

OPERATION MANUAL

DTVLINK-C QAM ANALYZER



Warranty

The instrument is warranted for a period of 12 months under normal operating conditions (except batteries and LCD). Users should read manual carefully before first use and operate correctly according to the manual.

AD INSTRUMENTS shall have no responsibility for any defect or damage caused by improper use and maintenance or for any product which has been repaired or altered by any one others not AD INSTRUMENTS or our authorized service center.

When you need to repair or calibrate the instrument, Please contact AD INSTRUMENTS or our local distributors in your country.

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INDEX

1. General Introduction	1
1.1 Digital TV Measurement	1
1.2 Spectrum Scanning	1
1.3 Level Test	1
1.4 Channel Scanning	1
1.5 Tilt/Level List	1
1.6 C/N	1
1.7 Hum measurement	2
1.8 Modulation Depth	2
1.9 Limit Test	2
1.10 Auto Test	2
1.11 Voltage Measurement	2
1.12 Multiple User Channel	2
1.13 File Management	2
1.14 Intelligent Power Management	2
1.15 About the operation manual	2
2. Introduction	3
2.1 Appearance	3
2.2 Interface	4
2.3 Keypad	5
2.3.1 Soft keys	5
2.3.2 Knob	5
2.3.3 Shortcut keys	5
2.3.4 Character/Digit Input	5
2.4 Display Description	5
3. Using the Instrument	6
3.1 Learn User Channel Plan	6
3.2 QAM Measurement	8
3.2.1 Digital channel settings	8
3.2.2 Digital channel measurement	8
3.3 Spectrum Scanning	12
3.3.1 Soft Keys Operation	12
3.3.2 Parameter Setting	15
3.4 Level measurement	17
3.4.1 Soft Keys Operations	17
3.4.2 Parameter Setting	18
3.5 Channel Scanning	21
3.5.1 Soft Keys Operation	21
3.5.2 Parameter Setting	22
3.6 C/N	23
3.6.1 Soft Keys Operation	23
3.6.2 Parameter Setting	23
3.7 Single-frequency measurement	24
3.7.1 Soft Keys Operation	24
3.7.2 Parameter Setting	25
3.8 HUM Measurement	25
3.8.1 Soft Keys Operation	25
3.8.2 Parameter Setting	26
3.9 Modulation Depth measurement	27
3.9.1 Soft Keys Operation	27
3.9.2 Parameter Setting	27
3.10 Tilt/Level List Measurement	28

3.10.1 Tilt Mode	29
3.10.2 Level List Mode	30
3.11 Limit Test	30
3.11.1 Test result List	30
3.11.2 Limit Edit	31
3.12 Measure Function	32
3.12.1 Battery Voltage	32
3.12.2 Trunk Voltage(AC LINE)	32
3.12.3 Temperature Inside	32
3.13 Auto Test	33
3.13.1 Create New Project	33
3.13.2 AUTO Testing	34
3.14 File Management	35
3.14.1 File Directory	35
3.14.2 Read File	35
3.14.3 Delete File	36
3.14.4 Sort File	36
3.14.5 Select File	37
3.14.6 Transfer File	37
3.14.7 Rename the file	37
3.14.8 Change User Channel Plan	37
3.15 Return Path and Cable Modem	38
3.15.1 Register Cable Modem	38
3.15.2 Cable Modem Information	40
3.15.3 FTP	41
3.15.4 QAM Source	42
3.15.5 PING	44
3.15.6 WEB Browser	44
3.15.7 Return Path Spectrum	44
3.15.8 TRACEROUTE	45
3.16 Memorizer Information	45
4. Setup	46
4.1 Brief Introduction	46
4.2 System	46
4.3 General	47
4.3.1 Network Connections	47
4.3.2 Shutdown time	47
4.3.3 Date and Time	47
4.3.4 Language Selection	47
4.3.5 Upgrade System	48
4.3.5.1 Application Upgrade	48
4.3.5.2 File System Upgrade	48
4.3.5.3 Kernel Upgrading	49
4.3.5.4 Cable Modem Upgrade	49
4.3.6 Operator Setup	50
4.4 Measurement Parameter Setup	51
4.4.1 HUM	51
4.4.2 Level Calibrate	51
4.4.3 Level Unit	51
4.4.4 Limit Setup	51
4.4.5 Load Factory Setup	52
4.5 Channel Plan	52
4.5.1 Select User Plan	52
4.5.2 Channel Number Type	52
4.5.3 Learn User Plan	52
4.5.4 Edit User Plan	53

4.5.5 Tilt Edit	53
4.5.6 EX/IMPORT USER PLAN	54
5. Power Supply	55
5.1 Battery	55
5.2 Charge	55
6. Port	55
7. Specification	56

1. General Introduction

DTVLINK-C is new model with small size and high performance, which is developed for digital TV analysis of CATV by Deviser. This model can measure and display most indexes of Digital TV (Channel Power, MER, BER, Constellation Diagram); Analog TV (Single-frequency Level, Carrier Level of Full Channels Spectrum, HUM, Modulation Depth); and Fast Spectrum Analysis.

Also DTVLINK-C can measure C/N, Trunk Voltage, Battery Voltage and Frequency Spectrum Scanning.

DTVLINK-C provides with USB and LAN port, which is convenient to communicate with PC. Also it is easier for you to make files management by Deviser PC software – Workbench.

The highlight is that DTVLINK-C has Cable Modem inside and it supports CM Register, CM Statistics, PING function, Bandwidth Testing and Web Browser etc.

Features:

- * QAM, QPSK, COFDM Test
- * Level Test
- * Channel Scanning
- * Spectrum Scanning
- * Tilt/Level Test
- * C/N Measurement
- * HUM
- * Modulation Depth
- * Auto Test
- * Limit Test
- * Voltage Measurement
- * Dual-Sound Channel Test
- * Multiple User Channel Plan Setup
- * File Management
- * Intelligent Power Management
- * Character /Numeral Input
- * Shortcut Setup
- * Knob Design
- * Multi languages

1.1 Digital TV Measurement

DTVLINK-C supports modulation modes of QAM, QPSK and COFDM, and detects problems of digital system by monitoring spectrum. Here, you can get Channel Power, MER, BER, Constellation diagram and etc...

NOTE: MER, BER test is only in QAM Modulation Mode. (16/32/64/128/256QAM)

1.2 Spectrum Scanning

DTVLINK-C has strong spectrum function, which supports two display modes including center frequency/span and start frequency/stop frequency. Also you can change RBW and average times here. In order to detect and know the interference, it provides with peak-hold function, and you can get the difference between peak spectrum and current spectrum by marker and double-marker function.

1.3 Level Test

DTVLINK-C supports accurate signal level test at analogue TV, digital, single frequency and DUAL modes. Here, you will get video level, audio level, $\Delta V/A$, peak-hold level and $\Delta \text{Peak-Peak}$ value etc. Also it supports single channel spectrum function in order for you to get more details.

1.4 Channel Scanning

DTVLINK-C supports video and audio level display of all channels, which could up to 150 channels most. Also its zoom in/out of 5 levels and marker function make your observation easier.

1.5 Tilt/Level List

Tilt/Level list test is the effective solution to check the flatness and amplitude, and DTVLINK-C support 16 channels tilt max.

1.6 C/N

To get the more accurate C/N, you had better shut off carrier please.

1.7 Hum measurement

HUM is also named as power supply hum modulation distortion, which comes from the low-frequency interference of power supply.

1.8 Modulation Depth

Modulation Depth of TV images is the general measurement parameter to judge the images quality.

1.9 Limit Test

By this function, you can fast test whether any channel is eligible. You can set up the eligible standard by yourself, and the non-eligible channels quantity and detailed information will displayed after test.

1.10 Auto Test

DTVLINK-C provides a convenient way to automatic test the cable system. You can set up test items including level, spectrum, limit test, QAM, etc. And the test result will be saved automatically.

1.11 Voltage Measurement

DTVLINK-C can measure battery voltage and trunk voltage, identify AC or DC automatically of the cable system.

1.12 Multiple User Channel

DTVLINK-C can create 12 user channel plans max, which contains digital channels or analog channels or mixed channels. Also they can be switched among each other very easily. So it is very suitable for multi-network maintenance.

1.13 File Management

DTVLINK-C can store the results of single-frequency level test, limit test, tilt test, QAM test, channel scanning, spectrum scanning and auto test. User can manage and analyze these files via PC.

1.14 Intelligent Power Management

DTVLINK-C with full charged is able to work over 5 hours. The power supply monitoring system will monitor the status of power and ensure the instrument in power saving mode.

1.15 About the operation manual

The interface and the method of operation are based on DTVLINK-C.

NOTE: Charge the battery before first use. Refer to 5.2.

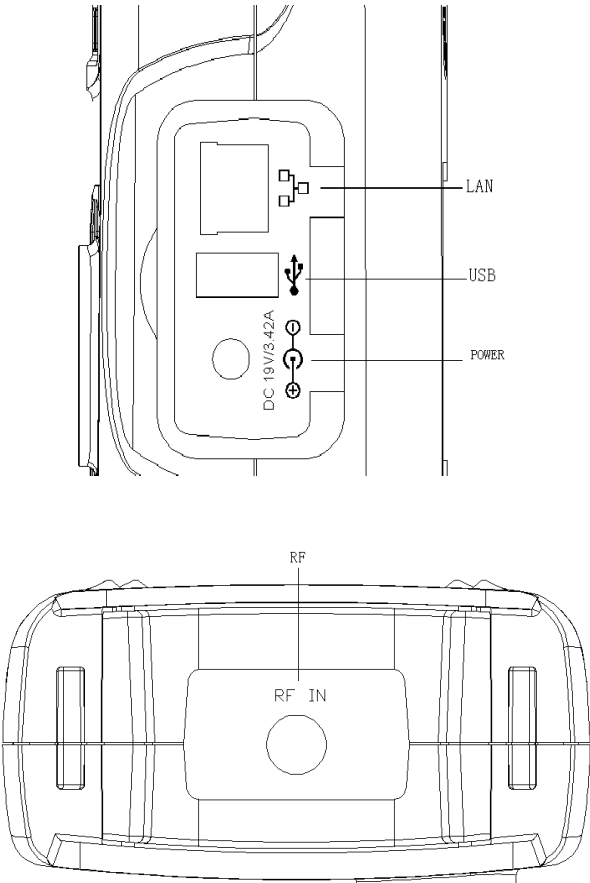
2. Introduction

2.1 Appearance

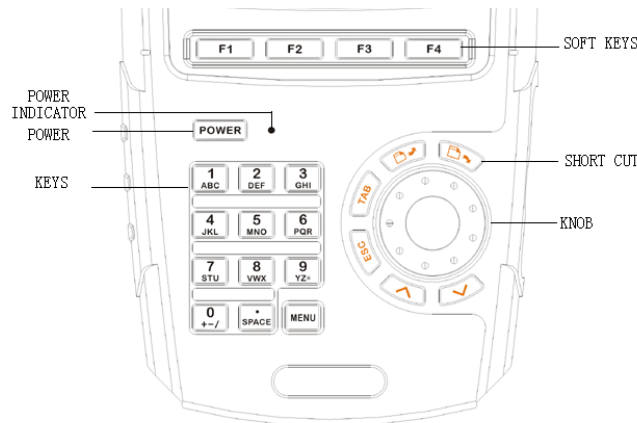
Get acquainted with the appearance before use:



2.2 Interface



2.3 Keypad



2.3.1 Soft keys



There are four soft keys (F1, F2, F3 and F4) located under the screen. They are used to access the functions represented by the icons displayed on the bottom of screen.



2.3.2 Knob




The knob has two operating mode: turn and press (equal to button). You can select functions, adjust channel etc by turning knob; confirm and enter shortcut interface by pressing it.


2.3.3 Shortcut keys

There are six keys around the knob including page down  /page up  /TAB  /ESC  /up  /down .

When you do test, you can use  and  to page up and down if there are several pages of soft keys setup.

If there are several sub-menu items after press the soft keys, you can use knob to select, or use  and  as well.

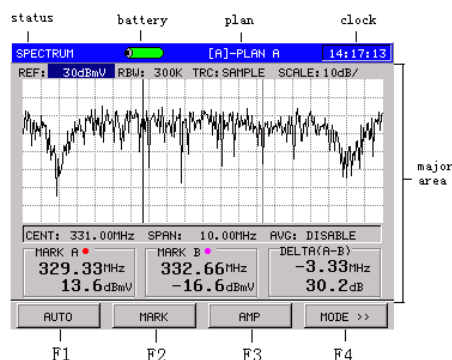
When a focus appears, and you need to change the location of cursor, you can use not only  and , but also  and knob.

If directly exit the operation from the sub-menu and do not save the changes, please press  key.

2.3.4 Character/Digit Input

Press any character/digit key circularly to enter what you want. If you input an error digit or want to re-input, turn left the knob (backspace) and re-input. When the input is finished, press knob to confirm.

2.4 Display Description



3. Using the Instrument

3.1 Learn User Channel Plan

In order to enhance your work efficiency, please create user channel plan before test. DTVLINK-C will choose all effective channels in the cable system automatically and save in this channel plan.

The User Channel Plan includes three elements as following:

- * Channel number
- * Channel format
- * Carriers frequency

The following is the step of setup user channel plan.

1. Connect the instrument with the cable system.
2. Press **MENU** return to main menu, and press **F4** into Figure3-1-1, then choose "Setup" function and press knob to enter Figure3-1-2.



Figure3-1-1

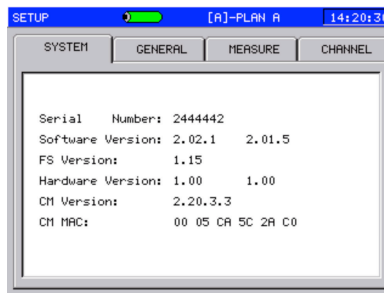


Figure3-1-2

Now press **F4** into Figure3-1-3 **CHANNEL**.



Figure3-1-3

Press the knob to enter **SELECT USER PLAN**, and pop-up interface as Figure 3-1-4.

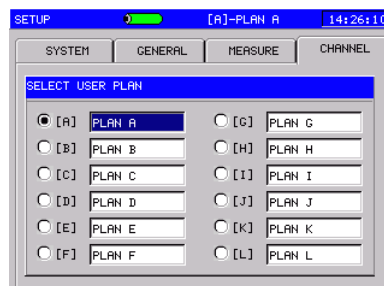





Figure3-1-4

Turn knob or press  and  to select user channel location that you want to setup(A-L). Each user channel plan can be named and twelve user channel plans can be setup max. When selected, press the knob to confirm and exit.

NOTE: If press  to exit, all setups are invalid.

- Turn knob to select **LEARN USER PLAN**, and press the knob, pop-up interface in Figure3-1-5.

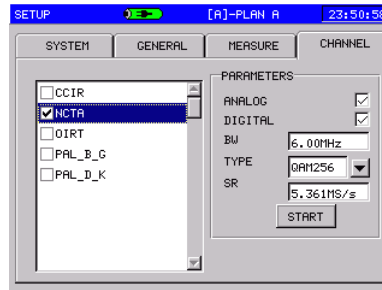






Figure3-1-5

Turn knob or  /  to select one channel type, then confirm by pressing knob.

- Press  to turn into Parameter setting, you can define the channel plan as Analogue channel plan, digital channel plan or analog/digital mixed channel plan. Also you can edit "Bandwidth, Modulation type, Symbol Rate" in digital channel plan. When your setup is finished, please press  to "START", then press knob to create your user channel plan. For a while, new user plan will be saved automatically. Refer to Figure3-1-6.

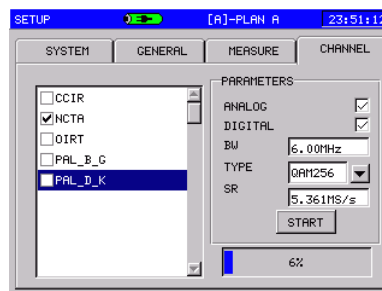


Figure3-1-6

NOTE: The analog channels with level higher than 45dB μ V and digital channel with power level higher than 32dB μ V will be enabled in standard channel plan. Only the enabled channels will display in each measurement interface. After setup your user channel plan, you can also choose or delete channels.

3.2 QAM Measurement

Press **MENU** return to main menu, press **F1** into Figure3-2-1. Turn knob to QAM icon and enter.

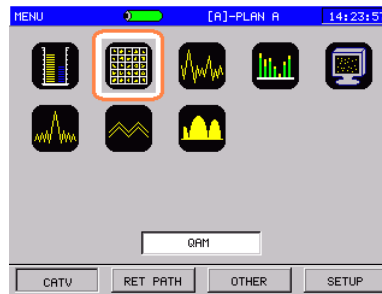


Figure3-2-1

3.2.1 Digital channel settings

Choose **SETUP** as Figure3-1-2, press **F4** into **CHANNEL**, and choose **EDIT USER PLAN** as Figure3-2-2. Here, turn knob to choose the channel, and press knob to enter editing interface of this channel, refer to Figure3-2-3. Then, change channel type to **DIGI**, and **SAVE AND EXIT**. Now the channel has been set as digital channel. And you can make QAM measurement of this channel.

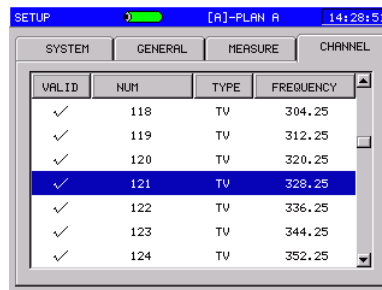


Figure3-2-2

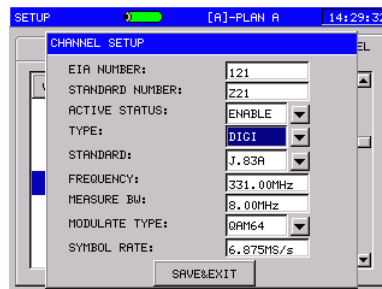


Figure3-2-3

3.2.2 Digital channel measurement

DTVLINK-C is able to measure MER, BER, constellation diagram etc. as figure 3-2-4.

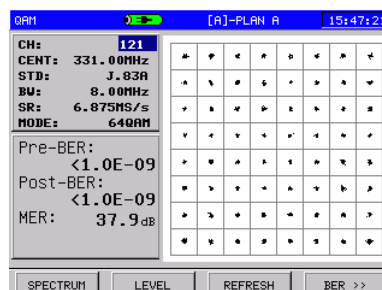


Figure3-2-4

3.2.2.1 Soft Keys Operation

Press and to turn to the first page as Figure 3-2-4, there are four soft keys as follows:

SPECTRUM(F1): Press SPECTRUM soft key to spectrum function as Figure3-2-5.

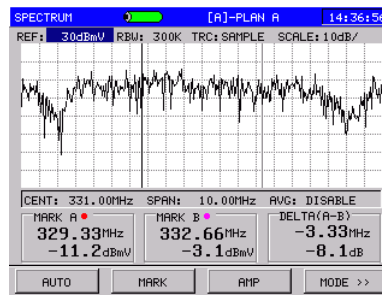


Figure3-2-5

LEVEL(F2): Press LEVEL soft key to power measurement function of this channel as Figure3-2-6.

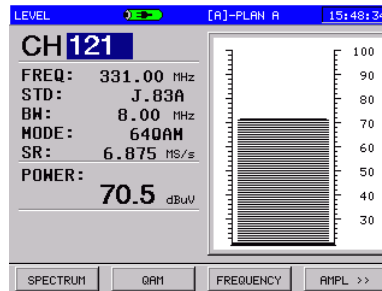


Figure3-2-6

REFRESH(F3): Press REFRESH soft key, the constellation will be initialized.

BER(F4): Press BER soft key to Statistics interface as Figure 3-2-7.

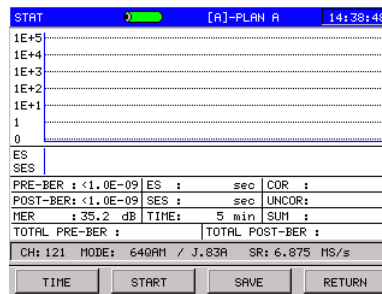


Figure3-2-7

In Figure3-2-7, press **F1** (TIME) to set the Statistical time which is from 1 minute to 1440minutes.

Press **F2** (START) to start statistical process as Figure3-2-8 and stop it by pressing **F2** again at any time.

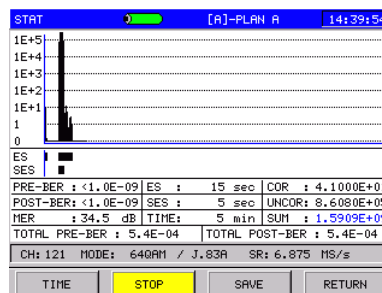


Figure3-2-8

In Figure 3-2-8, the meanings of abbreviations are as follows:



abbreviations	meaning
ES	Error seconds During 1s, there are one or more mistakes which can be corrected or not be corrected, and then ES plus1
SES	Serious error seconds, During 1s, if the result of the number of errors that can not be correct divided the total bits > 1.1E-3, SES plus1
COR	Corrected error numbers

abbreviations	meaning
UNCOR	Uncorrected error numbers
SUM	Total bits

TOTAL PRE-BER and TOTAL POST-BER are the average of all PRE-BER and POST-BER Since the beginning of the statistics.

Statistics chart is displayed on the upside of screen, green display means COR, red means UNCOR and blue means MER. Also ES and SES will be displayed real-time. Additionally, statistical result(cumulative value) displays under the chart.

In statistics chart interface, press **F3** (SAVE) to save the statistics process as a chart. Or Press **F4** (RETURN) to return to QAM measurement.

In QAM measurement interface, press  and  to turn to the second page as Figure 3-2-9, there are four soft keys as follows:

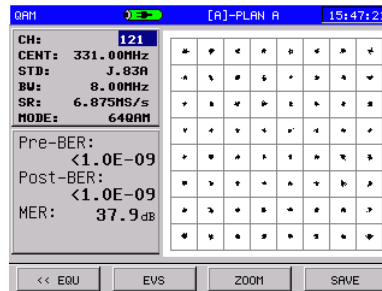


Figure3-2-9

EQU(F1): Press EQU soft key to enter Equalizer interface as Figure 3-2-10.

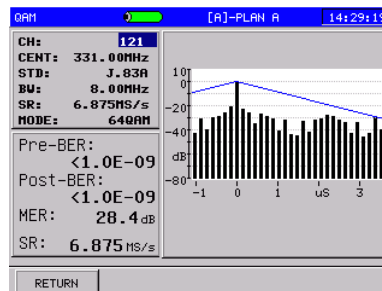


Figure3-2-10

The display on the screen is the tap coefficient of the equalizer, this feature can be used to analyze the distortion of the channel. X-axis is time, Y-axis is amplitude. Press RETURN can come back to **QAM** measurement.

EVS(F2): Press EVS soft key to enter EVS measurement interface as Figure 3-2-11.

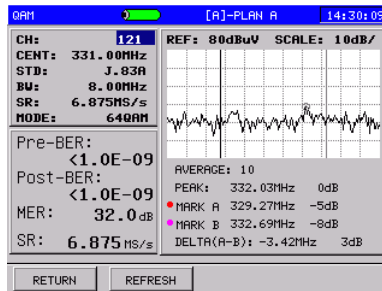






Figure3-2-11

The display of the EVS measurement is the in-band interference of the digital channel. Users can rotate the knob to switch between Mark A and B. Press REFRESH to refresh the screen display. Press RETURN to come back to **QAM** measurement.

ZOOM(F3): Press ZOOM soft key to enter zoom interface of Constellation diagram as Figure3-2-12. Turn knob or press  to choose the area, then press  to zoom in or out this area. Also you can press  or  to return Figure 3-2-9 again.

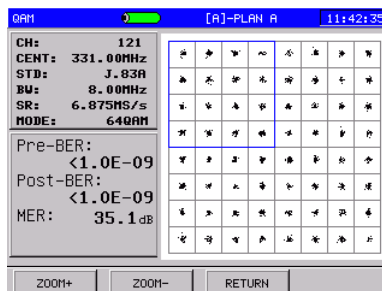





Figure3-2-12

SAVE(F4): Press SAVE soft key to save the current result of constellation. And you can save it as a file or chart.

3.2.2.2 Parameter Setting

You can modify or adjust measurement parameter. Turning the knob or pressing    can highlight the cursored parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear, prompting the user that this parameter is selected and can be modified now, as Figure 3-2-13.

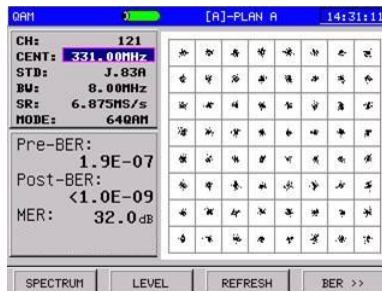



Figure3-2-13

After modified, press the knob again to confirm, the purple frame will disappeared. Press the  directly can cancel the selected status, too.

The modified parameter will be displayed as italic to remind you that it is not the same as the channel plan, and the CHANNEL No. is dashed as Figure 3-2-14.

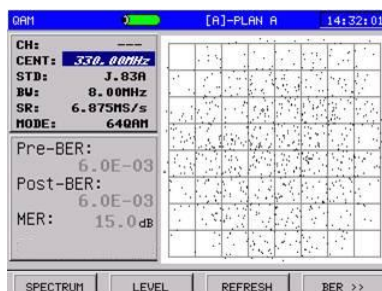


Figure3-2-14

CHANNEL: After selecting the CH parameter, you can input the channel number using the character/digit keys, or turn the knob or press to select the wanted channel num and press the knob to confirm.

CENTER FREQUENCY: After selecting the CENT parameter, you can input the frequency value using the character/digit keys, or turn the knob or press to adjust the frequency value and press the knob to confirm.

STANDARD: After selecting the STD parameter, you can turn the knob or press to select a standard from J.83A, J.83B, J.83C and J.83D and press the knob to confirm.

BANDWIDTH: After selecting the BW parameter, you can input the bandwidth value using the character/digit keys, or turn the knob or press to adjust the bandwidth value and press the knob to confirm.

SYMBOL RATE: After selecting the SR parameter, you can input the symbol rate using the character/digit keys, or turn the knob or press to adjust the symbol rate and the knob to confirm.

MODULATION TYPE: After selecting the MODE parameter, you can turn the knob or press to select a modulation type, at last press the knob to confirm.

3.3 Spectrum Scanning

Press to return to main menu interface, and press and choose spectrum icon, and then press knob to enter spectrum measurement.

DTVLINK-C's spectrum function is similar to spectrum analyzer, which supports double-marker display and peak-hold function as Figure 3-3-1. Here, you can set up span, frequency, RBW and average time freely, and press and to switch soft key pages. Additionally, turn knob to modify the cursor location.

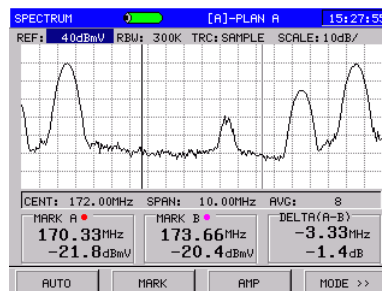


Figure 3-3-1

3.3.1 Soft Keys Operation

Press and to turn to the first page, as Figure 3-3-1, there are four soft keys as follows:

AUTO(F1): Press AUTO soft key, the instrument will select the best visual angle and reference level for you automatically.

MARK(F2): Press MARK soft key, you can select **PEAK** or **MARK->CF**, as Figure 3-3-2.

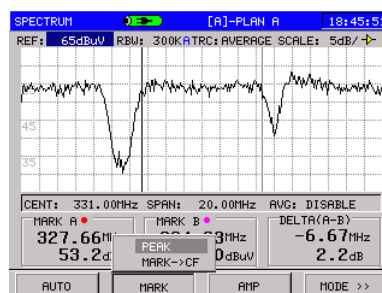


Figure 3-3-2

Choose **PEAK** and press knob to confirm. The instrument will search the peak value at this field automatically, and the current active marker will move to the peak frequency position. Please refer to 3.3.2 section to see how to set the active maker.

Choose **MARK->CF**, the current frequency of the active marker will be set as center frequency.

AMP(F3): Press AMP key, select **ON/OFF** to open or close the amplifier as Figure3-3-3. If the amplifier is open, icon will be displayed at information column above the graph as Figure3-3-4.

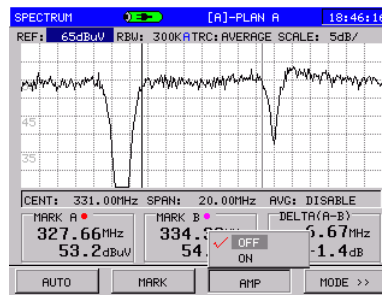


Figure 3-3-3

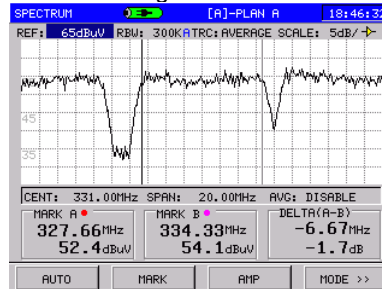


Figure 3-3-4

MODE(F4): DTVLINK-C provides two ways of frequency setup to observe spectrum: Center frequency /span and start/stop frequency. Pressing MODE soft key, you can change frequency setup mode including center frequency/span and start/stop frequency. Center frequency/span mode is shown in Figure3-3-5, start/stop frequency mode is shown in Figure 3-3-6.

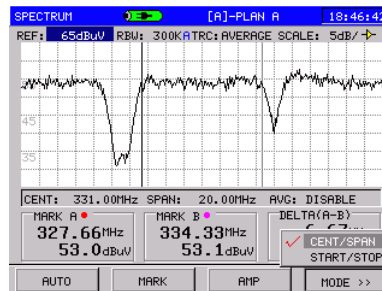


Figure 3-3-5

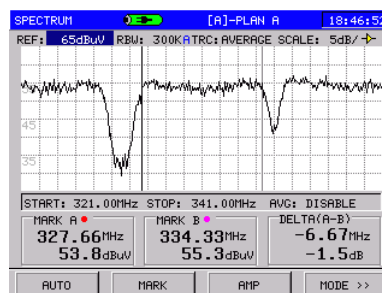




Figure 3-3-6

Press  and  to turn to the second page as Figure3-3-7, there are four soft keys as follows:

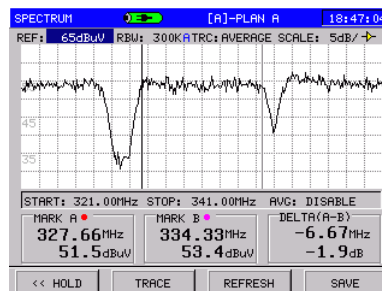



Figure 3-3-7

HOLD(F1): Press HOLD soft key, you can hold the spectrum to observe, and the scan will be stopped at current spectrum graph. Then you can press  (TRIG) to resume scanning again as Figure 3-3-8.

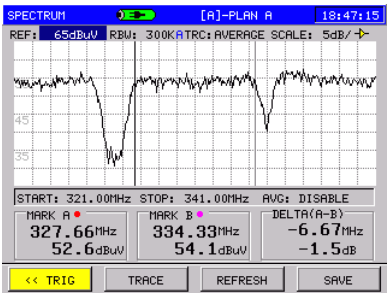


Figure 3-3-8

TRACE(F2): Pressing TRACE key, you can select **MAX** or **DISPLAY LIMIT**, as Figure 3-3-9.

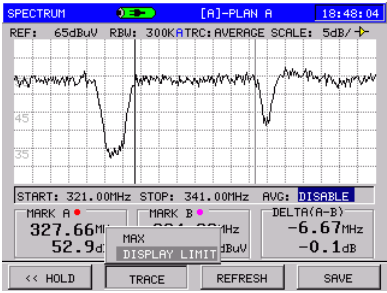


Figure 3-3-9

Turn knob to choose **MAX** and press knob to confirm, it will pop-up a submenu, you can select **ENABLE** to open peak hold function. Here, the peak graph and current graph will display on the same screen as Figure 3-3-10, and the lighter one is peak value graph.

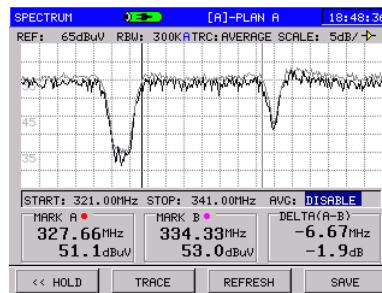


Figure 3-3-10

At Figure 3-3-9, Choose **DISPLAY LIMIT** to set up the display limit. After setup, all values less than this limit will display as the limit value. Please refer to Figure 3-3-11, the limit is set to 30dBuV.

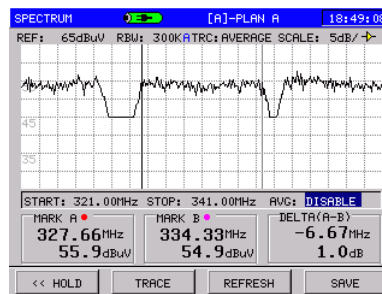


Figure 3-3-11

REFRESH(F3): Press REFRESH key to refresh the scanning data.

SAVE(F4): Press SAVE key to save current data as a file or chart.

3.3.2 Parameter Setting

You can modify or adjust measurement parameter. Turn the knob or press **TAB** can highlight the cursored parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear, prompting the user that this parameter is selected and can be modified now, as Figure 3-3-12. After modified, press the knob again to confirm, the purple frame will disappear. Press the **ESC** directly can cancel the selected status, too.

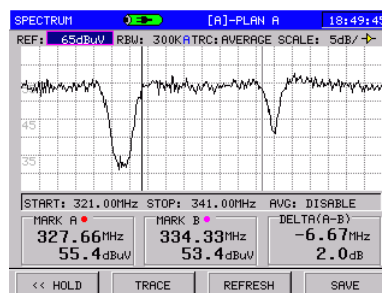






Figure 3-3-12



REFERENCE LEVEL: After selecting the REF parameter, you can input the reference level using the character/digit keys, or turn the knob or press to adjust the reference level, at last press the knob to confirm.



RBW: After selecting the RBW parameter, you can turn the knob or press to select one from 30KHz, 100KHz, 300KHz, 1MHz, 3MHz and auto, at last press the knob to confirm. When **AUTO** is enabled, DTVLINK-C will adjust RBW automatically according to current span and a blue sign "A" will display at the up of screen following the RBW value.



NOTE: The scanning speed will be different at different RBW.



TRC: After selecting the TRC parameter, you can turn the knob or press   to select from AVERAGE, SAMPLE, POS and NEG, at last press the knob to confirm.



SCALE: After selecting the SCALE parameter, you can turn the knob to choose one scale from 1dB/, 2dB/, 5dB/, 10dB/ and 20dB/, and press   to adjust the scale at step 1dB, at last press the knob to confirm.

CENTER FREQUENCY: After selecting the CENT parameter, you can input the center frequency using the character/digit keys, or turn the knob or press   to adjust the center frequency, at last press the knob to confirm. Any frequency from 4 to 1000MHz can be input. This parameter only is displayed in CENT/SPAN mode.


SPAN: After selecting the SPAN parameter, you can input the span using the character/digit keys, or turn the knob or press   to adjust the span, at last press the knob to confirm. Any span less than 996MHz can be input. This parameter only is displayed in CENT/SPAN mode.



START FREQUENCY: After selecting the START parameter, you can input the frequency using the character/digit keys, or turn the knob or press   to adjust the frequency, at last press the knob to confirm. Any frequency from 4 to 1000MHz can be input. This parameter only is displayed in START/STOP mode.

STOP FREQUENCY: After selecting the STOP parameter, you can input the frequency using the character/digit keys, or turn the knob or press   to adjust the frequency, then press the knob to confirm. Any frequency from 4 to 1000MHz can be input. This parameter only is displayed in START/STOP mode.

AVERAGE: After selecting the AVG parameter, you can turn the knob or press   to select one from DISABLE, 2, 4, 8, 16, 32, 64 and 128, then press the knob to confirm.

NOTE: The scanning speed will be different at different Average times.

MARKA: After selecting the MARKA parameter, the red marker A becomes active marker, turning the knob or pressing  can move the red marker to the wanted view point.

MARKB: After selecting the MARKB parameter, the purple marker B becomes active marker, turning the knob or pressing   can move the purple marker to the wanted view point.



NOTE: The default active marker is chose marker last time.

3.4 Level measurement

DTVLINK-C is able to measure the level of analog channel, digital channel, single-frequency channel and dual-audio channel.

Press **MENU** to return to main menu interface, and press **F1** to switch to Figure 3-2-1. Then turn knob to choose **LEVEL** measurement and press knob to enter the interface of level measurement.

3.4.1 Soft Keys Operations

Press  and  to turn to the first page, the interface is shown as Figure 3-4-1, there are four soft keys as follows:

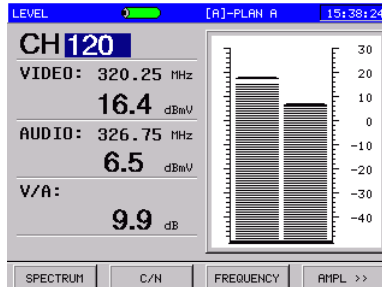


Figure 3-4-1

SPECTRUM(F1): Press SPECTRUM soft key to enter the single channel spectrum scanning interface, as Figure 3-4-2.

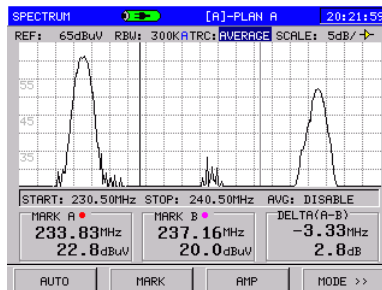


Figure 3-4-2

C/N or QAM(F2): If the current channel is analog channel, **F2** shows C/N, otherwise shows QAM. Press C/N soft key to enter the C/N measurement interface as Figure 3-4-3, press QAM soft key to enter QAM measurement interface as Figure 3-4-4.

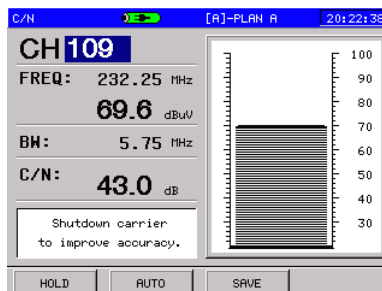


Figure 3-4-3

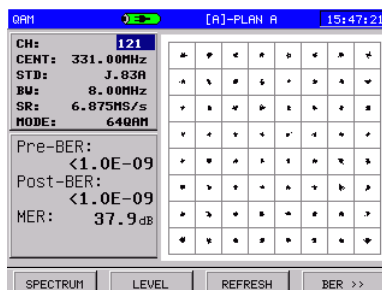


Figure 3-4-4

FREQUENCY(F3): Press FREQUENCY soft key to enter frequency measurement interface, as Figure 3-4-5.

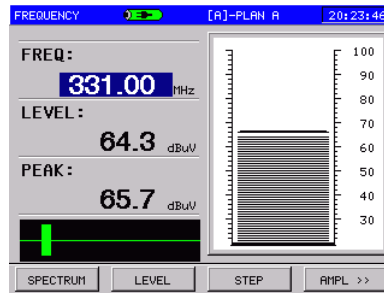


Figure 3-4-5

AMPL(F4): Press AMPL soft key and choose **REF** or **Scale** to change, Also choose **AUTO** to make the meter automatically adjust to the best state, as Figure 3-4-6.

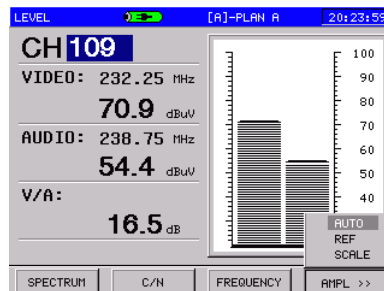


Figure 3-4-6

Press and to turn to the second page, the interface is shown as Figure 3-4-7, there is only one soft key:

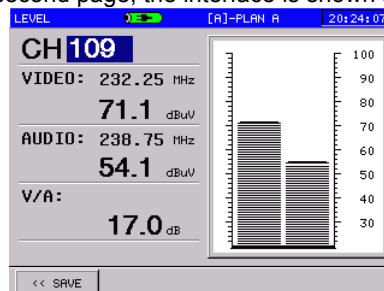


Figure 3-4-7

SAVE(F1): Press SAVE soft key to save the current measurement data in file format.

3.4.2 Parameter Setting

You can modify or adjust measurement parameter. Turning the knob or pressing can highlight the cursored parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear, prompting the user that this parameter is selected and can be modified now, as Figure 3-4-8. After modified, press the knob again to confirm and the purple frame will disappeared. Press the directly can cancel the selected status, too.

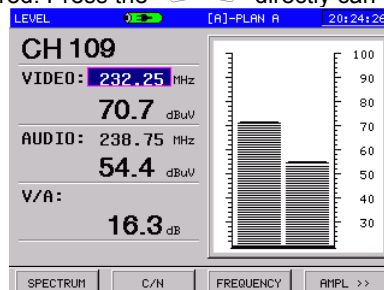


Figure 3-4-8

The modified parameter will be displayed as italic if it is not the same as the channel plan, and the CHANNEL number is dashed as Figure 3-4-9

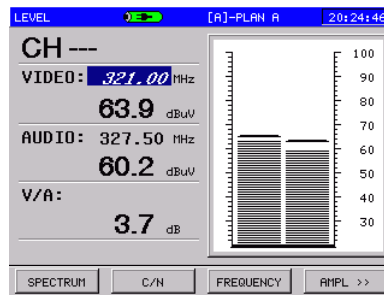


Figure 3-4-9

CHANNEL: After selecting the CH parameter, you can input the channel num using the character/digit keys, or turn the knob or press to select the wanted channel num, at last press the knob to confirm.

The modifiable parameters are different when different channel types.

1) Analog Channel Measurement

The video level, audio level and $\Delta V/A$ can be measured in analog mode. Also results will be displayed as histogram on the right of screen as Figure 3-4-10

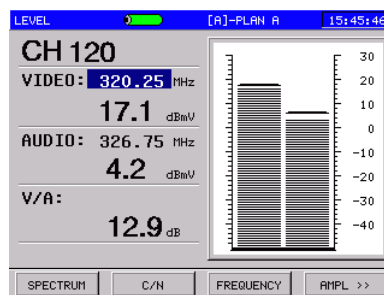


Figure 3-4-10

Two parameters video and audio can be modified.

VIDEO: After selecting the VIDEO parameter, you can input the video frequency using the character/digit keys, or turn the knob or press to adjust the frequency, at last press the knob to confirm.

AUDIO: After selecting the AUDIO parameter, you can input the audio frequency using the character/digit keys, or turn the knob or press to adjust the frequency, at last press the knob to confirm.

2) Digital Channel Measurement

The average power of digital channel can be measured in digital mode Also histogram diagram will be displayed on the right of screen as Figure 3-4-11.

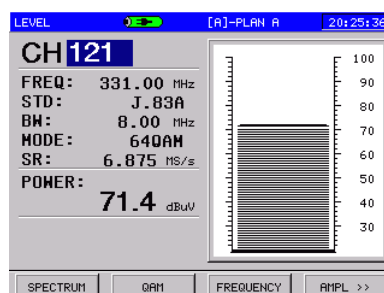






Figure 3-4-11



Parameters such as center frequency, standard, bandwidth, modulation type and symbol rate can be modified..

CENTER FREQUENCY: After selecting the FREQ parameter, you can input the center frequency using the character/digit keys, or turn the knob or press to adjust the frequency, at last press the knob to confirm.

STANDARD: After selecting the STD parameter, you can turn the knob or press to select one from J.83A, J.83B, J.83C and J.83D, at last press the knob to confirm.

BANDWIDTH: After selecting the BW parameter, you can input the bandwidth using the character/digit keys, or turn the knob or press   to adjust the bandwidth, at last press the knob to confirm.

MODULATION TYPE: After selecting the MODE parameter, you can turn the knob or press   to select one from QPSK, 16QAM, 32QAM, 64QAM, 128QAM or 256QAM.

SYMBOL RATE: After selecting the SR parameter, you can input the symbol rate using the character/digit keys, or turn the knob or press   to adjust the symbol rate, at last press the knob to confirm.

NOTE: In this mode, you can only measure the average power of digital channel. If you want to get other parameters, please refer to QAM mode.

3) Single-Frequency Channel Measurement

In this mode, you can measure the levels of any frequencies and the peak level in the frequency span, frequency difference value and level difference value between peak frequency and center frequency will be displayed as Figure 3-4-12.

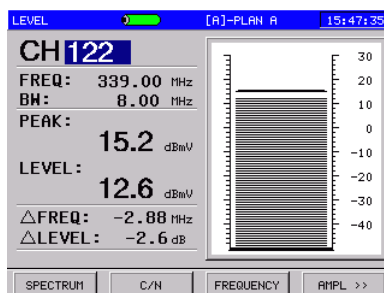






Figure 3-4-12

Two parameters such as frequency and bandwidth can be modified.

FREQUENCY: After selecting the FREQ parameter, you can input the center frequency using the character/digit keys, or turn the knob or press   to adjust the frequency, at last press the knob to confirm.

BANDWIDTH: After selecting the BW parameter, you can input the bandwidth using the character/digit keys, or turn the knob or press   to adjust the bandwidth, at last press the knob to confirm.

4) Dual-audio Channel Measurement

In order to satisfy the request of Dual-audio TV measurement, DTVLINK-C provides with 100kHz bandwidth to measure it. As Figure 3-4-13, dual-audio channel level, two audio level and $\Delta V/A$ are displayed obviously.

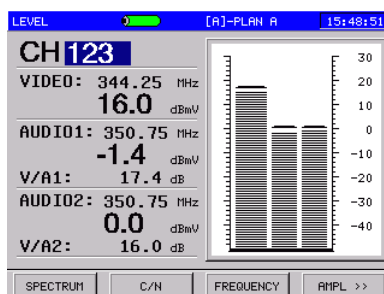








Figure 3-4-13

Parameters video, audio1 and audio2 can be modified.

VIDEO: After selecting the VIDEO parameter, you can input the video frequency using the character/digit keys, or turn the knob or press   to adjust the frequency, at last press the knob to confirm.

AUDIO1: After selecting the AUDIO1 parameter, you can input the audio1 frequency using the character/digit keys, or turn the knob or press   to adjust the frequency, at last press the knob to confirm.

AUDIO2: After selecting the AUDIO2 parameter, you can input the audio2 frequency using the character/digit keys, or turn the knob or press   to adjust the frequency, at last press the knob to confirm.

3.5 Channel Scanning

DTVLINK-C provides with channel scanning function in order to test the flatness and amplitude of cable TV system quickly.

Press **MENU** to return to main menu interface and press **F1** to enter interface as Figure 3-2-1, then choose **SCAN** icon and press knob to enter.

The scanning graph of current user plan is displayed as Figure3-5-1.

A purple triangle shows the current scanning channel.

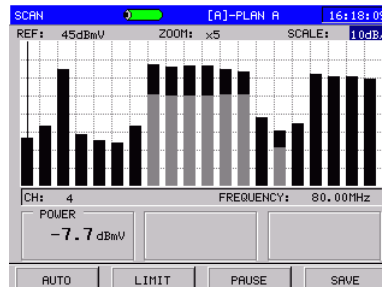


Figure 3-5-1

3.5.1 Soft Keys Operation

There is only one page soft key, as Figure 3-5-1.

AUTO(F1): Press AUTO soft key to adjust reference level and scale quickly. As a result, the meter will automatically adjust them to most optimal state.

LIMIT(F2): After Pressing LIMIT soft key and choosing **ENABLE** as Figure 3-5-2, limit display will be enable as Figure 3-5-3, and there are two lines that means the highest and lowest video level. The channels between the two lines are eligible. The information of current channel will display on the bottom of screen. (Limit parameters setup, please refer to item 4.4.4)

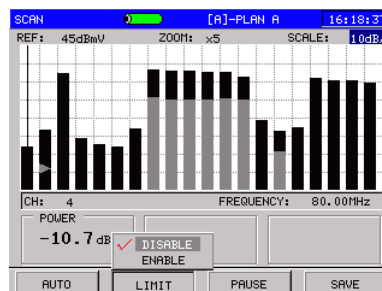


Figure 3-5-2

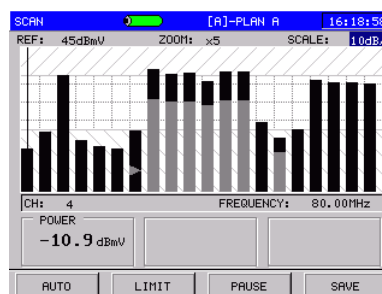


Figure 3-5-3

PAUSE(F3): If you want to freeze scan, press PAUSE soft key, then **F2** becomes SWEEP. Here, this graph will be retained till you press SWEEP soft key even if this meter doesn't connect with the cable system. Refer to Figure 3-5-4.

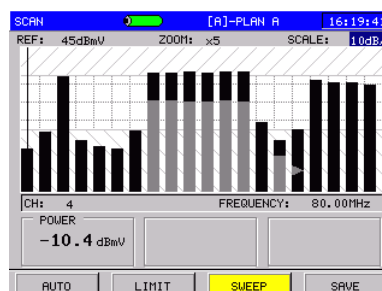






Figure 3-5-4

SAVE(F4): After pressing SAVE soft key, you can select one format to save the scan data.

3.5.2 Parameter Setting

You can modify or adjust measurement parameter. Turning the knob or pressing    can highlight the cursored parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear, prompting the user that this parameter is selected and can be modified now, as Figure 3-5-5. After modifying, press the knob again to confirm, the purple frame will disappeared. Pressing the  directly can cancel the selected status, too.

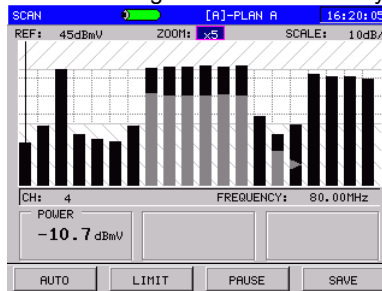








Figure 3-5-5



The meter will scan all channels of cable according to the current user plan (as figure 3-5-1 [A]). After scan, audio level and video level will be displayed with difference color in one column. Yellow is video level and green is audio level.

In this measurement function, several parameters that can be modified as follows:

REFERENCE LEVEL: After selecting the REF parameter, you can input the reference level using the character/digit keys, or turn the knob or press   to adjust it, at last press the knob to confirm.

ZOOM: After selecting the ZOOM parameter, you can turn the knob or press   to select one cursor from 5 levels, and then press the knob to confirm. The visible channel number is different with different cursor.

SCALE: After selecting the SCALE parameter, you can input the scale using the character/digit keys, or turn the knob or press   to adjust it, at last press the knob to confirm.

VIEW CHANNEL: After selecting the CH parameter, you can input the channel number using the character/digit keys, or turn the knob or press   to modify it, at last press the knob to confirm.

The marker will show the cursored channel, whose channel number, frequency and level value will be displayed under the graph as Figure 3-5-6.

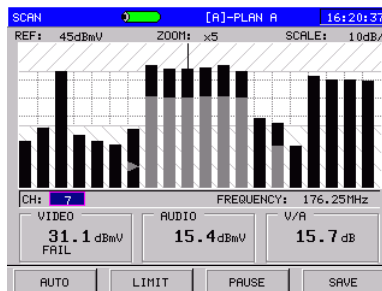


Figure 3-5-6

While the CH parameter selected, you can turn the knob or press   to move marker to the end of channel in one screen and continue move to reach aim channels to scan channels from this channel.

3.6 C/N

Press **MENU** to return to main menu interface, and press **F1** to Figure 3-2-1, then choose **C/N** icon to enter into C/N measurement interface as Figure 3-6-1. (In order to get more accuracy result, please shutdown carrier to improve accuracy.)

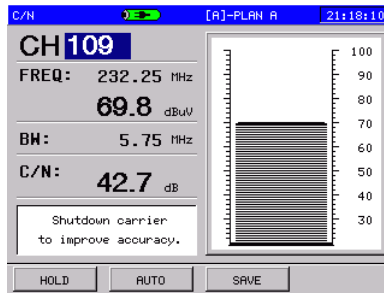


Figure 3-6-1

3.6.1 Soft Keys Operation

There is only one page soft key, as Figure 3-6-1.

HOLD(F1): Press HOLD soft key, the waveform scanning will pause, and **F1** will change into TRIG. Press TRIG will restart scanning as Figure 3-6-2.

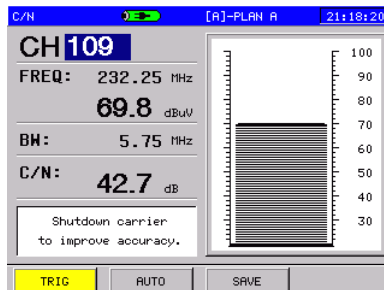


Figure 3-6-2

AUTO(F2): Press AUTO soft key, the meter will automatically adjust the reference and scale of right histogram according to current signal.

SAVE(F3): Press SAVE soft key to save current measurement data as a chart.

3.6.2 Parameter Setting

You can modify or adjust measurement parameter. Turning the knob or pressing **TAB**, **↑**, or **↓** can highlight the focus parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear, prompting the user that this parameter is selected and can be modified now, as Figure 3-6-3.

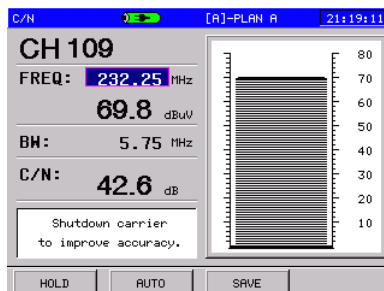


Figure 3-6-3

After modified, press the knob again to confirm, the purple frame will be disappeared. Press the **ESC** directly can cancel the selected status, too.

If the modified parameter is not the same as the channel plan, the CHANNEL parameter will be dashed as Figure 3-6-4.

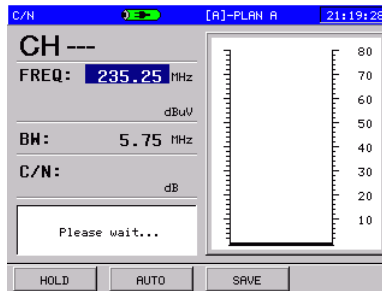


Figure 3-6-4

The modifiable parameters as follows:

CHANNEL: After selecting the CH parameter, you can input the channel number using the character/digit keys, or turn the knob or press to modify it, at last press the knob to confirm.

FREQUENCY: After selecting the FREQ parameter, you can input the frequency using the character/digit keys, or turn the knob or press to adjust it, at last press the knob to confirm.

BANDWIDTH: After selecting the BW parameter, you can input the bandwidth using the character/digit keys, or turn the knob or press to adjust the bandwidth, at last press the knob to confirm.

3.7 Single-frequency measurement

Press **MENU** to return to main menu interface, and press **F1** to Figure3-2-1, and choose **FREQUENCY** to enter into frequency measurement interface as Figure3-7-1.

You can set the frequency step, then turn knob to change the current frequency by this step. Also you can directly input any frequency to test.

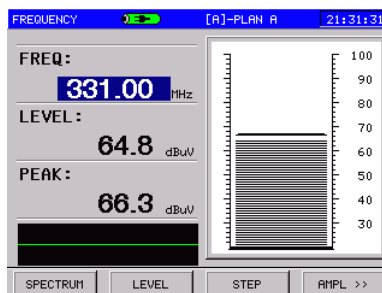


Figure 3-7-1

3.7.1 Soft Keys Operation

Press and to turn to the first page, the interface is shown as Figure3-7-1, there are four soft keys as follows:

SPECTRUM(F1): To enter into current frequency spectrum measurement, press the SPECTRUM soft key.

LEVEL(F2): To enter into current frequency level measurement, press the LEVEL soft key.

STEP(F3): To set the Frequency step, press the STEP soft key, select one step from 10kHz, 100kHz, 1MHz, 10MHz and channel, and then press the knob to confirm as Figure 3-7-2. After that, you can change the testing frequency with the new step.

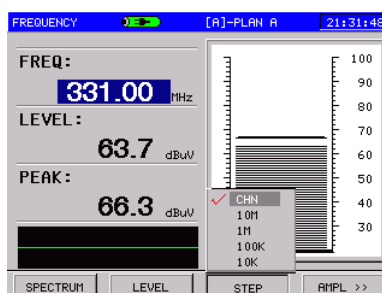


Figure 3-7-2

AMPLITUDE(F4): After pressing AMPLITUDE soft key, you can choose **REF** or **SCALE** to change current reference level and scale. As Figure 3-7-3. While popping up the input dialog, you can change the reference level and scale of histogram in the right by turning the knob or inputting directly.

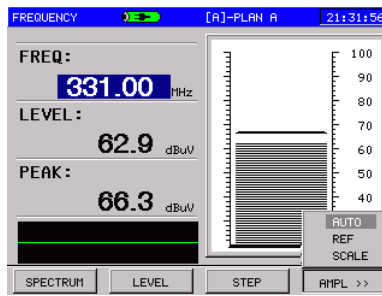


Figure 3-7-3

Also you can select AUTO to adjust them quickly, then the meter will adjust these two parameters to get optimal visual observation automatically.

Press and to turn to the second page, the interface is shown as Figure 3-7-4, the soft keys are as following.

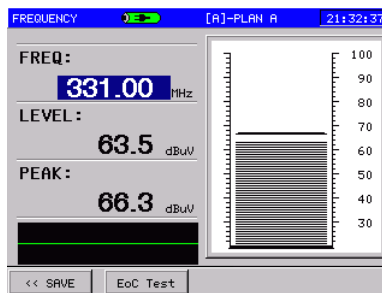


Figure 3-7-4

SAVE(F1): Press SAVE soft key to save current measurement data as a file or picture.

EoC Test(F2): Press EoC Test soft key to set up the attenuation value of EoC Test, and then ATT soft key is enabled.

ATT(F3): Press ATT soft key to input the attenuation value.

3.7.2 Parameter Setting

The Frequency parameter can be set in this measurement.

FREQUENCY: You can change the testing frequency with step by turning the knob or pressing , or inputting the frequency value directly, at last press the knob to confirm.

3.8 HUM Measurement

DTVLINK-C support HUM measurement to analog channel.

Press to return to main menu interface, and press key and choose to enter into measurement as Figure 3-8-1.

HUM modulation is also named power hum modulation distortion, which caused by low-frequency interference of the power.

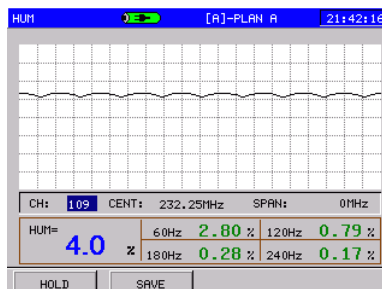


Figure 3-8-1

3.8.1 Soft Keys Operation

In the interface of HUM measurement, there are two soft keys as Figure 3-8-1.

HOLD(F1): After pressing HOLD soft key, waveform scanning will be paused, and is changed to TRIG, press it to cancel current pause, shown as Figure 3-8-2.

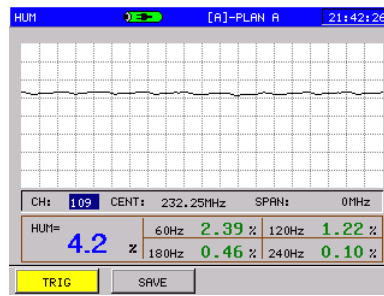


Figure 3-8-2

SAVE(F2): Press SAVE soft key to save the current measurement result as a chart.

3.8.2 Parameter Setting

You can modify or adjust measurement parameter. Turning the knob or pressing **TAB** can highlight the focused parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear, prompting the user that this parameter is selected and can be modified now, as Figure 3-8-3.

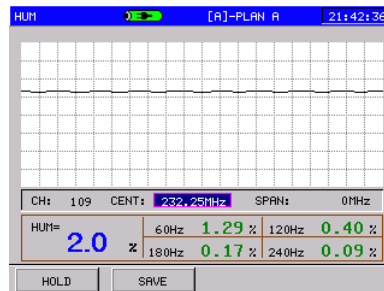


Figure3-8-3

After modified, press the knob again to confirm, the purple frame will be disappeared. Press the **ESC** directly can cancel the selected status, too.

If the modified parameter is not the same as the channel plan, and the CHANNEL parameter will be dashed as Figure 3-8-4.

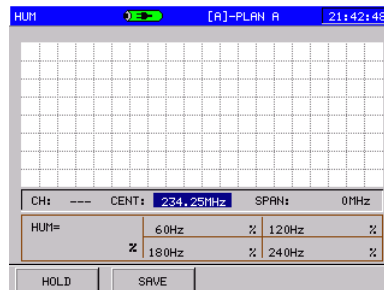


Figure3-8-4

CHANNEL: After selecting the CH parameter, you can input the channel number using the character/digit keys, or turn the knob or press to modify it, at last press the knob to confirm.

FREQUENCY: After selecting the CENT parameter, you can input the frequency value using the character/digit keys, or turn the knob or press to modify it, at last press the knob to confirm.

3.9 Modulation Depth measurement

DTVLINK-C provides modulation depth measurement of analog channel.

Press **MENU** to return to main menu interface, and press **F1** key and choose **MODULATE** icon to enter into **Modulation Depth** measurement as Figure 3-9-1.

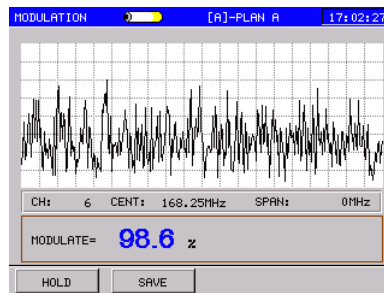


Figure 3-9-1

3.9.1 Soft Keys Operation

In the interface of MODULATE measurement, there are two soft keys as Figure 3-9-1.

HOLD(F1): After pressing HOLD soft key, waveform scanning will be paused, and **F1** is changed to TRIG, press it to cancel current pause as Figure 3-9-2.

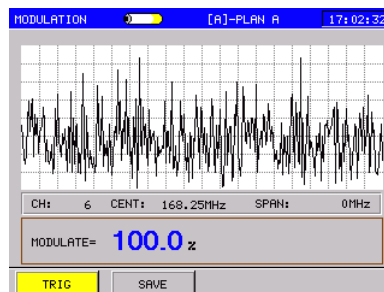


Figure 3-9-2

SAVE(F2): Press SAVE soft key to save the current measurement result as a chart.

3.9.2 Parameter Setting

You can modify or adjust measurement parameter. Turning the knob or pressing **TAB** **↑** **↓** can highlight the focused parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear, prompting the user that this parameter is selected and can be modified now, as Figure 3-9-3.

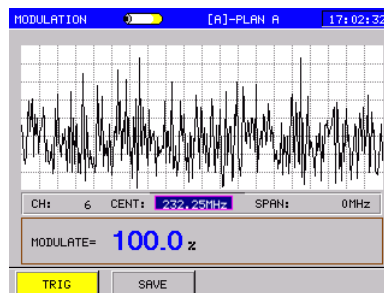


Figure3-9-3

After modified, press the knob again to confirm, the purple frame will be disappeared. Press the **ESC** directly can cancel the selected status, too.

If the modified parameter is not the same as the channel plan, and the CHANNEL parameter will be dashed as Figure 3-9-4.

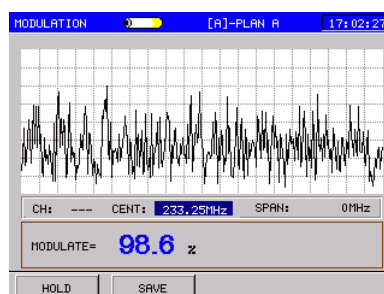


Figure3-9-4

CHANNEL: After selecting the CH parameter, you can input the channel number by using the character/digit keys, or turn the knob or press to modify it, at last press the knob to confirm.

FREQUENCY: After selecting the CENT parameter, you can input the frequency value by using the character/digit keys, or turn the knob or press to modify it, at last press the knob to confirm.

3.10 Tilt/Level List Measurement

Tilt/Level list test is the effective solution to check the flatness and splitter's gain of cable system, DTVLINK-C can get levels of 16 channels and observe the measurement result and graph easily.

Press **MENU** to return to main menu interface, and press **F3** (OTHER) and choose **TILT** icon, then press knob to enter Tilt/Level List measurement.

Please select at least four channels to do tilt test, otherwise it will pop-up one dialog box as Figure 3-10-1.



Figure 3-10-1

At Figure 3-10-1, press to choose No and return to pre-interface, press to choose Yes and select the channels that you want to do tilt test as Figure 3-10-2.

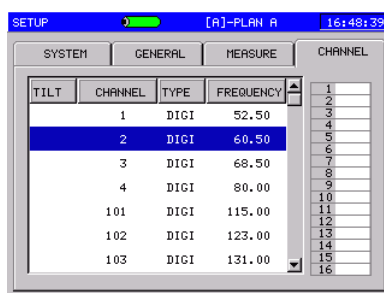


Figure3-10-2

Turn Knob or press to select the channels that you want to do tilt test, then press knob to confirm. Here, "√" means this channel is selected. If you want to cancel this selection, please press knob again and "√" will disappeared. The channel No. of all channels selected will be saved and displayed at the right column as Figure3-10-3.

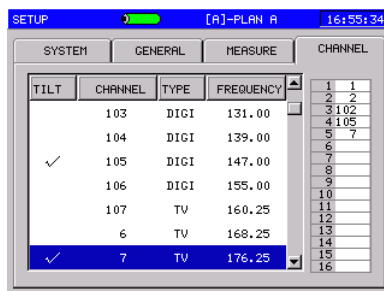


Figure 3-10-3

After select, press to exit and it will pop-up one dialog box as Figure3-10-4. Here, turn knob or press and choose Yes to exit, then you can do tilt test.

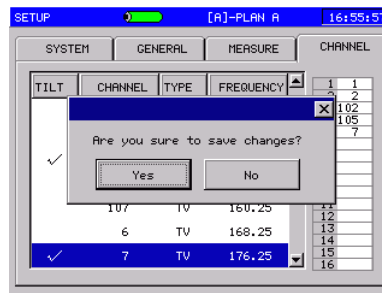


Figure 3-10-4

3.10.1 Tilt Mode

In tilt test interface, the channels will display as histogram, and test result will be displayed at the bottom of screen, please refer to Figure 3-10-5.

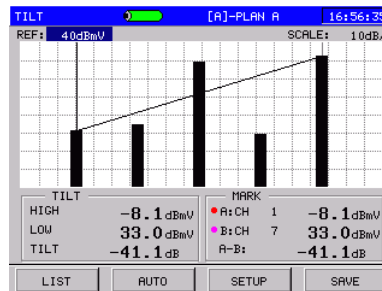


Figure 3-10-5

3.10.1.1 Soft Keys Operation

There is only one page soft key, as Figure 3-10-5.

LIST(F1): Press LIST soft key to enter level list mode, as Figure 3-10-6.

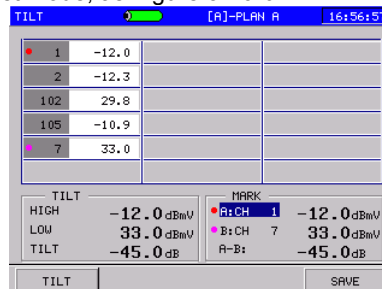




Figure 3-10-6

AUTO(F2): Press AUTO soft key the meter will automatically adjust them to most optimal state.

SETUP(F3): When testing, if you want to change the tested channels quantity, please press SETUP soft key and enter into Figure 3-10-3 to re-select.

SAVE(F4): Press SAVE soft key, you can save current data as a file or chart.

3.10.1.2 Parameter Setting

REFERENCE LEVEL: Turn the knob to select the REF parameter, then press the knob, a purple frame will appear, as Figure 3-10-7. You can input the reference level using the character/digit keys, or turn the knob or press   to adjust the reference level, press the knob to confirm.

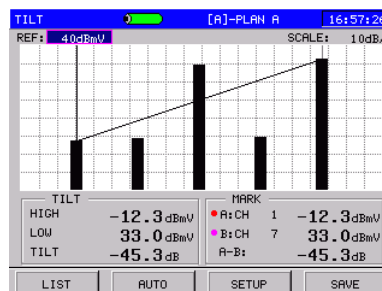




Figure 3-10-7

SCALE: Turn the knob to select the SCALE parameter, then press the knob, a purple frame will appear. You can turn the knob or press   to adjust the reference level, press the knob to confirm.

MARK: Turn the knob to select MARK A or MARK B, then press the knob, a purple frame will appear, as Figure 3-10-8. Now

turning the knob can move the active MARK to another channel. Channel No., level and difference between two frequencies marker will be displayed at the bottom of screen. This will be helpful for you to easily get two channels' details and difference.

Press knob or **ESC** to deselect MARK.

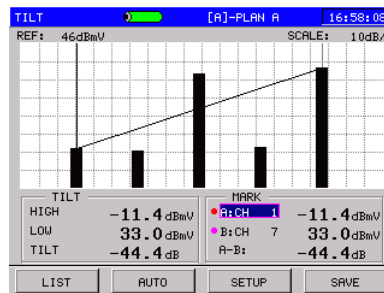


Figure 3-10-8

3.10.2 Level List Mode

Press **F1** to switch the modes between Tilt and level list. In level list mode, you can easily get level value of the channels tested, as Figure 3-10-6.

3.10.2.1 Soft Keys Operation

There are only two soft keys.

TILT(F1): Press TILT soft key to enter tilt mode, as Figure 3-10-5.

SAVE(F4): Pressing SAVE soft key, you can save current data as a file or chart.

3.10.2.2 Parameter Setting

MARK: Turn the knob to select MARK A or MARK B, then press the knob, a purple frame will appear, as Figure 3-10-9. Now turning the knob can move the active MARK to another channel. Channel No., level and difference between two frequencies marker will be displayed at the bottom of screen. This will be helpful for you to easily get two channels' details and difference.

Press knob or **ESC** to deselect MARK.

NOTE: You can not adjust reference level and scale at level list mode.

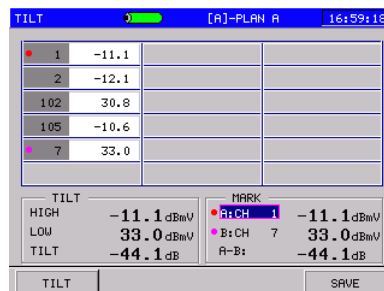


Figure 3-10-9

3.11 Limit Test

Press **MENU** to return to main menu interface, and press **F3** and choose **LIMIT** icon to Limit test as Figure 3-11-1.

In this function, you can fast test whether every channel(analog) in cable system is eligible or not eligible. And you can set up the eligible standard by yourself, also the non-eligible channels and test details will be displayed after test.

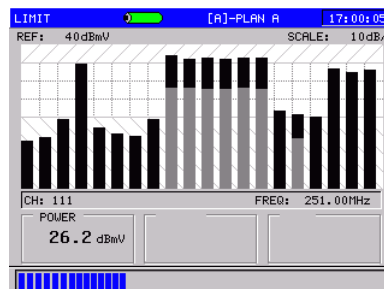


Figure 3-11-1

3.11.1 Test result List

As Figure 3-11-2, When limit test is finished, all test results will display on the screen, which includes minimum and maximum video level, VID, minimum and maximum V/A, and maximum VIDDEV.

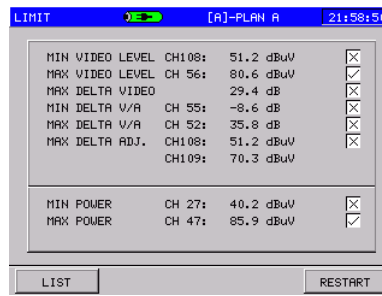


Figure 3-11-2

If you want to retest, please press **F4**; if you want to observe detailed results of each channel, please press **F1** as Figure 3-11-3. At Figure 3-11-3, press **F1** to save current results, or press **F4** to return to Figure 3-11-2 again.

CH	TYPE	VIDEO	AUDIO	P/F
101	DIGI	60.9	--	✓
102	DIGI	59.6	--	✓
103	DIGI	61.3	--	✓
104	DIGI	63.2	--	✓
105	DIGI	54.4	--	✓
106	DIGI	53.9	--	✓
107	DIGI	54.2	--	✓

FAILED SUM: 11 UNIT: dBuV

Buttons: SAVE, RETURN

Figure 3-11-3

At Figure 3-11-3, you can turn knob or press **↑** **↓** key to choose the channel that you want to observe. Then press knob to confirm and this channel's limit test result including V, A and V/A will be displayed on the screen as Figure 3-11-4 and 3-11-5. Here, press **ESC** to return to Figure 3-11-3.

CH	TYPE	VIDEO	AUDIO	P/F
108	TV	51.2	33.7	✗

MIN VIDEO LEVEL: ✓
MAX VIDEO LEVEL: ✓
MIN DELTA V/A: ✓
MAX DELTA V/A: ✗

FAILED SUM: 11 UNIT: dBuV

Buttons: SAVE, RETURN

Figure 3-11-4(Analog TV)

CH	TYPE	VIDEO	AUDIO	P/F
101	DIGI	60.9	--	✓
1		MIN POWER	✓	✓
1		MAX POWER	✓	✓
1				✓
105	DIGI	54.4	--	✓
106	DIGI	53.9	--	✓
107	DIGI	54.2	--	✓

FAILED SUM: 11 UNIT: dBuV

Buttons: SAVE, RETURN

Figure 3-11-5(Digital)

3.11.2 Limit Edit

You can edit the limit value in **LIMIT SETUP**. Please press **MENU** and choose SETUP, then press **F3** and choose **LIMIT SETUP** to enter into limit edit interface as Figure 3-11-6.

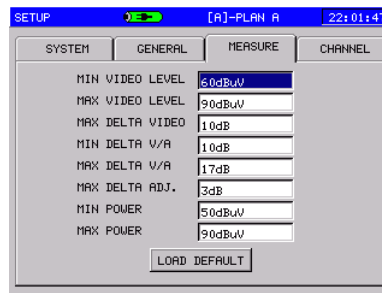


Figure 3-11-6

Please input directly to edit limit value and press **TAB** or turn knob to switch among the items, then press knob to confirm. Also you can choose default directly. After edit, please press **ESC** to return.

3.12 Measure Function

Press **MENU** to return to main menu interface, and press **F3** (Other) and choose **MEASURE** icon to enter into measure mode as Figure 3-12-1. Here, you can get battery voltage, trunk voltage and temperature inside.

3.12.1 Battery Voltage

As Figure 3-12-1, battery voltage will be displayed at the bottom of screen. When it is lower than 13V, this meter will remind that it will shut down automatically soon.

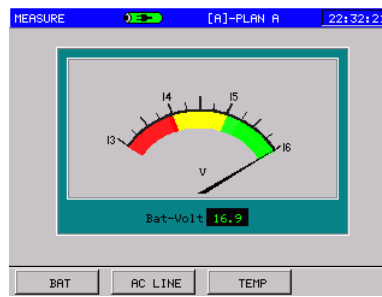


Figure 3-12-1

3.12.2 Trunk Voltage(AC LINE)

This meter will automatically judge whether it is AC or DC in the trunk, and display the trunk voltage on the underside of screen as Figure 3-12-2.

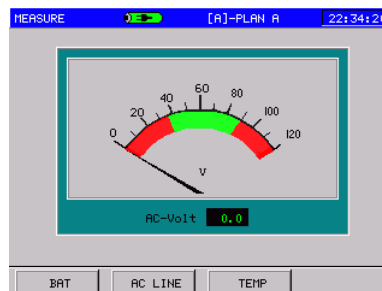


Figure 3-12-2

3.12.3 Temperature Inside

DTVLINK-C can monitor inside temperature itself, and you can press **F4** to choose the display unit: **Celsius** or **Fahrenheit**, please refer to Figure 3-12-3.

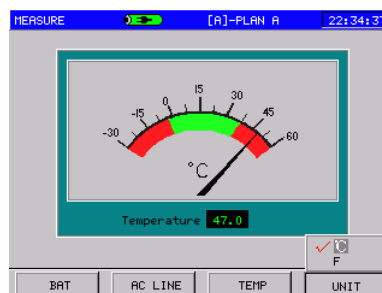


Figure3-12-3

3.13 Auto Test

Press **MENU** key to the main menu, press **F3** (OTHER) key to select the **AUTOTEST** icon and enter into Figure 3-13-1.

User can store all test items in one project and when you start this project, the appointed items will be tested in sequence and store in one file.

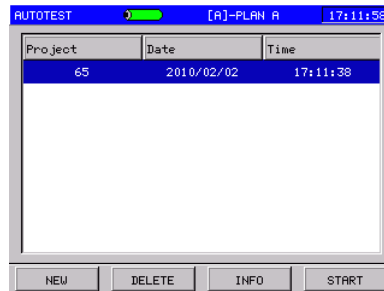


Figure 3-13-1

3.13.1 Create New Project

Press **F1** button, DTVLINK-C will guide you to build a new project step by step.

Step 1: Input Project Name

Press **F1** to create a new project as Figure 3-13-2. You can name the new project, and then you can press the knob to confirm it.

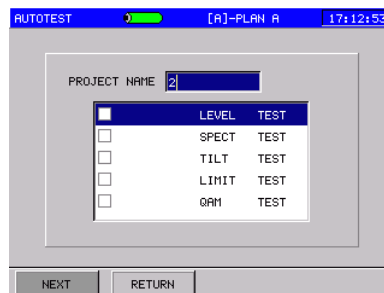


Figure 3-13-2

Step 2: Select test items

The auto test includes five items (Level test, Spectrum test, Limit test, Tilt test and QAM test). Select the test items by knob or keys, and disable or enable it by pressing knob. The "√" indicates the item has been enabled. After setting, press **F1** to continue or **F2** to return without saving.

Step 3: Setup test items

In this step, you can setup the parameters of test items to SPECT/LIMIT. As Figure 3-13-3, turn the knob or use to select test item, then press the knob. If SPECT test is selected, Figure 3-13-4 will be shown, after parameters are setting, return Figure 3-13-3 by pressing **F2** or **ESC**.



Figure 3-13-3



Figure 3-13-4

Step 4: Save Project

After all selected test items are setup, switch to Figure 3-13-3 and press **F1**, then project will be saved. Press **F2** to give up saving and return to the interface as figure 3-13-1.

NOTE: When the user channel plan is modified or re-learn, the instrument will delete the related auto test project files of the channel plan automatically.

3.13.2 AUTO Testing

As Figure 3-13-1, choose the project file, and press **F4** to start. If the channel plan of the project is not same as current channel plan, there will be pop up, as Figure 3-13-5.

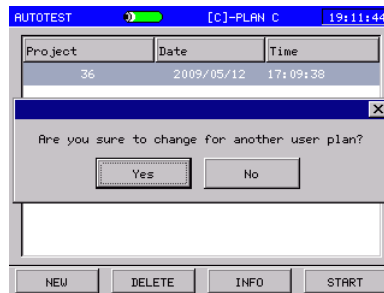


Figure 3-13-5

Press **F2** (DELETE) key may delete the project, as Figure 3-13-6.

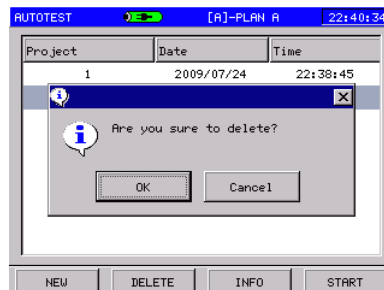


Figure 3-13-6

Press **F3** (INFO), you can observe the details of the project, as Figure 3-13-7. By repeating step 3 and step 4 in section 3.13.1, the project can be changed.

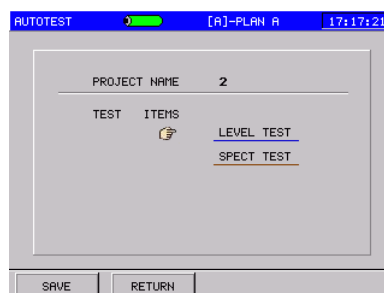


Figure 3-13-7

At the status of Figure 3-13-1, press **F4** to start the auto test, you can press **F1** to exit at any time, as Figure 3-13-8.

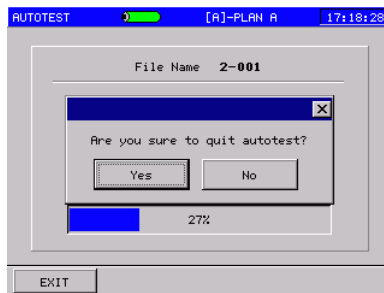


Figure 3-13-8

If the project includes several test items, test results will be saved as the same quantity and same files name , but the file types indicate the different measurement items.

3.14 File Management

Press **MENU** to return to the main menu , then press **F3** (OTHER) key, rotate the knob to select the **FILE** function, you can enter into the file management as Figure 3-14-1.

DTVLINK-C provide independent memory space to store the measurement data. The measurement data of level test, channel scan, tilt, limit test, frequency spectrum measurement and QAM can be stored in **FILE**.

3.14.1 File Directory

In main menu, all saved files was list with file names, type, date and time. Refer to Figure 3-14-1.

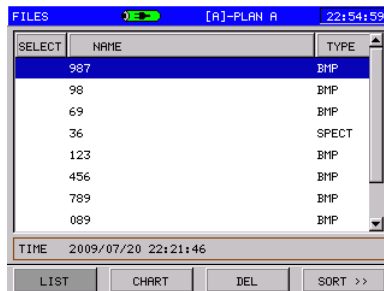


Figure 3-14-1

3.14.2 Read File

There are two kind of files, BMP file and DATA file.

BMP file can only be opened using CHART mode. After BMP file is opened, all keys are disabled except MENU and ESC, Figure 3-14-2 shows an example.

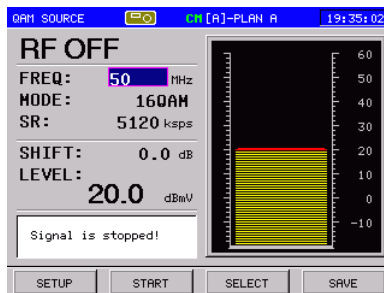


Figure 3-14-2

Normally, DATA file can be opened using LIST mode, some of them can also be opened using CHART mode.

At the status of Figure 3-14-1, press **F1** (LIST) to open a SPECT(spectrum) DATA file in LIST mode, the file data will be shown in a list, as Figure 3-14-3.

FREQUENCY	LEVEL	PEAK
669.00	-45.5	--
669.03	-47.3	--
669.07	-43.1	--
669.10	-49.7	--
669.13	-48.0	--
669.17	-46.3	--
669.20	-50.6	--

Figure 3-14-3

At the status of Figure 3-14-1, press **F2** (CHART) to open a SPECT(spectrum) DATA file in CHART mode, the file will be shown as Figure 3-14-4.

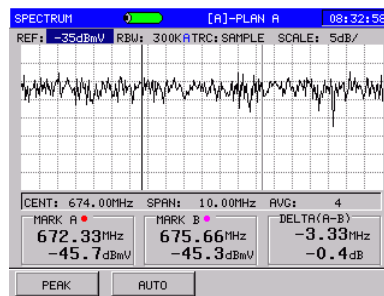


Figure 3-14-4

At the status of Figure 3-14-4, REF and SCALE can be changed, MARK A and MARK B can be moved. Return to Figure 3-14-1 by pressing **ESC**.

NOTE: As the BMP is compressed file, You maybe need to wait for a few seconds to open the same BMP file again.

3.14.3 Delete File

Select one or more files by pressing the knob, selected file(s) is marked by "✓", as Figure 3-14-5.

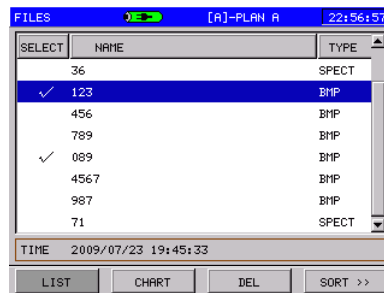


Figure 3-14-5

Press **F3** (DEL) in Figure 3-14-5, a dialog box will pop up as Figure 3-14-6, you can press the **TAB** key or turn the knob to decide whether to delete the file(s) selected.

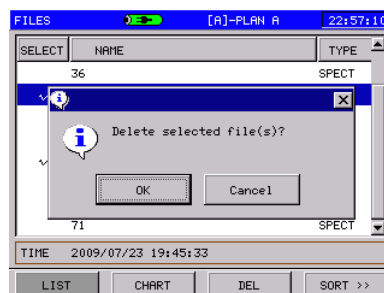


Figure 3-14-6

3.14.4 Sort File

At the status of Figure 3-14-1, press **F4** (SORT) to change the display order of the files. Ascending or descending can be selected, you can choose to sort by name, type, or date as Figure 3-14-7.

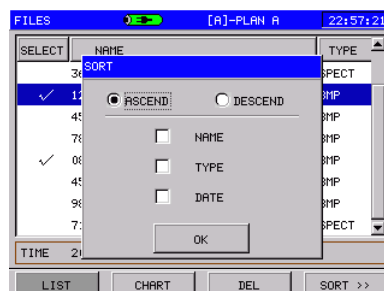


Figure 3-14-7

3.14.5 Select File

User can select file(s), then delete them or send them to another device. One file can be selected by pressing the knob, and you can select all the files at a time by pressing **F1** (ALL), as Figure 3-14-8. Deselect all by pressing **F2** (CLEAR).



Figure 3-14-8

3.14.6 Transfer File

Selected file(s) can be sent to USB device via USB interface. At the status of Figure 3-14-8, press **F3** to send the file(s), if no USB device is connected to DTVLINK-C, a dialog box will pop up as Figure 3-14-9.

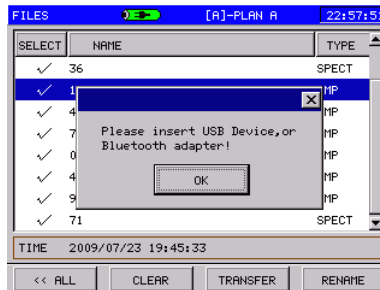


Figure 3-14-9

After USB device is connected, press **F3** and a dialog box will pop up as Figure 3-14-10. Press OK, all the files selected will be sent to the USB device or press Cancel to return to Figure 3-14-11.

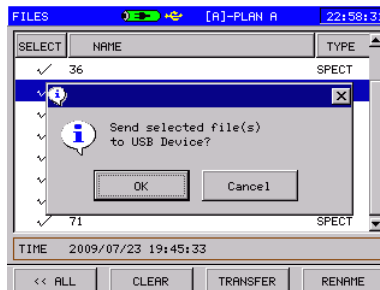


Figure 3-14-10

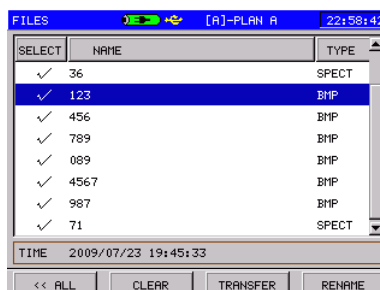


Figure 3-14-11

3.14.7 Rename the file

Rotate the knob to the operated file and press **F4** (RENAME) key to input the new file name.

3.14.8 Change User Channel Plan

When read a file, if the channel plan of saved file is different from current user channel plan, DTVLINK-C will pop up the dialog

box: Load other user plan? Press the **TAB** key to decide whether to change the current user channel plan.

3.15 Return Path and Cable Modem

Press **MENU** to return to the main interface, and then press **F2**, you can enter into the measurement interface of reverse return and cable modem, as Figure 3-15-1.



Figure 3-15-1

3.15.1 Register Cable Modem

Select **CM Register** in Figure 3-15-1, press the knob to enter into **CM Register** function interface, as Figure 3-15-2.



Figure 3-15-2

Users can modify the CM MAC address, if pop up "MAC Address Setting" dialog box. Then you can input the new address and also can select the existed address as Figure 3-15-3.



Figure 3-15-3

Here, press **F1** (CONNECT) to start the Cable Modem registration. And the real-time registration status is displayed in the right column. If succeed, the display is as Figure 3-15-4.

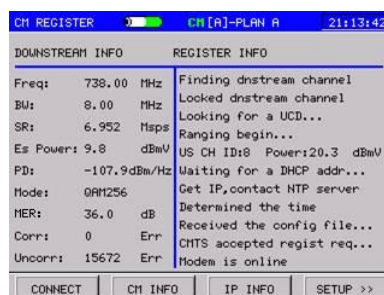


Figure 3-15-4

Press **F3** (IP INFO) in Figure 3-15-3, you can read the Cable Modem's MAC address, Cable Modem's IP address, the Local IP address, default gateway, subnet mask code, DNS and so on, as Figure 3-15-5.

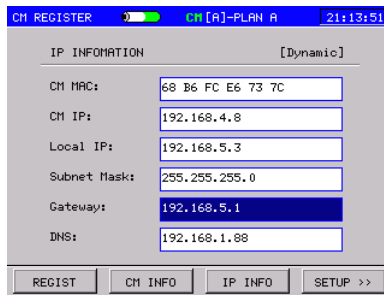


Figure 3-15-5

Press **F2** (CM INFO) in Figure 3-15-4, switch to the interface of **CM Information**.
 Docsis2.0's interface is as Figure 3-15-6.

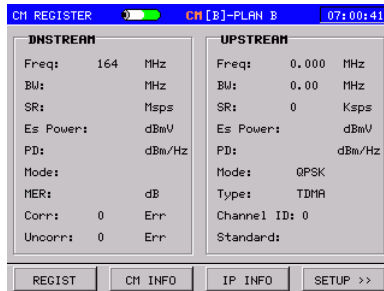


Figure 3-15-6

In Figure 3-15-6, you can view the downstream and upstream information.

Docsis3.0 8x4 Cable Modem is as Figure 3-15-7. 4x4 Cable Modem supports 4 downlink channels and 4 uplink channels and 8x4 Cable Modem supports 4 downlink channels and 4 uplink channels.



Figure 3-15-7

Please refer to the 3.15.2 about detailed operation.

Press **F4** (SETUP) in Figure 3-15-4, you can set the MAC address and downstream frequency, channel NO. which have priority in setting the registration process as Figure 3-15-8. (Only when the system is locked at setting downlink frequency, the channel NO. takes into effect. If the channel NO. is 0, the system will automatically search channel No.)



Figure 3-15-8


Press  in Figure 3-15-4 to go to Figure 3-15-9. Here, Press **F1** (Save) to save the current testing data.



Figure 3-15-9

Press **F2** key to look over the configure files.

3.15.2 Cable Modem Information

In Figure 3-15-1, enter into the **CM INFO** function by rotating and pressing knob. CM Docsis2.0, Please refer to **3.15.1**.

If DS2500 supports CM Docsis3.0, then CM Docsis3.0 8x4 Cable Modem is as Figure 3-15-10.

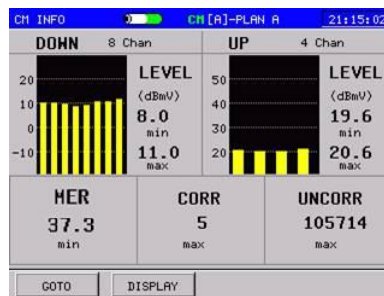


Figure 3-15-10

Press **F1** (GOTO) to CM register interface or PING interface.

Press **F2** (DISPLAY) to switch the display information: Both downstream and upstream or only downstream or only upstream. Both downstream and upstream is displayed in initial as Figure 3-15-11.

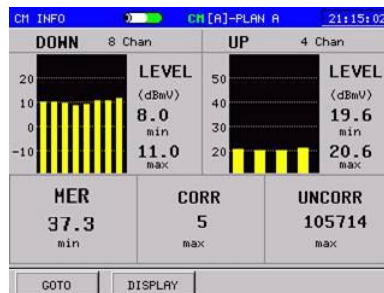


Figure 3-15-11

Select "UPSTREAM" to view all upstream channels as figure 3-15-12, Rotate marker to view each channel.

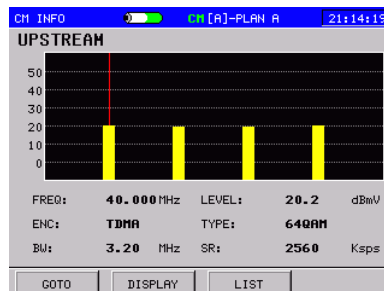


Figure 3-15-12

Press **F3** to list mode as figure 3-15-13.



Figure 3-15-13

Select "DOWNSTREAM" to view all downstream channels as figure 3-15-14, rotate marker to view each channel.

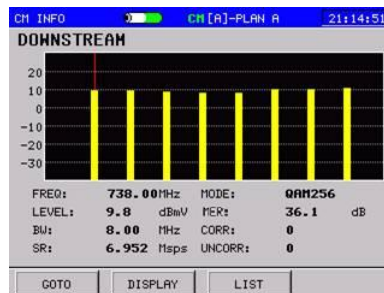


Figure 3-15-14

Press **F3** to list mode as figure 3-15-15.



Figure 3-15-15

NOTE: You can only read the complete Cable Modem INFO after completing the Cable Modem registration.

3.15.3 FTP

In Figure 3-15-1, rotate knob to select **FTP** function, press the knob to enter into the interface of **FTP** function, as Figure 3-15-16.

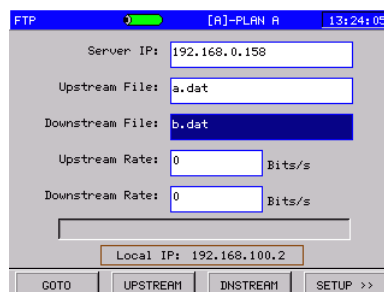



Figure 3-15-16

In **SERVER IP** column, you can input the server address you want to connect and press the knob to confirm. Choose the download file from the server in **Downstream** column. Press **F2** to upload the file to the file server, and press **F3** to download the file to DTVLINK-C. After Download or Upload is complete, the **Upstream Rate** and **Downstream Rate** column shows the corresponding transmission speed.

In Figure 3-15-16, press **F4** (SETUP) can set the user name and password for connecting with server, as Figure 3-15-17.



Figure 3-15-17

In Figure 3-15-16, press  to next page and press **F1** (Port) to set the connection port with server, as Figure 3-15-18.

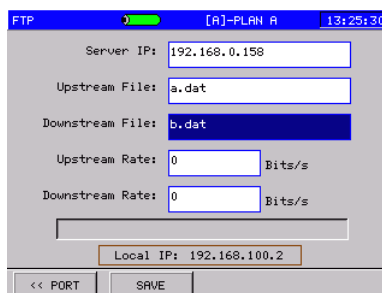


Figure 3-15-18

NOTE:

1. The test file for upload is the system default, users can not change.
2. To realize the upload function, it needs to write access to the file to open the file server need to open the right of write in .
3. The download files can be user-defined, the file name match upper/lower case.

3.15.4 QAM Source

In Figure 3-15-1, turn the knob to choose **QAM SOURCE**, press the knob to enter the interface of **QAM SOURCE**, as Figure 3-15-19.

NOTE: This function consumes more power, please turn off the function in time.

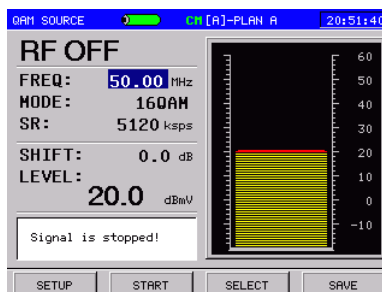


Figure 3-15-19

3.15.4.1 Soft Keys Operation

QAM SOURCE function has two modes as follows:

Non-sweep mode: In this mode, the signal source transmits only one frequency signal.

Sweep mode: In this mode, the signal source transmits frequency from start frequency to stop frequency in the step 1MHz at the setting speed.

In Non-sweep mode, there are four soft keys, as Figure 3-15-19.

SETUP(F1): Press SETUP soft key, you can set the sweep time and can open or close sweep mode.

START(F2): After pressing the START soft key, the meter start to transmit the signal, and **F2** is changed to STOP, as Figure 3-15-20, press it can stop the signal transmission.

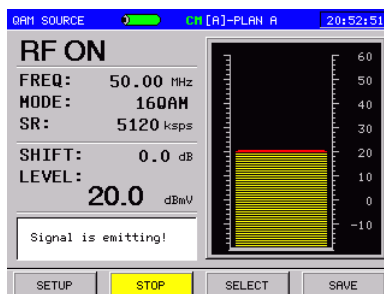


Figure 3-15-20

SELECT(F3): Press SELECT soft key, you can select one of among PROFILE 1, PROFILE 2 and PROFILE 3, and then press the knob to lead out the previous setup.

SAVE(F4): Press SAVE soft key, you can select one of among PROFILE 1, PROFILE 2 and PROFILE 3, and then press the knob to save the setup.

In sweep mode, **F3** becomes FREQUENCY, and now you can press the soft key to set up the start/stop frequencies and the frequency range.

3.15.4.2 Parameter Setting

You can modify or adjust QAM SOURCE parameter. Turning the knob or pressing **TAB**, **↑**, **↓** can highlight the focused parameter. Turn the cursor to the parameter wanted to be modified, and then press the knob, a purple frame will appear and tell that this parameter is selected and can be modified now, as Figure 3-15-21. After modify, press the knob again to confirm, the purple frame will disappear. Pressing the **ESC** directly can cancel the selected status, too.

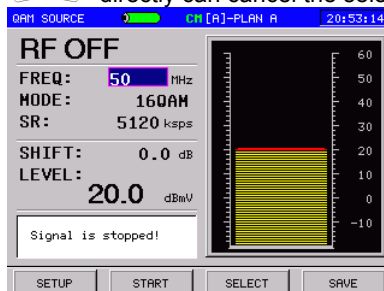


Figure 3-15-21

The modifiable parameters are listed as follows:

TRANSMISSION FREQUENCY: In Non-sweep mode, after selecting the FREQ parameter, you can set single transmission frequency, inputting the frequency value using keypad or turning the knob or pressing **↑**, **↓** to adjust the frequency, at last press the knob to confirm.

MODULATE TYPE: After selecting the MODE parameter, you can choose the modulation types from Modulation close(CW), QPSK, 8QAM, 16QAM, 32QAM and 64QAM by turning the knob or pressing **↑**, **↓**, at last press the knob to confirm.

SYMBOL RATE: After selecting the SR parameter, you can select the code rate from 160ksp/s, 320ksp/s, 640ksp/s, 1280ksp/s, 2560ksp/s and 5120ksp/s by turning the knob or pressing **↑**, **↓**, at last press the knob to confirm.

LEVEL SHIFT: After selecting the SHIFT parameter, you can input the level shift directly using keypad, or turn the knob or press **↑**, **↓** to adjust it, at last press the knob to confirm.

LEVEL AMPLITUDE: After selecting the LEVEL parameter, you can input the level amplitude directly using keypad, or turn the knob or press **↑**, **↓** to adjust it, at last press the knob to confirm.

The output amplitude of signal is according to the set of amplitude and level shift together.

NOTE: The output amplitude of signal is according to the set of amplitude and level shift together.

3.15.5 PING

In Figure 3-15-1, rotate knob to select **PING** function, press knob to enter into the interface as Figure 3-15-22.

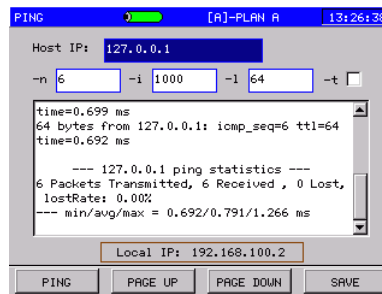


Figure 3-15-22

PING is used to check the network smooth and the connection speed. Input the tested IP address in the **SERVER IP** column, then press **F1** to start testing. During testing, **F1** will be **STOP**. The test information will be shown on the screen in real-time.

Setup instruction:

“-n”, Data package quantity of ping command.

“-i”, The time interval of data package sending, Unit is MS.

“-l”, Data package length of Ping.

“-t”, When “-t” option is selected, The meter will ping the appointed IP address continuously till press **F1** to stop.

3.15.6 WEB Browser

In Figure 3-15-1, rotate the knob to select **WEB** function, and press the knob to enter into the interface.

Press **F1** select the website to visit.

Press **F2** refresh the page.

Press **F3** to goto the next page.

Press **F4** to return to the previous page.

3.15.7 Return Path Spectrum

In Figure 3-15-1, rotate the knob to select the **Return Path** function, press the knob to enter into the interface as Figure 3-15-24.

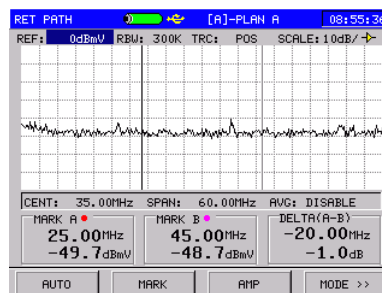



Figure 3-15-24

In the interface of the **Return Path** function, press **F4** to select the mode: Narrow, Wide. Users can setup the CENT when mode is Narrow and the default Span is 8MHz.

In Figure 3-15-24 press  to next page and press **F2** to Figure 3-15-25.

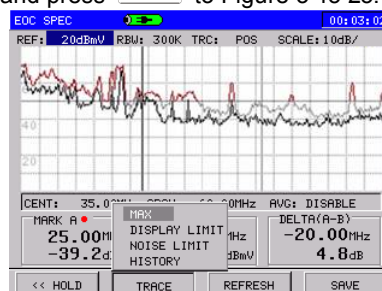


Figure 3-15-25

Turn the knob to select **Noise Limit**, and then press the knob to set up the value. The Spectrum curve which is under Noise Limit

value is yellow and the Spectrum curve which is above Noise Limit value is red.

Turn the knob to select **History**, and then press the knob to pop up a dialog box: Save, Enable and Disable. Select **Save** to save the Spectrum curve. Select **Enable** to display the previous Spectrum curve. Select **Disable** to cancel the display.

In this function, The detailed soft key instruction, please refer to section 3.3.

3.15.8 TRACEROUTE

In Figure 3-15-1, rotate the knob to select the **Traceroute** function, press the knob to enter into the interface as Figure 3-15-26.

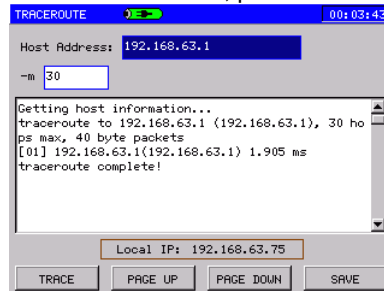


Figure 3-15-26

The function is used to check up the data Transmission condition and the Route connection between instruction and destination host. The measurement data includes: Route name(If it has), IP address and the time(ms) that arrival and return.

Input the tested IP address in the **Host Address** column, then press **F1** to start testing. During testing, **F1** will be **STOP**. The test information will be shown on the screen in real-time.

“-m”: the maximal number of equipment through Route.

Press **F4** (SAVE) to save the interface as a picture.

3.16 Memorizer Information

Press **MENU** key to return the main interface of the menu, then press **F3** (other) key to select memorizer function. The Figure is as 3-16-1.

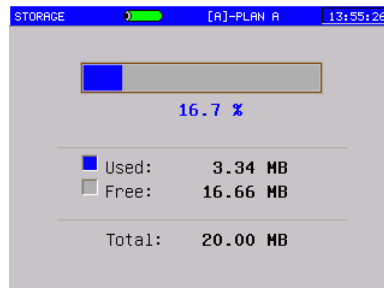


Figure 3-16-1

In this interface you can view memory usage, including used space, free space and the total capacity.

NOTE:

1. Due to the instrument itself need to use some storage space, even if the user did not save any documents, the used space is not zero.
2. Different hard version has different memory capacity.

4. Setup

4.1 Brief Introduction

Press **MENU** to return to the main interface, and then press **F4** to select **SETUP** function, you can enter into the interface of setup by rotate knob. Using four soft-keys, you can select the different setup menu, as Figure 4-1-1.

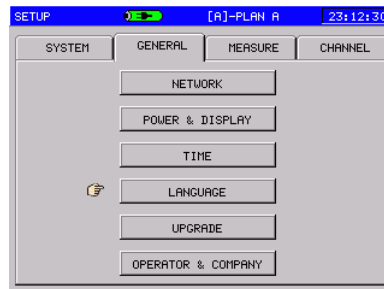


Figure 4-1-1

- * **System:** General information of the DTVLINK-C, includes manufacturer information, version and so on.
- * **General:** The setup includes network connection, power and display, time, language selection and upgrade system.
- * **Measurement:** The setup includes HUM, Level Calibrate, level unit, limit setup, load factory setup.
- * **Channel:** The setup for channel plan includes user plan selection, learn and edit user plan and tilt channel setup.

4.2 System

This is for the information of the meter, refers to Figure 4-2-1. It includes serial number, software version, hardware version and so on.

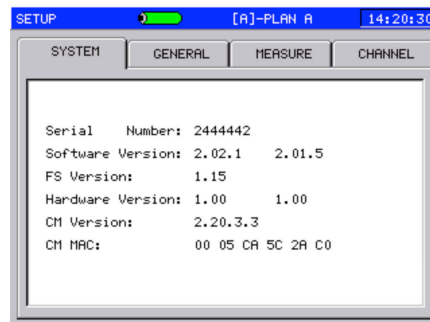


Figure 4-2-1

4.3 General

4.3.1 Network Connections

In order to meet different demand, DTVLINK-C support to set up network, as Figure 4-3-1.

Users connect the network by **RJ45** or **MODEM**. If choose **CM->RJ45**, once the Cable Modem registration is successful, users can connect the equipment (such as PC) with DTVLINK-C by LAN port to visit the network. Users can also get the Network setup parameters automatically or do setup manually. Parameters include IP address, Net mask, default gateway, DNS.

NOTE:

1. Gateway automatic get defaults close in RJ45 mode and open in MODEM mode.

3. Only DTVLINK-C with the hardware version number larger than 1.10 has CM->RJ45 option.

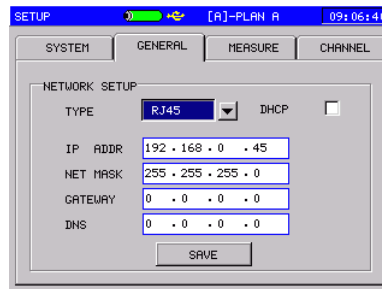


Figure 4-3-1

4.3.2 Shutdown time

To save the power, the instrument can be set to shut-off automatically for inactive keypad after 3 minutes, 5 minutes, 10 minutes, 30 minutes and ON. Refer to Figure 4-3-2.



Figure 4-3-2

4.3.3 Date and Time

When there is something wrong in system date or clock, user can calibrate new date or time, as Figure 4-3-3.

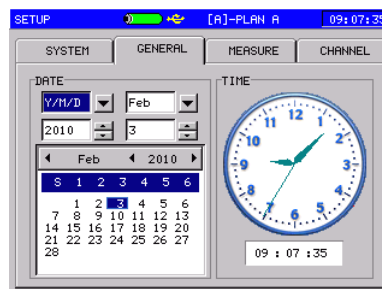


Figure 4-3-3

4.3.4 Language Selection

The language of DTVLINK-C can switch among English, Korean and Spanish as figure 4-3-4. After choose, instrument will transform menu automatically.

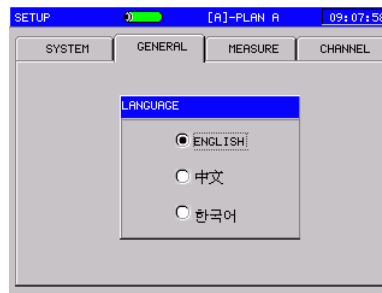


Figure 4-3-4

4.3.5 Upgrade System

DTVLINK-C can upgrade system conveniently. Connect the USB port memory equipment with upgrade file to DTVLINK-C, then select System Upgrade and press knob to start upgrading, as in Figure 4-3-5.

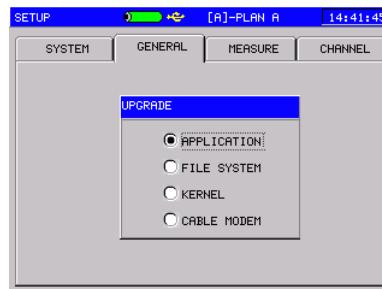


Figure 4-3-5

User can select Application, File system, Kernel and Cable Modem to upgrade. If application, press knob to Figure 4-3-6.

NOTE: Only hardware version over 1.0 support file system or kernel upgrade.

4.3.5.1 Application Upgrade

Rotate the knob to select the “APPLICATION” in Figure 4-3-5, and then press the knob to enter into Figure 4-3-6.

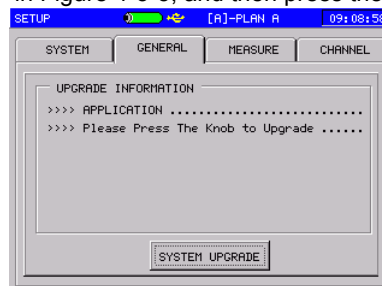


Figure 4-3-6

In Figure 4-3-6, press knob to upgrade, as Figure 4-3-7.



Figure 4-3-7

It will turn off automatically after the application upgrade is completed. Turn on again, DTVLINK-C will run the new version software (After upgrade, The time of first turn on will be longer.).

4.3.5.2 File System Upgrade

In Figure 4-3-5, rotate knob to select file system, and then press it to enter into Figure 4-3-8.



Figure 4-3-8

In Figure 4-3-8, press knob to start the file system upgrade, as Figure 4-3-9.



Figure 4-3-9

It will turn off automatically after the file system upgrade is completed. Turn on again, DTVLINK-C will run the new version software.

4.3.5.3 Kernel Upgrading

In Figure 4-3-5, rotate knob to select Kernel, then press it to enter into Figure 4-3-10.



Figure 4-3-10

In Figure 4-3-10, press knob to start the Kernel upgrade, as Figure 4-3-11.

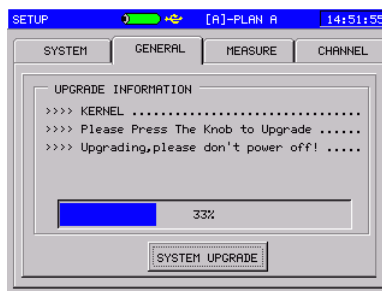


Figure 4-3-11

It will turn off automatically after the Kernel upgrade is completed. Turn on again, DTVLINK-C will run the new version software.

4.3.5.4 Cable Modem Upgrade

In Figure 4-3-5, rotate knob to select CABLE MODEM, then press it to enter into Figure 4-3-12.

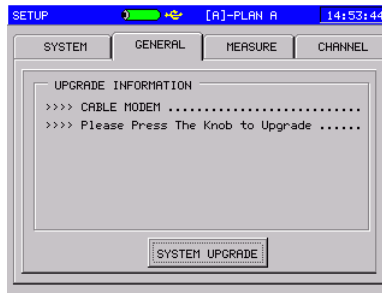


Figure 4-3-12

In Figure 4-3-12, press knob to start the CABLE MODEM upgrade. Firstly, it will analyze the file version as Figure 4-3-13.

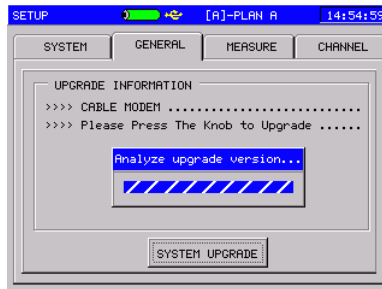


Figure 4-3-13

Here has a dialog box after analyzing the version:



Figure 4-3-14

In Figure 4-3-14, rotate knob to select "YES", then press it to start the CABLE MODEM upgrade, as Figure4-3-15.

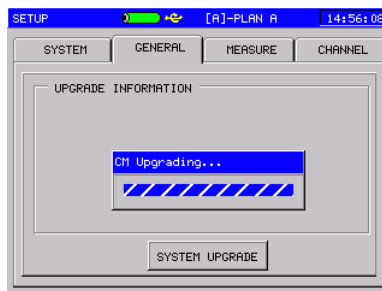
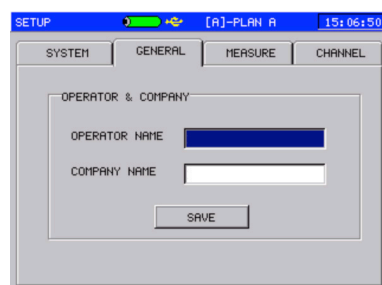


Figure4-3-15

It will return the General setting interface after the CABLE MODEM upgrade is completed.

4.3.6 Operator Setup

In this interface, you can set the operator's name and company name, as Figure 4-3-16. The test file will has these information and can be viewed in the workbench software.



4.4 Measurement Parameter Setup

4.4.1 HUM

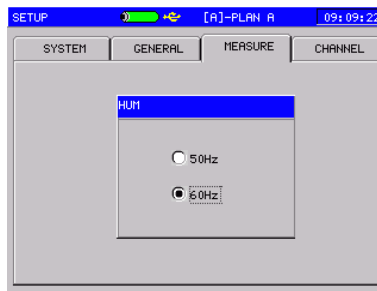


Figure 4-4-1

4.4.2 Level Calibrate

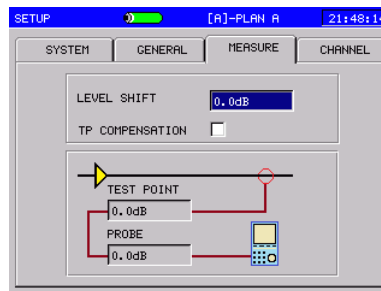


Figure 4-4-2

User can make amendment and compensation of the measure data in level, channel scan function.

4.4.3 Level Unit

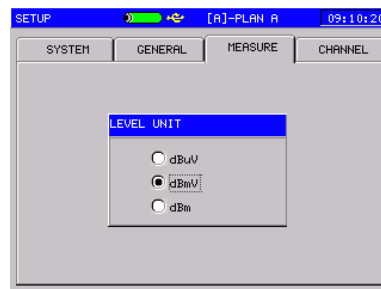


Figure 4-4-3

4.4.4 Limit Setup



Figure 4-4-4

FCC standard

Item	Limit
Minimum Video level	60dB μ V
Maximum Video level	90dB μ V
Maximum delta Video level	10 dB
Minimum Δ V/A	10dB
Maximum Δ V/A	17dB
Maximum Δ ADJ	3dB

For the digital channels, the min power is 50dBμV and the max power is 90dBμV. To set the test limit, you can choose limit item by rotating the knob or press **TAB**, and then input the value or rotate the knob to change the value, at last press knob to confirm and press **ESC** key to exit.

4.4.5 Load Factory Setup

You can use this function to recover the factory default setup, as figure 4-4-5.



Figure 4-4-5

4.5 Channel Plan

4.5.1 Select User Plan

Up to twelve user plans can be built and saved. The user plans are labeled as A-L. User can choose one as current user plan as Figure 4-5-1. Then, the meter will measure according to the selected the user plan.



Figure 4-5-1

NOTE: DTVLINK-C has twelve default user plans.

4.5.2 Channel Number Type

You can set the channel number to be displayed in digital(numeric) mode or standard (alphanumeric) mode. After the choice, the meter will show the channel number as you desired in any measurement mode. Refer to Figure 4-5-2.

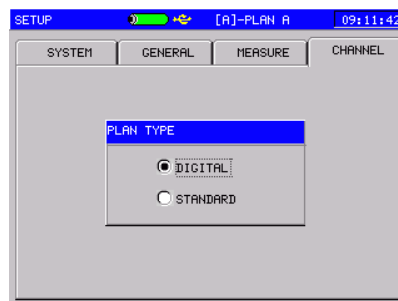


Figure 4-5-2

4.5.3 Learn User Plan

You can build and stored up to twelve user plans in meter. Before first measurement, you should build the user plan to make the meter be compatible with your cable system.

NOTE: The LEARN USER PLAN option will build the new user plan and replace the current selected user plan. If build other user plans, you can enter into SELECT USER PLAN and then make the LEARN USER PLAN operation.

Detailed operation refers to 3.1.

4.5.4 Edit User Plan

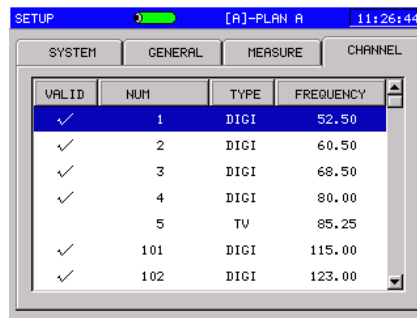


Figure 4-5-3

Enter into the **EDIT USER PLAN** by pressing knob as Figure 4-5-3, press **ESC** to exit. Rotate the knob or key to highlight one channel, and press knob to edit status as Figure 4-5-4.

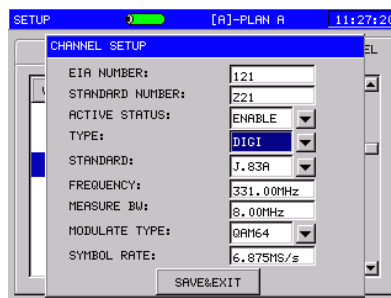


Figure 4-5-4

NOTE: Be sure to save the edit by pressing the **SAVE&EXIT**. Press **ESC** to exit, and the edit will not be saved.

4.5.5 Tilt Edit

Up to sixteen channels can be tested in TILT measurement mode. Press knob to access Tilt setup status when the cursor indicate tilt edit, or press “setup” key to access this status, as Figure 4-5-5.

Highlight the desired channel by rotating knob or pressing and buttons, and enable or disable the channel by pressing the knob. The “✓” indicator is shown to mark the enabled channel.

The DTVLINK-C will list the selected channel in sequence according to the frequency.

Press **ESC** to return to the previous menu, there will be a pop up to remind whether save your setting as Figure 4-5-6. If select YES, the set is effective, otherwise un-effective.

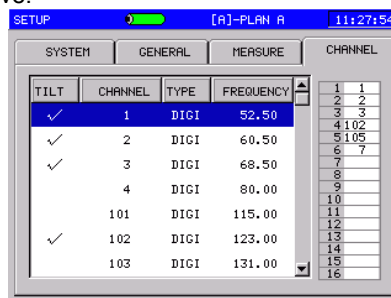


Figure 4-5-5

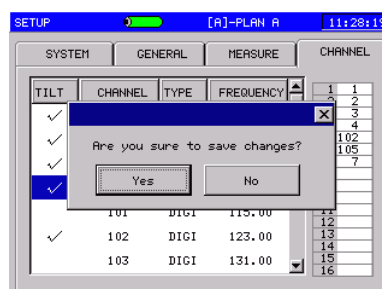


Figure 4-5-6

NOTE: Max sixteen channels can be listed.
--

4.5.6 EX/IMPORT USER PLAN

Users can export the channel user plans of DTVLINK-C into USB device, and then users can import the channel user plans to others DTVLINK-C. Users also can read the channel user plans in EXCEL format.

5. Power Supply

5.1 Battery

DTVLINK-C use built-in 14.8V 2.5AH Li-Polymer battery and work over 5 when fully charged. When the voltage of the battery drops below 13.5V, the battery icon flashes in screen. Once the voltage of the battery is lower than 13V, the instrument will shut down automatically. Please charge about 4-5 hours.

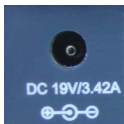
NOTE:

1. The meter can be only charged by the charger provided together with DTVLINK-C.
2. It is suggested to close the instrument when charging.
3. Low temperature may reduce the capability of the battery, but the battery will not be damaged.
4. Please replace the battery when its working hours shorten distinctly.

5.2 Charge

The instrument's charge sock and charger plug is as follows:

DTVLINK-C charge socket



Charger's plug



Please charge the instrument as following charge process:

1. Insert the charger output plug to DTVLINK-C' DC charge socket.
2. Connect the charger to AC 100V-240V Power and the charger indicator will light with red.
3. When indicator become to green, the instrument has been fully charged (It is suggested to charge another one hour after indicator change to green. This way can extend the battery life). Then you can disconnect the charger input plug with power and pull out the charger output plug.

NOTE: The instrument can not be charged in the temperature beyond 10 °C~35 °C, otherwise the battery life will be shorten.

6. Port

DTVLINK-C have network port (RJ45) which can communicate with PC. Refer to Figure 6-1-1.

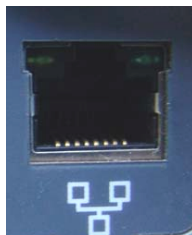


Figure 6-1-1

Use the Workbench software (Option) ,DTVLINK-C can be connect to PC by internet and User can remotely make Parameter setup, File management, Data print, Screen capture and so on.

7. Specification

	DTVLINK-C
Digital TV Measurement	
Frequency Range	5MHz~1000MHz
Frequency Resolution	10KHz
Frequency Accuracy	$\pm 10 \times 10^{-6}$
Power Level Range	30dBμV~110dBμV
Level Resolution	0.1dB
Level Accuracy	$\pm 1.5\text{dB}$ (C/N>20dB)
Input Impedance	75Ω
MER	~40dB
MER Accuracy	$\pm 2\text{dB}$
EVM	√
BER	1E-3~1E-9(Pre/Post RS)
Modulation Type	16/32/64/128/256QAM ITU-T J.83 ANNEX A/B/C
Constellation	√
BER Statistics	√
Analog TV Measurement	
Frequency Range	5MHz~1000MHz
Frequency Resolution	10KHz
Frequency Accuracy	$\pm 10 \times 10^{-6}$
Level Range	30dBμV~120dBμV
Level Resolution	0.1dB
Level Accuracy	$\pm 1.5\text{dB}$
Input Impedance	75Ω
Other functions	C/N, V/A, Tilt, Limit Test, Channel Scan/Management, Auto Test, Trunk Volt
Spectrum Analysis	
Frequency Range	5MHz~1000MHz
Frequency Resolution	100Hz
Frequency Accuracy	$\pm 10 \times 10^{-6}$
Power Level Range	10dBμV~120dBμV
Level Resolution	0.1dB
Level Accuracy	$\pm 1.5\text{dB}$
Dynamic Range	60dB
Input Impedance	75Ω
RBW	30KHz/100KHz /300KHz/1MHz /3MHz (Self-adapt)
Sweep time	300ms/field (8MHz)
Measurement Bandwidth	995MHz MAX
Return Path Noise Testing	√
Cable Modem	
Main Function	DOCSIS2.0/3.0/ EuroDOSIS CM Statistic function /Ping/Bandwidth testing/Website browser
QAM Source	
Frequency Range	5MHz~65MHz(Docsis2.0 and Docsis3.0 4×4Cable Modem);5MHz~85MHz(Docsis3.0 8×4Cable Modem);
MER	>38dB
Modulation Type	QPSK;QAM(8/16/32/64);CW(Modulation Close)
Symbol Rate	160/320/640/1280/ 2560/5120 KSym/s
Level Output	68~114dBuV
Others	
Dimension	About 247mm×130mm×67mm
Weight	About 1160g
Power Supply	14.8V 2.1AH Lithium battery(Chargeable)
Charge Time	4~5 hours
Work Time	More than 5 hours(CM Close), More than 3.5 hours(CM Open)
Port	USB、LAN
PC Software	Workbench software

