SVA1000X Series
Spectrum Analyzer

User Manual

UM0701X-E01A

SIGLENT TECHNOLOGIES CO.,LTD

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SIGLENT guarantees this product conforms to the national and industrial standards in China as well as the ISO9001: 2008 standard and the ISO14001: 2004 standard. Other international standard conformance certification is in progress.

General Safety Summary

Carefully read the following safety precautions to avoid any personal injury or damage to the instrument and any products connected to it. To avoid potential hazards, please use the instrument as specified.

Use Proper AC Power Line

Only the power cord designed for the instrument and authorized by the local country should be used.

Ground the Instrument

The instrument is grounded through the protective earth conductor of the power line. To avoid electric shock, please make sure the instrument is grounded correctly before connecting its input or output terminals.

Connect the Probe Correctly.

If a probe is used, do not connect the ground lead to high voltage since it has an isobaric electric potential as the ground.

Look Over All Terminals' Ratings

To avoid fire or electric shock, please look over all ratings and sign instruction of the instrument. Before connecting the instrument, please read the manual carefully to gain more information about the ratings.

Use Proper Overvoltage Protection

Make sure that no over-voltage (such as that caused by a thunderstorm) can reach the product, or else the operator might be exposed to danger of electrical shock.

Electrostatic Prevention

Operate the instrument in an electrostatic discharge protective area environment to avoid damages induced by static discharge. Always ground both the internal and external conductors of the cable to release static before connecting.

Maintain Proper Ventilation

Inadequate ventilation may cause increasing of the instrument's temperature, which will eventually damage the instrument. So keep well ventilated and inspect the intake and fan regularly.

Avoid Exposed Circuit or Components

Do not touch exposed contacts or components when the power is on.

Do Not Operate Without Covers

Do not operate the instrument with covers or panels removed.

Use Only the Specified Fuse.

Keep Product Surfaces Clean and Dry.

To avoid the influence of dust and/or moisture in the air, please keep the surface of the device clean and dry.

Do Not Operate in Wet Conditions.

In order to avoid short circuiting to the interior of the device or electric shock, please do not operate the instrument in a humid environment.

Do Not Operate in an Explosive Atmosphere.

In order to avoid damage to the device or personal injury, it is important to operate the device away from an explosive atmosphere.

Safety Terms and Symbols

Terms on the product. These terms may appear on the product:

DANGER **Indicates direct injuries or hazards that may happen.**
WARNING **Indicates potential injuries or hazards that may happen.**
CAUTION **Indicates potential damages to the instrument or other property that may happen.**

Symbols on the product. These symbols may appear on the product:

Hazardous Voltage

Protective Ground

Warning

Earth Chassis Ground

SVA1000X Series Spectrum Analyzer Overview

The SIGLENT SVA1000X series spectrum analyzer has a frequency range from 9 kHz to 1.5 GHz; it is light-weight and small size, with a user friendly interface, concise style of display, reliable measurement precision and plenty of RF measurement functions. It is ideal for RF transmission monitoring and characterization as well as research and development, education, production, and maintenance.

Features and Benefits

- All-Digital IF Technology
- Frequency Range from 9 kHz to 1.5 GHz
- Up to 1.5 GHz Tracking Generator
- Vector Network Analyzer (Opt.)
- Distance-to-Fault (Opt.)
- Modulation Analysis (Opt.)
- Advanced Measurement Kit (Opt.)
- EMI Filter and Quasi Peak Detector Kit (Opt.)
- 10.1 inch WVGA(1024x600) Display, Multi-Touch Screen
- Web Browser Remote Control on PC and Mobile Terminals

Contents

Chapter 1 Quick Start

1.1 General Inspection

1. Inspect the shipping container

Keep the damaged shipping container or cushioning material until the contents of the shipment have been completely checked and the instrument has passed both electrical and mechanical tests.

The consigner or carrier will be responsible for damages to the instrument resulting from shipment. **SIGLENT** will not provide free maintenance or replacement.

2. Inspect the instrument

If the instrument is found to be damaged, defective or fails in electrical or mechanical tests, please contact SIGLENT.

3. Check the accessories

Please check the accessories according to the packing list. If the accessories are incomplete or damaged, please contact your SIGLENT sales representative.

1.2 Preparing for Use

1.2.1 Adjust the Supporting Legs

Adjust the supporting legs properly to use them as stands to tilt the analyzer upwards for stable placement as well as easier operation and observation of the instrument display.

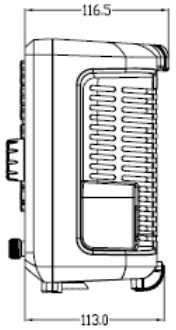


Figure 1-1 before adjusting

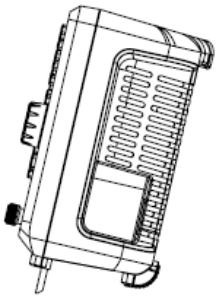


Figure1-2 after adjusting

1.2.2 Connect to AC Power Supply

The analyzer accepts 100-240V, 50/60/440Hz AC power supply. Please use the provided power cord to connect the instrument to the power source as shown in the figure below. Before powering on, make sure the analyzer is protected by a fuse.

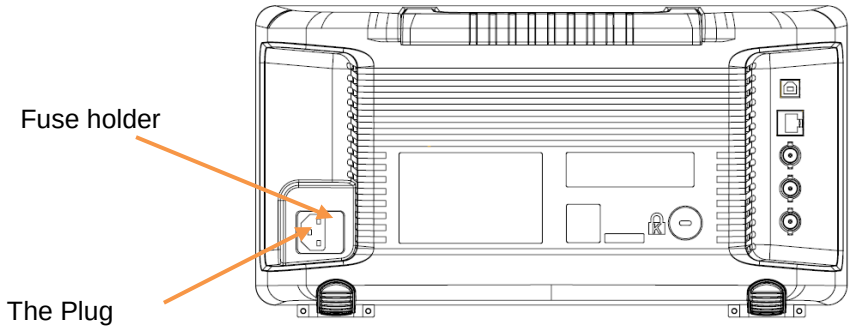


Figure 1-3 Power Cord Connection

1.3 The Front Panel

Figure 1-4 the Front Panel

Table 1-1 Front Panel Description

NO.	Description	NO.	Description
1	User Graphical Interface, touch support	7	RF Input, VNA port 2
2	Menu Control Keys	8	TG Output, VNA port 1
3	Function Keys	9	3.5 mm Earphone interface
4	Knob	10	USB Host
5	Numeric / Letter Keyboard	11	Power Switch
6	Arrow Keys		

1.3.1 Front Panel Function Keys

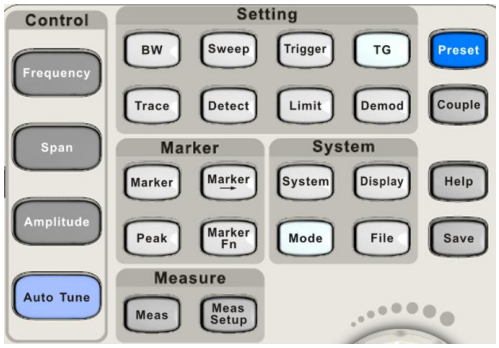


Figure 1-5 Function Keys area

Table 1-2 Function keys description

Control Keys	Description
Frequency	Set the parameters of frequency, and Peak→CF, CF→Step.
Span	Set the parameters of span, and X-scale (Log-Linear) setup.
Amplitude	Set the parameters of amplitude, including Ref Level, Attenuator, Preamp, etc.; and Correction setup.
Auto Tune	Scan the full span rapidly and move the biggest signal to center freq, and automatically sets the optimal parameters according to the signal.
Control Keys	Description
BW	Set the parameters of RBW and VBW, Average Type (Log power, Power, Voltage), and Filter Type (-3 dB Gauss\ -6 dB EMI).
Trace	Select Trace, Trace setup and Trace math.
Sweep	Set the parameters of sweep, and EMI QPD Dwell Time.
Detect	Select the detector type for each trace independently.
Trigger	Select triggers in Free Trigger, Video Trigger and External Trigger.
Limit	Set the Pass\Fail Limit.
TG	Set the parameters of tracking generator. Including TG Level, TG Level offset Normalization setup. The backlight LED is on when TG source is working.
Demod	Set the demodulation parameters of the AM and FM for audio listening.
Marker Keys	Description
Marker	Set the Markers and Marker Table.
Marker->	Set other system parameters on the basis of the current marker value.
Marker Fn	Special functions of the marker such as noise marker, N dB bandwidth measurement and frequency counter.
Peak	Search for the peak signal, peak search configuration and peak table.
Meas Keys	Description
Meas	In spectrum analyzer mode, selects the Advanced Measurement function. In non-spectrum analyzer mode, select corresponding settings.
Meas Setup	Set the measurement parameters.

System Keys	Description
System	Set the system parameters.
Mode	Select the working mode between spectrum analyzer and other modes.
Display	Set the display parameters.
File	Use the file system and files.
Shortcut Keys	Description
Preset	Sets the system to certain status.
Couple	Set the parameters of some functions between auto and manual.
Help	Turn on the built-in help.
Save	Save Shortcut Key.

1.3.2 Front Panel Key Backlight

The on/off state and the color of the backlights of some keys at the front panel indicate the working state of the analyzer. The states are as listed below.

1. Power Switch

- Flash on and off alternatively, in a “breathing” state: indicate the unit is in stand-by.
- Constant on: indicates the instrument is in normal operating state.

2. Mode

When the function is **Spectrum Analyzer**, the backlight turns off. When in another mode, the backlight turns on.

3. TG

When the **TG** source is on, the backlight of **TG** turns on. When the TG is output is disabled the backlight is off.

1.3.3 Using the Numeric Keyboard

The analyzer provides a numeric keyboard at the front panel. The numeric keyboard supports English uppercase/lowercase characters, numbers and common symbols (including decimal point, #, space and +/-) and are mainly used to edit file or folder names and set parameters.

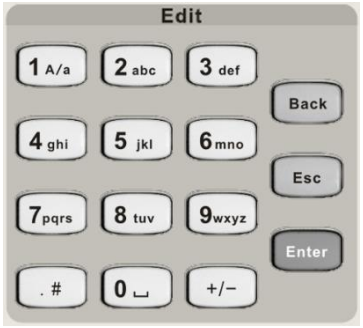


Figure 1-6 Numeric Keyboards

1. +/-

In the number input mode, this key sets the sign of number. In file input mode, this toggles the character type between numbers and letters.

2. 1 A/a

In the number input mode, this key enters the number “1”. In file input mode, this toggles the between upper and lowercase letters.

3. . #

In number input mode, this key enters a decimal point. In English input mode, this key enters special characters (!, -, (, etc..).

4. Back

In parameter editing, press this key to delete the character to the left of the cursor.

5. Esc

- During the parameter editing process, press this key to clear the inputs in the active function area. Press again to exit parameter input mode.
- When the instrument is in remote mode (being controlled by a computer), use this key to return to local mode. This will unlock the front panel.

6. Enter

In parameter editing, the system will complete the input and insert a default unit for the parameter.

1.3.4 Front Panel Connectors

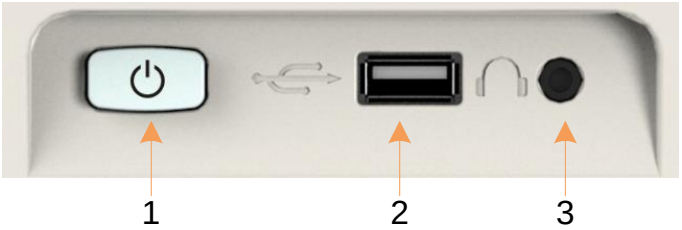


Figure 1-7 Front Panel Connectors (1)

1. Power Switch

Power on / Power down the instrument

2. USB Host

- The analyzer can serve as a “**host**” device to connect external USB devices. This interface is available for USB storage devices, the SIGLENT GPIB-USB adapter, wireless or wired mouse and keyboard, and the SIGLENT Ecal electronic calibration module for the SVA model instruments.

- Read and write functions for an external USB storage device or store the contents currently displayed on the screen in the USB storage device in .png or .jpg or .bmp format.

3. Earphone Jack

The analyzer can demodulate AM and FM signals. Insert a 3.5 mm earphone into to the jack to acquire the audio output of the demodulated signal. You can turn on or off the earphone output and adjust the volume via **Demod** ->**Volume**.

CAUTION

Protect your hearing. Please turn the volume down to zero before using the earphone. Gradually turn the volume up to a comfortable level after putting in the earphone.

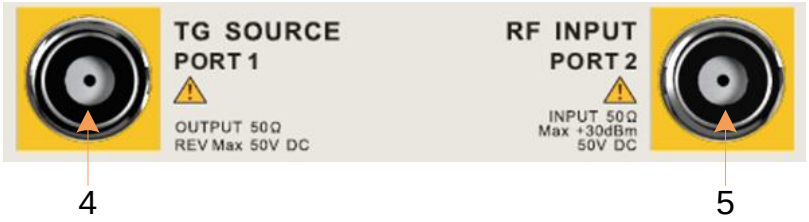


Figure 1-8 Front Panel Connectors (2)

4. TG SOURCE, VNA PORT 1

- The **TG SOURCE** can be connected to a device-under-test (DUT) through a cable with a male N-type male connector.
- In the VNA mode, this port is used as the single port of S11 and the output port of S21.

CAUTION

To avoid damage to the tracking generator, the reverse DC voltage cannot exceed 50 V

5. RF INPUT, VNA PORT 2

- The RF INPUT can be connected to the DUT through a cable with a male N-type connector
- In the VNA mode, this port is used as the input port for S21 measurements.

CAUTION

To avoid damage to the instrument, the RF input signal must meet the following: The DC voltage component and the maximum continuous power of the AC (RF) signal component cannot exceed 50 V and +30 dBm respectively.

1.4 Rear Panel

Figure 1-9 Rear Panel

1. Handle

Pull up the handle vertically for easy carrying of the instrument. When you do not need the handle, press it down.

2. USB Device Interface

The analyzer can serve as a “slave” device to connect external USB devices. Through this interface, a PC can be connected to control the analyzer.

3. LAN Interface

Through this interface, the analyzer can be connected to your local-area-network (LAN) for remote control.

4. REF IN 10 MHz

The analyzer can use the internal or an external reference source.

- When a 10 MHz external clock signal is received through the **[10 MHz IN]** connector, this signal is used as the external reference source and “**Ext Ref**” is displayed in the status bar of the user interface. When the external reference is lost or not connected, the instrument switches to its internal reference source automatically and “**Ext Ref**” on the screen disappears.
- The **[10 MHz IN]** and **[10 MHz OUT]** connectors are usually used to build synchronization among multiple instruments.

5. REF OUT 10 MHz

The analyzer can use the internal or an external reference source.

- When an internal reference source is used, the **[10 MHz OUT]** connector can output a 10 MHz clock signal generated by the analyzer. This signal can be used to synchronize other instruments.
- The **[10 MHz OUT]** and **[10 MHz IN]** connectors are usually used to build synchronization among multiple instruments.

6. Trigger in

In external trigger mode, the analyzer will update the trace scan after the Trigger In connector receives an external trigger signal that meets the trigger input specifications.

7. Security Lock Hole

If needed, you can use a security lock(purchased separately) to lock the analyzer to a desired location.

8. AC Power Supply and Fuse

The analyzer accepts 100-240V, 50/60/440Hz AC power. Please use the power cord provided as accessories to connect the instrument. Before power on, make sure the analyzer is protected by the proper input fuse.

1.5 User Interface

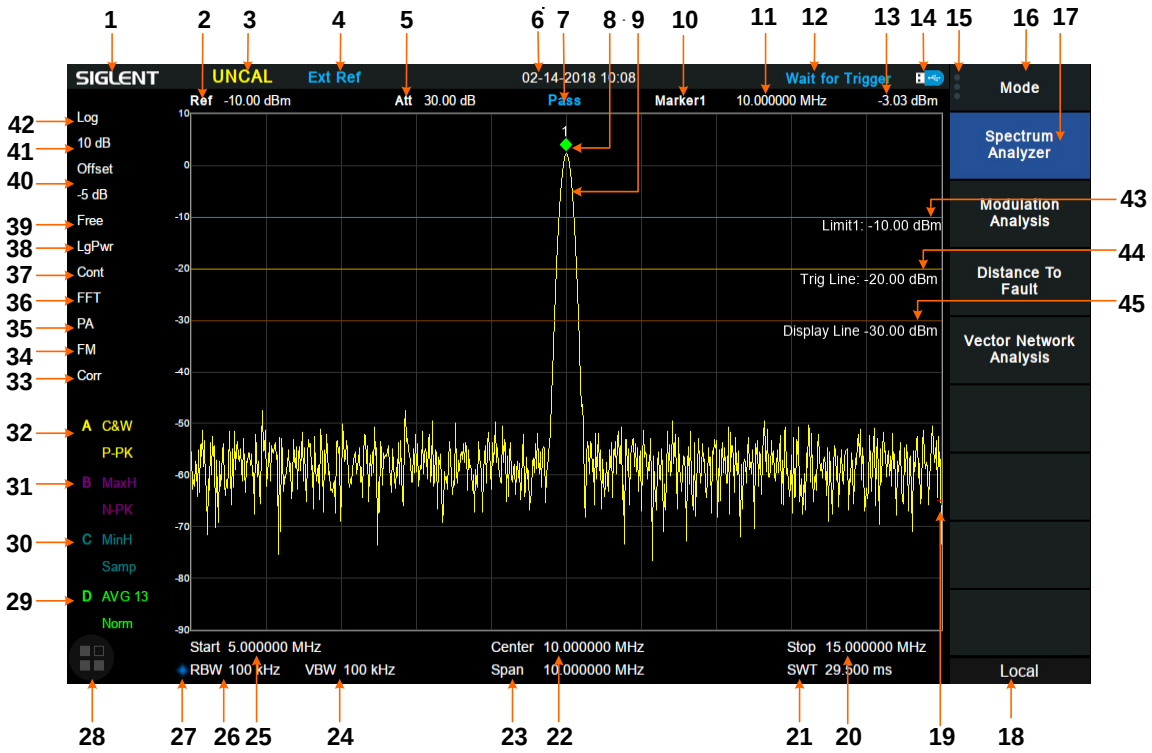


Figure 1-10 User Interface

Table 1-3 User Interface labels

NO.	Name	Description
1	SIGLENT	SIGLENT logo
2	Ref	Reference level
3	UNCAL	When the sweep time is less than the auto couple time, the measure result may have decreased accuracy, The display will indicate uncalibrated using the letters "**UNCAL**"
4	EXT REF	Valid Ext 10 MHz reference clock detected indicator
5	Att	Attenuator Value
6	Day and time	System time
7	Pass/Fail status	Limit Pass/Fail status
8	Marker	Current active marker
9	Trace	Active trace
10	Marker instruction	current marker, touch to open a new marker
11	Marker x value	Unit: frequency, frequency delta or time
12	State indication	Auto Tune: Automatically sets the optimal parameters according to the characteristics of the signal Waiting for Trigger: waiting for trigger

13	Marker y value	Amplitude value or amplitude delta value
14	USB storage device identification	The identification is displayed when a USB flash drive is inserted
15	Main menu touch logo	Clicking this button will bring up the main menu
16	Menu title	Function of the current menu.
17	Menu items	Menu items of the current function
18	Operation status	Local is local mode, Remote is remote mode, Upgrade means the instrument is upgrading
19	Sweep progress indication	Indicates the currently scanned frequency position
20	Stop frequency	Stop frequency value
21	Sweep time	Time duration of a single sweep
22	Center frequency	Center frequency value
23	Span	Span value
24	VBW	Video bandwidth
25	Start frequency	The first frequency of a sweep
26	RBW	Resolution bandwidth
27	Manually instructions	When it appears, this parameter is not automatically coupled but manually configured
28	Touch assistant	Click to open the commonly used functions for measurement, such as peak search. Touch Assist can be moved to any position on the screen and it can be turned off in the DISPLAY menu
29 30 31 32	Trace status	Set the trace A\B\C\D parameters. Trace mode: C&W: Clear Write MaxH: Max Hold MinH: Min Hold View: View AVG: Video average and times. Detect type: P-PK: Positive peak N-PK: Positive peak Samp: Sample Norm: Normal AVG: average Q-PK: Quasi-peak
33	Correction	When present, indicates that there is a user-configured amplitude correction table being mathematically applied to the displayed trace data
34	AM or FM	AM or FM demodulation activated

35	PA	Enable or disable the Preamplifier
36	FFT	Sweep mode is FFT
37	Single or Continue	Sweep mode single or continuous
38	Average type	Log power\Power\Voltage power
39	Trigger type	Free\Video\External trigger
40	Ref offset	34：Ref offset identification；35：Ref offset value
41	Scale/Div	Scale value
42	Scale type	Logarithm or linearity
43	Limit line	Limit Pass/Fail level
44	Trigger level	Video trigger level
45	Display line	Reference display line

1.6 Firmware Operation

1.6.1 Check System Information

Users can get the system information by press **System**->"**System Info**", including

- Product Model, Serial and Host ID
- Software Version and hardware Version
- Option Information

1.6.2 Load Option

Refer to the procedures below to activate the options you have purchased.

1. Press **System**->"**System Info**"->"**Load Option**"
2. Enter the license key in the onscreen window. Press **Enter** to confirm your input and terminate the license key input.

1.6.3 Firmware Upgrade

Follow this procedure to update the instrument firmware:

1. Download the firmware package from an official SIGLENT website. www.siglentamerica.com, http://www.siglent.com/ens, https://www.siglenteu.com
2. Extract and copy the .ADS file into the root directory of a USB stick.
3. Plug the USB stick into the USB Host connector. Press **System**->"**System Info**"-> "**Firmware Update**"; find the .ADS file in USB stick.
4. Press the '**Load**', the analyzer will perform the update process automatically.
   The upgrade procedure will take several minutes. Once the upgrade is completed, please follow the instruction to reboot.
   Any interruption during the update process will result in update failure and system data

loss.

This is **not covered under the warranty** and the user will bear repair costs and shipping.

Do not remove the USB storage device until the update is finished.

1.7 Mode

The analyzer offers a variety of operating modes. They can be purchased separately. They can be selected via the **Mode** key:

- Spectrum Analyzer
- Modulation Analysis (AMA/DMA)
- Vector Network Analysis (VNA)
- Distance-To-Fault (DTF)

Front panel key menus may be different in different modes.

1.8 Touch Operation

The analyzer has a 10.1 inch multi-touch screen and supports various gesture operations. Including:

- Press or click on the upper-right-corner of the screen to enter the main menu
- Swipe up and down or left and right in the waveform area to change the X-axis center coordinate or Y-axis reference level
- Perform two-points scaling in the waveform area to change the X-axis span
- Click on a screen parameter or menu for parameter selection or editing;
- Open and drag the marker;
- Use auxiliary shortcuts to perform common operations.

You can turn the touch screen function on and off via **Display**->'Touch Settings'.

1.9 Remote Control

The analyzer supports communication with computers via USB, LAN, and GPIB-USB interfaces. By using these interfaces, in combination with programming languages and/or NI-VISA software, users can remotely control the analyzer based on a SCPI (Standard Commands for Programmable Instruments) compliant command set, Labview and IVI (Interchangeable Virtual Instrument), to interoperate with other programmable instruments. You can also remote monitor and control the analyzer in Web Browser or EasySpectrum. For more details, refer to the 'Programming Guide' or contact your nearest SIGLENT office.

1.10 Using Built-in Help

The built-in help system provides information about every function key at the front panel and every menu soft key.

- Press **Help** and a prompt about how to obtain help information will be shown at the center of the screen. Then, press the key that you want to get help of and the relevant help information will be shown at the center of the screen.
- When the help information show at the center of the screen. Press the **Help** button; it will close the help information.

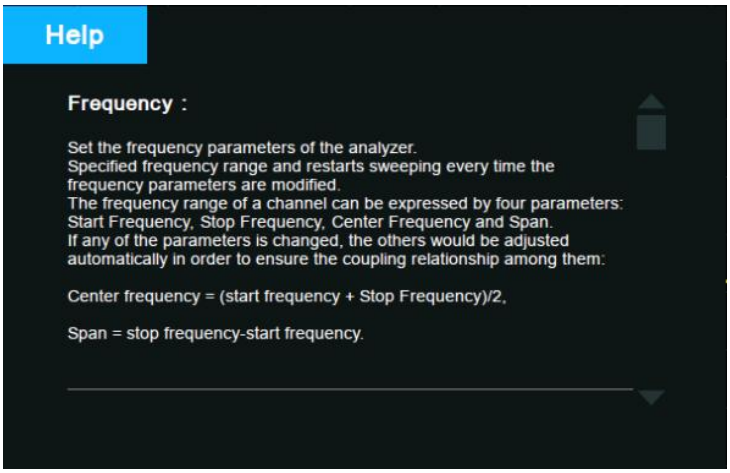


Figure 1-11 help information

Chapter 2 Front Panel Operation

This chapter describes in detail the function keys at the front panel and the associated functions.

Subjects in this chapter:

- Basic Settings
- Sweep and Function
- Marker
- Measurement
- System
- Mode Setup
- Shortcut keys

2.1 Basic Settings

2.1.1 Frequency

Set the frequency parameters and functions of the analyzer. The sweep will restart every time the frequency parameters are modified.

The frequency range of a channel can be expressed by three groups of parameters: Start Frequency, Center Frequency and Stop Frequency. If any of the parameters change, the others will be adjusted automatically in order to ensure the coupling relationship among them

$$f_{center} = (f_{start} + f_{stop})/2$$
$$f_{span} = f_{stop} - f_{start}$$

, Where f_{span} is the span

2.1.1.1 Center Frequency

Set the programmed frequency to the center of the display. The center frequency and span values are displayed at the lower left and right sides of the grid respectively. Please pay attention to the following points:
The start and stop frequencies will vary with changes to the center frequency when the span is constant.
In Zero Span, the start frequency, stop frequency and center frequency are always set to the same value.

Table 2-1 Center Frequency

Parameter	Explanation
Default	Full Span/2
Range	Zero Span, 0 Hz ~ Full Span Nonzero Span, 50 Hz ~ (Full Span -50Hz)
Available Units	GHz\MHz\kHz\Hz
Knob Step	Span > 0, step = Span/200, min 1 Hz Span = 0, step = RBW/100
Direction Key Step	Freq step
Related to	Start Freq, Stop Freq

2.1.1.2 Start Frequency

Set the start frequency of the current sweep. The start and stop frequencies are displayed at the lower right sides of the grid respectively. Please pay attention to the following points:

- The span and center frequency vary with the start frequency when the Span does not reach the minimum (The parameters vary with the span, please refer to "**Span**");

- In Zero Span, the start frequency, stop frequency and center frequency are always the same value.

Table 2-2 Start Frequency

Parameter	Explanation
Default	0 GHz
Range	Zero Span, 0 Hz ~ Full Span Nonzero Span, 0 Hz ~ (Full Span-100Hz)
Unit	GHz, MHz, kHz, Hz
Knob Step	Span > 0, step = Span/200, min 1 Hz Span = 0, step = RBW/100
Direction Key Step	Freq step
Related to	Center Freq, Span

2.1.1.3 Stop Frequency

Set the stop frequency of the current sweep. The start and stop frequencies are displayed at the lower right sides of the grid respectively. Please pay attention to the following points:
The span and center frequency vary with the stop frequency. The change of the span will affect other system parameters. For more details, please refer to "**Span**".
In Zero Span, the start frequency, stop frequency and center frequency are always the same value.

Table 2-3 Stop Frequency

Parameter	Explanation
Default	Full Span
Range	Zero Span: 0 Hz ~ Full Span Nonzero Span: 100 Hz ~ Full Span
Unit	GHz\MHz\kHz\Hz
Knob Step	Span > 0, step = Span/200, min 1 Hz Span = 0, step = RBW/100
Direction Key Step	Freq step
Related to	Center Freq, Span

2.1.1.4 Freq Step

Set the step size for incrementing/decrementing the center frequency, start frequency and stop frequency when sung the arrow keys. Please pay attention to the following points:
At a fixed step change the value of the center frequency can reach the purpose and continuous measurement channel switch.
There are two kinds of frequency step modes： **Auto** and **Manual**. In Auto mode, the Freq step is 1/10 of the span in Non-zero span or equals the RBW while in Zero Span. In Manual mode,

you can set the step using the numeric keys.

Table 2-4 Frequency step

Parameter	Explanation
Default	Full Span/10
Range	1Hz ~ Full Span
Unit	GHz, MHz, kHz, Hz
Knob Step	Span > 0, Step = Span/200, min 1 Hz Span = 0, Step = 100
Direction Key Step	1-2-5 sequence step
Relation	RBW, Span and related parameters

2.1.1.5 Peak -> CF

Executes a peak search and sets the center frequency (CF) of the display to the frequency of the current peak. The function is invalid in Zero Span.

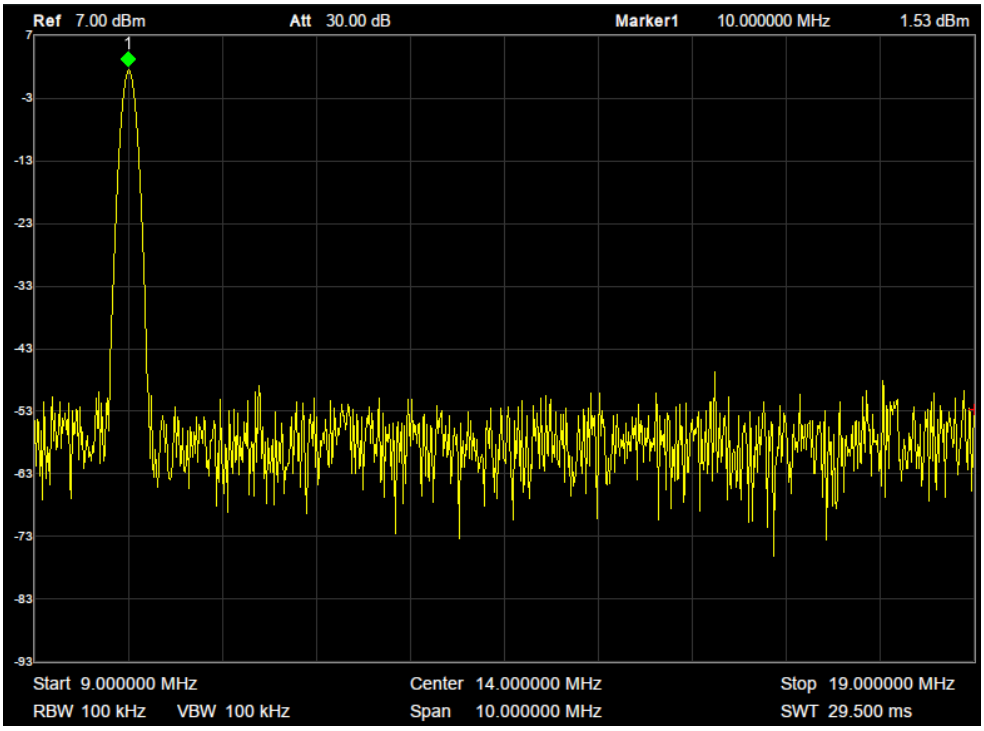


Figure 2-1 before Peak -> CF

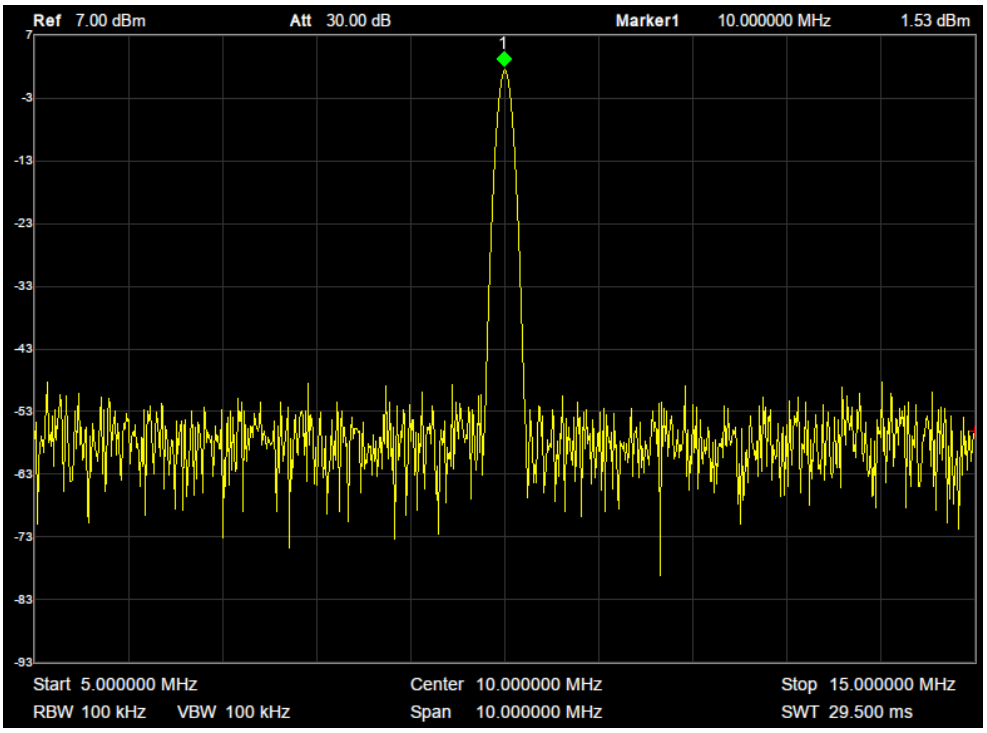


Figure 2-2 after Peak -> CF

2.1.1.6 CF -> Step

Set the current center frequency as the CF step. At this point, the CF step will switch to "**Manual**" mode automatically. This function is usually used with channel switching. Take a harmonic waveform measurement for example: locate a signal at the center frequency (CF) of the display and execute CF->Step. Then press the down direction key continuously to measure each order of harmonic in sequence

2.1.2 Span

Set the span of the analyzer. Any change to this parameter will affect the frequency parameters and restart the sweep.

2.1.2.1 Span

Set the frequency range of the current sweep. The center frequency and span are displayed at the low left and right sides of the grid respectively. Please pay attention to the following points：
The start and stop frequency vary with the span when the center frequency is constant.
In manual span mode, the span can be set down to 100 Hz and up-to the full span described in Specifications. When the span is set to the maximum, the analyzer enters full span mode.
Modifying the span in non-zero span modes may cause an automatic change in both CF step and RBW if they are in Auto mode. Besides, the charge of RBW may influence VBW (in Auto VBW mode).
Variation in the span, RBW or VBW would cause a change in the sweep time.

In non-zero span, neither "**Video**" trigger nor "**1/△time**" readout function is valid.

Table 2-5 Span

Parameter	Explanation
Default	Maximum bandwidth
Range	0 Hz ~ 3.2GHz
Unit	GHz, MHz, kHz, Hz
Knob Step	Span/200, Min = 1 Hz
Direction Key Step	In 1-2-5 sequence
Related to	Start Freq, Stop Freq, Freq Step, RBW, Sweep time

Note: 0 Hz is available only in zero span.

2.1.2.2 Full Span

Set the span of the analyzer to the maximum frequency span available.

2.1.2.3 Zero Span

Set the span of the analyzer to 0Hz. Both the start and stop frequencies will equal the center frequency and the horizontal axis will denote time. The analyzer measures the time domain characteristics of the amplitude of the corresponding frequency point on the input signal. Please pay attention to the following points:

The following functions are invalid in Zero span: Peak ->CF, Signal Track, Zoom In and Zoom Out.

- **Frequency**: Peak->CF;
- **SPAN**: Zoom In and Zoom Out;
- **Marker->**: M ->CF, M->CF step, M->Start Freq, M->Stop Freq, △M->CF and △M->Span;
- **Marker**: Frequency, Period and 1/△Time(valid in Delta marker type);

2.1.2.4 Zoom In

Set the span to half of its current value. At this point, the signal on the screen is zoomed in to observe signal details.

2.1.2.5 Zoom Out

Set the span to twice the current value. At this point, the signal on the screen is zoomed out to gain more information about the nearby spectrum.

2.1.2.6 Last Span

Set the span to the previous span setting.

2.1.2.7 X-Scale

Set the scale type of X-axis to Linear (Lin) or Logarithmic (Log) scale.
In Log scale type, the frequency scale of X-axis is displayed in the logarithmic form.
If the scale type of X-axis is in the logarithmic type form, the scale type will be switched into Lin when turning on measurements (Meas).

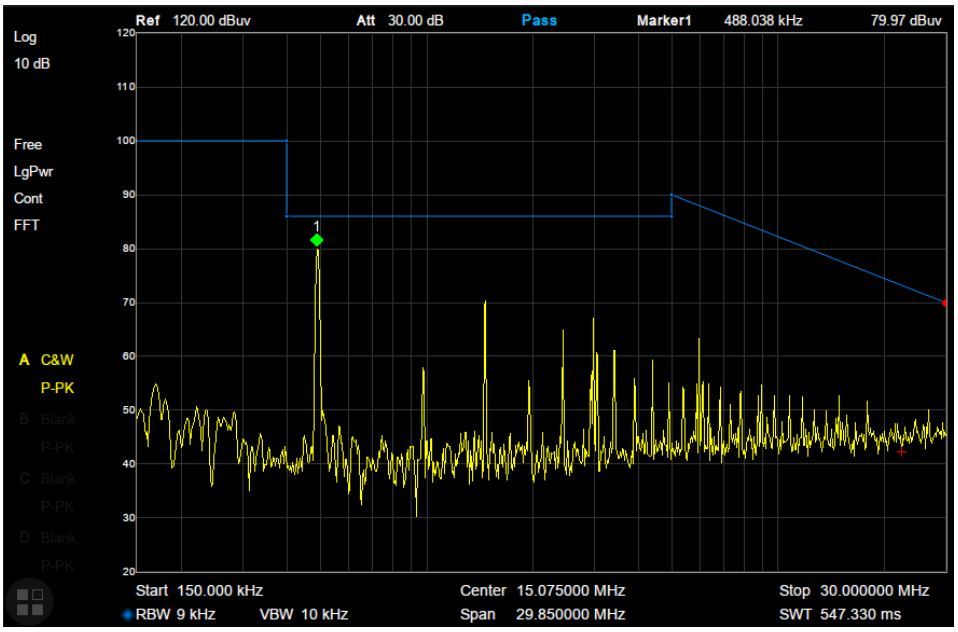


Figure 2-3 Logarithmic X Scale

2.1.3 Amplitude

Set the amplitude parameters of the analyzer. Through modifying these parameters, signals under measurement can be displayed in a proper mode for easier observation and minimum error.

2.1.3.1 Ref Level

Set the maximum power or voltage that can be currently displayed in the trace window. The value is displayed at the upper left corner of the screen grid.
The maximum reference (Ref) level available is affected by the maximum mixing level; input attenuation is adjusted under a constant maximum mixing level in order to fulfill the following condition:

Ref <= ATT - PA - 20dBm, where ATT = Attenuation value, PA = Preamplifier value

Table 2-6 Ref Level

Parameter	Explanation
Default	0 dBm
Range	-100 dBm ~ 20 dBm

Unit	dBm, dBmV, dBuV, V, W
Knob Step	In Log scale mode, step = Scale/10 In Lin scale mode, step = 0.1 dB
Direction Key Step	In Log scale mode, step = Scale In Lin scale mode, step = 1 dB
Related to	Attenuator, Preamp, Ref Offset

2.1.3.2 Attenuator

Sets the value for the internal attenuator of the RF input.

Input attenuation can be set up for automatic and manual using two kinds of patterns.

- Automatic mode: The instrument sets the attenuation value according to the state of preamplifier and value of the current reference level automatic adjustment.
- The maximum input attenuation can be set to 31 dB. When setting parameters do not meet the above formula, you can adjust the reference level.

Table 2-7 Attenuator

Parameter	Explanation
Default	20 dB
Range	0 ~ 31 dB
Unit	dB
Knob Step	1 dB
Direction Key Step	5 dB
Related to	Preamp, Ref level

2.1.3.3 RF Preamp

Control the state of the internal preamplifier (PA) located in the RF input signal path. When the signal-under-measurement is small, turning on the preamplifier can reduce the displayed noise level and aid in distinguishing small signals from the noise.

The corresponding icon "**PA**" will appear at the left side of the screen when the preamplifier is turned on.

2.1.3.4 Units

Set the unit of the Y-axis to dBm, dBmV, dBuV, Volts (RMS) and Watts. The default is dBm.

The conversion relationships between units are as follows.

$$\mathrm{dBm} = 10\lg\left(\frac{\mathrm{Volts}^2}{\mathrm{R}} \times \frac{1}{1\mathrm{mW}}\right)$$

$$\mathrm{dB\mu V} = 20\lg\left(\frac{\mathrm{Volts}}{1\mu\mathrm{V}}\right)$$

$$\mathrm{dBmV} = 20\lg\left(\frac{\mathrm{Volts}}{1\mathrm{mV}}\right)$$

$$\text{Watts} = \frac{\text{Volts}^2}{\text{R}}$$

Where, R denotes the reference impedance. The default value is 50Ω and can be adjusted by pressing "**Correction -> RF input**". The "75 Ω" impedance is just a numeric value, not a real impedance. Setting the RF input to 75 Ω will not change the actual input impedance. A 75 Ω feed-through adapter is required to match 75 Ω circuits to the 50 Ω input of the SVA.

2.1.3.5 Scale

Set the logarithmic units per vertical grid division on the display. This function is only available when the scale type is set to "**log**". Please pay attention to the following points:

- By changing the scale, the displayed amplitude range is adjusted
- The Minimum range: Reference level –10 × current scale value
- The Maximum range: The reference level.

Table 2-8 Scale

Parameter	Explanation
Default	10 dB
Range	1 dB ~ 20 dB
Unit	dB
Knob Step	1 dB
Direction Key Step	1-2-5 sequence
Related to	Scale Type

2.1.3.6 Scale Type

Set the scale type of the Y-axis to Lin or Log. The default is Log.

- In Lin mode, the vertical Scale value cannot be changed. The Display area is set for reference level of 0%. Please pay attention to the following points;
- In Log scale type, the Y-axis denotes the logarithmic coordinate; the value shown at the top of the grid is the reference level and each grid represents the scale value. The unit of Y-axis will automatically switch to the default unit (dBm) in Log scale type is changed from Lin to Log;
- In Lin scale type, the Y-axis denotes the liner coordinate; the values shown at the top of the grid and the bottom of the grid are the reference level and the scale setting function is invalid. The unit of Y-axis will automatically switch to the default unit (Volts) in Lin scale type when the scale type is charged from Log to Lin.

2.1.3.7 Ref Offset

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

The change of this value changes both the reference level readout and the amplitude readout of the marker; but does not impact the position of traces on the screen.

Table 2-9 Ref Offset

Parameter	Explanation
Default	0 dB
Range	-100 dB ~ 100 dB
Unit	dB
Knob Step	Not support
Direction Key Step	Not support

2.1.3.8 Correction

Correct the displayed amplitude to compensate for gains or losses from external devices such as antennas and cables. When using this function, you can view the correction data table and save or load the current correction data. When amplitude correction is enabled, both the trace and related measurement results will be mathematically corrected. Positive correction values are added to the measured values. Negative (-) correction values are subtracted from the measured values.

1. RF Input

Set the input impedance for numeric voltage-to-power conversions. To measure a 75 Ω device, you should use a 75 Ω to 50 Ω adapters to connect the analyzer with the system-under-test and then set the input impedance to 75 Ω.

2. Apply Correction

Enable or disable amplitude corrections. Default is Off. The analyzer provides four correction factors that can be created and edited separately, but they can be applied independently in any combination.

Table 2-10 Edit Correction table

Function	Explanation
Correction	Select the correction factor on or off.
Add Point	Add a point into correction table.
Point Num	Select a point to edit by point num.
Frequency	Edit the frequency value for the current selected point.
Amplitude	Edit the amplitude value for the current selected point.
Del Point	Delete the selected correction point.
Del All	Clear all data of the correction table.
Save/Load	Save or load correction data. You can save the current correction data into or load correction data from a specified file.

2.1.4 Auto Tune

The analyzer will search for signals automatically throughout the full frequency range and adjust the frequency and amplitude settings for optimum display of the strongest signal.

- In the process of auto search, The "**Auto Tune**" is shown in the status bar on the screen until the search is finished.
- Some parameters such as the reference level, scale, input attenuation and maximum mixing level may be changed during the auto search.

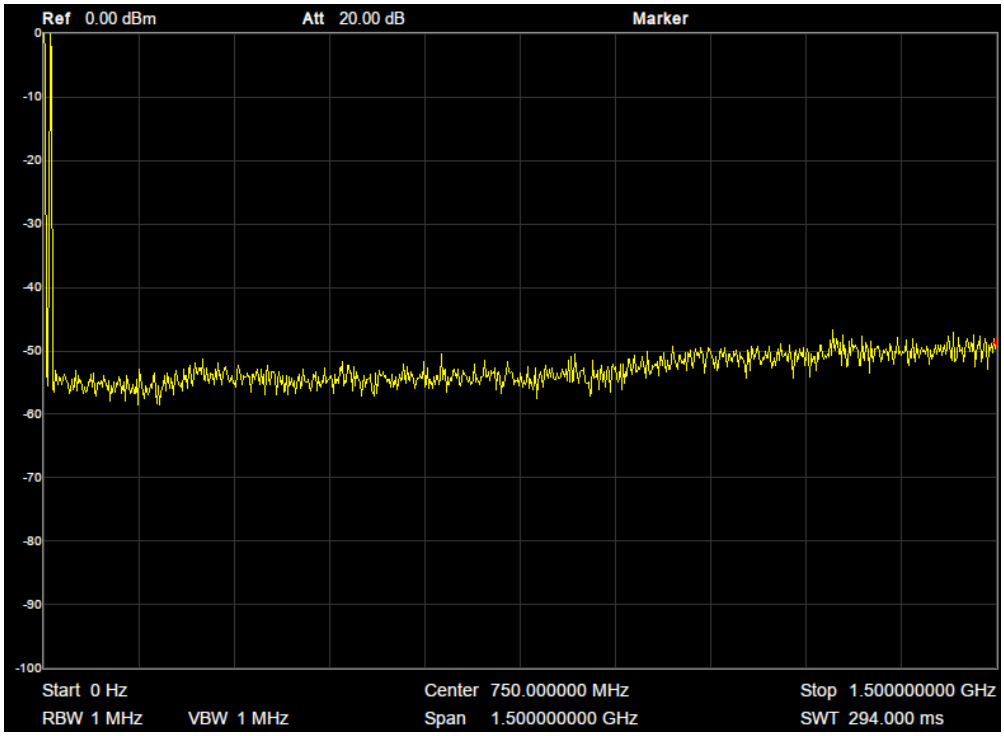


Figure 2-4 before Auto Tune

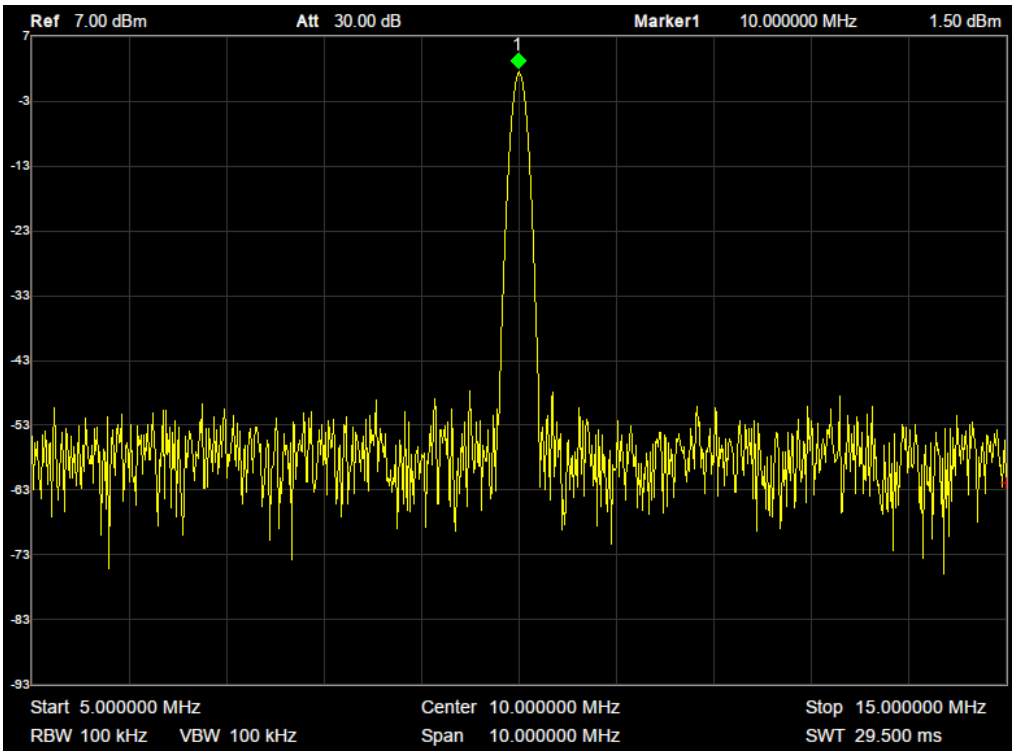


Figure 2-5 after Auto Tune

2.2 Sweep and Function

2.2.1 BW

The bandwidth menu contains the RBW (Resolution Bandwidth), VBW (Video Bandwidth), and controls for averaging and filter shape, including the EMI filter that enables EMI measurement controls.

2.2.1.1 Resolution Bandwidth

Set the resolution bandwidth in order to distinguish between signals which have frequency components that are near one another.

- Reducing the RBW will increase the frequency resolution, but will also increase the sweep time (Sweep Time is affected by a combination of RBW and VBW when the analyzer is in Auto mode).
- RBW varies with the span (non-zero span) in Auto RBW mode.

Table 2-11 RBW

Parameter	Explanation
Default	1 MHz
Range	1 Hz ~ 1 MHz
Unit	MHz, kHz, Hz
Knob Step	in 1, 3, 10 sequence
Direction Key Step	in 1, 3, 10 sequence
Relation	Span, RBW, VBW, Sweep Time

2.2.1.2 Video Bandwidth

Set the desired video bandwidth in order to filter out the noise outside the video band.

- Reducing the VBW will smooth the trace and helps to highlight small signals from noise, but it will also increase the sweep time (Sweep Time is affected by a combination of RBW and VBW when it is in Auto mode).
- VBW varies with RBW when it is set to Auto. While in Manual mode, VBW is not affected by RBW.

Table 2-12 VBW

Parameter	Explanation
Default	1 MHz
Range	1 Hz ~ 3 MHz
Unit	MHz, kHz, Hz
Knob Step	in 1, 3, 10 sequence

Direction Key Step	in 1, 3, 10 sequence
Relation	RBW, V/R Ratio, Sweep Time

2.2.1.3 V/R Ratio

Set the ratio of VBW to RBW. This value is different while measuring different kinds of signals:

- Sine/Continuous Wave (CW) signals: Use 1 to 3 (for faster sweeps)
- Pulsed/transient signals: Use 10 (to reduce the influence on the amplitude of transient signals)
- Noise signals: Generally use 0.1 (to obtain the average of noises)

Table 2-13 V/R Ratio

Parameter	Explanation
Default	1
Range	0.001 ~ 1000
Unit	N/A
Knob Step	in 1, 3, 10 sequence
Direction Key Step	in 1, 3, 10 sequence
Relation	RBW,VBW

2.2.1.4 Average Type

Choose one of the following averaging types: log power (video), power (RMS), or voltage averaging. When trace average is on, the average type is shown on the left side of the display.

1. Log Power

Select the logarithmic (decibel) scale for all filtering and averaging processes. This scale is "Video" because it is the most common display and analysis scale for the video signal within a analyzer. This scale is excellent for finding Sine/CW signals near noise.

2. Power Average

In this average type, all filtering and averaging processes work on the power (the square of the magnitude) of the signal, instead of its log or envelope voltage. This scale is best for measuring the true time power of complex signals.

3. Voltage Average

In this Average type, all filtering and averaging processes work on the voltage of the envelope of the signal. This scale is good for observing rise and fall behavior of AM or pulse-modulated signals such as radar and TDMA transmitters.

2.2.1.5 Filter

Set the RBW filter type. The analyzer supports two kinds of RBW filters: “**Gauss**” (-3 dB

bandwidth) and "**EMI**" (-6 dB bandwidth).
When "**EMI**" is selected, resolution bandwidth can be 200 Hz, 9 kHz or 120 kHz only.
"**Quasi-Peak**" detector is available only in "**EMI**" filter.

2.2.2 Trace

The sweep signal is displayed as a trace on the screen.

2.2.2.1 Select Trace

The analyzer allows for up to four traces to be displayed at the same time. Each trace has its own color (Trace 1 - Yellow, Trace 2 - Purple, Trace 3 - Light blue and Trace 4 - Green). All traces can be set parameter independently. As a default, analyzer will choose Trace A and set the type of the trace as Clear Write

2.2.2.2 Trace Type

Set the type of the current trace or disable it. The system calculates the sampled data using a specific operation method according to the trace type selected and displays the result. Trace types include Clear Write, Max Hold, Min Hold, View, Average and Bank. The corresponding icon of the trace type will be displayed in the status bar at the left of the screen. Take Trace 1,2,3,4 as an example and the icons are as shown in the figure below.

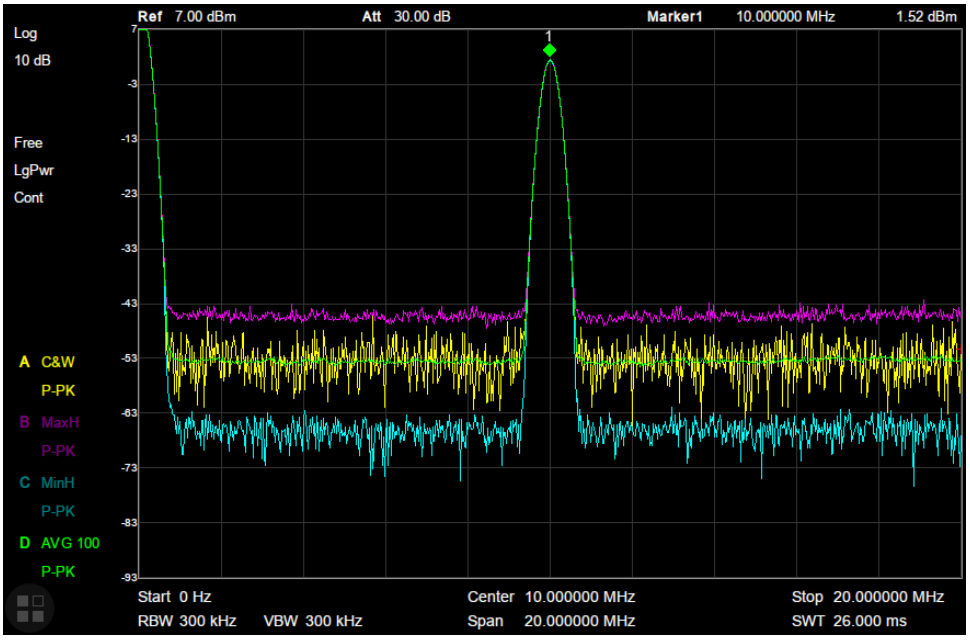


Figure 2-6 Trace Type

1. Clear Write

Erases any data previously stored in the selected trace, and display the data sampled in real-time of each point on the trace.

2. Max Hold

Retains the maximum level for each trace point of the selected trace. Updates the data if a new maximum level is detected in successive sweeps. Max Hold is very effective when measuring events that may take successive scans to measure accurately. Some common applications include FM Deviation, AM NRSC, and frequency hopping or drift.

3. Min Hold

Display the minimum value from multiple sweeps for each point of the trace and update the data if a new minimum is generated in successive sweeps.

4. View

Freezes and holds the amplitude data of the selected trace. The trace data is not updated as the analyzer sweeps.

5. Blank

Disable the trace display and all measurements of this trace.

2.2.2.3 Average Times

Set the number of averages of the selected trace.

More averages can reduce the noise and the influence of other random signals; thus highlighting the stable signal characteristics. The larger the number of averages is, the smoother the trace will be. Enabling averaging increases the length of time to collect the full spectral information because the analyzer will need to execute the sweep count that corresponds to the average setting. The displayed data is averaged in a first-in-first-out fashion.

Table 2-14 Average Times

Parameter	Explanation
Default	100
Range	1 ~ 999
Unit	N/A
Knob Step	1
Direction Key Step	5

2.2.2.4 Math

Set the computational method of the math trace.

1. Variable X, Y

Variable X, Y can be applied to trace A, B, C, or D.

2. Output Z

The Math result is denoted by the Z variable and can be displayed by trace A, B, C, or D.

3. Calculation Type

The analyzer provides the calculation types as shown below:

Power Diff X-Y+Offset→Z

Power Sum X+Y+Offset→Z

Log Offset X+ Offset→Z

Log Diff X-Y-Ref→Z

Table 2-15 Offset

Parameter	Explanation
Default	0dB
Range	-100 dB ~ 100 dB
Unit	dB

2.2.3 Detect

The analyzer displays the sweep signal on the screen in the form of a trace. For each trace point, the analyzer always captures all the data within a specific time interval and processes (Peak, Average, etc.) the data using the detector currently selected, then it displays the processed data (a single data point) on the screen.

Select an appropriate detector type according to the actual application in order to ensure the accuracy of the measurement.

The available types are **Pos Peak**, **Neg Peak**, **Sample**, **Normal**, **Average** and **Quasi Peak**. The default is **Pos peak**.

1. Positive Peak

For each trace point, Positive Peak detector displays the maximum value of data sampled within the corresponding time interval.

2. Negative Peak

For each trace point, Negative Peak detector displays the minimum value of data sampled within the corresponding time interval.

3. Sample

For each trace point, Sample detector displays the transient level corresponding to the central time point of the corresponding time interval. This detector type is applicable to noise or noise-like signal.

4. Normal

Normal detector (also called rosenfell detector) displays the maximum value and the minimum value of the sample data segment in turn: Odd-numbered data points display the maximum value and even-numbered data points display the minimum value. In this way, the amplitude

variation range of the signal is clearly shown.

5. Average

For each trace point, Average detector displays the average value of data sampled within the corresponding time interval.

6. Quasi-Peak

Quasi-Peak (QP) detector, which is a weighted form of peak detector, is used for EMC pulse testing. The SVA QP detector is designed to follow CISPR-16 response specifications. For a single frequency point, the detector detects the peaks within the QP dwell time.

The peaks detected are weighted using a digital model that follows a defined response curve as well as the time constant specified in the CISPR 16 standards. The measurement time for QP is far longer than Peak Detector.

2.2.4 Sweep

Sets parameters about the Sweep functions, including sweep time, sweep rule, sweep mode, number of sweep, etc.

2.2.4.1 Sweep Time

Sets the time needed for the analyzer to finish a sweep within the span range. The sweep time can be set in "**Auto**" or "**Manual**" mode and the default is "**Auto**".

- In non-zero span, the analyzer selects the shortest sweep time on the basis of the current RBW and VBW settings if Auto is selected.
- Decreasing the sweep time will decrease measurement time. However, an error may be caused if the specified sweep time is less than the minimum sweep time in Auto coupling; at this point, "**UNCAL**" is shown in the status bar on the screen. Measurements taken with "UNCAL" showing may not meet the specifications of the instrument and can have significant error.

Table 2-16 Sweep Time

Parameter	Explanation
Default	N/A
Range	900 us ~ 1.5 ks (Quasi Peak：900us ~ 15ks)
Unit	ks, s, ms, us
Knob Step	Sweep time/100, min =1 ms
Direction Key Step	in 1,3 sequence

2.2.4.2 Sweep Rule

The analyzer provides two sweep time rules to meet the different sweep time requirements:

- **Speed**: Activates the default fast sweep time rule.
- **Accuracy**: Activates the normal sweep time rule to ensure increased measurement accuracy. The Speed sweep time rule provides a fast measurement function that decreases the sweep time. Using Fast Sweep will decrease the measurement accuracy.

2.2.4.3 Sweep

Sets the sweep mode in single or continuous, the default is continuous. The corresponding icon of the sweep will be displayed in the status bar at the left of the screen.

1. Single

Sets the sweep mode to "**Single**". The number on the parameter icon denotes the current sweep number.

2. Numbers

Sets the number of sweeps for a single sweep. In single sweep mode, the system executes the specified number of sweeps and the number shown on the icon in the status bar at the left of the screen varies with the process of the sweep.

3. Continue

Sets the sweep mode to "Continue". The character Cont on the parameter icon denotes the analyzer is sweeping continuously.

- If the instrument is in single sweep mode and no measurement function is enabled, press this key and the system will enter continuous sweep mode and sweep continuously if the trigger conditions are satisfied.
- If the instrument is in single sweep mode and a measurement function is on, press this key and the system will enter continuous sweep mode and measure continuously if the trigger conditions are satisfied.
- In continuous sweep mode, the system will send a trigger initialization signal automatically and enter the trigger condition judgment directly after each sweep.

Table 2-17 Sweep Times

Parameter	Explanation
Default	1
Range	1 ~ 9999
Unit	N/A
Knob Step	1
Direction Key Step	1

2.2.4.4 Sweep Mode

Sweep mode includes auto, sweep and FFT operation modes.

1. Auto

When the sweep mode is auto, the analyzer selects the sweep mode automatically between Sweep and FFT Mode in the shortest time.

2. Sweep

True swept operation including point-by-point scanning. The Sweep mode is only available when the RBW is in 30 Hz – 1 MHz.

3. FFT

The FFT mode is only available when RBW is in 1 Hz - 30 kHz.
When the tracking generator (TG) is on, the sweep mode is forced to Sweep.

2.2.4.5 QPD Dwell Time

Dwell time is the measurement time at a single frequency. QP detector gets its weighted envelope response during this dwell time. The longer dwell time is, the more sufficiently the QP detector responses to a single frequency, and the more accurately the QP detector envelope is.

Table 2-18 QPD Dwell Times

Parameter	Explanation
Default	50 ms
Range	0 s ~ 10 s
Unit	ks, s, ms, us
Knob Step	N/A
Direction Key Step	N/A

2.2.5 Trigger

The trigger type can be Free Run, Video or External.

2.2.5.1 Free Run

The trigger conditions are satisfied at any time and the analyzer generates trigger signals continuously.

2.2.5.2 Video Trigger

A trigger signal will be generated when the system detects a video signal of which the voltage exceeds the specified video trigger level.
Set the trigger level with the video trigger menu entry. At this point, the trigger level line (Trig Line) and value are displayed on the screen.

Table 2-19 Trigger Setup

Parameter	Explanation
Default	0 dBm
Range	-300 dBm ~ 50 dBm
Unit	dBm
Knob Step	1 dB
Direction Key Step	10 dB

2.2.5.3 External

In this mode, an external signal (TTL signal) is input from the [TRIGGER IN] connector at the rear panel and trigger signals are generated when this signal fulfills the specified trigger edge condition.

Set the trigger edge in external trigger to the rising (Pos) or falling (Neg) edge of the pulse.

2.2.6 Limit

The analyzer supports Pass/Fail test function. In this function, the measured curve is compared with the pre-edited curve. If the related rules are met, the result is "**Pass**"; or else is "**Fail**".

2.2.6.1 Limit1

Select enable or disable limit1.

2.2.6.2 Limit1 Edit

Edit the properties of the limit1 lines.

Table 2-20 Limit1 Edit Menu

Function	Explanation
Type	Select the desired limit line (upper or lower) for editing
Mode	Select the line or point for editing. Set the number of the point to be edited if you selected the point type. The range from 1 to 100
Add point	Add a new point for editing.
X-axis	Edit the X-axis value (frequency or time) of the current point. If the X-axis unit is frequency and the Ref Freq is enabled, edit the frequency difference between the frequency of the current point and the center frequency.
Amplitude	Edit the amplitude of the current point or line. If the Ref AMPT is enabled, edit the amplitude difference between the amplitude of the current point and the reference level.

Del Point	Delete the point you are editing.
Del All	Delete all point.
Save/Recall	Save or load the limit file.

2.2.6.3 Limit2

Select enable or disable limit2.

2.2.6.4 Limit2 Edit

Edit the properties of the limit2 lines.

Table 2-21 Limit2 Edit Menu

Function	Explanation
Type	Select the desired limit line (upper or lower) for editing
Mode	Select the line or point for editing. Set the number of the point to be edited if you selected the point type. The range from 1 to 100
Add point	Add a new point for editing.
X-axis	Edit the X-axis value (frequency or time) of the current point. If the X-axis unit is frequency and the Ref Freq is enabled, edit the frequency difference between the frequency of the current point and the center frequency.
Amplitude	Edit the amplitude of the current point or line. If the Ref AMPT is enabled, edit the amplitude difference between the amplitude of the current point and the reference level.
Del Point	Delete the point you are editing.
Del All	Delete all points.
Save/Recall	Save or load the limit file.

2.2.6.5 Test

Enable or disable the limit test function.

2.2.6.6 Setup

1. Fail to stop

Select whether the instrument will continue or stop operation when a failure occurs.

2. Buzzer

Turn on or off the buzzer. When the buzzer is on, it beeps when a failure occurs.

3. X Axis

Set the X-axis unit to frequency or time units.
Note that all the points of the current limit line will be deleted when the X-axis unit changes.

2.2.7 TG (Tracking Generator)

Set the parameters related to the tracking generator (TG).

2.2.7.1 TG

The tracking generator is a signal source with an adjustable frequency and amplitude. When the TG is enabled, a signal with the same frequency of the current sweep signal will be output from the connector at the front panel. The power of the signal could be set through the menu. The TG output frequency follows the analyzer sweep frequency. For example, if the sweep is set to scan from 1 MHz to 10 MHz, the TG output frequency will change from 1 MHz to 10 MHz in coordinated steps with the sweep. In Zero Span mode, the TG frequency will match the center frequency of the analyzer.

2.2.7.2 TG Level

Set the output power of the signal of the tracking generator.

Table 2-22 TG Level

Parameter	Explanation
Default	0 dB
Range	-20 dBm ~ 0 dBm
Unit	dBm
Knob Step	1 dB
Direction Key Step	10 dB

2.2.7.3 TG Level Offset

Assigns a certain offset to the output power of the TG when gains or losses occur between the TG output and external device in order to display the actual power value.

- This parameter only changes the readout of the TG output power, rather than the actual value.
- The offset could be either a positive (gain in the external output) or a negative (loss in the external output).

Table 2-23 TG Level Offset

Parameter	Explanation
Default	0 dB
Range	-200 dB ~ 200 dB
Unit	dB

Knob Step	1 dB
Direction Key Step	10 dB

2.2.7.4 Normalize

Normalization can eliminate errors in the TG Level. Before using this function, connect the **[TG SOURCE]** output terminal of the TG with the **[RF INPUT]** input terminal of the analyzer.

When enabled, the reference trace will be stored automatically after the current sweep finishes if no reference trace is stored before. During the reference trace storage, the corresponding prompt message is displayed. When normalization is enabled, the corresponding value of the reference trace will be subtracted from the trace data after every sweep.

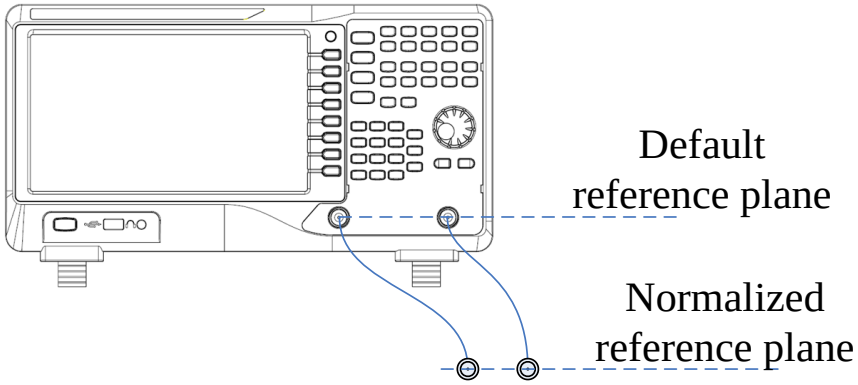


Figure 2-7 Normalization

2.2.7.5 Norm Ref Level

Adjust the vertical position of the trace on the screen by adjusting the reference level when normalization is enabled.

This operation differs from the **Ref Level** function in the **AMPT** menu. This parameter has no influence on the reference level of the analyzer.

Table 2-24 Reference level under normalization

Parameter	Explanation
Default	0 dB
Range	-200 dB ~ 200 dB
Unit	dB
Knob Step	1 dB
Direction Key Step	10 dB

2.2.7.6 Norm Ref Pos

Adjust the vertical position of the normalization reference level on the screen by adjusting the reference position when normalization is enabled.

◆ The function of this menu is similar to that of **Norm Ref Level**. When it is set to 0%, the

normalization reference level is displayed at the bottom of the screen grid and at the top when it is set to 100%.

Table 2-25 TG reference position under normalization

Parameter	Explanation
Default	100%
Range	0 ~ 100%
Unit	100%
Knob Step	1%
Direction Key Step	10%

2.2.7.7 Ref Trace

Set whether to display the reference trace or not. If "**View**" is selected, the reference trace saved (Trace D) will be shown in "View" type.

Note: When normalization is enabled, the unit of Y-axis is "dB" and will not be influenced by the definition in **AMPT->Units**. At this point, "(dB)" is displayed under the Y-axis scale in the user interface.

2.2.8 Demod

Press **Demod** at the front panel to enter the demodulation setting menu. Both AM and FM demodulations are available in this device.

2.2.8.1 Demod (AM/FM)

Set the demodulation type to AM or FM; or disable the demodulation function. The default is off.

- The system will enable a marker automatically, place it at the center frequency and perform AM (or FM) demodulation on this frequency point after you enable AM (or FM) demodulation.
- The analyzer features an earphone jack and the demodulated signal can be output in audio frequency (AF) mode through the earphone. The frequency and intensity of AF denotes the frequency and amplitude of the signal respectively.

2.2.8.2 Earphone

Set the status of the earphone. When it is on, the demodulated signal can be heard through the earphone during the demodulation. By default, it is off.

2.2.8.3 Volume

Set the volume of the earphone.

Table 2-26 Volume

Parameter	Explanation
Default	6
Range	0 ~ 10
Unit	N/A
Knob Step	1
Direction Key Step	1

2.2.8.4 Demod Time

Set the time for the analyzer to complete a signal demodulation after each sweep.

If the **Earphone** is set to “On”, you will hear the demodulated signal through the earphone during the demodulation. A longer demod dwell time is recommended for demodulating audio signals.

Table 2-27 Demod time

Parameter	Explanation
Default	5 s
Range	5 ms ~ 1000 s
Unit	ks, s, ms
Knob Step	0 ms ~ 100 ms, step = 1 ms 100 ms ~ 1 s, step = 10 ms 1 s ~ 10 s, step = 100 ms 10 s ~ 100 s, step = 1 s 100 s ~ 1000 s, step = 10 s
Direction Key Step	1-2-5 step

2.3 Marker

2.3.1 Marker

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

- The analyzer allows for up to eight/four pairs of markers to be displayed at one time, but only one pair or a single marker is active every time.
- You can use the numeric keys, knob or direction keys to modify the desired frequency or time as well as view the readouts of different points on the trace.

2.3.1.1 Select Marker

Select one of the four markers. The default is Marker1. When a marker is selected, you can set its type, trace to be marked, readout type and other related parameters. The enabled marker will appear on the trace selected through the **Select Trace** option and the readouts of this marker are also displayed in the active function area and at the upper right corner of the screen.

Table 2-28 Marker parameters

Parameter	Explanation
Default	Center Frequency
Range	0 ~ Full Span
Unit	Readout = Frequency, units available are GHz, MHz, kHz, Hz Readout = Time (or Period), units available are s, ms, us, ns, ps
Knob Step	Readout = Frequency (or Period), Step = Span/(Sweep Points - 1)
Direction Key Step	Readout = Frequency (or Period), Step = Span/10

2.3.1.2 Select Trace

Select the trace to be marked by the current marker. Valid selections include A, B, C, or D.

2.3.1.3 Normal

One of the marker types. It is used to measure the X (Frequency or Time) and Y (Amplitude) values of a certain point on the trace. When selected, a marker with the number of the current marker (such as "**1**") appears on the trace.

- If no active marker exists currently, a marker will be enabled automatically at the center frequency of the current trace.
- You can use the numeric keys, knob or direction keys to move the marker. The readouts of the marker will be displayed at the upper right corner of the screen.

- The readout resolution of the X-axis (frequency or time) is related to the span. For higher readout resolution, reduce the span.

2.3.1.4 Delta

One of the marker types. It is used to measure the delta values of X (Frequency or Time) and Y (Amplitude) between the reference point and a certain point on the trace. When selected, a pair of markers appears on the trace: Fixed Related Marker (marked by a combination of the marker number and letter "**+**", such as "**2+**") and the Delta Marker (marked by the "Δ", such as "1Δ2").

- After the marker selects "Delta", the original marker will become the delta measurement marker, and the related marker of the incrementing sequence number will become the reference "fixed" marker
- The delta marker is in the "relative to" state, and its X-axis position can be changed; the related marker is in the "fixed" state by default (the X-axis and Y-axis positions are fixed), but the X-axis can be adjusted by changing to the "normal" state.
- The first row in the upper right corner of the trace area shows the frequency (or time) difference and amplitude difference between the two markers; the second row in the upper right corner of the trace area shows the X axis and amplitude value of the related marker.

2.3.1.5 Fixed

One of the marker types. When "Fixed" is selected, the X-axis and Y-axis of the marker will not change by the trace and can only be changed through the menu. The fixed marker is marked with "+".

After the marker selects "Delta", the original marker will become the delta measurement marker, and the related marker of the incrementing sequence number will become the reference "fixed" marker

2.3.1.6 Off

Turn off the marker currently selected. The marker information displayed on the screen and functions based on the marker will also be turned off.

2.3.1.7 Relative To

"Relative to" is used to measure the delta values of X (Frequency or Time) and Y (Amplitude) between two markers which can mark on different traces.

After the marker selects "Delta", the original marker will become the delta measurement marker, and the related marker of the incrementing sequence number will become the reference "fixed" marker

2.3.1.8 Marker Table

Enable or disable the Marker Table.

Display all the markers enabled on the lower portion of the screen, including marker number, trace number, marker readout type, X-axis readout and amplitude. Through this table you can view the measurement values of multiple points. The table allows for up to eight markers to be displayed at one time.

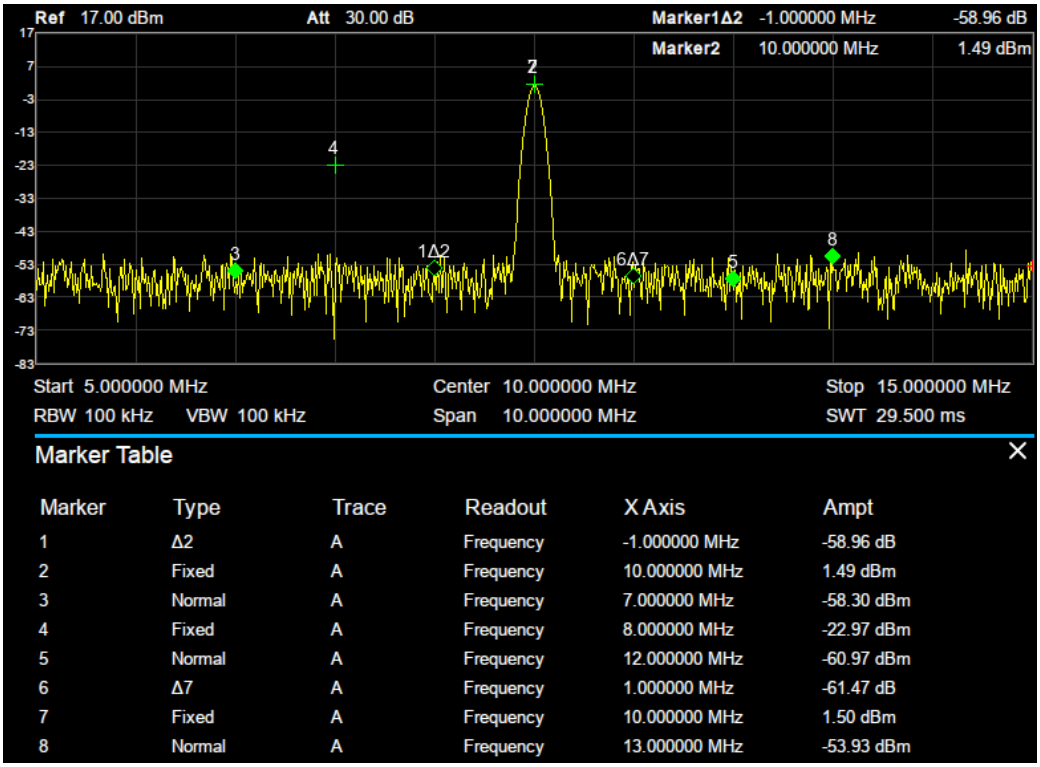


Figure 2-8 Marker table

2.3.2 Marker ->

1. M->CF

Set the center frequency of the analyzer to the frequency of the current marker.

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

2. M -> CF Step

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

- If the **Normal** marker is selected, the center frequency step will be set to the frequency of the current marker.
- If the **Delta** or **Delta** Pair marker is selected, the center frequency step will be set to the

frequency of the Delta Marker.

- The function is invalid in Zero span.

3. M -> Start Freq

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

- If the **Normal** marker is selected, the start frequency will be set to the frequency of the current marker.
- If the **Delta** or **Delta Pair** marker is selected, the start frequency will be set to the frequency of the Delta Marker.
- The function is invalid in Zero span.

4. M -> Stop Freq

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

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

5. M ->Ref Level

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

- If the **Normal** marker is selected, the reference level will be set to the amplitude of the current marker.
- If the **Delta** or **Delta Pair** marker is selected, the reference level will be set to the amplitude of the Delta Marker.

6. ΔM->Span

Set the span of the analyzer to the frequency difference between the two markers in Delta marker type.

- If **the Normal** marker is selected, this function is invalid.
- The function is invalid in Zero span.

7. ΔM->CF

Set the center frequency of the analyzer to the frequency difference between the two markers in **Delta** marker type.

- If the **Normal** marker is selected, this function is invalid.
- The function is invalid in Zero span.

2.3.3 Marker Fn

Special marker functions including Noise Marker, N dB BW and Freq Counter.

2.3.3.1 Select Marker

Select one of the eight markers (1, 2, 3, 4, 5, 6, 7 and 8) and the default is Marker1.

2.3.3.2 Noise Marker

Execute the Noise marker function for the selected marker and read the normalized noise power spectral density.

- If the current marker is "**Off**" in the Marker menu, pressing **Noise Marker** will first set it to Normal type automatically; then measure the average noise level at the marked point and normalize this value to 1 Hz bandwidth. During this process, certain compensation is always made on the basis of the detection and trace types. The measurement will be more precise if RMS Avg or Sample detection type is used.
- This function can be used for measuring the C/N ratio.

2.3.3.3 N dB BW

Enable the N dB BW measurement or set the value of N dB. The N dB BW denotes the frequency difference between two points that are located on both sides of the current marker and with N dB fall (N<0) or rise (N>0) in amplitude as shown in the figure on the next page.

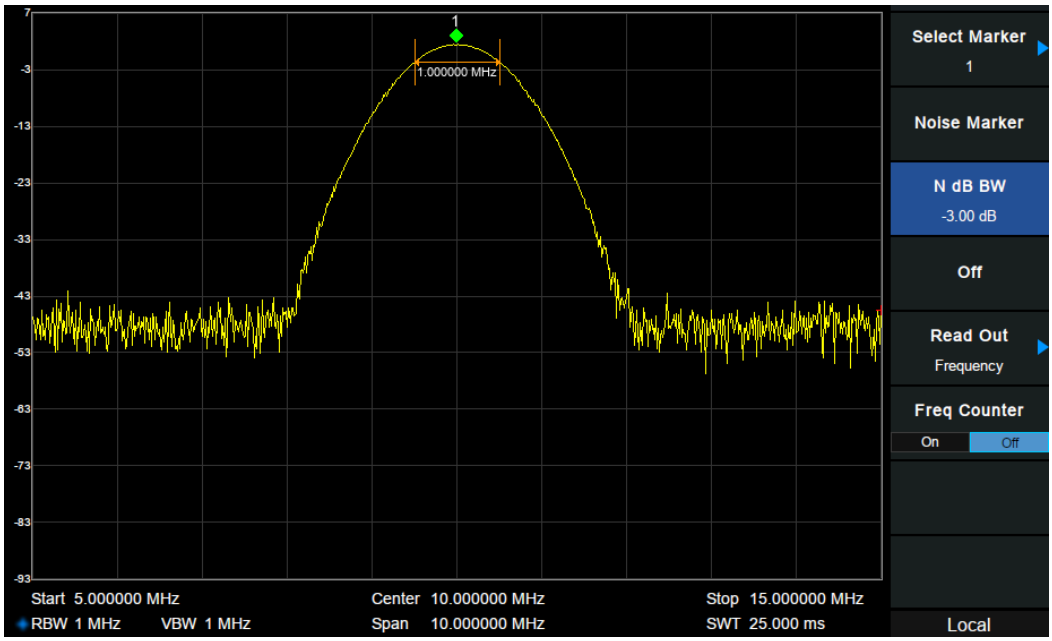


Figure 2-9 N dB BW

When the measurement starts, the analyzer will search for the two points which are located at both sides of the current point with N dB fall or rise in amplitude and display the frequency difference between the two points in the active function area. "----" would be displayed if the search fails.

Table 2-29 N dB Noise

Parameter	Explanation
Default	-3 dB
Range	-100 dB ~ 100 dB
Unit	dB
Knob Step	0.1 dB
Direction Key Step	1 dB

2.3.3.4 Freq Counter

Turn on or off the frequency counter. The frequency readout is accuracy is up to 0.01 Hz.

- The function is valid only when selecting marker 1.
- If marker 1 is selected but not active, turning on the frequency counter will open marker 1 Normal marker automatically.
- The frequency counter measures the frequency near the center frequency in Zero span.

2.3.3.5 Off

Turn off the noise marker, N dB BW measurement or Frequency Counter, but not the marker itself.

2.3.3.6 Read Out

Select a desired readout type for the X-axis for the marker. Different markers can use different readout types. This setting will change the readout type and affect the marker readings in the active function area and at the upper right corner of the screen, but will not change the actual value.

1. Frequency

In this type, Normal marker shows the absolute frequency. Delta markers and Delta Pair markers show the frequency difference between the delta marker and reference marker. The default readout mode in non-zero span is "**Frequency**".

Note: This type is invalid in Zero span.

2. Period

In this type, the Normal marker shows the reciprocal of frequency; while Delta marker and Delta Pair marker show the reciprocal of frequency difference. When the frequency difference is zero, the reciprocal is infinite and 100 Ts is displayed.

Note: This type is invalid in Zero span.

3. Δ Time

In this type, the Normal marker shows the time difference between the marker and the start of the sweep; while Delta marker and Delta Pair marker show the sweep time difference between

the delta marker and reference marker.
The default readout mode in Zero span is Δ Time.

2.3.4 Peak

Open the peak search setting menu and execute peak search.

2.3.4.1 Peak -> CF

Execute peak search and set the center frequency of the analyzer to the frequency of the peak.

2.3.4.2 Next Peak

Search for and mark the peak whose amplitude is closest to that of the current peak and which meets the peak search condition.

2.3.4.3 Next Left Peak

Search for and mark the nearest peak which is located at the left side of the current peak and meets the peak search condition.

2.3.4.4 Next Right Peak

Search for and mark the nearest peak which is located at the right side of the current peak and meets the peak search condition.

2.3.4.5 Peak Peak

Execute peak search and minimum search at the same time and mark the results with delta pair markers. Wherein, the result of peak search is marked with the delta marker and the result of minimum search is marked with the reference marker.

2.3.4.6 Count Peak

Enable or disable continuous peak search. The default is Off. When enabled, the system will always execute a peak search automatically after each sweep in order to track the signal under measurement.

2.3.4.7 Peak Table

Open the peak table (in the lower window) which lists the peaks (with frequency and amplitude) that meet the peak search condition. Up to 16 peaks can be displayed in the table.

2.3.4.8 Search Config

Define the conditions of peak search for various peak searches. A real peak should meet the requirements of both the "**Peak Excursion**" and "**Peak Threshold**".

1. Peak Threshold

Assign a minimum for the peak amplitude. Peaks whose amplitudes are greater than the specified peak threshold are treated as real peaks.

Table 2-30 Peak Threshold

Parameter	Explanation
Default	-140 dBm
Range	-200 dBm ~ 200 dBm
Unit	dBm
Knob Step	1 dB
Direction Key Step	5 dB

2. Peak Excursion

Set the excursion between the peak and the minimum amplitude on both sides of it. Peaks whose excursions are beyond the specified excursion are treated as real peaks.

Table 2-31 Peak Excursion

Parameter	Explanation
Default	15 dB
Range	0 dB ~ 200 dB
Unit	dB
Knob Step	1 dB
Direction Key Step	5 dB

3. Peak Type

Set the peak search condition. The available options are Maximum and Minimum

2.4 Measurement

2.4.1 Meas

Provides optional measurement functions. When activated, the screen will be divided into two parts, the above part is the measure screen which displays traces. The other part is used to display measurement results.

2.4.1.1 Channel Power

Measure the power and power density within the specified channel bandwidth. When this function is enabled, the span and resolution bandwidth are automatically adjusted to smaller values. Select **Channel Power** and press **Meas Setup** to set the corresponding parameters.

2.4.1.2 ACPR

Measures the power of the main channel and adjacent channels as well as the power difference between the main channel and each of the adjacent channels. When this function is enabled, the span and resolution bandwidth of the analyzer are adjusted to smaller values automatically.
Select **ACPR** and press **Meas Setup** to set the corresponding parameters.

2.4.1.3 Occupied BW

Integrates the power within the whole span and calculates the bandwidth occupied by this power according to the specified power ratio. The OBW function also indicates the difference (namely “Transmit Freq Error”) between the center frequency of the channel under measurement and the center frequency of the analyzer. Select **Occupied BW** and press **Meas Setup** to set the corresponding parameters.

2.4.1.4 T-Power

The system enters Zero span and calculates the power within the time domain. The types of powers available include Peak, Average and RMS. Select **T-Power** and press **Meas Setup** to set the corresponding parameters.

2.4.1.5 TOI

Automatic measurement of IP3 (Third order Intercept Point), including the power of fundamental wave and the Third order in the power, and calculate the adjustable Intercept Point

2.4.1.6 Spectrum Monitor

Display the power of the swept spectrum as an intensity color map commonly referred to as a waterfall chart. Select **Spectrum Monitor** and press **Meas Setup** to set the corresponding parameters.

2.4.1.7 Meas Off

Turn off all the Meas functions.

2.4.2 Meas setup

2.4.2.1 Channel Power

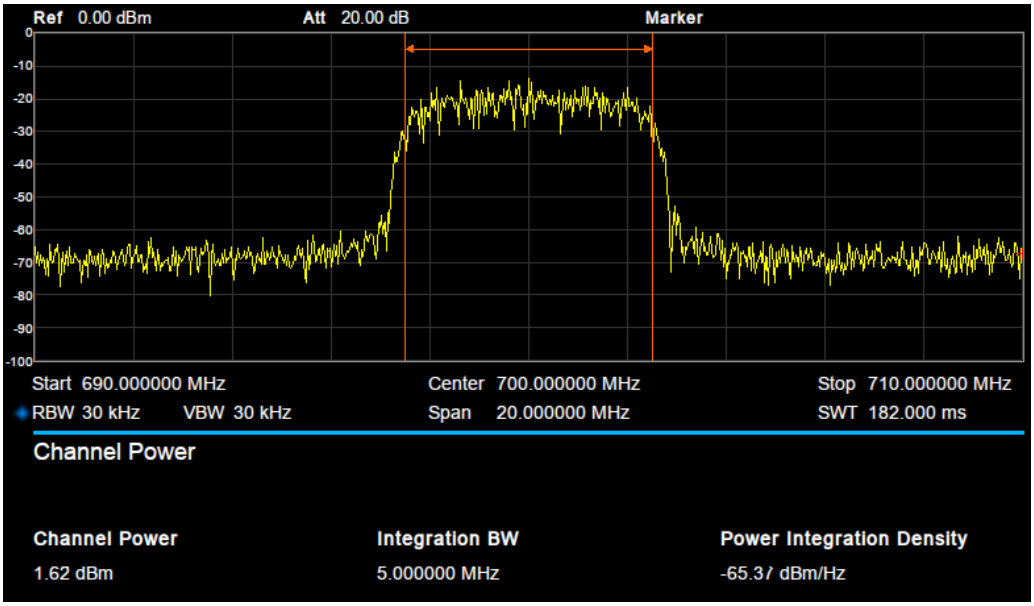


Figure 2-10 Channel Power

Measurement Results: Channel power and power spectral density.

- Channel Power: Power within the integration bandwidth.
- Power Spectral Density: Power (in dBm/Hz) normalized to 1Hz within the integration bandwidth.

Measurement Parameters: Center Freq, integration bandwidth, Span, Span power.

1. Center Freq

Set the center frequency, this center frequency which is the same with the center frequency of the analyzer. Modifying this parameter will change the center frequency of the analyzer.

2. Integration bandwidth

Set the frequency width of the channel to be tested and the power of the channel is the power

integral within this bandwidth. You can use the numeric keys, knob or direction keys to modify this parameter.

Table 2-32 Integration BW

Parameter	Explanation
Default	2 MHz
Range	100 Hz ~ Span
Unit	GHz, MHz, kHz, Hz
Knob Step	Integration BW/100, the minimum is 1 Hz
Direction Key Step	In 1-1.5-2-3-5-7.5 sequence

3. Span

Set the frequency range of the channel. This span which is the same with the span of the analyzer is the frequency range of the sweep. Modifying this parameter will change the span of the analyzer.

The channel power span is related to the integration bandwidth.

Table 2-33 Channel Power Span for Chan Power Measurement

Parameter	Explanation
Default	current span
Range	100 Hz ~ Span
Unit	GHz, MHz, kHz, Hz
Knob Step	Channel Power Span/100, the minimum is 1Hz
Direction Key Step	In 1-1.5-2-3-5-7.5 sequence

4. Span Power

Set the integrated bandwidth to the sweep span of display. The channel power and power spectral density display on the screen simultaneously.

2.4.2.2 ACPR

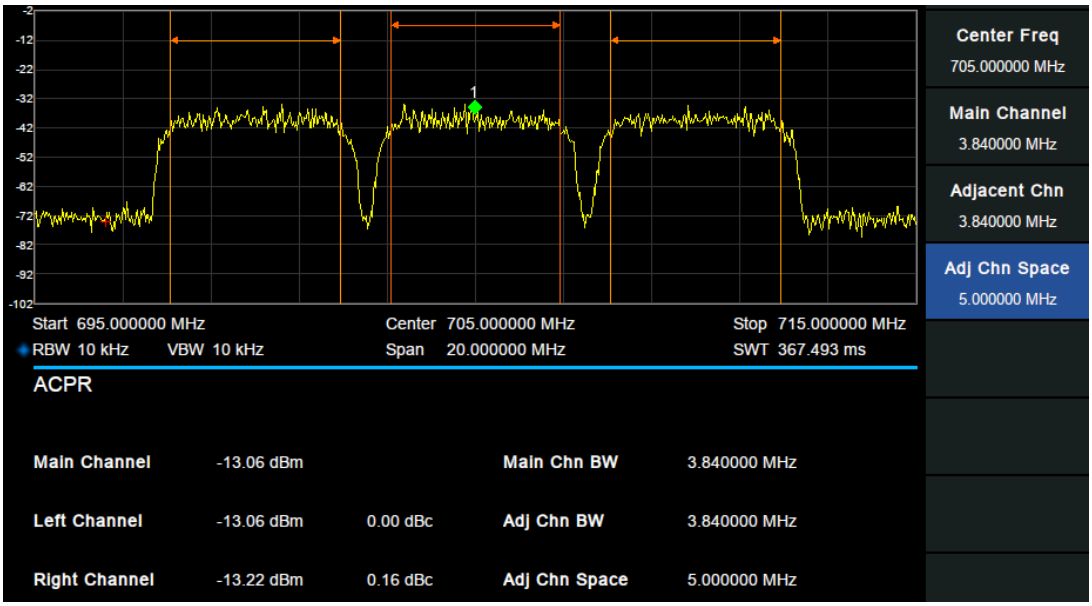


Figure 2-11 ACPR

Adjacent Channel Power Measurement: Main CH Power, Left channel power and Right channel power.

- Main CH Power: Displays the power within the bandwidth of the main power
- Left channel power : Displays the power of left channel and the power difference between the left channel and the main channel (in dBc)
- Right channel power: Display the power of the right channel and the power difference between the right channel and the main channel(in dBc)

Measurement parameter: Center frequency, main channel bandwidth, adjacent channel bandwidth and channel spacing

1. Center Frequency

Set the center frequency. The center frequency is the same with the center frequency of the analyzer display. Modifying this parameter will change the center frequency of the analyzer.

2. Main channel bandwidth

Set the bandwidth of the main channel and the power of the main channel is the power integral within this bandwidth.

Table 2-34 Main channel bandwidth

Parameter	Explanation
Default	1 MHz
Range	100 Hz ~ Sweep Span
Unit	GHz, MHz, kHz, Hz
Knob Step	Integration BW /100, the minimum is 1 Hz
Direction Key Step	In 1-1.5-2-3-5-7.5 Sequence

3. Adjacent channel bandwidth

Set the frequency width of the adjacent channels.

The adjacent channel bandwidth is related to the main channel bandwidth.

Table 2-35 Adjacent channel bandwidth

Parameter	Explanation
Default	1 MHz
Range	100 Hz ~ Sweep Span
Unit	GHz, MHz, kHz, Hz
Knob Step	Integration BW /100, the minimum is 1 Hz
Direction Key Step	In 1-1.5-2-3-5-7.5 Sequence

4. Adjacent Channel space

Set the difference between the center frequency of the main channel and the center frequency of the adjacent channels.

Adjusting this parameter will also adjust the distance between the upper/lower channel and the main channel.

Table 2-36 adjacent channel space

Parameter	Explanation
Default	3 MHz
Range	100 Hz ~ full span
Unit	GHz, MHz, kHz, Hz
Knob Step	Integration BW /100, the minimum is 1 Hz
Direction Key Step	In 1-1.5-2-3-5-7.5 Sequence

2.4.2.3 OBW

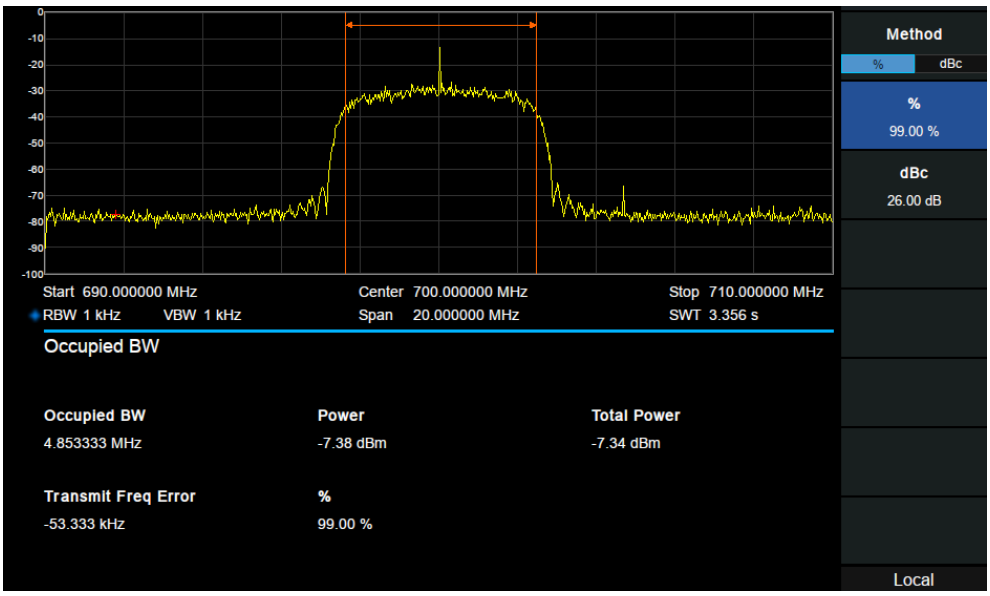


Figure 2-12 OBW

OBW measurement: occupied bandwidth and transmit frequency error.

- **Occupied Bandwidth:** Integrates the power within the whole span and then calculates the bandwidth occupied by the power according to the specified power ratio.
- **Transmit Frequency Error: The** difference between the center frequency of the channel and the center frequency of the analyzer.

2.4.2.4 T-Power

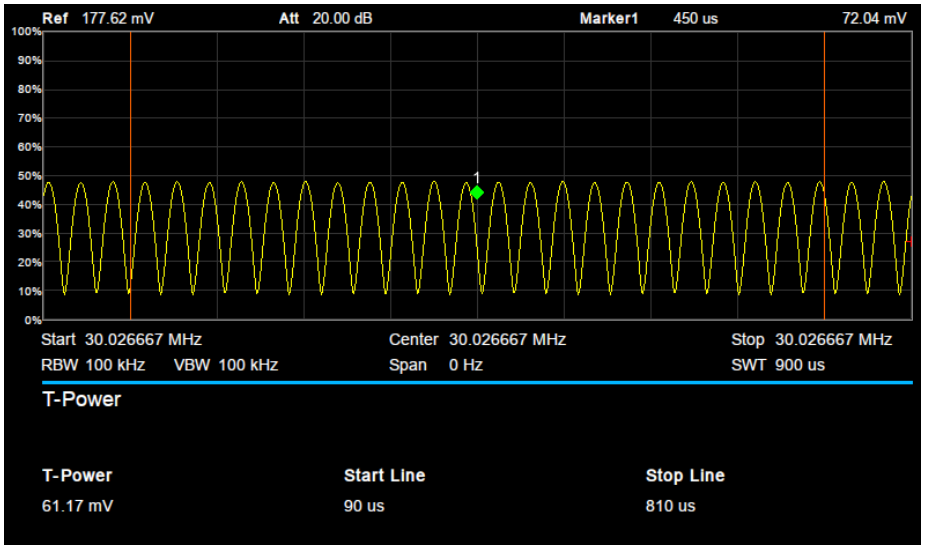


Figure 2-13 T-Power

T-Power: The power of the signal from the start line to the stop line.

Measurement Parameter: Center frequency, start line, stop line.

1. Center Frequency

Set the center frequency, this center frequency which is the same with the center frequency of the analyzer. Modifying this parameter will change the center frequency of the analyzer.

2. Start line

Set the left margin (in time unit) of T-Power measurement. The data calculated under this measurement is between the start line and stop line.

Table 2-37 start line

Parameter	Explanation
Default	0 s
Range	0 s ~ stop line
Unit	ks, s, ms, us, ns
Knob Step	Sweep time/751
Direction Key Step	In 1-1.5-2-3-5-7.5 Sequence

3. Stop line

Set the right margin (in time unit) of T-Power measurement. The data calculated under this measurement is between the start line and stop line.

Table 2-38 stop line

Parameter	Explanation
Default	900 us
Range	Start line ~ sweep time
Unit	ks, s, ms, us, ns
Knob Step	Sweep time /751
Direction Key Step	In 1-1.5-2-3-5-7.5 Sequence

2.4.2.5 TOI

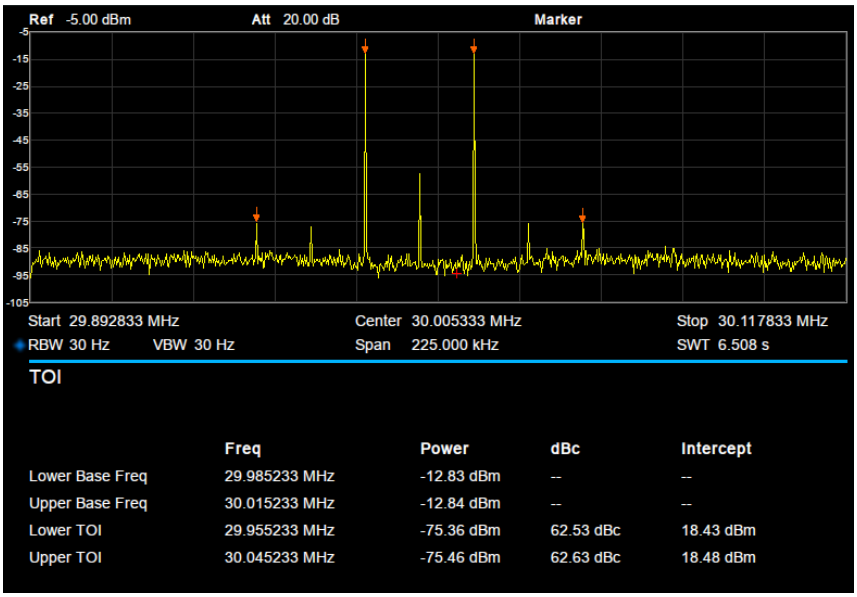


Figure 2-14 TOI

TOI is an automatic measurement. There are no user controlled parameters.

2.4.2.6 Spectrum Monitor

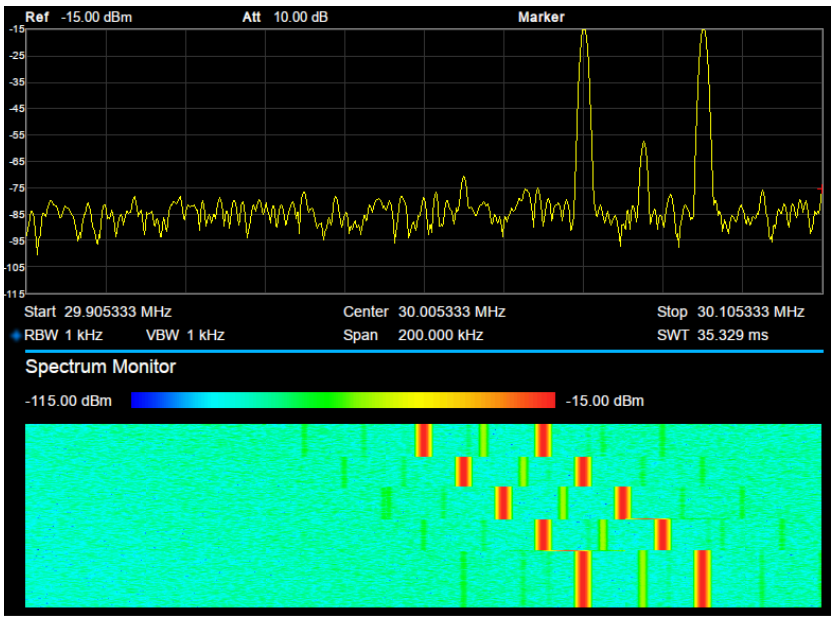


Figure 2-15 Spectrum Monitor

Displays the power of spectrum of successive scans as a color map. Also called a waterfall chart.

Spectrogram: Sets the meas state of spectrum monitor.

2.5 System

2.5.1 System

Set the system parameters.

2.5.1.1 Language

The analyzer supports a multi-language menu, Chinese and English built-in help and popup messages.

Press this key to select the desired display language.

2.5.1.2 Power On/Preset

1. Power On

Set the power on setting to Default, Last or one of user.

- **Def:** Load the default settings, for more details please refer to Table 2-51.
- **Last:** When Last is selected, instrument settings before the last power-off are recalled automatically at power on.
- **User:** If power on is set to user, the device will recall the specified configuration after power on.

2. Preset

Set the preset type to Default, Last or one of User.

- **Def:** When press **Preset**, load the default settings, for more details please refer to Table 2-51.
- **Last:** When press **Preset**, load the last power-off settings.
- **User:** When press **Preset**, load the specified configuration type.

3. User Config

Save the current instrument settings as user-defined setting into the internal non-volatile memory.

4. Factory

When **factory** is selected, the device will recall the initial config.

5. Reset & Clear

When **Reset & Clear** is selected, the device will recall the initial config and all user data and settings will be erased.

2.5.1.3 Interface Config

The analyzer supports communications through LAN, USB and the SIGLENT USB-GPIB

adapter as standard remote computer control interfaces.

1. LAN

Config or reset related parameters of the LAN connection. As a default, the IP config is DHCP.

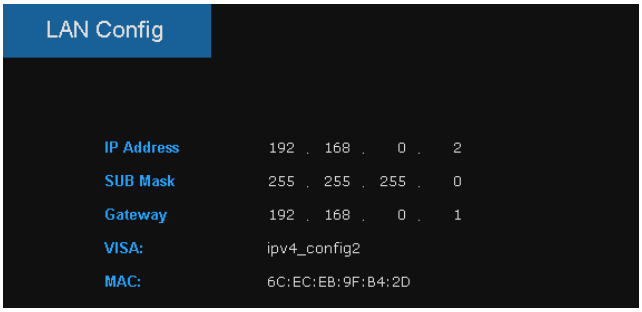


Figure 2-16 Static IP Config

2. GPIB

Config GPIB port number. The analyzer provides a digital interface for use with an optional SIGLENT USB-GPIB module through the front USB port.

2.5.1.4 Calibration

Auto Cal

When Auto Cal is open, the analyzer will process self-calibration regularly. Within half an hour after power-on, the device executes a self-calibration every 10 minutes.

2.5.1.5 System Info

1. System Info

- Product Model, Serial and HOST ID
- Software Version and Hardware Version
- Option Information

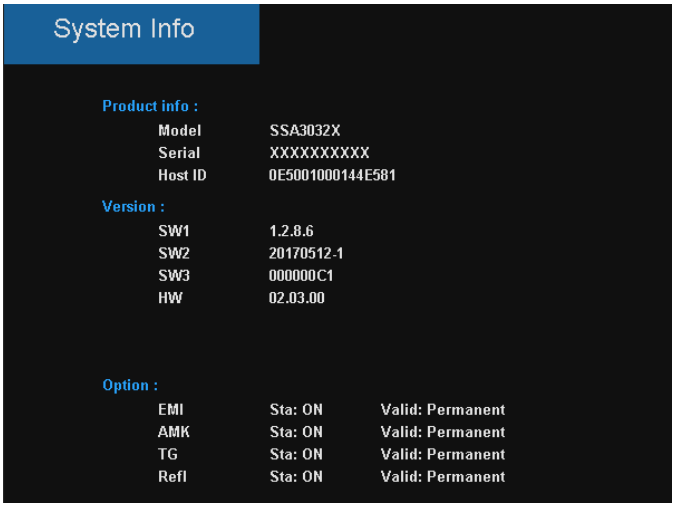


Figure 2-17 System Info

2. Load Option

Load license, enter license here to load options.

3. Firmware Update

Update firmware from the proper files in storage. SVA firmware files have .ADS file extensions. After the firmware has updated, the analyzer will be reboot.

2.5.1.6 Date and Time

Controls the display state and format for system data and time. The system time is displayed in “ymd”, “mdy”, “dmy” format in the user interface.

2.5.1.7 Self Test

1. Screen Test

Tests whether the screen has any pixel defects by displaying five colors: White, Red, Green, Blue and Black. Press any key to switch the screen color and exit the test.

2. Keyboard Test

Enter the keyboard test interface. Press the function keys at the front panel one-by-one and observe whether the corresponding key is checked. If not, an error may have occurred in that key. To exit the test, press “←“four times.

3. LCD Test

If the keys at the front panel are transparent, when the key is pressed, the corresponding backlight will turn on when testing it.

2.5.2 Display

2.5.2.1 Display Line

Open or Close Display Line or move the location.

Table 2-39 Display Line

Parameter	Explanation
Default	0 dBm
Range	REF Level + REF Offset – 10*Scale/Div ~ REF Level + ref Offset
Knob Step	1 dB
Direction Key Step	Scale/Div

2.5.2.2 Grid brightness

Controls the display grid brightness.

Table 2-40 Grid brightness

Parameter	Explanation
Default	30%
Range	0 ~ 100%
Unit	None
Knob Step	1%
Direction Key Step	10%

2.5.2.3 Screenshot

Toggle between normal and inverse color for images of the display saved to storage.
The color of traces is not inversed in inverse mode.

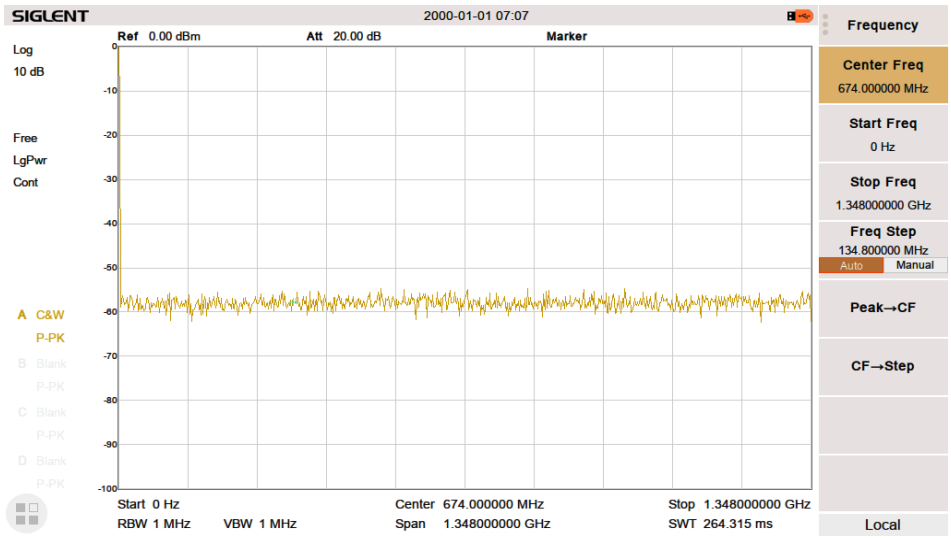


Figure 2-18 Inverse color Screenshot

2.5.3 File

2.5.3.1 Browser

Browser type including “Dir” and “File”,
Dir: When selected, use the knob or direction keys to change the highlighted directory.
File: When selected, use the knob or direction keys to switch among files or folders under the current directory.

2.5.3.2 Open/Load

Open the selected folder or load selected file

2.5.3.3 Back

Return to previous directory.

2.5.3.4 View Type

User can define the file type be browsed, included “All Type”, “STA”, “TRC”, “COR”, “CSV”, “LIM”, “PIC” (JPG/BMP/PNG).

2.5.3.5 Save Type

User can define the file type be saved, included “STA”, “TRC”, “COR”, “CSV”, “LIM”, “JPG,” “BMP”, “PNG”.

1. STA(Status)

STA files can be used to save and recall the instrument configuration. They are saved in ASCII format, which can be read by humans.

2. TRC(Trace)

TRC files store the active (visible) trace data and scaling factors that were in place when the data was saved. They are saved in ASCII format, which can be read by humans.

NOTE: When you first recall trace files, the instrument will adjust the display parameters (horizontal and vertical scaling, for example) to match the settings used during data collection. The trace data will not change, even if you adjust the parameters.

3. COR(Correction)

COR files store the data used to mathematically adjust the displayed input signal based on external factors (Cable loss, Amplifier/Antenna gain, etc.). They are saved in ASCII format, which can be read by humans.

4. CSV(Comma-Separated Variable)

CSV files store instrument configuration (scaling, units, etc.) and raw data (amplitude and frequency values) in ASCII format, commonly viewed in spreadsheet programs like Microsoft® Excel®. This file type can be read by humans

5. LIM(limit)

LIM files store the line or point data used to configure and display lines used for visual indication of a user-defined limit. They are saved in ASCII format, which can be read by humans.

6. BMP(Bitmap)/JPG(JPEG)/PNG

Picture files capture the display of the instrument (screenshot) as an image file. All of the details of the display are captured exactly. What you see on the display is in the file. These are

readable using image programs like Microsoft® Paint®.

2.5.3.6 Save

Save file in current directory, the file type is set in ‘Save Type’.
If there is an external memory, it will be saved to the external memory first.
Also used to set the save type of the **Save** shortcut, which can be used to quickly save the screenshot

2.5.3.7 Create Folder

Create a new folder in current directory.

2.5.3.8 Delete

Delete selected file or directory.

2.5.3.9 Rename

Rename the selected file or folder.

2.5.3.10 Operate

1. Browser
Browse files or directories; use the knob or direction keys to select the corresponding item.

2. Open/Load
Open the selected folder or directory, Load the selected file.

3. Back
Return to previous directory

4. Cut
Cut the Selected file or folder, and delete the primary one after paste.

5. Copy
Copy the Selected file or folder for paste.

6. Paste
Paste the file cut or copied before into the current.

7. Delete
Delete selected file or directory.

2.6 Mode Setup

The analyzer offers a variety of optional operating modes that can be purchased separately. Once activated, you can select the operating mode via the **Mode** key enables:

- Spectrum Analyzer
- Modulation Analysis (AMA/DMA)
- Vector Network Analysis (VNA）(Only for SVA models)
- Distance-To-Fault (DTF)(Only for SVA models)

Front panel keys may be different in different modes.

Different modes have their own Preset

2.6.1 Spectrum Analyzer

Press **Mode**, select 'Spectrum Analyzer' to enter spectrum analysis mode.

The 'Spectrum Analysis' mode is the default mode of the machine. In this mode, the **Mode** backlight does not light up; in other modes, the **Mode** backlight will light up.

2.6.2 Digital Modulation Analysis

This mode (DMA) enables modulation analysis of incoming signals. To start, press **Mode**, then select "Modulation Analysis" mode. The instrument will enter into ASK/FSK/AM/FM analysis sub-mode. ASK modulation analysis and FSK modulation analysis can be performed by selecting either "ASK" or "FSK" respectively. Pressing **Meas**, can also select "ASK" and "FSK".

2.6.2.1 Carrier Frequency

After entering into "ASK" or "FSK" modulation analysis, set the modulated carrier frequency. Press **Frequency** can set the relative parameters

Table 2-41 Grid brightness

Parameter	Explanation
Default	100 MHz
Range	Full Span
Knob Step	1%
Direction Key Step	1%

2.6.2.2 Symbol Rate

Sets the symbol rate of the signal to be analyzed. Press **Meas Setup**, then select "Symbol Rate", you can input the symbol rate and change the symbol rate by the knob.

Table 2-42 Symbol Rate

Parameter	Explanation
Default	10 ksps
Range	1 ksps ~ 100 ksps
Unit	Msps, ksps, sps

2.6.2.3 Filter Setup

After entering into the "Filter Setup" sub-menu, you can choose the relative parameters of filters.

1. Measure Filter

- Sqrt Nyquist
- Nyquist
- Gauss
- Off

2. Reference Filter

- Sqrt Nyquist
- Nyquist
- Gauss
- Off

Note: The rule of common filter type selected

Transmitter Filter	Measure Filter	Reference Filter
Sqrt Nyquist	Sqrt Nyquist	Nyquist
Nyquist	Off	Nyquist
Gauss	Off	Gauss

3. Filter Alpha/BT

- For Sqrt Nyquist and Nyquist filter settings, you can set the alpha parameter. It can be set the same as the transmitter.
- For a Gauss filter, use the BT parameter. It can be set the same as the transmitter.

Table 2-43 Filter Parameter

Parameter	Explanation
Default	0.5
Range	0 ~ 1
Unit	0.01

4. Filter Length

Set the symbols number of the filter selected. It can be set the same as the transmitter.

Table 2-44 Filter Length

Parameter	Explanation
Default	6
Range	2 ~ 25
Unit	1

2.6.2.4 Measure Length

Set the number of symbols which will be used in calculating the measurement. As the length is longer, the range for statistics is bigger, and the measure time is longer.

Table 2-45 Measure Length

Parameter	Explanation
Default	100
Range	20 ~ 1500
Unit	1

2.6.2.5 Avg Number

Open and close the average option for the measurement result. It can set the average number. When the Avg Number is set to off, the column title "Average" in numerical results view will be changed to "Current". The "Average" measurement result will be stable if the average number is set to larger values.

Table 2-46 Avg Number

Parameter	Explanation
Default	10
Range	1 ~ 100
Unit	1

2.6.2.6 View

After entering into the "View" sub-menu, you can select three view modes.

◆ Waveform: Display the demodulation waveform.

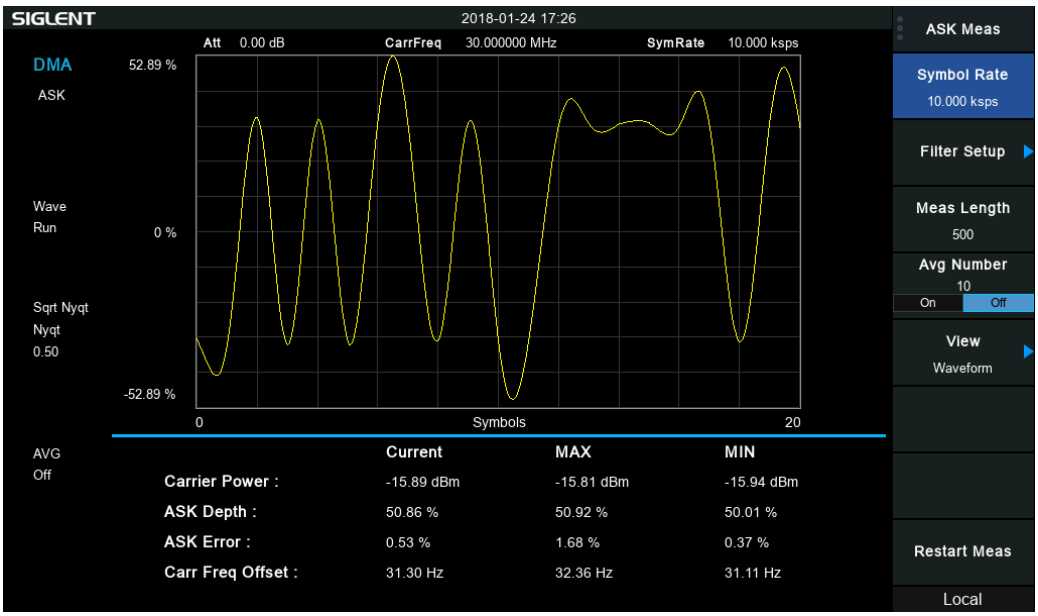


Figure 2-19 Waveform View

◆ Symbol: Display the demodulation digital symbols. (binary or hex)

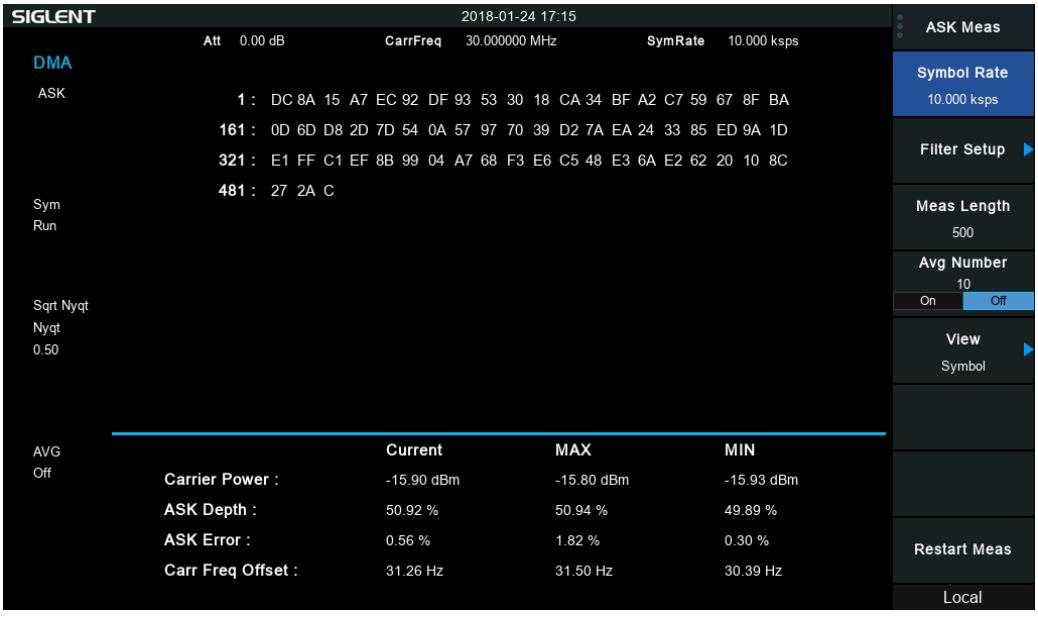


Figure 2-20 Symbol View

- Eye: Display eye diagram.

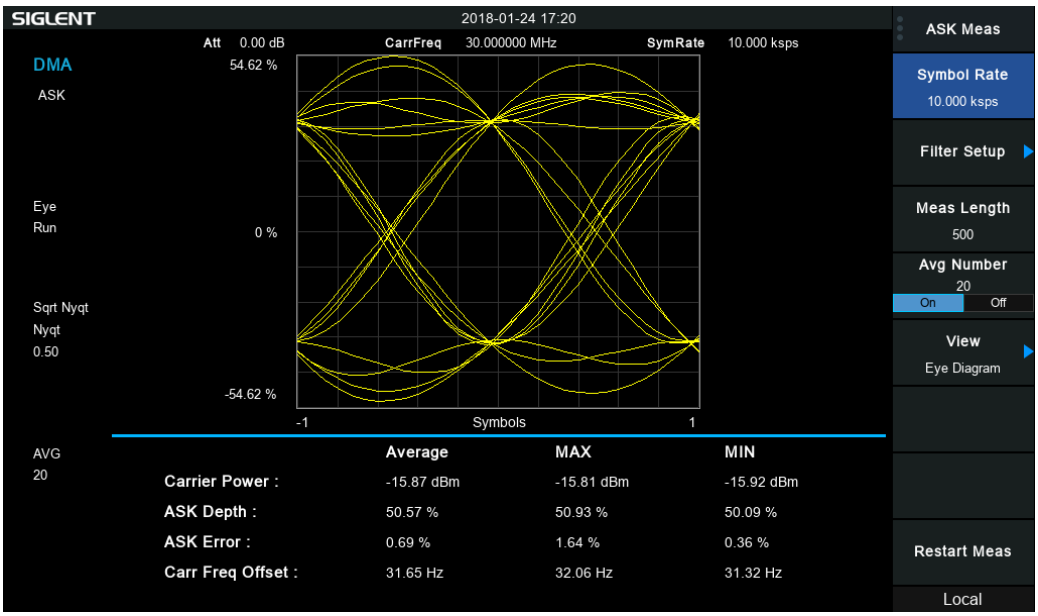


Figure 2-21 Eye View

2.6.2.7 Trigger

Press **Trigger** to open the menu. The analyzer will begin a sweep only with the selected trigger conditions are met. A trigger event is defined as the point at which your trigger source signal meets the specified trigger level.

- Free Run: New sweep starts as soon as possible after the current sweep ends.
- RF Trigger: Activates the trigger condition that starts the next sweep if the detected RF envelops voltage rises to a level set by the RF trigger level.
- External: The trigger even is the rising or falling edge of the external trigger signal.

2.6.2.8 Sweep

Select "single" or "continue" type for sweep. Press **Sweep** into the menu. When "single" sweep type is selected, it will start a new sweep if meets the trigger even, after press the menu button "single".

- Single Sweep
- Continue Sweep

2.6.3 Analog Modulation Analysis

This mode (AMA) enables modulation analysis of incoming signals. To start, press **Mode**, then select "Modulation Analysis" mode. The instrument will enter into ASK/FSK/AM/FM analysis sub-mode. AM modulation analysis and FM modulation analysis can be performed by

selecting either "AM" or "FM" respectively. Pressing **Meas**, can also select "AM" and "FM".

2.6.3.1 Carrier Frequency

After entering into "AM" or "FM" modulation analysis, set the modulated carrier frequency. Press **Frequency** can set the relative parameters

Table 2-47 Carrier Frequency

Parameter	Explanation
Default	100 MHz
Range	Full Span
Unit	GHz、MHz、kHz、Hz

2.6.3.2 IFBW

After entering into the mode "AM" modulation analysis or "FM" modulation analysis, set the intermediate frequency bandwidth (IFBW).

Press **Meas Setup**, you can set the "IFBW" again.

It specifies the IFBW of the signal to be analyzed. The measurement accuracy will be impacted if this value isn't set precisely. The IFBW should be as narrow as possible to improve the S/N ratio.

For "AM" modulation analysis, the IFBW should be larger than twice the modulation frequency.

For "FM" modulation analysis, the IFBW should be larger than twice the sum of the deviation frequency and the modulation frequency.

Table 2-48 IFBW

Parameter	Explanation
Default	1.2 MHz
Range	1.2 MHz, 960 kHz, 600 kHz, 480 kHz, 300 kHz, 240 kHz, 120 kHz, 96 kHz, 60 kHz
Unit	MHz, kHz

2.6.3.3 EqLPF

After entering into the mode "AM" modulation analysis or "FM" modulation analysis, set the equivalent low pass filter (EqLFP).

Press **Meas Setup**, you can set the "EqLFP" again.

It specifies the EqLPF bandwidth of the signal to be analyzed. The measurement accuracy will be impacted if this value isn't set precisely. The EqLPF is an additional low pass filter. It can conveniently measure the lower modulation frequency signal. The EqLPF bandwidth should be

as narrow as possible to improve the S/N ratio, but also need to be larger than the modulation frequency.

Table 2-49 EqLPF

Parameter	Explanation
Default	IFBW/6
Range	Off, IFBW/6, IFBW/20, IFBW/60, IFBW/200, IFBW/600, IFBW/2000
Unit	kHz、Hz

2.6.3.4 Avg Number

Open and close the average option for the measurement result. It can set the average number. When the Avg Number is set to off, the column title "Average" in numerical results view will be changed to "Current". The "Average" measurement result will be stable if the average number is set to larger values.

Table 2-50 Avg Number

Parameter	Explanation
Default	10
Range	1 ~ 100
Unit	1

2.6.3.5 Trigger

Press **Trigger** to open the menu. The analyzer will begin a sweep only with the selected trigger conditions are met. A trigger event is defined as the point at which your trigger source signal meets the specified trigger level.

- Free Run: New sweep starts as soon as possible after the current sweep ends.
- RF Trigger: Activates the trigger condition that starts the next sweep if the detected RF envelops voltage rises to a level set by the RF trigger level.
- External: The trigger even is the rising or falling edge of the external trigger signal.

2.6.3.6 Sweep

Select "single" or "continue" type for sweep. Press **Sweep** into the menu. When "single" sweep type is selected, it will start a new sweep if meets the trigger even, after press the menu button "single".

- Single Sweep
- Continue Sweep

2.6.4 Distance-to-fault

Press **Mode**, then select "Distance-to-fault" to enter Distance-to-fault mode.

2.6.4.1 Disp Mode

Entering "Disp Mode" sub-menu, then choose from the following three types of display. This value is also displayed in the status bar on the left side of the screen.

- Return Loss
- VSWR
- Reflection Coefficient

All three forms reflect the matching condition of the entire cable.

Table 2-47 Return Loss (RL), VSWR, and Reflection Coefficient (Γ)

Parameter	Conversion relationship
RL	$\mathrm{RL} = -20 * \log_{10}(\lvert\Gamma\rvert)$
VSWR	$\mathrm{VSWR} = (1 + \lvert\Gamma\rvert)/(1 - \lvert\Gamma\rvert)$

2.6.4.2 Start Distance

Set the starting distance for DTF.

The range of this distance is limited by the minimum resolution.

Table 2-48 Start Distance

Parameter	Explanation
Default	0.00 m
Range	0.00 m ~ （Stop Distance – 0.2）m
Unit	m, feet

2.6.4.1 Stop Distance

Set the stopping distance for DTF.

The range of this distance is limited by the velocity factor and is proportional to the velocity factor. When the velocity factor is 1, the length that can be measured is the maximum.

Table 2-49 Stop Distance

Parameter	Explanation
Default	34.00 m
Unit	m, feet

Selecting the appropriate frequency span (= start freq – stop freq) is not as obvious as it may seem. The resolution and maximum distance range are dependent upon the span, the number of frequency data points and the velocity factor of the cable. Therefore, the frequency span

must be chosen carefully.

There is a constraint that limits the frequency range:

$$\text{Maximum Distance(meters)} = \frac{7.68 \times 10^{10} \times \text{ velocity factor}}{\text{start freq} - \text{ stop freq (Hz)}}$$

The wider the span is, the smaller the maximum distance that can be measured. In another words, long distance measurements require small span settings.

Meanwhile, there is also a relationship between resolution and the span.

$$\text{Resolution(meters)} = \frac{1.5 \times 10^{8} \times \text{ velocity factor}}{\text{start freq} - \text{ stop freq (Hz)}}$$

The wider the span is, the smaller the resolution. Wider frequency sweeps improve the resolution of DTF measurements.

2.6.4.2 Unit

Set the display units for the fault point distance, including the following two units. This value is also displayed in the status bar on the left side of the screen.

- Meter
- Feet

The default unit is "Meter".

2.6.4.3 Velocity Factor

Set the velocity factor of the cable to be measured with respect to the speed of light in a vacuum. Make sure that the velocity factor of the cable to be measured matches the actual value. Otherwise, the position of the positioning point obtained from the measurement does not meet the actual requirements.
This value is also displayed in the status bar on the left side of the screen.

Table 2-50 Velocity Factor

Parameter	Explanation
Default	66.00%
Range	0.00% ~ 100.00%
Unit	1

2.6.4.4 Cable Atten

Set the attenuation factor of the cable-under-test. It is used to compensate the amplitude of peaks in different positions. The DTF calculates the peaks by the final receiving data which has been attenuated by the cable, thus the amplitude of peaks cannot show exactly where the mismatch position is. So the cable atten is used to compensate by length.

Table 2-51 Cable Atten

Parameter	Explanation
Default	0.00 dB/m
Range	0.00 dB/m ~ 5.00 dB/m
Unit	dB/m

2.6.4.5 Window

Set the window function used in DTF.

The use of a non-rectangular window function can improve the side lobe effect of the analysis. The vertical axis is more accurate, but the horizontal axis resolution is reduced.

In the sub-menu, the following three settings can be selected.

- Off
- Rectangular
- Hamming

The default state is "Off"; this value is also displayed in the status bar on the left side of the screen.

Table 2-52 Window function properties

Win-type	Expression	Main lobe width
Rectangular	$0 \le \mathrm{k} \le \mathrm{M}, \omega[\mathrm{k}] = 1;, \omega[\mathrm{k}] = 0$	$4\pi/\mathrm{N}$
Hamming	$0 \le \mathrm{k} \le \mathrm{M}, \omega[\mathrm{k}] = 0.54 - 0.46\cos\left(\frac{2\pi\mathrm{k}}{\mathrm{M}}\right); \mathrm{else}, \omega[\mathrm{k}] = 0$	$8\pi/\mathrm{N}$

2.6.4.6 Calibration

Set calibration related items. There are three calibration states, factory calibration, user calibration, and no calibration. The user calibration status is displayed in green font at the top left corner of the screen. Enter the sub-menu; you can make the appropriate choice.

1. Calibration

Calibrating with the specified mechanical calibration requires three loads: open, short, and match. Calibration data is saved as user calibration data.

2. Ecal

Use the optional SIGLENT electronic calibration unit for calibration. Calibration data is saved as user calibration data.

3. Cal kit

Specifies the calibration kit used for mechanical calibration.

4. Clear

Clear user calibration data.

2.6.5 Vector Network Analysis

Press **Mode**, then select "Vector Network Analysis" to enter VNA mode.

2.6.5.1 Meas

Select S11 or S21 as the current measurement item. This value is also displayed in the status bar on the left side of the screen.

2.6.5.2 Format

Set the display type of measurement result, enter “Format” submenu, and select the corresponding display type. This value is also displayed in the status bar on the left side of the screen.

1. Log Mag

The trace represents the logarithmic magnitude of the measurement result, unit: dB.

2. Phase

The trace represents the phase of the measurement result, range:$-180^{\circ}\sim180^{\circ}$, units: degrees.

3. Group Delay

The trace represents the transmission delay of the signal through the DUT, units: Seconds (s).

4. Smith

The Smith chart format is used to display impedances based on the reflection measurement data of the DUT. In this format, traces are plotted at the same spots as in the polar format. The Smith chart format allows users to select one of the following five data groups for displaying the marker response values.

- Linear magnitude and phase (°)
- Log magnitude and phase (°)
- Real and imaginary parts
- Resistance (ohm), Reactance (ohm), and inductance (H) or capacitance (F)
- Conductance (S), susceptance (S), and capacitance (F) or inductance (H)

5. Polar

In the polar format, traces are drawn by expressing the magnitude as a displacement from the origin (linear) and phase in an angle counterclockwise from the positive X-axis. This data format does not have a stimulus axis, so frequencies must be read by using the marker. The polar format allows users to select one of the following three data groups for displaying the marker response values.

- Linear magnitude and phase (°)
- Log magnitude and phase (°)
- Real and imaginary parts

6. Lin Mag

The trace represents the linear magnitude of the measurement result, units: 1.

7. SWR

The trace represents:$\frac{1+\rho}{1-\rho}$, where ρ is the reflection coefficient, units: 1.

2.6.5.3 Ref Level

Set the reference level to indicate the minimum value that the current grid can display. This value is also displayed in the status bar on the left side of the screen.

2.6.5.4 Scale

Set the vertical scale of each grid to adjust the range of amplitude that can currently be displayed. This value is also displayed in the status bar on the left side of the screen.

2.6.5.5 Calibration

Set calibration related items. This function is only available when the measurement item is S11. There are three calibration states, factory calibration, user calibration, and no calibration. The user calibration status is displayed in green font at the top left corner of the screen. Enter the sub-menu; you can make the appropriate choice.

1. 1-Port Cal

Calibrating with the specified mechanical calibration requires three loads: open, short, and match. Calibration data is saved as user calibration data.

2. Response (Through)

When operating, connect the port 1 and port 2 of the analyzer with an optional Through Adapter. The normalization operation moves the measurement reference plane to both ends of the Through Adapter. This function is only available when the measurement item is S21. Enter the normalized submenu to make the appropriate selection.

3. Ecal (not available)

Use the optional SIGLENT electronic calibration kit for calibration. Calibration data is saved as user calibration data.

4. Clear

Clear user calibration data.

5. Cal kit

Specifies the calibration kit used for mechanical calibration.

- F503ME:Type-N 50Ω 3 GHz Cal Kit (Siglent)
- 85032F:Type-N 50Ω 9 GHz Cal Kit (KeySight)

6. Modify Cal kit (not available)

Use user defined calibration kit.

2.7 Shortcut Key

2.7.1 Preset

Recall the preset setting and restore the analyzer to a specified status.

- Press **System** **->Pwr On/Preset ->Preset** to select “Def”, “Last” or “User”.
- Press **Preset** to load the factory settings listed in the following table (except items marked with “**”) or User-defined settings.
- Different modes have their own Presets. The following table shows the initial default state of the spectrum analysis mode.

Table 2-51 Factory Settings

Parameter	Default
Frequency	
Center Freq	750 MHz
Start Freq	0 Hz
Stop Freq	1.5 GHz
Freq Step	Auto
Span	
Span	1.5 GHz
X Scale	Linear
Amplitude	
Ref Level	0 dBm
Attenuator	Auto, 20 dB
Preamp	Off
Units	dBm
Scale/Div	10 dB
Scale Type	Log
Ref Offset	0 dBm
Corrections	Off
BW	
RBW	Auto, 1MHz
VBW	Auto, 1MHz
VBW/RBW	1
Avg Type	Log Pwr
Filter	Gauss
Sweep	
Sweep Time	Auto
Sweep Rule	Speed
Sweep	Continue
Sweep Mode	Auto

Numbers	1
QPD Dwell Time	50 ms
Trig	
Trigger Type	Free Run
Video Trigger	0 dBm
External Trigger	Rising
TG	
TG	Off
TG Level	-20 dBm
TG Lvl Offset	0 dB
Normalize	Off
Norm Ref Lvl	0 dB
Norm Ref Pos	100%
Ref Trace	Blank
Trace	
Select Trace	A
Trace Type of Trace A	Clear Write
Avg Times	100
Variable X	A
Variable Y	B
Constant	0 dB
Output Z	C
Math Type	Off
Detect	
Select Trace	A
Detect Type of Trace A	Pos Peak
Limit	
Limit1	Off, Limit Upper, 0 dBm
Limit2	Off, Limit Lower, -100 dBm
Test	Stop
Fail to stop	Off
Buzzer	Off
X Axis	Freq
Demod	
Demod Mode	Close
Earphone	Off
Volume	6
Demod Time	5.00 s
Marker	
Select Marker	1
Select Trace	A

Marker Type	Normal
Delta Pair	Delta
Relative To	Off
Marker Table	Off
Marker Fn	
Select Marker	1
Marker Fn	Off
N dB BW	-3 dB
Read Out	Frequency
Peak	
Cont Peak	Off
Peak Table	Off
Peak Threshold	-140 dBm
Peak Excursion	15 dB
Peak Type	Max
Mode	
Mode	Spec Analyzer
Measure	
Meas Type	Off
Measure Setup	
Channel Power	
Center Freq	750 MHz
Integration BW	2 MHz
Span	1.5 GHz
ACPR	
Center Freq	750 MHz
Main Channel	1 MHz
Adjacent Chn	1 MHz
Adj Chn Space	3 MHz
Occupied BW	
Method	%
dBc	26
%	99
T-Power	
Center Freq	750 MHz
Start Line	0 s
Stop Line	20 ms
System**	
Language	English
Power On	Def
Preset	Def

IP Config	DHCP
Auto Cal	Close
Tine Date	On
Set Format	ymd
Display**	
Display Line	Off, 0 dBm
Grid Brightness	30%
Screenshot	Normal
Touch	On
Touch Assistant	On

2.7.2 Couple

Set related parameters according to the coupling relationship.
Auto all: Set Related parameters automatically according to the coupling relationship.

1. RBW

RBW has a coupling relationship with the span. Please refer to the introduction of the "Resolution Bandwidth".

2. VBW

VBW has a coupling coupling relationship with VBW. Please refer to the introduction of "VBW".

3. Attenuation

Input attenuation has coupling relationship with Ref Level and the preamp. Please refer to introduction of "amplitude".

4. Freq step

Freq step has a coupling relationship with RBW at the zero span, when in none-zero mode, Freq step have coupling relationship with Span. please refer to the introduction of the "Freq Step".

5. Sweep time

Sweep time has a coupling relationship with RBW, VBW and span. Please refer to the introduction of "Sweep Time".

2.7.3 Help

After pressing **Help**, press any key to show help information. Press **Help** second time to close help information

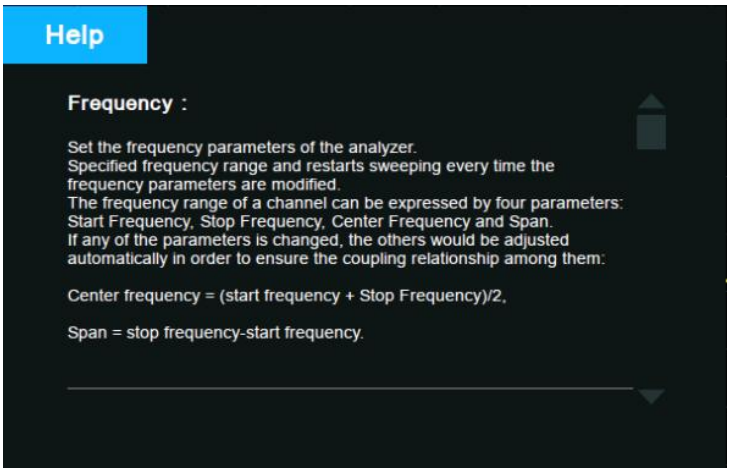


Figure 2-22 Help

2.7.4 Save

Quick save a file, according to **File->'Save Type'** settings.

Chapter 3 Programming Overview

The Siglent SVA1000X Series analyzer features LAN, USB Device, and SIGLENT GPIB_USB module interfaces. By using a computer with these interfaces, and a suitable programming language (and/or NI-VISA software), users can remotely control the analyzer based on SCPI (Standard Commands for Programmable Instruments) command set, Labview and IVI (Interchangeable Virtual Instrument), to interoperate with other programmable instruments.
This chapter introduces how to build communication between the analyzer and a controller computer with these interfaces.

3.1 Remotely Operating the Analyzer

The analyzer provides both the USB and LAN connection which allows you to set up a remote operation environment with a controller computer. A controller computer could be a personal computer (PC) or a minicomputer. Some intelligent instruments also function as controllers.

3.1.1 USB: Connecting the Analyzer via the USB Device port

Refer to the following steps to finish the connection via USB-Device:

1. Install NI-VISA on your PC for USB-TMC driver.
2. Connect the analyzer USB Device port to a PC with a USB A-B cable.
3. Switch on the analyzer

Figure 3-1 USB Device

The analyzer will be detected automatically as a new USB hardware.

3.1.2 LAN: Connecting the Analyzer via the LAN port

Refer to the following steps to finish the connection via LAN:

1. Install NI-VISA on your PC for VXI driver. Or without NI-VISA, using socket or telnet in your PC's Operating System.
2. Connect the analyzer to PC or the local area network with a LAN cable
3. Switch on the analyzer

Figure 3-2 LAN

4. Press button on the front panel **System**→Interface→LAN to enter the LAN Config function menu.
5. Select the IP Config between Static and DHCP

- DHCP: the DHCP server in the current network will assign the network parameters automatically (IP address, subnet mask, gate way) for the analyzer.
- Static: you can set the IP address, subnet mask, gate way manually. Press Apply.

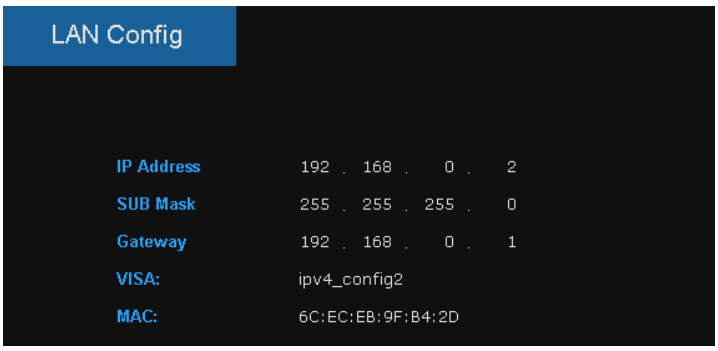


Figure 3-3 LAN Config

The analyzer will be detected automatically or manually as a new LAN point.

3.1.3 GPIB: Connecting the Analyzer via the USB-Host port

Refer to the following steps to finish the connection via USB:

1. Install NI-VISA on your PC for GPIB driver.
2. Connect the analyzer USB Host port to a PC's GPIB card port, with SIGLENT USB-GPIB adaptor.
3. Switch on the analyzer

Figure 3-4 SIGLENT USB-GPIB Adaptor

4. Press button on the front panel **System**→Interface→GPIB to enter the GPIB number.

The analyzer will be detected automatically as a new GPIB point.

3.2 Build Communication

3.2.1 Build Communication Using VISA

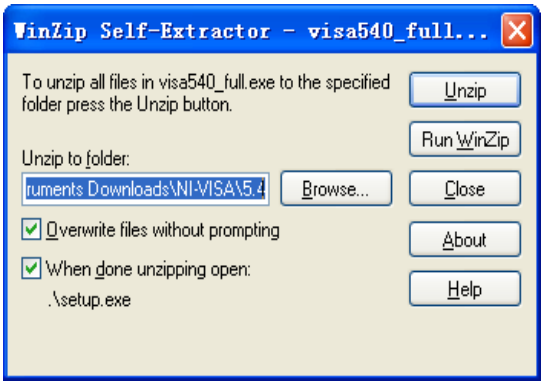
NI-VISA includes a Run-Time Engine version and a Full version. The Run-Time Engine version provides NI device drivers such as USB-TMC, VXI, GPIB, etc. The full version includes the Run-Time Engine and a software tool named NI MAX that provides a user interface to control the device.

You can get NI-VISA full version from:

http://www.ni.com/download/.

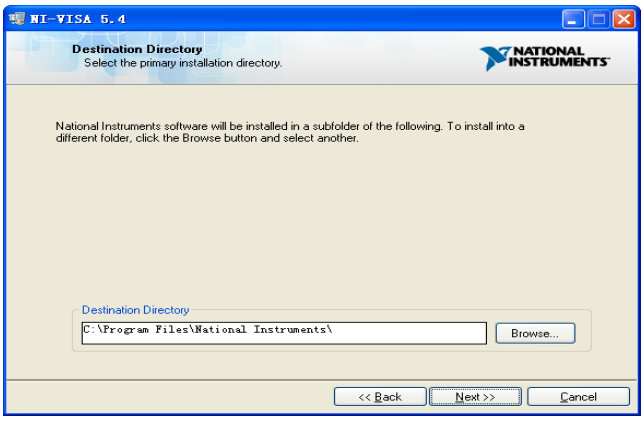
After download you can follow the steps below to install it:

1. Double click the visa_full.exe, dialog shown as below:

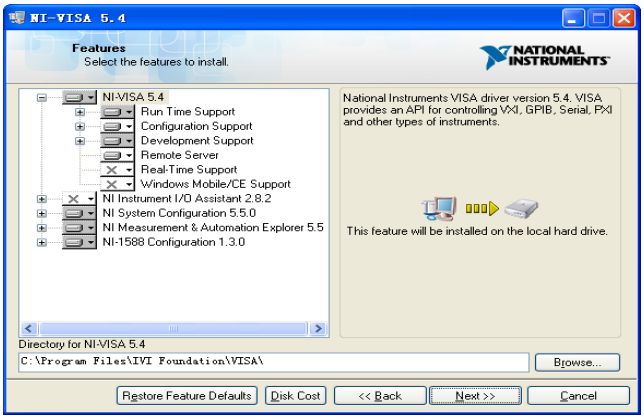


2. Click Unzip, the installation process will automatically launch after unzipping files. If your computer needs to install .NET Framework 4, its setup process will auto start.

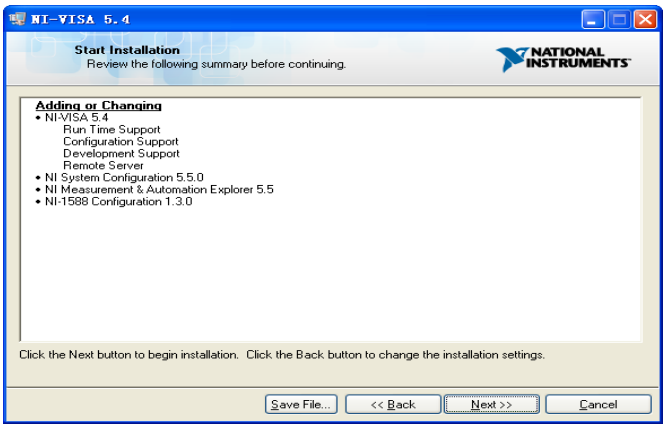
3. The NI-VISA installing dialog is shown above. Click Next to start the installation process.



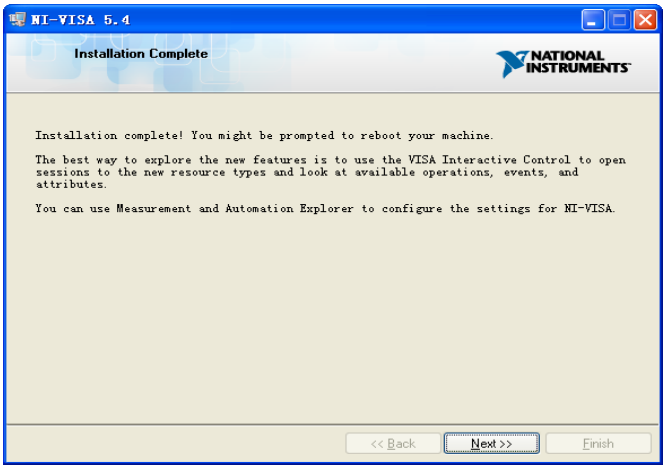
4. Set the install path, default path is “C:\Program Files\National Instruments\”, you can change it. Click Next, dialog shown as above.



5. Click Next twice, in the License Agreement dialog, select the “I accept the above 2 License Agreement(s).”, and click Next, dialog shown as below:



6. Click Next to run installation.



Now the installation is complete, reboot your PC.

3.2.2 Build Communication Using Sockets/Telnet

Through the LAN interface, VXI-11, Sockets and Telnet protocols can be used to communicate with the analyzer. VXI-11 is provided in NI-VISA, while Sockets and Telnet are commonly included in PC's OS initially.

Socket LAN is a method used to communicate with the analyzer over the LAN interface using the Transmission Control Protocol/Internet Protocol (TCP/IP). A socket is a fundamental technology used for computer networking and allows applications to communicate using standard mechanisms built into network hardware and operating systems. The method accesses a port on the analyzer from which bidirectional communication with a network computer can be established.

Before you can use sockets LAN, you must select the analyzer's sockets port number to use:

- **Standard mode:** Available on port 5025. Use this port for programming.
- **Telnet mode:** The telnet SCPI service is available on port 5024.

3.3 Remote Control Capabilities

3.3.1 User-defined Programming

Users can use SCPI commands to program and control the analyzer. For details, refer to the introductions in “**Programming Examples**”.

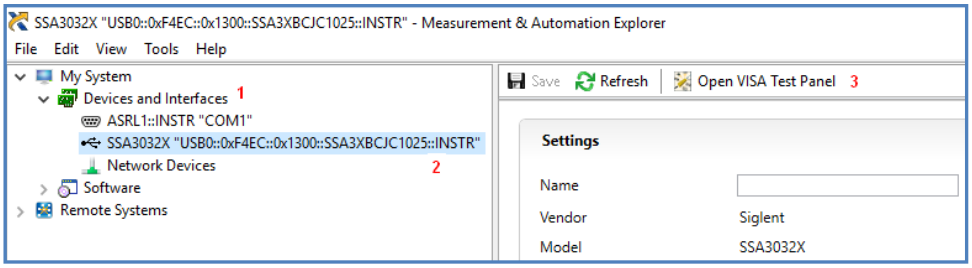
3.3.2 Send SCPI Commands via NI MAX

Users can control the analyzer remotely by sending SCPI commands via NI-MAX software. NI_MAX is National Instruments Measurement and Automation Explorer. It is an executable program that enables easy communication to troubleshoot issues with instrumentation.

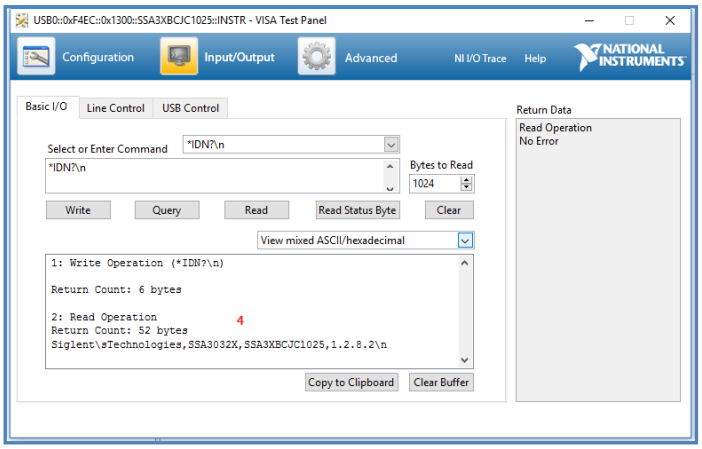
3.3.2.1 Using USB

Run NI MAX software.

1. Click “Device and interface” at the upper left corner of the software;
2. Find the “USBTMC” device symbol



3. Click “Open VISA Test Panel” option button, then the following interface will appear.
4. Click the “Input/Output” option button and click the “Query” option button in order to view the operation information.



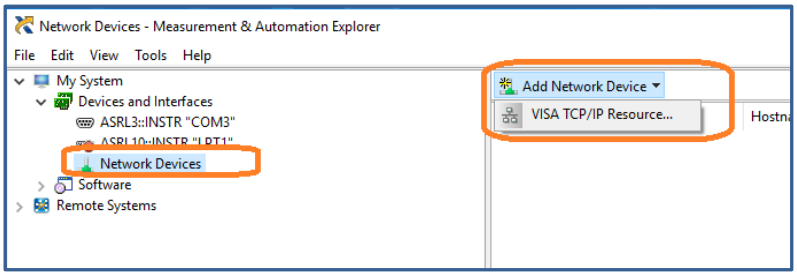
NOTE: The “*IDN?” command (known as the Identification Query) returns the instrument manufacturer, instrument model, serial number, and other identification information.

3.3.2.2 Using LAN

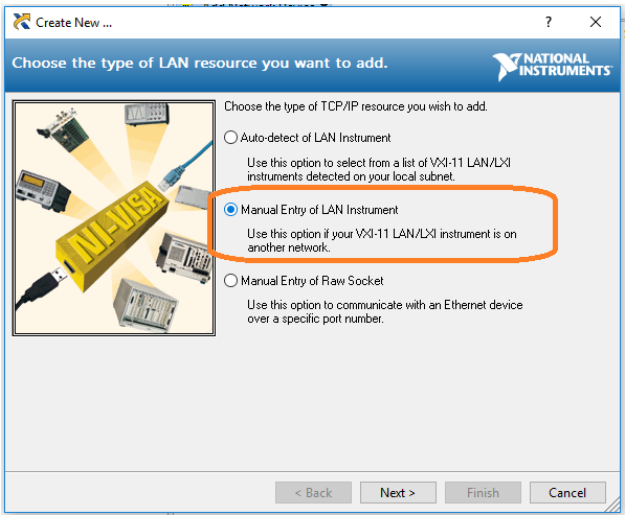
Select “Add Network Device”, and select “VISA TCP/IP Resource” as shown:

Run NI MAX software.

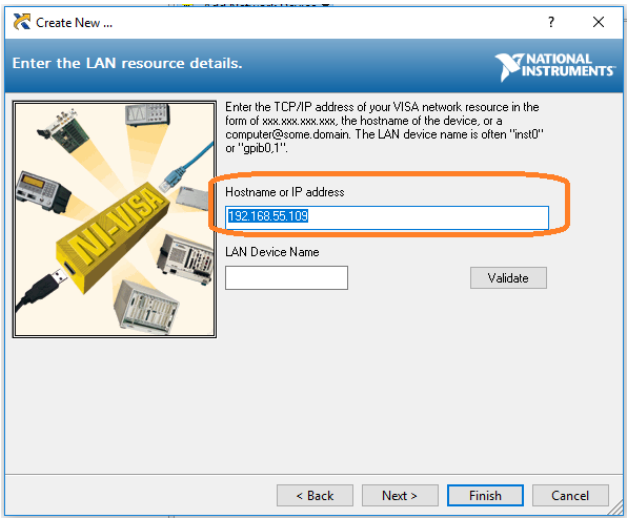
1. Click “Device and interface” at the upper left corner of the software;
2. Find the “Network Devices” symbol, click “Add Network Devices”;



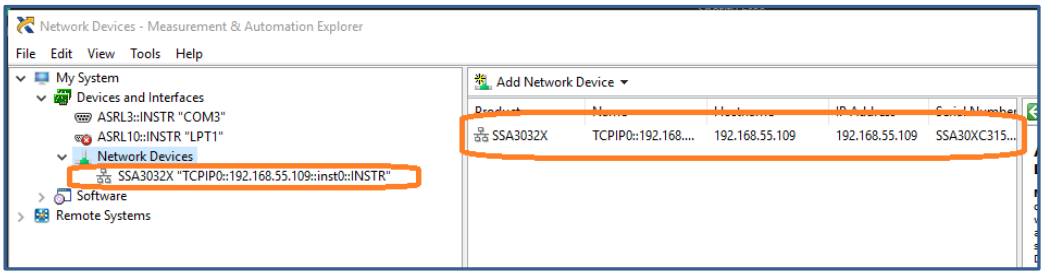
1. Select Manual Entry of LAN instrument, select Next, and enter the IP address as shown. Click Finish to establish the connection:



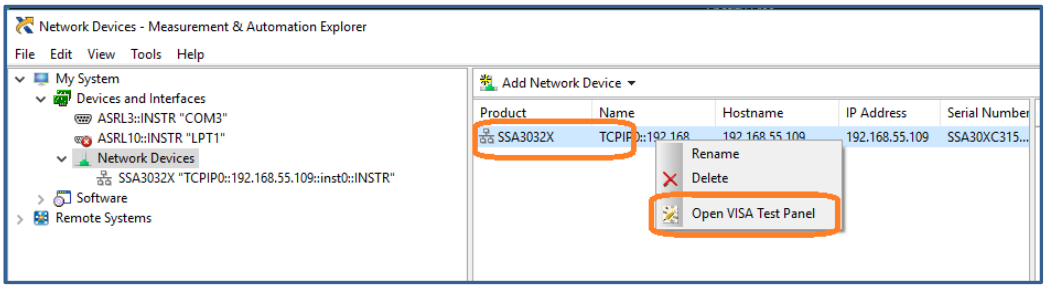
NOTE: Leave the LAN Device Name BLANK or the connection will fail.



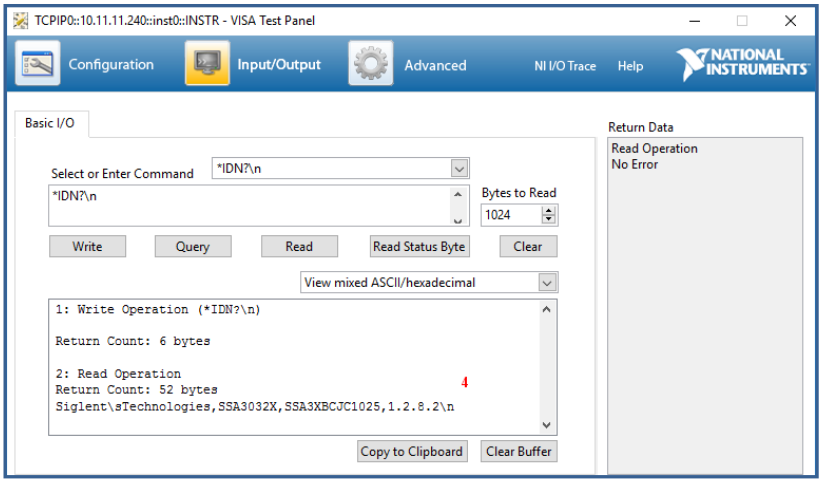
2. After a brief scan, the connection should be shown under Network Devices:



3. Right-click on the product and select Open NI-VISA Test Panel:



4. Click “Input/Output” option button and click “Query” option button. If everything is OK, you will see the Read operation information returned as shown below.



3.3.3 EasySpectrum Software

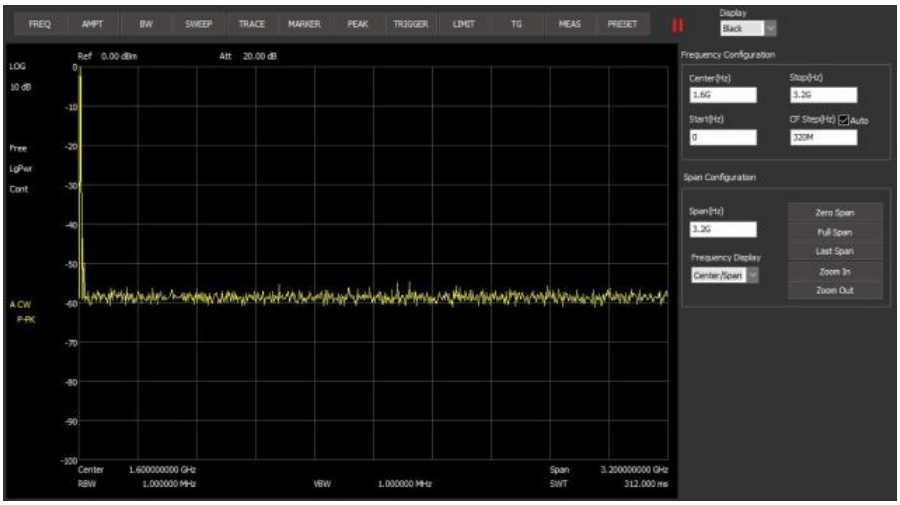
Users can control the analyzer remotely by EasySpectrum. PC software EasySpectrum is an easy-to-use, PC-Windows-based remote control tool for Siglent’s analyzer. You can download it from Siglent’s website. To connect the analyzer via the USB/LAN port to a PC, you need install the NI VISA first.

It is able to be used as:

- A monitor to display and control the trace scans simultaneously with the analyzer;
- A file maker to get user defined Limit/Correction files, and load them to the analyzer;
- An EMI receiver perform EMI Pre-compliance test including pre-scan, peak search, final scan and report generating.

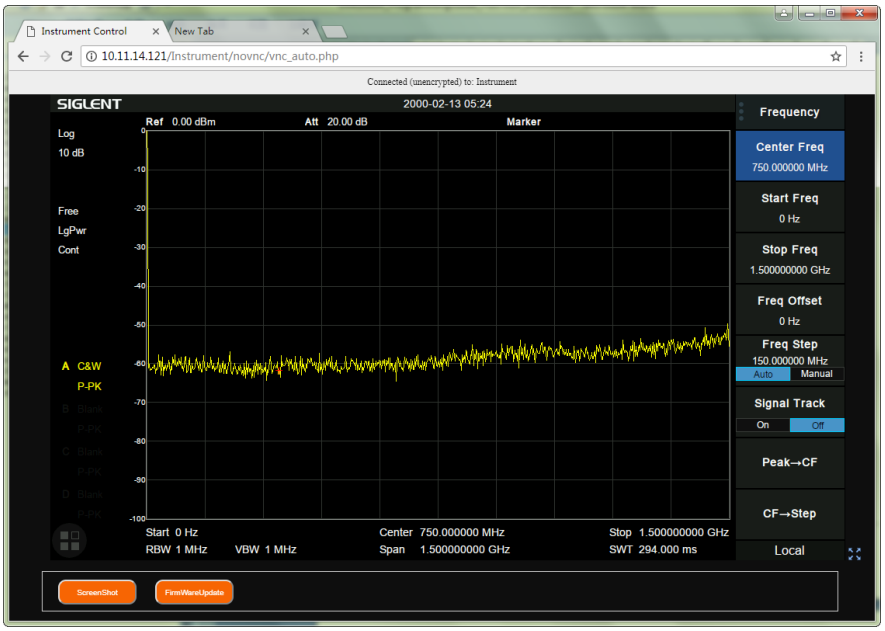
For the further description of the software, please refer to the online help embedded in this

software.



3.3.4 Web Control

With the embedded web server, the analyzer can be controlled through LAN from a web browser* on PC and mobile terminals, without any extra driver be installed. This provides remote controlling and monitoring capabilities. Screenshot and firmware update are also supported.



*Web browser with HTML5 supported like Google Chrome or Firefox are recommended.

Chapter 4 Service and Support

4.1 Service Summary

SIGLENT warrants that the products that it manufactures and sells will be free from defects in materials and workmanship for a period of three years (accessories for a period of one year) from the date of shipment from an authorized Siglent distributor. If the product proves defective within the respective period, **SIGLENT** will provide repair or replacement as described in the complete warranty statement.

To arrange for service or obtain a copy of the complete warranty statement, please contact your nearest Siglent sales and service office. Except as provided in this summary or the applicable warranty statement, **SIGLENT** makes no warranty of any kind, express or implied, including without limitation the implied warranties of merchantability and fitness for a particular purpose. In no event shall **SIGLENT** be liable for indirect, special or consequential damages.

4.2 Troubleshooting

Before calling **SIGLENT**, or returning an analyzer for service, perform the quick checks listed below. This check may eliminate the problem.

If the problem remains still, please contact **SIGLENT** and provide your device information in the back of the analyzer.

1. **The Power Switch  is still dark after power on:**

(1) Check that the power is correct / working.

(2) Check the power cord has been connected correctly

(3) Check the power fuse. If a new fuse needs to be installed, please use a specified fuse.

2. **The analyzer's screen is still dark (no display) after power on:**

(1) Check whether the fan is running while the screen is dark, maybe the LCD cable is loose?

(2) Check whether the fan is not running while screen is dark, maybe it has failed to start up?

Do not disassemble the instrument by yourself and contact **SIGLENT**.

3. The key is unresponsive or gives a wrong response:

(1) Press all the keys at the front panel to check if all of them are normal after power on.

(2) Press **System** ->**Self Test** ->**Key Test** to check if all the keys are working properly.

(3) If a key is not working, the numeric keyboard connection might be loose or the numeric keyboard is broken.

Do not disassemble the instrument by yourself and contact **SIGLENT**.

4. The spectrum lines on the screen do not update for a long period of time:

(1) Check whether the screen is locked; if so, press **Esc** to unlock it.

(2) Verify whether all the trigger conditions have been met and whether there is a valid trigger signal inputting.

(3) Check whether the analyzer is in single sweep.

(4) Check whether the current sweep time is too long.

5. Wrong measurement results or poor precision:

To calculate the system errors and check the measurement results and precision, refer to the introductions in "**Specifications**". To reach these specifications, please:

(1) Check whether all the external devices are successfully connected and are working normally.

(2) Get some knowledge of the signal under measurement and set appropriate instrument parameters.

(3) Make measurements under proper conditions; for example, warm-up the instrument appropriately and operate the instrument under the specified environment temperature.

(4) Calibrate the instrument regularly to reduce or avoid errors that might occur over time.

If you need a specific calibration after the stated calibration period, contact **SIGLENT** or get paid service from authorized measurement agencies.

6. Pop-up Message:

The instrument may display prompt messages, error messages or state messages according to the current working status. These messages are displayed to help you to use the instrument correctly and are not instrument failures.

4.3 Contact Us

China:

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