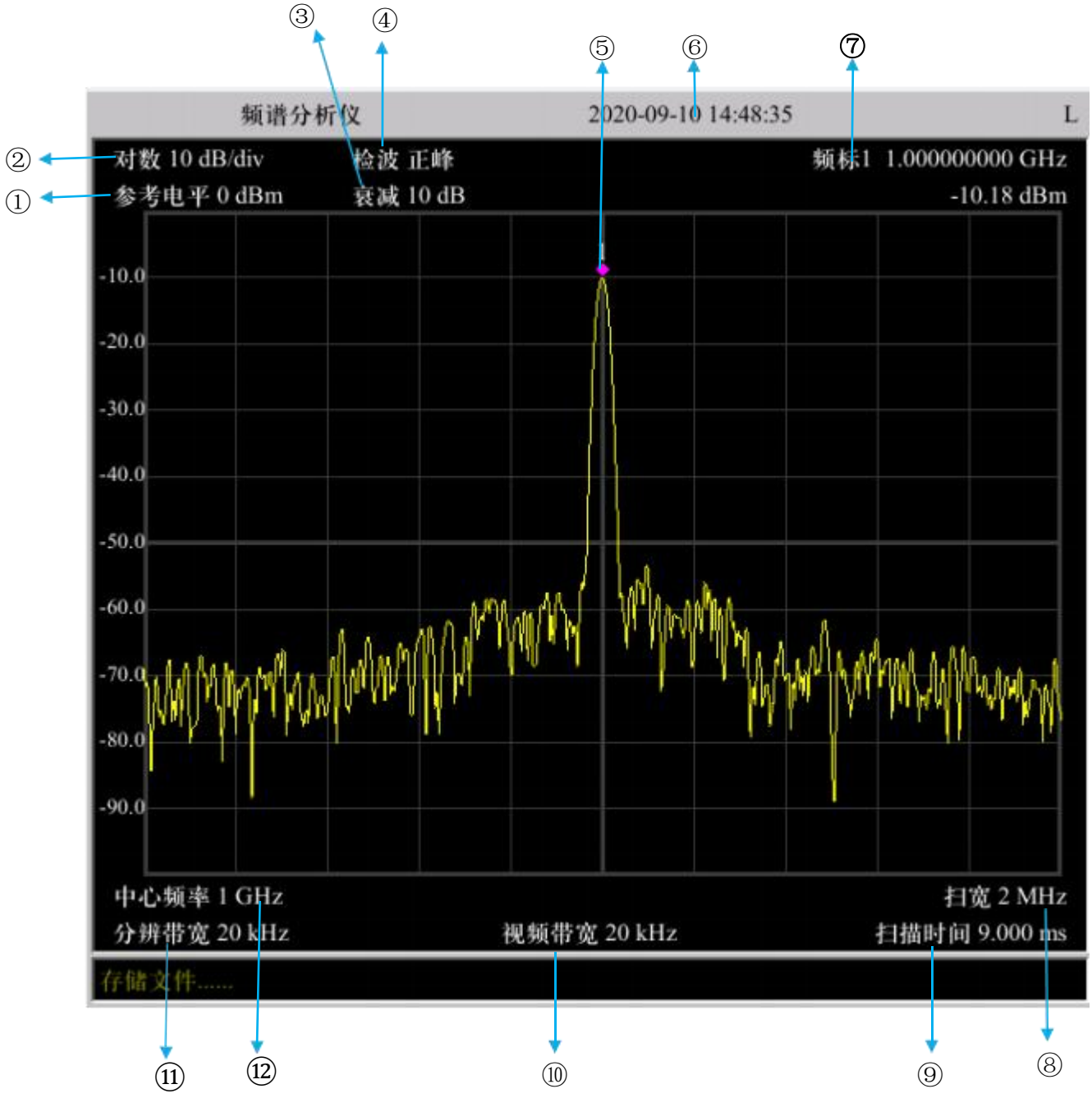


Figure 2-7 User Interface View

Table 2-4 User interface label description

NO.	Item	Description
①	Reference level	Display reference level
②	Logarithmic scale display	Display data output format logarithmic or linear
③	Attenuation value	Display RF attenuator value
④	Detection mode	Display spectrum curve detection method
⑤	Cursor	Display cursor position
⑥	Time	Display time
⑦	Cursor reading	Display measured frequency and amplitude
⑧	Span width	Display span value
⑨	Sweep time	Display sweep time
⑩	Video bandwidth	Display video bandwidth value
⑪	Resolution bandwidth	Display resolution bandwidth value
⑫	Center frequency	Display center frequency value

2.4 Basic Measurements

The following demonstrates the measurement of continuous wave signals and introduces the basic measurement methods of spectrum analyzer using S3532A as an example. A signal generator (Agilent N5183B) is used to output a continuous wave signal with a frequency of 1GHz and an amplitude of -10dBm as the measurement source signal.

Notice

The input signal amplitude must not exceed +27 dBm (0.5W) to avoid damaging the spectrum analyzer.

The measurement steps are as follows:

1) Connecting devices

Connect the signal output of the signal generator to the RF input of the spectrum analyzer [RF IN 50Ω].

2) Parameter settings

a) Reset the instrument

- Press the [Preset] button on the instrument. All parameters will be restored to factory settings.

b) Set the center frequency

- Press the [FREQ] key, the frequency menu appears in the soft menu area of the screen, the [Center Frequency] soft menu is highlighted, and the center frequency parameter appears in the upper left corner of the screen, indicating that the center frequency function is activated.
- The center frequency value can be changed using the numeric keyboard, knob or arrow keys.
- Press the numeric keys and enter 1GHz to set the center frequency of the spectrum analyzer to 1GHz.

c) Setting the span

- Press the [SPAN] key, and the span menu appears in the soft menu area of the screen. The [Span] soft menu is highlighted, and the span parameter appears in the upper left corner of the screen, indicating that the span function is activated.
- The span value can be changed using the numeric keyboard, knob, or arrow keys.
- Press the number keys and enter 2MHz, then the span of the spectrum analyzer is set to 2MHz.

After completing the above steps, a 1GHz spectrum curve can be observed on the spectrum analyzer.

3) Using cursors to measure frequency and amplitude

- Press the [Peak] key, the cursor will be marked at the maximum peak of the signal, and the frequency and amplitude values of the cursor will be displayed in the upper left corner of the screen.

4) Reading measurement results

The signal with input frequency of 1GHz and amplitude of -10dBm is measured by spectrum analyzer as shown in Figure 2-8.

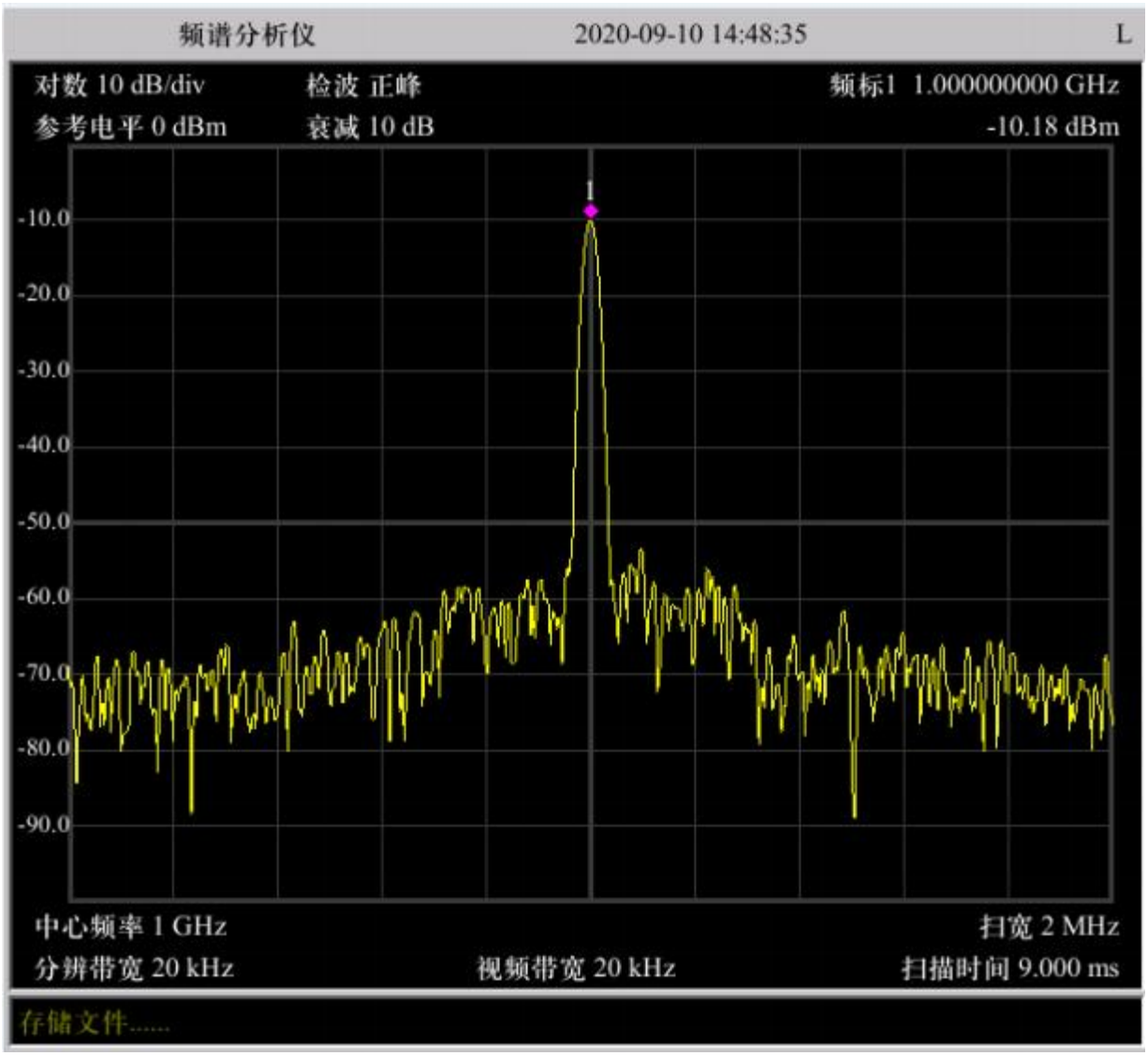


Figure 2-8 Measurement Signal View

3. Menu Description

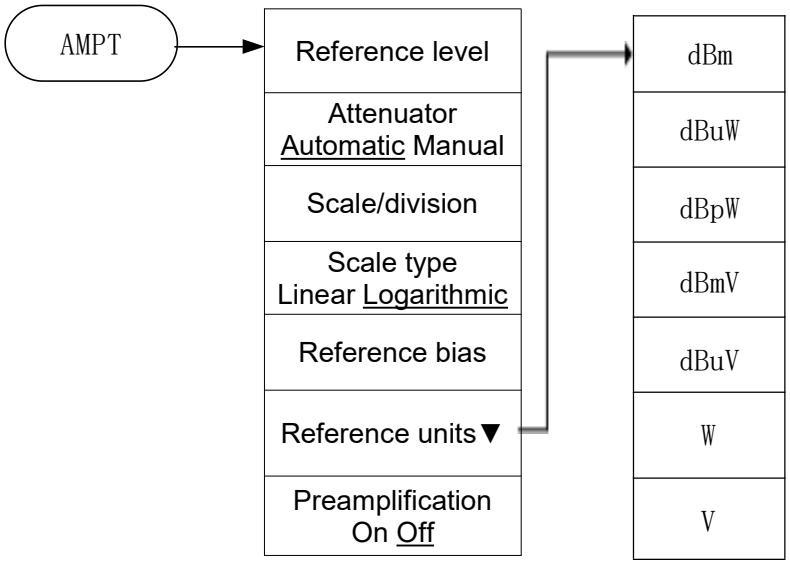
This chapter provides a function map of the spectrum analyzer panel buttons and explains the meaning of each menu in detail.

3.1 Menu Map

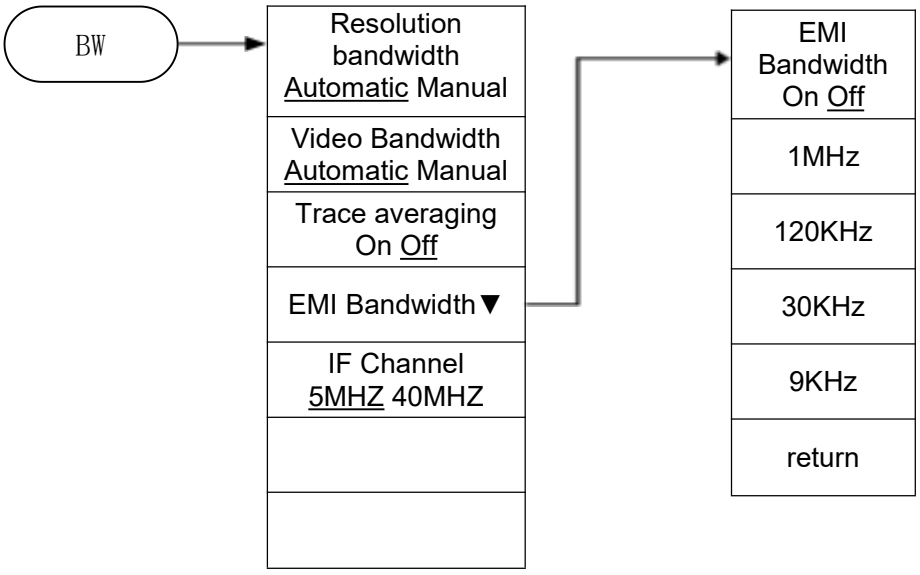
This section provides a function map of the menu buttons on the spectrum analyzer panel in alphabetical order from A to Z. For the specific meaning of each menu, please refer to the next section.

- AMPT
- BW
- Demod
- Detector
- Display
- File
- FREQ
- Marker
- Marker→
- Marker Fctn
- Meas
- Meas Setup
- Peak
- Print Setup
- Save
- Source
- SPAN
- Sweep
- System
- Trace
- Trig

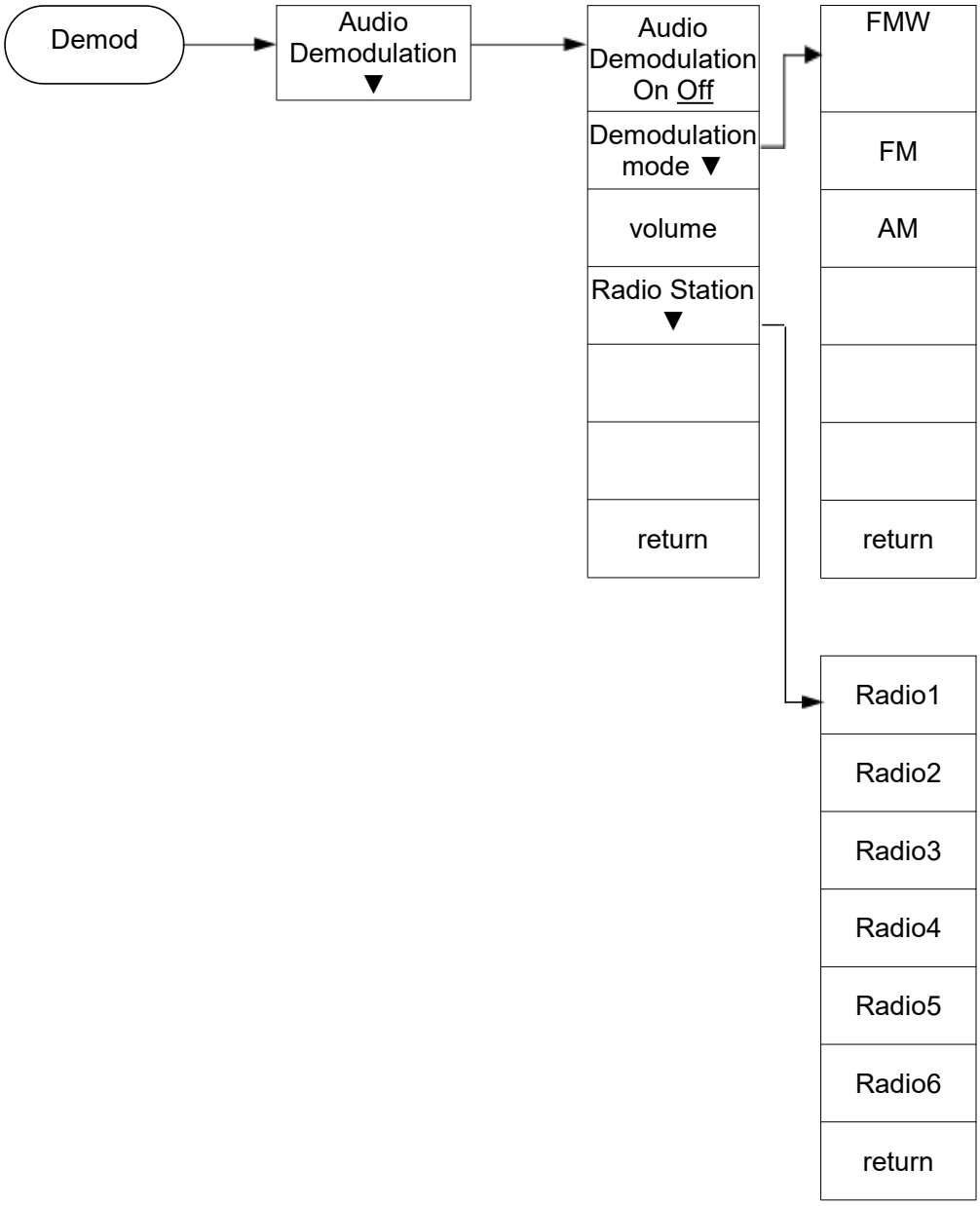
3.1.1 AMPT



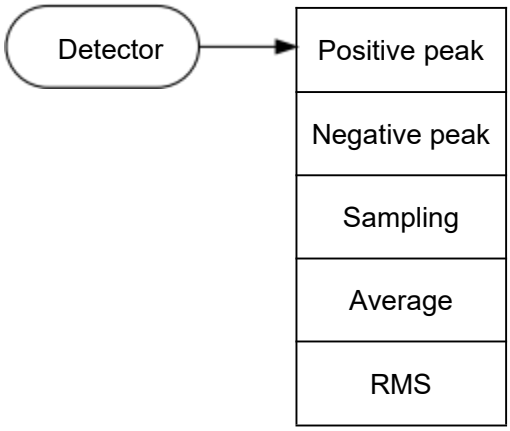
3.1.2 BW



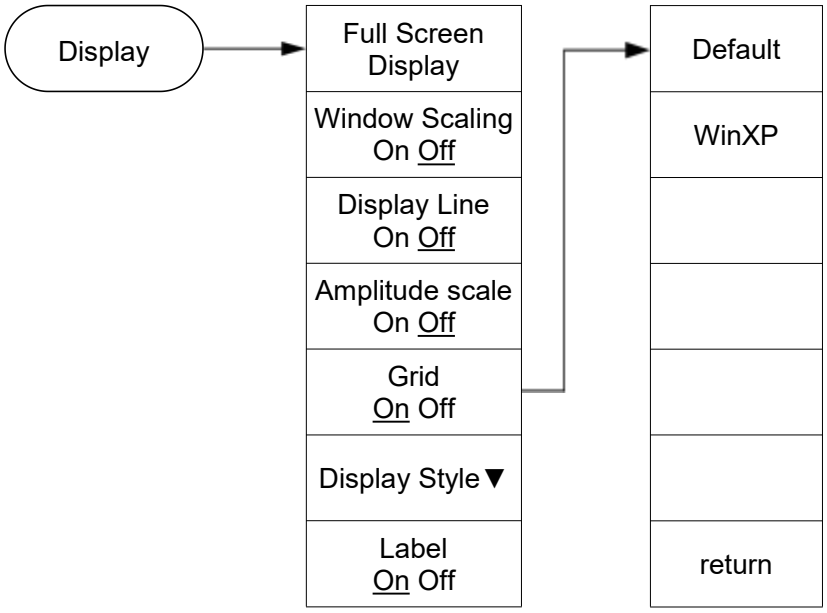
3.1.3 Demod


Demod
Audio Demodulation ▼
Audio Demodulation On Off
Demodulation mode ▼
volume
Radio Station ▼
return
FMW
FM
AM
return
Radio1
Radio2
Radio3
Radio4
Radio5
Radio6
return

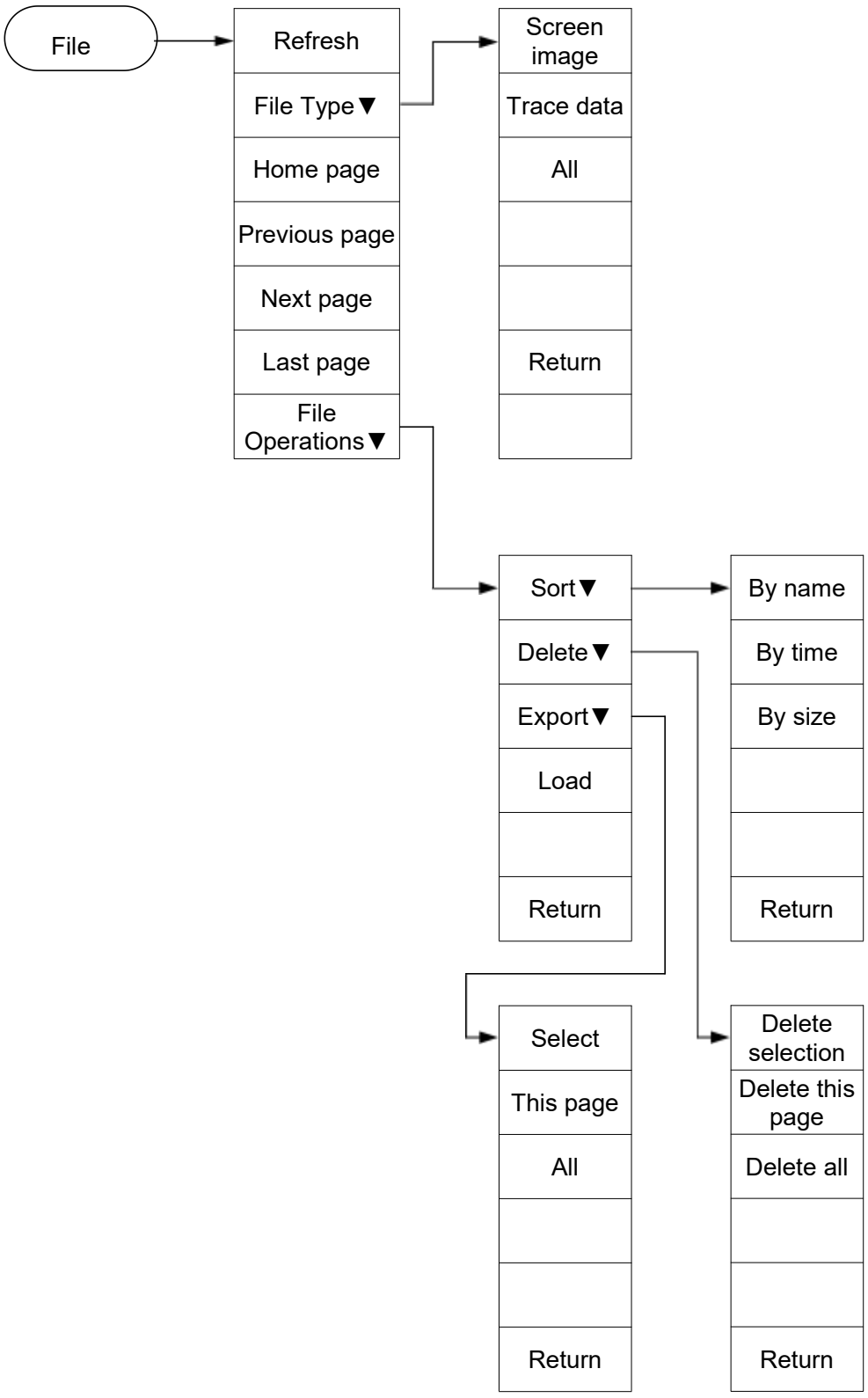
3.1.4 Detector



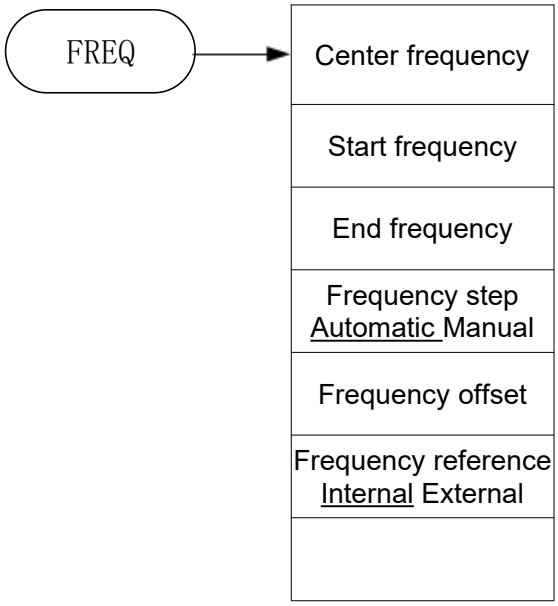
3.1.5 Display



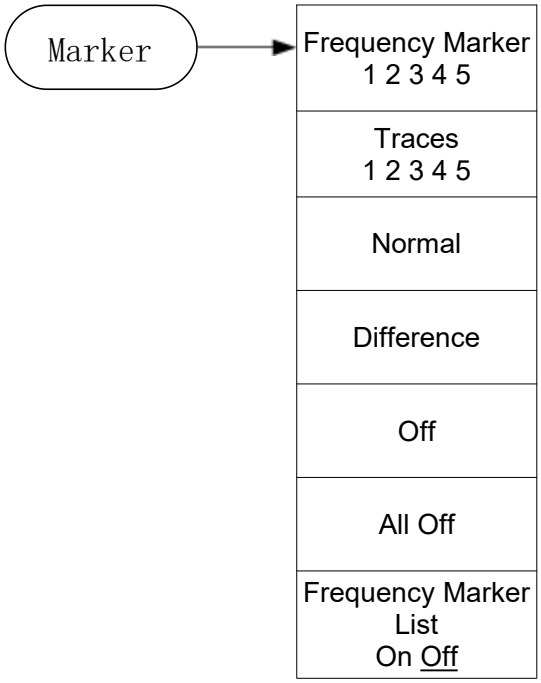
3.1.6 File


File
Refresh
File Type▼
Home page
Previous page
Next page
Last page
File Operations▼
Screen image
Trace data
All
Return
Sort▼
Delete▼
Export▼
Load
Return
By name
By time
By size
Return
Select
This page
All
Return
Delete selection
Delete this page
Delete all
Return

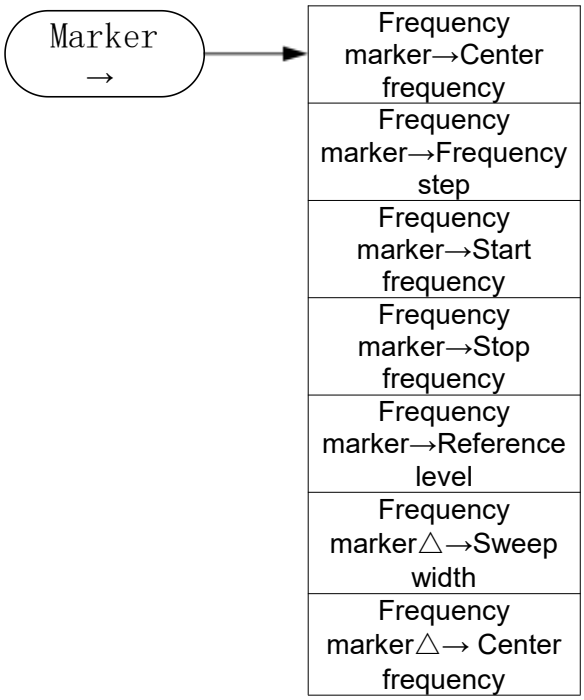
3.1.7 FREQ



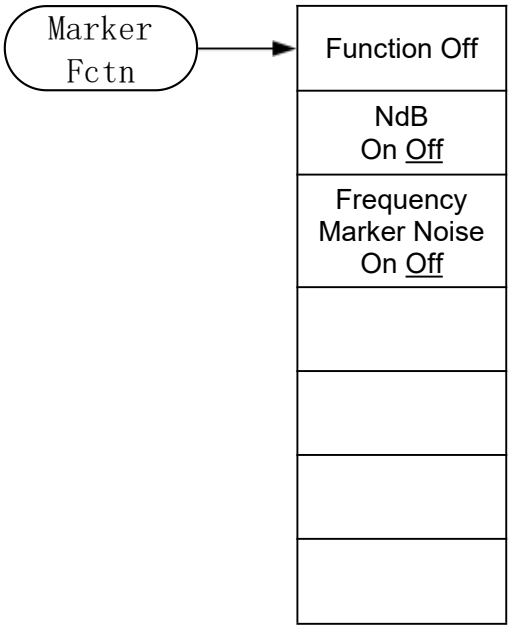
3.1.8 Marker



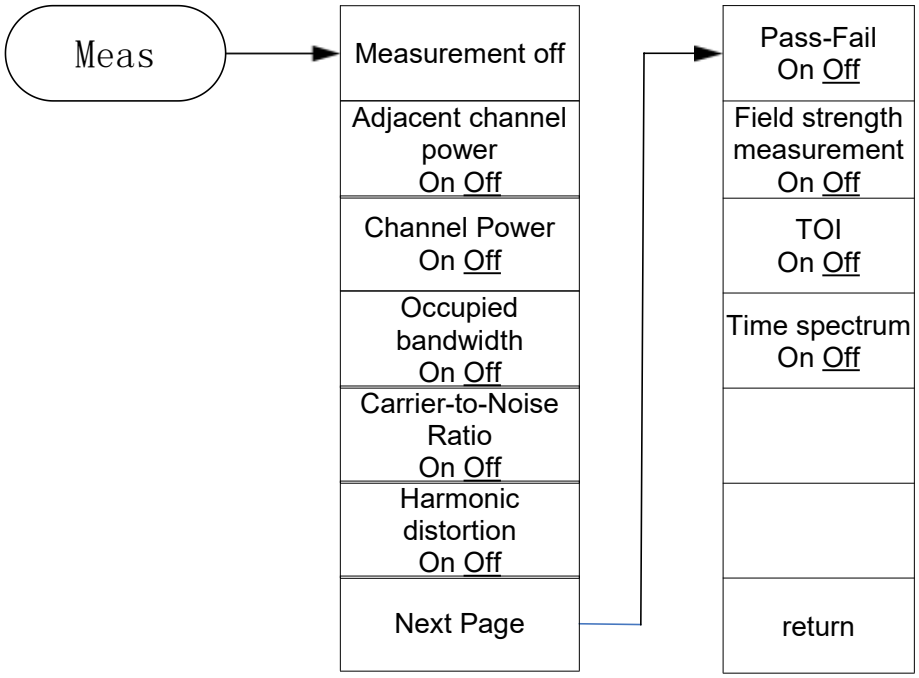
3.1.9 Marker→



3.1.10 Marker Fctn



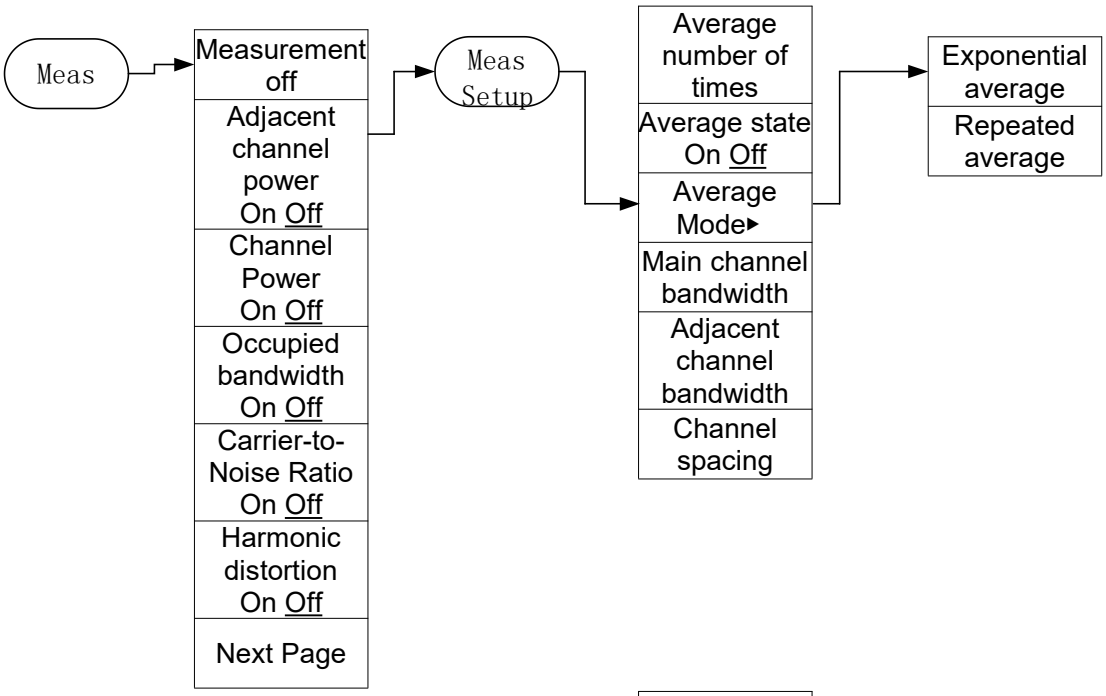
3.1.11 Meas

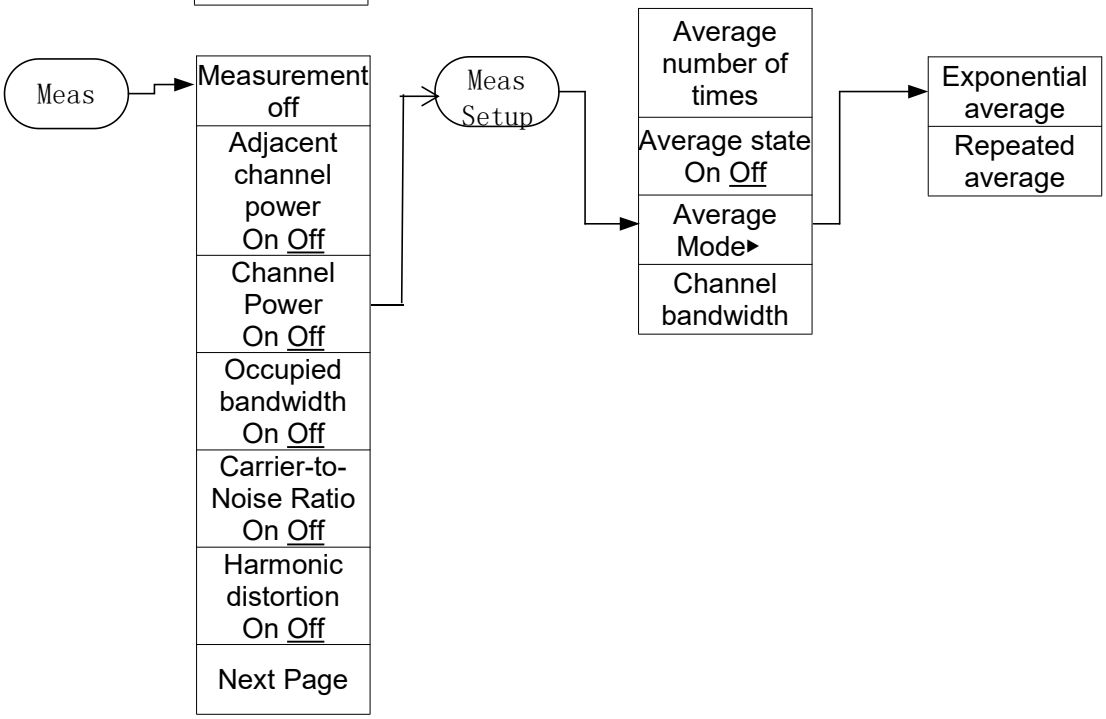


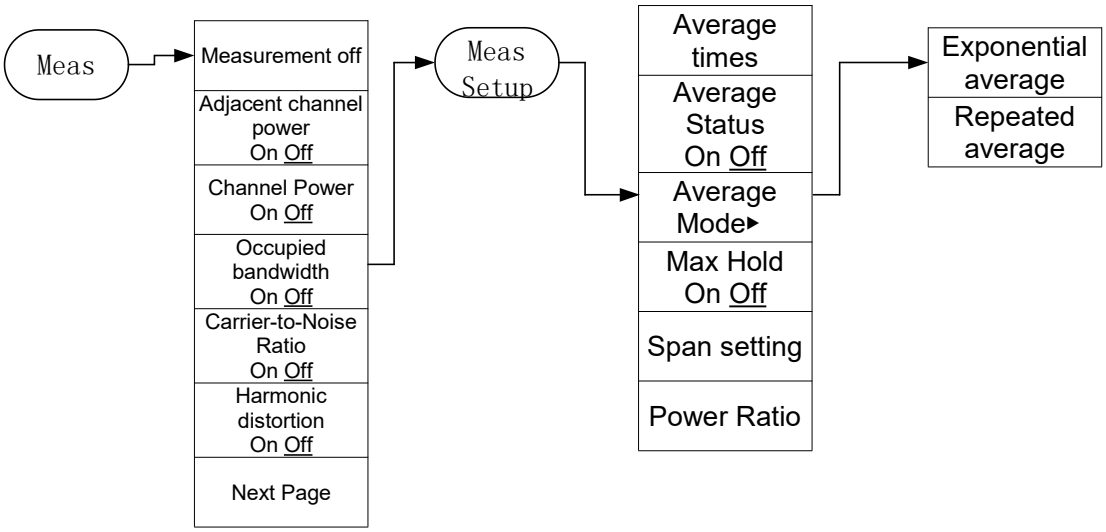
3.1.12 Meas Setup

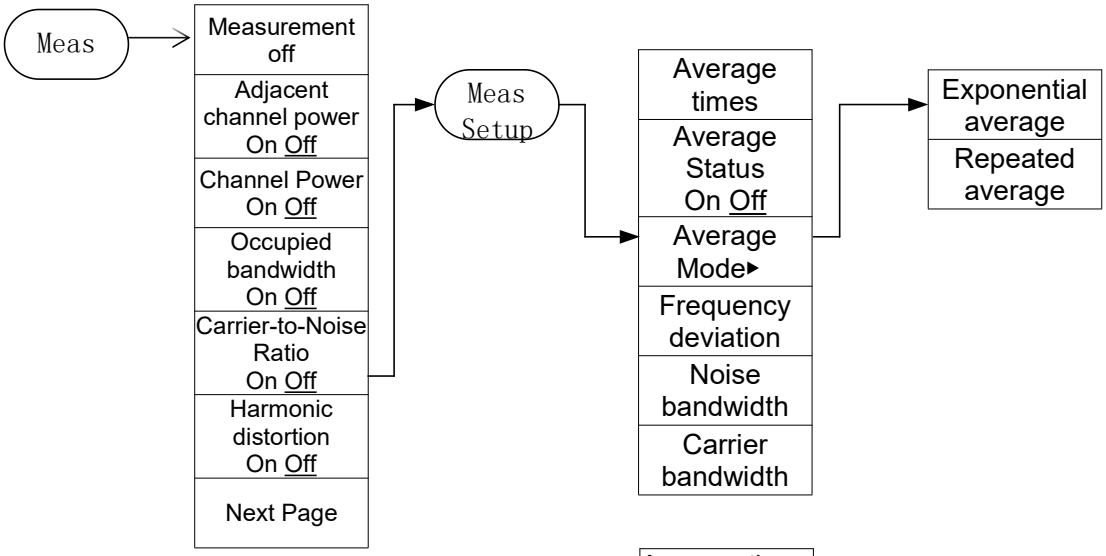
Meas Setup All parameter settings can only be performed after the corresponding measurement function of Meas is enabled, such as measuring adjacent channel power:

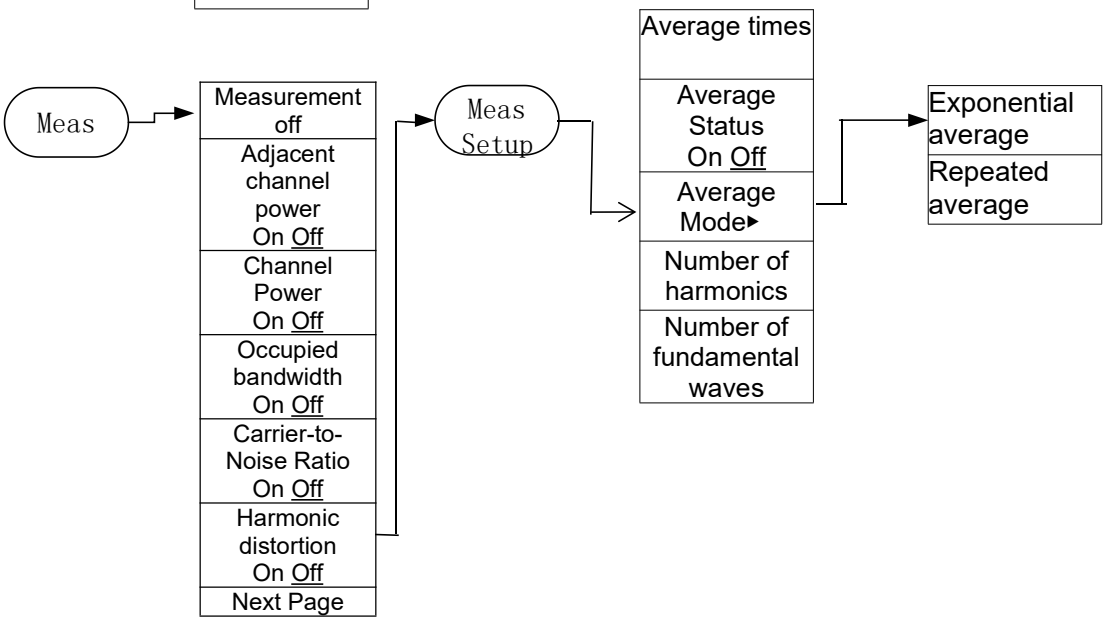
- —Press [Meas] → [Adjacent Channel Power] → [Meas Setup] to measure the adjacent channel power data.

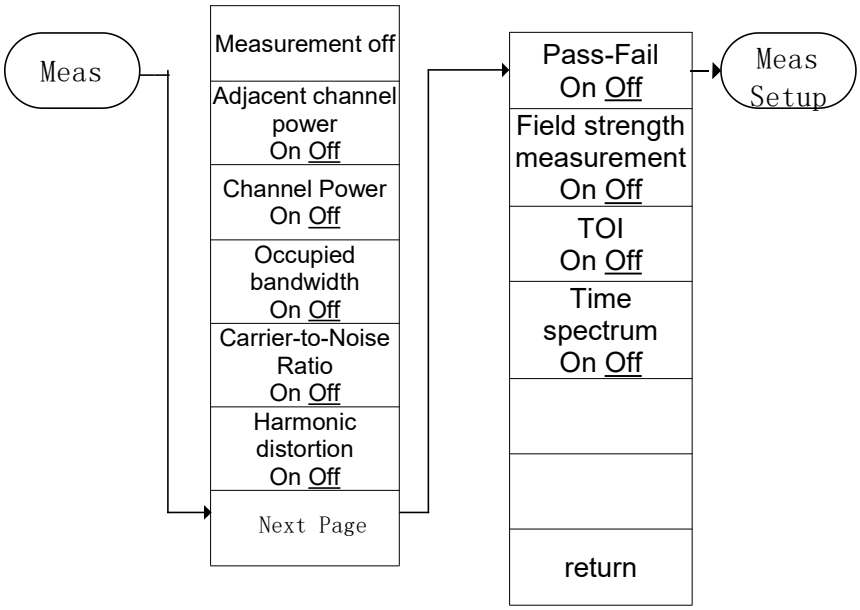

Meas
Measurement off
Adjacent channel power On Off
Channel Power On Off
Occupied bandwidth On Off
Carrier-to-Noise Ratio On Off
Harmonic distortion On Off
Next Page
Meas Setup
Average number of times
Average state On Off
Average Mode▸
Main channel bandwidth
Adjacent channel bandwidth
Channel spacing
Exponential average
Repeated average

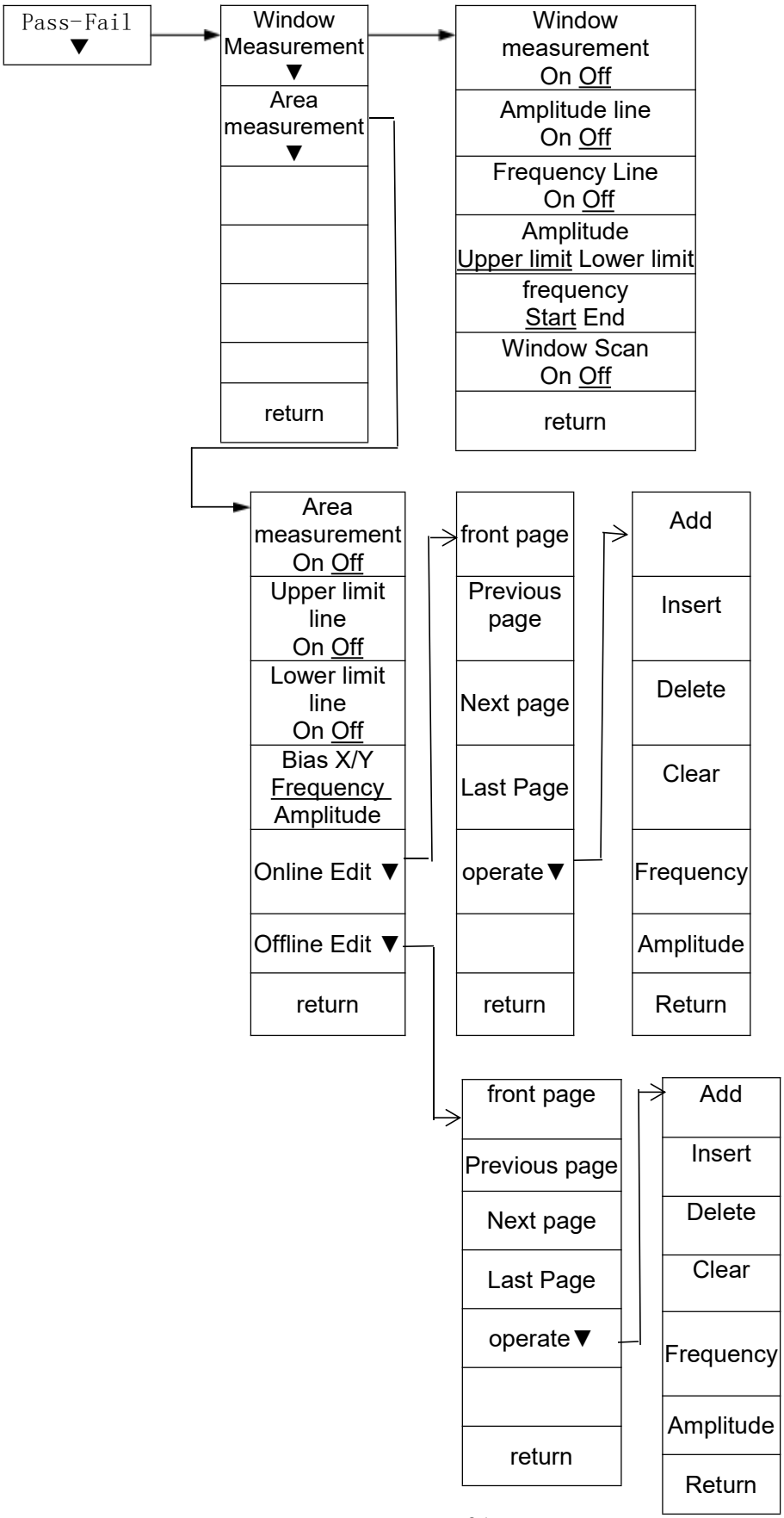

Meas
Measurement off
Adjacent channel power On Off
Channel Power On Off
Occupied bandwidth On Off
Carrier-to-Noise Ratio On Off
Harmonic distortion On Off
Next Page
Meas Setup
Average number of times
Average state On Off
Average Mode▸
Channel bandwidth
Exponential average
Repeated average

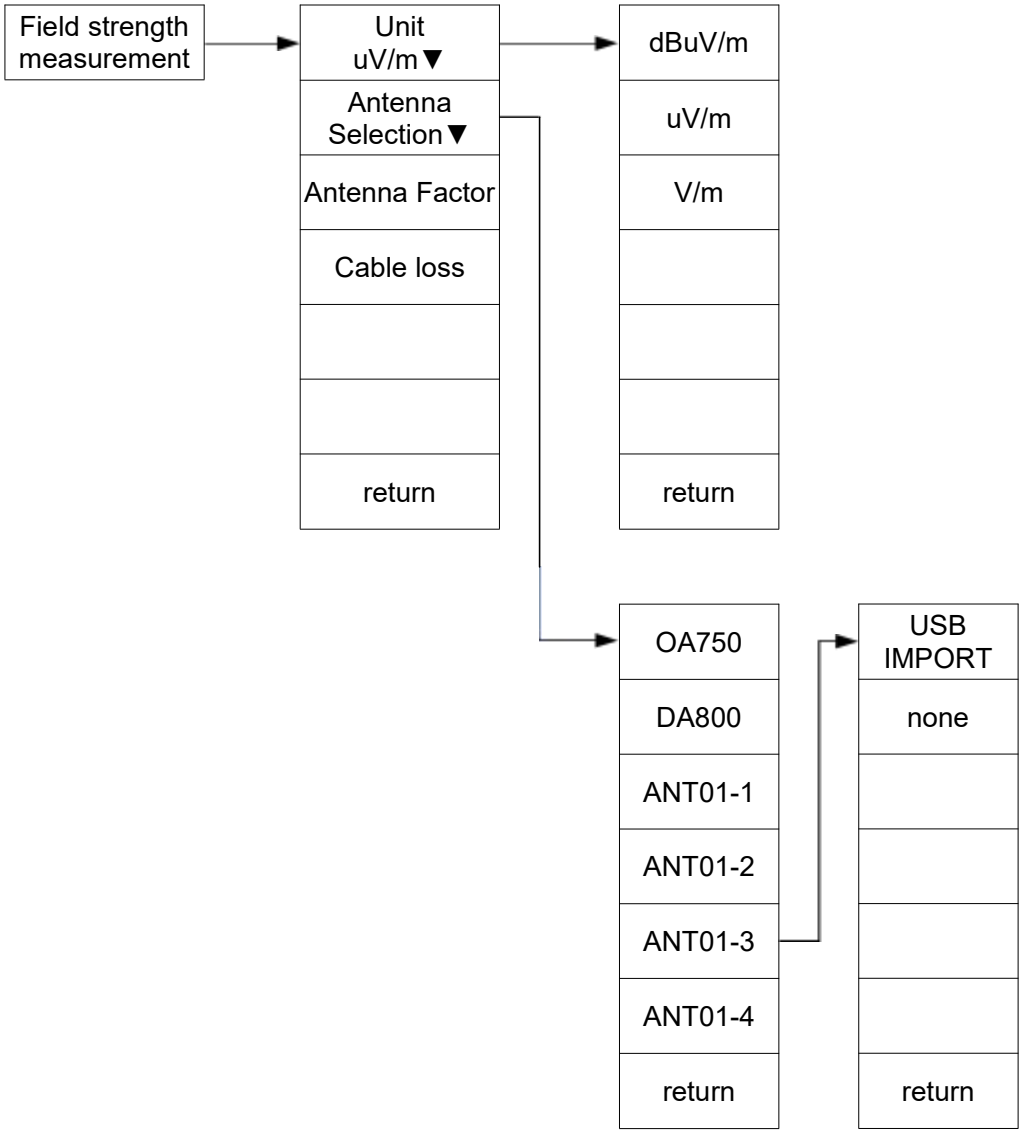

Meas
Measurement off
Adjacent channel power On Off
Channel Power On Off
Occupied bandwidth On Off
Carrier-to-Noise Ratio On Off
Harmonic distortion On Off
Next Page
Meas Setup
Average times
Average Status On Off
Average Mode▸
Max Hold On Off
Span setting
Power Ratio
Exponential average
Repeated average


Meas
Measurement off
Adjacent channel power On Off
Channel Power On Off
Occupied bandwidth On Off
Carrier-to-Noise Ratio On Off
Harmonic distortion On Off
Next Page
Meas Setup
Average times
Average Status On Off
Average Mode▸
Frequency deviation
Noise bandwidth
Carrier bandwidth
Exponential average
Repeated average

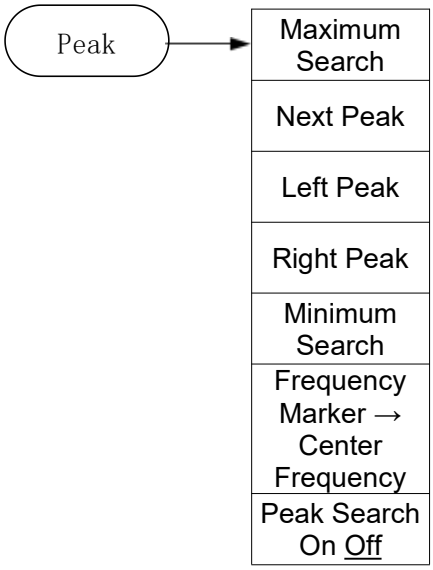

Meas
Measurement off
Adjacent channel power On Off
Channel Power On Off
Occupied bandwidth On Off
Carrier-to-Noise Ratio On Off
Harmonic distortion On Off
Next Page
Meas Setup
Average times
Average Status On Off
Average Mode▸
Number of harmonics
Number of fundamental waves
Exponential average
Repeated average


Meas
Measurement off
Adjacent channel power On Off
Channel Power On Off
Occupied bandwidth On Off
Carrier-to-Noise Ratio On Off
Harmonic distortion On Off
Next Page
Pass-Fail On Off
Field strength measurement On Off
TOI On Off
Time spectrum On Off
return
Meas Setup

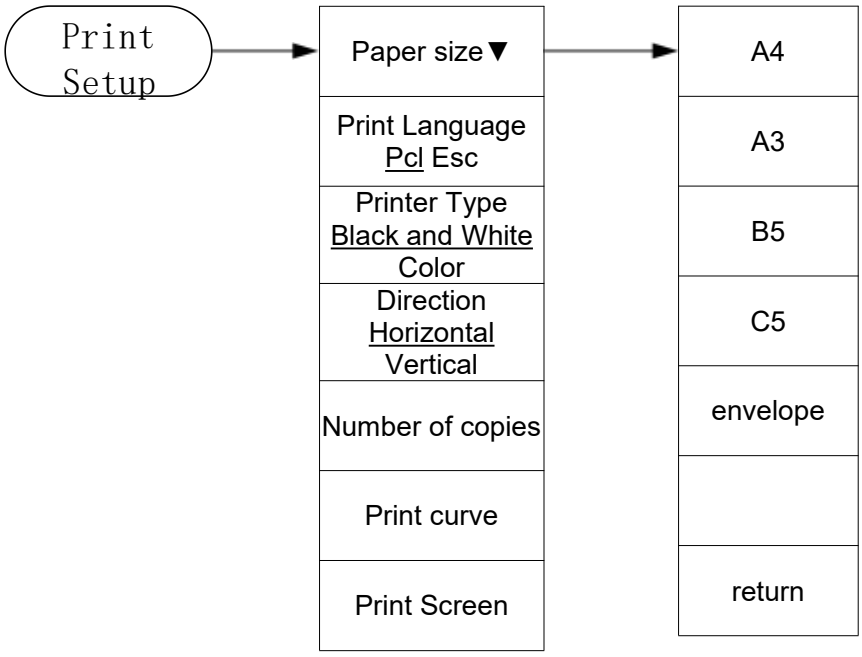

Pass-Fail
▼
Window Measurement
▼
Area measurement
▼
return
Window measurement On Off
Amplitude line On Off
Frequency Line On Off
Amplitude Upper limit Lower limit
frequency Start End
Window Scan On Off
return
Area measurement On Off
Upper limit line On Off
Lower limit line On Off
Bias X/Y Frequency Amplitude
Online Edit ▼
Offline Edit ▼
return
front page
Previous page
Next page
Last Page
operate▼
return
Add
Insert
Delete
Clear
Frequency
Amplitude
Return
front page
Previous page
Next page
Last Page
operate▼
return
Add
Insert
Delete
Clear
Frequency
Amplitude
Return


Field strength measurement
Unit uV/m▼
Antenna Selection▼
Antenna Factor
Cable loss
return
dBuV/m
uV/m
V/m
return
OA750
DA800
ANT01-1
ANT01-2
ANT01-3
ANT01-4
return
USB IMPORT
none
return

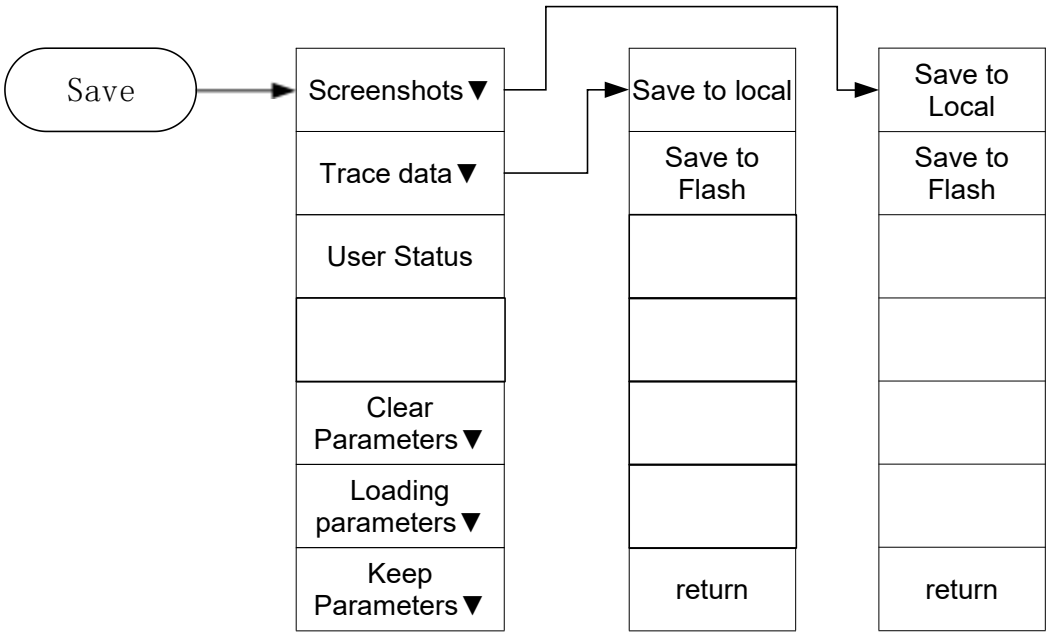
3.1.13 Peak



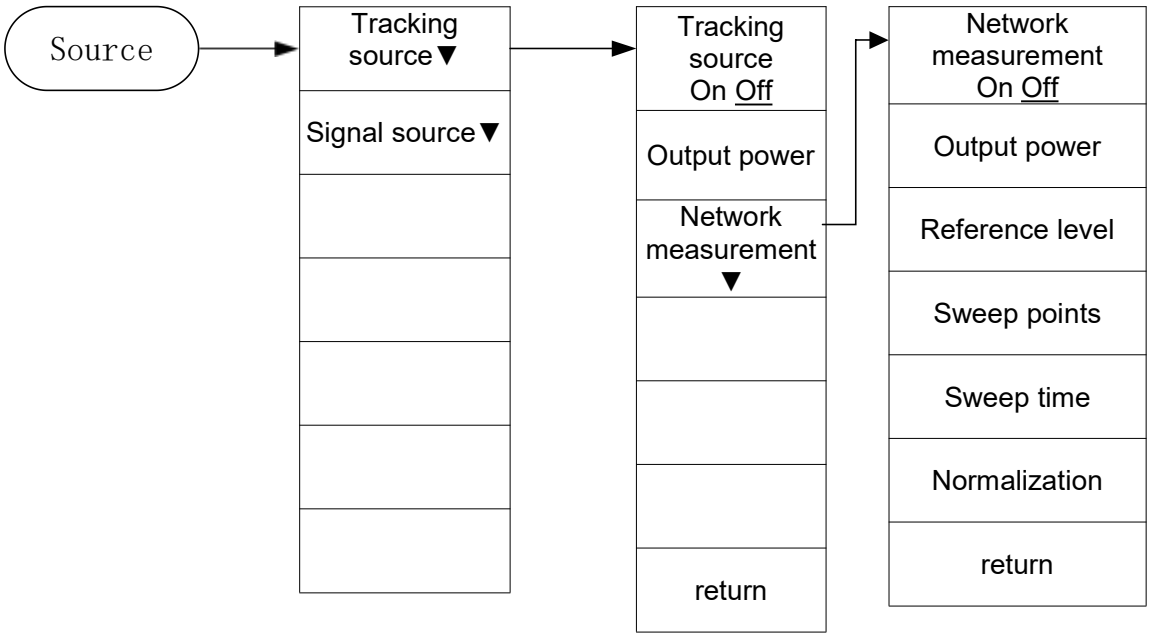
3.1.14 Print Setup



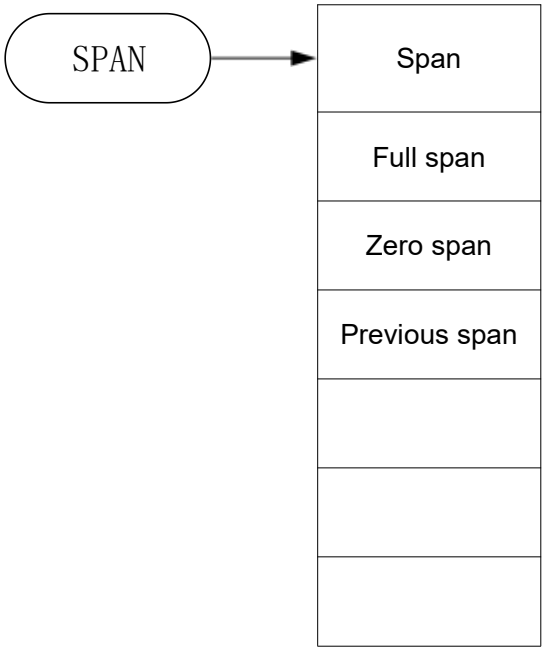
3.1.15 Save



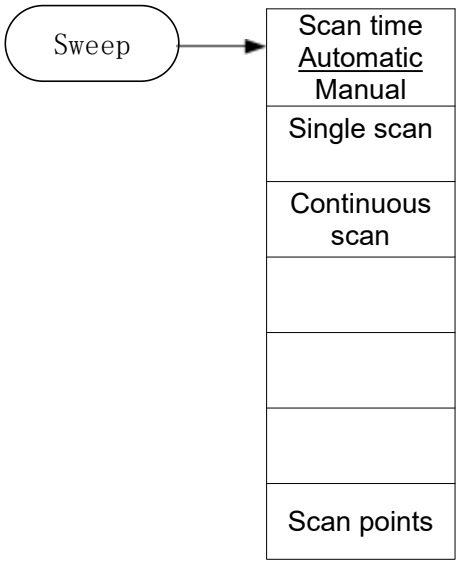
3.1.16 Source



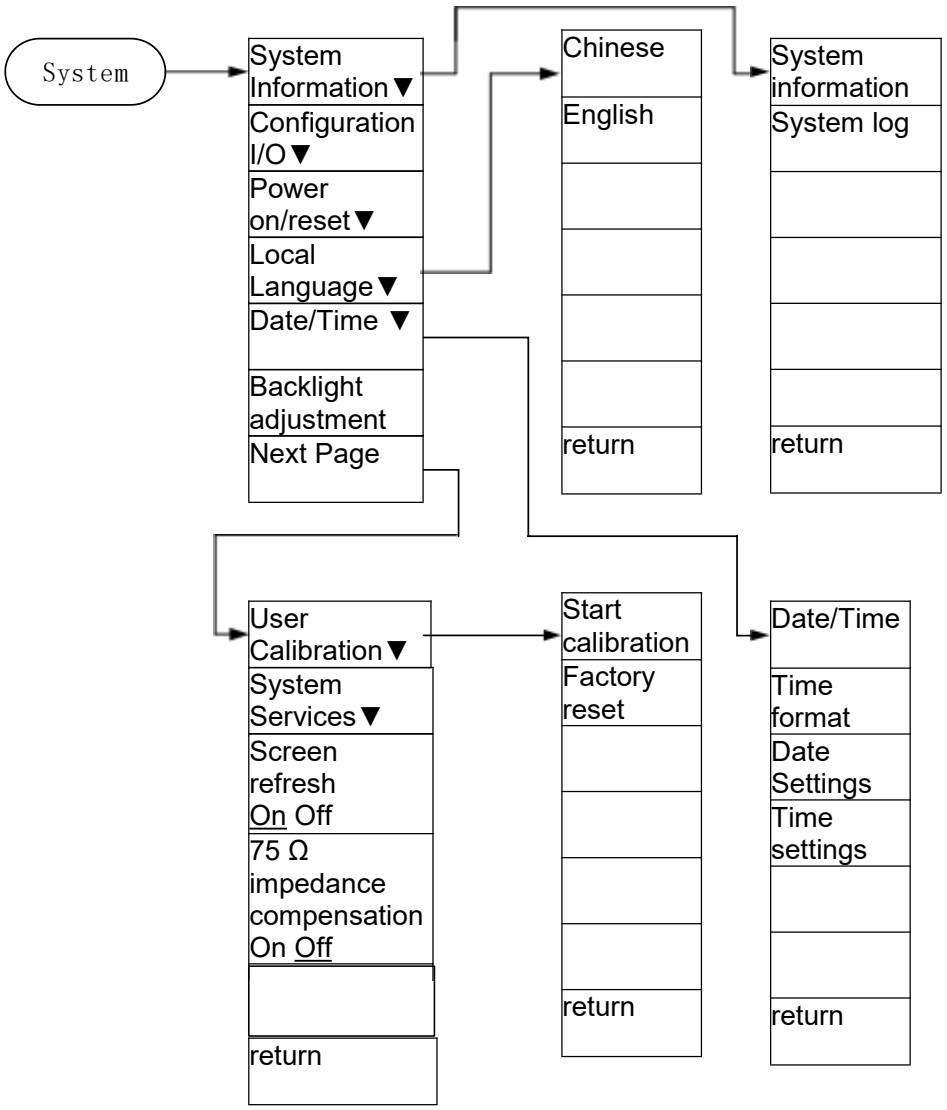
3.1.17 SPAN

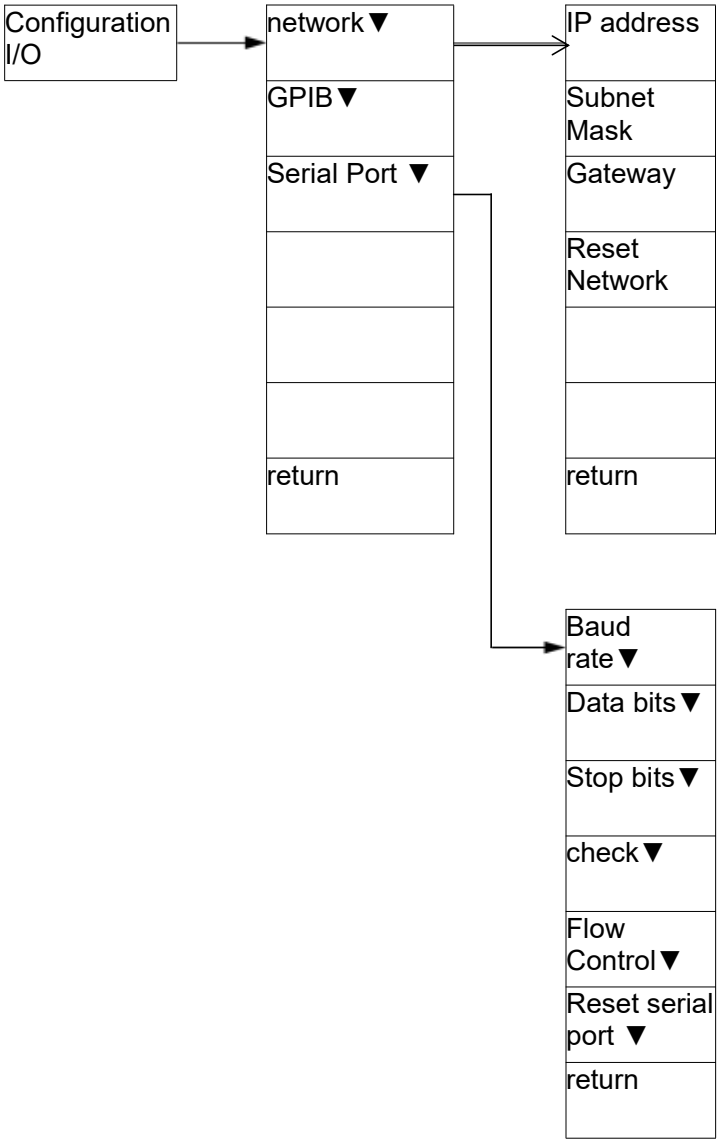


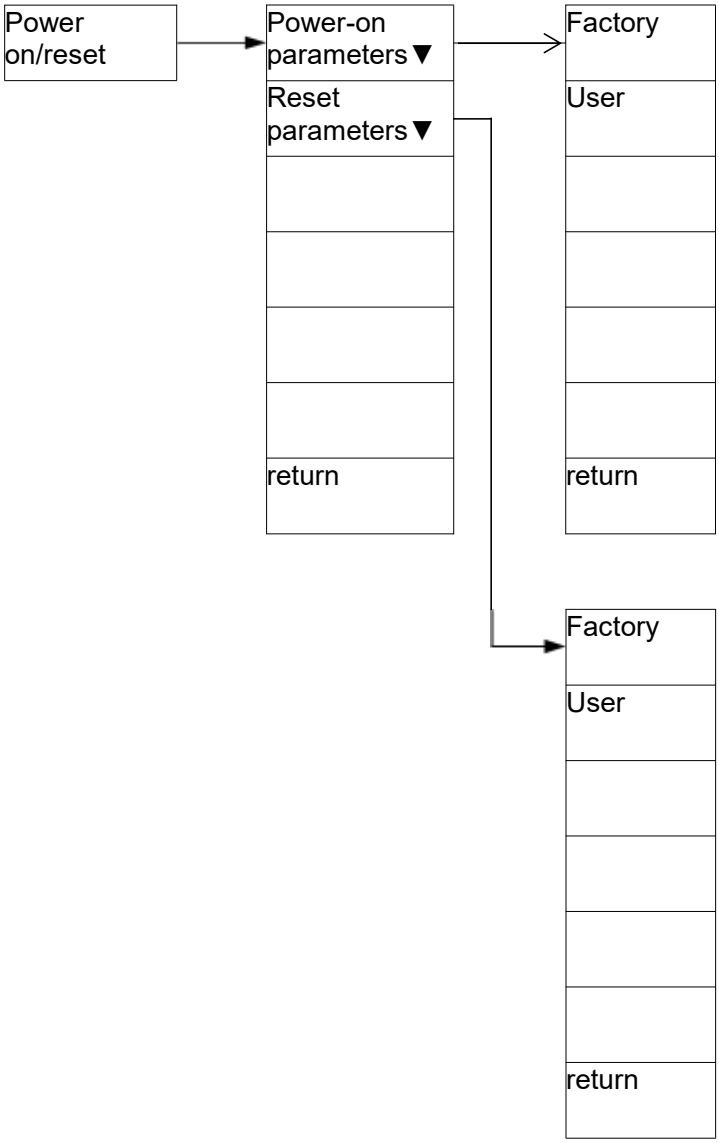
3.1.18 Sweep


Sweep
Scan time
Automatic
Manual
Single scan
Continuous scan
Scan points

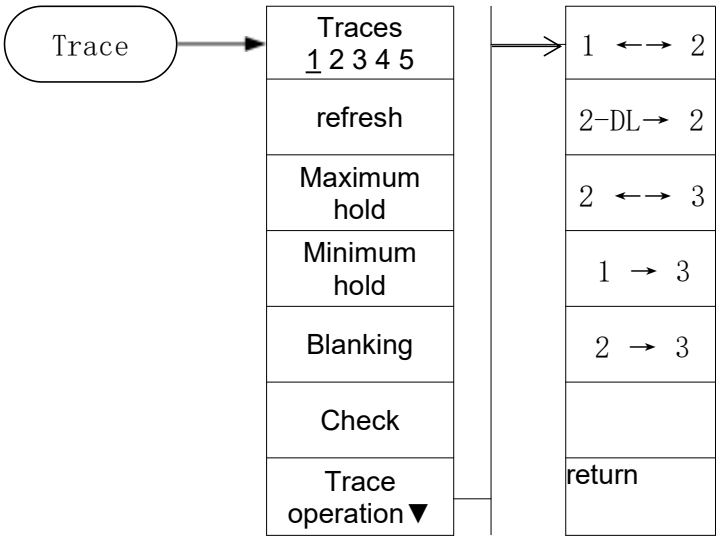
3.1.19 System


System
System Information▼
Configuration I/O▼
Power on/reset▼
Local Language▼
Date/Time ▼
Backlight adjustment
Next Page
Chinese
English
return
System information
System log
return
User Calibration▼
System Services▼
Screen refresh On Off
75 Ω impedance compensation On Off
return
Start calibration
Factory reset
return
Date/Time
Time format
Date Settings
Time settings
return

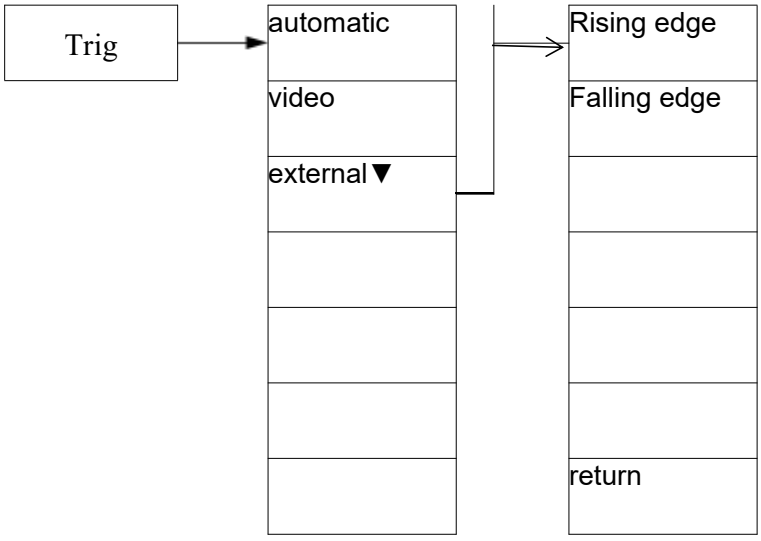

Configuration I/O
network▼
GPIB▼
Serial Port ▼
return
IP address
Subnet Mask
Gateway
Reset Network
return
Baud rate▼
Data bits▼
Stop bits▼
check▼
Flow Control▼
Reset serial port ▼
return


Power on/reset
Power-on parameters▼
Reset parameters▼
return
Factory
User
return
Factory
User
return

3.1.20 Trace



3.1.21 Trig



3.2 Menu Introduction

This section briefly describes the functions of the front panel keys and soft keys in a list format according to the menu structure:

Table 3-1 Basic Function Description

Function keys	Access Keys	Description
【AMPT】	——	Activate the reference level function and a soft menu for amplitude setting will pop up.
[Reference level]	【AMPT】	Activates the reference level function.
[Attenuator] Automatic Manual	【AMPT】	Adjust the spectrum analyzer input attenuator and set it to automatic or manual mode.
[Scale/division]	【AMPT】	Select a logarithmic amplitude scale of 1, 2, 5 or 10dB.
[Scale type] Linear Logarithmic	【AMPT】	Select the scale type for the vertical axis to be linear or logarithmic. The default is logarithmic.
[Reference bias]	【AMPT】	Adds an offset to all amplitude readings but does not change the position of the screen trace.
[Reference units▼]	【AMPT】	A soft menu for setting amplitude units pops up.
[dBm]	[Reference units▼]	Select dB relative to 1mW as the amplitude unit.
[dBuW]	[Reference units▼]	Select dB relative to 1uW as the amplitude unit.
[dBpW]	[Reference units▼]	Select dB relative to 1pW as the amplitude unit.
[dBmV]	[Reference units▼]	Select dB relative to 1mV as the amplitude unit.
[dBuV]	[Reference units▼]	Select dB relative to 1uV as the amplitude unit.
[W]	[Reference units▼]	Select Watts as the amplitude unit displayed.
[V]	[Reference units▼]	Select Volts as the amplitude units displayed.

Table 3-2 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Preamplification] On Off	【AMPT】	Sets the preamplifier on or off.
【BW】	——	A soft menu for setting bandwidth and scan will pop up.
[Resolution bandwidth] Automatic Manual	【BW】	Set the resolution bandwidth to automatic or manual mode.
[Video Bandwidth] Automatic Manual	【BW】	Set the video bandwidth to automatic or manual mode.

[Trace averaging] On Off	【BW】	Turn the trace averaging function on or off. When it is on, a smooth trace is calculated through continuous averaging.
[EMI Bandwidth▼]	【BW】	A soft menu about EMI bandwidth measurement pops up.
[EMI Bandwidth] On Off	[EMI Bandwidth▼]	Enable or disable EMI bandwidth measurement.
[1MHz]	[EMI Bandwidth▼]	Set the EMI resolution bandwidth to 1MHz.
[120KHz]	[EMI Bandwidth▼]	Set the EMI resolution bandwidth to 120KHz.
[30KHz]	[EMI Bandwidth▼]	Set the EMI resolution bandwidth to 30KHz.
[9KHz]	[EMI Bandwidth▼]	Set the EMI resolution bandwidth to 9KHz.
【Demod】	——	A soft menu of demodulation function pops up.
[Audio Demodulation▼]	【Demod】	A soft menu of audio demodulation test function pops up.
[Audio Demodulation] On Off	[Audio Demodulation▼]	Turn audio demodulation on or off.

Table 3-3 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Demodulation mode▼]	[Audio Demodulation▼]	The demodulation mode soft menu pops up.
[FMW]	[Demodulation mode▼]	Set the demodulation mode to wideband FM demodulation.
[FM]	[Demodulation mode▼]	Set the demodulation mode to FM demodulation.
[AM]	[Demodulation mode▼]	Set the demodulation mode to AM demodulation.
[volume]	[Audio Demodulation▼]	Set the volume of the audio demodulation output.
[Radio Station▼]	[Audio Demodulation▼]	A soft menu for quick selection of some radio stations pops up.
【Detector】	——	A soft menu for setting the detection mode pops up.
[Mean]	【Detector】	Set the detection mode to average value detection mode.
[RMS]	【Detector】	RMS averaging calculates the true average power and is best used to measure the power of complex signals.

Table 3-4 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Positive peak]	【Detector】	For video signals, select the positive peak detection mode.
[Negative peak]	【Detector】	For video signals, select the negative peak detection mode.
[sampling]	【Detector】	Sampling video signal, sampling detection mode.

【Display】	——	Pop up a display-related soft menu.
[Full Screen Display]	【Display】	Display the image in full screen mode.
[Window Scaling] On Off	【Display】	Select the display line to change its display position.
[Display Line] On Off	【Display】	When this menu is on, an adjustable horizontal reference line is activated on the screen.
[Amplitude scale] On Off	【Display】	Turn the amplitude scale on or off.
[Grid] On Off	【Display】	Turn on or off the grid on the screen.
[Display Style▼]	【Display】	Pop up the display style soft menu.
[default]	[Display Style▼]	Display in default mode.
[WinXP]	[Display Style▼]	Display in WinXP mode.
[Label] On Off	【Display】	Open or close the on-screen label menu.
【File】	——	Pop up the file-related soft menu.
[refresh]	【File】	Refresh the file directory.
[File Type▼]	【File】	Open the soft menu of file types for selective viewing.
[Screen Image]	[File Type▼]	Only files in screen image format can be viewed.
[Trace data]	[File Type▼]	Only files in trace data format can be viewed.
[all]	[File Type▼]	All types of files can be viewed.
[front page]	【File】	Set the current interface to display as the home page.

Table 3-5 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Previous page]	【File】	The previous page of the current interface can be displayed.
[Next page]	【File】	The next page of the current interface can be displayed.
[Last page]	【File】	The current interface can be displayed as the last page of the directory.
[File operation▼]	【File】	A soft menu pops up for operating stored files.
[Sort▼]	[File Operations▼]	A soft menu pops up for sorting files.
[By name]	[Sorting▼]	Sort files by name.
[By time]	[Sorting▼]	Sort files by time.
[By size]	[Sorting▼]	Sort files by size.
[Delete▼]	[File Operations▼]	A soft menu for deleting stored files pops up.

[Delete Selection]	[delete▼]	Delete only the selected files.
[Delete this page]	[delete▼]	Delete only the files on the current page.
[Delete All]	[delete▼]	Delete all stored files.
[Export▼]	[File Operations▼]	Export files.
[choose]	[Export▼]	Export only the selected files.
[This page]	[Export▼]	Export only the files on the current page.
[all]	[Export▼]	Export all stored files.
[Loading]	[File Operations▼]	Display the stored files as pictures.
【FREQ】	——	Activate the center frequency (or start frequency) to pop up a soft menu for setting the frequency function.
[Center frequency]	【FREQ】	Activate the center frequency function to set the spectrum analyzer to the center frequency span mode.
[Start frequency]	【FREQ】	Activate the start frequency to set the analyzer to the start-stop mode.

Table 3-6 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Stop frequency]	【FREQ】	Activate the stop frequency and set the analyzer to start-stop mode.
[Frequency step] Automatic Manual	【FREQ】	Adjust the center frequency step size so that the center frequency increases or decreases by the set step size.
[Frequency offset]	【FREQ】	Add an offset to the displayed frequency value, including the frequency marker value. This does not affect the scan range.
[Frequency offset] Internal External	【FREQ】	Set the frequency reference mode, internal or external.
【MARKER】	——	Activate the frequency marker, and a soft menu related to the frequency marker pops up.
[Frequency Marker] 1 2 3 4 5	【Marker】	Set the frequency marker to any one or more of cursors 1, 2, 3, 4, and 5.
[Traces] 1 2 3 4 5	【Marker】	Select Trace 1, 2, 3, 4, or 5 to set the corresponding trace parameters.
[normal]	【Marker】	Restores normal cursor functionality.
[Difference]	【Marker】	Set the frequency marker of any other cursor except cursor 1 to the frequency marker frequency that differs by △ from the frequency of cursor 1 set as the reference frequency.
[closure]	【Marker】	Disable the currently activated frequency marker function.

[Close All]	【Marker】	Turn off all currently activated frequency marker functions, and the frequency marker will no longer be displayed.
[Frequency Marker List] On Off	【Marker】	Turn on or off the display of all frequency marker tables.
【MARKER→ 】	——	Activate the frequency marker, and a soft menu related to "Frequency marker →" pops up.
[Frequency Marker → Center frequency]	[Frequency Marker → ▼]	Set the center frequency to be equal to the frequency marker frequency.
[Frequency Marker→Frequency step]	[Frequency Marker → ▼]	The step size of setting the center frequency is equal to the frequency scale frequency. The center frequency can be changed by the step key.

Table 3-7 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Frequency Marker→Start frequency]	[Frequency Marker→ ▼]	Set the start frequency to the frequency marker frequency.
[Frequency Marker→Stop frequency]	[Frequency Marker→ ▼]	Set the end frequency to the frequency marker frequency.
[Frequency Marker→Reference level]	[Frequency Marker→ ▼]	Set the reference level to the frequency marker amplitude.
[Frequency Marker△→Sweep width]	[Frequency Marker→ ▼]	Set the frequency span to the frequency marker difference.
[Frequency Marker△→ Center frequency]	[Frequency Marker→ ▼]	Set the center frequency to the frequency marker difference.
【Marker Fctn】	——	Activate the soft menu related to the frequency marker function.
[Function Off]	【Marker 】 Fctn	Turn off the frequency marker measurement function.
[NdB] On Off	【Marker 】 Fctn	The XdB measurement function is turned on and off. The default value of X is 3.
[frequency marker noise] On Off	【Marker 】 Fctn	Turn on or off the frequency marker noise function. When turned on, the average noise level read at the frequency marker is the noise power normalized to 1Hz bandwidth.
【Meas】	——	A soft menu pops up including adjacent channel power, channel power, occupied bandwidth measurement, etc.
[Measurement off]	【Meas】	Turn off all measurement functions.
[Time spectrum] On Off	【Meas】	Turns the time-spectrum measurement mode on or off.
[Adjacent channel power] On Off	【Meas】	A soft menu for measuring transmitter adjacent channel power pops up.

Table 3-8 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Channel Power] On Off	【Meas】	Enter the channel power measurement soft menu.
[Occupied bandwidth] On Off	【Meas】	Enter the occupied bandwidth measurement soft menu.
[Pass-Fail▼]	【Meas】	The Pass-Fail measurement function soft menu pops up.
[Window Measurement▼]	[Pass-Fail▼]	A soft menu for the pop-up window measurement mode.
[Window Measurement] On Off	[Window Measurement▼]	Turns the window measurement function on or off.
[Amplitude line] On Off	[Window Measurement▼]	Turn the amplitude lines on or off.
[Frequency Line] On Off	[Window Measurement▼]	Turn the frequency line on or off.
[Amplitude] Upper limit Lower limit	[Window Measurement▼]	Set the upper and lower limits of the amplitude line.

Table 3-9 Basic Function Description (Continued)

Function keys	Access Keys	Description
[frequency] Start End	[Window Measurement▼]	Set the start and end values of the frequency line.
[Window Scan] On Off	[Window Measurement▼]	Open or close the window scan.
[Area measurement▼]	[Pass-Fail▼]	Pop up the soft menu of the regional measurement function.
[Area measurement] On Off	[Area measurement▼]	Open or close the regional measurement function.
[Upper limit line] On Off	[Area measurement▼]	Open or close the upper limit line.
[Lower limit line] On Off	[Area measurement▼]	Open or close the lower limit line.
[Bias X/Y] Frequency Amplitude	[Area measurement▼]	Add an offset value to the original frequency and amplitude values to facilitate measurement.
[Online Edit▼]	[Area measurement▼]	Pop up the soft menu of the upper limit editing.
[Offline Edit▼]	[Area measurement▼]	Pop up the soft menu of the lower limit editing.
[Frequency Count]	【Meas】	Pop up the soft menu of the frequency counting function.

[Frequency Count] On Off	[Frequency Count]	Turn the frequency counter on or off (activate a frequency marker). When the counter is on, the counting result is displayed.
[Resolution bandwidth]	[Frequency Count]	Set the counting resolution.
【PEAK】	——	Place the frequency marker at the highest point of the trace, and a soft menu related to the frequency marker function pops up.
[Maximum value search]	【PEAK】	Place the frequency marker at the highest point of the trace.

Table 3-10 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Next peak]	【PEAK】	Move the active marker to the next highest trace peak point related to the current marker position.
[Left Peak]	【PEAK】	Place the marker to the peak point to the left of the current marker.
[Right Peak]	【PEAK】	Place the marker to the peak point to the right of the current marker.
[Minimum search]	【PEAK】	Find the minimum amplitude value on the trace and mark it with a cursor.
[Frequency Marker → Center Frequency]	【PEAK】	Set the peak frequency marker to the center frequency.
[Peak Search] On Off	【PEAK】	Turn on or off the signal tracking function. The frequency marker always tracks the maximum value of the current trace.
【Print Setup】	——	Pop up the print-related soft menu.
[Paper size▼]	【PrintSetup】	Pop up the print paper size setting soft menu.
[A4]	[Paper size▼]	Set to print on A4 paper.
[A3]	[Paper size▼]	Set to print on A3 paper.
[B5]	[Paper size▼]	Set to print on B5 paper.
[C5]	[Paper size▼]	Set to print on C5 paper.
[envelope]	[Paper size▼]	Set to print on envelope paper.
[Print Language] Pcl Esc	【PrintSetup】	Set the print language to Pcl or Esc.
[Printer Type] Black and White color	【PrintSetup】	Set the printer type to black and white or color.
[direction] Horizontal Vertical	【PrintSetup】	Set the print direction to landscape or portrait.
[Number of copies▼]	【PrintSetup】	Set the number of copies to print.
[Print curve]	【PrintSetup】	Print only graphics.

Table 3-11 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Print Screen]	【PrintSetup】	Print all information on the screen.
【Save】	——	Pop up a soft menu related to saving the current interface information.
[Screenshots▼]	【Save】	The current interface information is saved as a screenshot, and a related soft menu pops up.
[Save to local]	[Screenshots▼]	The current interface information is saved to the local memory as a screenshot.
[Save to Flash]	[Screenshots▼]	The current interface information is saved to the flash memory as a screenshot.
[Trace data▼]	【Save】	The current interface information is saved as trace data, and the relevant soft menu pops up.
[Save to local]	[Trace data▼]	The current interface information is saved to the local memory as trace data.
[Save to Flash]	[Trace data▼]	The current interface information is saved to the flash memory in the form of trace data.
[User status]	【Save】	The current interface is set to user status and is directly called when setting the power-on reset parameters.
[Clear parameters▼]	【Save】	Clear the parameters saved in the instrument memory.
[Load parameters▼]	【Save】	View the saved parameters.
[Save parameters▼]	【Save】	Save the current parameters in the machine memory.
【Source】	——	Pop up a soft menu for other measurement functions.
[Tracking source▼]	【Source】	Pop up a soft menu related to the tracking source settings.
[Tracking source] On Off	[Tracking Source▼]	Turn on or off the tracking source measurement function.
[Output power]	[Tracking Source▼]	Used to set the tracking source output power.
[Network measurement▼]	[Tracking Source▼]	Pop up a soft menu related to the tracking source network measurement function.
[Network measurement] On Off	[Network Measurement▼]	Turn on or off the network measurement function.
[Output power]	[Network Measurement▼]	Set the tracking source output power.

Table 3-12 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Reference level]	[Network Measurement▼]	Set the reference level for network measurements.
[Scan Points]	[Network Measurement▼]	Set the number of sweep points.
[Scan time]	[Network Measurement▼]	Set the sweep time.

[Normalization]	[Network Measurement▼]	Network measurement user on-site normalization calibration.
[Signal source▼]	【Source】	Pop-up soft menu about signal source.
[Signal source] On Off	[Signal Source▼]	Turn on or off signal source output.
[Output frequency]	[Signal Source▼]	Set signal source output frequency.
[Output power]	[Signal Source▼]	Set signal source output power.
【SPAN】	——	Activate the frequency span, set the spectrum analyzer to the center frequency span mode, and pop up a soft menu for setting the span.
[Span]	【SPAN】	Activate the frequency span function, set the spectrum analyzer to the center frequency span mode.
[Full span]	【SPAN】	Set the span of the spectrum analyzer to the maximum value.
[Zero span]	【SPAN】	Set the span to 0Hz. This function displays the input signal in amplitude-time mode, so it is particularly useful for observing modulated signals.
[Previous span]	【SPAN】	Set the span of the spectrum analyzer to the previous span value.
【Sweep】	——	Activate the soft menu related to scanning.
[Scan time] Automatic Manual	【Sweep】	Set the sweep time to automatic or manual mode.
[Single scan]	【Sweep】	Set the single sweep mode.
[Continuous scan]	【Sweep】	Set the continuous sweep mode.
[Scan points]	【Sweep】	Set the number of sweep points.
【SYS】	——	Pop up the soft menu about system settings.
[System Information▼]	【System】	Open the system information and system log soft menus.

Table 3-13 Basic Function Description (Continued)

Function keys	Access Keys	Description
[System Information]	[System Information▼]	Open the relevant parameters about system information.
[System Log]	[System Information▼]	Open the system log to view the system modification record.
[Configuration I/O▼]	【System】	Pop up the soft menu for configuring I/O.
[Network▼]	[Configuration I/O▼]	Open the soft menu for setting local network parameters.
[IP address]	[Local Network▼]	Set the host IP address.
[Subnet mask]	[Local Network▼]	Set the subnet mask parameters.
[Gateway]	[Local Network▼]	Set the gateway parameters.
[Reset network]	[Local Network▼]	Reset the network and reconnect the system.

[GPIB▼]	[Configuration I/O▼]	Pop up the soft menu for GPIB port settings.
[Serial port▼]	[Configuration I/O▼]	Pop up the soft menu for serial port settings.
[Baud rate▼]	[Serial port▼]	Pop up the soft menu for baud rate settings.
[Data bit▼]	[Serial port▼]	Pop up the soft menu for baud rate settings.
[Stop bit▼]	[Serial port▼]	Pop up the soft menu for stop bit settings.
[Parity▼]	[Serial port▼]	Pop up the soft menu for setting verification.
[Flow control▼]	[Serial port▼]	Pop up the soft menu for setting flow control.
[Reset serial port▼]	[Serial port▼]	Reset the serial port.
[Power on/reset▼]	【System】	Open the soft menu for power-on and reset settings.
[Power on parameters▼]	[Power on/reset▼]	Open the soft menu for power-on parameter settings.
[Factory]	[Power on parameters▼]	You can set the factory power-on parameters.
[User]	[Power on parameters▼]	You can set the user power-on parameters.
[Reset parameters▼]	[Power on/reset▼]	Open the soft menu for reset parameter settings.
[Factory]	[Reset parameters▼]	You can set the factory reset parameters.
[User]	[Reset parameters▼]	You can set the user reset parameters.
[Local language▼]	【System】	Enter the language setting soft menu.

Table 3-14 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Chinese]	[Local language▼]	Display the system in Chinese.
[English]	[Local language▼]	Display the system in English.
[Date/Time▼]	【System】	Enter the soft menu for date and time settings.
[Date Setting]	[Date/time▼]	Set the system date.
[Time Setting]	[Date/time▼]	Set the system time.
[Backlight Adjustment]	【System】	Set the LCD backlight brightness.
[User Calibration▼]	【System】	Pop up the user calibration soft menu.
[Start Calibration]	[User calibration▼]	Input an external standard signal and press this key to perform user calibration.
[Factory Reset]	[User calibration▼]	Press this key to delete the user self-calibration data and restore to factory parameters.
[System Service▼]	【System】	Press this key to enter the factory debugging interface.
[Screen Refresh] On Off	【System】	Turn on or off the screen refresh function.
[75Ω Impedance Compensation]	【System】	Turn on or off 75Ω impedance compensation.

On Off		
【Trace】	——	Pop up a soft menu related to trace and detection.
[Traces] 1 2 3 4 5	【Trace】	Select the currently operable trace register.
[Refresh]	【Trace】	Refresh the current curve.
[Maximum hold]	【Trace】	In the trace register, display and hold the maximum response of the input signal.
[Minimum hold]	【Trace】	In the trace register, display and hold the minimum response of the input signal.
[Hide]	【Trace】	Clear the contents of the trace register from the display area.
[View]	【Trace】	Display the contents of the current trace register without refreshing.

Table 3-15 Basic Function Description (Continued)

Function keys	Access Keys	Description
[Trace operation▼]	【Trace】	Pop up the soft menu for trace math operations.
[1 ←→ 2]	[Trace operation▼]	Swap the contents of trace register 1 and trace register 2, and then put traces 1 and 2 in display mode at the same time.
[2-DL→ 2]	[Trace operation▼]	Subtract the display line value from trace register 2 and place the result back into trace register 2.
[2 ←→ 3]	[Trace operation▼]	Swap the contents of trace register 2 and trace register 3, and then put traces 2 and 3 into display mode simultaneously.
[1 → 3]	[Trace operation▼]	Swap the contents of trace register 1 into trace register 3 and put trace 3 into display mode.
[2 → 3]	[Trace operation▼]	Swap the contents of trace register 2 into trace register 3 and put trace 3 into display mode.
【Trig】	——	A soft menu for setting the trigger mode pops up.
[Automatic]	【Trig】	Set the trigger mode to automatic trigger mode so that the sweep trigger is as fast as the spectrum analyzer allows.
[Video]	【Trig】	Set the trigger to video trigger mode. Whenever the input signal passes the video trigger level, a sweep signal with a ramp will be generated.
[External▼]	【Trig】	Set the trigger mode to external trigger mode.

3.3 Menu Description

3.3.1 FREQ

Set various frequency parameters of the spectrum analyzer. The spectrum analyzer performs frequency sweep within the set frequency range. Whenever the frequency parameters are changed, the frequency sweep is restarted.

There are two ways to indicate the frequency range of the current channel of the spectrum analyzer: start frequency/end frequency, center frequency/span. Adjusting any of the four parameters will adjust the other three parameters accordingly to meet the coupling relationship between them:

$$f_{center} = (f_{stop} + f_{start}) / 2 \quad (3\text{-}1)$$

$$f_{span} = f_{stop} - f_{start} \quad (3\text{-}2)$$

f_{center} , f_{stop} , f_{start} and f_{span} represent: center frequency, end frequency, start frequency and span respectively.

3.3.1.1 [Center frequency]

Activate the center frequency and set the spectrum analyzer to the center frequency mode. If the set center frequency is inconsistent with the current span, the span will automatically adjust to the best value that matches the expected frequency.

Key points:

- Modifying the center frequency will automatically modify the start frequency and end frequency while keeping the span setting unchanged.
- Modifying the center frequency is equivalent to shifting the current channel, and the adjustable range is limited by the frequency range given by the indicator.
- In zero span mode, the start frequency, end frequency, and center frequency have the same value and will be modified together.
- You can use the numeric keys, knob, and arrow keys to modify this parameter.

3.3.1.2 [Start frequency]

Activate the start frequency and simultaneously set the spectrum analyzer to the start frequency/stop frequency mode.

Key points:

- The modification of the start frequency will cause the change of the span and center frequency. The change of span will affect other system parameters. For details, see the introduction in the "Span" section.

- In zero span mode, the start frequency, center frequency, and stop frequency have the same value and will be modified together.
- You can use the numeric keys, knob, and arrow keys to modify this parameter.
- When adjusting the start frequency, if the selected start frequency exceeds the end frequency, the end frequency will automatically increase and finally equal the start frequency.

3.3.1.3 [Stop frequency]

Activate the stop frequency and set the spectrum analyzer to the start frequency/stop frequency mode at the same time.

Key points:

- Modification of the stop frequency will cause changes in the span and center frequency. Changes in the span will affect other system parameters. For details, see the introduction in the "Span" section.
- You can modify this parameter using the numeric keys, knob, and arrow keys.
- When adjusting the stop frequency, if the selected stop frequency is less than the start frequency, the start frequency will automatically decrease and finally equal the stop frequency.

3.3.1.4 [Frequency Step Automatic Manual]

Adjust the center frequency step size. Modifying the center frequency with a fixed step value can achieve the purpose of continuously switching measurement channels.

Key points:

- The frequency step setting is divided into two modes: manual and automatic. When the frequency step is in automatic setting mode, if the span is non-zero, the frequency step is 1/10 of the span. When the frequency step is in manual mode, the step amount of the center frequency can be adjusted using the numeric keys, step keys or knob. At this time, activate [Center Frequency] and press the step key, and the center frequency will change with the set step amount.
- Set the appropriate frequency step, select the center frequency, and then press the up and down arrow keys to switch the measurement channel at the set step to manually scan adjacent channels.
- You can use the numeric keypad and arrow keys to modify this parameter.

This function is very useful for quickly adjusting the center frequency to the harmonic of the input signal. For example: Observe the harmonics of a 300MHz input signal, set [Frequency Step Automatic Manual] to Manual, and enter 300MHz. If the center frequency is 300MHz at this time, press the step increment key to change the center frequency to 600MHz, which is equal to the second harmonic. Press the step increment key again, and the center frequency will increase by another 300MHz to 900MHz. The underline in the [Frequency Step Automatic Manual] menu indicates whether the step setting is in automatic mode or manual mode. When the step is in manual mode, press [Frequency Step Automatic Manual] to return to automatic mode.

3.3.1.5 [Frequency offset]

The set offset is added to the displayed frequency value, including the frequency marker frequency value. This does not affect the scanned frequency range.

3.3.1.6 [Frequency Reference Internal External]

Internal and external reference switching, the spectrum analyzer uses a 10MHz reference. When using an external reference, switch to "External" and connect the external reference signal.

3.3.2 SPAN

Activate the span function and set the spectrum analyzer to span mode. The [SPAN] key pops up [Span], [Full Span], [Zero Span], and [Previous Span] simultaneously. The span can be set using the numeric keys or step keys. Use the numeric keys or [Zero Span] to set the span to zero.

3.3.2.1 [Sweep width]

Set the frequency range of the current channel. Pressing this key will switch the frequency input mode to: center frequency/span.

Key points:

- Modifying the span will automatically modify the start and end frequencies of the spectrum analyzer.
- When manually setting the span, the minimum setting can be 0 Hz, which means entering zero span mode. For the maximum setting value, please refer to the specifications in "Performance Indicators". When the span is set to the maximum, the spectrum analyzer enters full span mode.

- When changing the span in non-zero span mode, if the frequency step and RBW are in automatic mode, the frequency step and RBW will be automatically modified, and the modification of RBW will cause the change of VBW (in automatic mode).
- Changing any one of the span, RBW and VBW will cause the change of sweep time.
- You can use the numeric keys, knob and direction keys to modify this parameter.

3.3.2.2 [Full Span]

Set the spectrum analyzer to center frequency/span mode and set the span to maximum.

3.3.2.3 [Zero span]

Set the span to 0. At this time, the start and end frequencies are equal to the center frequency, and the horizontal axis is the time coordinate. The spectrum analyzer measures the time domain characteristics of the amplitude at the corresponding frequency point of the input signal. This is conducive to observing the signal in the time domain, especially for observing modulated signals.

3.3.2.4 [Previous sweep width]

Returns the spectrum analyzer to the previously selected span.

3.3.3 AMPT

Set the amplitude-related parameters of the spectrum analyzer. By adjusting these parameters, the measured signal can be displayed in the current window in a way that is easy to observe and minimizes measurement errors.

3.3.3.1 [Reference level]

Activate the reference level function and set the maximum power or voltage value that can be displayed in the current window.

Key points:

- The maximum value of the reference level that can be set is affected by the maximum mixing level, input attenuation, and preamplifier. When adjusting the reference level, always adjust the input attenuation on the basis of ensuring that the maximum mixing level remains unchanged to satisfy the inequality:

$$LRef - aRF + aPA \leq Lmi$$

LRef, *aRF*, *aPA* and *Lmi represent*: reference level, input attenuation, preamplifier and maximum mixing level.

- You can use the numeric keys, knob, and arrow keys to modify this parameter.

The reference level corresponds to the top of the coordinate grid. The accuracy of measuring signals close to the reference level is relatively good, but the input signal amplitude cannot be greater than the reference level during the measurement process; if the measured signal level is greater than the reference level, there will be signal compression and distortion during the measurement process, and the measurement result is not true. The input attenuator of the spectrum analyzer is associated with the reference level and can be automatically adjusted to avoid compression of the input signal. In the case of 0dB attenuation, the minimum reference level on the logarithmic scale is -80dBm.

3.3.3.2 [Attenuator Automatic Manual]

In attenuator manual mode, set the RF front-end attenuator so that large signals can pass through the mixer with low distortion (small signals can pass through the mixer with low noise). Only valid in internal mixer mode, used to adjust the input attenuator of the spectrum analyzer. In automatic mode, the input attenuator is related to the reference level.

Key points:

- When the preamplifier is turned on, the input attenuation can be set to a maximum of 30 dB. If the set parameters cannot be met, adjust the reference level to ensure it.
- When the reference level changes, the attenuation can be adjusted automatically; however, the change of attenuation does not affect the reference level.
- You can use the numeric keys, knob, and arrow keys to modify this parameter.

The purpose of attenuator adjustment is to make the maximum signal amplitude of the input mixer less than or equal to -10dBm. For example: if the reference level is +12dBm, the attenuation is 22dB, and the input level of the mixer is -18dBm (12-22-8=-18). The ultimate purpose is to prevent the signal from being compressed. You can set the attenuator to manual mode through [Attenuator Auto Manual] and adjust the attenuator manually. The bright line under Auto or Manual will indicate whether the attenuator is in automatic coupling mode or manual setting mode. When the attenuator is in manual setting mode, press [Attenuator Auto Manual] to re-associate the attenuator with the reference level.

Warning

The maximum signal amplitude of the input attenuator (at least 10dB attenuation) is +27dBm. Signals with higher power may damage the input attenuator or mixer.

Notice

The minimum setting value of the input attenuator in the "auto coupling" state is 10dB; if the user input power is less than -10dBm and the reference level is set less than or equal to -10dBm (preamplifier off), the input attenuator value can be set to 0dB in "manual mode".

3.3.3.3 [Scale/division]

Set the size of each division on the vertical axis. This function is only available when the scale type is logarithmic. Select 1, 3, 5 or 10dB logarithmic amplitude scale. The default value is 10dB/ division. Any activated frequency marker is read in dB, and the frequency marker difference is read in dB as the difference between the two frequency markers.

Key points:

- Adjust the amplitude range that can be displayed by setting different scales.
- The current displayed signal amplitude range: reference level -10×current scale to reference level.
- You can modify this parameter using numeric keys, knobs, and direction keys.

3.3.3.4 [Scale Type Linear Logarithmic]

Select whether the scale displayed on the vertical axis is linear or logarithmic. The default scale is logarithmic.

Key points:

- Select logarithmic scale, the vertical axis is logarithmic coordinates, the top of the grid is the reference level, and each size is the scale value; when switching from linear to logarithmic scale, the Y-axis unit is automatically changed to the default unit dBm under the logarithmic scale.
- Select linear scale, the vertical axis is linear coordinate, the top of the grid is the reference level, the bottom is 0V, each size is 10% of the reference level, and the scale setting function is invalid. When the logarithmic scale is switched to the linear scale, the Y-axis unit is automatically changed to the default unit type Volts under the linear scale.
- The scale type does not affect the Y-axis unit setting.

3.3.3.5 [Reference bias]

When there is gain or loss between the device under test and the spectrum analyzer input, an offset value is added to the reference level to compensate for the resulting gain or loss.

Key points:

- This value does not change the position of the curve, but only modifies the reference level and the amplitude reading of the cursor.
- You can modify this parameter with the numeric keys.
- This offset is in dB and does not vary with the selected scale and unit.

3.3.3.6 [Reference units▼]

A soft menu for setting the amplitude unit of the spectrum analyzer pops up. Include：[dBm]、[dBuW]、[dBpW]、 [dBmV] 、[dBuV] 、[W] and [V]。

Key points:

1) [dBm]
   Select decibels relative to 1mW as the amplitude unit.
2) [dBuW]
   Select decibels relative to 1uW as the amplitude unit.
3) [dBpW]
   Select decibels relative to 1pW as the amplitude unit.
4) [dBmV]
   Select decibels relative to 1mV as the amplitude unit.
5) [dBuV]
   Select decibels relative to 1μV as the amplitude unit.
6) [W]
   Select Watts as the amplitude unit displayed.
7) [V]
   Select Volts as the amplitude unit for display.

3.3.3.7 [Preamplification On Off]

Set the switch of the preamplifier. When testing very weak signals, turn on the preamplifier to improve the receiving sensitivity of the spectrum analyzer and test signal characteristics more accurately.

Warning

When measuring high-power signals or unknown signal power, please turn off the preamplifier, otherwise the preamplifier or mixer may be burned out.

3.3.4 AUTO

Automatically search for signals in the entire frequency band and adjust the frequency and amplitude parameters to the optimal state, realizing signal search and automatic parameter setting with one click.

Key points:

- During the automatic signal search, parameters such as reference level, scale size, and input attenuation may be modified.

3.3.5 BW

Set the spectrum analyzer's resolution bandwidth, video bandwidth, EMI bandwidth, trace averaging and other related parameters.

3.3.5.1 [Resolution Bandwidth Automatic Manual]

Set the resolution bandwidth to distinguish between two signals with similar frequencies.

Set the resolution bandwidth to automatic or manual mode. The horizontal line under automatic or manual will indicate whether the resolution bandwidth is in automatic mode or manual mode. Press [Resolution bandwidth automatic manual] until the horizontal line under automatic is lit, so that the resolution bandwidth is in automatic coupling mode.

Key points:

- Reducing the resolution bandwidth can achieve higher frequency resolution, but it will also result in a longer sweep time (when the sweep time is automatic, it is affected by both the resolution bandwidth and the video bandwidth).
- When the resolution bandwidth is in automatic mode, it will decrease as the span (non-zero span) decreases.

3.3.5.2 [Video Bandwidth Automatic Manual]

Set the video bandwidth to filter out noise outside the video band.

Set the video bandwidth to automatic or manual mode. The bright line under automatic or manual will indicate whether the bandwidth is in automatic or manual mode. When the video bandwidth is in manual mode, press [Video Bandwidth Automatic Manual] to light up the underline under automatic mode to return to automatic mode.

Key points:

- Reducing the video bandwidth can make the spectrum smoother, thus highlighting the small signal buried in the noise, but it will also cause the sweep time to be longer (when the sweep time is automatic, it is affected by the resolution bandwidth and video bandwidth together).
- When the video bandwidth is set to automatic, it will change with the resolution bandwidth. When it is set to manual, it will not be affected by the resolution bandwidth.

3.3.5.3 [Trace Averaging On Off]

Turns trace averaging on or off. Trace averaging allows smooth display of traces without using a narrow video bandwidth. This function sets the detector to sampling mode and continuously averages the trace to smooth the trace.

3.3.5.4 [EMI Bandwidth▼]

A soft menu about EMI bandwidth measurement pops up.

3.3.5.5 [EMI Bandwidth On Off]

Enable or disable EMI bandwidth measurement. The bandwidth parameters that can be set are: 1MHz, 120KHz, 30KHz, 9KHz.

3.3.6 Sweep

A soft menu related to spectrum analyzer scanning pops up.

3.3.6.1 [Scan Time Automatic Manual]

Set the sweep time to automatic or manual mode. In manual mode, set the time the spectrum analyzer takes to complete a sweep within the sweep range.

Key points:

- When the span is non-zero, select automatic setting and the spectrum analyzer will select the shortest sweep time based on the current settings of parameters such as RBW and VBW.
- You can use the numeric keys and arrow keys to modify this parameter.

3.3.6.2 [Single scan]

Set the scan to single scan.

3.3.6.3 [Continuous Scan]

Set the scan to continuous scan.

3.3.6.4 [Scan Points]

Set the number of points obtained in each scan, that is, the number of points of the current trace.

Key points:

- When the scan time is limited by the sampling rate of the ADC, changing the number of scan points will affect the scan time. The larger the number of points, the longer the scan time required.
- Changing the number of scan points will affect multiple system parameters, so the system will rescan and measure.
- You can use the numeric keys, knob, and arrow keys to change parameters.

3.3.7 Trig

A soft menu for setting the trigger function pops up.

3.3.7.1 [automatic]

The trigger condition is met at any time, that is, the trigger signal is continuously generated.

3.3.7.2 [video]

Set the trigger mode to video trigger.

3.3.7.3 [external▼]

A soft menu for selecting external trigger mode pops up.

3.3.7.4 [Rising edge]

Set the trigger to external rising edge trigger.

3.3.7.5 [Falling edge]

Set the trigger to external falling edge trigger.

3.3.8 Trace

The sweep signal is displayed on the screen as a trace. This menu can be used to set the trace-related parameters. Up to 5 traces can be displayed at the same time. Press this key to pop up a soft menu related to the trace.

3.3.8.1 [Traces 1 2 3 4 5]

Select the trace, the spectrum analyzer provides traces 1, 2, 3, 4, and 5. The selected trace number and the state menu item of the trace will be underlined.

3.3.8.2 [refresh]

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

3.3.8.3 [Maximum Hold]

Displays the maximum response of the input signal held in the trace. In this mode, the trace continuously receives sweep data and the positive peak detection mode is selected.

3.3.8.4 [Minimum hold]

Displays the minimum response of the input signal held in the trace. In this mode, the trace continuously receives sweep data and the negative peak detection mode is selected.

3.3.8.5 [Blanking]

Clear the trace on the screen. But the content in the trace register remains the same and is not refreshed.

3.3.8.6 [Check]

Displays the contents of the current trace without refreshing it for easier observation and reading.

3.3.8.7 [Trace operation▼]

A soft menu related to trace operation pops up.

3.3.8.8 [1 ←→ 2]

Exchange the contents of trace register 1 with those of trace register 2, and put the contents of both trace registers 1 and 2 into display mode.

3.3.8.9 [2-DL→ 2]

Subtracts the display line value from trace register 2. This function is executed once when activated. To execute it again, press [2 - DL → 2] again. When this function is activated, the display line is also activated.

3.3.8.10 [2 ←→ 3]

Exchange the contents of trace register 2 with those of trace register 3, and put the contents of trace registers 2 and 3 into display mode at the same time.

3.3.8.11 [1 → 3]

Move the contents of trace register 1 into trace register 3 and put trace 3 into display mode.

3.3.8.12 [2 → 3]

Move the contents of trace register 2 into trace register 3 and put trace 3 into display mode.

3.3.9 Detector

When displaying a larger span, one pixel contains the spectrum information of a relatively large sub-segment, that is, multiple sampling points will fall on one pixel. By setting the detector detection method, you can decide which sampling values the pixel contains. Press this key to pop up a soft menu related to detection. Including: [Positive Peak], [Sampling], [Negative Peak], [Average], [RMS].

Key points:

- Select different detection methods according to the actual application to ensure the accuracy of the measurement.
- The selectable detection methods are positive peak, negative peak, and sampling value.
- The selected detection method has a corresponding parameter icon in the status bar on the left side of the screen.

Table 3-2 Comparison of detection methods

Detection method	Measurement
Mean	The power of the detected signal is calculated by arithmetic averaging.
RMS	RMS averaging calculates the true average power and is best suited for measuring the power of complex signals.
Positive Peak	Positive peak detection ensures that no peak signal is missed, which is beneficial for measuring signals very close to the noise floor.
Samples	Sampling detection is beneficial for measuring noisy signals. It can measure noise better than standard detection.
Negative Peak	Negative peak detection is mostly used in self-test of spectrum analyzers, but rarely in measurements. It can reproduce the modulation envelope of AM signals very well.

3.3.9.1 [Mean]

The power of the detected signal is calculated by arithmetic mean.

3.3.9.2 [RMS]

The value is obtained by taking the square root of the sum of the voltage values measured in a signal collection unit and then dividing it by the input characteristic impedance of the spectrum analyzer (usually 50Ω).

3.3.9.3 [Positive peak]

Select the positive peak detection mode. In this mode, the detector selects the maximum value in the sampled data segment and displays it on the corresponding pixel point. The positive peak detector is selected when [Max Hold] is selected.

3.3.9.4 [Negative peak]

Select the negative peak detection mode. This mode allows the detector to select the minimum value in the sampled data segment and display it at the corresponding pixel point.

3.3.9.5 [sampling]

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

3.3.10 Display

A soft menu pops up regarding the spectrum analyzer display.

3.3.10.1 [Full Screen Display]

The screen switches to full-screen display mode, and the menu on the right side of the screen and the parameter status on the left side are blanked to allow you to view more detailed trace information. Pressing this key again will exit the full-screen mode.

3.3.10.2 [Window Scaling On Off]

When the window zoom is turned on, the measurement signal can be displayed with a small span in the lower half of the screen.

3.3.10.3 [Display Lines On Off]

Turn the display line on or off or change its display position. The display line can be used as a reference when taking readings.

3.3.10.4 [Amplitude Scale On Off]

Turn the amplitude scale function on or off. When turned on, it is displayed on the far left of the screen, making it easy to observe the signal power.

3.3.10.5 [Grid On Off]

Set the screen grid to on or off.

3.3.10.6 [Display Style▼]

Set the display style to default or WinXP mode.

3.3.10.7 [Tags On Off]

Enable or disable the on-screen grid.

3.3.11 Meas and Meas Setup

Provides a variety of advanced measurement functions, including: time spectrum, adjacent channel power, channel bandwidth and occupied bandwidth. Meas Setup All parameter settings can only be performed after the corresponding measurement function of Meas is turned on, such as measuring adjacent channel power:

- Press [Meas] → [Adjacent Channel Power] → [Meas Setup] to measure the adjacent channel power data.

3.3.11.1 [Measurement off]

You can directly close the currently running measurement function, or select Close in the measurement menu.

3.3.11.2 [Time spectrum On Off]

Turn the time spectrum measurement function on or off.

3.3.11.3 [Adjacent Channel Power On Off]

Open or close the adjacent channel power measurement. Press [Measurement Settings] to pop up the adjacent channel power measurement parameter setting soft menu. Adjacent channel power is used to measure the adjacent channel power ratio of the transmitter. The absolute value of the main channel power and the absolute value of the adjacent channel power are obtained by linear power integration, so as to obtain the adjacent channel power ratio.

3.3.11.4 [Channel Power On Off]

Turn on or off the channel power measurement. Press [Measurement Settings] to pop up the parameter setting soft menu of channel power measurement. Channel power is used to measure the transmitter channel power. According to the channel bandwidth set by the user, the absolute value of the main channel power is obtained through linear power integration.

3.3.11.5 [Bandwidth Occupied On Off]

Open or close the occupied bandwidth measurement. Press [Measurement Settings] to pop up the occupied bandwidth measurement parameter setting soft menu. Occupied bandwidth is a measure of the bandwidth occupied by the transmitter signal. It can be measured from the ratio of the in-band power to the total power in the frequency span. The default value is 99% (users can set this value).

3.3.11.6 [Pass-Fail▼]

A soft menu of the pass/fail measurement function pops up. There are two modes of pass/fail measurement: window measurement and area measurement.

3.3.11.7 [Window Measurement▼]

A soft menu for the pop-up window measurement mode.

3.3.11.8 [Window Measurement On Off]

Enable or disable window measurement mode.

3.3.11.9 [Amplitude Lines On Off]

Turn the amplitude line on or off. The amplitude line is turned on by default when the measurement window is opened.

3.3.11.10 [Frequency Line On Off]

Turn the frequency line on or off. The frequency line is turned on by default when the window measurement is turned on.

3.3.11.11 [Amplitude Upper limit Lower limit]

Set the upper and lower limits of the amplitude line.

3.3.11.12 [Frequency Start Stop]

Set the start and end values of the frequency line.

3.3.11.13 [Window Scan On Off]

Turn window scanning on or off. When window scanning is on, only the window formed by the intersection of the amplitude line and the frequency line is scanned, and the periphery is scanned; when it is off, the entire frequency is scanned.

3.3.11.14 [Area measurement▼]

A soft menu for area measurement mode pops up.

3.3.11.15 [Area Measurement On Off]

Turns area measurement mode on or off.

3.3.11.16 [Upper Limit Line On Off]

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

3.3.11.17 [Lower Limit Line On Off]

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

3.3.11.18 [Bias X/Y Frequency Amplitude]

It is used to edit the upper limit line and the lower limit value and set the appropriate control line according to the specific test results.

3.3.11.19 [Online Edit▼]

Upper line editing is used to edit the control line above the trace according to the specific situation of the trace.

3.3.11.20 [Offline Edit▼]

Upper line editing is used to edit the control line below the trace according to the specific situation of the trace.

3.3.11.21 [Frequency Count▶]

Enter the frequency counting soft menu.

3.3.11.22 [Frequency Count On Off]

Turn on the frequency count to more accurately test the frequency accuracy of the signal.

3.3.11.23 [Resolution bandwidth]

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

3.3.12 Marker

The frequency marker cursor is a diamond-shaped marker used to mark points on the trace. The cursor can be used to read the amplitude, frequency or scanning time point of each point on the trace.

Key points:

- Up to 5 pairs of cursors can be displayed simultaneously, but only one pair or one cursor is active at a time.
- In the cursor menu, you can use the numeric keys and arrow keys to enter the frequency and view the readings at different points on the trace.

3.3.12.1 [Frequency marker 1 2 3 4 5]

Activate a single frequency marker, select cursor 1 by default, and place the frequency marker at the center of the trace. If the frequency marker difference is activated, this soft key will become the menu under the [Frequency Marker Difference] function.

If there is already a frequency marker, this command will not produce any action. If there are already two frequency markers (e.g. in [Frequency Marker Difference] mode), [Frequency Marker] changes the active frequency marker to the new single frequency marker. Amplitude and frequency information (time information when the span is 0Hz) are available from the frequency marker, and these values are displayed in the active function area and in the upper right corner of the screen. The active frequency marker can be moved using the numeric keys, step keys or knob.

The frequency marker reads data from the currently active trace (this trace may be trace A or trace B). If both traces are activated, or both traces are in static display mode, the frequency marker reads data from trace A.

3.3.12.2 [Traces 1 2 3 4 5]

In trace measurement, it is used to activate the frequency marker of each trace.

3.3.12.3 3.3.12.3 [normal]

One of the types of cursors. In normal measurement mode, activate the cursor to measure the X (frequency or time) and Y (amplitude) values of a point on the trace. After selecting [Normal Frequency Marker], a cursor marked with the current cursor number appears on the trace, such as "1".

Key points:

- If no cursor is currently active, activates a cursor at the center frequency of the current trace.
- Move the cursor position by using the direction keys and digital input values, and the current cursor reading is displayed in the upper right corner of the screen.
- The resolution of the X-axis (frequency or time) reading is related to the span and the number of sweep points. To obtain a higher reading resolution, increase the number of sweep points or reduce the span.

3.3.12.4 [Difference]

One of the types of cursors. Used to measure the difference between a "reference point" and a "point on the trace": X (frequency or time) and Y (amplitude) values. After selecting [Marker Difference], a pair of cursors will appear on the trace: the reference cursor and the difference cursor, which will display the amplitude difference and frequency difference between the two markers in the upper right corner of the active area and the display area. If a single marker already exists, [Marker Difference] will place a static marker and an active marker to the original position and the single marker position. The active marker can be moved using the knob, step keys or numeric keys. If two markers exist, you can directly press [Marker Difference]. However, if [Marker Difference] is already activated, pressing [Difference] will place the static marker at the position of the active marker. The displayed amplitude difference is expressed in dB units, or linear units converted according to the corresponding ratio.

Key points:

- If there is an active cursor, a reference cursor is activated at the current cursor, otherwise both the reference cursor and the difference cursor are activated at the center frequency.
- The reference cursor position is fixed (including X and Y), while the difference cursor is active and its position can be changed using the knob, arrow keys, and numeric keys.
- The frequency (or time) difference and amplitude difference between the two cursors are displayed in the upper right corner of the screen.
- Two methods to define a point as a reference point:

a) Open a "normal" cursor, position it at a point, and then switch the cursor type to "difference", then the point becomes a reference point, and the difference measurement can be achieved by modifying the difference point position.

b) Open a "difference" cursor, position the difference cursor at a point, and select the "difference" menu again, that is, position the reference cursor at the point, and the difference measurement can be achieved by modifying the difference point position.

3.3.12.5 [closure]

Close the currently opened cursor and its related functions, and the frequency marker will no longer be displayed.

3.3.12.6 [Close All]

Close all opened cursors and their related functions, and the frequency marker will no longer be displayed.

3.3.12.7 [Frequency Marker List On Off]

All the opened cursors are displayed in the frequency division window in a list format. The displayed contents include: cursor number, marked trace number, cursor reading type, frequency and corresponding amplitude. The frequency marker list can be used to view the measured values of multiple measurement points.

3.3.13 Marker Fctn

Enter the frequency marker function related soft menu.

3.3.13.1 [Function Off]

Disable the frequency marker measurement function.

3.3.13.2 [NdB On Off]

Enable the NdB bandwidth measurement function. NdB bandwidth refers to the frequency difference between two points with a drop (N<0) or increase (N>0) of N dB to the left and right of the current cursor frequency point.

Key points:

- After the measurement starts, first search for two frequency points with a difference of N dB to the left and right of the current cursor frequency point. If found, the frequency difference between them will be displayed in the active function area.
- You can use the numeric keys to change the value of N. The default value of N is 3.

3.3.13.3 [Frequency marker noise On Off]

Turn on or off the frequency marker noise function. Perform the function of marking noise for the selected cursor, and then read the noise power density value at the cursor. When turned on, the average noise level read at the frequency marker is the noise power normalized to 1Hz bandwidth.

3.3.14 Marker→

A soft menu related to the frequency marker function pops up. Use the current cursor value to set other system parameters of the instrument (such as center frequency, reference level, etc.). These menus are related to the frequency, span, and whether the frequency marker of the spectrum analyzer is in normal or differential frequency marker mode.

3.3.14.1 [Frequency Marker → Center Frequency]

Set the center frequency to be equal to the frequency marker frequency. This function can quickly move the signal to the center of the screen.

Key points:

- When the "normal" cursor is selected, the center frequency is set to the frequency at the cursor.
- When the "frequency mark difference" cursor is selected, the center frequency is set to the frequency at the difference cursor.
- This function is invalid in zero span.

3.3.14.2 [Frequency Marker → Frequency Step]

Set the center frequency step of the spectrum analyzer according to the frequency at the current cursor.

Key points:

- When the "Normal" type cursor is selected, the center frequency step is set to the frequency at the cursor.

- When the "Frequency Marker Difference" cursor is selected, the center frequency step is set to the frequency at the difference cursor.
- This function is invalid in zero span.

3.3.14.3 [Frequency marker → start frequency]

Set the start frequency of the spectrum analyzer according to the frequency at the current cursor.

Key points:

- When the "Normal" cursor is selected, the start frequency is set to the frequency at the cursor.
- When the "Frequency Marker Delta" cursor is selected, the start frequency is set to the frequency at the delta cursor.
- This function is invalid in zero span.

3.3.14.4 [Frequency marker → end frequency]

Set the stop frequency of the spectrum analyzer according to the frequency at the current cursor.

Key points:

- When the "normal" cursor is selected, the stop frequency is set to the frequency at the cursor.
- When the "frequency mark difference" cursor is selected, the stop frequency is set to the frequency at the difference cursor.
- This function is invalid in zero span.

3.3.14.5 [Frequency marker → reference level]

Set the reference level of the spectrum analyzer according to the amplitude at the current cursor position.

Key points:

- When the "Normal" cursor type is selected, the reference level is set to the amplitude at the cursor.
- When the "Frequency Marker Delta" cursor type is selected, the reference level is set to the amplitude at the delta cursor.

3.3.14.6 [Frequency marker △→Sweep width]

Set the frequency span to be equal to the frequency value of the frequency standard difference so that the span can be reduced rapidly as required.

3.3.14.7 [Frequency marker △→Center frequency]

Set the center frequency of the spectrum analyzer to be equal to the frequency marker difference.

3.3.15 Peak

Open the peak search setup menu and execute the peak search function.

Key points:

- When "Maximum" is selected in the peak search option, the maximum value on the trace is searched and marked with a cursor.
- The peak search of the next peak, right peak, and left peak value must meet the search parameter conditions.
- The pseudo signal at zero frequency caused by the local oscillator feedthrough is not regarded as a peak and will be ignored.

3.3.15.1 [Maximum value search]

Place a frequency marker at the highest point of the trace and display the frequency and amplitude of the frequency marker in the upper right corner of the screen. [Maximum Search] does not change the activated function.

3.3.15.2 [Next peak]

Moves the active marker to the next highest point on the trace associated with the current marker position. When this key is pressed repeatedly, lower peaks can be found quickly.

3.3.15.3 [Left Peak]

Finds the next peak to the left of the current marker position. The next peak must meet the current peak and peak threshold criteria.

3.3.15.4 [Right Peak]

Finds the next peak to the right of the current marker position. The next peak must meet the current peak and peak threshold criteria.

3.3.15.5 [Minimum search]

Places a marker at the minimum point on the trace and displays the frequency and amplitude of the marker in the upper right corner of the screen.

3.3.15.6 [Frequency Marker → Center Frequency]

Set the center frequency to be equal to the frequency marker frequency. This function can quickly move the signal to the center of the screen.

3.3.15.7 [Peak Search On Off]

Set the peak search mode, the default is off. Turn on the mode to automatically search for the peak.

3.3.16 File

Enter the file management menu to operate files in the spectrum analyzer or in an external USB storage device.

3.3.16.1 [refresh]

Refresh the file directory.

3.3.16.2 [File Type▼]

Select the file type as All, Screen Image, and Trace Data.

3.3.16.3 [File Operations▼]

A soft menu pops up for file operations, including file sorting, deletion, and export.

- Sorting can be done by name, time, or size.
- Delete can be done by selected files, this page, or all.
- Export can be done by selected files, this page, or all.

3.3.17 Save

Execute the file saving operation.

- When saving, select the file type according to your needs, including screenshots or trace data. Similarly, the file storage location can be selected to save to local storage or mobile flash memory.
- If user status is selected, it is used to call data when powering on/resetting settings.

3.3.18 System

System-related operations: system information, I/O configuration, power on/reset, local language, date and time, backlight adjustment, user calibration, and system services, etc.

3.3.18.1 [System Information▼]

View system information or recent messages.

3.3.18.2 [System Information]

System information includes the following information: serial number, device model, software version, firmware version, temperature, local network, IP address, subnet mask, gateway, network card physical address, listening port, serial port.

3.3.18.3 [System log]

View the update record of the instrument system.

3.3.18.4 [Configuration I/O▼]

Pop up a soft menu of network, serial port, and GPIB configuration parameters.

3.3.18.5 [network▼]

Pop up a menu related to network configuration.

3.3.18.6 [IP address]

Used to set the network port IP address.

3.3.18.7 [Subnet Mask]

Used to set the parameters of the subnet code.

3.3.18.8 [Gateway]

Used to set the gateway address parameters.

3.3.18.9 [Reset Network]

Used to reset the network settings.

3.3.18.10 [GPIB]

Pop up the GPIB settings soft menu.

3.3.18.11 [Serial Port▼]

Pop up the serial port settings soft menu, including baud rate, data bit, stop bit, check, flow control, and reset serial port.

3.3.18.12 [Power on/reset▼]

Pop up the spectrum analyzer power-on parameter or reset parameter settings soft menu.

3.3.18.13 [Power-on parameters▼]

Power-on parameter settings include factory and user states.

3.3.18.14 [Reset parameters▼]

Reset parameter settings include factory and user states.

3.3.18.15 [Local Language▼]

Pop up the language settings soft menu, and select the language displayed by the spectrum analyzer as Chinese or English according to your needs.

3.3.18.16 [Date/Time▼]

Used to set the instrument date, time, and date and time format.

3.3.18.17 [Date Settings]

Set the date displayed on the spectrum analyzer. The date input format is: YYYYMMDD. For example, October 1, 2009 is marked as: 20091001.

3.3.18.18 [Time settings]

Set the time displayed by the spectrum analyzer. The time input format is: HHMMSS, for example: 23 hours 12 minutes 11 seconds is expressed as: 231211.

3.3.18.19 [Backlight adjustment]

Set the backlight brightness of the spectrum analyzer LCD screen. You can modify the parameters with the numeric keys, knob and arrow keys.

3.3.18.20 [User Calibration▼]

The user calibration related soft menu pops up.

- Set the signal generator frequency to 440MHz and power to -20dB, connect it to the RF input of the spectrum analyzer, press the user calibration key, and start user calibration.
- If the user calibration compensation data is not needed, you can press [Restore to Factory] to clear the data and restore to the factory state.

3.3.18.21 [System Services▼]

Enter the factory debugging menu.

3.3.18.22 [Screen refresh On Off]

Turn on or off the screen refresh function.

3.3.18.23 [75Ω Impedance Compensation On Off]

Turn on or off the 75Ω impedance compensation function according to test needs.

3.3.19 Print Setup

Set relevant parameters for printing. The spectrum analyzer supports HP printers.

3.3.19.1 [Paper size▼]

Used to select the paper size for printing, including A4, A3, B5, C5, and envelopes.

3.3.19.2 [Print Language Pcl Esc]

Set the printer language, you can choose Pcl and Esc.

3.3.19.3 [Printer Type Black and White Color]

Select the print type as black and white or color printer.

3.3.19.4 [Direction Landscape Portrait]

Used to switch between horizontal and vertical placement.

3.3.19.5 [Number of copies]

Used to set the number of printed papers.

3.3.19.6 [Print curve]

Print the curve of the current interface.

3.3.19.7 [Print Screen]

Used for full-screen printing.

3.3.20 Source

Pop up the soft menu related to the tracking source measurement.

3.3.20.1 [Tracking Source On Off]

The RF output and spectrum reception are completely synchronized in the frequency sweep, and the tracking source frequency cannot be set separately.

3.3.20.2 [Output Power]

The tracking source power output range is 0 dBm to -30 dBm.

3.3.20.3 [Network Measurement▼]

The tracking source network measurement function is mainly used for amplitude-frequency characteristic measurement; the RF output is completely synchronized with the spectrum measurement, and can be used as a scalar network analyzer. When the network measurement function is "on", the measurement result is displayed relative to the "normalized" value, expressed in "dB". When the network measurement function is "off", the measurement display is the spectrum measurement result, expressed in "dBm".

3.3.20.4 [Network Measurement On Off]

Turn the tracking source network measurement function on or off.

3.3.20.5 [Output Power]

Used to set the output power of the tracking source.

3.3.20.6 [Reference level]

This soft menu is used for users of tracking source network measurement to adjust the display position of the measurement results.

3.3.20.7 [Normalization]

This soft menu is used for user field calibration of tracking source network measurement. After connecting the instrument RF output to the RF input, press the "Normalize" soft menu and the display will show a straight line on the 0dB scale.

3.3.20.8 [Signal Source▼]

Pop up the soft menu of signal source settings.

3.3.21 Demod

Enter the demodulation settings. This spectrum analyzer supports AM, FM and FWM, which are off by default.

3.3.21.1 [Audio Demodulation▼]

Pop up the audio demodulation soft menu.

3.3.21.2 [Audio Demodulation On Off]

Turn on or off audio demodulation.

3.3.21.3 [Demodulation mode▼]

Pop up the soft menu related to demodulation mode. Including FMW, FM, AM.

3.3.21.4 [volume]

When audio demodulation is turned on, adjust the speaker output volume.

3.3.21.5 [Radio Station▼]

You can directly listen to some local radio stations.

4. Measurement Applications

This chapter introduces the functions and usage of spectrum analyzers through examples. The contents of this chapter are as follows:

- Continuous wave signal measurement
- Using resolution bandwidth to resolve closely spaced signals
- N dB bandwidth measurement
- Adjacent channel power measurement
- Channel power measurement
- Occupied bandwidth measurement
- Small signal measurement using preamplifier
- Harmonic distortion measurement
- AM modulated signal measurement

4.1 Continuous wave signal measurement

One of the most common measurement tasks of a spectrum analyzer is to measure the frequency and amplitude of a signal. In the following example, a signal generator (Agilent N5183B) is used to output a 1GHz, -10dBm continuous wave signal as the measurement signal.

Procedure:

1) Device connection

Connect the signal output of the signal generator to the RF input of the S3532A spectrum analyzer.

2) Parameter settings

a) Reset the instrument

◆ Press the [Preset] key.

b) Setting parameters

- Press the [FREQ] key,
- Press [Center Frequency], enter 1GHz;
- Press the [SPAN] key,
- Press [Span], enter 2MHz;

c) Using cursors to measure frequency and amplitude

- Press the [Peak] key, the cursor is on the peak frequency, the cursor will be marked at the signal peak, and the frequency and amplitude values of the cursor will be displayed in the upper right corner of the screen.

3) Reading measurement results

The measured input signal frequency is 1GHz and the amplitude is -10.18dBm, as shown in Figure 4-1 below.

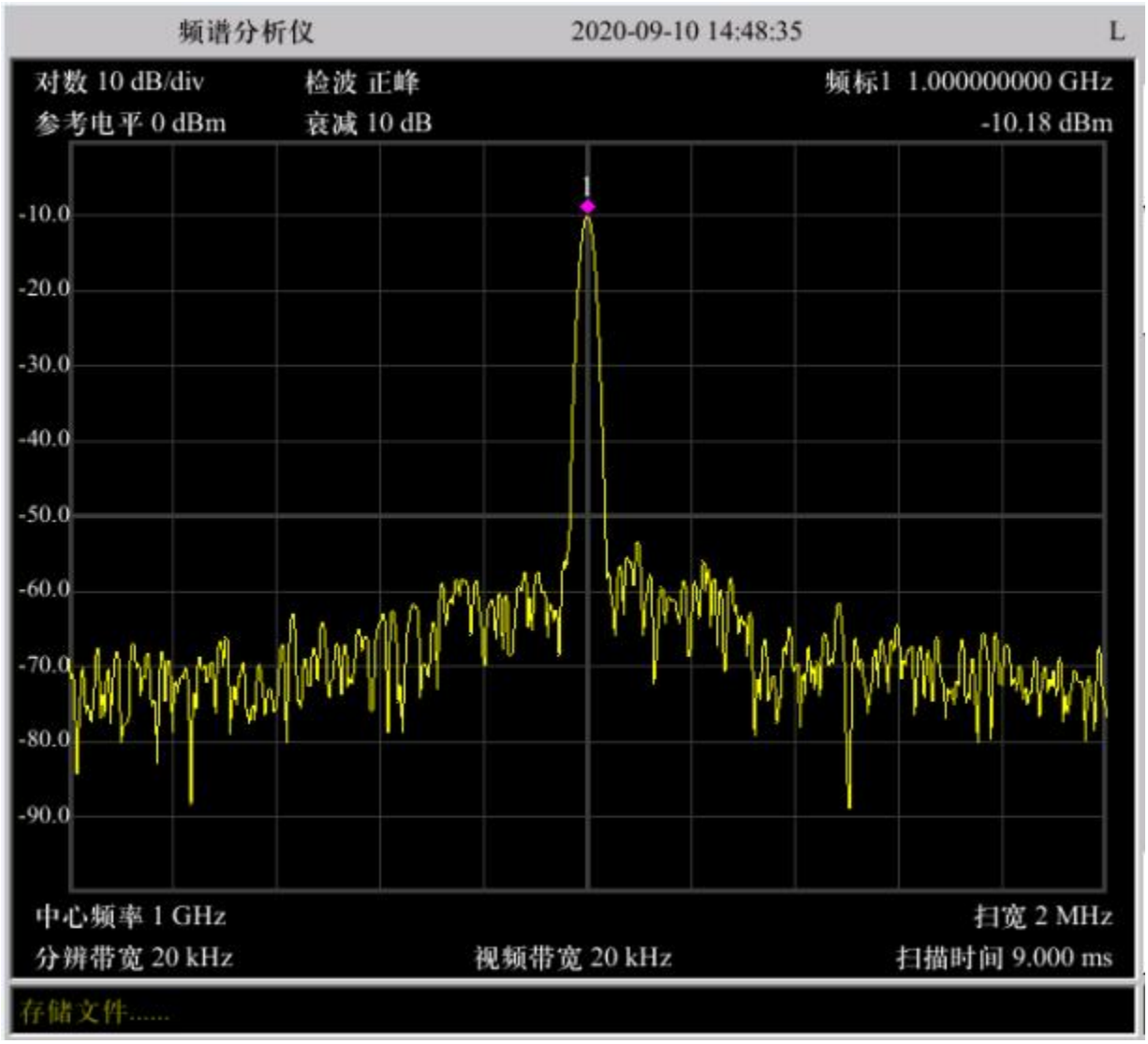


Figure 4-1 Measurement results of sinusoidal signal

4.2 Using resolution bandwidth to resolve closely spaced signals

Resolution bandwidth description: The signal resolution is determined by the bandwidth of the intermediate frequency (IF) filter, i.e., the resolution bandwidth. When a signal passes through the IF filter, the spectrum analyzer uses the signal to scan the bandpass shape of the IF filter. Therefore, when the frequencies of two equal-amplitude signals are very close, the top of the bandpass waveform scanned by either signal will almost cover the other signal, making it look like one signal. If the two signals are not equal in amplitude, but the frequencies are still very close, the small signal may be drowned by the response of the large signal. The resolution bandwidth function is used to select the appropriate IF bandwidth in the measurement. We use the 3dB bandwidth of the filter as its resolution bandwidth; the following describes how to select the appropriate resolution bandwidth.

4.2.1 Resolving two equal amplitude signals

Generally, to distinguish two equal-amplitude signals, the resolution bandwidth must be less than or equal to the frequency interval between the two signals. For example, to distinguish two equal-amplitude signals 1kHz apart, a resolution bandwidth of 1kHz or less should be selected.

Operation steps:

1) Equipment connection

Connect the RF input of the spectrum analyzer to two signal sources through a combiner. Set the frequency of one source to 1800.4995MHz and the frequency of the other source to 1800.5005MHz. The signal output amplitudes of the two sources should be equal to -20dBm. Adjust the output amplitudes of the two signal generators and observe the displayed signals of the spectrum analyzer to make the amplitudes of the two signals displayed by the spectrum analyzer equal.

2) Parameter setting

a) Reset the spectrum analyzer

- Press the [Preset] key.

b) Set parameters

- Press the [FREQ] key,
- Press [Center Frequency], enter 1800.5MHz;
- Press the [SPAN] key,
- Press [Span] and enter 50kHz;
- Press the [BW] key,
- Press [Resolution Bandwidth Auto Manual], set the resolution bandwidth to manual, and enter 3kHz; you can see that the peak signal on the screen becomes flat, indicating that there may be two signals; as shown in Figure 4-2.

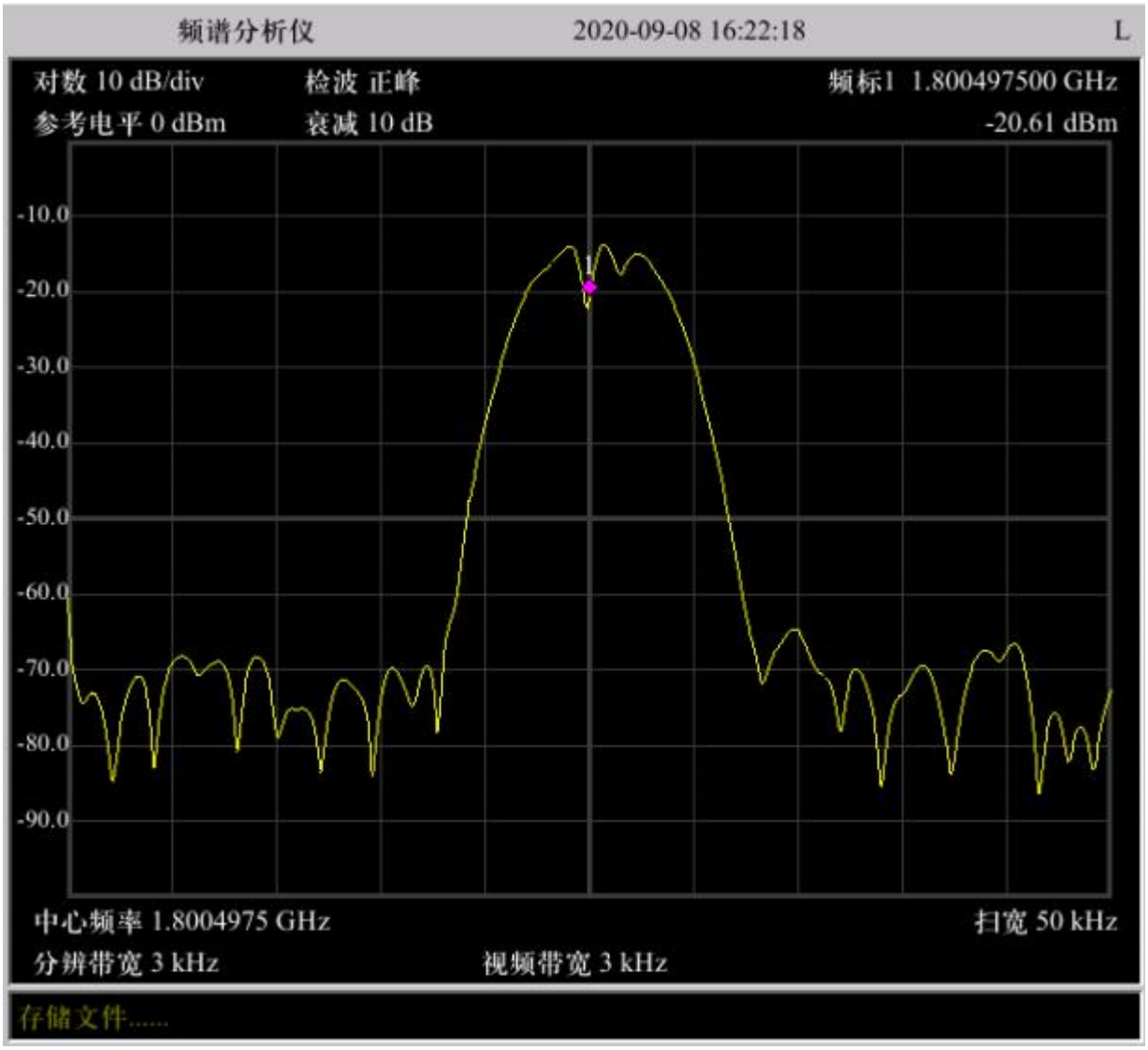


Figure 4-2 1kHz resolution bandwidth

3) Measurement results

a) Reduce the resolution bandwidth to 500Hz.

- Press the [BW] key,
- Press [Resolution Bandwidth Auto Manual], set the resolution bandwidth to manual, and enter 500Hz. You can see two signals appear on the screen, as shown in Figure 4-3; continue to reduce the resolution bandwidth to see the two signals more clearly.

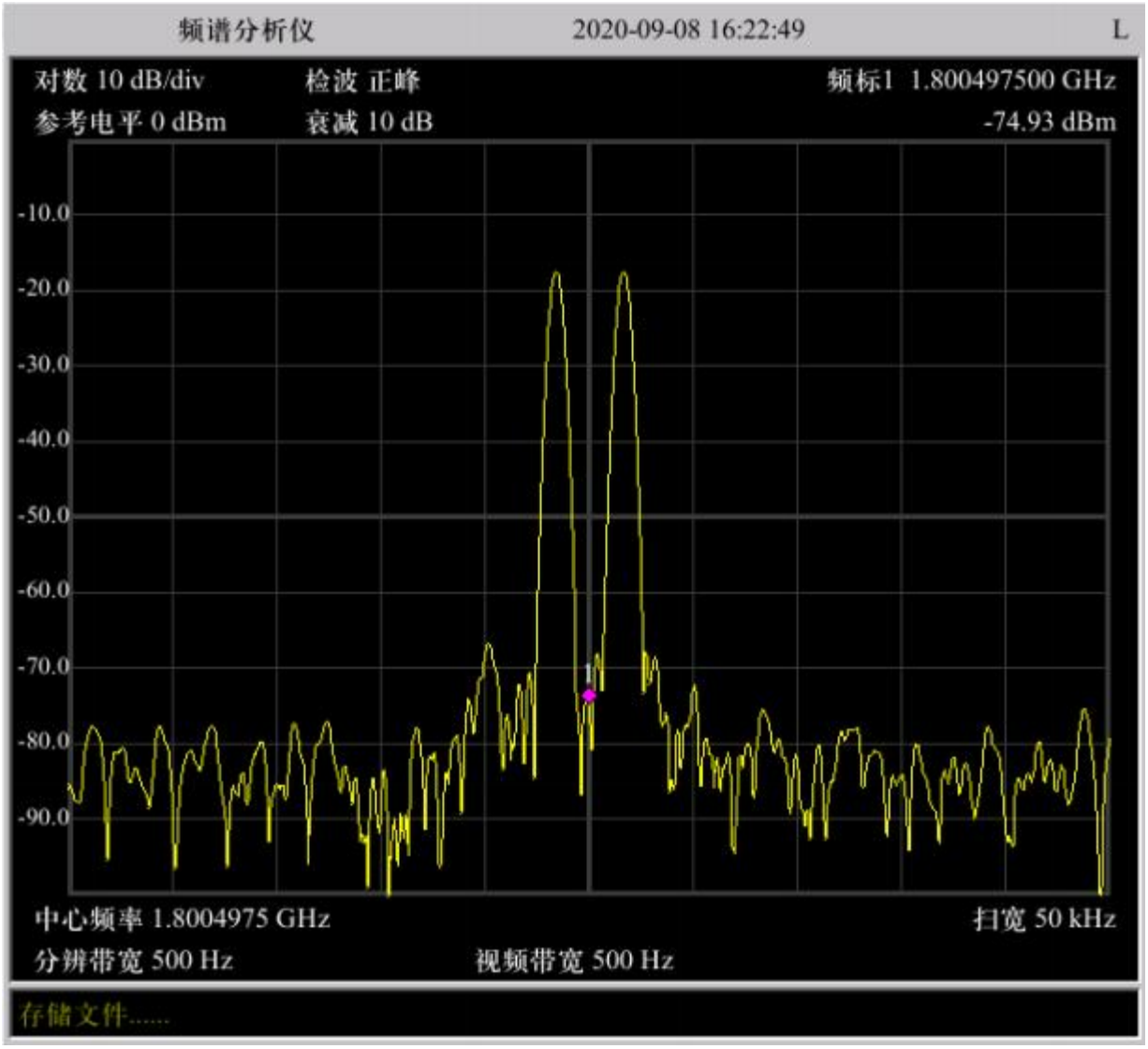


Figure 4-3 100Hz resolution bandwidth

4.2.2 Measurement steps to distinguish two unequal amplitude signals

This example is to distinguish two unequal amplitude signals with a frequency difference of 50kHz and an amplitude difference of about 40dB. To distinguish two unequal amplitude signals, the resolution bandwidth must be smaller than the frequency interval of the two signals (the same as distinguishing two equal amplitude signals). However, the maximum frequency bandwidth for distinguishing two unequal amplitude signals is mainly determined by the rectangular coefficient of the intermediate frequency filter, not the 3dB bandwidth. The rectangular coefficient is defined as the ratio of the 60dB bandwidth of the intermediate frequency filter to the 3dB bandwidth, as shown in Figure 4-4.

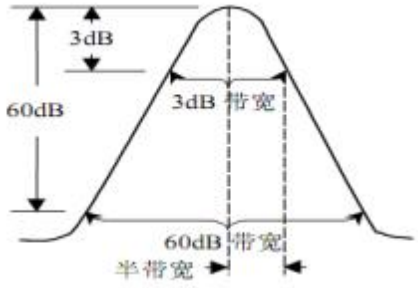


Figure 4-4 Bandwidth and rectangular coefficient

1) Device Connection

Connect the RF input port of the spectrum analyzer to two signal sources through a combiner. Set the frequency of one source to 1800MHz and the amplitude to -10dBm; the frequency of the other source to 1800.005MHz and the signal output amplitude to -40dBm, and turn on the RF output of both signal sources.

2) Parameter settings

a) Reset the instrument

◆ Press the [Preset] key.

b) Setting parameters

◆ Press the [FREQ] key,

◆ Press [Center Frequency], enter 1800.0025MHz;

◆ Press the [SPAN] key,

◆ Press [Span], enter 500kHz;

◆ Press the [BW] key,

◆ Press [Resolution Bandwidth Auto Manual], set the resolution bandwidth to manual, and enter the resolution bandwidth to 30kHz.

3) Measurement results

The rectangular coefficient of the resolution bandwidth filter of the S3532A spectrum analyzer is approximately 5:1. When the resolution bandwidth is 30kHz, the 60dB point is 235kHz and the half bandwidth is 117.50kHz, which is larger than the frequency interval of 50kHz and cannot distinguish between the two input signals, as shown in Figure 4-5.

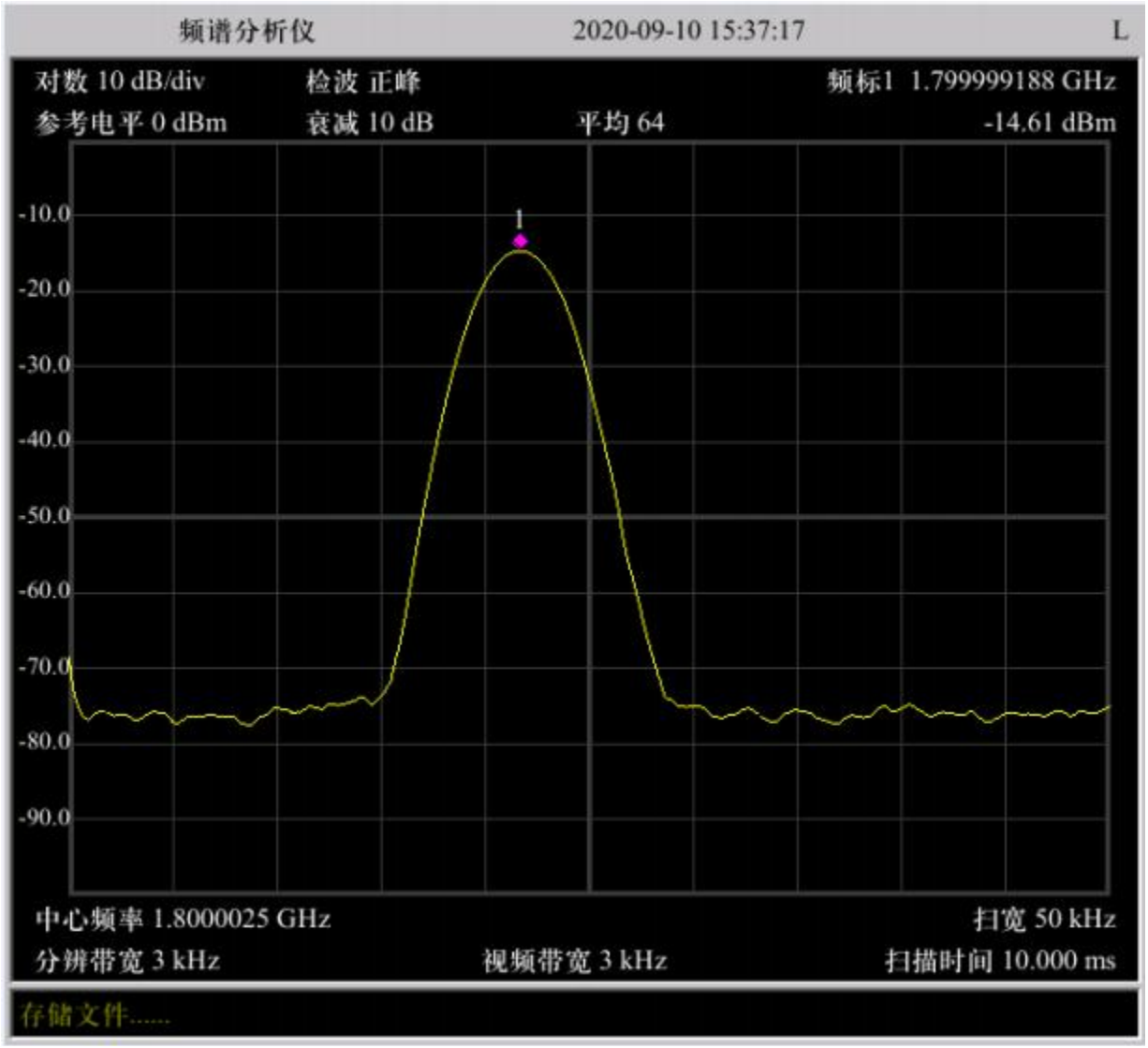


Figure 4-5 Test with 50kHz resolution bandwidth setting

a) Reduce the resolution bandwidth and observe the submerged small signal.

◆ Press the [BW] key,

◆ Press [Resolution bandwidth Auto Manual], set the resolution bandwidth to manual, and enter 500Hz; as shown in Figure 4-6.

b) Measure the frequency difference between two signals

◆ Press the [Peak] key, the cursor is on the peak frequency;

◆ Press the [Marker] key,

◆ Press [Difference] and move the cursor to the secondary peak value to read the frequency difference and amplitude difference between the two unequal amplitude signals; as shown in Figure 4-6.

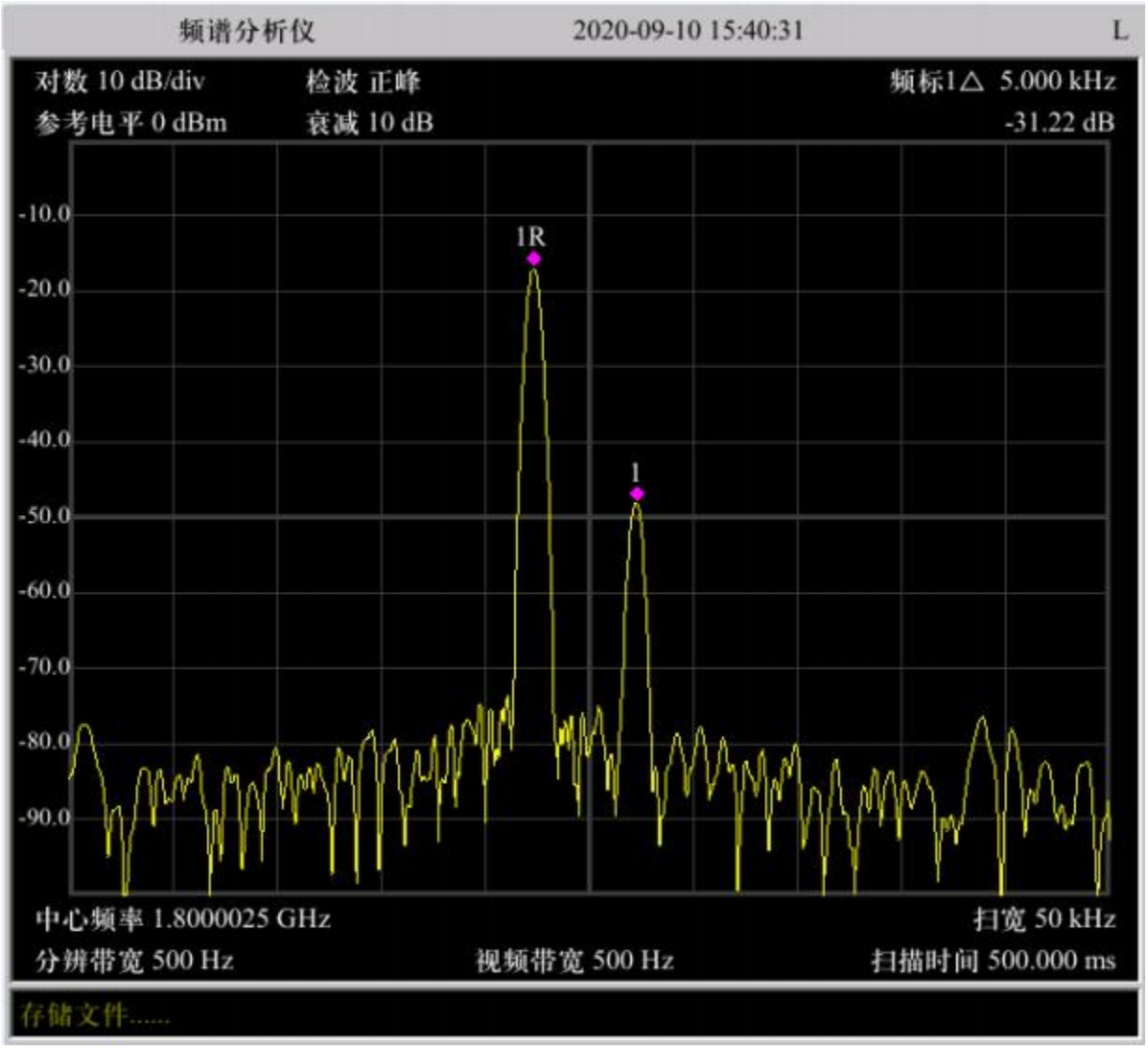


Figure 4-6 Test with 1kHz resolution bandwidth setting

4.3 N dB Bandwidth measurement

The following example uses a signal generator (Agilent N5183B) to output a 500MHz, -10dBm continuous wave signal as the measured signal.

Operation steps:

1) Equipment connection

Connect the signal output of the signal generator to the RF input on the front panel of the spectrum analyzer.

2) Parameter setting

a) Reset the instrument

- Press the [Preset] key.

b) Set parameters

- Press [FREQ] key,
- Press [Center Frequency] and enter 500MHz;
- Press [SPAN] key,
- Press [Span] and enter 1 MHz;
- Press [BW] key,
- Press [Resolution bandwidth Auto Manual], set the resolution bandwidth to manual, and enter 30kHz.
- Press [Trace average On Off], set it to on.

c) Use NdB bandwidth to measure signal bandwidth

- Press [Marker Fctn],
- Press [NdB On Off] to set NdB to on. The default value of N is 3. If you need to change it, press [NdB] and enter the value.

3) Read the measurement results

The measurement results are displayed in the active function area. The bandwidth of the current cursor when it drops 3dB is 30kHz, as shown in Figure 4-7.

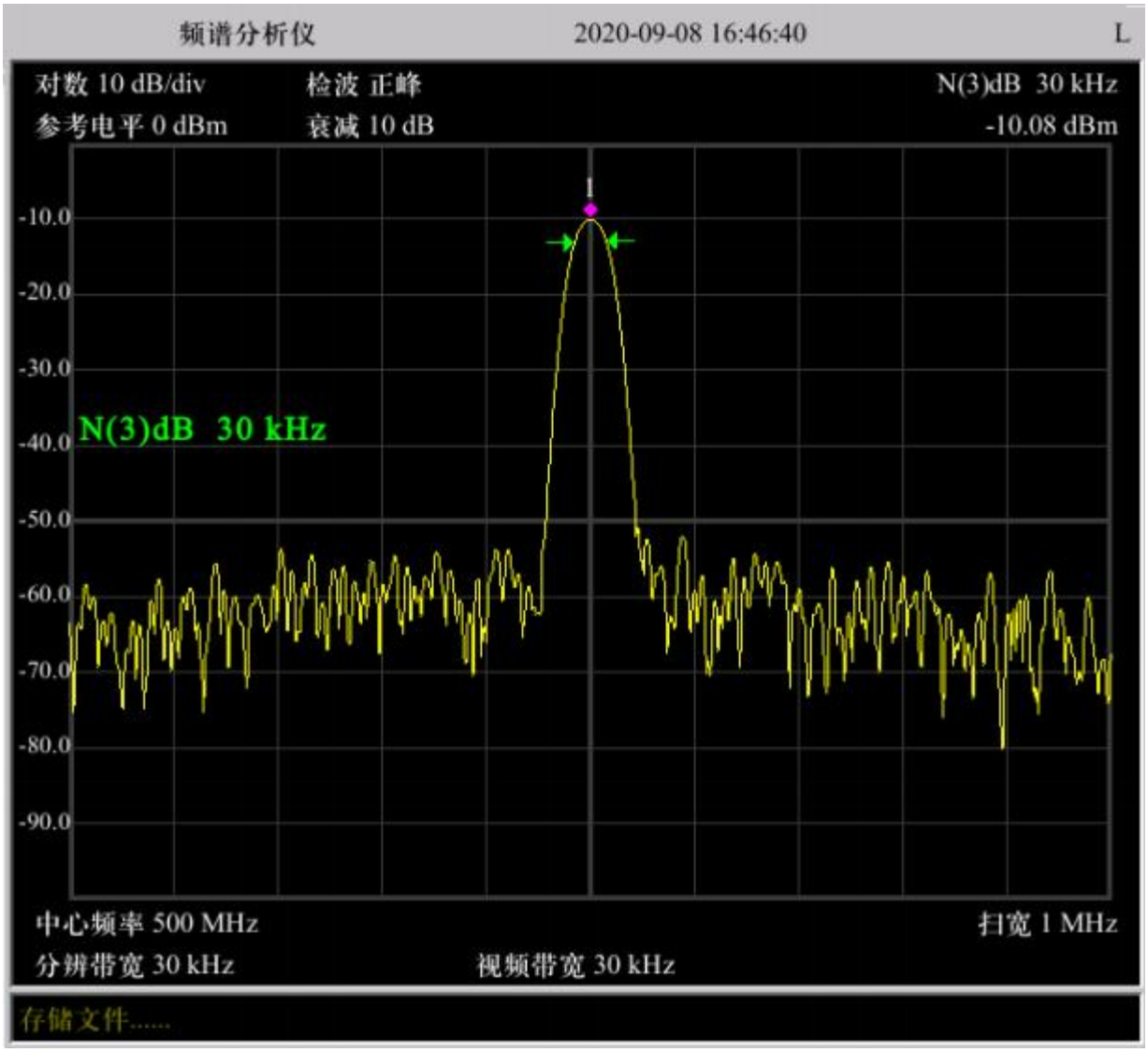


Figure 4-7 N(3)dB bandwidth measurement results

4.4 Adjacent channel power measurement

In the following example, a signal generator (Agilent N5183B) is used to output a 1 GHz, -10 dBm continuous wave signal as the measured signal.

Operation steps:

1) Equipment connection

Connect the signal output of the signal generator to the RF input on the front panel of the spectrum analyzer.

2) Measure the signal power using the adjacent channel power

a) Reset the instrument

◆ Press the [Preset] key.

b) Set parameters

- Press the [FREQ] key,
- Press [Center Frequency] and enter 1 GHz;
- Press the [Meas] key,
- Press [Adjacent Channel Power On Off] to set the adjacent channel power on.

3) Read the measurement results

The measurement results are displayed in the lower half of the split screen window, as shown in Figure 4-8.

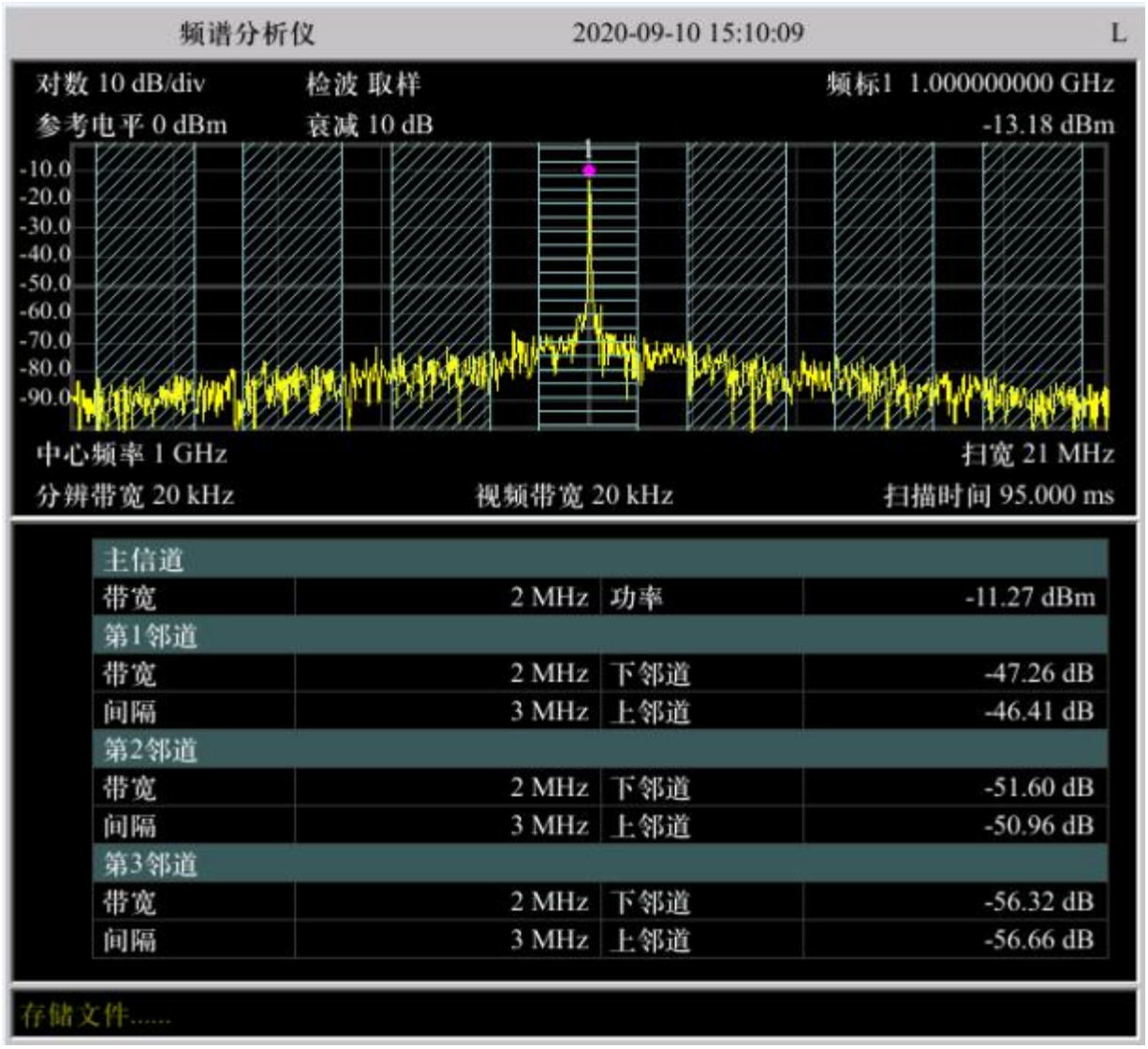


Figure 4-8 Adjacent channel power measurement results

4.5 Channel power measurement

In the following example, a signal generator (Agilent N5183B) is used to output a 500 MHz, -10dBm continuous wave signal as the measured signal.

Operation steps:

1) Equipment connection

Connect the signal output of the signal generator to the RF input of the spectrum analyzer panel.

2) Use channel power to measure signal power

a) Reset the instrument

- Press the [Preset] key.

b) Set parameters

- Press the [FREQ] key,
- Press [Center Frequency] and enter 500 MHz;
- Press the [Meas] key,
- Press [Channel Power On Off] to set the channel power on.

3) Read the measurement results

The measurement results are displayed on the screen, and the channel power is -10.17dBm, as shown in Figure 4-9.

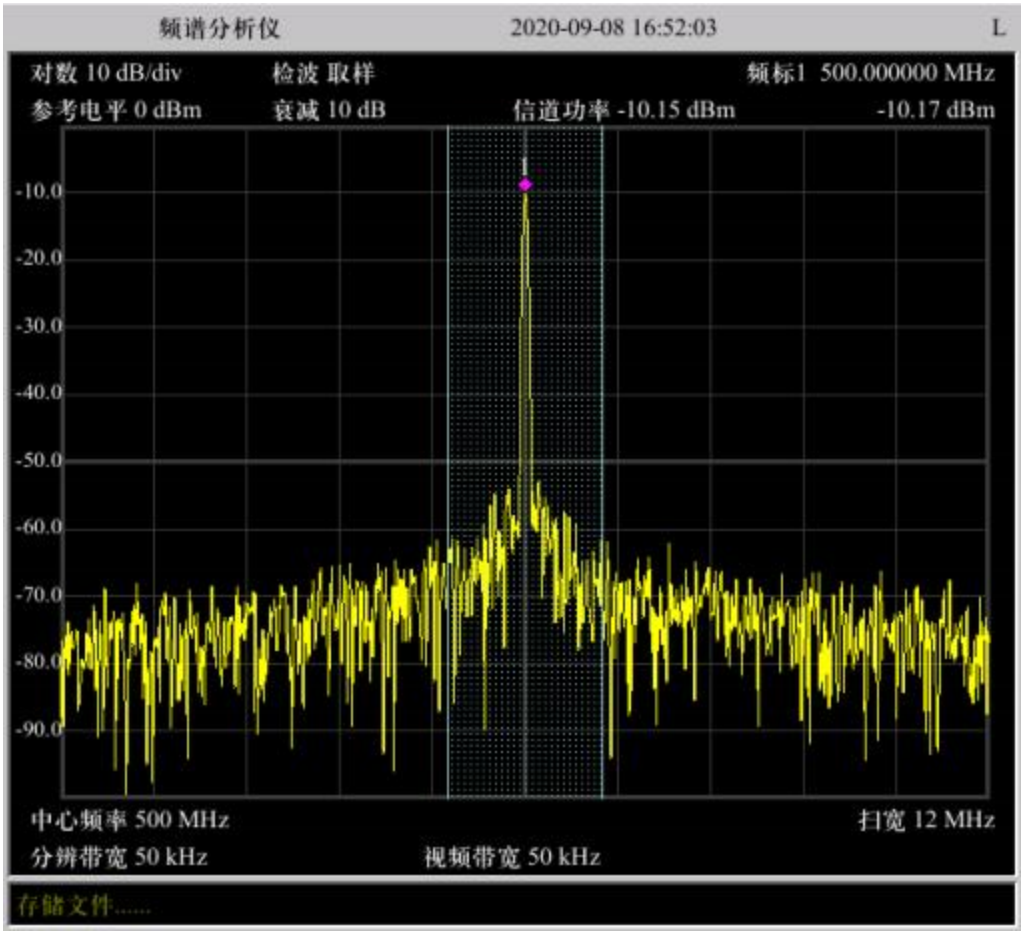


Figure 4-9 Channel power measurement results

4.6 Occupied bandwidth measurement

In the following example, a signal generator (Agilent N5183B) is used to output a 500 MHz, -10dBm continuous wave signal as the measured signal.

Operation steps:

1) Equipment connection

Connect the signal output of the signal generator to the RF input on the front panel of the spectrum analyzer.

2) Use occupied bandwidth to measure signal power distribution

a) Reset the instrument

- Press the [Preset] key.

b) Set parameters

- Press the [FREQ] key,
- Press [Center Frequency] and enter 500 MHz;
- Press the [Meas] key,
- Press [Occupied Bandwidth On Off] to set the occupied bandwidth on.

3) Read the measurement results

The measurement results are displayed in the lower half of the split-screen window: The occupied bandwidth is 165 kHz, as shown in Figure 4-10.

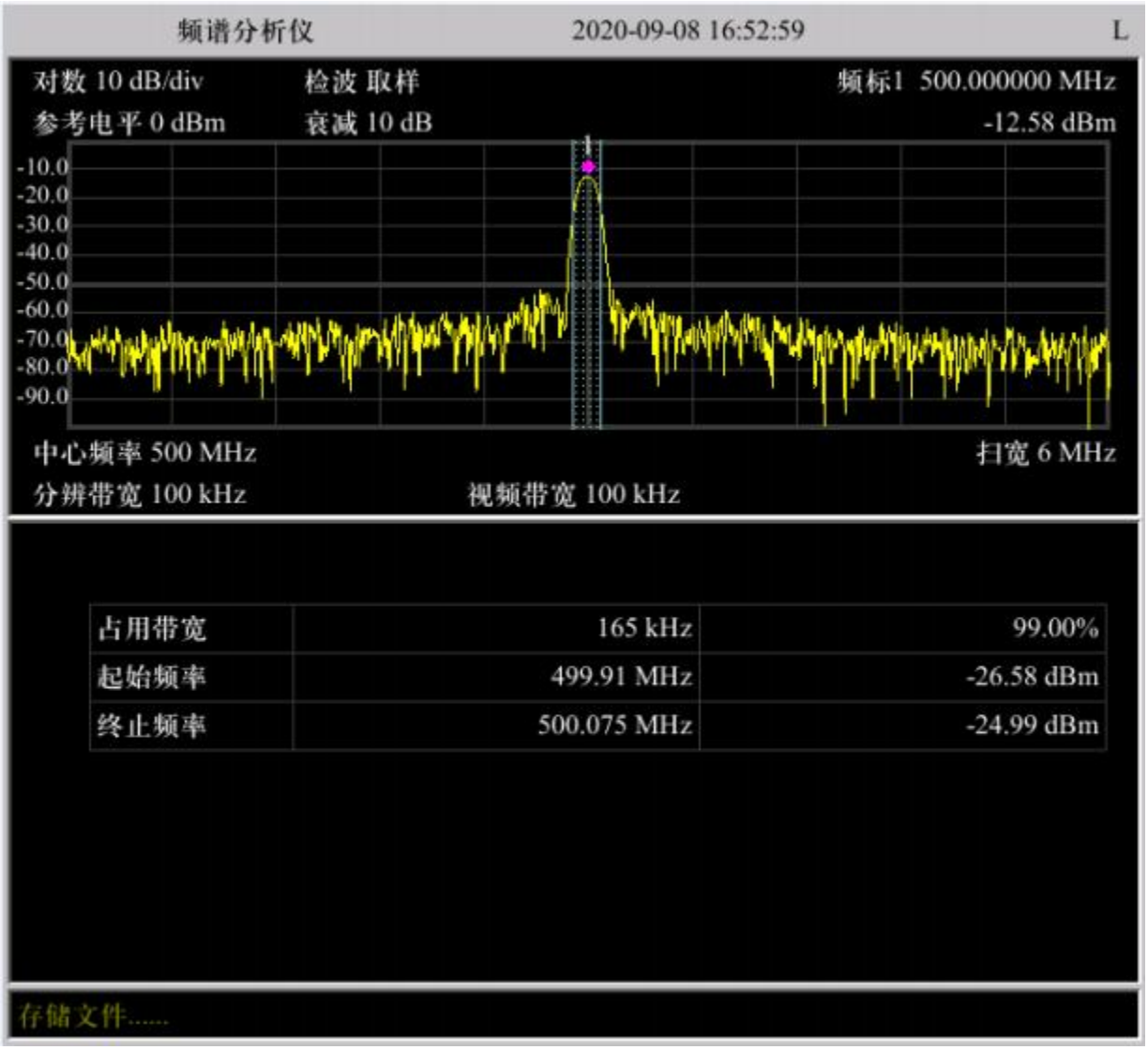


Figure 4-10 Occupied bandwidth measurement results

4.7 Using a preamplifier for small signal measurements

In the following example, a signal generator (Agilent N5183B) is used to output a 500 MHz, -120 dBm continuous wave signal as the measured signal.

Operation steps:

1) Equipment connection

Connect the signal output of the signal generator to the RF input on the front panel of the spectrum analyzer.

2) Use the preamplifier for small signal measurement

a) Use the preamplifier for small signal measurement

- Press the [Preset] key.

b) Set parameters

- Press [FREQ] key,
- Press [Center Frequency], enter 500 MHz;
- Press [SPAN] key,
- Press [Span], enter 1KHz;
- Press [AMPT] key,
- Press [Reference Level], enter -120dBm.
- Press [Preamp On Off] to set preamp on.

3) Read measurement results

The spectrum analyzer test output signal is shown in Figure 4-11.

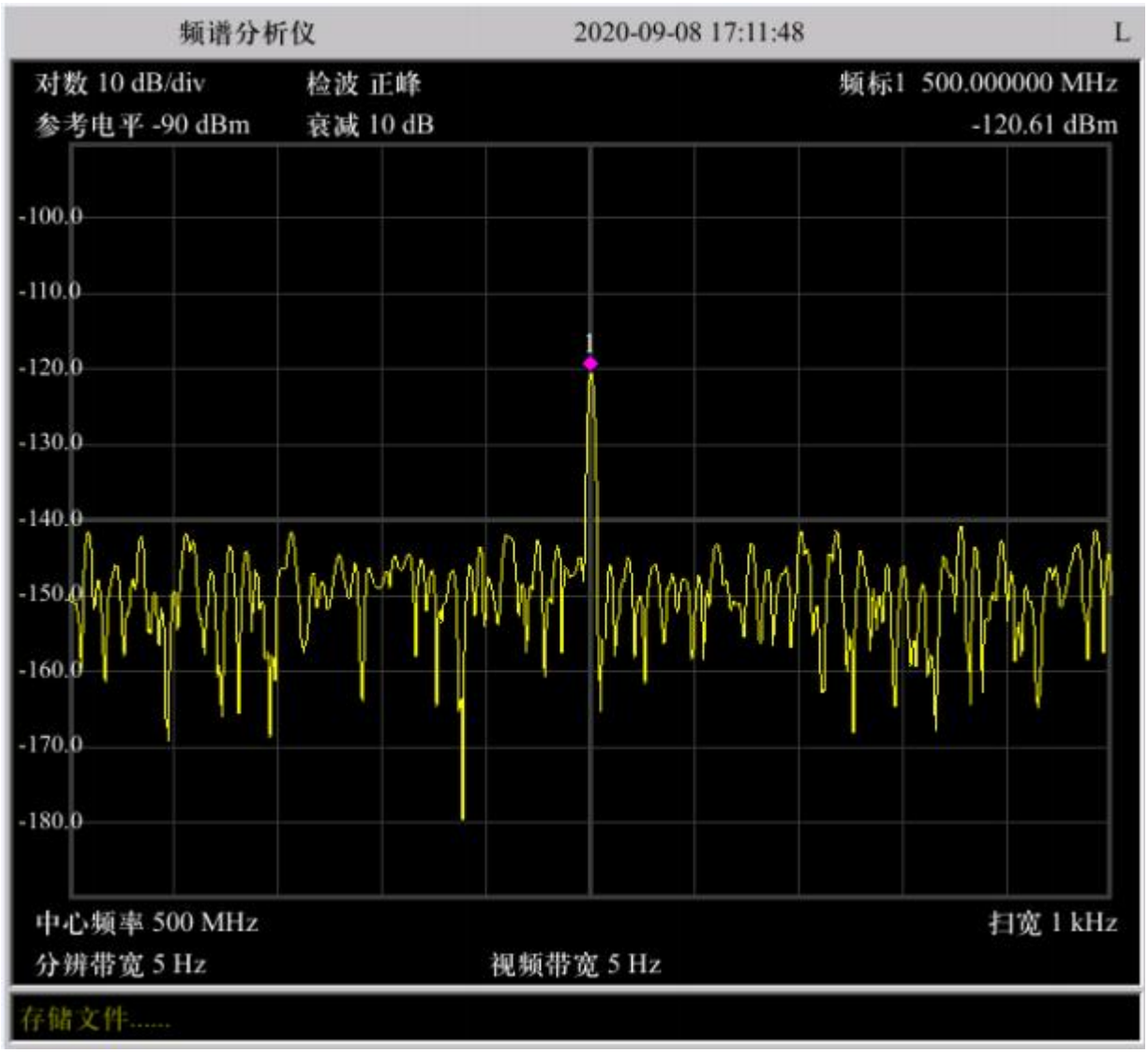


Figure 4-11 Preamplification measurement results

4.8 Harmonic distortion measurements

In the following example, a signal generator (Agilent N5183B) is used to output a 500 MHz, 0 dBm continuous wave signal as the measured signal.

Operation steps:

1) Equipment connection

Connect the signal output of the signal generator to the RF input on the front panel of the spectrum analyzer.

2) Use the cursor difference function to measure

a) Reset the instrument

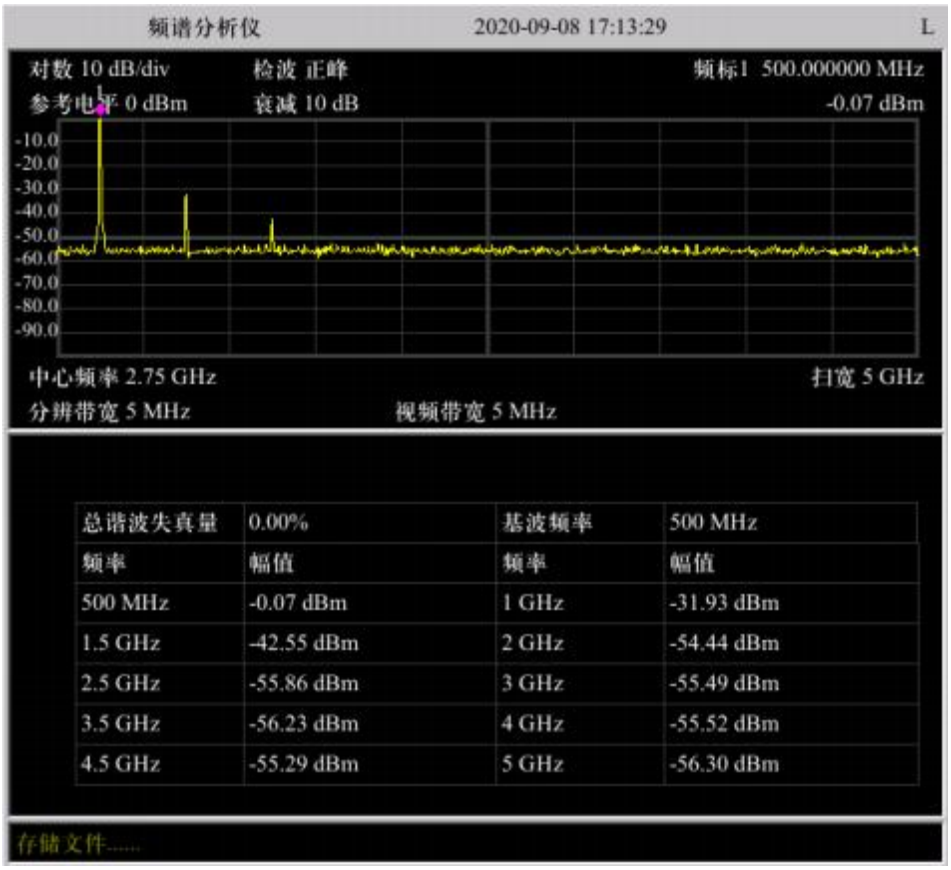
- Press the [Preset] key.

b) Set parameters

- Press the [Meas] key,
- Press [Harmonic Distortion On Off] to set the harmonic distortion on.

3) Reading measurement results

The fundamental wave and harmonic graphs of the spectrum analyzer test output are shown in Figure 4-12.



总谐波失真量	0.00%	基波频率	500 MHz
频率	幅值	频率	幅值
500 MHz	-0.07 dBm	1 GHz	-31.93 dBm
1.5 GHz	-42.55 dBm	2 GHz	-54.44 dBm
2.5 GHz	-55.86 dBm	3 GHz	-55.49 dBm
3.5 GHz	-56.23 dBm	4 GHz	-55.52 dBm
4.5 GHz	-55.29 dBm	5 GHz	-56.30 dBm

Figure 4-12 Harmonic distortion measurement results

4.9 AM Modulated signal measurement

The demodulation function of the spectrum analyzer can be used to The AM modulated signal is demodulated from the carrier signal and is displayed on the screen. In the following example, Using a signal generator (Agilent N5183B) outputs a AM The modulated signal is used as the measured signal: the carrier is 1GHz , -10dBm The continuous wave signal with a modulation frequency of 1kHz , The modulation depth is 100% .

Steps:

1) Device Connection

Connect the signal output of the signal generator to the RF input on the front panel of the spectrum analyzer.

2) Measuring AM Signals Using Zero Span

a) Reset the instrument

- Press the [Preset] key.

b) Setting parameters

- Press the [FREQ] key,
- according to [Center frequency], enter 1 GHz;
- Press 【 SPAN 】 key,
- according to [Zero span], set the span of the spectrum analyzer to 0 Hz;
- Press the [Sweep] key,
- according to [Scan Time Automatic Manual], set the scan time to manual, enter 10 ms,
- according to [Single Scan];
- Press [AMPT 】 key,
- according to [Scale type linear-logarithmic], set the scale type to linear.

c) Using cursors to measure the frequency of AM modulated signals

- Press 【 Peak 】 key;
- Press 【 Mark 】 key,

- according to [Difference];
- Press 【 Peak 】 key,
- according to [Next Peak]; you can also press [Peak key [Right Peak] or [Left peak], check Find the peak on the right or left; read the frequency value of the cursor, which is the frequency of the modulating signal.

3) Reading measurement results

The measured period of the modulated signal is 1ms , as shown in the figure As shown in 4-13.

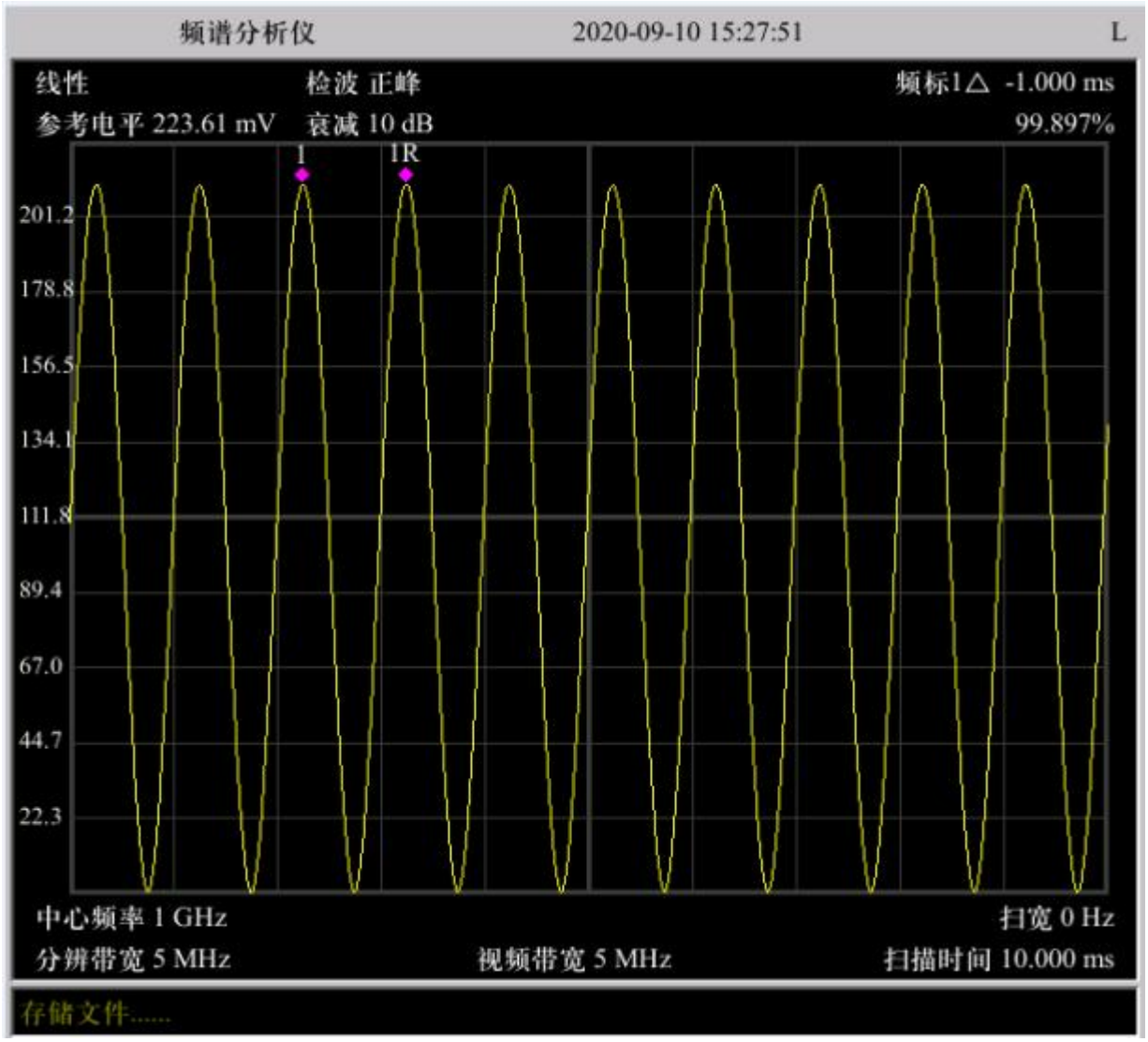


Figure 4-13 Modulation signal measurement results

4.10 Signal frequency measurement using a frequency counter

In order to measure the signal frequency more accurately, the spectrum analyzer provides a frequency counter function. Compared with cursor measurement, It can measure the signal frequency more accurately. In the following example, a signal generator (Agilent E 4421B) Output 500 MHz , -10 dBm The continuous wave signal is taken as the measured signal.

Steps:

1) Device Connection

Connect the signal output terminal of the signal generator to the RF input terminal on the front panel of the spectrum analyzer.

2) Measuring frequency using a frequency counter

a) Reset the instrument

- Press the [Preset] key.

b) Setting parameters

- Press 【 FREQ 】 key,
- according to [Center Frequency] key, enter 500 MHz;
- Press 【 SPAN 】key,
- according to [Span] key, enter 10 MHz.

c) Open Cursor

- Press【 Mark 】 key;
- Press the [Peak] key; the cursor will be marked at the peak of the signal, and the frequency and amplitude at the cursor will be displayed. The degree value will be displayed in the upper right corner of the screen grid.

d) Measuring frequency using a frequency counter

- Press【Marker Fctn 】 key,
- according to [Frequency Count] key,

- according to [Frequency Count On/Off] key, set the frequency count to on. The frequency of the signal is displayed in the area and the upper right corner of the screen. Users can set the frequency counter as needed. Number resolution.

3. Read the measurement results

The measured frequency is 499.999993 MHz (accurate to 1 Hz), such as 4-14 As shown in the figure.

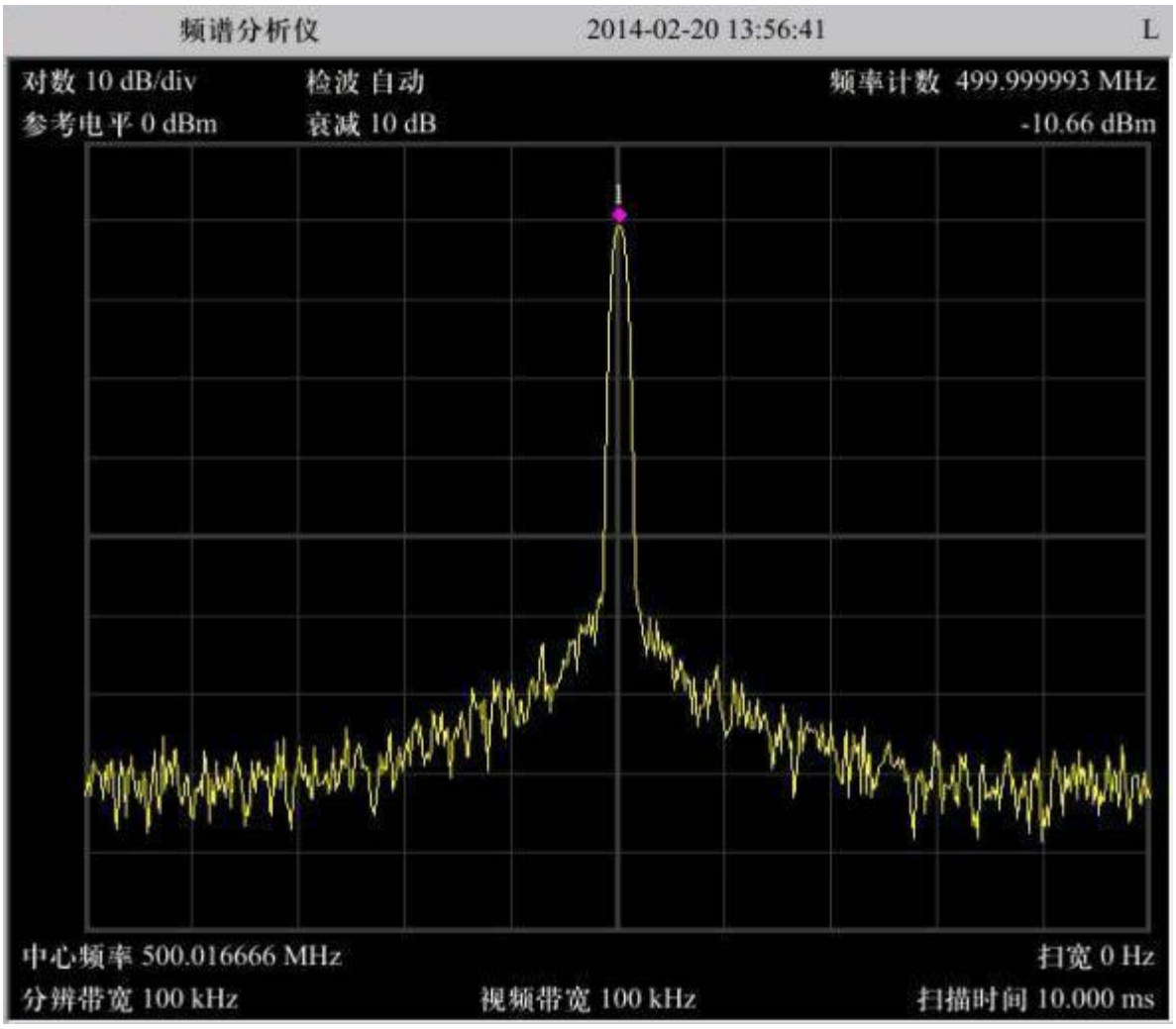


Figure 4-14 Frequency counting test

4.11 Third-Order Intermodulation Distortion Measurement

In the following example, a signal generator is used 1 (Agilent E4421B) Output 500 MHz , -10 dBm A sinusoidal signal is generated using a signal generator 2 (Agilent E 4422B ） Output 501 MHz , -10 dBm positive String signal.

Steps:

1) Device Connection

The signal generator 1 The output signal of the signal generator 2 is connected to the front of the spectrum analyzer through a combiner. RF input terminal of the panel.

2) Using the cursor function to measure frequency and amplitude

e) Reset the instrument

◆ Press the [Preaet] key.

f) Setting parameters

◆ Press 【 FREQ 】 key,

◆ according to [Center Frequency] key, enter 500.5 MHz;

◆ Press 【 SPAN 】 key,

◆ according to [Span] key, enter 5 MHz;

◆ according to【 BW 】 key,

◆ according to [Resolution Bandwidth [Auto/Manual] key, set the resolution bandwidth to manual, and enter 1 kHz.

g) Using cursors to measure frequency and amplitude

◆ Press 【 Peak 】 key,

◆ Press【 Mark 】 key,

◆ according to [Difference] key;

◆ Press 【 Peak 】 key,

◆ according to [Next Peak] key; read the cursor value, that is, the third-order intermodulation distortion value.

3) Reading measurement results

The measurement results are displayed in the cursor area at the top of the screen, from which the measured frequency and Amplitude difference, as shown in the figure As shown in Figure 4-15 .

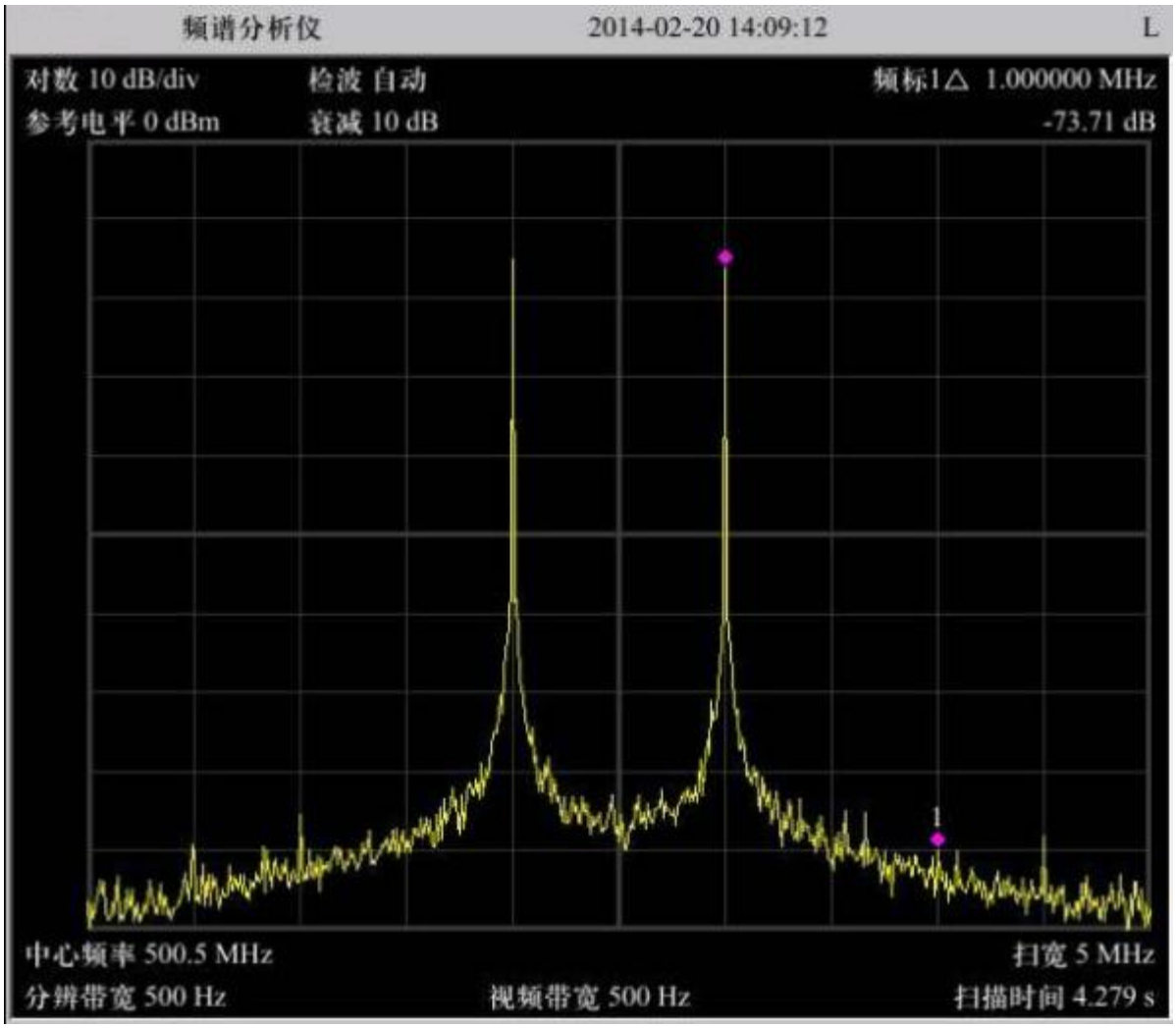


Figure 4-15 Third-order intermodulation distortion measurement

5. Remote Control

Users can use standard SCPI (Standard Commands for Programmable Instruments) For detailed instructions on commands and programming, refer to the "Programming Manual". Users can also use the host computer software provided by SALUKI SA Remote Control , Send commands to remotely control the spectrum analyzer.

This spectrum analyzer can LAN Interface and PC This chapter will describe in detail how to use Use the host computer software provided by our company S Remote Control the spectrum analyzer remotely through various interfaces Program control.

5.1 pass LAN control

1)Connecting devices

The spectrum analyzer is TheLAN interface is connected to your local area network.

2)Communication test

Double-click to open the remote control host computer software SARemote Control of LAN console, open remote Command control panel, you can send commands and read data through this panel. As shown below as shown in 5-1 .

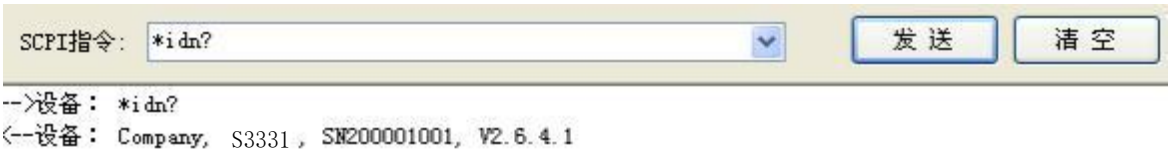


Figure 5-1 Sending commands and reading data through the panel

6. Troubleshooting and repair

This chapter lists the common faults that may occur during the use of the spectrum analyzer and their troubleshooting methods. The content is as follows:

- The spectrum analyzer screen remains black after powering on.
- The key did not respond or the key value was incorrect.
- No signal is displayed after normal startup.
- The frequency of the signal is not displayed accurately.
- The amplitude of the signal is not displayed accurately.

6.1 Fault diagnosis and troubleshooting

6.1.1 The spectrum analyzer screen remains black after powering on:

1) Check if the fan is spinning:

a) If the fan is spinning normally, the display cable may be loose.

b) If the fan does not rotate, the machine did not start properly. Please follow the steps below to solve the problem.

2) Turn the machine's power switch on and off several times to check if it is damaged.

3) If there is no problem with the machine switching on and off, there may be a fuse inside the machine that has blown.

6.1.2 The key does not respond or the key value is incorrect:

1) If all keys are unresponsive, the keyboard cable may be loose.

2) If the key value is incorrect, the keyboard may be damaged.

6.1.3 No signal display after normal startup:

If there is no signal displayed on the spectrum analyzer screen, please check as follows: Set the signal generator frequency 30MHz , power -20dBm , connect this signal to the RF input port; you can also connect the spectrum analyzer instrument 10MHz The reference is connected to the RF input; if there is still no signal displayed, it may be a machine hardware failure.

6.1.4 The frequency display of the signal is inaccurate:

When testing the signal, if the signal frequency read exceeds the allowable error range or the signal is Shake left and right:

1) Check if the input signal is stable. If so, check according to step (2).

2) Check whether the internal and external references of the spectrum analyzer are normal, and select the reference as the internal reference according to different test conditions. Reference or external reference: Press [Frequency] [Frequency Reference Internal External] , set the signal generator frequency 10MHz, Power -20dBm, connect this signal to the RF input port. If the frequency is still inaccurate after reading , Can There may be a malfunction in the internal circuit of the spectrum analyzer.

6.1.5 The amplitude of the signal is not displayed accurately:

If the signal amplitude is not displayed accurately, please check it as follows:

1) Check whether the input signal amplitude is correct. If so, refer to step (2) or (3) for processing.

2) Recalibration: Setting the Signal Generator Frequency 440MHz, power -20dBm, connect this signal to the spectrum Analyzer RF input port, click: [System 】[Next page][User calibration][Start calibration allow].

3) If the signal amplitude is still not accurate after recalibration, there may be a hardware failure in the spectrum analyzer. If there is any fault, please contact the manufacturer in time and do not disassemble the instrument by yourself.

6.2 Spectrum Analyzer Repair

If you encounter a problem with your spectrum analyzer that is difficult to solve, you can contact us by phone or fax. If you believe that the spectrum analyzer hardware is damaged and needs to be repaired, please pack the spectrum analyzer in the original packaging materials and packaging box. Analyzer and proceed as follows:

1) Write a detailed description of the spectrum analyzer fault phenomenon and put it in the packaging box together with the spectrum analyzer.

2) Place the machine in a dust/antistatic plastic bag to reduce possible damage .

3) Seal the box with tape and reinforce it with nylon straps.

4) Mark the box with the words "Fragile! Do not touch! Handle with care!"

5) Please check in as precision instruments.

6) Keep copies of all shipping documents.

Note meaning

Using other materials to pack the spectrum analyzer may damage the device. Do not use polystyrene. Balls are used as packaging materials, they cannot adequately cushion the machine and may cause damage to the machine.

7. Performance Indicators

This chapter lists the technical specifications and general technical specifications of the spectrum analyzer . Technical Index The following conditions apply:

- The instrument has been preheated before use30 minutes.
- The instrument is within a calibration cycle and has performed a self-calibration.
- Data without tolerances are typical values. Typical values are indicators that are not guaranteed for the product.

S3532A Technical Specifications		
Applicable conditions	The given technical indicators apply to the following conditions: Warm-up 30 minutes while the instrument is in the calibration cycle	
Model	S3532A	
Frequency range	9kHz to 3.6GHz	
Frequency reading accuracy	±(frequency marker reading × frequency reference accuracy + 1% × span + 10% × RBW + 0.5 × [span/(scanning point -1)]+1Hz)	
Inside department base allow (10MHz)	Aging rate	<1ppm/year
	Temperature Drift	<0.5ppm (15℃ to 35℃)
Resolution Bandwidth (RBW)		
scope	1Hz to 500kHz (at 1 to 10 Continuous stepping), 1MHz, 3MHz	
Selectivity (60dB/3dB)	RBW ≤ 500kHz	<5:1 typical (digital implementation, close to Gaussian shape)
Accuracy		<10% (<5% typical)
Video Bandwidth (VBW)	10Hz to 3MHz	
Displays the average noise level (1Hz Resolution Bandwidth, RF Attenuator 0dB)		
Preamp Off	100kHz to 1MHz <-100dBm-3×(f/100kHz)dB 1MHz to 10MHz <-130dBm 10MHz to 1GHz <-135dBm 1 GHz to 3.6 GHz <-130 dBm	
Preamp On	100kHz to 1MHz <-120dBm-3×(f/100kHz)dB 1MHz to 10MHz <-150dBm 10MHz to 1GHz <-155dBm 1 GHz to 3.6 GHz <-150 dBm	
Phase Noise		
fc=500MHz	Frequency Deviation 30kHz -90dBc/Hz	

	Frequency Deviation 100kHz -100dBc/Hz	
	Frequency Deviation 1MHz -115dBc/Hz	
Note: Typical fc=500MHz, sampling detection, trace averaging times ≥10		
Scan time		
Non-zero span	3ms to 3000s	
Zero span	1ms to 3000s	
Scan Mode	Continuous, Single	
trigger		
Trigger source	Free, Video, External	
External trigger level	5V TTL level, nominal value	
Frequency Counter		
Counting resolution	1Hz, 10Hz, 100Hz, 1kHz	
Counter uncertainty	Frequency reading × frequency reference accuracy + counting resolution	
Amplitude Accuracy (20°C to 30℃)		
Comprehensive amplitude accuracy	± 1.5dB	
Amplitude		
Measuring range fc ≥ 10MHz	Displays average noise level up to +27dBm	
Maximum safe input level	Average continuous power	+27dBm
Maximum DC input voltage	50Vdc	
Input attenuator range	0 to 39dB, step size 3dB	
Spurious and Residual Responses		
TOI (Third Order Distortion)	>30MHz	+7dBm
SHI (Second Order Distortion)	>10MHz	+40dBm
Input Related Spurious Signals		<-60dBc
Remaining Responses		<-85dBm
Tracking signal generator (option)		
Frequency range	100kHz to 3.6GHz	
Output Power	-30dBm to 0dBm 1dB Stepping	
Output flatness	Tracking signal source (100kHz to 3.6GHz) ±3dB	
	Independent signal source (150MHz to 3.6GHz) ±3 dB	
Input/Output		
RF input/output	N Type negative (50Ω)	
USB	Device side: USB 1.1 B Connectors Host terminal: USB 2.0 A Connectors	

LAN	10/100 Base-T, RJ-45 Connectors	
RS232	9 Pinout D-SUB (male)	
Reference Input/Output	10MHz, BNC Vulva	Input Power 0dBm to +10dBm
		Output Power 0dBm±2dB
VGA	800*600, 60Hz, 15 Pinout D-SUB (female)	
External trigger input	5 V TTL Level (±10V, 100 mA maximum)	
FM/AM Audio Demodulation	Headphone jack	
Common parameters		
monitor	TFT-LCD, 8.4 Inch, 800*600	
Maximum weight	6.5kg	
Dimensions (excluding feet)	390 (W) × 182 (H) × 230 (D) mm	
Operating temperature	0℃ to 40℃	
Storage temperature	-30°C to +70°C	
electricity source	Input voltage range	100VAC-240VAC
	AC Frequency range	40Hz to 60Hz
Power consumption	maximum 30W	

S3532B Technical Specifications

Applicable conditions	The given technical indicators apply to the following conditions: Warm-up 30 minutes while the instrument is in the calibration cycle	
model	S3532B	
Frequency range	9kHz ~ 7.5GHz	
Frequency reading accuracy	±(frequency marker reading × frequency reference accuracy + 1% × span + 10% × RBW + 0.5 × [Span/ (Scan point -1)]+1Hz)	
Inside department base allow (10MHz)	Aging rate	<1ppm/year
	Temperature Drift	<0.5ppm (15℃ to 35℃)
Resolution Bandwidth (RBW)		
scope	1Hz to 500kHz (at 1 to 10 Continuous stepping), 1MHz, 3MHz	
Selectivity (60dB/3dB)	RBW ≤ 500kHz	<5:1 typical (digital implementation, close to Gaussian shape)
Accuracy		<10% (<5% typical)
Video Bandwidth (VBW)	10Hz to 3MHz	
Displays the average noise level (1Hz Resolution Bandwidth, RF Attenuator 0dB)		
Preamp Off	100kHz to 1MHz <-95dBm-3×(f/100kHz)dB 1MHz to 10MHz <-125dBm	

	10 MHz to 2 GHz <-133 dBm 2 GHz to 3.4 GHz <-130 dBm 3.4 GHz to 5 GHz <-133 dBm 5 GHz to 7.5 GHz <-127 dBm	
Preamp On	100kHz to 1MHz <-110dBm-3×(f/100kHz)dB 1MHz to 10MHz <-140dBm 10 MHz to 2 GHz <-148 dBm 2 GHz to 3.4 GHz <-143 dBm 3.4 GHz to 5 GHz <-145 dBm 5 GHz to 7.5 GHz <-140 dBm	
Phase Noise		
fc=500MHz	Frequency Deviation 30kHz -80dBc/Hz	
	Frequency Deviation 100kHz -90dBc/Hz	
	Frequency Deviation 1MHz -110dBc/Hz	
Note: Typical fc=500MHz, sampling detection, trace averaging times ≥10		
Scan time		
Non-zero span	3ms to 3000s	
Zero span	1ms to 3000s	
Scan Mode	Continuous, Single	
trigger		
Trigger source	Free, Video, External	
External trigger level	5V TTL level, nominal value	
Frequency Counter		
Counting resolution	1Hz, 10Hz, 100Hz, 1kHz	
Counter uncertainty	Frequency reading × frequency reference accuracy + counting resolution	
Amplitude Accuracy (20°C to 30℃)		
Comprehensive amplitude accuracy	± 1.5dB	
Amplitude		
Measurement Range fc ≥ 10MHz	Displays average noise level up to +20dBm	
Maximum safe input level	Average continuous power	+23dBm
Maximum DC input voltage	50Vdc	
Input attenuator range	0 to 30dB, step size 1dB	
Spurious and Residual Responses		

TOI (Third Order Distortion)	>30MHz	+10dBm
SHI (Second Order Distortion)	>10MHz	+40dBm
Input Related Spurious Signals		<-60dBc
Remaining Responses		<-85dBm
Tracking signal generator (option)		
Frequency range	100kHz to 3.2GHz	
Output Power	-30dBm to 0dBm 1dB Stepping	
Output flatness	Tracking Generator (100kHz to 3.2GHz) ±3dB	
Input/Output		
RF input/output	N Type negative (50Ω)	
USB	Device side: USB 1.1 B Connectors Host terminal: USB 2.0 A Connectors	
LAN	10/100 Base-T, RJ-45 Connectors	
RS232	9 Pinout D-SUB (male)	
Reference Input/Output	10MHz, BNC Vulva	Input Power 0dBm to +10dBm
		Output Power 0dBm±2dB
VGA	800*600, 60Hz, 15 Pinout D-SUB (female)	
External trigger input	5 V TTL Level (±10V, 100 mA maximum)	
FM/AM Audio Demodulation	Headphone jack	
Common parameters		
monitor	TFT-LCD, 8.4 Inch, 800*600	
Maximum weight	6.5kg	
Dimensions (excluding feet)	390 (W) × 182 (H) × 230 (D) mm	
Operating temperature	0℃ to 40℃	
Storage temperature	-30°C to +70°C	
power supply	Input voltage range	100VAC-240VAC
	AC Frequency range	40Hz to 60Hz
Power consumption	maximum 30W	

S3533A Technical Specifications		
Applicable conditions	The given technical indicators apply to the following conditions: Warm-up 30 minutes while the instrument is in the calibration cycle	
model	S3533A	
Frequency range	5kHz ~ 8GHz	
Frequency reading accuracy	±(frequency marker reading × frequency reference accuracy + 1% × span + 10% × RBW + 0.5) × [Span/ (Scan point -1)]+1Hz)	
Inside Department base allow	Standard	Aging rate: <1ppm/year, Temperature drift: <0.5ppm (15 ℃ to 35℃)

(10MHz)	High stability time base option	Aging rate: <0.2ppm/year, Temperature drift: <0.1ppm (15℃ to 35℃)
Resolution Bandwidth (RBW)		
scope	1Hz to 5MHz, 1, 3, 5 Stepping	
Selectivity (60dB/3dB)	RBW≤1MHz	<5:1 typical (digital implementation, close to Gaussian shape)
Accuracy		<10% (<5% typical)
Video Bandwidth (VBW)	1Hz to 5MHz	
Displays the average noise level (1Hz Resolution Bandwidth, RF Attenuator 0dB)		
Preamp Off	5kHz to 1MHz <-120dBm 1MHz to 10MHz <-130dBm 10MHz to 2GHz <-138dBm 2GHz to 3.1GHz <-136dBm 3.1GHz to 5GHz <-136dBm 5GHz to 8GHz <-135dBm	Typical value -130dBm Typical value -140dBm Typical value -142dBm Typical value -140dBm Typical value -140dBm Typical value -138dBm
Preamp On	1MHz to 10MHz <-140dBm 10MHz to 2GHz <-158dBm 2GHz to 3.1GHz <-156dBm 3.1GHz to 5GHz <-155dBm 5GHz to 8GHz <-153dBm	Typical value -145dBm Typical value -162dBm Typical value -160dBm Typical value -159dBm Typical value -155dBm
Phase Noise		
fc=1GHz	Frequency Deviation 10kHz -98dBc/Hz	
	Frequency Deviation 1MHz -112dBc/Hz	
Note: Typical fc=1GHz, sampling detection, trace averaging times ≥10		
Scan time		
Non-zero span	5ms to 3000s	
Zero span	20us to 3000s	
Scan Mode	Continuous, Single	
Trigger		
Trigger source	Free, Video, External	
External trigger level	5V TTL level, nominal value	
Frequency Counter		
Counting resolution	1Hz, 10Hz, 100Hz, 1kHz	
Counter uncertainty	Frequency reading × frequency reference accuracy + counting resolution	
Amplitude Accuracy (20°C to 30℃)		
Comprehensive amplitude accuracy	± 1.5dB	
Amplitude		
Test Quantity range fc ≥	Displays average noise level up to +20dBm	

10MHz		
Maximum safe input level	Average continuous power	+27dBm
Maximum DC input voltage	50Vdc	
Input attenuator range	0 to 30dB, step size 1dB	
Spurious and Residual Responses		
TOI (Third Order Distortion)	>30MHz	+7dBm
SHI (Second Order Distortion)	>10MHz	+40dBm
Input Related Spurious Signals		<-60dBc
Remaining Responses		<-95dBm (typical: <-100dBm)
Input/Output		
RF input/output	N Type negative (50Ω)	
USB	Device side: USB 1.1 B Connectors Host terminal: USB 2.0 A Connectors	
LAN	10/100 Base-T, RJ-45 Connectors	
RS232	9 Pinout D-SUB (male)	
Reference Input	10MHz, BNC Female; Input power 0dBm to +10dBm	
Reference output	10MHz, BNC Female; Output power 0dBm±2dB	
IF output	145MHz, BNC Vulva	
VGA	800×600, 60Hz, 15 Pinout D-SUB (female)	
External trigger input	5 V TTL Level (±10V, 100 mA maximum)	
FM/AM Audio Demodulation	Headphone jack	
Common parameters		
monitor	TFT-LCD, LED Backlight, 8.4 inch	
Maximum weight	7kg	
Dimensions (excluding feet)	390mm×182mm×230mm	
Operating temperature	0℃ to 40℃	
Storage temperature	-30°C to +70°C	
power supply	Input voltage range	100VAC to 240VAC
	AC Frequency range	40Hz to 60Hz
Power consumption	about 30W	

S3533B Technical Specifications		
Applicable conditions	The given technical indicators apply to the following conditions: Warm-up 30 minutes while the instrument is in the calibration cycle	
model	S3533B	
Frequency range	9kHz~20GHz	
Frequency reading accuracy	±(frequency marker reading × frequency reference accuracy + 1% × span + 10% × RBW + 0.5 × [Scan width/ (scan point -1)]+1Hz)	
Inside department base allow (10MHz)	Standard	Aging rate: <1ppm/year, Temperature drift: <0.2ppm (15 ℃ to 35℃)
	High stability time base option	Aging rate: <0.2ppm/year, Temperature drift: <0.1ppm (15℃ to 35℃)
Resolution Bandwidth (RBW)		
scope	1Hz to 5MHz, 1, 3, 5 Stepping	
Selectivity (60dB/3dB)	RBW≤1MHz	<5:1 typical (digital implementation, close to Gaussian shape)
Accuracy		<10% (<5% typical)
Video Bandwidth (VBW)	1Hz to 5MHz	
Displays the average noise level (1Hz Resolution Bandwidth, RF Attenuator 0dB)		
Preamp Off	9kHz to 1MHz <-100dBm 1MHz to 20MHz <-105dBm-3×(f/2MHz)dB 20 MHz to 4.0 GHz <-138 dBm 4 GHz to 7 GHz <-135 dBm 7 GHz to 8 GHz <-133 dBm 8 GHz to 15 GHz <-135 dBm 15GHz to 18GHz <-133dBm 18 GHz to 20 GHz <-128 dBm	
Preamp On	1MHz to 10MHz <-135dBm 10 MHz to 2 GHz <-156 dBm 2 GHz to 5 GHz <-154 dBm 5 GHz to 7 GHz <-152 dBm 7 GHz to 8 GHz <-150 dBm 8 GHz to 15 GHz <-154 dBm 15GHz to 18GHz <-152dBm 18 GHz to 20 GHz <-147 dBm	
Phase Noise		
fc=1GHz	Frequency Deviation 10kHz -90dBc/Hz	
	Frequency Deviation 1MHz -105dBc/Hz	

Note: Typical fc=1GHz, sampling detection, trace averaging times ≥10		
Scan time		
Non-zero span	5ms to 3000s	
Zero span	20us to 3000s	
Scan Mode	Continuous, Single	
Trigger		
Trigger source	Free, Video, External	
External trigger level	5V TTL level, nominal value	
Frequency Counter		
Counting resolution	1Hz, 10Hz, 100Hz, 1kHz	
Counter uncertainty	Frequency reading × frequency reference accuracy + counting resolution	
Amplitude Accuracy (20°C to 30℃)		
Comprehensive amplitude accuracy	1MHz ~ 13.5GHz	± 1.5dB
	13.5GHz ~ 20GHz	±2.0dB
Amplitude		
Measuring range fc≥10MHz	Displays average noise level up to +20dBm	
Maximum safe input level	Average continuous power	+27dBm
Maximum DC input voltage	50Vdc	
Input attenuator range	0 to 30dB, step size 1dB	
Spurious and Residual Responses		
TOI (Third Order Distortion)	>30MHz	+7dBm
SHI (Second Order Distortion)	>10MHz	+40dBm
Input Related Spurious Signals		<-60dBc
Remaining Responses		<-85dBm
Input/Output		
RF input/output	N Type negative (50Ω)	
USB	Device side: USB 1.1 B Connectors Host terminal: USB 2.0 A Connectors	
LAN	10/100 Base-T, RJ-45 Connectors	
RS232	9 Pinout D-SUB (male)	
Reference Input	10MHz, BNC Female; Input power 0dBm to +10dBm	
Reference output	10MHz, BNC Female; Output power 0dBm±2dB	
IF output	145MHz, BNC Vulva	
VGA	800*600, 60Hz, 15 Pinout D-SUB (female)	
External trigger input	5 V TTL Level (±10V, 100 mA maximum)	

FM/AM Audio Demodulation	Headphone jack	
Common parameters		
monitor	led Backlight, 8.4 inch TFT-LCD, 800×600	
Maximum weight	7kg	
Dimensions (excluding feet)	390 (W) × 182 (H) ×230 (D) mm	
Operating temperature	0℃ to 40℃	
Storage temperature	-30°C to +70°C	
power supply	Input voltage range	100VAC to 240VAC
	AC Frequency range	40Hz to 60Hz
Power consumption	about 35W	

Appendix :

Ordering Information

Configuration	describe	Order Number
Spectrum Analyzer Host	9kHz to 3.6GHz	S3532A
	9kHz to 7.5GHz	S3532B
	5kHz to 8GHz	S3533A
	9kHz to 20GHz	S3533B
Standard	CD-ROM (User Manual, Programming Manual)	
	Power cord (AC input)	
Optional	100kHz to 1.5GHz Tracking Source	S3532A-TG15
	100kHz to 3.2GHz Tracking Source	S3532B-TG32
	100kHz to 3.6GHz Tracking signal source	S3532A-TG36
	High stability time base option	OCXO
	Advanced Measurement Options	Meas
	Field strength measurement	FS
	Near Field Probe Kit	ANT01
	Frequency discrimination characteristic test module	FD100
	Omnidirectional antenna/directional antenna	OA750/DA800
	VSWR Bridge	VB30
	USB Power Sensors	UP60
	RF Demonstration Kit	TR1000