RIGOL

User's Guide

EMI Measurement Application

Applicable to RSA5000-EMI/RSA3000-EMI

Feb. 2019

RIGOL (SUZHOU) TECHNOLOGIES INC.

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E-mail: service@rigol.com
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Safety Requirement

General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injury or damage to the instrument and any product connected to it. To prevent potential hazards, please follow the instructions specified in this manual to use the instrument properly.

Use Proper Power Cord.
Only the exclusive power cord designed for the instrument and authorized for use within the local country could be used.

Ground the Instrument.
The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, connect the earth terminal of the power cord to the Protective Earth terminal before connecting any input or output terminals.

Connect the Probe Correctly.
If a probe is used, the probe ground lead must be connected to earth ground. Do not connect the ground lead to high voltage. Improper way of connection could result in dangerous voltages being present on the connectors, controls or other surfaces of the oscilloscope and probes, which will cause potential hazards for operators.

Observe All Terminal Ratings.
To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your manual for more information about ratings before connecting the instrument.

Use Proper Overvoltage Protection.
Ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the operator might be exposed to the danger of an electric shock.

Do Not Operate Without Covers.
Do not operate the instrument with covers or panels removed.

Do Not Insert Objects Into the Air Outlet.
Do not insert objects into the air outlet, as doing so may cause damage to the instrument.

Use Proper Fuse.
Please use the specified fuses.

Avoid Circuit or Wire Exposure.
Do not touch exposed junctions and components when the unit is powered.

Do Not Operate With Suspected Failures.
If you suspect that any damage may occur to the instrument, have it inspected by **RIGOL** authorized personnel before further operations. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by **RIGOL** authorized personnel.

Provide Adequate Ventilation.
Inadequate ventilation may cause an increase of temperature in the instrument, which would cause damage to the instrument. So please keep the instrument well ventilated and inspect the air outlet and the fan regularly.

Do Not Operate in Wet Conditions.
To avoid short circuit inside the instrument or electric shock, never operate the instrument in a humid environment.

Do Not Operate in an Explosive Atmosphere.
To avoid personal injuries or damage to the instrument, never operate the instrument in an explosive atmosphere.

Keep Product Surfaces Clean and Dry.
To avoid dust or moisture from affecting the performance of the instrument, keep the surfaces of the instrument clean and dry.

Prevent Electrostatic Impact.
Operate the instrument in an electrostatic discharge protective environment to avoid damage induced by static discharges. Always ground both the internal and external conductors of cables to release static before making connections.

Use the Battery Properly.
Do not expose the battery (if available) to high temperature or fire. Keep it out of the reach of children. Improper change of a battery (lithium battery) may cause an explosion. Use the **RIGOL** specified battery only.

Handle with Caution.
Please handle with care during transportation to avoid damage to keys, knobs, interfaces, and other parts on the panels.

Safety Notices and Symbols

Safety Notices in this Manual:

WARNING
Indicates a potentially hazardous situation or practice which, if not avoided, will result in serious injury or death.

!

CAUTION
Indicates a potentially hazardous situation or practice which, if not avoided, could result in damage to the product or loss of important data.

Safety Terms on the Product:

DANGER	It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.
WARNING	It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.
CAUTION	It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

Safety Symbols on the Product:

Hazardous Voltage	Safety Warning	Protective Earth Terminal	Chassis Ground	Test Ground

Mode Setup

The Mode Setup menu is used to set parameters related to the working mode.

Open the global parameter setting menu for the selected working mode under **Mode**.

Global CF Mode

Turns on or off the global center frequency. In any working mode, if you enable the global center frequency mode, then the global center frequency will be set to the center frequency of the current mode. When a different working mode is selected, the global center frequency will be set to the center frequency of the previous working mode, that is, the one that is before switching the working mode. If you change the center frequency in any working mode, then the global center frequency will change with it.

Global CF

Sets the global center frequency. It is only available when you turn on the global center frequency.

Mode Preset

Resets the parameters of the current mode to be the factory default settings.

EMC Standard

Sets the EMC standard to "None" or "CISPR".

- When "None" is selected, the filter type is set to Gauss. At this point, the filter bandwidth is -3 dB. The instrument will switch to "CISPR" standard automatically when "Quasi Peak", "CISPR Average" or "RMS Average" detector is selected. The filter type is set to EMI. At this point, the filter bandwidth is -6 dB.
- When "CISPR" is selected, for Meter 1, the detector is, by default, positive peak; for Meter 2, the detector is, by default, quasi peak; for Meter 3, the detector is, by default, CISPR average.

Meters Control

Sets the parameters of the meter.

1. Meters

1) Select Meter
Specifies the currently selected meter to "Meter1", "Meter2", or "Meter3".

2) Meter
Enables or disables the selected meter.
- When enabled, the histogram of the selected meter is displayed in the meter display area of the user interface, and the corresponding detector type is selected to perform the measurement.
- When disabled, the selected meter is not displayed and the system will not perform the measurement.

3) Detector
Sets the detector of the selected meter, including "Pos Peak", "Quasi Peak", "CISPR Average", "RMS Average", "Average(Vol)", and "Neg Peak".
Note: "Quasi Peak", "CISPR Average", "RMS Average", and "Average(Vol)" are mutually exclusive. You can at most select two among the three items ("Quasi Peak", "CISPR Average", and "RMS Average").

4) Limit
Sets the limits of the selected meter.

5) Limit State
Enables or disables the limit line of the selected meter.

2. Dwell Time
Sets the dwell time of the meter detector.

3. Peak Hold Time

1) Peak Hold Type
Sets the max hold time type of the meter to "Adjust" or "Infinite".
- When "Infinite" is selected, the peak hold line of the selected meter will not be reset. The **Adjust Time** menu is grayed out and disabled.
- When "Adjust" is selected, the peak hold line of the selected meter will be reset to the current signal value after the set peak hold time. At this time, you can use the **Adjust Time** menu to set the peak hold time.

2) Adjust Time
Sets the peak hold time of the meter.

4. Reset Peak Hold
Resets the peak hold lines of all the currently enabled meters to the current

signal value.

5. Couple to Signal

Enables or disables the coupling function of the meter and the signal table. When enabled, the instrument will search for the signal frequency that is closest to that of the current meter from the signal table automatically and modify the meter frequency to the frequency of the signal.

6. Couple to Marker

Enables or disables the coupling function of the meter and the marker. When enabled, the instrument will set the meter frequency to the current frequency at the marker.

Install the Option

RSA provides various options (for option information, refer to **"Accessories and Option List"**) to expand the function of the spectrum analyzer. If you need to purchase the option, please contact **RIGOL** sales representative. After you have purchased the option successfully, you will get the corresponding key. Then perform the following operations to install the option.

1. Acquire the License of the Option

- Log in to the **RIGOL** official website (www.rigol.com), click **License Activation** to enter the "Registered product license code" interface.
- Input the correct key, serial number (press **System** → **About System** → **System Info** to acquire the serial number of the instrument), and verification code. Click **Generate** to acquire the option license. In the license generation interface, click **Download** to download and save the license file to the PC.

2. Install the Option

You can install the option via the following 2 methods.

1) Install the option by reading the license file from the USB storage device
   - Copy the saved option license file to the root directory of the USB storage device.
   - Power on the instrument and insert the USB storage device. Press **File** to enter the file operation menu interface.
   - Press **File Explorer**, and then the file manager interface is displayed. In the interface, find the directory of the USB storage device. Then select the desired option license file (suffixed with ".lic"). Press **Import License** to import the activation code and complete the reading of the option installation file.
2) Install the option by sending SCPI Commands

- Log in to **RIGOL** official website (www.rigol.com) to download the software Ultra Sigma. Then install it according to the installation wizard.
- Use the USB cable to connect the rear-panel USB DEVICE interface of RSA to the USB HOST interface of the PC.
- Run Ultra Sigma. Search the resource and right-click the resource name. In the displayed menu, select "SCPI Panel Control". Input the following option installation command in the displayed SCPI control panel: :SYSTem:LKEY <option info>@<license info>. Wherein, <option info> indicates the option order No., and <license info> indicates the option license code.

  For example, the following command is used to install the option RSA5000-PA.
  :SYSTem:LKEY
  RSA5000-PA@8AD12B8EBC5DF492D1D4289B7CBA5B6150BF6F5D752D645C36D74530B05F39B49C461B23A50D6C94A34E06782AC4380070B0D1A86BA84E02768391FFD70C2103

Chapter 2 Front Panel Function Keys

This chapter describes in detail the front-panel function keys of RSA and their associated menu functions in EMI mode.

Contents in this chapter:

- Basic Settings
- Sweep and Function Settings
- Measurement Settings
- Marker Measurement
- Input/Output
- Shortcut Key
- System Function

Basic Settings

FREQ

Sets the frequency parameters of the analyzer.

The frequency range of the current channel can be expressed by either of two groups of parameters: Start Frequency/Stop Frequency (f_{start} / f_{stop}); or Span Center Frequency/Span (f_{center} / f_{span}). If any of the four parameters is changed, the other three parameters will make adjustment automatically to ensure the coupling relationship among them:

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

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

Frequency(Meter)

It is used to set the frequency of the meter in frequency scan. You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Note: In the trace display area of the user interface, a purple vertical line is used to mark the frequency of the meter. Press **System** → **Display** → **Meters Freq Line**, you can turn on or off a purple vertical line.

Table 2-1 Frequency (Meter)

Parameter	Remarks
Default	515 MHz
Range	0 Hz to Fmax[1]
Unit	GHz, MHz, kHz, Hz
Knob Step	step = RBW (meter)/2
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	step = RBW (meter)*10

Note[1]: The maximum measurement frequency Fmax is determined by the instrument model. For RSA5065, Fmax is 6.5 GHz; for RSA5032, Fmax is 3.2 GHz. For RSA3045, Fmax is 4.5 GHz; for RSA3030, Fmax is 3 GHz.

Midspan Freq

Sets the center frequency of the current channel.

Remarks:

- When you modify the midspan frequency, the start and stop frequency will be modified automatically if the span remains to be unchanged.
- Modifying the midspan frequency indicates that the frequency is changed along the current channel horizontally, and the adjustable range should be within the frequency range specified in the technical specifications of the analyzer.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-2 Midspan Freq

Parameter	Remarks
Default	515 MHz
Range	5 Hz to (Fmax - 5 Hz)
Unit	GHz, MHz, kHz, Hz
Knob Step	step = RBW (meter)/2
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	step = RBW (meter)*10

Start Freq

Sets the start frequency of the current frequency channel.

Remarks:

- When you modify the start frequency, the span and midspan frequency will be changed.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-3 Start Frequency

Parameter	Remarks
Default	midspan frequency - span/2
Range	0 Hz to (Fmax – 10 Hz)
Unit	GHz, MHz, kHz, Hz
Knob Step	step = RBW (meter)/2
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	step = RBW (meter)*10

Start Freq Mode

Sets the coupling mode of the start frequency to "Manual" or "Auto". When "Auto" is selected, the start frequency will automatically couple to the start frequency of the first range among the currently enabled ranges in the scan table.

Stop Freq

Sets the stop frequency of the current frequency channel.

Remarks:

- When you modify the stop frequency, the span and midspan frequency will be changed.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-4 Stop Frequency

Parameter	Remarks
Default	midspan frequency + span/2
Range	10 Hz to Fmax
Unit	GHz, MHz, kHz, Hz
Knob Step	step = RBW (meter)/2
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	step = RBW (meter)*10

Stop Freq Mode

Sets the coupling mode of the stop frequency to "Manual" or "Auto". When "Auto" is selected, the stop frequency will automatically couple to the stop frequency of the first range among the currently enabled ranges in the scan table.

Scale Type

Sets the scale type of X-axis to Lin or Log.

Remarks:

- The X-axis scale type is only related to data display, and will not affect scan and trace data.
- Modifying the X-axis scale type will neither restart the scan nor affect the number of scan points.

SPAN

Sets the span of the analyzer. Changing this parameter will change the frequency parameters.

Span

Sets the frequency range of the current channel.

Remarks:

- When you modify the span, the start and stop frequency will be modified automatically if the midspan frequency remains to be unchanged.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-5 Span

Parameter	Remarks
Default	970 MHz
Range	10 Hz to Fmax
Unit	GHz, MHz, kHz, Hz
Knob Step	step = span/200, Min = 2 Hz
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	at 1-2-5 step

AMPT

Sets the amplitude parameters of the analyzer. You can modify these parameters to make the signals under test be displayed with minimal errors in the current window, easy for you to observe.

Ref Level

Sets the maximum power or voltage that can be displayed in the current window.

Remarks:

- The RF link is limited by the maximum mixer level, so when you reduce the attenuation, the instrument may reduce the reference level to meet the mixer level limit. When you increase the attenuation, the reference level remains unchanged.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-6 Ref Level

Parameter	Remarks
Default	106.99 dBuV
Range	-63.01 dBuV ~ 136.99 dBuV
Unit	dBm, dBmV, dBuV, V, W
Knob Step	step = scale/10
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	step = scale

Att(Meter)

Sets the meter attenuator.

Remarks:

- In the frequency scan measurement, this value only affects the attenuation of the meter.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-7 Att(Meter)

Parameter	Remarks
Default	0 dB
Range	0 dB to 50 dB
Unit	dB
Knob Step	preamp off, step = 1 dB
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	5 dB

RF Preamp(Meter)

Sets the meter preamplifier to be on or off. When the signal under test is a low-level signal, turning on the preamplifier can reduce the displayed average noise level, so that you can distinguish low-level signals from the noise. By default, the preamp gain is 20 dB.

Y Axis Unit

Sets the unit of the Y-axis to dBm, dBmV, dBμV, Volts, or Watts. Wherein, dBm, dBmV, and dBμV are for Log scale; Volts and Watts are for Linear scale. The default unit is dBuV.

Remarks:
The conversion relations between units are as follows:

$$dBm = 10lg\left(\frac{Volts^2}{R} \times \frac{1}{0.001W}\right) \quad (2\text{-}3)$$

$$dB\mu V = 20lg\left(\frac{Volts}{1\mu V}\right) \quad (2\text{-}4)$$

$$dBmV = 20lg\left(\frac{Volts}{1mV}\right) \quad (2\text{-}5)$$

$$Watts = \frac{Volts^2}{R} \quad (2\text{-}6)$$

Wherein, R denotes the reference resistance.

Scale/Div

Sets the unit per division in the vertical axis.

Remarks:

- The amplitude range to be displayed can be adjusted by setting the scale.
- The range of the signal amplitude that can be displayed is as follows:
  Minimum: reference level – 10 × current scale value
  Maximum: reference level
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-8 Scale/Div

Parameter	Remarks
Default	10 dB
Range	0.1 dB to 20 dB
Unit	dB
Knob Step	scale ≥ 1, step = 1 dB
Left/Right Arrow Key Step	scale < 1, step = 0.1 dB
Up/Down Arrow Key Step	at 1-2-5 step

Ref Offset

Adds an offset value to the reference level to compensate for gains or losses generated between the DUT and the analyzer input.

Remarks:

- The offset value does not affect the trace position, but will modify the reference level readout and the marker amplitude readout.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-9 Reference Level Offset

Parameter	Remarks
Default	0 dB
Range	-300 dB to 300 dB
Unit	dB
Knob Step	level offset ≥ 1 or level offset ≤ -1: step = 1 dB;
Left/Right Arrow Key Step	-1 < level offset < 1, step = 0.1 dB
Up/Down Arrow Key Step	5 dB

Sweep and Function Settings

BW

RBW(Meter)

Sets the resolution bandwidth (RBW) of the meter. You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-10 RBW

Parameter	Remarks
Default	120 kHz
Range	100 Hz to 10 MHz[1]
Unit	GHz, MHz, kHz, Hz
Knob Step	at 1-3-10 step
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	at 1-3-10 step

Note[1]: When the EMC measurement standard is "None" and "Gauss" filter is selected, the RBW range is as above. When "EMI" filter is selected, resolution bandwidth can only be 200 Hz, 9 kHz, 120 kHz, or 1 MHz.

RBW Mode(Meter)

Sets the RBW mode of the meter to "Manual" or "Auto".

Remarks:

- When you select "Manual", use the **RBW(Meter)** menu to set the RBW value.
- When you select "Auto", use the RBW to automatically couple to the frequency of the meter.
- When the EMC measurement standard is "None", the **RBW Mode(Meter)** menu is grayed out and disabled. You can manually set the RBW. When the EMC measurement standard is "CISPR", select the Auto RBW mode.

Frequency (Meter) Fmet	RBW
Fmet < 150 kHz	200 Hz
150 kHz ≤ Fmet < 30 MHz	9 kHz
30 MHz ≤ Fmet < 1 GHz	120 kHz
Fmet ≥ 1 GHz	1 MHz

Filter Type(Meter)

Sets the RBW filter type.

Remarks:

- The RSA series supports two kinds of RBW filters: Gauss and EMI.
- When the EMC measurement standard is "CISPR", the **Filter Type(Meter)** menu is grayed out and disabled. By default, EMI filter is selected. When "EMI" is selected, resolution bandwidth can only be 200 Hz, 9 kHz, 120 kHz, or 1 MHz.
- When the EMC measurement standard is "None", the default filter is "Gauss".

Sweep

Sets the sweep-related parameters.

Frequency Scan

Sets the current frequency scan mode to "Single" or "Cont".

Start/Stop

Selects "Start" to start pre-scan, peak search, or the final measurement according to the selected frequency scan mode.
Selects "Stop" to stop the current scan, search, or measurement.

Pause/Resume

Selects "Pause" to pause the current pre-scan, peak search, or final measurement operation. Note, the pause operation can be executed only within the two scan ranges.
Selects "Resume" to resume scan, search, or measurement and start the operation from the scan point where you pause.

Clear List and Start

After you press or tap this menu, all the signals in the signal table will be cleared. Then, the selected scan sequence will be launched. If the selected scan sequence is being scanned and is in the Cont scan mode, you need to select "Stop" under the **Start/Stop** menu to stop scan. In other conditions, when the measurement is completed, the scan sequence is stopped automatically.

Continue(Meter)

Sets the measurement mode of the meter to Continuous. Only when you set the current setting to Single scan mode or restart to launch the scan sequence, can the measurement be stopped.

Single(Meter)

Sets the measurement mode of the meter to Single. The meter performs a single measurement with the meter and then stops. You can launch the meter by switching the mode to Continuous.

Trigger

Selects the trigger source and sets trigger-related parameters.

Trigger Source

Sets "Free Run", "External 1", or "External 2" to be the trigger source.

Free Run

The trigger conditions are met at any time, that is, the analyzer generates trigger signals continuously.

External 1

In this mode, an external signal is input via the **[TRIGGER IN]** connector on the rear panel. When the signal meets the set trigger conditions, trigger signals are generated.

1. **Slope**
   Sets the trigger polarity for External Trigger 1 to "POS" or "NEG".

2. **Delay State**
   Enables or disables the trigger delay function. After the trigger delay function is enabled, you can set the trigger delay time.

3. **Delay Time**
   Sets the time interval during which the instrument waits to start the sweep operation after the trigger signal that meets the trigger conditions is generated. You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

   Table 2-11 Trigger Delay Time

Parameter	Remarks
Default	1 μs
Range	0 μs to 500 ms
Unit	s, ms, μs, ns, ps
Knob Step	trigger delay/100, Min = 1 μs
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	at 1-1.5-2-3-5-7.5 step

External 2

Press **Input/Output** → **Ext Trigger2** to select "In". Then, an external signal is input via the **[TRIGGER IN/OUT]** connector on the rear panel. When the signal meets the set trigger conditions, trigger signals are generated.

Note: The input signal frequency on the external trigger interface should not be greater than 1 MHz.

1. **Slope**
   Sets the trigger polarity for External Trigger 2 to "POS" or "NEG".

2. **Delay State**
   Enables or disables the trigger delay function. After the trigger delay function is enabled, you can set the trigger delay time.

3. **Delay Time**
   Sets the time interval during which the instrument waits to start the sweep operation after the trigger signal that meets the trigger conditions is generated. You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

   Table 2-12 Trigger Delay Time

Parameter	Remarks
Default	1 μs
Range	0 μs to 500 ms
Unit	s, ms, μs, ns, ps
Knob Step	trigger delay/100, Min = 1 μs
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	at 1-1.5-2-3-5-7.5 step

Hold-off State

Turns on or off the trigger hold-off function.

Hold-off Time

Sets the hold-off time between trigger signals. You can use the numeric keys, the knob, and the arrow keys on the front panel to modify this parameter; also you can modify it on the touchscreen.

When the trigger conditions are met, the trigger occurs. Then, the delay begins, and

the hold-off time begins. During the hold-off time, new trigger signals will be ignored. For a free-running trigger, the hold-off value is the minimum time between two trigger signals.

Table 2-13 Trigger Hold-off Time

Parameter	Remarks
Default	100 ms
Range	100 μs to 500 ms
Unit	s, ms, μs, ns, ps
Knob Step	trigger holdoff time/100, Min = 1 μs
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	at 1-1.5-2-3-5-7.5 step

Auto Trig State

Enables or disables the auto trigger function.

Auto Trig

Sets the time that the instrument will wait for the trigger conditions to be met. When the set waiting time times out, the instrument will not wait and start to initiate the sweep measurement.

Table 2-14 Auto Trigger Time

Parameter	Remarks
Default	100 ms
Range	1 ms to 100 s
Unit	s, ms, μs, ns, ps
Knob Step	auto trigger time/100, Min = 1 μs
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	at 1-1.5-2-3-5-7.5 step

Trace

Displays the trace-related parameters.

Selected Trace

RSA series can display at most 3 traces synchronously in EMI mode. Select the corresponding trace to set the relevant parameters for the specified trace. By default, Trace1 is selected and enabled, and the trace type is "Clear Write".

Note: The trace currently displayed on the screen can be saved to the internal or external memory. If needed, you can recall it at any time. Press **Save** to save it according to descriptions in **"Save"**.

Trace Type

Sets the type of the currently selected trace. The system calculates the scanned data by a specific operation method according to the selected trace type. The results will not be displayed unless you set "Trace Update" and "Trace Display" to "On". Trace types include Clear Write, Average, Max Hold, and Min Hold.

1. **Clear Write**
   Sets the trace data to a minimum value, and displays the real-time scanned data of each point on the trace.

2. **Average**
   Displays an average trace, which is represented by averaging the data of each point on the trace. The type of the trace is displayed to be smooth.

3. **Max Hold**
   Maintains and displays a max hold trace, which represents the maximum data value on a point-by-point basis. When a new maximum value is generated, data will be updated, and the newly updated maximum value prevails.

4. **Min Hold**
   Maintains and displays a min hold trace, which represents the minimum data value on a point-by-point basis. When a new minimum value is generated, data will be updated, and the newly updated minimum value prevails.

Trace Det

Sets the detector for the current measurement. The selected detector can be applied to the current trace. The available trace detectors include Pos Peak, Quasi Peak,

CISPR Average, RMS Average, Average(Vol), and Neg Peak.

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

2. **Quasi-Peak**
   The quasi-peak detector is implemented according to CISPR standard.

3. **CISPR Average**
   The average detector is implemented according to CISPR standard.

4. **RMS Average**
   The RMS average detector is implemented according to CISPR standard.

5. **Average**
   For each data point, average (see equation (2-7)) all the sampled data within the corresponding time interval and display the result.

   $$V_{AV} = \frac{1}{N} \times \sum_{i=1}^{N} v_i \qquad (2\text{-}7)$$

   Wherein, V_{AV} is the average of voltage in V; N is the number of sampled values for each point displayed; v_i is the envelope of the sampled value in V.

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

Detector Auto

Enables or disables the Detector Auto function. By default, Detector Auto is enabled. If you set the detector type manually, the Detector Auto function is disabled automatically.

Trace Update

Enables or disables trace update.

Trace Display

Enables or disables the trace display.

Remarks:

- The trace state and the parameter settings for the corresponding state are as follows:
  - Active: Trace Update and Trace Display are "On".
  - View: Trace Update is "Off", and Trace Display is "On".
  - Clear: Trace Update and Trace Display are "Off".
  - Back-end: Trace Update is "On", and Trace Display is "Off".
- In most cases, the inactive trace data keep unchanged. However, the data may be changed in the following conditions:
  - Load the stored data to trace.
  - Trace data are cleared by the trace clear function.

Measurement Settings

Meas

Provides the frequency scan measurement function.

Meas Setup

Avg Setting

1. Avg Number

Specifies the number of counts (N) for Average, Max Hold, and Min Hold. For Average, the greater the value of N, the smoother the trace is displayed.
In Average, Max Hold, and Min Hold modes, the instrument will not stop sweeping until the sweep count has reached N only when the scan sequence is "Scan Only" and the instrument performs the single sweep. Except "Scan Only", when other scan sequences are started, if the selected trace type is "Average", "Max Hold", or "Min Hold", the measurement will stop after a specified number of times of measurement is executed.

Table 2-15 Average Count

Parameter	Remarks
Default	1
Range	1 to 10,000
Unit	None
Knob Step	1
Left/Right Arrow Key Step	1
Up/Down Arrow Key Step	1

2. Avg Type

Selects the average type to "Log", "RMS", or "Scalar".

- **Log**: In this mode, all filtering and averaging processes select the log unit (dB). This average type is the most effective one for finding the low-level signal that is close to the noise amplitude. The formula is shown as follow:

$$NewAvg = \frac{(k-1) \times OldAvg + Newdata}{k} \quad (2\text{-}8)$$

  In the above formula, the parameter unit is dB.
- **RMS**: In this mode, all filtering and averaging processes work on the power (the square of the amplitude) of the signal. This average type is best for measuring the true time average power of complex signals. As the voltage result is in proportion to the square root of the average of the square of the voltage, it is also called the root mean square. The formula is shown as follows:

$$NewAvg = 10log\left(\frac{(k-1)\times 10^{\frac{OldAvg}{10}} + 10^{\frac{Newdata}{10}}}{k}\right) \quad (2\text{-}9)$$

In the above formula, the parameter unit is dB.

- **Scalar**: In this mode, all filtering and averaging processes work on the voltage envelope of the signal. This average type is the most appropriate one for observing the great envelope fluctuations of AM or pulse-modulated signals such as radar and TDMA transmitters. The formula is shown as follows:

$$NewAvg = 20log\left(\frac{(k-1)\times 10^{\frac{OldAvg}{20}} + 10^{\frac{Newdata}{20}}}{k}\right) \quad (2\text{-}10)$$

In the above formula, the parameter unit is dB.

3. Avg Auto

Sets the status of auto average. When the auto average function is enabled, the instrument will select the best average type based on the current settings. When you select one of the average types manually, the instrument will apply the selected type, and the auto average status is set to Manual.

Limit

Sets the parameters of limit lines. After you press **Preset**, the limit line measurement function is disabled, but the data of the limit lines will be reserved. The limit line data will only be deleted when the loading mode is Default. When you exit the measurement mode, the limit line data will not be deleted.

1. Test Limits

Selects whether the displayed traces are tested against the displayed limit lines. For each displayed trace, the corresponding limit line is turned on, and a message will be displayed at the upper-left corner of the trace to indicate whether the test passes or fails.

2. Select Limit

Selects the current limit line. By default, it is Limit1.

3. Limit State

Enables or disables the display of the limit line. When the limit line is on, the measurement interface displays the limit line, and the corresponding traces are tested against the current limit lines. Each limit line is displayed in a different color.

4. Edit Limit

When "Display State" of the limit line is set to "On", this menu is valid. When you

press this key to enter the editing menu, open the limit editing window.

- **X to CF**: When "Fixed" is selected, the frequency of the current editing point will not be affected by the midspan frequency. When "Relative" is selected, the frequency of the current editing point is the difference between the frequency of the point and the current midspan frequency. At this time, if the midspan frequency changes, then the position of the current editing point changes along with the midspan frequency.
- **Y to Ref**: When "Fixed" is selected, the amplitude of the current editing point will not be affected by the reference level. When "Relative" is selected, the amplitude of the current editing point is the difference between the amplitude of the point and that of the current reference level. At this time, if the reference level changes, then the position of the current editing point changes along with the reference level.
- **Margin State:** Enables or disables the display of the margin. When you enable the display of the margin, the measurement interface displays the margin lines; when you disable the display of the margin, the margin is invalid.
- **Margin:** Sets the margin for the current limit line.
- **Freq Interpolation:** Sets the interpolation mode between two frequency points in the limit line table to "Linear" or "Log".
- **Navigation:** Selects the first line of the limit line table.
- **Frequency:** Edits the frequency of the current point. When Rel Freq is selected, edit the frequency difference between the frequency of the current point and the center frequency.
- **Amplitude:** Edits the amplitude of the current point. If the Rel Ampt is enabled, edit the amplitude difference between the amplitude of the current point and the reference level.
- **Append Point:** Inserts an edit point.
- **Delete Point:** Deletes the point that you are editing.
- **Build From:** Sets a trace for building the limit line. The range is from Trace1 to Trace3.
- **Build:** Builds the limit line from the selected trace.
- **Copy From:** Copies the selected limit line into the current limit line. The range is from Limit1 to Limit6.
- **Copy:** Performs the limit line copy operation.
- **X Offset:** Sets the frequency offset of the current limit line.
- **Y Offset:** Sets the amplitude offset of the current limit line.
- **Apply Offset:** Adds the X and Y offsets to each point of the current limit line, then resets the X and Y offset values to 0.

  Tip: You can touch any point in the trace display window on the screen to edit the current point to be the limit line data point. You can also drag the point to adjust the position of the current edit point, that is, to change the frequency/amplitude of the current point.

5. Test Trace

Sets the trace for the current limit line test.

6. Delete Limit

Deletes the current limit line. The data of the current limit line will be cleared and they will be restored to factory defaults.

7. Delete All Limits

Deletes all limit lines. After you press the menu, the data of all the limit lines will be cleared and they will be restored to factory defaults.

Signal Table

Sets the parameters for the signal table.

The signal table is displayed below the user interface, as shown in the figure below.

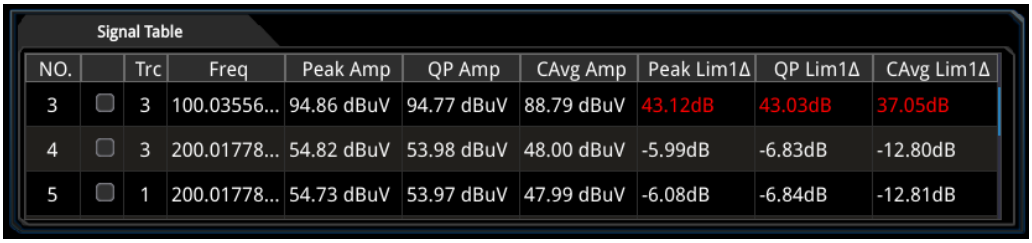

Figure 2-1 Signal Table

Parameter	Description
NO.	indicates signal sequence number.
Checkbox	" √ " indicates that the signal is marked.
Trc	indicates the measured trace.
Freq	indicates the frequency of the searched frequency point that meets the peak condition.
Peak Amp	indicates positive peak detector amplitude. Displays the corresponding amplitude when the current trace detector is pos peak after the search operationis executed. Displays the corresponding detection amplitude of the final measurement detector 1 type after the final measurement is performed. If there is no measurement data, "--" is displayed.
QP Amp	indicates quasi peak detector amplitude Displays the corresponding amplitude when the current trace detector is quasi-peak after the search operationis executed. Displays the corresponding detection amplitude of the final measurement detector 2 type after the final measurement is performed. If there is no measurement data, "--" is displayed.

CAvg Amp	indicates CISPR average detector amplitude Displays the corresponding amplitude when the current trace detector is CISPR average after the search operationis executed. Displays the corresponding detection amplitude of the final measurement detector 3 type after the final measurement is performed. If there is no measurement data, "--" is displayed.
Peak Lim1△	Difference between positive peak detector amplitude and limit1. Only when the corresponding limit line is enabled and the final measurement is performed, the difference between the detector amplitude of the currently selected measurement detector1 type and the limit line (1 to 6) is displayed. If there is no measurement data, "--" is displayed.
QP Lim1△	Difference between quasi-peak detector amplitude and limit1. Only when the corresponding limit line is enabled and the final measurement is performed, the difference between the detector amplitude of the currently selected measurement detector2 type and the limit line (1 to 6) is displayed. If there is no measurement data, "--" is displayed.
CAvg Lim1△	Difference between CISPR average detector amplitude and limit1. Only when the corresponding limit line is enabled and the final measurement is performed, the difference between the detector amplitude of the currently selected measurement detector3 type and the limit line (1 to 6) is displayed. If there is no measurement data, "--" is displayed.

Note: The signal table currently displayed on the screen can be saved to the internal or external memory. If needed, you can recall it at any time. Press **Save** to save it according to descriptions in **"Save"**.

1. Select Signal

Selects signal n in the signal table.

2. Page Up

If the current signal table has several pages of data, press this key to go to the previous page to view the data.

3. Page Down

If the current signal table has several pages of data, press this key to go to the next page to view the data.

4. Signal->Meters

Modifies the frequency of the meter to the frequency of the selected signal.

5. Mark Signal

Performs the signal marking operation. Marks the checkbox next to the marked signal.

6. Mark All

Marks all the signals in the signal table.

7. Clear Mark

Unmarks all the signals in the signal table.

8. Delete

Deletes the signal of the selected type.

- Selected: deletes the selected signal from the signal table.
- All: marks and deletes all the signals in the signal table.
- Marked: deletes all the marked signals from the signal table.
- Unmarked: deletes all the unmarked signals from the signal table.

9. Signal Zoom

Zooms the coordinate display of the currently selected signal to 10% of the current span by taking the midspan frequency as the reference.

10. Zoom Out

Returns the coordinate display of the currently selected signal to its previous display set before the Signal Zoom.

11. Sort Signals

Sorts the signal in the signal table according to "frequency", "detector amplitude", or "limit delta detector amplitude".
Wherein, detector amplitude includes "Det 1 Amp", "Det 2 Amp", and "Det 3 Amp"; limit delta detector amplitude includes "△Det 1 Amp", "△Det 2 Amp", and "△Det 3 Amp".

12. Sort Order

Selects the signal to be sorted in ascending or descending order.

13. Auto Sort

Enables or disables the auto sort function. When enabled, the measurement will sort the signal according to the previously set sort order and sort type.
Otherwise, the signal will be added to the signal table in the descending order of the trace amplitude.

14. Search Criteria

Sets the search criteria. When the peak that meets the conditions is searched, the signal will be added to the signal table.

- Peak Criteria: performs the search and finds the peak that meets the peak criteria.

- Pk Crit & LIM: performs the search and finds the peak that meets the peak criteria and limit line criteria.
- SubRng & LIM: performs the search and finds the peak that meets the peak criteria for each subrange and limit line criteria. After this mode is selected, the whole span is divided into n subranges. Wherein, n is set by the **Subrange Num** menu.

15. Peak Num State
Enables or disables the setting of the number of peaks.

16. Peak Num
When the search criteria is "Peak Criteria" or "Pk Crit & LIM", set the maximum number of peaks searched.

17. Subrange Num
Sets the number of subranges for the signal search.

Scan Table

Sets the parameters for 10 ranges in the scan table.

Note: The scan table currently displayed on the screen can be saved to the internal or external memory. If needed, you can recall it at any time. Press **Save** to save it according to descriptions in **"Save"**. If a scan sequence is currently executed, then the **Scan Table** menu is grayed out and disabled.

1. Select Range
Specifies the selected range. 10 ranges are available for you to choose.

2. Range
Enables or disables the selected scan range. When enabled, the selected range will be chosen as a part of the measurement. Besides, you can tap the checkbox at the left side of the selected range in the pre-scan setting table. If the checkbox is highlighted and with a tick "√" being displayed, it indicates that the selected range is enabled.

3. Start Freq
Sets the start frequency of the selected scan range.

4. Stop Freq
Sets the stop frequency of the selected scan range.

5. Points
Sets the number of scan points for the selected scan range.

6. Scan Time

Sets the time to scan the selected scan range for one time.

7. Auto Scan Time

Enables or disables the auto scan time function of the selected scan range. When enabled, the instrument is configured with a scan time automatically. When disabled, you can press **Scan Time** to manually set the scan time of the selected range.

Besides, you can also tap the checkbox at the left side of scan time of the selected range in the pre-scan setting list. If the checkbox is checked with a tick "√" and highlighted, it indicates that auto scan time within the selected range is enabled.

8. RBW

Sets the RBW of the selected scan range. Reducing RBW can gain a higher frequency resolution, but will also prolong the sweep time.

9. Auto RBW

Enables or disables the auto RBW function. When enabled, the instrument is configured with a RBW automatically. When disabled, you can press **RBW** to manually set the RBW of the selected range.

Besides, you can also tap the checkbox at the left side of RBW of the selected range in the pre-scan setting list. If the checkbox is checked with a tick "√" and highlighted, it indicates that auto RBW within the selected range is enabled.

10. Filter Type

Sets the RBW filter type in the selected range to "Gauss" or "EMI".
When the EMC measurement standard is "CISPR", the **Filter Type** menu is grayed out and disabled. By default, EMI filter is selected. When "EMI" is currently selected, resolution bandwidth can only be 200 Hz, 9 kHz, 120 kHz, or 1 MHz. When the EMC measurement standard is "None", the default filter is "Gauss".

11. Attenuation

Sets the attenuation value of the selected scan range.

12. Auto Att

Enables or disables the auto attenuation function of the selected scan range. When enabled, the instrument is configured with an attenuation value automatically. When disabled, you can press **Attenuation** to manually set the attenuation value of the selected range.

Besides, you can also tap the checkbox at the left side of attenuation of the selected range in the pre-scan setting list. If the checkbox is checked with a tick

"√" and highlighted, it indicates that auto attenuation within the selected range is enabled.

13. RF Preamp
Enables or disables the preamplifier of the selected scan range.

14. Scan Table
Enables or disables the scan table display. When enabled, the scan table will be displayed in the user interface.

Scan Sequence

Selects the measurement sequence.

Remarks:
- You need to select "Start" under **Sweep** → **Start/Stop** menu to start the selected measurement sequence.
- If a scan sequence is currently executed, then the **Scan Sequence** menu is grayed out and disabled.

1. Scan Only
Only performs the pre-scan operation.

2. Search Only
Only performs the peak search operation.

3. Scan-Srch-Ms
Performs the pre-scan, peak search, and final measurement.

4. Scan-Search
Performs the pre-scan and peak search.

5. Search-Meas
Performs the peak search and final measurement.

6. (Re)measure
Performs the final measurement.

(Re)measure

Sets the type of the final measurement to "Curr Signal", "All Signals", or "Marked Sigs".

Remarks:

- If you select the type of the marked signal, but the marked signal is not found in the signal table, then re-measurement cannot be executed.
- If a scan sequence is currently executed, then the **Re(measure)** menu is grayed out and disabled.

Detectors

Sets the detector parameters related to the final measurement. If a scan sequence is currently executed, then the **Detectors** menu is grayed out and disabled.
Note: when these detector parameters are set, the detector parameters under the **Marker Func** key will also be changed accordingly.

1. **Select Detector**
   Select the detector to be "Detector 1", "Detector 2", or "Detector 3".

2. **Dwell Time**
   Sets the dwell time of the selected detector.

3. **Detector**
   Sets the type of the selected detector. The available detector types include Pos Peak, Quasi Peak, CISPR Average, RMS Average, Average, and Neg Peak. You can also turn off the detector.

4. **Limit for Delta**
   Sets the limit line of the current detector measurement, so as to obtain the limit delta data in the signal table. The available limits include "Limit 1" through "Limit 6".

Auto Couple

When you enable "Auto Couple" function, all the manual/auto settings in the current measurement mode will be set to "Auto". This operation does not affect other measurement modes.
In auto state, the auto coupled parameters are changed with their coupled parameters. The auto coupling operation will ensure the optimal performance of the instrument. After the operation, all the auto coupled parameters will immediately be automatically reset based on the coupled parameters.

Meas Preset

Restores the parameters associated with the current measurement to their factory default values.

Marker Measurement

Marker

Marker is a triangle sign (as shown in the following figure), which is used for marking the point on the trace. You can read the amplitude and frequency of each point on the trace via marker.

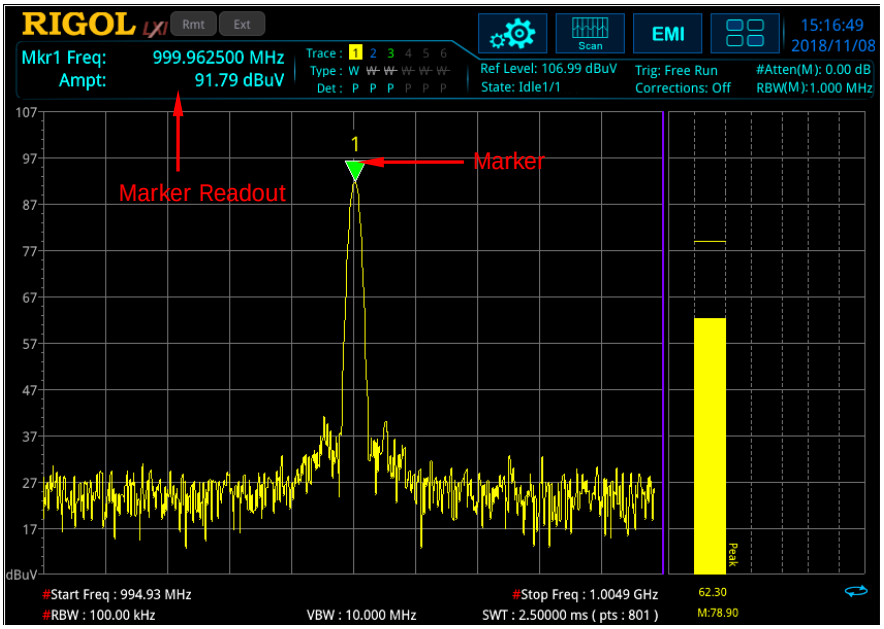

Figure 2-2 Marker

Remarks:

- RSA offers 8 markers, and only a single marker or one pair of markers can be turned on each time.
- In the Marker menu, you can use the numeric keys, the knob, or the arrow keys to modify frequency or time; to view the readout of different points on the trace. You can also use the touch screen to do the above things.

Selected Marker

RSA series provides 8 markers. By default, Marker1 is selected under "Selected Marker". After you select a marker, you can set parameters such as the marker mode and the marker trace. The currently enabled marker will be marked on the trace selected under **Marker Trace**. The readout of the currently activated marker at the marker point will be displayed in the measurement result bar at the upper-left corner of the screen.

Marker Mode

Sets the type of the marker. The available marker modes include Position, Delta, and Off.

1. **Position**
   It is used to measure the X (Frequency) and Y (Amplitude) values of a certain point on the trace. When "Position" is selected, a marker whose name is Marker plus a marker number (such as "Marker1") appears on the trace.

   Remarks:
   - If no active marker exists currently, a marker will be enabled at the midspan frequency. If the current marker is found in the range where no trace is displayed, a marker will be enabled at the midspan frequency, and it will be displayed at the bottom of the trace display area .
   - The readout resolution of the X-axis is related to the span. To obtain a higher readout resolution, reduce the span.

2. **Delta**
   It is used to measure the difference between "reference point" and "certain point on the trace": X (frequency) and Y (amplitude) value.

   Remarks:
   - If an active marker exists currently, then activate a reference marker at the current marker; otherwise activate both the reference marker and Delta marker at the same time at the midspan frequency.
   - When you change the position of the Delta marker, the position of the reference marker remains unchanged, but the frequency difference between the two markers will change along with it.
   - The frequency difference between the two markers and the amplitude difference between them are displayed in the measurement result bar at the upper-left corner of the screen.

Application of the "Delta" Marker

It is used to measure the S/N ratio of the single spectrum signal. Move the reference marker to the location where the signal resides, and move the Delta marker to the location where the noise resides. The amplitude displayed in the measurement results is S/N ratio.

3. Off

Turns off the marker currently selected. Then, the marker information displayed on the screen and the functions concerning the marker will also be disabled.

Reference Marker

Sets the reference marker for the current marker. By default, the reference marker is the marker next to it.

Remarks:

- Each marker can have another marker to be its reference marker.
- If the current marker is a Delta marker, the measurement result of the marker will be determined by the reference marker.
- Any marker cannot take itself to be the reference marker.

Marker Trace

Selects the trace that the current marker marks. It can be Trace 1, Trace 2, and Trace 3. One marker can only mark one trace. The selected trace determines the position of the marker and the final readout results.

Marker Frequency

Sets the frequency of the marker to change the position of the marker on the trace. Press this key to modify the value to change the position of the marker.

Table 2-16 Marker Frequency

Parameter	Remarks
Default	515 MHz
Range	0 Hz to 6.5 GHz
Unit	GHz, MHz, kHz, Hz
Knob Step	step = span/(sweep points – 1)
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	step = span/(sweep points – 1)*100

Line State

Enables or disables the marker line.

Remarks:

- When you enable the marker line, a cross line is displayed at the amplitude point where the marker resides. The width of the horizontal line and the height of the vertical line are consistent with the length and height of the graticule in the waveform display area.
- If the marker is not visible in the selected area, extend the marker line to the display area for better observation. This function is useful for the marker outside the display area. The marker extension line can better display the amplitude of the marker, making it easy for you to observe and compare.

Couple Markers

Enables or disables the couple marker function. When this function is enabled, moving any marker will enable other markers (except the Off marker) to move with it.

All Markers Off

Turns off all the enabled markers and their related functions.

Marker->

Adds the new measurement results to the existing signal table.

Mkr->List

Adds the frequency at the current marker to the signal table.

Remarks:
- The newly added signal frequency information is sorted according to the current ordering rule.
- If the trace detector matches the detector in the signal table, then the corresponding amplitude and limit delta values will be updated.

Meas at Mkr->List

Adds the current measurement results (including frequency, marker amplitude, and limit delta) to the signal table.

Remarks:
- If the invalid marker measurement is executed, then errors may occur and you cannot add the measurement results to the signal table.
- The newly added signal measurement result information is sorted according to the current ordering rule.
- If the trace detector matches the detector in the signal table, then the corresponding amplitude and limit delta values will be updated.

Meter->Mkr Freq

Sets the frequency of the meter to the frequency at the currently selected marker.

Mkr->Meter Freq

Sets the frequency at the currently selected marker to the frequency of the meter.

Meter->Signal

Replaces the frequency of the currently selected signal with the currently set frequency of the meter.

Meter->List

Adds the currently set meter frequency to the signal table.

Marker Func

Selected Marker

Selects a marker for measurement. The available markers include Marker 1 through Marker 8.

Detectors

1. **Select Detector**
   Sets the detector for marker measurement. The available detectors include Detector 1, Detector 2, and Detector 3.

2. **Dwell Time**
   Sets the dwell time of the selected detector.

3. **Detector**
   Sets the type of the detector for marker measurement. The available detector types include Pos Peak, Quasi Peak, CISPR Average, RMS Average, Average, and Neg Peak. You can also turn off the detector.

4. **Limit for Delta**
   Sets the limit line of the current detector measurement to obtain the limit delta in the marker measurement list. The available limits include Limit 1 through Limit 6.

Meas at Mkr Win

Enables or disables the marker measurement window display. When this function is enabled, the marker measurement window is displayed in the upper left corner of the user interface. The final measurement results of the current marker will be displayed in the window.

Measure at Marker

Press this key to perform the marker measurement. At this time, the final measurement is performed according to the detector settings at the current marker frequency, and the measurement results are displayed in the window.

If multiple traces are turned on, you can place a marker on any trace in the scan display and make measurements at the marker.

Peak

The peak search function enables the marker to move to the specific signal peak point, and then in combination with the function of Delta marker, it can provide a powerful analysis capability.

Peak Search

Performs the peak search function.

Remarks:

- If "Max" is selected under **Search Mode**, the system will search for the maximum value on the trace and mark it with a marker.
- If "Para" is selected under **Search Mode**, the system will search for the peak of the specified parameter on the trace and mark the peak with a marker.
- The peak search for the Next Peak, Next Peak Right, and Next Peak Left must meet the specified peak search condition.
- When no peak meets the specified peak search condition, "No peak found" is displayed.

Next Peak

Searches for and marks the peak whose amplitude on the trace is next to that of the current peak and which meets the peak search condition.

Next Peak Right

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

Next Peak Left

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

Minimum Search

Searches for and marks the peak with the minimum amplitude on the trace.

Peak Config

1. Peak Threshold

Specifies the minimum value of the peak amplitude. Only when the peak is greater than the peak threshold, can it be judged as a peak.

Table 2-17 Peak Threshold

Parameter	Remarks
Default	16.99 dBuV
Range	-93.01 dBuV ~ 106.99 dBuV
Unit	dBm, dBmV, dBuV, V, W
Knob Step	1 dBuV
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	5 dBuV

2. Threshold State

Enables or disables the peak threshold function.

Remarks:

- When the peak threshold function is enabled, press **Peak Threshold** to set it.
- When the peak threshold function is disabled, the **Peak Threshold** menu is grayed out and disabled.

3. Peak Excursion

Sets the excursion of the peak amplitude. It defines the minimum amplitude variation required for a signal to be identified as peak.

Table 2-18 Peak Amplitude

Parameter	Remarks
Default	6 dB
Range	0 dB to 100 dB
Unit	dB
Knob Step	1 dB
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	5 dB

4. Excursion State

Enables or disables the peak excursion function.

Remarks:

- When the peak excursion function is enabled, press **Peak Excursion** to set it.
- When the peak excursion function is disabled, the **Peak Excursion** menu is grayed out and disabled.

5. Threshold Line

Sets whether to display the peak threshold line or not. By default, it is off.

Remarks:

- When the threshold line is on, the threshold line displays the amplitude it represents.
- If the excursion state is on, then the peak excursion line will be displayed at the top of the peak threshold, and the peak area will be displayed at the left section.

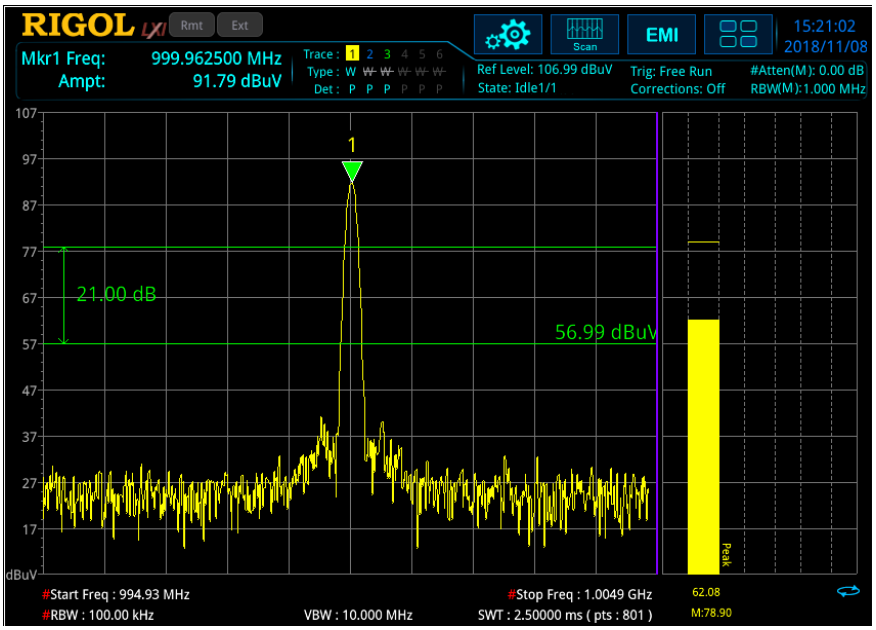

Figure 2-3 Threshold Line

6. Search Mode

Sets the peak search condition: maximum value on the trace or the parameter that meets the search criteria.

- If "Max" is selected, the system searches for the maximum value on the trace. This setting applies only to the peak search executed by pressing **Peak**. Other searches such as Next Peak, Next Peak Right, and Next Peak Left are all searched based on "Para".
- If "Para" is selected, the system searches for the peak that meets the search criteria on the trace.

Input/Output

Sets the input/output interface of the instrument.

Input Impedance

Sets the input impedance for voltage-to-power conversions (refer to equation (2-3). The default input impedance is 50 Ω. If the output impedance of the system under measurement is 75 Ω, you should use a 75 Ω to 50 Ω adapter (option) supplied by **RIGOL** to connect the analyzer with the system under test, and then set the input impedance to 75 Ω.

Ext Gain

Compensates for gain or loss in the measurement system outside the instrument.

Remarks:

- The value does not affect the trace position, but will modify the parameters such as reference level readout and the marker amplitude readout.
- You can use the numeric keys, the knob, or arrow keys to modify this parameter; you can also use the touch screen to modify the parameter.

Table 2-19 External Gain

Parameter	Remarks
Default	0 dB
Range	-120 dB to 120 dB
Unit	dB
Knob Step	1 dB
Left/Right Arrow Key Step	1 dB
Up/Down Arrow Key Step	5 dB

Ext Trigger2

Sets the external trigger 2 **[TRIGGER IN/OUT]** to be the "input" or "output" interface.

Corrections

Sets the parameters related to the amplitude correction to compensate for the gain or loss from external devices such as Antenna and Cable. When using this function, you can view the correction data table and save or load the current correction data.

Select

Selects a correction factor from Antenna, Cable, Other, or User. By default, all the correction factors are disabled. After selecting a correction factor, press **Correction** to enable the correction factor. RSA allows users to enable multiple correction factors at the same time.

Correction

Sets the on/off status of the amplitude correction. By default, it is off. If enabled, the currently selected correction factor data will be used for amplitude correction. If multiple correction factors are enabled, all the corresponding data will be used for amplitude correction.

Freq Interp

Sets the interpolation type of the points between two points in the correction table during amplitude correction.

- In Lin mode, linear interpolation is adopted for the frequency, and log interpolation is adopted for the amplitude.
- In Log mode, for both of frequency and amplitude, we interpolate on a log scale.

Edit

Press this key to enter the correction data editing interface. You can edit the frequency of the correction factor and the correction data of the corresponding amplitude.

1. **Navigation:** Selects the first line of the correction data table.
2. **Frequency:** Edits the frequency of the currently selected point.
3. **Amplitude:** Edits the amplitude correction value of the currently selected point.
4. **Append Point:** Inserts an edit point and adds a line to the correction table.
5. **Delete Point:** Deletes the currently selected point and deletes a line from the correction table.

Note: The edited correction data can be saved to the internal or external memory of

the analyzer. If needed, you can recall it at any time. After completing the correction data editing, press **Save** to save it according to descriptions in **"Save"**.

Delete Correction

Deletes the correction data that you are editing.

Delete All Corr

Deletes all the edited correction data.

Shortcut Key

Auto Tune

In EMI mode, the Auto Tune function is disabled.

Preset

Recalls the preset setting and restores the system settings of the analyzer to a specified status.

Remarks:

- To set the preset type, press **System** → **Reset** → **Preset Type**. The available types include "Factory" or any one of items from "User1" to "User6".
- Press **Preset** to recall the factory settings listed in the following table (except items specified in Note **[1]**) or user-defined settings.

Parameter Name	EMI Parameter Value
FREQ	
Frequency(Meter)	515 MHz
Midspan Freq	515 MHz
Start Freq	Auto, 30 MHz
Stop Freq	Auto, 1 GHz
Scale Type	Log
SPAN	
Span	970 MHz
AMPT	
Ref Level	106.99 dBuV
Att(Meter)	10 dB
RF Preamp(Meter)	Off
Y Axis Unit	dBuV
Scale/Div	10 dB
Ref Offset	0 dB
BW	
RBW(Meter)	Auto, 120 kHz
Filter Type(Meter)	EMI
Trigger	
Source	Free Run
Hold-off	OFF, 100 ms
Auto Trig	OFF, 100 ms
Slope	POS
Delay	OFF, 1 μs

Trace	
Selected Trace	Trace1
Trace Type	Clear Write
Trace Det	Pos Peak
Detector Auto	On
Trace Update	On
Trace Display	On
Mode Setup	
Global CF	Off, 515 MHz
EMC Standard	CISPR
Select Meter	Meter 1
Meter	On
Detector	Pos Peak
Limit	Off, 80 dBuV
Dwell Time	10 ms
Peak Hold Type	Infinite
Adjust Time	2 s
Couple to Signal	Off
Couple to Marker	Off
Meas Setup	
Frequency Scan	
Avg Number	1
Avg Type	Scalar
Avg Auto	Auto
Test Limits	Off
Select Limit	Limit1
Limit State	Off
Test Trace	Trace1
X to CF	Fixed
Y to Ref	Fixed
Margin	Off, 0 dB
Freq Interpolation	Lin
Frequency	0 Hz
Amplitude	106.99 dBuV
Build From	Trace1
Copy From	Limit1
X Offset	0 Hz
Y Offset	0 dB
Select Signal	1
Delete	Selected
Sort Signals	Freq
Sort Order	ASC
Auto Sort	On
Search Criteria	Peak Criteria

Peak Number	On, 25
Subrange Num	25
Select Range	Range 5
Range	On
Start Freq	600 MHz
Stop Freq	1 GHz
Point	6667
Scan Time	On, 544.117 ms
Auto RBW	On, 120 kHz
Filter Type	EMI
Attenuation	On, 10 dB
RF Preamp	Off
Scan Table	Off
Scan Sequence	Scan Only
(Re)measure	Curr Signal
Select Detector	Detector 1
Dwell Time	200 ms
Detector	Pos Peak
Limit for Delta	Limit 1
Marker	
Selected Marker	Marker 1
Marker Mode	Position
Reference Marker	Marker 2
Marker Trace	Trace 1
Marker Frequency	515 MHz
Line State	Off
Couple Markers	Off
Peak	
Peak Threshold	On, 16.99 dBuV
Peak Excursion	On, 6 dB
Threshold Line	Off
Search Mode	Max
Marker Func	
Selected Marker	Marker 1
Select Detector	Detector 1
Dwell Time	200 ms
Detector	Pos Peak
Limit for Delta	Limit 1
Meas at Mkr Win	Off
System[1]	
Power On	Preset
Preset Type	Default
Align Auto	On
LAN Setting Mode	DHCP

Display Line	Off, 81.99 dBuV
Graticule	On
HDMI	On
HDMI Resolution	1280*720 60Hz
LCD	On
LCD Backlight	100%
Meters Display	On
Meters Freq Line	On
Next Range Display	Off
Power Switch	Default
Beep Switch	Off
Volume	50
SCPI Display	On
User Key	Off
Language	English

Note[1]: Not affected by Preset settings.

User

User-defined shortcut key. For some hard-to-find but commonly used function menu, you can define it as shortcut key (for the defining method, refer to the introduction in **"User Key"**). After that, press the shortcut key under any operation interface to quickly open and set the desired menu or function.

Note: You can use the **User** key to define all the keys on the front panel and the sub-menus of these keys (except **Save**).

Quick Save

Repeats the most recent save that was performed from the **Save** menu. Its save location is the currently defined "Quick Save Path". The register storage does not support Quick Save.

Cont

Press this key to perform the continuous sweep operation.

Single

Press this key to perform the single sweep operation.

System Function

System

Sets the system parameters.

Preset

Functions include: select the instrument settings to be recalled after the analyzer is powered on ("Last" or "Preset"); set the preset type ("Default" or one of the items from "User1" to "User6"); save system configuration.

1. **Power On**
   Sets the power on setting to "Last" or "Preset".
   - When "Last" is selected, the last system settings before power-off would be recalled automatically at power-on.
   - When "Preset" is selected, settings defined in **Preset Type** would be recalled automatically at power-on.

2. **Preset Type**
   Sets the preset type to "Default" (by default) or any one of the items from "User1" to "User6".
   - When Power On is set to "Preset", the specified preset type will be recalled at power-on.
   - After the instrument starts, press **Preset** on the front panel in any operation interface will recall the specified preset type.

3. **Save User Preset**
   Saves the current system setting as user-defined settings to the internal non-volatile memory. You can store up to 6 system states (correspond to "User1" to "User6" in the preset type) and name each state file.

   When one of the items from "User1" to "User6" is selected under **Preset Type**, press **Save User Preset**, and the instrument automatically completes the saving operation.

Alignment

1. **Align Now**
   Press this key and the analyzer will use the internal calibration source to perform a self-calibration immediately.

2. **Align Auto**
   Enables or disables auto self-calibration. If auto self-calibration is enabled, the

analyzer will perform one self-calibration after being started.

Interface

The analyzer supports the LAN or USB communication interface.

1. Network Interface

Sets the LAN parameters. Use the touch screen or the externally connected mouse to tap or click the setting information icon at the top of the user interface. Then tap or click the network setting information icon . The LAN parameter setting interface is displayed, as shown in the following figure.

Figure 2-4 LAN Parameter Setting

The following items can be set through the front panel keys, shortcut keys on the keyboard, externally connected mouse, touch screen, or remote interface.

1) Mode

Sets the mode of obtaining the IP address.

- DHCP: When DHCP is selected, the DHCP server assigns network parameters (such as the IP address, subnet mask, and gateway) to the analyzer based on the current network configuration.
- Auto: When "Auto" is selected, the instrument will acquire the IP address ranging from "169.254.0.1" to "169.254.255.254" and the subnet mask (255.255.0.0) automatically based on the current network configuration.
- Manual: When "Manual" is selected, you can self-define a desired IP address for the analyzer.

Note: The analyzer attempts to acquire the IP address configuration

according to the sequence of DHCP, Auto IP, and Manual IP. These three methods cannot be disabled at the same time.

2) IP

Press **IP** and use the numeric keys to input the desired IP address.
The format of the IP address is "nnn.nnn.nnn.nnn". The range for the first segment (nnn) of the address is from 1 to 223 (except 127); and the range for the other three segments is from 0 to 255. You are recommended to ask your network administrator for an IP address available.

3) Subnet mask

Press **Subnet mask** and use the numeric keys to input the desired subnet mask.
The format of the subnet mask is nnn.nnn.nnn.nnn; wherein, the range of "nnn" is from 0 to 255. You are recommended to ask your network administrator for a subnet mask available.

4) Gateway

Press **Gateway** and use the numeric keys to input the desired gate address.
The format of the default gateway is "nnn.nnn.nnn.nnn". The range for the first segment (nnn) is from 1 to 223 (except 127); and the range for the other three segments is from 0 to 255. You are recommended to ask your network administrator for a gate address available.

5) DNS

- mDNS: enables or disables the sending of the network information (including IP address, host name, etc.).
- DNS Mode: sets the mode of obtaining the DNS address to "Manual" or "Auto".
- Preferred DNS: sets the preferred address for the DNS.
- Backup DNS: sets the backup address for the DNS.

The format of the DNS address is "nnn.nnn.nnn.nnn". The range for the first segment (nnn) of the address is from 1 to 223 (except 127); and the range for the other three segments is from 0 to 255. You are recommended to ask your network administrator for an address available.

6) Apply

After the LAN interface configuration is finished, press this key to apply the current configuration to the instrument.

7) Reset

Turns on DHCP and Auto-IP; turns Manual-IP off. Clears the set network password and restores it to the factory defaults.

2. USB

RSA provides a USB DEVICE interface on the rear panel. The analyzer may serve as a "slave" device to be connected to the PC via this interface.

Display

Controls the screen display. You can set the current mode, the current measurement interface or window, and other display-related parameters.

1. Display Line State

Turns on or off the display line.

2. Display Line

Sets the display line level to change its display location. This line can be used as the reference for the readout.

Remarks:

- This line is a reference horizontal line whose amplitude is equal to the set value, and the corresponding amplitude unit is the same as the Y-axis unit.
- You can use the numeric keys, the knob, and the arrow keys on the front panel to modify the display line level; also you can modify it on the touchscreen.
- The settings of the display line only take effect in the spectral line display area.
- If the display line is out of the visible range, then the display level value will be marked at the top or bottom of the graticule.

Table 2-20 Display Line Level

Parameter	Remarks
Default	81.99 dBuV
Range	Current amplitude range
Unit	dBm, dBmV, dBuV, V, W
Knob Step	step = scale/10
Left/Right Arrow Key Step	
Up/Down Arrow Key Step	step = scale

3. Graticule

Enables or disables the display of the graticule.

4. HDMI

Enables or disables HDMI.

5. HDMI Resolution

The resolution supported by the HDMI interface is "1280*720 60Hz", "640*480

60Hz", or "720*480 60Hz".

6. LCD

Enables or disables LCD.

Remarks:

- If you are not updating data, turning off LCD can improve the measurement speed.
- To reduce the electromagnetic radiation of some circuit component, turn off the LCD.
- To avoid misoperation, turn off the LCD.

7. LCD Backlight

Sets the brightness of the LCD backlight.

The brightness is expressed in percentage. When it is 100, it indicates that the backlight is the brightest; when it is 1, the backlight is the darkest.

8. Meters Display

Enables or disables the display of the meter window. When enabled, the meter window is displayed at the upper-right section of the user interface. When disabled, the meter window is not displayed in the user interface, and only the spectral line window and the signal table window are displayed in the user interface.

9. Meters Freq Line

Enables or disables the display of the meter frequency line. When enabled, a purple vertical line that indicates the current frequency of the meter is displayed in the spectral line display window. When disabled, the meter frequency display line is hidden.

10. Next Range Display

Enables or disables the display of the next scan range. When enabled, the currently selected scan range is marked by a green box. By default, it is Range 1. When you press **Next Range**, you can switch to the next scan range. When disabled, the scan range is not marked, and you cannot switch to the next range.

11. Next Range

Press or tap this menu, and then you can switch the current scan range to the next range.

About System

Displays the system information or the option information.

1. System Info

- Model
- Serial Number
- Hardware Version Number
- Firmware Version Number
- Software Version

2. Option Info

Displays the option information.
RSA provides many kinds of options to meet your various measurement requirements. To purchase the corresponding option, please contact **RIGOL**.

3. Self Test

- **Screen**
  Tests whether the screen has a dot defect by using six colors: blue, red, green, gray, white, and black. Press any key to switch the screen color and exit the test.
- **Multi-point Touch**
  Enters the multi-point touch test interface. Use multiple fingers to make pinch or stretch gestures on the screen, and observe the size of the characters. If they do not change along with your gestures, it indicates that problems occurred to the multi-point touch function. To exit the test, press **Esc** for three consecutive times.
- **Single-point Touch**
  Enters the single-point touch test interface. Touch or use the mouse to make stretch or strike gestures on the screen. If the corresponding traces are displayed, then it indicates that the point on the touchscreen is valid. To exit the test, press **Esc** for three consecutive times.
- **Keyboard**
  Enters the keyboard test interface. Press the function keys on the front panel one by one and observe whether the corresponding key is illuminated. If not, an error may have occurred to that key. To exit the test, press **Esc** for three consecutive times.

  Note: For the transparent keys on the front panel, they will be also illuminated during the test.

4. License Info

Displays the license registration information about the components such as Linux and QT.

5. Online Update

Connects the analyzer to the external network by using the network cable. If you do not have the right to access the Internet, please ask the administrators to grant your right to access the external Internet first. Then, press this key to update the software.

Date/Time

Sets the system date and time.

1. Set Time

Sets the displayed system time of the analyzer. Press the **Hour**, **Minute**, and **Second** softkeys respectively to set the time.

2. Set Date

Sets the displayed system date of the analyzer. Press the **Year**, **Month**, and **Day** softkeys respectively to set the date. You can also press **Date Format** to select whether the date is displayed in "YMD" or "MDY" form.

Security Clear

Press this key to perform the security clear function. This function includes the following operations:

- Deletes all the files that users have saved, including the state files (state), trace state files (trace state), screen files (screen), measdata files (measdata), and limit files (limit), amplitude correction files (correction), signal table (signaltable), and scan table (scantable) saved by users in all modes.
- Executes the factory resetting operation.

Language

RSA supports multi-language menu, Chinese and English built-in help and pop-up messages.

Press this key to select the desired display language.

Settings

1. Power Switch

Sets whether the power switch on the front panel is effective or not.

- Default: When the analyzer is powered on, press the power switch on the front panel to start up the analyzer.
- Always: When the analyzer is powered on, it starts automatically.

2. Beep Switch

Turns on or off the beeper.

3. Volume

After you turn on the beeper, you can press this key to adjust the volume of the beeper.

4. User Key

Defines an associated function for the **User** key on the front panel. The definition method is as described below. After that, pressing **User** in any operation interface can quickly enable the defined function.

- Press **User Key** to select "On";
- Open the function menu that needs to be defined. For example, press **System** → **Display** → **Display Line**;
- Press **User** and the definition is finished. At this time, **User Key** turns off automatically.

5. SCPI Display

When you use the SCPI commands to control the instrument remotely, turning on the SCPI Display will go to the specified menu of the corresponding command; turning off the SCPI Display will not go to the specified menu.

System Message

Press this key, and then a prompt message dialog box will be displayed. You can press the corresponding front-panel softkey to select to view all the messages, the messages that have been read or not read. You can also use the touch screen or the externally connected mouse to tap or click the specified icon in the prompt message dialog box.

1. Select All

Selects all the displayed messages.

2. Select Read

Only selects the messages that have been read.

3. Select Unread
Only selects the messages that have not been read.

4. Delete
Deletes the selected messages.

5. Query All
Views all the displayed messages.

6. Query Read
Only views the messages that have been read.

7. Query Unread
Only views the messages that have not been read.

File

RSA allows you to save various types of files to the internal or external memory, and recall them when necessary.

Press **File** on the front panel to enter the file operation menu interface.

File Explorer

Press the key to enter the file manager interface. You can touch the screen or use the mouse to tap or click on the screen to select the corresponding file or folder. All the files with the specified file types are displayed. When you select a file, you can press the **Copy**, **Paste**, or **Delete** softkeys to copy, paste, or delete the specified file.

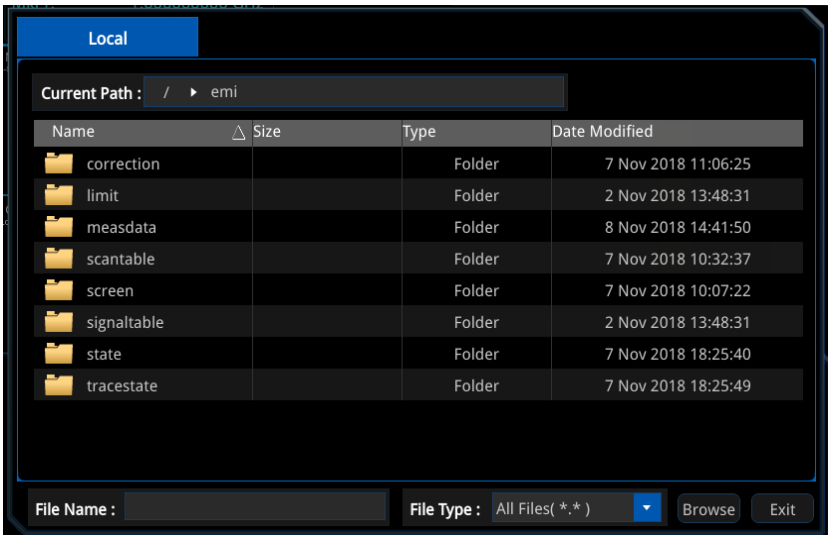

Figure 2-5 File Manager

The available file types include: State, Trace+State, Measurement Data, Limit, Screen Image, License, Amplitude Correction, Signal Table, and Scan Table. The descriptions for various file types are shown in the following table.

Table 2-21 Descriptions of File Type

File Type	Format	Suffix Name
State	BIN	.sta
Trace+State	BIN	.trs
Measurement Data	CSV	.csv
Limit	CSV	.csv
Amplitude Correction	CSV	.csv
Screen Image	IMAGE	.jpg/bmp/png
Signal Table	CSV	.csv
Scan Table	CSV	.csv

Note: RSA can only recognize files whose filenames consist of Chinese characters, English letters, or numbers. If the filename or folder name contains other characters, the file or the folder might not be displayed normally in the file manager interface.

Copy

Copies the currently selected file or folder.

Paste

Pastes the file or folder.

When the current path has contained a file or folder whose name is the same as the one that you want to paste, after you perform the paste operation, the original file or folder will be overwritten.

Rename

Renames a file that has been stored. After you select a file, press this key to input a new filename.

Delete

Deletes the selected file.

New Folder

Creates a folder. Press this key to create a new empty folder under the current directory, and the file is named with a default filename. To modify this filename, press **Rename** to rename the file.

Quick Print

If the printer has been successfully installed, press this key to quickly print the currently displayed screen image.

Print

Prints the current screen according to print parameter settings when the printer has been successfully installed and is in idle state.

Printer Setup

1. Printer Parameters

1) Page Size
Sets the page size for printing. When "Default" is selected, the page size depends on the printer currently connected.

2) Quality
Sets the print quality.

3) Color
Sets the print color to Color, Mono, Inverse, or Inverse-Mono.

4) Orientation
Sets the print orientation to "Landscape" or "Portrait".

5) Adjust
Sets the print border to Adaptive, Non-Adpt, and Hold Min.

6) Counts
Sets the print copies and the default is 1. The range available is from 1 to 99.

7) Border
Turns on or off the border.

In addition, you can preview the print page, and set to print the image or the text in All page, 1/2, 1/4, or 1/9 page.

2. **Add Device**
   Queries and adds a printer. Inputs the IP address of the printer, the manufacturer of the printer, the printer model, and printer drive. Then, the printer is added.

3. **Select Device**
   Selects the desired printer.

Import License

In the file manager interface, select a file to be imported and then press **Import License** to import the file.

System Update

Press this key to update the analyzer software after selecting the update file in the USB storage device.

Recall

RSA allows you to recall various types of files saved to the internal or external storage memory.

Press **Recall** on the front panel to enter the file recalling menu. The available file types include: State, Trace+State, Measurement Data, Limit, Amplitude Correction, Signal Table, and Scan Table.

State

Press **State** to enter the state recalling menu. The state can be recalled from the register or the file.

1. **Recall**
   Press **File Explorer** to enter the file manager interface. Select a file and then press **Recall** to import the file.

2. **Register 1 through Register 16**
   When any one of the items from Register 1 to Register 16 is selected, the state of the specified register will be recalled.

Trace+State

Press **Trace+State** to enter the trace+state recalling menu. The state of the instrument and the selected trace can be recalled from the register or the file.

1. **Recall**
   Press **File Explorer** to enter the file manager interface. Select a file and then press **Recall** to import the file.

2. **To Trace**
   Selects the trace+state file or the trace data of the register to recall them to the selected trace.

3. **Register 1 through Register 16**
   When any one of the items from Register 1 to Register 16 is selected, the state of the specified register will be recalled.

Measurement Data

Press **Meas Data** to enter the measurement data recalling menu.

1. **Recall**
   Press **File Explorer** to enter the file manager interface. Select a file and then press **Recall** to import the file.

2. **To Trace**
   Selects the measurement data file and recalls it to the selected trace.

Limit

Press **Limit** to enter the limit recalling menu.

1. **Recall**
   Press **File Explorer** to enter the file manager interface. Select a file and then press **Recall** to import the file.

2. **To Limit**
   Selects the limit line file and recalls it to the selected limit line.

3. **Limit Directory**
   Sets the limit directory to be recalled to "User" or "Preloaded". If you select "Preloaded", you can load the built-in limit line from the Preloadedlimit folder. If you select "User", you can load the user-defined limit line from the Limit folder.

Amplitude Correction

Press **Correction** to enter the amplitude correction data recalling menu.

1. **Recall**
   Press **File Explorer** to enter the file manager interface. Select a file and then press **Recall** to import the file.

2. **To Correction**
   Selects the amplitude correction file and recalls it to the selected type of the amplitude correction.

Signal Table

Press **Signal Table** to enter the signal table recalling menu.

Press **File Explorer** to enter the file manager interface. Select a file and then press **Recall** to import the file.

Scan Table

Press **Scan Table** to enter the scan table recalling menu.

Press **File Explorer** to enter the file manager interface. Select a file and then press **Recall** to import the file.

Save

RSA allows you to save various types of files to the internal or external memory.

Press **Save** on the front panel to enter the file saving menu. The available file types include: State, Trace+State, Measurement Data, Limit, Screen Image, Amplitude Correction, Signal Table, and Scan Table.

State

Press **State** to enter the state saving menu. The state can be saved to the register or the file.

1. **Save**
   Press this key to save the current state in the default filename or user-defined filename.

   The default state filename is determined by the following methods:
   - If you haven't input a filename by pressing the **Save As** key, its default filename is state<n>.sta. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1. For example, if 3 files (state1.sta, state2.sta, state5.sta) exist in the current directory, then the new filename for the file that you want to save should be state6.sta by default.
   - If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.sta". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.sta".

2. **Save As**
   Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding state file.

   You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

3. **Register 1 through Register 16**
   When any one of the items from Register 1 to Register 16 is selected, the current state of the instrument will be saved to the corresponding register. The register supports quick save and recalling instrument state. The register menu displays the time for saving the instrument state.

Trace+State

Press **Trace+State** to enter the trace+state saving menu. The state of the instrument and the selected trace can be saved to the register or the file.

1. **Save**
   Press this key to save the current trace+state file in the default filename or user-defined filename.

   The default filename is determined by the following methods:
   - If you haven't input a filename by pressing the **Save As** key, its default filename is tracestate<n>.trs. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1.
   - If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.trs". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.trs".

2. **Save As**
   Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding trace+state file.

   You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

3. **Save From Trace**
   Selects the trace to be saved. You can select any single trace from Trace1 to Trace3.

4. **Register 1 through Register 16**
   When any one of the items from Register 1 to Register 16 is selected, the current state of the instrument will be saved to the corresponding register. The register supports quick save and loading instrument state. The register menu displays the time for saving the instrument state.

Measurement Data

Press **Meas Data** to enter the measurement data saving menu. The selected measurement data type (e.g. trace, measurement results) can be saved to the specified file. The data will be saved in .csv format. They are separated with a comma, and this is convenient for you to use the Excel to analyze the data.

1. **Save**
   Press this key to save the currently selected type of measurement data in the

default filename or user-defined filename.

The default filename is determined by the following methods:

- If you haven't input a filename by pressing the **Save As** key, its default filename is measdata<n>.csv. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1.
- If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.csv". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.csv".

2. Save As

Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding Measurement Data file.

You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

3. Save From Trace

If the data to be saved are traces, select the trace to be saved. You can select any single trace from Trace1 to Trace3.

4. Data Type

Selects the measurement data type to be saved. The data types supported by the instrument include trace and EMI measurement results.

5. Meas Results

After selecting the type of the EMI measurement results, click this menu, and then the measurement results interface is displayed. You can enable the touch screen or use its sub-menu to set the EMI measurement report.

1) Environment

Menu Name	Function Description
Temperature	Enables or disables the display of the temperature.
Humidity	Enables or disables the display of the humidity.
Testing Place	Enables or disables the display of the testing place.
Testing Distance	Enables or disables the display of the testing distance.
Polar Direction	Enables or disables the display of the polar direction.
Other Explanation	Enables or disables the display of the other explanation.

After selecting the corresponding menu, you can edit the information using the pop-up soft keyboard in the text box on the right side of the corresponding parameters in the Meas Result Content interface.

2) Header
press this menu to enter the trace file header information menu.

Menu Name	Function Description
Client	Enables or disables the display of the client information.
Operator	Enables or disables the display of the operator information.
Product Desc	Enables or disables the display of the product description.

After selecting the corresponding menu, you can edit the information using the pop-up soft keyboard in the text box on the right side of the corresponding parameters in the Meas Result Content interface.

3) Ampt Corr
Selects the displayed amplitude correction data to "Full Data". You can also select "Off" to turn off the display of the correction data.

4) Limits
Selects the displayed limit line data to "Full Data". You can also select "Off" to turn off the display of the limit line data.

5) Screen
Sets the screen image of the report to "Inverted" or "Normal". You can also select "Off" to turn off the display of the screen image.

6) Table&List
- Scan Table: enables or disables the display of the scan table information of the report.
- Signal Table: enables or disables the display of the signal table information of the report.

7) Output Format
Sets the output format of the report to "HTML" or "PDF". When you select "HTML", save the report with the name suffixed with ".html". When you select "PDF", save the report suffixed with ".pdf".

Limit

Press **Limit** to enter the limit line saving menu. The selected limit line is saved to the file.

1. Save

Press this key to save the currently selected limit line in the default filename or user-defined filename.
The default filename is determined by the following methods:

- If you haven't input a filename by pressing the **Save As** key, its default filename is limit<n>.csv. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1.
- If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.csv". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.csv".

2. Save As

Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding Limit file.

You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

3. Select Limit

Selects the limit line to be saved. You can select any single limit line from Limit1 to Limit6.

Screen Image

Press **Screen Image** to enter the screen saving menu.

1. Save

Press this key to save the current screen image in the default filename or user-defined filename.

The default filename is determined by the following methods:

- If you haven't input a filename by pressing the **Save As** key, its default filename is screen<n>.jpg. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1.
- If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.jpg". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.jpg".

2. Save As

Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding Screen Image file.

You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

3. Screenshot Info

1) Format
Press this key to select the file format of the current screen image to "JPEG", "BMP", or "PNG".

2) Color Type
Press this key to select the color of the current screen image to "Normal" or "Inverted".

Amplitude Correction

Press **Correction** to enter the amplitude correction data saving menu. The selected amplitude correction data is saved to the file.

1. Save

Press this key to save the current amplitude correction data in the default filename or user-defined filename.

The default filename is determined by the following methods:

- If you haven't input a filename by pressing the **Save As** key, its default filename is correction<n>.csv. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1.
- If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.csv". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.csv".

2. Save As

Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding amplitude correction file.

You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

3. Select Corr

Selects the amplitude correction type to be saved. You can select "Antenna", "Cable", "Other", or "User". "

Signal Table

1. Save

Press this key to save the selected signal table in the default filename or user-defined filename.

The default filename is determined by the following methods:

- If you haven't input a filename by pressing the **Save As** key, its default filename is signaltable<n>.csv. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1.
- If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.csv". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.csv".

2. Save As

Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding signal table file.

You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

Scan Table

1. Save

Press this key to save the selected scan table in the default filename or user-defined filename.

The default filename is determined by the following methods:

- If you haven't input a filename by pressing the **Save As** key, its default filename is scantable<n>.csv. Wherein, n refers to the file number of the filenames that are named based on the naming mode in the current file directory. The value of <n> is the existing maximum file number plus 1.
- If you have pressed the **Save As** key to input the filename abc, then the file is saved to be "abc.csv". After that, press the **Save** key again, another file is saved automatically with the filename "abc1.csv".

2. Save As

Press this key and then use the numeric keypad on the front panel to input the filename. Then, press **Save** to save the corresponding scan table file.

You can also touch the screen or use the mouse to tap or click the **Save As** menu, and then input the filename with the keypad.

Quick Save Path

1. Set Path

Press the **Set Path** softkey to open the file explorer interface. Select the corresponding path, and then press **OK** to set the current path to be the quick save path.

2. View Path

Press the **View Path** softkey to display the current quick save path information in the center of the user interface.

Chapter 3 Appendix

Appendix A: RSA5000 Accessories and Option List

	Remarks	Order No.
Model	Real-time Spectrum Analyzer, 9 kHz to 3.2 GHz	RSA5032
	Real-time Spectrum Analyzer, 9 kHz to 6.5 GHz	RSA5065
	Real-time Spectrum Analyzer, 9 kHz to 3.2 GHz (with tracking generator, factory installed)	RSA5032-TG
	Real-time Spectrum Analyzer, 9 kHz to 6.5 GHz (with tracking generator, factory installed)	RSA5065-TG
Standard Accessories	Quick Guide (hard copy)	-
	Power Cord	-
Option	Preamplifier (PA)	RSA5000-PA
	Highly Stable Clock	OCXO-C08
	Real-time Analysis Bandwidth 40 MHz	RSA5000-B40
	Advanced Measurement Kit	RSA5000-AMK
	EMI Measurement Application	RSA5000-EMI
	Vector Signal Analysis Measurement Application	RSA5000-VSA
	Spectrum Analyzer PC Software	Ultra Spectrum
	EMI Pre-compliance Test Software	S1210 EMI Pre-compliance Software
Optional Accessories	Include: N-SMA cable, BNC-BNC cable, N-BNC adaptor, N-SMA adaptor, 75 Ω-50 Ω adaptor, 900 MHz/1.8 GHz antenna (2pcs), 2.4 GHz antenna (2pcs)	DSA Utility Kit
	Include: N(F)-N(F) adaptor (1pcs), N(M)-N(M) adaptor (1pcs), N(M)-SMA(F) adaptor (2pcs), N(M)-BNC(F) adaptor (2pcs), SMA(F)-SMA(F) adaptor (1pcs), SMA(M)-SMA(M) adaptor (1pcs), BNC T type adaptor (1pcs), 50 Ω SMA load (1pcs), 50 Ω BNC impedance adaptor (1pcs)	RF Adaptor Kit
	Include: 50 Ω to 75 Ω adaptor (2pcs)	RF CATV Kit
	Include: 6 dB attenuator (1pcs), 10 dB attenuator (2pcs)	RF Attenuator Kit
	30 dB high-power attenuator, with the max power of 100 W	ATT03301H
	N Male-N Male RF Cable	CB-NM-NM-75-L-12G
	N Male-SMA Male RF Cable	CB-NM-SMAM-75-L-12G
	VSWR Bridge, 1 MHz to 3.2 GHz	VB1032
	VSWR Bridge, 2 GHz to 8 GHz	VB1080
	Near-field Probe	NFP-3
	Rack Mount Kit	RM6041
	USB Cable	CB-USBA-USBB-FF-150

Appendix B: RSA3000 Accessories and Option List

	Description	Order No.
Model	Real-time Spectrum Analyzer, 9 kHz to 3 GHz	RSA3030
	Real-time Spectrum Analyzer, 9 kHz to 4.5 GHz	RSA3045
	Real-time Spectrum Analyzer, 9 kHz to 3 GHz (with TG installed when leaving the factory)	RSA3030-TG
	Real-time Spectrum Analyzer, 9 kHz to 4.5 GHz(with TG installed when leaving the factory)	RSA3045-TG
Standard Accessories	Quick Guide (hard copy)	-
	Power Cord	-
Option	Preamplifier (PA)	RSA3000-PA
	High Stability Clock	OCXO-C08
	RBW 1 Hz to 10 MHz	RSA3000-BW1
	Real-time Analysis Bandwidth 25 MHz	RSA3000-B25
	Real-time Analysis Bandwidth 40 MHz	RSA3000-B40
	Advanced Measurement Kit	RSA3000-AMK
	EMI Measurement Application (includes RSA3000-EMC)	RSA3000-EMI
	EMC Filter and Quasi-Peak Detector Kit	RSA3000-EMC
	Spectrum Analyzer PC Software	Ultra Spectrum
	EMI Pre-compliance Test Software	S1210 EMI Pre-compliance Software
Optional Accessories	Include: N-SMA cable, BNC-BNC cable, N-BNC adaptor, N-SMA adaptor, 75 Ω-50 Ω adaptor, 900 MHz/1.8 GHz antenna (2pcs), 2.4 GHz antenna (2pcs)	DSA Utility Kit
	Include: N(F)-N(F) adaptor (1pcs), N(M)-N(M) adaptor (1pcs), N(M)-SMA(F) adaptor (2pcs), N(M)-BNC(F) adaptor (2pcs), SMA(F)-SMA(F) adaptor (1pcs), SMA(M)-SMA(M) adaptor (1pcs), BNC T type adaptor (1pcs), 50 Ω SMA load (1pcs), 50 Ω BNC impedance adaptor (1pcs)	RF Adaptor Kit
	Include: 50 Ω to 75 Ω adaptor (2pcs)	RF CATV Kit
	Include: 6 dB attenuator (1pcs), 10 dB attenuator (2pcs)	RF Attenuator Kit
	30 dB high-power attenuator, with the max power of 100 W	ATT03301H
	N(M)-N(M) RF Cable	CB-NM-NM-75-L-12G
	N(M)-SMA(M) RF Cable	CB-NM-SMAM-75-L-12G
	VSWR Bridge, 1 MHz to 3.2 GHz	VB1032
	VSWR Bridge, 2 GHz to 8 GHz	VB1080
	Near-field Probe	NFP-3
	Rack Mount Kit	RM6041
	USB Cable	CB-USBA-USBB-FF-150

Note: For more details about the accessories and the options, please contact RIGOL sales representatives or the local distributors.

Appendix C: Warranty

RIGOL (SUZHOU) TECHNOLOGIES INC. (hereinafter referred to as **RIGOL**) warrants that the product will be free from defects in materials and workmanship within the warranty period. If a product proves defective within the warranty period, **RIGOL** guarantees free replacement or repair for the defective product.

To get repair service, please contact with your nearest **RIGOL** sales or service office.

There is no other warranty, expressed or implied, except such as is expressly set forth herein or other applicable warranty card. There is no implied warranty of merchantability or fitness for a particular purpose. Under no circumstances shall **RIGOL** be liable for any consequential, indirect, ensuing, or special damages for any breach of warranty in any case.

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