Operation Manual

DS2460Q QAM Analysis Meter

Ver： 1.02

DEVISER

Warranty

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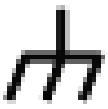
Symbols

The following are general definitions of safety symbols used on equipment and in manuals.

Dangerous voltage.

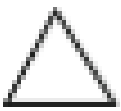
Protective ground.

 Frame or chassis ground.

Alternating current

Direct current

Alternating or direct current

 Caution! Read the manual.

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The foregoing warranty shall not apply to defects resulting from improper or inadequate use or maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product.

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1 Maintenance and Safety Considerations

1.1 Calibrating the Meter

All the instruments have analog circuitry: preamplifiers, filter, etc.-whose performance can change over time. A regular schedule of calibrations will keep your instrument in optimal condition to support you design, troubleshooting, and manufacturing work.

It is recommended to calibrate and verify the meter at least once a year to ensure that the meter meets the original designed performance and specifications.

To avoid damaging the default calibration data stored in a non-violated memory, a calibration to the meter can only be done by an authorized service center and qualified personnel with appropriate equipment.

For detailed information on the calibration procedures, please contact factory or authorized distributor.

Environmental condition: Calibration or verification

test should be performed under laboratory condition whereby the ambient temperature or relative humidity can be controlled.

Warm up: Allow up to at least 5 minutes warm-up before performing calibration to the meter. After exposure or storage in a high humidity (condensing) environment, relative recovery period is required essentially.

1.2 About Battery, Adapter and Firmware upgrade

Please charge-discharge the battery in every 3 months to extend battery life!

Warning： Danger of explosion if the battery is incorrectly replaced. Replace only with the same type battery recommended. Do NOT dispose of batteries in a fire. Do NOT place batteries in the trash. Batteries must be recycled or disposed of properly.

CAUTION: Recharge the battery only in the meter. If left unused, a fully charged battery will discharge itself over time.

Never use a damaged or worn-out adapter or battery. Charging the batteries internally, even while the analyzer is powered off, the analyzer may keep warm. To avoid overheating, always disconnect the analyzer from the AC adapter before storing the analyzer into the soft carrying case.

CAUTION: Connect the automotive adapter to the

power output connector for IT equipment, when charging the battery on your automotive.

CAUTION: Temperature extremes will affect the ability of the battery to charge. Allow the battery to cool down or warm up as necessary before use or charging. Storing a battery in extreme hot or cold temperatures will reduce the capacity and lifetime of a battery. Battery storage is recommended at a temperature of less than 25°C.

The analyzer cannot be used in the standard soft carrying case for more than 1 hours if the ambient temperature is higher than 35°C.

CAUTION: Use only the original AC-DC adapter or originally supplied battery for the power source.

Whether the meter work or power off, you can charge the battery.

1 Insert the battery in the analyzer.

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

3 The charge indicator lights, indicating that the

battery is charging. When the battery is fully charged, the green charging indicator turns off.

The charging time for a fully depleted battery, is approximately four hours.

If the meter is power on, the charging time is longer.

CAUTION: In updating process, there must be a constant power supply to for at least 10 minutes. If power fails during the updating process it can cause damage to the instrument.

Danger: DS2460 provide option VFL (Visual Fault Locator), VFL output signal (red light) has danger:
In any case, user forbidden directly use the VFL output port towards himself or other person eyes. Doing so may causethe irradiated people damageto your eyesightand even blindness!

2 General Introduction

DS2460Q is new model with color screen and high performance, which is developed for digital cable TV analysis 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).Also DS2460Qcan measure Trunk Voltage, Battery Voltage, Spectrum Analysis and channel Scanning.

DS2460Qhasmicro USB port for communicating with PC and also the PC software – TOOLBOX which can make files management and analysis. DS2460Q also has one RJ-45 port which used for network function PING.

Features:

* QAM Test
* Level Test
* Channel Scanning
* Spectrum Analysis
* Tilt
*HUM
* Voltage Measurement
* Multiple User Channel Plan Setup
* File Management
* Intelligent Power Management
* Character / Numeral Input
* Multi languages
* Optical Power Meter (Option)
* Visual Fault Location (Option)
* TDR (Option)
* 8VSB Measurement (Option)

2.1 Channel Measurement

DS2460Q supports accurate signal level test in analog TV, QAM and single frequency modes.

For Analog channels, you can get video level, audio level and ΔV/A etc.

For Digital channels, you can get Channel Power, MER and BER.

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

2.2 Constellation Diagram

For Digital channels, Constellation diagram function supports modulation modes of QAM, Here, you can get Channel Power, MER, BER and Constellation diagram.

2.3 BER Statistics

For Digital channels, you can get MER, BER, ES, SES, COR, UNCOR and etc…

2.4 Tilt/Level List

Tilt/Level list test is the effective solution to check the flatness and amplitude, and DS2460Q support 12 channels tilt max.

2.5 Channel Scanning

DS2460Q supports video and audio level display of all channels, which could up to 160 channels most. Also its zoom in/out of 5 levels and marker function make your observation easier.

2.6 Spectrum Analysis

DS2460Q has two type spectrum functions: fast spectrum analysis (5~1200MHz) and normal spectrum analysis (45-1052MHz).Two types spectrum analysis

provide several spans, and two sample modes (AVG and PEAK). In order to detect and know the interference, they have peak-hold function which shows the difference between peak spectrum and current spectrum by marker and double-marker function. The fast spectrum analysis has faster sweep speed and lower resolution.

2.7 Hum Measurement

HUM measurement function can measure 50Hz/60Hz power supply hum modulation distortion, and provide the fundamental distortion, second harmonic distortion and total distortion.

2.8 Limit Measurement

DS2460Q can fast check the cable system by the limit test function. Each enabled channel will be tested according to the limits set by user, and after the testing, pass/fail indicator can be viewed.

2.9 Return Path

The Return-Path function on DS2460Q is a fast spectrum analysis function on upstream frequency band, and with pass/fail auto diagnose.

2.10 Voltage Measurement

DS2460Q can measure battery voltage, trunk voltage and identify AC or DC automatically of the cable system.

2.11 Multiple User Channel

DS2460Q can create20 user channel plans max, which contains digital channels or analog channels or mixed channels. Also they can be switched easily. So it is very suitable for multi-network maintenance.

2.12 File Management

DS2460Q can store the results of channel level test, QAM test, tilt test, channel scanning, spectrum

scanning and HUM test for analog TV channel. User can manage and analyze these files via meter or PC.

2.13 Intelligent Power Management

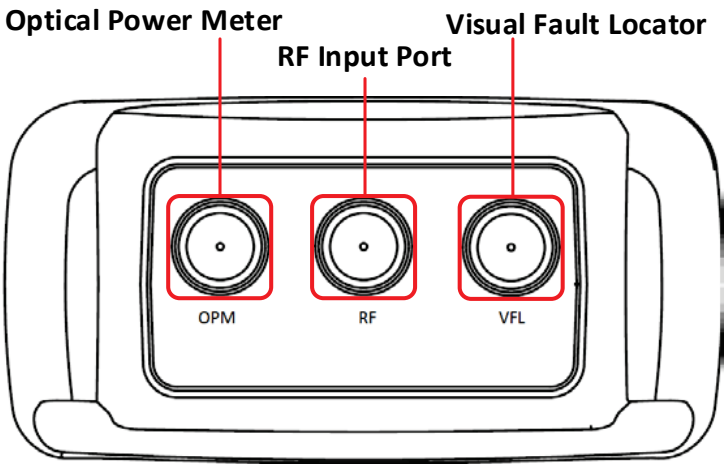
DS2460Q with full charged is able to work over5 hours. The power supply monitoring system will monitor the status of power and ensure the instrument in power saving mode.

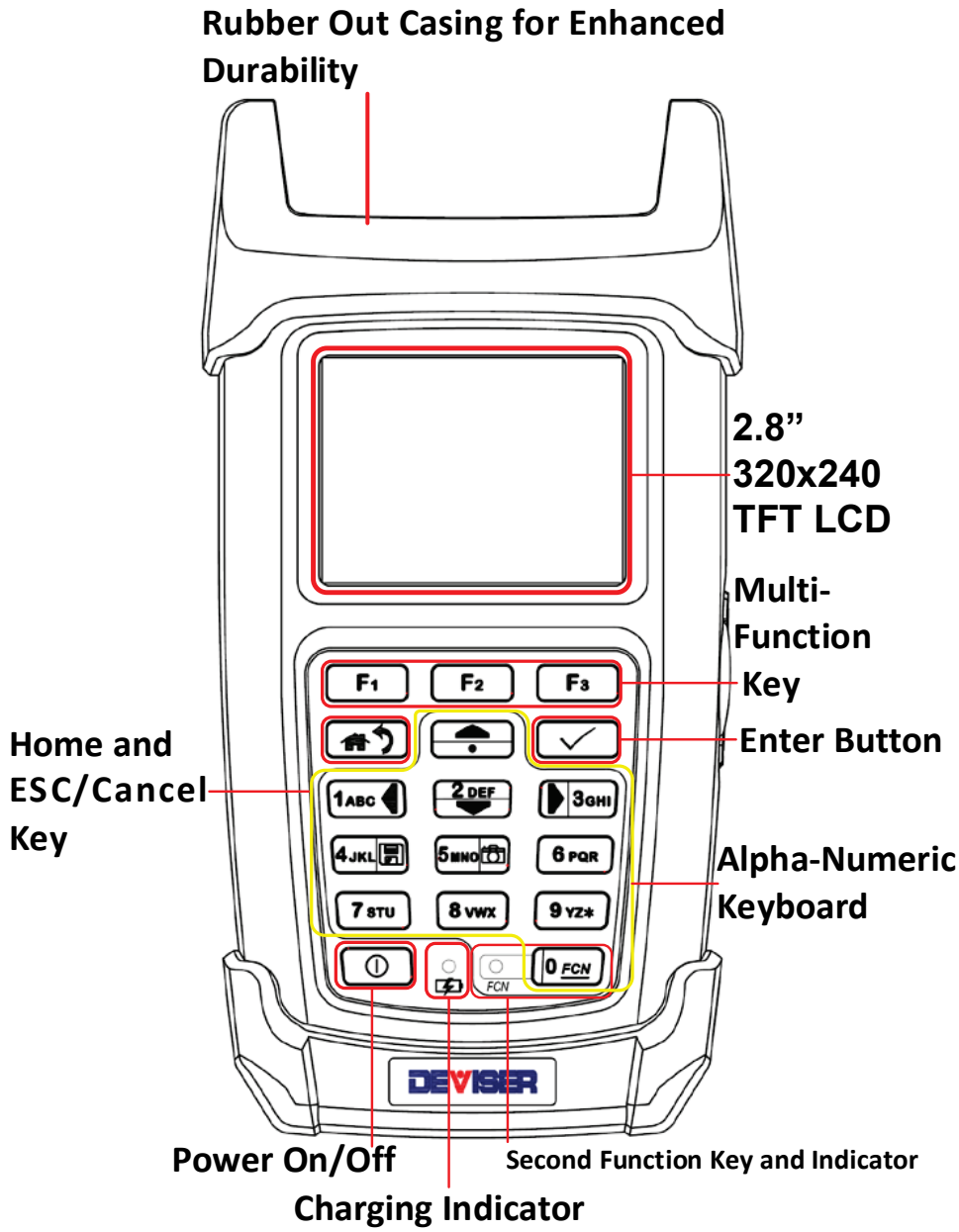
NOTE: Charge the battery before first use. Refer to 6.2.

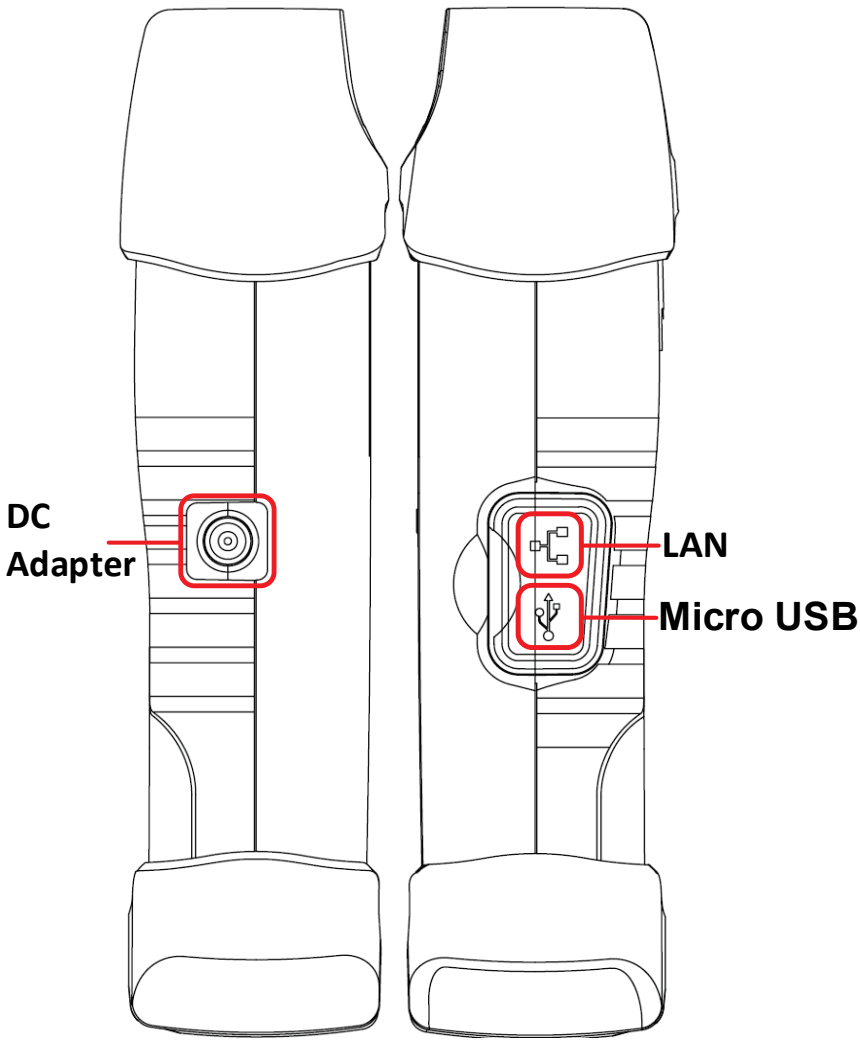
3 Introduction

3.1 Appearance

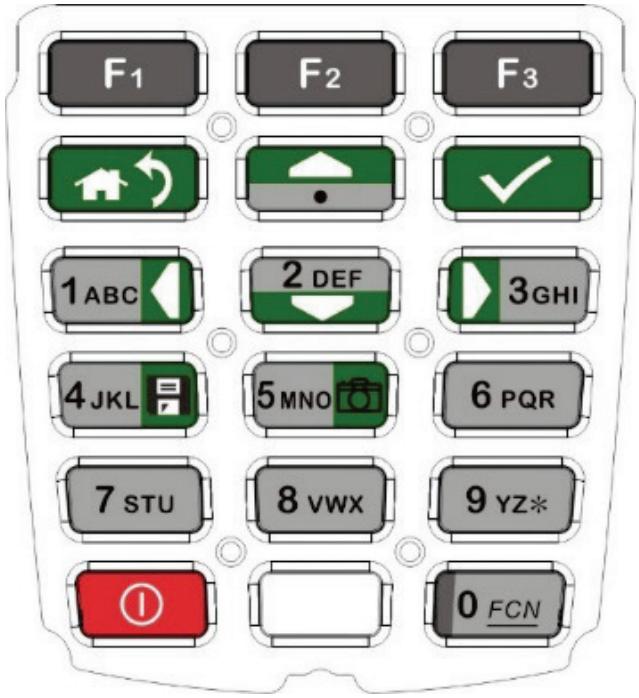
Get acquainted with the appearance before use：




Rubber Out Casing for Enhanced Durability
2.8”
320x240
TFT LCD
Multi-
Function
Key
Enter Button
Home and
ESC/Cancel
Key
Alpha-Numeric
Keyboard
F1
F2
F3
1ABC
2DEF
3GHI
4JKL
5MNO
6PQR
7STU
8VWX
9YZ*
0FCN
FCN
DEVISER
Power On/Off
Charging Indicator
Second Function Key and Indicator


DC
Adapter
LAN
Micro USB

3.2 Keypad



3.2.1 Soft keys

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

3.2.2 Shortcut keys

There are nine keys bellow the three soft keys including: , , , 1ABC , 2DFE , 3GHI , 4JKL , 5MNO , 0FCN .

Return to previous menu or home page.

Enter or confirm button.

, 1ABC , 2DFE , 3GHI The normal function is arrow key, in FCN mode (second function) these four keys are used to input the alphabets, numbers and symbols.

4JKL Save file or explore saved files. In FCN mode is used to input the alphabets, numbers and symbols.

5MNO Capture the screen snapshot. In FCN mode is

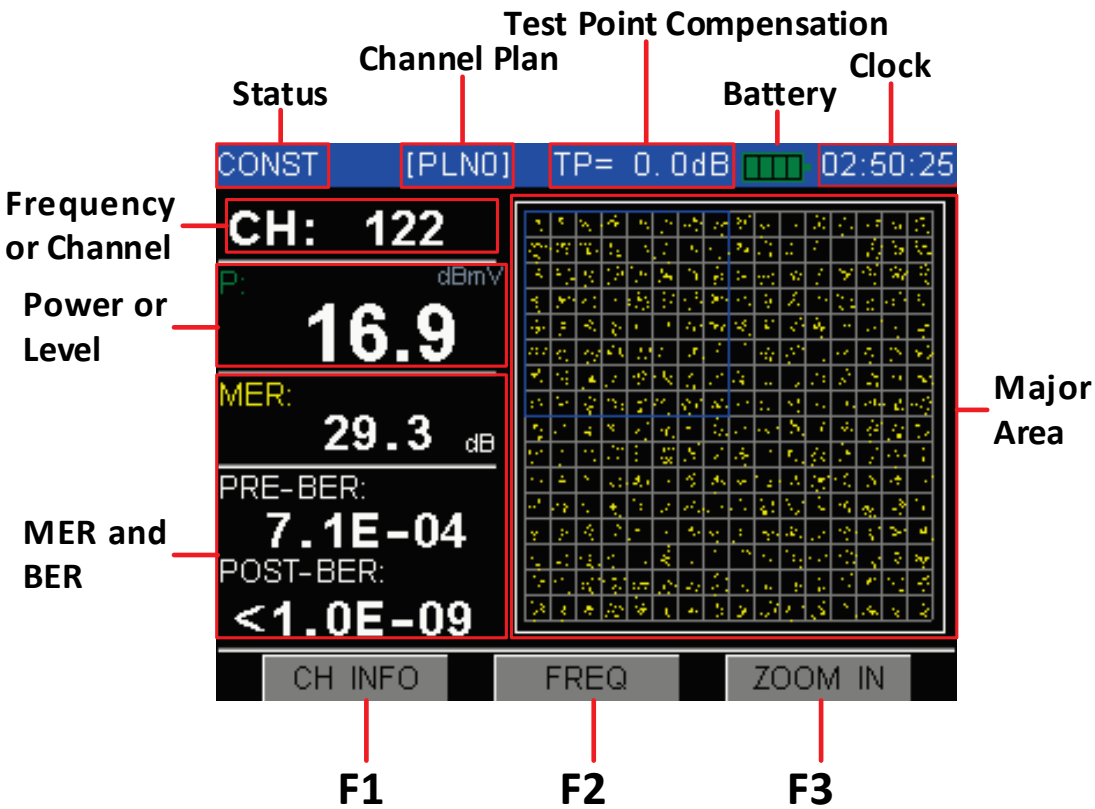
used to input the alphabets, numbers and symbols.

0FCN Open the FCN function, In FCN mode is used to input the letters, numbers and symbols.

3.2.3 Alphabet/Number Input

If you want to input alphabet/number, first step press the key 0FCN, you can find the second function indicator lights beside the 0FCN key. At the same time, the three soft button F1, F2 and F3 from the different function switch to F1: ENTER, F2 : BACK and F3 : ESC. Press any alphabet/number key multi times circularly to input number, capital letter or lowercase. After you complete input operation, the second function indicator is off.

3.3 Display Description



4 Using the Instrument

4.1 Function Menu Display

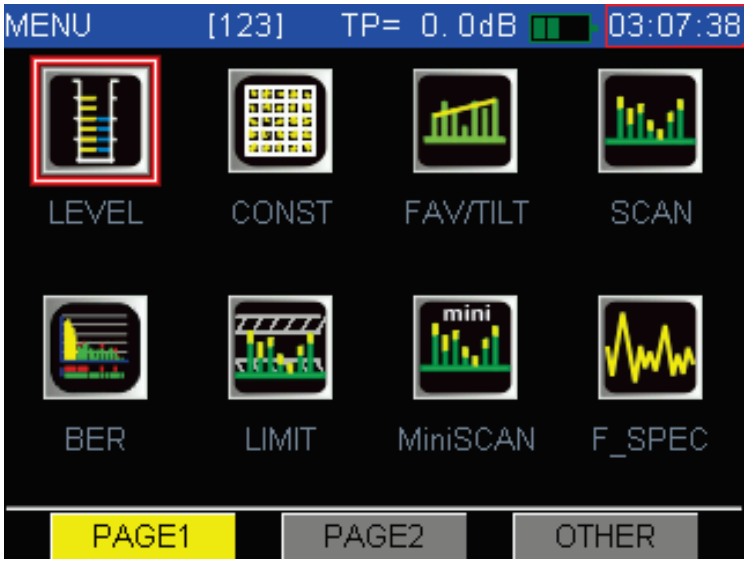


Figure 4-1

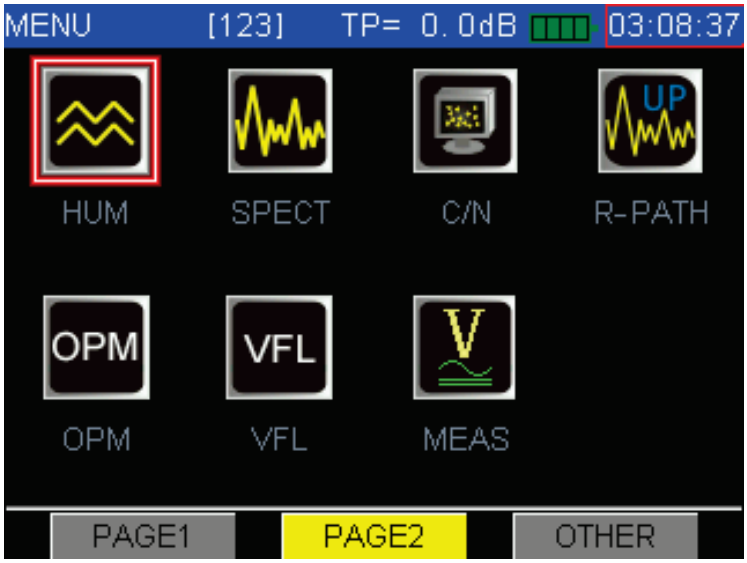


Figure 4-2

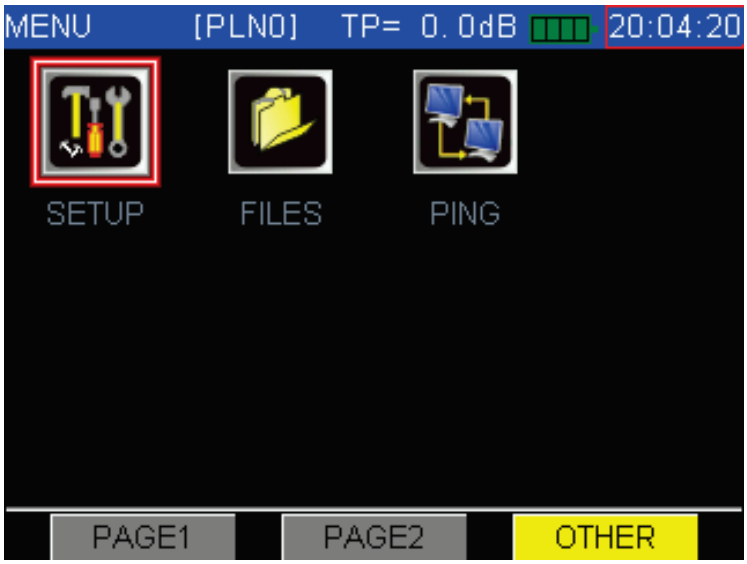


Figure 4-3

The Figure 4-1**,** Figure 4-2 and Figure 4-3 Display the Main Menu which include all of the function icons,

Soft Keys:

F1 Open the page 1

F2 Open the page 2

F3 Open the page 3

4.2 Learn User Channel Plan

In order to enhance your work efficiency, please create user channel plan before measurement. DS2460Q will choose all effective channels in the cable system automatically and save in this channel plan.

The User Channel Plan includes four elements as follows:

* Channel number
* Channel TYPE (TV, DIGI)
*Carriers frequency (video carrier and digital channel center frequency)
* The channel valid or invalid

The following is the step of setup user channel plan.

1. Connect the instrument with the cable system.
2. Press return to main menu, press F3 open the other screen, and select the Setup shortcut likeFigure 4-4, then press into Setup Menu.

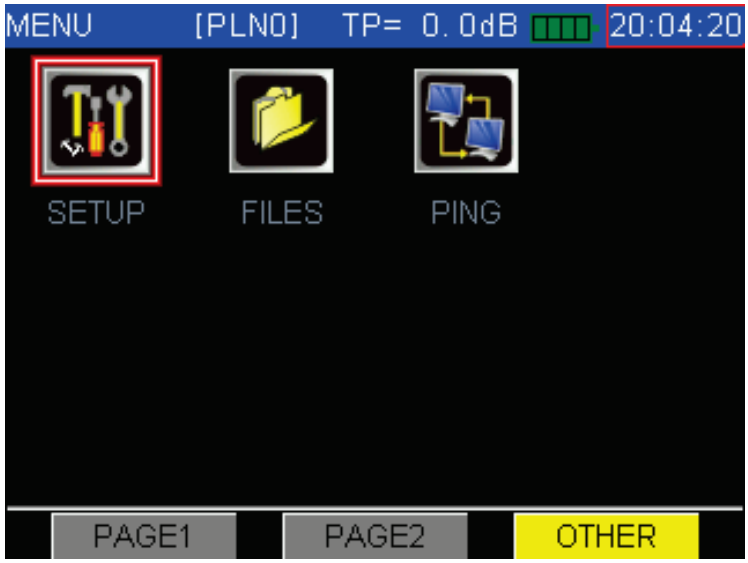


Figure 4-4

Then press the or

select the CHANNEL PLAN item, as Figure 4-5 show.

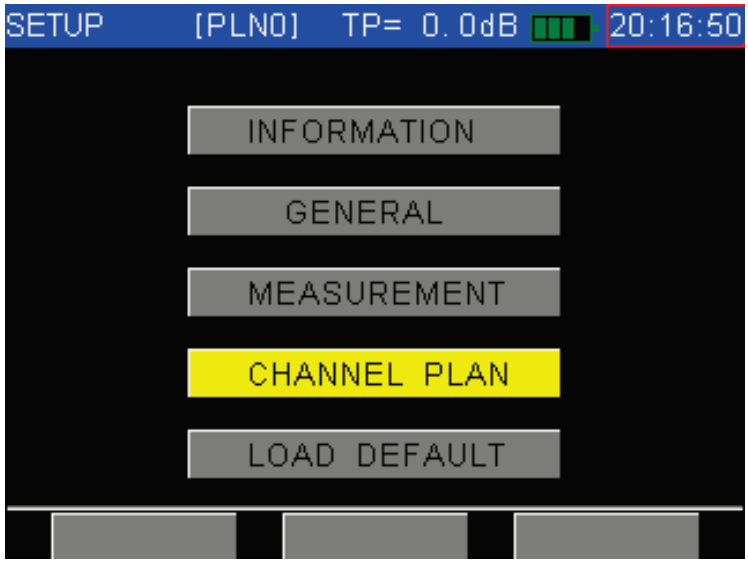


Figure 4-5

DS2460Q has 20 blank channel plans. If you first time use this meter, you must choose one blank channel

plan before you start create new channel plan. If you uses this meter a period of time, you want to create a new channel plan for different zone network, you need choose another blank channel plan from the 20 default channel plans. If you continue use last time used channel plan, the new created channel plan will cover the old channel plan information. So you'd better rename every useful channel name in case you forget the useful channel plan.

Now press into Figure 4-6 CHANNEL PLAN setup screen, then press or open the SELECT USER PLAN item. User can see Figure 4-7 shows screen.

You can press and button to move the cursor to choose one channel plan, then press or confirm you choice.

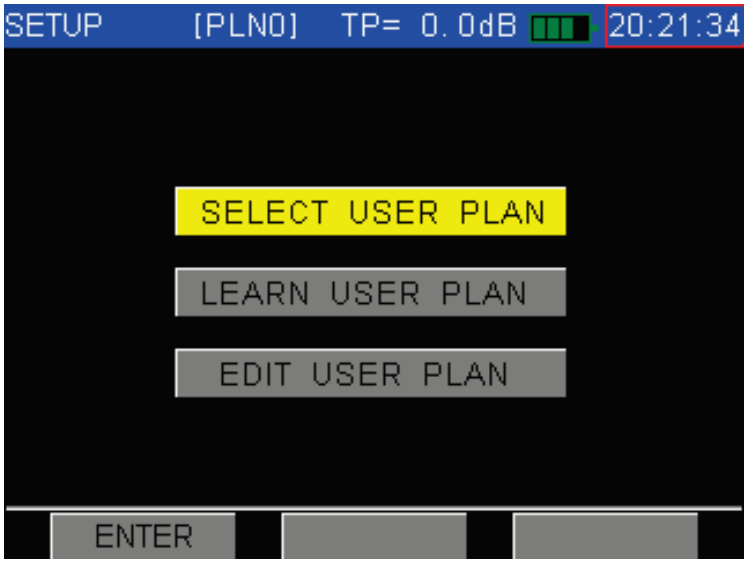


Figure 4-6

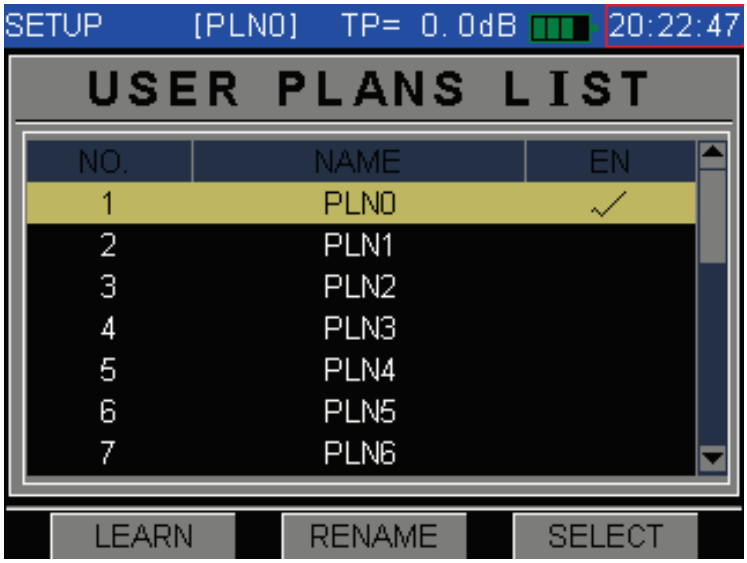


Figure 4-7

In this screen, you can press F2 RENAME soft button, then press the 0 FCN, as the Figure 4-8 show.

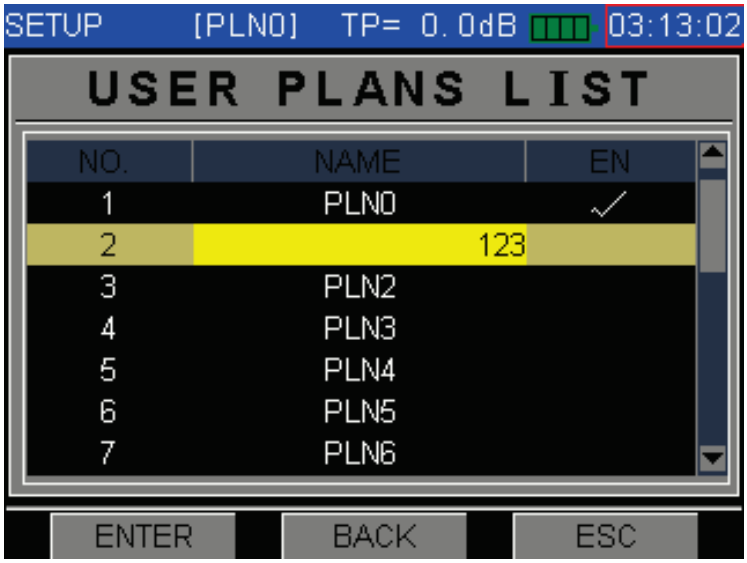


Figure 4-8

Press F1 save the new name and quit rename operation, F2 is backspace, to correct you input contents, press F3, don't save and quit. After you quit, continue press F3(SELECT) to set the current cursor position channel plan as the default channel plan, the symbol "√" is marking on this channel plan. Press the F1(ENTER) or ✓ enter create or learn channel plan function. The Figure 4-11 and Figure 4-12 show the LEARN USER PLAN screen.

The channel name use digital or standard name. In Figure 4-9 and Figure 4-10 show the channel digital name and standard name difference. Press F1

(STANDARD/DIGITAL) can switch channel name.

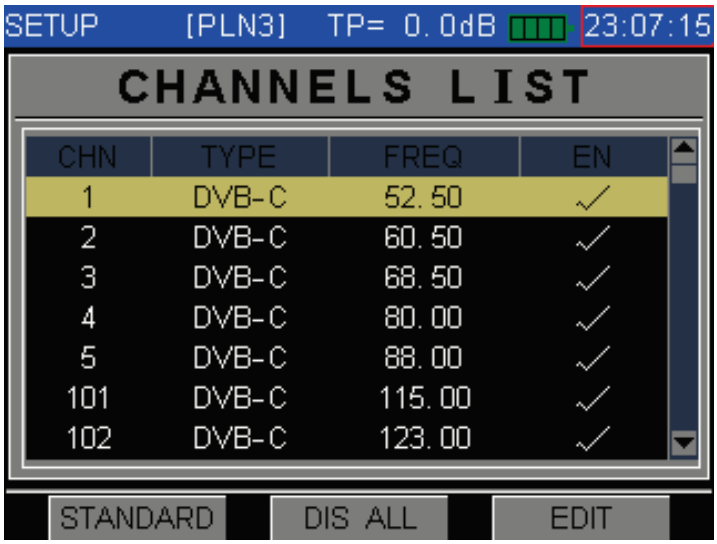


Figure 4-9

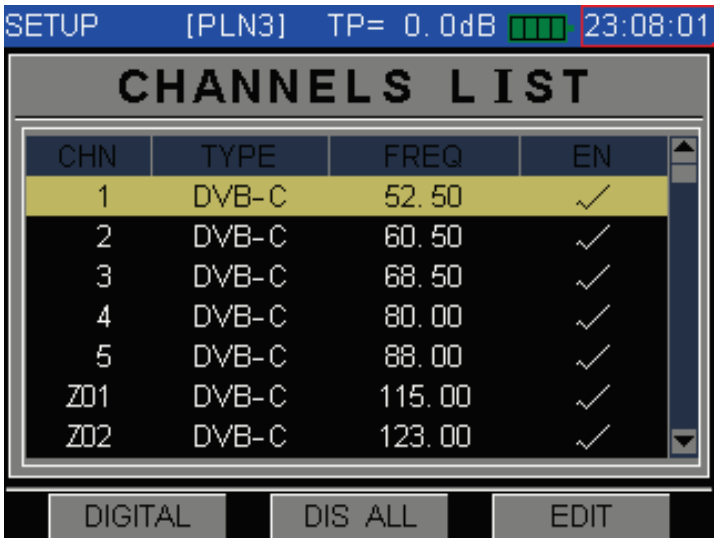


Figure 4-10

After select one blank channel plan, we should start learn user plan.

3. Press F1 or ✓ button to choose the channel plan standard. DS2460Q has four default standard: PAL_D/K, NCTA, OIRT, CCIR. Press ▲ and 2DFE ▼ button to switch editable channel parameters position. Use ✓ or 1ABC ◀ and ▶ 3GHI button to change parameters' value. For SR (Symbol Rate) parameter, you must use 0FCN button switch the key to alphabet and number input function to input the right symbol rate. If you only choose analog TV channel, the screen display content show in Figure 4-11; if user also choose the digital TV channel, the screen display content show in Figure 4-12.

You can define the channel plan as Analog channel plan, digital channel plan or analog/digital mixed channel plan. Also you can edit "Standard, Bandwidth, Modulation type, Symbol Rate" in digital channel plan. When your setup is completed, please press F3 (START), start learn user plan. Figure 4-13 shows the learning progress. After the meter completes learn channel plan, the channel information will be

automatic saved in the memory.

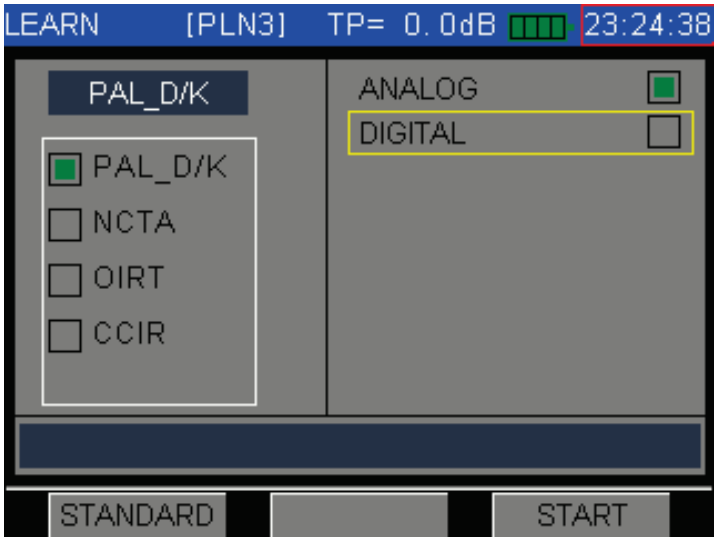


Figure 4-11

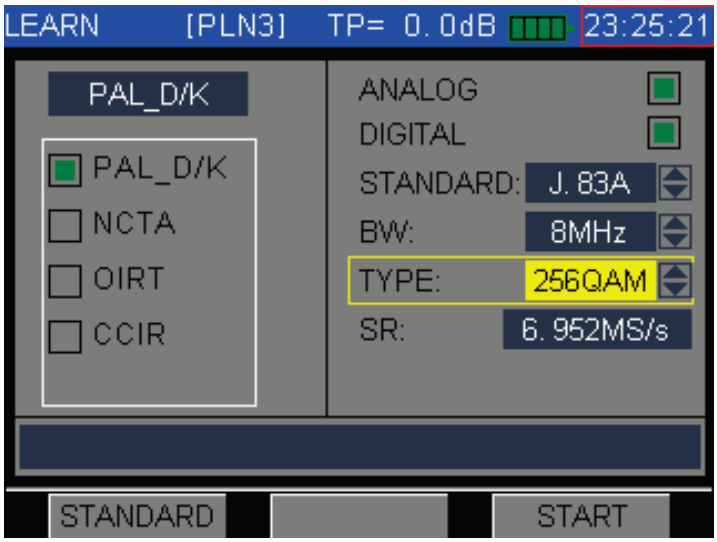


Figure 4-12

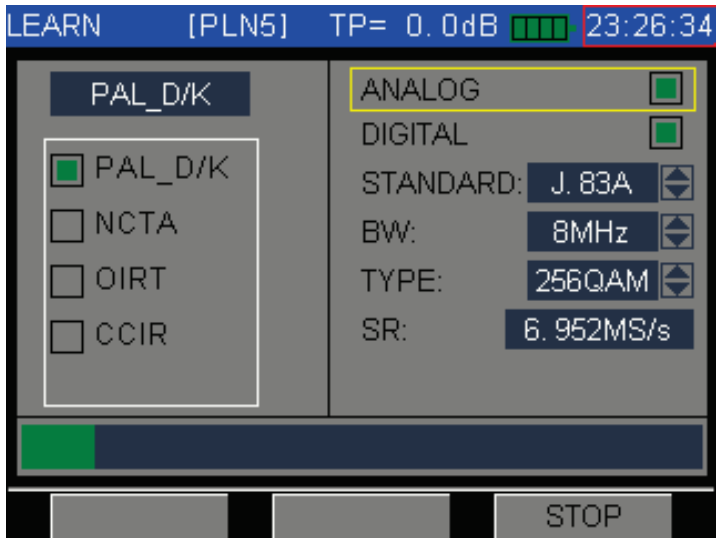


Figure 4-13

NOTE: The analog channels with level higher than -15dBmV and digital channel with power level higher than -28dBmV will be enabled in standard channel plan. Only the enabled channels will be displayed in each measurement interface. After setup your user channel plan, you can also enable or disable channels. When the learning the channel plan, please keep the power on and don't interrupt the process, otherwise it will create a wrong channel plan.

After you complete channel plan learning, back to previous screen, move the cursor on the item EDIT USER PLAN, press F1 or ✓ button, you can open channel list screen. The information as Figure 4-14 and Figure 4-15 show.

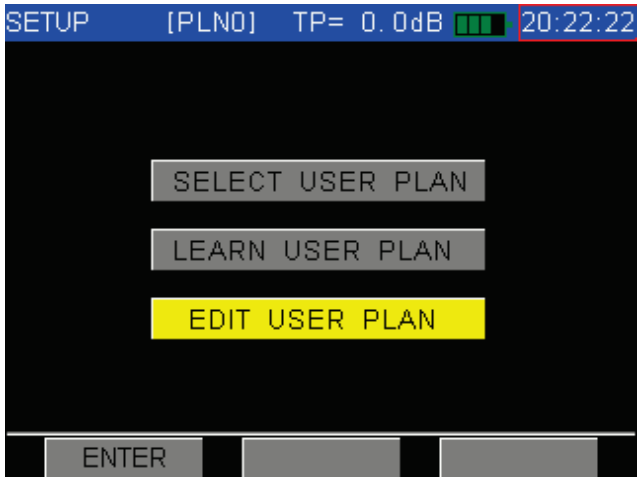


Figure 4-14

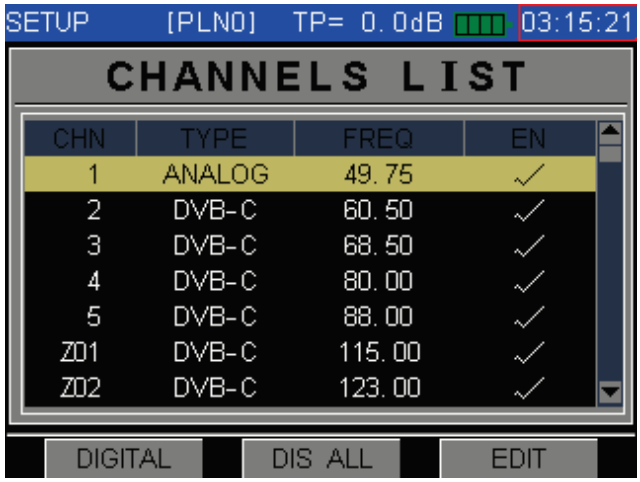


Figure 4-15

Move the cursor on analog TV channel, press the , the analog channel detailed information will be displayed, as Figure 4-16 show. Move the cursor on digital TV channel, press the button, the digital channel detailed information will be displayed, as Figure 4-17 show.

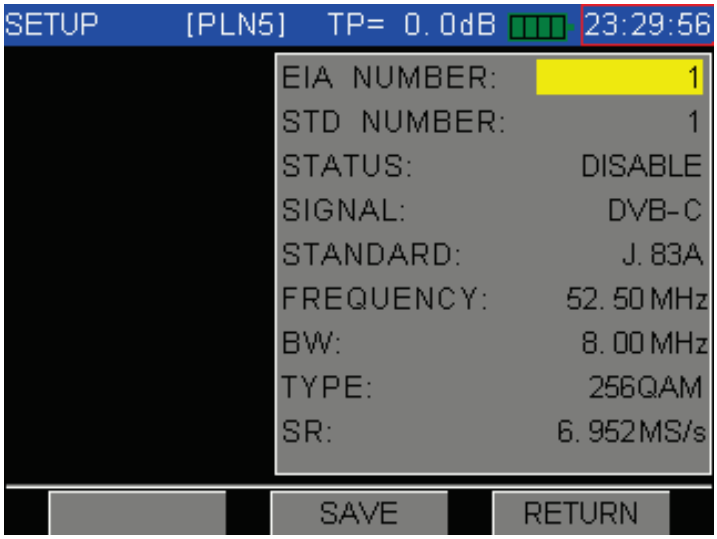


Figure 4-16

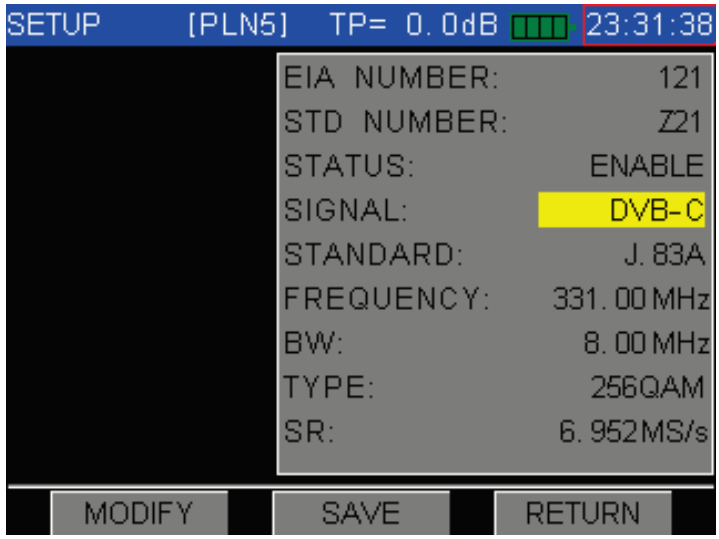


Figure 4-17

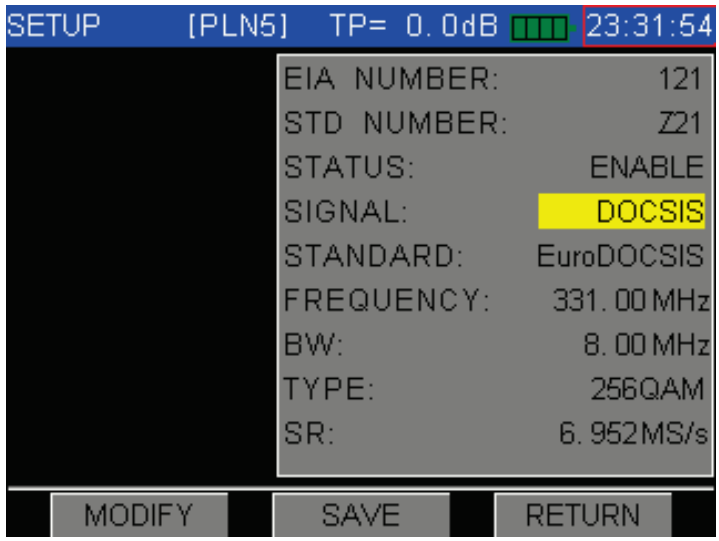


Figure 4-18

4.3 Level Measurement

Press return to main menu, press the arrow key to select the Level icon as Figure 4-19. Then press .

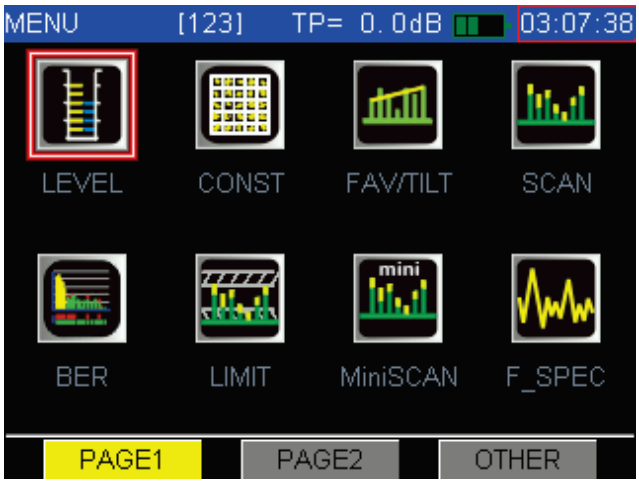


Figure 4-19

The program confirm at least one active channel exist in one channel plan. So you channel plan at least has only one analog channel.

The channel list will display as the Figure 4-20 show. Press or 2DFE to select the channel. Press 1ABC or 3GHI will page up or page down the channel list. Then press enter channel information as the Figure 4-21 show.

Press or to select the channel parameters, if the selected parameter could be changed, press (MODIFY) or to change. As the Figure 4-21 show, ensuring the STATUS is enable, the channel will be enabled.

Figure 4-20

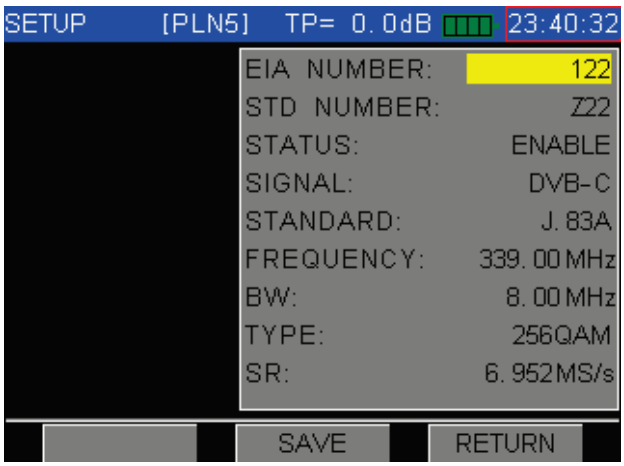


Figure 4-21

4.3.1 Analog channel measurement

If the current channel is a valid analog channel, The Level function will display as the Figure 4-22 show, three test results are displayed on the screen, include Video, audio and V/A.

: Video Level : Audio Level

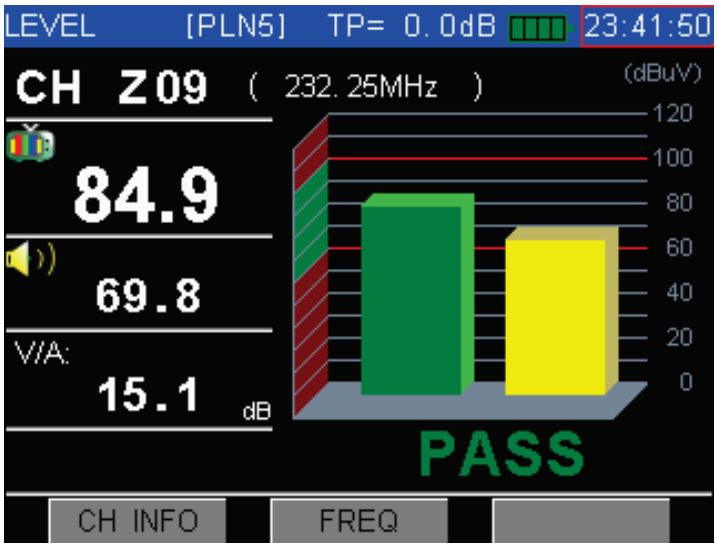


Figure 4-22

CH INFO(F1): Press this button will display the channel information of this analog channel as the Figure 4-23 show. The channel parameters also can be modified in this screen.

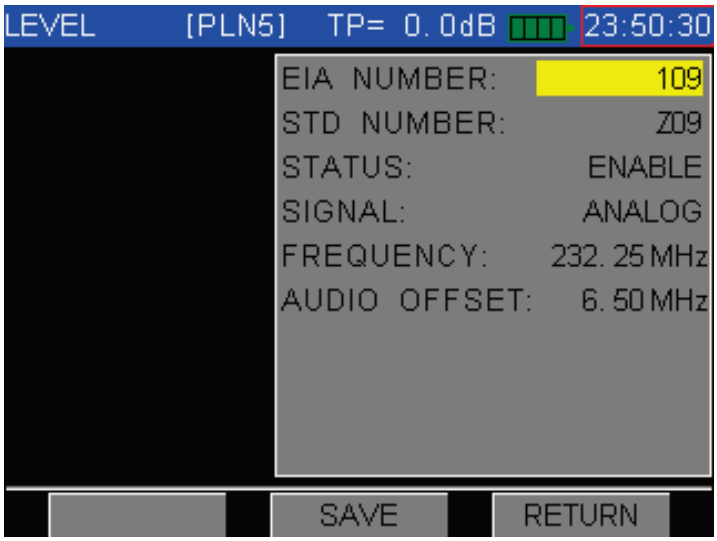


Figure 4-23

The buttons and

are used for switch channels circularly. If the next channel is digital channel, the screen will be changed. (Refer to next section.)

FREQ(F2 **)**: Press this button to show single frequency measurement interface as Figure 4-24,the user can modify the frequency, press this button again to return.

SAVE(4JKL **)**: Press this button to save the result of level test, refer to Figure 4-79.

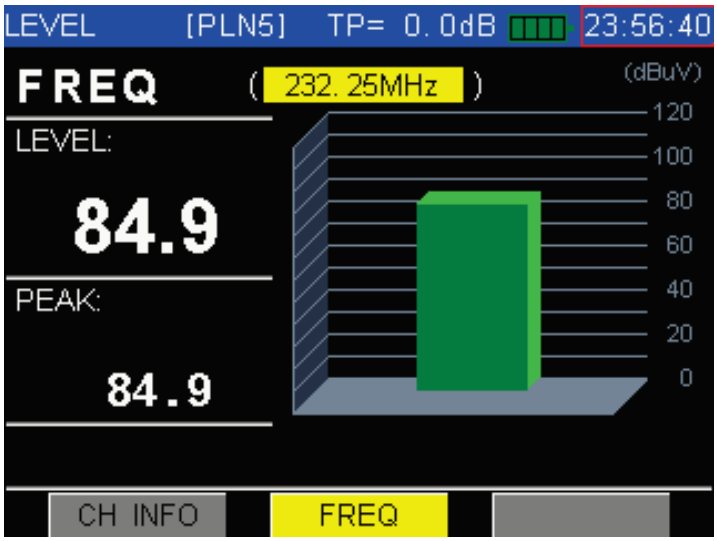

LEVEL
[PLN5]
TP= 0.0dB
23:56:40
FREQ
(232.25MHz)
(dBuV)
LEVEL:
84.9
PEAK:
84.9
120
100
80
60
40
20
0
CH INFO
FREQ

Figure 4-24

4.3.2 Digital channel measurement

In this function DS2460Q is able to measure POWER, MER and BER. As the Figure 4-25 show.

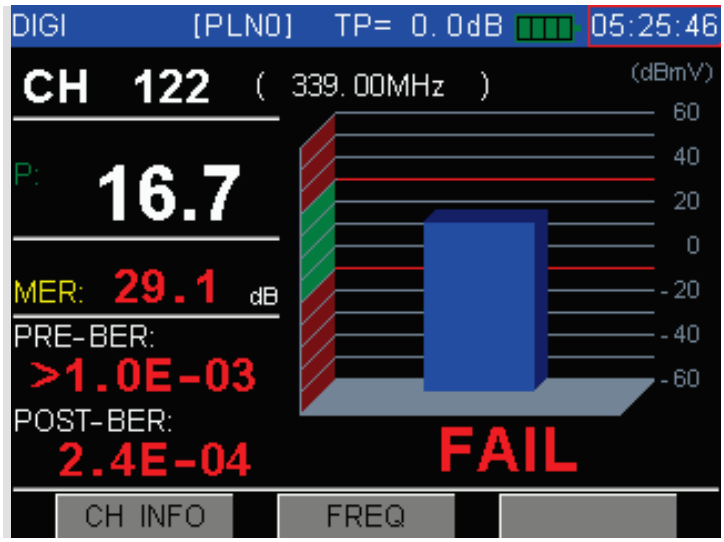


Figure 4-25

CH INFO(F1): Press this button will display the channel information of this digital channel, as the Figure 4-26 show. The channel parameters also can be modified in this screen.

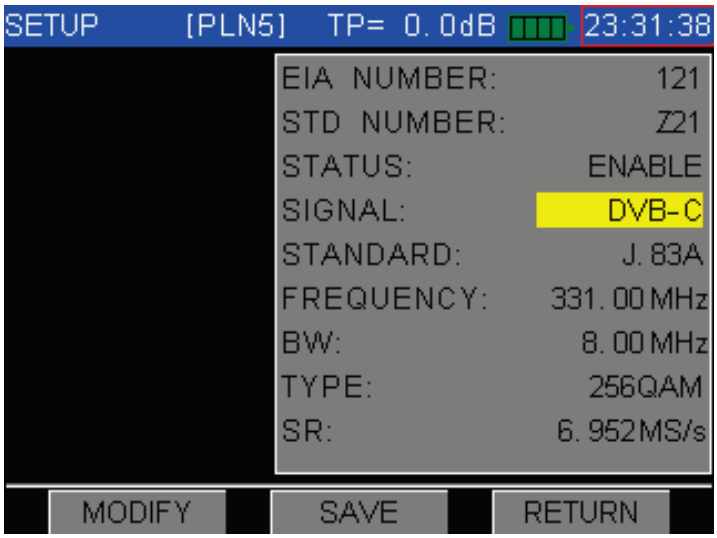


Figure 4-26

The and are used for switching channels circularly. If the next channel is analog channel, the screen will be as the Figure 4-22 show.

SAVE(**)**: Press this button to save the result of level test ,refer to Figure 4-79.

FREQ(F2 **)**: Press this button into frequency measurement interface as Figure 4-27. In this mode, the user can easily modify the central frequency, but the other parameters of digital channel will be the same as channel mode, press this button again to return.

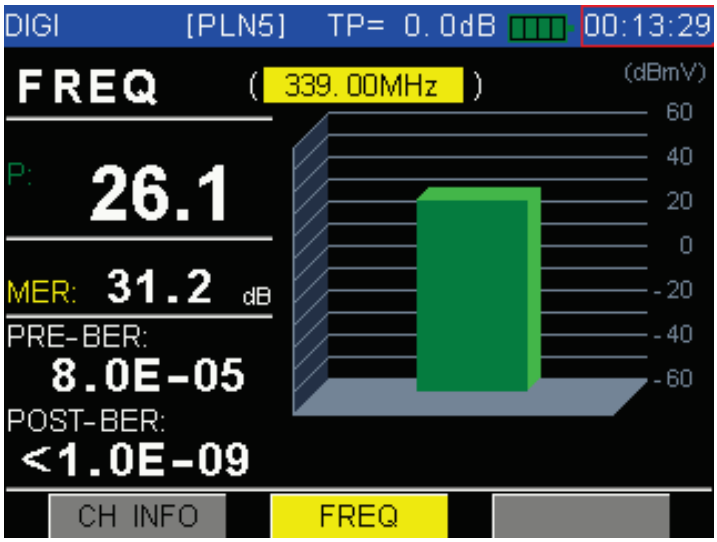


Figure 4-27

4.3.3 Limit Display

A **PASS** or **FAIL** in big font is displayed in the screen to indicate the quality of current channel as the Figure 4-25, the limit value to judge the quality of channel can be showed in the measurement setup menu, and also can be modified.

And also it can disable the judge of channel quality of in the measurement setup menu.

4.4 Constellation Diagram

Press to return to main menu interface, and press the arrow keys to choose constellation icon, and then press to enter constellation measurement.

DS2460Q's constellation diagram function supports modes of QAM. Here, you can get channel POWER, MER, BER(pre-BER and post-BER) and constellation diagram, all of the channel parameters can be modified by press F1.Constellation diagram shows as Figure 4-28.

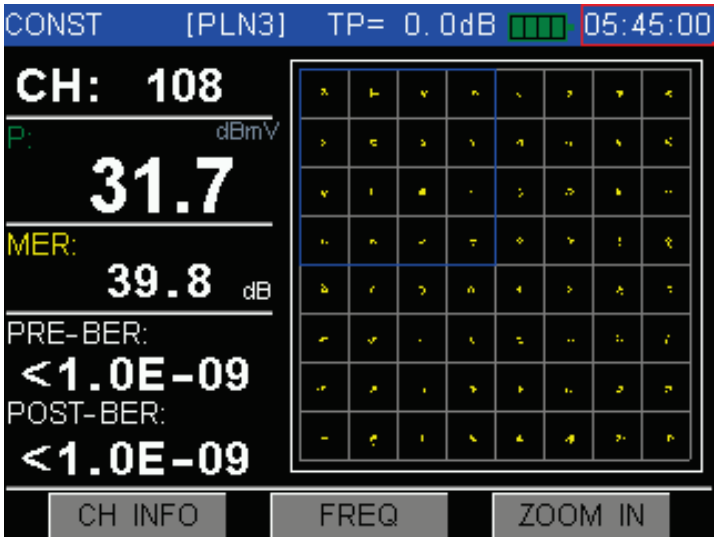


Figure 4-28

Soft Keys Operation:

CH INFO(F1): Press this button to display the current channel information, and user can modify all of the parameters in this menu, as the Figure 4-29 show.

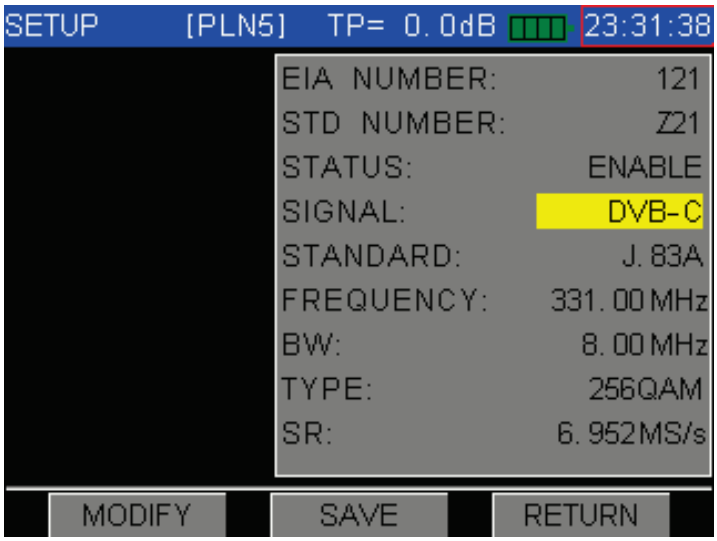


Figure 4-29

FREQ (F2): Press this button to display the current frequency POWER, MER, BER (pre-BER and post-BER) and constellation diagram as the Figure 4-32 show, press this button again to return.

Now the DS2460Q support the channel parameters automatic identify. If user want to use this function, you must to open it, operation steps: Setup->Measurement->Auto Diagnosis->Auto ID. User must choose “AUTO ID” option. If the channel center frequency setup right, the program can automatic identify the QAM parameter. DS2460Q only support standard QAM parameters auto identify.

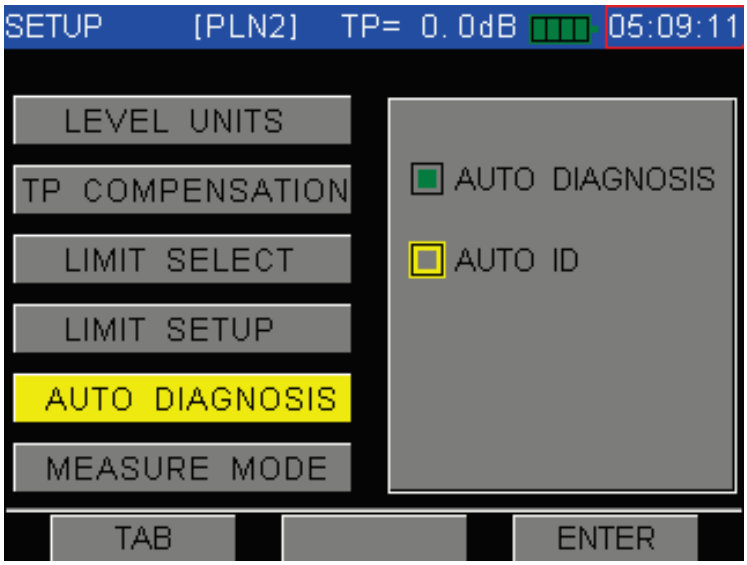


Figure 4-30

If the channel plan parameters different with the QAM signal, this function can take effective. Press the button **CH INFO(F1)** , you can find before the

modulation type and symbol rate display the red asterisk, as the Figure 4-31 show. If user press the button SAVE(F2), the new parameters will be saved in channel plan ,the asterisk will disappear.

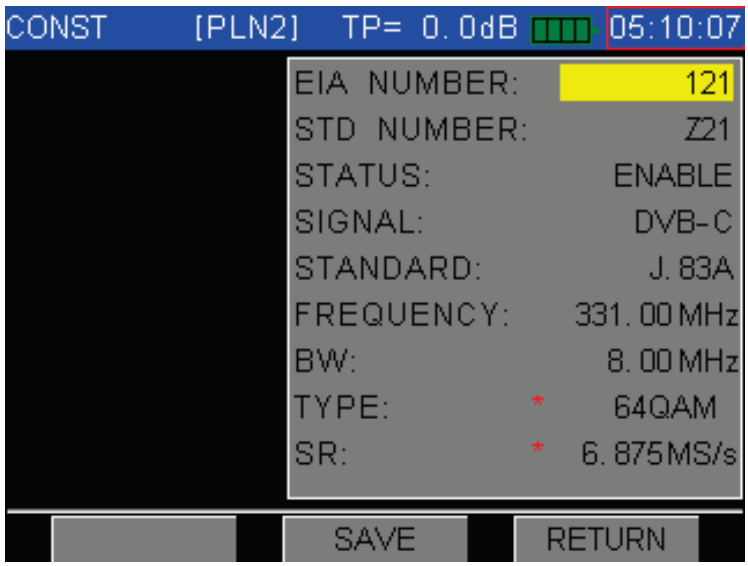


Figure 4-31

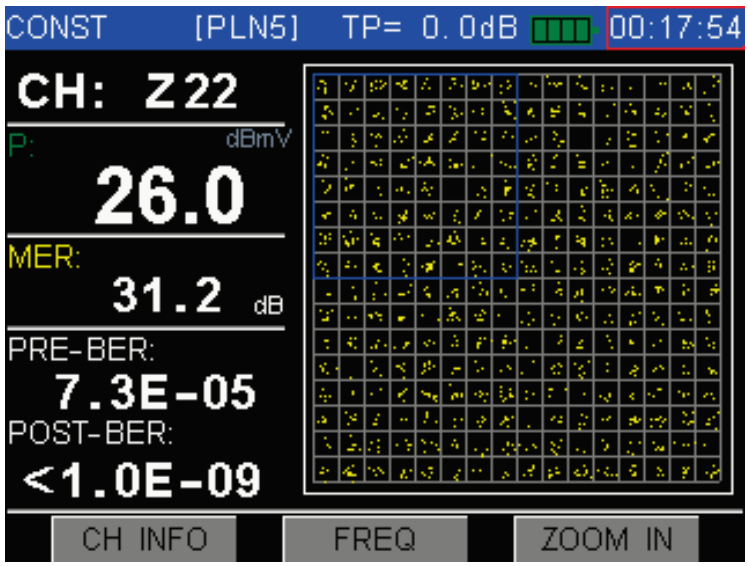


Figure 4-32

ZOOM OUT/ZOOM IN(F3): Press this button and switch the status of constellation diagram between zoom in and normal mode. Press zoom in key again, the selected quadrant will be zoom in, and the zoom in flag will be displayed on the top of the screen as Figure 4-33.

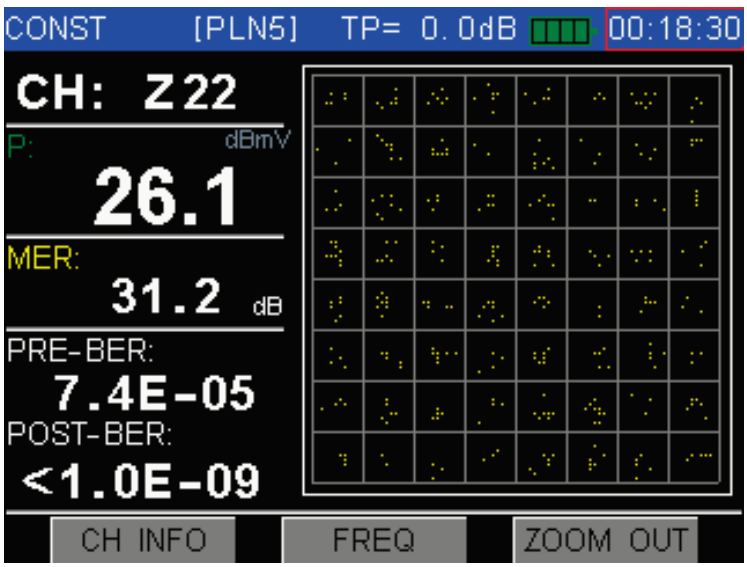


Figure 4-33

Press the 1ABC and 3GHI button, switch the select quadrant.

The and 2DFE buttons are used for switching digital channels circularly.

Note: This function only supports digital channels, if the current user plan doesn't have any digital channels, the screen will show as Figure 4-34.

Figure 4-34

4.5 8VSB Measurement(Option)

If you want to use DS2460Q demodulate ITU-T J.83D 8VSB signal, you must do these operation: SETUP->CHANNEL PLAN->EDIT USER PLAN-> F3 (EDIT)->SIGNAL: DVB-C->STANDARD: J.83D. or LEVEL, QAM,BER screen, press the F1 (CH INFO) to directly modify one channel parameters.

The channel information as show in the Figure 4-35.

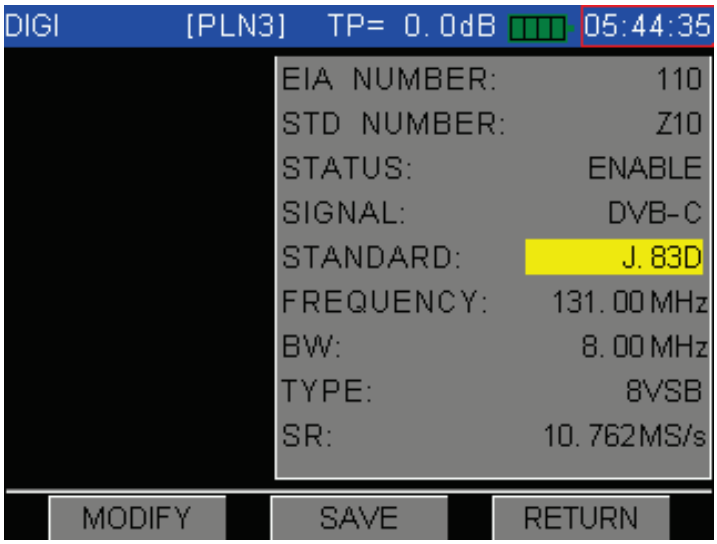


Figure 4-35

The 8VSB power and constellation test screen snapshot as show in the Figure 4-36 and Figure 4-37.

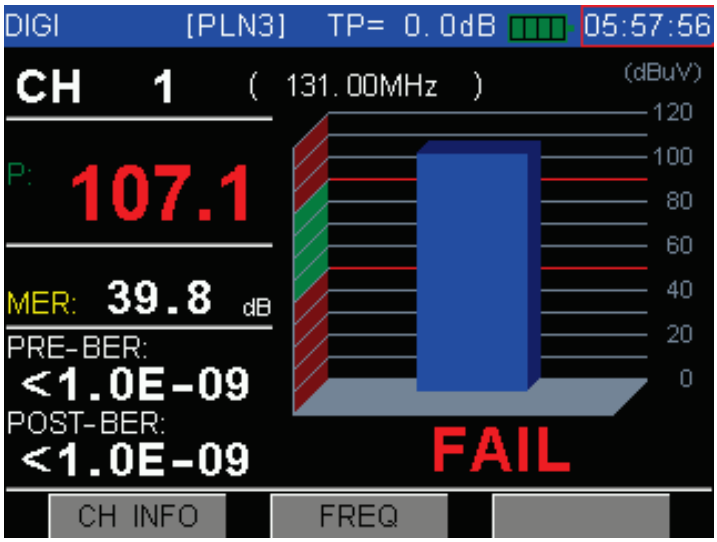


Figure 4-36

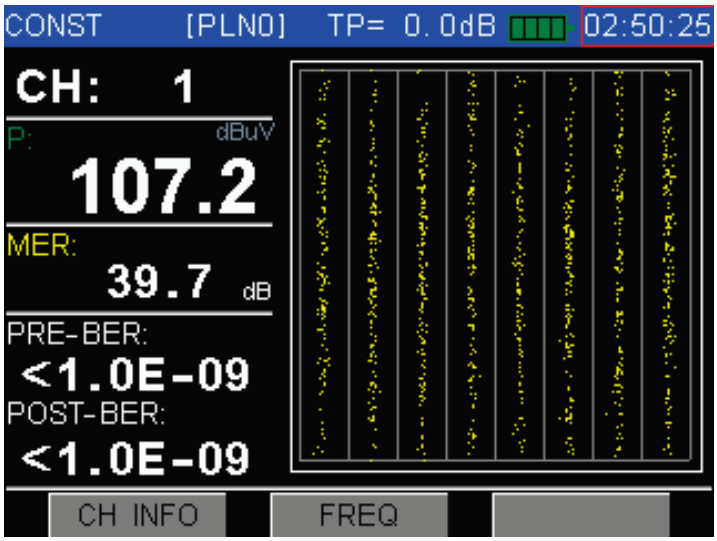


Figure 4-37

4.6 BER Statistics Measurement

Press to return to main menu interface, and press the arrow key to choose BER icon, and then press to enter BER statistics measurement.

DS2460Q is able to make BER statistics during set time, the user can get MER, BER, ES, SES, COR, UNCOR, SUM bits and TOTAL BER as Figure 4-38.

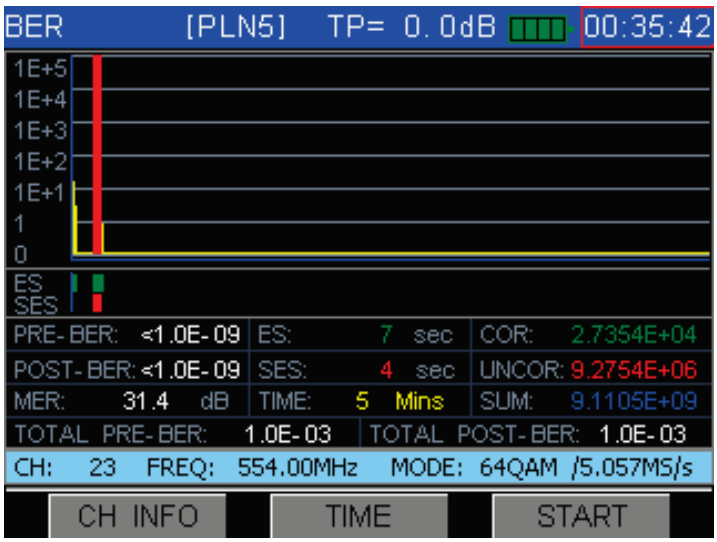


Figure 4-38

4.6.1 Parameter Description

parameters	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't be correct divided the total bits > 1.1E-3, SES plus1
COR	**Corrected error bits**
UNCOR	**Uncorrected error bits**
SUM	**Total bits**
TOTAL PRE-BER	(COR+UNCOR)/SUM
TOTAL POST-BER	UNCOR/SUM

4.6.2 Soft Keys Operations

CH INFO(F1): Press this button can check the current channel information, and user can modify all of the parameters in this menu.

TIME (F2):Press this button to set the statistics time, DS2460Q supports several fixed time(5 minutes, 15 minutes, 30 minutes, 60 minutes, 2 hours, 6 hours, 12 hours, 24 hours, and 48hours).

START/STOP(F3):Press this button will start or stop the statistics process and the screen will show as Figure 4-39.

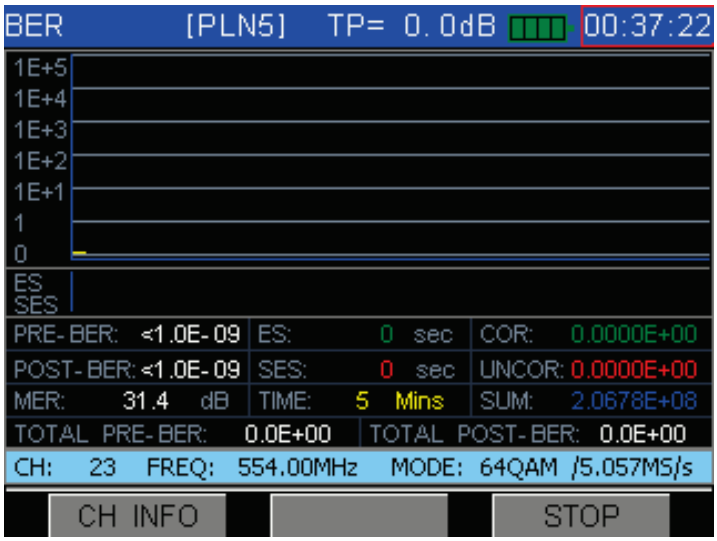


Figure 4-39

4.7 Tilt/Level List Measurement

Tilt/Level list test is the effective solution to check the flatness and splitter's gain of cable system, DS2460Q can get levels of 12 channels and observe the measurement result and graph easily.

Press to return to main menu interface, and press the arrow keys to choose Tilt icon, then press 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 4-40.

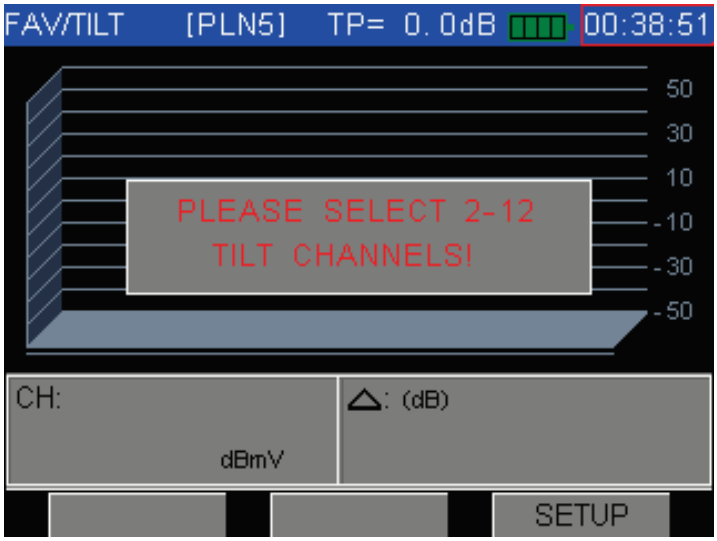


Figure 4-40

In Figure 4-40, press F3 to enter the tilt channels setup menu, select the channels that you want to do

tilt test as Figure 4-41; press the and button to change the highlight line, and then press the to select or unselect the channel.

Here, the and button have been defined to page up and page down the channel list.

The "√" means this channel is selected. If you want to cancel this selection, please press again and "√" will disappeared. The channel No. of all channels selected will be saved and displayed at the left blocks

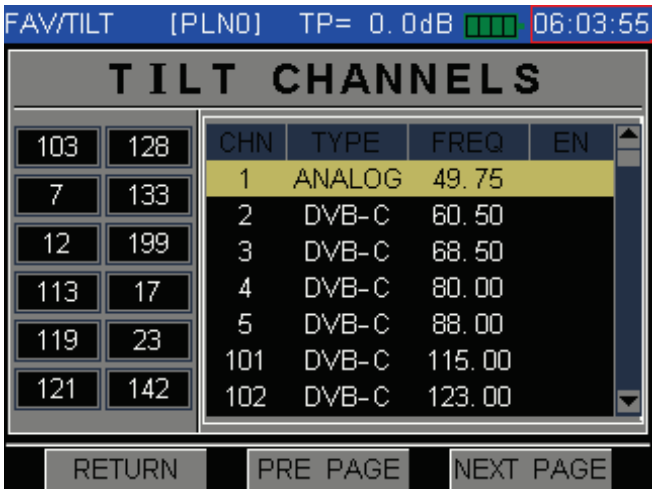


Figure 4-41

After selected，Press to return to main menu interface, and press the again to enter the Tilt/Level List measurement. Now the Tilt measurement can be continued.

4.7.1 Tilt Mode

In tilt test interface, the channels will be displayed as histogram, and test result will be displayed at the bottom of screen as Figure 4-42.

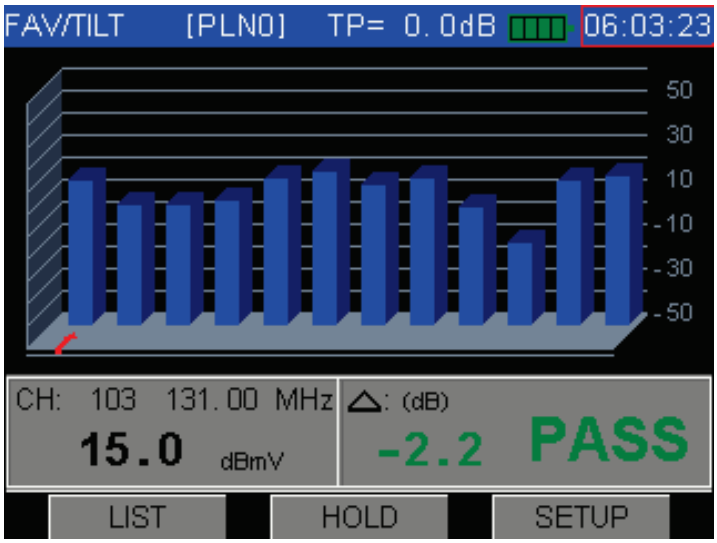


Figure 4-42

Soft Keys Operation

LIST(F1): Press LIST soft key to enter level list mode, as Figure 4-43.

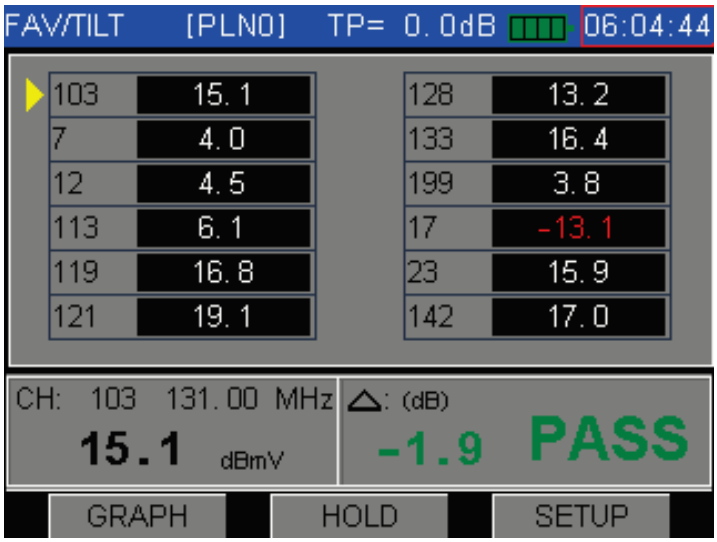


Figure 4-43

SAVE (F2): Press 4JKL key and enter into Figure 4-79to save the result of tilt test ,refer to4.21.2.

SETUP(F3): When testing, press SETUP soft key and enter into Figure 4-41to re-select tested channels.

4.7.2 Level List Mode

Press F1 to switch the modes between Tilt Graph and level list. In level list mode, you can easily get level value of the channels tested, as Figure 4-43.

Soft Keys Operation

LIST(F1): Press GRAPH soft key to enter Tilt mode, as Figure 4-42.

SAVE (F2): Press SAVE soft key and enter into Figure 4-79to save the result of tilt test ,refer to4.21.2.

SETUP(F3): When testing, press SETUP soft key and enter into Figure 4-41to re-select tested channels.

Here, the 1ABC and 3GHI button is defined to switch the tilt channel which's test result will be displayed at the bottom of screen.

A FAIL or PASS will be displayed at the bottom of the screen, the Limit value can be modified in

Measurement Setup（Refer to5.4.3）.

And also we can disable the judge of quality of channel in the Measurement Setup.

4.8 Channel Scanning

DS2460Q support channel scanning function in order to test the flatness and amplitude of cable TV system quickly. Press to return to main menu interface and press arrow keys to select the SCAN icon, and then press to enter Channel Scanning function as Figure 4-44. The scanning graph of current user plan is displayed on the screen, a slider in red color shows the current scanning channel.

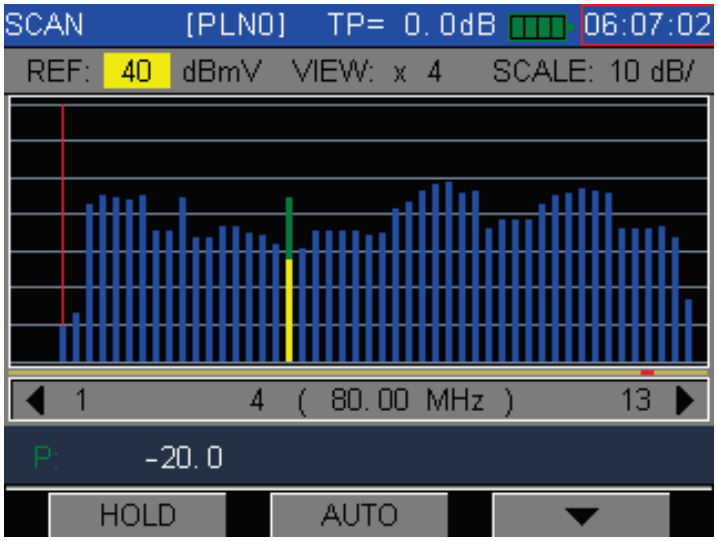


Figure 4-44

Green color represents video level of analog channels. Yellow color represents audio level of analog channels. Blue color represents power of digital channels. The scan function also display the channel number of scanning start channel and end channel.

4.8.1 Buttons Operation

MARK: In Figure 4-44, press the 1ABC and 3GHI buttons, the marker with red color will move left or right. And the test result of channel at the position of marker will be displayed on the bottom of the screen.

REFERENCE LEVEL: Press and 2DFE buttons can modified the range of reference level: 0 ~ 120 dBμV (-60dBmV ~ +60dBmV).

VIEW: Press F3 to find the next page soft button menu, show as the Figure 4-45, press the F1 (VIEW) multi times and the zoom times circulation display between ×1, ×2, ×3, ×4 and ×5.

×1: Max display 30 channels in the screen.

×2: Max display 50 channels in the screen.

×3: Max display 75 channels in the screen.

×4: Max display 150 channels in the screen.

×5: Max display 255 channels in the screen.

SCALE: In Figure 4-45, press F2 (SCALE) multi times , and the scale circulation display between 1dB, 2dB,

5dB and 10dB.

AUTO: In Figure 4-44, press F2(AUTO) soft key to adjust reference level and scale quickly .The meter will automatically adjust them to most optimal state.

(F3):Press this button to next page as Figure 4-45, the user can press this button again to return.

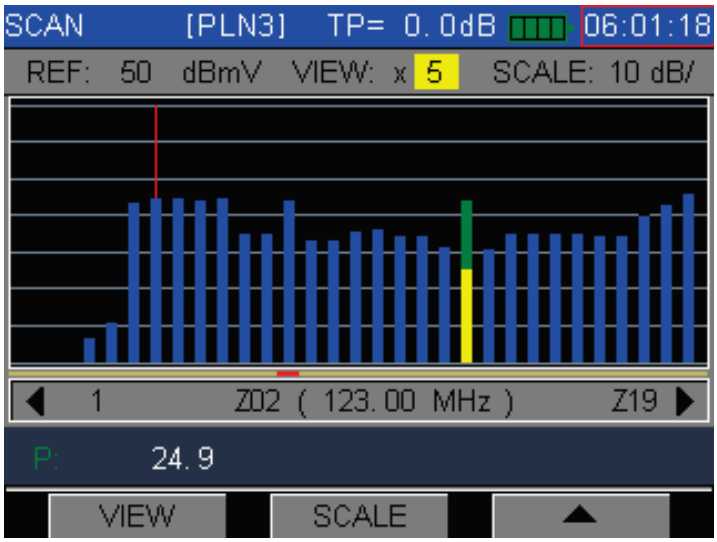


Figure 4-45

SAVE: Press 4JKL button and enter into Figure 4-79to save the result of tilt test ,refer to4.21.2.

STOP(F1): Press STOP soft key, the scanning will stop, and you can continue the scanning by pressing it again.

4.9 Mini SCAN

DS2460Q support Mini SCAN function. The Mini max support 16 channels. In SCAN mode, the digital channel only give signal power, the meter doesn't demodulate the QAM signal. In mini SCAN ,the QAM signal will be demodulated, user can read the signal power, MER and BER. Because the meter demodulate the signal, the mini SCAN speed will slower than the SCAN

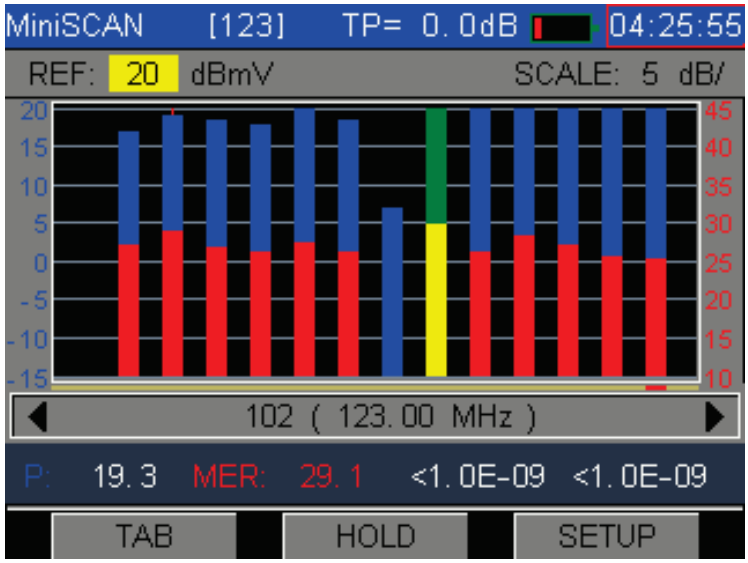


Figure 4-46

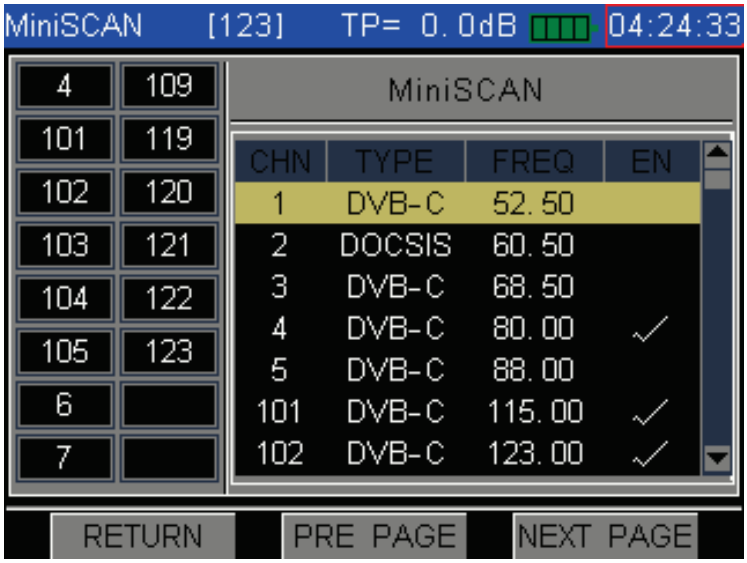

MiniSCAN [123] TP= 0.0dB 04:24:33
4
109
101
119
102
120
103
121
104
122
105
123
6
7
MiniSCAN
CHN TYPE FREQ EN
1 DVB-C 52.50
2 DOCSIS 60.50
3 DVB-C 68.50
4 DVB-C 80.00
5 DVB-C 88.00
101 DVB-C 115.00
102 DVB-C 123.00
RETURN
PRE PAGE
NEXT PAGE

Figure 4-47

4.10 Return Path Spectrum

Press to return to main menu interface and press (PAGE1) to select the R-PATH icon, and then press to enter R-PATH function, as show in Figure 4-48.

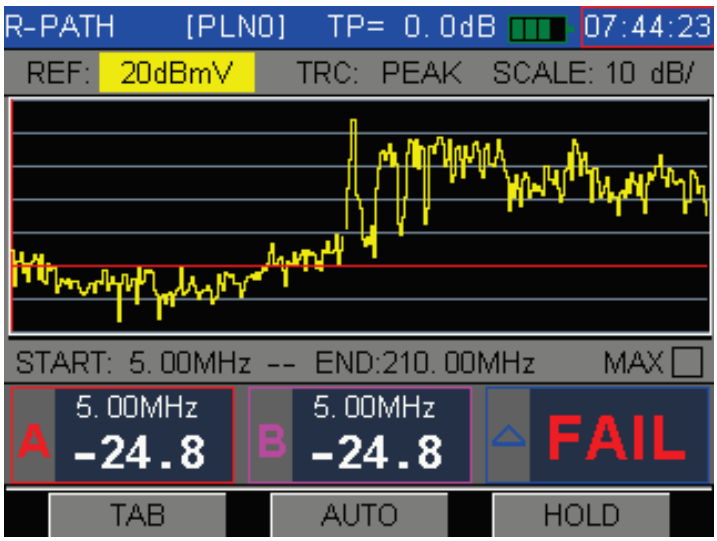


Figure 4-48

In the interface of the R-PATH function, the start and stop frequency setting have several fixed options: 5~46MHz, 5~68MHz, 5~88MHz, 5~120MHz, 5~210MHz. If the cursor on the start and stop frequency parameters, user can use or buttons to switch different option.

User can use F1(TAB) or 1ABC/3GHI buttons to change cursor's position.

The max hold function is used to hold the spectrum trace peak value, as show in the Figure 4-49. User press F3(HOLD) can active the hold function, this function can temporary freeze the spectrum trace. If the cursor on marker A or B, user can use the and 2DFE buttons to move the marker. If the cursor move on the REF or SCALE position, user also can use the and 2DFE buttons to modify the value.

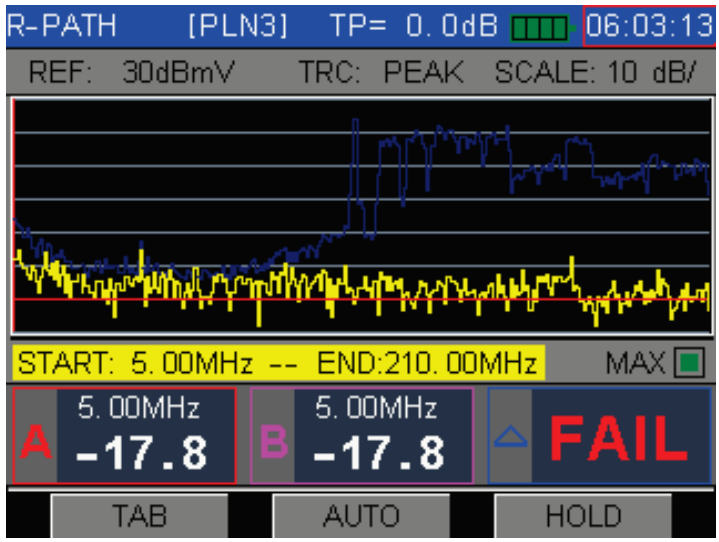


Figure 4-49

4.11 Fast Spectrum

Press to return to main menu interface and press (PAGE1) to select the F_SPEC icon, and then press to enter F_SPEC function, as show in Figure 4-50.

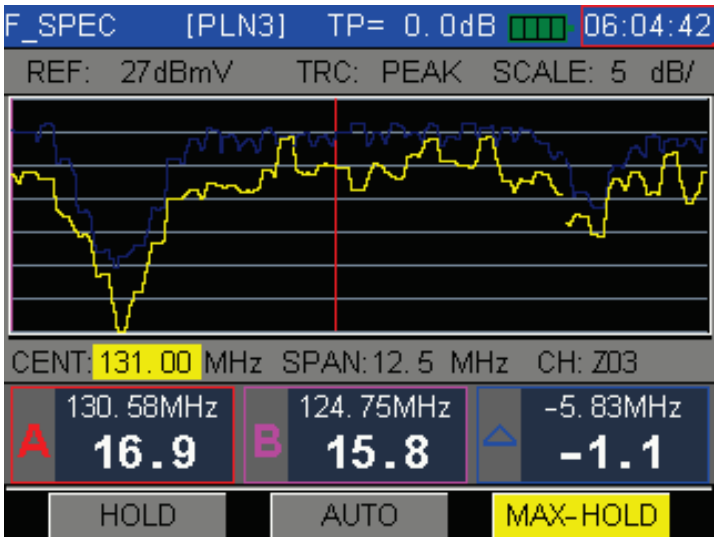


Figure 4-50

The DS2460Q has three type spectrum analysis modes: normal spectrum analysis, fast spectrum analysis and return path spectrum analysis. The fast spectrum analysis mode allow technician viewing 5~1220MHz, the normal spectrum analysis mode sweep speed lower than fast spectrum analysis mode,

but it has better amplitude accurate.

The F_SPEC function has several fixed span settings: 12.5MHz, 25MHz, 62.5MHz, Full Band.

User press F3 (MAX-HOLD) can active the peak value hold function. The max hold function is used to hold the spectrum trace peak value, as show in the Figure 4-50. User press F1 (HOLD) can active the hold function, this function can temporary freeze the spectrum trace. If the cursor on marker A or B, user can use the and buttons to move the marker. If the cursor move on the REF or SCALE position, user also can use the and buttons to modify the value.

The AUTO function is used to adjust reference level and scale quickly . The meter will automatically adjust them to most optimal state.

4.12 Spectrum Scanning

Press to return to main menu interface and press (PAGE2) to select the SPECT icon, and then press to enter F_SPEC function, as show in Figure 4-51Figure 4-50.

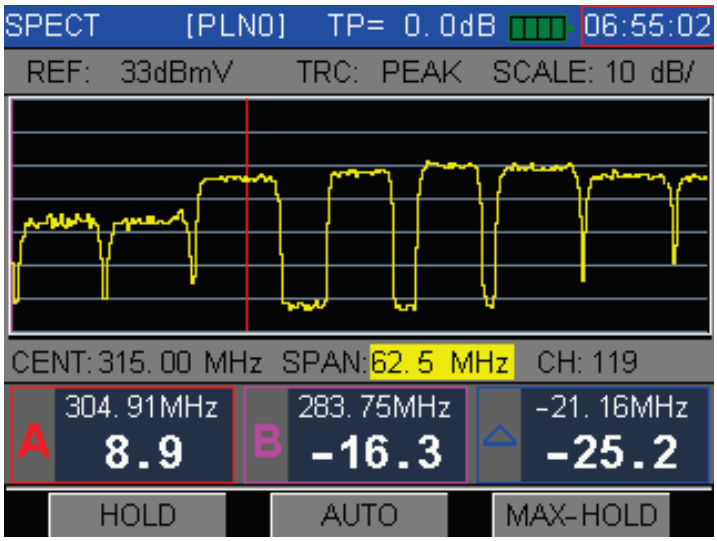


Figure 4-51

The DS2460Q has three type spectrum analysis modes: normal spectrum analysis, fast spectrum analysis and return path spectrum analysis. The fast spectrum analysis mode allow technician viewing 5~1220MHz, the normal spectrum analysis mode sweep speed lower than fast spectrum analysis mode,

but it has better amplitude accurate.

The SPECT function has several fixed span settings: 2.5MHz, 6.25MHz, 12.5MHz, 25MHz, 62.5MHz, Full Band.

User press F3 (MAX-HOLD) can active the peak value hold function. The max hold function is used to hold the spectrum trace peak value, as show in the Figure 4-51. User press F1 (HOLD) can active the hold function, this function can temporary freeze the spectrum trace. If the cursor on marker A or B, user can use the and buttons to move the marker. If the cursor move on the REF or SCALE position, user also can use the and buttons to modify the value.

The AUTO function is used to adjust reference level and scale quickly . The meter will automatically adjust them to most optimal state.

4.13 HUM Measurement

DS2460Q support HUM measurement to analog channel. Press to return to main menu interface and press F2 (PAGE2)and use arrow buttons to select the HUM icon, and then press to enter HUM function. Show as Figure 4-52.

HUM modulation is also named power hum modulation distortion, which caused by low-frequency interference of the power.(50Hz or 60Hz)

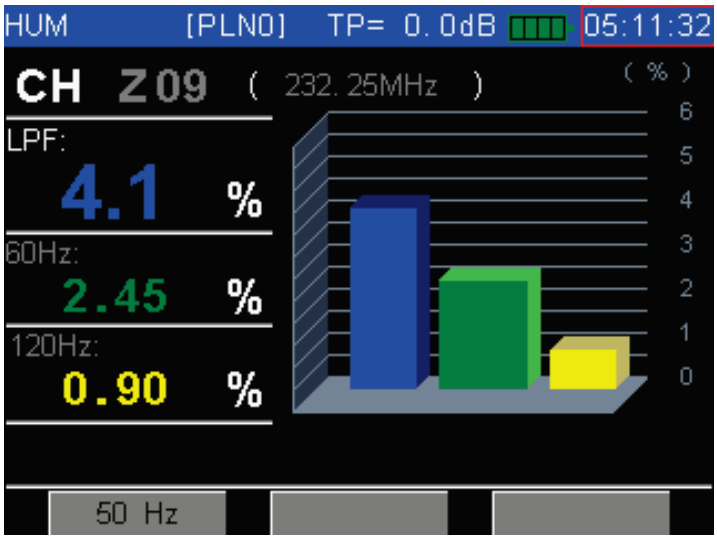


Figure 4-52

4.13.1 Soft Keys Operation

50Hz/60Hz(F1): After pressing **50Hz**or **60Hz** soft key, the DS2460Q will select the frequency of system power as Figure 4-53.

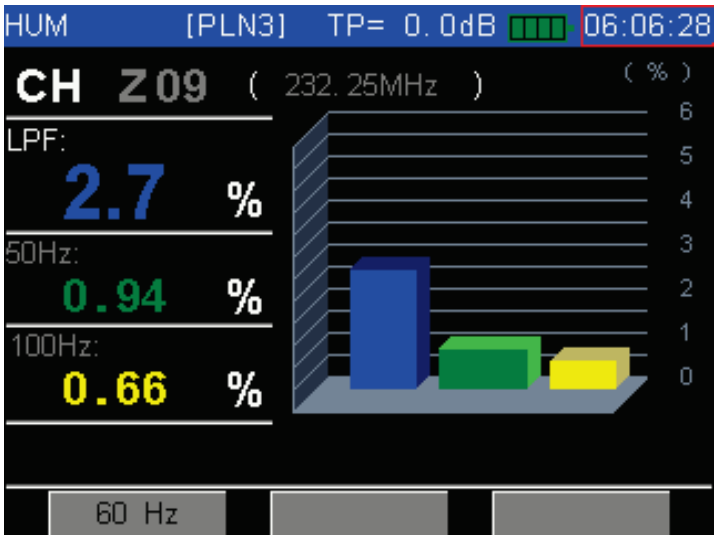


Figure 4-53

The buttons and are used to switch analog channels circularly. Also you can input the channel number using the character/digit keys (need use 0FCN button).

SAVE: Press 4JKL button and enter into Figure 4-79 to save the result of tilt test ,refer to 4.21.2.

4.14 Limit Measurement

Press to return to main menu interface and press arrow buttons to select the LIMIT icon, and then press to enter LIMIT function. As show in the Figure 4-54, DS2460Q is able to detect cable TV system rapidly, and check out the number of unqualified channels and the reason of unqualified channels. The amplitude of each channel of selected user plan is checked one by one. The channel number, video level and audio level whether or not acceptable will be shown.

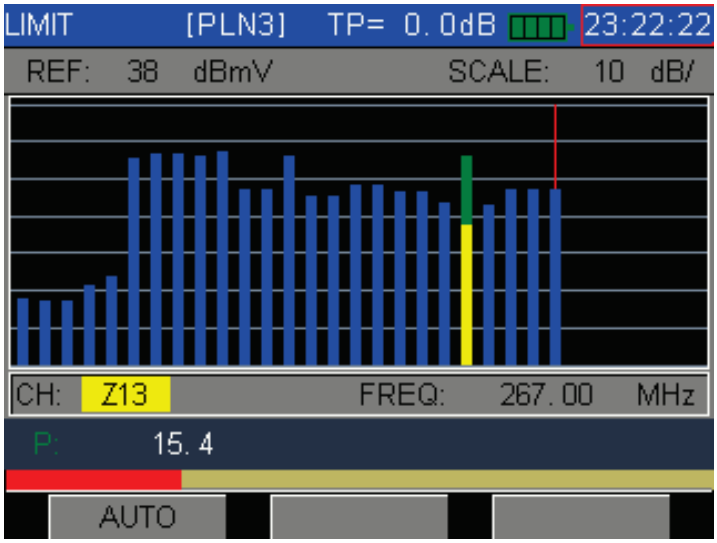


Figure 4-54

When the program does the limit scan, press the F1(AUTO) button, program will automatic modify the reference level.

After the limit test scanning, the general test results of cable system will be listed. The test items are consist of minimum video level, maximum video level, maximum delta video level, minimum ΔV/A, maximum ΔV/A and maximum ΔADJ channels. Refer to Figure 4-55.

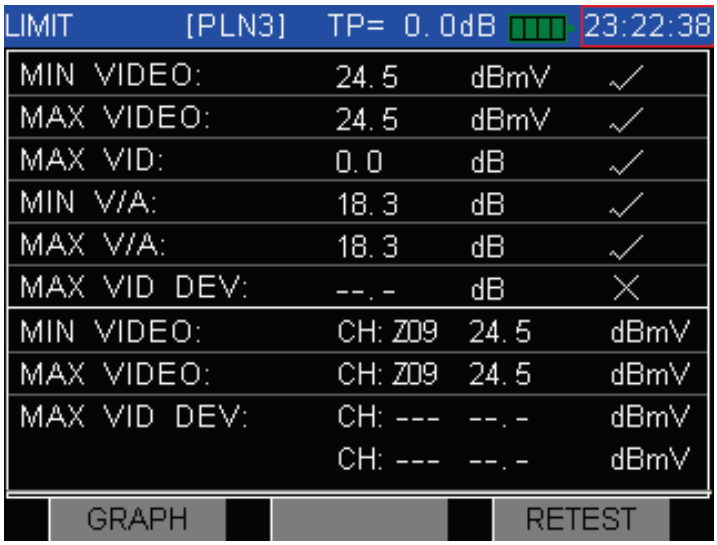


Figure 4-55

Press F1 (GRAPH)to graph display test results screen, as show in Figure 4-56.

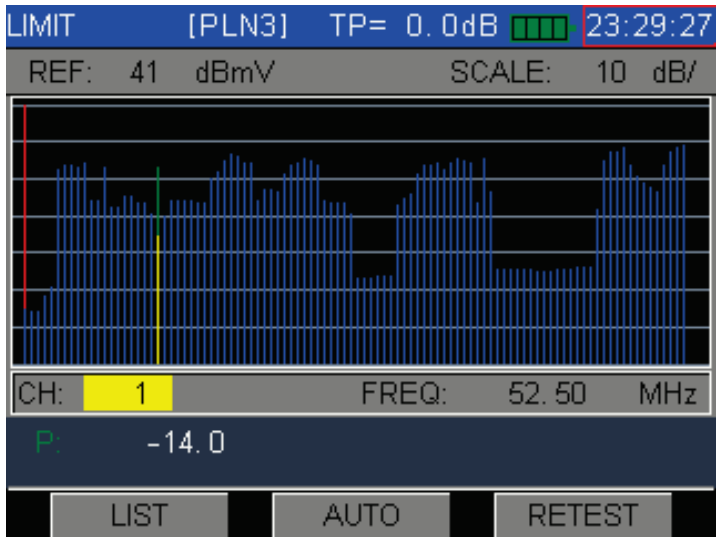


Figure 4-56

Press F1 (LIST) again to view the test result LIST as Figure 4-57.Press F3 (RETEST) can do limit test once again. Section 5.4.4 describe limit setup and edit detailed information.

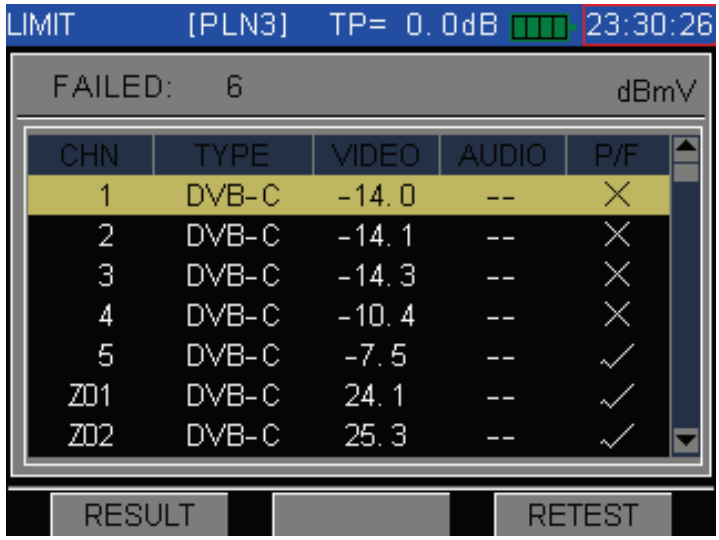


Figure 4-57

4.15 C/N Measurement

Press to return to main menu interface and press (PAGE2) and use arrow buttons to select the C/N icon, and then press to enter C/N function. As show in Figure 4-58.

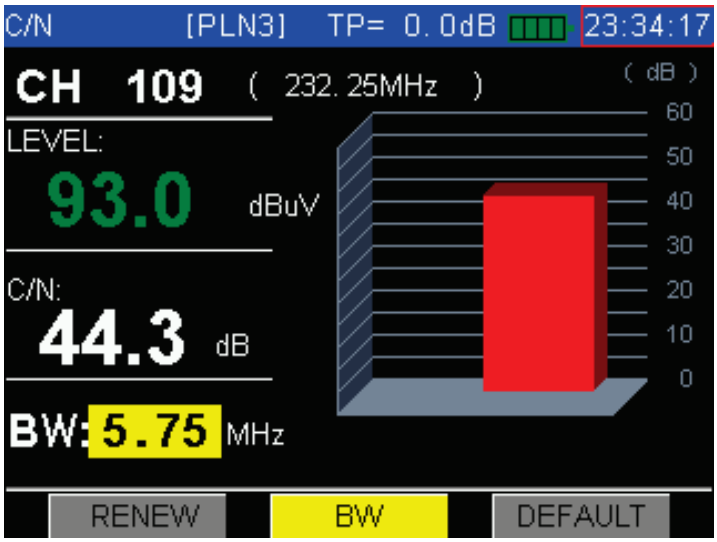


Figure 4-58

To measure C/N Ratio with your DS2460, you must set-up the video carrier frequency and noise bandwidth correction correctly. Noise bandwidth is different depending on the channel bandwidth, which depends on your location. (NA, or EU). NTSC-M system uses 4MHz noise bandwidth correction. PAL-D

system uses 5.75MHz noise bandwidth correction.

Noise measurement bandwidth for different TV standard

Standard	I	B，G	K1，L	D，K	M，N
Video bandwidth	6.75	5.75	7.25	6.75	4.95
Noise bandwidth	5.08	4.75	5.58	5.75	4.00

Press F2(BW) and 0FCN can edit and input new bandwidth value. As show in the Figure 4-59.

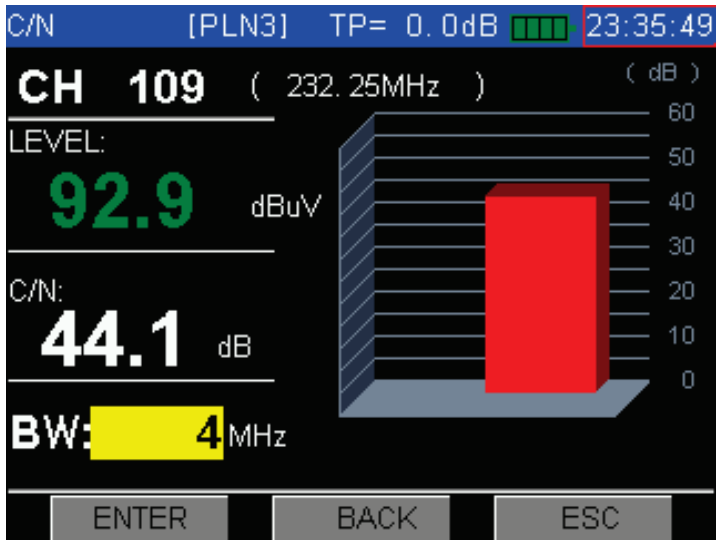


Figure 4-59

User also can press F3 switch several often used noise correction bandwidth setting.

The F1 (RENEW) button is used to update test result.

4.16 Fiber Optical Connector Introduction

Fiber optical connector is the most commonly used passive optical fiber device. It connect two optical fibers' end faces, realize optical signal continue transmission. You can find optical connector at many position: optical fiber end face, passive optical fiber device input and output port, active optical equipment input and output port and fiber jumper.

Optical fiber connector is composed by pin and connector, example FC/PC type connector. "FC" at the front side of the symbol "/", means outside connect type. Often used outside connection type: FC, SC, ST, LC, MU, MT-RJ, D4, E2000. "PC" at the back of symbol "/", means the shape of the pin end face. Often used the shape of the end face: PC, APC, UPC.

Usually, we according to optical fiber

- Straight physical contact (PC)

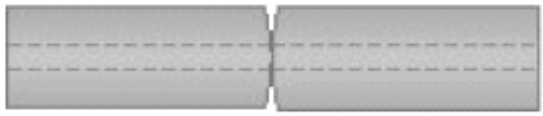


Figure 4-60

The fiber ends are pressed together in the connector. There is no air gap left to cause reflections. The return loss is30 – 55 dB.

This is the most common connector for single mode fibers(for example FC/PC, ST, SC/PC, DIN, HMS, E 2000 connectors).

- Slanted (angled) physical contact (APC)

Figure 4-61

In these connectors the ends of the fibers are slanted. Again no air gap is left. This gives the best return loss(60-80 dB).

These connectors are used for high-speed telecom and CATV links (for example FC/APC, SC/APC, E 2000-HRL connectors).

- Straight air gap

Figure 4-62

Inside these connectors there is a small air gap between the two fiber ends. Their return loss is less than 14 dB and the reflection is fairly high.

Straight air gap connectors, for example ST connectors, are used for multimode fibers.

Common connector illustration

Figure 4-63 FC Fiber Optical Connector

Figure 4-64 SC Fiber Optical Connector

Figure 4-65 ST Fiber Optical Connector

DS2460 use FC/SC/ST replaceable connector interface, user can replace different appropriate connector interface according to field application environment.

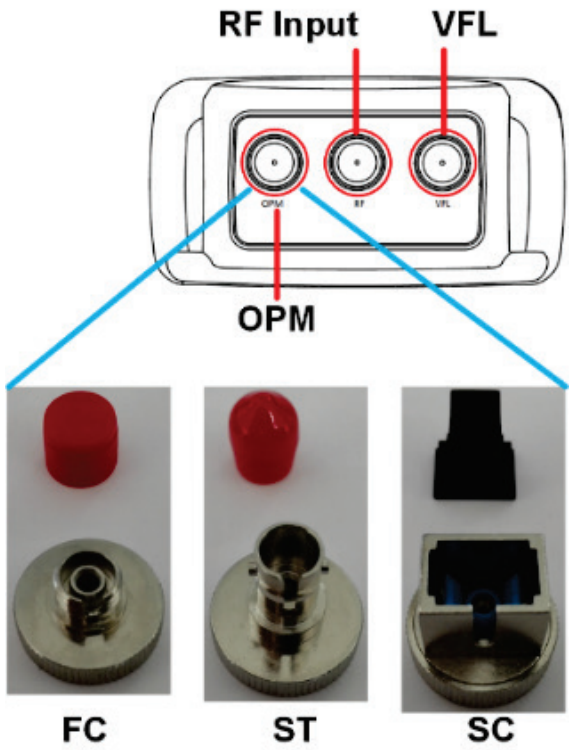


Figure 4-66

4.17 Optical Power Meter(Option)

Press to return to main menu interface and press (PAGE2) and use arrow buttons to select the OPM icon, and then press to enter OPM function. As show in Figure 4-67.

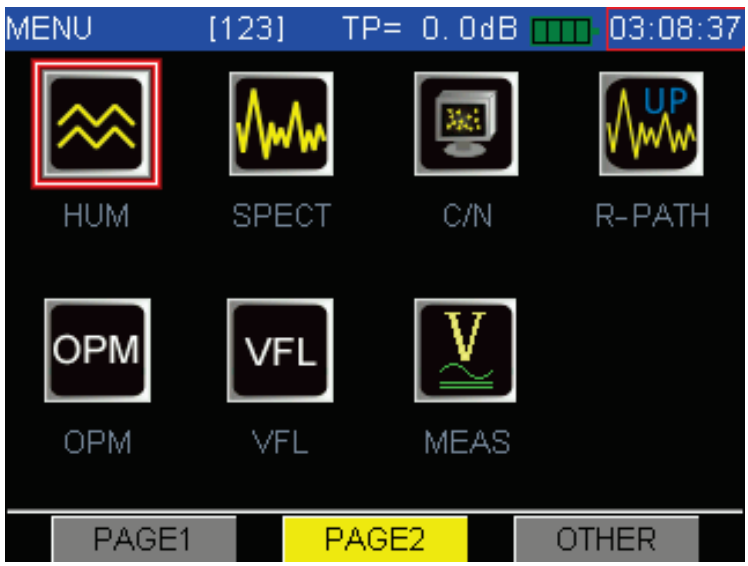


Figure 4-67

The Figure 4-68 is optical power meter screen snapshot.

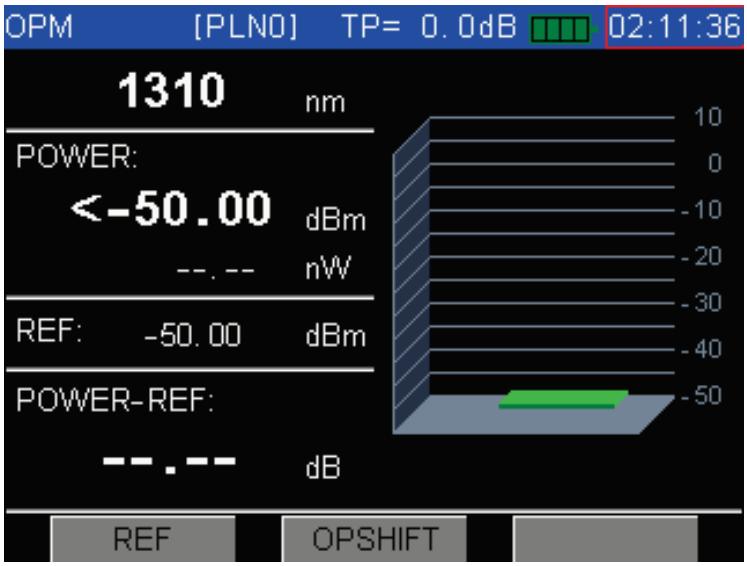


Figure 4-68

Operation steps:

(1) Connect optical power meter signal input port and under test optical fiber;

(2) Press to return to main menu interface and press F2 (PAGE2) and use arrow buttons to select the OPM icon, and then press to enter OPM function.;

(3) Use the use the and 2DFE buttons to choose the right wavelength, the related optical power measurement results display on the screen.

(4) Press button to quit OPM function.

Press the F2 (OPSHIFT), the Figure 4-68 will display, if user long time use the optical power meter, the test device has a little drift, user can use this function do compensation the drift or offset operation.

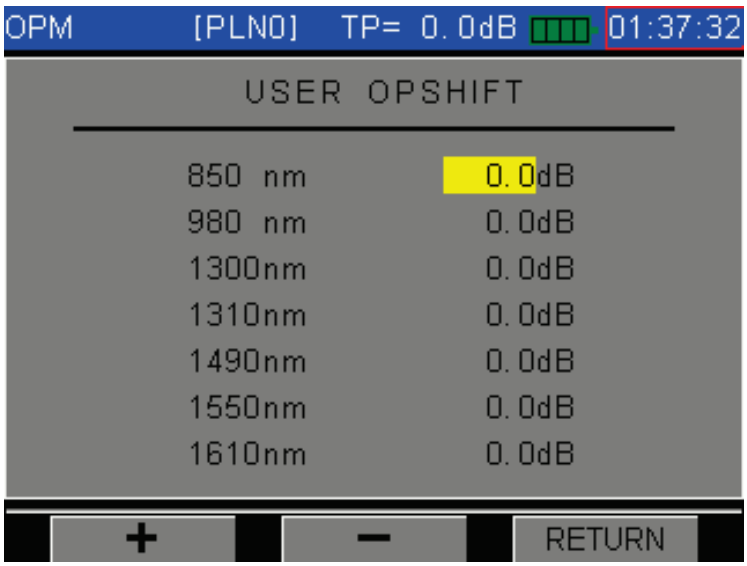


Figure 4-69

The offset means the optical measurement device drift (any analog device has drift character, according to temperature or device ageing), if you use the optical power meter for a long time, this meter need back to factory does calibration. If you don’t sent the meter to factory to do calibrate. You can use compensation function. If you also have other standard optical power meter, you can reference the

standard OPM. Example, the standard OPM measurement results is -5dBm, your OPM measurement results is -6dBm, it means your OPM has 1dBm offset for a long time using. You need do some compensation by yourself. Now you enter 1dBm in OFFSET position on one wavelength, press enter button, quite compensation menu. Now you measurement same signal, you can find the test result display -5dBm (-6dBm +1dBm=-5dBm), same with standard OPM. You can use your OPM for a long time again. Several months later, you need compare with standard OPM again, if your OPM has offset, you need compensation again.

dBm and mW Conversion Table

dBm	W	mW
30.0	1W	1000
20.0	100mW	100
10.0	10mW	10
7.0	5mW	5
0.0	1mW	1
-3.0	500μW	0.5
-10.0	100μW	0.1
-20.0	10μW	0.01
-30.0	1μW	0.001
-40.0	100nW	0.0001

4.18 Visual Fault Location (Option)

In practice, engineer often use one type red light source to local optical fiber breakpoint. This type red light source usually called visual fault locator.

Press to return to main menu interface and press (PAGE2) and use arrow buttons to select the VFL icon, and then press to enter VFL function. As show in Figure 4-70.

User only need press to control VFL ON/OFF.

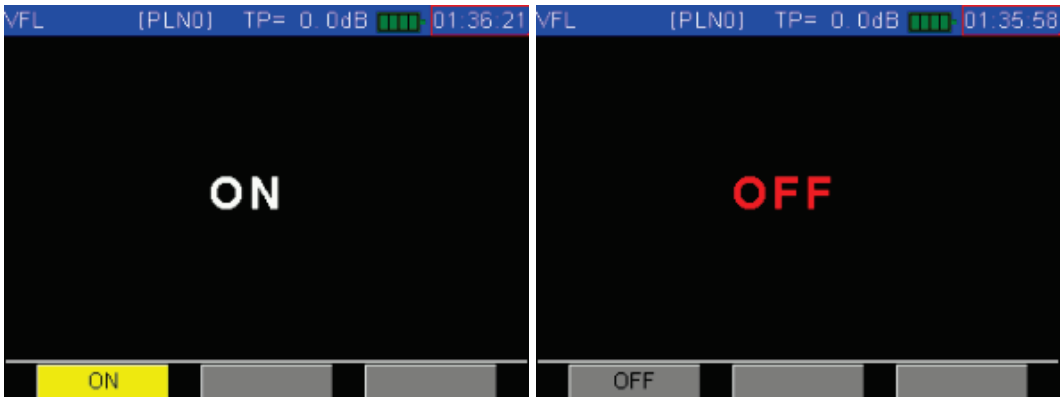


Figure 4-70

In any case, user forbidden directly use the VFL output port towards himself or other person eyes. Doing so may causethe irradiated people damageto your eyesightand even blindness!

4.19 TDR (Option)

TDR, OPM and VFL three functions, user only can choose two functions. Because DS2460Q only has three ports, one for RF signal, and other two for options.

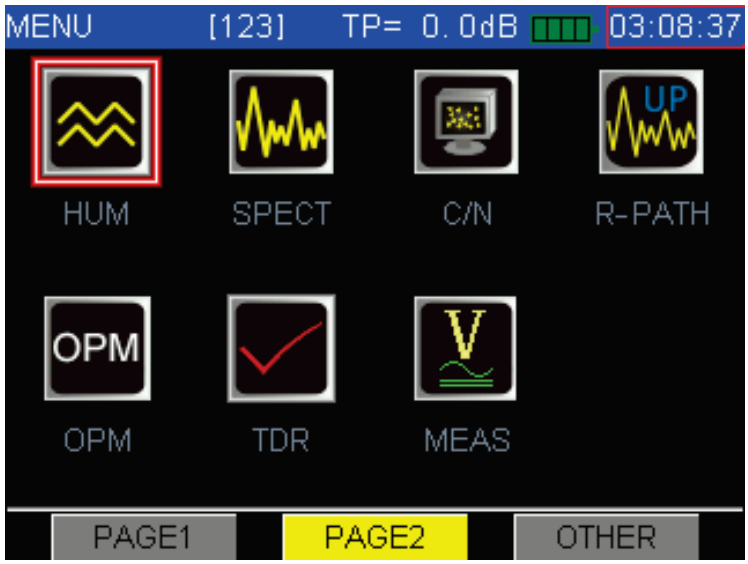


Figure 4-71

TDR (Time Domain Reflectometer) can display cable fault on LCD by curve mode and automatic calculate the distance from the measuring position to fault location. The TDR option is only used for 75Ω coaxial cable. Before start measurement, the first step is setup the span (measuring range), it is an estimate

value. User need according to the local environment to estimate the measuring range.

The second step is setup PLUSE (PULSE bandwidth). The shorter the test distance, the narrower the pulse width; the longer the cable / line distance tested, the wider the pulse width. The last one parameter is RATIO (Velocity of Propagation). The velocity of a signal in free space is the speed of light or 2.997925 x 10^8m/s (this is generally accepted to be approximately 3x10^8 m/s. The velocity of a signal in a medium is less than that in free space and is dependent on the permeability and permittivity of the materials.). The manufacturer should provide the velocity of propagation of coaxial cable. Press the button F3 [START], start the measurement.

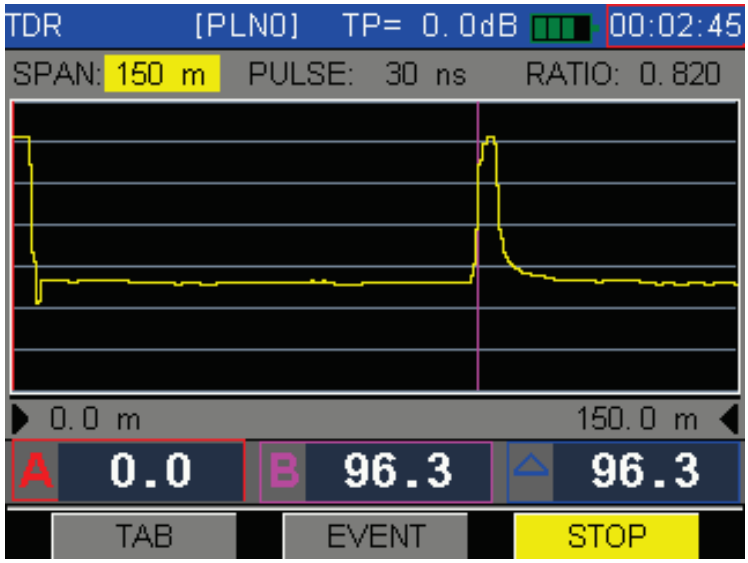


Figure 4-72

Electrical pulses are transmitted into the cable, and a portion of the pulse energy will be reflected back to the instrument from cable discontinuities or faults.

When the cable has Open Circuit fault, the reflection pulse is positive, as the Figure 4-73 show.

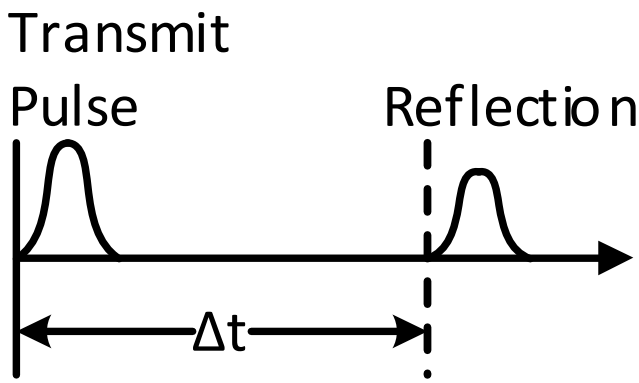


Figure 4-73

While the cable has Short Circuit fault, the reflection pulse is negative, as the Figure 4-74 show.

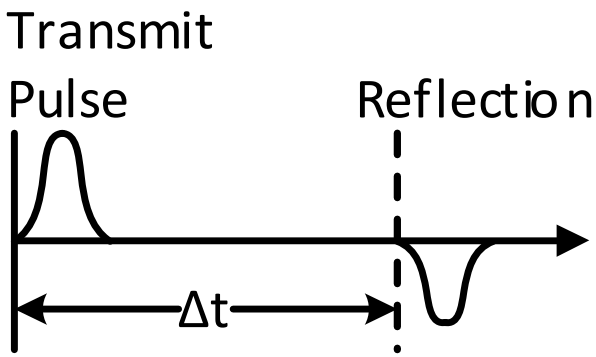


Figure 4-74

The waveform is upward also indicate the high impedance serial or the characteristic impedance of cable has significant change. The waveform is downward also indicate the T-joint or the cable has the lower characteristic impedance. The short circuit and open circuit has the great reflection, the bad connection or other minor discontinuities has the small reflection.

If you not find any reflection on screen, maybe no fault location on the cable or the fault location position beyond the current setup measuring range.

TDR function has several measuring range options:

50m, 150m, 300m, 600m, 1200m, 2400m.

TDR function has several pulse width options: 10ns, 30ns, 50ns, 100ns, 300ns, 500ns, 1000ns.

The velocity of propagation range: 0.60 ~ 1.00.

4.20 PING Test

Press to return to main menu interface and press (OTHER) and use arrow buttons to select the HUM icon, and then press to enter C/N function. As show in Figure 4-76.

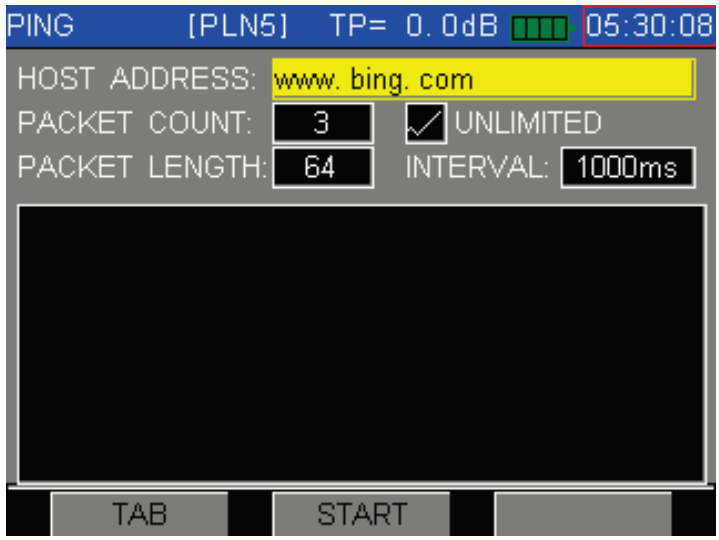


Figure 4-75

If user want to start PING test, user must setup the DS2460Q network address. As show in the Figure 4-76. If you want to directly PING web site domain name, you must configure the DNS server IP address. If you don’t configure the DNS server IP address, you only can PING IP address.

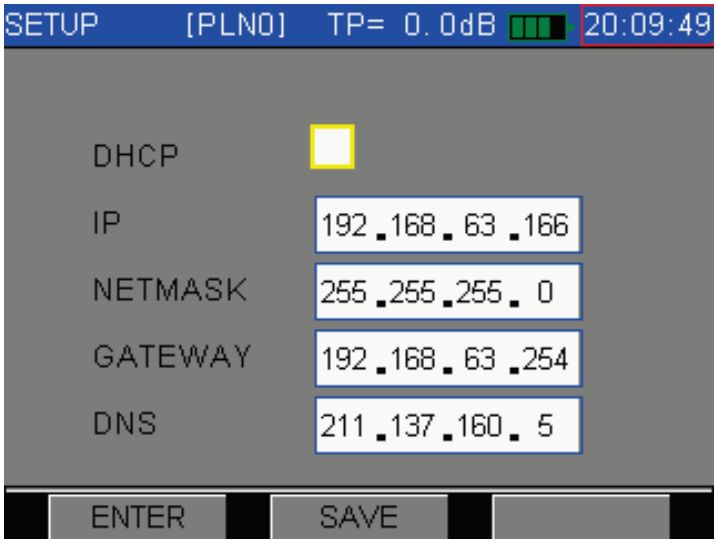


Figure 4-76

The PING function parameters introduction.

HOST ADDRESS: Input the network address or the desired IP address to be tested in the host address box at the top (for example: www.google.com).

PACKET COUNT: the number of data packets sent by the assigned PING order.

UNLIMITED: if this box is checked, the PING function will be continuous until the test is interrupted by pressing the stop button.

PACKET LENGHT: the package length: of the PING request

INTERVAL: time interval delay between ping packets,

in ms.

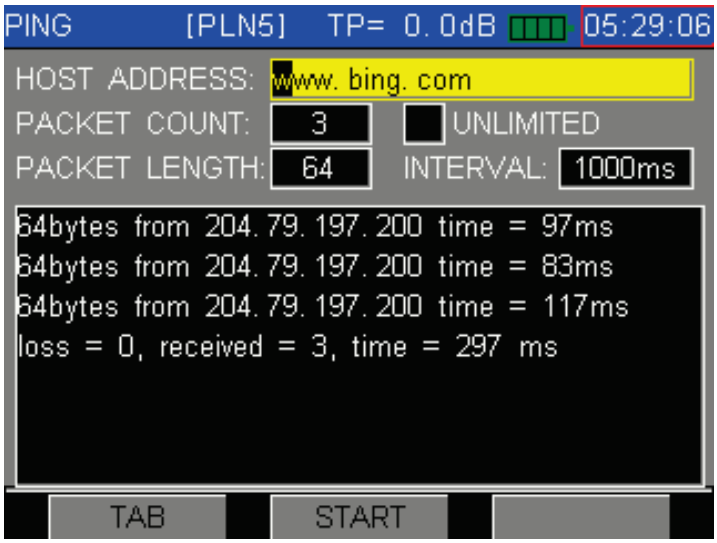


Figure 4-77

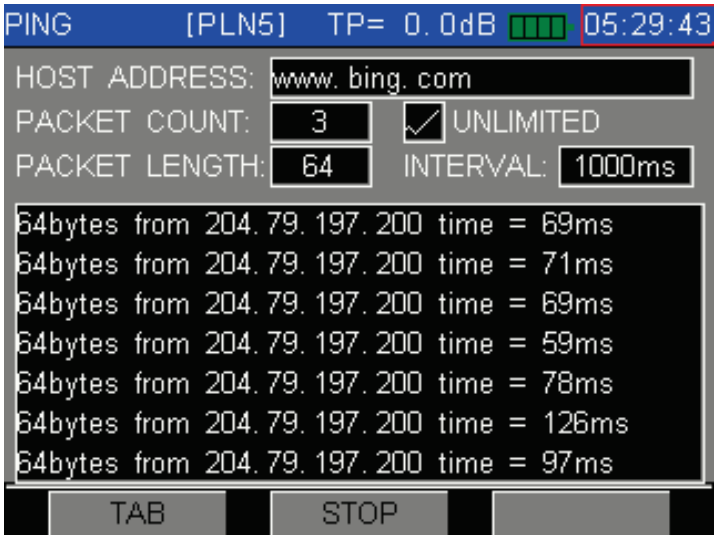


Figure 4-78

4.21 File Management

DS2460Qhas independent memory space to store the measurement data. The measurement data of level test(analog channels),QAM test(digital channels), channel scan, tilt, frequency spectrum measurement and HUM can be stored into files.

4.21.1 File Directory

Press to return to main menu interface and press (OTHER) to select the FILES icon, and then press to enter FILE management function as Figure 4-79.

In file list menu, All saved files was list with file type, names, date and time.

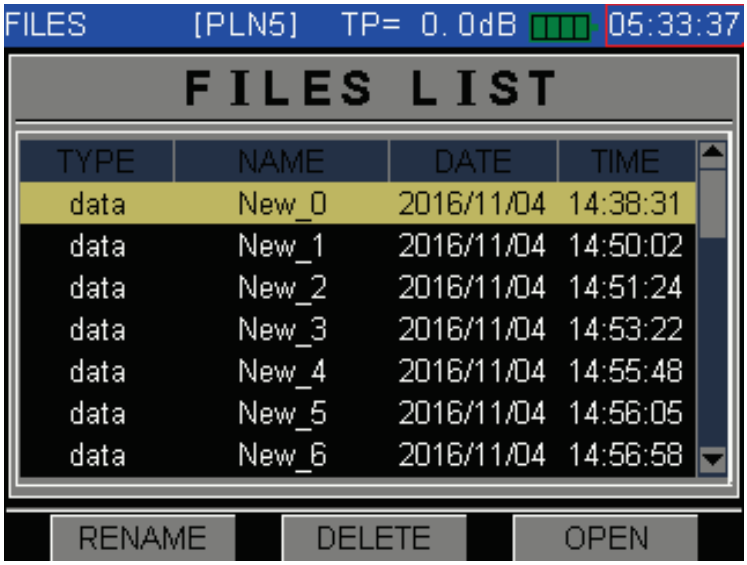


Figure 4-79

4.21.2 Save File

If you are making measurements in LEVEL, TILT, SCAN, SPECT, LIMIT and HUM(at least one of them), Press 4JKL button, and the screen will display as Figure 4-80.The program automatic setup a file name. If you want to modify the file name, press the 0FCN button, then input the letter and number, as show in Figure 4-81.

In any function screen, press the 5MNO button, the program saved file is screen snapshot, as show in Figure 4-82.

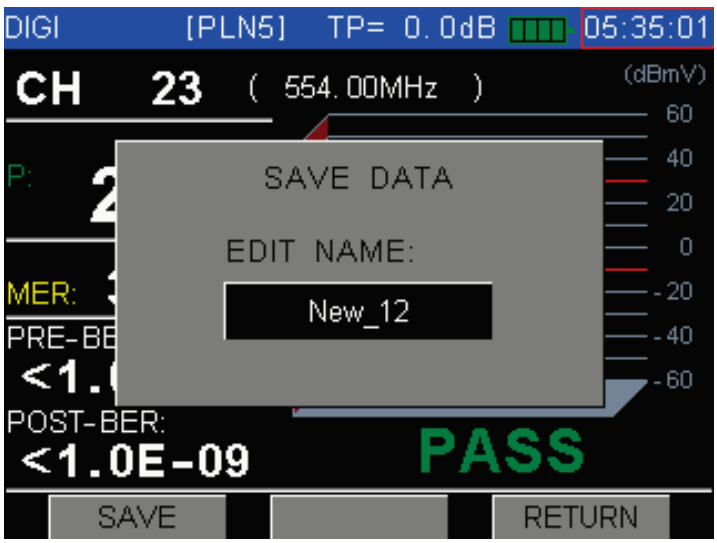


Figure 4-80

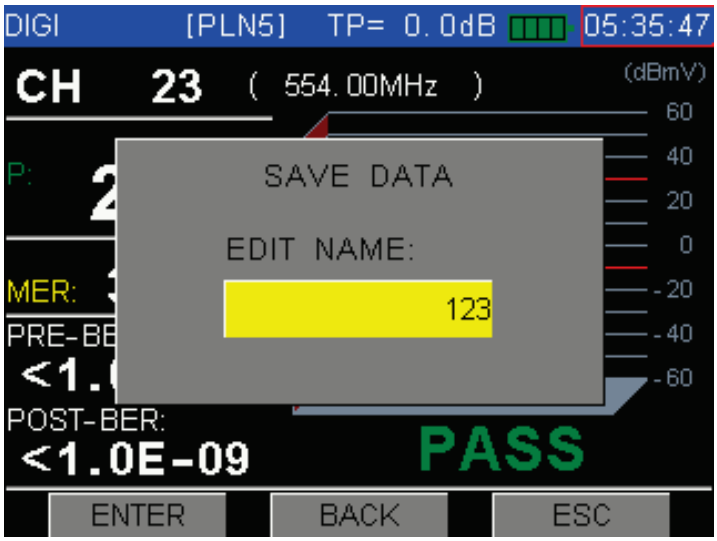


Figure 4-81

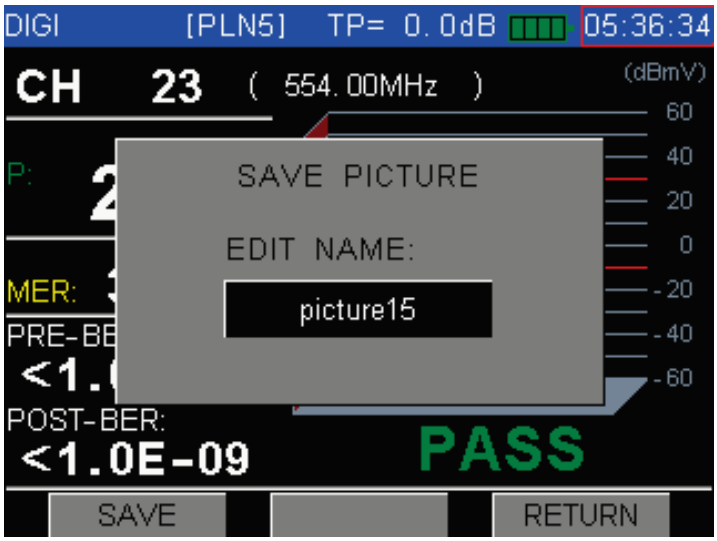


Figure 4-82

4.21.3 Read File

Press to return to main menu interface and press F3(OTHER) to select the FILES icon, and then press to enter FILE management function as Figure 4-79.

Press and 2DFE button, move the cursor, and then press F3 to open the file. “OPEN THE FILE” dialog will display as show in Figure 4-83.

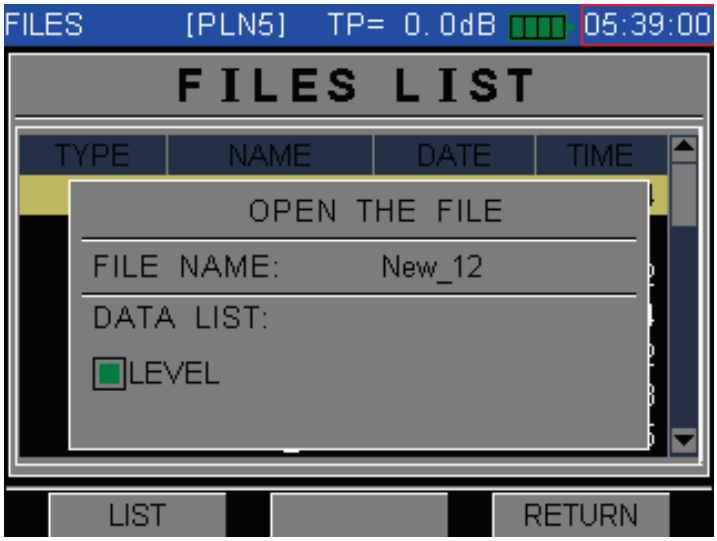


Figure 4-83

Normally, the data items can be opened using LIST mode(F1), press or 2DFE to select the data item or press F2(PRE PAGE)/F3(NEXT PAGE)to select data item in LIST mode as show in Figure 4-84,

Figure 4-85, Figure 4-86, Figure 4-87, Figure 4-88.

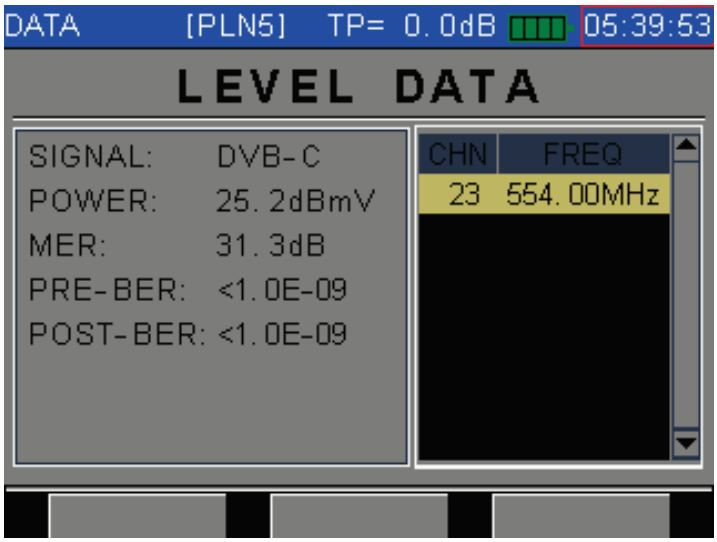


Figure 4-84

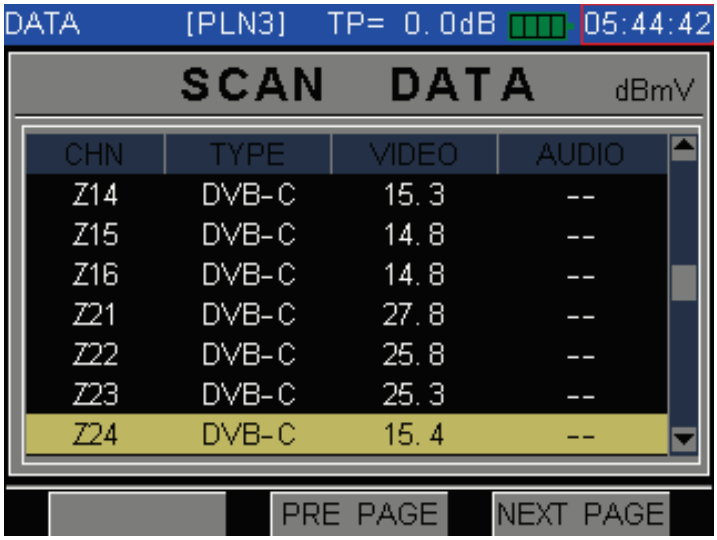


Figure 4-85

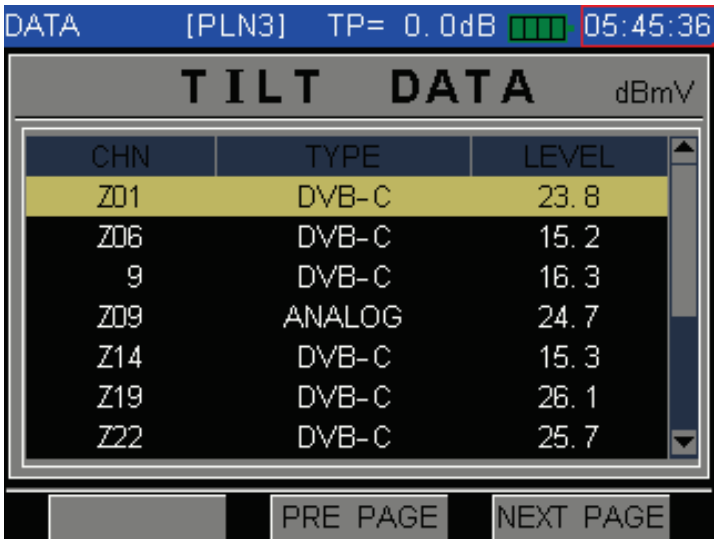


Figure 4-86

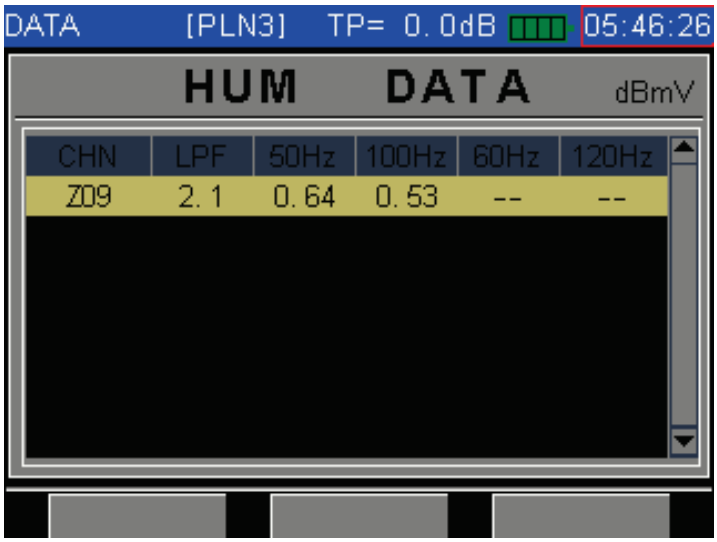


Figure 4-87

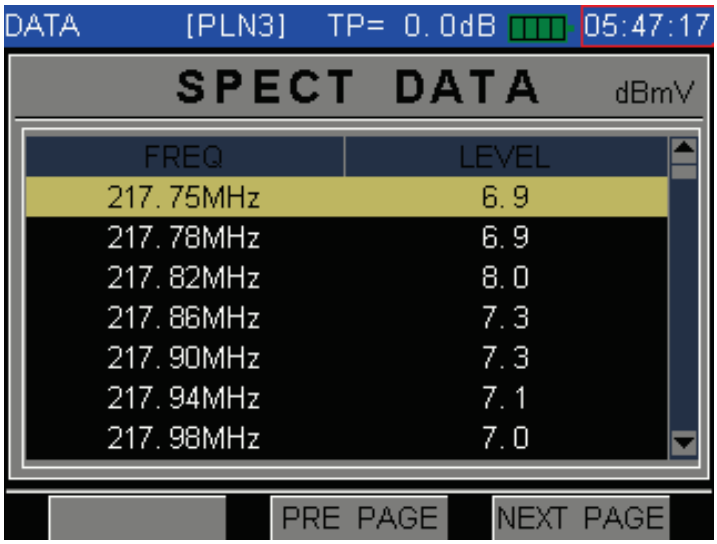

DATA
[PLN3]
TP= 0.0dB
05:47:17
SPECT DATA
dBmV
FREQ
LEVEL
217.75MHz
6.9
217.78MHz
6.9
217.82MHz
8.0
217.86MHz
7.3
217.90MHz
7.3
217.94MHz
7.1
217.98MHz
7.0
PRE PAGE
NEXT PAGE

Figure 4-88

4.21.4 Delete File

Select one file by press or

and press DELETE(F2) to delete this selected file, the “DELETE FILE” dialog will display as Figure 4-89.

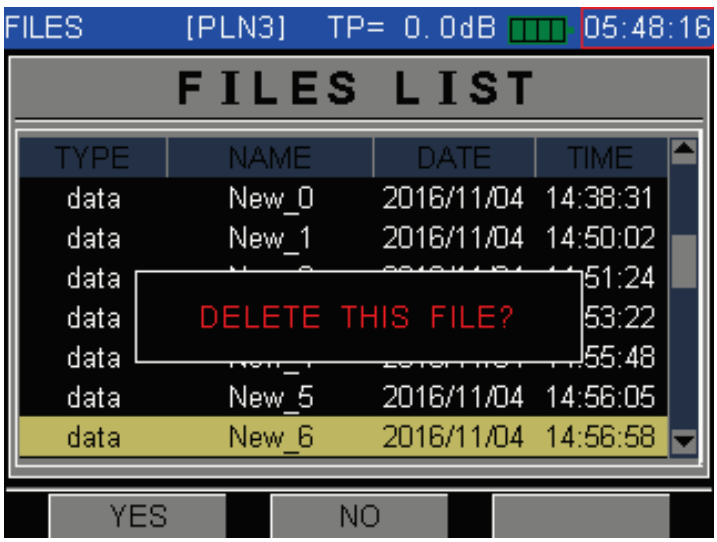


Figure 4-89

Press (ENTER)F1 in Figure 4-89, the file will be deleted as Figure 4-90.

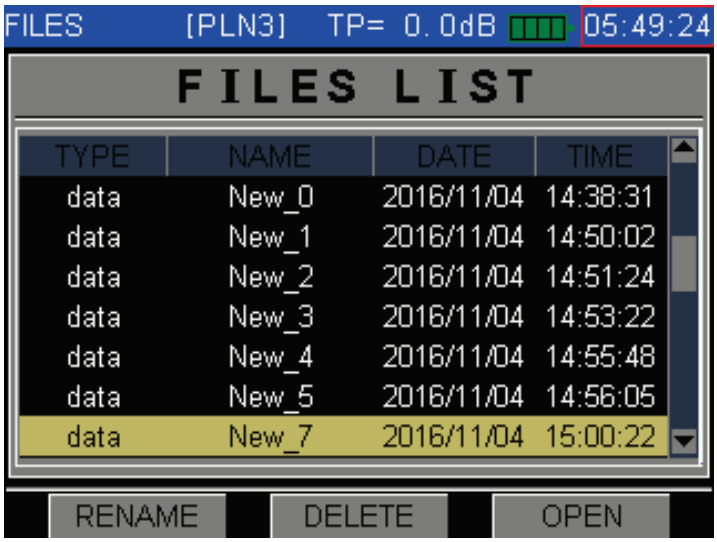

FILES
[PLN3]
TP= 0.0dB
05:49:24
FILES LIST
TYPE
NAME
DATE
TIME
data
New_0
2016/11/04
14:38:31
data
New_1
2016/11/04
14:50:02
data
New_2
2016/11/04
14:51:24
data
New_3
2016/11/04
14:53:22
data
New_4
2016/11/04
14:55:48
data
New_5
2016/11/04
14:56:05
data
New_7
2016/11/04
15:00:22
RENAME
DELETE
OPEN

Figure 4-90

5 Setup

5.1 Brief Introduction

Press to return to main interface and press F3 open the other page, select the SETUP icon, and then press to enter SETUP menu as show in Figure 5-1.

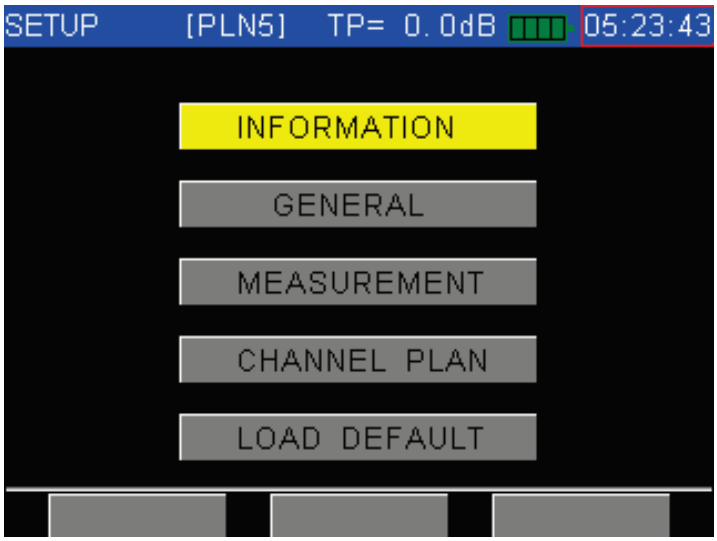


Figure 5-1

*__INFORMATION__: General information of the DS2460Q, includes manufacturer information, version and so on.

* **GENERAL**: The setup includes auto shutdown time setting, language selection , date and time setting , files status and system upgrade(NOT INSTALL) .

* **MEASUREMENT**: Level unit, TP compensation, Limit select, Limit setup, Auto diagnosis and Measure mode.

* **CHANNEL PLAN**: The setup for channel plan includes user plan selection, learn and edit user plan.

* **LOAD DEFAULT** : Load the default values of system configuration.

5.2 Information

This is the information of the instrument, Refer to Figure 5-2.It includes serial number, software version , hardware version, calibration date and so on.

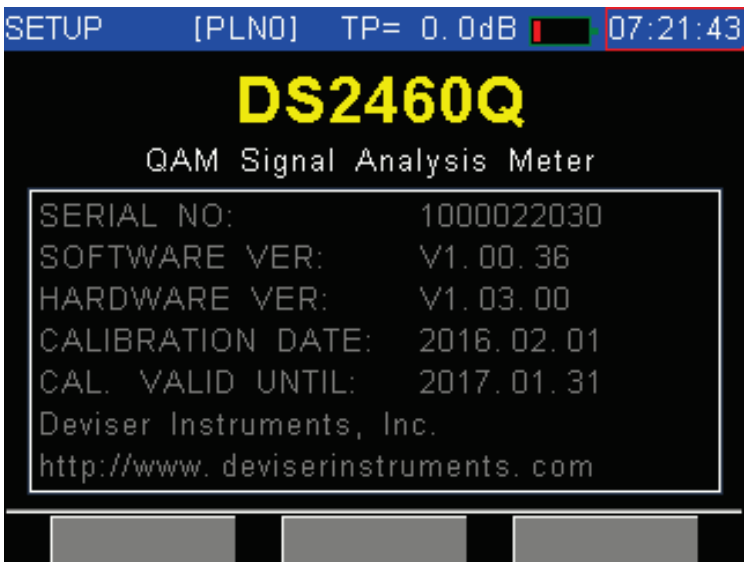


Figure 5-2

5.3 General

5.3.1 Meter Shutdown Time

To save the power, the instrument can be set to shutdown automatically for inactive keypad after 3 minutes, 5 minutes, 10 minutes ,30 minutes and ON(never shutdown mode), as show in Figure 5-3.

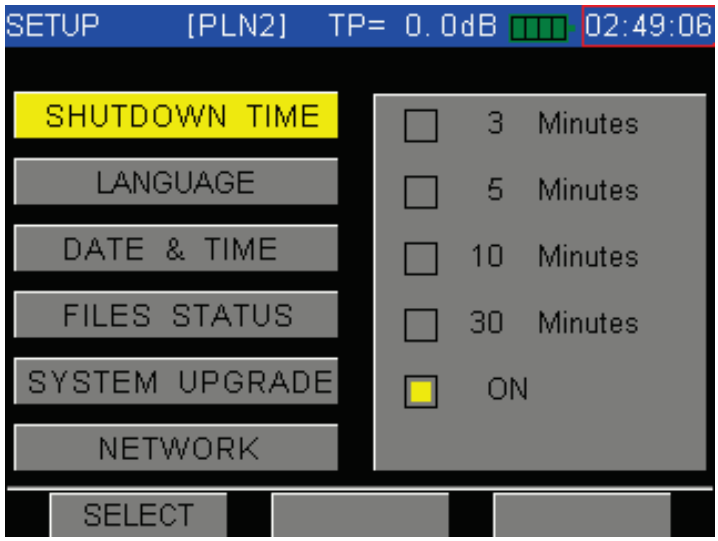


Figure 5-3

5.3.2 Language Selection

The language of DS2460Q can switch among English, Dutch, Russian and Korean as Figure 5-4. After choose, instrument will transform menu automatically. The DS2460 have plan support more languages.

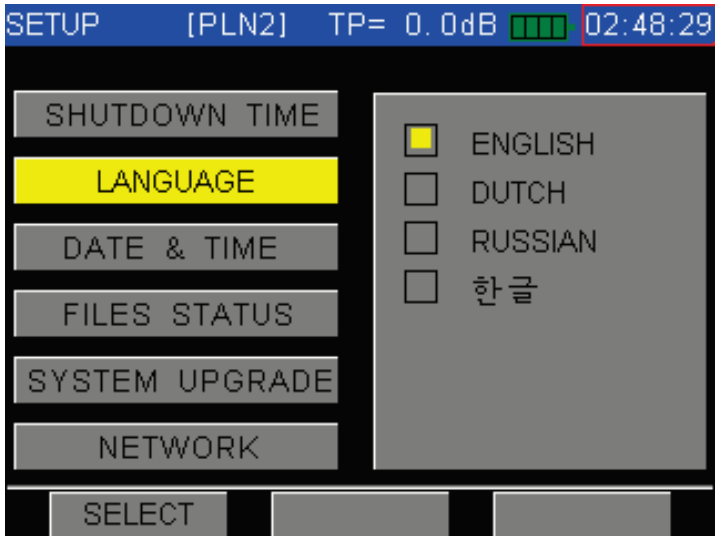


Figure 5-4

Note： Contact Deviser for more languages.

5.3.3 Date and Time

When there is something wrong in system date or clock, user can calibrate new date or time, as Figure 5-5.

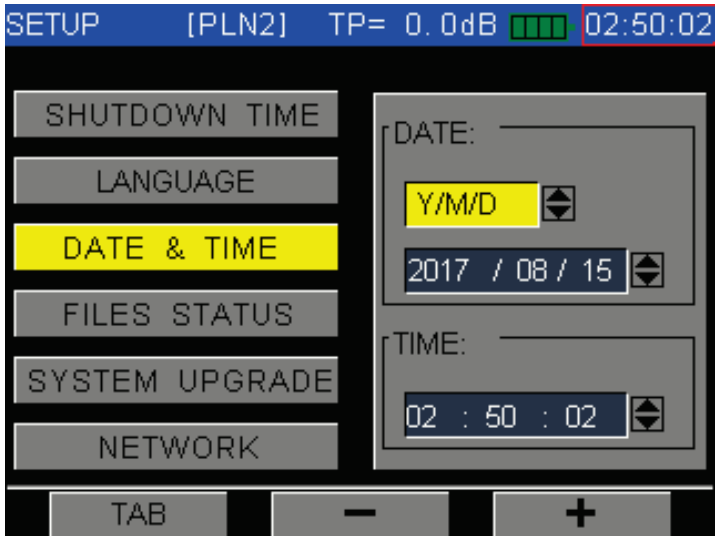


Figure 5-5

5.3.4 Files Status

This interface shows the number of files have been saved, and also show the Memory status as Figure 5-6.

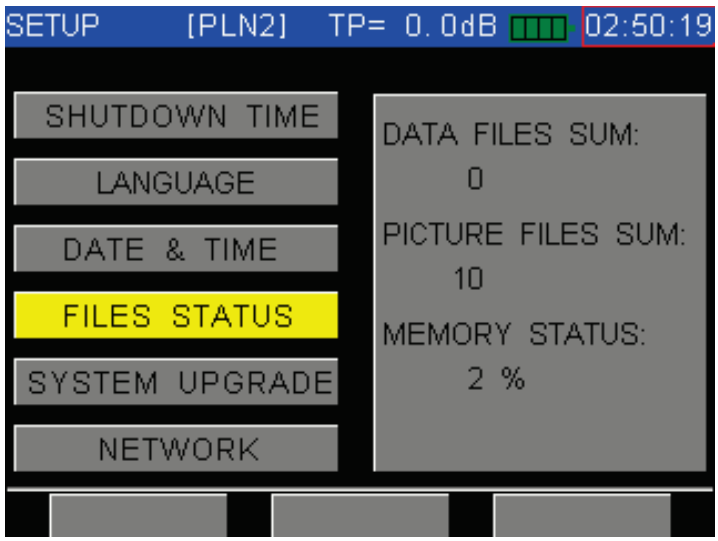


Figure 5-6

5.3.5 System upgrade

This function is used to open DS2460Q option. Now DS2460 provide four options: OPM, VFL, EQUALIZER, 8VSB. Now, the DS2460Q doesn't provide TDR option, but DS2460Q has plan to provide TDR option.

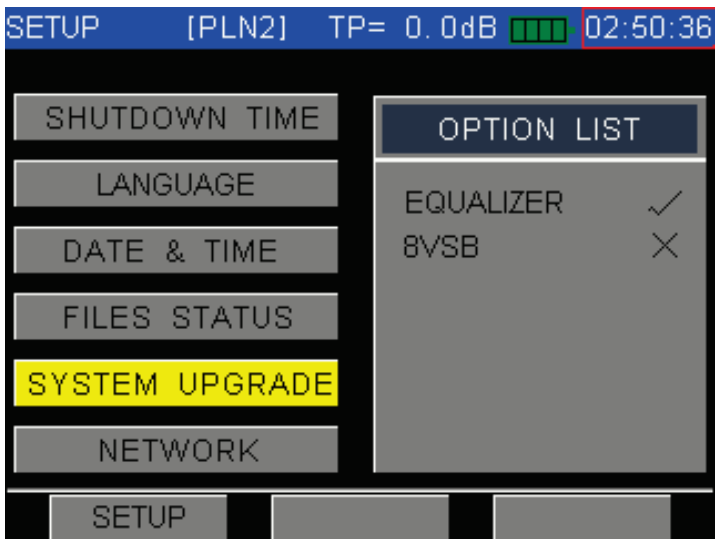


Figure 5-7

If user want to open one option, he must ensure the related hardware also install in DS2460Q. If the related option's hardware has installed in the DS2460Q, the user only need contact with the sales, get the option's password, then open the Figure 5-7 interface, press the F1 (SETUP) to open the

password input dialogue box, show as the Figure 5-8. Press the 0FCN button, the user can input the password, show as the Figure 5-9.

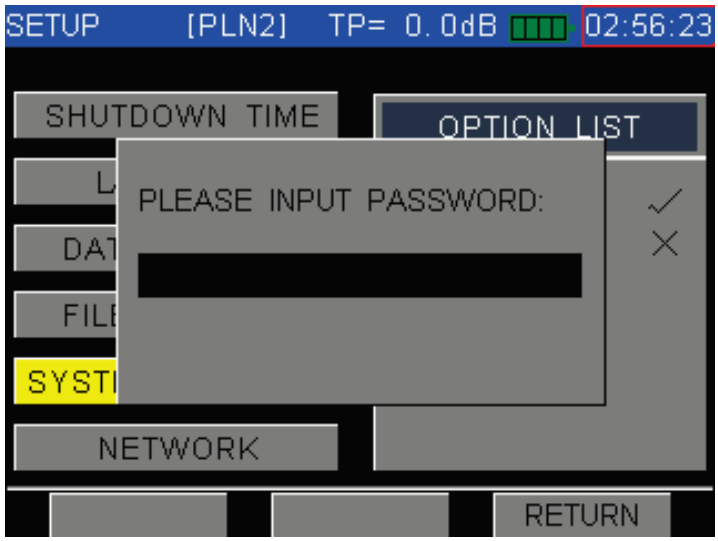


Figure 5-8

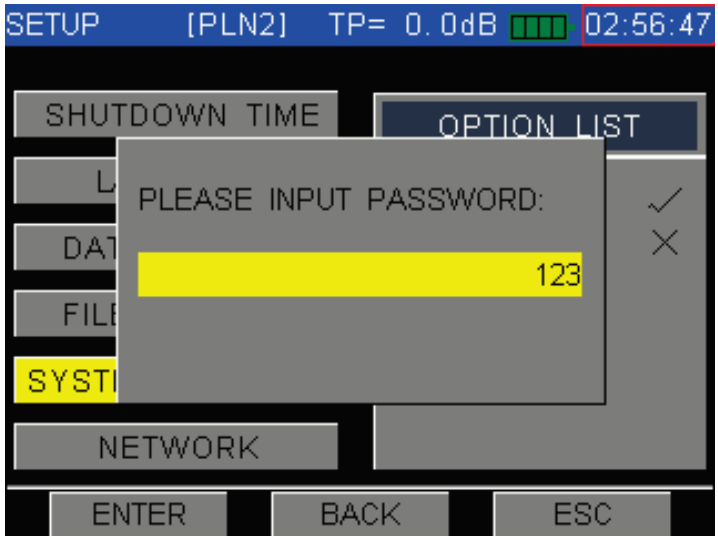


Figure 5-9

5.3.6 Network

DS2460Q has one RJ-45 Ethernet port and support PING function, so the network setting feature is must. In general setup screen, move the cursor on "NETWORK" item. Press F1 (ENTER) or ✓ button. The network setup screen address can be opened, as show in the Figure 5-10 and Figure 5-11.

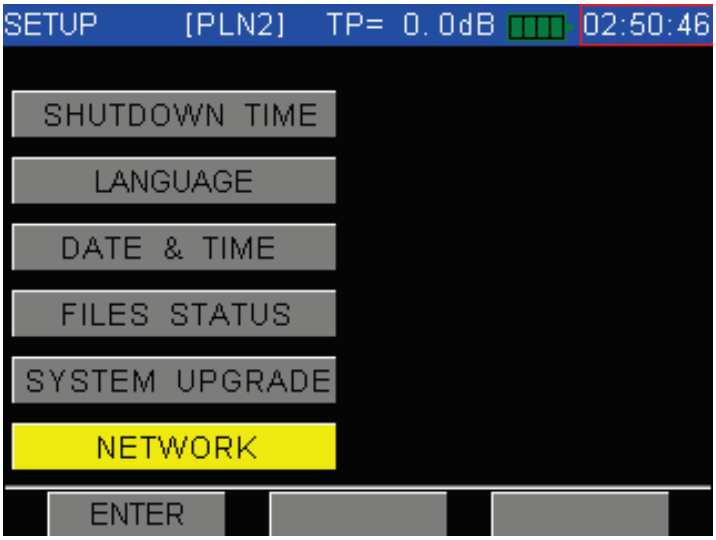


Figure 5-10

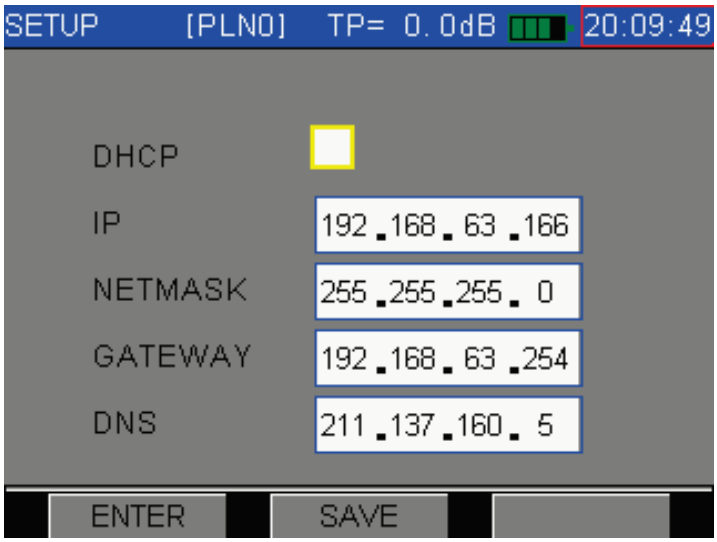


Figure 5-11

The Figure 5-12 show the PING measurement snapshot.

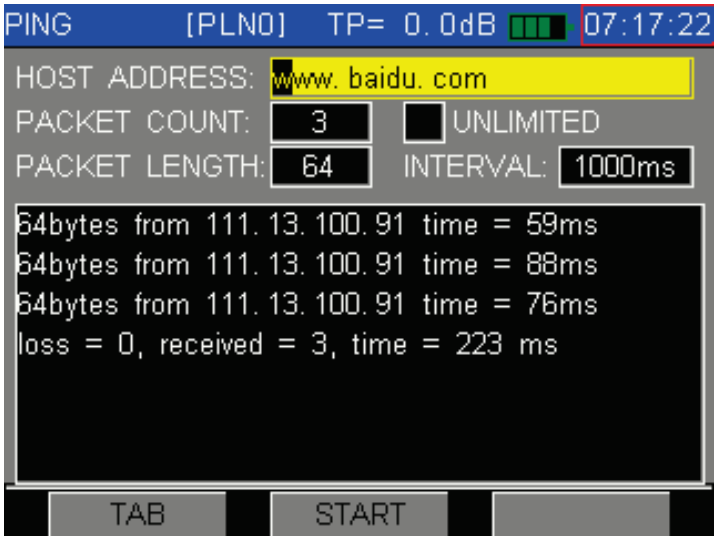


Figure 5-12

5.4 Measurement Parameter Setup

5.4.1 Level Unit

There are different units of measure for different countries and industries, the DS2460 supports 3 unit formats: dBmV, dBµV and dBm and will automatically convert values for convenience and better user experience.

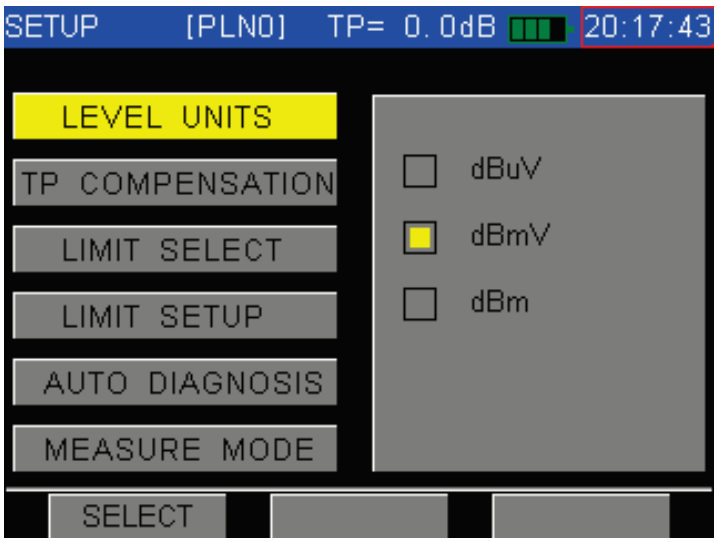


Figure 5-13

5.4.2 TP Compensation

When the cursor is moved to “TP COMPENSATION”, use the and button or (TAB) move the cursor on the different check box, TEST POINT value and PROBE value. TP compensation can be edited and applied only if the related box is checked.

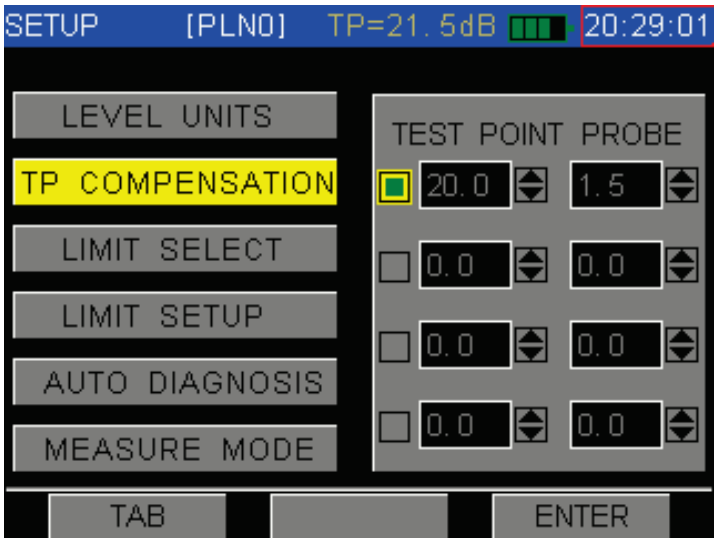


Figure 5-14

The typical optical receiver test point loss is 20dB, if so, the user can input the required TEST POINT compensation. (20dB in this example) Some probes along with specific length of cables may account for 1.5dB loss (in this example), the user can input that

PROBE value in the probe correction box. In this example, the total correction value is 21.5dB. In the measurement interface, the instrument will add TP COMPENSATION=21.5dB in the test result. After total compensation, the test result will display the true network measurement values.

On DS2460 user can setup max four groups TP compensation values. At different position, user can active different TP compensation values.

If the cursor one the one group compensation value check box position, user can use the F3 (ENTEN) to check this group compensation. If the cursor position is on the TEST POINT value or PROBE value position. User can use F2 (-) and F3 (+) to modify the compensation value.

Because DS2460 default setup user must choose one group compensation, one group compensation value need set to zero for those don’t need any compensation measurement.

5.4.3 Limit Select

DS2460Q support 10 group limits setting. If the cursor move to “LIMIT SELECT” position. User can use the and button move the cursor on different group limit setting and press F1(SELECT) or button to confirm you choice. Press F2(RENAME) can give the related limit setting a new name. User need press button to input the letter and number at the same time.

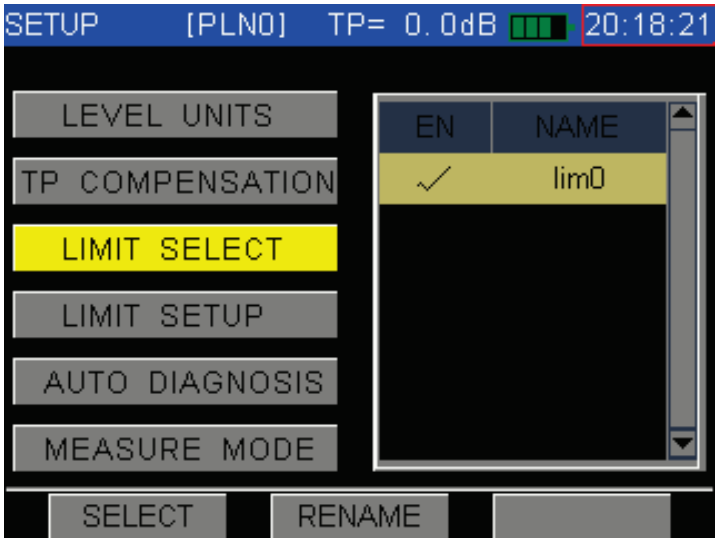


Figure 5-15

5.4.4 Limit Setup

Three pages of Limit setting have been provided as show in Figure 5-16, Figure 5-17 and Figure 5-18. Six Limit items included in page one(1/3) , which is used for single analog channel test. The default value of these Limit items are list as

Table 5-1. The range of these Limit items are list as Table 5-2. The difference between MAX VIDEO and MIN VIDEO must be larger than 6dB.

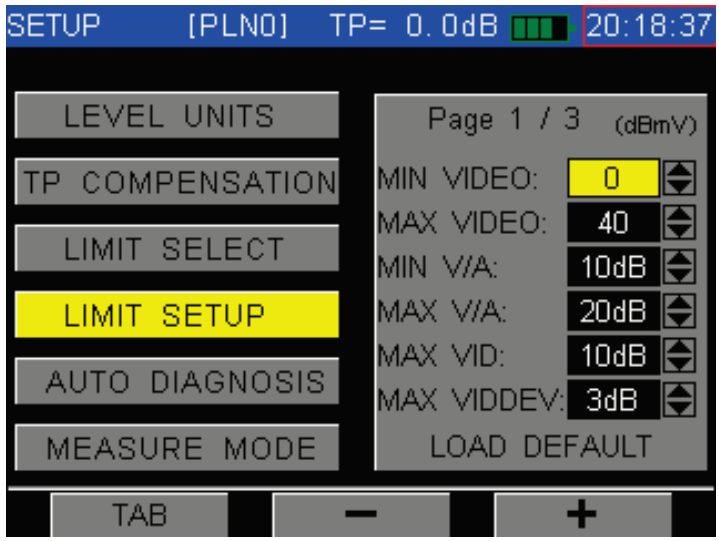


Figure 5-16

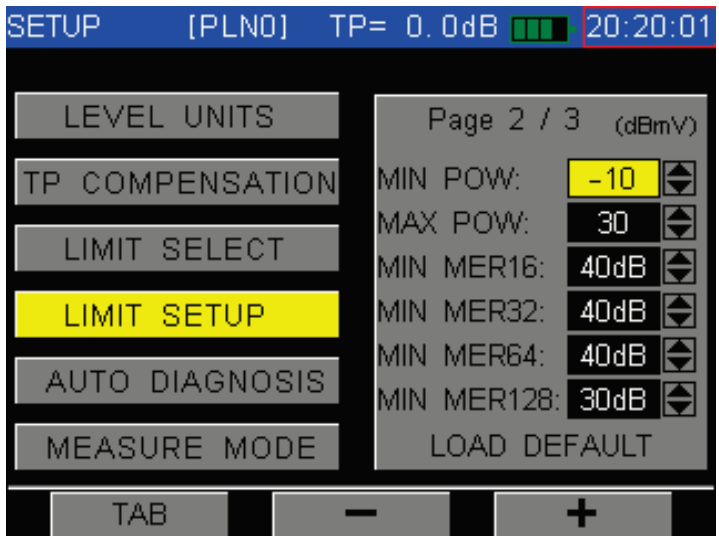


Figure 5-17

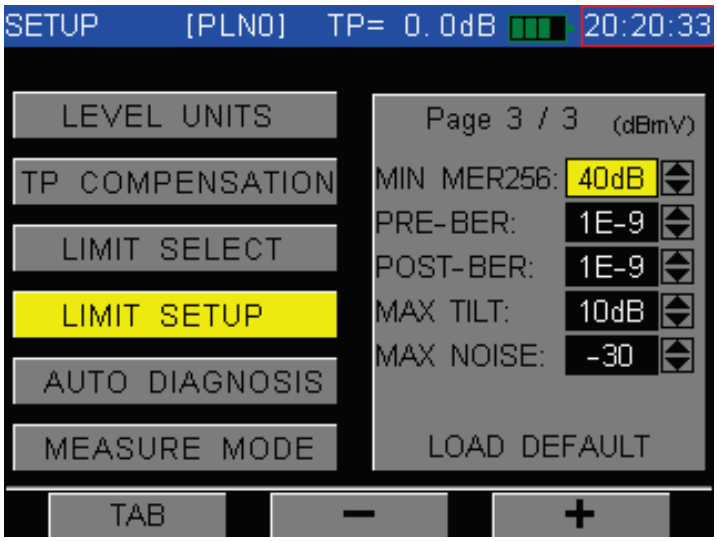

SETUP
[PLN0]
TP= 0.0dB
20:20:33
LEVEL UNITS
TP COMPENSATION
LIMIT SELECT
LIMIT SETUP
AUTO DIAGNOSIS
MEASURE MODE
Page 3 / 3
(dBmV)
MIN MER256:
40dB
PRE-BER:
1E-9
POST-BER:
1E-9
MAX TILT:
10dB
MAX NOISE:
-30
LOAD DEFAULT
TAB
−
+

Figure 5-18

Table 5-1

Item	Limit
Minimum Video level	60dBμV
Maximum Video level	100dBμV
Minimum △ V/A	10dB
Maximum △ V/A	20dB
Maximum VID	10 dB
Maximum VID DEV	3 dB

Table 5-2

Item	Limit
Minimum Video level	30~99dBμV
Maximum Video level	31~120dBμV
Minimum △ V/A	0~19dB
Maximum △ V/A	1~30dB
Maximum VID	1~30 dB
Maximum VID DEV	1~20 dB

Page two(2/3) is used for digital channels test, five limit items list include of MIN POWER, MAX POWER, MIN MER, MAX PRE-BER and MAX POST-BER. The

default value of these Limit items are list as Table 5-3. The range of these Limit items are list as Table 5-4. The difference between MAX POWER and MIN POWER must be larger than 6dB.

Table 5-3

Item	Limit
Minimum Power level	50dBμV
Maximum Power level	90dBμV
Minimum MER	32dB
Maximum PRE-BER	1.0E-9
Maximum POST-BER	1.0E-9

Table 5-4

Item	Limit
Minimum Power level	25~89dBμV
Maximum Power level	26~110dBμV
Minimum MER	20~40dB
Maximum PRE-BER	1.0E-3~1.0E-9
Maximum POST-BER	1.0E-3~1.0E-9

Page three(3/3) is used for tilt measurement, two limit items list including of MIN TILT and MAX TILT. The default value of these Limit items are list as Table 5-5. The range of these Limit items are list as Table 5-6.

Table 5-5

Item	Limit
Minimum Tilt Delta	10dB
Maximum Noise	30dBμV

Table 5-6

Item	Limit
Minimum Tilt Delta	0~30dB
Maximum Noise	-10~30dBμV

To set the test limit, you can choose limit item by press TAB(F1), and then press F2(-) or F3(+) to adjust it. If you want to load default values of all limit items on each page, please press the TAB(F1) to choose the LOAD DEFAULT button on the bottom of that page, and then press F3(ENTER) to confirm.

NOTE: If the digital channels have been included in tilt measurement with analog channels, the power of digital channels will be add a fixed offset so that it can be compare with video of analog channels.

5.4.5 Auto Diagnosis

You can enable the auto diagnosis function(PASS and FAILURE) as Figure 5-19.

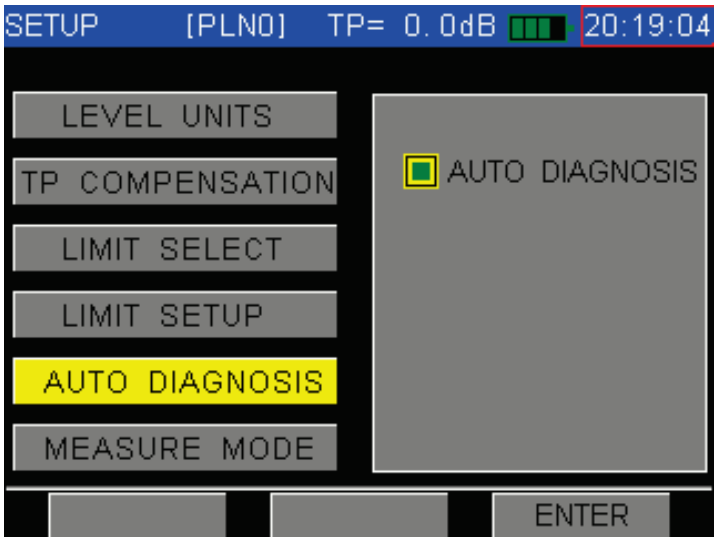


Figure 5-19

NOTE: Before the auto diagnosis function can be work correctly, the Limit items must be set the valid values.

5.4.6 Measure Mode(Option)

The DS2460 offers adaptive equalizer setup : Long Taps and Short Taps. Long Taps can better suppression ISI (Inter Symbol Interference) and co-frequency interference.

Short taps equalizer cooperate with a better selective filter and provide a better performance in full-loaded CATV plant.

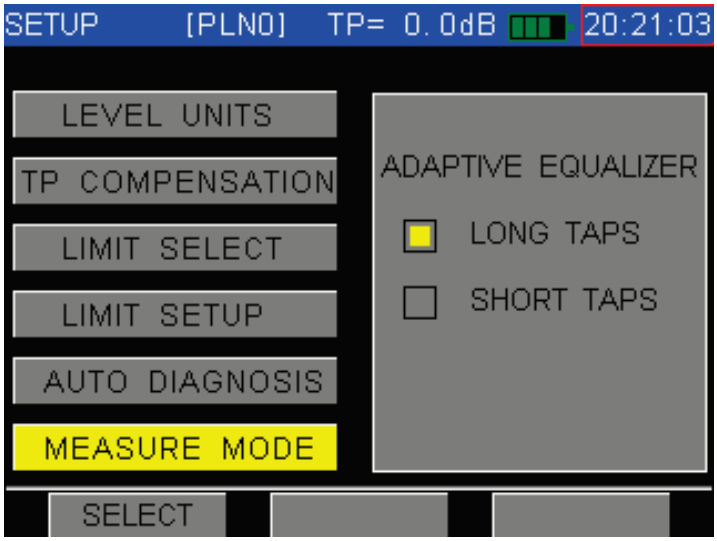


Figure 5-20

The 8VSB option only support short taps equalizer, so the “MEASURE MODE” item will be forbidden. If user open the 8VSB option, he can’t find the “MEASURE

MODE” item, show as the Figure 5-21.

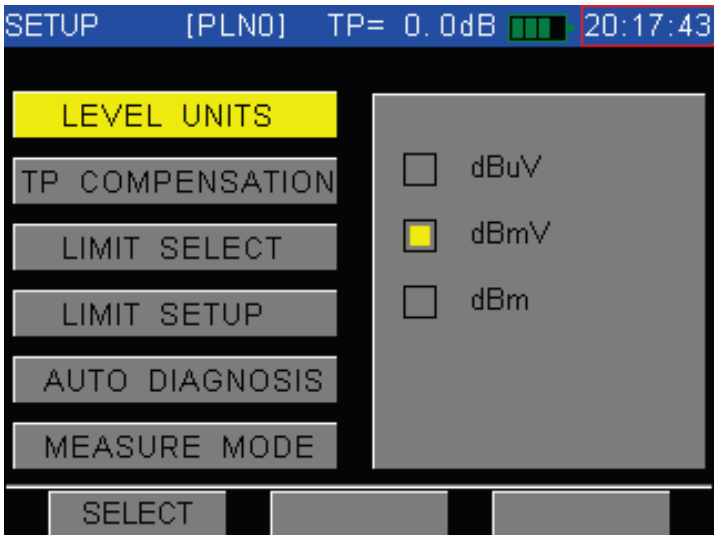


Figure 5-21

5.4.7 Voltage and temperature

The icon “MEAS” in the HOME PAGE 2 is used to enter the trunk voltage and temperature measurement interface.

Trunk Voltage

This meter will automatically judge whether it is AC or DC in the trunk, and display the trunk voltage on the screen as Figure 5-22.

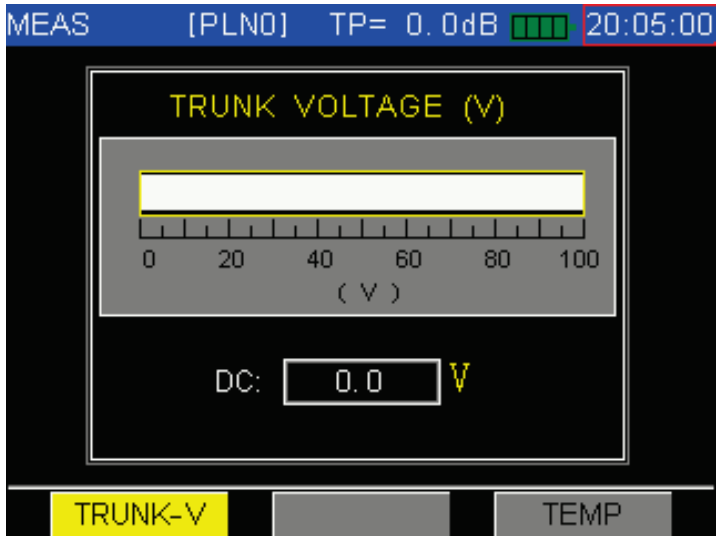


Figure 5-22

Temperature Inside

DS2460Q can monitor inside temperature itself, and display **Celsius or Fahrenheit** at the same time, refer to Figure 5-23.

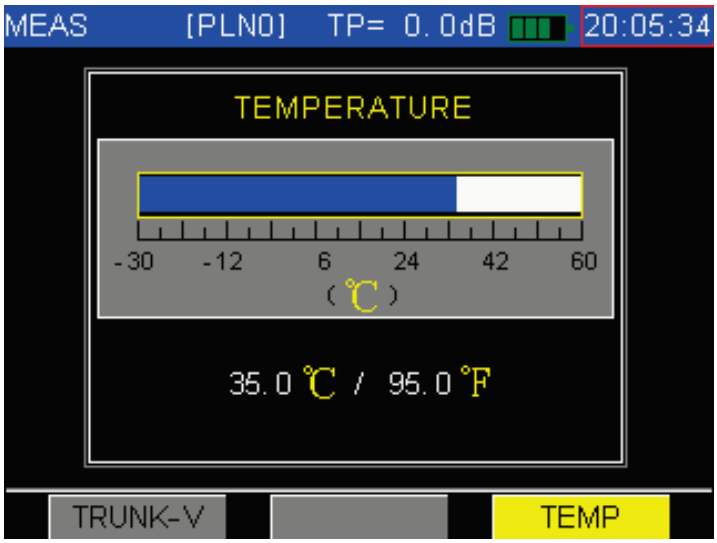


Figure 5-23

5.5 Channel Plan

Up to 20 user plans can be built and saved. The user plans are labeled as PLN0 to PLN19. User can choose one as current user plan as Figure 5-26. Then, the meter will measure according to the selected the user plan.

5.5.1 Select User Plan

In home page, press F3 button to open other page, press the setup icon, enter the setup menu. Choose “CHANNEL PLAN” item.

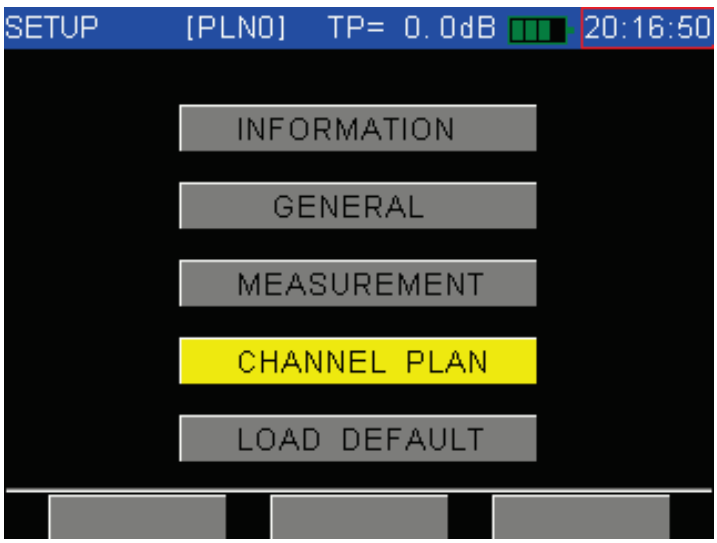


Figure 5-24

First step, choose the first item “SELECT USER PLAN”. Enter the select user plan screen, you can look at the channel plan list, use the and button move the cursor on the different channel plan. If you confirm you choice, press the F3 or button, the symble “√” at the third column will be marked.

You can rename the channel plan name by press the F2(RENAME). Input the new channel name, user must press the button to input the letters and numbers at the same time.

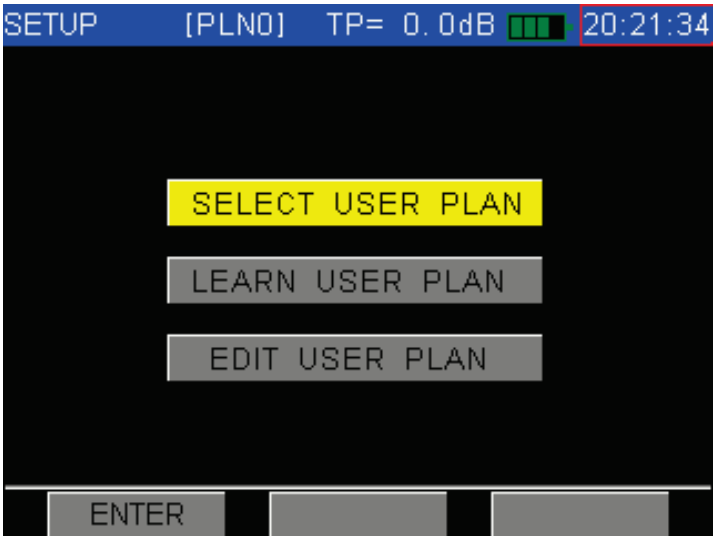


Figure 5-25

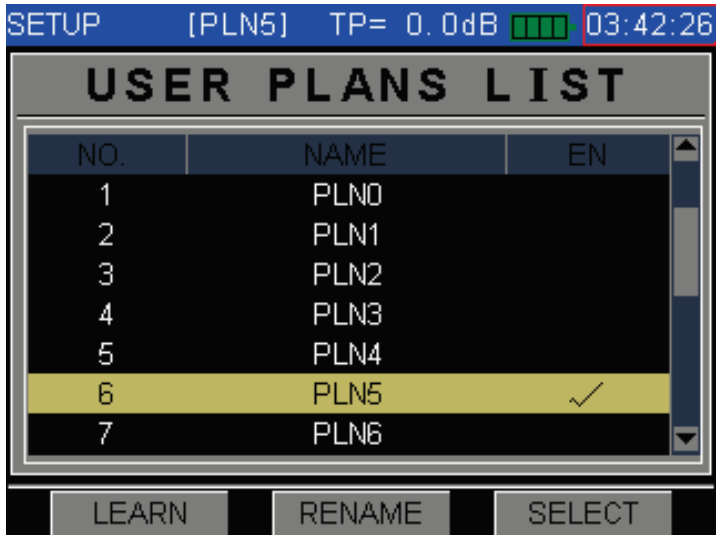

SETUP
[PLN5]
TP= 0.0dB
03:42:26
USER PLANS LIST
NO.
NAME
EN
1
PLN0
2
PLN1
3
PLN2
4
PLN3
5
PLN4
6
PLN5
7
PLN6
LEARN
RENAME
SELECT

Figure 5-26

5.5.2 Learn User Plan

You can build and store up to 20 user plans in meter. Before first measurement, you should build the user plan to make the meter be compatible with your cable system. Figure 5-27 and Figure 5-28 show how to learn user plan.

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.

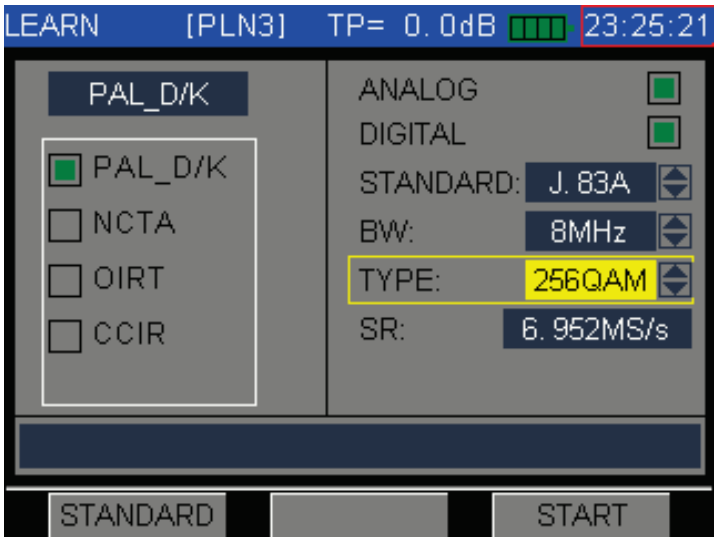


Figure 5-27

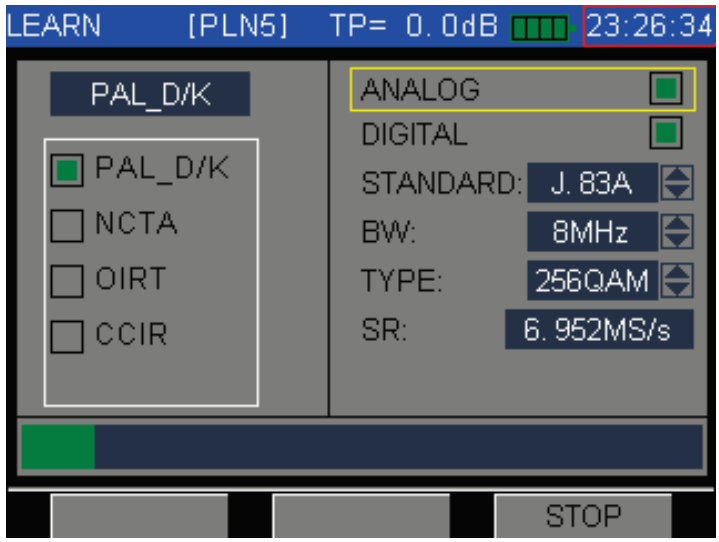

LEARN
[PLN5]
TP= 0.0dB
23:26:34
PAL_D/K
PAL_D/K
NCTA
OIRT
CCIR
ANALOG
DIGITAL
STANDARD:
J.83A
BW:
8MHz
TYPE:
256QAM
SR:
6.952MS/s
STOP

Figure 5-28

5.5.3 Edit User Plan

The user plan is combined by following:

* Digital(numeric) channel number
* Standard (alphanumeric) channel number
* Channel type (Analog, DVB-C, DOCSIS）
* Carrier frequency
* Audio offset
* Activation status
*DVB-C Channel Standard or DOCSIS Channel Standard
*Channel Bandwidth
* Modulation
* SR(Symbol rate)

You can set the channel number to be displayed in digital(numeric) mode or standard (alphanumeric) mode. After choose, the meter will show the channel number as you desired in any measurement mode. Refer to Figure 5-29 and Figure 5-30.

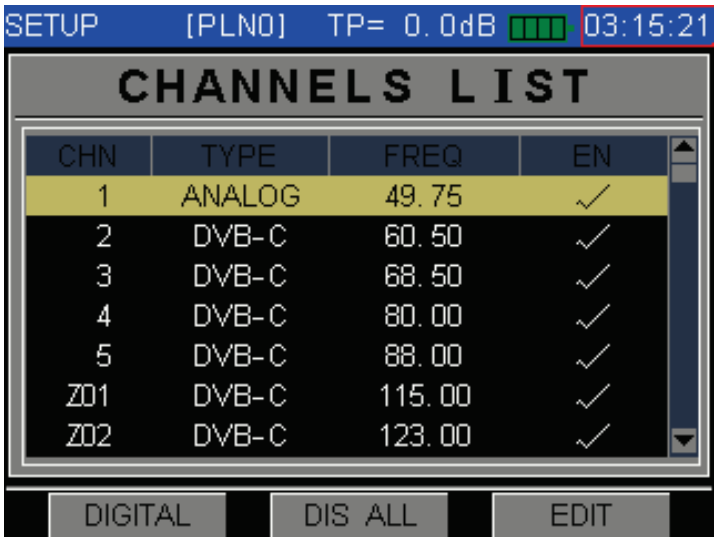


Figure 5-29

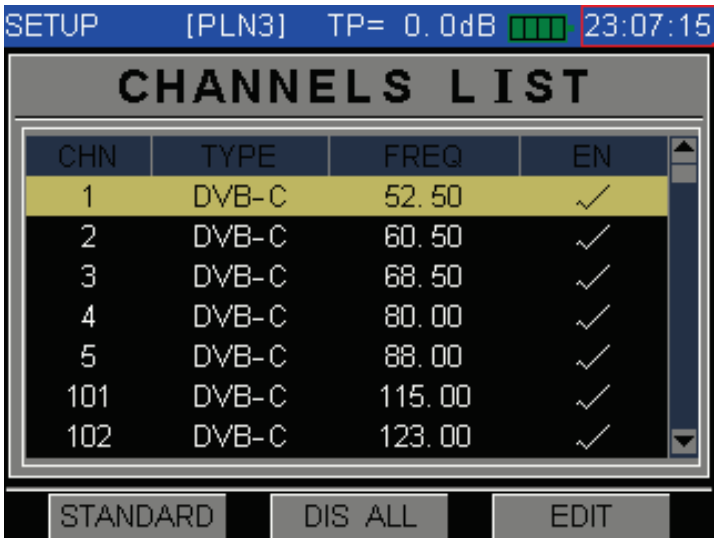


Figure 5-30

EDIT USER PLAN will show the channels list on the screen as Figure 5-29 and Figure 5-30, you can only exit this function by press the (HOME) key, press or 2DFE to highlight one channel, and press

F3 (EDIT)to edit channel parameters as Figure 5-31.

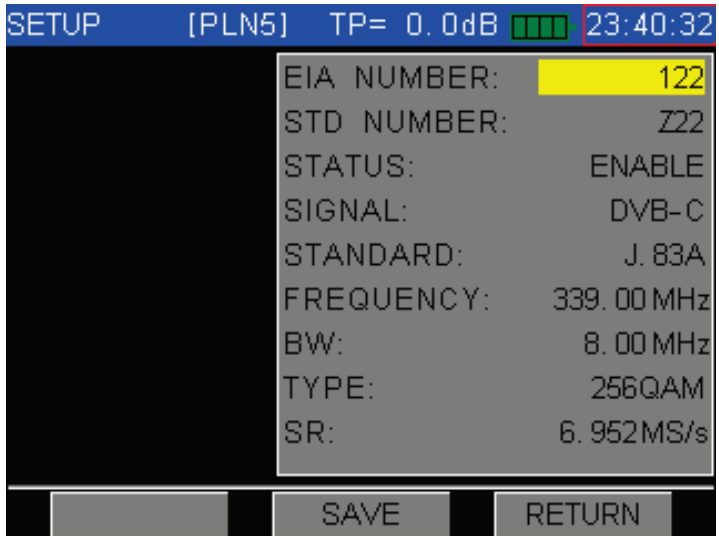


Figure 5-31

Figure 5-32 show all signal types related channel information. (Analog, DVB-C, DOCSIS)

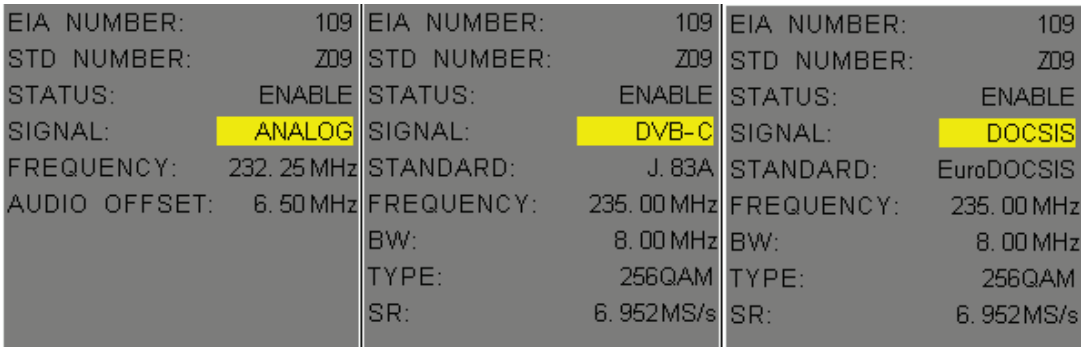


Figure 5-32

5.5.4 Load Default

If you move the cursor on the “LOAD DEFAULT” item and press the button, the screen will popup prompting message: “LOAD DEFAULTS?”. If you press F1(YES), the system program will automatic restart, at the same time the program will remove all user settings and saved files. If you press F2(NO), the program will quit this function.

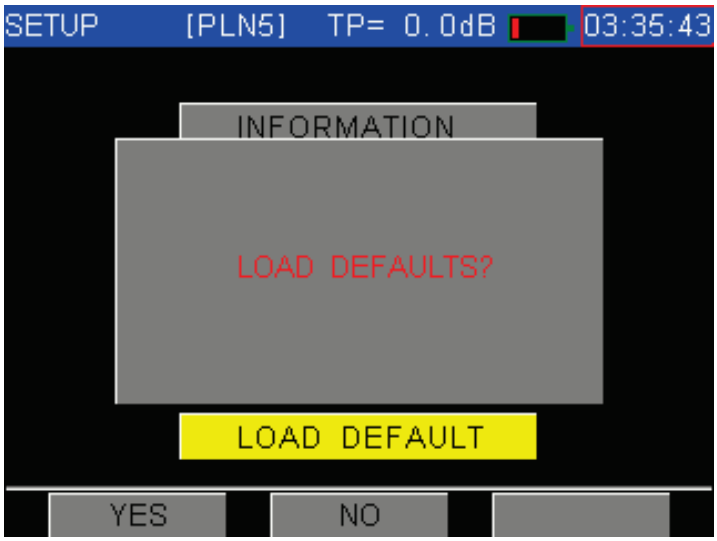


Figure 5-33

6 Power Supply

6.1 Battery

DS2460Q uses built-in 7.4V 2.5AH Li-Polymer battery and works over5when fully charged. When the voltage of the battery drops to 6.8V, the battery icon flashes in screen. Once the voltage of the battery is lower than 6.8V, the instrument will shut down automatically. The charge time is about 3 hours.

NOTE：

1. The meter can be only charged by the charger provided together with DS2460Q.

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.

6.2 Charging

Please charge the instrument as following charging process:

1. Insert the charger output plug to DS2460Q' 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't be charged in the temperature beyond 10℃~35℃, otherwise the battery life will be shorten.

7 Port

The instrument can communicate with a PC through the Micro USB communication port. Refer to Figure 7-1 and Figure 7-2.

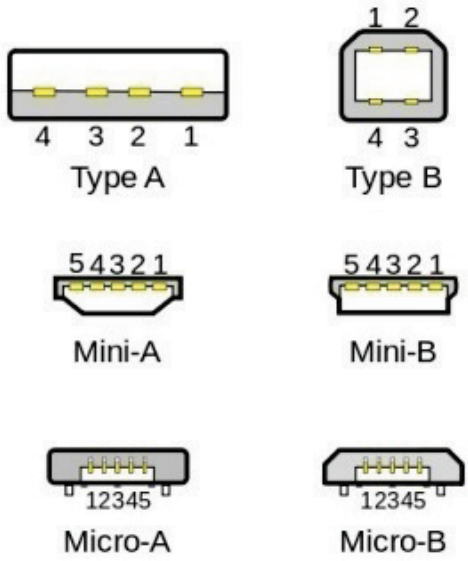


Figure 7-1USB port type

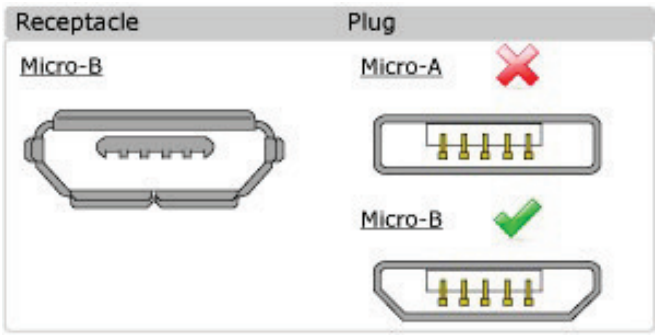


Figure 7-2 Micro-B USB 2.0 Receptacle and Plug

Management PC software-Toolbox is provided as standard. You can remotely control the instrument to download the measurement results or download the channel plan. The test results can be displayed as graph on the PC monitor for analysis and printing.

8 Specification

Normal Spectrum Analysis	
Frequency Range	45MHz~1052MHz
Span	2.5MHz, 6.25MHz, 12.5MHz, 25MHz, 62.5MHz, Full Span
Fast Spectrum Analysis	
Frequency Range	5MHz~1220MHz
Span	12.5MHz, 25MHz, 62.5MHz, Full Span
Return path Spectrum Analysis	
Frequency Ranger	5~210MHz
Channel Scan	
Number of Channels	160 channels max
Scale	1,2,5,10dB/div
Zoom	1X,2X,3X,4X,5X five levels
Analog TV	
Support Standard	PAL, NTSC and FM Radio (Single Frequency)

Level Measurement	Range: -30dBmV to +60dBmV; Accuracy: ±2dB; Resolution: 0.1dB
Frequency	Range: 5M-1052M ; Accuracy: ±50ppm; Resolution: 10KHz
Resolution Bandwidth	280KHz
C/N	>50dB
HUM Measurement Range	2% to 15%
Digital TV	
Power Level	Range: -30dBmV to +60dBmV; Accuracy: ±2dB; Resolution: 0.1dB
Frequency	Range: 46MHz to 1052MHz; Accuracy: ±2dB; Resolution: 0.1dB
Support Standard	ITU-T J.83 Annex A, B ,C, D
QAM Demodulation Type	Annex A: QAM 16/32/64/128/256 Annex B&C: QAM64/256
Interleave Depth	128x1~128x4(J.83B);12x17(J.83A/C)
Symbol Rate Range	4MS/sec to 7MS/sec

MER	41dB; Accuracy ±2dB
BER	1E-3 to 1E-9
Constellation Display Mode	QAM64 and QAM256 with zoom in and zoom out capability
8VSB (Option)	
Frequency Range	46 ~ 1000MHz
Power Level Range	-35dBmV ~ +60dBmV; Accuracy:< ±2.0dB; Resolution: 0.1dB
Modulation Type	8VSB
Symbol Rate	10.762MS/s
MER	~40dB
BER	1E-3 ~ 1E-9
Constellation	√
Line Voltage Measurement	
Range	0V to 100V (AC/DC) with accuracy ±2V
Optical Power Measurement (Option)	
Accuracy	±0.23dB (±5%)
Detector Type	InGaAsΦ300μm

Range	-50dBm ~ +27dBm
Linearity	0.07dB/10dB
Resolution	0.01dBm, mW, μW, nW
Wavelength	850nm, 980nm, 1300nm, 1310nm, 1490 nm, 1550nm, 1610 nm
Interface	FC\SC\ST Universal Connector Interface Adapter
VFL (Visual Fault Location) (Option)	
Output Power	10mW
Output Wavelength	650±10nm
Safety Standard	IEC 60825-1：2007
Interface	FC/PC
TDR (Time Domain Reflection) (Option)	
Measuring Range	5m~1200m
Accurate	± 1% of the range
Resolution	<1% of the range
Others	
RF Input	75Ω
USB	USB Micro B 2.0

Ethernet	10/100 BASE-T
Display	2.8” 320x240 TFT LCD
AC/DC Adapter	AC 100V to 240V 50-60Hz, DC 15V/0.9A
Battery	7.4V 2.5Ah Lithium Battery
Charge Time	<4 hours
Working Time	>5 hours
Dimension (W×H×L)	200mm × 106mm × 54mm
Weight	About 600 grams
Work Temperature	-10 ~ +40°C
Storage Temperature	-20 ~ +70°C

9 Standard Accessories

Standard Accessories	Quantity
DS2460Q	1
AC-DC power adapter/charger	1
Carrying bag	1
F connect	2
Manual and Toolbox software CD	1

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