ShinewayTech®
Dependable Partner for Future Networks

CAA-100A

Cable & Antenna Analyzer + Spectrum 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

CONTENTS

Safety Instructions iii
General iii
Environmental conditions iii
Before applying power iii
Do not operate in an explosive atmosphere iii
Do not remove the instrument cover iii
Safety Terms Used in This Manual iii
Electrical safety precautions iv
1. General Information 1
1.1 Scope of this Manual 1
1.2 Unpacking and Inspection 1
1.3Product Introduction 1
1.4 Features 1
2. The appearance introduction of equipment 3
2.1 The head cover 3
2.2 Front panel 3
3.User interface and menu instructions 6
4.Cable and Antenna interface 7
4.1 Cable and Antenna Analyzer Measurement Interface 7
4.2 Calibration interface 9
4.2.1 Electronic Calibration 10
4.2.2 Mechanical Calibration 12
4.2.3 Mechanical Calibration 13
4.3 Parameter setup instructions 14
4.3.1 Set frequency parameter 14
4.3.2 Set DTF parameter 16
4.3.3 Set Distance parameter 17
4.3.4 Set Cable parameter 18
4.3.5 Set Window Function 19
4.4 Cable and Antenna Test Instruction 19
5.Spectrum interface 21
5.1 Spectrum Parameter Settings 21
5.1.1 Frequency Setting 22
5.1.2 Amplitude Setting 23

5.1.3 Detector Type Setting 24
5.1.4 Bandwidth Setting 24
5.2 Spectrum testing 25
6. General Function of Cable & Antenna Analyzer + Spectrum Analyzer 27
6.1 Marker 27
6.2 Limit 29
6.3 Scale 30
6.4 Files 32
6.5 Display 34
6.6 Average/Smooth 36
7. RF Power Meter 37
7.1 Power Meter Main Interface 37
7.2 Frequency Band Setting 39
7.3 Time Span Setting 39
7.4 CCDF Threshold Setting 40
7.5 Measure Time Setting 41
7.6 Limit Setting 42
7.7 Version 42
7.8 Default Setting 43
7.9 Normal test mode 43
7.9.1 Normal mode 43
7.9.2 Burst mode 43
7.9.3 Display the Test Result 44
7.9.4 Save and Import the Test Result 44
8. System Setting Interface 45
9. Help Interface 49
10 warranty information 52
10.1 the warranty period 52
10.2 Exclusions 52
10.3 Warranty Registration 52
10.4 Returning Instruments 52
10.5 Contacting Customer Service 53

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.

1.3Product Introduction

CAA-100A can support Cable and Antenna analyzer, Spectrum Analyzer, Terminal RF Power Meter and RF In-Line Digital Power Meter Function; this 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

Support Cable and Antenna analyzer, Spectrum Analyzer, Terminal RF Power Meter and RF In-Line Digital Power Meter Function

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

2. The appearance introduction of equipment

2.1 The head cover

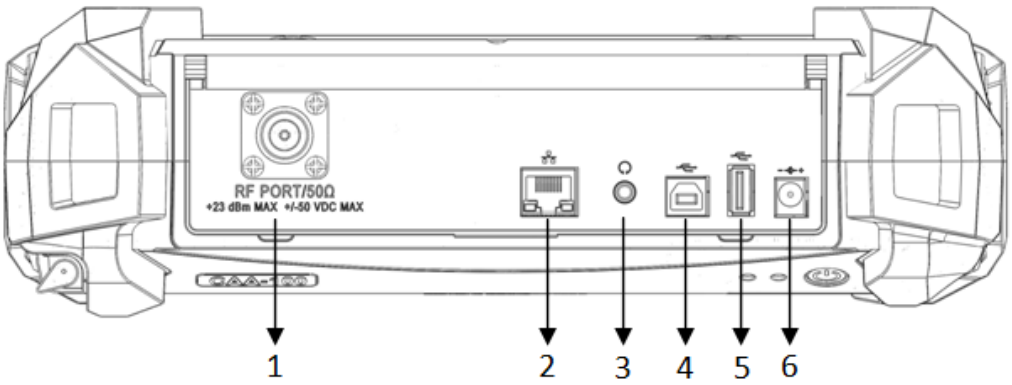
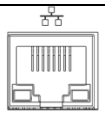
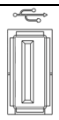
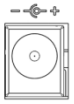


Fig. 2.1 Device top interface

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

No.	Name	Icon	Function and Description
1	RF connector		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。

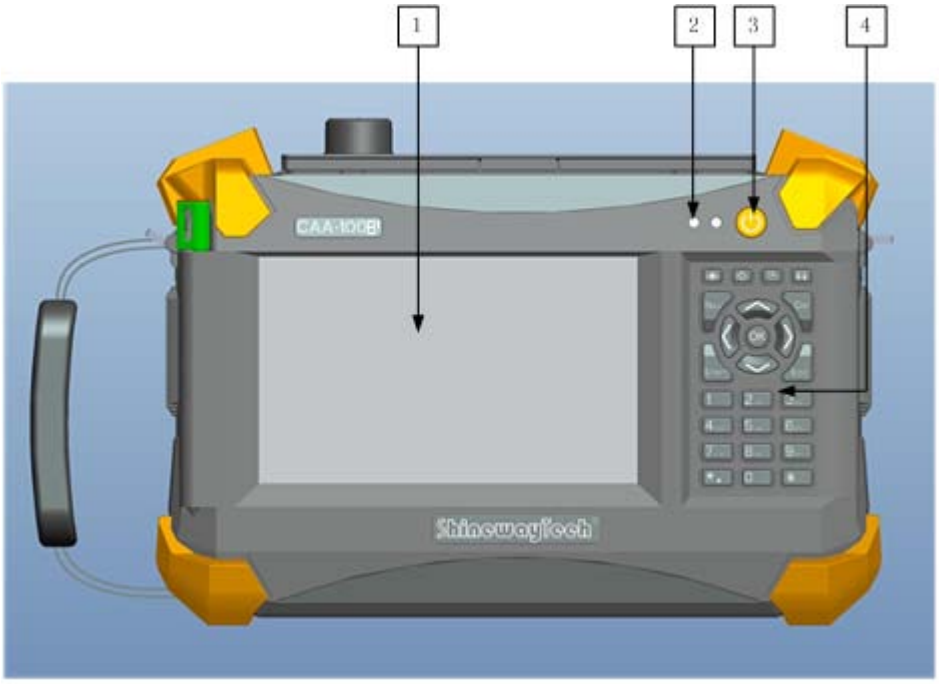


Fig. 2.2 Front panel

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

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.

Powered on instrument and enter the main interface; Main interface is including five parts: Cable and Antenna, Spectrum, Power Meter, Setting and help.

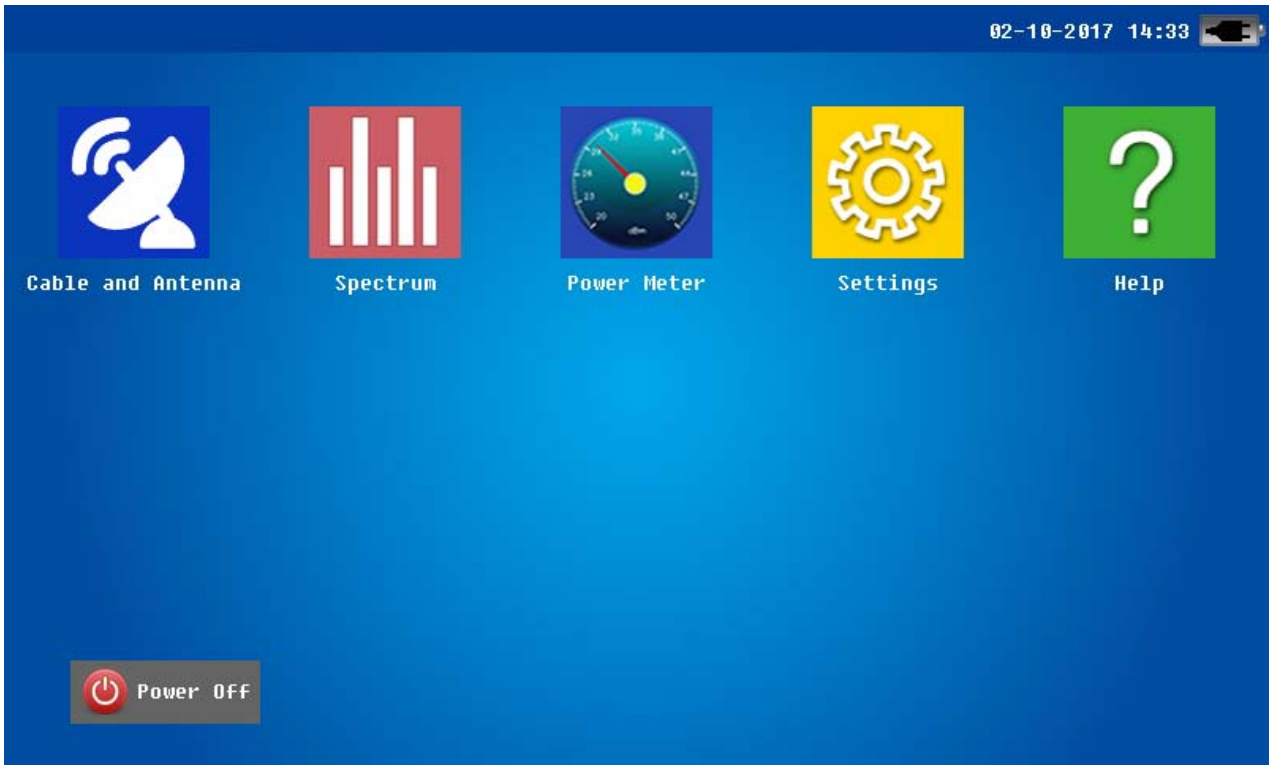


Fig. 3.1 Main interface

4.Cable and Antenna interface

Click "Cable and Antenna" 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.

Fig. 4.1 Cable and Antenna function main interface

Note: Click other icons in the main interface, system will enter the corresponding operation interface.

4.1 Cable and Antenna Analyzer Measurement Interface

Measurement interface mainly consists of the following parts, as shown in Tab. 4.1.

Tab. 4.1 Operation Function of Measurement interface

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

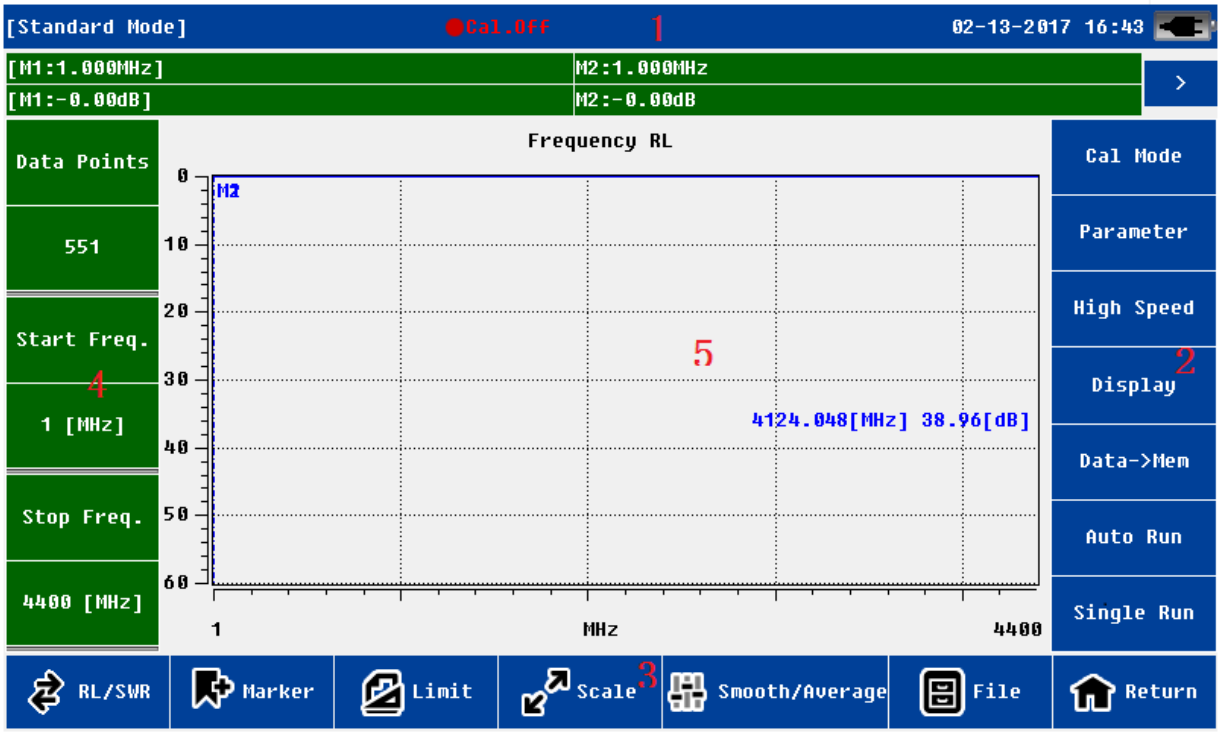


Fig. 4.2 Cable and Antenna Analyzer Measurement Interface

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

Note: For the high speed menu, it is including High Speed and Low speed. High speed is sampling characteristics Fast, low-speed sampling characteristics anti-interference ability.

Detailed description as shown in Tab. 4.2.

Tab. 4.2 Detailed Description of Cable and Antenna Analyzer Measurement Interface

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
	Auto Run：Start continuous measurement, clicks again to stop. **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.
	Single run：Start single measurement, the system enters the idle state after measurement
Function menu 2	RL/SWR：fast switching between the return loss and VSWR measurement
	Marker：For details see later chapter
	Limit：For details see later chapter
	Scale：For details see later chapter
	Smooth/Average： turn on/off Smooth/Average function.User can utilize these function to observe and analyze measurement dat.
	File：For details see later chapter
Main display area	Display the measurement results and other information.

4.2 Calibration interface

Users need to calibrate before the measurement. For this unit, it has two methods : mechanical calibration and electronic calibration. As shown in Fig. 4.3 and Fig.4.4,, click Calibration icon and enter the calibration interface.

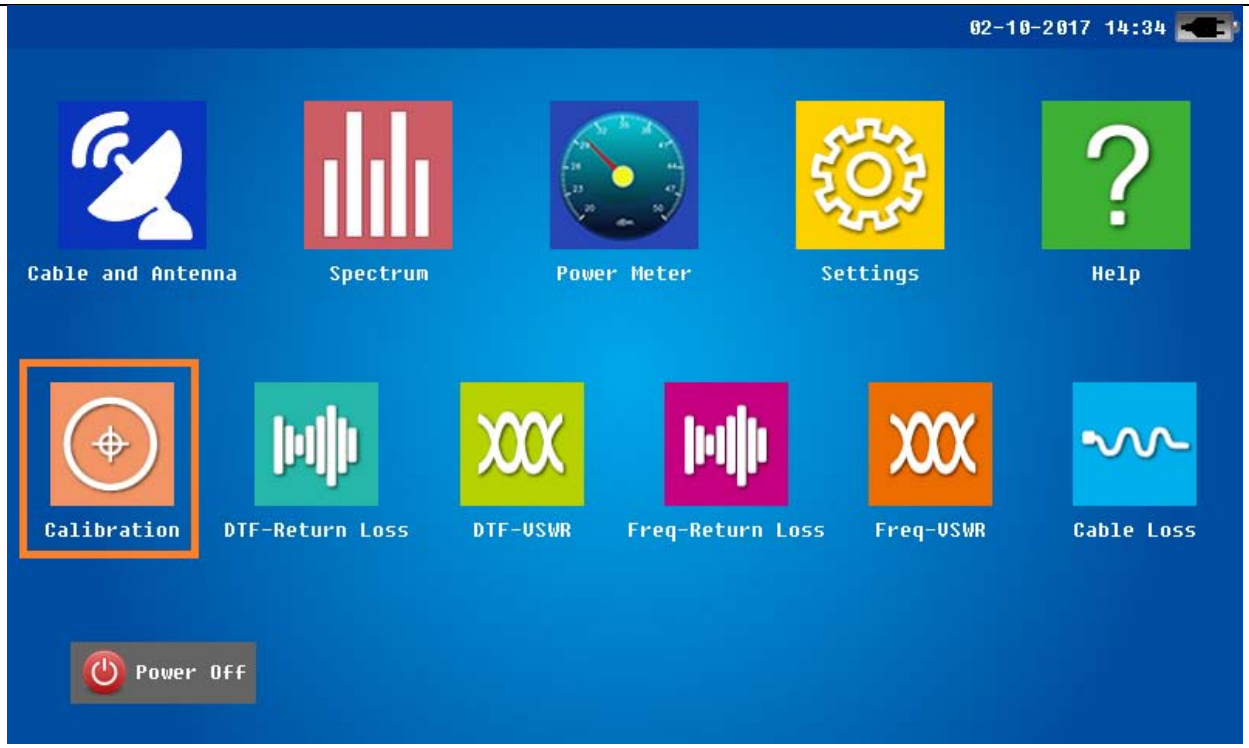


Fig. 4.3 Cable and Antenna main interface

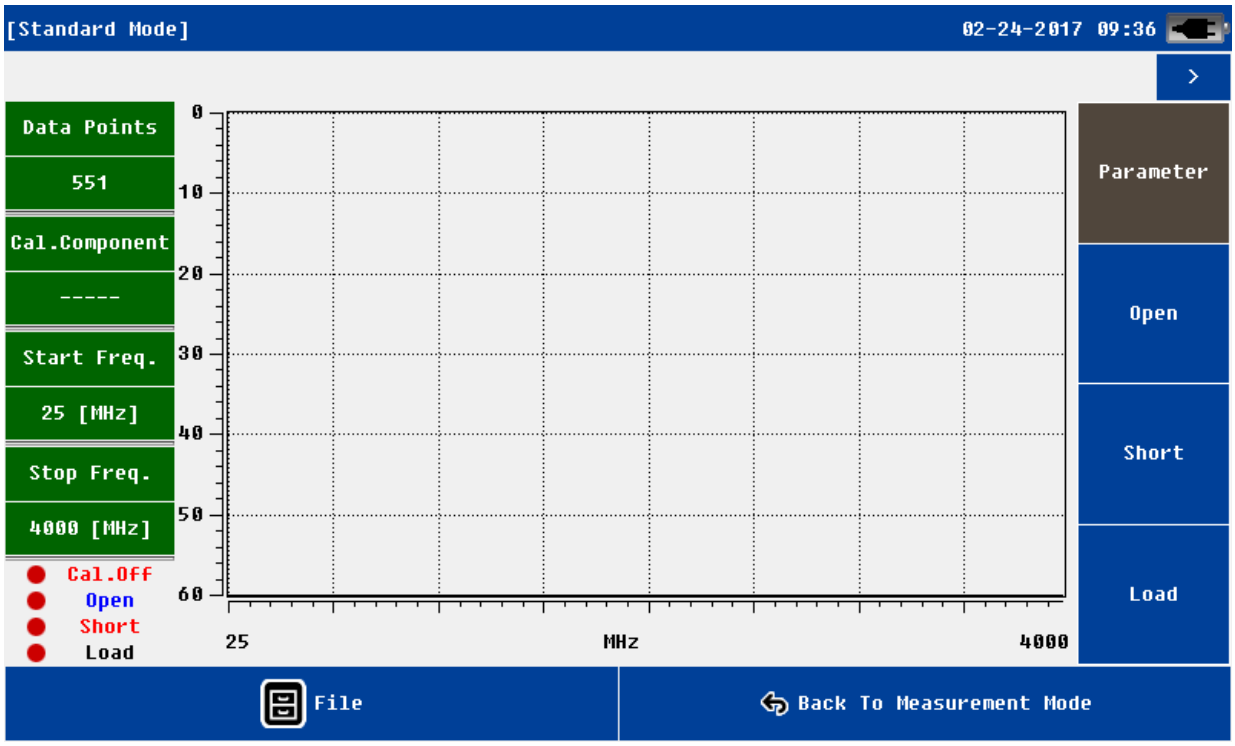


Fig. 4.4 Calibration interface

4.2.1 Electronic Calibration

Click Parameter to set the calibration method, and select "FlexCal", as shown in Fig.4.5.

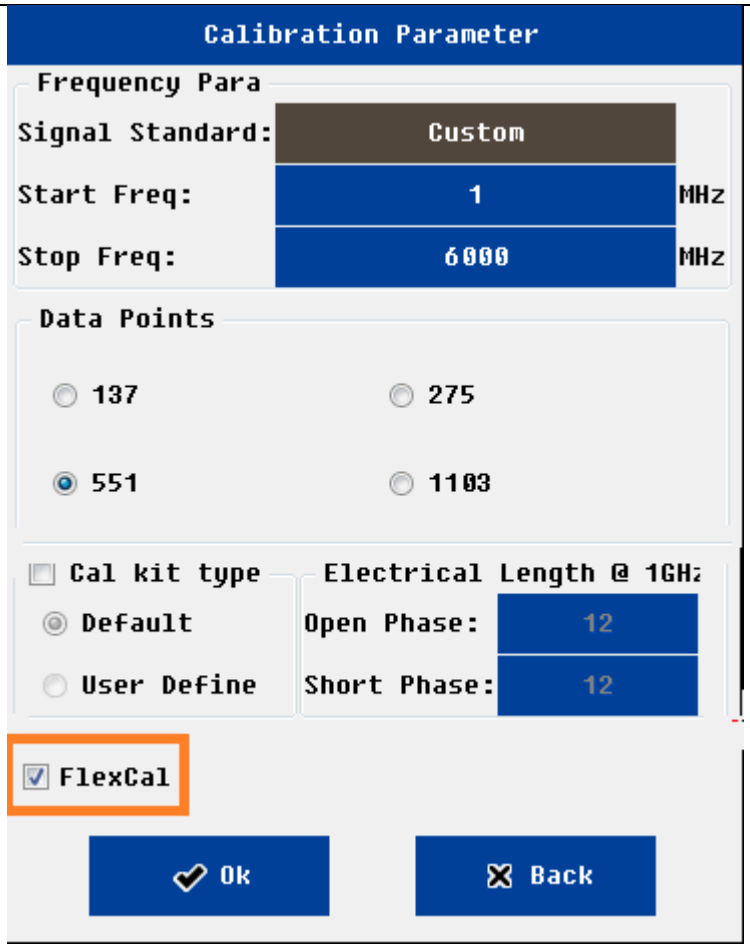


Fig. 4.5 Calibration Parameter Interface

Click OK, and connect the electronic calibrator; then click Ecal, result as shown in Fig. 4.6, electronic calibration will be finished.

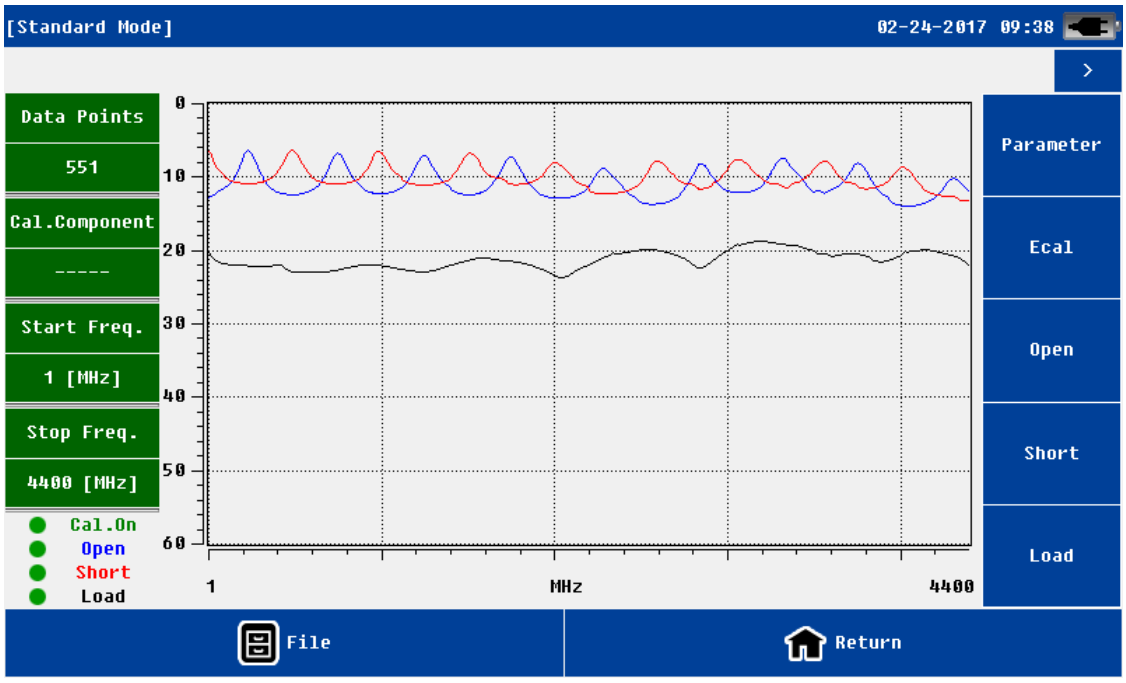


Fig.4.6 Calibration Result

4.2.2 Mechanical Calibration

Mechanical calibration is used T-type calibrator, the open short load (OSL) calibration. Users need to follow the instruction and connect open / short/50 Ohm load respectively to the RF port and do calibration. Calibration parameters select the "Cal kit type", as shown in Fig. 4.7.

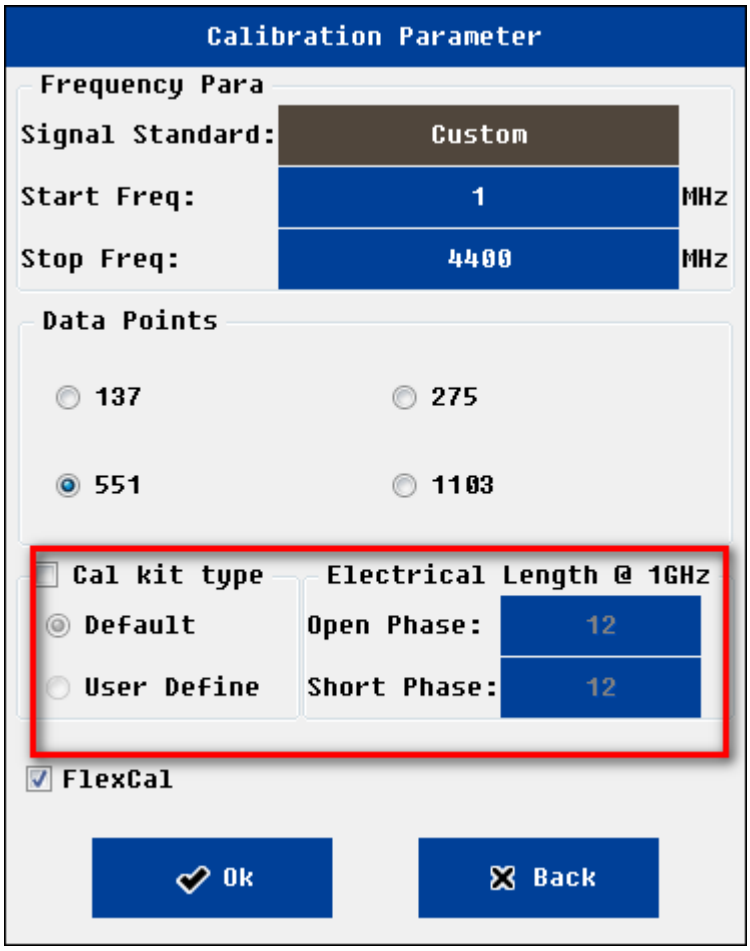


Fig. 4.7 Calibration parameters

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

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, as shown in Fig.4.6.

4.2.3 Mechanical Calibration

The calibration interface is similar to the test interface.

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/Impedenc-e 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).

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/50Ohm) test results. User can import the previous calibration data; or do OSL mechanical calibration (Electroniic calibration)before test.

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.

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.

4.3 Parameter setup instructions

4.3.1 Set frequency parameter

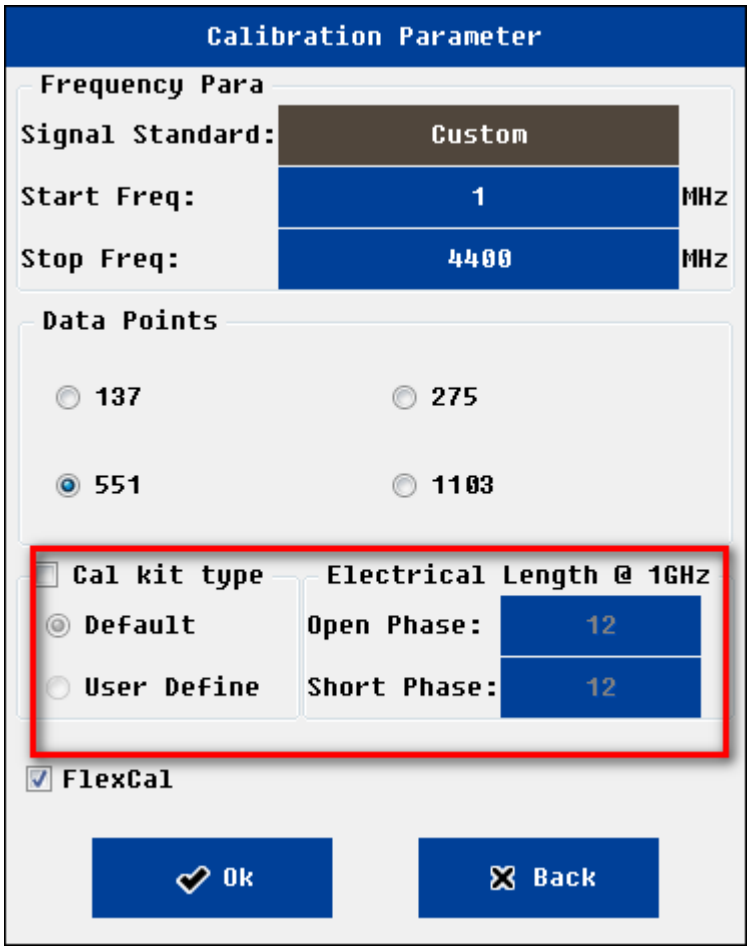


Fig.4.8 Calibration parameters interface

Calibration parameters can set frequency parameters, data points, mechanical calibration and other parameters. Fig4.8 shows the starting frequency of 1MHz is the minimum frequency, the termination frequency of 4400MHz for the maximum frequency.

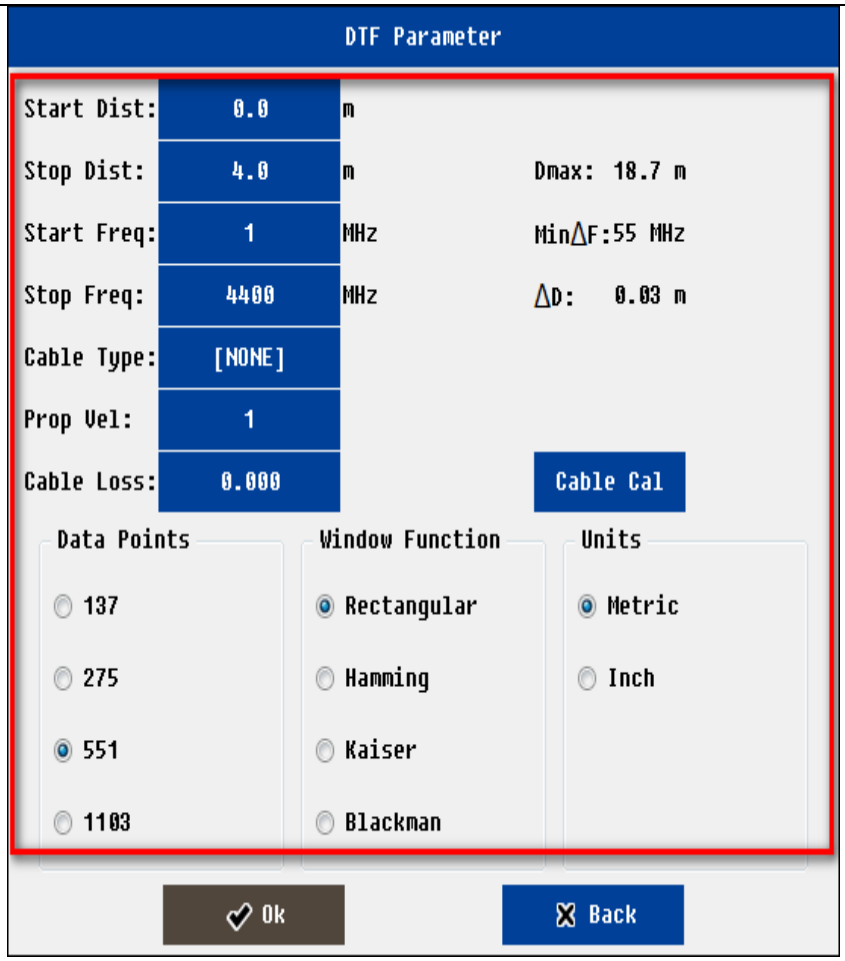


Fig. 4.9 DTF setting interface

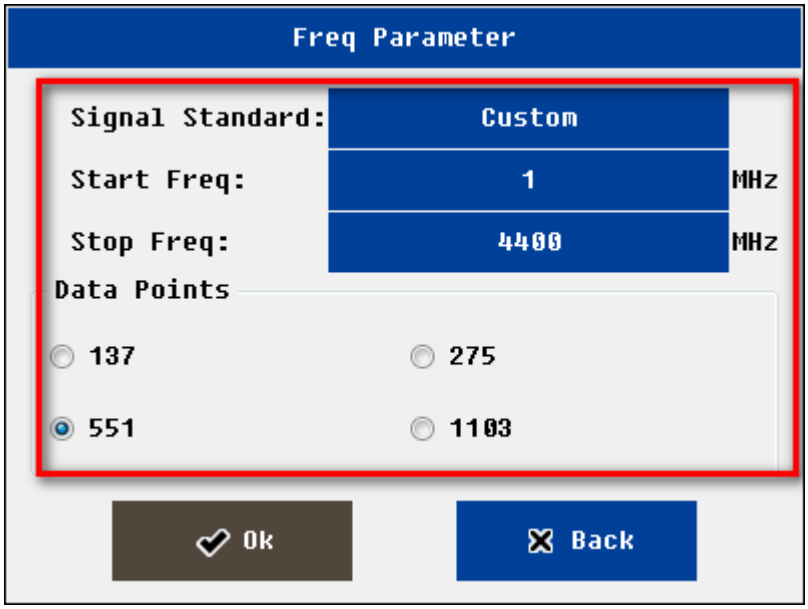


Fig. 4.10 Frequency setting interface

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

4.3.2 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.

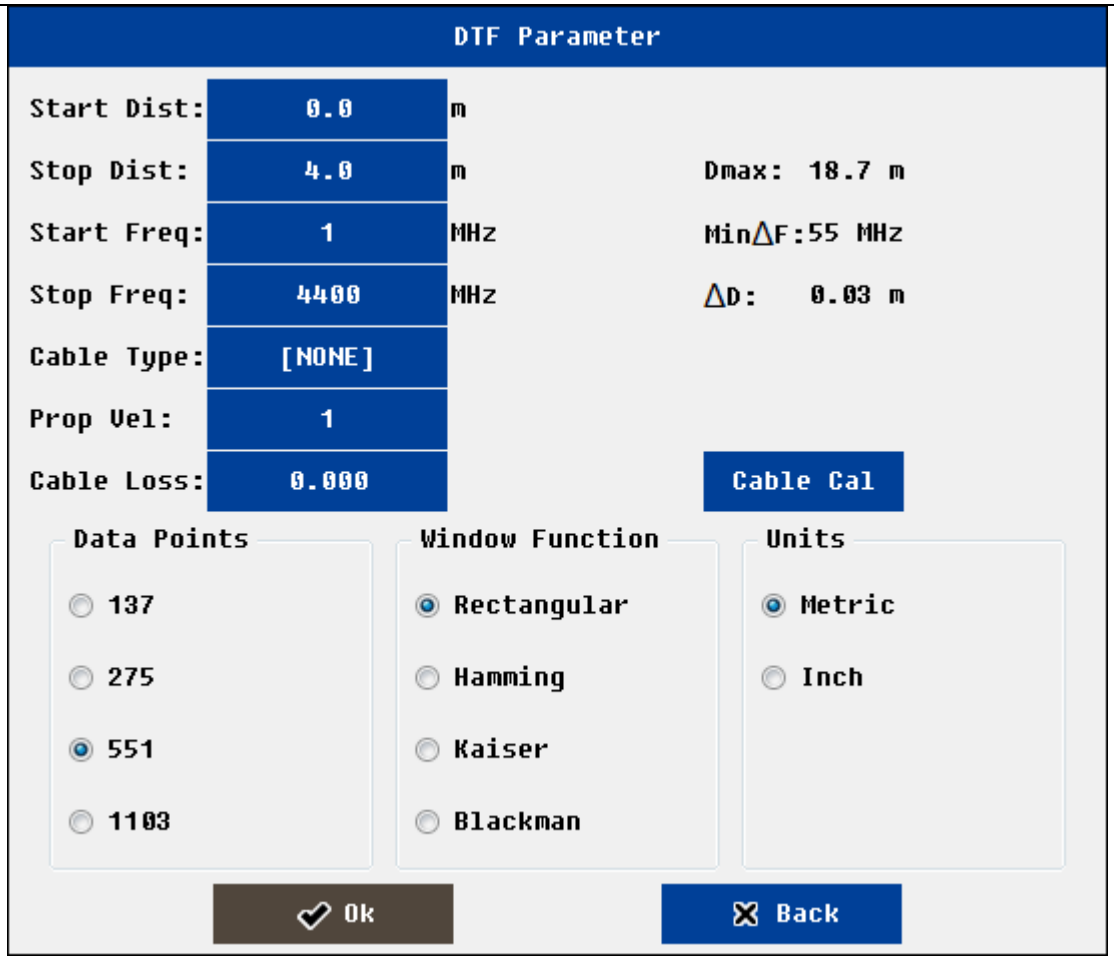


Fig. 4.11 DTF setting interface

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 .

4.3.3 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 be decided.

$$D\max = N*150*10\text{^}8*Vp*\frac{1}{F2-F1}$$

For the convenience of users, the system will automatically display the relevant information (the maximum allowed cable length: Dmax; resolution Δ D) in the upper right corner.

For example: N=551; Vp=0.85; F1=25MHz, F2=4000MHz. The corresponding Dmax is 17.64 meters, Δ D 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) *100kHz. 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~Dmax

4.3.4 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*300M 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.

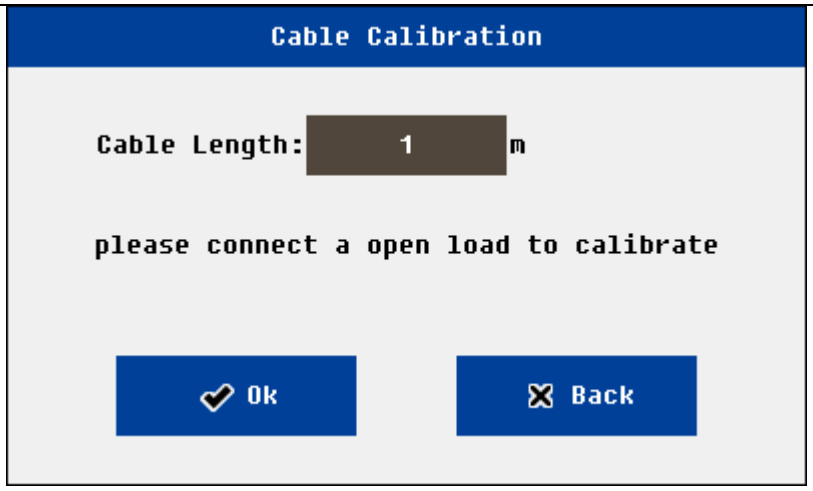


Fig. 4.12 Cable Calibration interface

4.3.5 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 .

4.4 Cable and Antenna Test Instruction

The Freq-Return Loss, Freq-VSWR, Cable-Loss 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

The DTF-VSWR,DTF-Return Loss 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.Spectrum interface

Click "Spectrum" Icon in the main interface and enter the Spectrum interface, as shown in Fig5.1.

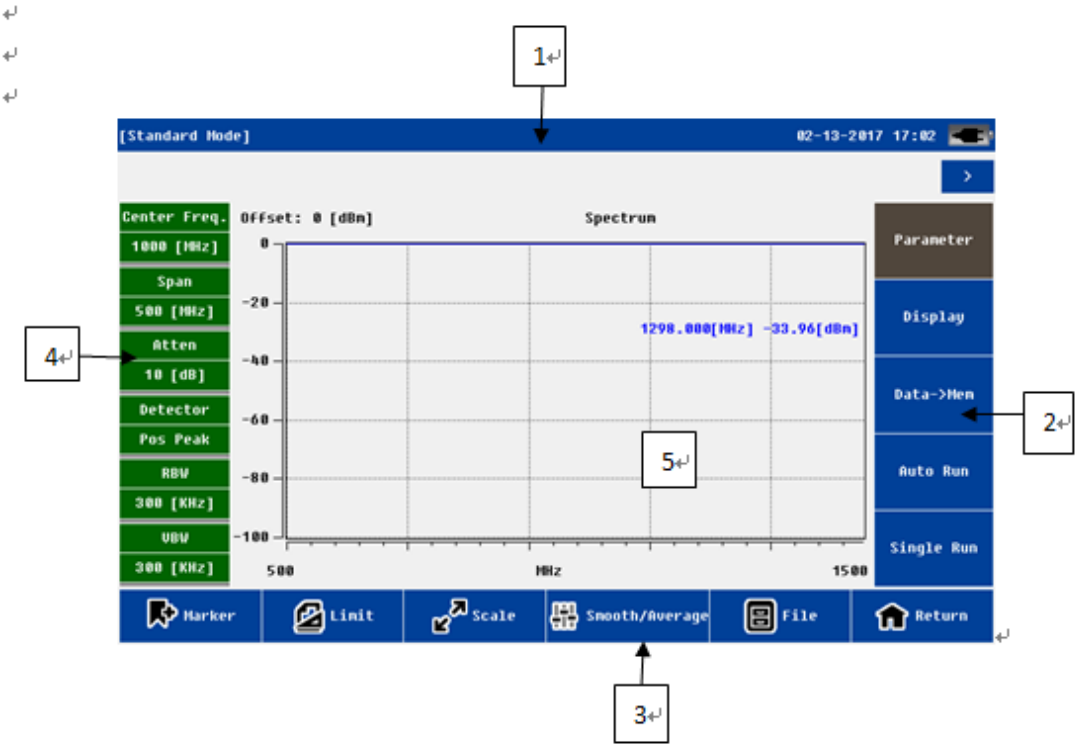


Fig. 5.1 Spectrum interface

Tab. 5.1

No.	Name	Location	Detail
1	Status Bar	Top	Display the system status information and measurement information
2	Function menu	Right	For details see later chapter
3	Function menu	Bottom	For details see later chapter
4	Info. Bar	Left	Frequency, Attenuation, Detection mode, bandwidth and others
5	Display area	Middle	For details see later chapter

5.1 Spectrum Parameter Settings

Parameter can set frequency, amplitude, detector settings, bandwidth and other information.

5.1.1 Frequency Setting

Frequency setting includes Start Frequency (300MHz – 4000MHz), Stop Frequency (300MHz – 4000MHz), Center Frequency, span (Min. 1MHz) and Signal Standard.

Spectrum test input start, termination frequency, the center frequency will automatically change according to the frequency of the relationship;

The span will display the maximum bandwidth (termination frequency - starting frequency);

If know the test frequency, users can set the center frequency and Span, as shown in Fig.5.2.

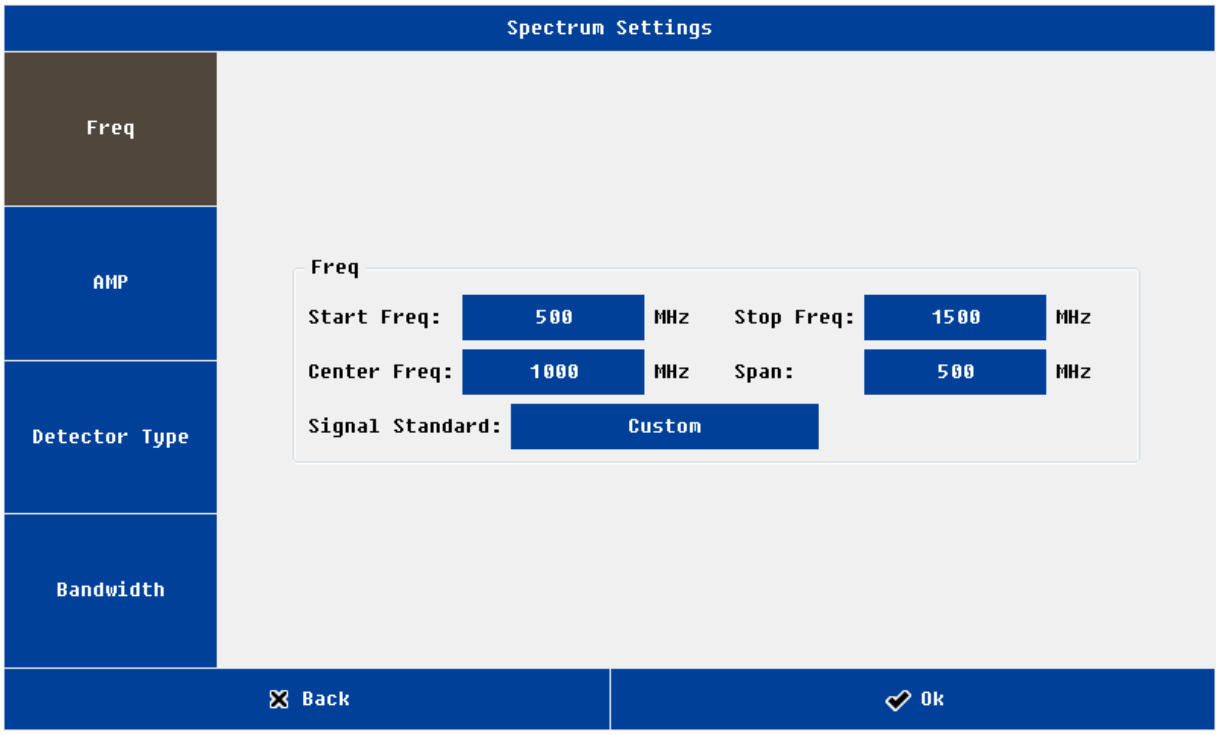
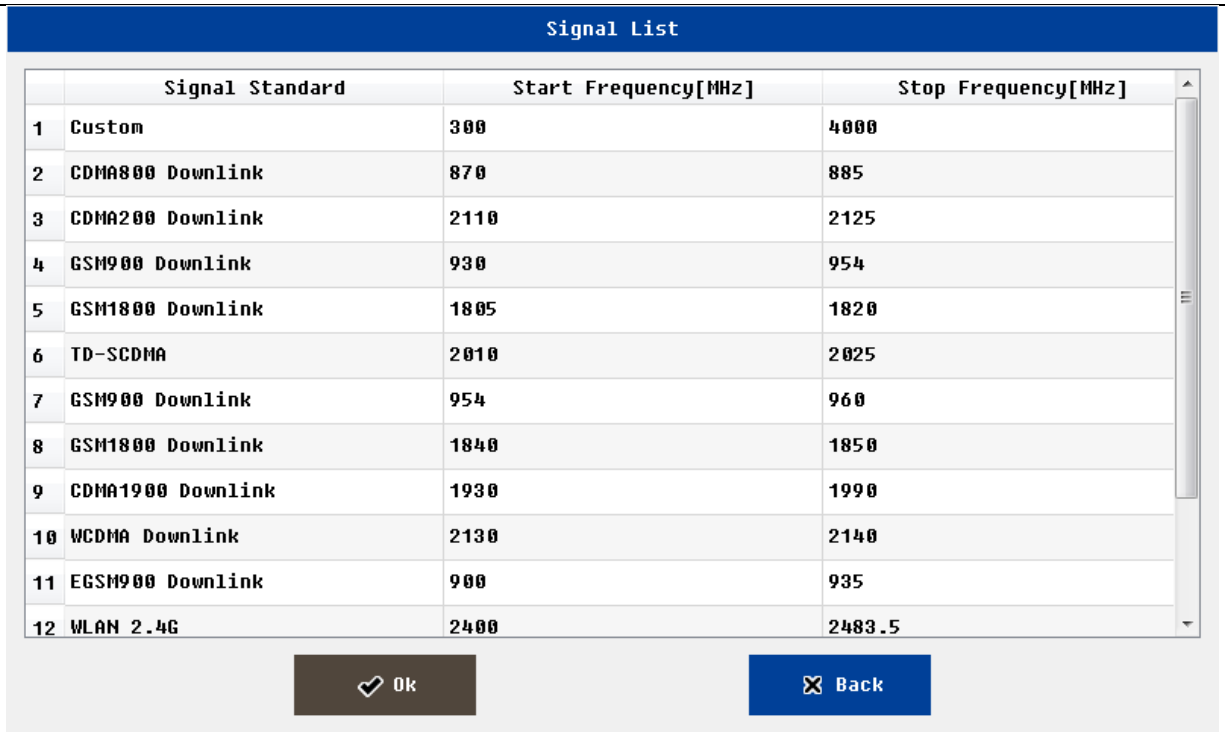


Fig.5.2 Frequency Setting

Note: Center Freq=(Stop Freq – Start Freq)/2

Span: the min is 1MHz, and the max. is the full bandwidth.

Signal standard is for the convenience of users, given the commonly used fixed frequency band, as shown in Fig,5.3.



Fig,5.3 Signal List

5.1.2 Amplitude Setting

Amplitude setting includes Offset, Atten.(range 0dB to 30dB, Interval 5 dB), Grid and Compensate(0, 10dB/div, 20dB/div), as shown in Fig.5.4.

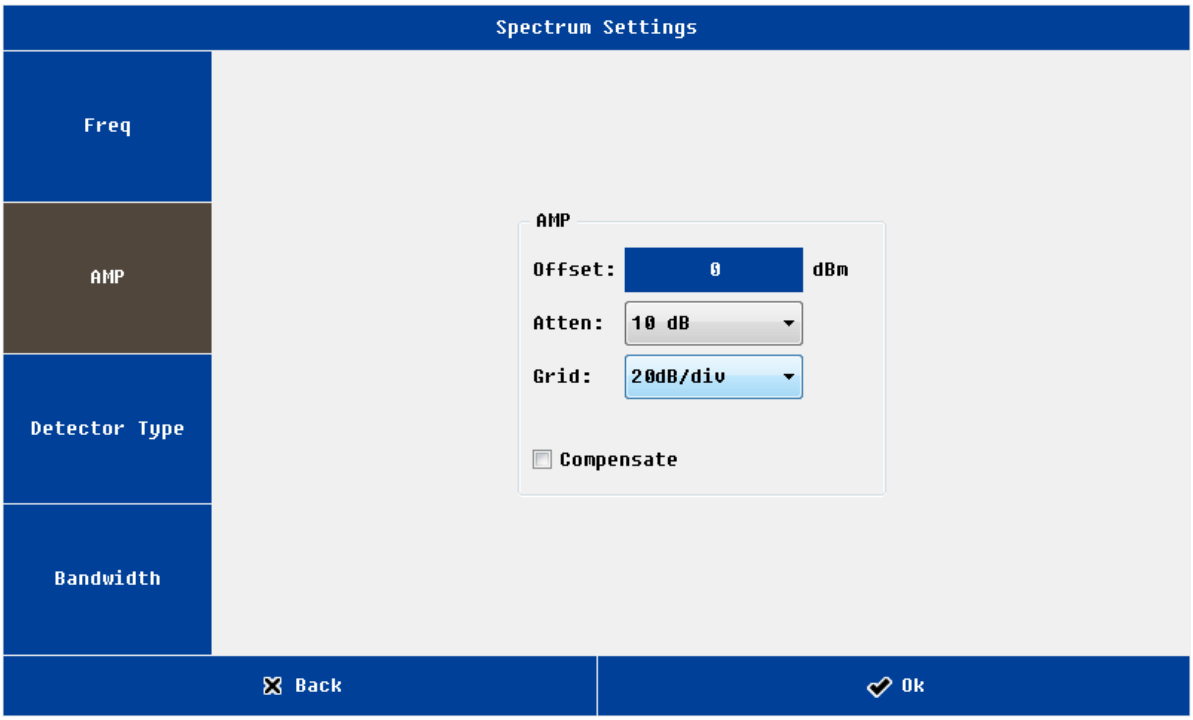


Fig. 5.4 Amplitude Setting

Note: Offset and Atten. exist in relation.

5.1.3 Detector Type Setting

It includes four Detector Type: Pos Peak, Neg Peak, RMS and Sample, as shown in Fig. 5.5.

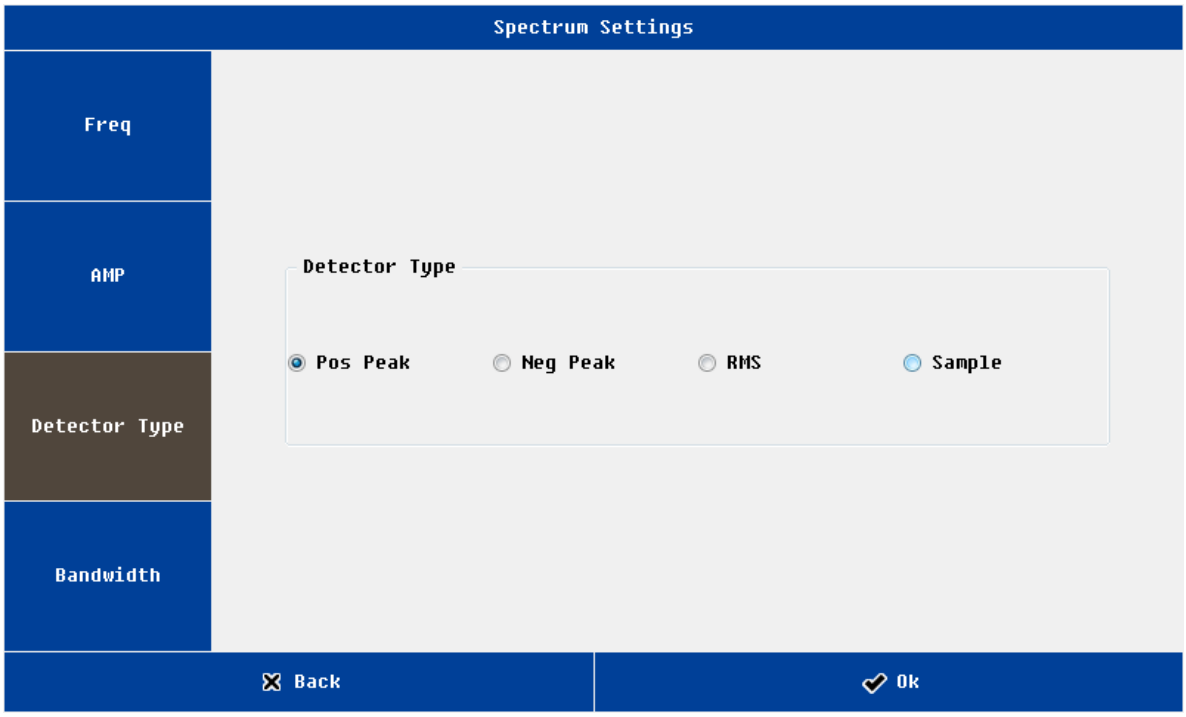


Fig. 5.5 Detector Type Setting

5.1.4 Bandwidth Setting

It includes RBW(1KHz,3KHz,10KHz,30KHz,100KHz,300KHz), VBW, RBW/VBW(1,3,10), as shown in Fig.5.6.

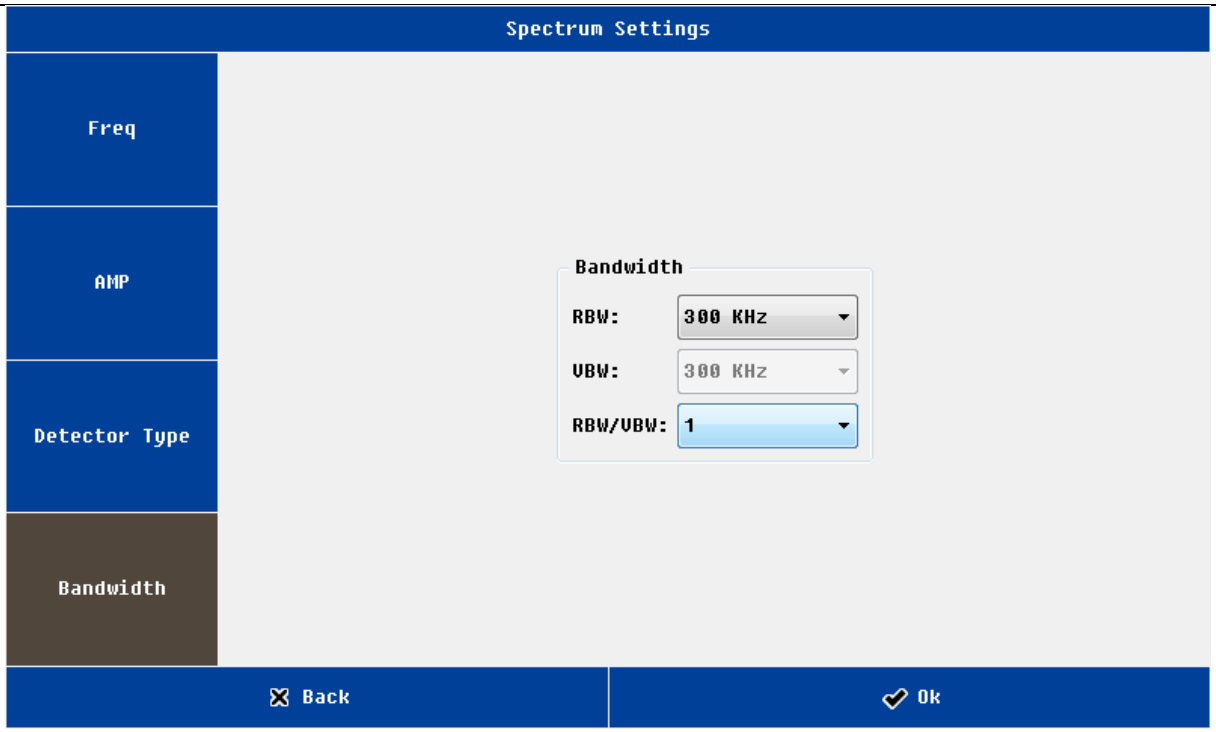


Fig. 5.6 Bandwidth Setting

5.2 Spectrum testing

Before testing, users can set parameters, and can choose continuous measurement or a single measurement. The settings in the measurement process are consistent with the general function of the cable & antenna, as shown in Fig.5.7.

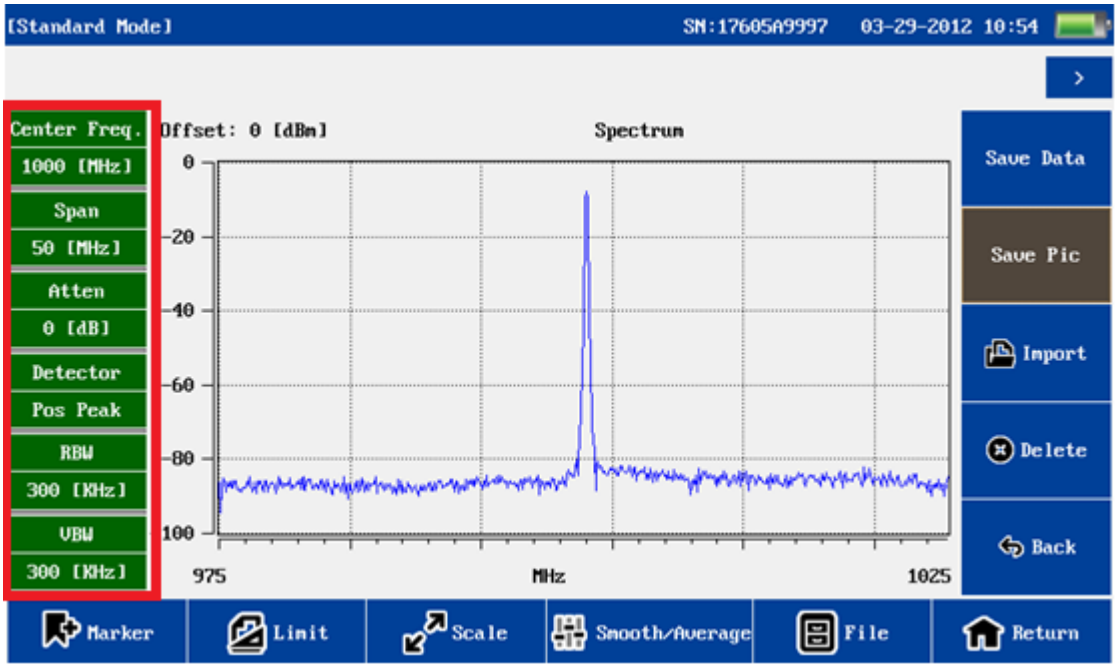


Fig. 5.7 Spectrum testing interface

The left side of the red box shows the parameter setting information, the test results response time is decided by the

frequency sweep width and bandwidth settings.

Note: Exceptional spurious, <- 70dBc @ Input frequency ± 25.6MHz.

6. General Function of Cable & Antenna Analyzer + Spectrum Analyzer

"Display", "Data to Memory", "Auto Run", "Single Run", "Marker", "Limit ", "Scale", "Smooth / Average" and "File" is the General function. Take the cable & antenna test as an example.

6.1 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.

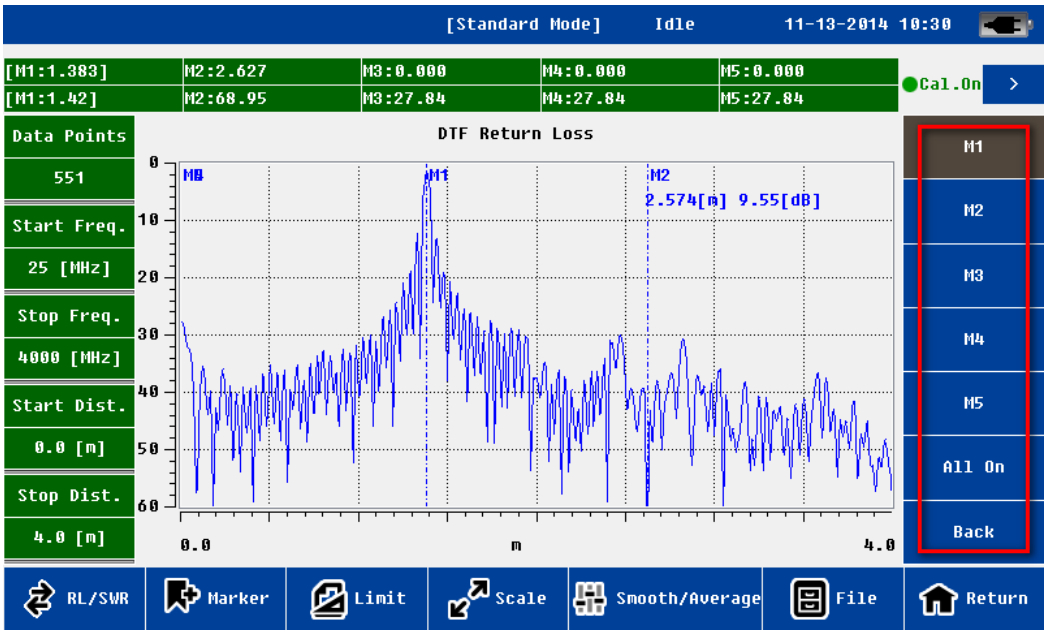


Fig. 6.1 Marker Menu

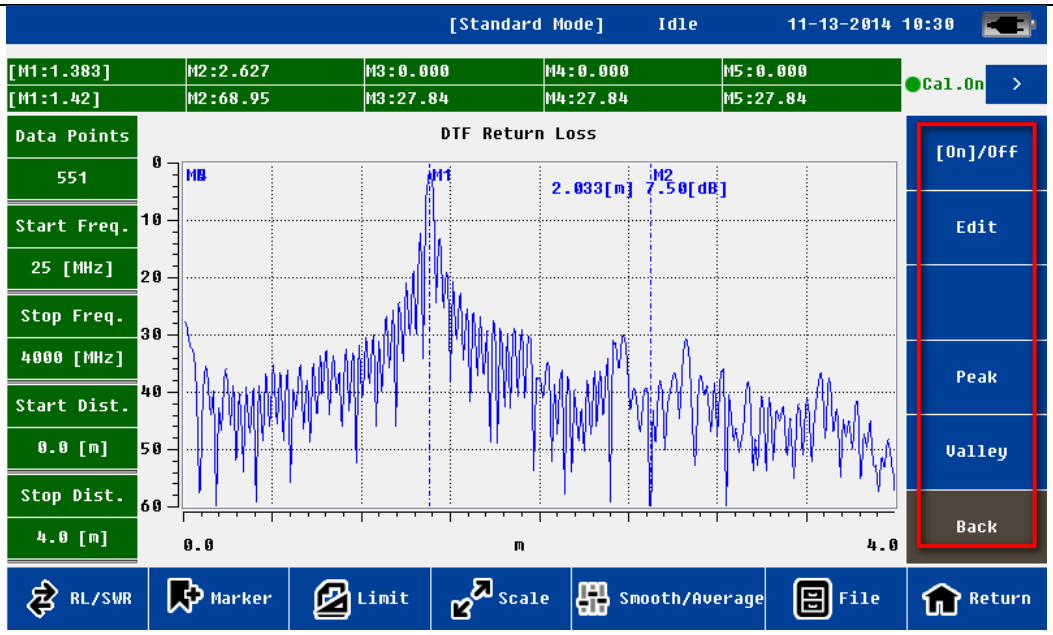


Fig. 6.2 Marker Setting Menu

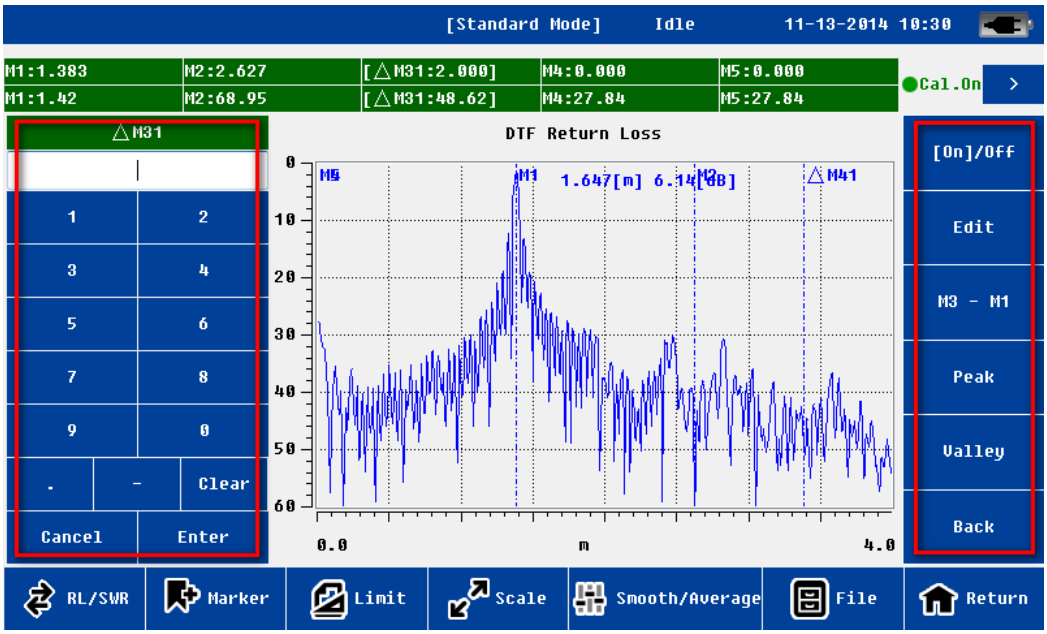


Fig. 6.3 Edit Marker Setting Menu

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.

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).

6.2 Limit

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.

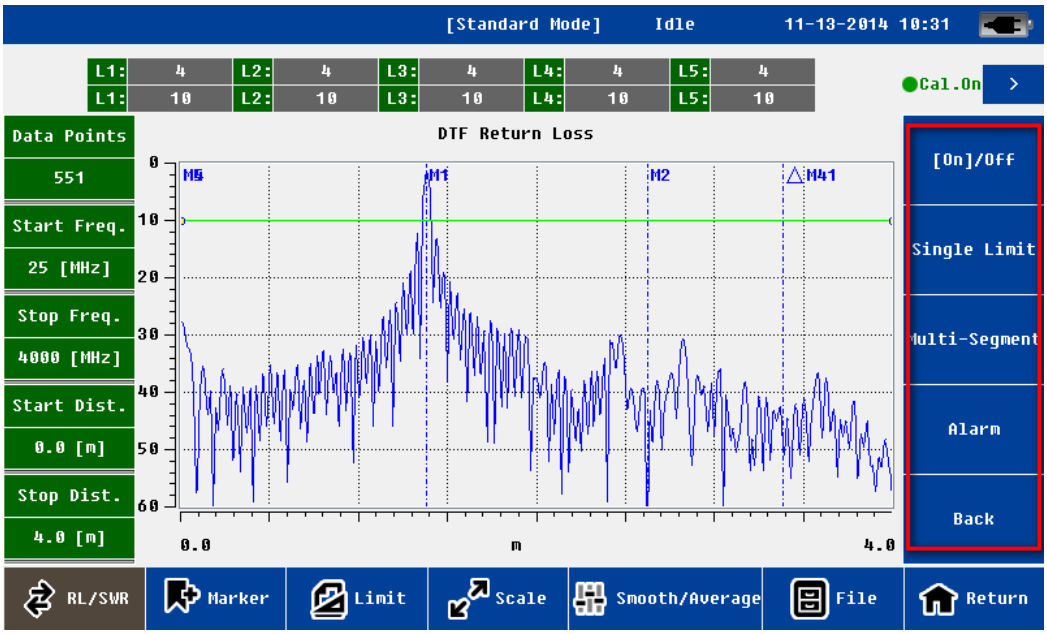


Fig. 6.4 Limit menu

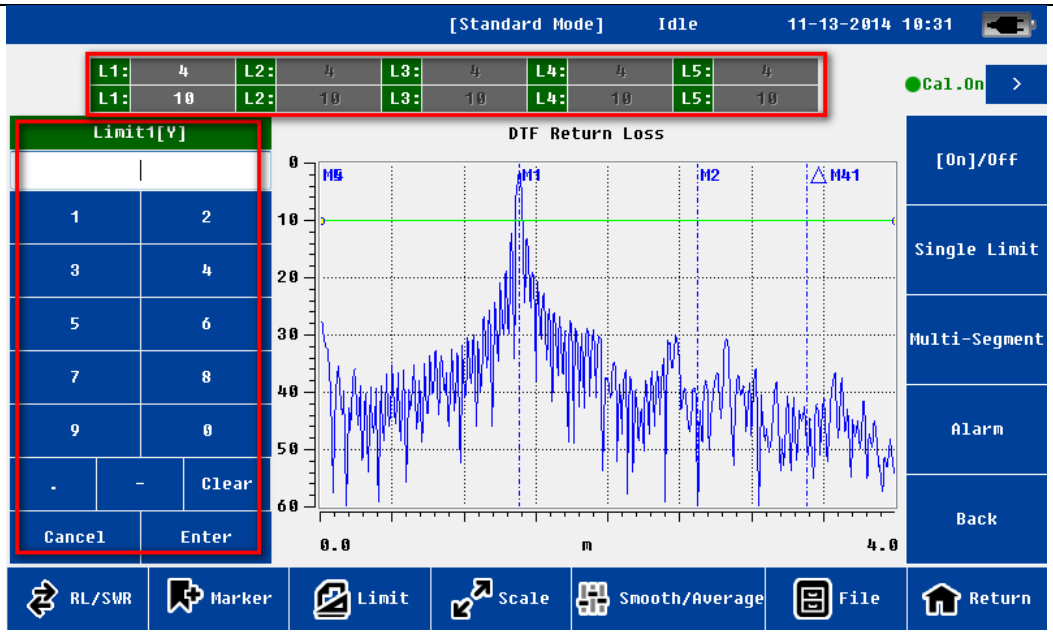


Fig. 6.5 Limit setting menu

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.

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).

6.3 Scale

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

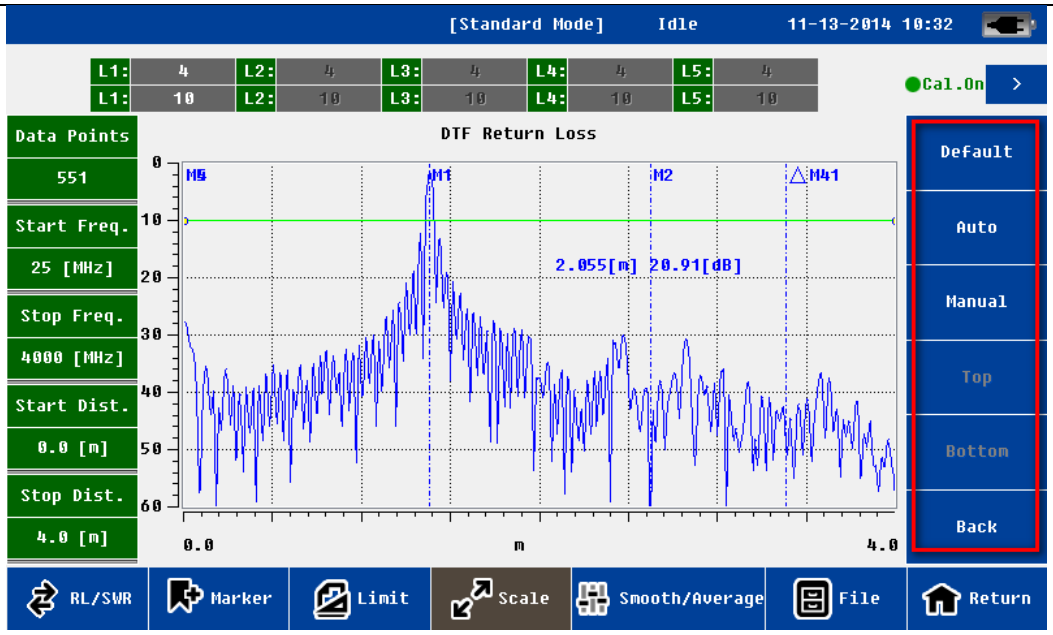
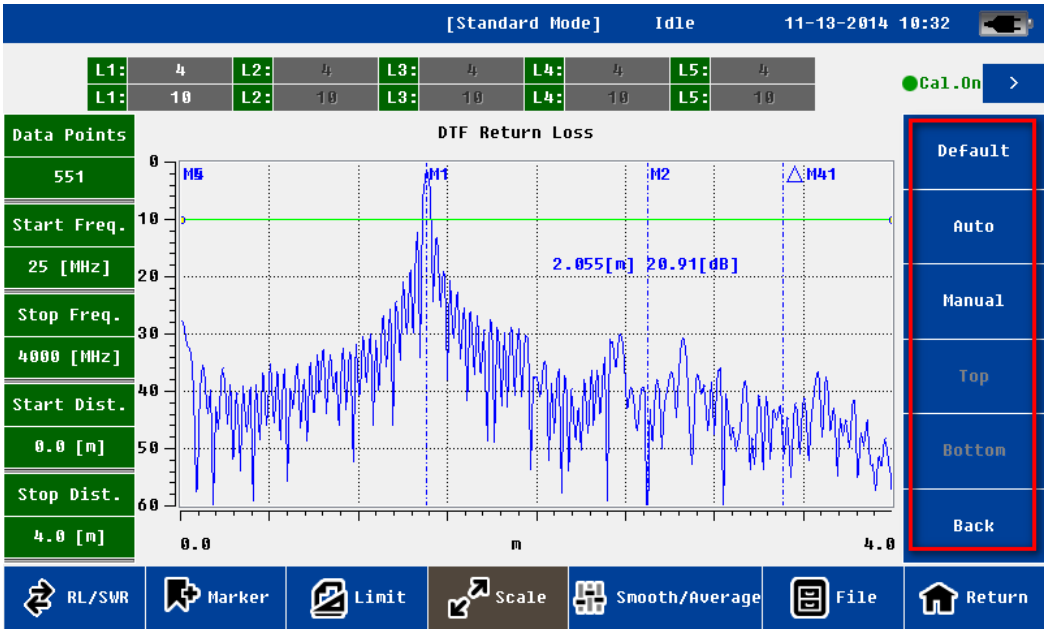


Fig.6.6 Scale menu



Fog.6.7 Manual scale setting menu

Tab.6.1

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.

6.4 Files

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

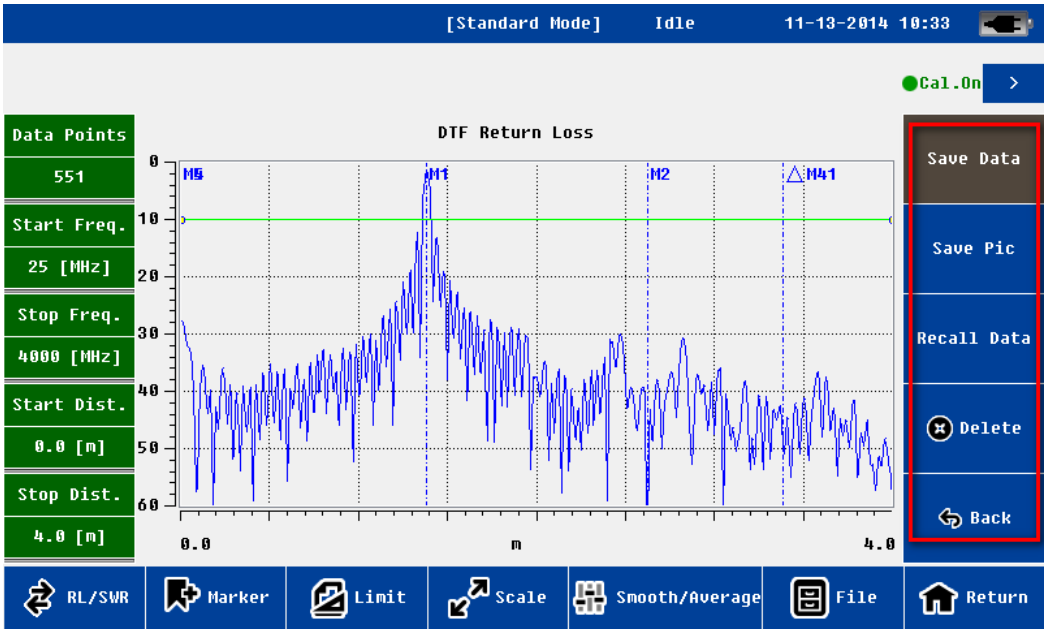


Fig. 6.8 File menu

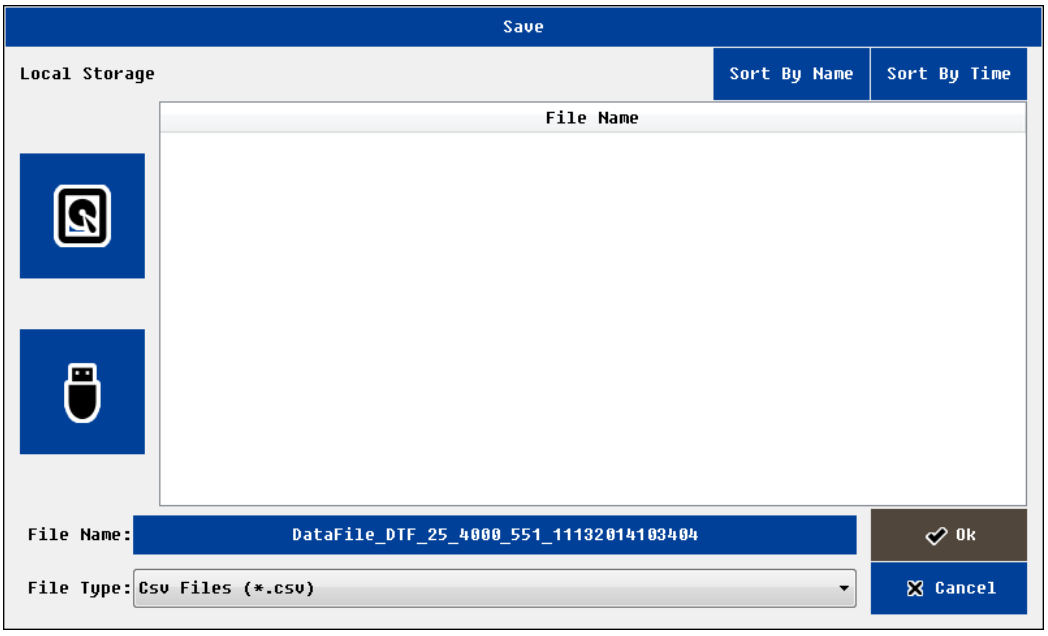


Fig. 6.9 Save file interface

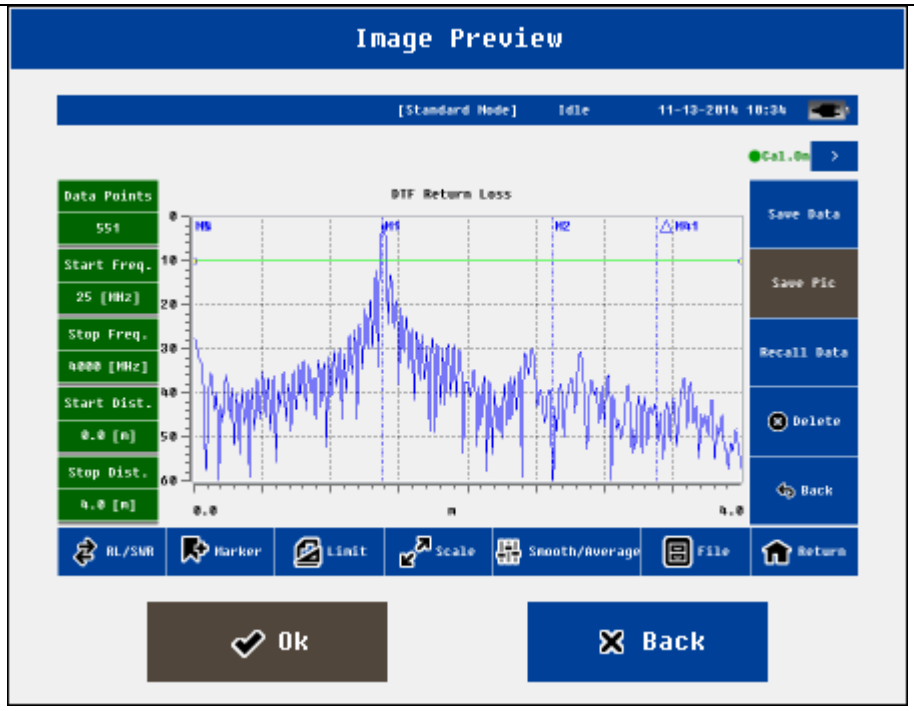


Fig. 6.10 Image preview interface

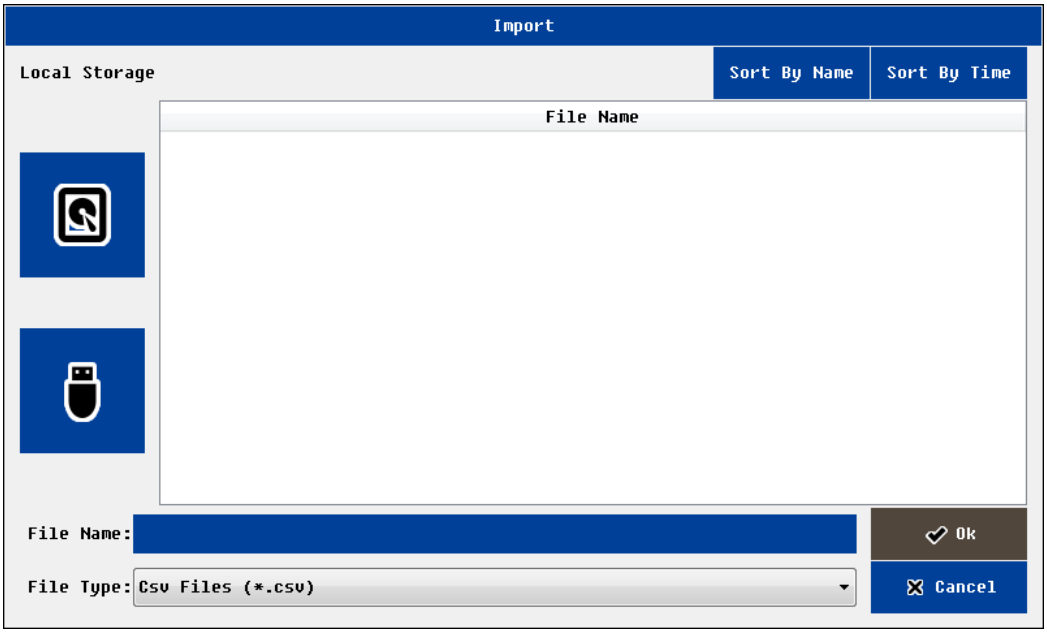


Fig. 6.11 File import interface

Fig. 6.12 File delete interface

Tab. 6.2 Files Management

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

NOTE

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

6.5 Display

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

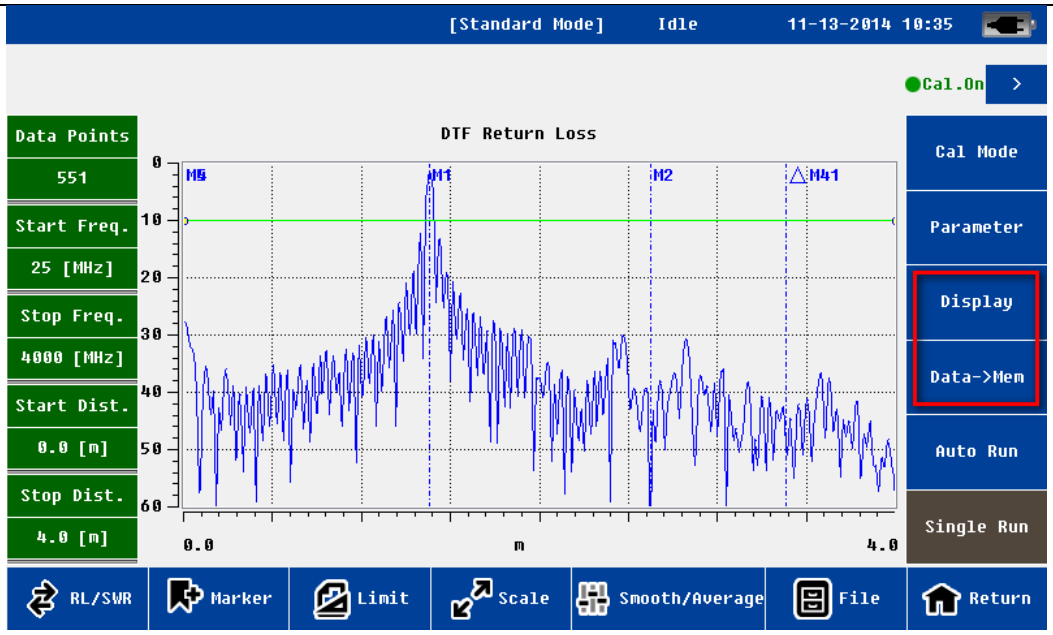


Fig. 6.13 Display menu

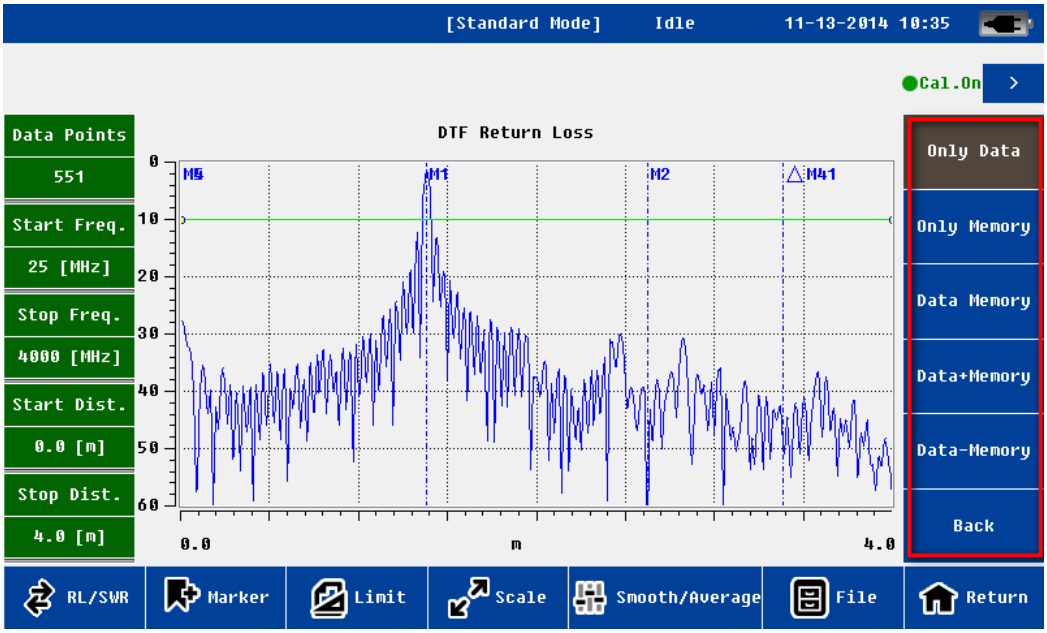


Fig. 6.14 Display setting menu

Tab.6.3

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.

6.6 Average/Smooth

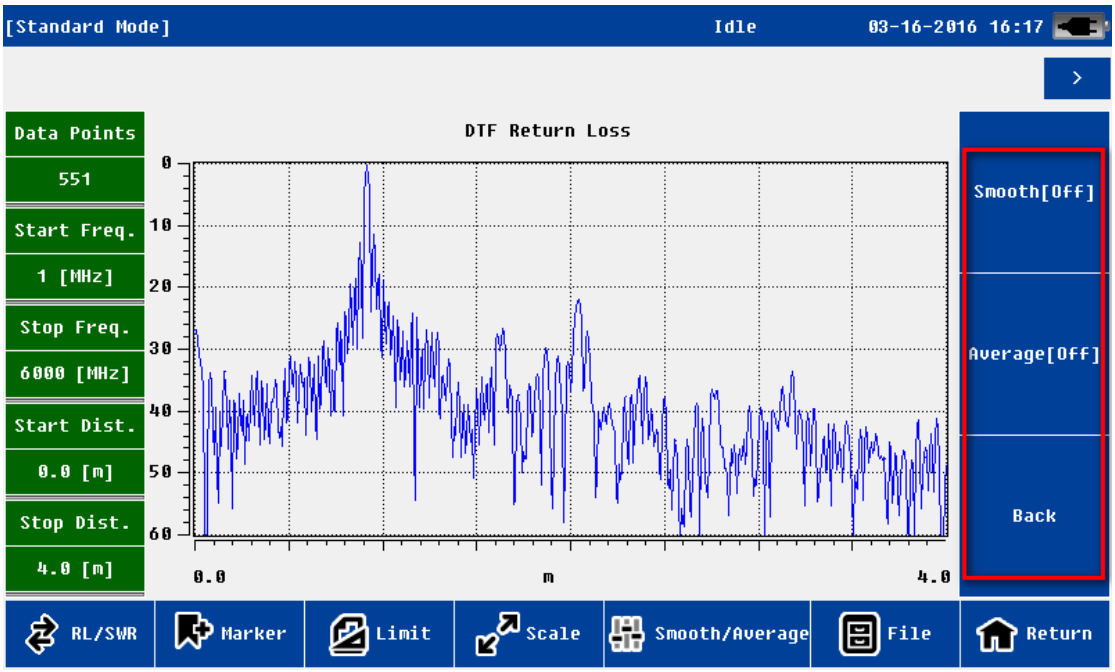


Fig.6.15 Average/Smooth menu

Tab. Average/Smooth

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

7. RF Power Meter

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

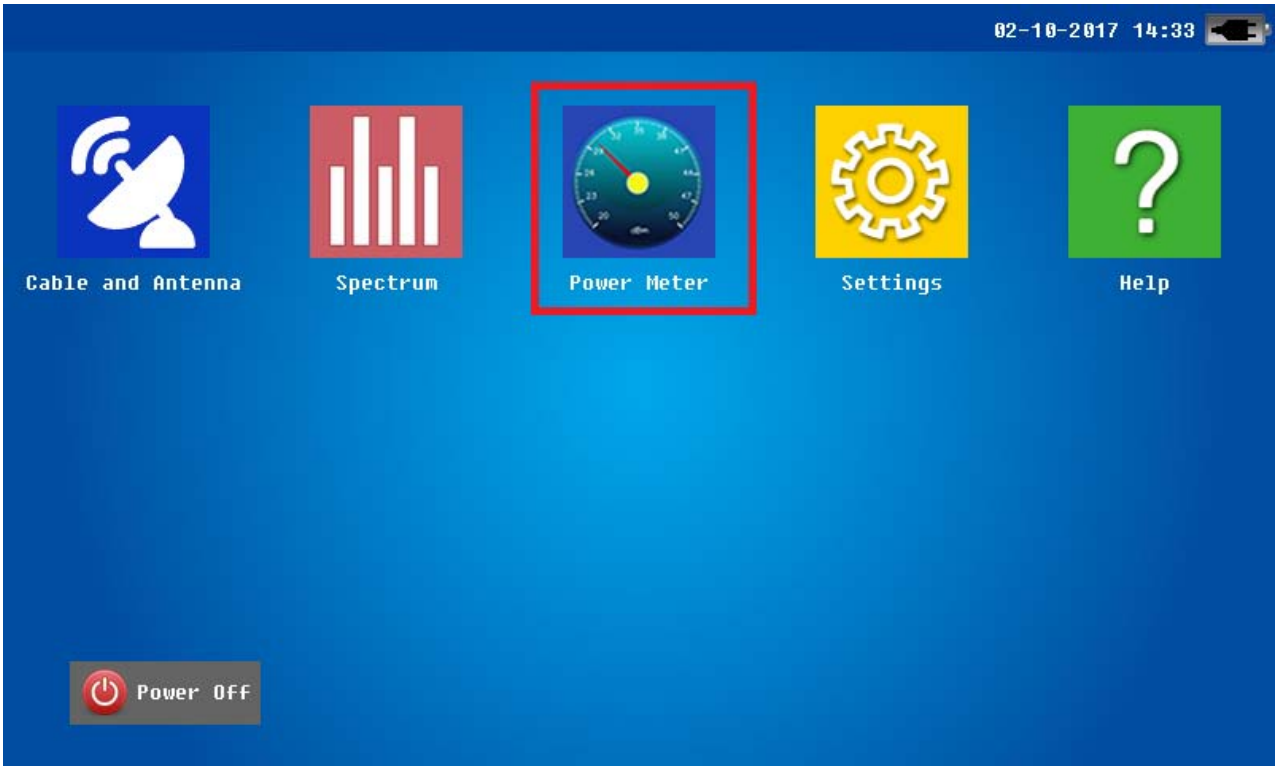


Fig.7.1 Main interface

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.

7.1 Power Meter Main Interface

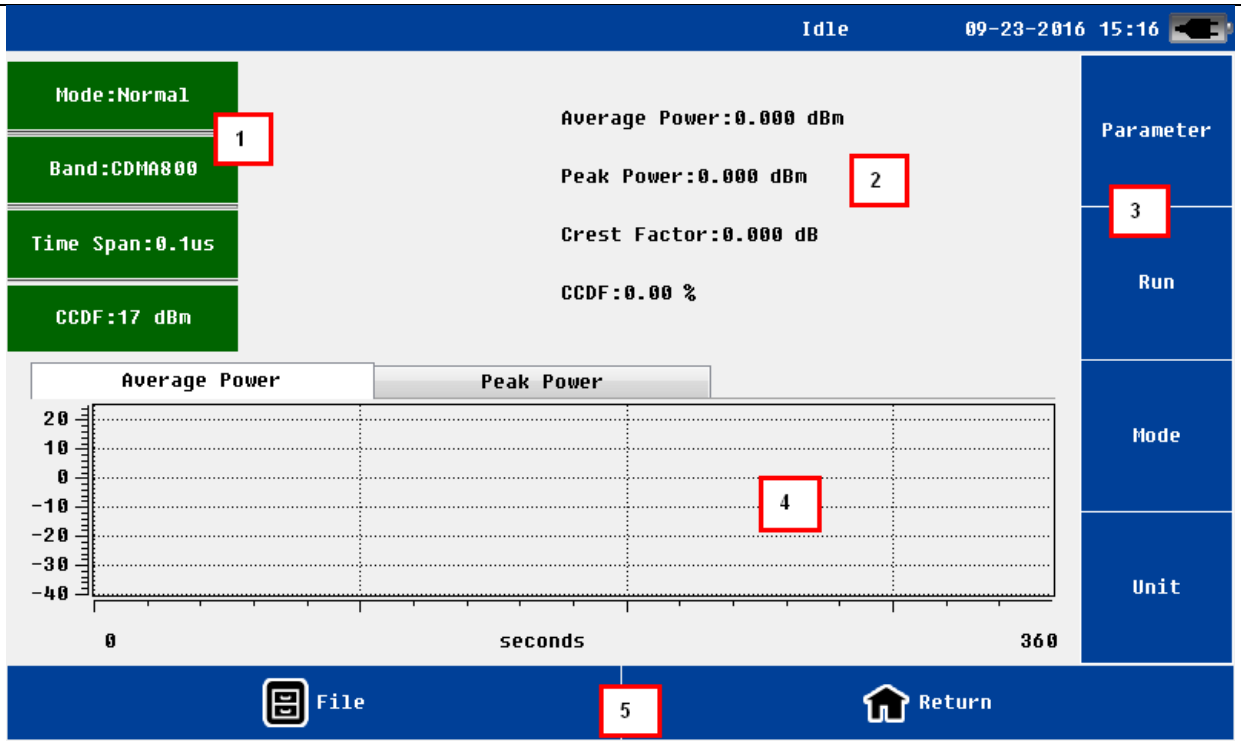


Fig.7.2 Power Meter Interface

The function of RF Power Meter interface is as Tab.7.1.

Tab.7.1 Power Meter Interface Function

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

Tab7.2

Name	Function
Run	Start to test
Stop	Stop to test
Mode	Change the test mode. It supports both common mode and burst mode
Unit	Change the unit. It supports both dBm and mW.

RF Power Meter can test Normal Mode: Average Power, Peak Power, Crest Factor, CCDF; Burst Mode: Burst Power, Peak Power, DutyCycle.

Before testing, users should set the work frequency information.

If tested signal is modulation signal, users should set the Corresponding time resolution.

If test CCDF, users also should set CCDF threshold.

7.2 Frequency Band Setting

Before testing, users should set the frequency band.

Click parameter-Frequency, and set it. Users can select Build in Frequency, or input the defined frequency.

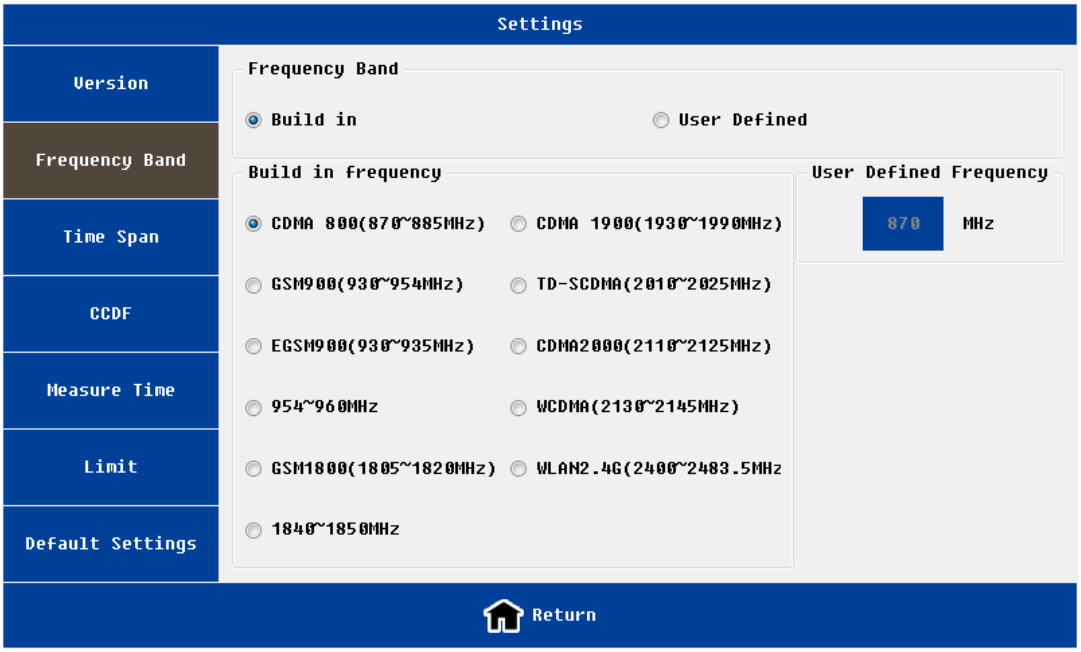


Fig.7.3 Frequency Band Setting

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

7.3 Time Span Setting

For the time span setting, it is 0.1μs, 1μs,15μs and 150μs. 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.

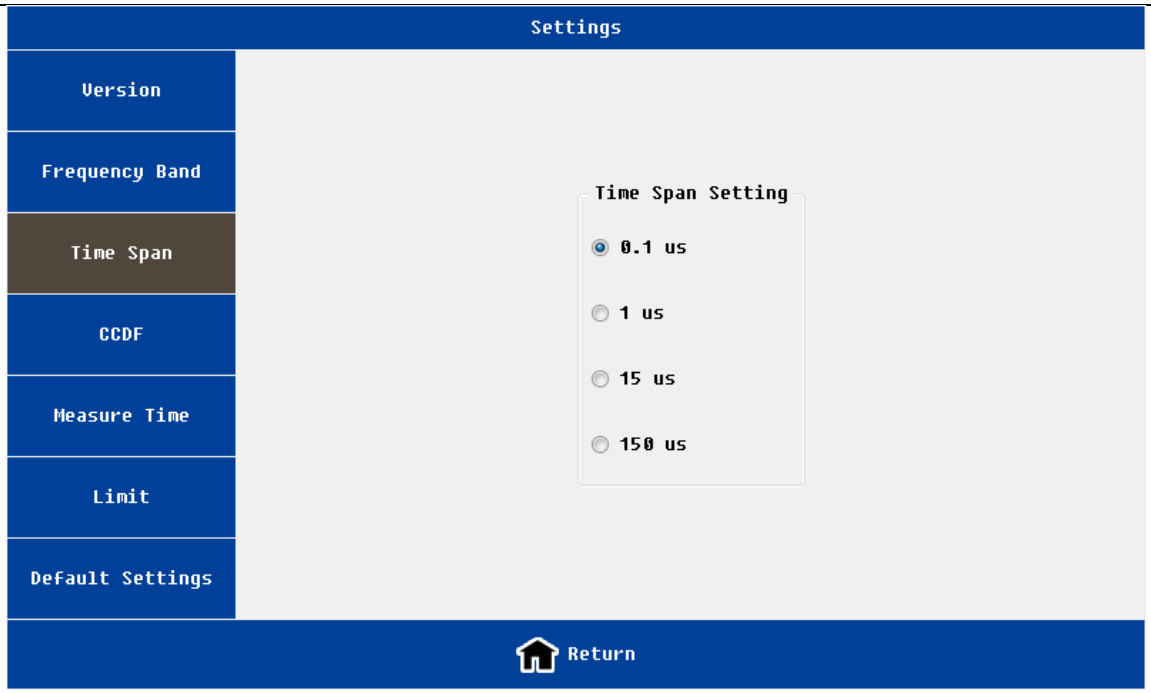


Fig.7.4 Time Span Setting

For different modulation, the time span is different, as shown in Tab.7.3.

表 7.3 时间分辨率推荐设置

Time Span	Modulation
150us	CW Burst（t.s.>300us）, Voice Band AM, FM, Phase Modulation
15us	CW Burst （t.s.>30us）, Voice Band AM, FM, Phase Modulation
1.0us	CW Burst（t.s.>2us）, GSM, 50kHz AM, DQPSK (1／4π,symbol rate<24k/s)
0.1us	CW Burst（t.s.>0.2us）, GSM, CDMA, WCDMA, DQPSK(1/4π,symbol rate<200k/s), DAB/DVB-T

Note: t.s is time span.

7.4 CCDF Threshold Setting

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

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

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

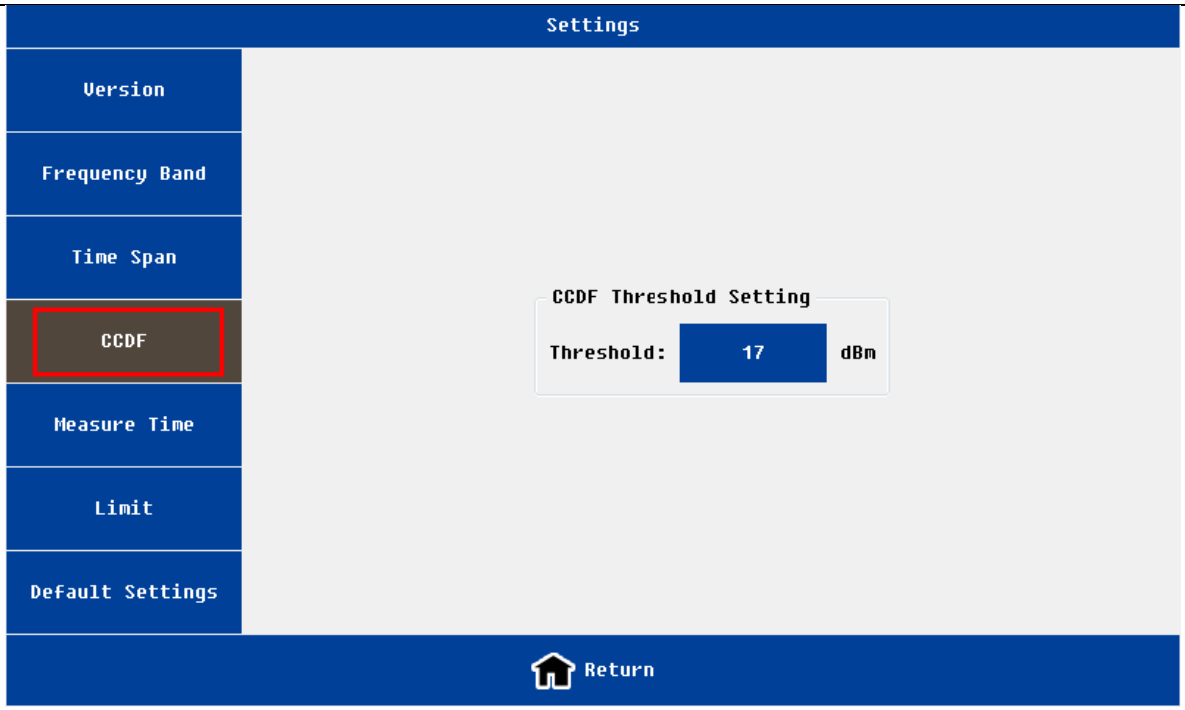


Fig.7.5 CCDF Threshold Setting

7.5 Measure Time Setting

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.

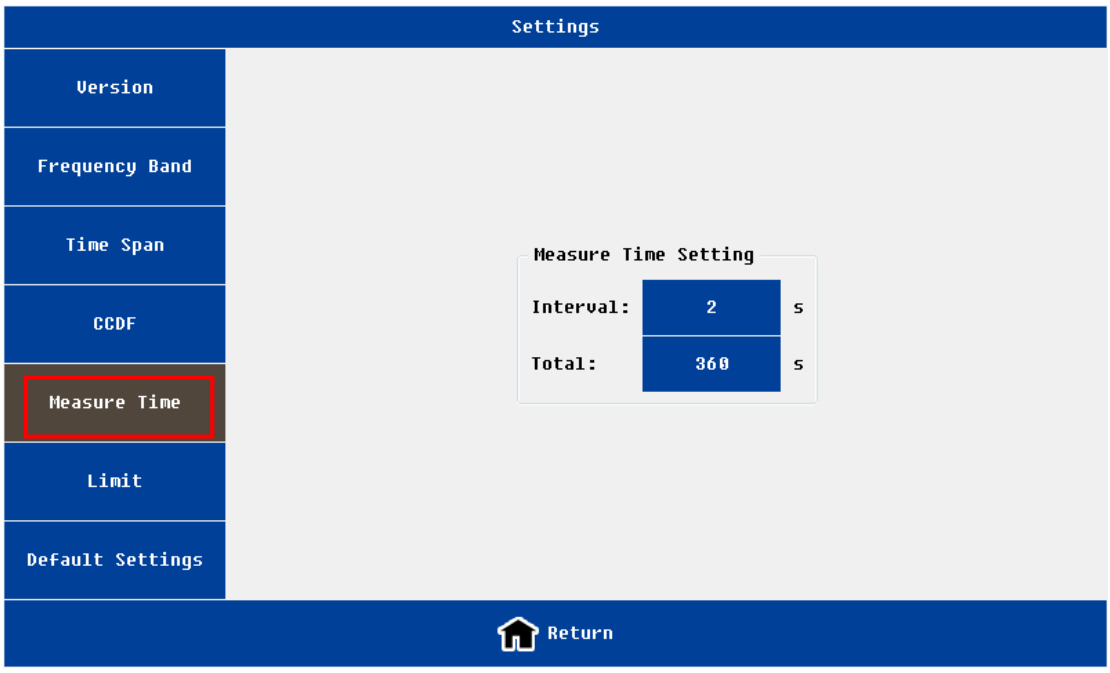


Fig. 7.6 Measure Time Setting

7.6 Limit Setting

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

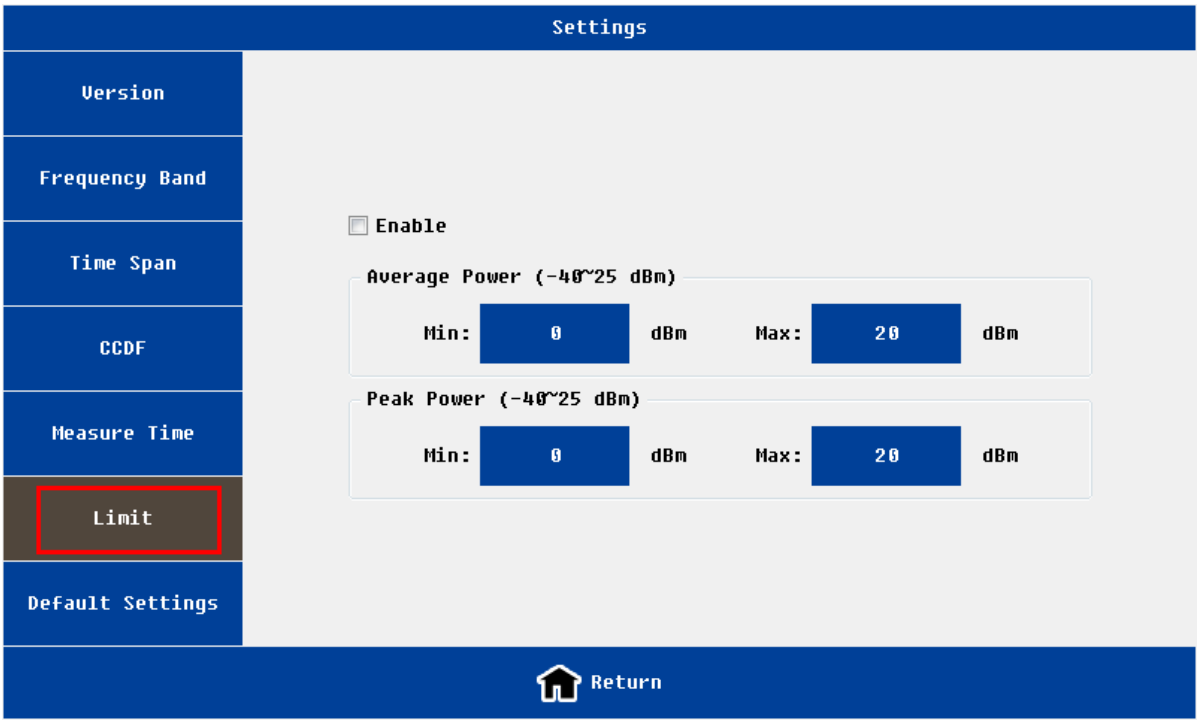


Fig. 7.7 Limit Setting

7.7 Version

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

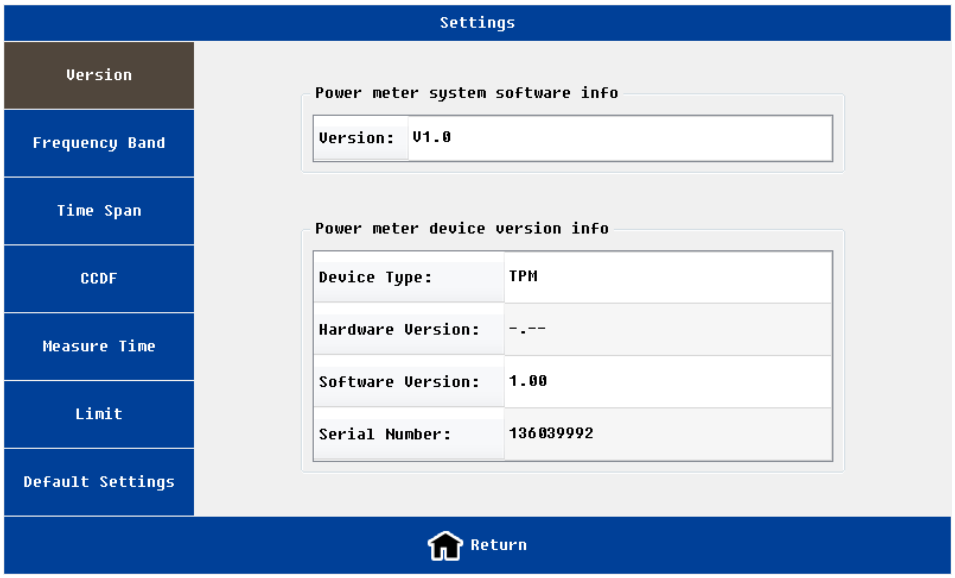


Fig.7.8 Version Interface

7.8 Default Setting

Users can load default parameters in this interface, as Fig.7.9.

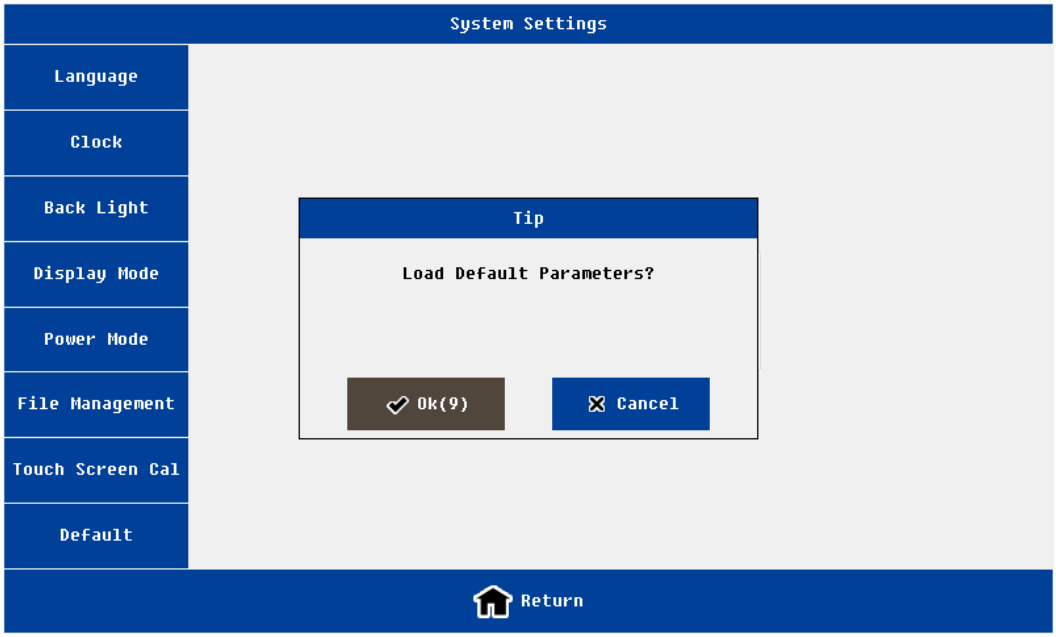


Fig.7.9 Default Interface

7.9 Normal test mode

After setting the parameter, users can test. This unit have two kind test mode: Normal Mode and Burst Mode.

7.9.1 Normal mode

Normal mode is to test the continuous signal, including continuous modulation signal. It tests Average Power, Peak Power, Crest Factor, CCDF.

Note: Before testing, frequency band and time span should be set correctly.

Before testing CCDF, the CCDF threshold should be set.

7.9.2 Burst mode

Burst mode is to test the burst signal. It tests Burst Average, Burst Peak Power and Duty Cycle.

Note: Before testing, users should set the work frequency information and time span.

7.9.3 Display the Test Result

User click Run to start testing, and click Stop to stop testing. If users do not click stop, then the instrument will stop teat as the time which is set in the parameter.

Test result will display as two methods:

(1) The list shows multiple project measurements;

(2) The history graph shows the selected project history measurement results.

If the test result will exceed the alarm range, the test result will be shown in red color.

7.9.4 Save and Import the Test Result

User can save the test result as .CSV files after testing.

User can import test result from file directory. It is as the following steps:

Click File, select Save submenu to bring up the Save File dialog box. And Click OK to save the current data.

Click File, select Save submenu to bring up the Import File dialog box. And Click OK to import the current data.

8. System Setting Interface

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

Fig.8.1 Language setting interface

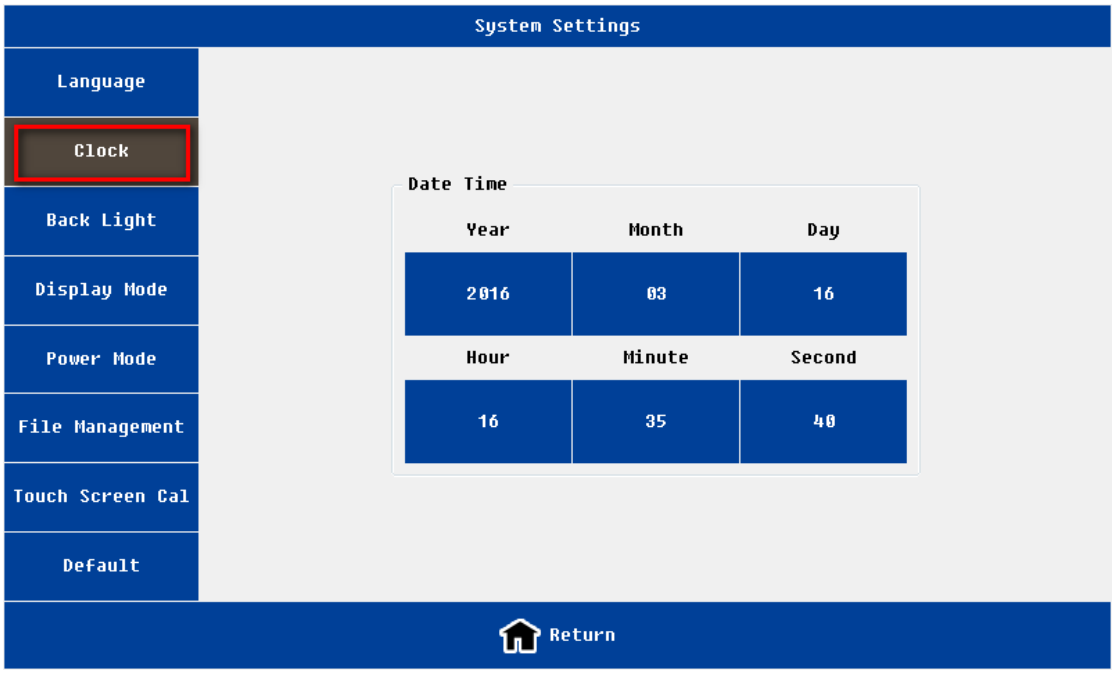


Fig.8.2 Clock setting interface

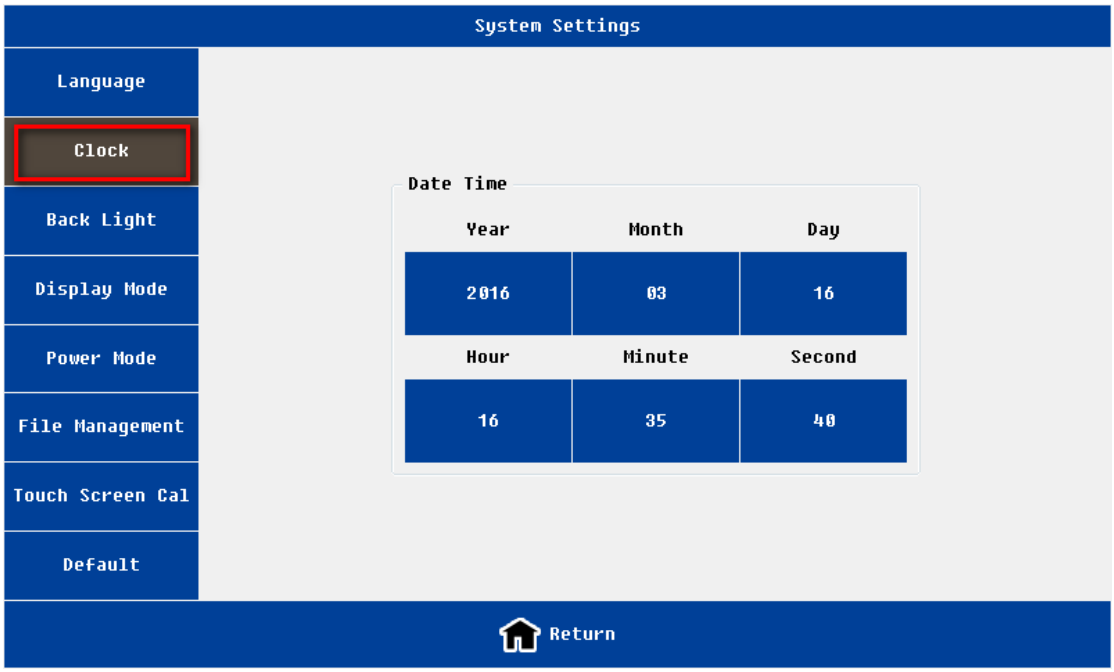


Fig.8.3 Back light setting interface

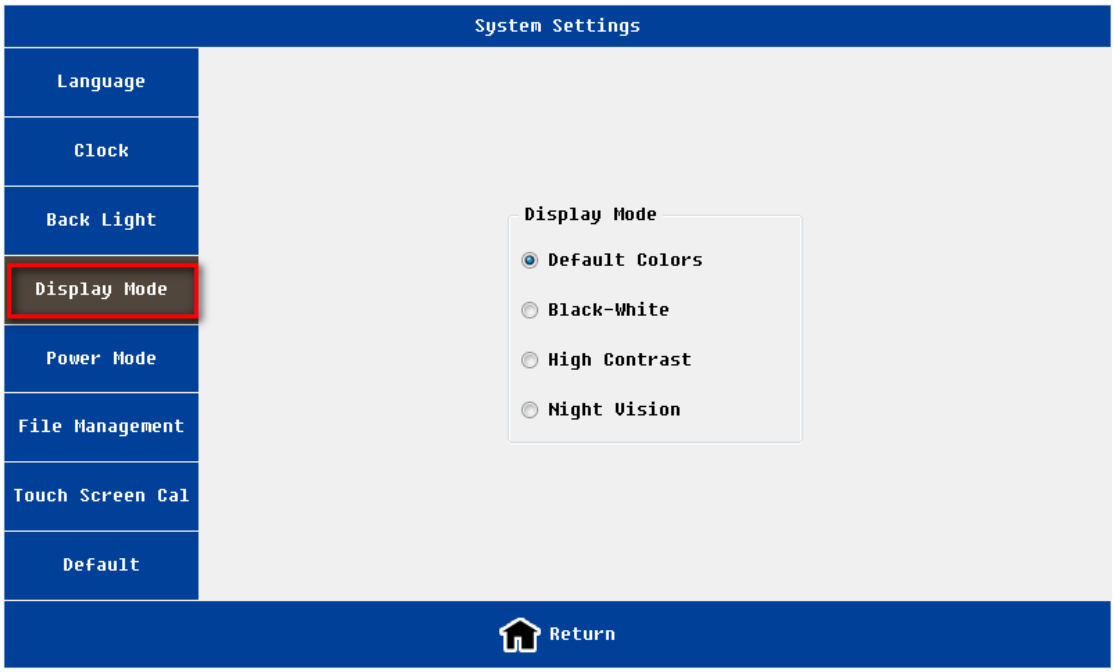


Fig. 8.4 Display mode setting interface

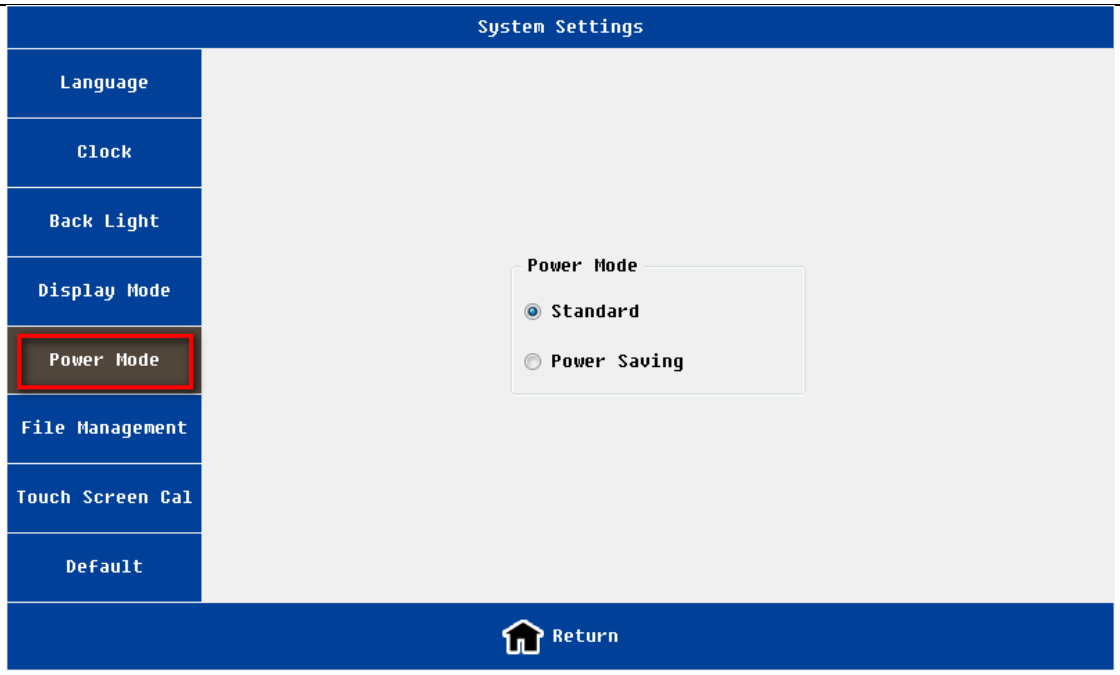


Fig.8.5 Power mode setting interface

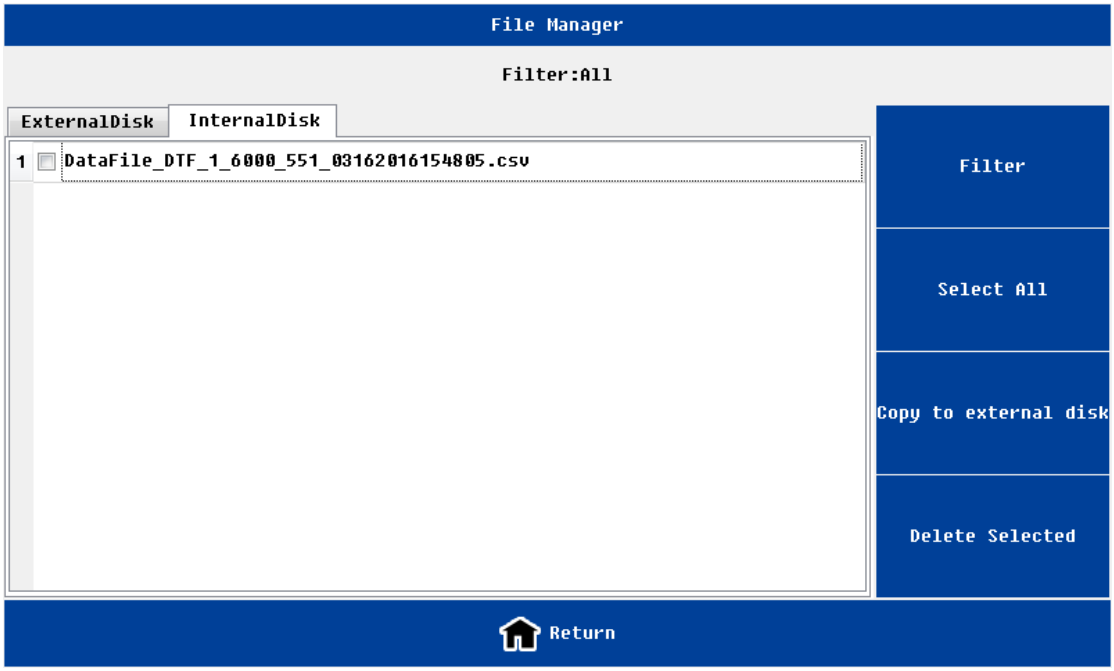


Fig. 8.6 File manager interface

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.**

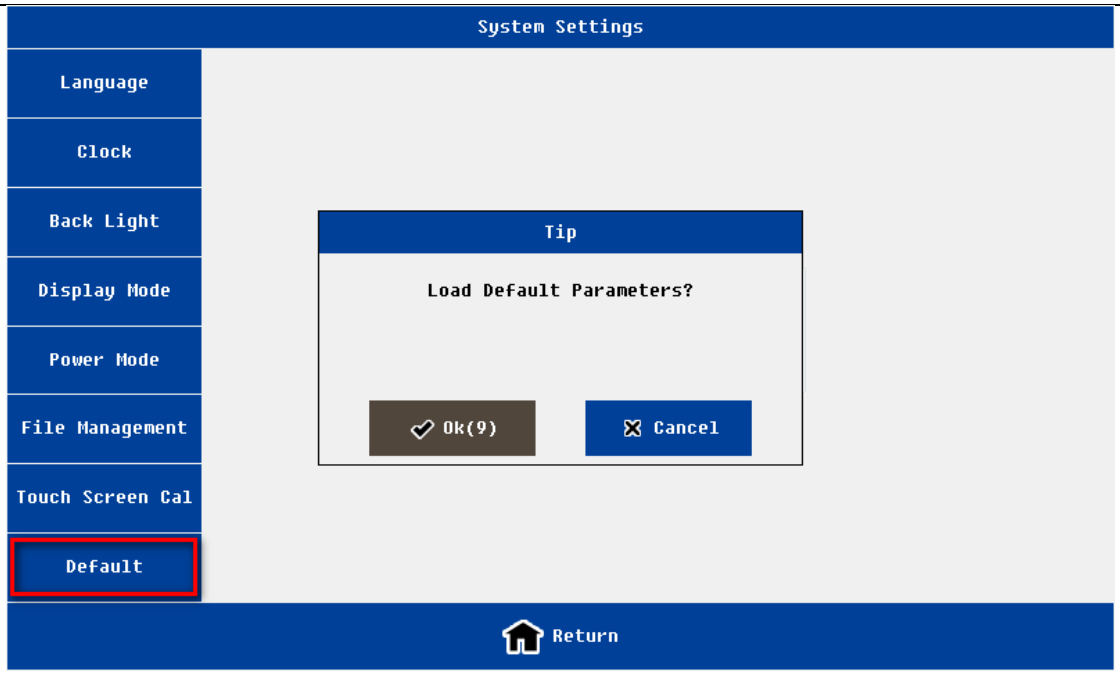


Fig.8.7 Load default setting interface

Tab.8.1 System Setting Function

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

9. Help Interface

In the main interface, click Help and enter the Help interface, as shown in Fig.9.1.

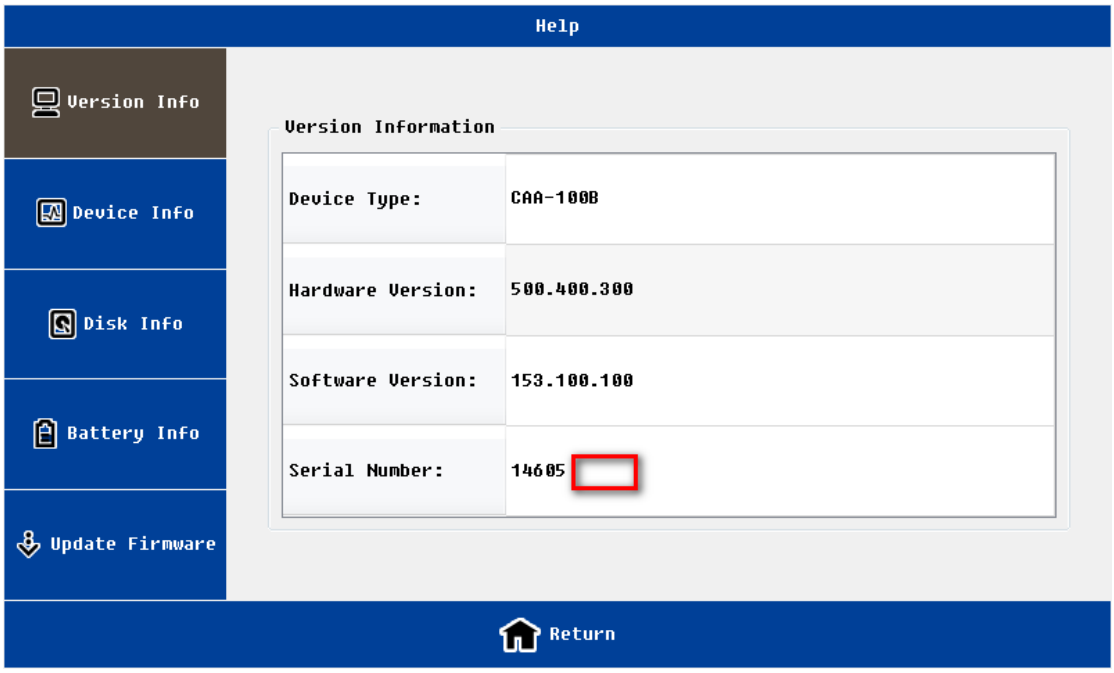


Fig. 9.1 Version information interface

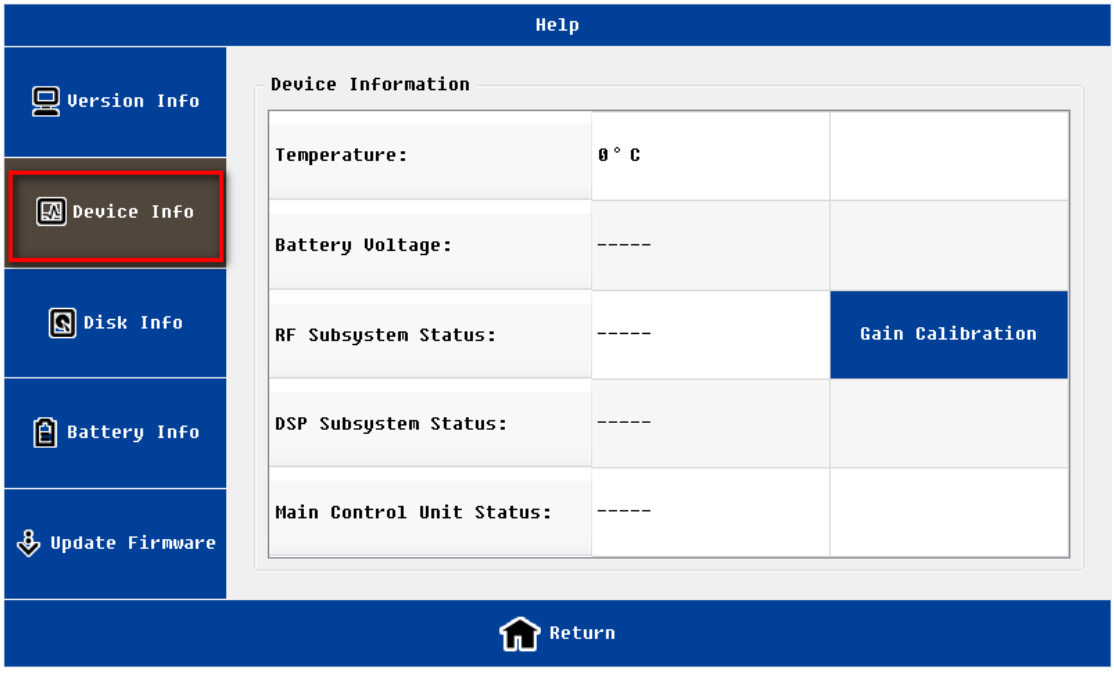


Fig. 9.2 Device information interface

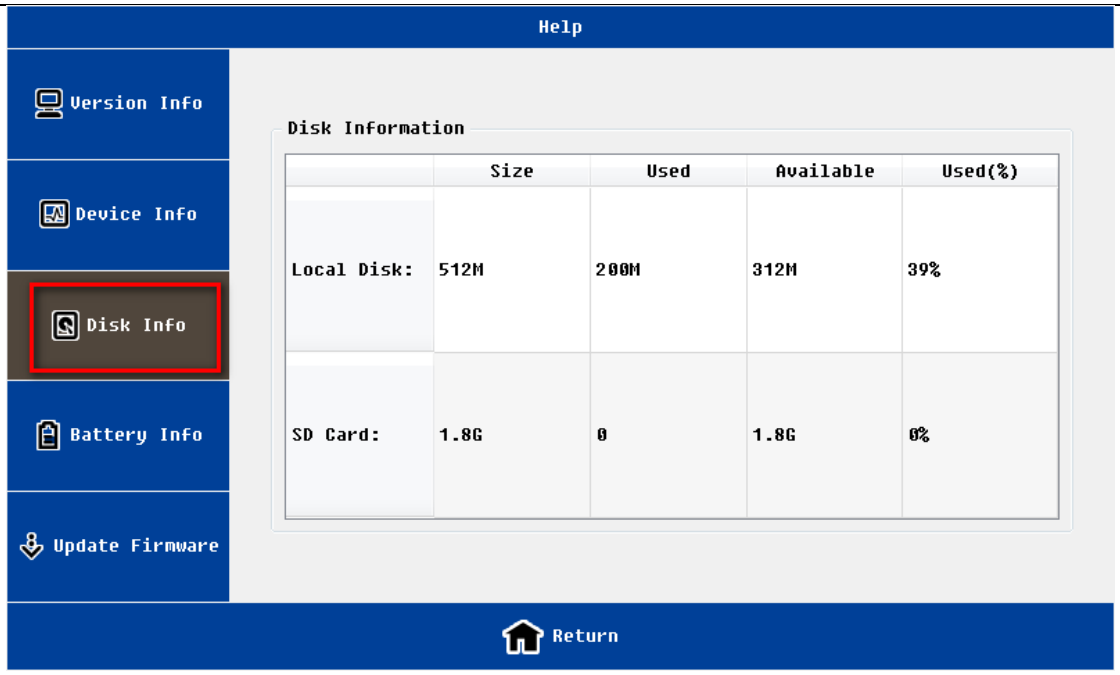


Fig. 9.3 Disk information interface

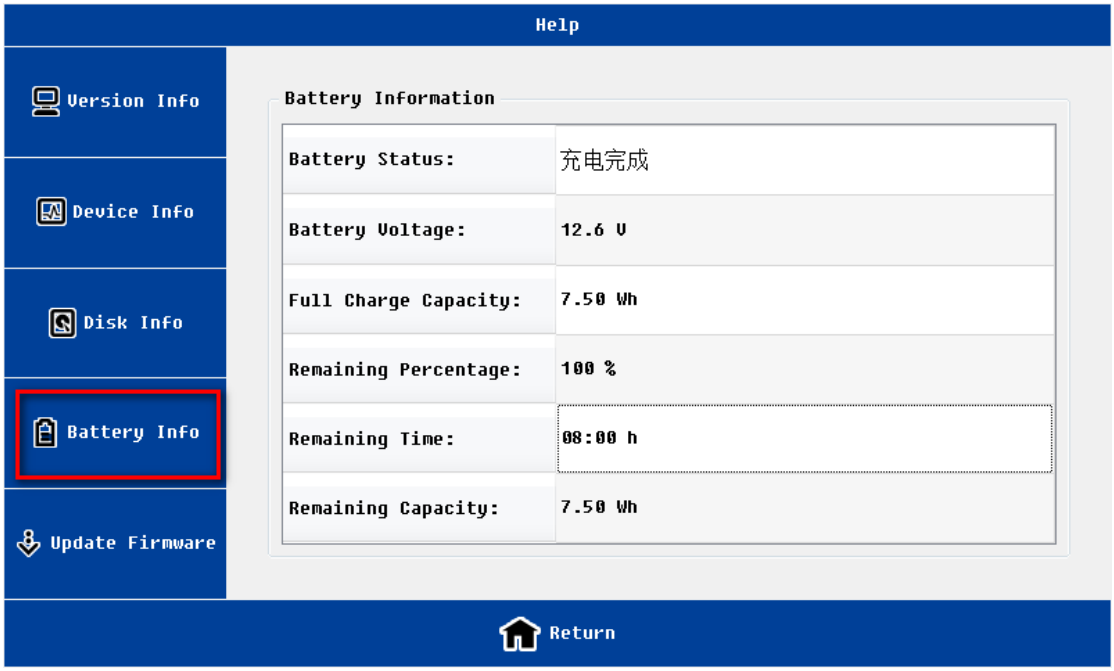


Fig. 9.4 Battery information interface

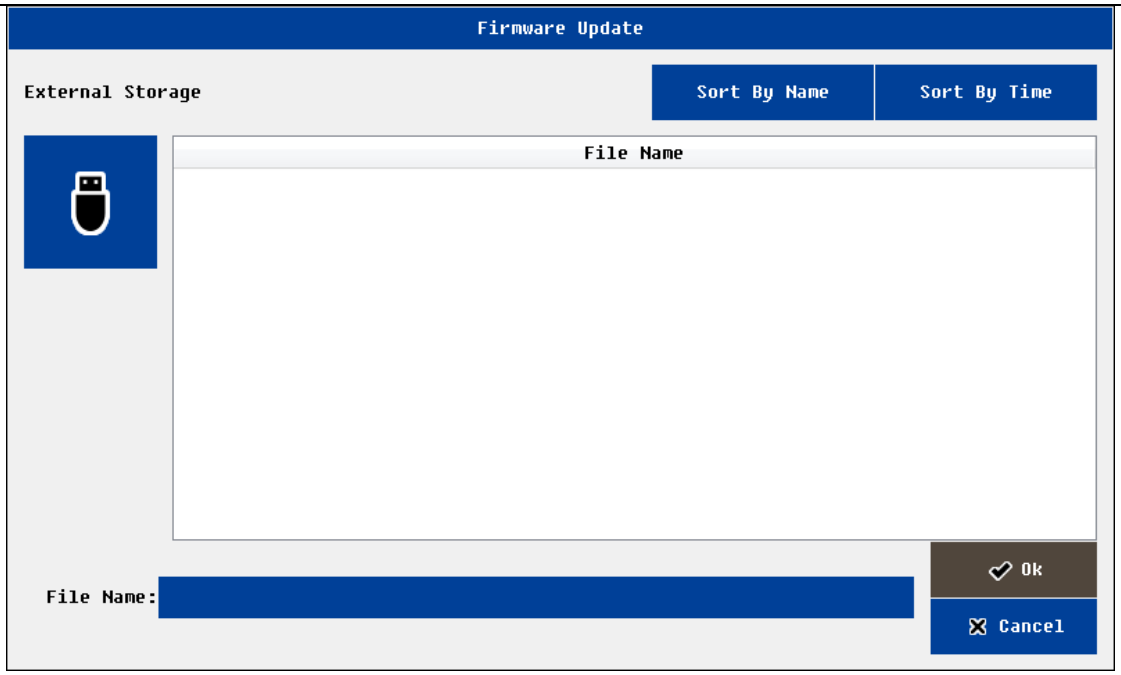


Fig. 9.5 Firmware update interface

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

Tab. 9.1 Help Function

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.

10 warranty information

10.1 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.

10.2 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.

10.3 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.

10.4 Returning Instruments

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

10.5 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.:

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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

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