SALUKI TECHNOLOGY

S3101 Cable & Antenna Analyzer

User Manual

Saluki Technology Inc.

The manual applies to the cable & antenna analyzer of the following models:

- S3101A Cable & Antenna Analyzer (1MHz - 4GHz)
- S3101B Cable & Antenna Analyzer (1MHz - 8GHz)

Standard Accessories of S3101 cable & antenna analyzer:

No.	Name	Qty.
1	Handheld Cable & Antenna Analyzer	1 Set
2	AC Adaptor	1 PC
3	Standard Three-phase Power Cord	1 PC
4	Built-in Rechargeable Battery	1 PC
5	USB Cable	1 PC
6	Car-mount Charger	1 PC
7	CD (PC software and User Manual)	1 PC
8	Certificate of Calibration	1 PC

Options of the S3101 cable & antenna analyzer:

Option No.	Item
S3101-01	USB Power Measurement Software
S3101-02	Backup Rechargeable Li-ion Battery
S3101-03	GPS Cable
S3101-04	S87230 USB Continuous Wave Power Sensor (9kHz - 6GHz)
S3101-05	S87231 USB Continuous Wave Power Sensor (10MHz - 18GHz)
S3101-06	S87232 USB Continuous Wave Power Sensor (50MHz - 26.5GHz)
S3101-07	S87233 USB Continuous Wave Power Sensor (50MHz - 40GHz)
S3101-10	SAV20201A Type N Male Calibration Kit DC - 9GHz
S3101-11	SAV20201B Type N Female Calibration Kit DC - 9GHz
S3101-12	N-DIN Adaptor L29/N-KJ-T
S3101-13	N-DIN Adaptor L29/N-JJ-T
S3101-14	Low Loss Test Cable N-JK (80cm)

Option No.	Item
S3101-15	Low Loss Test Cable N-JJ (80cm)
S3101-16	Functional Soft Case
S3101-18	Hard Case (Carrying Case)

Preface

Thanks for choosing S3101 Cable & Antenna Analyzer produced by Saluki Technology Inc. Please read this user manual carefully for your convenience.

Manual No.

S3101-03-01

Version

Rev02 2020.06 Saluki Technology

Manual Authorization

The information contained in this User Manual is subject to change without notice. The power to interpret the contents of and terms used in this Manual rests with Saluki.

Product Quality Assurance

The warranty period of the product is 36 months from the date of delivery.

Product Quality Certificate

The product meets the indicator requirements of the manual at the time of delivery. Calibration and measurement are completed by the measuring organization with qualifications specified by the state, and relevant data are provided for reference.

Quality/Environment Management

Research, development, manufacturing and testing of the product comply with the requirements of the quality and environmental management system.

Precautions

Warning

"Warning" indicates danger. It reminds the user to pay attention to a certain operation process, operation method or similar situations. Noncompliance with the rules or improper operation may result in personal injuries. You must fully understand the warning and all the conditions in it shall be met before the next step

Attention

"Attention" indicates important prompts and no danger. It reminds the user to pay attention to a certain operation process, operation method or similar situations. Noncompliance with the rules or improper operation may result in damage to the instrument or loss of important data. You must fully understand the caution and all the conditions in it shall be met before the next step.

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Content

1. Brief Introduction

S3101 is a new Cable and Antenna Analyzer that boosts your troubleshooting and testing speed while optimizing usability.

Utilizing the latest advancements in technology, the S3101 has been optimized for field conditions, ease of use, and efficient sweep management capabilities. It delivers 8 hours of continuous battery operation, the most ever offered in a handheld cable and antenna analyzer. With its large outdoor viewable 7" LCD touch screen display, new intuitive GUI, and classic mode, the S3101 is not only easy to use, but also significantly increases a user's efficiency in the field.

1. 1. Key Feature

- Frequency range: 1MHz to 4GHz/ 8GHz
- Multiple measurement functions: Return Loss, VSWR, Cable Loss, DTF Return Loss, DTF VSWR, Smith Chart and Port Phase
- Impact, dust, and splash resistant
- Smarter and faster electronic calibrator
- More than 8 hours of continuous battery life
- 7-inch LCD touch screen provides bright display both indoors and out-doors with largest view angle in class
- Dual window display provides different measurement format
- Measurement guide helps new users quickly familiarize with the instrument
- Supports USB memory stick and PC connectivity for easy efficient data management and automation
- Built-in GPS receiver (through the external GPS antenna) and users can get current location information

1. 2. Typical Applications

- Wireless Service Providers (WSPs)
- Public Safety
- Radio and TV Broadcasting
- Aerospace and Defense

2. Safety Instructions

Please read safety instruction carefully and Strictly follow!

We will spare no efforts to ensure that production process comply with latest safety standards so as to safeguard the safety of our users. The design and tests of our products and accessory equipment comply with relevant safety standards. We have established quality assurance system so that we can better supervise product quality and ensure that all products accord with standards in the system. To maintain the sound state of equipment and ensure safe operation, please comply with the following instruction. Contact us if you have any questions.

It is also your responsibility to use this product in correct manner. Suitable for industrial, laboratory and field uses, this equipment, however, must be used in correct manner so as to prevent personal injuries and property damages. For problems caused by misuses, liabilities rest on users. By proper use, it means that users should use this product according to prescriptions in the product document and in the required conditions. As sufficient expertise is required, only professional technicians and people that have been strictly trained and have mastered necessary skills are qualified to use this product. Please keep safety manual and product document in a proper manner, and deliver them to the end user. To forestall personal injuries and property loss, please abide by these safety instructions. Prior to using this product, please read carefully and comply with these instructions accordingly.

2. 1. Device safety

a) Use designated packing container in shipping and avoid falling or violent collisions in moving, which may cause damages to the device.

b) Use AC-DC adapter shipped with the device to supply power to the product. Using other power adapters may case damages to internal hardware.

c) Use 220V three-wire regulated voltage AC power supply to prevent high-power spike pulse interference from damaging internal hardware.

d) Ensure that power supply is well connected to the ground to prevent damages to the device caused by poor connection or false connection.

e) Take such anti-static measures as wearing anti-static wrist strap when operating this device so as to prevent static from damaging the device.

f) Injection of DC signal into input end is prohibited. Signal power needs to be lower than 0.5W. If not, damage to the device may occur.

g) If device uses external or internal batteries, replace these batteries with the same or equivalent type of batteries. When using other types of batteries, blast may occur.

h) Both insertions of objects into the gap of the device housing and dumping of liquids over device housing or into device are prohibited, which may cause short circuit, electric shock, fire or personal injuries.

i) Notches or gaps in the device, designed to help internal ventilation and whereby prevent overheat, must not be covered. The device must not be put on couch, wrapped with carpet, or placed in airtight housing unless ventilation is good

j) This device must not be placed on radiator, dish heater and other heating devices. Ambient temperature must not surpass the maximal temperature prescribed in this manual

k) Attention: Once this device is on fire, it may release toxic gases or liquids.

2. 2. Precautions on personal safety

a) When moving the device, use proper tools and move the device softly so as to avoid personal injuries caused by the falling of the device.

b) Device should be proper grounded so as to prevent personal injuries caused by poor or false grounding

c) When cleaning the device, please unplug the device to avoid electric shock. Use dry or moist soft cloth to clean the device. Do not clean the internal of the device.

d) Before using this device, personnel need to be trained. When using the device, concentration is required. Operation by unqualified people may cause personal injuries and property losses.

e) Use of this device when power line is broken is prohibited. Regular check on power line is necessary. Proper measures should be taken to keep power line in good state and prevent stumble and electric shock.

f) Field use of the device when there is lightning is prohibited, which may cause personal injuries and property loss.

3. Overview

This chapter will help the user get to know S3101 Cable & Antenna Analyzer quickly. This chapter includes the introductions of :

- Front Panel
- Interfaces on top
- Screen Area
- Battery
- Turn On/Off S3101

3.1. Front Panel Overview

This Section will give a detailed introduction to the front panel of S3101. You can get generally familiar with the basic application of the panel keyboard of the instrument by reading it. The front panel of S3101 Cable & Antenna Analyzer is as shown below:

Figure 3-1 Front Panel of S3101 Cable & Antenna Analyzer

The front panel of S3101 Cable & Antenna Analyzer is composed of various parts, including ON/OFF key, reset key, function key area, number pad (character key) area and LED indicator.

3.1.1. ON/OFF, Reset Key

Figure 3-2 Schematic Diagram of ON/OFF & Reset Key

【⏻】: Used to start up or shut down the instrument.

【Preset】: Used to reset and restore the system to default initial state.

3.1.2. Function Key Area

Figure 3-3 Schematic Diagram of Function Key Area

- 【Freq/Dist】: Used to set the measurement parameters, including frequency parameter, signal standard, distance parameter and speed factor.
- 【Sweep/Setup】: Used to set the measurement parameters, including trigger mode, sweep mode, sweep time, sweep points and intermediate frequency band width.
- 【Trace】: Used to realize the comparison between reference trace and current data, including the digital operation of difference value division; or store the current data as a reference trace. Reference trace can also load the saved traces by 【Save/Recall】.
- 【Ampt】: Used to set the display range of Y-axis.
- 【Marker】: Used to set the marker functions, including marker ON/OFF, marker mode, peak search and marker dragging mode.
- 【Cal】: Used to realize the calibration functions, including calibration method, calibration status ON/OFF and selection of calibration kit model.
- 【Save/Recall】: Used to realize the file operations, including save and load measurement status and measurement trace, screen capture, storage position and file copy.
- 【Limit】: Used to realize limit test functions, including limit test ON/OFF, alarm ON/OFF as well as the compilation, saving and loading of limit traces.
- 【Run/Hold】: Used to switch the results between continuous sweep and holding current sweep of the Analyzer.
- 【Meas】: used to set the measurement mode and single-dual window switch
- 【System/Local】: When in local operating mode, it is used for the settings of system mode, such as the switch of modes between antenna test and power test, setting of system date, time, power save mode, and view of product serial number and internal program version number of the Analyzer; when in remote control mode, it is used to return the Analyzer to local function.

3.1.3. Numeric (Character) Key Area

The numeric keys can be used to enter an exact value or to quickly switch from one value to another value, for changing the measurement setup of the Analyzer. The keys can also be used to enter characters, mainly to save the instrument settings or input of file names of measurement traces.

Figure 3-4 Numeric Key Area

Numeric (character) keys are used to input the values while setting frequency, marker, distance, amplitude and other parameters, and then press the corresponding unit key or Enter key to complete the input. There are 2 or 3 characters printed on the upper left corner of each numerical key and when the user intends to input characters, press them in quick succession to switch between numbers and characters. The correspondence relationship between entered character and press times is as shown below in Table 3-1:

Table 3-1 Instruction to Keys on the Keyboard

Press Times / Figure Key	1	2	3	4
1	1	A	B	C
2	2	D	E	F
3	3	G	H	I
4	4	J	K	L
5	5	M	N	O
6	6	P	Q	R
7	7	S	T	U
8	8	V	W	X
9	9	Y	Z	9
0	0			

【•】Decimal Point Key: Used to enter the decimals points when entering a decimal value with decimal places; used to enter the character "." When entering characters.

【+/-】Plus/Minus Sign: Used to trigger a positive or negative value input before figure input; used to enter the characters "+" or "-" when entering characters.

3.1.4. Other Keys

Figure 3-5 Other Keys

- 【↑】&【↓】: Mean increase and decrease respectively and used to control step or select current options.

- 【←】Backspace Key: Used to delete the last entered number or character.
- 【Esc】: Used to invalidate the entered values and close the input label when entering parameters.
- 【Enter】: Used to validate the entered values when entering parameters.

3. 1. 5. Knob

It is mainly used to move the marker and change the value of current parameters, such as adjust the frequency, distance and amplitude according to a certain proportion; in addition, the knob can also be used to switch the currently selected item when operating the list box. The knob supporting point is located in the center of the knob, shaped like “umbrella”. Therefore, do not try to hold down on side with a single finger to rotate the knob when using, which will increase the friction between the knob and shell. Operators can use four fingers to grip the side or top of the machine to form a pivot, and then use the thumb to complete the rotation. As the picture shows:

Not recommended **Not recommended** **Recommended**

Figure 3-6 Knob Operation

3. 2. Top Panel Overview

The top panel of S3101 Cable & Antenna Analyzer is as shown in Figure 3-7, including power interface, digital interface and test port.

Figure 3-7 Top Panels

3. 2. 1. Power Interface

Used for external DC power input. DC output from AC-DC adapter is used to power the Analyzer. The conductor inside external power interface is positive, with external conductor grounded.

Figure 3-8 Power interface

3. 2. 2. Digital Interface

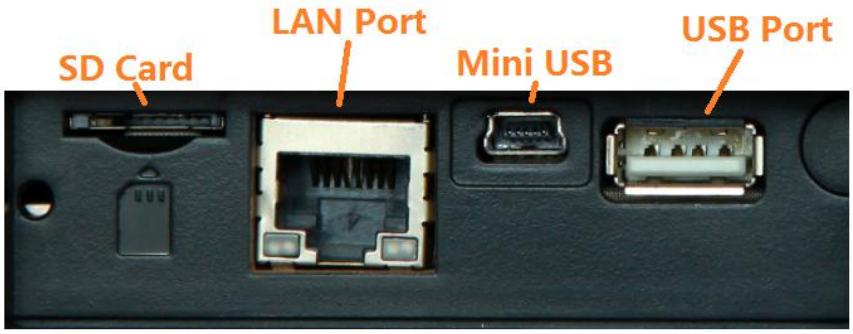

Figure 3-9 Digital Interface

1) SD card slot: Micro SD card can be used in memory space extension of the instrument, or copy of relevant data and documents of the instrument.

2) LAN (network) interface: a 10/100Mbps network interface, featured by standard 8-pin structure, can be used to select automatically from two data rates, and also connect to PC via a network cable, related tools and software then can be operated by PC to perform program control and data transmission to S3101 Cable & Antenna Analyzer.

3) Mini USB interface: used to connect an external PC and then related tools and software can be operated by PC to perform program control and data transmission to S3101 Cable & Antenna Feeder.

4) USB A-type port: used to connect external USB instrument, such as USB storage device, USB mouse and USB keyboard.

3. 2. 3. Test Port

Figure 3-10 Test Port

1) GPS antenna: used to connect GPS antenna instrument and support positioning of the current location of Analyzer.

2) 10MHz I/O port: used to input/output the 10MHz signals, and can also be used to provide 10MHz signal for the Analyzer as reference signal by connecting with other external instrument; output 10MHz inner signal to external instrument as reference clock.

3) Port 1: test port, with characteristic impedance of 50Ω and N-type female port.

Warning

The damage limit level at the test port: +27dBm RF power or ±25V DC voltage, and it may burn down the instrument in case of exceeding the above range.

3. 3. Screen Area Overview

S3101 is provided with a 7-inch HB TFT true color LED with the function of touch screen and supports soft-key operations of applications through touch screen. The touch screen display area is as shown in Figure 3-11. Additionally, it provides different settings with different

color contrast corresponding to different testing environment such as outdoor, nighttime, and normal testing environment.

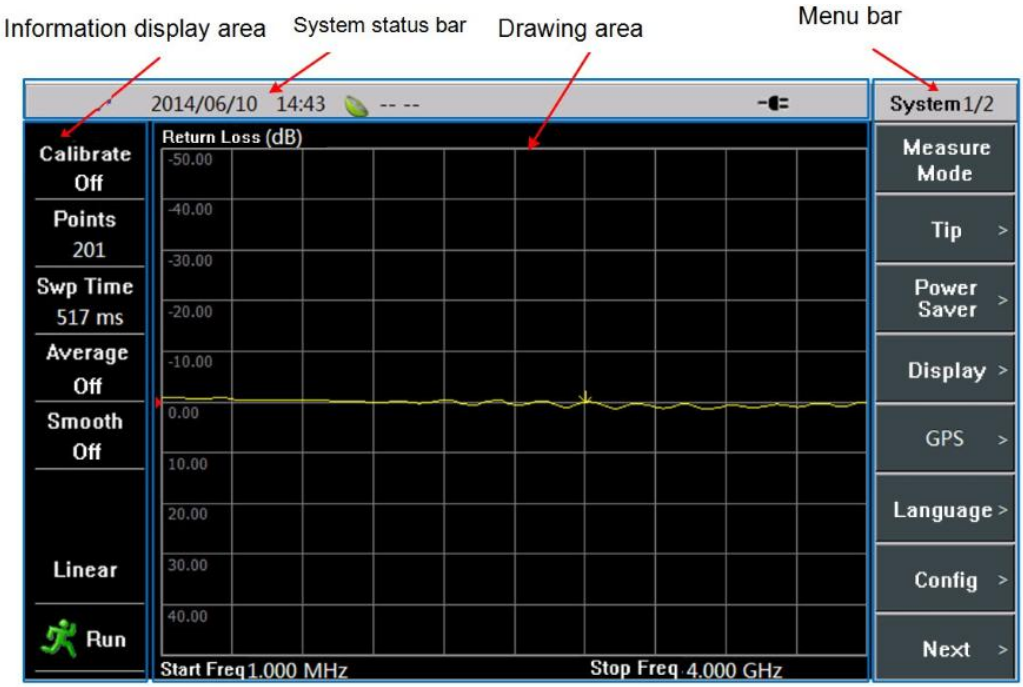

Figure 3-11 Touch Screen Display Area

3. 3. 1. System Status Bar

Figure 3-12 System Status Bar

1) Analyzer system date and time: Operators can set or change through 【System/Local】→[SET]→[Date/Time].

2) GPS display area: Operators can connect the GPS antenna and then turn on GPS through 【System/Local】→[GPS]→[GPS On Off]. GPS information will be displayed in this area.

3) Power supply identification area: This area includes the following three display status, as shown in Figure 3-13:

   a) when the battery is not installed, it displays the external power supply pattern;

   b) when the battery is installed and external power supply is not connected, it displays the current status of electric quantity;

   c) when the battery is installed and external power supply is connected, it displays the charging status.

a) External power supply **b) Display of electric quantity** **c) Charging status**

Figure 3-13 Power Supply Identification

3. 3. 2. Information Display Area

Figure 3-14 Information Display Area

Information display area mainly includes calibration On/Off, sweep point, sweep time and run/hold, etc. The area is mainly to provide operators with setting information about the sweep traces in the current drawing area; and operators can click the appropriate area to reset those information. For example: the sweep point is displayed as 201, the user can click the touch screen to sweep the area corresponding to the points, then the label information set of those point will be displayed in the drawing area in the middle of the display screen, and the trace sweep points can be reset via numeric keys and 【Enter】keys, knob or【↑】【↓】.

3.3.3. Trace display Area

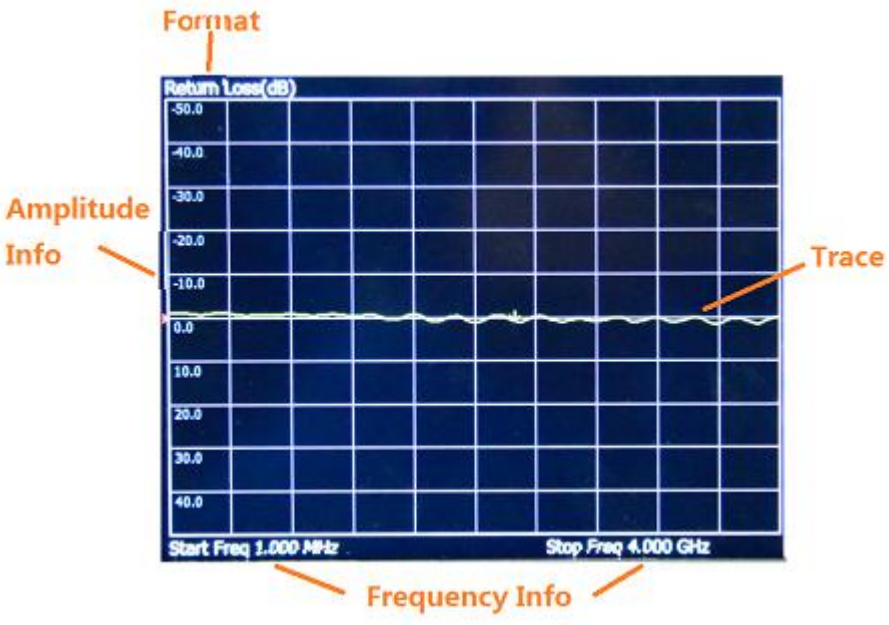

Figure 3-15 Drawing Area

The trace display area mainly presents the measurement data traces in a manner of two-dimensional images to the user, for easy and intuitive observance of measurement results. It mainly includes the measurement format, traces and X/Y-axis unit.

1) Measurement format names of the traces displayed on the screen, such as return loss, cable loss and DTF;

2) Measurement data trace obtained on the basis of different measurement formats;

3) Y-axis: amplitude information; X-axis: frequency or distance information.

Prompt

The bottom X-axis sign of the drawing area has the function of information display, and it can set the X-axis frequency or distance information via clicking on the corresponding areas on the screen.

3. 3. 4. Menu Bar

Located at the menu area on the right corner of the touch screen, the menu bar includes menu bar title and menu item. Click any function keys on the front panel of the Analyzer, the right touch screen expands the menu corresponding to the title, and then the user can click the menu to select the corresponding menu items and sett measurement parameters. The menu bar corresponding to the 【Meas】is as shown in Figure 3-16.

Figure 3-16 【MEAS】Menu Bar

3. 4. Battery

S3101 Cable & Antenna Analyzer is equipped with a rechargeable lithium-ion battery with a large capacity with operating time of up to more than 8 hours (Typ.). In order to assure the service life, the battery shall be taken out of the battery compartment in transport and long-term storage. Buying stand-by batteries of the same model with the original one is recommended to avoid test interrupt owing to low battery if long-time field test is performed.

3. 4. 1. Battery Installation & Replacement

S3101 Cable & Antenna Analyzer is easy to install or replace the battery, which is as shown in the below figures.

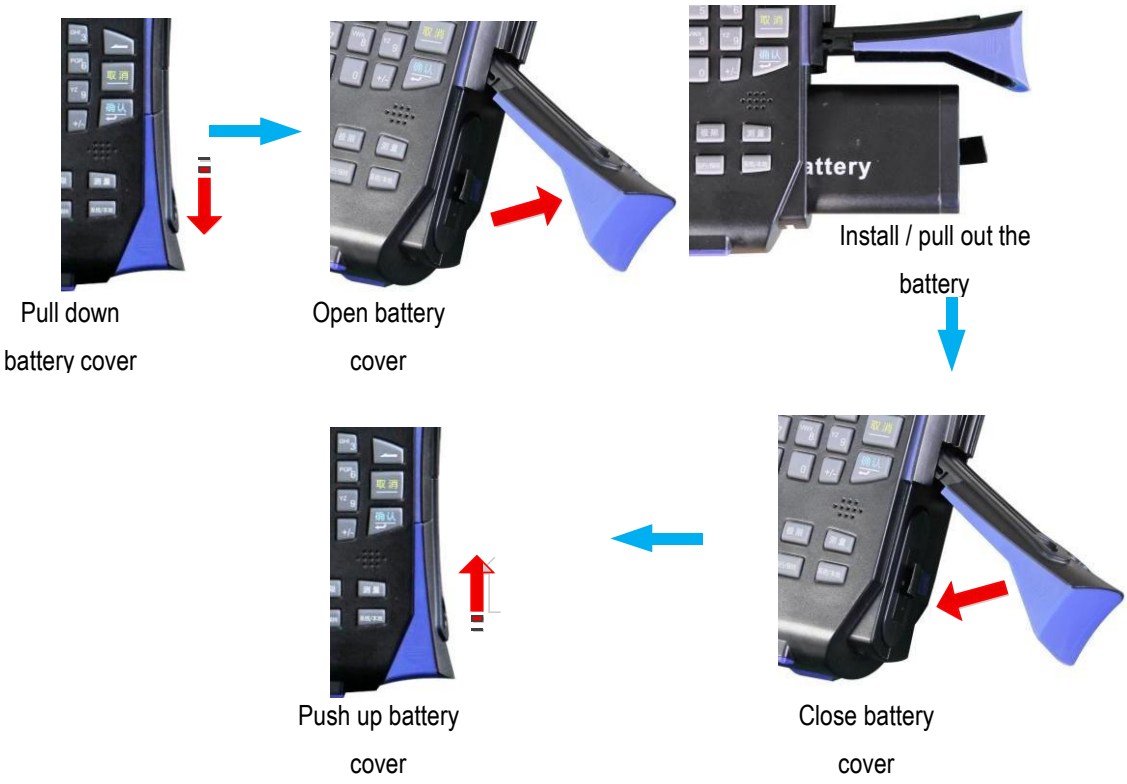

Figure 3-17 Battery Installation or Replacement Procedures

3. 4. 2. Viewing Battery Status

The user can view the battery status in either of the following methods:

1) Check the battery icon in the system status bar, which indicates the approximate level of charge. If only 1 bar left, please timely replace or charge the battery.

2) Press 【System/Local】 to enter system menu, click [Next Page]→[Self-test] to check the current battery remaining power in the power supply item.

3) Remove the battery, and press the key with a white point on the battery end, the indicator on the battery will light to indicate the current remaining battery power. If only 1 bar left, please timely charge the battery.

3. 4. 3. Charging a Battery

User can recharge the battery in the S3101 Cable & Antenna Analyzer while the analyzer is operating or when it is turned off. The charging procedures are as follows:

1) Install the battery in the Analyzer.

2) Plug in the supplied AC-DC adapter and switch external power on.

3) The yellow LED on the left bottom corner of the front panel lights and flashes when charging with power off, indicating that the battery is charging, and the constant yellow LED indicates complete charge; the green LED lights and flashes when charging with power on, indicating that the battery is charging, and the constant green LED indicates complete charge. At that time, the battery icon on the right of touch screen system status bar will show the battery is fully charged.

Moreover, the charging time for a fully depleted battery is approximately 4h.

3. 5. Turn On/Off S3101

Press the yellow power switch  at lower left corner of the front panel of S3101 Cable & Antenna Analyzer for about three seconds, after beep from the buzzer, release it, the Analyzer displays startup screen.

S3101 will take about 20 seconds to boot the start system and perform a series of self-test program, then the instrument enters the main program initialization interface and displays “Initializing, please wait……” After the main program starts, it will show an internal self-test report, and the user can observe whether the instrument is working properly. In order to make the internal components achieve a stable performance indicator, the S3101 should be warmed up for 15 minutes before starting measurement.

Press the yellow power switch  at lower left corner of the front panel for about 3s, the Analyzer will automatically exit from the measurement application program and cut the power supply off.

4. Calibration

S3101 Cable & Antenna Analyzer shall be calibrated before measurement. Calibration can minimize the measurement error and improve the measurement accuracy of the tester. S3101 provides 2 calibration method

- Mechanical Calibration

When use mechanical calibration, a N type calibration kit is required.

- Embedded Calibration

4. 1. Mechanical calibration

1) Press 【Cal】 key, click [Cal Kit] menu to select the calibration kit model and then click Enter;

2) Click [M Cal], and the calibration wizard will prompt saying “Please connect [OPEN], and start calibrating by pressing corresponding soft key！”;

3) Connect the open standard to the calibration port, press [Open] key and then the prompt massage saying “[OPEN] Measuring...” as shown in Figure 4-1:

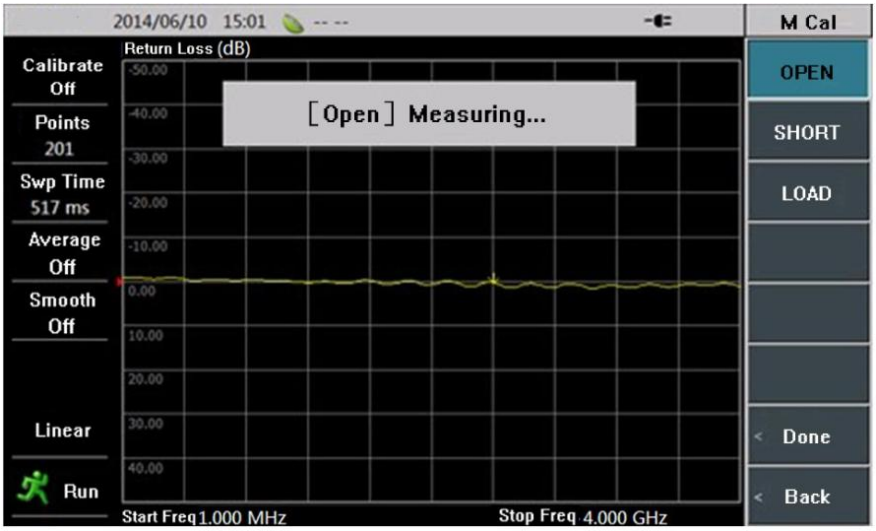

Figure 4-1 Calibration Open Standard

After completing open circuit measurement, the [Open] button on the right side of the menu bar is underlined as [Open], and the prompt massage saying “Please connect [SHORT], and start calibrating by pressing corresponding soft key!” as shown in Figure 4-2:

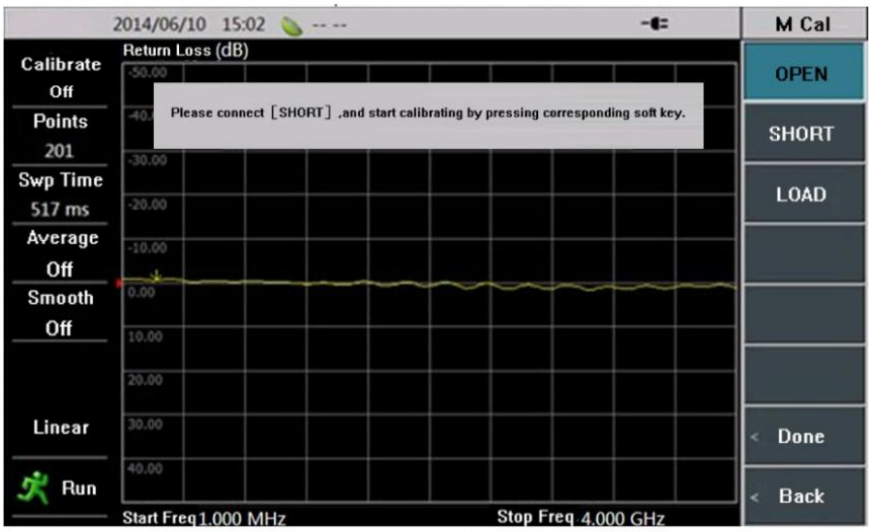

Figure 4-2 Calibration Short Standard

4) Disconnect the open standard with the calibration port, connect the short standard, and press [Short] button, then the screen will prompt "[SHORT] Measuring...". After completing short standard measurement, the [Short] button on the right side of the menu bar is underlined as [Short], and the prompt massage saying ""Please connect [LOAD], and start calibrating by pressing corresponding soft key".

5) Disconnect the short standard with the calibration port, connect the load, and press [Load] key, then the screen will prompt "[LOAD] Measuring...". After completing the load measurement, the [Load] item on the right side of the menu bar is underlined as [Load], and the prompt massage saying "Please Press "Done" soft key to finish the calibration" is popped up on the display screen as shown in Figure 4-3. Then press the [Done] key to complete the calibration.

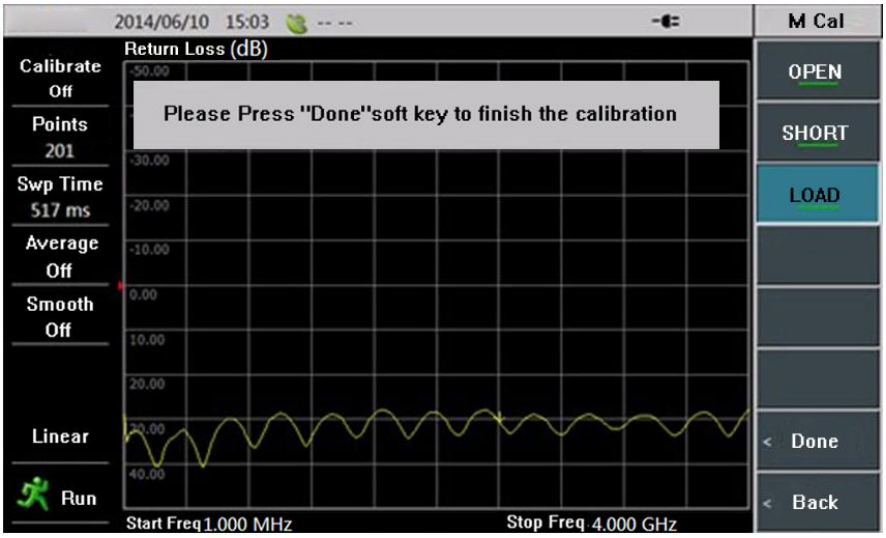

Figure 4-3 Complete Mechanical Calibration

6) After completing calibration, the top of information display area and the top of menu bar on the left side show "Calibrate ON." As shown in Figure 4-4. Connect the load with the port, observe the curve displayed in the screen, which indicates a proper calibration if the curve value is under 42dB (return loss measurement format) and instructions for proper calibration. After disconnecting the load with the port, connect DUT for measurement.

Figure 4-4 Calibration Switch is on

4. 2. Embedded calibration kit

4. 2. 1. Introduction

Operators can quickly perform “one-click” single-port calibration by embedded electronic calibration, which is not only of simple operation and high precision calibration, but also able to adapt to the environment temperature of 0℃ to +50℃, significantly improving the test efficiency. Meanwhile, the configuration of embedded electronic calibration of the test does not affect the use and performance of mechanical calibration kits. They can be used to meets the testing requirements of a variety of occasions.

4. 2. 2. Calibration Procedure

The embedded calibration process is as follows:

1) Before performing embedded calibration, please keep the measurement port is not connected.

2) When parameter settings are done, press 【Cal】 key, click [Embedded Calibration] menu item as shown in Figure 4-5, the instrument will automatically perform a calibration procedure with a prompt saying “Embedded Calibration Measuring……” displayed in the interface.

Figure 4-5 Start to Perform Embedded Calibration

3) After completing calibration, the display interface shows the prompt saying “Finish embedded calibration！ ” and the calibration status automatically displays from “OFF” to “ON” as shown in Figure 4-6.

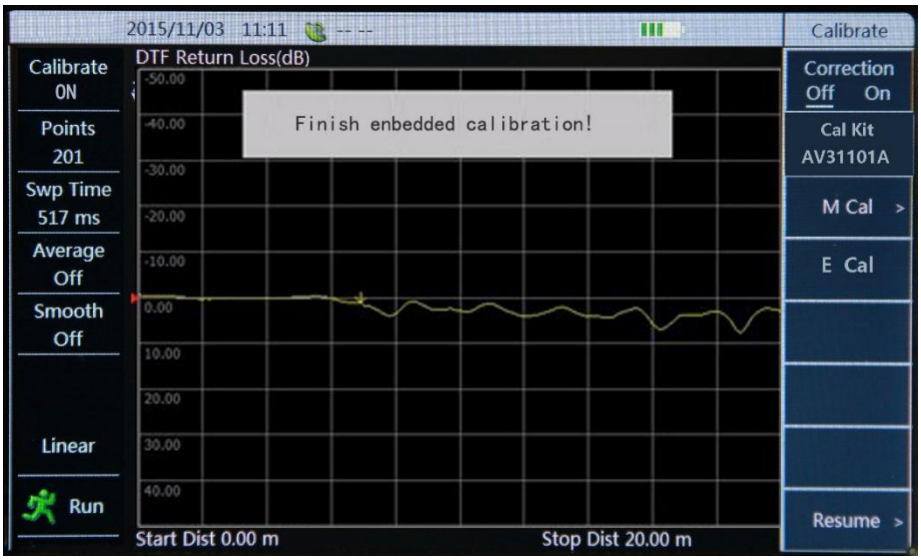

Figure 4-6 Complete Embedded Calibration

5. General Operations

This Section gives a description of how to set the frequency, marker and limit, etc. parameters of S3101 Cable & Antenna Analyzer, to facilitate operators to understand the basic operation of the Analyzer.

5. 1. Frequency

When the measurement format of the Analyzer is return loss, cable loss and phase, Smith chart, press 【Freq/Dist】 key and the right side of the screen will display the frequency menu bar.

- Set the measurement frequency range by start and stop frequencies:

1) Press 【Freq/Dist】 key to enter frequency menu bar;

2) Click the touch screen [Start Frequency] menu to input start frequency by turning the knob, 【↑】 or 【↓】 or numeric keys. When numeric keys are used to input the frequency value, the menu area changes to [GHz], [MHz], [kHz] and [Hz] four units menu, and then select the appropriate frequency unit to complete the start frequency setting;

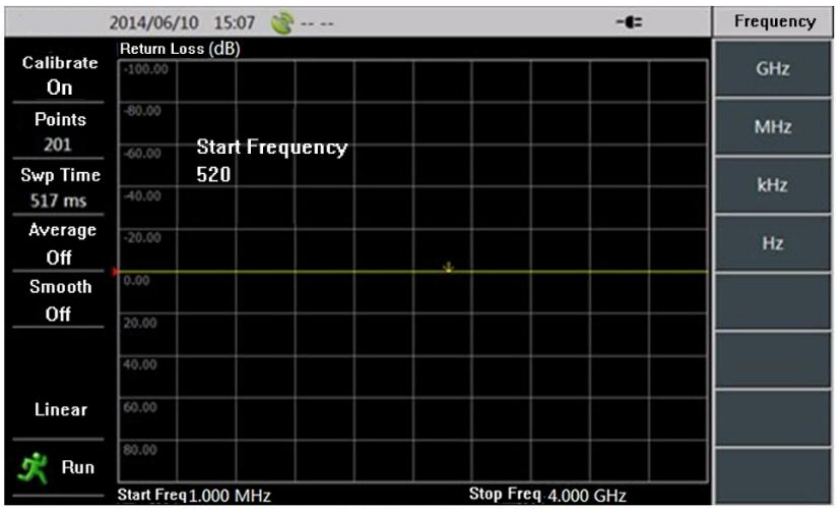

Figure 5-1 Input Start Frequency

3) Click the touch screen [Stop Frequency] menu to input the appropriate stop frequency.

- Set the measurement frequency range by center frequency and span.

1) Press 【Freq/Dist】 key to enter the frequency menu bar;

2) Click the touch screen [Center Freq] menu to input center frequency by turning the knob, 【↑】 or 【↓】 or numeric keys. When numeric keys are used to input the frequency value, the menu area changes to [GHz], [MHz], [kHz] and [Hz] four units menu, and then select the appropriate frequency unit to complete the center frequency setting;

3) Click the touch screen [Span] menu to input the appropriate span frequency.

5. 2. Distance

When the measurement format of the Analyzer is DTF Return Loss and DTF VSWR, press 【Freq/Dist】 key to display the Freq/Dist menu bar. Wherein the frequency setting is consistent with the instruction in section 5.1, and the distance setting steps are as follows:

1) Press 【Freq/Dist】 key to enter Freq/Dist menu bar;

2) Click the touch screen [Start Dist] menu to input start distance by turning the knob, 【↑】 or 【↓】 or numeric keys. When numeric keys are used to input the frequency value, the menu area displays the unit menu [M], and then click menu [M] or press 【Enter】 key to complete inputting the start distance;

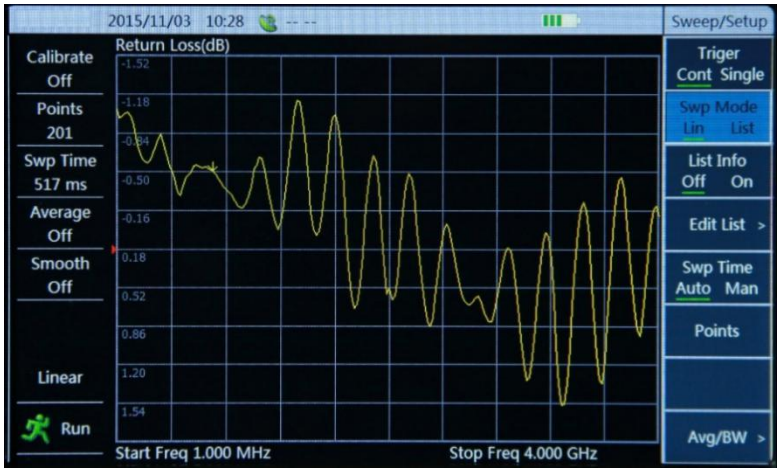

Figure 5-2 Input Stop Distance

3) Click the touch screen [Stop Distance] menu to input the appropriate stop distance.

5. 3. Amplitude

- Manually set the displayed frequency range by the top, middle and bottom values of the Amplitude menu:

1) Press 【Ampt】 key to enter amplitude menu;

2) Click the touch screen [Top] menu to input the appropriate top amplitude value by turning the knob, 【↑】 or 【↓】 or numeric keys, and then press 【Enter】 key to complete inputting the value;

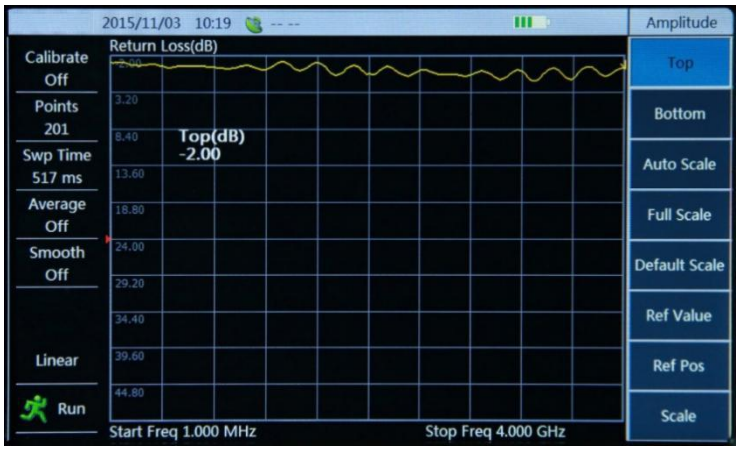

Figure 5-3 Input Top Amplitude Value

3) Click the touch screen [Bottom] menu to input the appropriate bottom amplitude value.

- Set the amplitude via auto mode:

For ease of operation, the Analyzer offers three automatic amplitude setting modes for the current measurement data, including auto scale, full scale, and default scale. At the auto scale mode, the Analyzer will automatically adjust the top and bottom amplitude values based on the maximum and minimum values of the current measurement data; at the full scale mode, the Analyzer will automatically set the top and bottom amplitude values as 100dB and -100dB or 450º and -450º; at the default scale mode, the Test will automatically set

the top and bottom amplitude values as 50dB and -50dB or 450º and -450º. The specific steps for amplitude settings via these three automatic modes are as follows:

1) Press 【Ampt】 key to enter amplitude menu;

2) Click the touch screen [Auto Scale], [Full Scale] or [Default Scale] menu, and then the application software will automatically set to the corresponding amplitude value.

Figure 5-4 Auto Scale of Amplitude

- Use the amplitude reference value, reference position and scale setting: In order to better observe the measurement curve, the Analyzer supplies operators with reference value, reference position or scale settings. The specific settings are as follows:

1) Press 【Ampt】 key to enter amplitude menu;

2) Click the touch screen [Ref Value], [Ref Pos] or [Scale] menu to input the appropriate amplitude reference value, reference position or scale by turning the knob, 【↑】 or 【↓】 or numeric keys, and then press 【Enter】 key to complete inputting such items.

5. 4. Sweep

Sweep/Setup mainly focuses on the settings of auxiliary parameters of the current test, including sweep time, sweep points, average smooth and IF bandwidth.

5. 4. 1. Set trigger mode:

1) Press 【Sweep/Setup】 key to enter Sweep/Setup menu bar;

2) Press the touch screen [Trigger Mode Cont Single] menu to complete the switching of the current trigger mode. When switched to "Single", the Analyzer will finish the sweep after completing primary sweep at the set frequency range.

5. 4. 2. Set sweep mode:

S3101 Cable & Antenna Analyzer provides two sweeping modes including linear sweep and list sweep, and operators can realize the switching of sweep modes by [Sweep Mode Linear List] menu. Before realizing the list sweep, first edit the list to build a list of information to be swept, and then use [Sweep Mode Linear List] to do switching. The list sweep steps are as follows:

1) Press 【Sweep/Setup】 key to enter Sweep/Setup menu bar;

2) Click the touch screen [Edit List] menu, and the menu bar will switch to the Edit List menu bar, as shown in Figure 5-5. Click the [Add Seg] to add a waveband to be swept in the list box; in this case, operators can set this segment of list by [Start Freq], [Stop Freq] and [Points]. If the list is already exited, operators can set the parameters with correspondence to the segments by [Seg ID] or

click the relevant segment number on the touch screen;

Figure 5-5 Edit Sweep List

3) After completing editing, click [Back] menu to return to the Sweep/Setup menu bar; in this case, it can use [Sweep Mode Linear List] menu to switch to the list sweep mode, as shown in Figure 5-6:

Figure 5-6 Sweep List

4) Click [List Info Off On] menu, operators can observe the list information edited.

5. 4. 3. Set sweep time:

The sweep time of S3101 Cable & Antenna Analyzer provides two modes, automatic and manual modes. In automatic mode, the Analyzer calculates the minimum time required for sweeping one screen based on the current state of the instrument. Operators can click [Sweep Time Auto Man] menu to switch to manual mode, and in this case complete sweep settings as needed. The specific setting process is as follows:

1) Press 【Sweep/Setup】 key to enter Sweep/Setup menu bar;

2) Click [Sweep Time Auto Man] menu to switch the sweep time to manual mode, and the menu will display [Sweep Time Auto Man]. Input the appropriate sweep time by turning the knob, 【↑】 or 【↓】 or numeric keys, and then press 【Enter】 key to complete inputting such items.

5. 4. 4. Set sweep points:

The default sweep point of S3101 Cable & Antenna Analyzer is 201, and operators can set the desired sweep points arbitrarily within 2 to 4001 according to the testing requirements. The specific sweep steps are as follows:

1) Press 【Sweep/Setup】 key to enter Sweep/Setup menu bar;

2) Click the touch screen [Sweep Point] menu, to input the appropriate sweep points by turning the knob, 【↑】 or 【↓】 or numeric keys, and then press 【Enter】 key to complete setting such items.

5. 5. Set [Avg/BW]

The random noise in Analyzer receiving path degrade the measurement accuracy. To reduce the trace noise and lower noise floor, S3101 Cable & Antenna Analyzer provides three functions including average, smooth and adjust IF bandwidth in order to obtain more accurate results and greater dynamic range.

5. 5. 1. Reduce IF bandwidth

IF bandwidth can be narrowed to reduce the noise of the Analyzer, thereby reducing the impact of noise on the measurement results and reducing trace noise. The noise floor can reduce by 10dB with each reduce of 10 times of IF bandwidth. S3101 Cable & Antenna Analyzer supports variable bandwidth IF filter, wherein the frequency bandwidth can be set from 10 KHz down to 1Hz at minimum, with step changes in 1, 2, 5 and 10. But note that the IF bandwidth reduce will elongate the sweep time. IF bandwidth setting steps are as follows:

1) Press 【Sweep/Setup】 key to enter Sweep/Setup menu bar;

2) Click [Avg/BW] menu to enter Avg/BW menu bar;

3) Click [IF BW] to pop up the “Set IF BW” list. Select the desired IF bandwidth by turning the knob, 【↑】 or 【↓】 or touching the selected items, and then click [Enter] key on the IF bandwidth dialogue box or 【Enter】 key to complete setting, as shown in Figure 5-7:

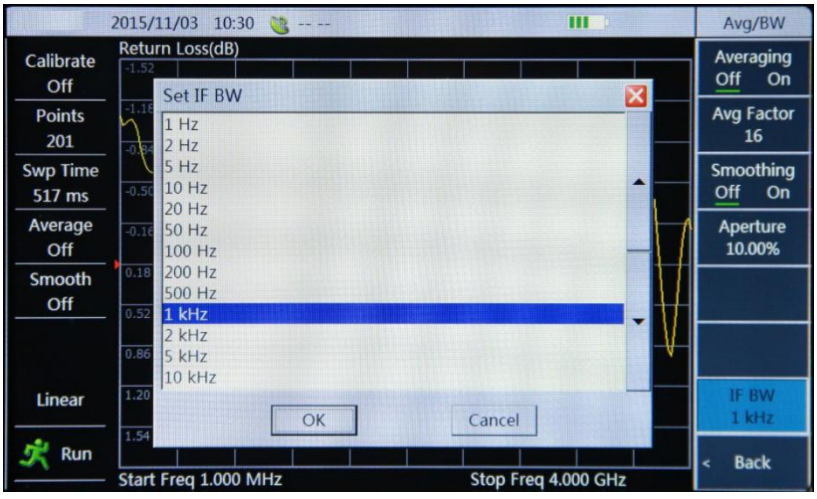

Figure 5-7 Set IF BW

5. 5. 2. Sweep average

Through several successive sweeps, the Analyzer takes the average value on the same measurement point for each measurement to calculate each measurement value. The setting of average factors determines the times of constant sweeps. The larger the average factor is, the more effective the decrease of impact of noise on the measurement will be.

1) Press 【Sweep/Setup】 key to enter Sweep/Setup menu bar;

2) Click the touch screen [Avg/BW] menu to enter Avg/BW menu bar;

3) Click the touch screen [Avg Factor] menu to input the appropriate average factor (1000 at a maximum) by turning the knob, 【↑】 or【↓】or numeric keys, and then press【Enter】key to complete setting;

4) Click the touch screen [Avg Off On] menu, the Analyzer will average the average factors set by operators and display the averaged trace on the screen, as shown in the below figure:

Figure 5-8 Set Average Factors

5. 5. 3. Trace Smoothing

Trace smoothing is displayed through the average of adjacent data points, and the ratio of adjacent data points to be averaged and total points is called smooth aperture. S3101 Cable & Antenna Analyzer sets the smooth aperture in a manner of percentage. Smoothing function can reduce the noise peak-peak value on the measurement data track without significantly increasing the sweep time.

1) Press 【Sweep/Setup】 key to enter Sweep/Setup menu bar;

2) Click the touch screen [Avg/BW] menu to enter Avg/BW menu bar;

3) Click the touch screen [Aperture] menu to input the smooth aperture (20% at a maximum) by numeric keys, and then press 【Enter】 key to complete setting;

4) Click the touch screen [Smooth Off On] menu to turn on or off the smoothing function, as shown in Figure 5-9:

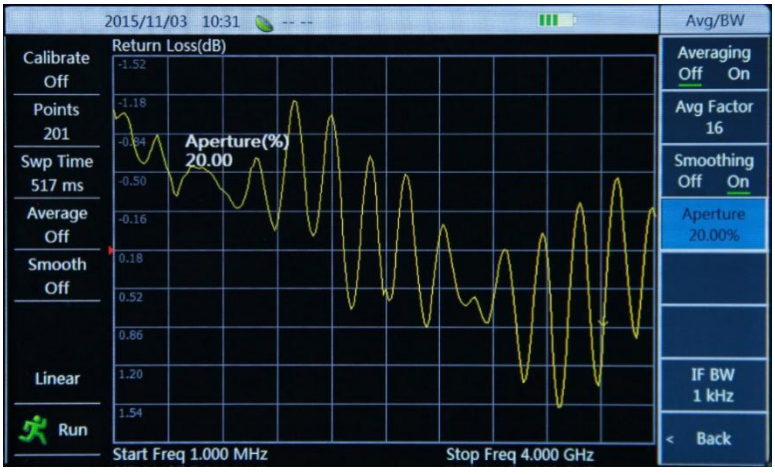

Figure 5-9 Set Smooth Apertures

5. 6. Limit

Limit function is available only for the measurement formats of return loss, DTF, cable loss and phase, and the sweep mode of linear sweep.

Limit test function can visually show whether the measured data exceeds the amplitude range represented by limit lines. Joined by multi-segments, limit line is edited via editing the limit value. If there is no data point exceeding the position limit value, then the limit test passes and the limit line is in green; as long as there is a data point exceeding the value, then the test fails and the limit line is in red. Turn the alarm function on to make beeps to warn the operators when the limit test fails.

5. 6. 1. Limit line

Editing of limit line is achieved by increasing the limit point, and adjusting the frequency and amplitude of limit point. The limit point can only be edited under activated state, and the current activated limit points are shown as open circles in the limit line, while inactivated ones as solid circles. Specific editing may follow the steps as follows:

1) Press 【Limit】 key to enter limit menu bar;

2) Click the touch screen [Mode Up Low] menu to select the type of edited limit line upper or lower limit line;

3) Click the touch screen [Edit] menu to enter Limit Line Edit menu bar. If there is no limit point at the present, add a limit point with value of 0 respectively to the start and stop frequencies, and the limit switch is automatically open;

4) Click the touch screen [Add Point] menu to add the limit point, which is the midpoint between the current activated point and adjacent limit point at right side;

5) Click the touch screen [Freq] menu to adjust the frequency of the current activated point;

6) Click the touch screen [Value] menu to adjust the amplitude of the current activated point;

7) Click the touch screen [Sel Point] menu, the activated limit point is represented by a hollow circle; it may also input the serial number before press 【Enter】 to activate the corresponding limit point; and also click again on [Limit Point] to switch to the next limit point at the right side of the limit point;

8) Repeat the above steps to edit and complete editing the limit line, as shown in the below figure:

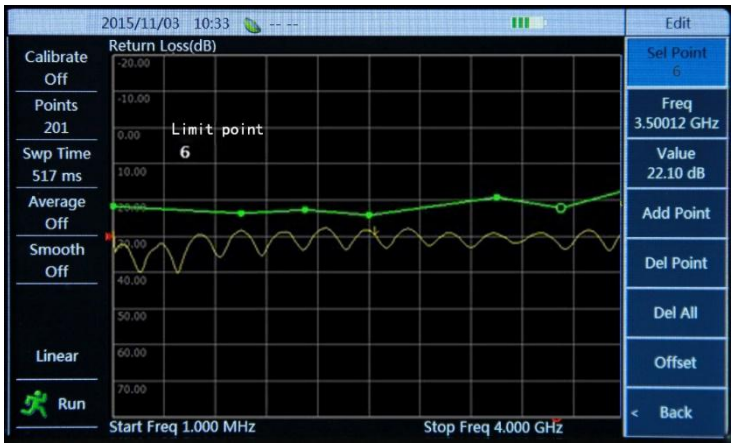

Figure 5-10 Edit Limit Line

5. 6. 2. Turn on limit test

Press 【Limit】 key and click the touch screen [Alarm Off On] menu to open or close the alarm function.

Additionally, during editing process, the limit test function has opened automatically, a single or all limit point can be deleted by clicking on [Del Point] or [Del All]; when there is no limit point, the limit test will automatically close. Figure 5-11 shows the limit line test fails.

Figure 5-11 Limit Test

5. 6. 3. Limit Line Store & Recall

The specific limit line store and recall steps are shown as follows:

- Press 【Limit】 key to enter the limit menu bar. Then click the touch screen [Save] menu to input the file name in the popped out box and then press 【Enter】 key to complete limit line store.
- Press 【Limit】 key to enter the limit menu bar. Then click the touch screen [Recall] menu to select the limit line in the popped out limit line file list and then press 【Enter】 key to complete limit line recall.

5. 7. Marker

In order to facilitate the measurement data reading, and search for specific measurement values, the Analyzer provides six separate markers for each window.

5. 7. 1. Turn on a marker

1) Press 【Marker】 key to enter marker menu bar;

2) Click the touch screen [Marker 1 2 3 4 5 6] menu to select the corresponded markers, and then click [Marker Off On] menu to separately open the corresponded marker.

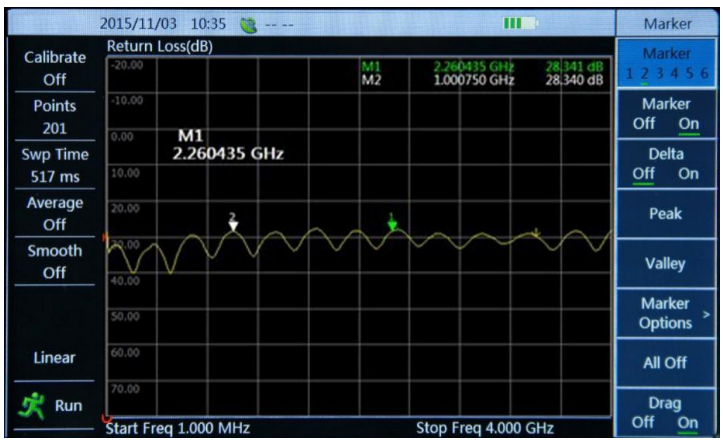

Figure 5-12 Marker Switch & Setting

5. 7. 2. Move marker

1) Use the above “Turn on a Marker” method to select the marker to be moved, making it the currently activated marker;

2) Input the marker frequency value (or distance value) directly via numeric keys, press the appropriate units menu to complete marker movement; or to move the marker by turning the knob or press【↑】and【↓】keys; it can also press and hold the trace marker and then drag to move the marker after the marker turns red (only available when dragging mode is on).

5. 7. 3. Marker peak and valley

1) After opening the marker, click [Peak] or [Valley] menu, it can search for a peak or valley on this measured trace.

2) Click [Marker Options] to enter quick marker menu bar, and by clicking on the appropriate quick marker menu, it can search for a peak or valley between the two markers range, or quickly set M1 to peak and M2 to valley, as shown in below figure:

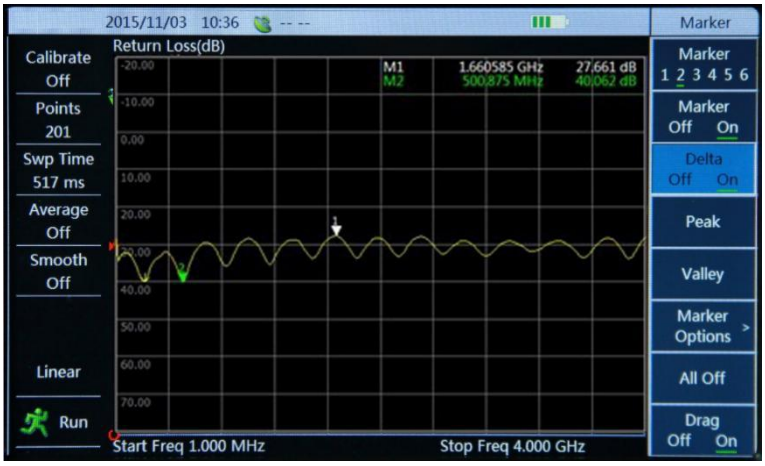

Figure 5-13 Peak & Valley Search

5. 7. 4. Marker mode

- The Analyzer provides two marker modes - Standard Mode and Delta Mode. Click [Delta Off On] menu to switch between them.
- Under standard mode, marker shows the frequency and amplitude value of data points, being the default mode of Analyzer marker; under delta mode, it displays the differential between the current marker and standard marker as well as frequency (or distance).

5. 7. 5. Basic marker operation

1) Press 【Marker】 key to enter marker menu bar, and then it opens Marker 1 by default;

2) Click [Marker 1 2 3 4 5 6] menu to select the marker number, it can activate the corresponding marker;

3) Click [Peak] or [Valley] menu to execute marker peak or valley search function;

4) Click [Delta Off On] menu to switch marker mode;

5) Click [Marker Off On] menu to close the currently active marker;

6) Click [All Off] menu to close all open markers in the current active window

Marker function is as shown in Figure 5-14:

Figure 5-14 Marker Function Schematic Diagram

5. 7. 6. Quick marker operation

1) Press 【Marker】 key to enter marker menu bar, it opens Marker 1 by default;

2) Click [Marker 1 2 3 4 5 6] menu to select Marker 2, and then press [Marker Off On] to activate Marker M2;

3) Click [Marker Options] menu to select [M5 Peak [M1, M2]], then M5 executes the peak search between M1 and M2; select [M5 Valley [M1, M2], then M5 executes the valley search between M1 and M2;

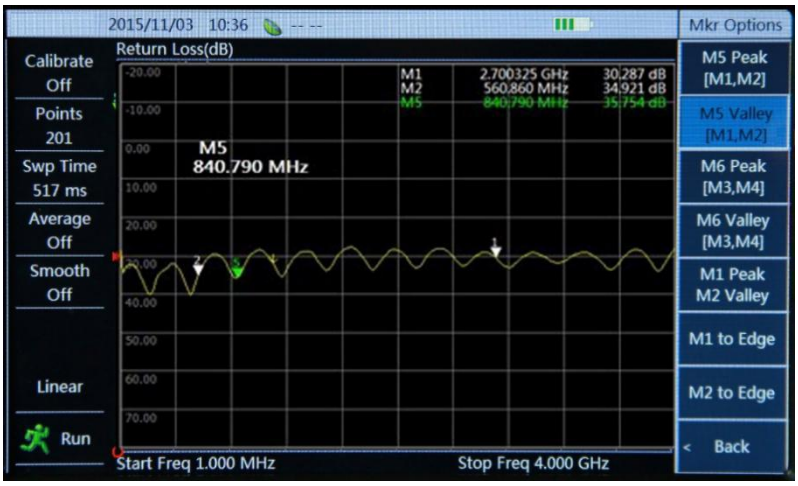

Figure 5-15 Use of Quick Marker

4) Click [M1 Peak M2 Valley] menu, then M1 executes peak search and M2 executes valley search;

5) Click [M1 To Boundary] menu, then M1 executes search to the last sweep point of trace; and press [M1 To Boundary] again, then M1 executes search to the first sweep point; the setting of M2 To Boundary is same as M1;

6) Click [All Off] menu to close all the open markers in the currently active window.

5. 7. 7. Switch of marker position under list sweep

Under list sweep, for the standard marker, if more than one segment contains the marker frequency to be set, press 【Enter】 to switch between different segments. For differential marker, it should always be in the same segment with corresponding reference marker, and the maximum and minimum value search is also focusing on the sweep segment where the standard marker is located.

5. 8. Display

S3101 Cable & Antenna Analyzer enables simultaneous display of two data windows, and each window can display data in different formats.

5. 8. 1. Open dual window

1) Press【Meas】to enter the measurement menu bar;

2) Click [Display Window Single Dual] menu to switch window display mode, the switch of windows numbers can be seen on the screen correspondingly.

5. 8. 2. Activate window

1) Press【Meas】to enter the measurement menu bar;

2) Click [Current Window Up Down] menu click the corresponding window on the touch screen to activate the corresponded window; the activated window is surrounded by a red box on the screen information display area, and the inactive window is surrounded by a non-red box.

5. 8. 3. Change the data format of the active window

1) Press【Meas】to enter the measurement menu bar;

2) Click the appropriate menu in the menu bar to select the appropriate measurement data format to change the measurement format of the current display screen drawing area; or drag the screen drawing area left or right to switch the corresponding measurement data format. Data formats include:

   - [Return Loss] is to select the return loss parameters and display them in the format of log;
   - [Cable Loss] is to directly measure the insertion loss of the cable;
   - [VSWR] is to select test parameters as VSWR;
   - [DTF Return Loss] is to select the return loss parameters under DTF mode and display them in the format of log;
   - [DTF VSWR] is to select the test parameters as VSWR under DTF mode;
   - [Phase] is to select test parameters as the reflection phase;
   - [Smith] is select test parameters as impedance, and the coordinate system serves as the Smith Chart.

In Figure 3-30, Window 1 is shown in the format of return loss; Window 2 is shown as Smith chart, and is active.

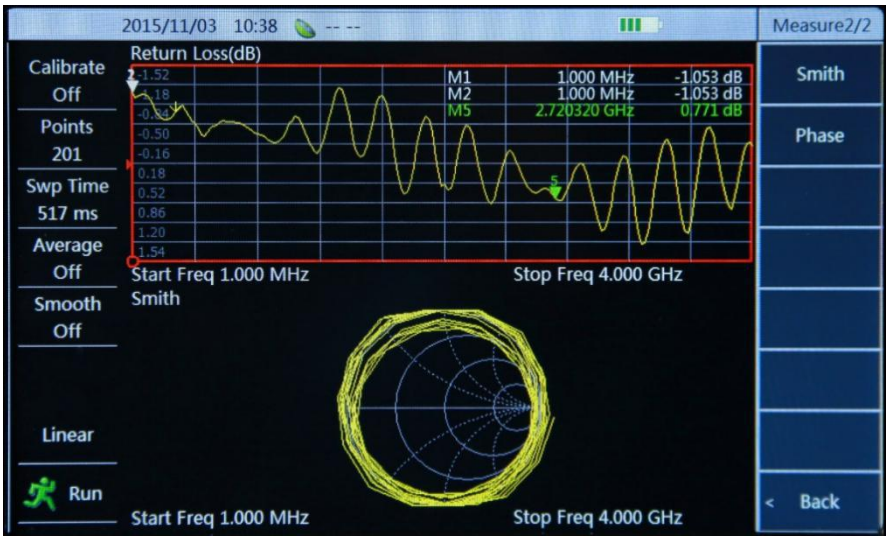

Figure 5-16 Simultaneous Display of Two Data Formats

Prompt

- Each window can set separately the trace marker.
- Frequency setting of the two windows is in synchronized association
- DTF parameters of the two windows are in synchronized association.

5. 9. Trace

The Analyzer provides two types of mathematical operations for the currently active traces and reference traces; and provides three kinds of trace display methods.

5. 9. 1. Obtain a Reference Trace

Before performing any type of trace operation, it must store a reference trace in memory, which can be obtained through recall of trace file and as which the current trace is set.

5. 9. 1. 1. Save current trace as reference trace

1) Press【Trace】 key to enter trace menu bar;

2) Click the [Data → Memory] menu, to store the current measurement trace in memory as a reference trace.

5. 9. 1. 2. Recall a trace from a file:

1) Press【Save/Recall】key to enter Store/Recall menu bar;

2) Click [Recall Trace] menu to select the trace in the file list popped up, and then click [Recall] or press【Enter】to recall the selected trace.

5. 9. 2. Trace Operation

The Analyzer provides D-value and ratio mathematical operation

1) Press 【Save/Recall】】 to enter Save/Recall menu bar;

2) Obtain a reference trace with reference to 5.9.1;

3) Click [Data - Mem] key, then the drawing area shows the corresponding traces by subtracting the stored data from the current measured data to realize the differential value calculation

4) press [Data/Mem] key, then the drawing area displays the corresponding traces by divorcing store data from the measured data to achieve the ratio operation.

5. 9. 3. Trace Display

Each window can display up to two traces, and if a reference trace has been obtained, the traces can be displayed through the following steps:

1) Press【Trace】to enter Trace menu bar;

2) Click the [Data] menu, then the trace corresponded with the current measured data is displayed on the screen;

3) Click [Store] menu, then the trace corresponded with the current stored data is displayed on the screen;

4) Press [Data & Storage] key, then two traces corresponded with the measured data and stored data are displayed on the screen. As shown in following figure, the stored trace is in green, and the current sweep trace is yellow:

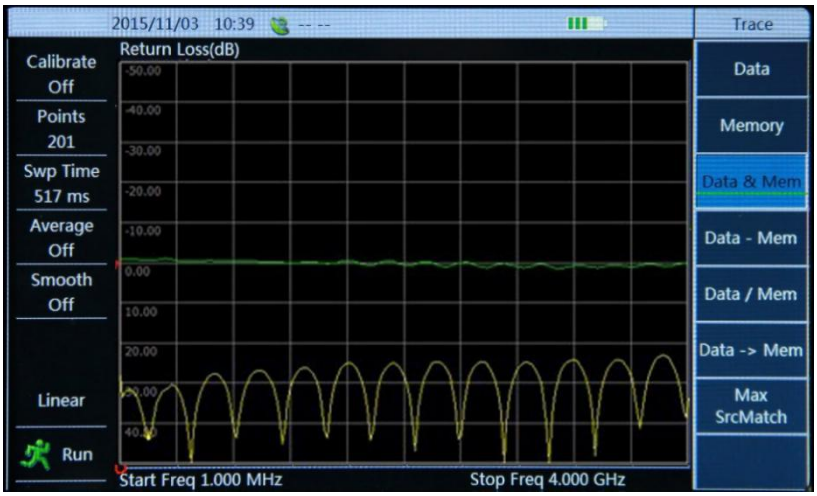

Figure 5-17 Trace Display

6. Cable & Antenna Test

S3101 Cable & Antenna Analyzer is provided with cable & antenna test function and Power Measurement function. This Chapter will introduce the operating procedures for cable & antenna test in detail.

After power on the S3101 Cable & Antenna Analyzer, the application program enters the antenna test function by default. If the operators have entered the power meter test function, press [MEAS MODE] menu under 【System/Local】 to switch to the antenna test function.

6. 1. Typical Measurement Formats

In order to understand the performance of the transmission system and solve the common problems in the transmission line system, S3101 provide following functions for cable & antenna diagnosis

- Return Loss

Return Loss is used to measure the signal reflection characteristics for antenna system, mainly for detecting the problems existing in antenna and cable system..

- Cable Loss

Cable loss is used to test the consistency or loss of energy on the transmission cable. Cable loss measurement is a method derived from return loss measurement.

- Fault Location (DTF)

Fault location test is a test method to find out the failure point of cable & antenna transmission system.

6. 2. Return Loss Measurement Setting

1) Press 【Meas】 key, click [Return Loss] menu to set the instrument measurement format as return loss.

2) Press 【Freq/Dist】 key and input the frequency range to be measured, that is start frequency and stop frequency.

3) Press 【Cal】 key to select the appropriate calibration kit to complete the calibration.

4) Connect the Analyzer to the DUT of which the terminal is antenna (in return loss measurement, DUT shall connect the load).

5) Press 【Ampt】 key and input the top-bottom coordinate figure or directly select the auto scale, to facilitate a better observation of measurement curve.

6) Press 【Marker】 key to set the appropriate marker.

7) Press 【Limit】 key to set a appropriate limit line.

8) Press 【Save/Recall】 key to store the current measurement results to the memory to facilitate later recall.

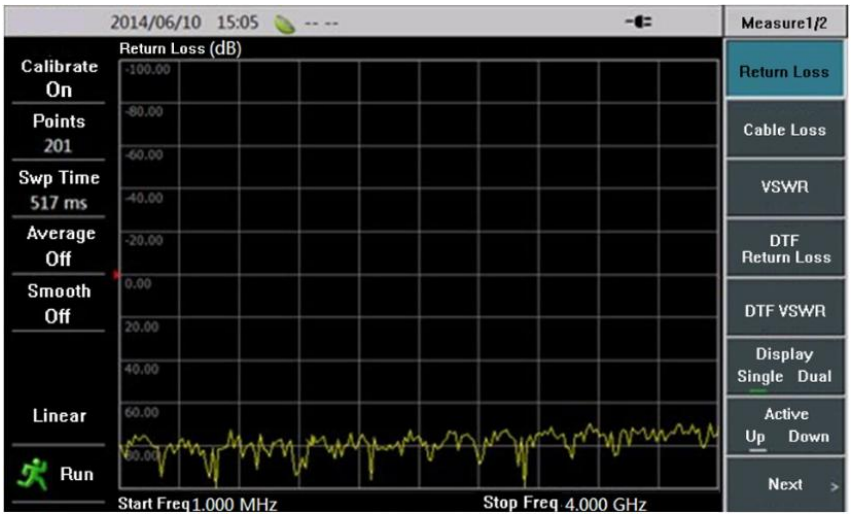

Figure 6-1 Return Loss Measurement

6. 3. Cable Loss Measurement Setting

1) Press 【Meas】 key, click [Cable Loss] menu to set the instrument measurement format as cable loss.

2) Press 【Freq/Dist】 key and input the frequency range to be measured, that is start frequency and stop frequency.

3) Press 【Cal】 key to select the appropriate calibration kit to complete the calibration.

4) Connect the Analyzer to the DUT of which the terminal is antenna (in cable loss measurement, DUT shall connect the short circuit).

5) Press 【Ampt】 key and input the top-bottom coordinate figure or directly select the auto scale, to facilitate a better observation of measurement curve.

6) Press 【Marker】】 key to set the appropriate marker.

7) Press 【Limit】 key to set an appropriate limit line .

8) Press 【Save/Recall】】 key to store the current measurement results to the memory to facilitate later recall.

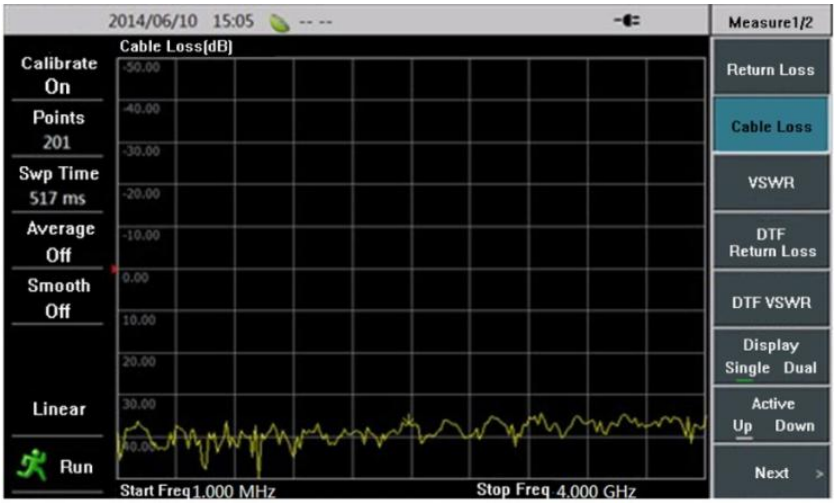

Figure 6-2 Cable Loss Measurement

6. 4. Distance-To-Fault (DTF) Measurement

In S3101 Cable & Antenna Analyzer, DTF measurement has two different display formats: DTF Return Loss and DTF VSWR. For the two same measurement processes, follow these steps to set.

1) Press 【Meas】 key to set the instrument measurement format as DTF Return Loss or DTF VSWR.

2) Press 【Freq/Dist】 key to first input the frequency range to be measured, that is start frequency and stop frequency; and then the distance range to be measured, that is start distance and stop distance; and also select the model of cable measured or input the cable velocity factor and cable loss.

3) Press 【Cal】 key to select the appropriate calibration kit to complete the calibration.

4) Connect the Analyzer to the DUT of which the terminal is antenna.

5) Press【Ampt】 key and input the top-bottom coordinate figure or directly select the auto scale, to facilitate a better observation of measurement curve.

6) Press 【Marker】】 key to set the appropriate marker.

7) Press 【Save/Recall】 key to store the current measurement results to the memory to facilitate later recall.

Figure 6-3 DTF Return Loss Measurement

7. Power Measurement

7. 1. Introduction

S3101 Cable & Antenna Analyzer connects optional external USB power probe, which supports precise Power Measurement. Power Measurement is a function of options. It is necessary to purchase associated measurement software and power probe if this function is required. This chapter provides a detailed description of Power Measurement function and related operation of S3101 Cable & Antenna Analyzer. The Analyzer displays power of signal tested, which is connected through power probe, with units of dBm and W or dB and %. Frequency range of Power Measurement is determined by measurement frequency range of power probe.

7. 2. Power Meter User Interface Introduction

S3101 Cable & Antenna tester uses cable&antenna test mode in default. You may switch to Power Measurement mode following the steps below:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Measure Mode] menu and select “Power meter” in the pop-up “Measurement model” dialog box;

3) Click "Confirm" key on dialog box or press【Enter】to enter Power Measurement interface.

Attention

Connect test port on power probe and signal source. USB interface of power probe is connected to USB A type connector of Analyzer with USB cable. Please connect the power probe before selecting “Power meter” function, otherwise the Analyzer will call up a warning of “Not connected probe！ ”, as shown in Figure 10-1:

Figure 10-1 Power Test Interface

7. 2. 1. System Status Bar

System status bar under Power Measurement mode is consistent with the one under antenna measurement.

Information Display Area

Information display area mainly includes several information displays such as zero correction, the maximum scale, the minimum scale,

average Off/On, offset Off/On, corresponding measurement Off/On, and Run /Hold. This area mainly provides configuration information of power meter measurement inside current Main display area for operators. User may reset the information by clicking corresponding areas on touch screen. For example: the maximum scale displayed is 30.00. You may click maximum scale area on touch screen then information setting of maximum scale will be displayed in Main display area. The information can be reset with knobs, 【↑】【↓】 keys, or numeric keys, as shown in Figure 10-2:

Figure 10-2 Information Display Area

Main Display Area

Main display area, mainly displaying power values obtained in measurement with dials and data for direct observation of measurement results for operators, is mainly composed of measurement mode, meter display area, and power data display area etc. As shown in Figure 10-3:

1) Measurement mode of current Analyzer

2) Power dial and pointer, used for indicating power value.

3) Power data display area displays specific values of current power level.

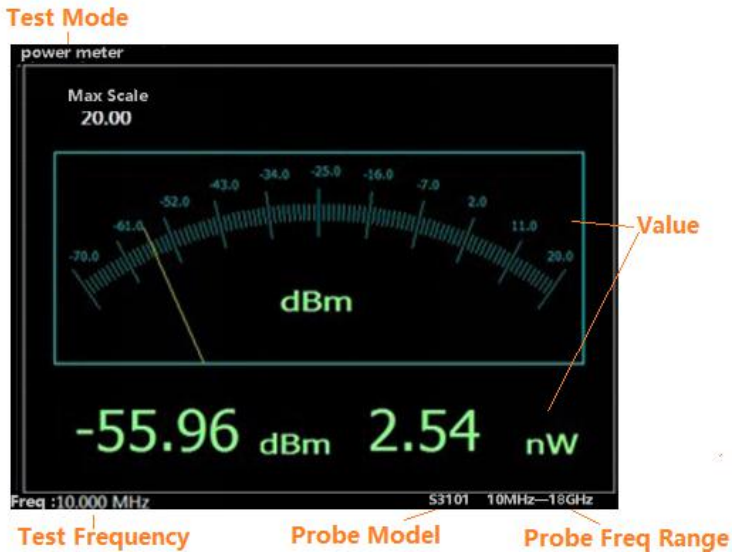

Figure 10-3 Main display area

7. 2. 2. Menu Bar

Menu bar is menu area in the right side of touch screen including two parts, menu bar title and menu items. Click function keys on front panel of Analyzer then menu bar of corresponding title will be spread in the right side of touch screen. You may select menu items and set measurement parameters through clicking menu on menu bar. For example, when 【Sweep/Setup】is clicked, corresponding menu bar is as shown in Figure 10-4.

Figure 10-4 SWEEP /SET Menu Bar

7. 3. Measurement Parameters Setting

7. 3. 1. Frequency

To obtain more convenient observation, you may set corresponding frequency range according to testing requirements for more accurate observation over power value of frequency point tested. Specific steps are as follows:

1) Press 【Freq/Dist】 to enter menu bar of frequency software;

2) Click [FREQ] menu (selected by default as there is only one drop-down menu in the menu), then input measurement frequency of power meter using knob, 【↑】 【↓】 keys, and numeric keys. Press corresponding menu and select frequency unit to complete frequency setting when numeric keys are used in inputting frequency values.

7. 3. 2. Sweep

- Average function

Average function covers average operation on results obtained from several continuous measurements and displays average result as measured values. Average factor setting determines continuous measurement times. The greater the average factor is, the lower the external interference of measured power will be obtained, which will lead to more accurate measured values.

- Offset function

When power of source under test is beyond measurement range, it is required to attenuate or enlarge signal tested. At this time, actual power value of source under test without being attenuated or amplified could be easily obtained through offset function.

In offset function, value displayed is current measured value deducting offset value set. Offset function is in operation when signal channel is connected with power amplifier or attenuator. Therefore, offset value shall be set to negative number when connecting external attenuator; positive value when connecting external amplifier.

- Relative measurement function

When turning on relative measurement function, it will save the power value of current measurement and then display the comparative value of each value measured with respect to power value saved. At the same time, units of comparative power value displayed will be changed from dBm to dB and from Watt to %. As shown in Figure 10-5.

Figure 10-5 SWEEP/SETUP Menu Bar

7. 3. 3. Amplitude

To obtain more accurate observation over signal tested, you may readjust amplitude setting of Analyzer according to frequency range

displayed. As shown in Figure 10-6:

Figure 10-6 Amplitude Setting

There are two amplitude setting methods as shown below:

- Manual setting: operators set the maximum value and the minimum value on power meter dial by themselves. Detailed operation is as below:

  1) Press 【Ampt】 key and enter amplitude menu bar;

  2) Press [Max Scale] menu, input the maximum scale value of power meter using knobs,【↑】【↓】keys or numeric keys, and press 【Enter】key to complete the maximum value setting;

  3) Press [Min Scale] menu, input the minimum scale value of power meter using knobs,【↑】【↓】keys or numeric keys, and press 【Enter】key to complete the minimum value setting.

- Automatic setting: operators do not have to set the maximum scale or the minimum scale by themselves. By clicking [Auto Scale] or [Full Scale] menu only based on requirements, application programs will automatically adjust the maximum value and the minimum value of dial in accordance with power data measured. The operation is as below:

  1) Press 【Ampt】key and enter amplitude menu bar;

  2) Click [Auto scale] on menu bar, application programs will automatically set the maximum values and the minimum values on dial according to power fluctuation range;

  3) Click [Full Scale] on menu bar, application programs will automatically set the maximum value on dial to 30dBm, the minimum value to -70dBm.

7. 4. Calibration

To obtain better Power Measurement over current signal and improve testing accuracy of power meter, it is required to perform zero calibration to power meter of Analyzer when necessary. During zero calibration, please turn off signal source first if power detector is connected with signal source; detailed steps of zero calibration are as follows:

1) Connect power probe with signal source and turn off signal source;

2) Press 【Cal】key and enter calibration menu bar;

3) Click [Zero] menu, the screen will indicate “Calibration”; “Finish calibration ! ” in a few seconds to indicate zero calibration is completed. As shown in Figure 10-7:

Figure 10-7 Power Meter Calibration

8. Document operation

8. 1. Introduction

This chapter mainly introduces document management function and menu structure of corresponding 【Save/Recall】】key of S3101 Cable & Antenna Analyzer. You may perform operations such as saving, recalling, copying, and deleting etc. to internal memory of Analyzer, external extension storage devices and documents between them via submenu.

The Analyzer provides a fast access to internal memory with large capacity, while supports external Mini SD card and USB external storage devices connecting. It is used for setting store status and measured data etc. of Analyzer. Save/Recall function set by instrument saves a lot of operating time on parameters setting and accelerates measurement speed. Save/Recall function supports comparative analysis over measured data or storing data in specific format for the convenience of analyzing and processing in externally controlled software.

Storage medium is internal memory in default state. Instrument setting and measured date will be stored into internal memory of Analyzer by default.

8. 2. Set Save Location

User may pay attention to the storage location of documents first if you want to store Sweep Trace or status during usage. Analyzer is set by default to store in internal memory of system, which is also displayed as [Internal] on screen. If you want to edit storage location, you may operate as follows:

1) Press 【Save/Recall】.

2) Press [Location [Internal]] menu and enter storage location menu bar.

3) Click corresponding storage location menu on storage location menu bar and complete storage location setting, as shown in Figure 8-1:

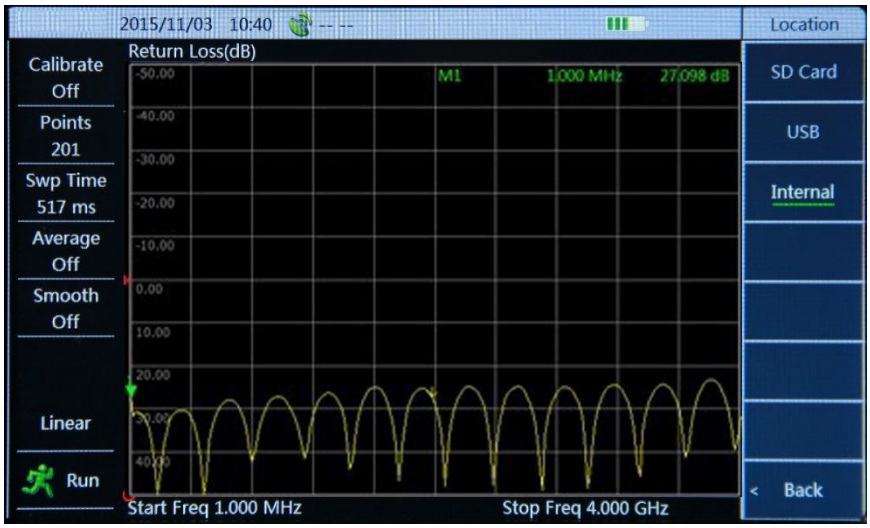

Figure 8-1 Location Selection

8. 3. Save State

User may complete corresponding documents storage based on your needs after selecting document save location. This part mainly introduces status storage and recall. Detailed steps are as follows:

1) Press 【Save/Recall】key.

2) Click [Save State] menu on Save/Recall menu bar on touch screen to bring up a dialog box “Input State Name”. You may input an appropriate status name in dialog box and click “Confirm key on screen or press 【Enter】 key and complete status storage. As shown in the following figure:

Figure 8-2 Status Storage

For more convenient operation, you may recall previous status stored. Status recalling steps are as follows:

1) Press 【Save/Recall】.

2) Click [Recall State] menu to bring up a status list of storage; while menu bar enters “Recall” menu bar, as shown in the following figure:

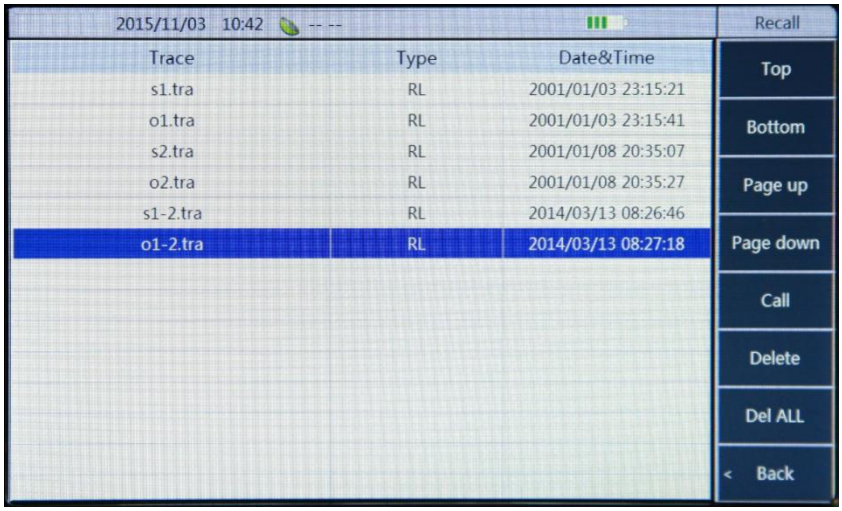

Figure 8-3 Recall Status

Select appropriate status via touch screen and click [Recall] menu on the right menu bar to complete recalling over pervious-stored status. In addition, you may use [Top], [Bottom], [Page Down], and [Page Up] in order to look for required status in status list conveniently. You may also select some certain status and delete it by clicking [Del] menu; you may click [Del all] menu to delete all status.

8. 4. Recall Trace

You may complete corresponding documents storage according to your own needs after selecting document storage location. This part mainly introduces trace save and recall. Trace save steps are as below:

1) Press 【Save/Recall】】key.

2) Click [Save Trace] menu to bring up a dialog box “Input Trace Name”. You may input an appropriate trace name in the dialog box and click “OK” key on screen or 【Enter】key to complete storage of trace. As shown in the following picture:

Figure 8-4 Trace Storage

You may also recall previous-stored status as status recalling. Trace recalling steps are as follows:

1) Press 【Save/Recall】】key.

2) Click [Recall Trace] menu on Save/Recall menu bar on touch screen to bring up a trace storage list, while menu bar will switch to menu bar of “Recall”. As shown in Figure 8-5.

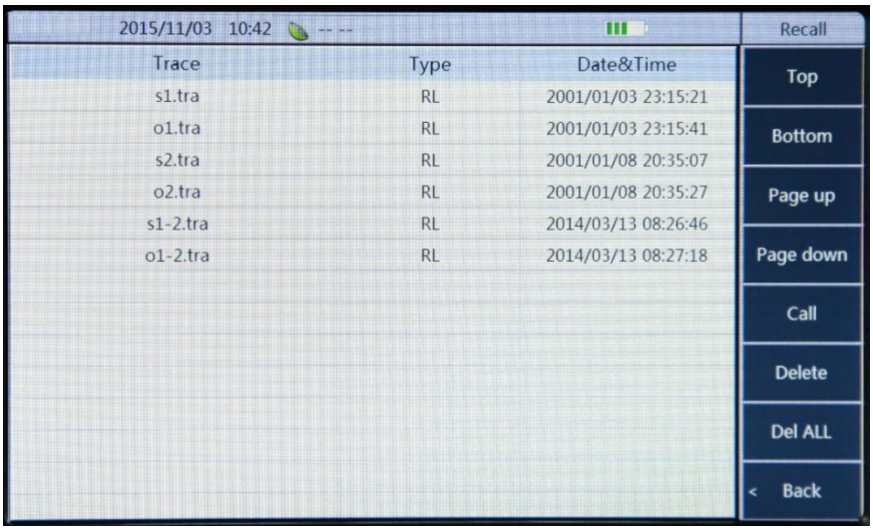

Figure 8-5 Recall Trace

Select trace required recalling via touch screen and click [Recall] menu and complete previous-stored status recalling. In addition, you may use [Top], [Bottom], [Page Down], and [Page Up] to look for required traces in order to look for required trace in trace list

conveniently; you may also click [Del] menu to delete some trace. You may click [Del all] menu to delete all traces. You may recall previous-stored traces (Traces recalled displayed are green in color) and perform comparison with currently measured trace via menu under 【Trace】key. The figure below shows the ratio between trace recalled and current tested trace.

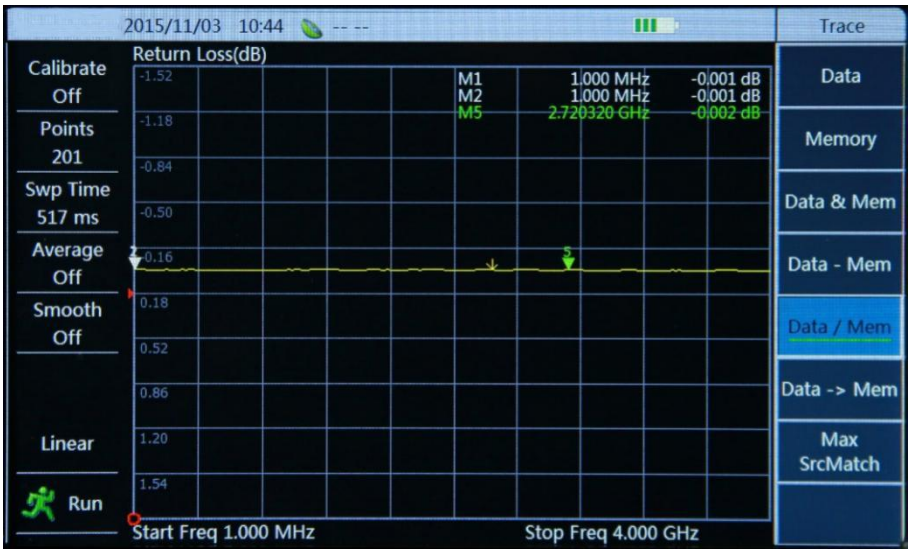

Figure 8-6 Current Trace/Recalled Trace

8. 5. Screen shot

You may observe testing data under some circumstances more directly or use image data while drafting documents in the future as Analyzer provides Screen Capture function. You may get an easy access to obtain data results of current testing and restore it in image format. If you want to take a Screen Capture for display interface of current testing data, you may operate as follows:

1) Press 【Save/Recall】.

2) Click [Save Pic] menu on Save/Recall menu bar via touch screen, then click [Print Screen] to bring up a dialog box of "Input Picture Name". You may input an appropriate name for Screen Capture and click "OK" key on screen or 【Enter】key to complete trace storage. The save picture will be stored in location set in Section 8.2

Figure 8-7 Screen Capture

8. 6. Document Management

Document management function is used to transfer, delete, or archive stored testing data, documents or images. Corresponding operation steps are as follows:

1) Press 【Save/Recall】】 key and enter Save/Recall menu bar.

2) Click [File Mgmnt] menu item to bring up a dialog box of document management, menu bar will enter “File Mgmnt” menu, as shown in Figure 5-8.

3) Click [Source File] menu item to activate the left part of dialog box and press【↑】【↓】keys or use knobs to select source documents or folders; or directly select documents or folders to be copied in the left side via touch screen.

4) Click [Destination] menu item to activate the right side of dialog box and press 【↑】 【↓】 keys or use knobs to select destination path; or directly click file paths where copied documents or folders located on the right side of touch screen.

5) Click [Start Copy] menu item to copy documents. Successful copy message brought out indicates completion of copy.

6) Click [Delete Source File] menu bar to delete source documents. Successful deletion message brought out indicates completion of delete operation.

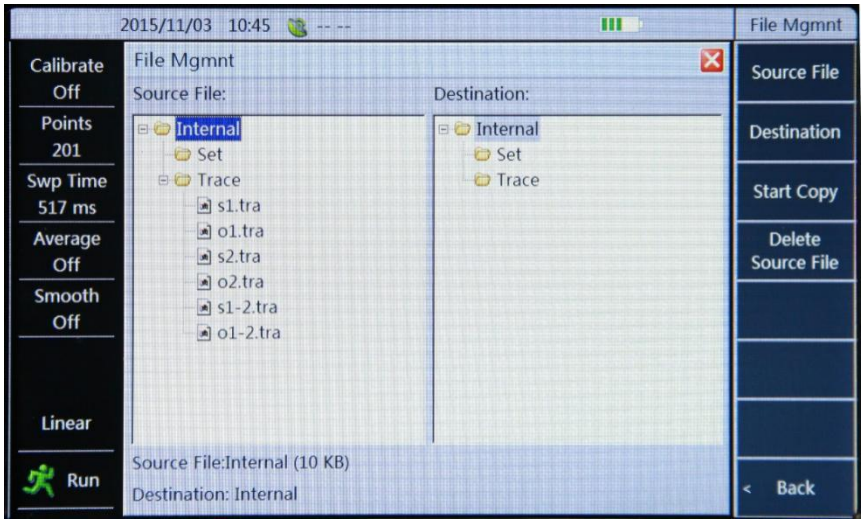

Figure 8-8 Document Management Dialog Box

8. 7. Default State

Default state is also original status after each startup of Analyzer. It is advised to use [Default state] menu to restore initial status if you want to restore to initial status after completing plenty of parameters setting as it will be comparatively simpler than resetting through parameters. You may also use 【RESET】 to perform this function, however, it is not recommended for too much time taken.

9. System Management

9. 1. Introduction

This chapter mainly introduces system management operation of S3101 Cable & Antenna Analyzer including functions such as measurement mode selection, power saving mode selection, self-test, display and system language etc. System setting operation has no direct relation with testing process, method or result. It mainly performs self-test of instrument, power saving or screen setting under different circumstances for better observation. One by one introduction on system function is as follows.

Display interface of Analyzer is as shown in Figure 9-1 when tool software introduced in Chapter 10 are used to perform distance control over Analyzer. A “Remote” control notice is called up next to power notice, while Analyzer does not respond to keyboard keys any more. You may press 【System/Local】key to switch instrument system to “Local” status if you want to operate via keyboard.

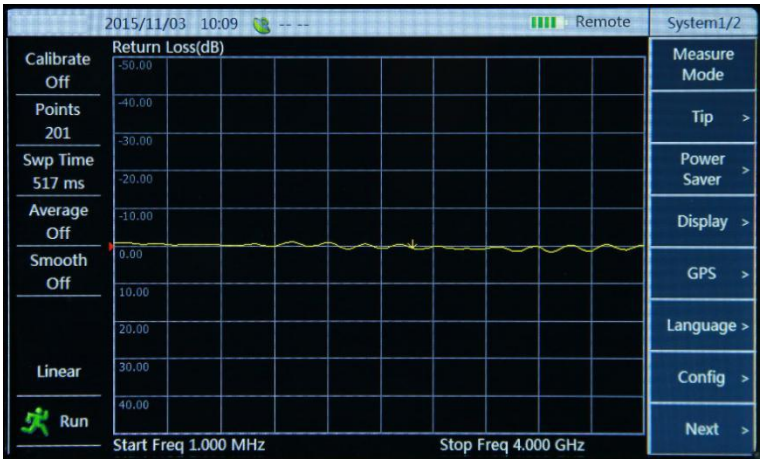

Figure 9-1 Equipment Remote Control TEST

9. 2. Measurement Mode

S3101 Cable & Antenna Analyzer supports two measurement modes, cable & antenna test and power meter test. You may select testing mode according to your needs. Measurement mode selection steps are as follows:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Measure Mode] menu to call up a “Measure model” selection dialog box;

3) Select measurement mode needed with 【↑】 【↓】keys or knobs or by clicking on touch screen directly. Click “OK” key on dialog box or press 【Enter】and complete measurement mode selection. As shown in the following figure:

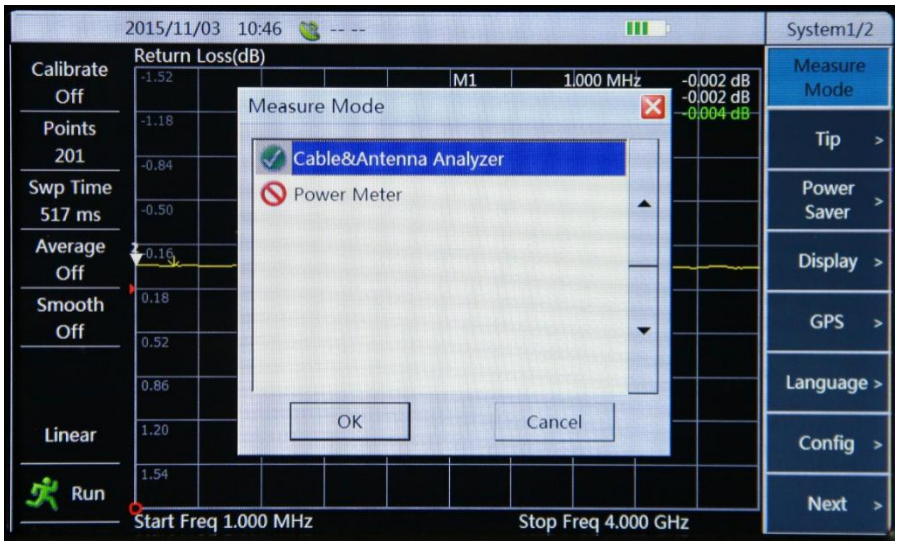

Figure 9-2 Measurement Mode Selection

9. 3. TIP

S3101 supports label function. You may add an appropriate tip for current measured result in order to mark pictures when taking Print Screen. Label setting steps are as follows:

1) Press 【System/Local】and enter system menu bar;

2) Click [TIP] menu and enter label menu bar;

3) Label switch and editing operation:

➢ If labeling function is off, you may click [TIP Off On] menu to bring up a dialog box of "Please enter a label". Input label content in the dialog box and click "Confirm" key on dialog box or press 【Enter】 key to complete label setting. You may also click [Edit Tip] menu directly to bring up dialog box of "Please enter a Tip" and input tip content. Click "Confirm" key on dialog box or press 【Enter】to complete label setting, while label switch will be automatically switched to [Tip Off On] status .

➢ If labeling function is on and required to edit, you may click [Edit Tip] menu to bring up a dialog box of "Please enter a Tip" and input it with new label content. Click "Confirm" key on dialog box or press 【Enter】 key to reedit label. As shown in the following figure:

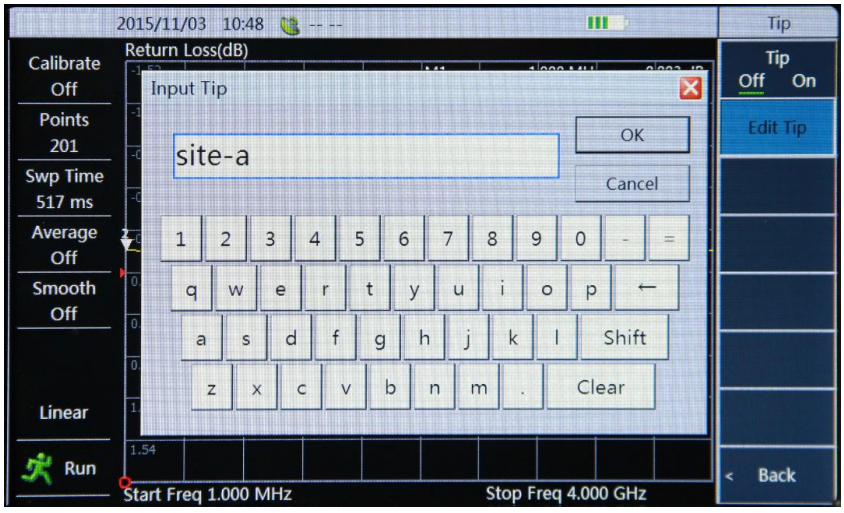

Figure 9-3 Label Editing

4) Press 【Enter】key or “OK” key on dialog box. After editing tip, measurement mode name of plot area will display label being edited by operators.

9. 4. Power Saving Mode

Considering LCD screen service life and power saving principle, S3101 Cable & Antenna Analyzer provides two power-saving modes, sleep mode and shutdown mode. You may select appropriate power saving mode according to self-test outcome. So-called sleep mode refers to a status, which will be automatically set by system according to time period set by operators if long time no operation occurred. In sleep mode, instrument screen will be off, while system is still on. The time period set by operators is sleep time. Sleep time setting steps are as follows:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Power Saver] menu and enter power saving mode menu bar;

3) Click power saving mode menu bar [Sleep] and set system sleep time with 【↑】【↓】keys, knobs, and numeric keys. Press 【Enter】key and complete sleep time setting. 30s before system enters sleep mode, a “Notice” dialog box will be brought up and indicate system will enter sleep mode soon, as shown in Figure 6-4. You may click anywhere on screen or any keys (excluding On/Off key and Reset key) on keyboard to cancel this sleep when the instrument is in sleep mode or countdown to sleep mode. System will then perform timing operation of the next round according to sleep time. You may also click [Sleep] menu again and turn off sleeping.

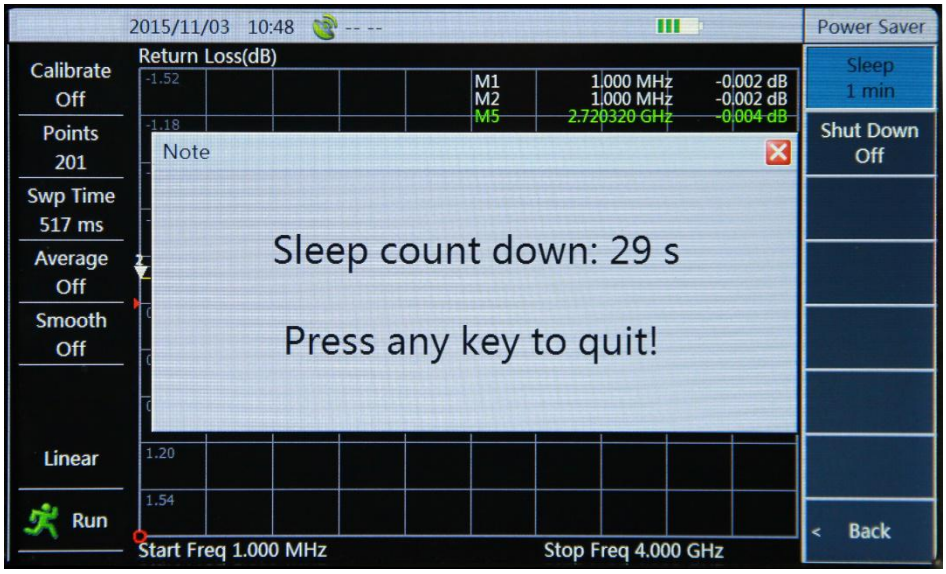

Figure 9-4 System Sleeping Function

Shutdown refers to shutdown of Analyzer in according to time period set by operators. Shutdown setting steps are as follows:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Power Saver] menu and enter power saving mode menu bar;

3) Click power saving mode menu bar [Shutdown] and set system shutdown time with 【↑】【↓】keys, knobs and numeric keys. Press 【Enter】key and complete shutdown time setting. 10 minutes before system shutdown, a “Notice” dialog box will be brought up and inform shutdown soon. You may cancel automatic shutdown by clicking anywhere on screen or using any keys on keyboard (excluding On/Off key and Reset key).

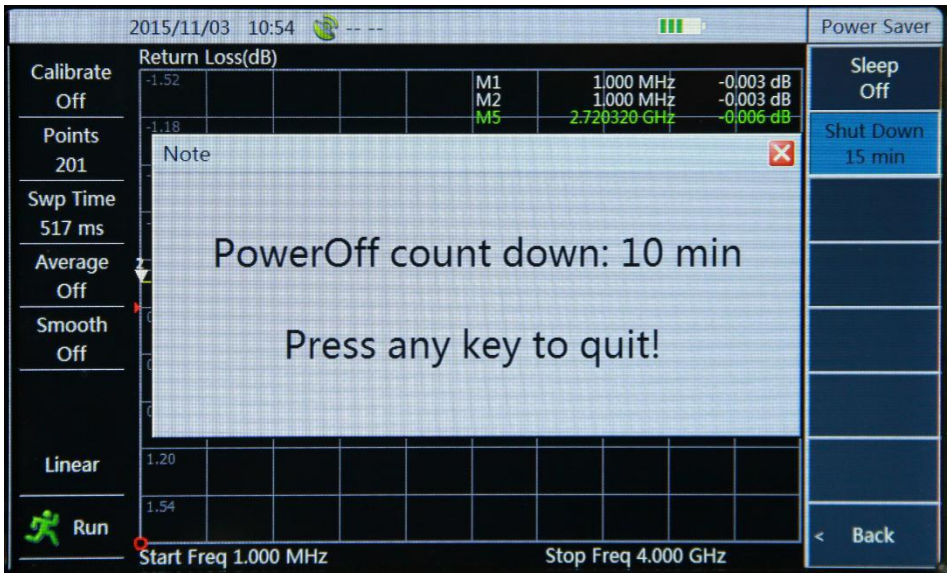

Figure 9-5 System Timing Shutdown Function

9. 5. Display

To better handle different testing scenarios for operators, S3101 Cable & Antenna Analyzer provides several kinds of display functions and backlight brightness adjustment function. You may adjust display and brightness of instrument according to testing environment. Setting steps of instrument display mode are as follows:

1) Press 【SYSTEM/LOACL】key and enter system menu bar;

2) Click [Display] menu and enter menu bar;

3) Click display mode on corresponding display menu bar according to testing environment.

Display mode of Analyzer is set to be normal mode by default, you may select appropriate testing environment. If testing outdoor, you may click [Outdoor Mode] menu on menu bar; if testing at night, you may click [Night Mode] menu on menu bar. Several kinds of screen display modes are as below separately:

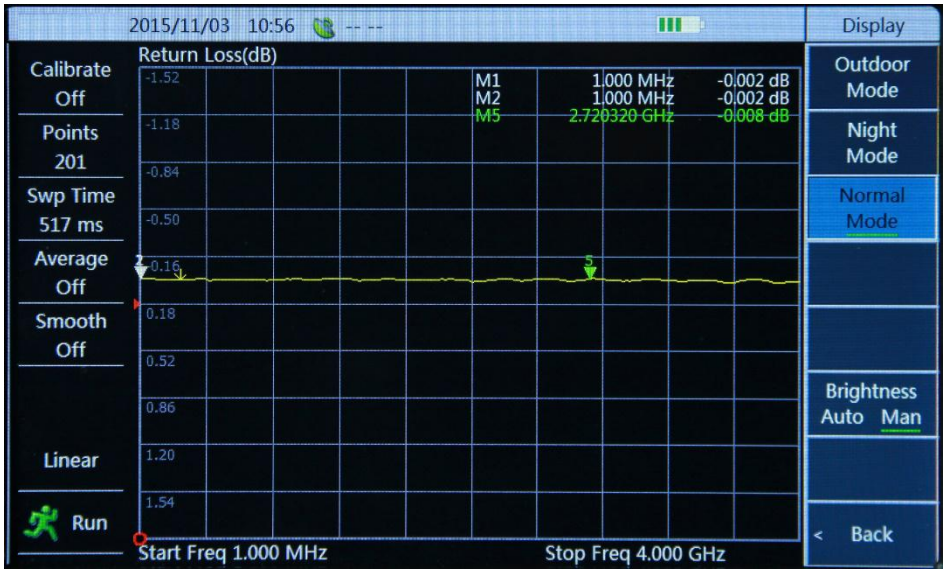

Figure 9-6 Normal Mode

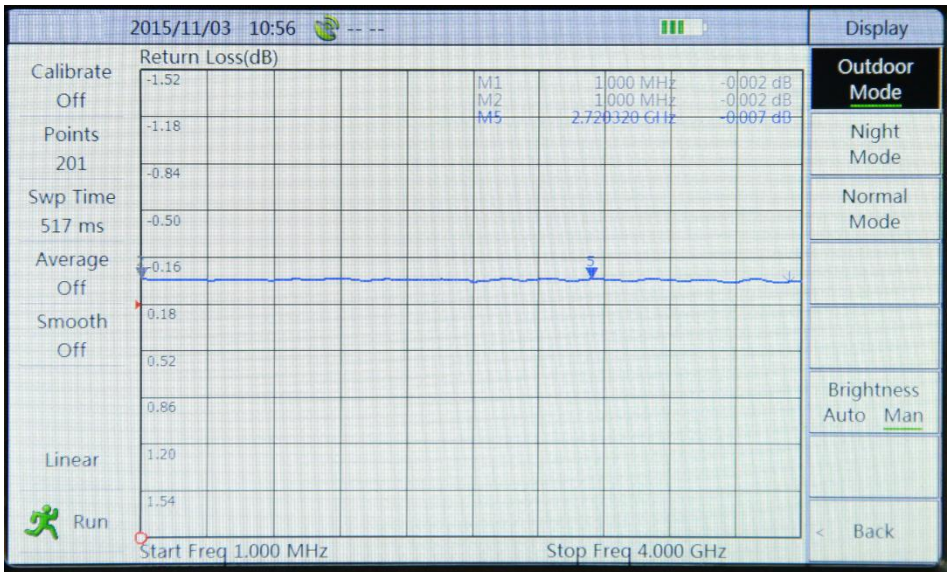

Figure 9-7 Outdoor Mode

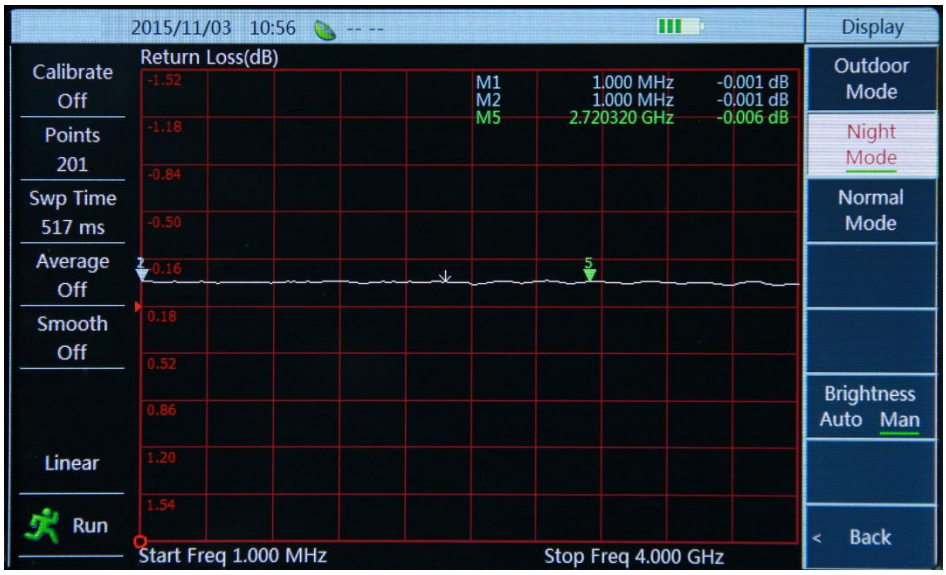

Figure 9-8 Night Mode

Apart from display mode selection, Analyzer also provides screen brightness adjustment function. You may adjust screen brightness using this function under the same display mode. Detailed operating steps are as follows:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Display] menu and enter display menu bar;

3) Click [Brightness Adjustment Auto Man] menu:

   a) Menu displayed as [Brightness Auto Man] indicates Analyzer can automatically adjust screen display brightness via light sensor. Screen brightness varies as ambient light varies;

   b) Menu displayed as [Brightness Auto Man] will bring up a dialog box of “Adjust Lightness”. You may select appropriate brightness grade with 【↑】 【↓】keys , knobs, or directly clicking dialog box.

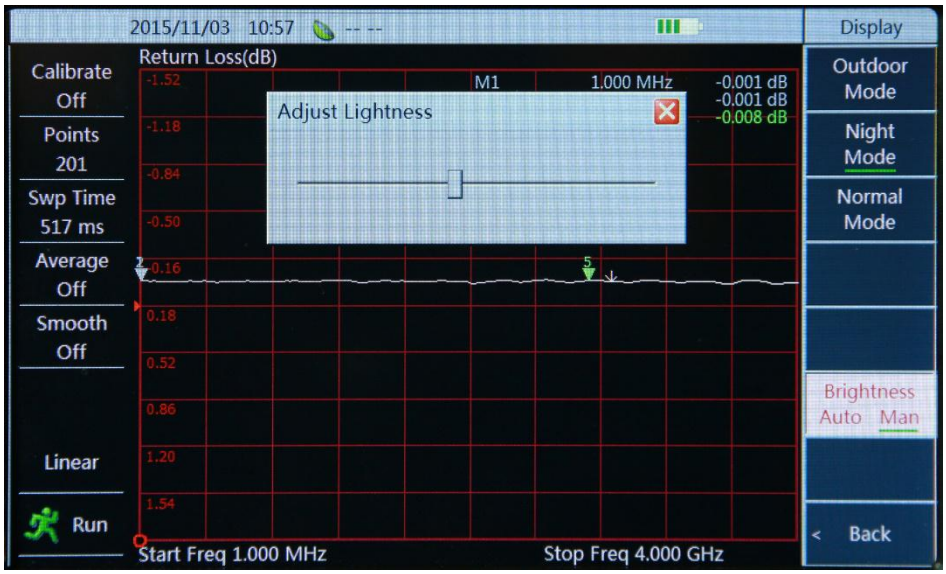

Figure 9-9 Screen Brightness Adjustment

9. 6. GPS Function

S3101 Cable & Antenna Analyzer adds GPS function and supports connecting external GPS antenna to check geographical position where Analyzer locates. It includes information such as latitude, latitudinal hemisphere, longitude, longitudinal hemisphere, altitude, date, and time etc. Detailed operating steps of GPS function are as follows:

1) Connect GPS antenna and Analyzer;

2) Press【System/Local】key and enter system menu bar;

3) Click [GPS] menu and enter GPS menu bar;

4) Click [GPS Off On] menu on GPS menu bar; Surface GPS function is on when the menu displayed as [GPS Off On]. The latitudinal and longitudinal information of instrument's location will be displayed in system status bar of Analyzer after a while.

5) You may click [GPS Info] on GPS menu bar and check relevant detailed information of GPS. As shown in Figure 9-10:

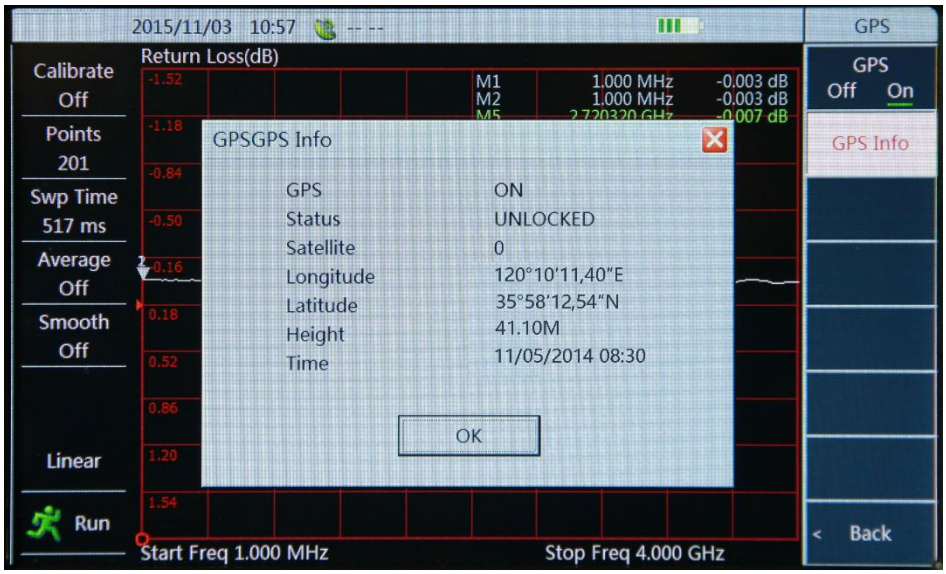

Figure 6-10 Detailed GPS Information

9. 7. Setup

9. 7. 1. Date & Time

S3101 Cable & Antenna Analyzer provides system time setting function. System time setting steps of Analyzer are as follows:

1) Press【System/Local】key and enter system menu bar;

2) Click [Config] menu and enter setup menu bar;

3) Click [Date & Time] menu to bring up a dialog box of “Set Date and Time”. You may edit it with [Prev], [Next], knobs or selecting the content to be edited by clicking directly. Input modified value via keypad,【↑】【↓】keys, or numeric keys. Click “OK” key on dialog box or press 【Enter】to complete date and time setting. As shown in Figure 9-11:

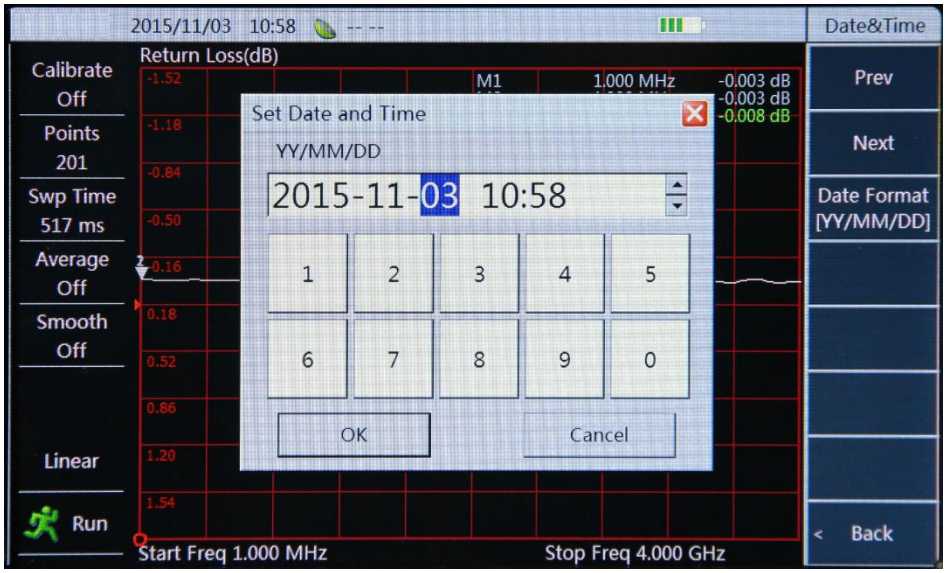

Figure 9 -11 Date and Time Setting

In addition, you may also switch display method of date by clicking [Date Format] menu in “Date and Time” menu bar.

9. 7. 2. LAN

Similar to common PC system, you may need to reconfigure network of Analyzer system when using computer to interconnect instrument or performing distance control with tool software in Chapter 7 in order to maintain mainframe computer and Analyzer in the same network segment. LAN setting steps are as follows:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Config] menu and enter setting menu bar;

3) Click [LAN] menu to bring up “network configuration” dialog box on the screen;

4) Click [IP] menu on menu bar and switch cursor to IP address configuration column and input IP address of each segment with numeric keys. You may switch to each segment via [Next] and [Prev]. As shown in Figure 9-12:

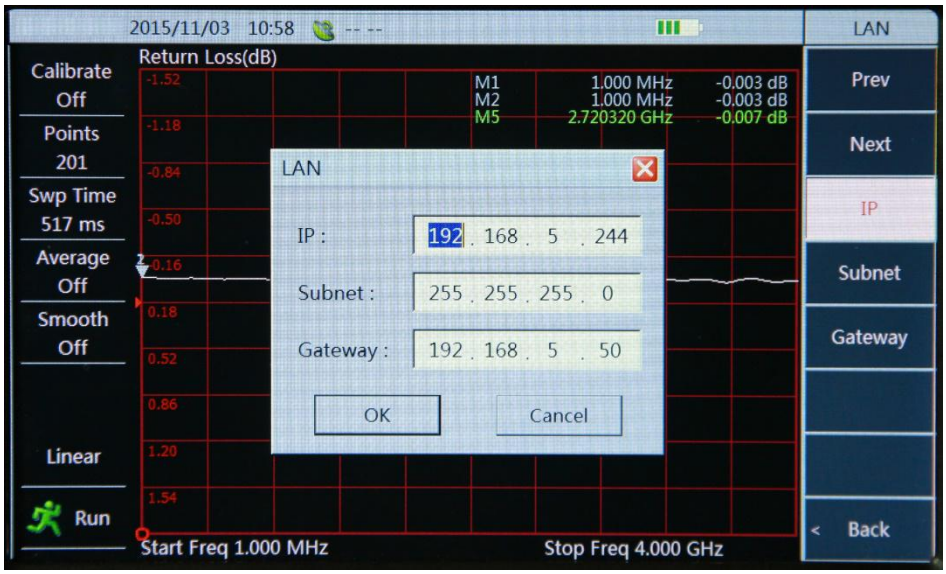

Figure 9-12 LAN—IP Configuration

5) Click [Subnet Mask] menu on menu bar and switch cursor to subnet mask configuration column. Set subnet mask of instrument with numeric keys; as shown in the following figure:

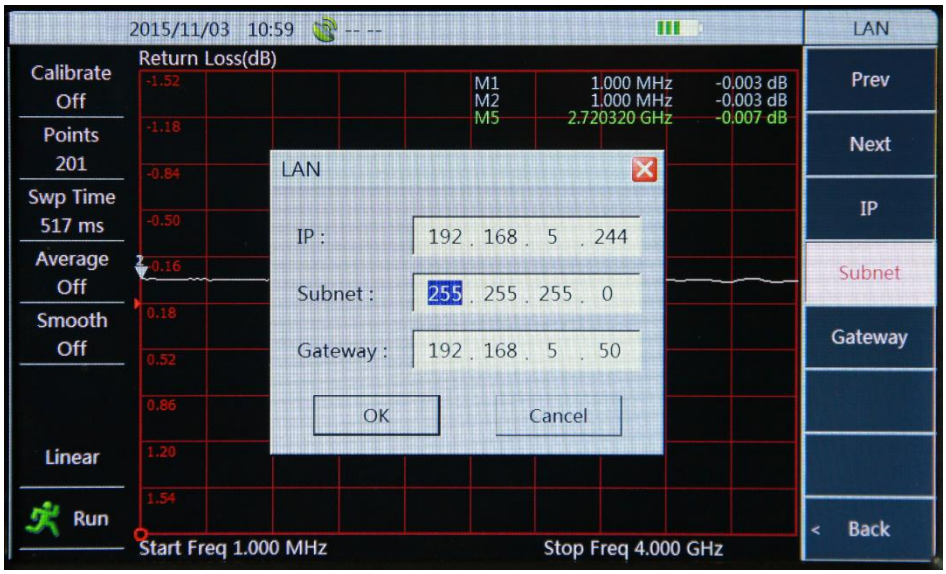

Figure 9-13 LAN—Subnet Mask

6) Click [Gateway] menu on menu bar and switch setting cursor to Gateway column; set default gateways of the instrument separately with numeric keys. As shown in the figure below:

Figure 9-14 LAN—Gateway

7) After configuration is completed, click “OK” key or 【Enter】key to complete LAN setting.

9. 7. 3. Touch Screen Calibration

Touch precision of touch screen will be calibrated before delivery. However, you may recalibrate touch screen for low precision of touch screen response caused by accident. You may recalibrate touch screen using these two methods below:

1. Calibration with mouse: connect mouse to USB A type interface of digital interface and perform Touch Screen Calibration following the steps below:

   a) Press 【System/Local】key and enter system menu bar;

   b) Click [Config] menu with mouse and enter setting menu bar;

   c) Click [Touch Calibrate] menu with mouse to bring up Touch Screen Calibration page

2. Calibration with combination key: switch menu and complete Touch Screen Calibration with combination keys provided by instrument. Detailed operating steps are as follows:

   a) Press 【System/Local】and 【↑】keys simultaneously then a menu in menu bar will be circled by red frame, as shown in Figure 9-15:

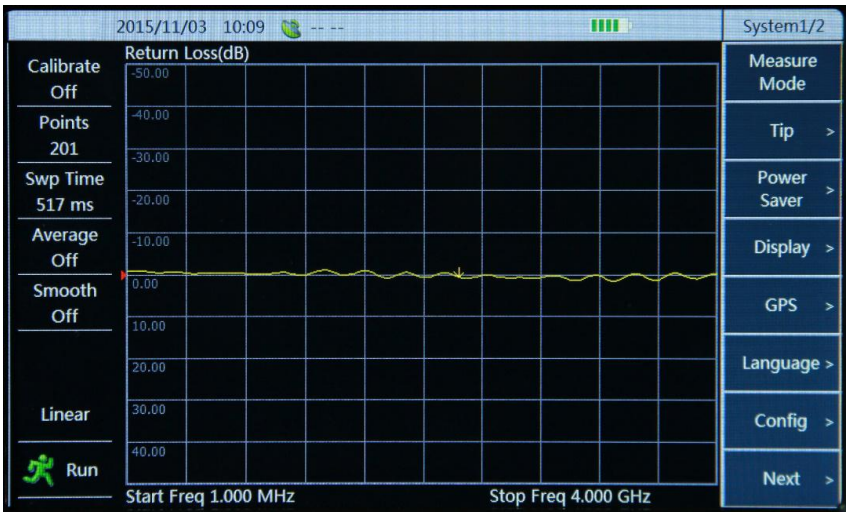

Figure 6-15 Combination Key

b) You may switch the menu circled by red frame with【↑】【↓】keys and locate it to [Config] menu. Press【Enter】 key and enter setting menu bar;

c) Circle the red frame to [Touch Screen Cal] menu according to similar operation in Step 2. Press【Enter】key to bring up calibration page of touch screen.

You may click "+" with sharp pen needle in turn in calibration page. Perform Touch Screen Calibration according to notice on screen. Press 【Enter】key after completing calibration of 5 points. Then calibration is completed. As shown in Figure 9-16:

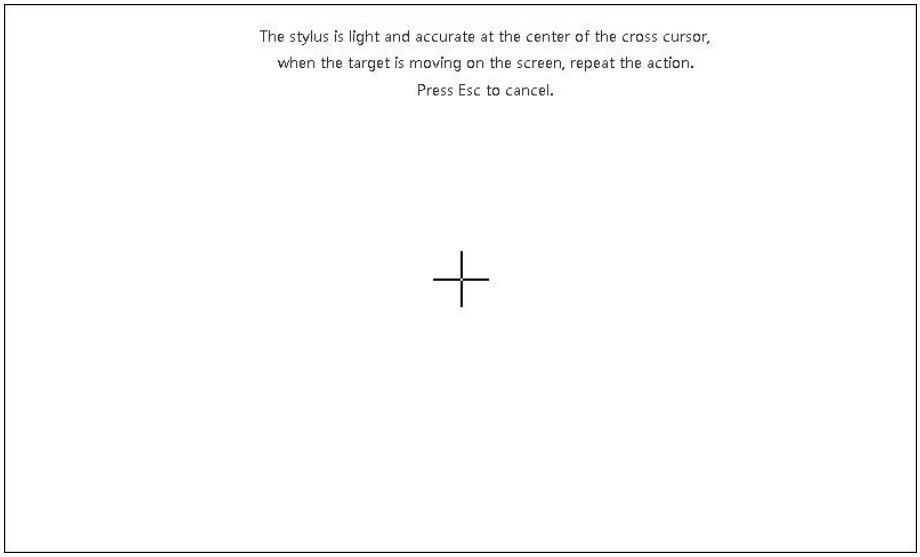

Figure 9-16 Screen Calibration

9. 7. 4. Software Update

Internal application software of Analyzer is latest corresponding process when delivered. The software might be upgraded in the future development and maintenance. You may choose to upgrade some software according to your needs. Please contact us in advance if process update is needed. If you already have an upgrade package, you may place it under root directory of external USB memory or SD card, or insert it into external memory (thumb drive etc.) Click [Software Update] menu. Applications software will automatically look up and install upgrade process. Software Update steps are as follows:

1) Press【System/Local】key and enter system menu bar;

2) Click [Config] menu and enter setting menu bar;

3) Click [Update] menu; Analyzer will automatically look up and upgrade software package. Click OK in turn in the following two dialog boxes in Figure 6-17 after upgrade software package is found. Wait until new processes are automatically installed. Reboot the instrument and run new processes after installation is completed.

9. 7. 5. Management

Management function of Analyzer provides interfaces for application process, function debugging, and signal passageway indicators checking. They are not open to operators. Therefore, we encrypt to [Manage] menu to prevent unnecessary system errors occurred by misoperation of operators. No more tautology here.

9. 8. Self-test

Analyzer will perform testing over each functional component by running a series of testing processes to make sure the instrument runs

properly. You may also check current status via [Self-test]. Please contact us if self-test does not pass. Contact information is provided in 1.3. Operating steps of running self-test are as below:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Next] menu and enter the second page of system menu bar;

3) Click [Self-test] menu to call up a selection dialog box of "Self-test"; in this dialog box, you may check self-test results of each item such as EEPROM, FPGA, CPLD, internal temperature and power supplying condition etc. As shown in Figure 6-17:

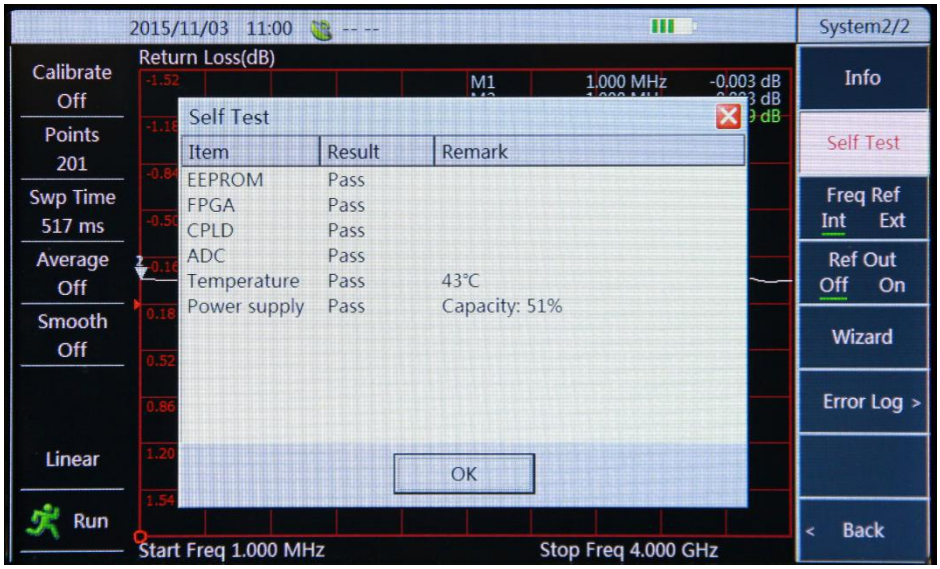

Figure 9-17 Self-test of Instrument

9. 9. Frequency Reference (10MHz)

S3101 Cable & Antenna Analyzer provides input/output interface for 10MHz reference clock. You may use Analyzer to provide 10MHz reference clock for other Analyzers. You may also use external 10MHz clock for this instrument. Operating steps of 10MHz reference clock input/output function are as below:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Next] menu and enter the second page of system menu;

3) Click [Freq Ref Int Ext] menu on system menu; Analyzer utilizes self-produced 10MHz clock reference when displayed as [Freq Ref Int Ext]; you may need to connect external 10MHz clock reference through port to make Analyzer run properly.

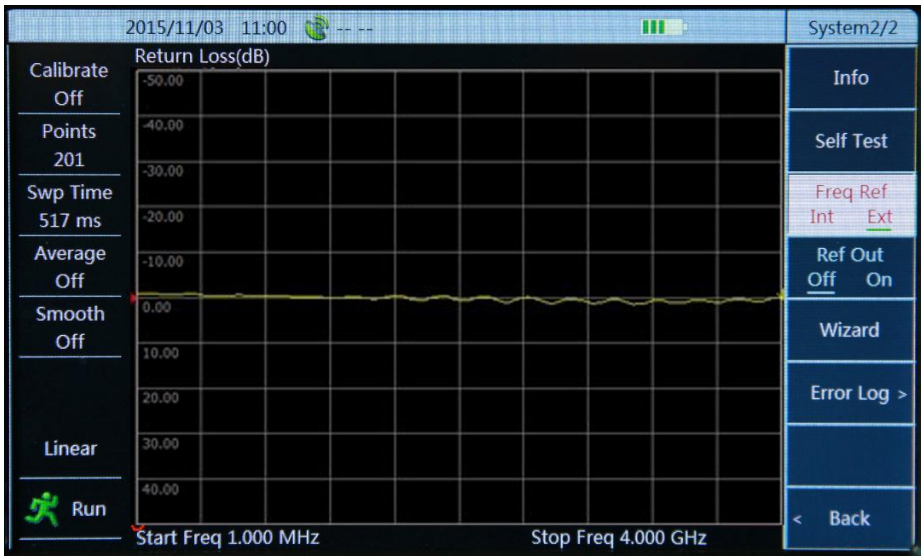

Figure 9-18 10MHz Reference Internal and External Input

4) When Frequency Reference is as [Freq Ref Int Ext], 10MHz reference clock can be externally output via 10MHz port. Click [Ref Output Off On] menu on system menu. 10MHz clock reference outputs externally through port when it is displayed as [Ref Output Off On]. Analyzer can provide 10MHz clock reference for other testing equipment.

9. 10. Measurement Guide

S3101 Cable & Antenna Analyzer provides measurement guide function (This function is not applicable under power meter measurement mode.) for faster and more convenient master of basic operation of several measurement format. You may get the knowledge of basic measurement setting etc. of measurement with the three basic measurement types provided in measurement guide. Steps of entering measurement guide function are as follows:

1) Press 【System/Local】key and enter system menu bar;

2) Click [Next] menu and enter the second page of system menu bar;

3) Click [Wizard] menu to bring up “Wizard” on the top of plot area;

4) You may select measurement mode you need to know on element brought up and click “Enter” key to check its measurement process. As shown in Figure 9-19:

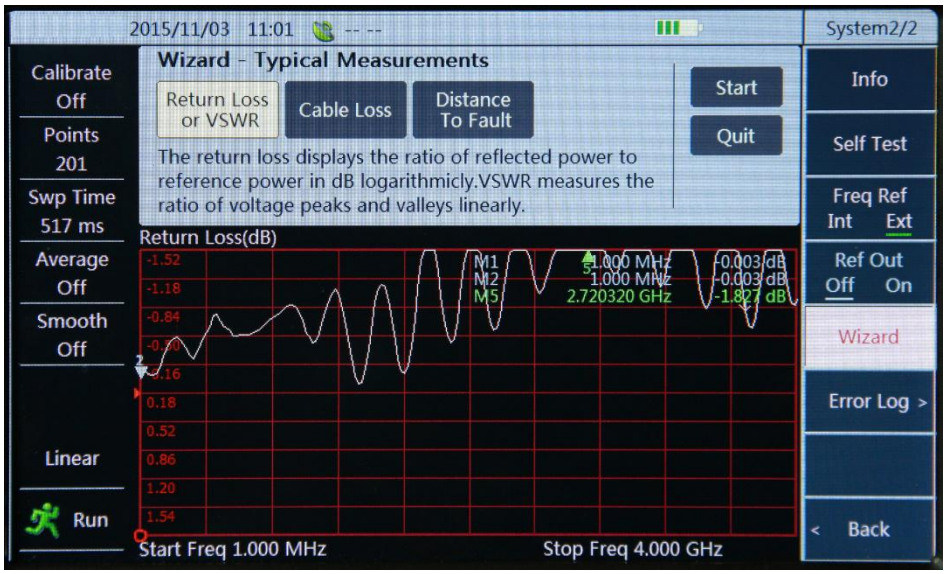

Figure 9-19 Measurement Guide

10. Software Toolkit

10. 1. Software Description

The software toolkit of S3101 Cable & Antenna Feeder Tester is mainly applied to control S3101A/B through computer, and realize reading, saving and comparing of the curve. All of those are convenient for operators to analyze the remote data, and for analyzers to monitor and maintain system effectively on PC.

Software toolkit mainly provides the following functions:

- Recall the curve, open the curve data files stored in PC or within the instrument, which are displayed as graphs;
- Collect the curves, gather the sweeping curves of S3101 in real time;
- Save the current acquisition curve to the PC;
- Curve comparison and operation;
- Set the parameters, such as frequency, sweeping points, measuring format, DTF parameters, etc.

Requirements on system configuration of the computer:

- Processor of Inter Pentium 4 or higher
- Operating system of Windows
- Memory of 512 Mbytes
- Hard-disk space of 500Mbytes
- USB or LAN interface

10. 2. Instructions for Use

10. 2. 1. Communication Connection

Connect the device to computer with USB or network cables, and select the communication mode once the software is started. Click the 【Remote Ctrl】key as shown in Figure 10-1, and then select the 【USB】or 【LAN】 check box in the【Communication】group. If the【LAN】network communication is selected, it needs IP address of the specified equipment, with the method: click the【IP】key to pop up an IP dialog box as shown in Figure 10-2, and then input IP address of instrument, press the “OK” key to complete input of the specified IP.

Figure 10-1【COMMUNICATION INTERFACE】 Group

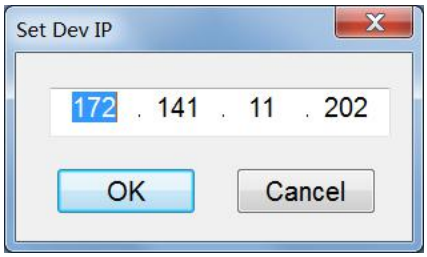

Figure 10-2 IP Address Dialog Box

After the communication interface has been selected, click【Connect】as shown in Figure 10-1. If this key becomes into 【Discon】, it means that the instrument has been successfully connected, as shown in Figure 10-3.

After the communication interface has been selected, click【Connect】as shown in Figure 10-1. If this key becomes into 【Discon】, it means that the instrument has been successfully connected, as shown in Figure 10-3.

Figure 10-3 Change of the Key after Successful Connection

10. 2. 2. Trace Collection & Storage

Trace collection refers to gather the test curves of S3101 in real time, which are then displayed in window of the software toolkit. Click the【Remote Ctrl】tab, and then select the【Start】key in the【Trace Capture】group to start to collect traces, as

shown in Figure 10-4. Software will display the trace collection window with title of “Trace Capture”, and then the【Start】key become into【Stop】, as shown in Figure 10-5.

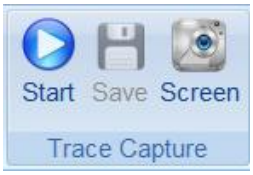

Figure 10-4 【TRACE COLLECTION】Group

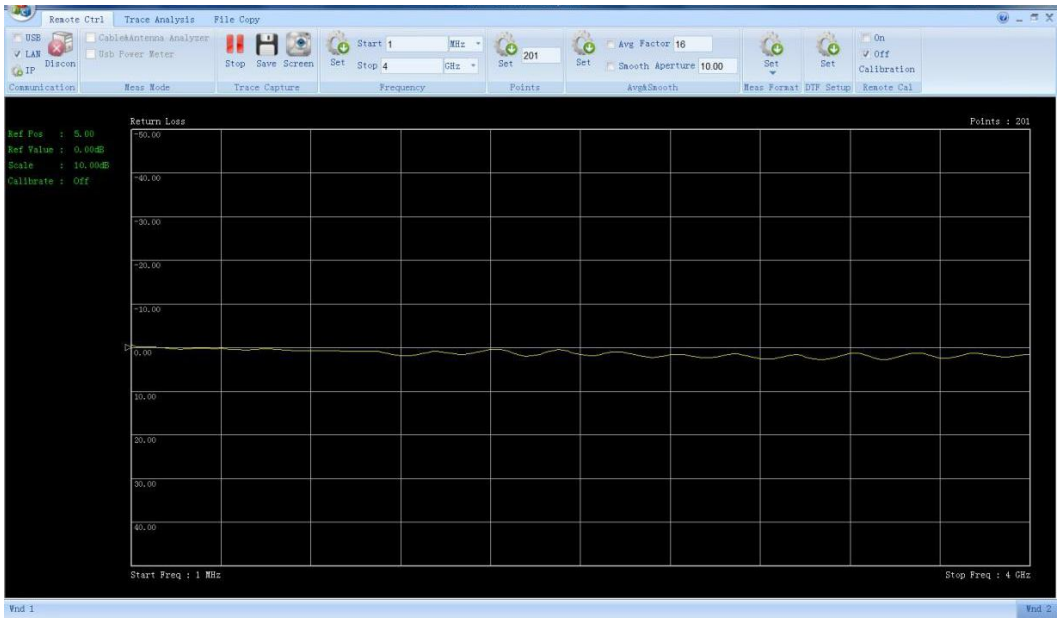

Figure 10-5 Trace Capture Window

Click the【 Stop 】 key, or directly close the trace collection window to stop the collection.

【Save】can realize the storage of the collected current trace data. Click this key, and then select the destination folder and input the file name in the popped-up dialog box of "Save As…". After that, click the "Save" key to save this trace in ".tra" format.

"Remote Screen Capture" can realize screenshot towards the display interface of instrument. Click this key, and then select the destination folder and input the file name in the popped-up dialog box of "Save as…". After that, click the "Save" key to save this screenshot in ".jpg" format.

10. 2. 3. Setting of Sweeping Parameters

Parameters which can be set include sweep frequency, points, average/smooth set, measuring format, DTF parameters, etc. Click the 【 Remote Ctrl 】 tab, the parameter setting area contains 【Frequency】, 【Points】, 【Avg&Smooth】,【Meas Format】, 【DTF】 and so on, as shown in Figure 10-6.

Figure 10-6 Parameter Setting Column

The method of setting is shown as follows:

- Input the start and stop frequency values in the【Frequency】group and select units for them, and then click the【Set】key to set the frequency.
- Input points in the【Points】group, and then click the【Set】key to set the points.
- In the【Avg&Smooth】group, click the【Avg】check box to open or close the average; similarly, click the【Smooth】check box to open or close the smoothness. Input the average factor and smooth aperture, and then click【Set】to set them.
- In the【Meas Format】group, click【Set】to pop up the measuring format menu, as shown in Figure 10-7. After that, click the format menu you need to finish setting.

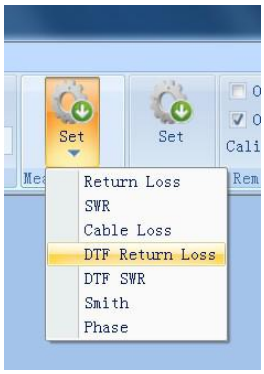

Figure 10-7 Measurement Format Set

- In the【DTF】group, click【Set】to pop up the dialog box of "DTF Setting", as shown in Figure 10-8, and input the corresponding parameters and then press the【OK】key to finish the setting.

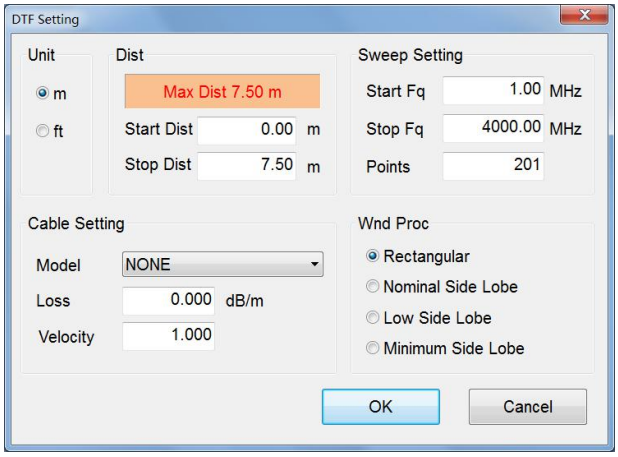

Figure 10-8 Dialog Box of DTF Parameter Setting

10. 2. 4. Remote Calibration

Remote calibration refers to control the mechanical calibration of instrument by computer. Click the 【 Remote Ctrl 】 tab, and then select 【 Calibration 】 in the 【Remote Cal】group to pop up the dialog box of "Calibrate". Operating procedures of remote calibration are shown as follows:

1) In the "Set Cal Kit" column of the dialog box, click the corresponding key to select model of calibration kit;

2) Connect the "Open Circuit" of calibration kit to test port of instrument, after that, click the【OPEN】key in the dialog box. After the open circuit has been tested, the key text will be marked with green underline;

3) Complete the test of short circuit and load by referring to Step 2;

4) After all calibration standards have been tested, the【Finish】key in the dialog box will become into normal state. And then press this key to close the dialog box to complete the calibration.

Figure 10-9【Remote Cal】 Group

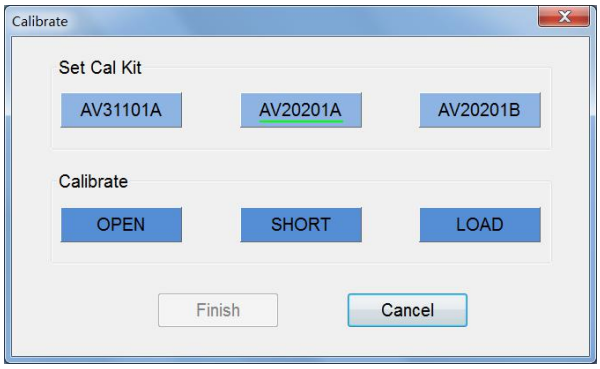

Figure 10-10 Dialog Box of Calibrate

10. 2. 5. Trace Analysis

Trace analysis mainly realizes functions such as the reading of measured values, details observation of trace, trace operations, etc. As for trace analysis function, click the【Trace Analysis】tab, which includes【File】,【Scale】,【Enlarge Drawing】,【Trace Math】and【Marker】, as shown in Figure 10-11.

Figure 10-11 Trace Analysis Tab

1. Read the trace

Click the【Read】key to pop up the drop-down menu, which includes “Local Trace File” and “Dev Trace File”, as shown in Figure 10-12.

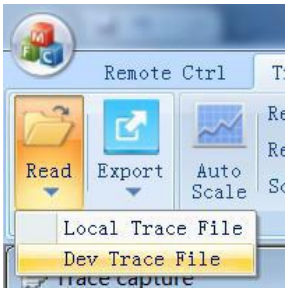

Figure 10-12【File】Group

“Local Trace File” is used for opening the trace files in the computer. Click this menu item to pop up the dialog box of “Open trace file”, as shown in Figure 10-13, and then select the trace file which you want to open. After that, click【OPEN】and the selected trace will be displayed in the trace window of software.

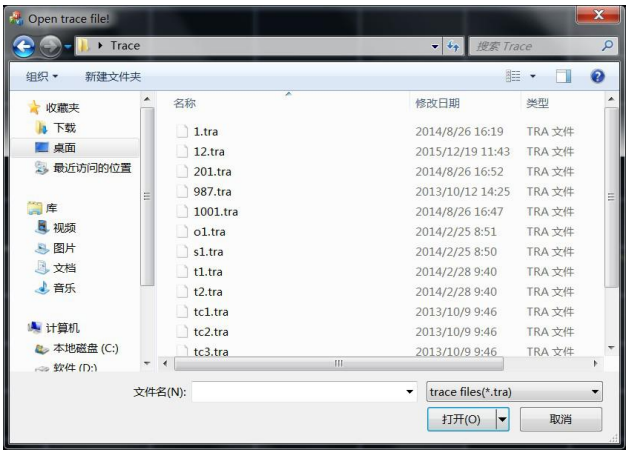

Figure 10-13 Dialog Box of "Open trace file"

"Dev Trace File" is used for opening the trace files stored in the file. Click this menu item to pop up the dialog box of "Open Dev Trace File", as shown in Figure 10-14. This dialog box displays the trace file list stored in the instrument, select the file and then click the 【OPEN】key to open this file on the computer.

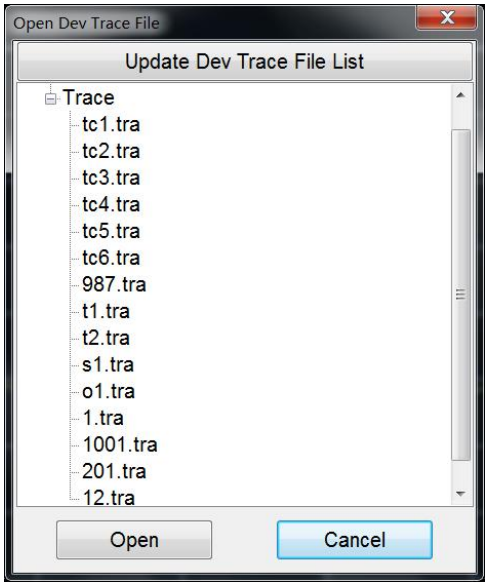

Figure 10-14 Dialog Box of "Open Dev Trace File"

2. Set the Ruler

Ruler of trace window can be set in the【Scale】group, which include reference position, reference value and scale. You can also click【Auto Scale】, then software will automatically adjust the ruler according to the measured maximum and minimum.

3. Magnify the Drawing

Drawing magnification is used for observing the details of trace. The 【 Enlarger Drawing】group includes two keys:【Enlarge】and【Restore】, as shown in Figure 10-16. Click 【Enlarge】, this key becomes highlighted, which means trace can be magnified through dragging mouse, as shown in Figure 10-15. After magnification, the trace can be restored to the unmagnified state by clicking the【Restore】key.

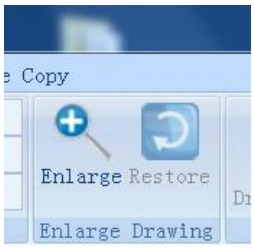

Figure 10-15 【Enlarge Drawing】 Group

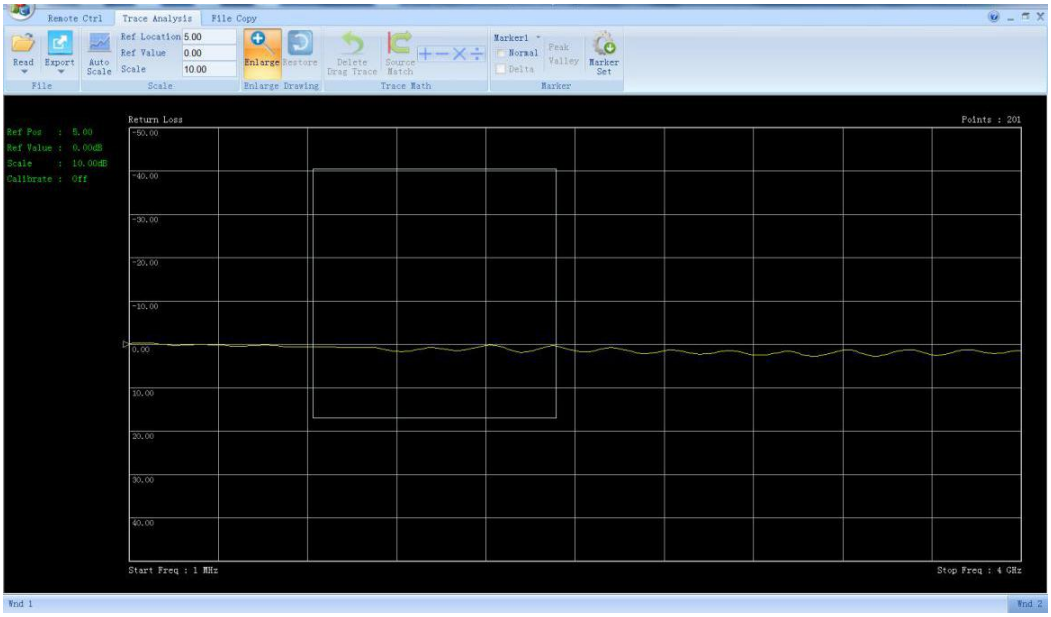

Figure 10-16 Use of Drawing Magnification Function

4. Trace Operation

Trace operation needs to be carried out between two traces. When using this function, it needs to open two trace files, and then drag your mouse in a trace window to another one in order to make two traces stay within the same window, as shown in Figure 10-17.

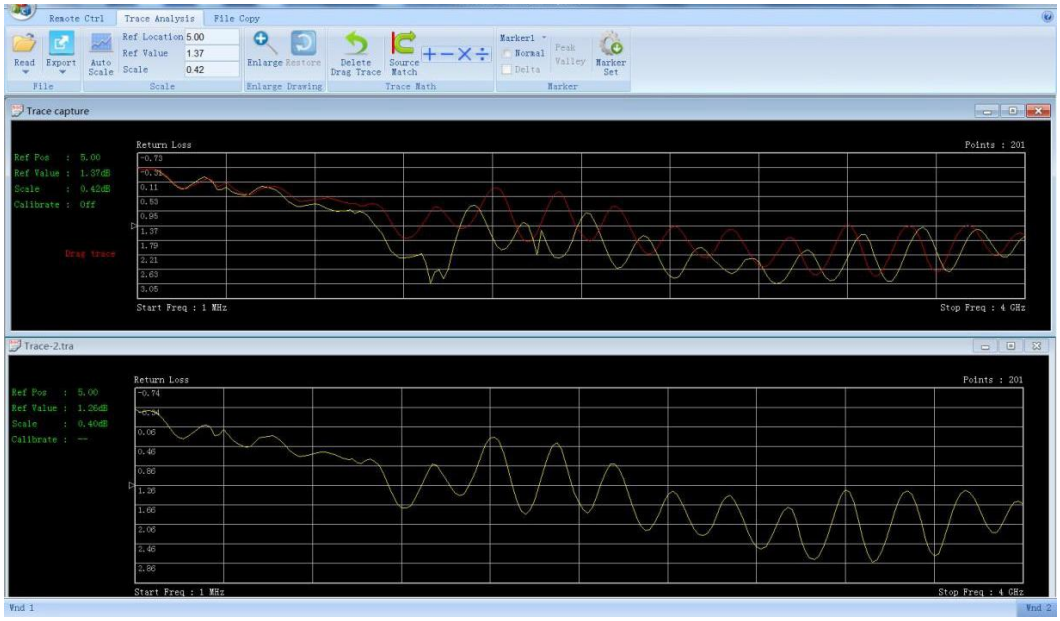

Figure 10-17 Diagrams for Dragging the Trace

In the Figure 10-17, the trace in the top window is dragged into the bottom window, and displayed as red curve. The dragged-in trace can

be deleted by clicking the【Delete Drag Trace】key.

After the trace is dragged in (or when the trace is directly deleted), it can calculate the two traces in the top window in the Figure 10-17: make the top window activated, and click the addition, subtraction, multiplication, and division keys in the【Trace Math】group to realize the corresponding operation, with calculation result displayed as blue curve, as shown in Figure 10-18.

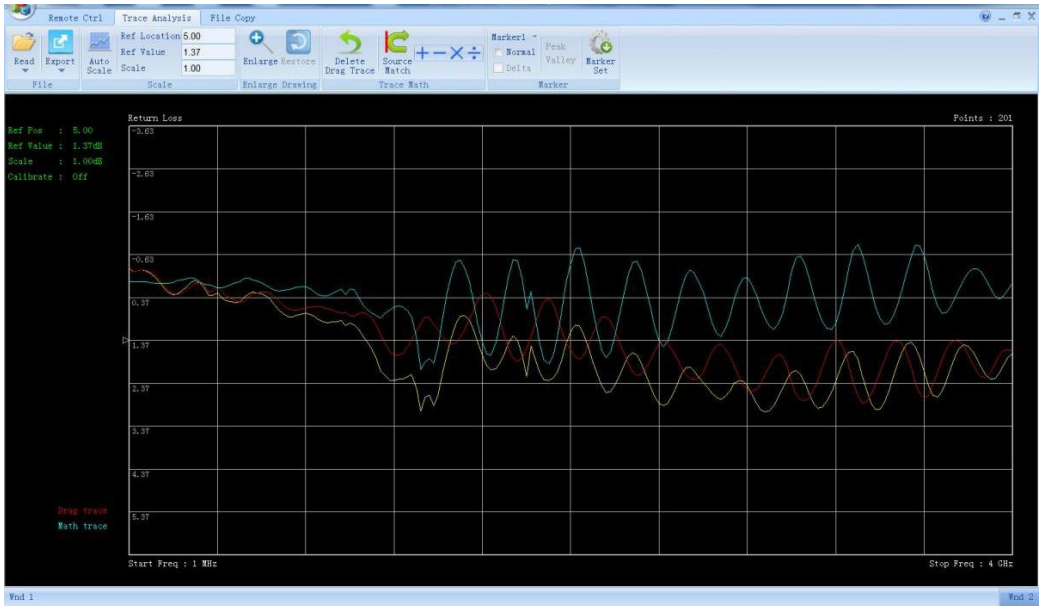

Figure 10-18 Trace Math Diagram

5. Marker Function

Marker function is used for reading the measuring values on the trace, with 6 groups of markers in total provided by the instrument. The【Marker】group includes three groups of keys: left key is used for selecting the current marker and opening and closing the marker; two keys in the middle are used for setting the current marker at extreme value; as for the right【Marker Set】, click it to edit the marker position or conduct the local extreme value searching function in the popped-up dialog box of "Marker Setting". After the marker is opened, the marker can also be moved by dragging the mouse or pressing the arrow keys.

Figure 10-19 【Marker】Group

10. 2. 6. File Transfer

File transfer function is used for copying the internal documents of instrument to the computer, including the state, trace and image files. Click the【File Copy】tab, as shown in Figure 10-20, and then select【Copy Dev File】in the【Copy File】group to pop up the dialog box of copying the device files, as shown in Figure 10-21. This dialog box lists the files can be copied inside of the device. Select the file, and the click the【Copy】key to pop up the dialog box of "Save as…". After that, select the storage path, and click "Save" to store the file.

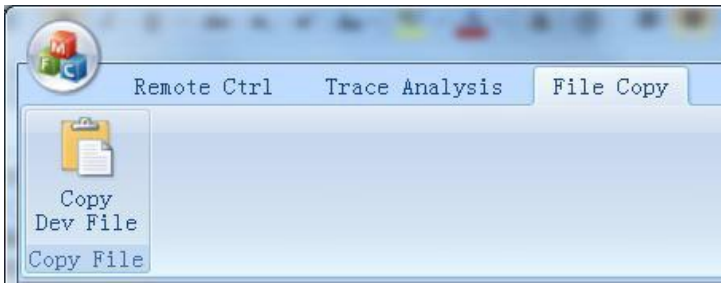

Figure 10-20 【FILE TRANS】Tab

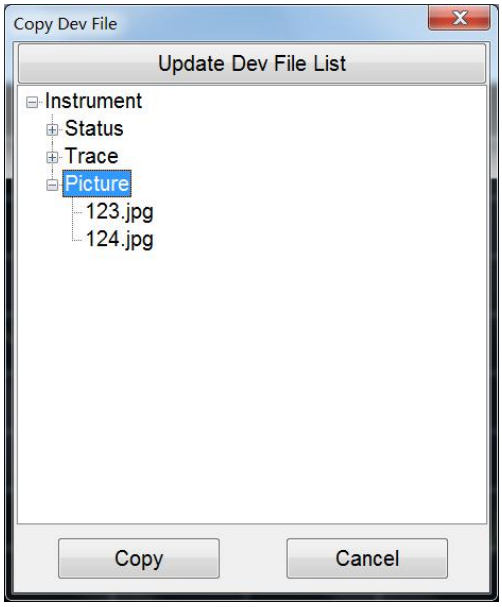

Figure 10-21 Dialog Box of Copy Document

10. 2. 7. Check the Software Version

Click the “About” key, namely question mark key, in the upper right corner of the software to check its version and copyright information, as shown in Figure 10-22.

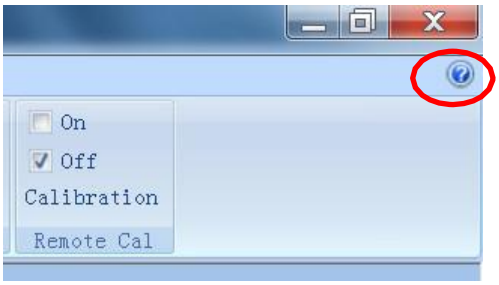

Figure 10-22 Key of “About”

10. 2. 8. Drawing Printing

Software toolkit provides the printing function for trace window activated currently. Click the “Recent List” key in the upper left corner of the software, to select the Printing Setting and Print in the drop-down list, as shown in Figure 10-23.

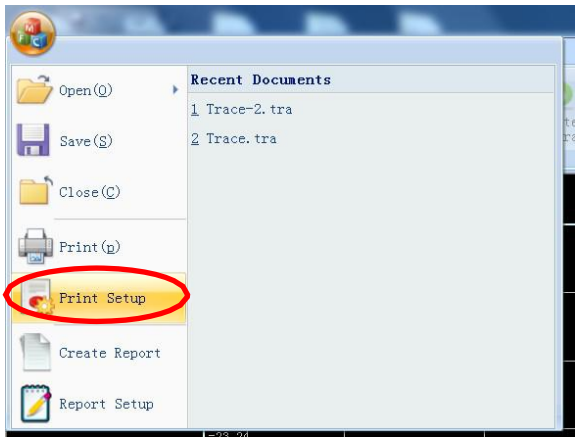

Figure 10-23 Key of Printing Function

10. 2. 9. Generate the Test Report

Software toolkit can generate the test reports in “pdf” format, which include some common items besides the drawing of current trace window. Click the “Recent List” key in the upper left corner of software, to select the Report Setting and Report Generation in the drop-down list, as shown in Figure 10-24. The display and content of report item can be set through the dialog box of “Report”, as shown in Figure 10-25.

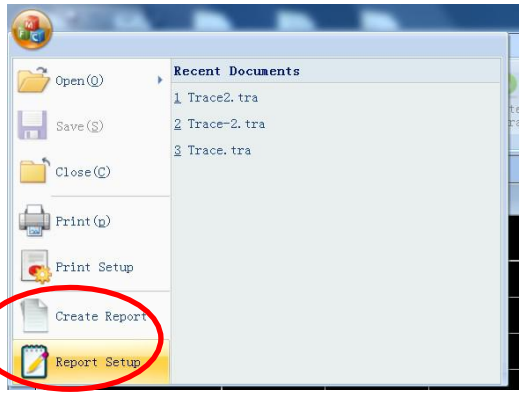

Figure 10-24 “Create Report” Function

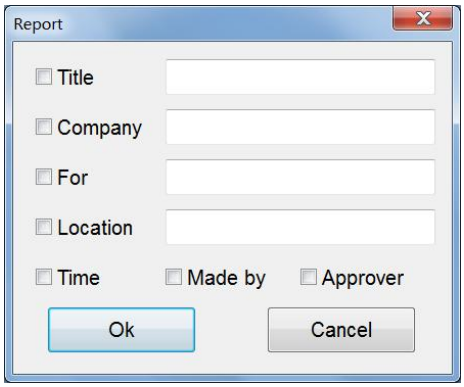

Figure 10-25 Dialog Box of “Report Setup”

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