

CAA-100 Series
Cable and Antenna
Analyzer

User's Manual

Notices

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The battery is a consumable part and is not subject to the CAA-100 Series cable and antenna analyzer warranty.

ISO9001 Certification

Produced to ISO9001 International Quality System Standard as part of ShinewayTech, objective of continually increasing customer satisfaction through improved process control.

Safety Instructions

During each stage of operation of this instrument, please always observe the following safety instructions. Not taking any safety precautions or following the instructions will violate the safety standards of design, manufacturing and application of these instruments. In no case will Shineway Technologies bear the responsibilities for consequences incurred by violation of the following instructions.

General

This product is a Safety Class 1 instrument. The protective features of this product may be impaired if it is used in a manner not specified in the operation instrument.

Environmental conditions

It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specifications tables.

Before applying power

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note the instrument's external markings described under Symbols.

Do not operate in an explosive atmosphere

Do not operate the instrument in the presence of flammable gases or fumes.

Do not remove the instrument cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel. Instrument that appears damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Safety Terms Used in This Manual

WARNING!

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personnel injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

CAUTION!

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or the entire product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

NOTE

The NOTE sign information that may be beneficial during the use and maintenance of the instrument.

Electrical safety precautions

If you need to ensure that the equipment completely off, unplug the power line and remove the battery.

WARNING!

Only using the AC/DC power adapter in the room.

The equipment should be placed where the surrounding air can flow freely.

Do not operate equipment in the flammable gas or near the smoke .

Do not operate equipment if any part of outer surface(upper cover panel, etc.)damaged, To avoid the electric shock,

Only approved professional personnel can open and debug and maintenance or repair the equipment when its power supply is turned on.

Even turn off the power supply ,equipment still be in a charged state over a period of time due to internal capacitor

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1. General Information

1.1 Scope of this Manual

Thank you for purchasing ShinewayTech instrument. Please read this manual carefully before using any of ShinewayTech instrument. Always observe the warnings and cautions appearing throughout this manual.

This manual contains the information necessary for proper operation and maintenance of CAA-100 Series instrument, troubleshooting instructions as well as information regarding obtaining services.

1.2 Unpacking and Inspection

This instrument has been carefully packed in accordance with standard shipping procedures. Examine the instrument for damage that may have occurred during shipment. If you find any damage or the instrument is not working, or if any of the following items are not included, please contact your representative of Shineway Technologies, Inc.

If necessary, you may contact Shineway Technologies, Inc via this email: support@shinewaytech.com.

NOTE

When returns, please

Packing meter with soft material; Use original case. If not, please fill at least 3cm soft material around the meter; Correctly fill out and return the product repair card, including company name, address, postal code, contact person, telephone, e-mail, problem description; Tape the box; Deliver to agents nearby or embranchment in Chinese mainland.

1.3 Product Introduction

CAA-100 Series product is portable, easy to learn and use, Has the characteristics of powerful function, fast operation, integrated intelligent etc..

CAA-100 Series product is equipped with a large and easy to read color LCD which can display the measurement data, trace and figure. This product has rich peripheral interface, users can easily backup or upload data. It is also equipped with a special PC software with which users can analyze, print ,record and archive measuring data and report.

1.4 Features

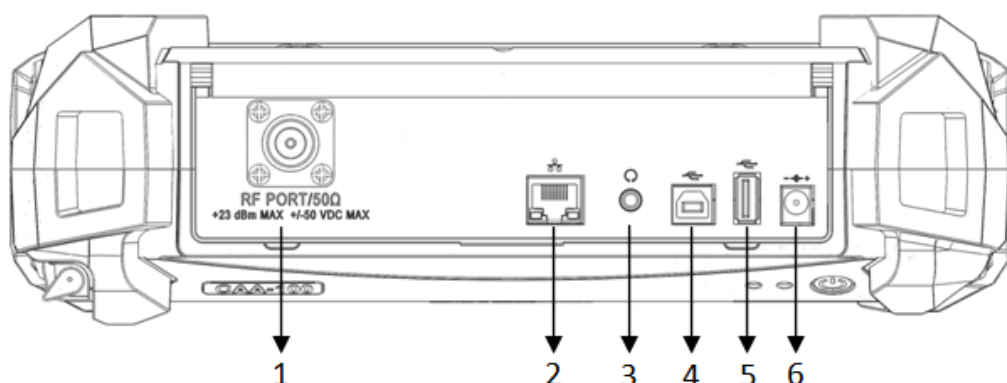
7 inch color LCD touch screen, support 4 level brightness, touch screen operation, supplemented by the keyboard operation, convenient and easy to use

high-capacity data storage , support backup almost unlimited data and curve


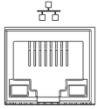


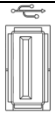

with PC management and analysis software, users can analyzer and manage measurement data freely.
 large capacity battery, support more than 8 hours of continuous work if charged fully
 Frequency range is 1M to 6000M.

2. The appearance introduction of equipment

2.1 The head cover

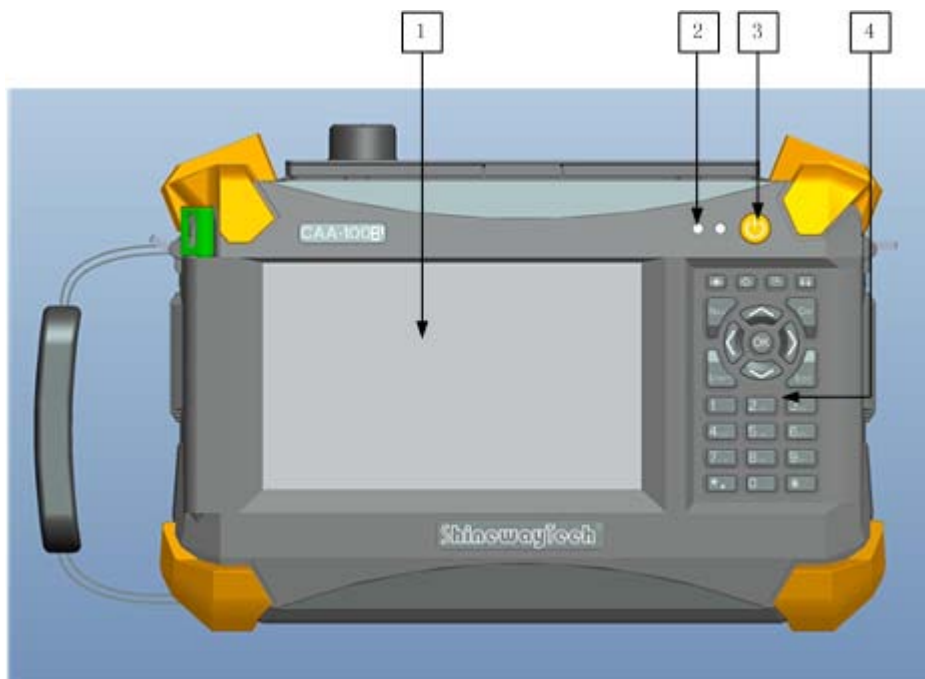


The head cover contains a variety of interface. A detailed description of the following

No.	Name	Icon	Function and Description
1	RF connector	 RF PORT/50Ω +23 dBm MAX +1-50 VDC MAX	To connect cable and antenna unit to be tested
2	RJ45 LAN		Reserved
3	Ear socket		Reserved
4	USB Device port		To connect PC, then users can run special software to analyze and manage measurement data
5	USB host port		To connect flash disk
6	Adapter socket		To connect external AC-DC adapter

2.2 Front panel

1. Screen display area;
2. indicator lights;
3. power button;
4. hard keyboard.













Note: Press the power button shortly to open the instrument, and press it for 2s to turn off the instrument;

Description for indicator lights:

Position	State	Meaning
Left	Red	Battery Charging...
	green	Battery Charge fully
Right	Off	Power off
	green	Power on
	red	Measuring...


Description for hard keyboard:

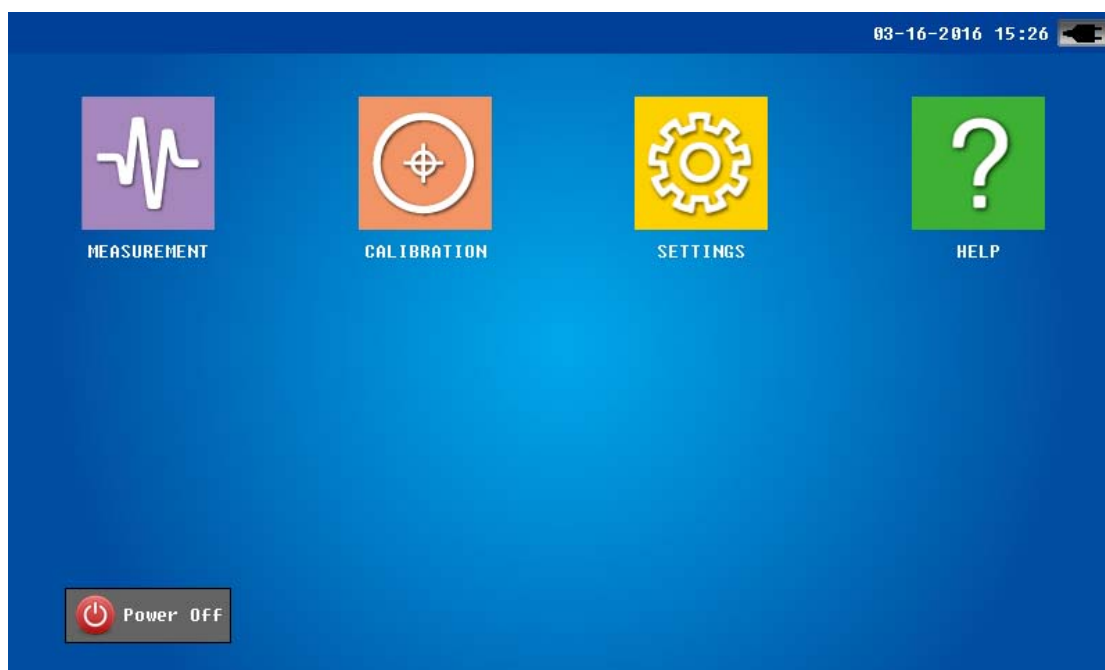
Icon	function and description
	Adjust the display screen brightness, there are four levels
	Switch display mode (black and white, normal, night vision, and high contrast)

	Preview, save the measurement picture
	Save calibration and measurement curve
	popup or down the right menu
	Quick start measurement
	Backspace
	Return to the previous interface
	left and right move marker line
	Up and down move limit line
	Enter key
	Digital key, input 0-9
* key	decimal point
#key	Minus sign

3. User interface and menu instructions

3.1 Turn-on the instrument

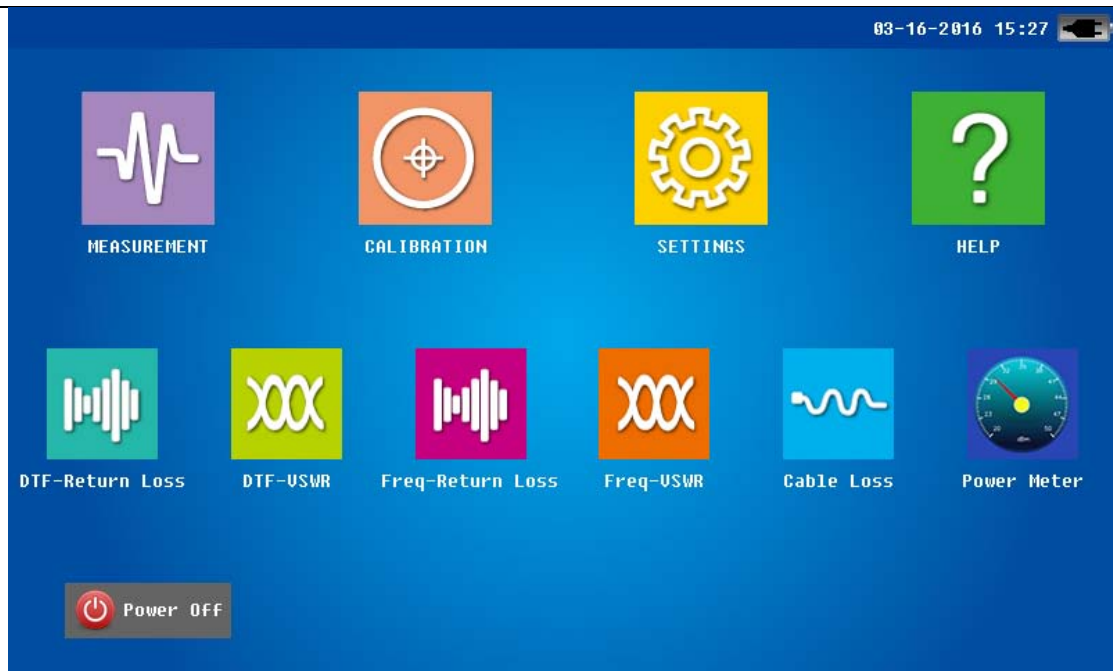
Press , equipment will display the boot picture. During startup, the right light turns red, the system will initialize DSP system, self check system state, etc. When main interface appear, the boot process end, the right light turns green.



Main interface

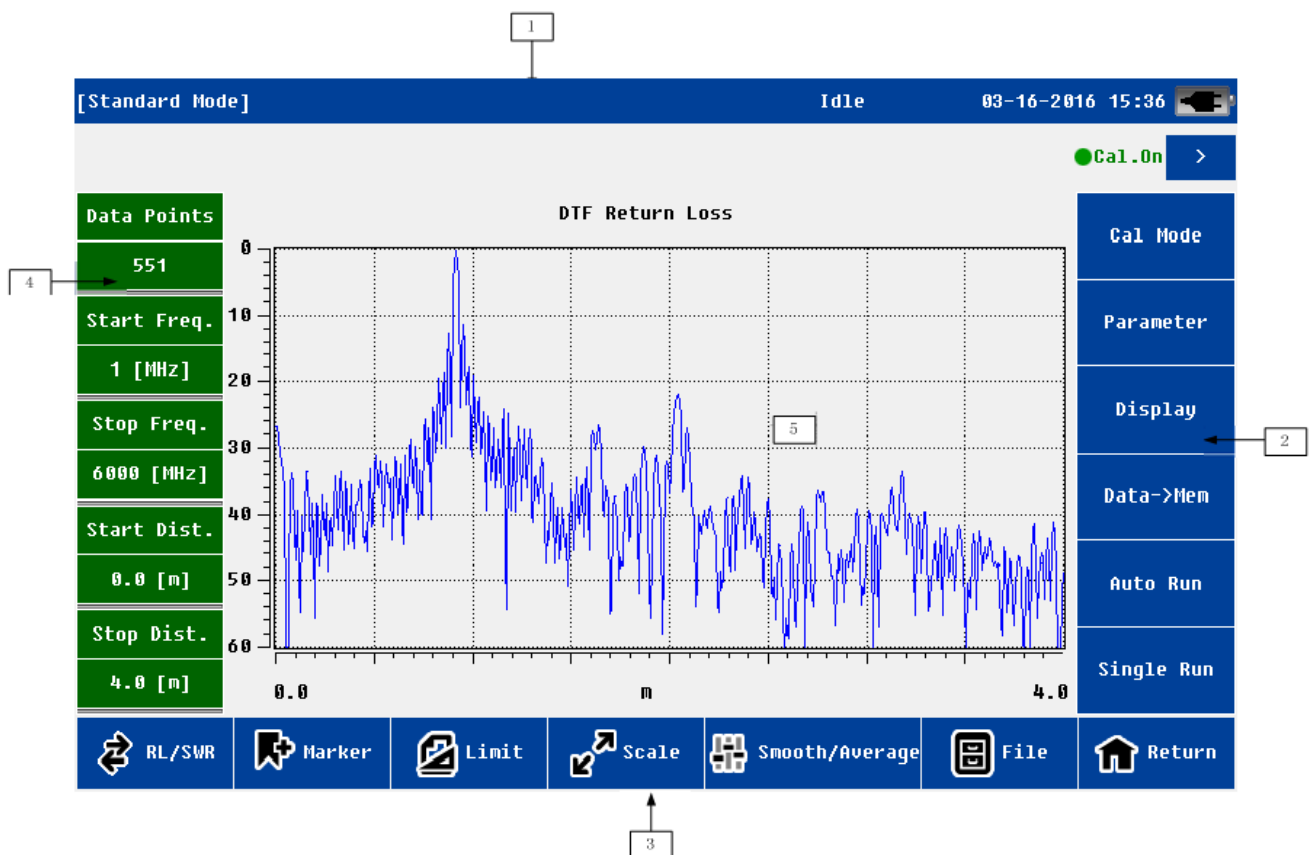
3.2 Main interface

Click "MEASUREMENT" Icon , 5 sub-icons appear, Corresponding to the five measurement modes: DTF(distance fault)return loss, DTF-VSWR, Frequency return loss, Frequency-VSWR, cable loss. Click the icon, the system will go into the corresponding measurement interface.



Note: Click other icons in the main interface (CALIBRATION, SETTINGS, HELP), system will enter the corresponding operation interface.


3.3 Measurement Interface



Measurement interface mainly consists of the following parts:

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No.	Name	Position	Function and Description
1	status bar	Top	Display the system status and measurement information
2	function menu	Right	For details, see the later chapter Note: If some menu are selected, this part may will refresh.
3	function menu	Bottom	For details see later chapter
4	Message bar	Left	Frequency, distance, measuring points etc.
5	Display area	Middle	For details see later chapter

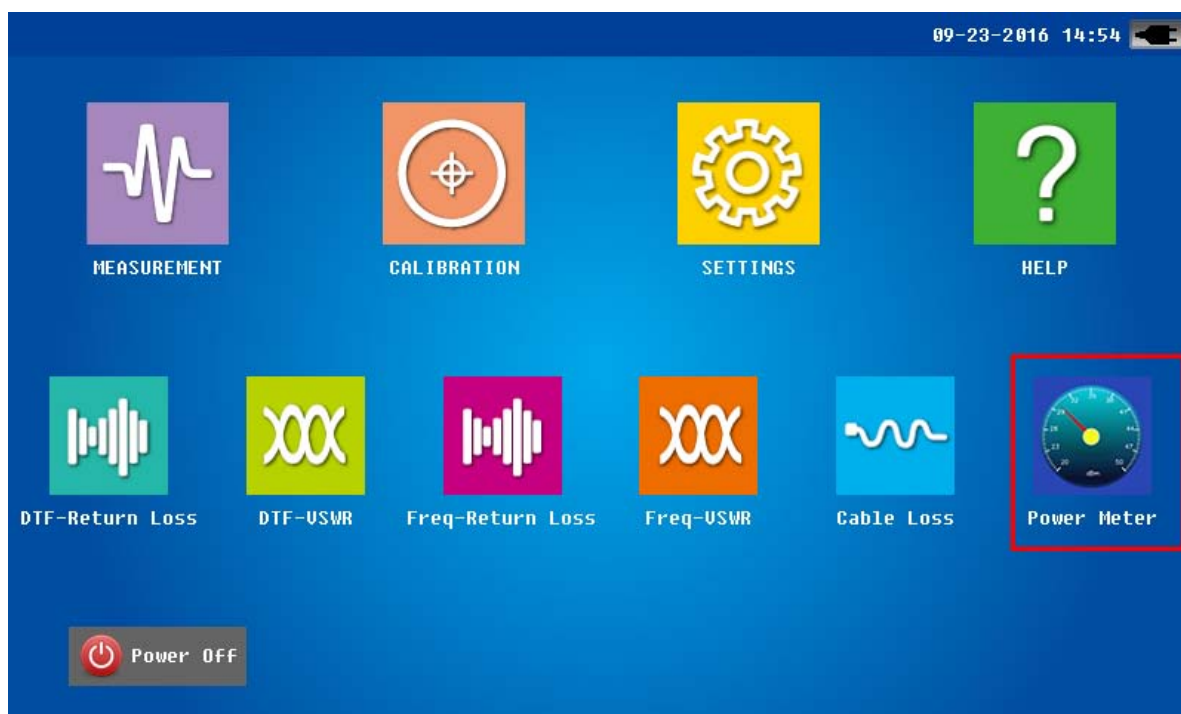
If the user wants to zoom in the display area, can click the arrow  or “Nav” key. Click again the area will zoom out.

Detailed description:

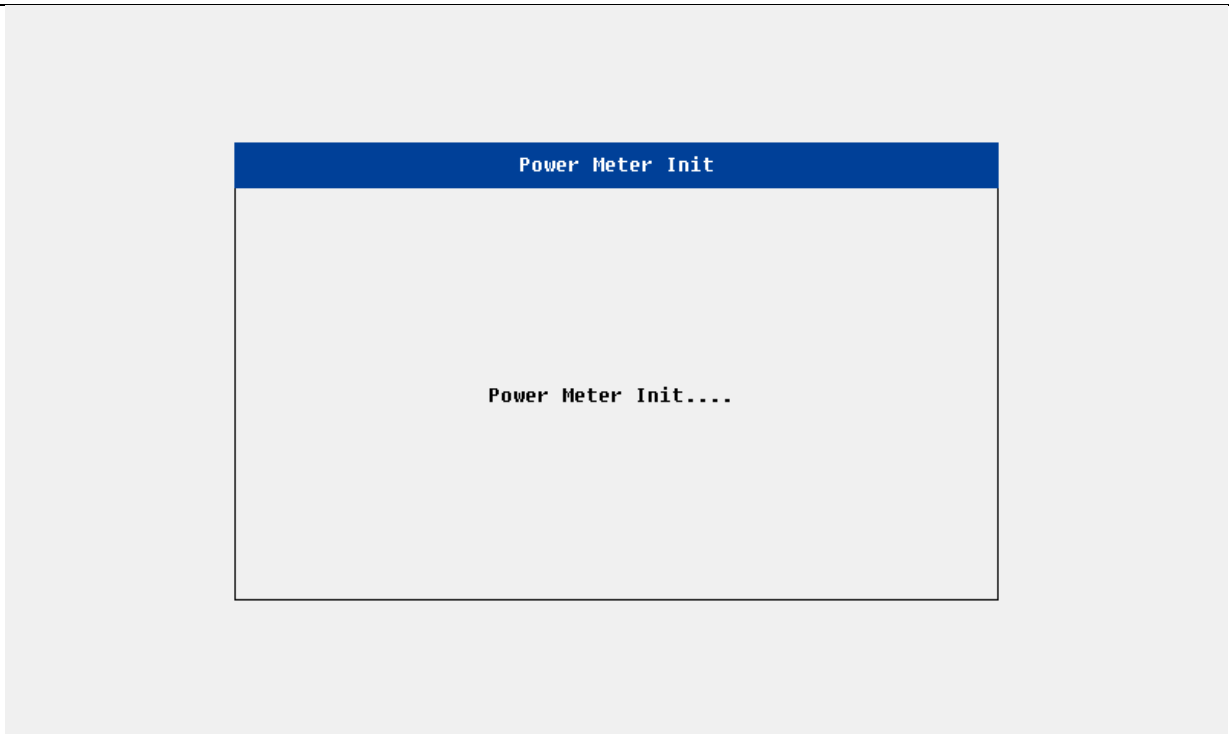
Function	Function and Description
Status bar	Power management mode: standard and power saving mode
	Measurement state: idle and measuring
	Time: year/month/date/hour/minute
	The adapter and battery state: 1. Connect an external adapter, without battery - display adapter icon; 2. Connect an external adapter, with battery charging - display charging icon; 3. Connect an external adapter, with battery full - display adapter icon; 4. Without adapter, only battery - display battery icon, divided into 5 levels. If battery is low voltage system will alarm
	Calibration state: (valid)On or (unvalid) off Note: Only when calibration is valid(on), user can start measurement.
	Marker information
	Limit line information
Measurement information	Measurement points: 137、275、551、1103
	Start and stop frequency and distance
Function menu 1	Cal mode: enter calibration interface
	Parameter: enter parameter setting menu. If user in the freq-return loss/freq-VSWR/cable loss measurement mode, it will go into frequency parameter setting menu; If user in the DTF-return loss/DTF-VSWR measurement mode ,it will go into DTF parameters menu, more parameters and information will be included in this menu.
	Display: For details see later chapter
	Data-> Mem : Save current data to memory Note: only one data can be save to the memory

	<p>Auto Run: Start continuous measurement, clicks again to stop.</p> <p>Note: while measuring and Auto Run state is on, some functions are prohibited. If users want to use these function again, need to click the menu once again and check the state is off.</p>
	<p>Single run: Start single measurement, the system enters the idle state after measurement</p>
Function menu 2	<p>RL/SWR: fast switching between the return loss and VSWR measurement</p>
	<p>Marker: For details see later chapter</p>
	<p>Limit: For details see later chapter</p>
	<p>Scale: For details see later chapter</p>
	<p>Smooth/Average: turn on/off Smooth/Average function. User can utilize these function to observe and analyze measurement dat.</p>
	<p>File: For details see later chapter</p>
Main display area	<p>Display the measurement results and other information.</p>

3.4 RF Power Meter Interface

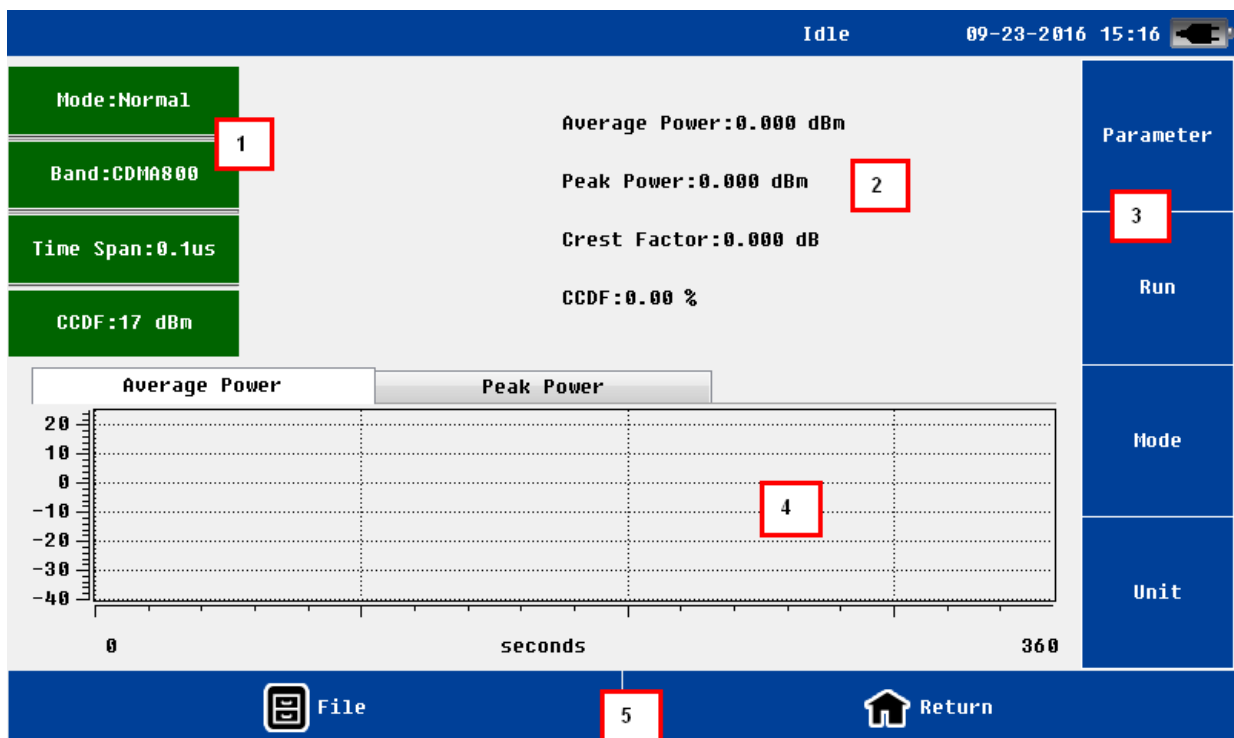


In the main interface, click Measurement—Power Meter coin, users will enter the RF Power Meter interface. The steps and the interface are as shown below:


NOTE

Users should connect the RF power meter to the unit first, and then click the coin to enter the power meter interface.

Users should quit the power meter interface, and then disconnect the power meter.



DPM-50AP Power Meter: Normal Mode: Forward Power, Reflected Power, Return Loss, VSWR, Peak Power, Crest Factor, CCDF; Burst Mode: Burst Power, DutyCycle.

TPM-50A Power Meter: Normal Mode: Average Power, Peak Power, Crest Factor, CCDF; Burst Mode: Burst Power, Peak Power, DutyCycle.

RF Power Meter interface is main including the followings:

No	Naming	Location	Description
1	Information status bar	Left up connector	Display parameter information
2	Test result display area	Up	RF power meter, etc.
3	Function menu	Right	Parameter setting, Run/Stop, Mode, Unit
4	Historical graph display area	Bottom	Display power meter in the current mode
5	File management and exit	Below	Files storage, import, delete; Image storage

3.4.1 Power Meter Setting

In setting menu, users can set parameters of power meter.

Version

This interface displays the power meter type, hardware and software version.

The screenshot shows the 'Settings' menu with a sidebar on the left containing options: Version, Frequency Band, Time Span, CCDF, Measure Time, Limit, and Default Settings. The 'Version' option is selected and highlighted with a red box. The main content area displays the 'Power meter system software info' section with 'Version: V1.0'. Below it is the 'Power meter device version info' section with the following details: Device Type: TPM (highlighted with a red box), Hardware Version: ---, Software Version: 4.00, and Serial Number: 13603 (with a red box around the number). At the bottom of the screen is a 'Return' button with a home icon.

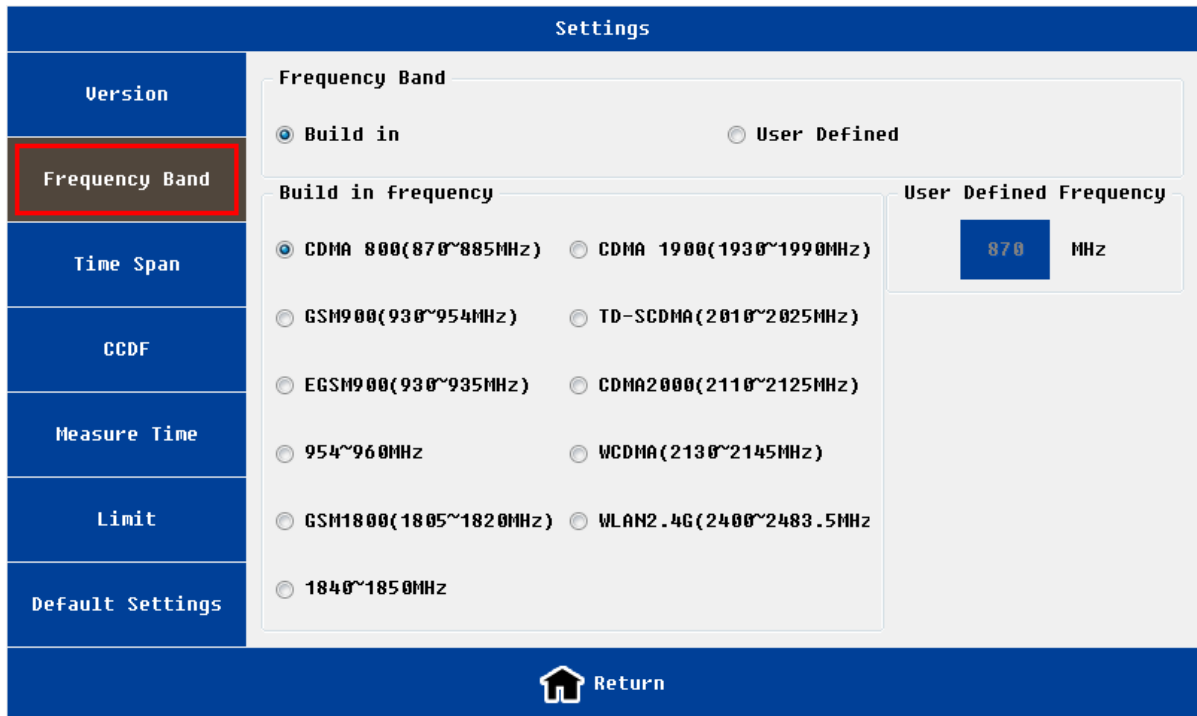
Frequency Band

It is include build in frequency and user defined frequency. For the user defined frequency, users can input the

frequency range is below:

DPM-50AP Frequency range: 300M~4200M

TPM-50A Frequency range: 50M~4000M



Time Span

For the time span setting, it is 0.1 μ s, 1 μ s, 15 μ s and 150 μ s. Modulation signal modulation frequency is higher, the time span should be smaller. For burst signals or pulse signals, the time span needs to be less than the minimum pulse width.



CCDF Threshold

Before testing the CCDF, users should set the CCDF Threshold.

DPM-50AP CCDF Threshold : 17dBm~57dBm;

TPM-50AP CCDF Threshold : -40dBm~20dBm.



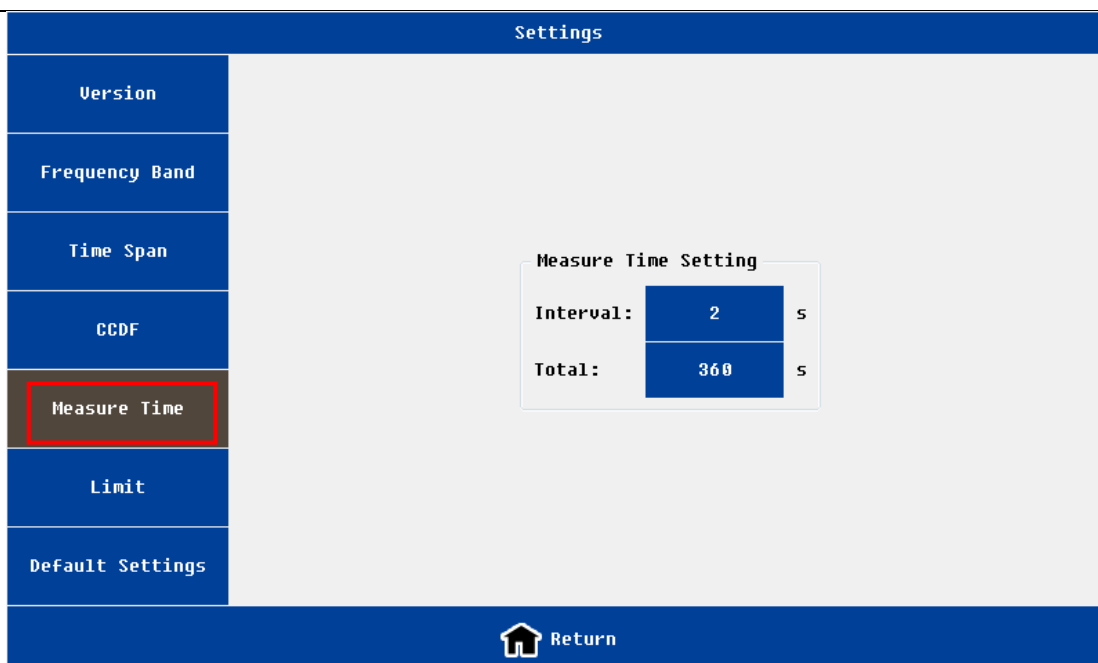
Measure Time

Users can set the interval measure time and the total measure time;

Interval : 1s – 60s;

Total : 2s – 7200s;

The total time should be longer than the interval time.



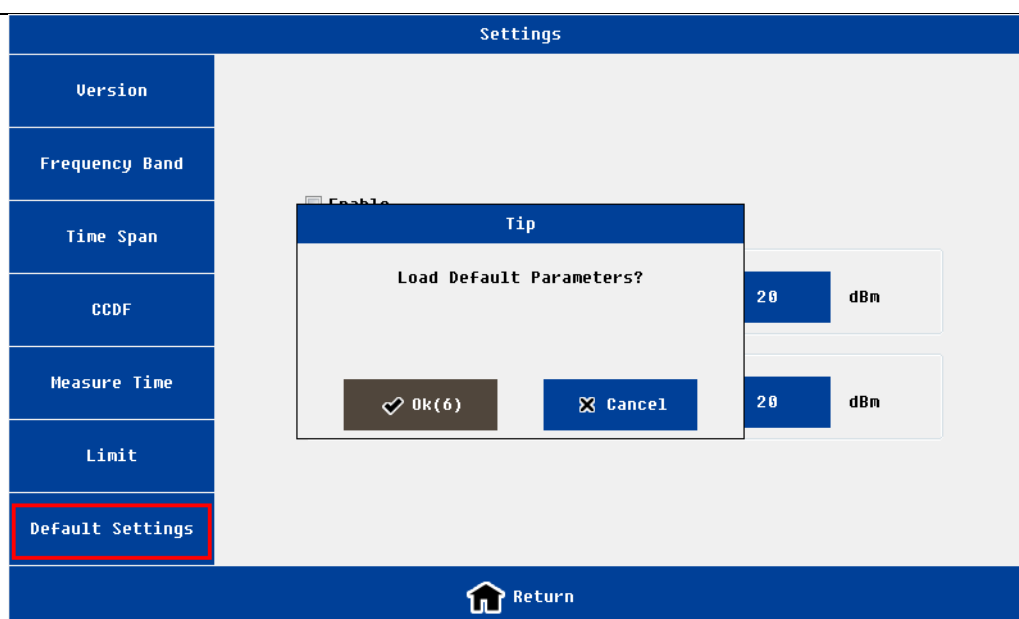
Limit

Users can set the limit power range and chose the Enable, and then the test result can be displayed in red color to alarm.



Default Setting

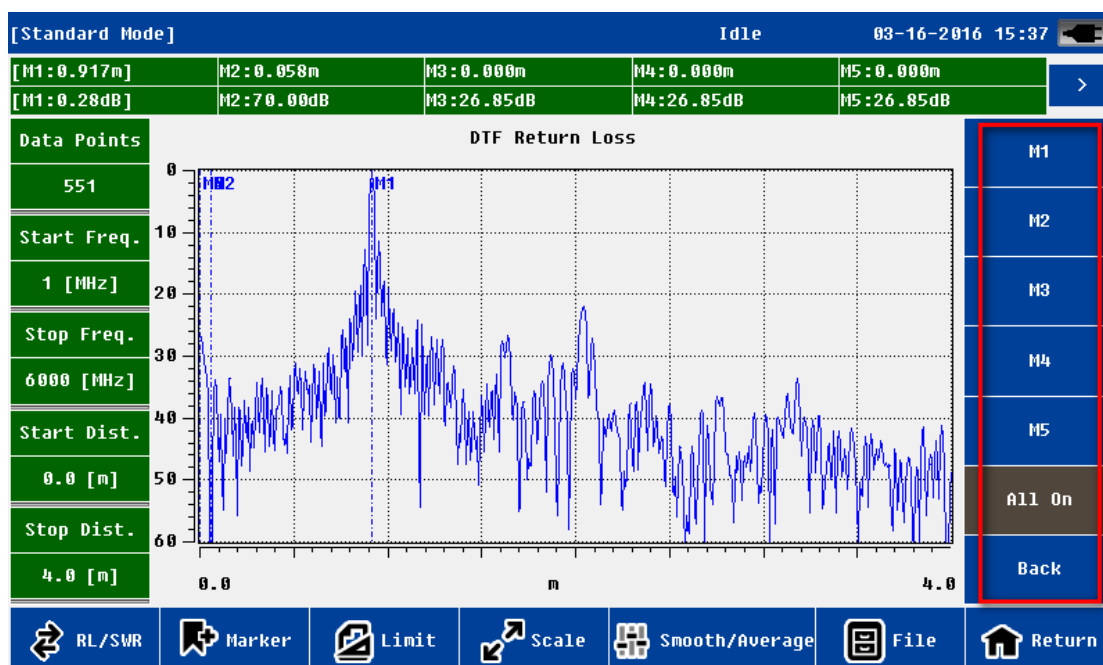
Users can load default parameters in this interface.



3.5 The function menu description

3.5.1 Marker

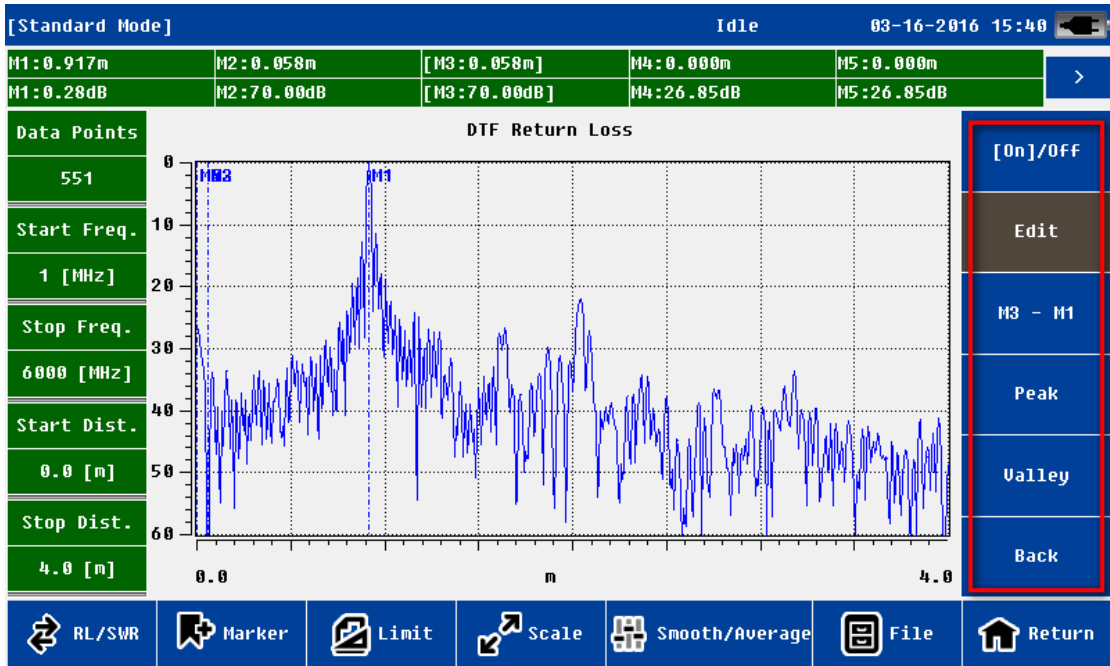
In all five measurement mode users can use mark function. The user click "marker" menu, new mark menu will appear on the right side of screen.



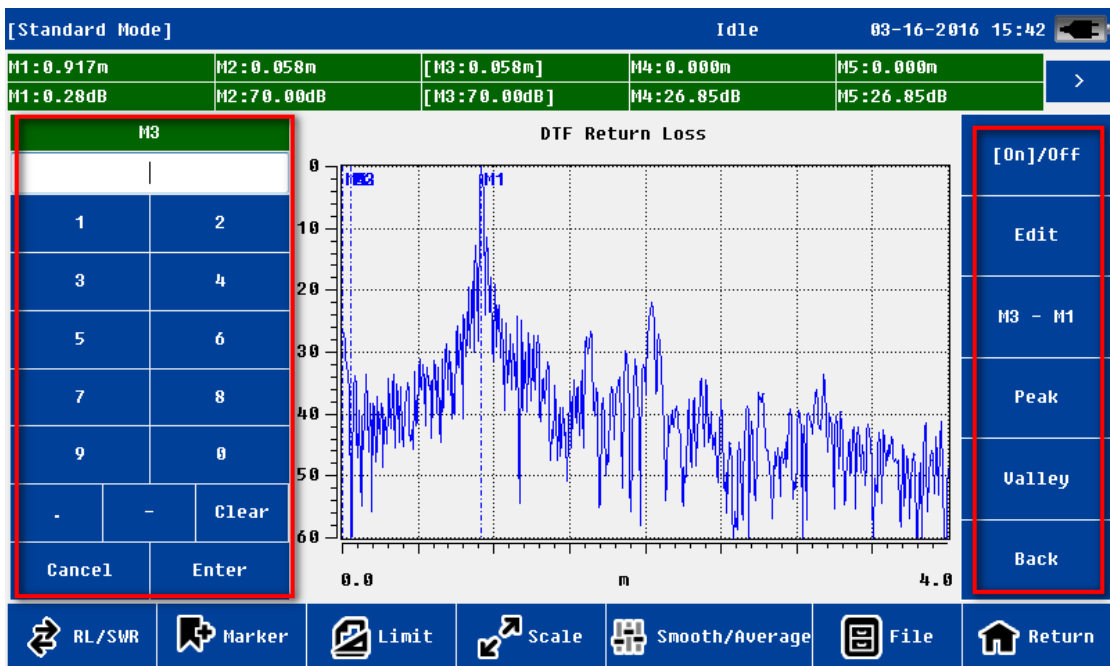
The system supports 5 marker lines(M1, M2, M3, M4, M5), each marker can be independent turn on/off and edited. The user can also close all markers.

The user clicks on "MX", the MX marker automatically is activated. The status will be shown on the top status

bar. Users click on the "Edit" menu, the edit menu will show on the left side of the main display area.



Marker setting menu



Marker setting menu

The user can define the position of marker line by the following ways:

- The soft keyboard to enter digital value
- The hard keyboard to enter digital value
- touch screen directly with touch pen to move and define the location
- left and right arrow key of hard keyboard to fine adjust and define the location

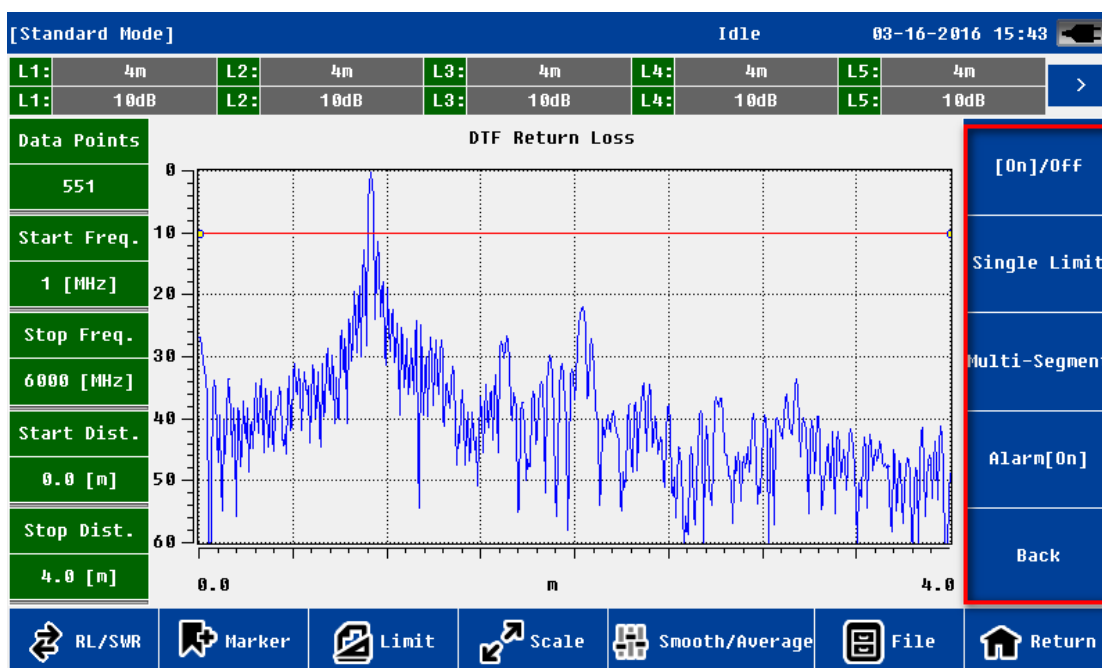
After the location of the mark line is determined , users need to confirm the operation (soft keyboard "Enter" key or hard keyboard "OK" key).

Users also can click on the "mark to the peak" or "mark to the valley" to determine the location of the mark line

For M2~M5, the system also supports difference marker relative to M1 . users click on the "MX-M1" ,the system will go into the difference marker mode. The status displayed in the status bar is the difference between X and Y direction, i.e. (MX2~5-MX1; MY2~5-MY1).

3.5.2 Limit Line

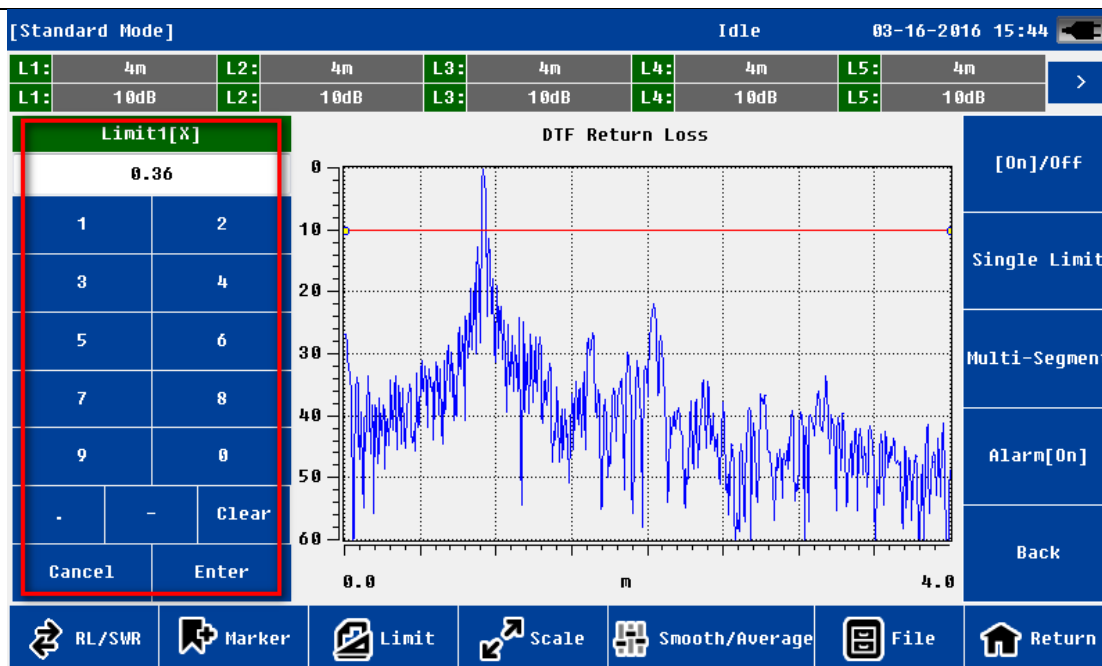
In all five measurement mode users can use limit line function. The user click on the "limit" menu, the limit menu will appear on the right side of screen. The user click on the "[On]/off" menu and activate this function. the limit line status information will display on the top of the screen.



Limit menu

System supports single section and multi section limit line.

The user clicks on edit box of limit line status(x, y independently), the new edit menu will pop-up on the left of the screen.



Limit setting menu

The user can define the limit line position by the following ways

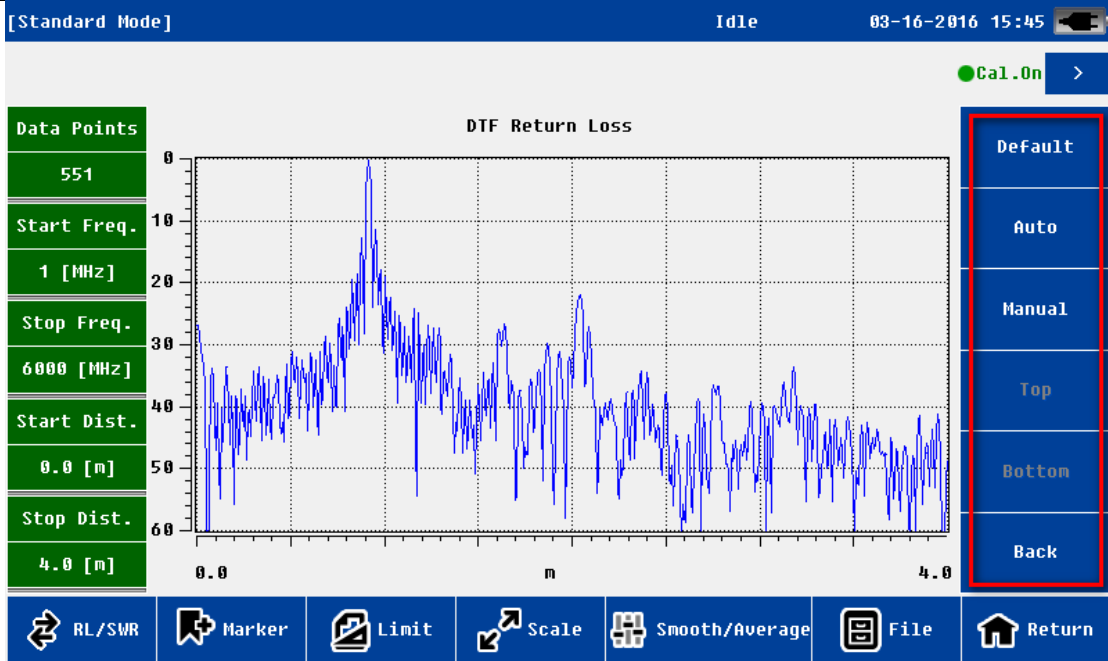
- The soft keyboard to enter digital value
- The hard keyboard to enter digital value
- touch screen directly with touch pen to move and define the location
- Up and down arrow key of hard keyboard to fine adjust and define the location

After the location of the limit line is determined, users need to confirm the operation (soft keyboard "Enter" key or hard keyboard "OK" key).

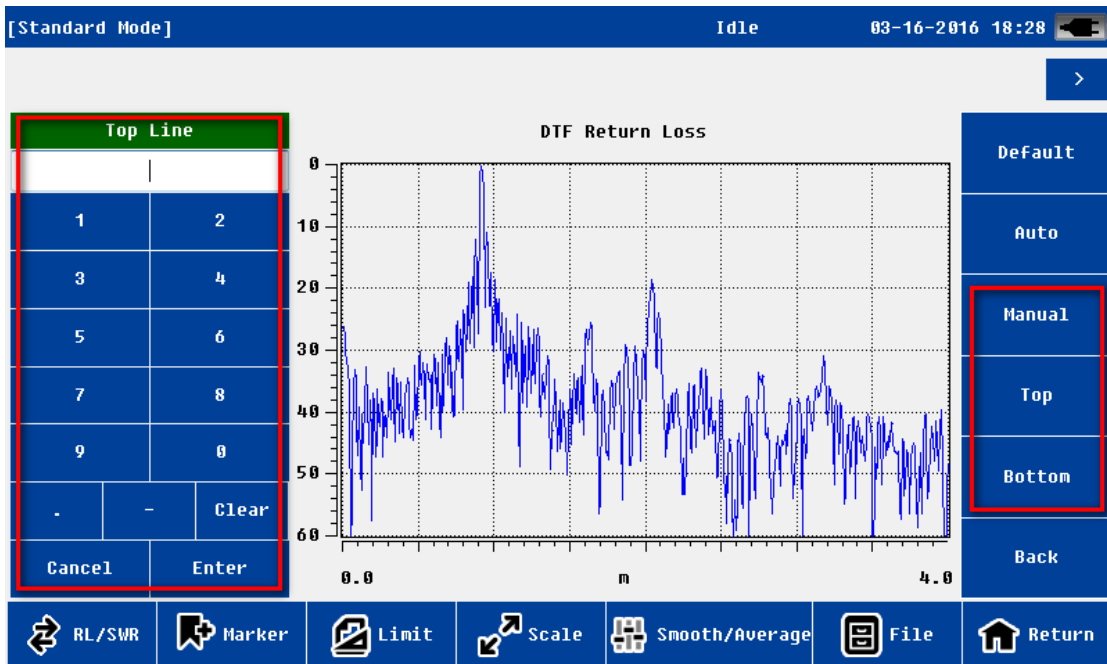
Users can also enable the limit line alarm function. If this function is enabled, once the measurement data exceeds the limit line, limit line color will turn red (the default is green).

3.5.3 Scale

Scale function is mainly used to adjust the Y axis, convenient for users to view data.



Scale menu



Manual scale setting menu

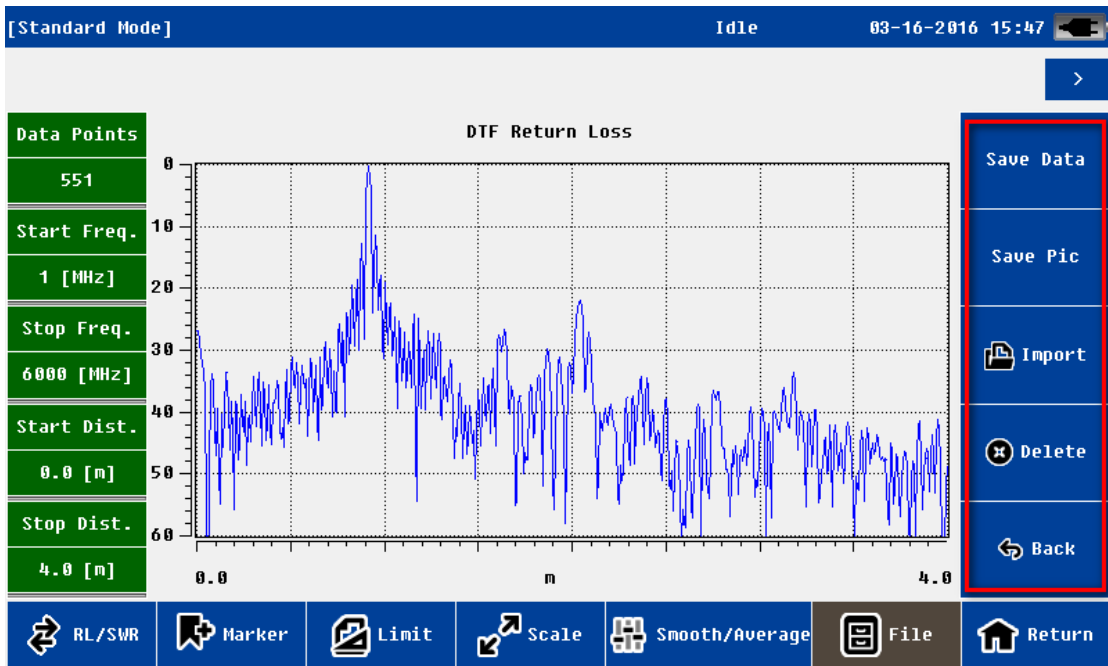
Name	function and description
Default	Y axis coordinate go back to the default value Return Loss: 0~60; VSWR: 1~65; Cable Loss: 0~30
Auto	Adjust Y axis automatically to adapt current measurement data
Manual	Users can edit upper and lower line of Y axis coordinate manually.

NOTE

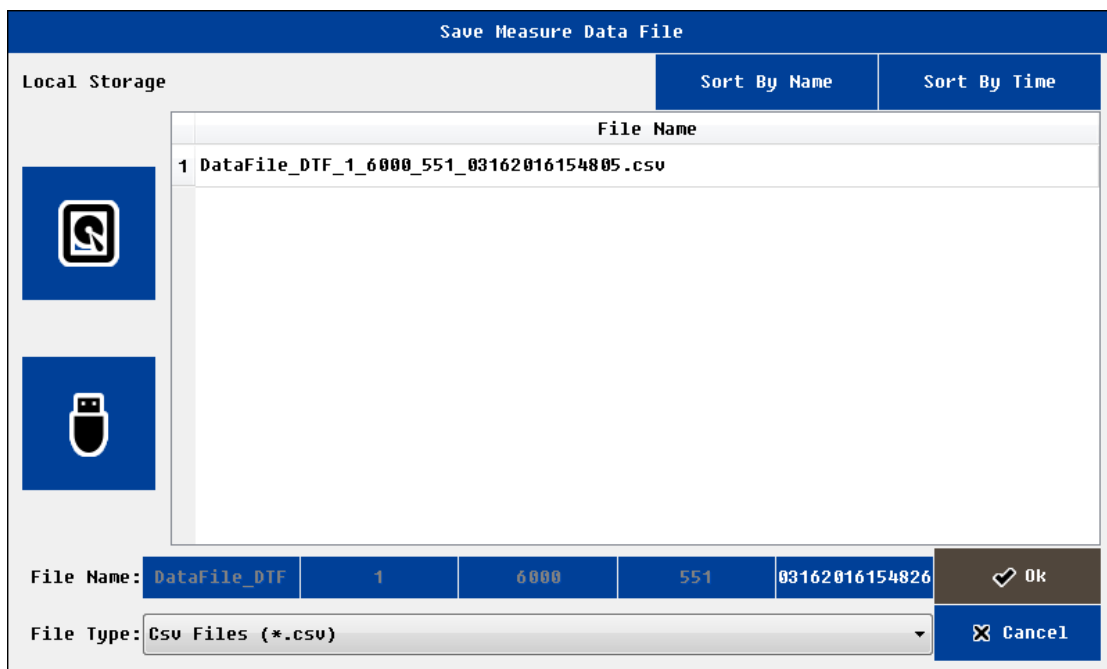
The upper and lower coordinate can only be edited if “manual” menu is activated.

3.5.4 File

The user can save measurement data or picture to PC; also can recall measurement data from PC to CAA-100 Series . This function facilitate users to analyze the measurement data later.



File menu



Save file interface

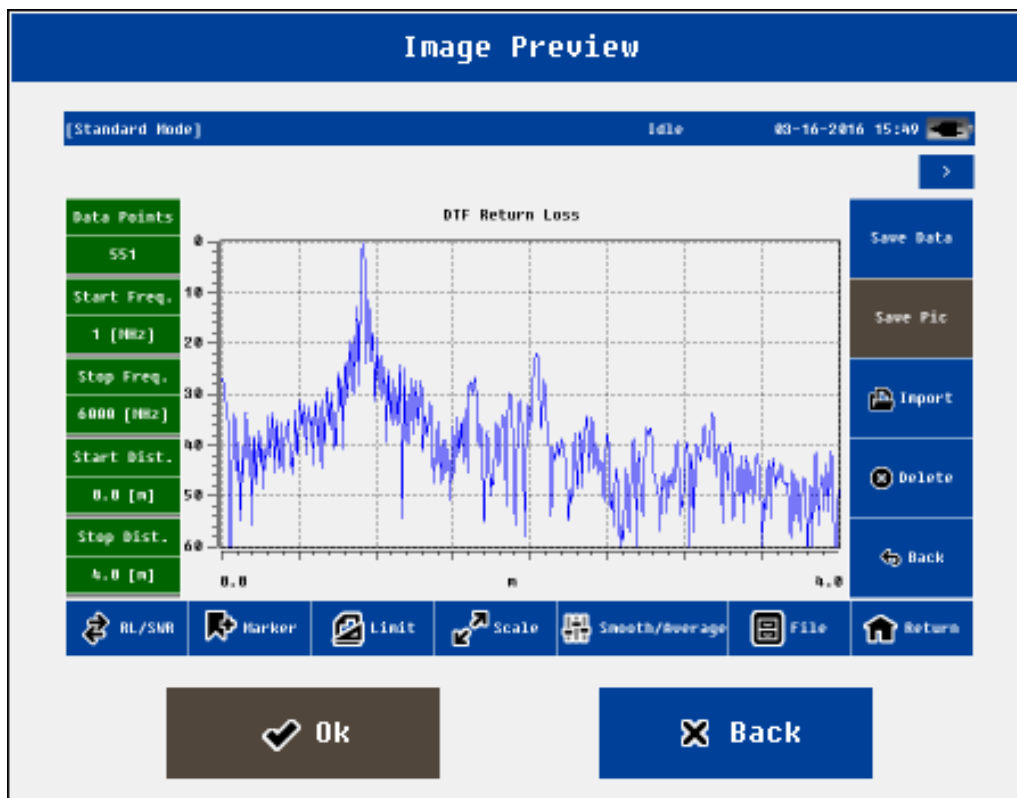
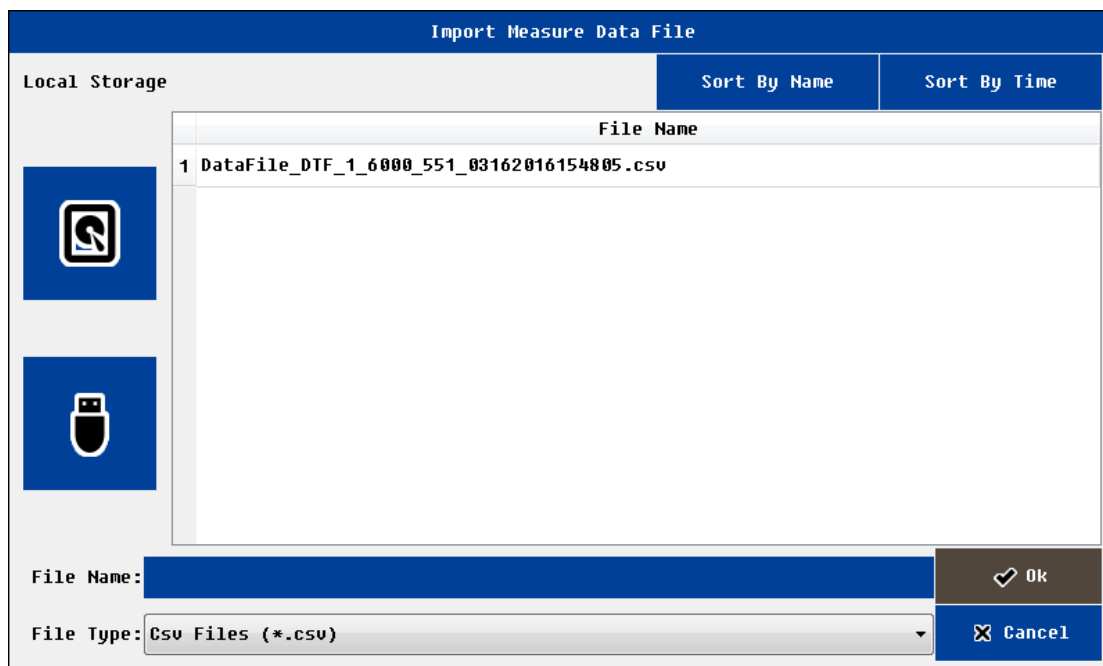
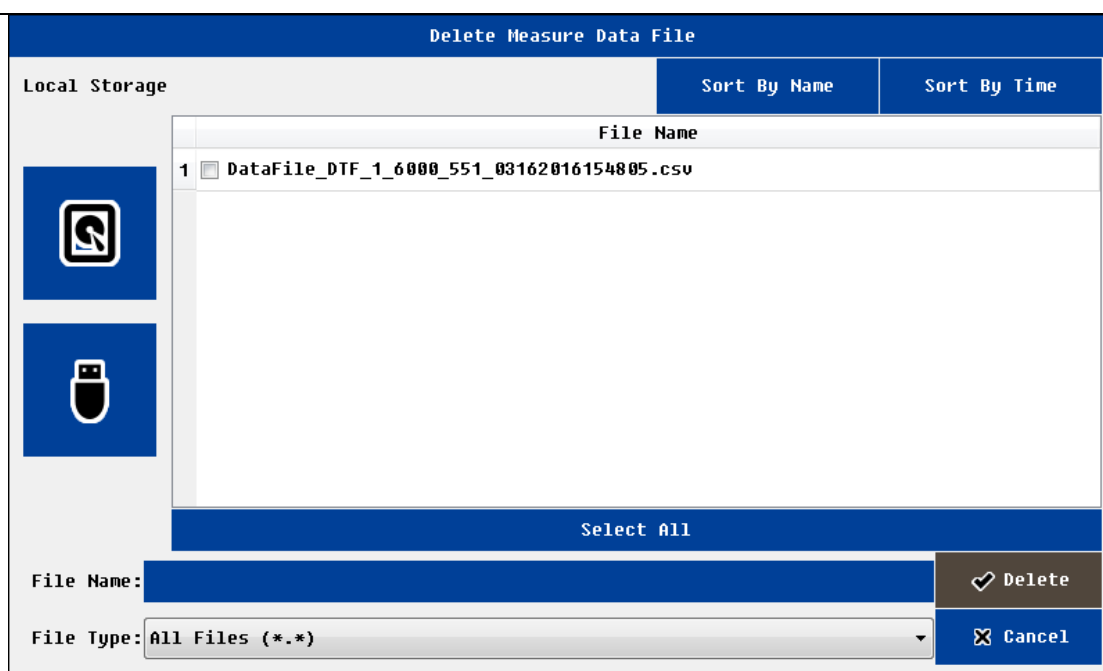


Image preview interface



File import interface



File delete interface

Name	Function and Description
Save Data	<p>The default file type is .csv format</p> <p>The default file name includes the measurement mode, frequency, measuring points, the time information</p> <p>users can choose to save in the local memory or external memory</p> <p>Only support measurement and calibration data</p>
Save Picture	<p>The default file type is the.JPG format</p> <p>The default file name includes the measurement mode, frequency, measuring points, the time information</p> <p>users can choose to save in the local memory or external memory</p> <p>Only support measurement data</p> <p>Screenshot only support the curve of measurement data</p>
Recall Data	<p>The target file can be stored in the local memory or external memory</p> <p>Import file must be.csv type and the format must be correct</p>
Delete	Delete the files

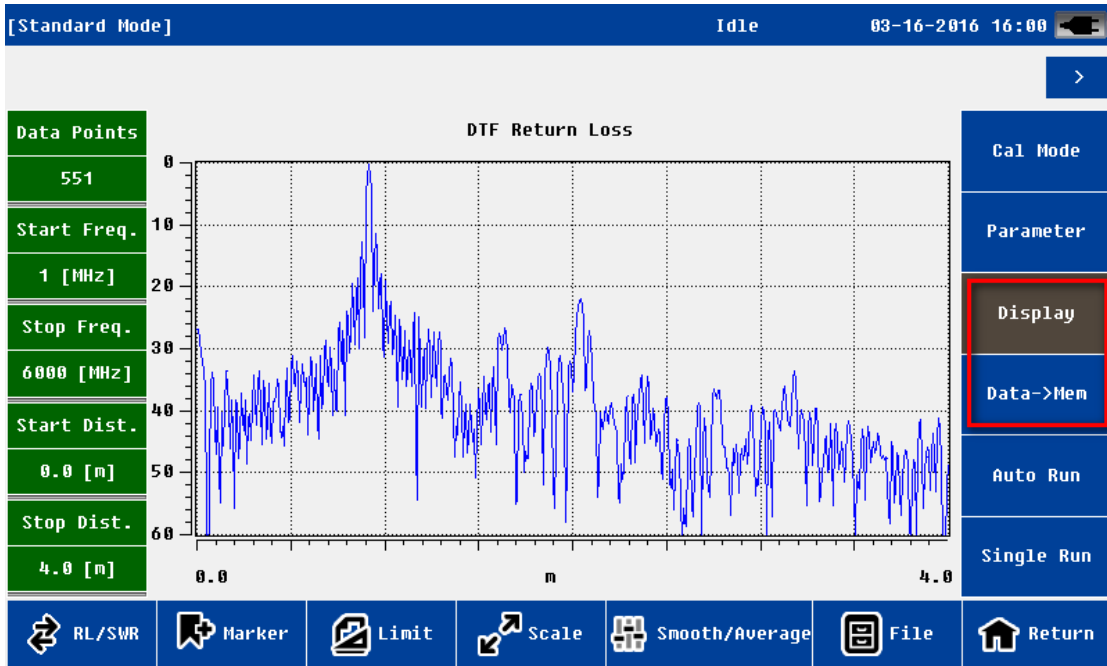
NOTE

User must return to the superior interface before removing the external disk.

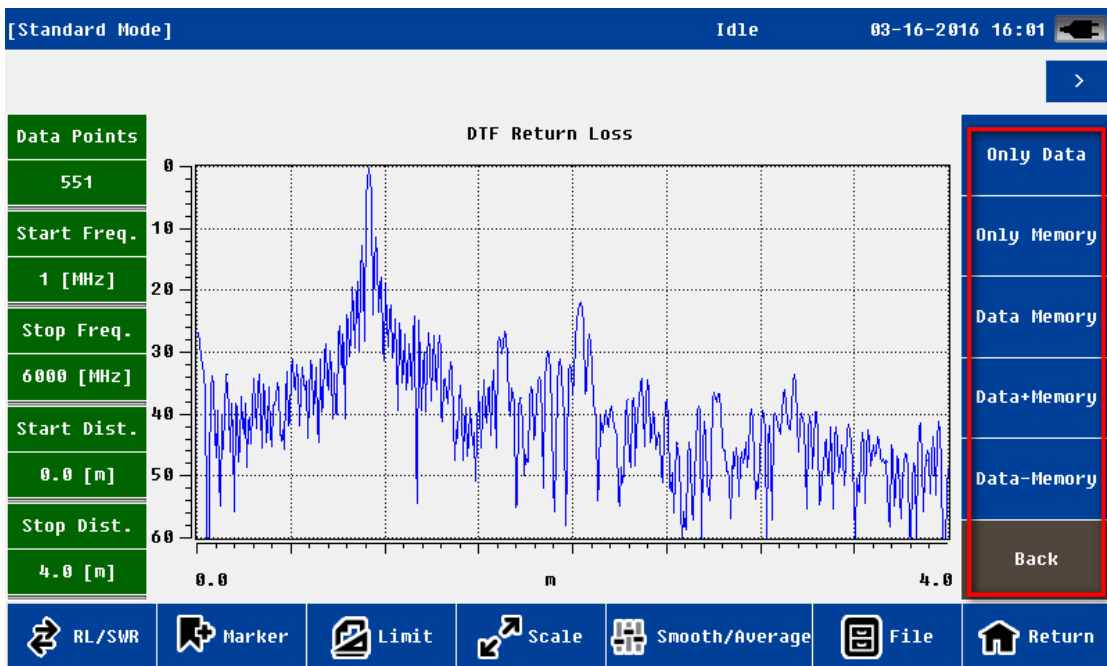
3.5.5 Display

The display menu is mainly used for data analysis. Users can save current data(either current measurement
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data or recalled history data) to the memory , then compare the current measured data and memory data.



Display menu

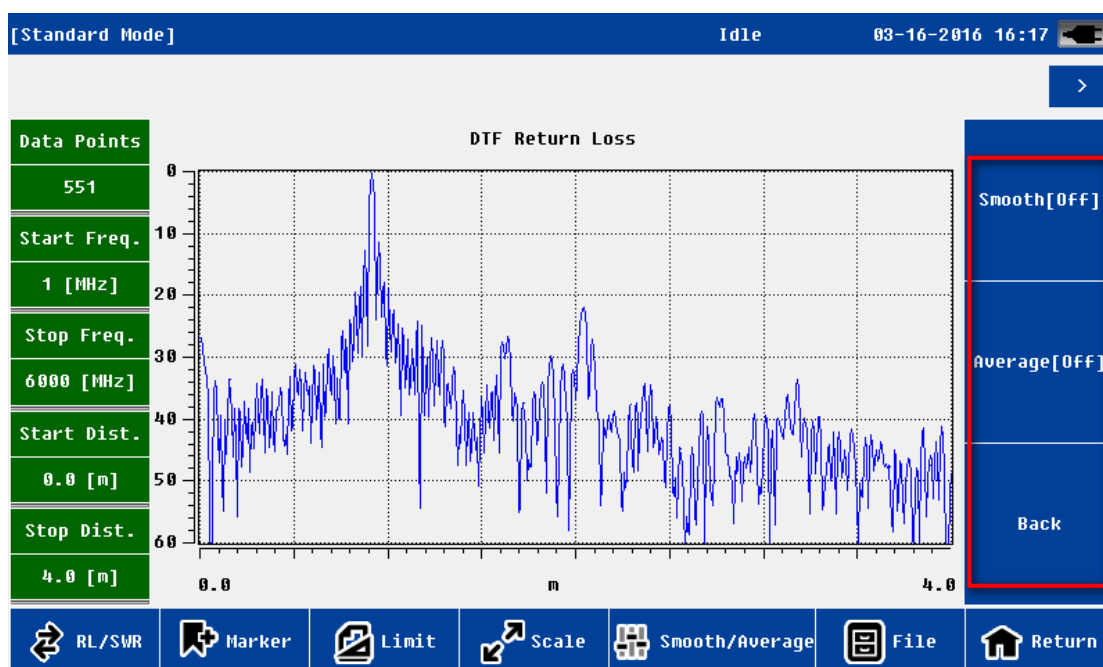


Display setting menu

Name	function and description
Data->Mem	Save current data to memory Note: Only one data can save The data can be the current measurement data, can also be a historical data. It can recall from local or external disk
Only Data	Display the current measurement data

Only Memory	Display the memory data
Data & Memory	Display the current measuring data and memory data at the same time Note: the format of two data must be same , such as the mode of measurement, frequency, measuring points, the distance information etc.
Data + Memory	Display “the current measuring data plus the memory data” Note: the format of two data must be same , such as the mode of measurement, frequency, measuring points, the distance information etc.
Data - Memory	Display “the current measuring data - the memory data” Note: the format of two data must be same , such as the mode of measurement, frequency, measuring points, the distance information etc.

3.5.6 Average/Smooth



Average/Smooth menu

name	function and description
Smooth	For a single curve do smooth operation
Average	For 2 relative curve do average operation.

3.6 Calibration interface

Users need to calibrate before the measurement. For this unit, it has two methods : mechanical calibration and electronic calibration.

Mechanical calibration is used T-type calibrator, the open short load (OSL) calibration. Users need to follow
Shineway Technologies, Inc.

the instruction and connect open / short/50 Ohm load respectively to the RF port and do calibration. Finishing the mechanical calibration, if users change frequency or the measurement point, this calibration will not effect and users should recalibrate.

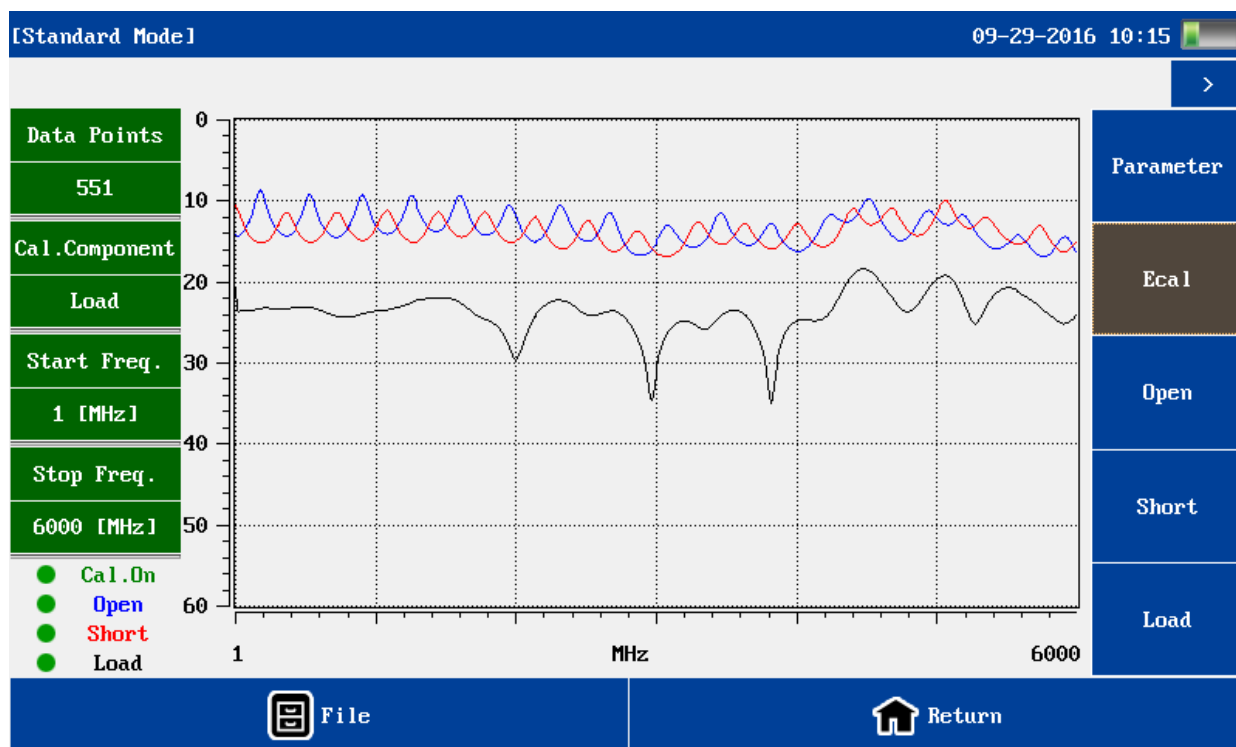
Electronic calibration is done with electronic calibrator, Flexcal calibration. Connect electronic calibrator and data cable to the unit, click the Ecal coin, it will do the electronic calibration. Electronic calibration is default in the whole frequency, and the measurement point is 551; Finished the electronic calibration, it will be effect whether users change the frequency range and measurement point or not.

NOTE

When users select the Flexcal, the calibration is default the whole frequency range calibration and the measurement range is 551. When calibration is finished, changing the frequency range or measurement point will have no effect on the calibration status.

Mechanical calibration can select the Flexcal or not. If select the Flexcal, calibration state will not be effect by changing the frequency range or measurement point; if not, when users change the frequency range or measurement point, users must do recalibration.

Electronic calibration is default to select the Flexcal.



Calibration interface

The calibration interface is similar to measurement interface. On the left-top of screen including frequency information, On the left-bottom of screen including calibration information.

The user can save current calibration data to the local or external disk, or Import history calibration data to

CAA-100 Series.

Before calibration, the user need to set the correct parameters, Mainly refer to the frequency and measurement points. The completion calibration, the corresponding curve will display on the screen. If calibration is valid, the status on the left-bottom will become "cal On". If calibration is invalid or unfinished, the status will be "cal off".

After the calibration, the user can return directly to the measurement interface for measurement.

System support different calibration kit only if user know the exact electrical length of open/short load. Users can input this parameters in the e parameter menu.

Is the electrical length of open and short cal kit same?	Is the exact electrical length of open and short cal kit known?	Return Loss/VSWR/cable Loss measurement	Phase/Impedence measurement
Yes	unknown	support	Do not support
Yes	know	support	Support
	know	support	support

The return loss of 50 ohms cal kit need to be > 42 .

The VSWR of open/short cal kit need to be > 100 .

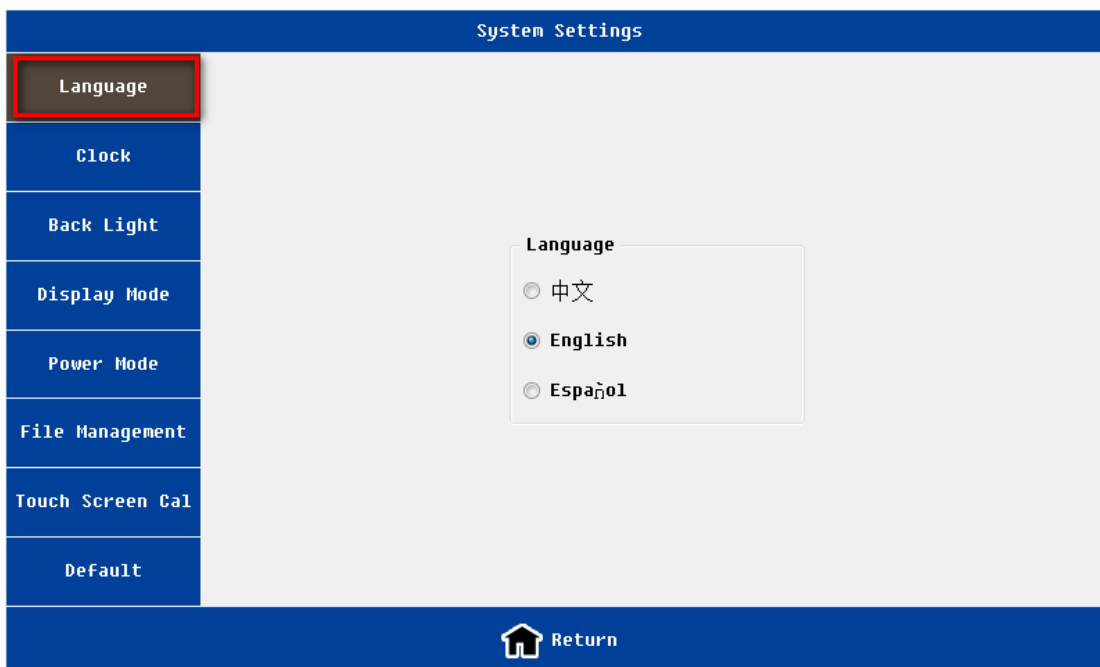
If the user does not focus on phase and impedance characteristics, cal kit from other manufacturers can be directly used (usually short and open cal kit have same electrical length).

Calibration setting menu

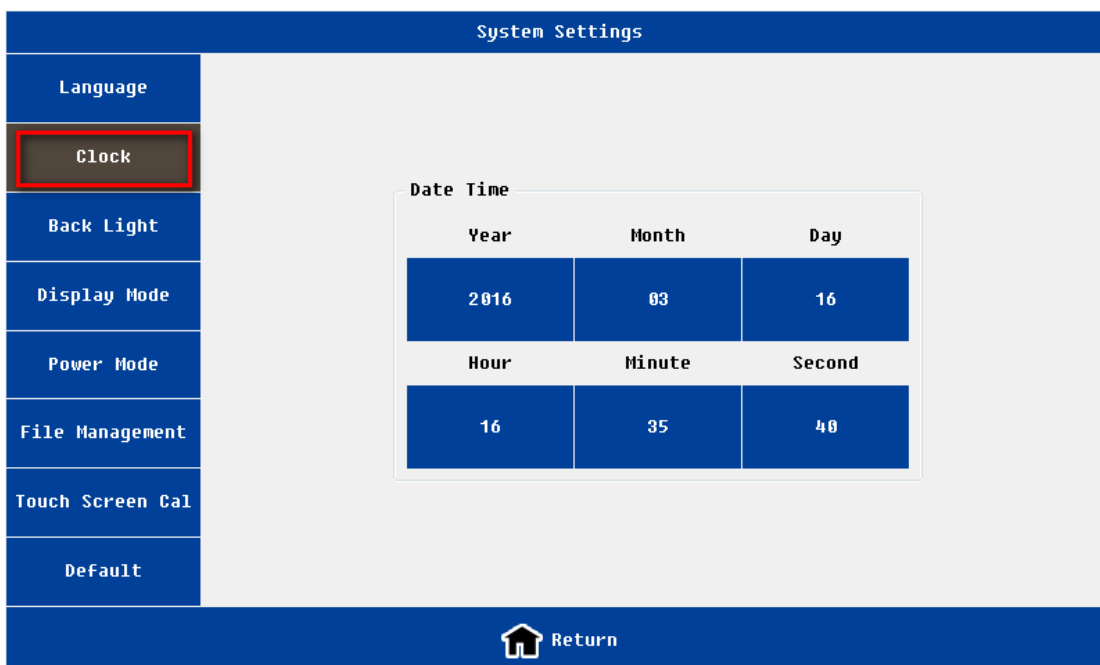
Note: the electric length is measured at 1GHz frequency, the unit is degree.

3.7 System Settings Interface

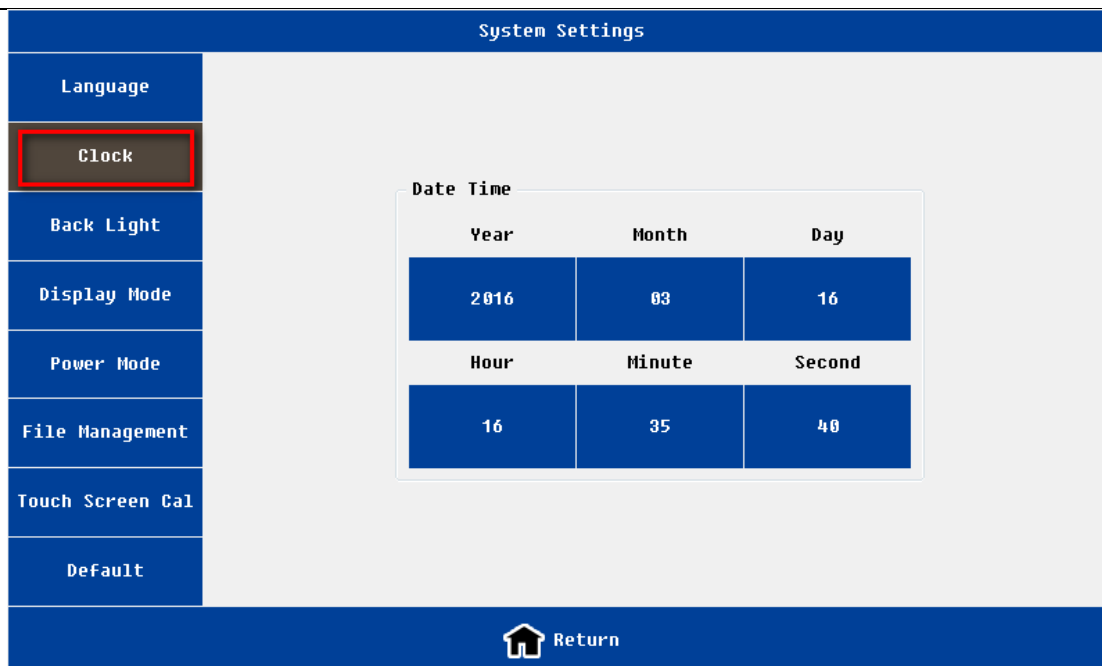
In the system settings interface, users can do all kinds of system configuration.



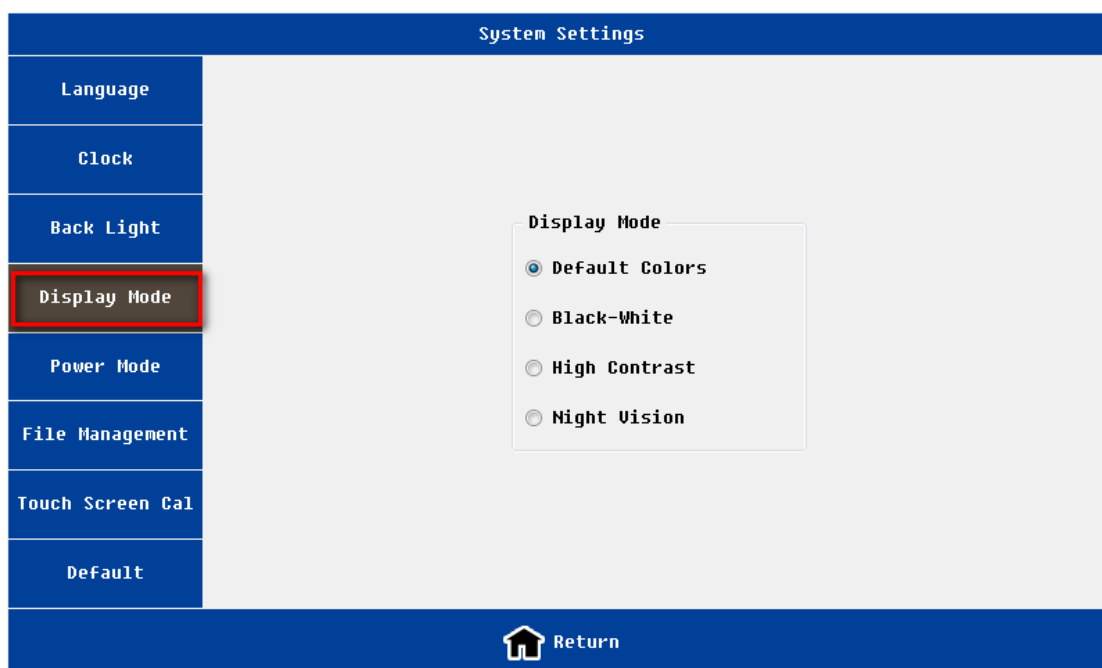
Language setting interface



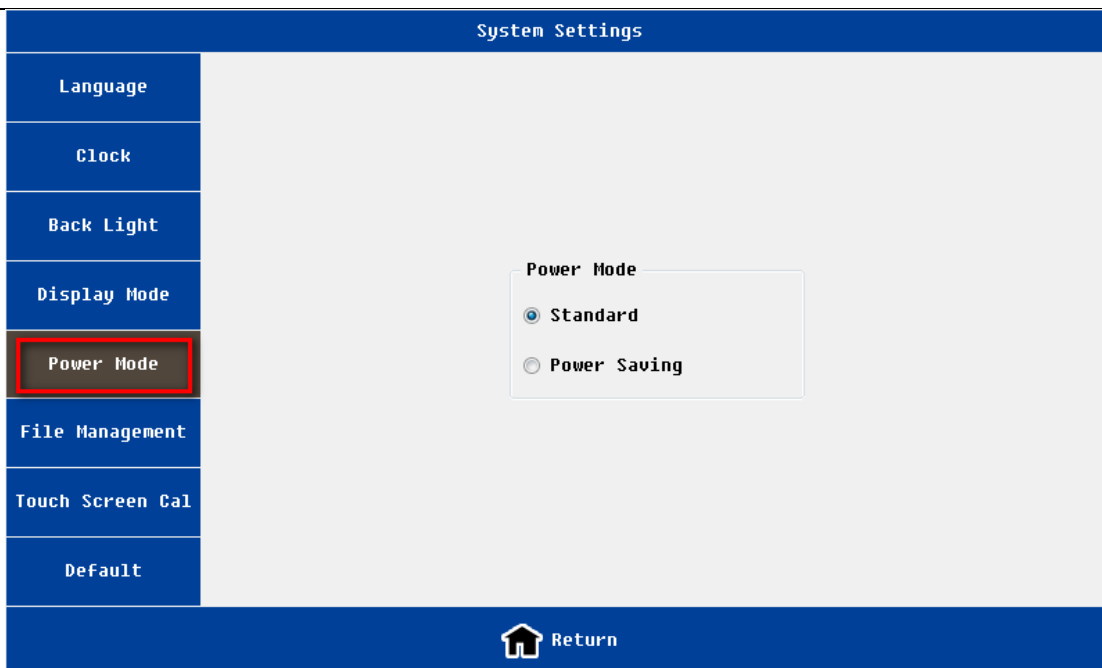
Clock setting interface



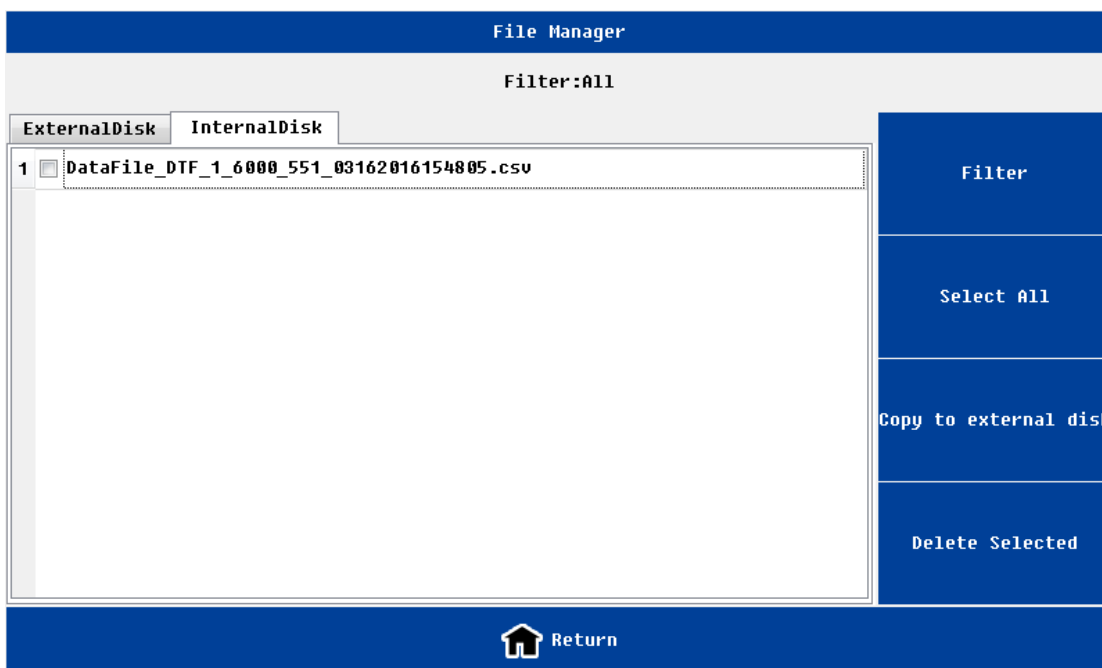
Back light setting interface



Display mode setting interface



Power mode setting interface

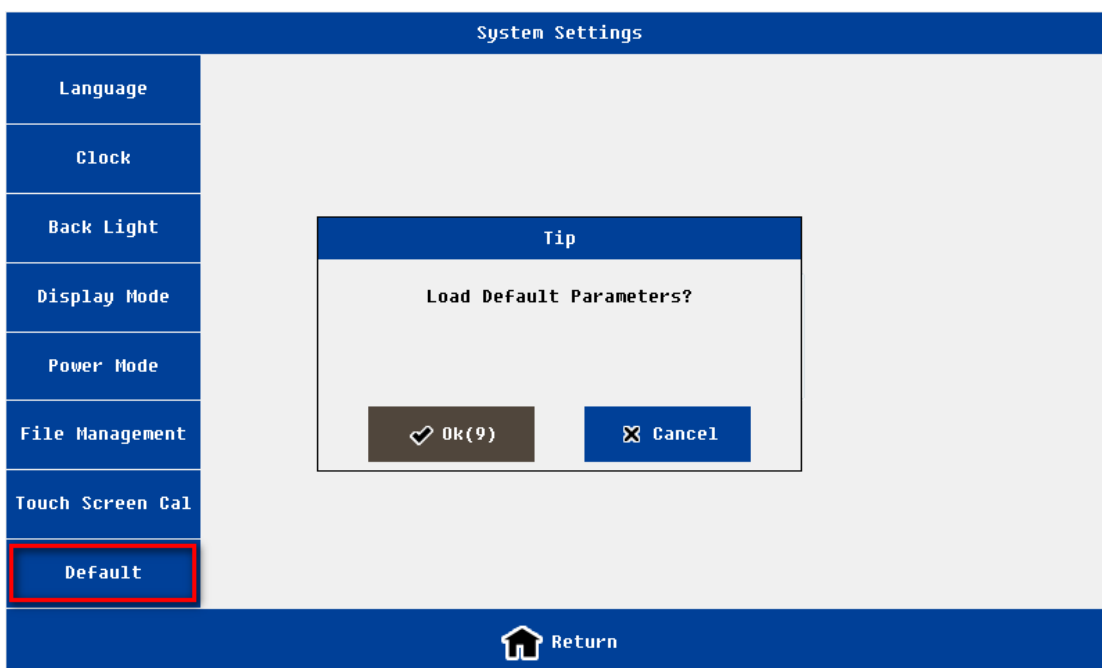




File manager interface

NOTE:

- 1) Please make sure that the external memory has been inserted before operating “File Management”;
- 2) User must return to the superior interface before removing the external disk to make sure files performed.

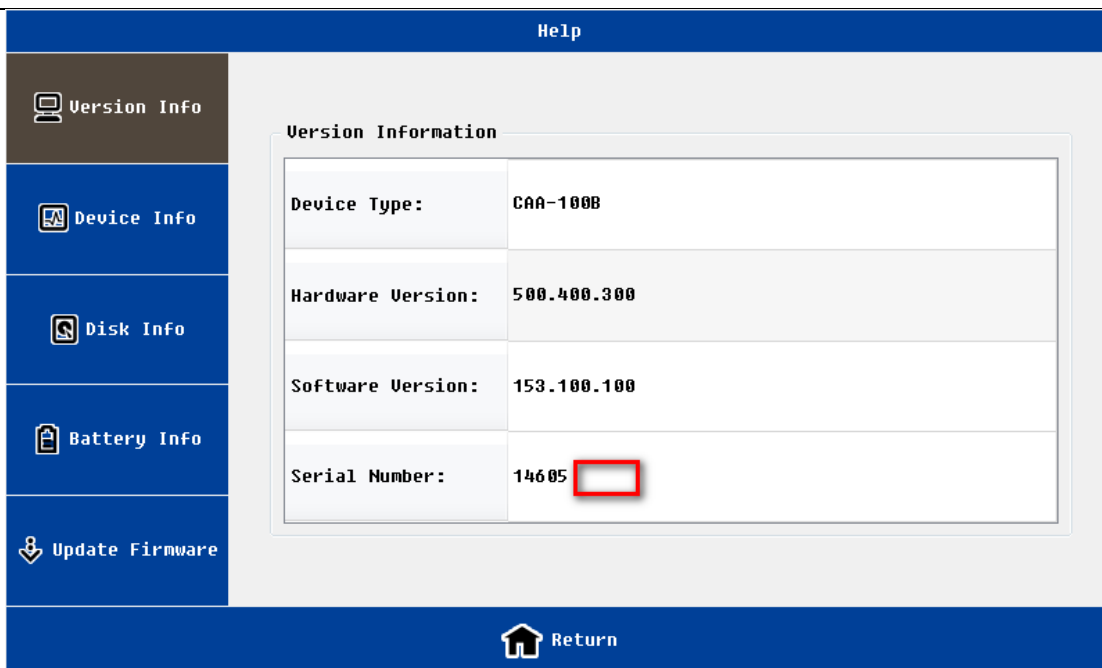


Load default setting interface

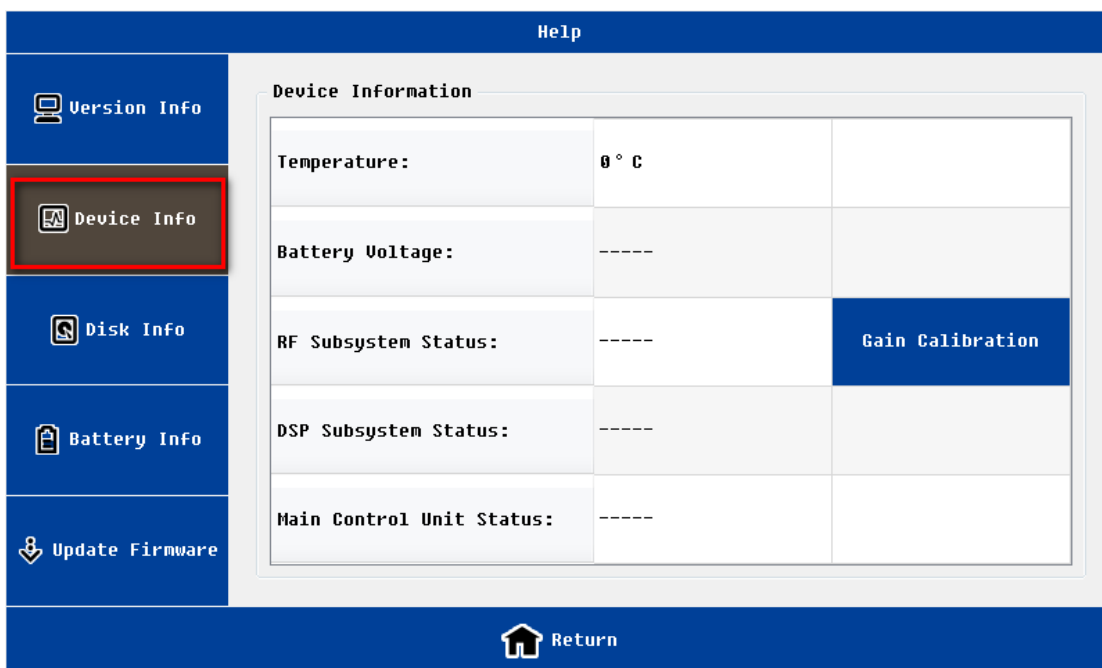
Name	function and description
Language	Support English /Chinese
Clock	year, month, date, hour, minute and second

Back Light	Support 4 levels brightness adjustment
Display Mode	4 modes: Default: Black-white: used for printing High-contrast: Night vision: used in night environment
Fan Mode	Three modes: Auto; Always On; Always Off. The default is Always On. If temperature higher than 45 degrees ,fan is turned on; if below 35 degrees fan is turned off.
Power Mode	Two modes: standard modes(default); power saving mode If working in the power saving mode, the relative RF circuits will be power on until measurement . It can save power's consumption and protect circuits, but its disadvantage is the measurement time will be a little long.
File management	For file management of both local disk and the external disk Support file copy and delete functions Support following file type :measurement data(.csv), measurement image (.Jpg), calibration data (.csv)
Touch screen Cal	To calibrate the touch screen. Users Can exit by pushing any hard key
Default	Restore to default value

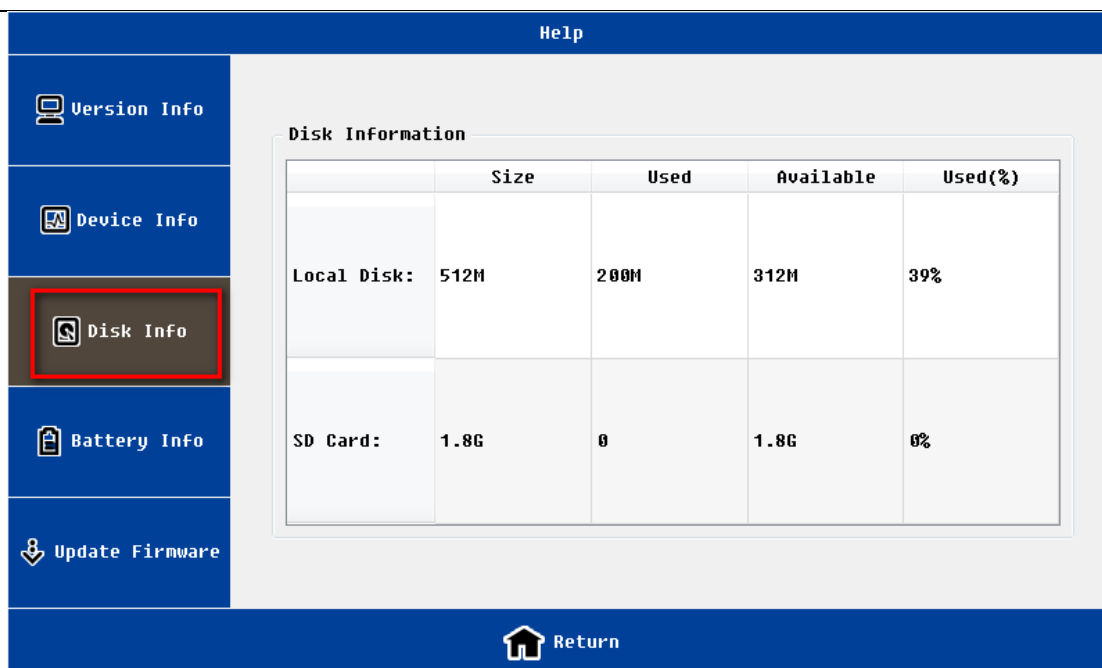
3.8 Help interface



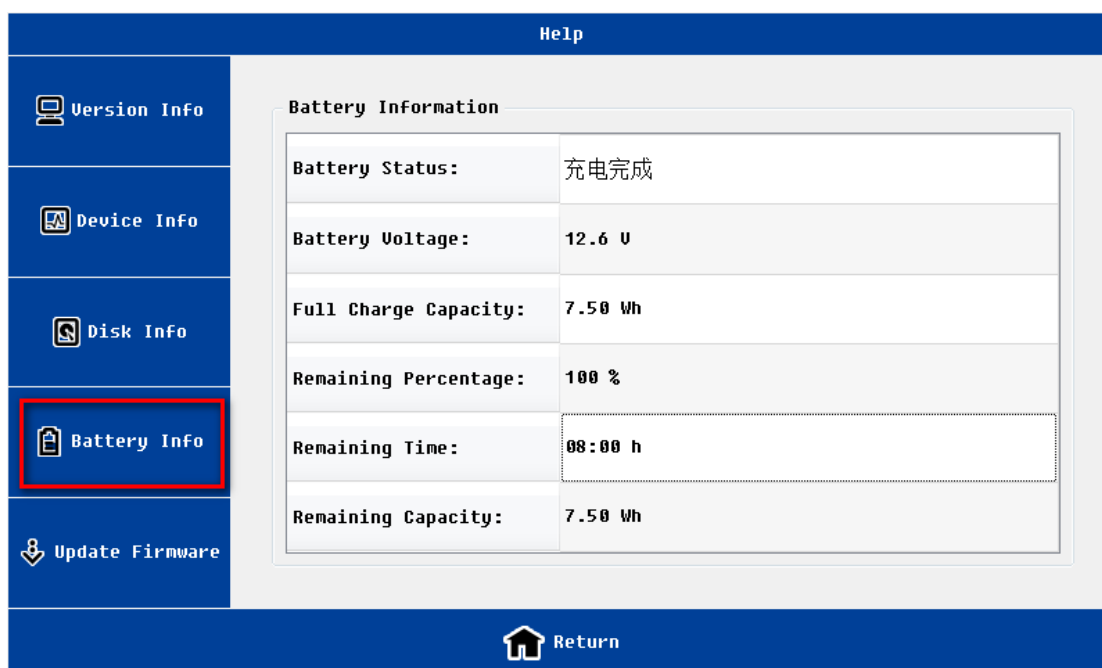
Version information interface



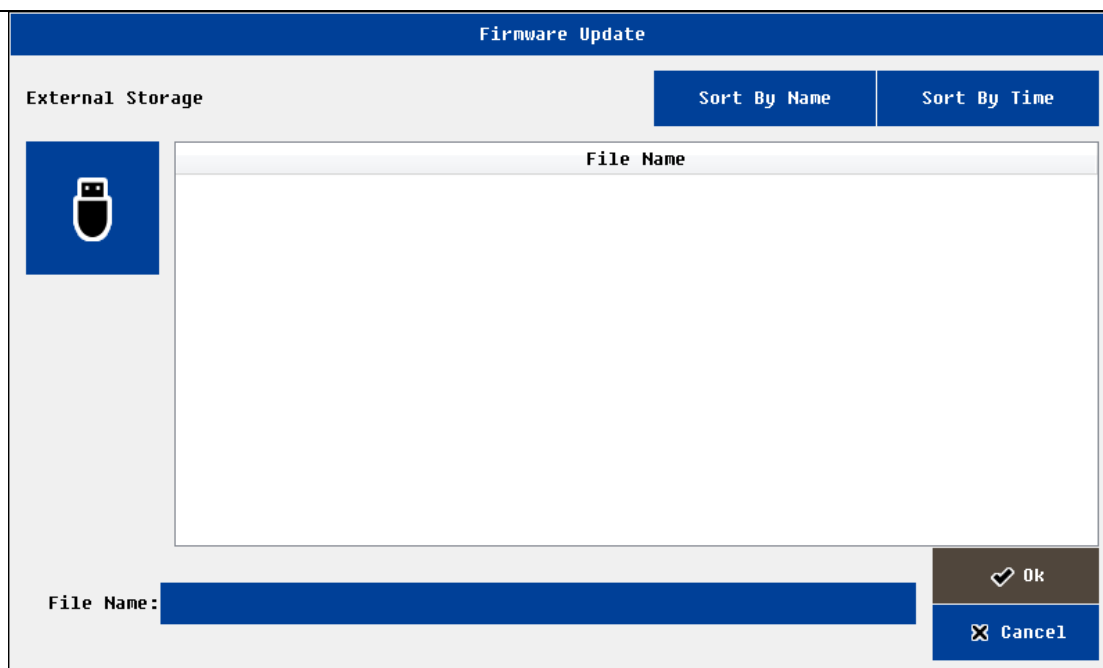
Device information interface



Disk information interface



Battery information interface



Firmware update interface

On the help menu, the user can view a variety of instruments information; meanwhile users can upgrade the firmware.

Name	function and description
Version Info	Includes: hardware version, software version, instrument serial number, etc.
Device Info	Includes: board temperature, battery voltage and instrument subsystems statue, etc.
Disk Info	Includes: the information of local disk and a built-in SD card. Note: the local disk refer to flash memory, the different version of the program will have different residual space
Battery Info	Showing the working status and residual power of the battery and other information
Update Firmware	The user insert the U-disk to the instrument, select the correct version file; the instrument will automatically upgrade. After the upgrade is complete, the instrument automatically restart.

4. Common operating instructions

4.1 Set frequency parameter

The user needs to properly set the frequency parameter before testing. In the following ways users can enter

the frequency setting interface.

Calibration Parameter

Frequency Para

Signal Standard: **Custom**

Start Freq: **1** MHz

Stop Freq: **6000** MHz

Data Points

137 275

551 1103

Cal kit type Electrical Length @ 1GHz

Default Open Phase: **12**

User Define Short Phase: **12**

FlexCal

Ok Back

Calibration setting interface

DTF Parameter			
Start Dist:	0.0	m	
Stop Dist:	4.0	m	Dmax: 13.7 m
Start Freq:	1	MHz	Min Δ F: 55 MHz
Stop Freq:	6000	MHz	Δ D: 0.02 m
Cable Type:	[NONE]		
Prop Vel:	1		
Cable Loss:	0.000		Cable Cal
Data Points		Window Function	
<input type="radio"/> 137	<input checked="" type="radio"/> Rectangular	Units	
<input type="radio"/> 275	<input type="radio"/> Hamming	<input checked="" type="radio"/> Metric	
<input checked="" type="radio"/> 551	<input type="radio"/> Kaiser	<input type="radio"/> Inch	
<input type="radio"/> 1103	<input type="radio"/> Blackman		
<input checked="" type="checkbox"/> Ok		<input checked="" type="checkbox"/> Back	

DTF setting interface

Freq Parameter		
Signal Standard:	Custom	
Start Freq:	1	MHz
Stop Freq:	6000	MHz
Data Points		
<input type="radio"/> 137	<input type="radio"/> 275	
<input checked="" type="radio"/> 551	<input type="radio"/> 1103	
<input checked="" type="checkbox"/> Ok		<input checked="" type="checkbox"/> Back

Frequency setting interface

- In the "calibration" interface, click on the "parameter" button
- In the "frequency return loss" or "frequency VSWR" or "cable loss" measurement interface, click on the

"parameter" button

- The user can also input frequency parameters in "DTF parameter setting" interface

After entering frequency setting interface, the user can set start frequency and stop frequency through the following ways

- Select pre-defined Signal standard
- Manual input frequency parameter

Users can click on edit box to edit the parameter of frequency , system will pop up the soft keyboard. The user also can directly press the digital keys of hard keyboard .

The users need to select measurement points . System supports 4 options: 137,275,551,1103.

If the measurement point is set to 1103, compared with the set to 551, it will take about 2 times longer measurement time. And so on.

NOTE

The minimum frequency interval is 1MHz.

The start frequency range is 25~3999MHz;The stop frequency range is 26~4000MHz.

The user can modify the pre-defined signal standard through PC software .

4.2 Set DTF parameter

The user needs to properly set the DTF parameter before DTF testing. In the following ways users can enter the DTF setting interface.

Enter the "DTF-return loss" or "DTF-VSWR" measurement interface, select "parameter" menu.

DTF Parameter			
Start Dist:	0.0	m	
Stop Dist:	4.0	m	Dmax: 13.7 m
Start Freq:	1	MHz	Min Δ F: 55 MHz
Stop Freq:	6000	MHz	Δ D: 0.02 m
Cable Type:	[NONE]		
Prop Vel:	1		
Cable Loss:	0.000		Cable Cal
Data Points		Window Function	
<input type="radio"/> 137	<input checked="" type="radio"/> Rectangular	<input checked="" type="radio"/> Metric	
<input type="radio"/> 275	<input type="radio"/> Hamming	<input type="radio"/> Inch	
<input checked="" type="radio"/> 551	<input type="radio"/> Kaiser		
<input type="radio"/> 1103	<input type="radio"/> Blackman		
<input checked="" type="checkbox"/> Ok		<input checked="" type="checkbox"/> Back	

DTF setting interface

The user can complete the following functions at the DTF parameter setting interface

- Enter frequency information and measure points
- Enter the distance information
- Enter the cable parameters
- Select the window function
- Set unit (support metric and Imperial)

NOTE

The user can modify the pre-defined cable parameters through PC software .

4.2.1 Set Distance parameter

Distance parameters need to satisfy the testing needs, but also associated with the following parameters

- The operating frequency range (F1, F2)

- The number of measured points (N)
- Cable propagation velocity (Vp)

Once the user set the operating frequency, the number of measured points, cable propagation velocity, the maximum allowed cable length (D_{max}) has been decided.

$$D_{max} = N * 150 * 10^8 * V_p * \frac{1}{F_2 - F_1}$$

For the convenience of users, the system will automatically display the relevant information (the maximum allowed cable length: D_{max} ; resolution ΔD) in the upper right corner.

For example: $N=551$; $V_p=0.85$; $F_1=25\text{MHz}$, $F_2=4000\text{MHz}$. The corresponding D_{max} is 17.64 meters, ΔD is 0.03 meters;

Do not change the frequency, if users want to increase the allowed cable length, can increase the number of measuring points, the corresponding test time can also be longer

NOTE

Due to the calculation of DTF, the minimum frequency interval is $(N-1) * 100\text{kHz}$. If the measurement points is 551, corresponding minimum frequency interval is 55MHz.

The minimum distance interval is 1 meters (inch) or 1 feet (inch)

Start distance range is : 0~Max-1; stop distance range is 1~ D_{max}

4.2.2 Set Cable parameter

Users can manually input cable parameters (velocity; cable loss) or select the type of cable known.

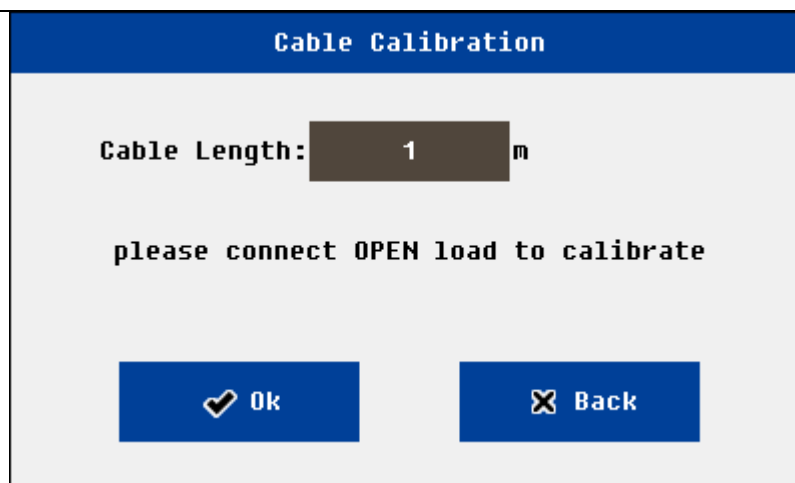
the propagation velocity of electromagnetic wave in the cable is less than the vacuum speed (300M meters /second). Propagation constant is 0.85, meaning that the actual propagation velocity of the electromagnetic wave in the cable is the $0.85 * 300\text{M}$ meters / second.

When the user in the fault distance analysis, often want to know the return loss or VSWR of one exact connector. At that position, the cable loss and connector return loss will be mixed together, systems need to remove cable loss impact in the calculation connector return loss. The unit of cable loss is dB/ meter.

Users can select cable from pre-defined cable list. Usually the cable loss will vary with frequency. System will automatically calculate the cable parameters According to the cable parameters and working frequency.

If the user does not know any cable information and parameters, but have a cable at hand, users can use the system tools("cable" cal) to get these parameters.

Click on the "cable cal" button in the DTF parameter interface, system will pop up one window. Users enter the measured actual length of cable (0.5~10 m); one end of the cable is connected to the RF port, the other end connected to open load or connected to nothing;. Once the calibration is completed, the cable parameters will automatically refresh in DTF parameter interface.



4.2.3 Set Window Function

In the distance to the fault analysis, if the location of the two connectors are close, because of the influence of spectral leakage, two connectors will be influenced each other. If return loss of one connector is much smaller than another one, most probably it will be lost and can't be recognized. In this case users should choose to use the window function.

System support four types window function: rectangle window, Hamming window, Keyser window, Blackman window.

4.3 OSL Calibration

The user needs to confirm the system is in "calibration valid" state before a test.

Before one test, system need to know beforehand the 3 known load (open /short/500hm) test results. User can import the previous calibration data; or do OSL mechanical calibration (Flexcal calibration)before test.

The user can enter the calibration interface by the following ways.

- In the main interface, click on "calibration" mode icon
- In the measurement of interface, click on the button "cal mode"

The OSL calibration procedure is as follows,

- Set the frequency parameter
- Set up calibration parameters (optional)
- Calibrate the first load
 - Connect the load to the RF ports, click on the corresponding button.
 - The system will pop up a small window, click on the "OK".
 - System start calibration.
 - Once calibration is completed the screen will display the curve.

- Calibrate other loads (Repeat the above steps)
- If all calibration of three loads completed, the green "cal on" will shown at the lower left corner of the screen.

Flexcal mechanical calibration is as the following step:

- Set the frequency parameter and measurement point
- Select the Flexcal calibration
- Click open / short / load under calibration interface and select the corresponding calibrator to calibrate
- If all calibration of three loads completed, the green "cal on" will shown at the lower left corner of the screen.

Flexcal electronic calibration is as the following step:

- Set the frequency parameter and measurement point
- Select the Flexcal calibration
- Connect the electronic calibrator and USB cable to the unit
- Click the ECAL coin, and it will be automatic to calibrate
- If all calibration of three loads completed, the green "cal on" will shown at the lower left corner of the screen.

Users can directly calibrate at the RF port, also can calibrate with a high performance cable connected to RF port. If the former, usually, the calibration curve of 50 ohm load will be significantly lower than the other two.

If calibration is completed, the user can start measurement .

The user can also select the file menu to save the calibration data in the local or external disk.

After the system boot, the default calibration data will be recent one.

The user clicks on the "file" menu, click "import", can recall previous calibration data. If the environment is similar, the previous calibration data can be used directly.

NOTE

For mechanical calibration, users need to re calibration if frequency changed or measurement points increased.

For Flexcal calibration, users do not need to re calibration if frequency changed or measurement points increased.

Need to re calibration if temperature changes a lot

Do not need re calibration if measuring points reduced.

Do not need re calibration if distance, cable parameters, window function changed.

4.4 Freq-Return Loss, Freq-VSWR, Cable-Loss measurement

The measurement can be used to verify the power matching of the port or the loss of the cable .X axis coordinate is frequency, Y axis coordinate are VSWR, or the return loss, or loss of cable separately.

In the following ways users can enter the measurement interface.

In the main interface, click on the "measurement" icon, and then click the corresponding icon

In the measurement interface, the user can do a variety of measuring operation.

NOTE

Need to set proper frequency parameters before test

Need to confirm that the system is in "calibration valid" state before test

The minimum frequency interval is 1MHz

4.5 DTF-VSWR,DTF-Return Loss measurement

The measurement can be used to verify the power matching performance of different position of cable and antenna system, then user know a certain position joint connection quality. X axis coordinate is distance, Y axis coordinate is VSWR, or return loss

In the following ways users can enter the measurement interface.

In the main interface, click on the "measurement" icon, and then click the corresponding icon

At the measurement interface, the user can do a variety of measuring operation.

NOTE

Need to set proper frequency ,distance, cable parameters and window function before test

Need to confirm that the system is in "calibration valid" state before test

The maximum measuring range and accuracy associated with frequency parameters, the propagation velocity of cable

The minimum frequency interval :1M

The user can set the unit in the DTF parameters window units (metric and Imperial)

5.CAA-100 Series Performance

Model	CAA-100	CAA-100B
Frequency Range	25MHz - 4000MHz	1MHz - 6000MHz
Frequency Resolution	100kHz	1kHz
Frequency Accuracy	+/-25ppm	+/-2.5ppm
Output Power	0dBm(typ.)	
Measurement Speed	3.5ms/point	
Data Points	137, 251, 551, 1103	
Anti-jamming Capability		
Frequency	-5dBm	
Channel	+17dBm	
Directivity	42dB (after calibration)	
Return Loss		
Return Loss Range	0 - 60 dB	

Return Loss Resolution	0.01dB
VSWR	
VSWR Range	1 - 65
VSWR Resolution	0.01
Cable Loss	
Cable Loss Range	0 - 30dB
Cable Loss Resolution	0.01dB
Distance-to-Fault	
Distance-to-Fault Return loss Range	0 - 60 dB
Distance-to-Fault SWR Range	1 - 65
Measuring Length	1500m
Resolution Ratio	$(1.5 \times 10^8) \times (V_p) / (F_2 - F_1)$ Where V_p is the cable's relative propagation velocity. where F_2 is the stop frequency and F_1 is start frequency
Data Points	137,251,551,1103
Electronic Calibrator	38dB, 1MHZ-4.4GHz; 32dB, 4.4GHz-6GHz; N(m), 50Ω
General Information	
Connector Type	N-Type female
Input Impedance	50 Ohm
Display	7 inch resistor touch screen, resolution 800×480
Data Interface	One USB Host Port One USB Device Port One 10M/100M Adaptive LAN Port
Memory Space	>2000 traces
Internal Battery	11.1V 7800mAh Rechargeable Lithium Battery
External Adapter	110 - 240V, 50 - 60Hz, AC input; 16V, 3.75A, DC output
Operating Temp. Range	-10°C - +50 °C
Storage Temp. Range	-40°C - +70°C
Humidity	0 - 85% (Non-Condensing)
Weight	2.5kg
Dimensions (L x W x H)	290×175×75mm

*Specifications subject to change without notice.

6 warranty information

6.1 the warranty period

For all ShinewayTech products, due to the fault caused by the material or production reasons, the company provide free warranty for one year from product delivery. In the warranty period, any failure of the product can provide a warranty or replaced by the company, but in any case, the company to assume the responsibility of all limits the original price range in the purchase of the product.

This warranty does not include the company providing products accessories or selected parts.

6.2 Exclusions

The warranty on your equipment shall not apply to defects resulting from the following:

Unauthorized repair or modification

Misuse, negligence, or accident

Shineway Technologies, Inc. reserves the right to make changes to any of its products at any time without having to replace or change previously purchased units.

6.3 Warranty Registration

A warranty registration card is included with the original shipment of equipment. Please take a few moments to fill out the card and mail or fax it to the local Customer Service Center of Shineway Technologies, Inc. to ensure proper initiation of your warranty term and scope of your warranty.

6.4 Returning Instruments

To return instrument for reasons of yearly calibration or other, please contact the

Shineway Technologies, Inc.

local Customer Service Center of Shineway Technologies, Inc. to obtain additional information and a RMA# (Return Materials Authorization number). And describe briefly reasons for the return of the equipment, to allow us offer you more efficient service.

6.5 Contacting Customer Service

Please check our web site (**www.shinewaytech.com**) for updates to this manual and additional application information. If you need technical or sales support, please contact local **Shineway Technologies** Customer Service.

Shineway Technologies (China), Inc.:

Address: Floor 7, Zhongtai Plaza, No.14 Shuangqing Rd.

Haidian District, Beijing, P.R.China

Postal code: 100085

Tel: +86-10-62953388

Fax: +86-10-62958572

Email: support@shinewaytech.com

WEB: www.shinewaytech.com

**THANK YOU FOR CHOOSING
SHINEWAY TECHNOLOGIES!**