



# SLM 1479

CATV, TV,  
Signal Level Meter

## User Manual





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Sencore is an engineering leader in the development of high-quality signal transmission solutions for the broadcast, cable, satellite, IPTV, telecommunications, and professional audio/video markets. The company's world-class portfolio includes video delivery products, system monitoring and analysis solutions, and test and measurement equipment, all designed to support system interoperability and backed by best-in-class customer support. Sencore meets the rapidly changing needs of modern media by ensuring the efficient delivery of high-quality video from the source to the home. For more information, visit [www.sencore.com](http://www.sencore.com)

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# SLM 1479 User Manual

## Revision History

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# Introduction

Thank you for choosing the Sencore SLM 1479. This instrument is a TV/RF signal analyzer providing today's engineer a complete tool in resolving digital video cable and broadcast reception challenges. Capable of testing and analyzing digital and analog cable channels and ATSC broadcast channels. The SLM 1479 features a large color touch control screen eliminating multiple menus and pushbuttons to achieve a new plateau in user friendliness, with selections virtually at your finger tip. The large screen further provides unprecedented resolution so you won't miss problems when analyzing critical constellation and spectrum analyzer test screens.

The SLM 1479 provides powerful digital TV/RF analysis including MER, BER, noise margin, constellation, and spectral analysis tests. A simple pass or fail indication simplifies interpretation. Additionally, the modulation type, FEC value, encryption type, network and program names, video/audio program identification lists, and non-encrypted video is displayed providing advanced signal analyzing.

The SLM 1479 further provides a full arsenal of unique special tests and control features to assist technicians in troubleshooting cable and TV reception systems. Advanced features include an integrated Spectrum Analyzer, BarScan, Tilt, Leakage, Ingress, and Logger tests. The SLM 1479 comes equipped with protective case, power adapters, USB cable, antenna, and SMART software.

## Package Contents

Great care is taken to ensure the SLM 1479 shipped from the Sencore factory is free of defects, contains the supplied accessories and is securely packaged. Please inspect the package and contents upon receipt. If there has been significant damage please contact Sencore for further instructions. It is recommended that you save all packing materials for return shipping to Sencore when calibration or service is needed.

Please inspect the contents to be sure you have received all the intended items and supplied accessories. Your SLM 1479 is shipped with the following:

- Instrument SLM 1479
- Soft Carry Case with carry strap
- AC Power Adapter/Battery Charger
- Automotive Power Cable
- Software CD Disc
- USB 2.0 Cable
- Replacement F Connector "Barrel"
- F Push-On Connector
- Leakage Test Antenna

## CD Disc Contents

The supplied CD disc contains several files. It contains a pdf version of this manual for your reference. It also contains a PC software program called “SMART” which is explained in the next section on this page. The CD also includes a pdf file of the SMART Software Users Guide which provides instructions on how to install, license, connect and use the SMART software. The CD further contains a driver file used for the USB connection from the PC to the SLM 1479 when establishing a connection for the SMART software.

## SMART Software

The SMART (**S**ystem **M**onitoring **A**cquisition & **R**eprogramming **T**ool) Software is provided at no additional charge. The software is provided on the CD shipped with the instrument. This software is used to interface with the meter and provide the following functions: custom channel plan programming, meter “cloning”, logger file download and export in xls, firmware updates and more. Please read the SMART Users Guide supplied on the CD with the instrument for information on how to install, use, and obtain the free license for the software.

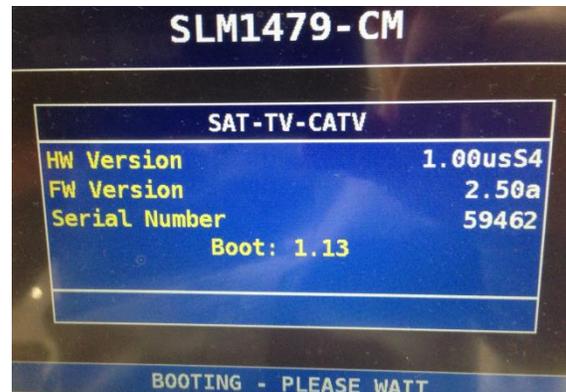
## System Information

The SLM 1479 provides unit information on its initialization screen when powering on. Should you seek Sencore technical or service assistance, please note the information on this initialization screen and have it available. Please note the hardware or “HW” value and the firmware revision or “FW” value.

A continuous screen with the same information is available in the METER CONFIGURATION menu. Touch the CONFIG pushbutton at the bottom right of the meter.

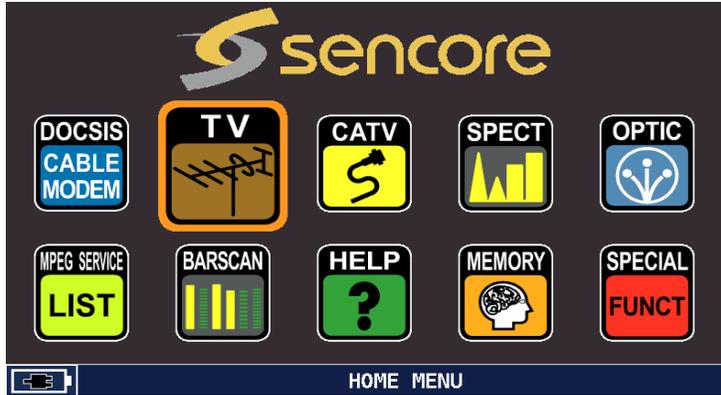
On the menu that appears, touch the “CONFIGURATION MENU” listing at the bottom and on this menu touch the “METER INFO” listing.

This screen also indicates the existence and or activation of optional features. If installed and active, these features indicate “OK” in the initialization screen.

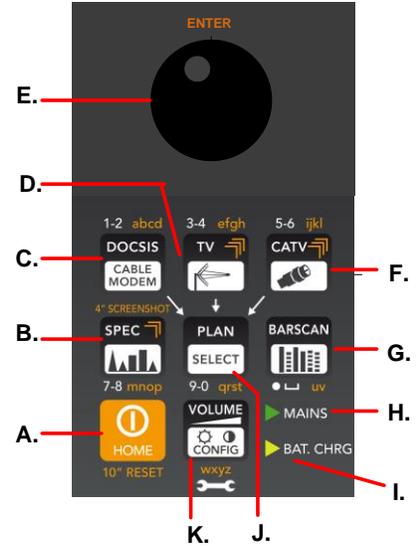


# Section 1: Unit Familiarization

## 1.1 Front Panel Control Familiarization



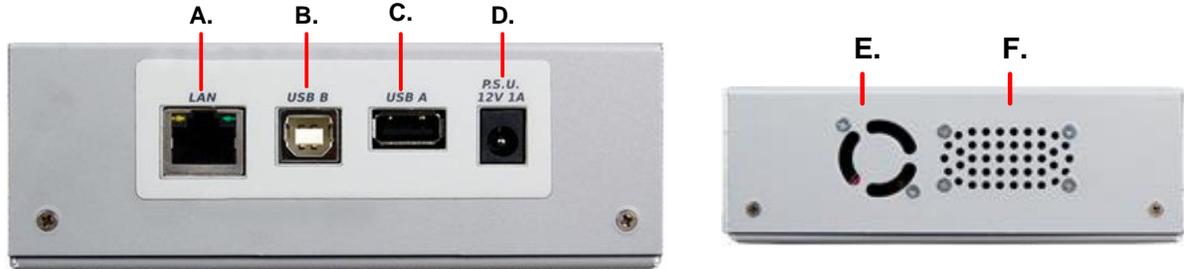
L.



Ref.	Main Function	Description	Second Function
A	Power and Home Pushbutton	Press 2-3 sec to power on or off, press briefly to return Home menu	Press/hold 10 seconds or more to reset unit
B	Spectrum Analyzer Pushbutton	Selects the Spectrum Analyzer function	Selects numeric 7-8, mnop letters, provides screenshots
C	DOCSIS Measure Pushbutton	Selects DOCSIS cable Measurements	Select numeric 1-2, abcd letters
D	TV Measure Pushbutton	Selects Broadcast TV Measurements	Select numeric 3-4, ijkl letters
E	Control Wheel – Enter Pushbutton	Rotate -Increments field selection on the display	Push ENTER button to enter a field for test or selection
F	CATV Pushbutton	Selects Cable Measurements	Select numeric 5-6, ijkl letters
G	Barscan Pushbutton	Selects Barscan Measurement	Select characters, uv letters
H	Main Power Light	Indicates AC Power present to mete	
I	Battery Charge Light	Indicates battery is being charged	
J	Plan Pushbutton	Selects channel or transponder tuning plans	Select numeric 9-0, qrst letters
K	Volume and Configure Menu Pushbutton	Controls volume of internal speaker, provides path to configuration menu	Press to Brightness/Volume Menu, configuration menu
L	Touch Panel Display	Provides all feature selections and measurements	

## 1.2 Right Side Panel Familiarization

The right side panel of the SLM 1479 contains several interface connection jacks along with an air intake fan and internal speaker. The following section provides a brief description.

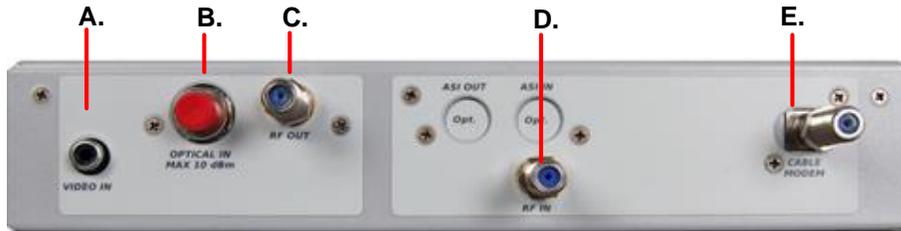


Ref.	Main Function	Description	Second Function
A	Management LAN Port	RJ45 Connector for LAN connection,	Meter Setup and remote /control application
B	USB B Connector Communications Port	Port for interface with PC for file upload, firmware updates	Use with SMART software via USB connection
C	USB A Connector	Port for USB memory stick – stores screen shots, logs, captures, etc.	Used to read/write mem file to/from meter
D	Power Supply Input	Jack – Connect Power Adapter 12VDC @ 3A (Center – Pos.)	Charge internal battery
E	Inlet for cooling fan	Opening – Internal Cooling Fan	DO NOT BLOCK AIR FLOW
F	Internal Speaker	Opening for sound from internal speaker	

Note: Please do not block the inlet air flow (E) and the opening on the units opposite side. The fan is automatically controlled and turns on and off randomly as needed to cool the internal circuits.

### 1.3 Top Panel Familiarization

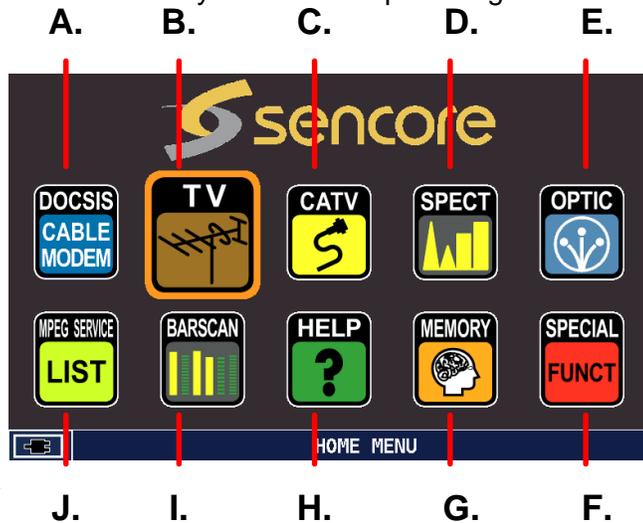
The top side panel of the SLM 1479 contains most of the input/output interface connection jacks. The following section provides a brief description of these inputs and outputs.



Ref.	Main Function	Description
A	A/V Input	Analog SD audio/video input
B	Optical Input	Provides input of optical measurements
C	RF Output from Optical converter	Optical to RF transceiver or converter – converts cable band channels from light to RF band
D	RF-IF Input Jack	RF-IF Input for cable or broadcast channel
E	Cable Modem	Provides DOCSIS measurements and generation

### 1.4 Home Menu Icon Familiarization

The Home Menu of the SLM 1479 is the first menu you see when powering on the meter. You may return to this menu from any other menu by briefly pressing the HOME pushbutton. The Home Menu shows icons representing tests or functions you may select to begin using the meter. You may alternately choose to directly to satellite, tv or cable tv measurements by pushing the SAT, TV or CATV pushbutton.



The color LCD screen includes a durable touch control panel. Touch the screen with your finger or with the included stylus at the location of the screen icon when you wish to select a field or function. The stylus is stored in the padded carrying case by opening the flap of the padded carrying case on the right side of the meter. Using the stylus, helps keep the meter's screen clearer and cleaner.

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The icons on the Home Menu screen quickly take you to measurement features provided by the meter. The following section briefly describes the icons.

**A: DOCSIS:** Touch to select the meter's DOCSIS setup and analyzing features. Also selects upstream generator.

**B: TV:** Touch to select TV Broadcast tuning plans, perform measurements on a TV-RF channel, view broadcast channel(s) on spectrum analyzer, and log broadcast channel measurements to memory – logger

**C: CATV:** Touch to select TV CABLE channel tuning plans, perform measurements on a digital or analog cable channels, view cable channel(s) on spectrum analyzer, log cable channel measurements to memory – logger

**D: SPEC:** Touch to view spectrum analyzer display for frequency spectrum viewing of the currently selected satellite, TV or cable measurement channel/transponder(s).

**E. OPTIC:** Optional Feature: Touch for measurements of the optical input power and power loss when comparing the active input power to a saved reference power level.

**F. SPECIAL FUNCT:** Touch to see extended or special functions associated with the selected satellite, broadcast TV, or cable TV measurement mode.

**G. MEMORY:** Touch to manage logger files, start channel logs, or recall log files.

**H. HELP:** Touch for tuning assistance “Auto Discovery” to determine signal type and signal setup.

**I. BARSCAN:** Touch to select the Bar Scan function which provides a bar chart showing multiple channel levels through a frequency span.

**J. MPEG SERVICE LIST:** Touch to display the program list of the selected channel or transponder. Includes program name, V-PID, A-PID, Encrypted Yes/No

### 1.5 Powering ON/OFF

The SLM 1479 is powered on and off with the orange front panel pushbutton labeled “HOME” located at the bottom right of the instrument front panel. The HOME pushbutton has a circle with a line in it on the pushbutton. This is a universal on/off symbol.

To turn the meter on, momentarily press the HOME pushbutton and release. You will hear the fan turn on briefly and after a boot delay see a meter information screen. When initializing, the display screen may briefly indicate “AUTO OFF ACTIVE.” This indicates the Battery Saving feature is set to “ON” to auto shutoff the meter after a period of non use. Please refer to the BATTERY SAVINGS feature section 3.19 on page 27 of this manual for information on this feature. Please also see the CONFIG section 3.21.1 of

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this manual on page 28 for more information on the TIMER OFF feature which may also be set to automatically power the unit off after a set delay.

To turn the meter off, press and hold down the POWER pushbutton for 2-3 seconds and release. When powering off the SLM 1479 should you wish to turn it back on again, please wait 5 seconds after powering down the instrument before you turn it back on again. This gives the internal circuits time to reach a full shutdown state for proper initialization.

### 1.6 Power Adapter

The SLM 1479 is supplied with a DC power supply that is used to power the instrument and to indirectly charge its internal battery. The power supply/adaptor is a regulated 12 VDC with a positive center terminal on the connector to the instrument. The power supply is rated for ACV inputs ranging from 100-240 VAC @ 50/60 Hz and can deliver up to 3.0 amp of DC output current.

The Power Supply/Adapter provided with the SLM 1479 meets industry and safety regulatory standards. This insures safe instrument operation. Therefore, it is recommended that you use only the provided Power Adapter.

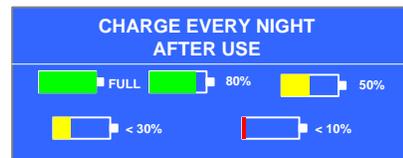
NOTE: When powering the SLM 1479 use only the supplied Power Adapter or a power supply/adaptor which strictly meets all technical specifications and industry safety (CE, UL etc) requirements.

### 1.7 Battery Charging/Management

The latest battery technology, hyper lithium polymer (Li Po) battery, powers the SLM 1479 for portable testing applications. The battery pack provides years of dependable service. The battery pack requires no routine maintenance but it is advisable to be familiar with some handling, charging, storing, and disposal characteristics.

Some charging management practices may extend the battery pack's useful life. Also the SLM 1479's power management features may provide added use time on a single charge. This section covers the meter's battery condition indicator, battery charging recommendations and battery power management features.

When operating from the battery, a battery indicator icon at the bottom left of the measurement screen indicates the remaining battery charge. Battery indicators include a full charge 100%, 80%, half charge 50%, 30%, and 10% charge indicators. The presence of the battery icon indicates the meter is operating under battery power. When the power supply/adaptor is used to power the meter, the battery icon is replaced by an AC plug icon.



The SLM 1479 uses a special battery charging/management circuit to monitor and manage battery charging. Battery charging is managed by the meter's charging circuits

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with sensors inside the battery pack. You should never remove the battery and attempt to charge the battery with an adjustable power supply.

A Li Po battery contains no memory or conditioning affects like other battery technologies so a full discharge and recharge cycle is not beneficial. After use, it would be advisable to charge the battery. If used daily, charge the battery pack every night for best battery life.

Avoid a complete discharge state or prolonged low charge of the battery as this can have an adverse effect. Charge the battery after continuous use in which the battery charge is low or depleted. Also, Li Po batteries gradually discharge over a very long period of time (> 4 months) when stored or not used. Recharge the battery every 3-4 months when not used or in storage. *NOTE: Do not leave the battery in a discharged state. If stored, or not used, periodically charge the battery.*

Battery operating time varies considerably depending on use and power management settings. Expect approximately 4 – 5 hours depending on power management settings and LNB powering. To extend the useable battery measurement time on a single charge, the SLM 1479 offers three power management features including: 1) Unit Auto Off, 2) Display Light Timer and, 3) Backlight Brightness. Please see the METER CONFIGURATION Menu (Section 3) of this manual for details on these settings. For maximum battery use time, set the BATTERY SAVING setting to the “ON” position. A lower display backlight brightness level greatly extends battery use time. Set the BRIGHTNESS setting as low as you can, depending on your tolerance for display brightness and the light in the testing environment.

### 1.8 Battery Replacement

The Li Po Battery is a 7.4V, 4 Ah, battery pack located inside the metal chassis of the SLM1479. The battery can only be accessed by disassembly of the instrument to gain access to internal components including the battery compartment. For this reason, in the field battery replacement is not recommended. Please consult the Sencore Service Dept. for assistance in diagnosing symptoms and information regarding options to replace the internal battery.

In the event you are handling a Li Po battery, please take cautions as described below.

**Handling:** Handle the Li Po battery pack with extreme care not to drop, short out the battery, or damage its protective wrap.

**Replacement:** You need to be absolutely sure you have the proper replacement Li Po battery pack for your SLM 1479. Sensing wires to the battery pack are critical in battery charging/discharging and safety. ONLY an exact replacement or a suitable replacement battery provided from Sencore should be used.

#### **WARNINGS !!**

**For your safety never attempt to repair/replace individual cells in a Li Po battery pack or solder to terminals on the cells.**

**LiPo Battery Replacement: Replace the SLM 1479 LiPo battery pack with only an identical replacement or approved replacement obtained from Sencore.**

**Li Po Battery Disposal: Li Po battery packs that can no longer be used are hazardous waste and must be disposed of accordingly. Completely discharge the battery and take it to a designated collection point in your area. Never dispose in a household or business waste collection.**

## Section 2: Quick Start Guide

### 2.1 Navigation

The SLM 1479 features a touch sensitive screen but supplements operation with a mechanical control knob and mechanical front panel switches. In combination, they are used to navigate, make selections, and initiate tests. The ability to make selections directly from the screen with a finger touch greatly simplifies meter use. The following section provides a brief explanation and some navigational hints to get you started.

**Control Knob:** The Control Knob may be rotated to increment through selectable screen fields. It may also be pushed to lock to a field or to make selections within a field. Rotating the knob, either clockwise or counter clockwise directs field movement on the display or selections within a highlighted/selected field. Pushing the knob inward selects a field or enters a selected operation. Pushing the knob also releases a selected field.

Operating the SLM 1479 requires 3 essential actions. These may be performed in random order depending on the test screen. They are summarized below:

#### User Action Summary:

**Touch Screen – Touch your finger tip or stylus to the screen** at locations of a listing, heading field or an icon. This selects the test or field. The selected field is indicated by a colored box, typically red or dark orange. (The color depends on the meter's Graphics Color setting)

**Control Knob – Turning the control clockwise or counter clockwise.** Moves a highlighted area upward or downward through a list or icons on the screen. Increments through values within a field when there is no list.

**Control Knob - ENTER – push in the Control Knob.** Selects a field so that changes may be made within the field. Releases a field so that the wheel can be used to move to other locations.

#### Navigation Hints:

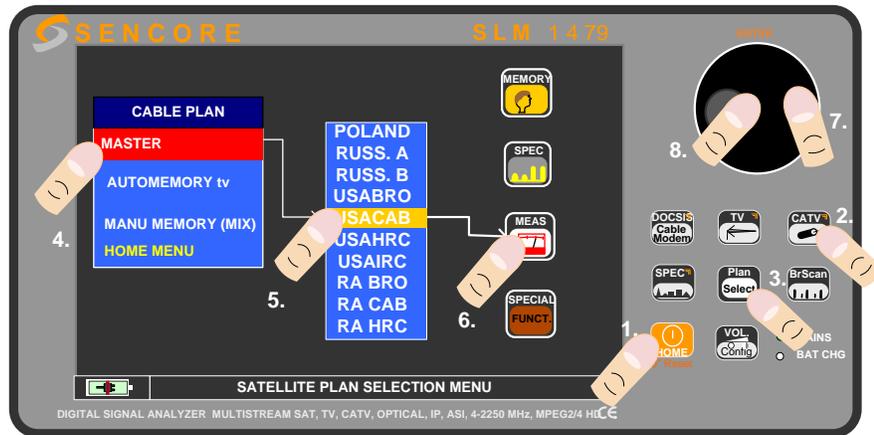
**Select a function – Home Menu:** Touch your finger to an icon location on the screen. Alternative: Rotate the control knob to move highlight (an orange ring surrounding the icon) to the desired function. Push inward the control knob to ENTER area of the control knob – selecting that function.

**Select/Release Field:** Touch your finger to the selectable field heading. Alternative: Rotate the control knob to move highlight to different or desired heading. Push inward the control knob to select/enter the field.

**Choose item within a list:** Touch finger to the desired choice. Repeat finger touch to increment through field selection. Alternative: Push inward the control knob to ENTER the field or release/exit the field.

## 2.2. Navigation – Exercise

To become familiar with the SLM 1479's navigation follow the steps below: (#s reference fingers in the diagram above.) (Display Graphics Color Setting = BLUE)



1. Power the meter on: Briefly press and release the HOME pushbutton (Finger #1). (This is not a touch button - firmly press and release). Control Knob Familiarization: Rotate the control knob (#7). Note how the orange highlight moves to different display icons. Move the highlight to the TV icon.

2. Select a Test - touch the display at the location of the TV icon or with it highlighted press the control knob (#8). Or, press the CATV pushbutton (#2) below the control knob.

3. Select a channel tuning plan. Press the PLAN pushbutton (#3). The CATV PLAN SELECTION MENU is shown with a left section, center section, and available test icons at the right. The blue sections contain listings which may be selected. A red box or yellow box highlights or indicates the selected listing in these groups.

4. Select a CATV Plan (left blue area) with the Control Knob – rotate the control knob (#7) and observe how the red highlight box moves through the selectable listings. Highlight the “MASTER” listing. Press the control knob to ENTER the field (#8). Notice how the red highlight disappears. The center colored area is now active and the yellow box indicates the selected listing.

5. Select a CATV tuning plan (center colored area) - touch your finger to the screen listing several listings above the one selected in the yellow box (#5). Your selection is moved to the center of the list and is highlighted. *To scroll farther down in the list, touch your finger along the screen near the bottom of the list. To scroll upward repeat the action near the top of the list box.* With the desired plan highlighted, select a satellite test icon (right side of screen) – touch the MEAS icon (#6). The meter advances to the CATV Measurement Menu.

**Hint:** Using the touch screen is the most efficient. Most selections are available on the touch screen. Only occasionally there are too many selections in a field to list requiring Control Knob use. Examples include the REF selection field in the Spectrum Analyzer and FREQ selection in the MEAS menu. These require use of the Control Knob to increment through selections.

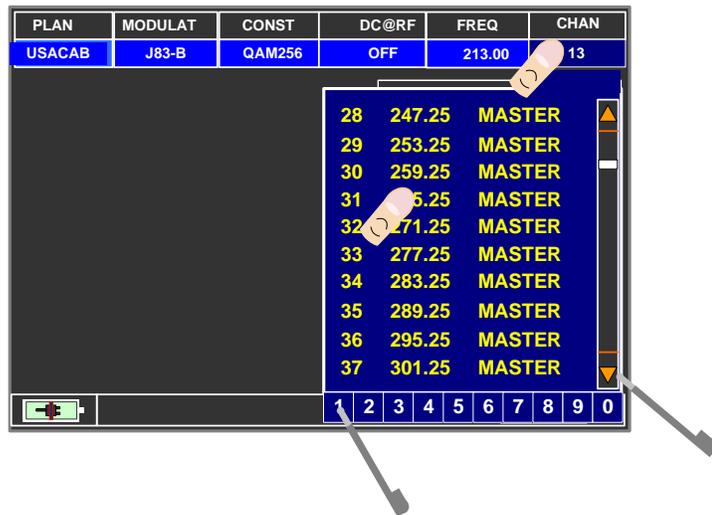
## 2.3 Dropdown Menu Selections

Several fields within the SLM 1479 screen have dropdown menus in which selections or entries are made. This section briefly explains how to select or enter values within a dropdown menu.

### Channel Selection Dropdown Menu

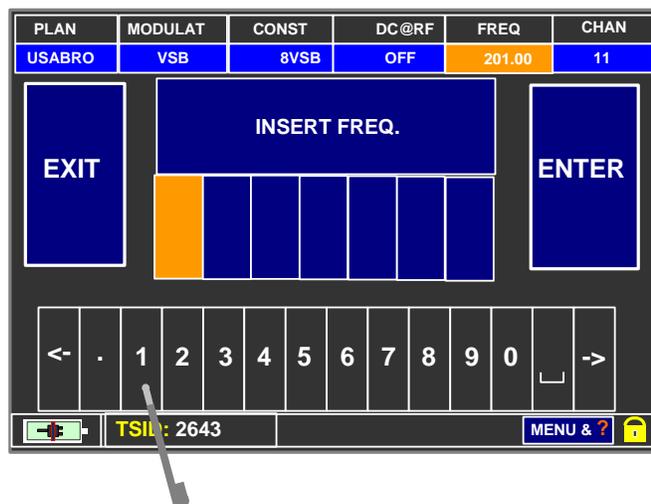
When many channels exist in the channel plan, a list is provided with a dropdown box by touching the on screen channel listing field with your finger tip or the stylus. The scroll up/down box with arrows on the right side of the dropdown list indicates that more channels are in the list than are currently visible. To scroll up in the list touch the up arrow with the stylus or your finger tip. To scroll downward touch the down arrow with the stylus or your finger tip.

You may jump to a channel listing by entering the desired channel number. With the stylus touch the channel numbers corresponding to the desired channel at the bottom of the list. The list immediately updates with the entered channel number centered in the list. To select the desired channel, touch the listing with your finger tip or stylus.



### Frequency Selection Entry

The FREQ field provides a drop down menu which provides direct entry of a desired frequency. Touch the frequency value below the FREQ heading to produce the frequency entry menu. Touch the stylus to the numbers at the bottom to enter the frequency value. Use the back arrow to increment fields to the left. Use the clear entry, 2<sup>nd</sup> from the right, to clear a field entry. Touch the ENTER box when you have entered the desired value. Press the EXIT box to exit without frequency selection.



## 2.4 Measurement Signal Selection

This section introduces you to the general operational layout of the SLM 1479 to improve your understanding and operational ease. The instrument is fundamentally divided into 2 major categories by signal type. The signal types are Broadcast Television (TV) and Cable Television (CATV). The first operational step is to select one of these signal types for measurement. The signal type is selected by touching one of the Home Menu screen icons or pressing the TV or CATV pushbutton. The DOCSIS test is an extension of the CATV measurement which may be selected via the touch panel DOCSIS icon or by pressing the DOCSIS pushbutton.

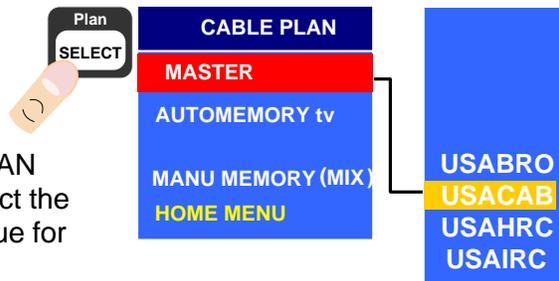


The SLM 1479 always retains the last selected signal type as its selected operational base until you return to the HOME Menu and select a different type or press the TV or CATV pushbutton to change signal types. On the HOME Menu screen either the TV or CATV icon will always be highlighted or outlined. As you navigate through other test menus, this operational mode is retained.

The selected TV, or CATV operational mode, determines the available testing features, measurements, screen configurations, spectrum analyzer screen configurations and features, special test selections, signal/channel plans, and individual screen popup menus. Therefore, when operating the SLM 1479, always be conscious of the main signal type selected on the HOME Menu. Always select the signal type that is proper for the TV-RF signal you are measuring.

## 2.5 Meter Tuning

The SLM 1479 is both a TV and Cable receiver. As a receiver it needs TV broadcast and/or cable channel tuning information. The PLAN SELECTION MENU(s) provides the needed channel plan selections. Press the PLAN SELECT pushbutton on the front panel to select the PLAN SELECTION MENU. This menu is unique for the cable and TV tuning channel plans.



The SLM 1479 contains factory TV, and cable channel plans that provide tuning and measurement without further setup. Factory tuning plans are available for various country locations. For quick occasional measurements simply select the standard plans as summarized below.

**BROADCAST TV TESTING:** Select “TvMASTER PLAN”, Select “USABRO”

**CABLE TESTING:** Select “MASTER,” Select “USACAB”

After selecting a plan, touch the corresponding TV or CATV measurement pushbutton.

## 2.6 Quick Start Measurements

This section of the manual provides only enough information to get you making basic satellite, broadcast TV or cable measurements. It is not intended to completely summarize all the information contained in this manual. Please reference other portions of the manual as needed to answer questions and become familiar with the SLM 1479 and its features.

### **Follow these steps to start making basic measurements:**

1. Connect the signal cable to the F-Type connector on the top – center of the meter identified as the RF-IN Jack. **BE SURE TO CONNECT TO THE CENTER F CONNECTOR AS THE ONE ON THE LEFT IS THE OPTICAL OUTPUT AND THE ONE ON THE RIGHT IS THE DOCSIS CABLE MODEM.**
2. Select the type of TV-RF signal to measure. When in the HOME icon menu screen touch the icon that matches the signal type to be measured. Or, simply press the TV or CATV front panel pushbutton.

TV (Broadcast): Touch to test terrestrial broadcast 8VSB signals.

CATV (Cable TV): Touch to test RF-RF signals on a cable television system.

Instructions Continued: a = BROADCAST TV, b = CABLE

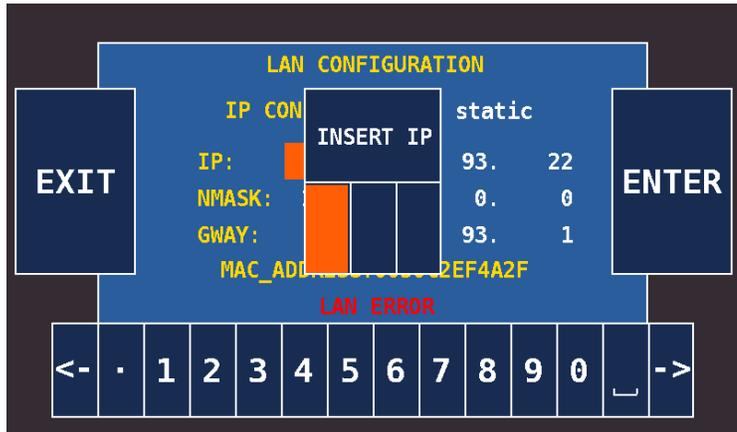
(Follow a, b, c, instructions below relative to the signal type selected above.)

3. Select a tuning channel plan and plan variation in the PLAN SELECTION MENU. Press the PLAN SELECT front panel pushbutton.
  - a. BROADCAST TV: Highlight “TvMASTER PLAN” - typically the default. Select/highlight “USABRO” in center section of display. Touch the screen’s MEAS icon at right.
  - b. CABLE: Select “MASTER” at left. Select “USACAB” in center section of the display. Touch the screen’s MEAS icon at the right of the screen.
4. Modify or select the channel/transponder or frequency to be measured.
  - a. TV: Touch the number below CHAN heading (upper right on screen). Touch finger near the up arrow or downward near the down arrow to move through the channel list. Press control knob to ENTER or select the channel.
  - b. CABLE: Touch the number below the CHAN heading (upper right on screen). Touch finger upward near the up arrow or downward near the down arrow to move through the channel list. Press the Control Knob to select.

NOTE: Press the TV or CATV push button to increment through available measurement pages. Touch the display section below the Vpid and Apid labels for MPEG program information. Touch the video portion of the display to view it full screen.

## 2.7 Entering Field Values

Some field values in the SLM 1479 are entered with a popup entry menu. This menu presents several entry boxes in the center of the display screen area. The number of fields represent the number of digits available for entry. The characters and/or numbers along the bottom are the appropriate entries. You may move to the left or right using the left arrow or right arrow entry. You may exit without making changes by selecting the EXIT field on the left. When the values are selected, select or touch the ENTER field to apply the value.

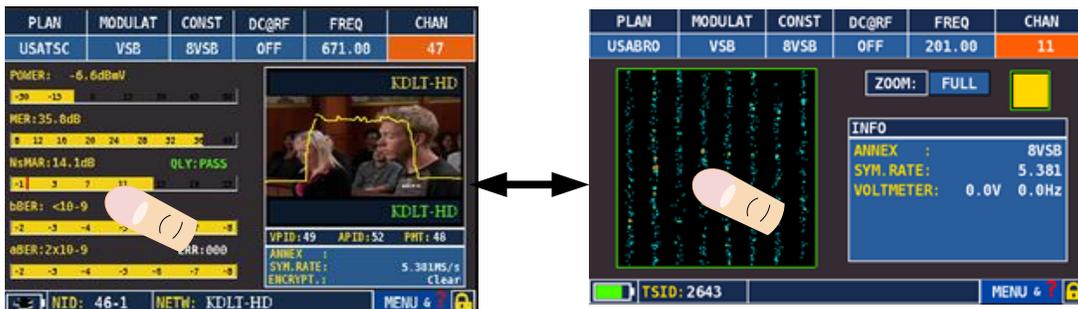


## 2.8 Touch Screen Shortcuts

The touch screen provides selections or shortcuts to move to other measurement pages simply by touching areas of the screen. These shortcuts are available when in the main channel measurement pages. The same area of the screen permits returning to the main measurement page by touching the same area. This section illustrates the shortcuts available.

### Main Measurement Page to Constellation Page

When in the main measurement page touching the left center of the screen advances the display to the constellation measurement page. Touching the same left center area of the constellation page returns the screen to the main measurement page.



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## Main Measurement Page to MPEG Service List Page

When in the main measurement page touching the right area of the screen below the video screen section advances the measurement to the MPEG SERVICE LIST function or display screen. Touching the same area of the MPEG SERVICE LIST screen returns the measurement to the main measurement page.



## Main Measurement Page to Full Screen Video Monitor

When in the main measurement page touching the right area of the screen on the video screen section advances the meter to a full screen display of the video. Touching the same area of the full screen displayed video returns the display to the main measurement page.

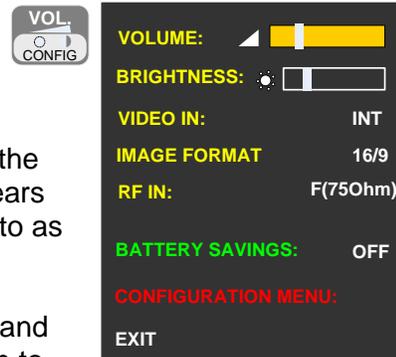


## Section 3: Meter Configuration

The DSA 1491 has two meter configuration menus. They include an initial CONFIG Pushbutton or “Quick View” menu and an extended CONFIGURATION MENU. The Quick View menu is accessed by briefly touching the CONFIG pushbutton at the bottom right corner of the meter. The extended CONFIGURATION MENU is accessed by touching the “CONFIGURATION MENU” listing in red at the bottom of the quick view menu. These menus and their listing are covered in the following section.

### 3.1 CONFIG Pushbutton (Quick View) Menu

The VOL/CONFIG pushbutton provides a quick view menu showing display settings and several in/out settings. This menu is intended to be easy to access providing commonly used selections or adjustments. To access this menu touch the VOL/CONFIG pushbutton at the bottom right of the meter front panel. The menu that appears automatically times off after a few seconds so is referred to as the “Quick View Menu” in this manual.



Each of the listings in the Quick View Menu is selectable and has an associated adjustment or selection which is shown to the right. Upon opening, the Quick View menu defaults to the VOLUME field which is highlighted. To select other listed fields, simply touch the screen with your finger over the listing. Alternatively, you may push the ENTER pushbutton and slide your finger over the arrow section of the Control Knob to navigate to other listings. The selection to the right of the listing is highlighted when selected for change. The following section briefly explains each of the selectable listings within this menu and explains the corresponding selections and use.

#### 3.11 VOLUME

The VOLUME field contains an adjustment bar which may be selected and varied to increase or decrease the audio speaker level. This field is by default always selected or highlighted when the VOL/CONFIG pushbutton is pressed and the Quick View menu appears.

To change the volume, touch your finger or stylus to the left side of the adjustment bar to decrease the volume. Touch to the right side of the adjustment bar to increase volume. Or, once the bar is selected move your finger over the arrow of the Control Knob to increase or decrease the volume setting.

The volume adjustment only varies the volume of the built-in meter’s speaker and the volume of the Audio/Video Output jack. When using an external HDMI monitor connected through the HDMI connector, the HDMI audio level is not varied with this adjustment. However, you may adjust the volume with the controls on the HDMI monitor.

### 3.12 BRIGHTNESS

The BRIGHTNESS field adjusts the display backlight setting resulting in an increase or decrease in the display's brightness. Keep in mind, that the brighter the display setting the faster the internal battery pack discharges reducing the portable use time.

To change the brightness, touch your finger or stylus to the left side of the adjustment bar to decrease the brightness. Touch to the right side of the adjustment bar to increase the brightness. Or, once the brightness bar is selected by touching the BRIGHTNESS field listing, move your finger over the arrow section of the Control Knob to increase or decrease the brightness.

### 3.13 VIDEO IN

The VIDEO IN field selects the INT (internal) or EXT (external) video. The INT selection directs the meter to route video from the meter's internal demodulator to the meter's display for normal TV-RF signal analyzing and video viewing. This is the default setting. Selecting EXT directs the meter to switch to an external video input monitoring mode. In this mode the video input to the Audio/Video Input on the left side of the meter is routed to the display for viewing. The audio to the Audio/Video Input is routed to the audio circuits for monitoring. Selecting this mode defeats the normal RF measurement functions.

Note that the normal default of the VIDEO IN setting is INT which provides normal meter use and video viewing of the demodulated TV-RF signal. To setup the meter for external video viewing, touch the VIDEO IN field or listing. Touch the highlighted field to increment to EXT. To switch back to normal meter use, press the CONFIG pushbutton and change the VIDEO IN setting back to the INT. setting.

### 3.14 IMAGE FORMAT

The IMAGE FORMAT field provides an aspect ratio selection for the displayed video. The image format may be set to either 16:9 or 4:3. The selection changes the aspect ratio of the video viewed on the SLM 1479's display. To select the image format, touch the IMAGE FORMAT field, and touch the highlighted section to increment to the desired aspect ratio.

### 3.15 RF IN

The SLM 1479 includes the optional capability of converting optical signals to RF channels for input to the SLM 1479's RF analyzing measurements. This capability complements measurements directly from the fiber cable in RFoG and fiber to the home delivery systems. The RF IN field provides control to switch or activate the Optical RF output so it may be used to feed the RF IN jack of the meter.

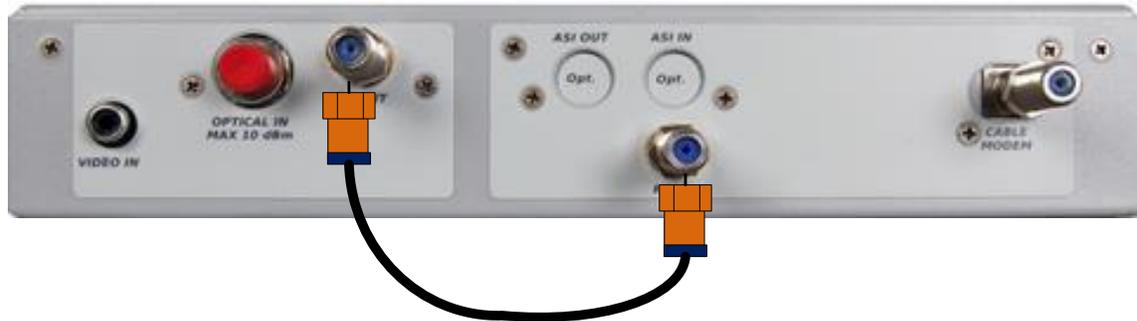
When making TV or CATV RF measurements with inputs to the conventional F connector or RF- IN jack, select the default or F (75 ohm) selection. When making

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converted optical RF signals from the output of the Optical Converter via the RF OUT jack select the OPTICAL selection in this field.

*Note: This input selection does not influence the OPTIC power level measurement function that is available from the HOME menu when the OPTIC icon is selected. This function always uses the OPTICAL IN jack.*

When making RF measurements from the optical converter you must connect a connection cable from the RF OUT connector near the OPTICAL IN connector on the top of the meter to the RF-IN jack at the top center of the meter. The SLM 1479 does not contain an internal connection path from the optical converter to the meter's RF analyzing circuitry.



### 3.16 BATTERY SAVING

The BATTERY SAVING field provides control to either turn ON or turn OFF the battery saving features of the meter. The SLM 1479 provides two battery saving features. When the BATTERY SAVING setting is in the ON mode, if no user key press or touch command is received for a period of 30 seconds, the display brightness is reduced. If no user key press or touch command is received within 5 minutes, the meter automatically powers off. When the displayed is dimmed, pressing a key or a touch command returns normal display brightness and resets the timer.

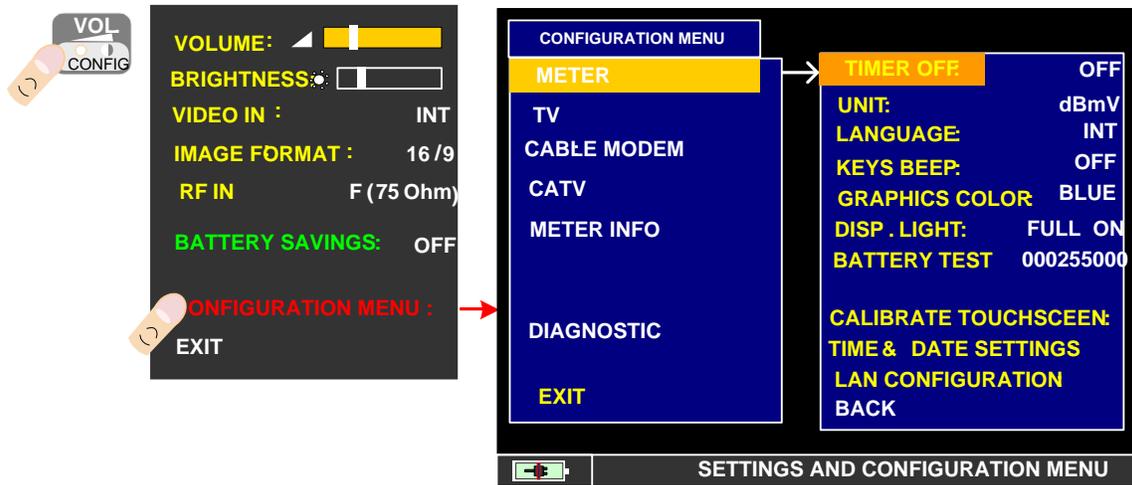
To use the BATTERY SAVING features, touch the BATTERY SAVING field and touch the highlighted selection field until it reads "ON." To disable the BATTERY SAVING features, touch the BATTERY SAVING field and touch the highlighted selection field to read "OFF."

### 3.17 CONFIGURATION MENU

The CONFIGURATION MENU field provides access to the Configuration Menu which provides further meter and measurement setup. The next section (3.2) provides details of the CONFIGURATION MENU.

### 3.2 Configuration Menu

The CONFIGURATION MENU provides setup options for the meter and measurement functions. The CONFIGURATION MENU is accessed by first pressing the VOL/CONFIG pushbutton at the bottom right of the meter's front panel. Secondly, touch the CONFIGURATION MENU listing near the bottom of the Quick View Config. Menu as illustrated below.



The CONFIGURATION MENU has several listings or categories in which setup selections are available. The selections are listed at the right of the category. The Configuration Menu includes METER, TV, CATV, CABLE MODEM, METER INFO and DIAGNOSTIC listings. Each listing has an associated configuration menu. Touch the screen listing to select the desired configuration menu. This section of the manual covers each of the CONFIGURATION MENU listings and explains the associated settings included within each.

#### 3.21 METER CONFIGURATION

The METER listing provides display and measurement settings. To access the METER field navigate to the CONFIGURATION MENU screen and touch the METER listing. The METER menu appears to the right and includes the selectable fields TIMER, UNIT, LANGUAGE, KEYS BEEP, GRAPHICS COLOR, DISP. LIGHT, BATTERY TEST, CALIBRATE TOUCHSCREEN, TIME & DATE SETTINGS, and LAN CONFIGURATION. The follow section describes the purpose and selections of each of these menu selections.

##### 3.21.1 TIMER OFF

The TIMER OFF field provides selections to specify the time delay before the meter powers off from user inactivity. If no touch command is sensed by the meter within the TIMER OFF setting time, the meter automatically turns itself off in order to save battery life. To set, navigate to the CONFIGURATION MENU and touch the METER field. Then touch the TIMER OFF listing followed by touches to the highlighted field at the right to

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select the desired time delay. The settings include: OFF (meter always on), 5 min (meter turns off in 5 minutes), 10 min (meter turns off in 10 minutes), 15 min (meter turns off in 15 minutes), 30 min (meter turns off in 30 minutes)..

### 3.21.2 UNIT

The UNIT field provides selection for the unit of measurement for the channel level tests. The unit of measurements available include dBm, dBuV (dB microVolt), and dBmV (dB milliVolt). To select, navigate to the CONFIGURATION MENU and touch the METER field. Touch the UNIT field followed by touches to the highlighted selection field at the right to increment to the desired unit of measurement.

NOTE: dBmV is the most popular reference for a TV and CATV measurements. dBm is commonly used for satellite power references.

### 3.21.3 LANGUAGE

The LANGUAGE field provides selection for the language used by the meter's display menus. The language selections include English, Spanish, Dutch, French, Italian, and Portuguese, and Polish. To select a language, navigate to the CONFIGURATION MENU and touch the METER field. Touch the LANGUAGE field followed by touches to the highlighted field at the right to increment through available language selections.

### 3.21.4 KEYS BEEP

The KEYS BEEP field provides selections to enable a beep sound from the meter's speakers when touch commands are received by the meter. The settings include OFF, LOW, MEDIUM, and HIGH selections. The OFF selection disables the touch beeps. The LOW, MEDIUM and HIGH selections enable the touch beeps and vary the sound level. To turn on the key beep feature and select a volume navigate to the CONFIGURATION MENU and touch the METER field. Touch the KEYS BEEP field followed by touches to the highlighted field at the right to increment through available beep levels.

### 3.21.5 GRAPHICS COLOR

The GRAPHICS COLOR field provides selections for the color scheme used by the various displays and menus of the SLM 1479. The color schemes include BLUE, GREEN, GREY, and BROWN to match personal preferences. The color scheme selected does not influence the battery use time. To select a color scheme, navigate to the CONFIGURATION MENU and touch the METER field. Touch the GRAPHICS COLOR field followed by touches to the highlighted field at the right to increment through the available color schemes.

### 3.21.6 DISPLAY LIGHT

The DISPLAY LIGHT field provides several time selections to choose from for delaying the time in which the POWER SAVINGS feature dims the display lights when there is no user selection activity. To select a display light dimming time delay, navigate to the CONFIGURATION MENU and touch the METER field. Touch the DISPLAY LIGHT field followed by touches to the highlighted field at the right to increment through the available

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time delays. Delay times may be FULL ON (display lights do not dim), 15 sec (display lights dim in 15 sec), 30 sec (display lights dim in 30 seconds).

### 3.21.7 BATTERY TEST

The BATTERY TEST field provides an automated battery test and reconditioning routine performed by the SLM 1479. The feature performs an internal battery test. The BATTERYTEST checks/recovers the battery capacity and recalculates the meter's battery charge indicator to get precise Indications on the charge battery status. For example, if the battery test indicates "000255000," the battery capacity is approximately 255 minutes. If letters are indicated, such as a "000275BGEY" readout, the battery capacity is 275 minutes. If sufficient time and/or a "Y" (YES) shows as the last letter, then the batteries are considered good.



### 3.21.8 TOUCHSCREEN

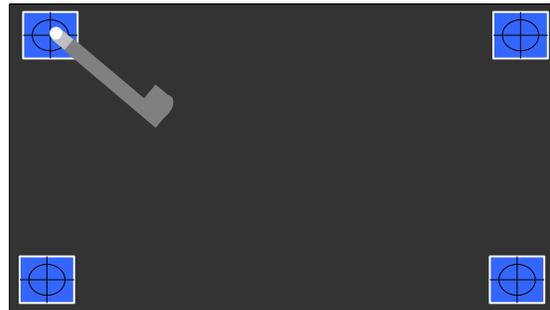
The TOUCHSCREEN field provides the ability to enable or disable the touchscreen. Setting this field to DISABLE will cause the touchscreen to be unresponsive to any touch selection. Setting this field to ENABLE permits touchscreen sensitive display selection. *Note: Full user control is possible using the large rotating and push control knob along with the front panel pushbuttons.*

### 3.21.9 CALIBRATE TOUCHSCREEN

The touch sensitive screen can be calibrated to improve position or touch location accuracy. If the touch point on the screen is shifted from the desired command or selection field's highlighted location or if you notice nearby values or commands are selected, a touch screen alignment with the included stylus is recommended.

To calibrate the touch screen navigate to the CONFIGURATION MENU and touch the METER field. Touch the CALIBRATE TOUCHSCREEN field to begin the calibration. The meter presents target circles one at a time in each corner of the meter starting at the upper left and progressing clockwise.

Touch the stylus to the center of each circle that alternately appears in the corners of the display screen. Repeat this operation 4 times for each position or square that appears.

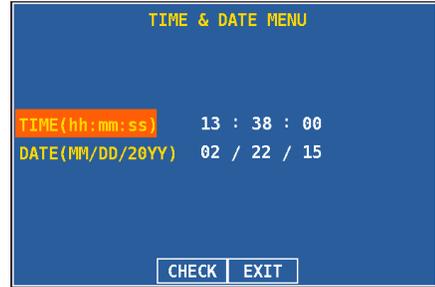


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Be sure to use the special stylus pointer and touch the screen exactly in the center of the target circle.

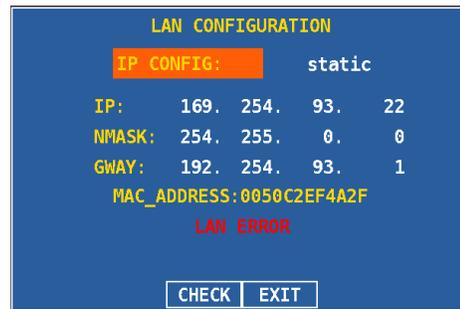
### 3.21.10 TIME & DATE SETTINGS

The TIME & DATE SETTINGS field provides entry of the time in hours (1-24), minutes, and seconds. It further provides entry of date information including the month, day, and year. The time and date settings are used for logging functions.



### 3.21.11 LAN CONFIGURATION

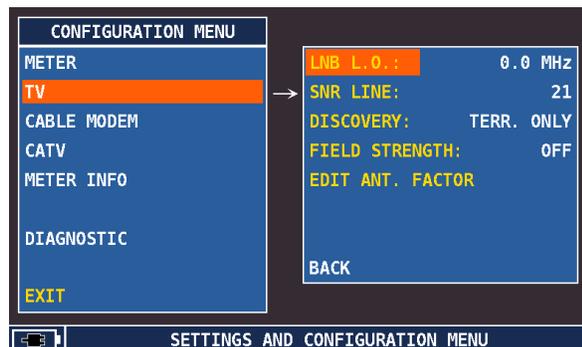
The LAN CONFIGURATION field provides selections to configure the RJ45 or LAN connection port of the SLM 1479 for connection to a network. The menu provides selection for a DHCP (Dynamic Host Connection Protocol) IP connection/configuration or static connection/configuration. The static configuration provides entry of IP, Network Mask and Gateway address entries. To configure a LAN connection, navigate to the CONFIGURATION MENU and touch the METER field. .22 TV Configuration



The TV listing provides settings relative to the terrestrial TV measurements provided by the SLM 1479. To access the TV field navigate to the CONFIGURATION MENU screen and touch the TV listing. The TV menu appears to the right and includes the selectable fields LNB L.O., C/N TYPE, and DISCOVERY. The follow section describes the purpose and selections of each of these menu selections.

### 3.23 TV CONFIGURATION MENU

The TV listing provides settings relative to using the TV measurements provided by the SLM 1479. To access the TV field navigate to the CONFIGURATION MENU screen and touch the TV listing. The TV configuration menu appears to the right and includes the selectable fields LNB L.O., C/N TYPE, DISCOVERY, FIELD STRENGTH and EDIT ANT. FACTOR. The follow section describes the purpose and operation of each of these menu selections.



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## 3.23.1 LNB L.O.

The meter LNB L.O. (Low Noise Block Converter - local oscillator) frequency is typically used for settings associated with the Satellite receiver and dish settings. However, the LNB L.O. feature is made available in the TV and CATV reception settings in the rare case that an LNB L.O. input is required for a frequency conversion of the received signal. The default setting is 0 MHz which results in no frequency conversion. If the LNB L.O frequency is set or selected, the meter performs the frequency conversion subtracting the lower frequency from the larger frequency.

*Note: If the LNB L.O. frequency is not the default 0 MHz, the frequency readout in the meter's measurement screen will indicate improperly for the known broadcast or cable channel frequency. The frequency indication is higher or lower by the entered L.O. frequency value.*

## 3.23.2 SNR LINE

The SNR LINE field is relative to measurements of analog channels only. The SNR (Signal-to-noise-ratio) measurement is a measured ratio of the video noise compared to the video amplitude or voltage. The ratio is calculated as a ratio of noise to signal voltages in dB.

The integrated video waveform monitor for analog channels is used to measure the SNR. The measurement is calculated using a single scan line of the detected video modulation of the selected channel. The SNR LINE field provides selection of the analog channel video scan line in which the meter performs the signal-to-noise ratio measurement. The selected line must be void of any test signal or vertical interval data as this would degrade or reduce the measured SNR measurement. The default line is line 21. To select a different line, touch the SNR LINE field. Rotate the large control knob to increment to the desired line. Push in the large knob to enter the selected line.

## 3.23.3 DISCOVERY

The DISCOVERY field provides an indication of the signal type(s) the meter searches for when performing a channel scan when creating automatic channel plans for broadcast TV. The DISCOVERY field in the TV Configuration is fixed at TERR. ONLY as there is no need to search for cable channel modulation types.

## 3.22.4 FIELD STRENGTH & EDIT ANT. FACTOR

The FIELD STRENGTH field provides modifications to the TV level measurements when using the SLM 1479 to measure TV coverage field strengths. The field provides several selections of common antenna types. Or, you may use an alternate antenna and select the CUSTOM antenna selection. When the CUSTOM selection is chosen the EDIT ANT. FACTOR field becomes active and may be selected to provide antenna factor calibration offsets and offsets for cable loss. For

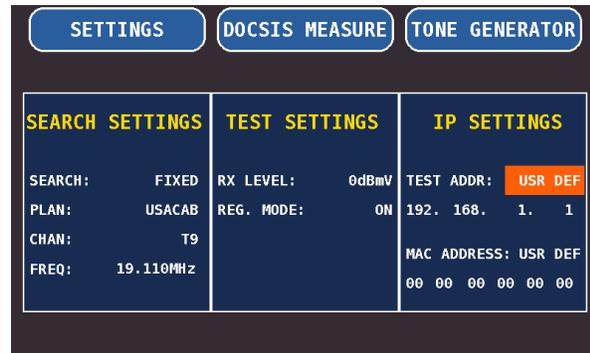
ANTENNA FACTOR SETTING			
FREQ	ANT. FACTOR	CABLE LOSS	
1	50MHz	3dB/m	0dB
2	150MHz	15dB/m	0dB
3	250MHz	23dB/m	0dB
4	400MHz	9dB/m	0dB
5	500MHz	9dB/m	0dB
6	600MHz	9dB/m	0dB
7	650MHz	14dB/m	0dB
8	750MHz	12dB/m	0dB
9	850MHz	11dB/m	0dB
10	950MHz	16dB/m	0dB
BACK			

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normal TV antenna dBmV measurements, the FIELD STRENGTH field should remain “OFF.”

## 3.23 CABLE MODEM

The CABLE MODEM listing provides selection of the settings used for the meter’s cable modem and DOCSIS testing of a cable system. The settings are divided into the Search Settings, Test Settings and IP Settings and are described in this section of the manual. More information on the DOCSIS test may be found in Section 7 of this manual starting on page 97.



### 3.23.1 SEARCH SETTINGS

The SEARCH settings select the channels in which the DOCSIS downstream channels are selected for testing. The AUTOMATIC selection permits the meter to automatically search and find the DOCSIS downstream channels. The FIXED search setting defines the channel, channel plan and channel frequency used as the primary downstream DOCSIS test channel. The channel within the selected channel plan defined for CATV measurements may be selected for the DOCSIS downstream channel. A frequency entry may be used to offset the frequency of the channel selected or define a test frequency.

### 3.23.2 TEST SETTINGS

The TEST settings select or define the input receive (RX) level for the cable system CMTS. This receive level is used by the DOCSIS Measurements to determine the attenuation (ATT:) measurement level using the known output level of the meter’s cable modem and defined receive level.

The REG. MODE defines the DOCSIS test mode as to if registration with the CMTS is desired. When ON the meter’s modem negotiates connection with the CMTS and requests service authorization. When authorization is granted then the meter is able to complete PING REPORT testing and IP Report measurements. When the REG. MODE is set to OFF the DOCSIS test does not register with the CMTS and only upstream and downstream measurements are provided.

### 3.23.3 IP SETTINGS

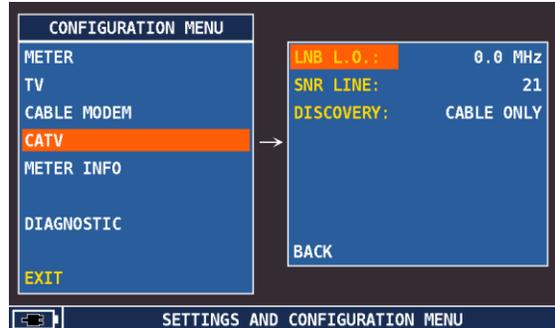
The IP Settings section configures the CMTS Gateway and MAC Address required for network connection. The address can be the pinged address (Gateway) or a user defined address. The MAC ADDRESS can be the default of the meter or be a user defined (USR DEF) MAC ADDRESS in which to emulate a cable modem in which is registered for use with the cable system CMTS.

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Please see the DOCSIS testing section of this manual for descriptions and use of the DOCSIS MEASURE and TONE GENERATOR sections of the DOCSIS tests.

### 3.24 CATV CONFIGURATION

The CATV listing provides settings relative to using the CATV measurements provided by the SLM 1479. To access the CATV field navigate to the CONFIGURATION MENU screen and touch the CATV listing. The CATV menu appears to the right and SNR LINE, and DISCOVERY. The follow section describes the purpose and selections of each of these menu selections.



#### 3.24.1 LNB L.O.

The meter LNB L.O. (Low Noise Block Converter - local oscillator) frequency is typically used for settings associated with the Satellite receiver and dish settings. However, the LNB L.O. feature is made available in the CATV reception settings in the rare case that an LNB L.O. input is required for a frequency conversion of the received signal. The default setting is 0 MHz which results in no frequency conversion. If the LNB L.O. frequency is set or selected, the meter performs the frequency conversion subtracting the lower frequency from the larger frequency.

Note: If the LNB L.O. frequency is not the default 0 MHz, the frequency readout in the meter's measurement screen will indicate improperly for the known broadcast or cable channel frequency. The frequency indication is higher or lower by the entered L.O. frequency value.

#### 3.24.2 SNR LINE

The SNR LINE field is relative to measurements of analog channels only. The SNR (Signal-to-noise-ratio) measurement is a measured ratio of the video noise compared to the video amplitude or voltage. The ratio is calculated as a ratio of noise to signal voltages in dB.

The integrated video waveform monitor for analog channels is used to measure the SNR. The measurement is calculated using a single scan line of the detected video modulation of the selected channel. The SNR LINE field provides selection of the analog channel video scan line in which the meter performs the signal-to-noise ratio measurement. The selected line must be void of any test signal or vertical interval data as this would degrade or reduce the measured SNR measurement. The default line is line 21. To select a different line, touch the SNR LINE field. Rotate the large control knob to increment to the desired line. Push in the large knob to enter the selected line.

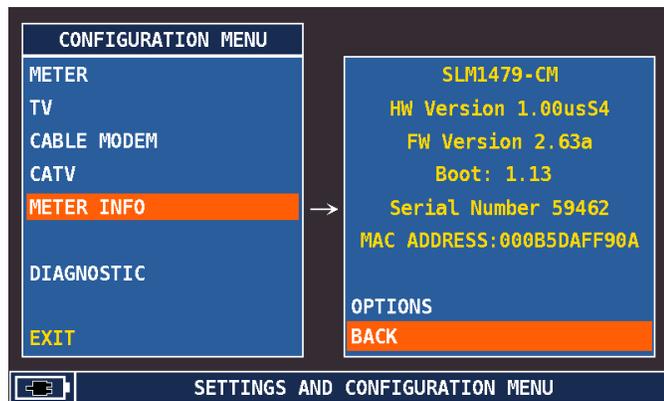
## 3.24.3 DISCOVERY

The DISCOVERY field provides an indication of the signal type(s) the meter searches for when performing a “HELP” channel function. A HELP discovery analysis is performed when in the Spectrum mode and selecting the MENU & ? menu and touching the HELP icon. A discovery analysis automatically tries to determine a channel band’s modulation type, symbol rate and bandwidth resulting in an automatic configuration of the meter and signal tuning/reception.

The DISCOVERY field in the CATV Configuration menu identifies CABLE ONLY. No selections or changes are available.

## 3.25 METER INFO MENU

The METER INFO menu provides information regarding the internal hardware, firmware, boot-up version, microprocessor program version, and serial number. The menu further indicates the inclusion of optional hardware and firmware features. The MAC address of the meter is also indicated.



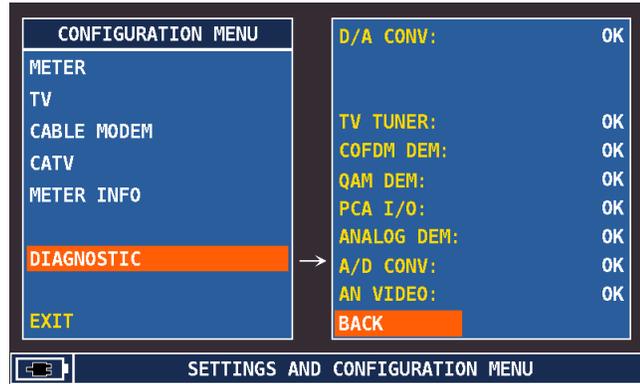
The Meter Info Menu contains an “OPTIONS” selection at the bottom right. Touch this selection or rotate the large Control Knob to highlight the OPTIONS row and push the knob in to select.

The OPTION LIST menu shows possible options for the SLM 1479. It further indicates a YES or NO indicating if that option is included or licensed in the meter. Not all of the listings are currently offered or available for the Sencore SLM 1479. The COAX CABLE REFLECTOMETER, 2700 MHZ SAT. EXT, VIDEO WAVE F. MONITOR, and HD REMOTE CONTROL are not currently available. Some options on the list are provided courtesy of Sencore and are not additional purchased options. Examples include the TV MINISPECTRUM, VIDEO WAVE F. MONITOR, and HD AUDIO DOLBY +. These options are included with every SLM 1479.

OPTION LIST	
HD AUDIO DOLBY+	YES
HD TV MINISPECTRUM	YES
HD OPTIC INPUT	YES
HD COAX CABLE REFLECT.	NO
HD REMOTE CONTROL	YES
DOCSIS 3.0 4x4	YES
HD 2700 MHZ SAT EXT	NO
HD VIDEO WAVE F. MONIT.	NO
HD ATSC USA	YES

## 3.26 DIAGNOSTIC TEST

The DIAGNOSTIC listing in the CONFIGURATION MENU provides a self-test of the meters internal circuits. The circuits should all indicate "OK" if they are working and responding to the microcontroller. If a listing does not indicate OK, a likely problem exists. Please contact the Sencore Service Dept. for assistance. Please see Appendix B of this manual for service information and procedures.



## Section 4 Video In Monitoring

The SLM 1479 offers a video input monitoring capability to supplement its TV-RF analyzing capabilities. This section summarizes the video input features and provides operational information.

### 4.1 Video In

The video display of the SLM 1479 may be used as an NTSC composite video monitor through the use of the VIDEO IN jack located at the top left of the meter. The video input jack is an RCA phono connector. Connect an RCA phono to RCA phono connection cable from the composite video source to the VIDEO IN connector of the meter.

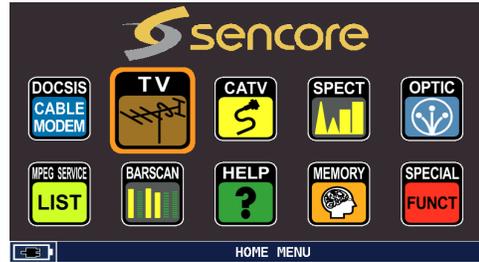


Select the VOL/CONFIG or Quick View menu by touching the VOL/CONFIG pushbutton at the bottom right of the meter. Touch the VIDEO IN field and touch the listing at the right to change to "EXT." This puts the meter into a video monitoring mode to monitor composite video. No RF measurements are available when in this mode. If selected the meter's touch panel screen goes blank if no video signal is being input to the VIDEO IN jack. Press the VOLUME/CONFIG pushbutton to return to the normal meter measurement function.



## Section 5: TV Broadcast Measurements

The broadcast TV signal analysis provided by the SLM 1479 indicates the performance of broadcast television digital 8VSB signals. Measurements provide guidance for antenna installation/aiming and may be used to test TV-RF distribution systems. This section provides information on the broadcast TV measurements.

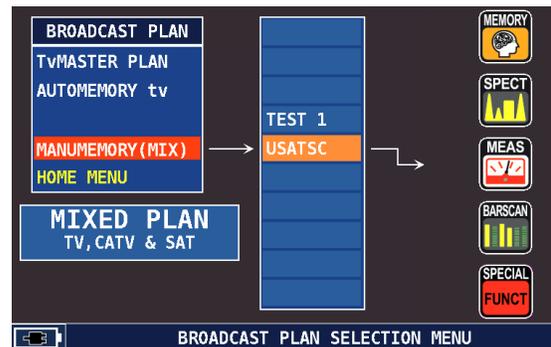


### 5.1 TV Plan Selection

When the TV icon in the HOME Menu is highlighted, pressing the PLAN SELECT front panel pushbutton presents a TV BROADCAST PLAN SELECTION MENU. This menu provides selections which define a tuning plan for selecting TV channels and respective frequency bands for measurements. The TV BROADCAST PLAN MENU contains several listings of which to choose from. The following is a brief description of these listings and their content.

**TvMASTER PLAN:** This selection provides a listing of standard or master TV channel plans to choose from. For testing applications in North America, the USABRO listing provides a suitable channel plan which includes all the off-air TV channels from 2 to 69.

**AUTOMEMORYtv:** This selection provides a list of channel plans to choose from that are “AUTO” plans. These plans are created with the AUTOMEMORYtv feature in the MEMORY MENU. Please see section 5.81 of this manual for information on creating an AUTO channel plan. If you have created an AUTO plan for broadcast signal analyzing or antenna work, it will be listed for selection.



**MANU MEMORY (MIX) Plan:** The MANU MEMORY (MIX) listing in the TV BROADCAST PLAN menu contains manually created channel plans. A manual plan may include a mix of cable channels or TV broadcast channels. Manual channel plans may be edited in the MEMORY MENU function or using the supplied SMART software. Manual channel plans may be created in the SMART software. The MANUMEMORY of the SLM 1479 includes a USATSC plan with all the off-air TV channels from 2 to 69. This plan may be edited in the MEMORY MENU to customize it for your local channels. Please see section 5.82 of this manual.

#### To Select a Broadcast TV Channel Plan:

1. Touch the TV icon. Touch the PLAN SELECT pushbutton to present the BROADCAST PLAN SELECTION MENU.

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2. Touch the TVMASTER PLAN. Touch the USABRO field in the center list. Press the TV pushbutton or the MEAS icon at the right. The meter advances to the TV MEASUREMENT page.

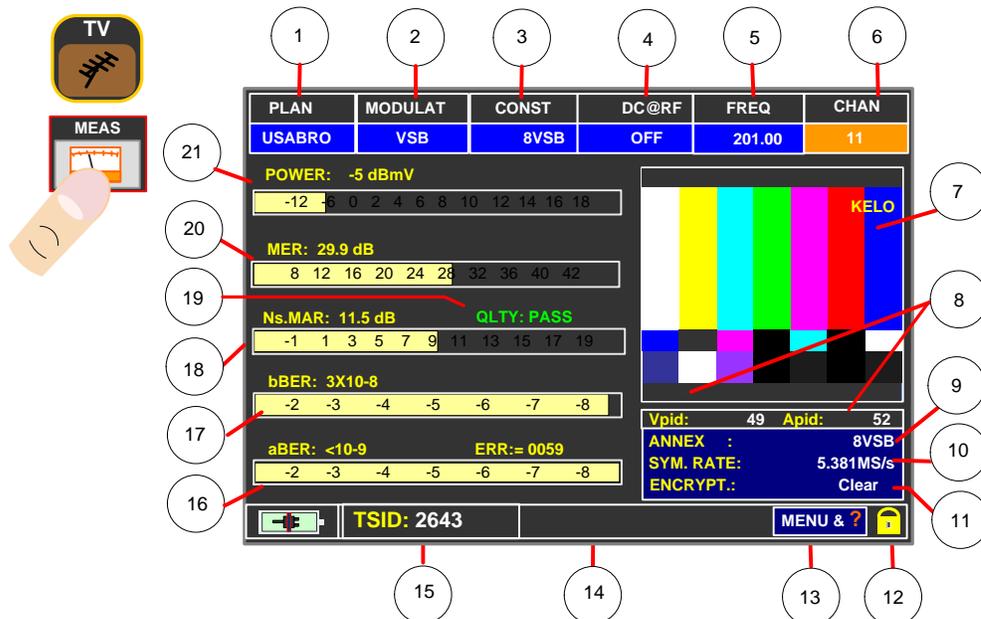
### 5.2 TV Digital & Analog Measurements

The SLM 1479 provides a comprehensive analysis of a TV broadcast signal, either digital or analog. Digital signal analysis includes standard 8VSB analysis. To access the TV Broadcast measurements touch the TV icon on the HOME page or touch the TV front panel pushbutton. Press the PLAN SELECTION pushbutton to select a broadcast channel plan as outlined in the previous section.



#### 5.21 Main Digital TV Measurement Page

The main measurement page includes many fields. The following section describes the fields of a digital channel measurement as numbered in the figure below.



- 1. Plan:** The TV channel plan selected in the TV Broadcast Plan Selection Menu or in a Manual channel plan
- 2. Modulation:** The modulation type of the digital signal. Defaults to the type identified in the channel plan which should be VSB for broadcast TV in North America for the selected channel (6). This is a field that permits selection of other modulation types and analog (AN.TV).
- 3. CONST:** The current setting for constellation based upon modulation.

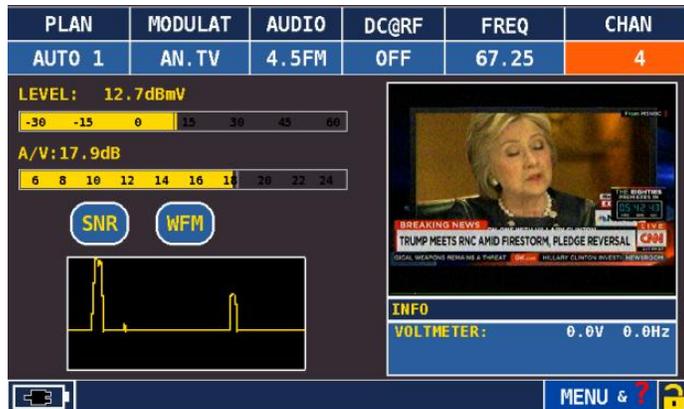
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4. **DC@RF:** This field indicates OFF as the SLM 1479 does not provide switchable output DC voltage
5. **FREQ:** The center frequency of the digital channel or video carrier of analog channel. Selectable field permits frequency tuning.
6. **CHAN:** The selected channel being analyzed. Selectable field permits channel selection. The channel must be included in the selected channel plan (1).
7. **Video:** The active video on the selected video service within the channel
8. **VPID/APID:** Video and Audio Program Identifier values for the selected video service contained in MPEG
9. **ANNEX:** The standard signal type or reference – 8VSB for terrestrial digital signals.
10. **SYM RATE:** The symbol rate of the RF digital carrier in million (MEGA) symbols per second.
11. **Encryption:** Indicates if the selected video service is encrypted
12. **Locked Symbol:** Indicates if the meter's receiver is locked to a digital RF signal
13. **MENU & ?:** Provides a popup menu with related selections and a HELP icon for auto tuning to determining the channel signal modulation, symbol rate, and frequency.
14. **Network Name (NETW):** Indicates the network name or identification
15. **TSID or NID:** Transport Stream or network Identification numbers
16. **aBER:** Bit Error Ratio measurement after error correction measurement
17. **bBER:** Bit Error Ratio measurement – before error correction
18. **Noise Margin (Ns.MAR):** Provided margin signal vs. noise power measurement
19. **Quality (QLTY) Rating:** Quality rating based upon MER and noise margin values
20. **MER:** Modulation Error Ratio measurement of selected channel
21. **POWER:** Average Power measurement for the digital channel and video carrier peak measurement for an analog channel, typically in dBmV.

### 5.22 Analog TV Measurements

The SLM 1479 may be used to analyze the level, A/V ratio, signal-to-noise (SNR) and analyze the video waveform of an analog TV channel. You may further view the demodulated video and listen to the audio. To measure a TV channel as an analog channel, the modulation type for the channel must be specified as an analog TV channel. The abbreviation for this on the meter is "AN. TV."

You may change the modulation type of a selected channel in the main measurement page by touching the MODULAT header. Select the AN.TV listing in the drop down selection box by touching the AN.TV listing

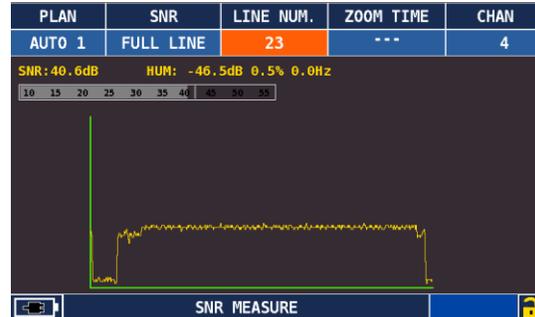


Analog measurements are provided on three different measurement pages. The 1<sup>st</sup> page provides a level measurement, provides video and audio monitoring, and provides a basic spectrum analyzer view. Any voltage input to the RF jack is indicated by the

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voltmeter measurement. The 2<sup>nd</sup> page provides a waveform monitor screen in which the signal-to-noise ratio and hum is measured on a selected video line. The 3<sup>rd</sup> measurement page provides a waveform monitor (WFM) screen in which the selected scan line of detected video is scanned and displayed.

Push the TV front panel push button to increment to each measurement page. Or touch the display's SNR field to increment to the second SNR MEASURE page or touch the WFM field to advance to the 3<sup>rd</sup> WFM (Waveform Monitor) measurement page.

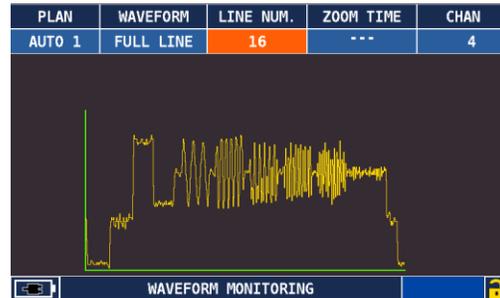


### 5.22.1 SNR MEASURE

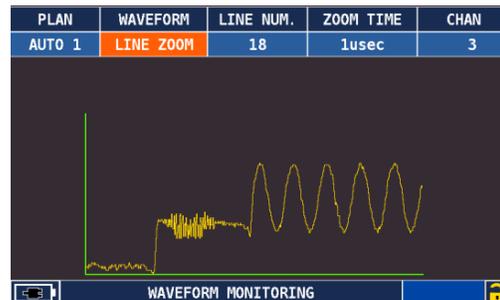
The SNR measurement page provides analysis of the detected video of the analog channel. The signal-to-noise ratio indicates the dB ratio or difference between the noise voltage and video amplitude voltage. The greater the ratio or dB value the better. The measurement should be performed on a video line in which there is no active video by selecting a line in the vertical blanking interval. Be sure to select a line in which there is no test signal or data signals such as close captioning. The default Line Num is selected in the meter's configuration menu. Please refer to section 3.23 starting on page 28.

### 5.22.2 WAVEFORM MONITORING (WFM)

The waveform monitor measurement page provides a view of the selected line of the detected video modulation of an analog channel. The LINE NUM field or header field may be selected and the knob rotated to increment/decrement to the desired line of video. The display shows one scan line starting at the beginning of the horizontal sync period to the beginning of the next sync period.



The waveform monitor offers a LINE ZOOM feature in which the first part of the scan line can be expanded for viewing. Select the WAVEFORM field and increment the large knob to select the LINE ZOOM mode.



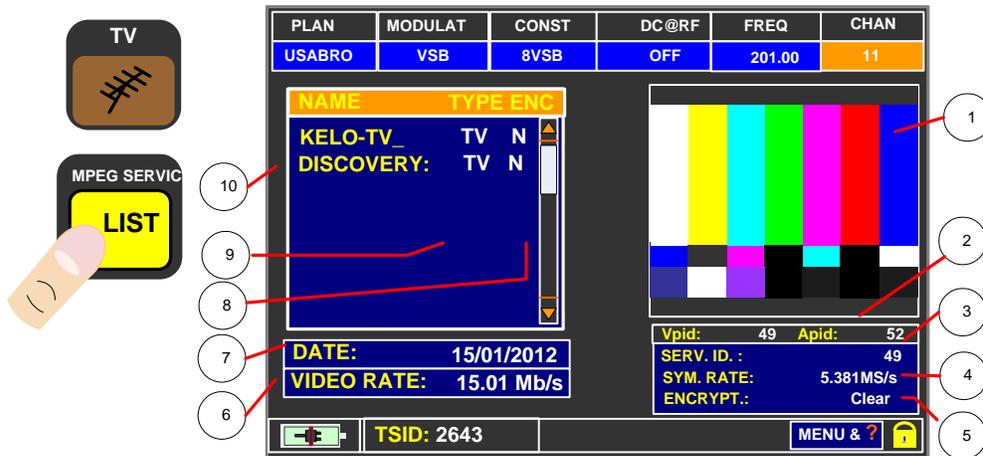
### 5.23 FM Radio Tuning & Measurement

To measure the level of an FM radio signal, touch the MODULAT header field and select the "FM RADIO" listing. Touch the FREQ header and enter the FM radio frequency. The level of the FM radio signal is metered and you may listen to the detected audio.

### 5.3 TV MPEG SERVICE List

The MPEG SERVICE LIST measurement page of the SLM 1479 provides information regarding the MPEG stream and video service/programs of the selected TV channel. The MPEG SERVICE LIST page may be accessed in two ways. From the HOME Menu with the TV icon highlighted, touch the MPEG SERVICE LIST icon. Secondly for convenience from the TV Main Measurement Page, touch the box below the displayed video. Touch the same box to return to the Main Measurement Page from the MPEG SERVICE LIST page.

#### 5.31 TV MPEG Service Page Description



The MPEG SERVICE LIST measurement page provides information regarding the MPEG transport stream and the selected video service/program contained in the stream. The top and bottom fields are the same as listed and described in the Main Measurement page in section 5.2 of this manual. The unique fields are numbered in the nearby figure and a brief description of these fields follow.

- 1. Demodulated Video Display:** Shows the demodulated video of the selected service from the selected satellite transponder.
- 2. VPID/APID:** Indicates the VPID (Video Packet Identifier Number) and APID (Audio Packet Identifier Number) of the selected video service/program.
- 3. Service ID:** The video service/program identification number
- 4. Symbol Rate:** The RF symbol rate of the channel's digital signal
- 5. Encryption Status:** Indicates if the video service selected is in the clear or encrypted.
- 6. Video Rate:** The MPEG data rate of the selected video service/program
- 7. Date:** The current date as listed in the MPEG stream
- 8. Encryption Status:** Indicates if the individual services are encrypted (YES) or in the clear non-encrypted (NO).
- 10. Service List:** List the video services/programs in the MPEG transport stream

## 5.32 TV Constellation & Monitoring

The constellation measurement page provides a second page of analysis of a broadcast digital channel. The top and bottom fields of the page are the same as the main measurement page. The left center of the Constellation & Info page provides a constellation analysis. The right center of the Constellation & Info page provides an INFO box with information regarding the CATV channel being measured.

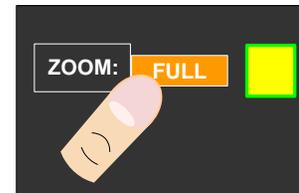
There are two ways to access the Constellation & Info measurement page from the Main Measurement page. Either press the TV pushbutton on the meter front panel or touch the display screen anywhere on the left center measurements area from the POWER measurement bar down to the aBER measurement bar. Touch this same area to return from the Constellation Measurement page to the Main Measurement Page.

### CONSTELLATION

The constellation analysis provides a visual indication of the detected RF symbol accuracy. The constellation diagram changes its appearance to match the modulation type and the number of symbols in the RF transmission. When measuring an 8VSB transmission the constellation diagram consists of 8 vertical spaced sections with detected symbols plotted within. A good constellation ends up showing a tightly created line from top to bottom in the middle of each of the 8 sections or targets. As noise and other signal impairment degrade the signal, the lines widen or separate from the middle target.



The constellation diagram may show a full or all the symbol squares or  $\frac{1}{4}$  sections of the constellation using the ZOOM feature. To zoom into a smaller  $\frac{1}{4}$  section of the full constellation diagram, touch the selection box to the side or right of the ZOOM box. Multiple touches increment the  $\frac{1}{4}$  section view through all the quarter sections of the constellation diagram. The box to the right of the selection box indicates the selected section being shown by the constellation diagram.



**ANNEX:** The digital signal standard annex is 8VSB and it complies with the North American ATSC standard.

**SYM. RATE:** The detected symbol rate of digital channel

**VOLTMETER:** Any voltage measured at the RF IN jack of the meter. If AC voltage is present the frequency is indicated.

## 5.33 TV MPEG Video Service Monitoring

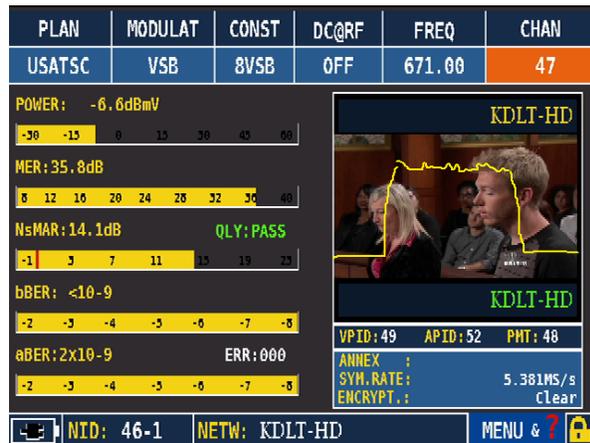
The video displayed in the Main Measurement Page or in the MPEG SERVICE LIST page may be expanded to fill the display screen. For a full screen view of the demodulated video of a selected video service touch the displayed video section of the screen.



The displayed video initially indicates the video service name along with associated MPEG header video and audio information. This information is located along the bottom of the display and includes the video resolution, aspect ratio, and MPEG compression level. The audio information includes the format, and data rate. After a few seconds for review, the bottom section is pushed to the bottom of the display. When viewing a full video display you may return to the previous measurement screen by touching the center of the screen.

## 5.34 MINISPECTRUM

The MINISPECTRUM feature provides a channel spectrum analyzer overlay on the video display within the main measurement page. The spectrum overlay is approximately a 10 MHz span with the center frequency as indicated in the FREQ. field. The overlay cannot be enable or disabled. When you touch the display and expand the video to full screen the overlay is removed. The spectrum overlay provides convenient feedback of multipath and optimum antenna orientation at the same time you are monitoring the channel's digital quality measurements.



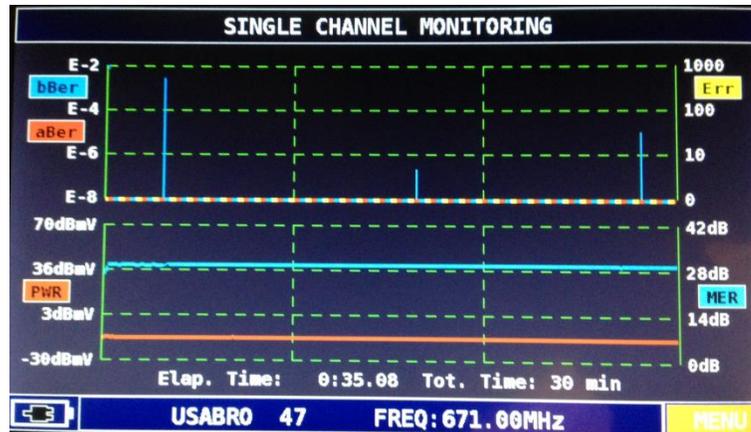


## 5.44 CHANNEL LOGGER

The SLM 1479 includes the ability to continuously monitor and chart the critical RF analyzing measurements of a broadcast channel over a selected time period. The charting allows you to see events or times of RF signal impairments or reception interruptions. To select the Channel Monitoring feature touch the MENU & ? field when in the main measurement screen. In the popup menu touch the CHANNEL LOGGER field. The SINGLE CHANNEL MONITORING screen with multiple measuring graphs is presented.

The Single Channel Monitoring screen is divided into a top and bottom chart or graph. Each graph includes multiple channel measurements as described below:

**Top Chart:** The top chart of the monitoring screen provides charted values which include 3 measurements on a single chart. The measurements are color coded to indicate aBER (red), bBER ((blue), and packet errors (yellow). Menu when in the The channel monitor provides a continuous graphing of the satellite transponder being received.



**Bottom Chart:** The bottom chart provides charted values of the channel's measured power (red), and MER (blue).

When in the Single Channel Monitoring function a control Menu provides selections applicable to the charting. The Menu includes the time interval setting elapsed from the left to right side of the chart.



**TIME INTVL:** Time Interval of the graph shown on the display.

**SEND TO USB:** Turns on the capability of writing channel monitoring values to a USB memory stick file. When turned ON the graphed values of the channel measurements are suspended and values are written to the USB stick file.

**FILE NAME:** Produces an entry menu to define a fine name to store channel monitoring values on the USB memory stick.

**RESET:** Resets or clears the graph. Restarts the channel monitoring and graphing.

The Channel Logger provides a means to continuously sample and record the key channel measurements to a file on the USB stick. To do this insert a USB stick into the

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meter USB-A port. Setup meter to the desired channel to be monitored/logged. Press the MENU & ? menu and select Channel Logger feature. Press the MENU field in the SINGLE CHANNEL MONITORING screen. In the menu, select FILE NAME and enter a file name for the data to be stored on the USB stick. Select the SEND TO USB field and increment to "ON." Press the ENTER selection or press the large control knob in to Enter. Measurements are active and the bottom of the display indicates "SAVING DATA ON FILE. PRESS ENTER TO STOP." Press the large control knob in to stop the logging.



### USB Logging File Data

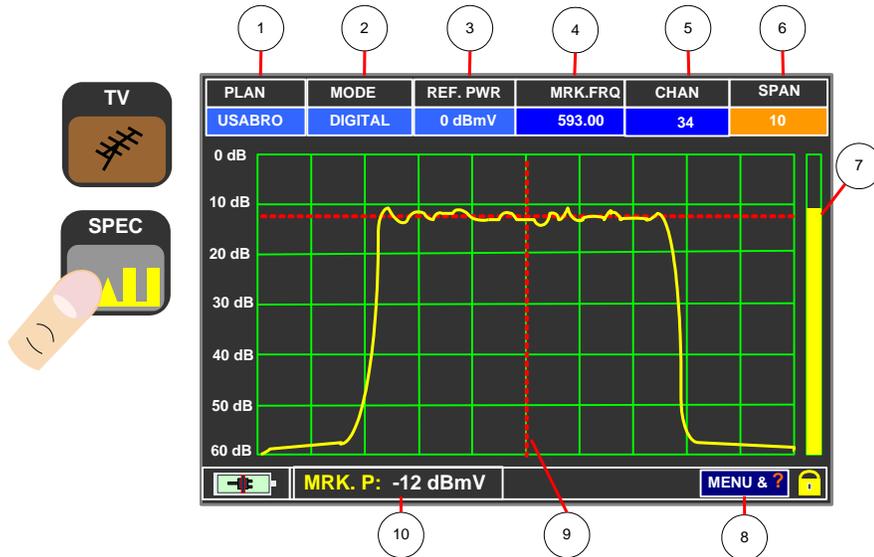
Channel monitoring values that are written to the USB stick file can be opened and viewed with a spreadsheet application. The values include a time reference from the date/time settings of the meter. The values include the Power, MER, aBER, bBER and packet errors

	A	B	C	D	E	F	G	H	I
1	USABRO 47	FREQ:671.00MHz							
2	;PWR;MER;aBer;bBer;Err;								
3	20:27.00;47.0;26.6;1E-8;2E-2;0;								
4	20:27.06;47.0;29.9;1E-8;1E-6;0;								
5									

## 5.5 TV Spectrum Analyzer

The TV spectrum analyzer provides detailed spectral analysis of both analog and digital analog TV signals. To select the spectrum analyzer function from the HOME menu with the TV icon highlighted, touch the SPEC icon. You may also access the spectrum analyzer from any of the other measurement pages by pushing the SPEC pushbutton at the right of the display.

The TV Spectrum Analyzer page contains header fields with many of the same sections as the measurement page. However, some of the headings are different. Below is a summary of all the header fields and an indication if the field may be highlighted for change.



- 1. Plan:** The channel plan selected in the TV Broadcast Plan Selection Menu. It may be the USABRO or a Manual or Auto plan. This field is not selectable.
- 2. MODE:** Indicates the spectrum analyzer's detector mode. Selectable field permits digital or analog selection.
- 3. Reference Power:** Indicates the level of the top line of the spectrum analyzer commonly called the reference power level.
- 4. Marker Frequency:** The frequency represented by the location of the vertical red marker line on the spectrum analyzer display. A selectable field permits moving the marker line. The marker may be moved automatically by touching points in the display or by highlighting the MRK FRQ field and rotating the touch control knob.
- 5. Channel:** The selected TV broadcast channel being analyzed. Selectable field permits channel selection. Note: A channel must be in the channel plan to be listed and selected.
- 6. Span:** The frequency span of the spectrum analyzer. A selectable field including 50 MHz, 100MHz, 200MHz, 500MHz and FULL selections.
- 7. Avg. Level:** Bar graph indicating the average transponder level. Not selectable.
- 8. Menu &?:** Popup Menu with selections to configure the meter's receiver and spectrum analyzer features. See the next section (5.6) for details.
- 9. Marker Line:** The marker frequency cursor line. May be moved by touching the display location you wish the marker to relocate.
- 10. Marker Power:** The power indicated at the frequency location of the marker line. The field is not selectable

## 5.6 TV Spectrum Analyzer Popup Menu

The TV Spectrum Analyzer includes a popup menu that provides settings for the spectrum analyzer and provides handy features. It further provides a convenient access to the HELP function. Touch the MENU & ? section of the display to access the Popup Menu. The Popup Menu listings are explained below.

**SPECTRUM:** Provides a selection of the sweep or update rate of the spectrum analyzer. Selections include FAST and SUPERFAST.

**BUZZER:** Provides a switch selection to turn the alignment buzzer on or off.

MENU	
SPECTRUM:	FAST
BUZZER:	OFF
MRK. BW:	OFF
Δ MARKER:	OFF
PICTURE:	FULL
LOC. OSC:	0.0MHz
dB DIV:	10 dB
DC@RF:	OFF
RBW FILTER:	100KHz
SAVE/RECALL	HELP
EXIT	?

**MRK. BW (Marker Bandwidth):** Selections include OFF, ON, and BW.PWR. The ON selection provides a variable BW with two vertical markers on the display which may be varied by rotating the touch control knob. The MRK BW selection adds a power measurement to the selected band at the bottom center of the spectrum analyzer display.

**DELTA MARKER:** Turns on or off a white marker which along with the existing red marker provide two adjustable frequency locations. At the center bottom of the spectrum analyzer display is added a Delta Marker Power (Delta MRK.P) measurement which indicates the level difference between the red and white frequency locations.

**PICTURE:** Changes how the spectral energy is displayed within the spectrum analyzer graph from a FULL to a CONTOUR view. The FULL selection fills in the displayed spectral energy with color. The CONTOUR selection outlines the top of the spectral energy with a colored line.

**LOC. OSC:** Provides user changes to the local oscillator setting of the meter. This feature is rarely used with TV broadcast measurements and should remain at 0MHz.

**dB DIV:** Provides 1,2,5,10 dB selections to change the resolution of the spectrum analyzer's vertical increments or dB level.

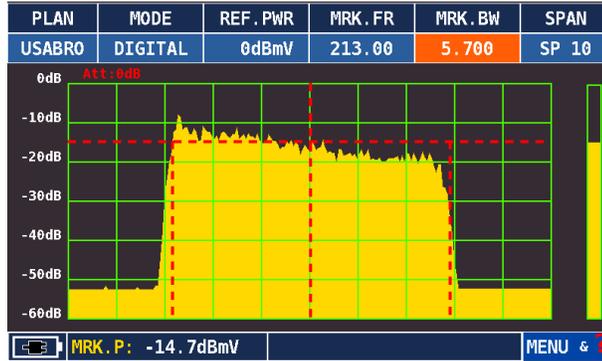
**SAVE/RECALL:** Provides memory for 20 captured spectrum analyzer screens which may be recalled and viewed on the screen.

**RBW Filter:** Indicates the spectrum analyzer's resolution bandwidth filter. No selections are provided to change the resolution bandwidth. The bandwidth is fixed at 100KHz.

**HELP ICON:** Provides signal analysis to automatically determine a digital broadcast signal type, modulation type, and symbol rate for automatic tuning.

## 5.62 Spectrum Analyzer Marker Bandwidth Measurement

The Spectrum Analyzer includes a marker bandwidth (MRK.BW.) measurement. This measurement provides a means to select a bandwidth of interest for a level measurement. The bandwidth is adjustable from 0 to 8 MHz. When the MRK BW function is turned ON the spectrum analyzer marker frequency field (MRK.FR.) is not selectable.



This Marker Bandwidth (MRK.BW) measurement anchors the reference marker (MRK. FR) so it may not be selected or moved. The test produces two bandwidth markers, red horizontal lines, which begin at the reference MRK FR. and move apart as the control knob is rotated. The CHAN header is replaced by a MRK BW. header and the associated marker bandwidth value is shown. The field may be touched and selected to adjust the 2nd red line to widen the bandwidth markers with the control knob.

To select the MARKER BANDWIDTH feature from the Spectrum Analyzer screen, touch the MENU&? field. In the popup menu touch the MRK.BW field at the right so it indicates "BW.PWR." Touch EXIT and then touch the MRK BW header and rotate the control knob to select the bandwidth. The bottom center field in the spectrum analyzer display indicates the power measurement in the selected bandwidth.

## 5.63 Spectrum Analyzer Delta Marker Measurement

The Spectrum Analyzer includes a Delta Marker measurement. The measurement provides an additional white horizontal and vertical marker or cursor on the spectrum analyzer display. The CHAN header is replaced by a MRK. FR. (Marker Frequency) header. This header field indicates the frequency position of the white marker. The header field may be touched and selected to move the white marker horizontally on the display screen. You may also touch locations on the screen moving the white marker to the touched point. The red marker is not moveable in the Delta Marker function.

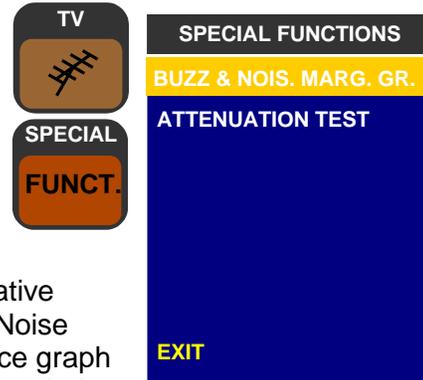


To select the DELTA MARKER function touch the MENU&? field and in the popup menu touch the Delta (Triangle) Marker listing so it indicates "ON."

The Delta Marker measurement provides a frequency difference measurement and a level difference measurement between the location of the red marker and the white marker. The Delta Frequency is indicated under the MRK FR. Header. The Delta Marker power or level is indicated in the bottom center measurement field.

## 5.7 TV Special Functions

The TV Special Functions menu provides several listings. The TV special functions menu is selected by pressing the SPECIAL FUNCT icon on the HOME Menu when the TV icon is highlighted. This section provides an overview of the special functions available for TV signal testing.



**BUZZ & NOISE MARG. GR.:** (Buzzer with Noise Margin Graph): Provides a buzzer to indicate the relative improvement or degradation of a TV digital channel Noise Margin.. Provides an active Noise Margin performance graph showing increases or decreases in signal performance during a moving 7 second segment.

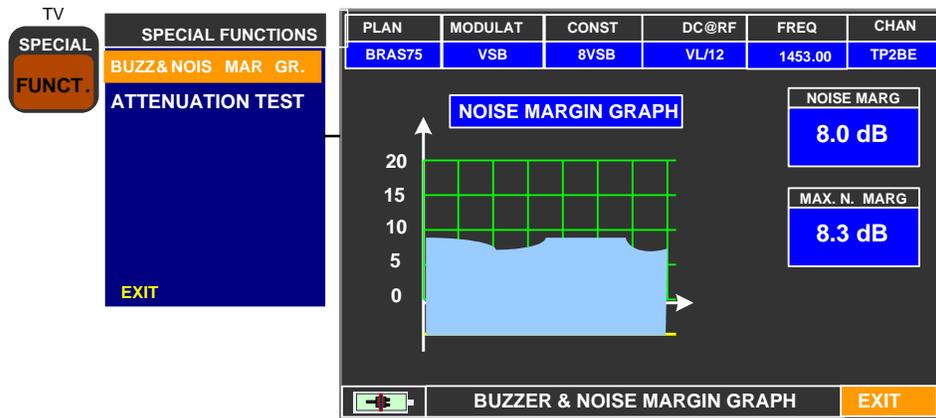
**ATTENUATION TEST:** Provides the simultaneous level dBmV measurement of three RF test frequencies showing relative attenuation compared to a referenced calibration point.

The following sections of this manual provide more information on these TV special functions.

### 5.71 TV BUZZER & NOISE MARGIN GRAPH TEST

The BUZZER & NOISE MARGIN GRAPH test, abbreviated BUZZ&NOIS. MAR. GR, is a special function which provides a time charted graph of the Noise Margin measurement of a selected satellite transponder. It further is accompanied by the alignment buzzer. The test may be used for satellite dish alignment or to monitor the received signal performance of a satellite dish or LNB

To select the BUZZ&NOIS MAR.GR. function from the Home Menu, touch the SPECIAL FUNCT icon with the TV icon highlighted. If the TV icon is not



highlighted, touch the TV icon and from the TV BROADCAST PLAN SELECTION MENU after selecting the desired channel plan, touch the SPECIAL FUNCT icon at the right. Then touch the BUZZ&NOIS MAR.GR listing which takes you directly to the test function.

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Measurements in the BUZZ&NOISE MAR.GR function include the following:

**NOISE MARG:** The Current Noise Margin measurement

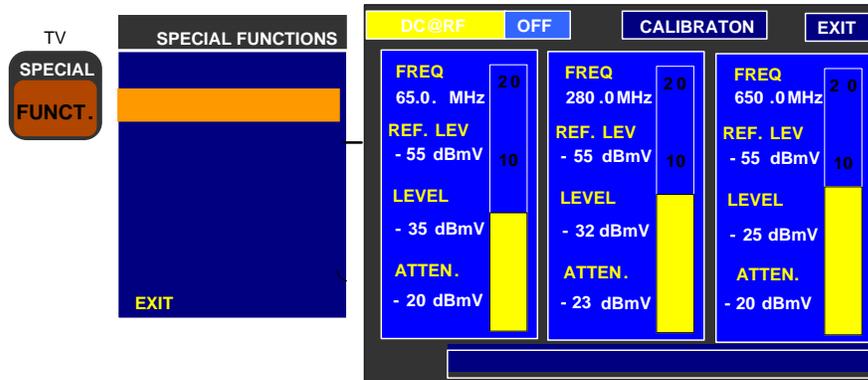
**MAX N. MARG:** Maximum or best Noise Margin measurement since the test began – signal lock

**MIN N. MARG:** Minimum or worst noise margin measurement since test began – signal lock.

The received signal performance (noise margin) is graphed from left to right scrolling a 7 second window of performance. Each horizontal increment represents a 1 second time interval. Interruptions are marked as a yellow line falling to the bottom of the chart moving to the left. Variations in noise margin are clearly seen as rising or falling levels along the top of the chart. Levels on the right of the graph clearly indicate the maximum and minimum variations since the onset of the test began.

5.72 TV ATTENUATION TEST

The TV ATTENUATION TEST is a special test that simultaneously measures the signal power of three TV frequencies and meters the attenuation of the signals compared to a reference or “calibrated” level. The test may be used to determine attenuation or losses between two signal points. It further may be used to determine the differences in losses between three test frequencies between the two signal points. The test is useful in determining attenuation losses and frequency response differences from an antenna or amplifier location to points in the TV-RF distribution system or to the receiver



To select the ATTENUATION TEST, touch the SPECIAL FUNCT icon on the Home Menu when the TV icon is highlighted. If in the TV BROADCAST PLAN SELECTION MENU, touch the SPECIAL FUNCT icon at the right of the display. Then touch the ATTENUATION TEST field which takes you directly to the test function.

The test function is highly automated with three preselected test frequencies. Connect the cable from the meter to the reference test point. Touch the CALIBRATION field at the top center of the test screen. The meter tests and captures the reference levels at the listed test frequencies. Proceed to move to other test points in which the same source signal(s) used to capture the reference levels are present. The meter indicates the current measured level and computes the attenuation for the three test frequencies compared to the captured reference level. The bar graphs indicate the attenuation levels for all three frequencies for easy comparison.

**FREQUENCY:** Frequency used for the level measurement

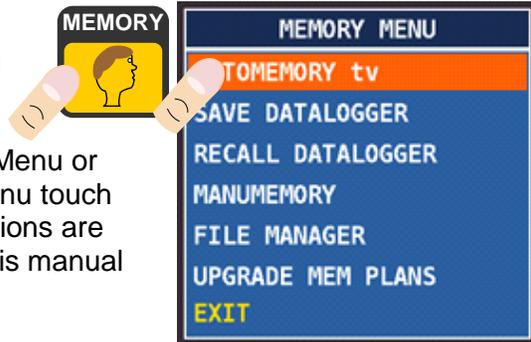
**REF LEV:** Power level at the reference point which was captured with the “CALIBRATION” activity. Calibration is initialized by touching the CALIBRATION field.

**LEVEL:** Indicates the active or current test power level for each of the three test frequencies

**ATTEN:** Indicates the attenuation or difference in power level between the reference level, captured during the “Calibration” step, and the current input measured power for the three test frequencies. Attenuation is also graphed by the vertical bar meters.

## 5.8 TV Memory Management

The MEMORY MENU provides channel plan creating, test logging features and channel plan management functions. The MEMORY MENU is accessed by pressing the MEMORY icon with the head/brain picture on it. On the Home Menu or in the TV BROADCAST PLAN SELECTION Menu touch the MEMORY icon. The MEMORY MENU functions are summarized below: The following sections of this manual provide more details.



**AUTOMEMORY tv:** Scans channels of a master TV or cable channel plan and automatically discovers active channels and builds an AUTO named channel plan with channels found meeting minimum level settings.

**SAVE DATALOGGER:** Scans the channels in a channel plan and records performance measurements to a log file. The scanning progress and test summary is shown during the scanning.

**RECALL DATALOGGER:** Selects and recalls a previously scanned and stored log file by name for reviewing the test results

**MANUMEMORY:** Provides creation and editing of manually created transponder/channel plans.

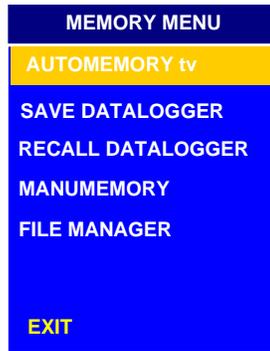
**FILE MANAGER:** Provides selection of logger and satellite manual created channel plans for renaming or deleting.

**UPGRADE MEM PLANS:** Provides transfer of the meter's mem plan from the meter to a USB memory stick or from the USB memory stick to the meter. The mem plan is a file containing the meter's channel plans and configuration. The mem plan can be created or edited in the provided SMART pc software. Saving the mem plan to the USB stick and writing a mem plan to the meter provides meter cloning.

Touch a listing in the MEMORY MENU to begin a function as listed above.

## 5.81 AUTOMEMORYtv – Scan to Create a Channel Plan

The AUTOMEMORYtv feature found in the MEMORY MENU provides the ability to automatically scan TV channels in a standard tuning plan and discover the active digital and analog channels. The active channels are retained creating a channel tuning plan for the meter. The file containing the active channels is named as an AUTO plan with a numeric reference (Example: AUTO 1).



Auto scanning channels and creating a channel plan provides the convenience of only listing the channels available in your area for meter selection. All inactive channels are removed from the channel plan. Auto scanning channels to create a channel plan further configures each available channel as either analog or digital so the meter automatically applies the proper signal measurements.

To perform the AUTOMEMORYtv scan, with the TV icon highlighted on the HOME MENU touch the MEMORY icon. The meter advances to the MEMORY MENU. Touch the AUTOMEMORYtv listing which brings up a configuration box. The listing in the configuration box are listed and explained below.

**FROM PLAN:** Selects the master tuning plan to use for scanning for channels. Use USABRO for scanning broadcast TV channels in North America.

**TO FILE N:** Selects the AUTO x channel plan name for reference. This is the new channel plan name which may be selected after the channel scan is complete and the plan successfully created.

**LEVEL:** Defines the minimum signal level of an analog channel required to consider the analog signal a valid channel prior to adding it to the channel plan.

**POWER:** This defines the minimum signal level of a digital channel during the channel scan required to consider the digital signal a valid channel.

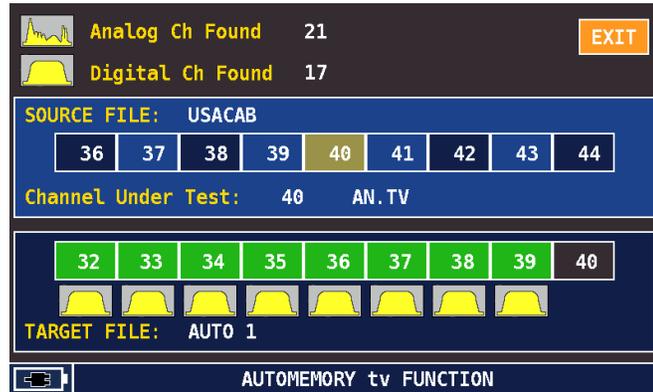
**DISCOVERY:** This defines the modulation signal types that the meter looks for during the channel scan. This field may offer TERRESTRIAL ONLY, CABLE ONLY, or TERR & CABLE selections. Select TERRESTRIAL ONLY when scanning for broadcast TV channels as this provides the fastest auto-scan time.

**START SAVE?:** Starts the AUTOMEMORY scan saving channel information to the AUTO x file specified.

To Create an AUTOMEMORY Channel Plan:

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1. Navigate to the MEMORY MENU and touch the AUTOMEMORYtv field.
2. Set the FROM PLAN field to USABRO. This is set by selecting the TV measure function. Then press the PLAN pushbutton and select the Master channel plan as needed. Then push the HOME button and from the start menu touch the Memory field to return to the AUTOMEMORYtv menu.
3. Set the TO FILE N field to select an AUTO file name. Note: If the AUTO file selected already contains channel data, the bottom field changes from START SAVE? to START OVERWRITE? Touching the START OVERWRITE? field begins a scan replacing the data in the existing AUTO file.
4. Touch the LEVEL and/or POWER fields and set as desired.
5. Touch the START SAVE? field to begin the channel scan.
6. Wait a few minutes and watch the display screen which illustrates the scanning process and indicates the channels as discovered. The meter indicates complete when all the channels have been scanned.
7. Touch the Exit field to exit the scan. The Auto scanned plan is automatically selected for use by the meter. The plan is then available for use.

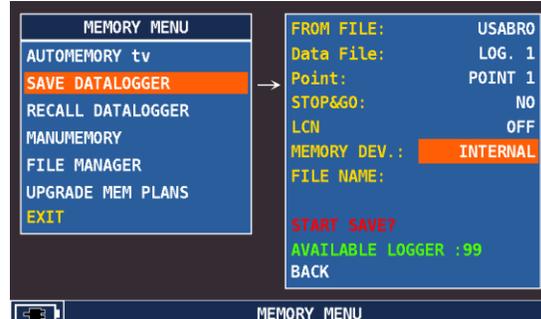


### 5.82 SAVE DATALOGGER – TV Auto Measure & Store

The SAVE DATALOGGER feature within the MEMORY MENU scans the channels in a selected manual channel plan and captures performance measurements for each channel to a log file. The logged data file is stored in one of the 99 available memory locations in the meter or may be written to a file on the USB memory stick. The file is named for latter recall and test result viewing.



To begin a data logger capture, select the SAVE DATALOGGER by touching the MEMORY icon on the Home Menu with the TV icon highlighted. Touch the SAVE DATALOGGER listing in the MEMORY MENU.



The SAVE DATALOGGER has a configuration menu with several fields which impact the function. Following is a brief description of these fields.

**FROM FILE:** This field indicates the selected channel plan in which the individual channels will be scanned and tested. This field may be highlighted and a channel plan selected.

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**Data File:** This is the file name where the scanned measurement data is to be stored.

**Point:** This is a name for the test point associated with the log file data.

**STOP&GO:** Provides for stopping the log measurements when changing from a cable channel or broadcast channel to a Docsis measurement when the manual memory channel plan contains a mix of signal types or tests. This provides the user a time to change input connections.

**LCN:** Turns the logging of the language channels on or off so as to include or exclude in the gathered channel data.

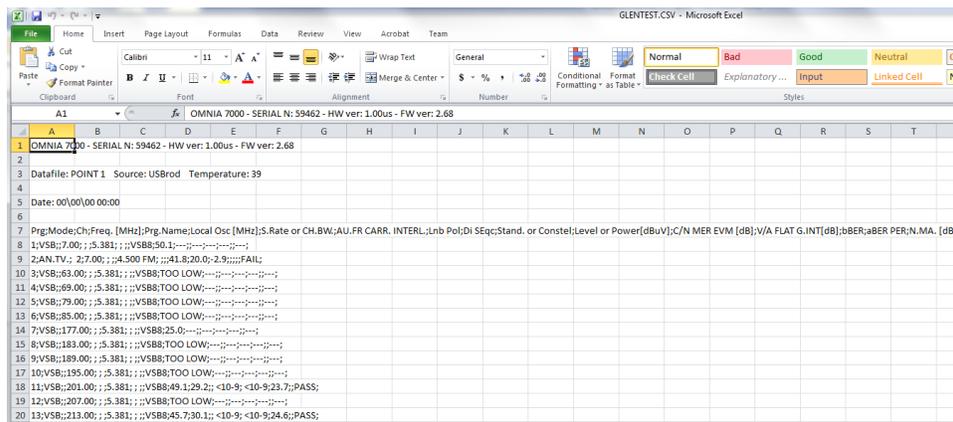
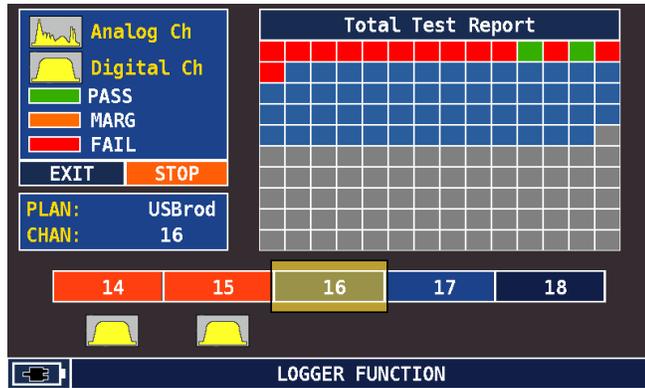
**MEMORY DEV:** Determines if the logging data is saved to internal meter memory or to an external USB Memory stick inserted into the USB-A jack.

**File Name:** Provides a file name entry for the data saved to the USB memory stick.

**START SAVE?:** Starts the logging saving channel performance testing data to the Data File name in the Date File field.

**AVAILABLE LOGGER: 99:** Indicates the available memory locations for storing logging data files.

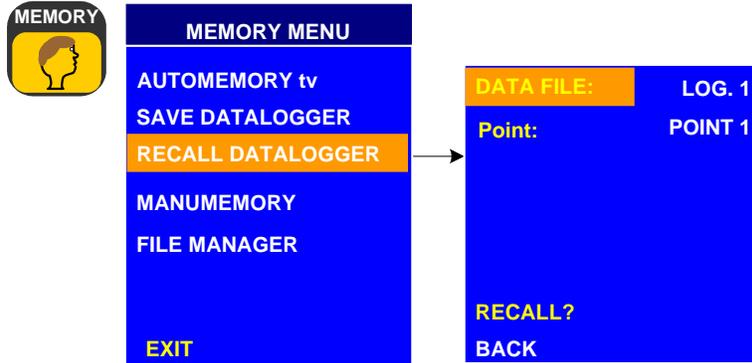
To begin the collection of test data with the SAVE DATALOGGER function touch the START OVERWRITE or START SAVE field to begin. When the DATA LOGGER begins scanning channels in the channel plan, a LOGGER FUNCTION screen shows the scanning/logging progress. A Total Test Report section, on the right of the display screen, indicates the progress of the scan and summarizes the performance of each channel tested. The channel is color coded in the report indicating a pass, marginal or fail status. Near the bottom of the LOGGER FUNCTION screen the channel currently being tested is highlighted. A picture indication shows if the transponder was digital or analog.



Data logging measurements and data are written to the USB stick csv file. The data can be opened and reviewed with a spreadsheet program such as Excel.

5.83 RECALL DATALOGGER - View TV Data Log File

The RECALL DATALOGGER within the MEMORY MENU provides a means to recall existing memory log files containing TV channel performance test data. The log files available for recall are files created with a SAVE DATALOGGER function covered in the previous section.



To recall a data logger file touch the MEMORY icon on the HOME Menu with the TV icon highlighted. Touch the SAVE DATALOGGER listing in the MEMORY MENU. In the DATA FILE field of the selection box, touch the listing on the right and rotate the touch Control Knob to increment through the available log files. Press the RECALL field to view the file’s measurement contents.

The DATALOGGER viewer shows the file name and point number in the upper left to identify the logger file. The name of the channel is shown in the left column. The digital or analog signal type is listed and the associated performance measurements are shown horizontally for each transponder/channel.

LOG. 1 POINT 1		EXIT			
NAME	TYPE	PWR LVL	MER C/N	bBER A/V	aBER PER
07	VSB	-34.2	---	----	----
11	VSB	-10.4	30.1	<E-09	<E-09
13	VSB	-13.7	30.7	<E-09	<E-09

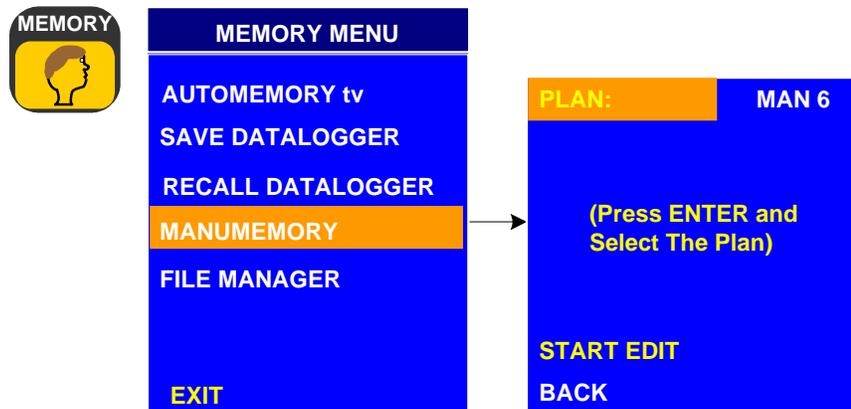
An indication of transponder signal performance is provided with a color coded box at the left of the transponder name. A green box indicates the transponder passed test performance criteria and is good. A red box indicates a performance issue.

## 5.84 MANUMEMORY – Creating or Editing TV Channel Plans

The MANUMEMORY feature found in the MEMORY MENU provides the ability to manually create a tuning plan which may include a list of broadcast channels. The file containing the active channels is named as a MANU plan with a numeric reference (Example: MANU 1). Manually creating a channel plan provides the convenience of only listing a few channels available in your area or desired for special testing application. Only the channels created and added to the list are available in the MANU channel plan for selection and measurement.

The MANUMEMORY feature permits entry of individual channels one at a time. For this reason it is ideal for creating a channel plan in which there is a small number of channels. When creating a channel plan with many channels the AUTOMEMORYtv or use of the SMART software is recommended.

The SLM 1479 provides management features for the MANU files. The MANUMEMORY feature permits edits or changes to listed channels within a previously created manual (MANU) channel plan. The following sections provide information on creating and editing a MANU channel plan.



### To Manually Create a Plan:

1. To create a transponder/channel plan navigate to the MANUMEMORY feature by touching the MEMORY icon and touching the MANUMEMORY listing in the MEMORY MENU.
2. In the PLAN field at the top of the configuration box touch the listing at the right to highlight the field. Move your finger over the arrow portion of the touch control knob to increment through available memory channels.
3. Select a manual channel plan number of choice. Press the START EDIT field to begin construction of a manual plan. *NOTE: The name of the selected manual file can be renamed. See the next section of this manual for instructions on how to rename an existing manual file.*
4. The ITEM EDITING menu appears to enable entry of transponder. Touch the SAVE? field to add a listing after changing the individual fields to the desired values.

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ACTIVE PLAN: MANU 25			
N	TR/CHAN	FREQ	MODE
1	11	201.0	8VSB
2	13	213.0	8VSB
1	15	479.0	8VSB
2	36	605.0	8VSB
3	47	731.0	8VSB

ACTION	
MODIFY ITEM	
ADD BELOW	
ADD ABOVE	
DELETE ITEM	
RETURN	
EXIT	

ITEM EDITING	
MODE	8 VSB
CHAN:	11
FREQ:	201 MHz
AUDIO:	4.5 FM
NAME	PR 1
SAVE?	
BACK	

### MANUMEMORY ACTIONS

**MODIFY ITEM:** Produces the ITEM EDITING menu which permits changes to the settings for the transponder listing highlighted

**ADD BELOW:** Produces the ITEM EDITING menu in which you may select the parameters of a transponder signal and dish characteristic to add a listing below the currently highlighted field.

**ADD ABOVE:** Produces the ITEM EDITING menu in which you may select the parameters of a transponder signal and dish characteristic to add a listing below the currently highlighted field.

**DELETE ITEM:** Deletes the highlighted listing from the selected plan.

**RETURN:** Returns to previous menu

#### To Edit an Existing Plan:

1. To make changes or additions to an existing manual memory plan navigate to the MANUMEMORY feature by touching the MEMORY icon followed by touching the MANUMEMORY listing in the MEMORY MENU.
2. In the PLAN field at the top of the configuration box touch the listing at the right side to highlight the file name. Rotate the control knob to increment through the available memory plans.
3. Select the file name in which you want to edit or add listings. Press the START EDIT field to begin editing.
4. Touch MODIFY ITEM from the listings to produce the ITEM EDITING Menu. Modify the items in the Menu to match the transponder and satellite dish characteristics as needed. Press the SAVE? field to write the changes to the highlighted channel listing.

Press BACK to return to the previous menu without making changes.

## 5.85 TV FILE MANAGER – Renaming or Deleting Files

The FILE MANAGER, found in the MEMORY MENU, provides management of the logger and transponder/channel plan files. The FILE MANAGER provides the ability to rename or delete files from the meter’s memory. To access the FILE MANAGER from the Home Menu, touch the MEMORY icon followed by a touch of the FILE MANAGER listing in the MEMORY MENU.



You can rename or delete files that were created with the DATA LOGGER as in scanning a TV channel plan and capturing performance measurement data to a test file. These test files are identified as LOG file types and are typically named as LOG 1, LOG2, etc. You can rename or delete files that were created by the AUTOMEMORY feature or with a MANUMEMORY feature of the meter. These files are typically named “AUTO 1,” “AUTO 2”, etc. or “MANU 1,” “MAN 2, etc. by the meter. However, these file names can be changed to a more recognized or descriptive name as desired. The following section summarizes how to rename, or delete these files in the FILE MANAGER function.

### To Rename a File:

1. Navigate to the MEMORY MENU. Touch the FILE MANAGER listing.
2. Scroll up or down in the listed files to find the file you want to rename. Touch the listing to select or highlight the listing and press the ENTER pushbutton in the center of the larger touch Control Knob.
3. Touch the RENAME FILE listing in the ACTION MENU which appears.
4. A naming overlay appears on the screen. Touch letters to enter into naming boxes. Press > to advance to the next box. Continue until the name is complete. Touch the EXIT box.

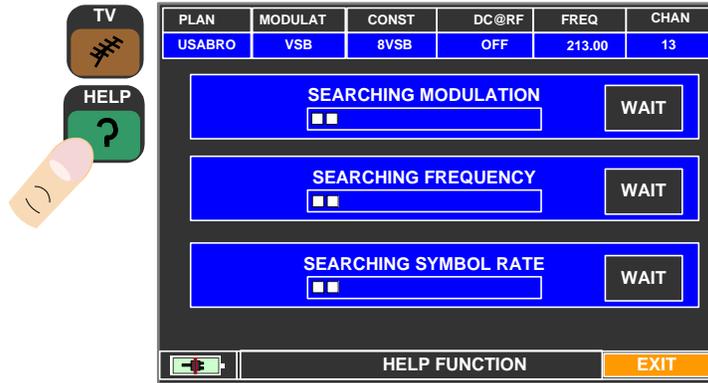
### To Delete an Existing File:

1. Navigate to the MEMORY MENU. Touch the FILE MANAGER listing.
2. Scroll up or down in the listed files to find the file you want to delete. Touch the listing to select or highlight the listing and press the ENTER pushbutton in the center of the larger touch Control Knob.
3. Touch the DELETE FILE listing in the ACTION MENU which appears to delete the selected file: **NOTE: DELETION IS PERMANENT – THE FILE CANNOT BE RECOVERED.**

## 5.9 TV “Help” Signal Discovery

The HELP icon on the SLM 1479 refers to help or assistance tuning in a digital channel. The HELP function is used to help determine for a user the RF type of signal within a TV broadcast channel.

Initiating a HELP function on the SLM 1479 directs the meter to automatically analyze the TV channel and determine automatically the RF modulation type, bandwidth/center frequency, and RF symbol rate. The SLM 1479 methodically analyzes the digital signal to determine these parameters. If the parameters are within the receiver capabilities the meter finishes by advancing to the measurement page with the channel displayed. If the channel has no recognizable signal or is a proprietary modulation scheme, the SLM 1479 reports “NO SIGNAL.”



To initiate a HELP function simply locate a HELP icon and touch it. The HELP icon is located in the Spectrum Analyzer’s popup menu. When in the Spectrum Analyzer function touch the MENU &? field at the bottom right of the screen. Touch the HELP icon.

The HELP FUNCTION screen informs you of the meter’s progress in determining the type of digital signal or detecting an analog signal within the channel. The boxes on the right in the center list the modulation, frequency, and symbol rates as discovered by the meter. When the search is completed, “FOUND” is displayed on all three measurement status boxes at the right.

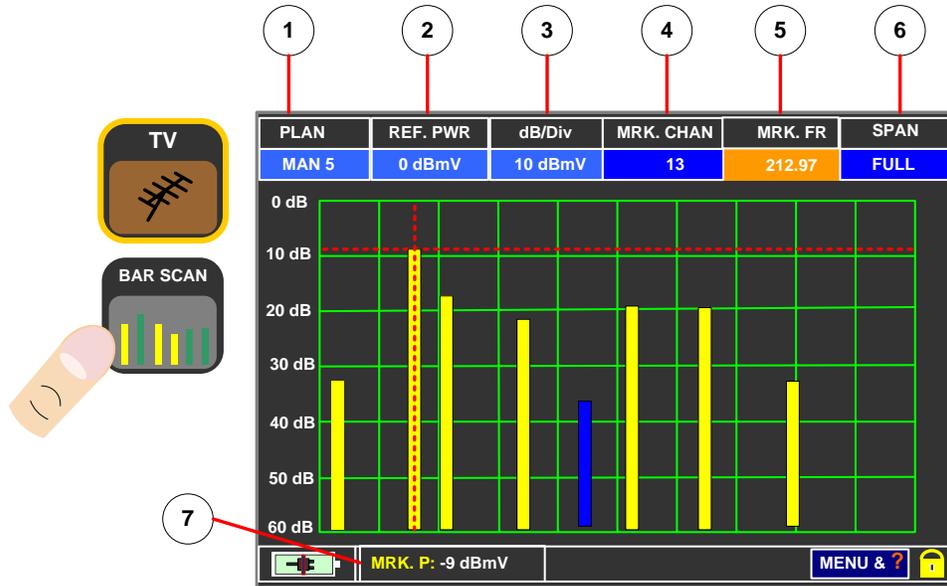
The HELP FUNCTION screen maintains the same header fields as in the TV measurement page. The fields indicate the plan, channel, channel frequency, constellation, and modulation for the selected channel. Press the EXIT field to exit at any time during the analysis.

### For TV Channel Signal DISCOVERY or HELP:

1. Touch the TV icon to select TV. Select a channel plan by pressing the PLAN SELECT pushbutton and touching a selection in the center box. Touch the SPECTRUM icon.
2. Touch the CHAN field header and select a TV channel or position cursor at the center of an unknown channel or signal.
3. Touch the “MENU & ?” field at the bottom right. Touch the HELP icon in the Popup Menu.
4. Wait while the meter analyzes and determines the channel symbol rate, frequency and modulation type. FOUND is shown in all three boxes when successful. Touch EXIT to return to the MEAS page and begin transponder measurements.

## 5.10 TV BAR SCAN Test

The BAR SCAN measurement shows multiple bars forming a bar chart. Each bar of the chart represents the level of a TV-RF channel. The Bar Scan is essentially a simplified spectrum display in which multiple channel levels through a frequency span are indicated with bars on a level chart. The number of channels plotted in the bar chart is determined by the selected span (SPAN). For a TV Bar Scan measurement touch the BAR SCAN icon with the TV icon highlighted. The following sections provide more information on the Bar Scan measurement and fields on the Bar Scan display screen.



### Bar Scan Basics

Each bar displays the signal level measured in a specific channel within the channel plan. The SPAN value determines the number of channels or bars displayed in the bar chart. A yellow bar represents a digital signal channel while a solid blue bar represents an analog signal channel. The marker, a vertical red dotted line, is initially positioned on the channel near the center of the display which is the center of the span of channels.

### Bar Scan Measurement Initialization

When the Bar Scan measurement is selected the meter automatically defaults the center channel of the span to the last channel selected in the Channel Measurement function of the meter. To select the center channel for the Bar Scan test prior to a measurement, press the MEAS button and select the desired channel. Press the HOME button to return to the HOME menu and with the TV icon highlighted touch the BAR SCAN icon. The Bar Scan measurement further selects a level reference based upon the selected channel's signal level. Be sure to select an active channel so a proper reference (REF) level is automatically selected.

**1. PLAN:** Indicates the channel plan selected for measurement. The plan includes the channel list that will be measured and plotted into the BAR SCAN test results.

**2. REF PWR Reference Power:** The reference value establishes the level of the top horizontal bar of the bar graph. To change the reference value, touch the REF field header and touch the value field below to see selections. Touch the desired selection.

**3. dB/DIV:** The db/Div field displays the level change represented between adjacent horizontal lines or divisions in the bar graph. This field may be highlighted and changed to predetermined values (5 dB/DIV, 10 dB/DIV).

**4. MRK CHN:** The Bar Scan display or span is centered upon a selected channel shown in the field under the CHAN header. The CHAN field is selectable and the channel value may be changed. Changing the value moves the red cursor or marker on the display. Highlight the CHAN field and use the UP and DOWN arrow pushbuttons to move the marker to the desired channel or bar.

**5. MRK FREQ. - Marker Frequency:** The Bar Scan display or span is centered upon a selected channel shown in the field under the MRK CHAN header. The CHAN field is selectable and the channel value may be changed. Changing the value moves the red cursor or marker on the display. Touch the CHAN field to highlight it and show the selectable channel list. Touch a channel in the list to select.

**6. SPAN:** The SPAN field determines the number of channels and a relative frequency span included in the bar graph or scan. To change, highlight the field and use the UP or DOWN key to change the span between pre-defined values, from (10, 20, 32, 64, 128).

**7. Marker Level Measurement:** This field indicates the level of the channel marked by the red cursors on the display. The unit of measurement is set in the METER CONFIGURATION MENU. A horizontal dotted line shows the real time signal level value measured in the currently selected channel.

## Section 6: CATV Measurements

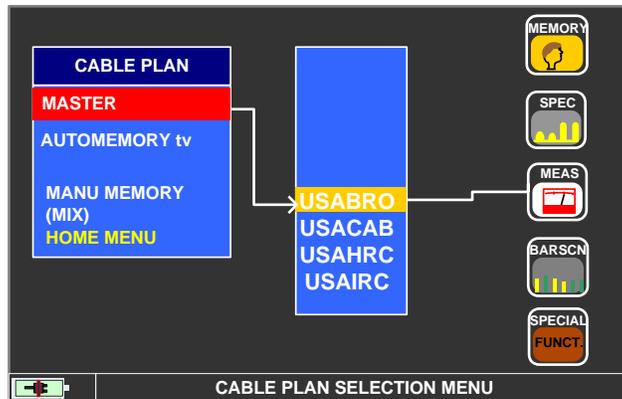
The SLM 1479 indicates the performance of cable television digital QAM signals providing guidance for installation and maintenance of cable TV-RF distribution systems. This section provides information on the cable TV measurements.



### 6.1 CATV Plan Selection

Upon selecting the CABLE icon in the HOME Menu and pressing the PLAN SELECT front panel pushbutton, the DSA 1491 presents a CABLE PLAN SELECTION MENU. This menu provides selections which define a tuning plan for selecting CATV channels and respective frequency bands for measurements. The CATV PLAN SELECTION MENU contains several listings of which to choose from. The following is a brief description of these listings and their content. These cable plan listings depend on the SLM 1479 model and are appropriate for different locations.

**MASTER PLAN:** This selection provides a listing of standard CATV channel plans in which to choose from. For testing applications in North America, the USACAB listing provides a suitable channel plan which includes all the CATV channels from 2 to 158.



**AUTOMEMORYtv:** This selection provides a list of channel plans to choose from that are “AUTO” plans. These plans are created with the AUTOMEMORYtv feature in the MEMORY MENU. Please see Section 6.81 in this manual for information on creating an AUTO cable channel plan. If you have created an AUTO plan for CATV signal analyzing, it will be listed for selection.

#### MANU MEMORY (MIX) Plan

The MANU MEMORY (MIX) listing in the CATV PLAN SELECTION Menu contains manually created channel plans. A manual plan may include either cable or TV channels with a mix of modulation/constellation types. It may also include a combination or a mix. Manual channel plans may be edited in the MEMORY MENU function of the meter or using the supplied SMART software with a PC. Manual channel plans may be created within the SMART software and transferred to the meter. Please see Section 6.83 for MANUMEMORY channel creation.

#### To Select a CATV Channel Plan:

1. Touch the TV icon. Touch the MASTER field to select it.

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2. Touch the USACAB field in the center list. The meter advances to the CATV MEASUREMENT page.

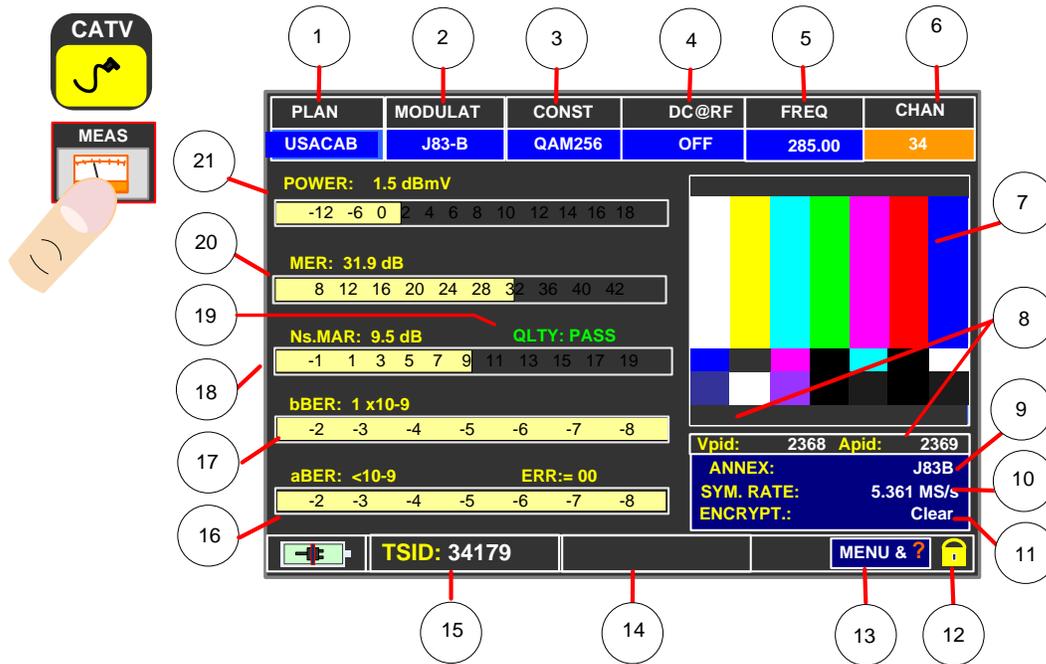
## 6.2 CATV Digital Measurements

The SLM 1479 provides a comprehensive analysis of a CATV signal, either digital or analog. Digital signal analysis includes standard QAM analysis also known as J83-B. To access the CATV measurements touch the MEAS icon from the HOME Menu with the CATV icon highlighted or touch the MEAS icon in the CATV Plan Selection Menu after selecting a cable channel plan.



There are two CATV measurement pages for digital cable signals including a main measurement page and a constellation measurement page. The remainder of this section describes the SLM 1479's CATV measurements and measurement pages. The following section describes the fields as numbered in the nearby figure.

### 6.21 Main Digital Measurement Page Description



**1. Plan:** The TV channel plan selected in the CATV Plan Selection Menu or in a Manual or Automemory channel plan.

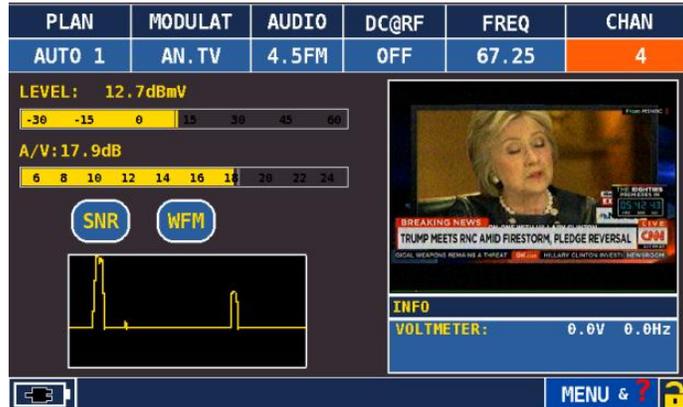
**2. Modulation:** The modulation type of the digital signal. Defaults to the type in the channel plan which should be J83-B (QAM B) for CATV in North America for the selected channel (6). Selectable field permits selection of other modulation types and analog (AN.TV).

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- 3. CONST:** The current setting for constellation based upon modulation. Typically reads QAM256 as most CATV systems use 256 symbols.
- 4. DC@RF:** Indicates if DC voltage is applied to the RF input jack of the meter. This field should be off for most testing applications. Selectable field permits voltage selection and output.
- 5. FREQ:** The center frequency of the digital channel or video carrier of an analog channel. (6). Selectable field permits frequency tuning. Changing the frequency causes dashed lines in the channel indicator as the frequency is no longer the channel's standard.
- 6. CHAN:** The selected channel being analyzed. Selectable field permits channel selection. For inclusion in the selectable list the channel must be included in the selected channel plan (1).
- 7. Video:** The active video on the selected video service within the channel.
- 8. VPID/APID:** Video and Audio Program Identifier values for the selected video service contained in MPEG.
- 9. ANNEX:** The standard signal type or reference – J83B for CATV digital signals.
- 10. SYM RATE:** The symbol rate of the RF digital carrier in million (MEGA) symbols per second. QAM 256 uses a standard symbol rate of 5.361 MS/s.
- 11. Encryption:** Indicates if the selected video service is encrypted or in the clear.
- 12. Locked Symbol:** Indicates if the meter's receiver is locked to a digital RF signal.
- 13. MENU & ?:** Provides a popup menu with related selections and a HELP icon for discovery of the channel signal modulation, symbol rate, and frequency.
- 14. Network Name (NETW):** Indicates the network name or identification.
- 15. TSID or NID:** Transport Stream or network Identification numbers.
- 16. aBER:** Bit Error Ratio measurement after error correction measurement
- 17. bBER:** Bit Error Ratio measurement – before error correction
- 18. Noise Margin (Ns.MAR):** Provided margin signal vs. noise power measurement
- 19. Quality (QLTY) Rating:** Quality rating based upon MER and noise margin values
- 20. MER:** Modulation Error Ratio measurement of selected channel
- 21. POWER:** Average Power measurement for the digital channel and video carrier peak measurement for an analog channel, typically in dBmV.

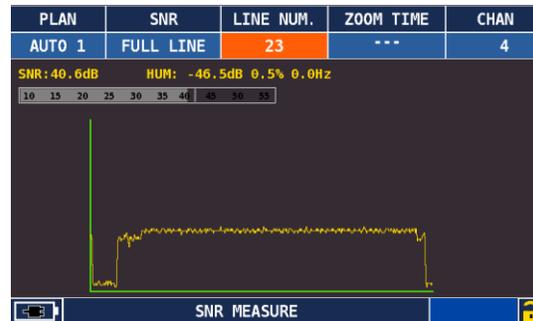
## 6.22 Analog CATV Measurement Page

An analog NTSC cable channel can be analyzed with the SLM 1479. To measure a TV channel as an analog channel, the modulation type for the channel must be specified as an analog TV channel. This may be done in the channel plan used for the CATV measurements, either in a Manual or Automatic plan.



Analog measurement include the level, A/V ratio, signal-to-noise (SNR) and video waveform line analyzing. You may further view the demodulated video and listen to the audio. To measure a TV channel as an analog channel, the modulation type for the channel must be specified as an analog TV channel. The abbreviation for this on the meter is “AN. TV.” You may change the modulation type of a selected channel in the main measurement page by touching the MODULAT header. Select the AN.TV listing in the drop down selection box by touching the AN.TV listing

Analog measurements are provided on three different measurement pages. The 1<sup>st</sup> page provides a level measurement, provides video and audio monitoring, and provides a basic spectrum analyzer view. Any voltage input to the RF jack is indicated by the voltmeter measurement. The 2<sup>nd</sup> page provides a waveform monitor screen in which the signal-to-noise ratio and hum is measured on a selected video line. The 3<sup>rd</sup> measurement page provides a waveform monitor (WFM) screen in which the selected scan line of detected video is scanned and displayed.



Push the TV front panel push button to increment to each measurement page. Or touch the display’s SNR field to increment to the second SNR MEASURE page or touch the WFM field to advance to the 3<sup>rd</sup> WFM (Waveform Monitor) measurement page.

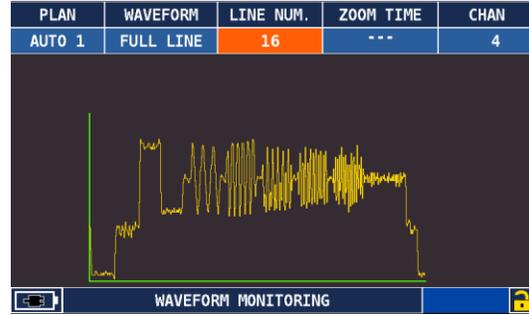
### 6.22.1 SNR MEASURE

The SNR measurement page provides analysis of the detected video of the analog channel. The signal-to-noise ratio indicates the dB ratio or difference between the noise voltage and video amplitude voltage. The greater the ratio or dB value the better. The measurement should be performed on a video line in which there is no active video by selecting a line in the vertical blanking interval. Be sure to select a line in which there is no test signal or data signals such as close captioning. The default Line Num is selected in the meter’s configuration menu. Please refer to section 3.23 starting on page 28.

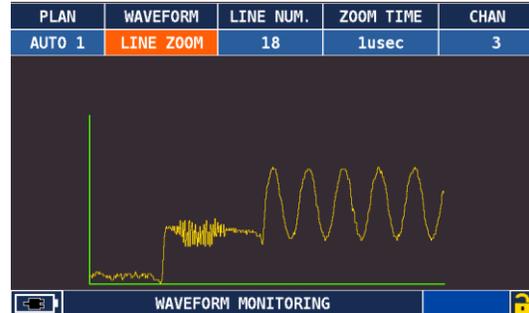
### 6.22.2 WAVEFORM MONITORING (WFM)

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The waveform monitor measurement page provides a view of the selected line of the detected video modulation of an analog channel. The LINE NUM field or header field may be selected and the knob rotated to increment/decrement to the desired line of video. The display shows one scan line starting at the beginning of the horizontal sync period to the beginning of the next sync period.



The waveform monitor offers a LINE ZOOM feature in which the first part of the scan line can be expanded for viewing. Select the WAVEFORM field and increment the large knob to select the LINE ZOOM mode.



### 6.23 FM RADIO TUNING & MEASUREMENT

To measure the level of an FM radio signal, touch the MODULAT header field and select the "FM RADIO" listing. Touch the FREQ header and enter the FM radio frequency. The level of the FM radio signal is metered and you may listen to the detected audio.

## 6.23 CATV Constellation & Info Measurement Page

The constellation measurement page provides a second page of analysis of a CATV digital channel. The top and bottom fields of the page are the same as the main measurement page. The left center of the Constellation & Info page provides a constellation analysis. The right center of the Constellation & Info page provides an INFO box with information regarding the CATV channel being measured.

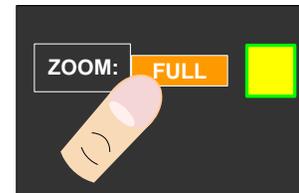


There are two ways to access the Constellation & Info measurement page from the Main Measurement page. Either press the front panel TV pushbutton or touch the display screen anywhere on the left center measurements area from the POWER measurement bar down to the aBER measurement bar. Touch this same area to return from the Constellation Measurement page to the Main Measurement Page.

### CONSTELLATION

The constellation analysis provides a visual indication of the detected RF symbol accuracy. The constellation diagram changes its appearance to match the number of symbols in the QAM RF signal. For example, a QAM 64 signal has 64 squares while a QAM256 signal has 256 squares.

The constellation diagram may show a full or all the symbol squares or 1/4 sections of the constellation using the ZOOM feature. To zoom into a smaller 1/4 section of the full constellation diagram, touch the selection box to the side or right of the ZOOM box. Multiple touches increment the 1/4 section view through all the quarter sections of the constellation diagram. The box to the right of the selection box indicates the selected section being shown by the constellation diagram.



**INFO:** The INFO box in the Constellation & Info measurement page provides additional CATV channel information. A brief overview of the information shown is listed below.

**ANNEX:** The digital signal standard annex it complies with such as J83-A which is the North American cable standard.

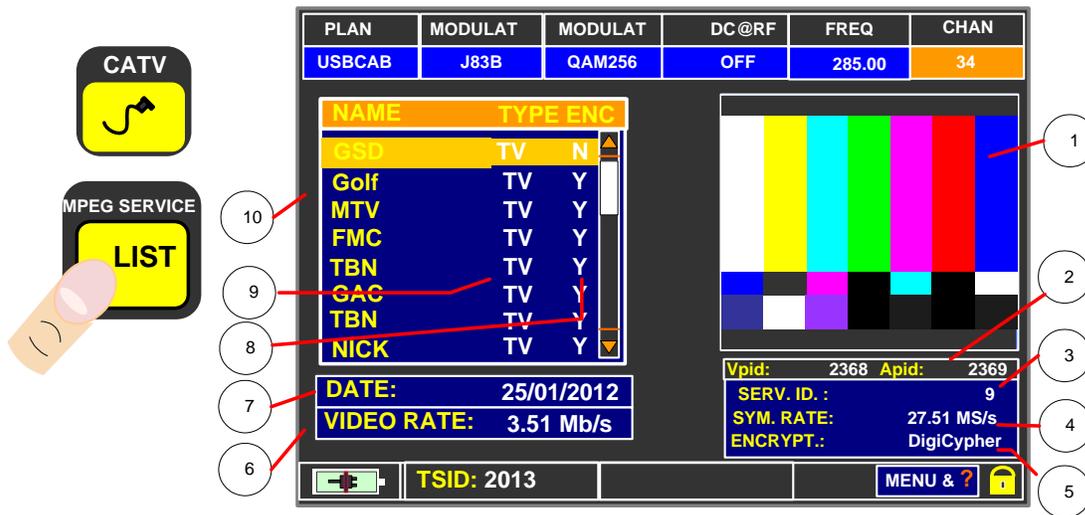
**SYM RATE:** The rate of the RF symbols as measured by the SLM 1479.

**LNB Curr:** Metered current flowing from the meter to the satellite dish LNB.

### 6.3 CATV MPEG SERVICE LIST

The MPEG SERVICE LIST measurement page of the SLM 1479 provides information regarding the MPEG stream and video service/programs of the selected CATV channel. The MPEG SERVICE LIST page may be accessed in two ways. From the HOME Menu with the TV icon highlighted, touch the MPEG SERVICE LIST icon. Secondly for convenience from the CATV Main Measurement Page, touch the box below the displayed video. Touch the same box to return to the Main Measurement Page from the MPEG SERVICE LIST page.

#### 6.31 CATV MPEG Service Page Description



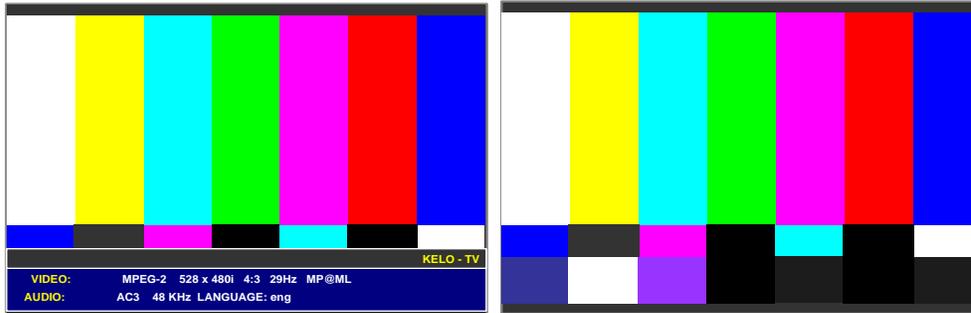
The MPEG SERVICE LIST measurement page provides information regarding the MPEG transport stream and the selected video service/program contained in the stream. The top and bottom fields are the same as listed and described in the Main Measurement page in section 6.2 of this manual. The unique fields are numbered in the nearby figure and a brief description of these fields is provided below.

- 1. Demodulated Video Display:** Shows the demodulated video of the selected service from the selected cable channel.
- 2. VPID/APID:** Indicates the VPID (Video Packet Identifier Number) and APID (Audio Packet Identifier Number) of the selected video service/program.
- 3. Service ID:** The video service/program identification number
- 4. Symbol Rate:** The RF symbol rate of the channel's digital signal
- 5. Encryption Status:** Indicates if the video service selected is in the clear or encrypted.
- 6. Video Rate:** The MPEG data rate of the selected video service/program
- 7. Date:** The current date as listed in the MPEG stream
- 8. Encryption Status:** Indicates if the individual services are encrypted (YES) or in the clear non-encrypted (NO).
- 10. Service List:** List the video services/programs in the MPEG transport stream

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## 6.32 CATV MPEG Video Service Monitoring

The video displayed in the Main Measurement Page or in the MPEG SERVICE LIST page may be expanded to fill the display screen. For a full screen view of the demodulated video of a selected video service touch the displayed video section of the screen.



The displayed video initially indicates the video service name along with associated MPEG header video and audio information. This information is located along the bottom of the display and includes the video resolution, aspect ratio, and MPEG compression level. The audio information includes the format, and data rate. After a few seconds for review, the bottom section is pushed to the bottom of the display. When viewing a full video display you may return to the previous measurement screen by touching the center of the screen.

## 6.4 CATV MEASUREMENT POPUP MENU

The CATV measurement page includes a popup menu that provides quick access to information and several available functions related to the CATV measurements. The Popup Menu listings are explained below.

**PRG. NAME:** The current channel number

**LNBLocOsc:** Provides user changes to the local oscillator setting of the meter. This remains at 0 MHz for all typical TV-RF input signal testing.

**BUZZER FUNC:** Provides a switch selection to turn the alignment buzzer on or off.

**BUZZ. TYPE:** Provides a selection to produce a tone based upon the received signal level or on the signal noise margin measurement.

**TS\_STREAMING:** Provides a selection to setup streaming of selected services from the RF demodulated transport stream to the LAN port or to a USB drive file.

**VISUALIZE NIT:** Provides a measurement screen with the information contained in the DVB Network Information Table.

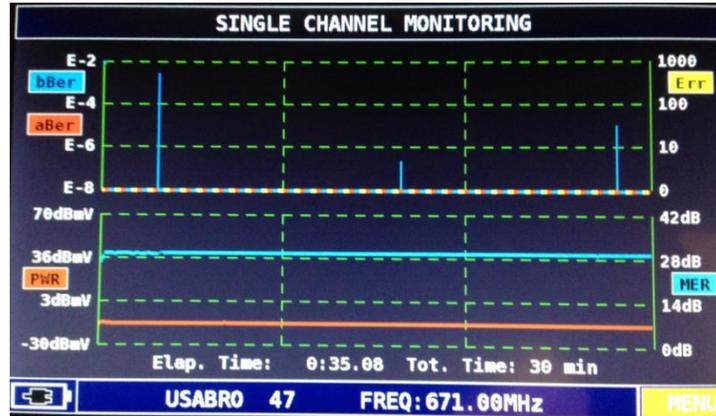
**CHANNEL LOGGER:** Monitors and charts the digital RF measurements of a satellite transponder or channel.





## 6.44 CHANNEL LOGGER

The SLM 1479 includes the ability to continuously monitor and chart/log the critical RF analyzing measurements of a selected cable channel over a selected time period. The charting allows you to see events or times of RF signal impairments or reception interruptions. To select the Channel Monitoring feature touch the MENU & ? field when in the main measurement screen. In the popup menu touch the CHANNEL LOGGER field. The SINGLE CHANNEL MONITORING screen with multiple measuring graphs is presented.



The Single Channel Monitoring screen is divided into a top and bottom chart or graph. Each graph includes multiple channel measurements as described below:

**Top Chart:** The top chart of the monitoring screen provides charted values which include 3 measurements on a single chart. The measurements are color coded to indicate aBER (red), bBER ((blue), and packet errors (yellow). Menu when in the The channel monitor provides a continuous graphing of the satellite transponder being received.

**Bottom Chart:** The bottom chart provides charted values of the channel's measured power (red), and MER (blue).

When in the Single Channel Monitoring function a control Menu provides selections applicable to the charting. The Menu includes the time interval setting elapsed from the left to right side of the chart. To access the control features touch the MENU field at the bottom right of the touch display screen. The selections provided are described below.



**TIME INTVL:** Time Interval of the graph shown on the display. The displayed time interval of the graph.

**SEND TO USB:** Turns on the capability of writing channel monitoring values to a USB memory stick file. When turned ON the graphed values of the channel measurements are suspended and values are written to the USB stick file.

**FILE NAME:** Produces an entry menu to define a fine name to store channel monitoring values on the USB memory stick.

**RESET:** Resets or clears the graph. Restarts the channel monitoring and graphing.

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The Channel Logger provides a means to continuously sample and record the key channel measurements to a file on the USB stick. To do this insert a USB stick into the meter USB-A port. Setup meter to the desired channel to be monitored/logged. Press the MENU & ? menu and select Channel Logger feature. Press the MENU field in the SINGLE CHANNEL MONITORING screen. In the menu, select FILE NAME and enter a file name for the data to be stored on the USB stick. Select the SEND TO USB field and increment to "ON." Press the ENTER selection or press the large control knob in to Enter. Measurements are active and the bottom of the display indicates "SAVING DATA ON FILE. PRESS ENTER TO STOP." Press the large control knob in to stop the logging.



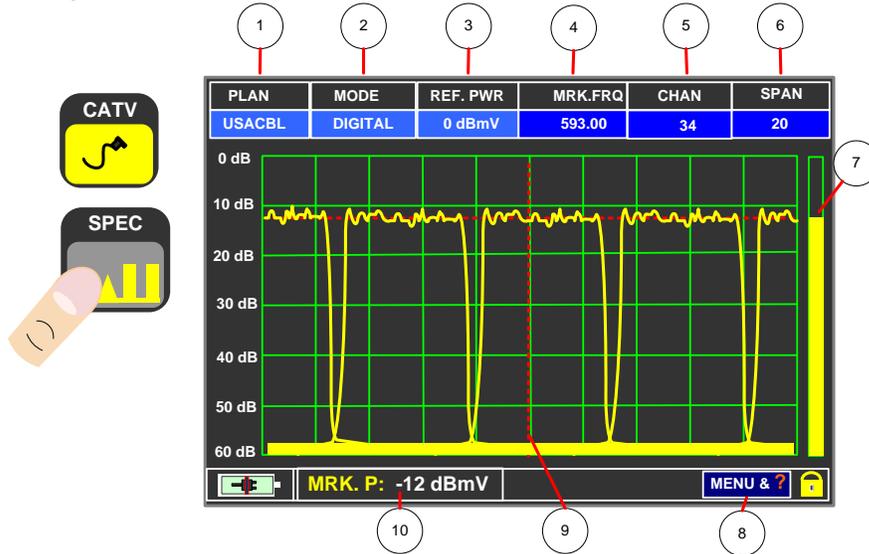
### USB Logging File Data

Channel monitoring values that are written to the USB stick file can be opened and viewed with a spreadsheet application. The values include a time reference from the date/time settings of the meter. The values include the Power, MER, aBER, bBER and packet errors.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	USCabl 38	CONST:QAM256	FREQ:309.00MHz														
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
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## 6.5 CATV Spectrum Analyzer

The CATV spectrum analyzer provides detailed spectral analysis of both analog and digital CATV signals. To select the spectrum analyzer function from the HOME menu with the TV icon highlighted, touch the SPEC icon. You may also access the spectrum analyzer from any of the other measurement pages by pushing the SPEC pushbutton at the right of the display.



The TV Spectrum Analyzer page contains header fields with many of the same sections as the measurement page. However, some of the headings are different. Below is a summary of all the header fields and an indication if the field may be highlighted for change.

- 1. Plan:** The channel plan selected in the CATV Broadcast Plan Selection Menu. It may be the USACAB or a Manual or Auto plan. This field is not selectable.
- 2. MODE:** Indicates the spectrum analyzer's detector mode. Selectable field permits digital or analog selection.
- 3. Reference Power:** Indicates the level of the top line of the spectrum analyzer commonly called the reference power level.
- 4. Marker Frequency:** The frequency represented by the location of the vertical red marker line on the spectrum analyzer display. A selectable field permits moving the marker line. The marker may be moved automatically by touching points in the display or by highlighting the MRK FRQ field and rotating the touch control knob.
- 5. Channel:** The selected CATV channel being analyzed. Selectable field permits channel selection. Note: A channel must be in the channel plan to be listed.
- 6. Span:** The frequency span of the spectrum analyzer. A selectable field with 50MHz, 100MHz, 200MHz, 500MHz and FULL selections.
- 7. Avg. Level:** Bar graph indicating the average channel digital level. Not selectable.
- 8. Menu &?:** Popup Menu with selections to configure the meter's cable TV receiver and spectrum analyzer features. See the next section (6.6) for details.
- 9. Marker Line:** The marker frequency cursor line. May be moved by touching the display location you wish the marker to relocate.
- 10. Marker Power:** The power indicated at the frequency location of the marker line. The field is not selectable

## 6.6 CATV Spectrum Analyzer Popup Menu

The CATV Spectrum Analyzer includes a popup menu that provides settings for the spectrum analyzer. It further provides a convenient access to the HELP DISCOVERY function. Touch the MENU & ? section of the display to access the Popup Menu. The Popup Menu listings are explained below.

**SPECTRUM:** Provides a selection of the sweep or update rate of the spectrum analyzer. Selections include FAST and SUPERFAST.

**BUZZER:** Provides a switch selection to turn the alignment buzzer on or off.

**MRK. BW (Marker Bandwidth):** Selections include OFF, ON, and BW.PWR. The ON selection provides a variable BW with two vertical markers on the display which may be varied by rotating the touch control knob. The MRK BW selection adds a power measurement to the selected band at the bottom center of the spectrum analyzer display.

**DELTA MARKER:** Turns on or off a white marker which along with the existing red marker provide two adjustable frequency locations. At the center bottom of the spectrum analyzer display is added a Delta Marker Power (Delta MRK.P) measurement which indicates the level difference between the red and white frequency locations.

**PICTURE:** Changes how the spectral energy is displayed within the spectrum analyzer graph from a FULL to a CONTOUR view. The FULL selection fills in the displayed spectral energy with color. The CONTOUR selection outlines the top of the spectral energy with a colored line.

**LOC. OSC:** Provides user changes to the local oscillator setting of the meter. This feature is rarely used with TV broadcast measurements and should remain at 0MHz.

**dB DIV:** Provides 1, 2, 5, 10 dB selections to change the resolution of the spectrum analyzer's vertical increments or dB level.

**DC@RF:** This feature is not available on the SLM 1479.

**RBW Filter:** Resolution Bandwidth Filter – This is fixed at 100 KHz

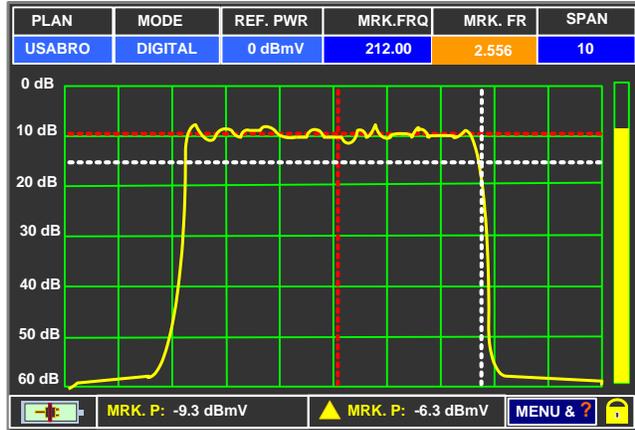
**SAVE/RECALL:** Provides memory for 20 captured spectrum analyzer screens which may be recalled and viewed on the screen.

**HELP ICON:** Provides help to automatically determine a cable channel's signal type, modulation type, and symbol rate for automatic tuning.

MENU	
SPECTRUM:	FAST
BUZZER:	OFF
MRK. BW:	OFF
Δ MARKER:	OFF
PICTURE:	FULL
LOC. OSC:	0.0MHz
dB DIV:	10 dB
DC@RF:	OFF
RBW FILTER:	100KHz
SAVE/RECALL	
EXIT	

## 6.62 CATV Spectrum Analyzer Delta Marker Measurement

The Spectrum Analyzer includes a Delta Marker measurement. The measurement provides an additional white horizontal and vertical marker or cursor on the spectrum analyzer display. The CHAN header is replaced by a MRK. FR. (Marker Frequency) header. This header field indicates the frequency position of the white marker. The header field may be touched and selected to move the white marker horizontally on the display screen. You may also touch locations on the screen and the white marker moves to the touch point. The red marker is not moveable in the Delta Marker function. To select the DELTA MARKER function touch the MENU&? field and in the popup menu touch the Delta (Triangle) Marker listing so it indicates "ON."



The Delta Marker measurement provides a frequency difference measurement and a level difference measurement between the location of the red marker and the white marker. The Delta Frequency is indicated under the MRK FR. Header. The Delta Marker power or level is indicated in the bottom center measurement field.

The Delta Marker measurement provides a frequency difference measurement and a level difference measurement between the location of the red marker and the white marker. The Delta Frequency is indicated under the MRK FR. Header. The Delta Marker power or level is indicated in the bottom center measurement field.

## 6.63 Spectrum Analyzer Marker Bandwidth Measurement

The Spectrum Analyzer includes a marker bandwidth (MRK.BW.) measurement. This measurement provides a means to select a bandwidth of interest for a level measurement. The bandwidth is adjustable from 0 to 8MHz. When the MRK BW function is turned ON the spectrum analyzer marker frequency field (MRK.FR.) is not selectable.

This Marker Bandwidth (MRK.BW) measurement anchors the reference marker (MRK. FR) so it may not be selected or moved. The test produces two bandwidth markers, red horizontal lines, which begin at the reference MRK FR. and move apart as the control knob is rotated. The CHAN header is replaced by a MRK BW. header and the associated marker bandwidth value is shown. The field may be touched and selected to adjust the 2 red widening bandwidth markers with the control knob.

To select the MARKER BANDWIDTH feature from the Spectrum Analyzer screen, touch the MENU&? Field. In the popup menu touch the MRK.BW field at the right so it indicates "BW.PWR." Touch EXIT and then touch the MRK BW header and rotate the control knob to select the bandwidth. The bottom center field in the spectrum analyzer display indicates the power measurement in the selected bandwidth.

## 6.7 CATV Special Functions

The CATV Special Functions menu provides several listings. The CATV Special Functions Menu is selected by pressing the SPECIAL FUNCT icon on the HOME Menu when the CATV icon is highlighted. You may also press the SPECIAL FUNCT icon when in the CATV PLAN SELECTION MENU after choosing a channel plan for your measurements. This section provides an overview of the special functions available for CATV signal testing.



### LEAKAGE:

Measures the field intensity of a signal emitted or “leaking” from the shielded cable system. Elevated leakage levels indicate a shielding problem which should be corrected.

### INGRESS:

Shows the potential ingress interference problems in the upstream cable spectrum by providing a spectrum analysis from 5 to 65 MHz. Includes a peak hold function for capturing random noise or interference spikes.

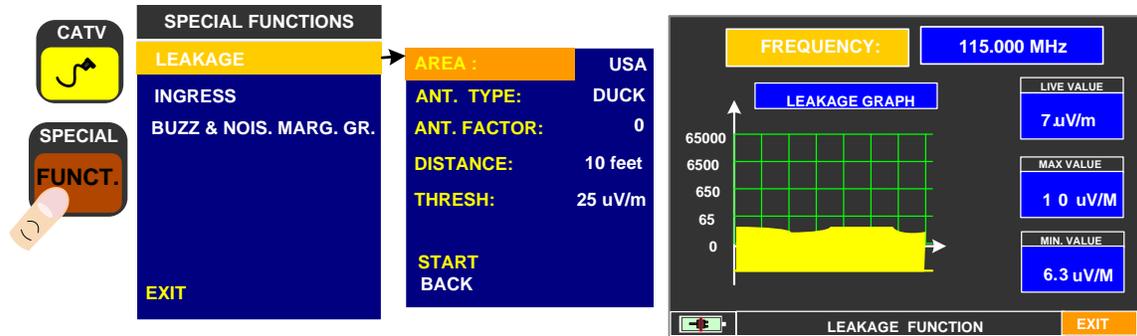
### BUZZ & NOISE MARG. GR.:

(Buzzer with Noise Margin Graph): Provides a buzzer to indicate the relative improvement or degradation of a TV digital channel Noise Margin.. Provides an active Noise Margin performance graph showing increases or decreases in signal performance during a moving 7 second segment..

The following sections of this manual provide more information on these CATV special functions.

## 6.71 CATV LEAKAGE TEST

The Leakage Test measures the field intensity of a signal emitted or “leaking” from the shielded cable system. Elevated leakage levels indicate a shielding problem which should be corrected to prevent potential interference to other signal transmissions and avionics. The Leakage Test further provides help in isolating leakage and in finding points of ingress. To select the Leakage Test function, with the CATV icon highlighted touch the SPECIAL FUNCT icon on the HOME MENU. Touch the LEAKAGE field in the CATV SPECIAL FUNCTIONS Menu to advance to the Leakage Test Setup Menu.



### LEAKAGE TEST SETUP:

The Leakage Test Setup menu provides settings used to set criteria for the Leakage Test. Settings select a test frequency in the range of 100-150 MHz to match the leakage test transmitter frequency and provide compensation for the antenna, antenna factors, and distance.

#### Area

The Area setting adapts the leakage test to standards established in Europe and USA. Set to USA for leakage testing in North America. This establishes the remaining Leakage Setup fields in the menu for selections to match standards for cable system leakage testing in the USA.

#### Antenna Type (USA ONLY)

The ANT. TYPE field provides selections for the type of antenna to be used for the Leakage Test. The selections include: MONOPOLE, DUCK, or BIPOLE. To use the supplied antenna set the antenna type to DUCK. Touch the ANT. TYPE field to highlight the right selection box. Touch the selection box to increment through selections.

#### Antenna Factor

The Antenna Factor setting compensates the Leakage Test measurements to conform with a calibrated or reference leakage field for a certain antenna type, mounted condition, and system measurement components. Touch the ANT FACTOR field to highlight the right selection field. Touch the selection field to increment through available settings which may be used to increase or decrease values to match the relative gain or

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loss of the antenna/system being used compared to the reference. When using the supplied duck antenna a setting of 200 is recommended.

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NOTE: The Antenna Type selections result in three programmed antenna factors, 100 for the dipole, 90 for the monopole, and 75 for the rubber duck antenna.

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### Distance

The Distance setting compensates the Leakage measurement based upon the estimated distance from the leak source. Touch the DISTANCE field to highlight the selection field at the right. Touch the field to increment distance settings to set a value for the distance from the leak source.

### Threshold

The Threshold setting determines the uV/M level at which an audible alarm on the unit is sounded to indicate leakage. The audible sound varies in pitch based on the amount of leakage present to indicate when you are getting closer to the leak. A setting of 20mV/meter is the FCC standard and the meter's default setting.

#### To Perform a Leakage Test:

To perform a Leakage Test, connect the test antenna to the RF Input of the meter. Touch the SPEC FUNCT icon with the CATV icon highlighted to access the CATV Special Functions Menu. Touch the LEAKGE listing or field to advance to the Leakage Setup Menu. After appropriate setup selections, touch the START field at the bottom to begin measurements.

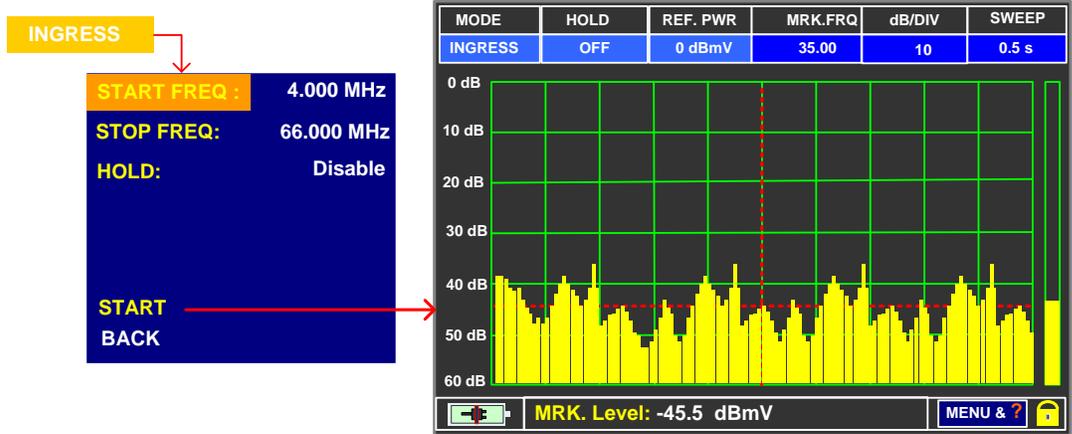
To change the Leakage Test frequency, touch the MENU &? field at the bottom right of the display screen. Touch the FREQUENCY listing to enter the test frequency. *Note: The selected frequency does not need to exactly match your transmitter frequency as the bandwidth of the meter is sufficiently wide to receive and measure properly.* The Leakage Test meter displays both the real time cable leakage factor (LIVE VAL) and the maximum leakage factor detected during the same measurement session (PEAK VAL).

The PEAK VAL measurement holds the peak value until the Leakage Test session is stopped and restarted. To restart a session, press the EXIT field and reselect the SPECIAL FUNCTION and LEAKAGE TEST field to restart the test.

The measurement session does get stopped and reset when editing the test frequency, therefore the PEAK VAL displays the maximum value of the cable leakage factor detected by the meter on all the test frequencies set on the meter by the user while performing the same measurement session.

**6.72: CATV INGRESS TEST**

The CATV Ingress Test is a special function which shows potential ingress interference problems in the upstream cable spectrum by providing a spectrum analysis from 5 to 65 Mhz. Connect the upstream cable signal to the RF input on the top left of the meter. From the HOME Menu with the CATV icon highlighted touch the SPECIAL FUNCTION icon. Touch the INGRESS listing in the SPECIAL FUNCTION Menu to advance to the INGRESS TEST.



The Ingress Test shows a spectrum analyzer display with a frequency span selected for the Ingress Test. To measurement an ingress signal, touch the MRK. FREQ. header field and touch the screen location in which you want the marker to relocate. You may also use the Control Knob to move the cursor. The signal level at the marker location is displayed at the display bottom row (MRK Level) with the relevant measurement unit. A horizontal dotted line shows the real time signal level value at the current marker position (current frequency value).

**REF. PWR: Reference Value**

With the Standard Navigation Mode highlight the top level (end of scale) value on the y-axis and set the appropriate end of scale value.

**HOLD:**

Touch the HOLD header to select the field. Touch the field to increment to “ON.” The max HOLD feature saves and shows a line above the normal signal signature indicating the spurious noise levels. This feature is useful for finding spurious or intermittent noise frequencies.

**MRK. FRQ: Moving the Marker (Frequency Value)**

Touch the MRK. FREQ. header field and touch the screen location in which you want the marker to relocate. You may also use the Control Knob to move the cursor. The relevant signal level measurement at the marker location is indicated at the bottom of the display (bottom row, MRK).

**SWEEP: Edit the Sweep Time**

This field changes the sweep time. Touch the SWEEP header to highlight the field. Touch the field below to increment through available sweep speeds from 50mS to 50s.

**MRK. LEVEL - Marked Level:** The level of a signal at the selected marker frequency.

**NOTE:** You may use the MENU & ? Popup Menu to gain access and adjust the spectrum analyzer’s ingress start and stop frequencies.

**6.73 CATV BUZZER & NOISE MARGIN GRAPH TEST**

The BUZZER & NOISE MARGIN GRAPH test, abbreviated BUZZ&NOIS. MAR. GR, is a special function which provides a time charted graph of the Noise Margin measurement of a selected satellite transponder. It further is accompanied by the alignment buzzer. The test may be used for satellite dish alignment or to monitor the received signal performance of a satellite dish or LNB

To select the BUZZ&NOIS MAR.GR. function from the Home Menu, touch the SPECIAL FUNCT icon with the CATV icon highlighted. If the CATV icon is not highlighted, touch the CATV icon and from the CATV PLAN SELECTION MENU, after selecting the desired channel plan, touch the SPECIAL FUNCT icon at the right. Then touch the BUZZ&NOIS MAR.GR listing which takes you directly to the test function.

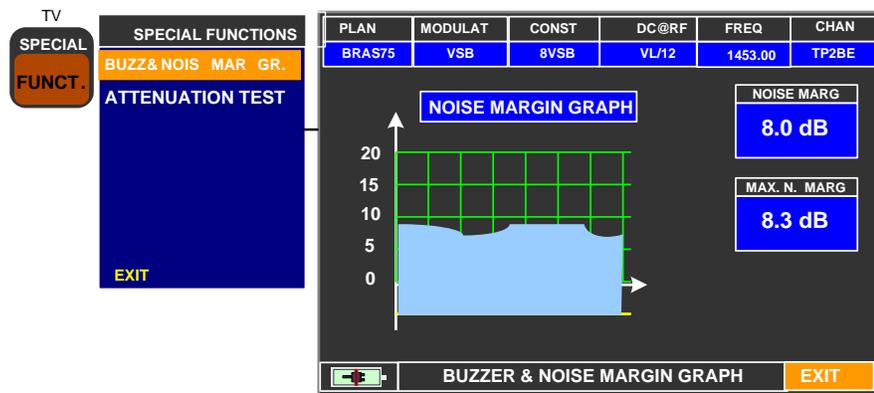
Measurements in the BUZZ&NOISE MAR.GR function include the following:

**NOISE MARG:**  
The Current Noise Margin measurement

**MAX N. MARG:**  
Maximum or best Noise Margin measurement since the test began – signal lock

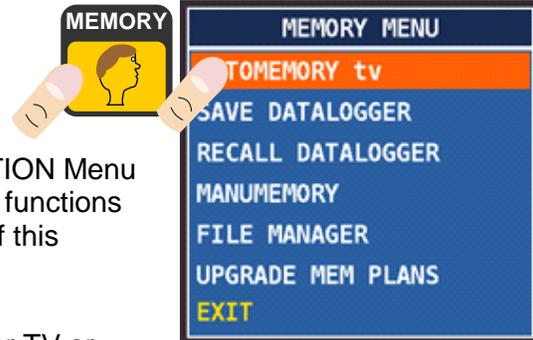
**MIN N. MARG:** Minimum or worst noise margin measurement since test began – signal lock.

The received signal performance (noise margin) is graphed from left to right scrolling a 7 second window of performance. Each horizontal increment represents a 1 second time interval. Interruptions are marked as a yellow line falling to the bottom of the chart moving to the left. Variations in noise margin are clearly seen as rising or falling levels along the top of the chart. Levels on the right of the graph clearly indicate the maximum and minimum variations since the onset of the test began.



## 6.8 CATV Memory Management

The MEMORY MENU provides channel plan creating, test logging features and channel plan management functions. The MEMORY MENU is accessed by pressing the MEMORY icon with the head/brain picture on it. On the Home Menu or in the TV BROADCAST PLAN SELECTION Menu touch the MEMORY icon. The MEMORY MENU functions are summarized below: The following sections of this manual provide more details.



**AUTOMEMORYtv:** Scans channels of a master TV or cable channel plan and automatically discovers active channels and builds an AUTO named channel plan with channels found meeting minimum level settings.

**SAVE DATALOGGER:** Scans the channels in a channel plan and records performance measurements to a log file. The scanning progress and test summary is shown during the scanning.

**RECALL DATALOGGER:** Selects and recalls a previously scanned and stored log file by name for reviewing the test results

**MANUMEMORY:** Provides creation and editing of manually created transponder/channel plans.

**FILE MANAGER:** Provides selection of logger and satellite manual created channel plans for renaming or deleting.

Touch a listing in the MEMORY MENU to begin a function as listed above.

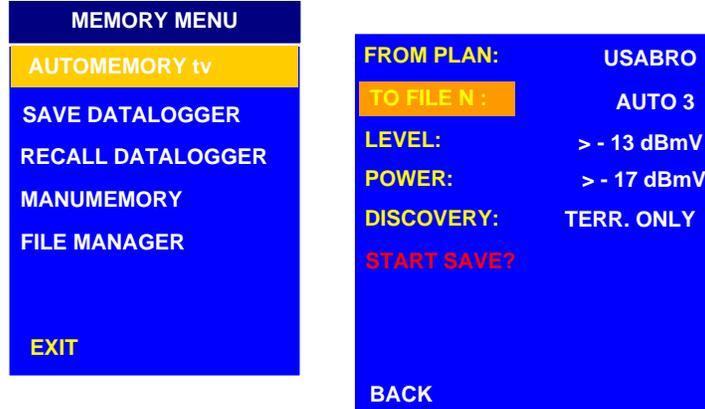
### 6.81 AUTOMEMORYtv – Scan CATV Channels to Create a Channel Plan

The AUTOMEMORYtv feature found in the MEMORY MENU provides the ability to automatically scan CATV channels in a standard tuning plan and discover the active digital and analog channels. The active channels are retained creating a channel tuning plan for the meter. The file containing the active channels is named as an AUTO plan with a numeric reference (Example: AUTO 1).

Auto scanning channels and creating a channel plan provides the convenience of only listing the channels available in your area for meter selection. All inactive channels are removed from the channel plan. Auto scanning channels to create a channel plan further configures each available channel as either analog or digital so the meter automatically applies the proper signal measurements.

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To perform the AUTOMEMORY tv scan, with the CATV icon highlighted on the HOME MENU touch the MEMORY icon. The meter advances to the MEMORY MENU. Touch the AUTOMEMORY tv listing which brings up a configuration box. The listing in the configuration box are listed and explained below.



**FROM PLAN:** Selects the master tuning plan to use for scanning for channels. Use USABRO for scanning broadcast TV channels in North America. Use USACBL for scanning cable TV channels in North America.

**TO FILE N:** Selects the AUTO channel plan name for reference. This is the new or existing channel plan name which channel data is to be stored during the scan. This name may be selected and used for CATV meter tuning after the channel scan is complete and the plan is successfully created.

**LEVEL:** Defines the minimum signal level of an analog channel required to consider the analog signal a valid channel prior to adding it to the channel plan.

**POWER:** This defines the minimum signal level of a digital channel during the channel scan required to consider the digital signal a valid channel.

**DISCOVERY:** This defines the modulation signal types that the meter looks for during the channel scan. This field may offer TERRESTRIAL ONLY, CABLE ONLY, or TERR & CABLE selections. Select CATV ONLY when scanning for cable channels as this provides the fastest auto-scan time.

**START SAVE?:** Starts the automemory scan saving channel information to the AUTO file specified.

### To Create an AUTOMEMORY Channel Plan:

1. Navigate to the MEMORY MENU and touch the AUTOMEMORYtv field.
2. Set the FROM PLAN field to USACBL. This is set by selecting the CATV measure function. Then press the PLAN pushbutton and select the Master channel plan as needed. Then push the HOME button and from the start menu touch the Memory field to return to the AUTOMEMORYtv menu.

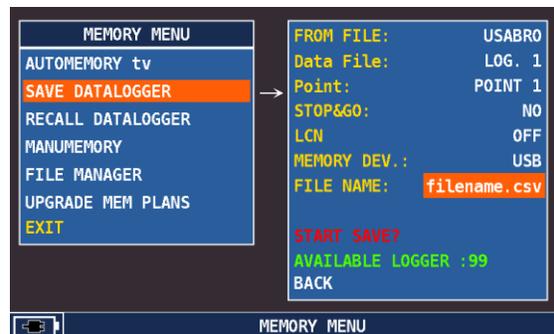


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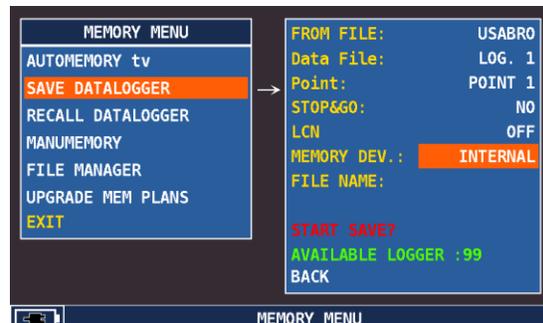
3. Set the TO FILE N field to select an AUTO file name. Note: If the AUTO file selected already contains channel data, the bottom field changes from START SAVE? to START OVERWRITE? Touching the START OVERWRITE? field begins a scan replacing the data in the existing AUTO file.
4. Touch the LEVEL and/or POWER fields and set as desired.
5. Touch the START SAVE? field to begin the channel scan.
6. Wait a few minutes and watch the display screen which illustrates the scanning process and indicates the channels as discovered. The meter indicates complete when all the channels have been scanned.
7. Touch the Exit field to exit the scan. The Auto scanned plan is automatically selected for use by the meter. The plan is then available for use.

### 6.82 SAVE DATALOGGER – CATV Auto Measure & Store

The SAVE DATALOGGER feature within the MEMORY MENU scans the channels in a selected manual channel plan and captures performance measurements for each channel to a log file. The logged data file is stored in one of the 99 available memory locations in the meter or may be written to a file on the USB memory stick. The file is named for latter recall and test result viewing.



To begin a data logger capture, select the SAVE DATALOGGER by touching the MEMORY icon on the Home Menu with the TV icon highlighted. Touch the SAVE DATALOGGER listing in the MEMORY MENU.



The SAVE DATALOGGER has a configuration menu with several fields which impact the function. Following is a brief description of these fields.

**FROM FILE:** This field indicates the selected channel plan in which the individual channels will be scanned and tested. This field may be highlighted and a channel plan selected.

**Data File:** This is the file name where the scanned measurement data is to be stored.

**Point:** This is a name for the test point associated with the log file data.

**STOP&GO:** Provides for stopping the log measurements when changing from a cable channel to DOCSIS test providing the user a time to change connections.

**LCN:** Turns the logging of the language channels on or off so as to include or exclude in the gathered channel data.

**MEMORY DEV:** Determines if the logging data is saved to internal meter memory or to an external USB Memory stick inserted into the USB-A jack.

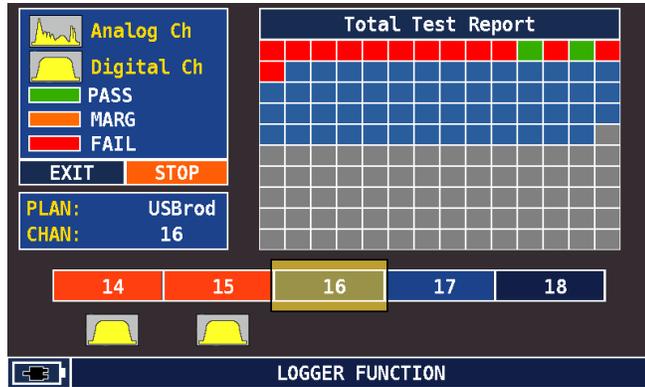
**File Name:** Provides a file name entry for the data saved to the USB memory stick.

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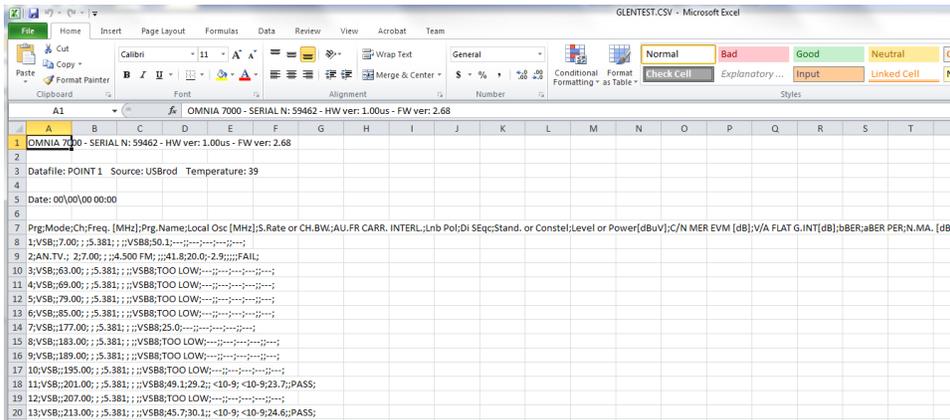
**START SAVE?:** Starts the logging saving transponder performance testing data to the Data File name in the Date File field.

**AVAILABLE LOGGER: 99:** Indicates the available memory locations for storing logging data files.

To begin the collection of test data with the SAVE DATALOGGER function touch the START OVERWRITE or START SAVE field to begin. When the DATA LOGGER begins scanning channels in the channel plan, a LOGGER FUNCTION screen shows the scanning/logging progress. A Total Test Report section, on the right of the display screen, indicates the progress of the scan and



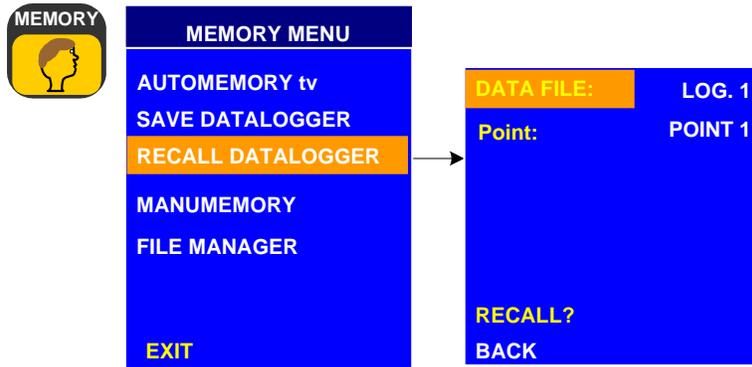
summarizes the performance of each transponder tested. The transponder is color coded in the report indicating a pass, marginal or fail status. Near the bottom of the LOGGER FUNCTION screen the transponder currently being tested is highlighted. A picture indication shows if the transponder was digital or analog.



Data logging measurements and data are written to the USB stick csv file. The data can be opened and reviewed with a spreadsheet program such as Excel.

6.83 RECALL DATALOGGER - View CATV Data Log File

The RECALL DATALOGGER within the MEMORY MENU provides a means to recall existing memory log files containing CATV channel performance test data. The log files available for recall are files created with a SAVE DATALOGGER function covered in the previous section.



To recall a data logger file touch the MEMORY icon on the HOME Menu with the CATV icon highlighted. Touch the SAVE DATALOGGER listing in the MEMORY MENU. In the DATA FILE field of the selection box, touch the listing on the right and rotate the touch Control Knob to increment through the available log files. Press the RECALL field to view the file’s measurement contents.

The DATALOGGER viewer shows the file name and point number in the upper left to identify the logger file. The channel number is shown in the left column. The digital or analog signal type is listed and the associated performance measurements are shown horizontally for each channel included in the log file.

LOG. 1 POINT 1		EXIT			
NAME	TYPE	PWR LVL	MER C/N	bBER A/V	aBER PER
07	VSB	-34.2	---	----	----
11	VSB	-10.4	30.1	<E-09	<E-09
13	VSB	-13.7	30.7	<E-09	<E-09

RECALL DATALOGGER

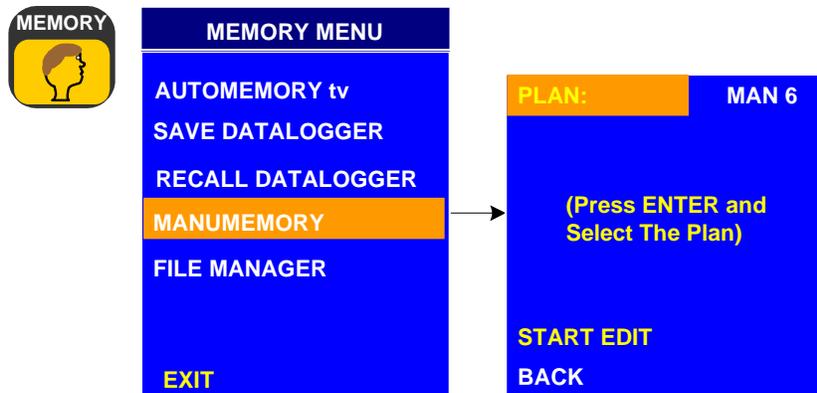
An indication of transponder signal performance is provided with a color coded box at the left of the channel name. A green box indicates the channel passed test performance criteria and is good. A red box indicates a performance issue with the channel measurements.

## 6.84 MANUMEMORY – Creating or Editing CATV Channel Plans

The MANUMEMORY feature found in the MEMORY MENU provides the ability to manually create a tuning plan which may include a list of broadcast channels. The file containing the active channels is named as a MANU plan with a numeric reference (Example: MANU 1). Manually creating a channel plan provides the convenience of only listing a few channels available in your area or desired for special testing application. Only the channels created and added to the list are available in the MANU channel plan for selection and measurement.

The MANUMEMORY feature permits entry of individual channels one at a time. For this reason it is ideal for creating a channel plan in which there is a small number of channels. When creating a channel plan with many channels the AUTOMEMORYtv or use of the SMART software is recommended.

The SLM 1479 provides management features for the MANU files. The MANUMEMORY feature permits edits or changes to listed channels within a previously created manual (MANU) channel plan. The following sections provide information on creating and editing a MANU channel plan.



### To Manually Create a Plan:

1. To create a transponder/channel plan navigate to the MANUMEMORY feature by touching the MEMORY icon and touching the MANUMEMORY listing in the MEMORY MENU.
2. In the PLAN field at the top of the configuration box touch the listing at the right to highlight the field. Move your finger over the arrow portion of the touch control knob to increment through available memory channels.
3. Select a manual channel plan number of choice. Press the START EDIT field to begin construction of a manual plan. *NOTE: The name of the selected manual file can be renamed. See the next section of this manual for instructions on how to rename an existing manual file.*
4. The ITEM EDITING menu appears to enable entry of transponder. Touch the SAVE? field to add a listing after changing the individual fields to the desired values.

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ACTIVE PLAN: MANU 25			
N	TR/CHAN	FREQ	MODE
1	11	201.0	8VSB
2	13	213.0	8VSB
1	15	479.0	8VSB
2	36	605.0	8VSB
3	47	731.0	8VSB

ACTION	
MODIFY ITEM	
ADD BELOW	
ADD ABOVE	
DELETE ITEM	
RETURN	
EXIT	

ITEM EDITING	
MODE	8 VSB
CHAN:	11
FREQ:	201 MHz
AUDIO:	4.5 FM
NAME	PR 1
SAVE?	
BACK	

### MANUMEMORY ACTIONS

**MODIFY ITEM:** Produces the ITEM EDITING menu which permits changes to the settings for the transponder listing highlighted

**ADD BELOW:** Produces the ITEM EDITING menu in which you may select the parameters of a transponder signal and dish characteristic to add a listing below the currently highlighted field.

**ADD ABOVE:** Produces the ITEM EDITING menu in which you may select the parameters of a transponder signal and dish characteristic to add a listing below the currently highlighted field.

**DELETE ITEM:** Deletes the highlighted listing from the selected plan.

**EXIT:** Returns to previous menu

#### To Edit an Existing Plan:

1. To make changes or additions to an existing manual memory plan navigate to the MANUMEMORY feature by touching the MEMORY icon followed by touching the MANUMEMORY listing in the MEMORY MENU.
2. In the PLAN field at the top of the configuration box touch the listing at the right side to highlight the file name. Rotate the control knob to increment through the available memory plans.
3. Select the file name in which you want to edit or add listings. Press the START EDIT field to begin editing.
4. Touch MODIFY ITEM from the listings to produce the ITEM EDITING Menu. Modify the items in the Menu to match the transponder and satellite dish characteristics as needed. Press the SAVE? field to write the changes to the highlighted channel listing.

Press BACK to return to the previous menu without making changes.

## 6.85 CATV FILE MANAGER – Renaming or Deleting Files

The FILE MANAGER, found in the MEMORY MENU, provides management of the logger and transponder/channel plan files. The FILE MANAGER provides the ability to rename or delete files from the meter’s memory. To access the FILE MANAGER from the Home Menu, touch the MEMORY icon followed by a touch of the FILE MANAGER listing in the MEMORY MENU.



You can rename or delete files that were created with the DATA LOGGER as in scanning a TV channel plan and capturing performance measurement data to a test file. These test files are identified as LOG file types and are typically named as LOG 1, LOG2, etc. You can also rename or delete files that were created by the AUTOMEMORY feature or with a MANUMEMORY feature of the meter. These are channel plan files and are typically named “AUTO 1,” “AUTO 2”, etc. or “MANU 1,” “MAN 2, etc. by the meter. However, these file names can be changed to a more recognized or descriptive name as desired. The following section summarizes how to rename, or delete these files in the FILE MANAGER function.

### To Rename a File:

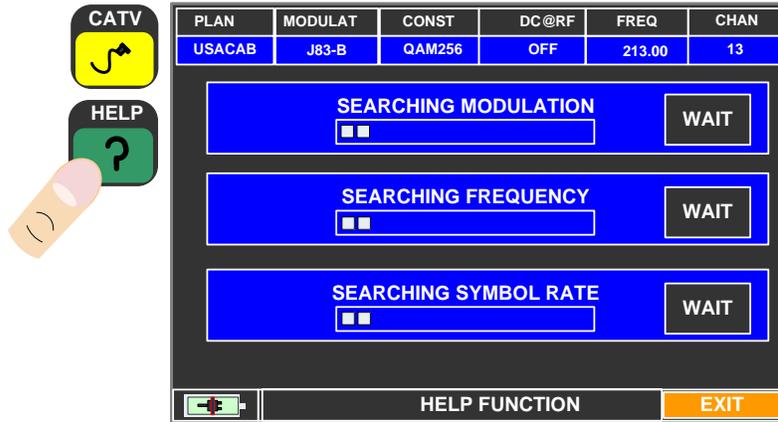
1. Navigate to the MEMORY MENU. Touch the FILE MANAGER listing.
2. Scroll up or down in the listed files to find the file you want to rename. Touch the listing to select or highlight the listing and press the ENTER pushbutton in the center of the larger touch Control Knob.
3. Touch the RENAME FILE listing in the ACTION MENU which appears.
4. A naming overlay appears on the screen. Touch letters to enter into naming boxes. Press > to advance to the next box. Continue until the name is complete. Touch the EXIT box.

### To Delete an Existing File:

1. Navigate to the MEMORY MENU. Touch the FILE MANAGER listing.
2. Scroll up or down in the listed files to find the file you want to delete. Touch the listing to select or highlight the listing and press the ENTER pushbutton in the center of the larger touch Control Knob.
3. Touch the DELETE FILE listing in the ACTION MENU which appears to delete the selected file: **NOTE: DELETION IS PERMANENT – THE FILE CANNOT BE RECOVERED.**

## 6.9 CATV HELP

The HELP icon on the SLM 1479 refers to help or assistance tuning in a digital channel. The HELP function is designed to help determine for a user the RF type of signal within a cable TV channel.



Initiating a HELP function on the SLM 1479 directs the meter to automatically analyze the TV channel and determine the RF modulation type, bandwidth/center frequency, and RF symbol rate. The SLM 1479 methodically analyzes the digital signal to determine these parameters. If the parameters are within the receiver capabilities the meter finishes by advancing to the measurement page with the channel displayed. If the channel has no recognizable signal or is a proprietary modulation scheme, the SLM 1479 reports “NO SIGNAL.”

To initiate a HELP function simply locate a HELP icon and touch it. The HELP icon is located within the Spectrum Analyzer’s popup menu. When in the Spectrum analyzer touch the MENU & ? field at the bottom right of the screen. Touch the HELP icon. If the channel spectrum is not centered, touch the spectrum analyzer touch screen to center the vertical cursor on the signal or channel center frequency. Initiate a HELP function to enable the meter to identify and lock to the digital channel.

The HELP FUNCTION screen informs you of the meter’s progress in determining the type of digital signal or detecting an analog signal within the channel. The boxes on the right in the center list the modulation, frequency, and symbol rates as discovered by the meter. When the search is completed, “FOUND” is displayed on all three measurement status boxes at the right.

The HELP FUNCTION screen maintains the same header fields as in the CATV measurement page. The fields indicate the plan, channel, channel frequency, constellation, and modulation for the selected channel. To return to the previous menu, press the EXIT field at the bottom right of the display.

### For CATV channel signal analysis or HELP:

1. Touch or select the CATV icon.
2. Touch the CHAN field header and select the TV channel.

3. Touch the "MENU & ?" field at the bottom right of the display. Touch the HELP icon in the Popup Menu.
4. Wait while the meter analyzes and determines the channel symbol rate, frequency and modulation type. FOUND is shown in all three boxes when successful. When successful the meter defaults to the measurement page for the transponder or channel. Touch EXIT at any time to exit the search.

## 6.10 CATV BAR SCAN Test

The BAR SCAN measurement shows multiple bars forming a bar chart. Each bar of the chart represents the level of a TV-RF channel within the selected channel plan. The Bar Scan is essentially a simplified spectrum display in which multiple channel levels through a frequency span are indicated with bars on a level chart. The number of channels plotted in the bar chart is determined by the selected span (SPAN). For a CATV Bar Scan measurement touch the BAR SCAN icon with the CATV icon highlighted. The following sections provide more information on the Bar Scan measurement and fields on the Bar Scan display screen.



### Bar Scan Basics

Each bar displays the signal level measured in a specific channel within the channel plan. The SPAN value determines the number of channels or bars displayed in the bar chart. A yellow bar represents a digital signal channel while a solid blue bar represents an analog signal channel. The marker, a vertical red dotted line, is initially positioned on the channel near the center of the display which is the center of the span of channels.

### Bar Scan Measurement Initialization

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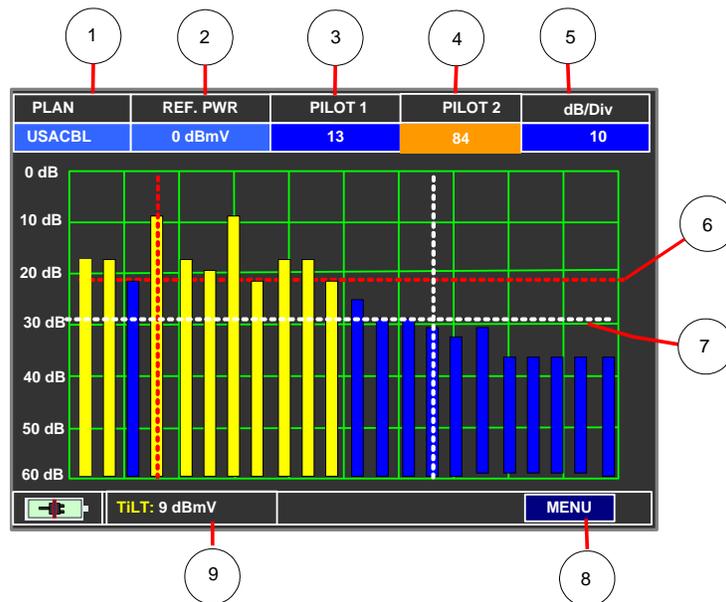
When the Bar Scan measurement is selected the meter automatically defaults the center channel of the span to the last channel selected in the Channel Measurement function of the meter. To select the center channel for the Bar Scan test prior to a measurement, press the MEAS button and select the desired channel. Press the HOME button to return to the HOME menu and with the CATV icon highlighted touch the BAR SCAN icon. The Bar Scan measurement further selects a level reference based upon the selected channel's signal level. Be sure to select an active channel so a proper reference (REF) level is automatically selected.

- 1. PLAN:** Indicates the channel plan selected for measurement. The plan includes the channel list that will be measured and plotted into the BAR SCAN test results.
  - 2. REF PWR Reference Power:** The reference value establishes the level of the top horizontal bar of the bar graph. To change the reference value, touch the REF field header and touch the value field below to see selections. Touch the desired selection.
  - 3. dB/DIV.:** The db/Div field displays the level change represented between adjacent horizontal lines or divisions in the bar graph. This field may be highlighted and changed to predetermined values (5 dB/DIV, 10 dB/DIV).
  - 4. MRK CHN:** The Bar Scan display or span is centered upon a selected channel shown in the field under the CHAN header. The CHAN field is selectable and the channel value may be changed. Changing the value moves the red cursor or marker on the display. Highlight the CHAN field and use the UP and DOWN arrow pushbuttons to move the marker to the desired channel or bar.
  - 5. MRK FREQ. - Marker Frequency:** The Bar Scan display or span is centered upon a selected channel which has a standard frequency reference. The MRK FR field is selectable and the value may be changed. Changing the value moves the red cursor or marker on the display. When the MRK FR is selected and changed, the channel value changes to dash lines indicating the frequency is no longer standard for the channel selected.
  - 6. SPAN:** The SPAN field determines the number of channels and a relative frequency span included in the bar graph or scan. To change, highlight the field and use the UP or DOWN key to change the span between pre-defined values, from (10, 20, 32, 64, 128).
  - 7. MARKER P – Marker Power or Level Measurement:** This field indicates the level of the channel marked by the red cursor on the display. The unit of measurement is set in the METER CONFIGURATION MENU. A horizontal dotted line shows the real time signal level value measured in the currently selected channel
- MENU &?:** Touch this field to gain access to the Popup Menu which contains a selection for configuring the BarScan Special Test from a BarScan measurement to a TILT measurement. Highlight the selection field and select the "BARS" setting to configure for a BarScan Test. Select the "TILT" setting to configure the test for a Tilt Test explained in the next section.

## 6.11 CATV BAR SCAN – TILT Test

In the Tilt measurement the signal level difference between two user-defined channels is measured. The channels included in the Tilt Test are enabled in the Channel Plan using the SMART software. The two channels for the tilt measurement can be directly set while the Tilt Test is running. A bar display is used and cursors show the signal level difference between the two specified channels. The display shows the analog channels as solid blue bars and digital channels as dashed yellow bars. To enter the Tilt measurement, highlight the TILT icon on the Home Menu and press the ENTER button. The following sections describe the functions within the Tilt measurement screen.

To select the CATV TILT test, touch the CATV icon and select the channel plan to use for the test. Touch the BAR SCAN icon. Touch the MENU field at the bottom right of the BARSCAN display to open the menu. Touch the BARS TYPE field to highlight the selection on the right side. Touch the highlighted field on the right side until it reads "TILT." Touch EXIT.



**1. PLAN:** The currently selected channel plan.

**2. Reference Power – REF PWR:**

The reference value establishes the dBmV level of the top horizontal bar of the bar graph. This field may be changed by red highlighting the field and pressing the UP and DOWN arrow pushbuttons.

**3. 4. Selecting Tilt Channels (Pilot 1, Pilot 2):** The CH1 and CH2 fields at the top center of the display specify the measurement channels. The triangle shapes at the bottom of the scale indicate the measurement channels. To edit the signal level end-of-scale value, with the Standard Navigation Mode highlight the top level (end of scale) value on the y-axis and select the requested end of scale value.

**5. Edit the Scale dB/Div:** This field displays the level change represented between adjacent horizontal lines or divisions in the bar graph. This field may be highlighted and the changed to predetermined values.

**6. PILOT 1 Marker:** The marker that shows the selected PILOT 1 channel.

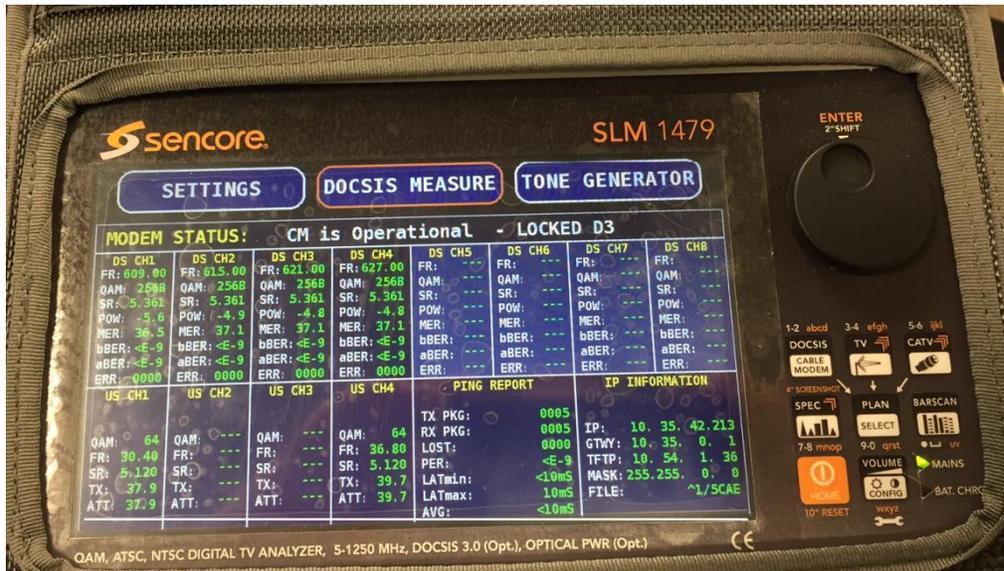
**7. PILOT 2 Marker:** The marker that shows the selected PILOT 2 channel.

**8. Menu:** Menu used to change the BAR SCAN function between the Bar Scan measurement and the TILT measurement.

**10. Tilt Measurement:** The Tilt Measurement value indicates the difference in level between channel 1 and channel 2 which are specified in the CH1 and CH2 fields

## Section 7: DOCSIS Measurements

The SLM 1479 contains an RF modem that is DOCSIS 3.0 compatible and may be used for testing both upstream and downstream performance in a DOCSIS cable network. The internal modem simulates a cable modem for testing and verification. To access the DOCSIS MENU, from the Home Menu screen, touch the DOCSIS icon. You may also select by pushing the DOCSIS CABLE MODEM pushbutton. The starting DOCSIS MENU contains three sections which provide DOCSIS related setup and testing functions. These sections are briefly described in this section. Subsequent sections provide detailed information on the DOCSIS measurements.



### SETTINGS - MODEM SETUP

The SETTINGS menu provides sections and fields used to configure the internal MODEM for system testing. The settings insure proper integration with the cable system to perform and provide Docsis analyzing measurements. The settings should be configured properly prior to performing any DOCSIS measurements. The settings insure the DOCSIS tests are configured to operate with the DOCSIS system to be tested. Details on the SETTINGS is found on the next page in this section of the manual.

### DOCSIS MEASURE

The DOCSIS MEASURE selection establishes a connection with the CMTS and provides test analysis of the DOCSIS upstream and downstream cable network. See the DOCSIS MEASURE section of this manual starting on page xx.

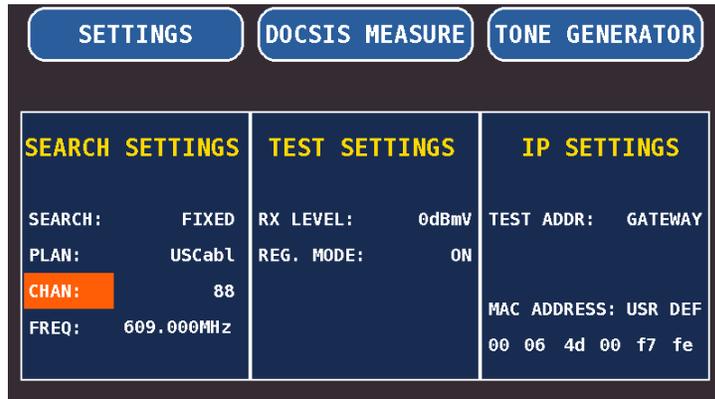
### **tone generator:**

The TONER GENERATOR selection is used to generate a test signal to evaluate reverse signal path attenuation or signal performance. The generator provides a QAM test signal, with selectable types, and variable output level to insure flexibility in troubleshooting and testing upstream paths. See the Tone Generator section of this manual starting on page 101 for details.

## 7.1 DOCSIS - Modem Setup – Settings

The DOCSIS MODEM SETTINGS menu provides sections and fields within each section used for configuring the internal cable modem of the SLM 1479. The settings should be configured properly prior to performing any DOCSIS measurements. The settings insure the DOCSIS tests are configured to operate with the DOCSIS system to be tested. From the initial DOCSIS MENU, touch the SETTINGS field in the upper left corner of the display.

The SETTINGS screen is divided into 3 sections including the SEARCH SETTINGS, TEST SETTINGS, and IP SETTINGS. These sections and the settings provided are covered in the remainder of this section.



### 7.11 SEARCH SETTINGS

The SEARCH SETTINGS are important in configuring the meter's internal cable modem as to the DOCSIS downstream channels to use to get a connection and data from the cable's CMTS.

#### SEARCH - Ranging Method

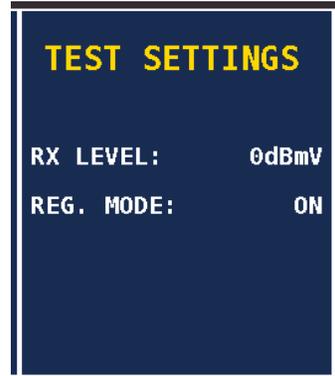
There are two methods used by the SLM 1479 to search for a downstream DOCSIS channel(s). The SEARCH selection may be set to AUTOMATIC or FIXED. Touch or Highlight the SEARCH field and use the control knob to increment to FIXED or AUTOMATIC to select the desired method.

**FIXED:** When set to a FIXED ranging method, a specific DOCSIS channel must be known and referenced for testing. It is likely that the cable system uses multiple channels for DOCSIS. You may use any of these active DOCSIS channels for the test. You may contact the cable provider for more specific information as to the best channel to use. When using the Fixed method be sure that a DOCSIS downstream channel of the cable system is selected and that the center frequency is correct for the specified channel.

**AUTOMATIC:** In this mode the meter will scan the channels and search for a DOCSIS channel on a cable system. This is helpful if the active DOCSIS channel is not known. However, it does take a lot longer to scan and search for a DOCSIS channel which adds considerable time to the DOCSIS testing.

## 7.12 TEST SETTINGS.

The TESTS SETTING section in the middle of the SETTINGS MENU provides instructions for the SLM1479's cable modem as to requirements relative to the CMTS receive (RX) level and if you desire the cable modem to be registered with the CMTS to complete the Ping and IP testing measurements.



### RX Level

The RX LEVEL defines the receive level required by the CMTS. If known, set the RX LEVEL field in the DOCSIS MENU to the value known to be the level required by the CMTS. If the level is not known, use the default value, 0 dBmV. To select a receive level, touch the field or rotate the control knob to highlight the RX LEVEL field and press the knob to enter the level field. Rotate the large knob to increment or decrement the value.

The RX LEVEL is used by the DOCSIS MEASURE for determining the US channel attenuation. The receive level in combination with the meter's modem output level are used to calculate the value as shown in the ATT test results for the US channel. For example, if the CMTS responds to an Upstream signal at -5 dBmV from the SLM 1479's modem outputting 40dBmV, then the upstream attenuation is 45dB. (ATT: 45 dB).

### REG. MODE

The REG MODE (Registration Mode) may be set to ON or OFF. Touch the field on the display or rotate the control knob to highlight the REG MODE field and press the knob to select the On/Off selection field. Rotate the knob or touch the field to increment from ON to OFF. If you configure the registration mode to off, the SLM 1479's cable modem during a DOCSIS test will not request registration with the system CMTS. If not registered the PING and IP Report testing is not available and will not populate the MEASUREMENT display section.

## 7.13 IP SETTINGS

The DOCSIS ADDRESS CONFIG. field provides selection of the CMTS Address and MAC Address required for network connection. The address can be the pinged address (Gateway) or a user defined address. This menu provides entry of the network address used to connect to the cable CMTS.



The DOCSIS IP Menu configures the CMTS Gateway and MAC Addresses required for network connection between the CMTS and the meter's internal modem.

### ADDRESS (CMTS Address)

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This address can be the pinged address (Gateway) or a user defined address which may be manually entered. Highlight the ADDRESS field and select the pinged address as the current Gateway address (GATEWAY) or a user defined address (USR DEF.).

### MAC ADDRESS

To access a cable system's DOCSIS network, the SLM 1479 requires a unique MAC address. The address can either be setup by provisioning the MAC address of the meter's internal modem by the cable administrator on the DOCSIS network or by emulating the MAC address of an already provisioned cable modem. Therefore, the MAC ADDRESS can be a DEFAULT value or USER DEFINED.

### USER DEFINED Address

The CMTS Address and the MAC address may be user defined. Each couple of the hexadecimal digits in the value can be highlighted and entered from "00" to "ff". To do so, set the address to "User Def." and touch the individual 2 digit fields in the MAC address fields. A popup menu appears to enter the digit values. Enter values in each 2 digit group until the desired address value is entered.

## 7.2 DOCSIS MEASURE

Prior to performing the DOCSIS MEASUREMENTs requires proper setup of the modem and CMTS address. Please perform MODEM SETUP and ADDRESS CONFIG prior to performing the DOCSIS MEASUREMENTS as explained in the previous section 7.1.

There are 3 fundamental and automated steps performed by the DOCSIS test when performing the DOCSIS MEASUREMENTs.

1. Modem reboot - Establish a downstream channel(s). (SELECT CMTS DOWNSTREAM CHAN)
2. Establish a connection/authorization/registration with the CMTS (CONNECTING TO CMTS)
3. Perform DOCSIS Measurement tests including:
  - a. Downstream Channel(s) performance report information
  - b. Upstream Channel (s) performance report Information
  - c. PING Report based upon file transfer data to and from CMTS
  - d. IP Report based upon network IP address/gateway assignments

These steps are automated by the DOCSIS test of the SLM1479 and do not require any user action. You may observe the progression of the automated connecting process by viewing the upper middle section of the DOCSIS testing screen below the DOCSIS MEASURE field.

### 7.21: DOCSIS Downstream & Upstream Channel Search Mode

To begin DOCSIS testing touch the DOCSIS MEASURE field at the top center of the display. Or rotate the large control knob until the field is highlighted and press the knob in to select and start the DOCSIS testing.

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SETTINGS		DOCSIS MEASURE				TONE GENERATOR	
<b>MODEM STATUS:</b> Rebooting Modem. - 87%							
DS CH1	DS CH2	DS CH3	DS CH4	DS CH5	DS CH6	DS CH7	DS CH8
FR: ---	FR: ---	FR: ---	FR: ---	FR: ---	FR: ---	FR: ---	FR: ---
QAM: ---	QAM: ---	QAM: ---	QAM: ---	QAM: ---	QAM: ---	QAM: ---	QAM: ---
SR: ---	SR: ---	SR: ---	SR: ---	SR: ---	SR: ---	SR: ---	SR: ---
POW: ---	POW: ---	POW: ---	POW: ---	POW: ---	POW: ---	POW: ---	POW: ---
MER: ---	MER: ---	MER: ---	MER: ---	MER: ---	MER: ---	MER: ---	MER: ---
bBER: ---	bBER: ---	bBER: ---	bBER: ---	bBER: ---	bBER: ---	bBER: ---	bBER: ---
aBER: ---	aBER: ---	aBER: ---	aBER: ---	aBER: ---	aBER: ---	aBER: ---	aBER: ---
ERR: ---	ERR: ---	ERR: ---	ERR: ---	ERR: ---	ERR: ---	ERR: ---	ERR: ---
US CH1	US CH2	US CH3	US CH4	PING REPORT		IP INFORMATION	
QAM: ---	QAM: ---	QAM: ---	QAM: ---	TX PKG: ---	RX PKG: ---	IP: ---	---
FR: ---	FR: ---	FR: ---	FR: ---	LOST: ---	---	GTWY: ---	---
SR: ---	SR: ---	SR: ---	SR: ---	PER: ---	---	TFTP: ---	---
TX: ---	TX: ---	TX: ---	TX: ---	LATmin: ---	---	MASK: ---	---
ATT: ---	ATT: ---	ATT: ---	ATT: ---	LATmax: ---	---	FILE: ---	---
				AVG: ---	---		

When the DOCSIS test is initiated it begins an automated process in which the internal cable modem of the meter is initialized (Rebooted) and connection of the cable company's CMTS is attempted. Once connected and authorized the automated testing continues until the downstream (DS) channel measurements and upstream (US) channels are established and test measurements completed.

Additional PING REPORT and IP CONFIGURATION measurement sections and data is provided. Progress or steps within the automatic DOCSIS test is reported by the meter's MODEM STATUS indications on the second line down from the top in the DOCSIS MEASURE menu. The following section provides a summary of the DOCSIS measurements provided.

## 7.22 DOCSIS Measurements

The DOCSIS MEASUREMENT page show all the test progress and parameters regarding the DOCSIS network and its performance.

SETTINGS		DOCSIS MEASURE				TONE GENERATOR	
<b>MODEM STATUS:</b> CM is Operational - LOCKED D3							
DS CH1	DS CH2	DS CH3	DS CH4	DS CH5	DS CH6	DS CH7	DS CH8
FR: 609.00	FR: 615.00	FR: 621.00	FR: 627.00	FR: ---	FR: ---	FR: ---	FR: ---
QAM: 256B	QAM: 256B	QAM: 256B	QAM: 256B	QAM: ---	QAM: ---	QAM: ---	QAM: ---
SR: 5.361	SR: 5.361	SR: 5.361	SR: 5.361	SR: ---	SR: ---	SR: ---	SR: ---
POW: -5.6	POW: -4.9	POW: -4.8	POW: -4.8	POW: ---	POW: ---	POW: ---	POW: ---
MER: 36.5	MER: 37.1	MER: 37.1	MER: 37.1	MER: ---	MER: ---	MER: ---	MER: ---
bBER: <E-9	bBER: <E-9	bBER: <E-9	bBER: <E-9	bBER: ---	bBER: ---	bBER: ---	bBER: ---
aBER: <E-9	aBER: <E-9	aBER: <E-9	aBER: <E-9	aBER: ---	aBER: ---	aBER: ---	aBER: ---
ERR: 0000	ERR: 0000	ERR: 0000	ERR: 0000	ERR: ---	ERR: ---	ERR: ---	ERR: ---
US CH1	US CH2	US CH3	US CH4	PING REPORT		IP INFORMATION	
QAM: 64	QAM: ---	QAM: ---	QAM: 64	TX PKG: 0005	0005	IP: 10.35.42.213	
FR: 30.40	FR: ---	FR: ---	FR: 36.80	RX PKG: 0000	0000	GTWY: 10.35.0.1	
SR: 5.120	SR: ---	SR: ---	SR: 5.120	LOST: <E-9	<E-9	TFTP: 10.54.1.36	
TX: 37.9	TX: ---	TX: ---	TX: 39.7	PER: <10mS	<10mS	MASK: 255.255.0.0	
ATT: 37.9	ATT: ---	ATT: ---	ATT: 39.7	LATmin: 1.0mS	1.0mS	FILE: ^1/SCAE	
				LATmax: <10mS	<10mS		
				AVG: <10mS	<10mS		

### DOWN STREAM (DS) CHANNEL MEASUREMENT Report

After the meter's cable modem is connected to the CMTS the DOWN CHAN or DOWN STREAM (DS) sections are populated. There may be one DS section shown with populated measurements or up to eight sections depending on the downstream channel bonding of the DOCSIS system. Each of the channel sections indicates specific performance data regarding that DOCSIS down stream channel.

MODEM STATUS: CM is Operational - LOCKED D3							
DS CH1	DS CH2	DS CH3	DS CH4	DS CH5	DS CH6	DS CH7	DS CH8
FR: 609.00	FR: 615.00	FR: 621.00	FR: 627.00	FR: ---	FR: ---	FR: ---	FR: ---
QAM: 256B	QAM: 256B	QAM: 256B	QAM: 256B	QAM: ---	QAM: ---	QAM: ---	QAM: ---
SR: 5.361	SR: 5.361	SR: 5.361	SR: 5.361	SR: ---	SR: ---	SR: ---	SR: ---
POW: -5.6	POW: -4.9	POW: -4.8	POW: -4.8	POW: ---	POW: ---	POW: ---	POW: ---
MER: 36.5	MER: 37.1	MER: 37.1	MER: 37.1	MER: ---	MER: ---	MER: ---	MER: ---
bBER: <E-9	bBER: <E-9	bBER: <E-9	bBER: <E-9	bBER: ---	bBER: ---	bBER: ---	bBER: ---
aBER: <E-9	aBER: <E-9	aBER: <E-9	aBER: <E-9	aBER: ---	aBER: ---	aBER: ---	aBER: ---
ERR: 0000	ERR: 0000	ERR: 0000	ERR: 0000	ERR: ---	ERR: ---	ERR: ---	ERR: ---

The down stream DOCSIS channel performance measurements include the include the frequency modulation constellation type, symbol rate, average power, MER, BER and Block Errors.

- FR:** Frequency center of the downstream DOCSIS channel
- QAM:** Modulation constellation of the downstream DOCSIS channel
- SR:** Symbol Rate of the downstream DOCSIS channel
- POW:** Channel Average Power of the downstream DOCSIS channel
- MER:** Modulation Error Ratio measurement of the downstream DOCSIS channel
- bBER:** Bit Error Ratio before FEC applied of the downstream DOCSIS channel
- aBER:** Bit Error Ratio after FEC applied of the downstream DOCSIS channel
- ERR:** Packet Error counter indicating downstream DOCSIS channel errors

### UPSTREAM CHANNEL (US) MEASUREMENT Report

The DOCSIS UPSTREAM (US) analysis is provided at the bottom section of the DOCSIS MEASUREMENT screen upon connection to the CMTS. This section shows upstream DOCSIS channel information. Information includes the modulation type, frequency, symbol rate, transmit level of the meter, and attenuation from the meter to the CMTS as reported by the CMTS and calculated by the meter using the known TX level.

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US CH1	US CH2	US CH3	US CH4
QAM: 64	QAM: ---	QAM: ---	QAM: 64
FR: 30.40	FR: ---	FR: ---	FR: 36.80
SR: 5.120	SR: ---	SR: ---	SR: 5.120
TX: 37.6	TX: ---	TX: ---	TX: 37.7
ATT: 37.6	ATT: ---	ATT: ---	ATT: 37.7

**QAM:** Constellation depth of the upstream channel used by the DOCSIS test

**FR:** Frequency of the upstream channel used by the DOCSIS test

**SR:** Symbol rate of upstream channel used by the DOCSIS test

**TX:** Modem Transmit (TX) level - the output level in dBmV of the meter's cable modem during the DOCSIS test to satisfy the defined CMTS input level

**ATT:** Attenuation of the upstream DOCSIS signal path computed from the defined input level to the CMTS and the known output level of the SLM1479's cable modem.

### PING Report

The PING REPORT section of the DOCSIS MEASURE page shows the network PING report showing the number of transmitted (TX PKG) and received (RX PKG) data packets, the number of lost packets (LOST), the present Packet Error Ratio (PER), and the minimum (LATmin), maximum (LATmax) and average (AVG) latency time of the various sent and received packets.

**TX PKG:** Transmit packets during DOCSIS ping test

**RX PKG:** Received packets during DOCSIS ping test

**LOST:** Lost packets during DOCSIS ping test

**PER:** Computed Packet Error Ratio of DOCSIS ping test

**LATmin:** Minimum latency during DOCSIS ping test

**LATmax:** Maximum latency during DOCSIS ping test

**AVG:** Average latency during DOCSIS ping test

PING REPORT	
TX PKG:	0005
RX PKG:	0005
LOST:	0000
PER:	<E-9
LATmin:	<10mS
LATmax:	10mS
AVG:	<10mS

### IP Report

The IP INFORMATION section shows the current IP address of the meter's cable modem, the Gateway(GTWY), the TFTP server, the TOD server, and the Subnet Mask (MASK) server. It will also display the current TFTP file (FILE) name.

**IP:** IP address of meter's cable modem

**GTWY:** IP gateway address

**TFTP:** IP address of TFTP server

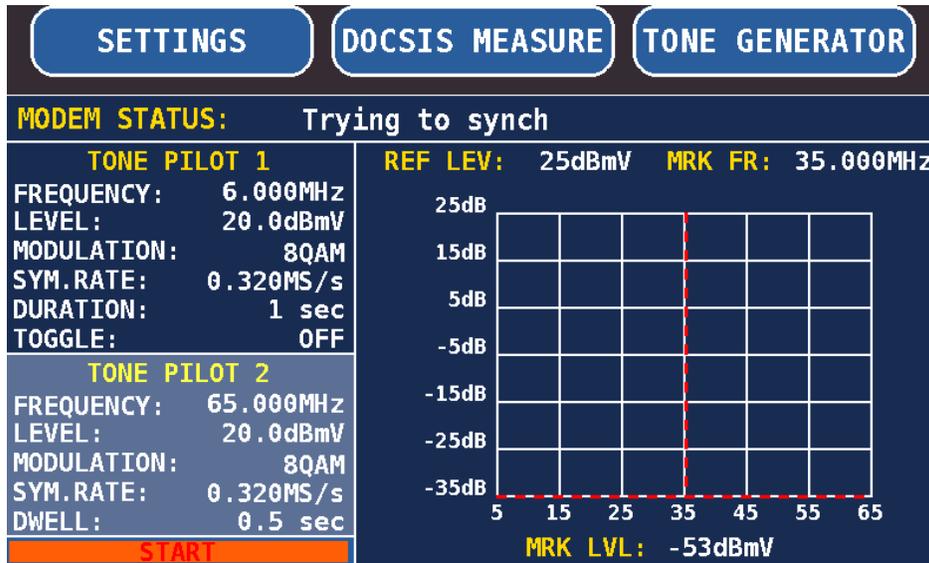
**MASK:** IP Subnet Mask

**FILE:** File name for ping data transfer and packet loss analysis

IP INFORMATION	
IP:	10. 35. 42.213
GTWY:	10. 35. 0. 1
TFTP:	10. 54. 1. 34
MASK:	255.255. 0. 0
FILE:	^1/6CDD1318/

### 7.3 DOCSIS Upstream Generator

The internal RF DOCSIS modem of the SLM 1479 may be used as an upstream QPSK or selectable QAM generator. The generator is capable of providing two alternating outputs with QPSK or 4, 8, 16, 32, or 64 QAM upstream test signals ranging from 5 to 65 MHz at output levels ranging from approximately 20 to 53 dBmV. The upstream RF signals may be used to test the upstream cable path attenuation, frequency response, and/or signal degradation.



To select the Upstream Generator starting on the Home Menu, red highlight the DOCSIS icon, and press the ENTER pushbutton. On the DOCSIS Menu touch or select the TONE GENERATOR field and press ENTER. The TONE GENERATOR menu appears with settings for the Upstream Generator 1 (TONE PILOT 1) and Upstream Generator 2 (TONE PILOT 2).

The RF outputs of the Upstream Generator's are produced by the SLM 1479's internal RF cable modem. The RF modem output is at the top right side of the meter and clearly labeled as the CABLE MODEM jack. Connect a cable from the SLM 1479's CABLE MODEM jack to the cable's upstream signal path.

- FREQUENCY:** Frequency of the tone generator, select from 5-65 MHz
- LEVEL:** Level of the tone generator output, select from 20-60 dbmV (Note-maximum output is approximately +53 dBmV)
- MODULATION:** Modulation type and constellation depth of output tone generator
- SYM. RATE:** Symbol rate of output
- DURATION:** Selects the on duration or time of the tone generator when enabled
- TOGGLE:** Sets generator to toggle its output between Tone Pilot 1 and Tone Pilot 2

#### Select the Upstream Frequency

The upstream generator frequency is variable through a range from 5-65 MHz. The FREQUENCY field provides selection of the output frequency. Select the FREQUENCY

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field by pressing the DOWN or UP pushbuttons. Press the LEFT and RIGHT arrow pushbuttons to select the desired frequency. You may also enter the frequency using the numeric keypad.

### Select the Level

The output level of the upstream QAM or QPSK generators is variable and may be set in the LEVEL field. The upstream generator has a wide output level range from approximately 8 to 53 dBmV. The LEVEL field provides control and selection of the output level of the RF modem for the Upstream Generator. Press the UP and DOWN pushbuttons to highlight the LEVEL field. Press the LEFT and RIGHT arrow pushbuttons to increment the values of the output generator.

### Select the Modulation Type

The modulation type of the upstream QAM or QPSK generator is selectable by symbol depth and includes settings for QPSK and QAM 8, 16, 32, and 64. Select the MODULATE field by pressing the UP and DOWN arrow pushbuttons. Select the modulation type by pressing the LEFT and RIGHT arrow pushbuttons.

### Select the Upstream Generator Symbol Rate

The Symbol Rate of the upstream digital signal may be selected including 160, 320, 640, 1280, 2560, 5120, kS/s rates. Select the SYM. RATE field by pressing the UP and DOWN arrow pushbuttons. Select the symbol rate by pressing the LEFT and RIGHT arrow pushbuttons.

### Set the Generator's Output Cycle Duration

The time or duration of the Upstream Generator's output is determined by the setting in the DURATION field. The duration may be set to continuous or to 1, 5, 10, or 30 seconds. When the TOGGLE field is set to ENABLE, the generator's output cycles on and off at periods determined by the time selected in the DURATION field. When the CYCLE field is set to DISABLE, the generator's output is active only for the time selected in the DURATION field.

### Set the Upstream Generator to Cycle On/Off or TOGGLE

The Upstream Generators may be set to output a continuous signal carrier or be set to cycle the output on or off. If you want the Upstream Generator output to cycle on and off, set the TOGGLE field to ENABLE. If you do not want the Generator's output to cycle on and off, set the TOGGLE field to DISABLE and the DURATION field to CONTINUOUS.

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When the TOGGLE field is set to "Enable" a second upstream generator becomes available. The Upstream Generator 2 menu is accessed by selecting the SETUP GENERATOR 2 field and pressing the ENTER pushbutton.

### Enable/Disable Upstream Generator Output (START, STOP)

The START field provides control to turn on or off the generator's output. The field is located at the bottom left of the display screen. When the TOGGLE field is set to DISABLE, the field initially shows START and there is no output. Select the field by navigating down to the START field by pressing the DOWN arrow pushbutton. Press the ENTER pushbutton to increment the field to indicate STOP. The output of the generator is active when the field indicates STOP. The Generator's output status is indicated in the field between the dashed lines.

### Selecting Generator 2

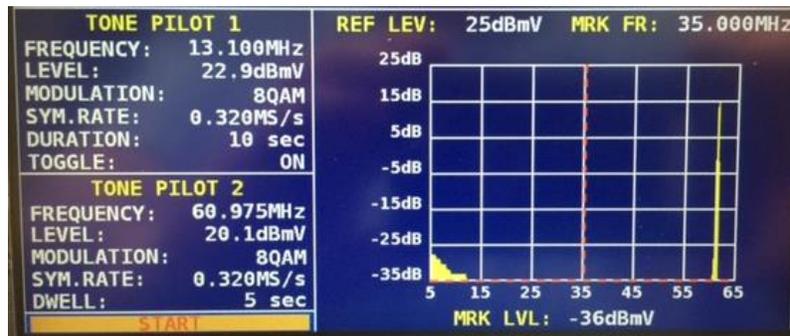
A second Upstream Generator is available to provide a second alternating RF upstream output signal. The second generator becomes available when the TOGGLE field is set to "Enable". Both Generator 1 and Generator 2 may be active but may only toggle on at alternating times

### Starting the Generator Output

The Generator's output is inactive or off until the START field is selected and you press the ENTER pushbutton. Exiting the DOCSIS Upstream Generator(s) function turns the generator(s) output off.

### DOCSIS Generator – Integrated Ingress Spectrum Analyzer

The DOCSIS Tone Generator provides an integrated Ingress Spectrum Analyzer on the right side of the measurement window. The Spectrum Analyzer mirrors the operation of the Cable Ingress Test function. It provides a spectrum analysis of the upstream spectrum from 5 to 65 MHz. The input for this measurement is the normal RF IN jack and not the CABLE MODEM jack. The integrated ingress spectrum may be used simultaneously while generating the Tone Pilot 1 or 2 generators.



## Section 8: Optic Power Measurements

An optional optical power measurement is available with the DSA1479. The following section describes the optical measurements available with this option.

### 8.1 Optic Power Function

When working with optical cables and signals please adhere closely to the following warning.

**WARNING ! HAZARD !**

**Never look inside the end of the fiber optic cable. Signals in the cable may cause eye injury.**

An integrated Optical Power Meter provides a convenient measurement tool for determining if the level of an optical signal is present and if the link loss is appropriate. A measurement at several popular light wavelengths is provided. Connect the optical cable to the meter at the top OPTICAL IN connector using one of the available adapters. Several adapters are provided to make connection to popular fiber connector types. See the next section 8.2 of this manual. From the Home Menu, touch the OPTIC icon to enable and begin optic power or conversion measurements.



Always make sure the fiber optic connector is properly secured to the meter when making measurements. Periodically clean the optical sensor using ONLY a gas duster - Canned Air.

#### Set the WAVELENGTH

Touch the WAVELENGTH field at the top right of the measurement screen. Repeat touch the wavelength field or rotate the Large Knob to increment through available values. Select the desired value (1310nm, 1490nm, or 1550nm).



#### Optical Power Measurement

The display indicates the current optical power PWR. The current power level is displayed on the Optical Power Graph level and Optical Power field for the appropriate value (1310nm, 1490nm, or 1550nm)

#### Optical Cable Loss Measurement

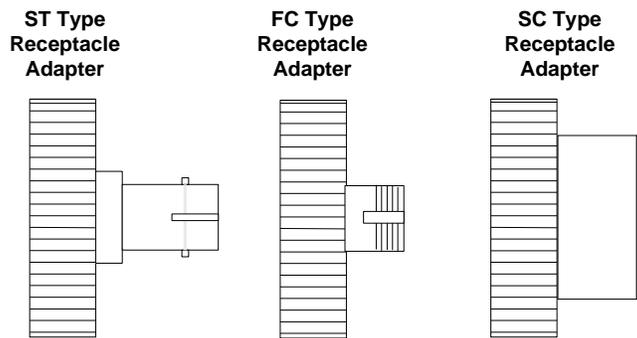
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An optical measurement may be stored and used as a reference value in which to compare subsequent measurements. The optical power delta or difference between the stored and current measurement is then shown in the LOSS field. This permits the easy calculation of link loss on an optical cable.

To store a reference (REF) value, input and measure the optical signal power at the desired test point. With the test active, highlight the STORE field and press ENTER.

### 8.2 Optical Input Connectors

The optical option on the SLM 1479 is supplied with several fiber cable adapters. The adapters provide connection from common fiber cable connectors to the optical power meter input jack of the meter. The following section illustrates and describes these adapters.



#### ST Type Adapter

The ST Type Adapter provides an optical connection from the common ST or “Straight Tip” type fiber connector. The female receptacle accepts connection from a male end ST type fiber connector. The SLM1478 is shipped with this connector already attached to the Optical Power Meter Input Jack.

#### FC Type Adapter

The FC Type Adapter provides an optical connection from the common FC or “Ferrule Connector” fiber cable connector. The female receptacle accepts connection from a male end FC type fiber connector.

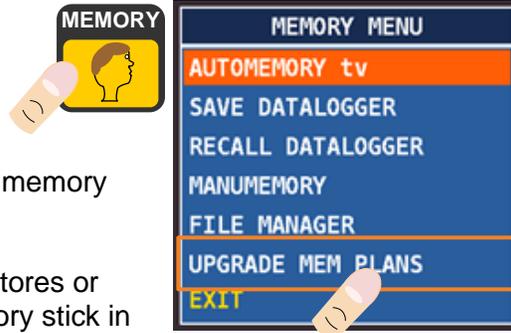
#### SC Type Adapter

The SC Type Adapter provides an optical connection from the common SC fiber cable connector. The female receptacle accepts connection from a male end SC type fiber connector.

The above adapters are all shipped with a cover or plug to prevent dirt from entering into the receptacle when attached to the Optical Power Meter Input Jack. Be sure to always keep the cover or plug in place to prevent dust and dirt from entering.

## Section 9: UPGRADE MEM PLANS - MEM File Transfers

The SLM 1479 accommodates a mem file transfer from the meter to and from a USB memory stick. The mem file may be imported or exported to or from a PC or another SLM 1479. Finally, the meter's firmware may be upgraded from a mem file contained on a USB memory stick.



**LOAD MEMORY PLANS FROM USB KEY:** Stores or writes an SLM1479.mem file from a USB memory stick in the USB-A jack to the meter to clone another meter or to update the meter's channel plans. The mem file may be sourced from another SLM 1479 or from the SMART software where the channel plans were modified or created.

**LOAD MEMORY PLANS ON USB KEY:** Stores or writes an SLM 1479.mem file sourced from within the SLM 1479 meter to the USB memory stick inserted in the USB-A jack. The SLM1479.mem file contains all the channel plans and configuration settings of the meter.

### USB Memory Stick Insertion

To transfer files to or from a USB memory device, the memory stick must be inserted into the USB A receptacle located on the left side of the meter. With the meter powered on, insert the USB memory stick. Selecting either of the write or read actions initiates a file transfer.

---

*NOTE: The USB Stick must be formatted as a FAT 16 device*

---

### 9.1 LOAD MEMORY PLANS FROM USB KEY

The LOAD/SAVE MEMORY PLANS Menu when used with a USB thumb drive provides a means to clone channel plans and setup values from one SLM1479 to another. Simply copy the memory/channel/OEM plans/files to the memory stick from one SLM 1478 using the SAVE MEMORY PLANS ON USB KEY feature. The plans and files are combined into a single mem file for convenience. Insert the memory stick into another SLM 1479 and write the mem file containing the files from the previous meter from the USB stick to the new SLM 1479. Use the LOAD MEMORY PLANS FROM USB KEY function to load the mem file from the USB stick to the meter.

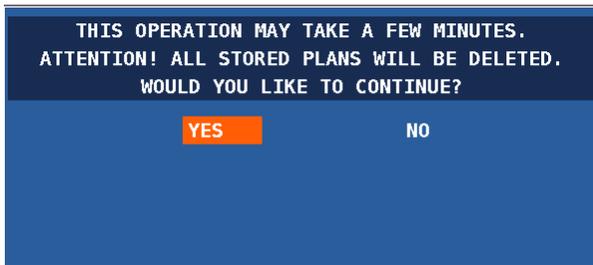


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All files may be viewed and edited within the SMART software. A mem file load is designed to replace all the channel plan factory and auto/manual created channel plan files within the meter. The mem file save or load cannot be used to move a single channel plan between meters or to/from the SMART software.

When cloning another meter write the mem file from that meter to a USB stick using the procedure described in the next section. You may also use the SMART software to create or edit a complete channel plan(s) and OEM files for the meter. The file is commonly saved and named as “SLM1479.mem.” This file name is used and recognized by the SLM 1479 for writing the file to the meter or saving the file to the USB memory stick. Save the SLM1479.mem file from the SMART software to PC memory and transfer the file to the USB memory stick or save within SMART directly to the USB memory stick.

To load the SLM1479.mem file from the USB memory stick to the meter insert the USB thumb drive containing the mem file into the USB A port. Press the MEMORY icon on the home menu. In the MEMORY MENU, touch the screen at the UPGRADE MEM PLAN listing or rotate the large knob to highlight the UPGRADE MEM PLAN field and press the knob to select. In the MEMORY PLANS menu touch the LOAD MEMORY PLANS FROM USB KEY. A warning message menu appears as shown below indicating that a mem plan load will replace all the currently stored meter channel plans and OEM configuration. Touch the YES field on the display screen to continue.



If the SLM1479.mem file is available on the USB drive, the file is written to the meter replacing all the previous factory, auto or manual plans and OEM files. If a mem file is not found on the USB stick, the meter presents a message indicating that the file is not available.

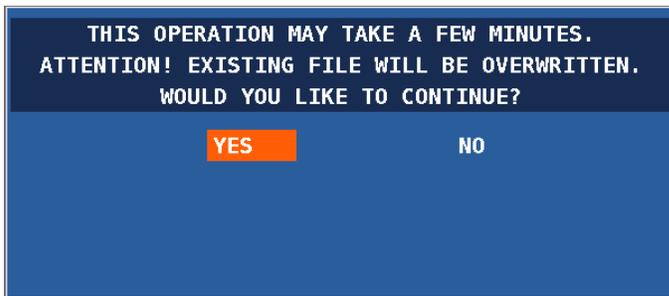
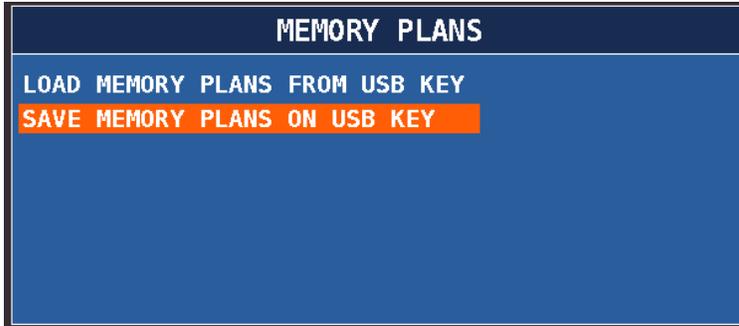
## 9.2 LOAD MEMORY PLANS ON USB KEY

When cloning another meter write the mem file from that meter to a USB stick using the procedure described in this section. You may also use the SMART software to create or edit a complete channel plan(s) and OEM files for the meter. The file is commonly saved and named as “SLM1479.mem.” This file name is used and recognized by the SLM 1479 for writing the file to the meter or saving the file to the USB memory stick. Save the SLM1479.mem file from the SMART software to PC memory and transfer the file to the USB memory stick or save within SMART directly to the USB memory stick.

To create and load the SLM1479.mem file from the meter to a USB memory stick press the MEMORY icon on the home menu. In the MEMORY MENU, touch the screen at the

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UPGRADE MEM PLAN listing or rotate the large knob to highlight the UPGRADE MEM PLAN field and press the knob to select. In the MEMORY PLANS menu touch the SAVE MEMORY PLANS ON USB KEY. A message appears as shown below indicating that a mem plan save will replace an SLM1479.mem file should it already exist on the USB drive. Touch the YES field on the display screen to continue.



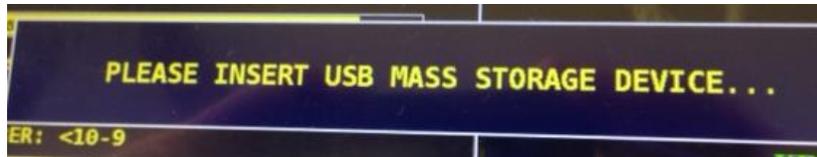
## Section 10: Display Screen Shot Captures

The SLM 1479's display screens can be captured as bit map files and written to a USB memory stick. This feature offers a simple means to capture and store measurement screens for sharing with others for analysis or for storing test results. The captured images are stored as bitmap files and may be named for identification. The files are written to a USB memory stick inserted into the USB A port at the left side panel of the meter.



### 10.1 Capturing Screen Shots to a USB Memory Stick

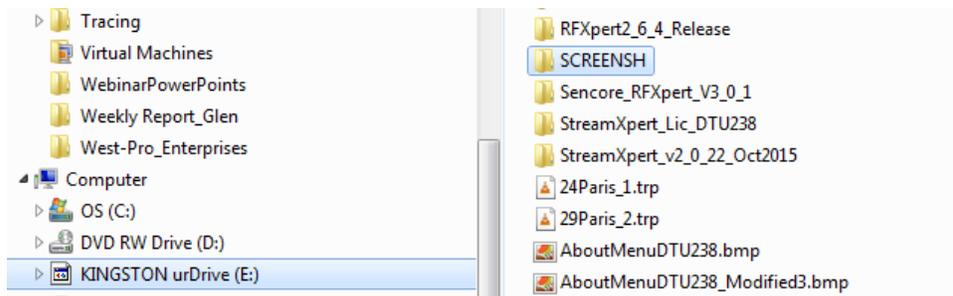
Configure the instrument measurement screen to show measurements as desired. Insert a USB memory stick into the USB A port at the left side panel of the meter. Press and hold down the SPEC pushbutton on the front panel for a minimum of 10 seconds. This initiates a second function of this pushbutton which provides a display screen shot capture. You will hear an audible beep from the speaker, if audio is enable and the volume sufficient. Commonly the first time you press and hold down the SPEC pushbutton you are prompted to install a storage device, meaning a USB stick. Install the USB drive or if the stick is already installed, returned to the desired measurement screen and repeat the SCREEN SHOT or SPEC pushbutton press for 10 seconds.



When the SCREEN SHOT capture is initiated you hear a beep. You hear several audible beeps form the unit speakers while the screen is being captured. Then the file name entry menu appears in which to enter a file name for the captured image.



Screen Shot captures are written to the USB memory stick and placed into a created folder called "SCREENSH." Files are saved as bit map (.bmp) files.



# SLM 1479 User Manual

## SLM 1479 SPECIFICATIONS

### STANDARDS:

TV:	ATSC 8 VSB, Analog NTSC,
CATV:	DVB-C (ETSI EN 300 429), DVB-C Annex A (J83A), DVB-C Annex B
AUDIO DECODING:	MPEG-1 Layer I / II (ISO-IEC 13818-3) Dolby Digital Plus Dolby AC-3 AAC & HE AAC
VIDEO DECODING:	MPEG-2 MP@ML HDTV (ISO-IEC 13818-2) MPEG-4/AVC (ISO-IEC 14496-10) ITU-T H.264

### DIGITAL TV & CABLE

RF input:	1- 75 $\Omega$ "F" connector (interchangeable)
Frequency range:	5 MHz to 1250 MHz
Frequency resolution:	100kHz
Modulation:	TV = 8VSB, CATV = 16QAM, 32QAM, 64QAM, 128QAM, 256QAM
Symbol rate:	2 to 6.999MS/s - Automatic selection FEC
Channel Bandwidth:	6 MHz,
Synchronization indication:	Unlock, Power Too Low, Lock
Measurement Power range:	-45 to +65 dBmV
Max input power:	+30dBm
RF power level accuracy:	0.5dB typ. (1dB max)
RF level unit:	dB $\mu$ V, dBmV, dBm selectable
Synchronization indication:	Unlock, Power Too Low, Lock
MER Range:	Up to 40 dB
MER Accuracy:	1 dB typical, 2 dB MAX
bBER before:	up to 1 x 10 <sup>-09</sup>
aBER after:	up to 1 x 10 <sup>-09</sup>
Constellation:	Constellation diagram with standard-specific grid and zoom
Custom Channel Plans:	25 (199 Ch. per plan)

### DIGITAL CATV & TV SPECIAL FUNCTIONS

AutoDiscovery	Automatic Digital Signal Type ID
Antenna Reception Peaking:	Buzz & Noise Margin Graph
Attenuation Test:	Attenuation of 3 Selected Freq. from stored reference test point
Leakage:	uV/M Signal Intensity Meter – shows leakage strength in CATV system
Leakage Frequency Range:	115-140 MHz
Resolution:	25 KHz
Ingress:	5-65 MHz Spectrum Analyzer with Peak Hold, BW is 100 KHz,
Bar Scan Test:	Multi-CH. Level via bars
Tilt Test:	Ch. 1/Ch.2 Level Ratio – BarScan Display

### ANALOG TV

Standard:	NTSC B-G-I-L-M-N
RF input:	75 $\Omega$ "F" connector
Input level range:	5 to 130 dB $\mu$ V (-50 to 70 dBmV)
Max input power:	+30 dBm
Frequency range:	TV and Radio, 5 MHz to 1250 MHz
Frequency resolution:	100 kHz
Level indications:	Level to low
Analog Measurements:	Video level, A/V ratio, S/N ratio
RF power level accuracy:	1 dB typical, (2 dB max)
Level Resolution:	0.1 dB
RF level unit:	dB $\mu$ V, dBmV, dBm selectable
S/N measurement:	up to 45 dB +/-1.5 dB Max (Waveform Monitor line select ratio calculation)
A/V ratio:	up to 22dB
A/V ratio accuracy:	1.5 dB typ. (2 dB max.)
Audio carrier FM modulation:	+ 4.5MHz,
Measure Filter Bandwidth:	100 kHz @ -3dB

***\*All Specifications are subject to change without notice***

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## OPTICAL

Input interface:	FC / ST / SC interchangeable input connectors
Wavelengths range:	WL (nm) 1310, 1490, 1550
Optical input level range:	- 25 dBm to +10 dBm
Optical level resolution:	0.1dB
Optical level accuracy:	+/- 0.5dB
Optical to RF Conversion:	Optic band to RF cable band transceiver

## SPECTRUM ANALYZER

Frequency range:	4MHz to 1,250 MHz
RF level range:	5 to 130dB $\mu$ V
Resolution Bandwidth:	TV / CATV = 100 kHz Fixed
SPAN TV/CATV:	1, 2, 5, 7, 10, 20, 50, 100, 200, 500 MHz, Full (4-1000MHz), VHF, UHF, 4-66MHz
TV & CATV:	FAST mode = 100kHz, SUPERFAST mode =50kHz
Frequency sweep:	Up to 80ms
dB/div scale selection:	1dB/div, 2dB/div, 5dB/div, 10dB/div

## SPECTRUM ANALYZER SPECIAL FUNCTIONS

Max-hold function:	Shows maximum level line and the real-time signal spectrum simultaneously
Spectrum save & recall function:	Save spectrum display to internal memory – may recall to view stored spectrums
Marker Measurements:	Single marker: Measures a marked position on spectrum Delta marker: Measures Freq. delta and power measurement delta Marker BW: 3 markers measure bandwidth, and bandwidth power
Help function:	Performs channel auto-discovery from the center signal spectrum Modulation type discovery, Symbol Rate discovery, Center frequency determined
Visualization modes:	Full Picture or Envelope, MENU Selectable
Trace color schemes Customizable:	GREEN BLUE GREY BROWN configuration menu selection

## MPEG Service List Function

Network/Program (Bouquet) ID:	Service Names Listed
Modulation Parameters ID:	Modulation Type Shown
Service Encryption Detection:	Yes/No Indicator
Encryption/CA System ID:	Type Listed
Bouquet/Network Service List:	A/V PID List
MPEG 2/4 Demodulator:	Video Program Displayed (Free to air)
LCN:	Detected/Listed

## Data Storing & Logging

Automemory:	Auto Scan detect - store channels creating AUTO tuning plan
Manumemory:	Creates mixed channel/transponder tuning plan for TV-CATV-RADIO
Datalogger:	Auto measure a channel plan and store measurement data
Data Logger Capacity:	Store up to 1300 channels
Data export:	USB-to connect an external USB device 10/100 Base-T LAN to download data on an external PC
Memory Plans:	99 with 199 transponders per plan
Logger Plans:	99 logger plans

## Input Output Interfaces

Universal Serial Bus (USB):	1x USB-A, USB On-The-Go for USB memory stick 1x USB-B for PC connection
Local Area Network (LAN):	1x 10/100 Base-T Ethernet interface (management)
Video In:	RCA Phono – Composite Video input
USB Port A:	USB 2.0 A type connector - memory stick use
USB Port B:	USB 2.0 B type connector - PC interface
USB B Interface:	SMART Management Software – FW updates, File Export, Create/Edit Ch. plans
Ethernet: (option pending)	Instrument remote measurement application via SNMP

***\*All Specifications are subject to change without notice***

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## *DOCSIS Downstream Upstream Generator Measurements*

DOCSIS:	3.0 Compliant Modem
Frequency Band:	5-1250 MHz
Input Impedance:	75Ω
Range:	-45 to +65 dBmV
Measurements Include:	Level, MER, Pre/Post BER, Lost Packet, Transmit, Power, Transmitted Packets, Receive Packets, PER, Latency Min/ Max Avg. Channel Bonding, Upstream Level and IP Status
MAC Address:	Default or user defined
Tone Generator Frequency:	5-65 MHz
Modulation:	QPSK, QAM, 8,16,32,64
Typical Range:	8 to 53 dBmV (1 dB typ., 2 dB max.)
Channel Bonding:	Up to 4 upstream & 8 downstream bonded channels,
Upstream Scan Spectrum	RF IN spectrum analysis form 5-65 MHz

## *Other Specifications*

TFT Display:	TFT LCD
Display Resolution:	7"- high brightness backlit display 16:10
Resolution:	480 x 800 pixels
Graphical User Interface:	Selectable color themes (green, blue, grey, brown)
Operation:	(Dual command - TOUCH and/or MECHANICAL)
Control/Pushbuttons:	24 step encoder, 8 button mechanical switch panel
Operating temperature range:	0° C to +50° C
Storage temperature range:	-25° C to 70° C
Humidity:	Up to 90% non condensing
AMSL:	Up to 3.000 m
External power adapter - Input:	110 VAC to 240 VAC- 50 Hz to 60 Hz
Power Supply Output:	12 VDC - max 3A
Internal Battery:	LI-ion Polymer,
Energy saving: Battery saving function:	Meter auto-off timer: OFF, 5 min, 10 min
Battery Reconditioning:	Built-in Test & Recovery Algorithm
Battery Operation Time:	4 Hrs. Typical Use
Dimensions W x H x D:	H 140 x W 240 x D 50 mm (meter only)
Weight:	Unit only 1,6 kg,
PC Interface:	USB
PC Management Software:	SMART software firmware updates, edit channel plans, logs

## *SUPPLIED ACCESSORIES:*

Soft protection bag  
AC power adapter 110/270 V to dc 12V 3A  
Spare double "F" Female connector  
USB 2.0 Cable  
Leakage Antenna

*\*All Specifications are subject to change without notice*

## APPENDIX A – NORTH AMERICA CHANNEL PLANS

### Channel Plans

Cable Channel Frequency Plans on FCC Digital, FCC, HRC, IRC, 50-870 Mhz

Based on Joint EIA/NCTA Engineering Committee approval (EIA IS-6 Interim Standard). Frequencies include Aeronautical FCC designated Offset Frequencies (Designated by an \*). HRC carriers are computed with a 6.000300 MHz +/- 1 Hz Comb Generator accuracy. VHF and UHF channels are per the FCC designations.

Sub-Band VHF Cable TV Channels, 5-50 Mhz

Channel #	FCC– DIG.	FCC	HRC	IRC	VHF/UHF
T-7	7.00	---	---	---	---
T-8	13.00	---	---	---	---
T-9	19.00	---	---	---	---
T-10	25.00	---	---	---	---
T-11	31.00	---	---	---	---
T-12	37.00	---	---	---	---
T13	43.00	---	---	---	---

Low-High VHF EIA/NCTA TV Channels

Channel #	FCC Digital	FCC Ana.	HRC	IRC	VHF/UHF
1	-----	-----	72.0036	73.2500	-----
2	57.00	55.25	54.0027	55.2500	57.00
3	63.00	61.25	60.0030	61.2500	63.00
4	69.00	67.25	66.0033	67.2500	69.00
5	79.00	77.25	78.0039	79.2500	79.00
6	85.00	83.25	84.0042	85.2500	85.00
7	177.00	175.25	174.0080	175.2500	177.00
8	183.00	181.25	180.0090	181.2500	183.00
9	189.00	187.25	186.0093	187.2500	189.00
10	195.00	193.25	192.0096	193.2500	195.00

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11	201.00	199.25	198.0099	199.2500	201.00
12	207.00	205.25	204.0102	205.2500	207.00
13	213.00	211.25	210.0105	211.2500	213.00

### CHANNEL PLANS

Mid-band Cable Channels and UHF Broadcast Channels 120-170 Mhz.

Channel #	FCC Digital	FCC	HRC	IRC	VHF/UHF
14	123.00	*121.2625	120.0060	*121.2625	473.00
15	129.00	*127.2625	126.0063	*127.2625	479.00
16	135.00	*133.2625	132.0066	*133.2625	485.00
17	141.00	139.2500	138.0069	139.2500	491.00
18	147.00	145.2500	144.0072	145.2500	497.00
19	152.00	151.2500	150.0075	151.2500	503.00
20	159.00	157.2500	156.0078	157.2500	509.00
21	165.00	163.2500	162.0081	163.2500	515.00
22	171.00	169.2500	168.0084	169.2500	521.00

Aeronautical Offset Freq. Allocation

Super-band Cable TV Channels and UHF Broadcast Channels

Channel #	FCC Digital	FCC	HRC	IRC	VHF/UHF
23	219.00	217.2500	216.0108	217.2500	527.00
24	225.00	223.2500	222.0111	223.2500	533.00
25	231.000	*229.2625	228.0114	*229.2625	539.00
26	237.00	*235.2625	234.0117	*235.2625	545.00
27	243.00	*241.2625	240.0120	*241.2625	551.00
28	249.00	*247.2625	246.0123	*247.2625	557.00
29	255.00	*253.2625	252.0126	*253.2625	563.00
30	261.00	*259.2625	258.0129	*259.2625	569.00
31	267.00	*265.2625	264.0132	*265.2625	575.00
32	273.00	*271.2625	270.0135	*271.2625	581.00
33	279.00	*277.2625	276.0138	*277.2625	587.00

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34	285.00	*283.2625	282.0141	*283.2625	593.00
35	291.00	*289.2625	288.0144	*289.2625	599.00
36	297.00	*295.2625	294.0147	*295.2625	605.00

Aeronautical Offset Freq. Allocation

Hyper-band Cable Channels and UHF Broadcast Channels 37-74

Channel #	FCC Digital	FCC	HRC	IRC	VHF/UHF
37	303.00	*301.2625	300.0150	*301.2625	611.00
38	309.00	*307.2625	306.015	*307.2625	617.00
39	315.00	*313.2625	312.0156	*313.2625	623.00
40	321.00	*319.2625	318.0159	*319.2625	629.00
41	327.00	*325.2625	324.0162	*325.2625	635.00
42	333.00	*331.2750 (+25k)	330.0165	*331.2750 (+25k)	641.00
43	339.00	*337.2625	336.0168	*337.2625	647.00
44	345.00	*343.2625	342.0171	*343.2625	653.00
45	351.00	*349.2625	348.0174	*349.2625	659.00
46	357.00	*355.2625	354.0177	*355.2625	665.00
47	363.00	*361.2625	360.0180	*363.2625	671.00
48	369.00	*367.2625	366.0183	*367.2625	677.00
49	375.00	*373.2625	372.0186	*373.2625	683.00
50	381.00	*379.2625	378.0189	*379.2625	689.00
51	387.00	*385.2625	384.0192	*385.2625	695.00
52	393.00	*391.2625	390.0195	*391.2625	701.00
53	399.00	*397.2625	396.0198	*397.2625	707.00
54	405.00	403.25	402.0201	403.2500	713.00
55	411.00	409.25	408.0204	409.2500	719.00
56	417.00	415.25	414.0207	415.2500	725.00
57	423.00	421.25	420.0210	421.2500	731.00
58	429.00	427.25	426.0213	427.2500	737.00
59	435.00	433.25	432.0216	433.2500	743.00
60	441.00	439.25	438.0219	439.2500	749.00

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61	447.00	445.25	444.0222	445.2500	755.00
62	453.00	451.25	450.0225	451.2500	761.00
63	450.00	457.25	456.0228	457.2500	767.00
64	465.00	463.25	462.0231	463.2500	773.00
65	471.00	469.25	468.0234	469.2500	779.00
66	477.00	475.25	474.0237	475.2500	785.00
67	483.00	481.25	480.0240	481.2500	791.00
68	489.00	487.25	486.0243	487.2500	797.00
69	495.00	493.25	492.0246	493.2500	803.00
70	501.00	499.25	498.0249	499.2500	-----
71	507.00	505.25	504.0252	505.2500	-----
72	513.00	511.25	510.0255	511.2500	-----
73	519.00	517.25	516.0258	517.2500	-----
74	525.00	523.25	522.0261	523.2500	-----

### Cable Channels 75-99

Channel #	FCC Digital	FCC	HRC	IRC	VHF/UHF
75	531.00	529.25	528.0264	529.2500	---
76	537.00	535.25	534.0267	535.2500	---
77	543.00	541.25	540.0270	541.2500	---
78	549.00	547.25	546.0273	547.2500	---
79	555.00	553.25	552.0276	553.2500	---
80	561.00	559.25	558.0279	559.2500	---
81	567.00	565.26	564.0282	565.2500	---
82	573.00	571.25	570.0285	571.2500	---
83	579.00	577.25	576.0288	577.2500	---
84	585.00	583.25	582.0291	583.2500	---
85	591.00	589.25	588.0294	589.2500	---
86	597.00	595.25	594.0297	595.2500	---
87	603.00	601.25	600.0300	601.2500	---

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88	609.00	607.25	606.0303	607.2500	---
89	615.00	613.25	612.0306	613.2500	---
90	621.00	619.25	618.0309	619.2500	---
91	627.00	625.25	624.0312	625.2500	---
92	633.00	631.25	630.0315	631.2500	---
93	639.00	637.25	636.0318	637.2500	---
94	645.00	643.25	642.0321	643.2500	---

Aeronautical Offset Freq. Allocation

### FM Mid-band Cable Channels

Channel #	FCC Digital	FCC	HRC	IRC	VHF/UHF
95	93.00	91.25	90.0045	91.2500	-----
96	99.00	97.25	96.0048	97.2500	-----
97	105.00	103.25	102.0051	103.2500	-----
98	111.00	*109.2750(+25k)	108.0054	109.2750	-----
99	117.00	*115.2750(+25k)	114.0057	115.2750	-----

Cable Channels 100-136

Channel #	FCC Digital	FCC	HRC	IRC	VHF/UHF
100	651.00	649.25	648.0324	649.25	---
101	657.00	655.25	654.0327	655.25	---
102	663.00	661.25	660.0330	661.25	---
103	669.00	667.25	666.0333	667.25	---
104	675.00	673.25	672.0336	673.25	---
105	681.00	679.25	678.0339	679.25	---
106	687.00	685.25	684.0342	685.25	---
107	693.00	691.25	690.0345	691.25	---
108	699.00	697.25	696.0348	697.25	---
109	705.00	703.25	702.0351	703.25	---
110	711.00	709.25	708.0354	709.25	---
111	717.00	715.25	714.0357	715.25	---
112	723.00	721.25	720.0360	721.25	---

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113	729.00	727.25	726.0363	727.25	---
114	735.00	733.25	732.0366	733.25	---
115	741.00	739.25	738.0369	739.25	---
116	747.00	745.25	744.0372	745.25	---
117	753.00	751.25	750.0375	751.25	---
118	759.00	757.25	756.0378	757.25	---
119	765.00	763.25	762.0381	763.25	---
120	771.00	769.25	768.0384	769.25	---
121	777.00	775.25	774.0387	775.25	---
122	783.00	781.25	780.0390	781.25	---
123	789.00	787.25	786.0393	787.25	---
124	795.00	793.25	792.0396	793.25	---
125	801.00	799.25	798.0399	799.25	---
126	807.00	805.25	804.0402	805.25	---
127	812.00	811.25	810.0405	811.25	---
128	819.00	817.25	816.0408	817.25	---
129	825.00	823.25	822.0411	823.25	---
130	831.00	829.25	828.0414	829.25	---
131	837.00	835.25	834.0417	835.25	---
132	843.00	841.25	840.0420	841.25	---
133	849.00	847.25	846.0432	847.25	---
134	855.00	853.25	852.0426	853.25	---
135	861.00	859.25	858.0429	859.25	---
136	867.00	865.25	864.0432	865.25	---

### Cable Channels 137-158

Channel #	FCC Digital	FCC	HRC	IRC	VHF/UHF
137	873.00	871.25	870.0435	871.25	---

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138	879.00	877.25	876.0438	877.25	---
139	885.00	883.25	882.0441	883.25	---
140	891.00	889.25	880.0444	889.25	---
141	897.00	895.25	894.0447	895.25	---
142	903.00	901.25	900.045	901.25	---
143	909.00	907.25	906.0453	907.25	---
144	915.00	913.25	912.0456	913.25	---
145	921.00	919.25	918.0459	919.25	---
146	927.00	925.25	924.0462	925.25	---
147	933.00	931.25	930.0465	931.25	---
148	939.00	937.25	936.0468	937.25	---
149	945.00	943.25	942.0471	943.25	---
150	951.00	949.25	948.0474	949.25	---
151	957.00	955.25	954.0477	955.25	---
152	963.00	961.25	960.048	961.25	---
153	969.00	967.25	966.0483	967.25	---
154	975.00	973.25	972.0486	973.25	---
155	981.00	979.25	978.0489	979.25	---
156	987.00	985.25	984.0492	985.25	---
157	993.00	991.25	990.0495	991.25	---
158	999.00	997.25	996.0498	997.25	---
159	1005.00				
160	1011.00				
161	1017.00				
162	1023.00				
163	1029.00				
164	1035.00				
165	1041.00				
166	1047.00				
167	1053.00				
168	1059.00				

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169	1065.00				
170	1071.00				
171	1077.00				
172	1083.00				
173	1089.00				
174	1095.00				
175	1101.00				
176	1107.00				
177	1113.00				
178	1119.00				
179	1125.00				
180	1131.00				
181	1137.00				
182	1143.00				
183	1149.00				
184	1155.00				
186	1161.00				
187	1167.00				
188	1173.00				
189	1179.00				
190	1185.00				
191	1191.00				
192	1197.00				
193	1203.00				
194	1209.00				
195	1215.00				
196	1221.00				
197	1227.00				
198	1233.00				
199	1239.00				
200	1245.00				

Channel 159 to 200 FCC Digital Channels interpolated from existing standards

## Appendix B – Cleaning/Maintenance Information

### CLEANING THE METER

Cleaning the meter from dust and dirt helps maintain the touch screen and other components through the years. Cleaning is simple and requires little attention. Never use chemical aggressive products and/or abrasive or rough clothes as they will scratch the surface material over the display and may damage other components. Always use a soft clean cloth, dampened with warm water or an alcohol solution. You may use a degreasing agent but not abrasive liquid soap. Keyboard and display components should be gently cleaned. Rubbing the keyboard and/or the display(s) may scratch or damage their functions.

### MAINTENANCE AND CARE OF THE METER

The Sencore SLM 1479 touch meter has been designed to withstand the rigorous conditions of field use. However, its appearance and useful life may be prolonged by following some simple and effective guidelines.

- The meter's touch screen protective film, although durable, is subject to scratching by continual touches with dirt or sand particles embedded into fingers or gloves. Clean fingers or gloves can reduce scratching and the protective film wear. Use of the supply stylus is advisable in situations where dirty hands and/or gloves are unavoidable.
- The meter's larger touch screen may be damaged by blunt force with a solid pointed object. Use caution to NOT expose to these conditions or potential mishaps. Use the neck or shoulder strap to minimize the chance of dropping the meter. Put the case cover over the front of the meter when in transport.
- The meter has **NOT** been designed to withstand high temperatures (over 60°C or 130° F). Those temperatures can be reached when the meter is left in a vehicle, especially behind the windshield, in an enclosed vehicle in direct sunlight, or in the isolation of the trunk. The LCD display and/or other components will be damaged by the extreme temperature.
- The internal battery rapidly loses its efficiency if exposed to high or low temperatures. This results in reduced meter use time when powered by the internal battery.
- When recharging the internal battery, always allow a good air circulation around the meter and the power adapter.
- The meter is well protected against incidental water drops but is NOT waterproof. In case of contact with water, allow the meter to dry thoroughly before trying to turn it on. Do not use a hairdryer or other strong heating sources in an attempt to dry as damage may easily occur.

## APPENDIX C - WARRANTY/SERVICE INFORMATION

Your SLM 1479 has been built to the highest quality standards in the industry. Details of this warranty are covered in a separate document shipped with your instrument.

### SERVICE INFORMATION

The Sencore Factory Service Department provides all “in and out of warranty” service and complete calibration services for all Sencore instruments. No local service centers are authorized to repair Sencore instruments. Factory service insures you the highest quality work, the latest circuit improvements, factory parts and the fastest turnaround time possible. Most service repairs are completed within 72 hours of their receipt.

### RETURNING SLM 1479 FOR SERVICE

Save the original packing materials for reuse should you ever need to ship your SLM 1479 to the Sencore Factory Service Department for repair or re-calibration. If the original packing material is not available, please follow the following procedure steps 1 thru 7.

1. Use a corrugated shipping container that has a sufficient strength 10-20lbs.
2. Pack the unit inside a plastic bag to protect it.
3. Cushion the unit with a minimum of 3 inches of padding on each side of the instrument, more as required to completely fill the shipping carton. Pack the carton tightly enough to prevent the unit from shifting during shipment.
4. Seal all seams in the container with durable shipping tape.
5. Be sure to enclose the following information: Owner's Name, Owner's Address (ship to), Billing Information, Purchase Order (if required), Contact Name and Phone Number, Service Desired or Problem.
6. A Return Authorization Number is required. Please go to the SENCORE web site at [www.sencore.com](http://www.sencore.com) and click on the SUPPORT heading on the home page. Within the ProCare Support section click on the Service and Repair field. A Service and Repair form is presented. Please fill out the form and click on the SUBMIT at the bottom. You will receive a return email with an RMA number and return instructions.

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7. Ship the packaged unit to the address listed below.

Sencore Factory Service  
3200 Sencore Drive  
Sioux Falls, SD 57107