July 2021

VIAVI Solutions

OneExpert CATV 630

Extended Quick Start Guide v 5.5

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Support Links

Viavi Customer Care:

For questions about warranty information, repair and calibration, Return Material Authorization (RMA) request, services quotation, order status.

T: 1-844 GO VIAVI (+1-844-468-4284)

E: NAM.CustomerCare@viavisolutions.com

https://www.viavisolutions.com/en-us/services-and-support/support-center/customer-care

Customer Care Portal Login

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RMA Request Form:

http://www.viavisolutions.com/en-us/services-and-support/return-material-authorization-rma-request

Viavi Technical Support:

Will assist you in using/configuring products or address issues regarding product performance.

T: +1-844 GO VIAVI (+1-844-468-4284)

E: catvsupport@viavisolutions.com

For access to online technical and product support:

http://support.viavisolutions.com

Quick Tip Videos:

https://www.viavisolutions.com/en-us/support/quick-references/quick-tip-videos

Product Focused YouTube Channel:

ViaviSolutions CIVT

Interactive ONX Videos

https://xpertinstruction.com

OneExpert CATV Overview

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OneExpert CATV Overview

OneExpert CATV Interfaces

D-Ring

Dual 10/100/1000 RJ45 Ports

Dual USB 2.0 Ports

D-Ring

Battery Charger – Under Flap

Port 2 – RF Ingress Port Upstream Ingress and TDR

Port 1 – RF US/DS Analysis DOCSIS, QAM

OneExpert CATV Controls

AC CHARGER PORT

- **SOLID GREEN** indicates that charging is complete.
- **SLOW FLASHING RED** indicates that the battery charge is critically low, and less than 10%
- **FAST FLASHING RED** indicates that the charging was suspended due to a fault and user intervention is necessary (for example, an incorrect charger is attached)
- **SOLID RED** indicates that the charging was suspended due to overheating
- **SOLID AMBER** indicates that the battery is charging

NETWORK INDICATOR and BATTERY LEDs

LCD Screen

SHORTCUT/SOFT KEYS

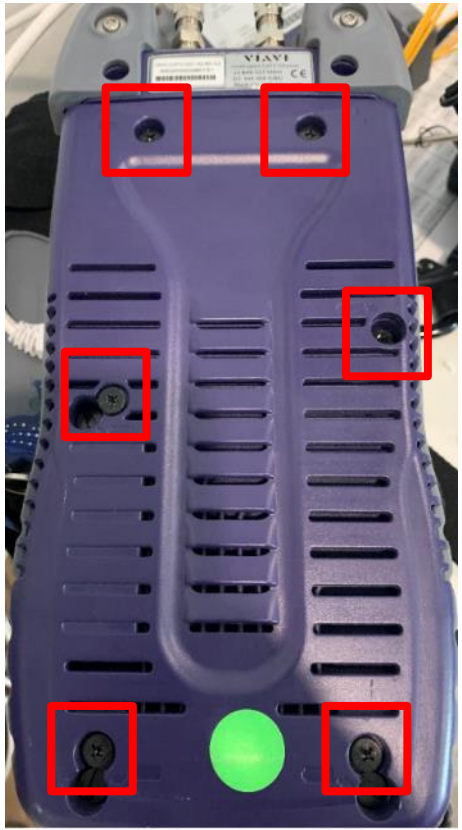
DIRECTIONAL Pad

BACK, HOME and UTILITY Buttons

POWER O/I Button

Battery Replacement

Removing and Replacing Battery



Remove OneExpert CATV cloth case and locate the 6 flat-head screws marked with the battery icon

Loosen each screw with a standard slotted screwdriver until they disengage from the MAINFRAME portion of the unit

Note that these 6 screws are designed to remain captive with the MODULE.

Removing the Module will expose a backplane connector that extends from the Mainframe. There is risk of damaging this backplane connector if the unit is pulled apart without exercising the proper caution.

A single screw hold the battery compartment lid in place

Removing and Replacing Battery

RF Barrel and Collar Replacement

OneExpert CATV RF Ports F-81 Adapter Barrel Style Connector

The ONX-CATV has two RF ports with field replaceable barrel style connectors. The ONX ships with two F- 81 splice style adapters rated to 3 GHz. These F-81 adapters are 1.2 in (307mm) long with a 0.5 in (132mm) distance between either end and the tightening nut. They are shipped installed into the RF ports to the recommended torque specification of 20 in-lbs. (1.6 ft-lbs.).

After some use these F-81 adapters may need to be replaced. When replacing these adapters, an F-81 adapter with similar dimensions and specifications is recommended.

Reason for RF Port Aluminum Collars and F-81 Considerations

Since early 2017 all ONX models are built with aluminum collars around the RF port F-81 barrel-connectors. These collars were added to provide additional mechanical protection from lateral forces which could break the F connector and/or the RF port on the ONX. These collars work by reinforcing the base of the connector and help distribute forces over a bigger area. The height of the collar accommodates the F-81 barrel-connector that was originally shipped with the ONX, but has some margin to accommodate other, similarly sized and rated, F-81 barrel-connectors.

It is important to ensure that ONX RF port F-81 barrel-connector replacements have enough length to pass through the aluminum collar and screw in far enough to close any gaps. Seating the connector properly into the ONX RF port prevents off-air signals from leaking around the F-81 barrel-connector. Also, the F-81 barrel-connector used should not be so long that when tightened it leaves a loose collar. The reinforcing strength provided by the collar requires the collar to be firmly held in place by the F-81 barrel-connector inserted into the ONX's RF ports. A loose collar will not properly strengthen the F-81 barrel-connector, making it more susceptible to breaking when stressed.

ONX-CATV's RF port aluminum collars

RF ports with collars between the F-81 barrel-connectors and ONX body

Replacing the F Connector

F-81 barrel-connectors come in many different forms based on their intended application. The ONX uses an F-81 splice style F connector, like the one shown here on the far-left. It is recommended that replacement F connectors be of similar length to minimize any negative impacts.

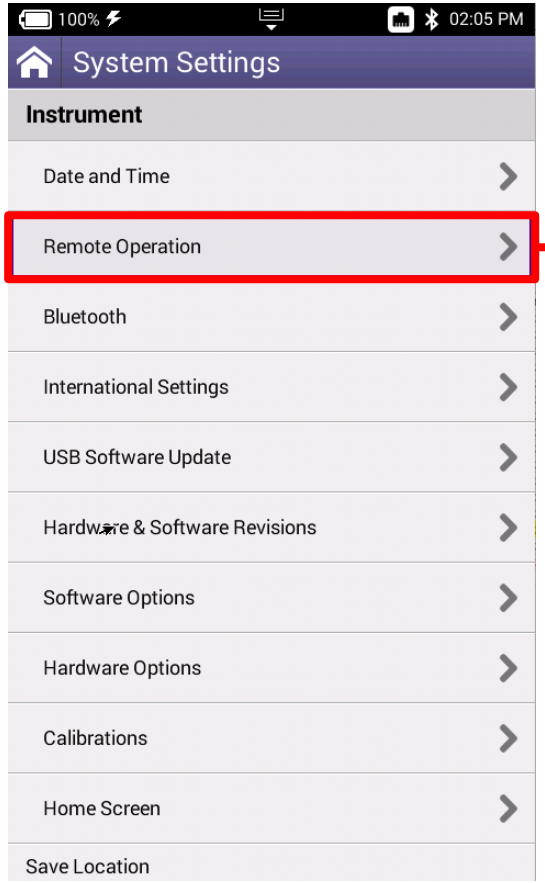
Start by removing the current F-81 adapter and collar (if present). If needed use a 7/16 wrench, turn the F connector counterclockwise until the adapter is completely out of the ONX RF port. Retain the collars if not replacing them with new ones.

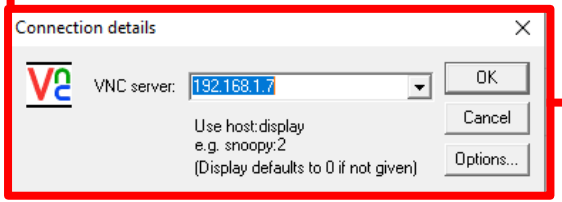
Place the new F-81 adapter through the collar and screw the adapter into the ONX RF Port by turning clockwise. Make sure the collar is between the ONX and the F connector nut, as shown in the picture below. Tightening the F-81 adapter into the RF port to the torque specification of 20 in-lbs. (1.6 ft-lbs.) is recommended, which is about hand tight plus another quarter turn.

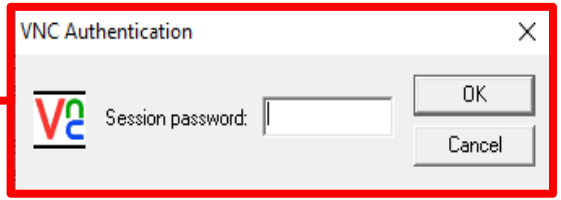
WARNING: Do NOT overtighten the F-81 adapter into the ONX's RF port, this can lead to permanently broken RF ports. Also, it is not recommended to use power tools when removing or replacing the F-81 adapters.

Remote Access

Remote Access



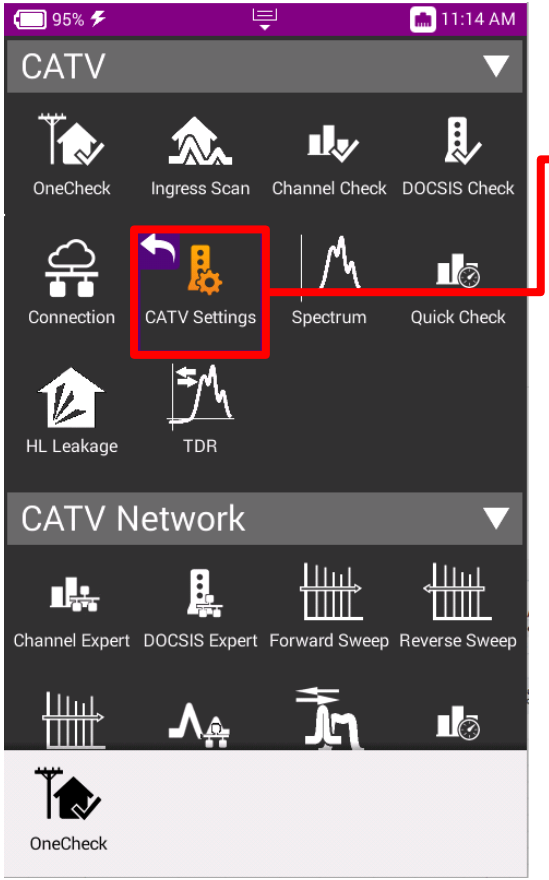


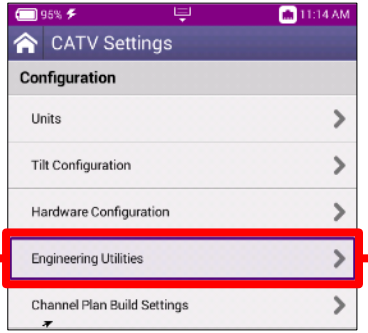


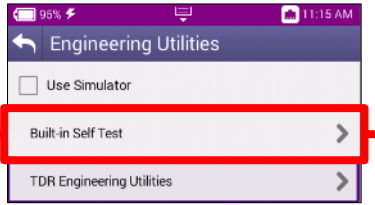
Engineering Mode

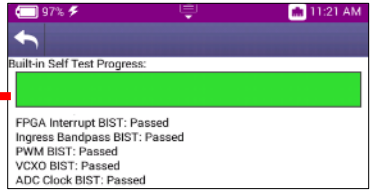
Engineering Mode

Hold UTILITY KEY simultaneously during POWER button press. Continue to hold UTILITY KEY until LEDs flash ORANGE, then release UTILITY KEY







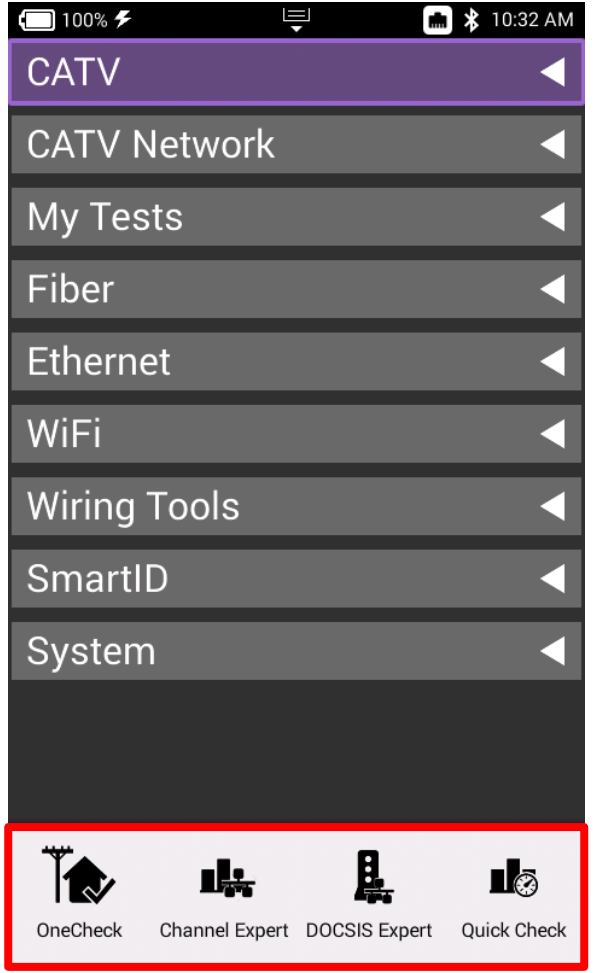


Home Screen

Home Screen

HOME is the default screen when OneExpert CATV is powered on

- It can be reached by selecting the **HOME** screen button above the On/Off Button
- Back Button from any test also returns the user to the **HOME** screen

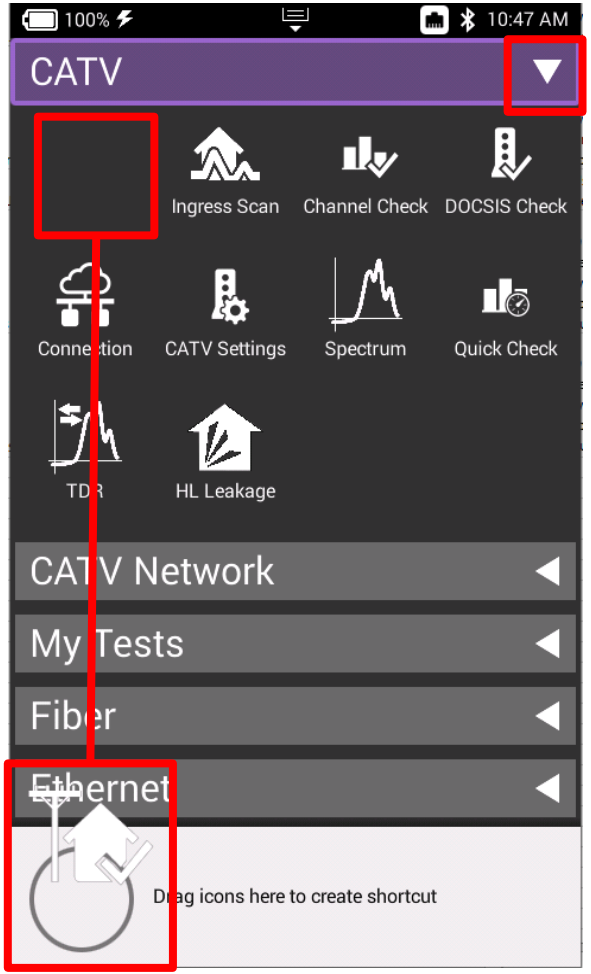


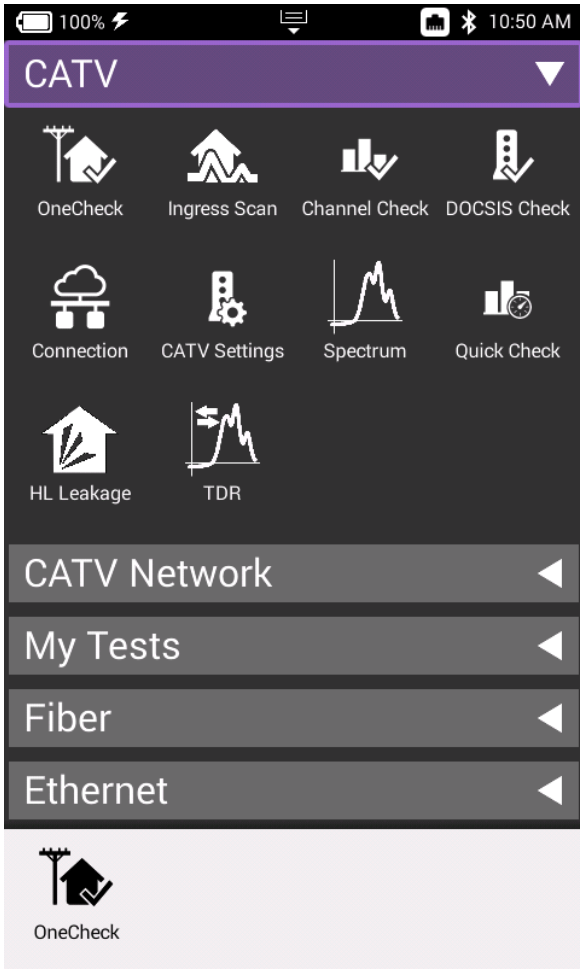
Home Screen

SHORTCUTS can be created by touching and holding a desired function icon and then dragging it to the bottom of the screen

TEST FUNCTION ICONS can also be rearranged like a mobile device

Each **MENU** option is labeled and can be opened or collapsed by the triangle buttons to the right





Utility Menu

Utility Menu

SAVE REPORT – Saves the results to a report. Formats available: XML, PDF, or HTML

VIEW REPORTS – Views a saved report

SCREENSHOT – Takes a screen capture of the current screen

NETWORK – Enables or disables the Ethernet network functions

BLUETOOTH – Enables or disables Bluetooth

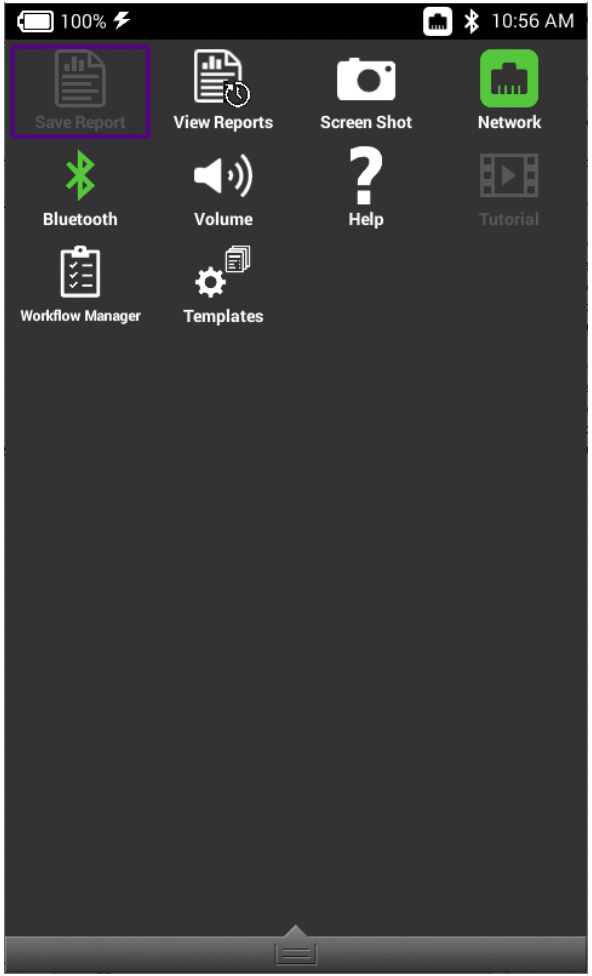
VOLUME – Control the device volume

HELP – Provides TAC phone numbers

TUTORIAL – Future enhancement to delivery video tutorials to the OneExpert CATV

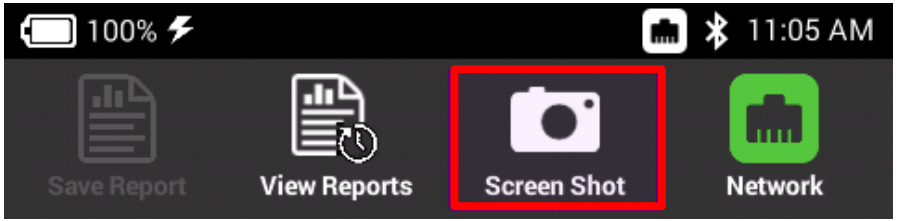
WORKFLOW MANAGER - Future enhancement

TEMPLATES – Use to switch between multiple templates and configurations

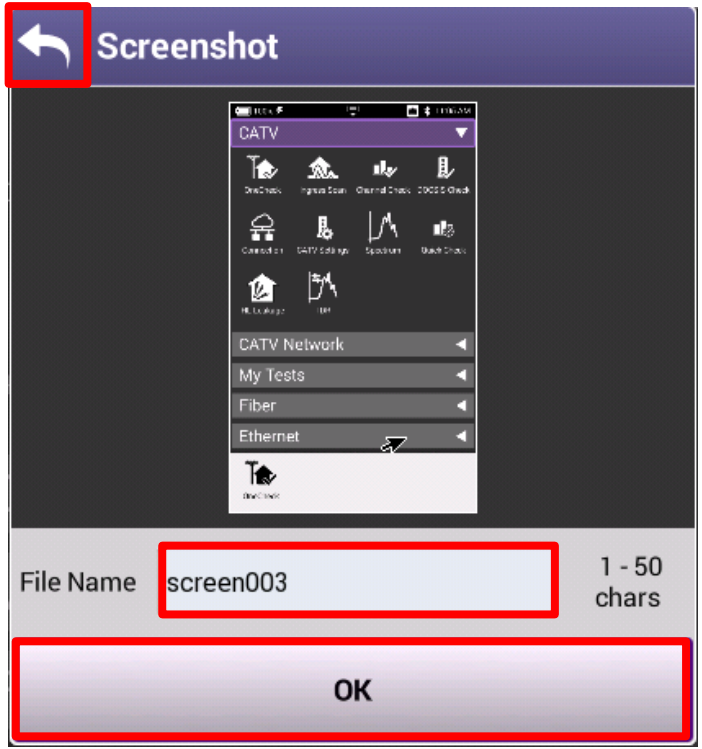


Utility Menu – Screenshot Creation

Select SCREENSHOT from the UTILITY menu, a prompt to save the screenshot will appear



A long push on UTILITY menu key will also automatically start a screen capture



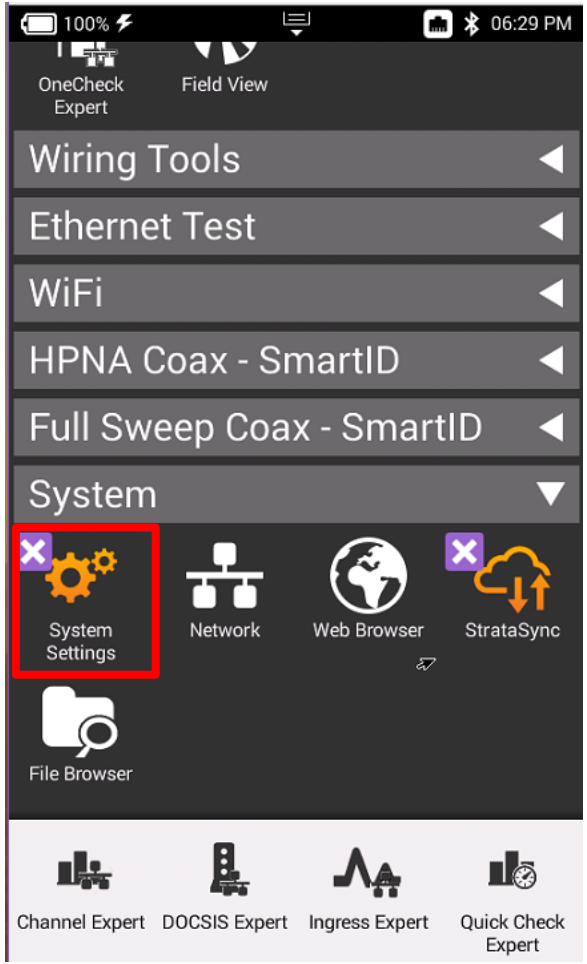
System Settings

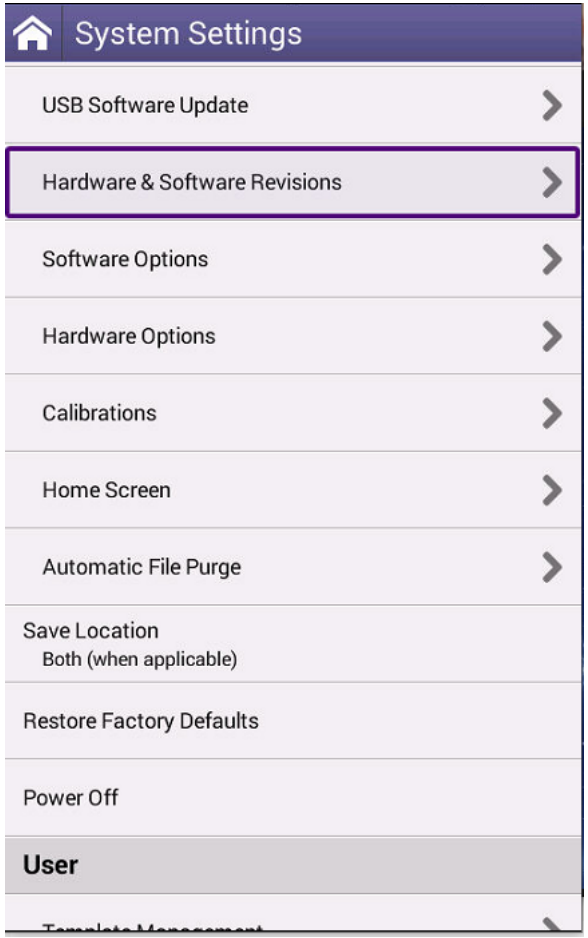
System Settings

Navigate from the HOME Screen down to the bottom, using the D PAD or swiping with a finger

Select SYSTEM SETTINGS

From SYSTEM SETTINGS, the user can set up the meter a variety of ways

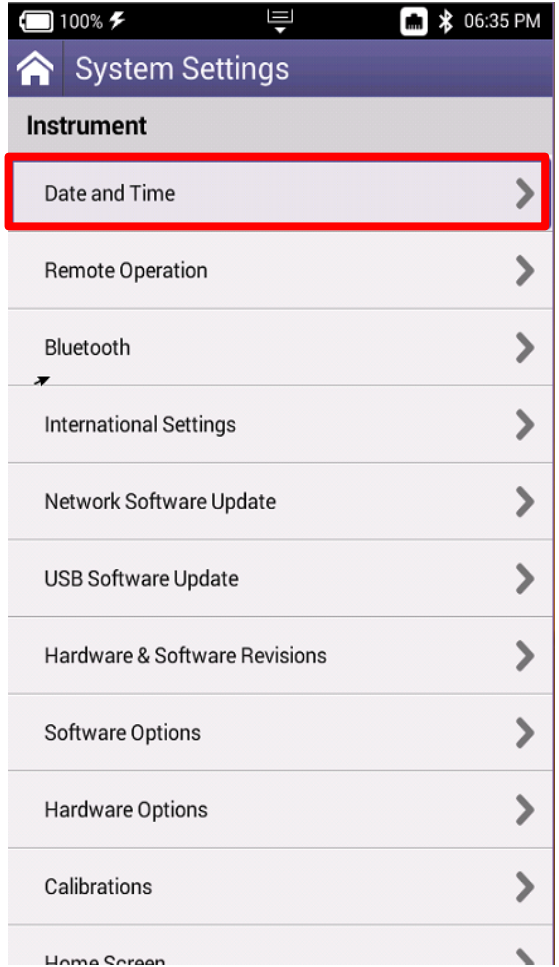


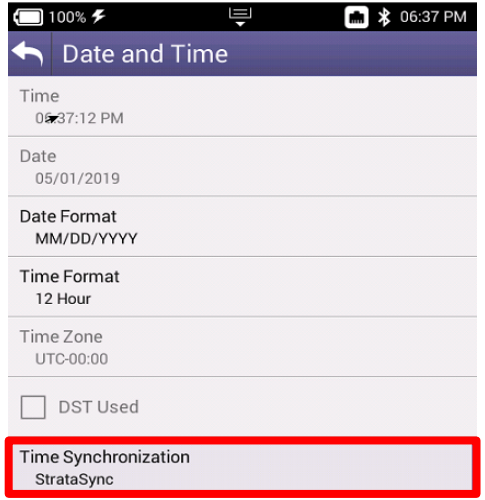


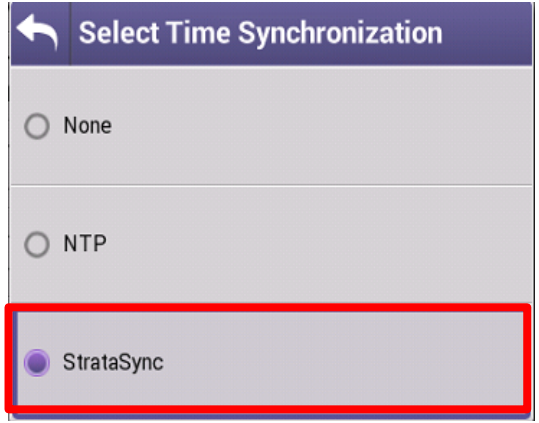
Date and Time

Select DATE AND TIME and make sure that TIME SYNCHRONIZATION is set to STRATASYNC

This is important because test data will be time stamped



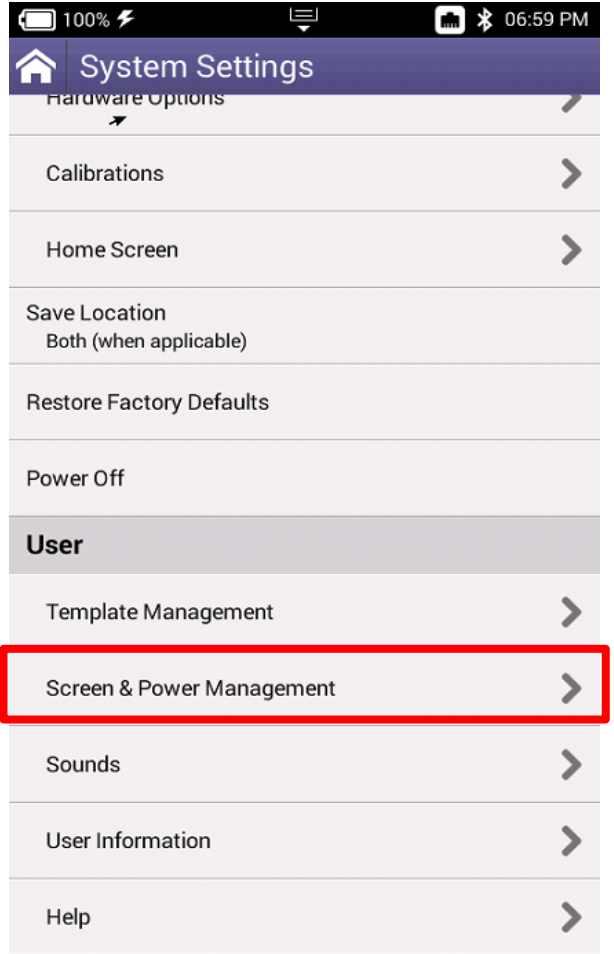


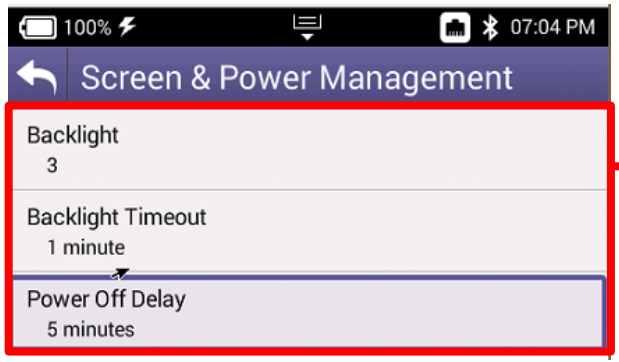


Screen and Power Management

Select SCREEN AND POWER MANAGEMENT to better conserve the ONX battery life

Recommended values are shown to the right. However, if POWER OFF DELAY needs to be set higher in order to accommodate technician's pace, select appropriate time

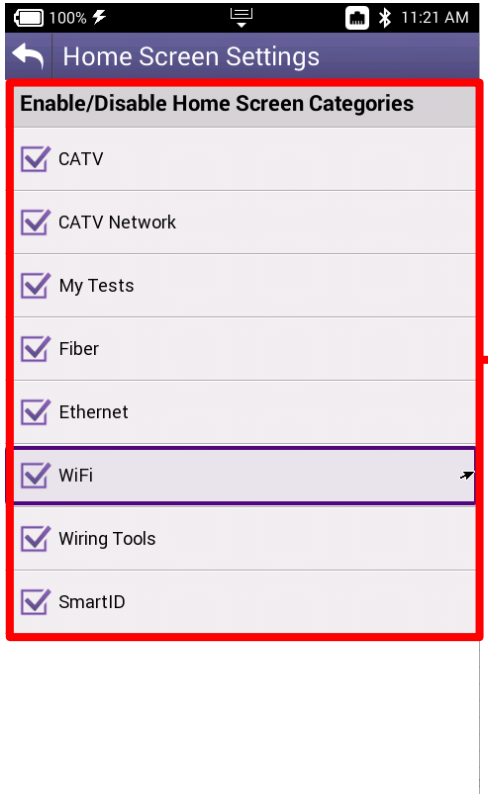


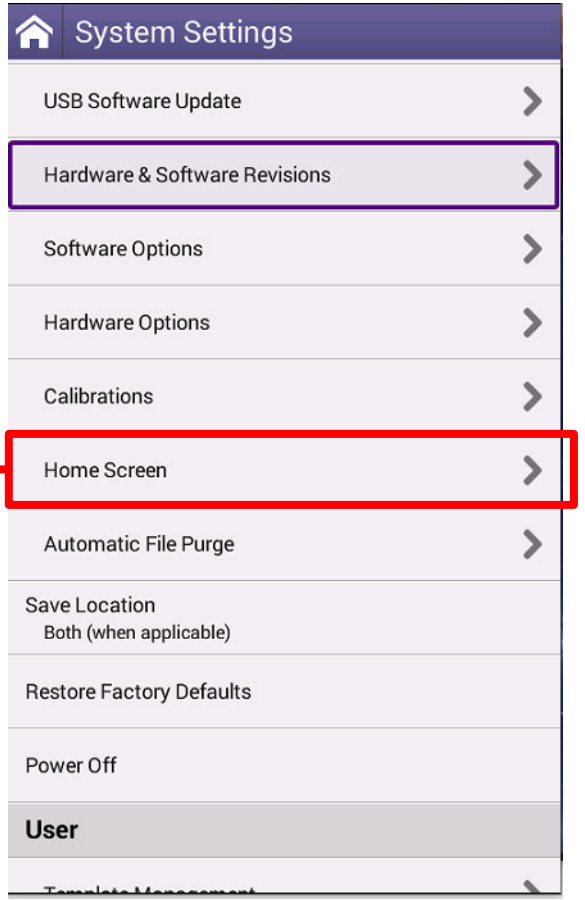


Customizing the Home Screen

Select HOME SCREEN to customize which measurement bundles are available on the HOME screen of the OneExpert CATV

Technicians are invited to customize as needed

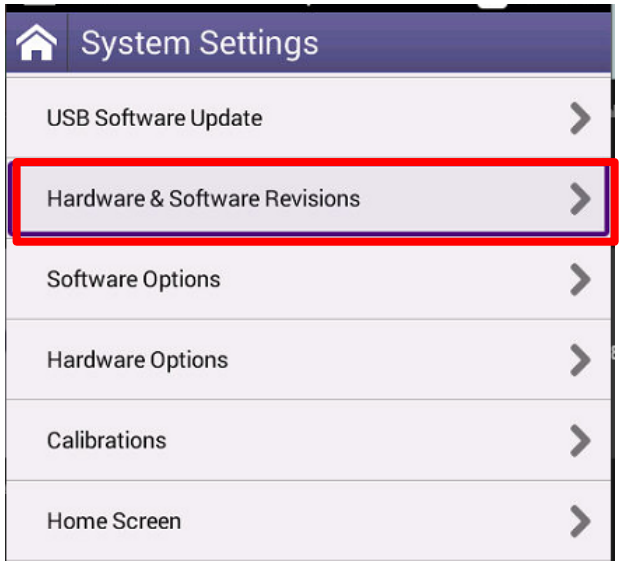


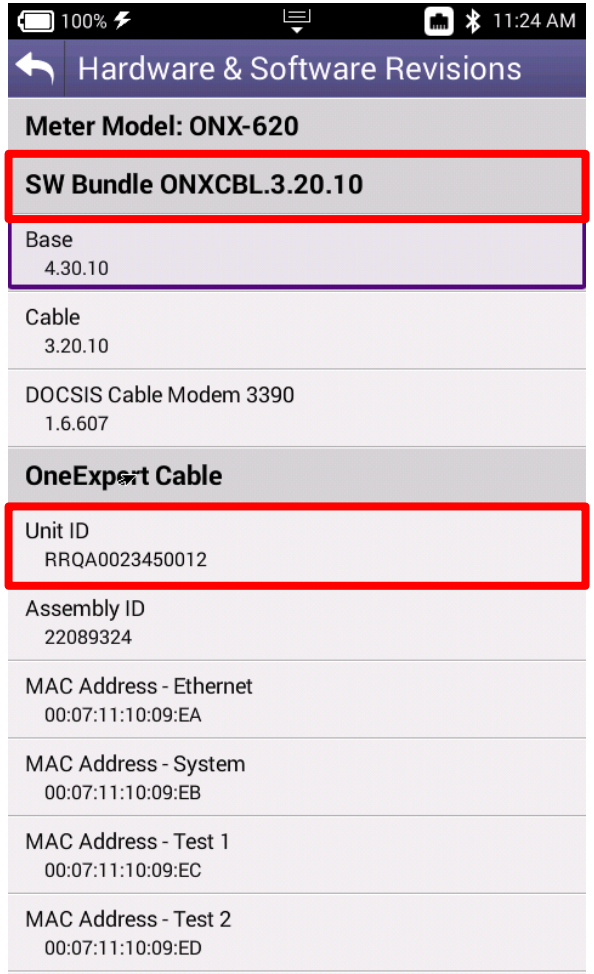


Hardware and Software Revisions

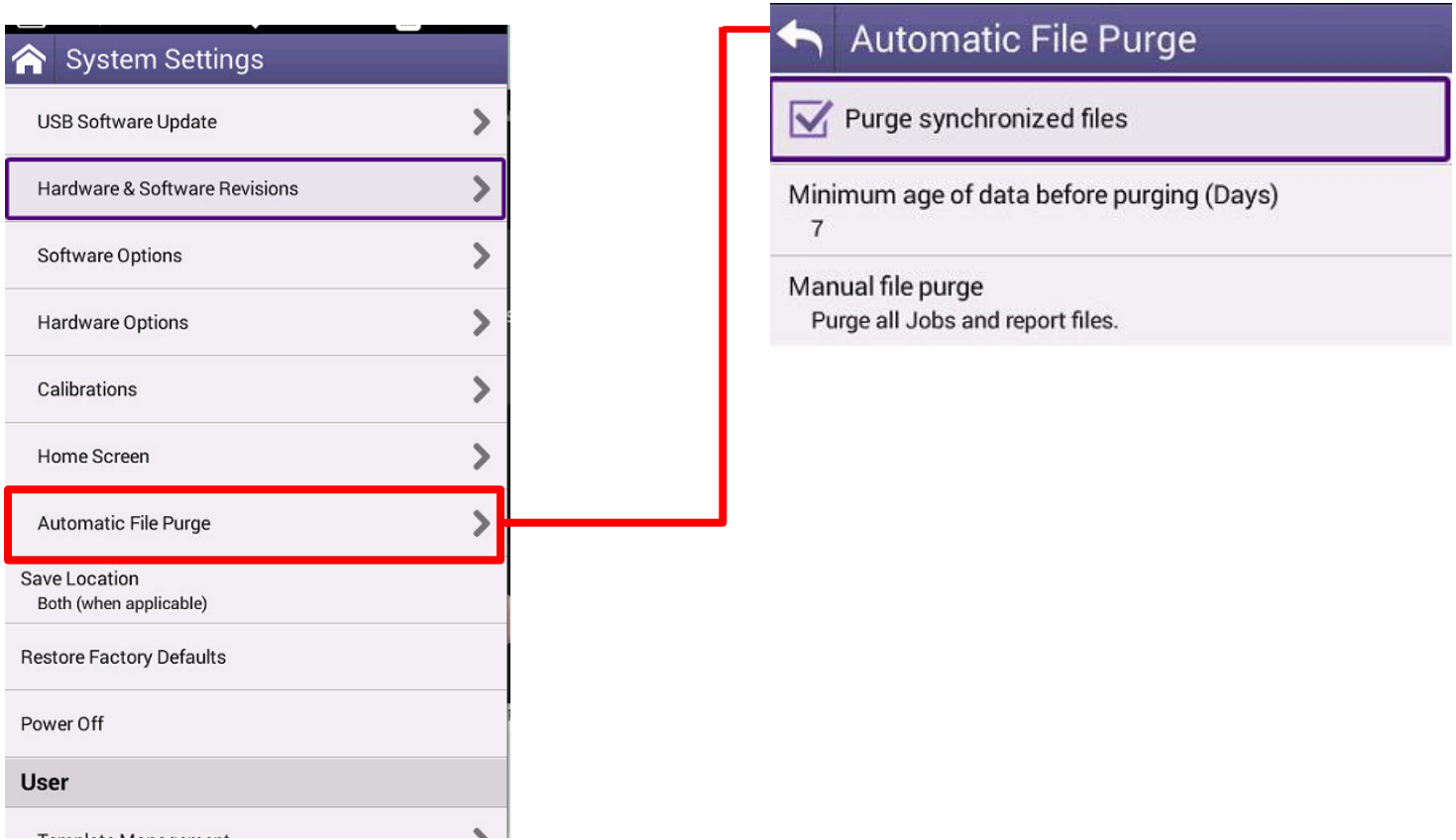
Select HARDWARE & SOFTWARE REVISIONS to verify the most up to date FIRMWARE is installed

Additionally, OneExpert CATV Serial Number (listed as Unit ID) and CM MAC Addresses (used in provisioning of the onboard Cable Modem)





Purge Files

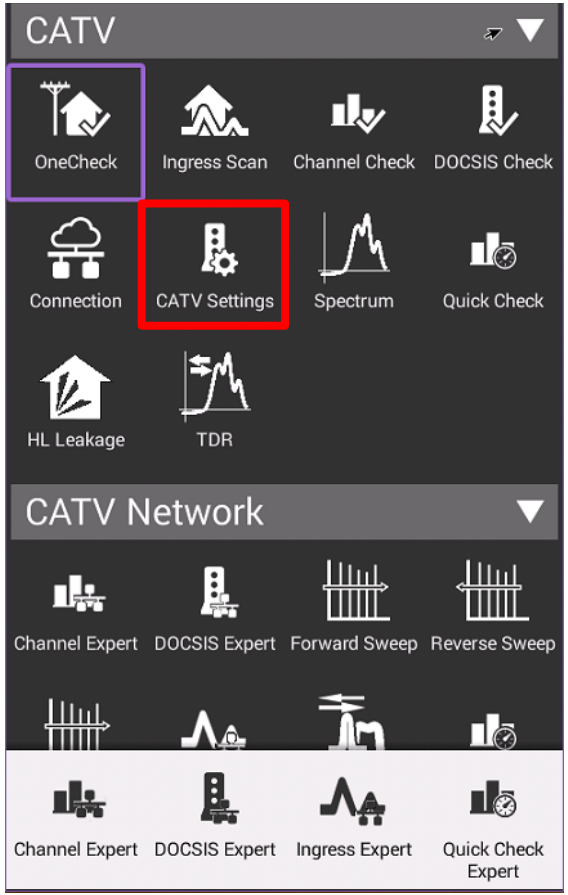


CATV Settings

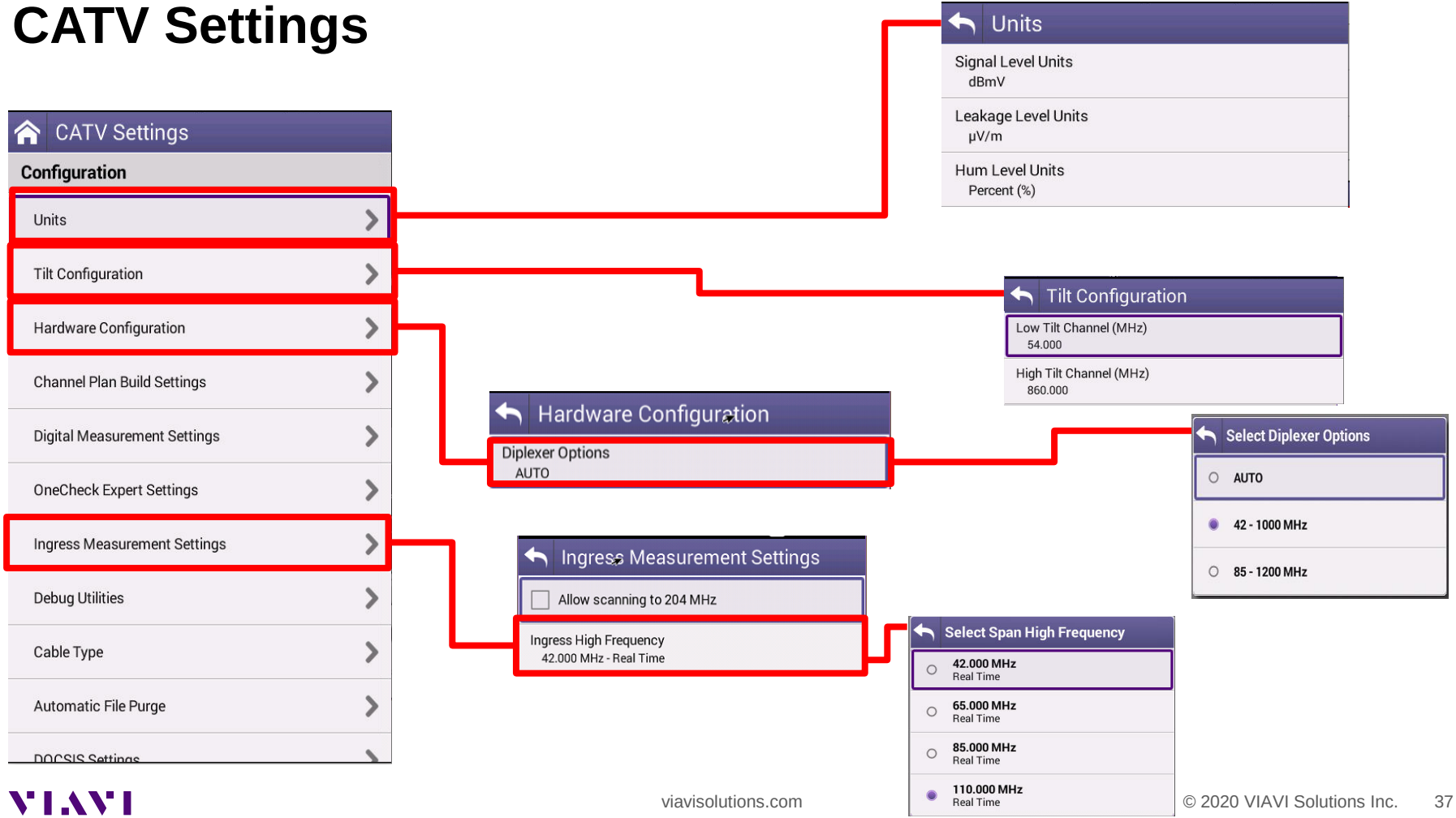
CATV Settings

Navigate from the HOME screen to CATV SETTINGS

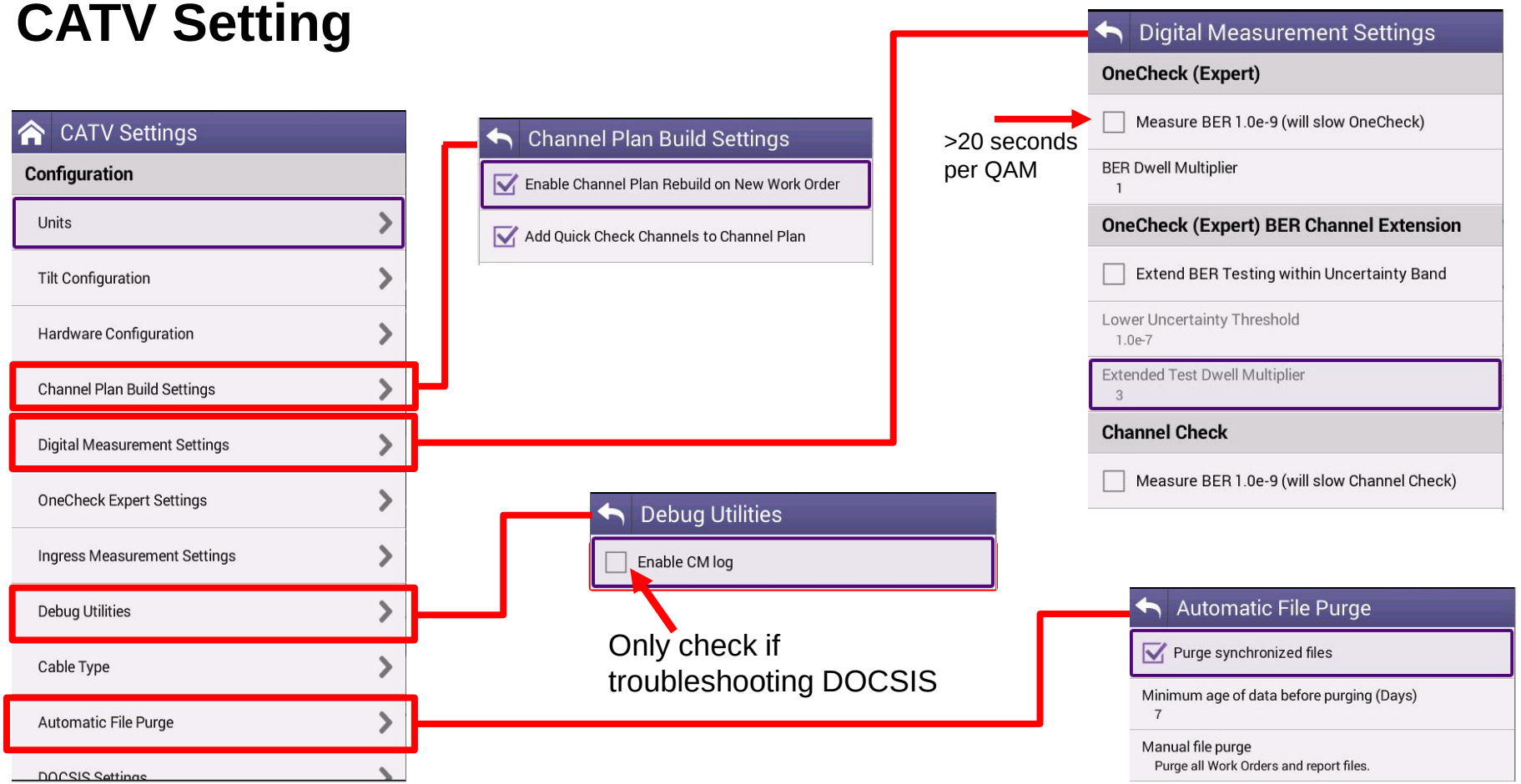
- Units of Measure
- Tilt
- Hardware Configuration
- Channel Plan Build Settings
- Digital Measurement Settings
- One Check Expert Settings
- Ingress Measurement Settings
- Debug Utilities
- Cable Type
- Automatic File Purge
- DOCSIS Setting



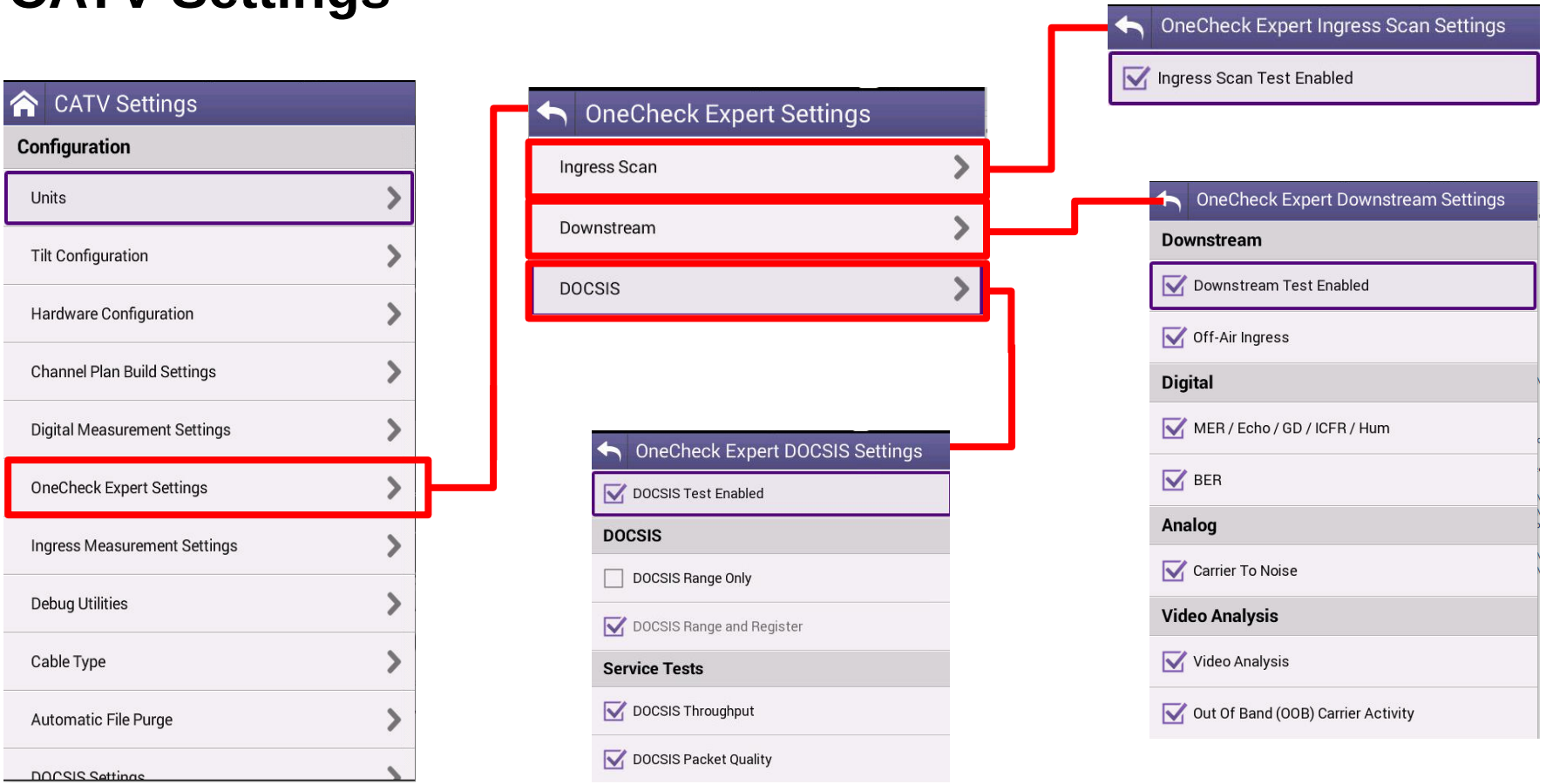
CATV Settings



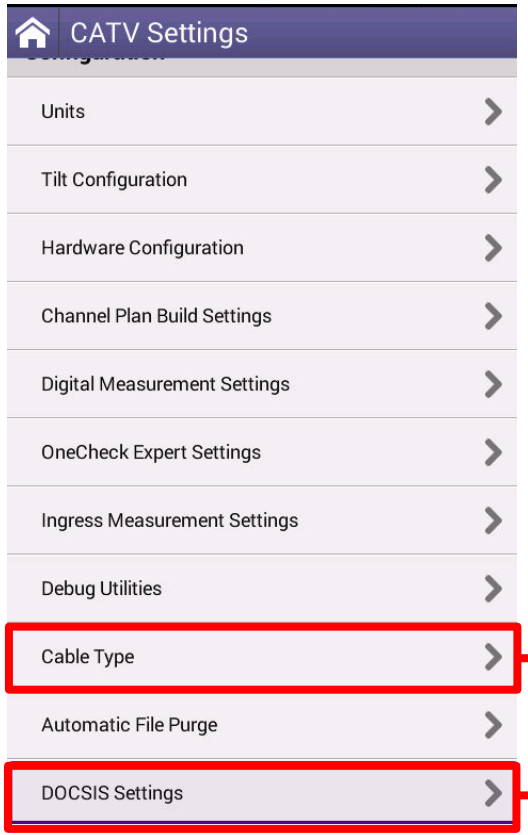
CATV Setting

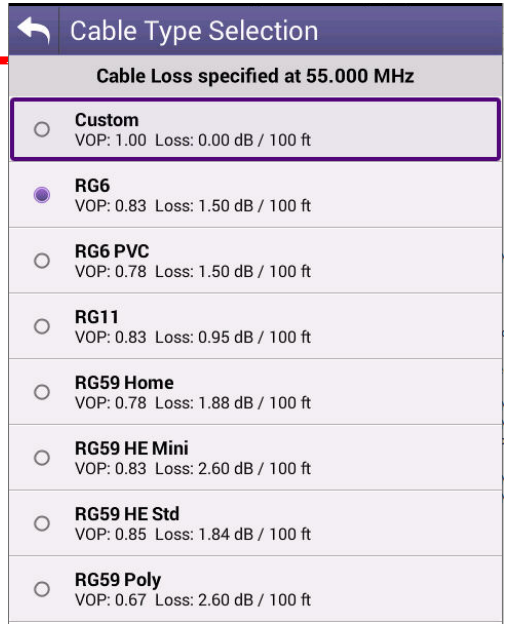


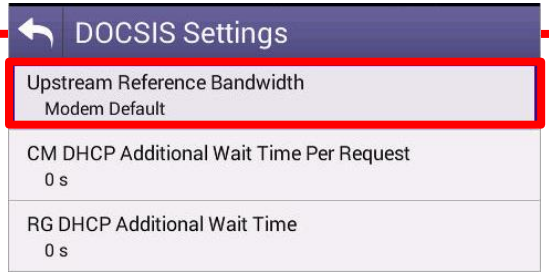
CATV Settings

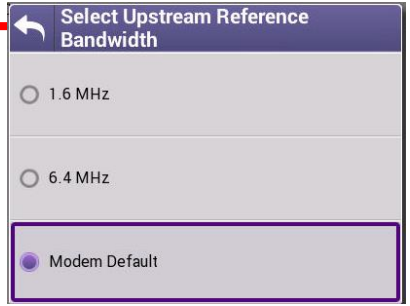


CATV Settings







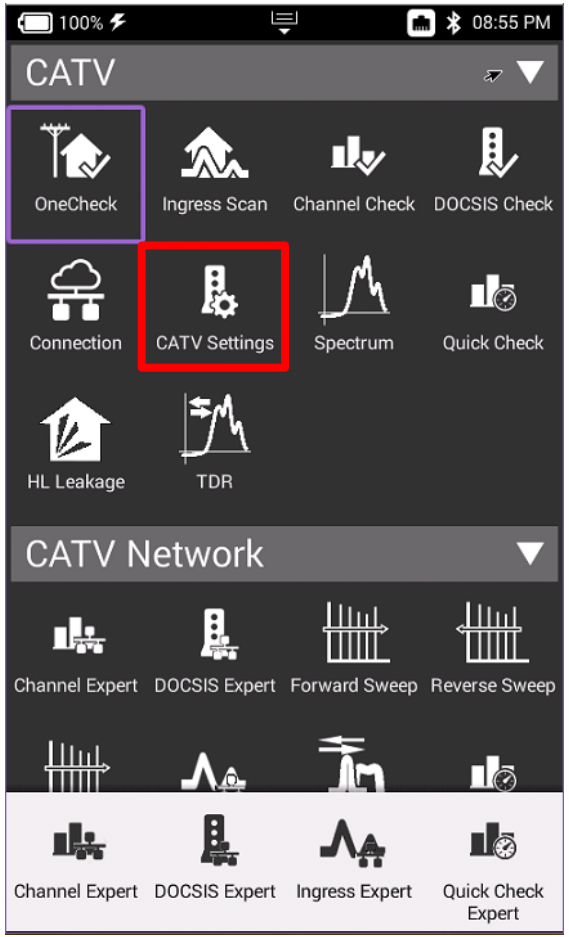


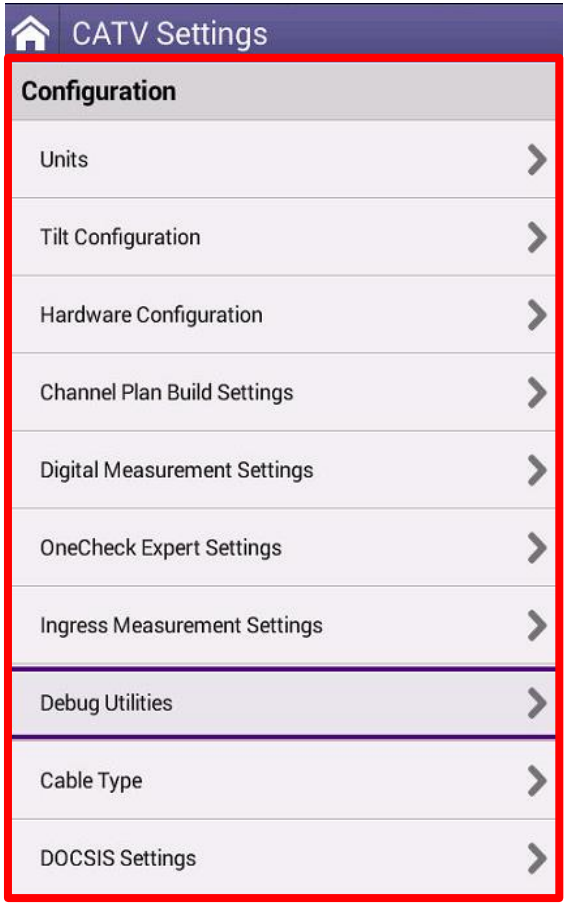
CATV Settings

CATV Settings

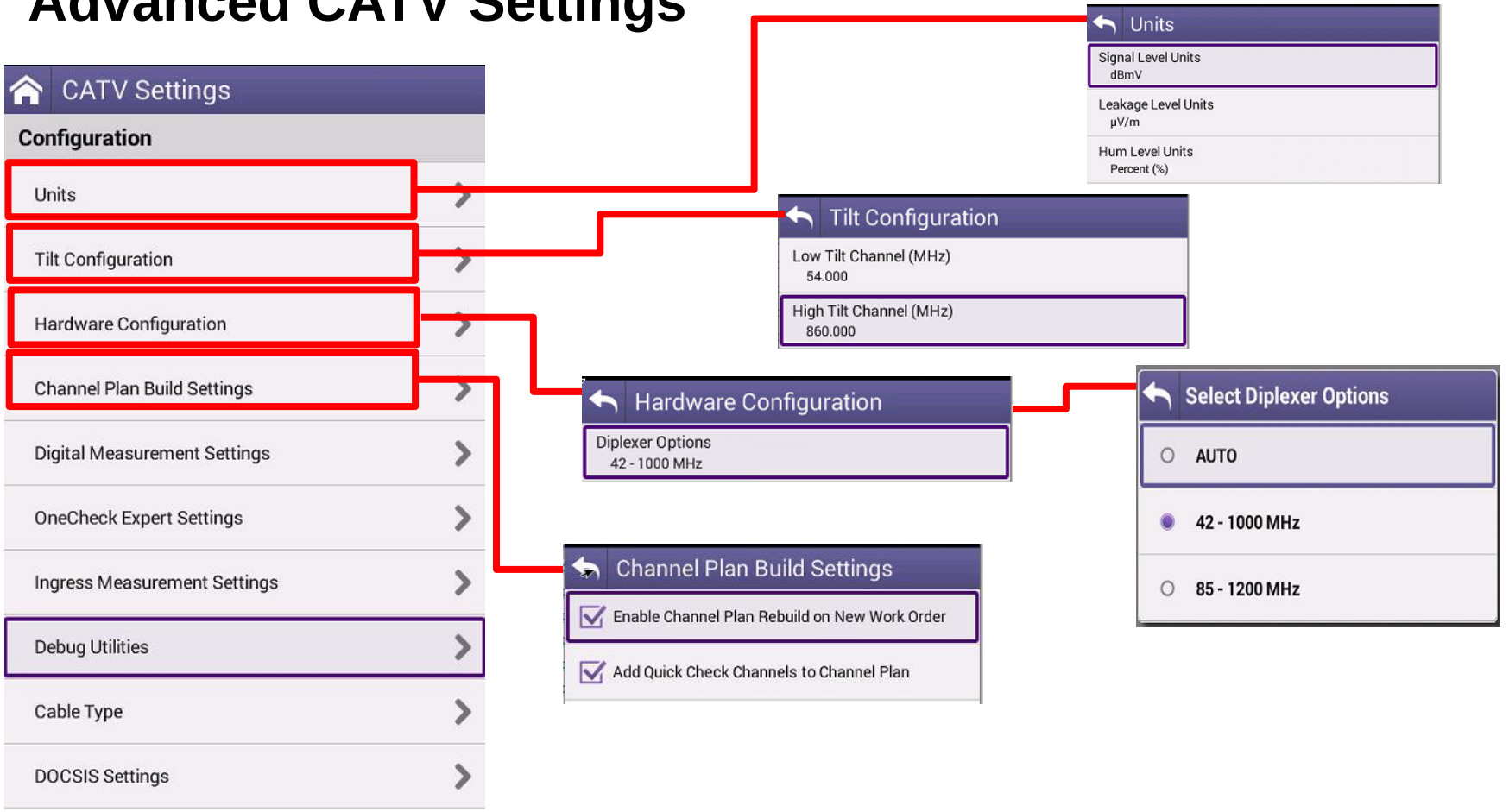
Navigate from the HOME screen to CATV SETTINGS

- IPv4 or IPv6
- Tilt
- Sweep
- Diplex
- Digital Measurement
- Channel Plan Build Settings

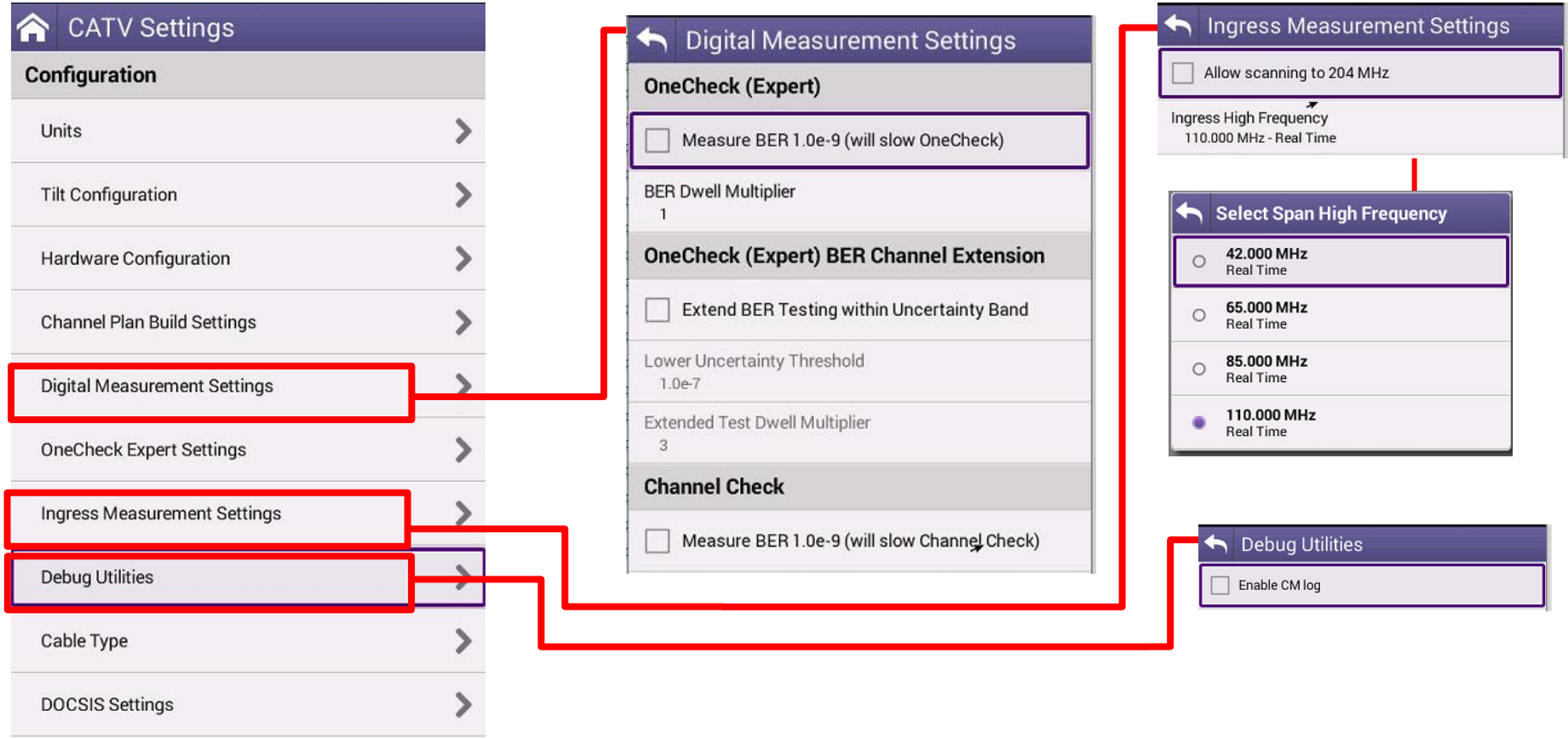




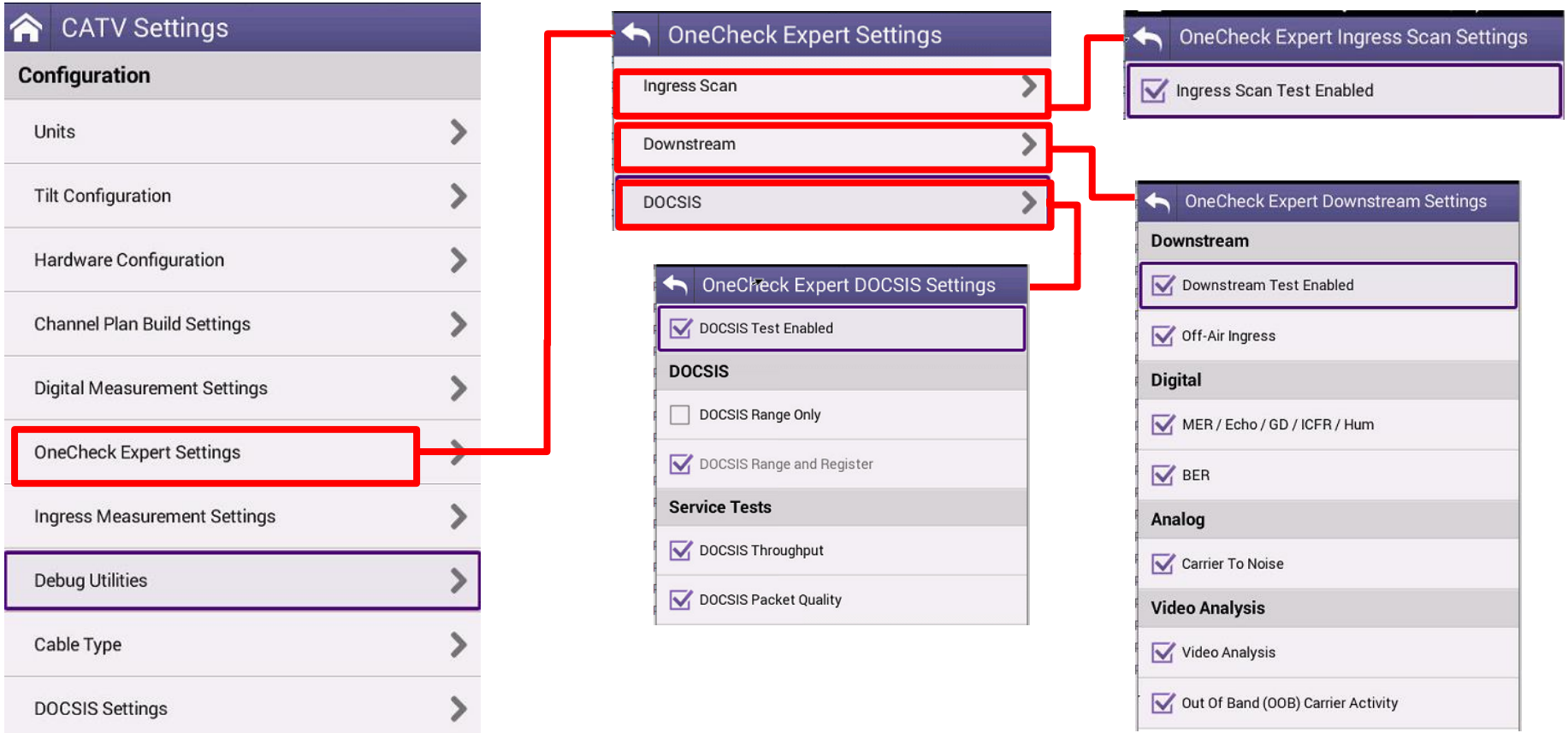
Advanced CATV Settings



Advanced CATV Settings



Advanced CATV Settings



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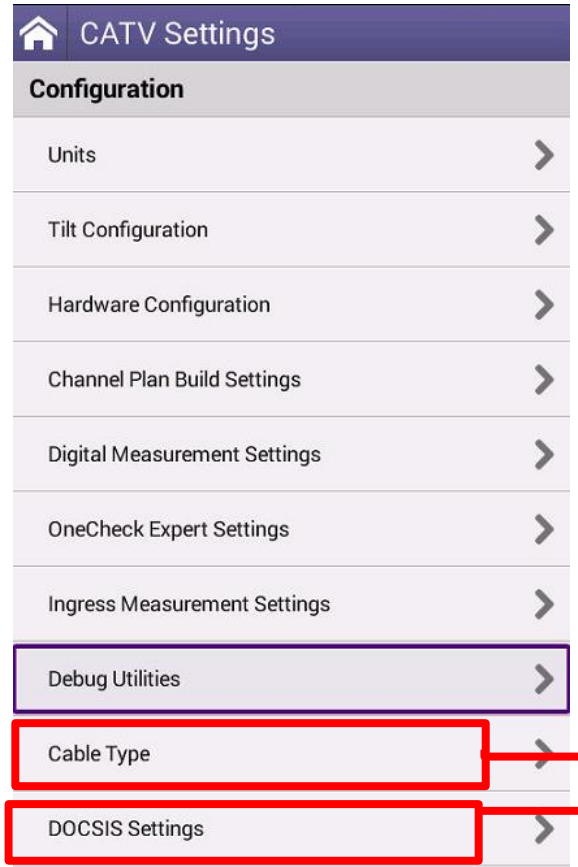
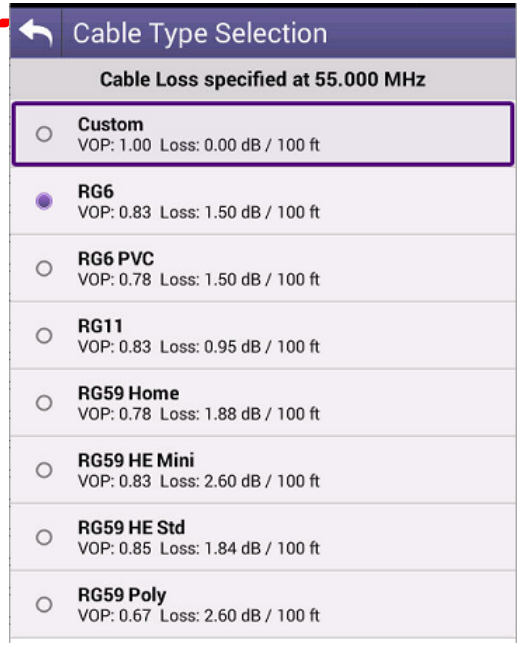
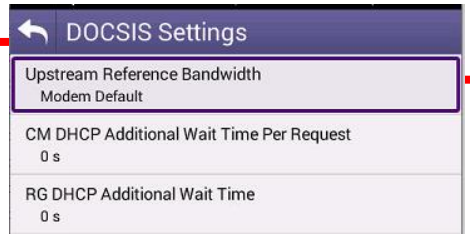
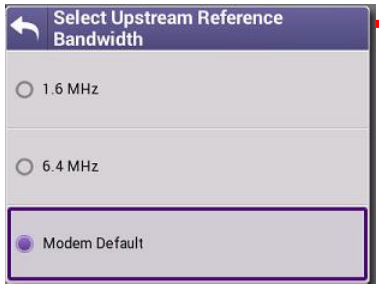






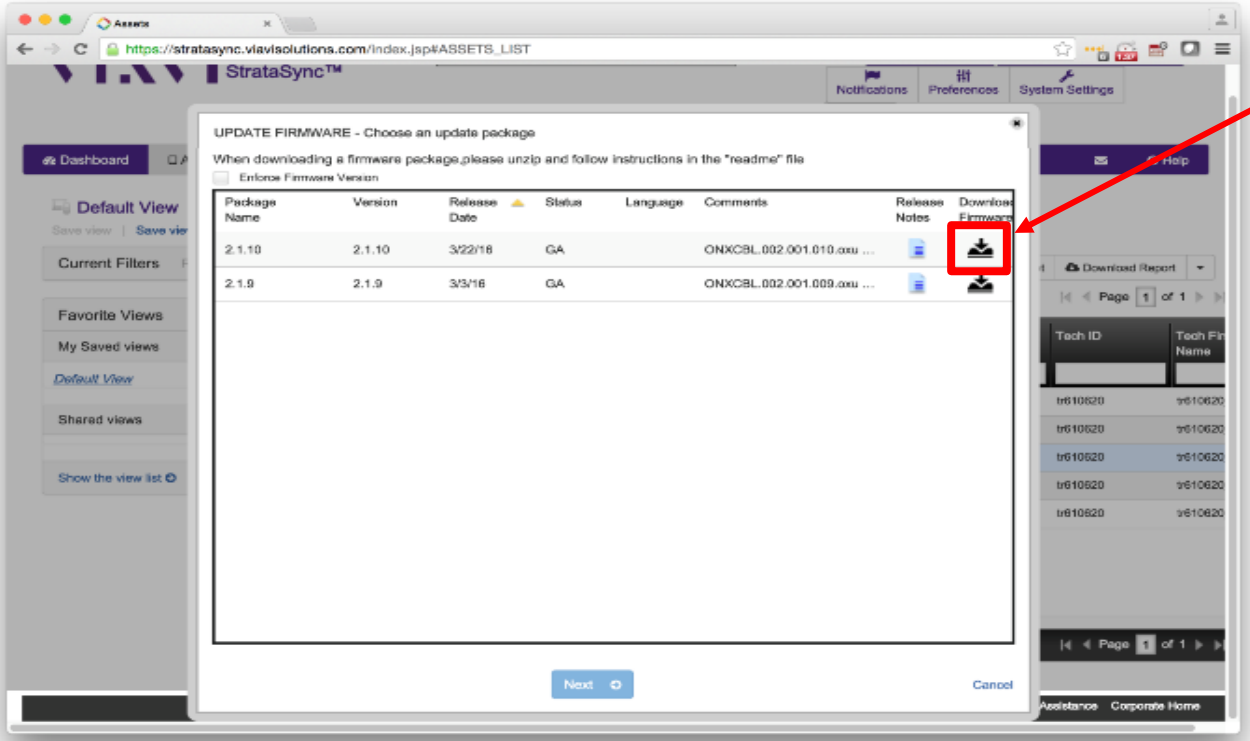


Software and Firmware Updates

Software and Firmware Upgrades

- Software (SW) and Firmware (FW) releases are the best way to ensure your VIAVI OneExpert is functioning at its best
- VIAVI delivers SW and FW easily via **StrataSync** and **USB Stick**
- All OneExpert units should be upgraded to the latest production software release – available through StrataSync (or your Viavi representative)
- New SW Version offer substantial operational improvements and enhancements over earlier software releases including the version that shipped with the units initially
- The software will be deployed to the units by the StrataSync Administrator, but each unit needs to be configured to connect with StrataSync
- Follow these steps to ensure your meter is configured correctly and you can connect to StrataSync to receive the latest updates.

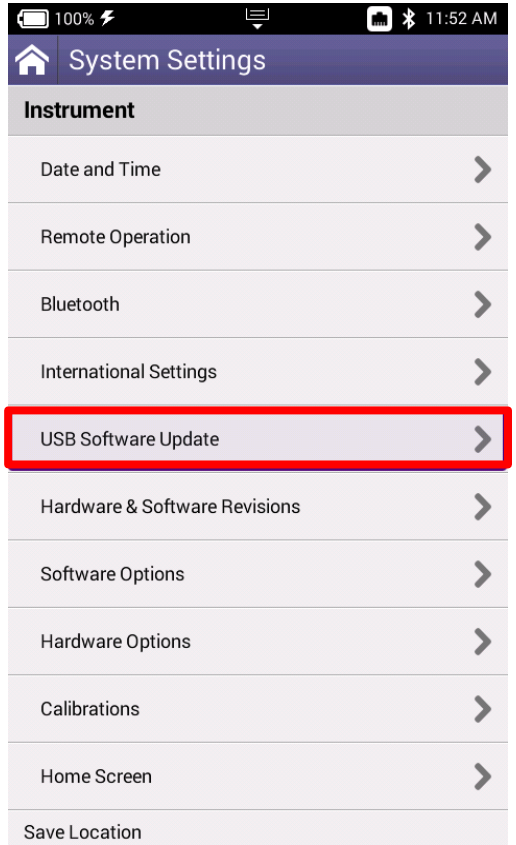
USB Software Upgrade

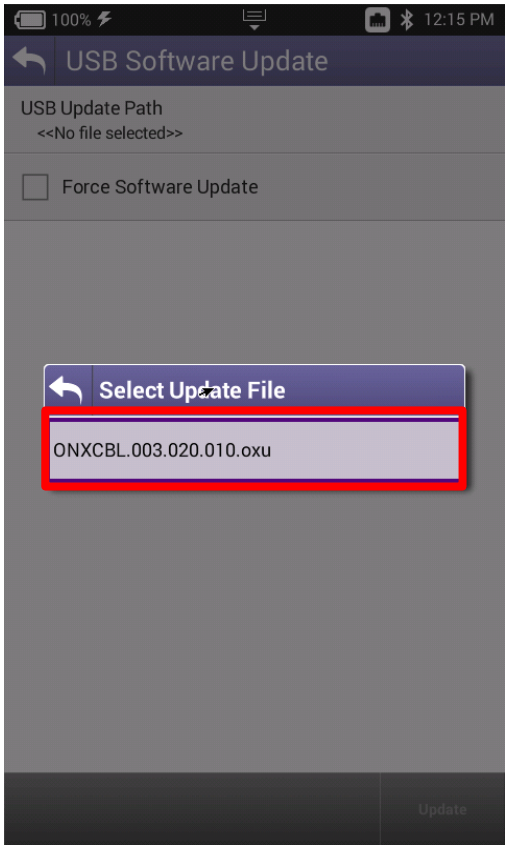


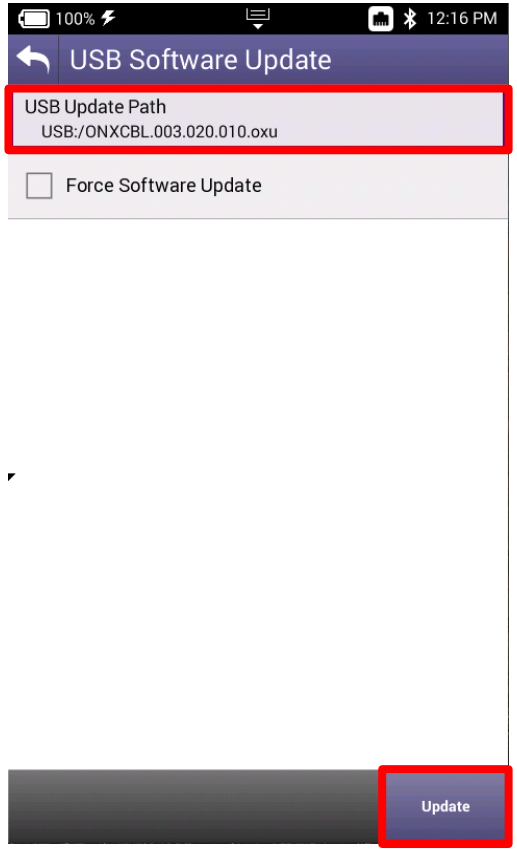
- Click here to download the newest firmware
- Copy the downloaded file ONXCBL.xxx.xxx.xxx.oxu to the root directory of a USB thumb drive.
- Press Cancel once the download has completed and you have placed the file on the USB thumb drive.

Note: Firmware must be downloaded from StrataSync first

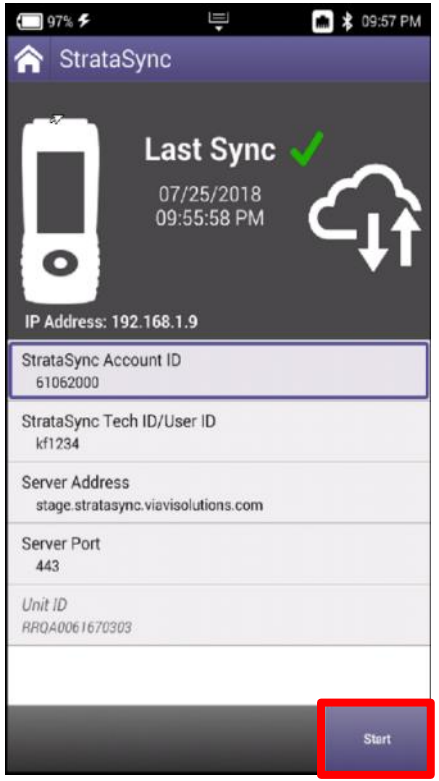
USB Software Upgrade

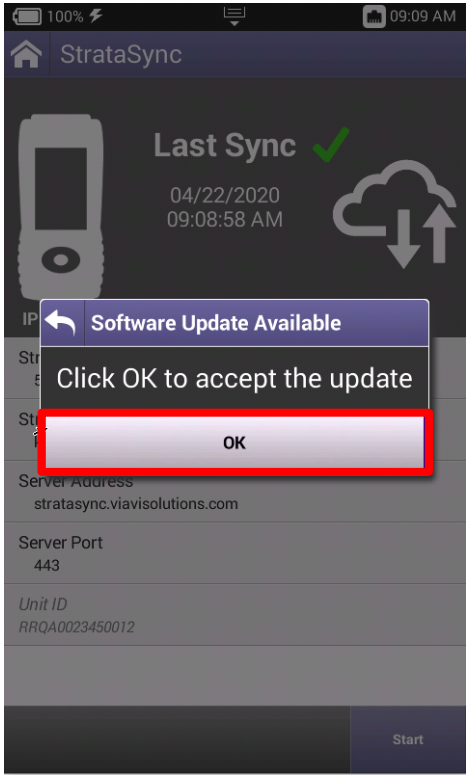






Ethernet Software Upgrade via StrataSync





Firmware Recovery Procedure

Place the update image on a USB drive in the root directory (not in any folder on the USB drive). Ensure that it is the only ONX update image on the drive.

Download the latest ONX firmware via StrataSync to get the latest link from Viavi TAC

Power off the unit.(If the unit is frozen, press and hold the power key until the ONX powers off ~10-15 seconds)

Attach power charger to the ONX.

Plug the USB drive with the ".oxu" firmware file into one of the ONX USB ports.

Hold down the left softkey+ right softkey+ up arrow. (softkeys are the 4 buttons just below the display)

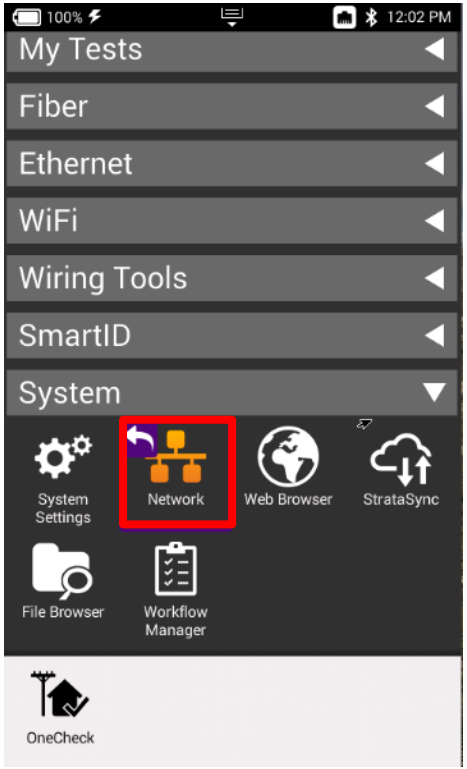
Press and release power key as normal while continuing to hold down on the left softkey+ right softkey+ up arrow until you see the

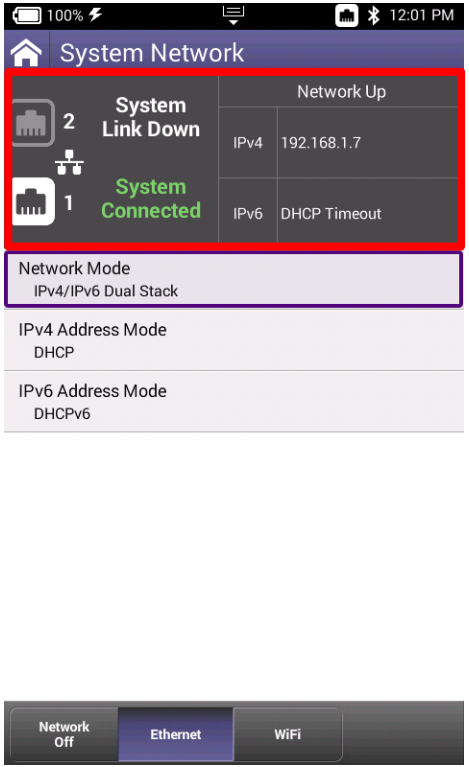
StrataSync Synchronization

StrataSync Synchronization - ETHERNET

Note - You can synchronize to StrataSync via RF or WiFi, but this is ONLY for sending test files, receiving configuration information like limit plans, etc. - not for SW/FW upgrades

Connect an Ethernet cable from an active internet connection (Cable Modem or router/gateway) to Port 1 on the ONX



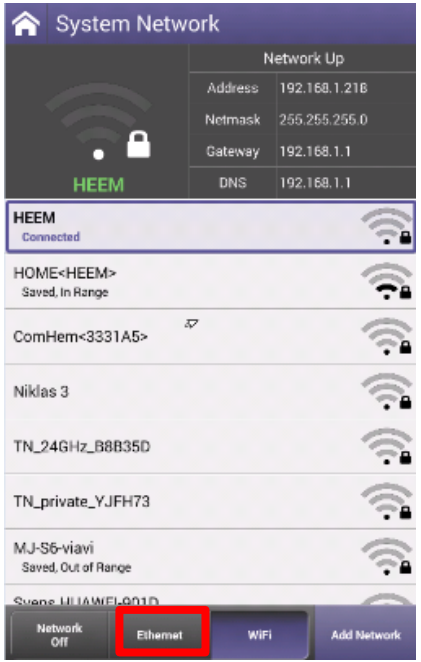


StrataSync Synchronization - WIFI

Note - **Sync via WiFi** is now supported. Use Network Settings app to configure and join a WiFi network prior to performing sync. You can synchronize to StrataSync via WiFi, but this is ONLY for sending test files, receiving configuration information like limit plans, etc.

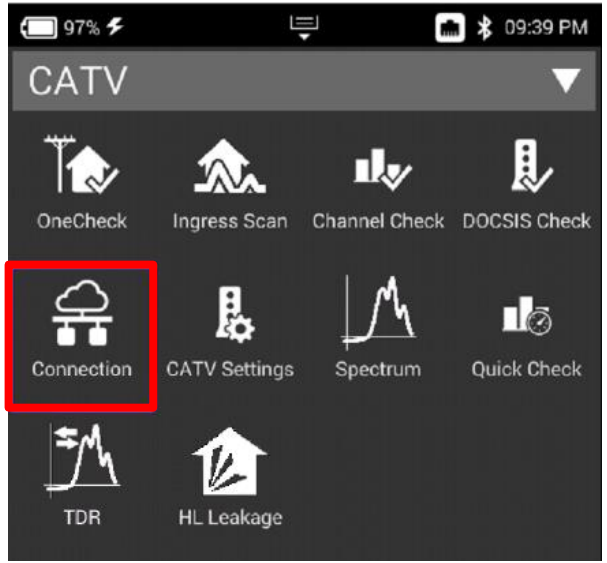
Connect with WiFi from an active internet connection
(Cable Modem or router/gateway)

From the ONX home screen navigate to **SYSTEM NETWORK / WIFI -** Verify the ONX has a valid IP address

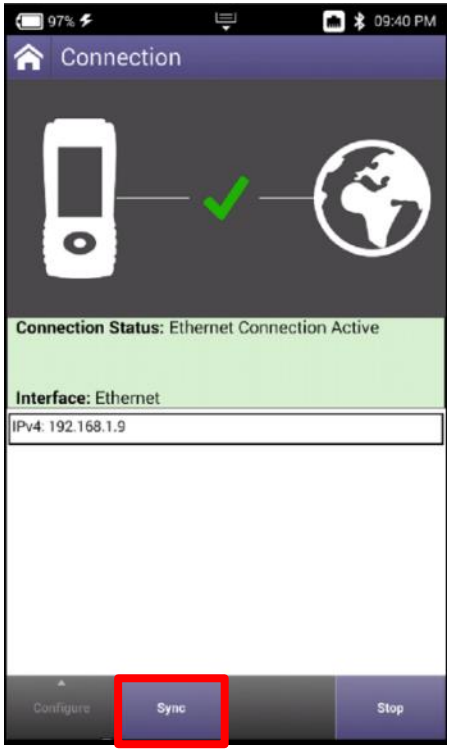


StrataSync Synchronization - RF

Make sure that CM MAC 1 is provisioned in the billing system
Select the CONNECTION APP from CATV

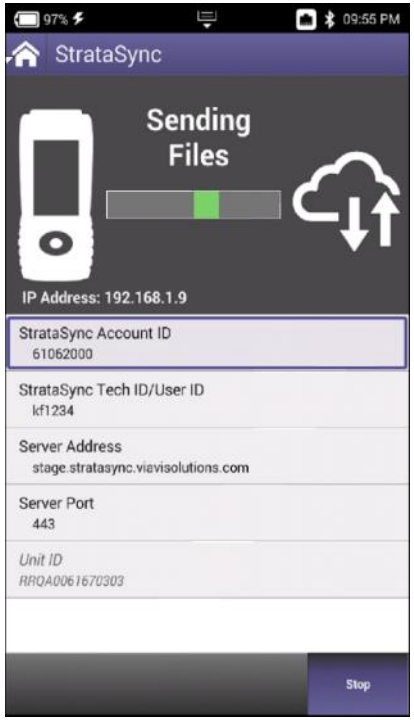


Once CONNECTION STATUS reports a GREN Check mark and INTERFACE: RF; IP ADDRESS is shown



StrataSync Synchronization – ETHERNET, WIFI and RF

After IP Address verification, navigate to the **SYSTEM** Menu and select **STRATASYNC**



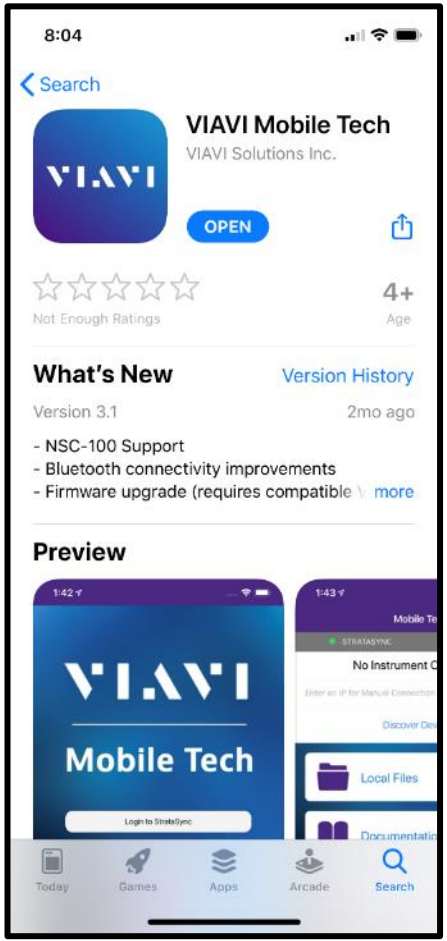
STRATASYNC ACCOUNT ID = xxxxxxxxx
SERVER ADDRESS = stratasync.jdsu.com
(*stratasync.viavisolutions.com* also works)
SERVER PORT = 443

Mobile Tech App

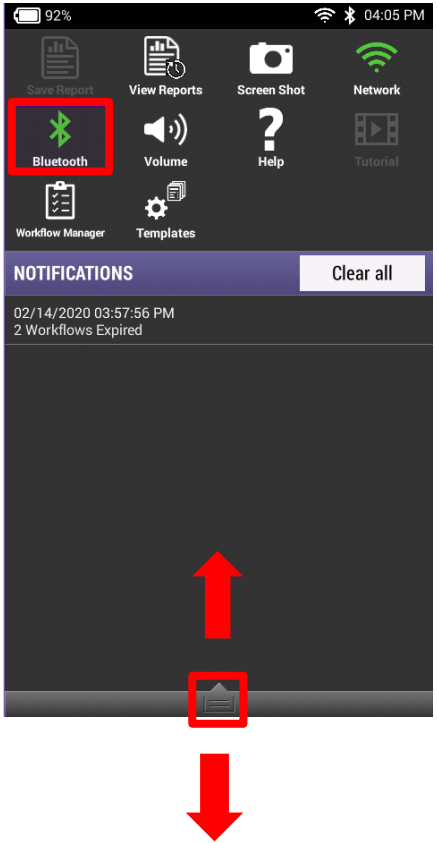
MOBILE TECH APP

Search for VIAVI and download VIAVI MOBILE TECH v3.1 app

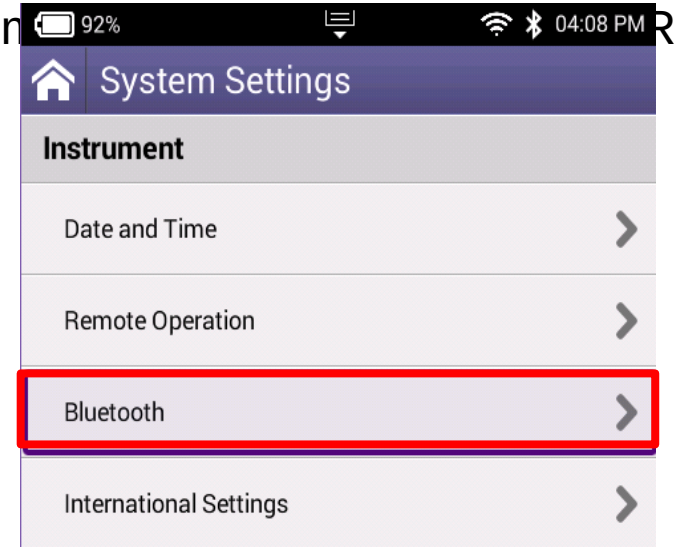
* Screenshots shown on iPhone, but MOBILE TECH APP on ANDROID is consistent

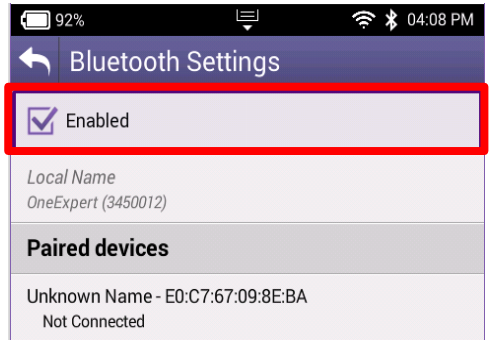


MOBILE TECH APP – Set Up



On ONX620 or 630, enable BLUETOOTH by going to SYSTEM SETTINGS->BLUETOOTH SETTINGS or by dragging down the TRAY and selecting BLUETOOTH and n REEN

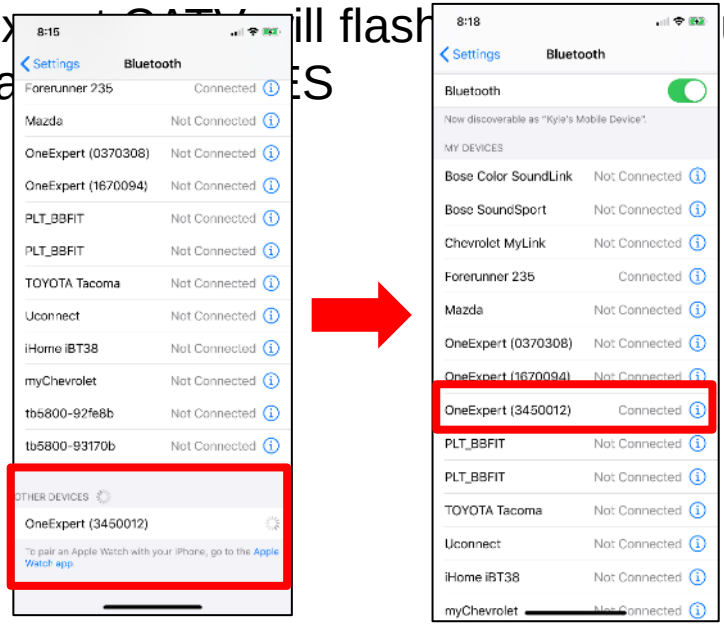


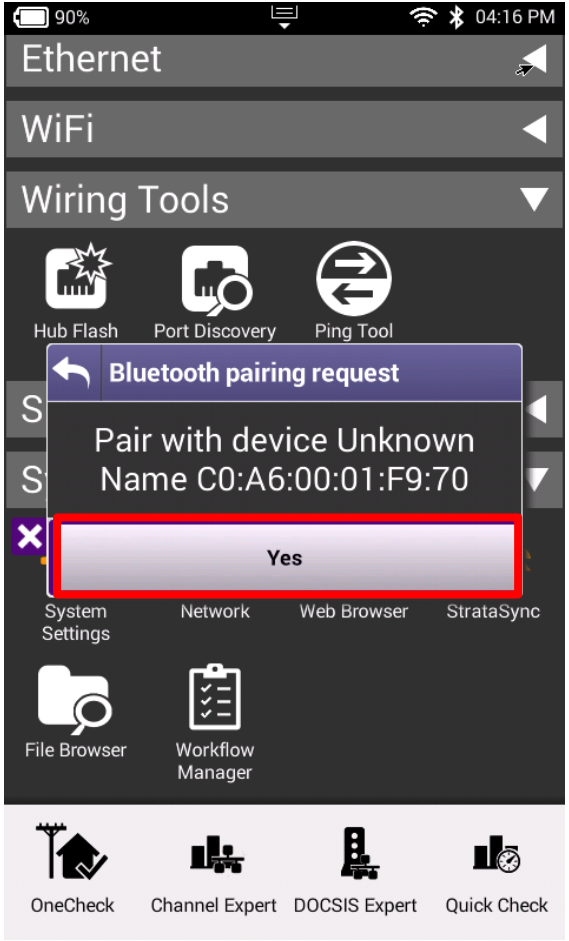


MOBILE TECH APP – Set Up

Select the appropriate OneExpert CATV serial number from the list of BLUETOOTH CONNECTIONS and pair

OneEx CATV will flash uest messa ES

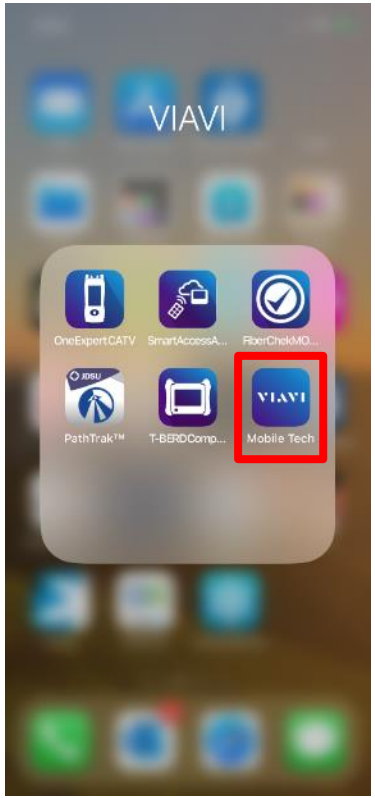


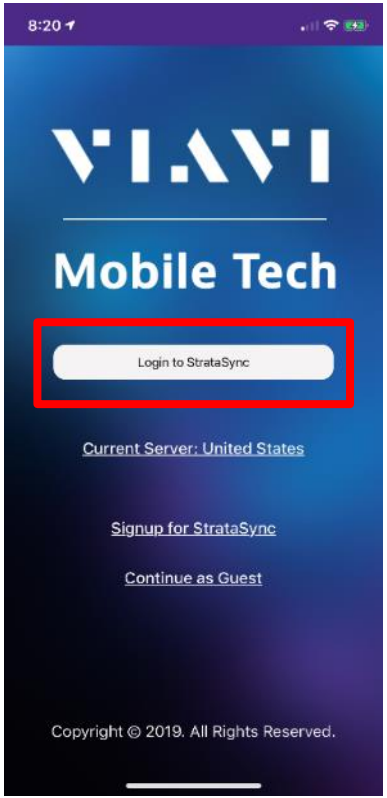


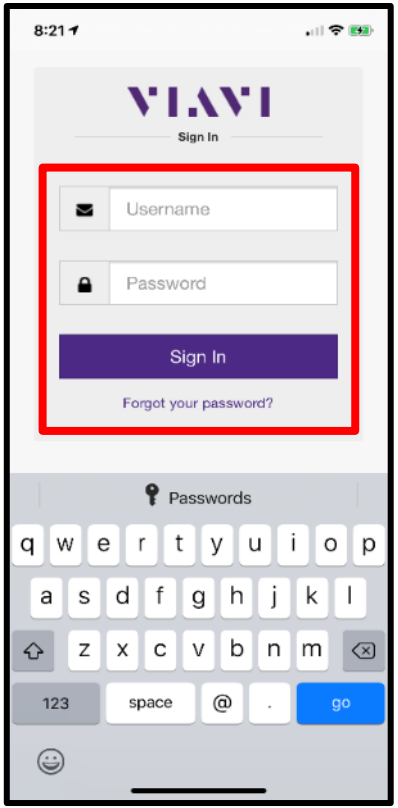
MOBILE TECH APP – Set Up

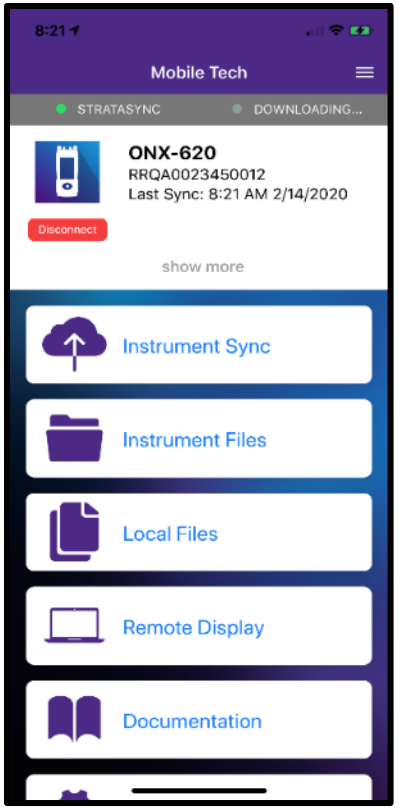
Login using USERNAME and PASSWORD

If user doesn't have login credentials – please reach out to local STRATASYNC ADMINISTRATOR

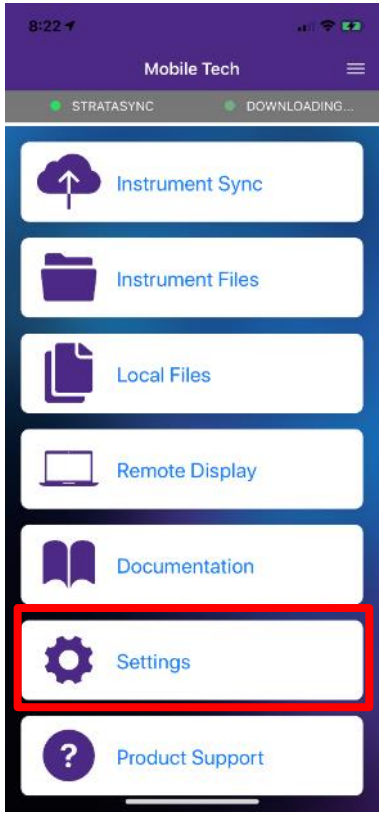


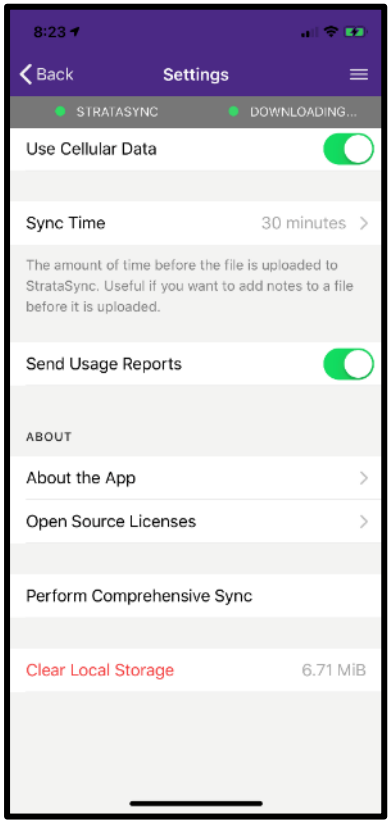






MOBILE TECH APP - Synchronization





Select the SETTINGS button and configure MOBILE TECH APP

- Choose how often user desires a SYNC
- Whether the SYNC will require WIFI or may use the LTE connection
- Whether or not to send usage reports
- Comprehensive SYNC (useful for uploading failure logs)
- Clear local Storage on user phone

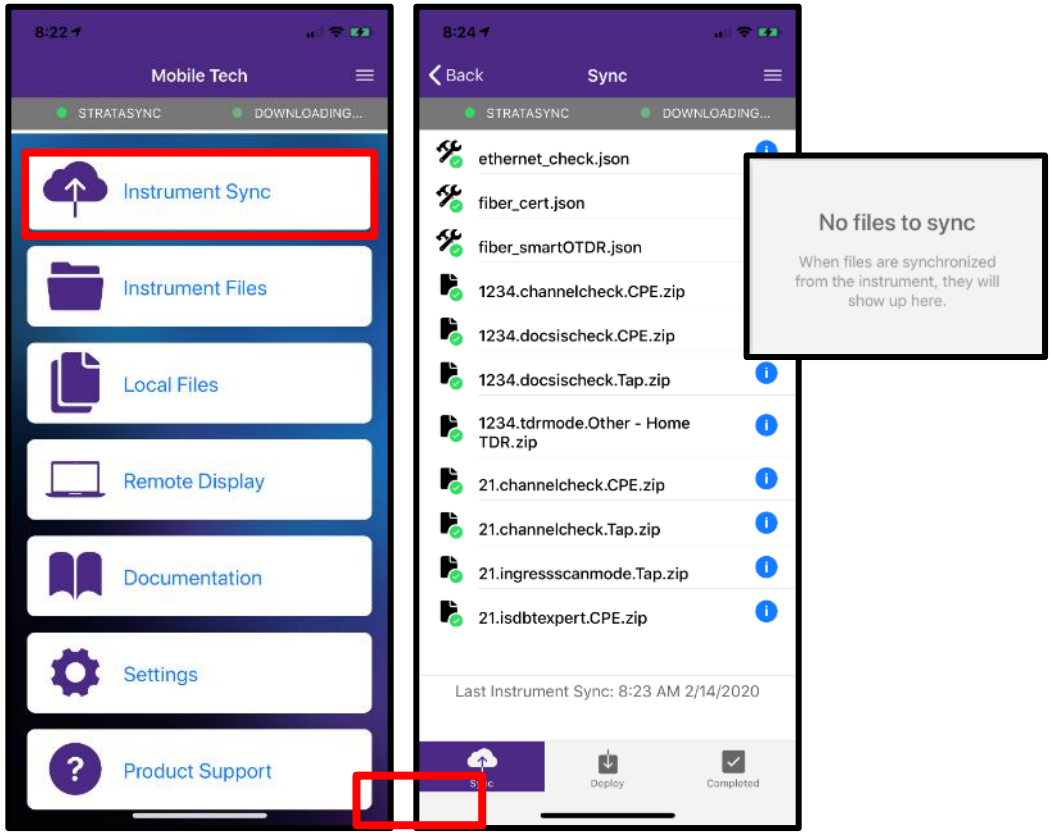
MOBILE TECH APP - Synchronization

By Selecting INSTRUMENT SYNC from the main menu, the USER can see all test data that has currently been saved to the ONX and is ready for sync

- **Note that only SAVED TEST DATA will migrate to MOBILE TECH APP for synchronization to STRATASYNC**

By selecting SYNC – the process will begin immediately

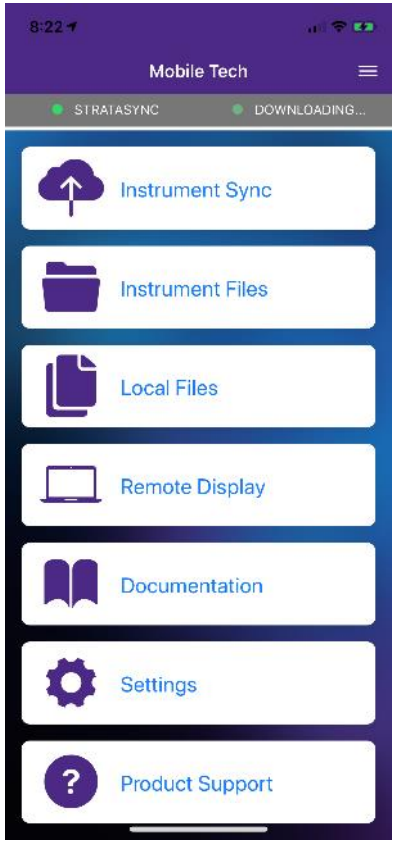
- The user can also rely on the timed sync setting – which allows the MOBILE TECH APP the ability to sync passively in the background are regular intervals



MOBILE TECH APP

- Beyond streamlined sync to STRATASYNC, the MOBILE TECH APP also provides the following functionality:
- View and manager files on the instrument
- View and manage local files, including craftsmanship photos
- Remote Display and Operation
- IN-APP Support Documentation
- LINK to VIAVI Technical Support

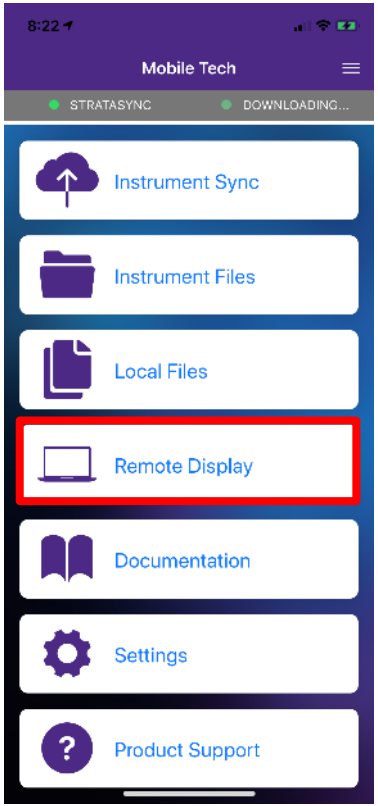
- Note – MOBILE TECH APP is interoperable with TB2000, TB4000, TB5800, One EXPERT CATV and a host of other VIAVI Solutions instruments

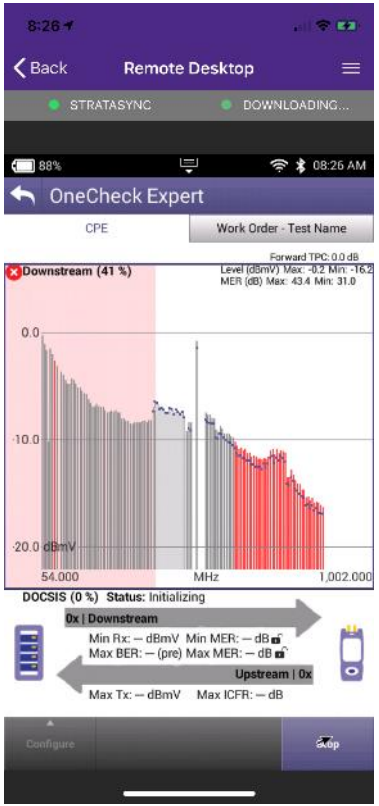


MOBILE TECH APP - Remote Display

REMOTE DISPLAY allows the user to control the ONX, via BLUETOOTH, and conduct normal meter functions

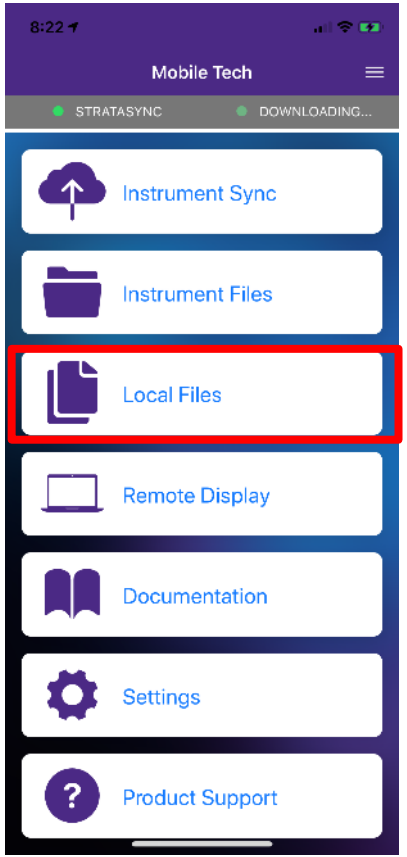
*Requires SmartAccess Anywhere option

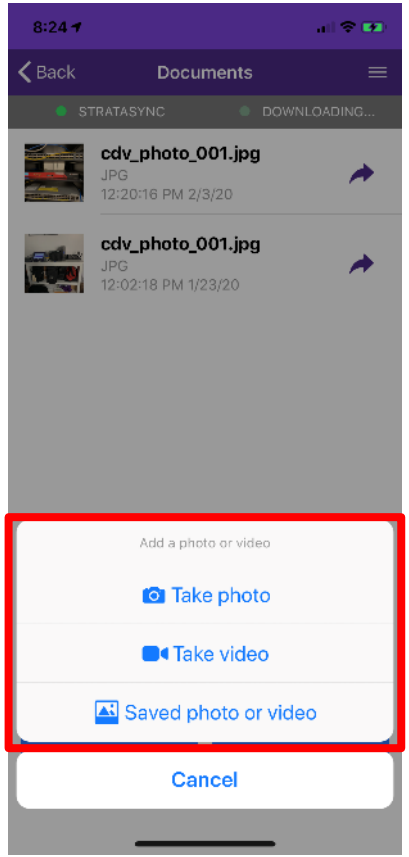




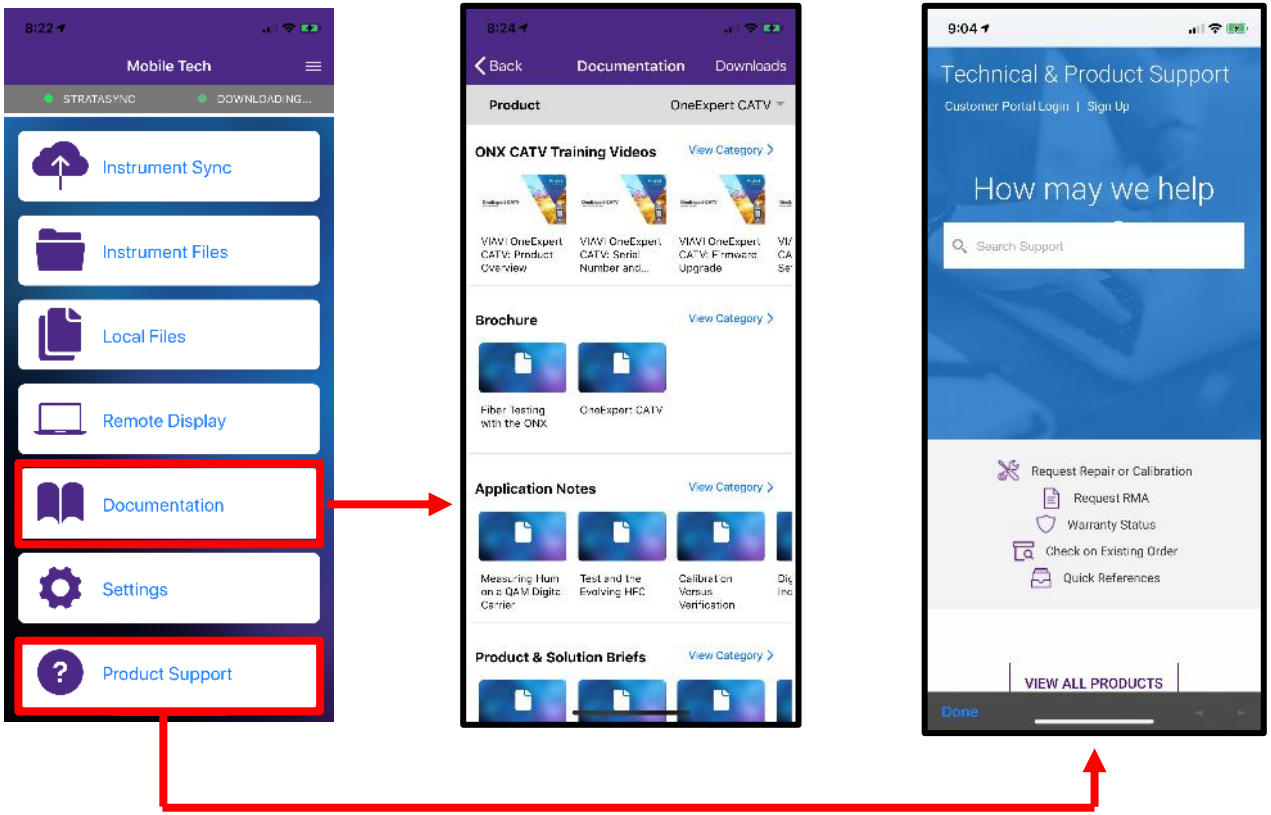
MOBILE TECH APP - LOCAL FILES

Allows users the ability to take photos or use photos from their mobile device and upload to StrataSync





MOBILE TECH APP - Product Support and Documentation

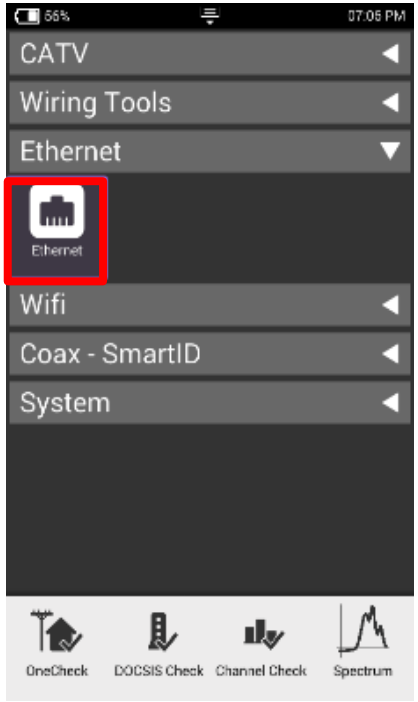


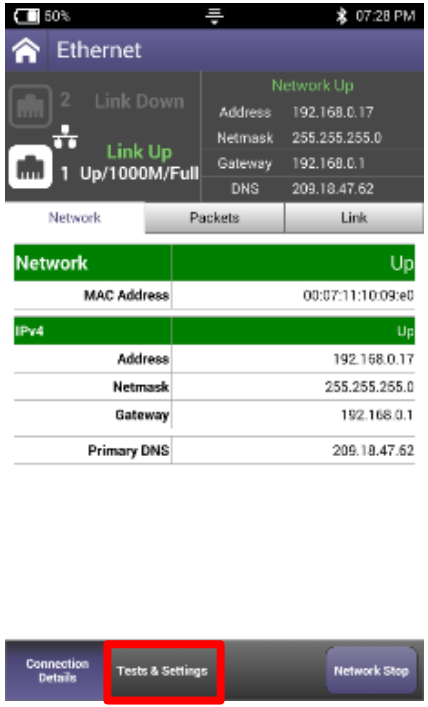
Ethernet Testing

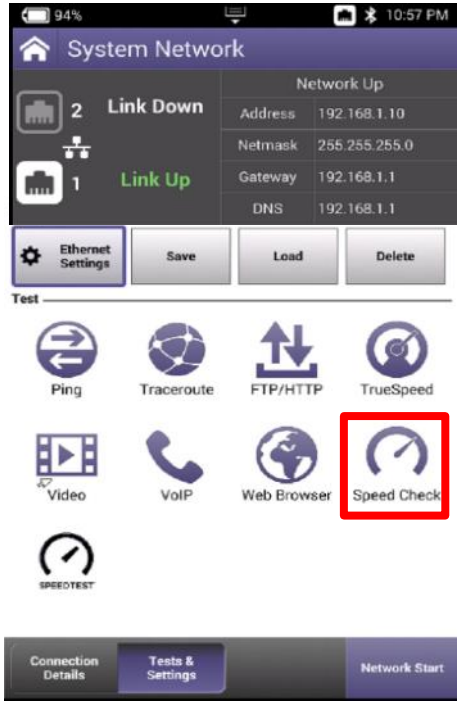
Ethernet – Tests and Settings

From HOME screen, select ETHERNET

Once NETWORK UP is indicated with green, select TEST AND SETTINGS

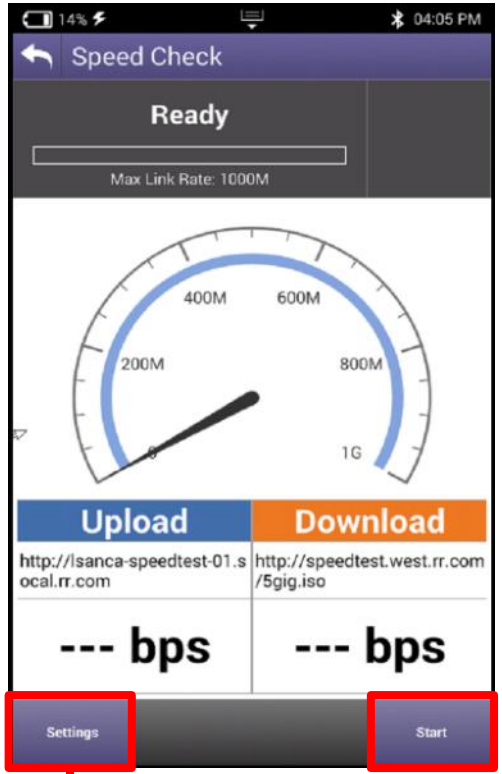


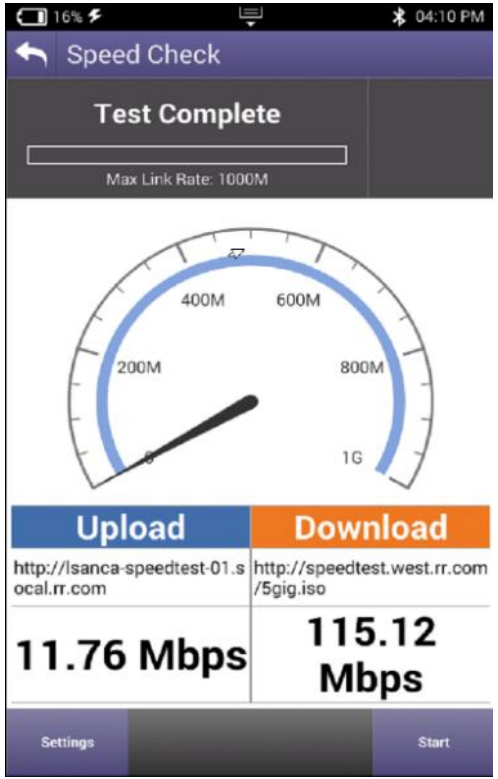


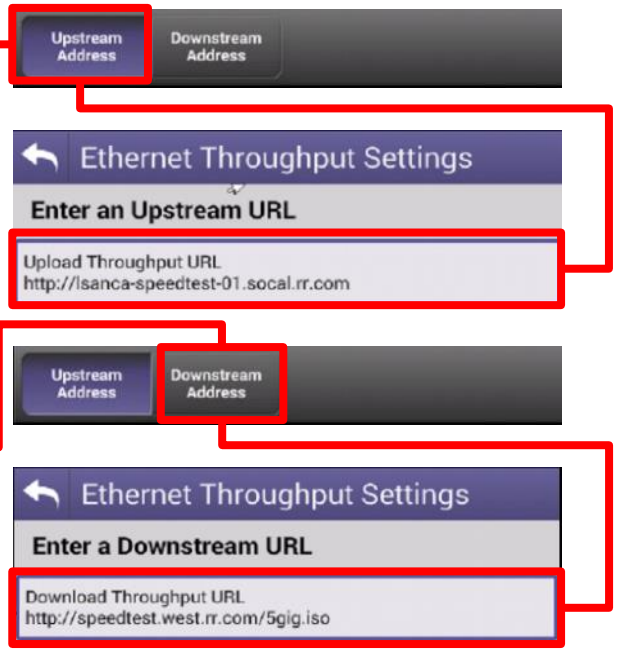


Ethernet – Speed Check

- CATV Ethernet's throughput IP Address/URL is configured in the mode under Settings.
- Default value are for both Downstream/Upstream the same: http://CATVSpeedTest.viavisolutions.com/bigfile.zip
- If the upstream URL changes, the file name need to be the same: bigfile.zip

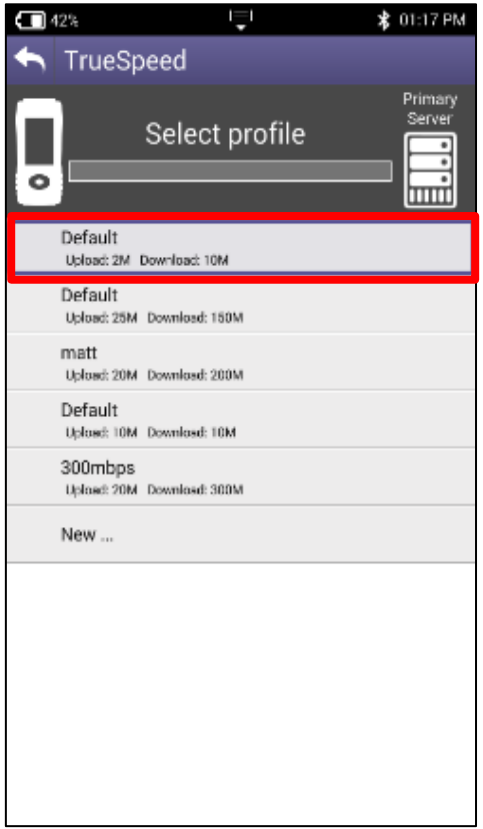


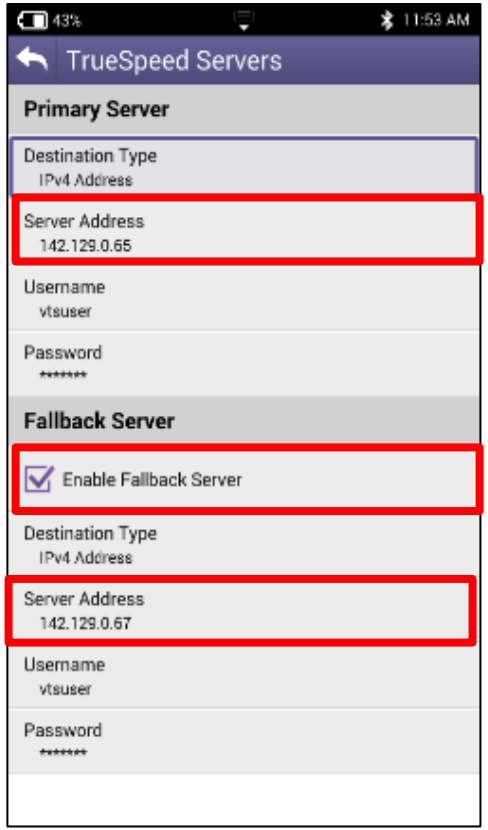




ETHERNET - TrueSpeed Setup

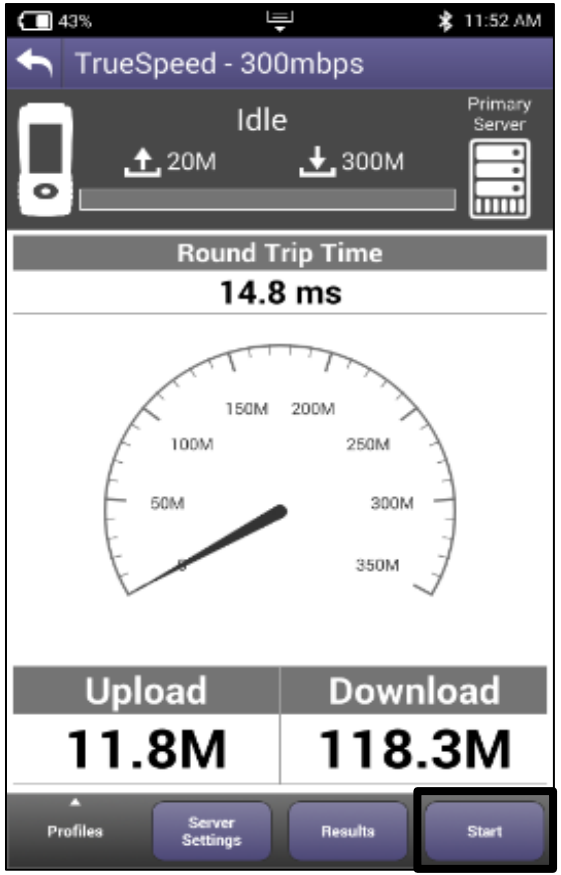
Select Profile or create a new one
The test will start automatically after Profile is selected
Stop Test and choose Server Settings on the bottom and enter the Server IP address and then resume. (Only applicable for first test setup)
Fallback Server is for second TrueSpeed VNF and can help alleviate queue

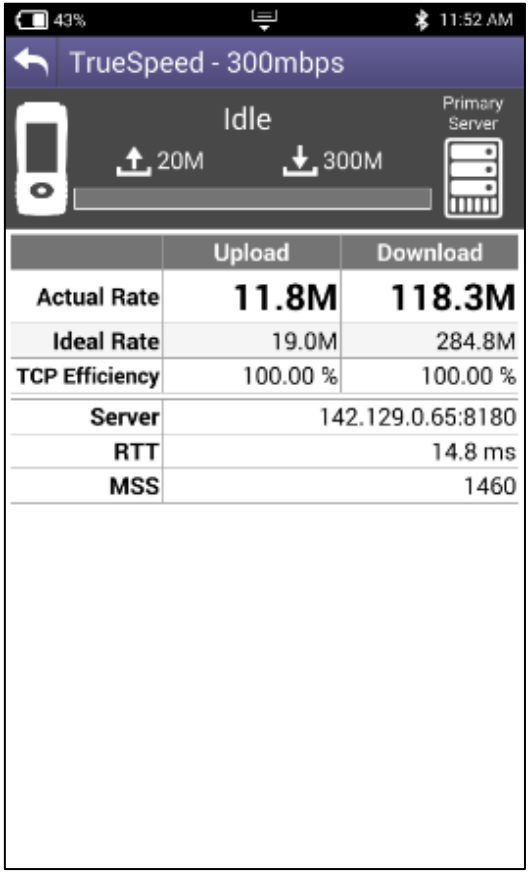




ETHERNET - TrueSpeed Results

After test completes, Results are displayed as either the Speedometer or a simple list





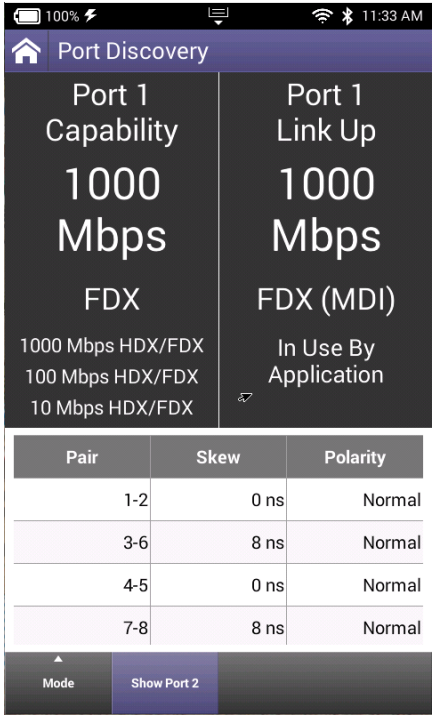
Wiring Tools

WIRING TOOLS - Port Discovery

PORT DISCOVERY will allow the technician to verify capabilities of the ELECTRICAL ETHERNET port under test

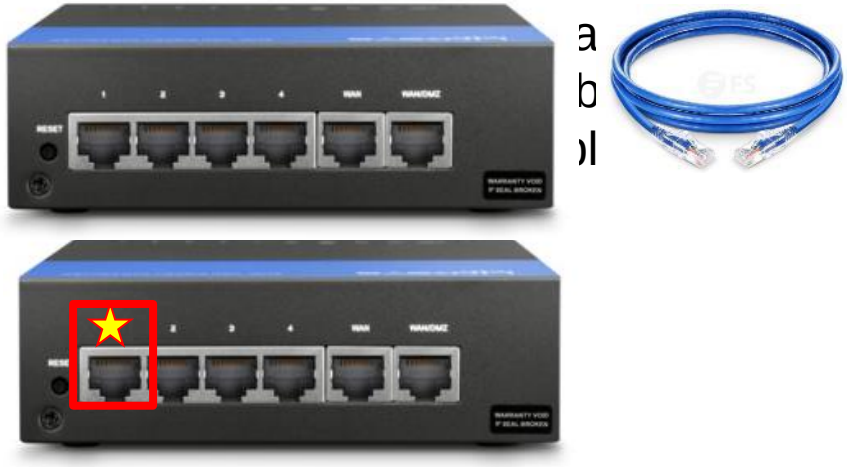
Useful in determining if a customer's switch or router can handle higher spe

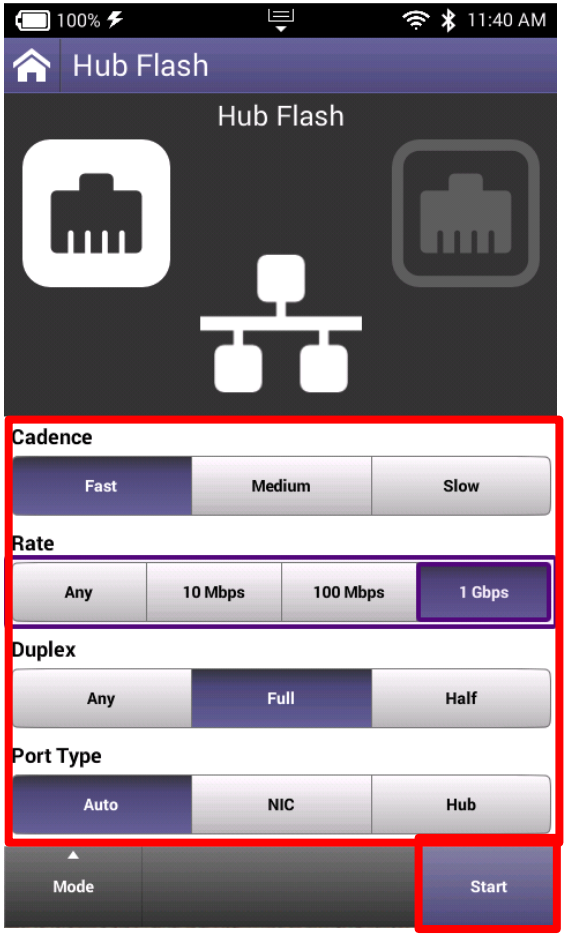
Po is test



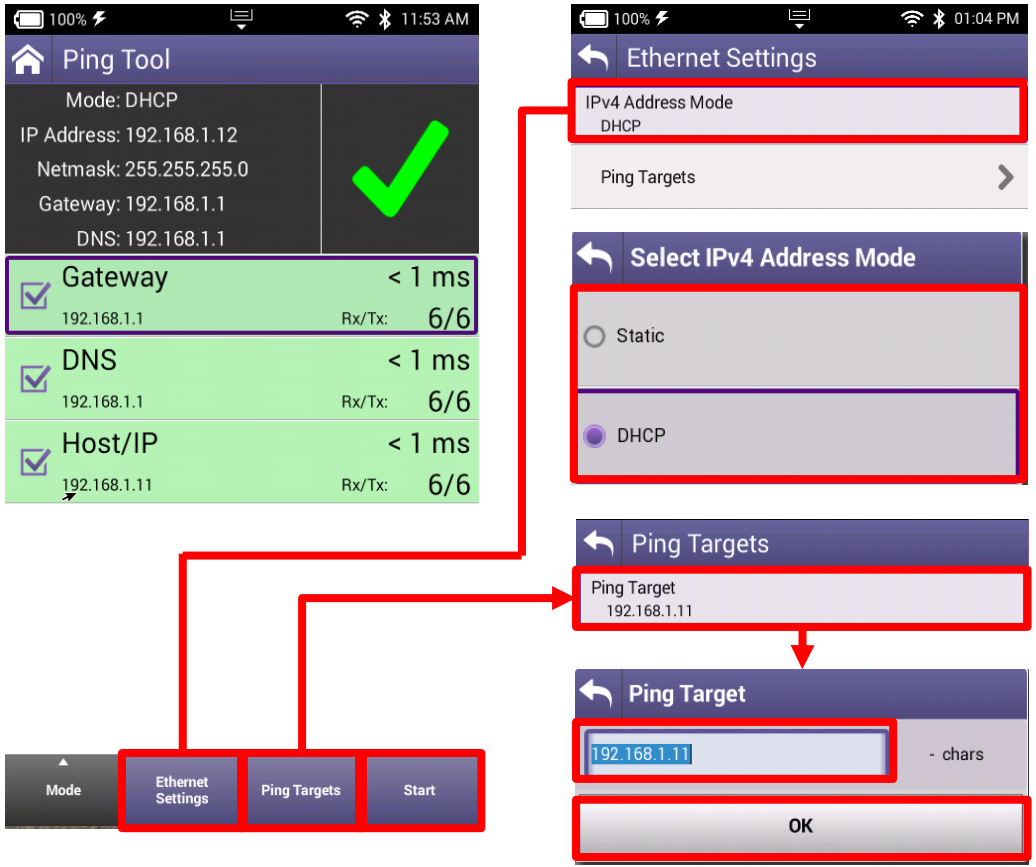
WIRING TOOLS - Hub Flash

HUB FLASH will allow the technician to “tone” out the ethernet on a far side router or switch using the cadence or speed of the port lights for identification



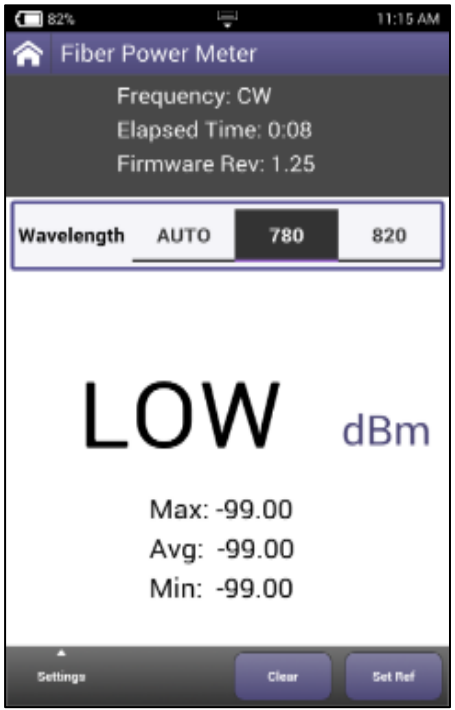


WIRING TOOLS - Ping Tool

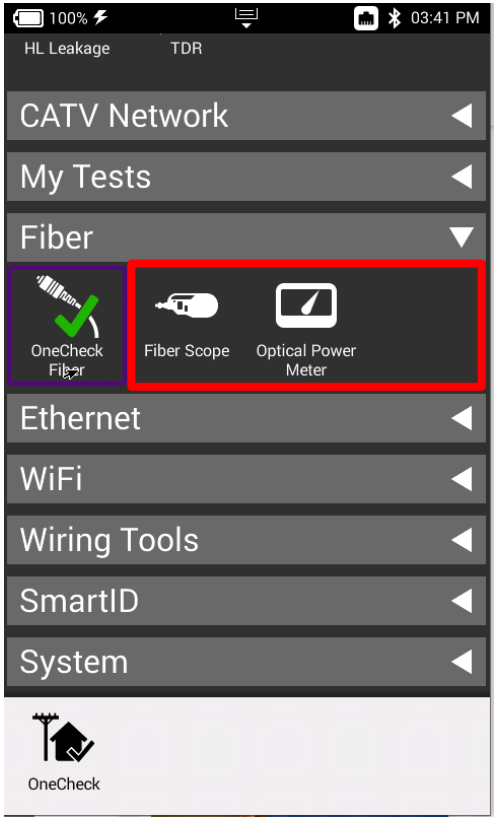


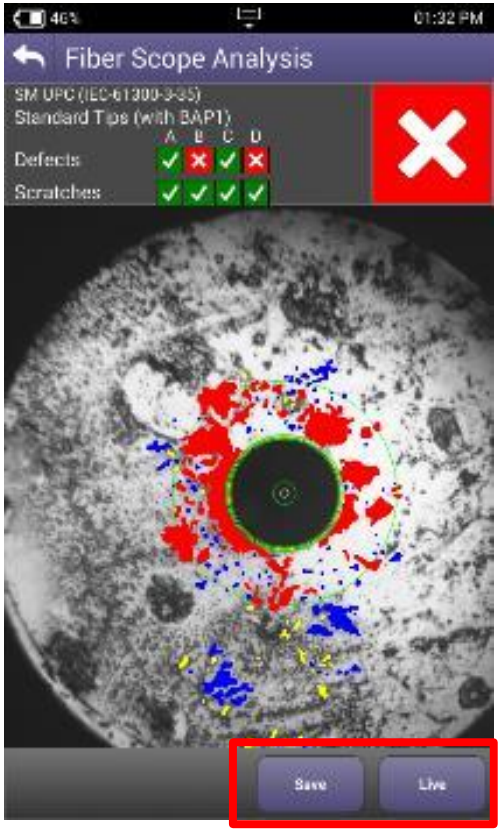
Fiber Optics

P5000i Fiber Microscope and MP-60/80 Optical Power Meter



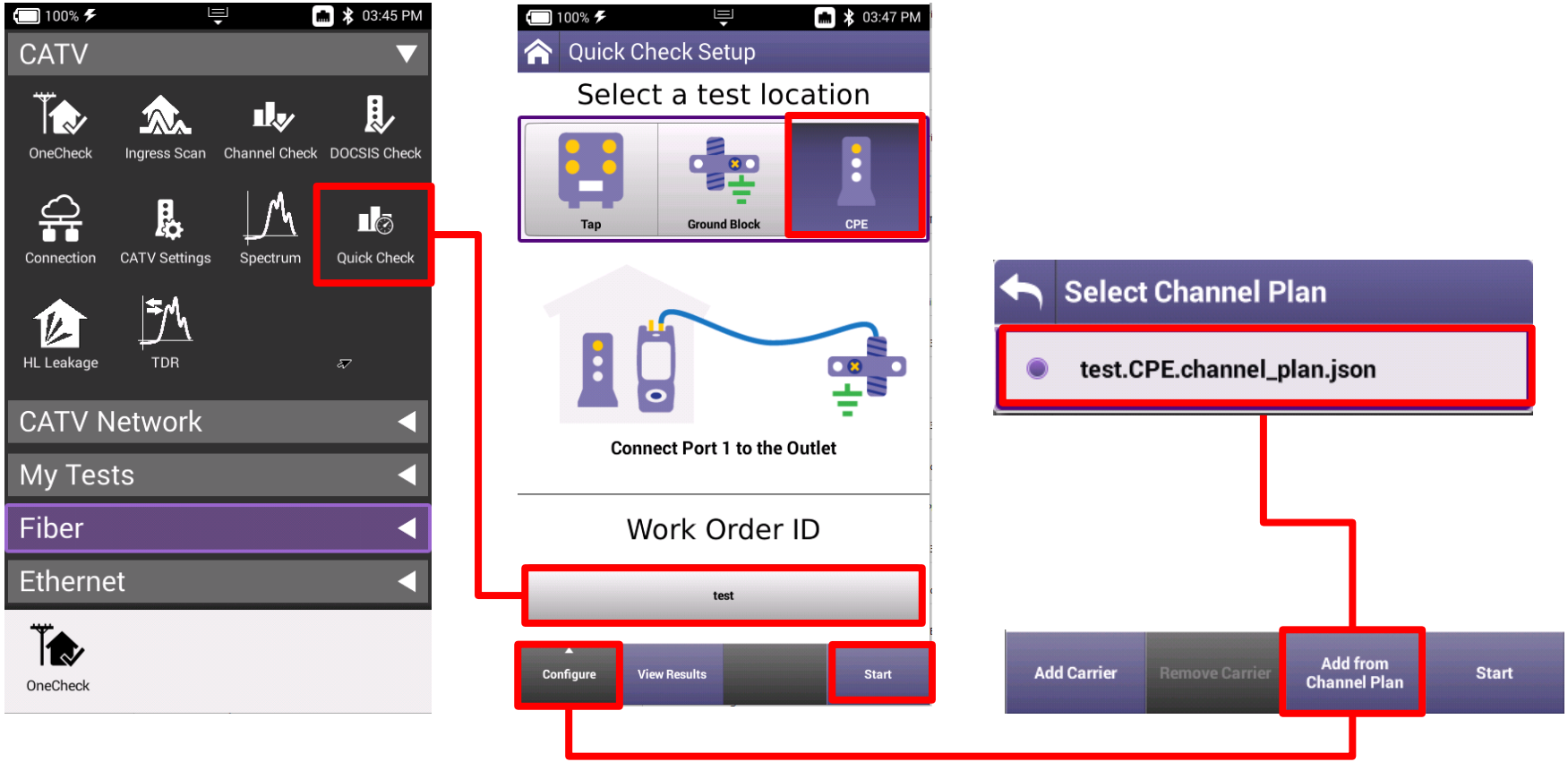
P5000i Probe Microscope



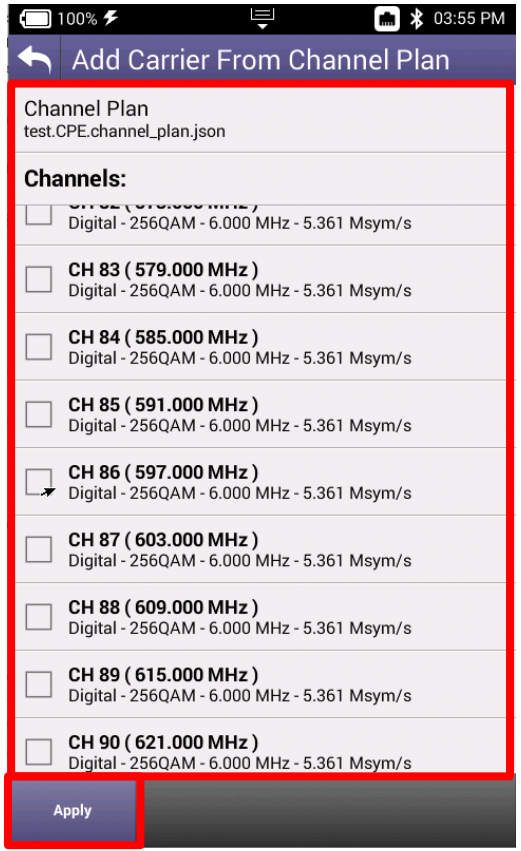


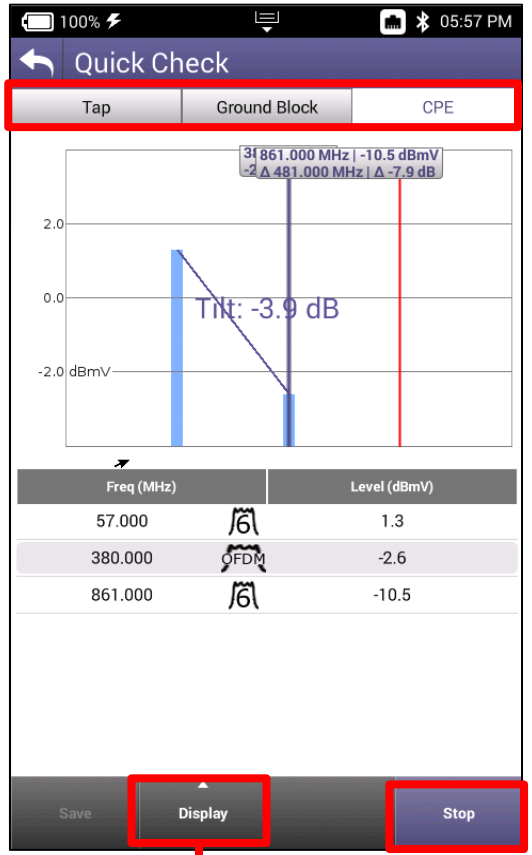
Quick Check

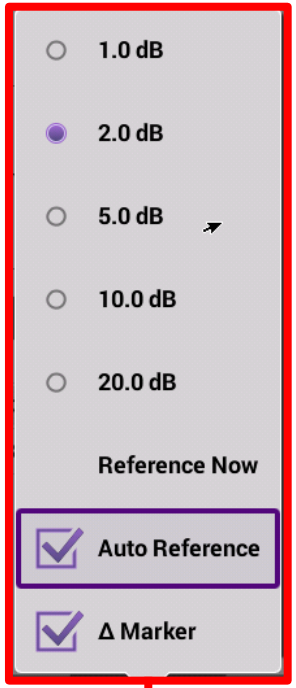
Quick Check



Quick Check

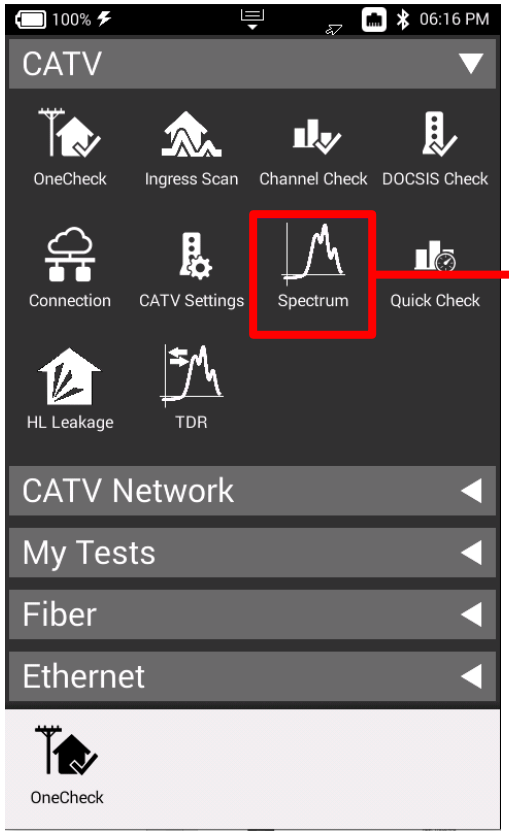


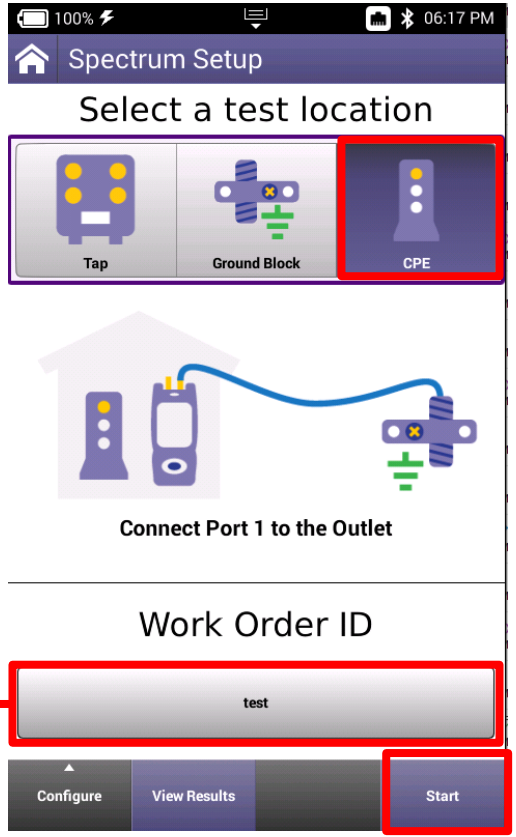


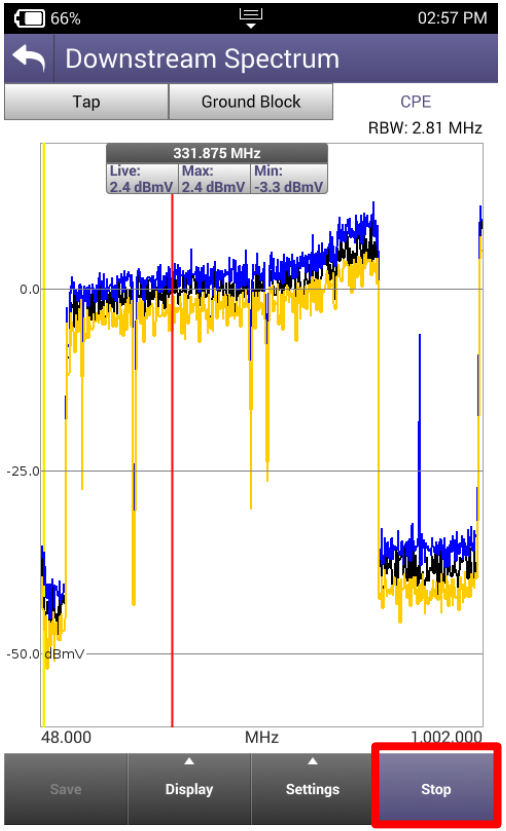


Spectrum

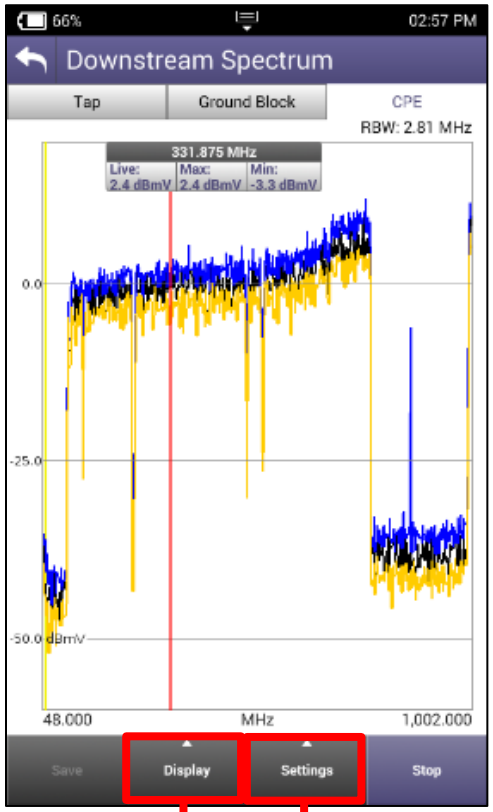
Spectrum

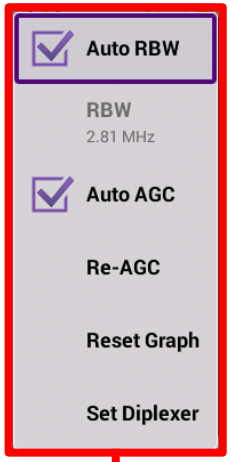


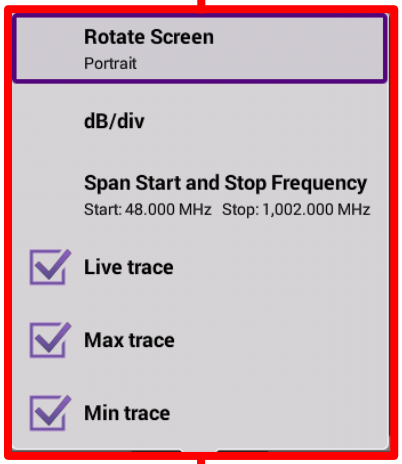


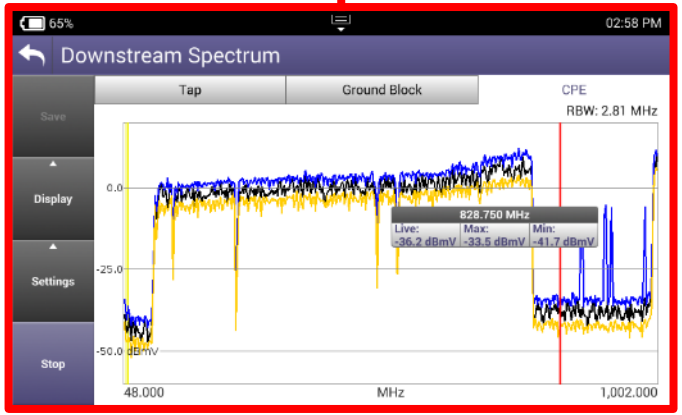


Spectrum



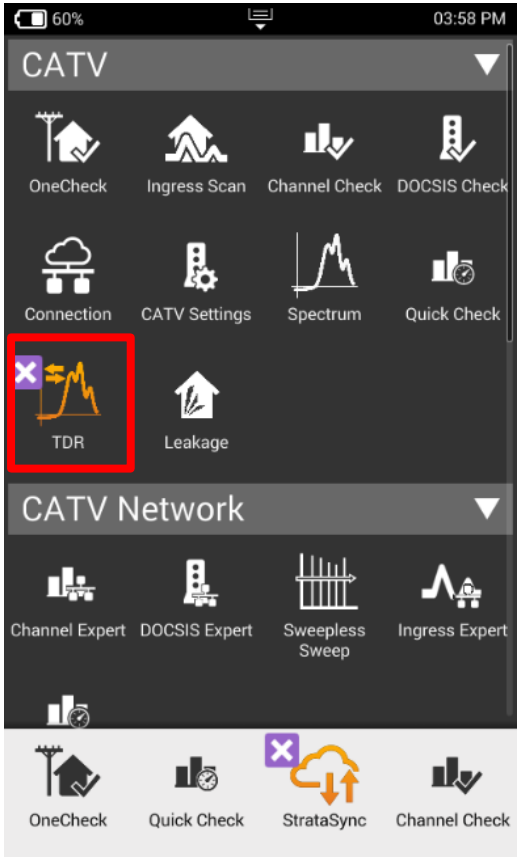




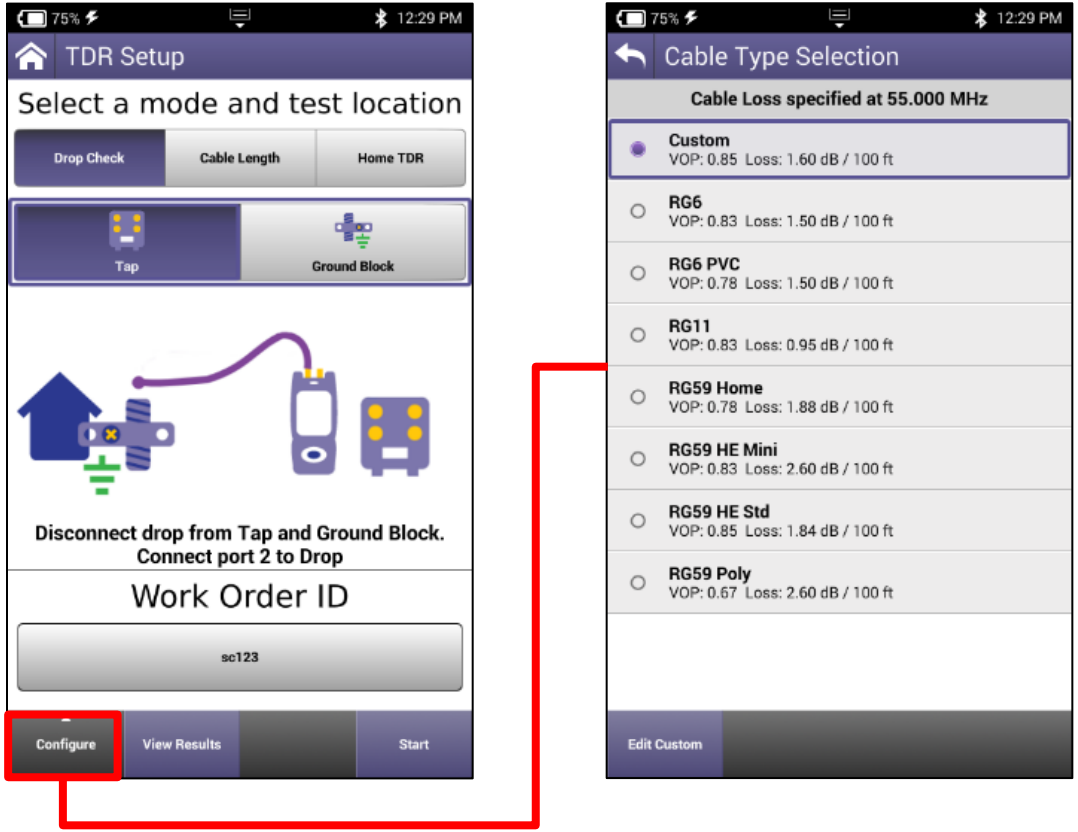


TDR

TDR



HOME TDR

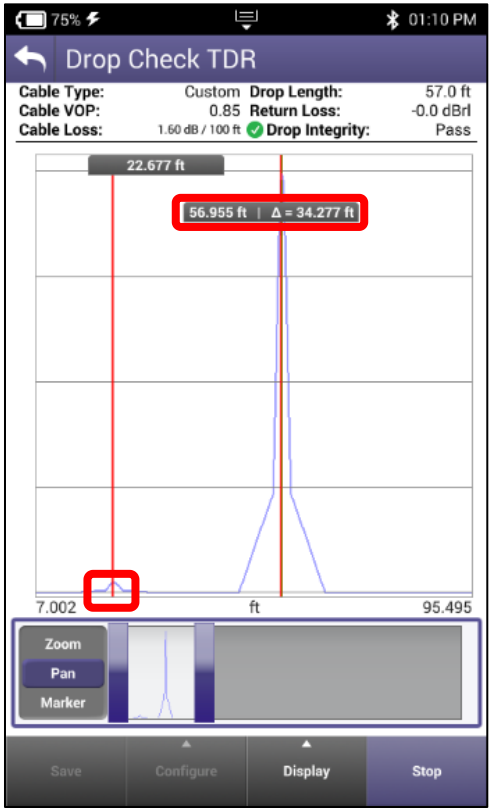


A TDR measures reflections based on time. Therefore the correct Velocity of Propagation for the cable to be tested must be chosen first.

VoP is essential for accurate distance measurements

TDR – DROP CHECK and CABLE LENGTH

Splice



DROP CHECK and CABLE LENGTH tabs are identical tests. The DROP CHECK simply reminds the user to disconnect the other end of the drop.

Displayed is a 57’ cable with a splice.

The splice is a small reflection at 22’ while the open end of the cable is a larger reflection at 57’.

TDR - HOME TDR

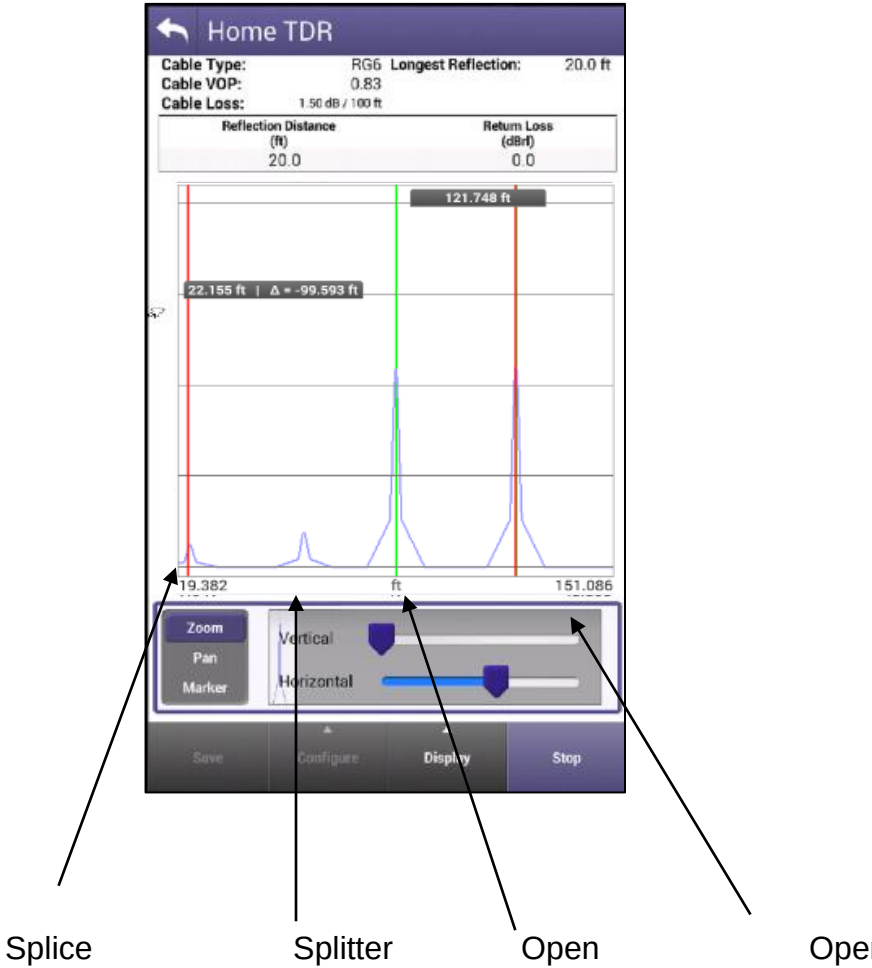
HOME TDR test is designed to display splices, splits and cable lengths.

Example to the left still shows the splice at 22’ with a splitter at 57’and 2 cables connected to the splitter with open ends.

HOME TDR displays all 4 events.

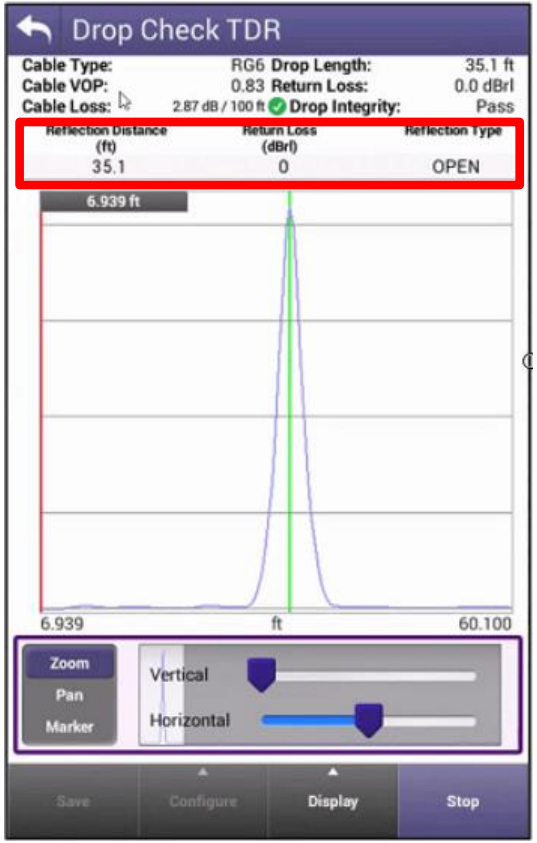
Markers can be added for relative distances under from the display button.

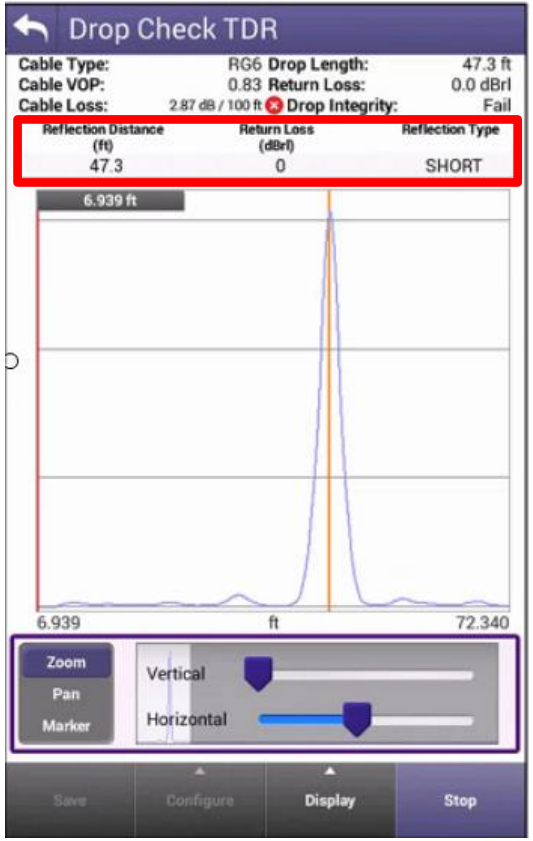
Horizontal Zoom and Pan functions are at the bottom of the display



TDR Mode-Drop Check Update

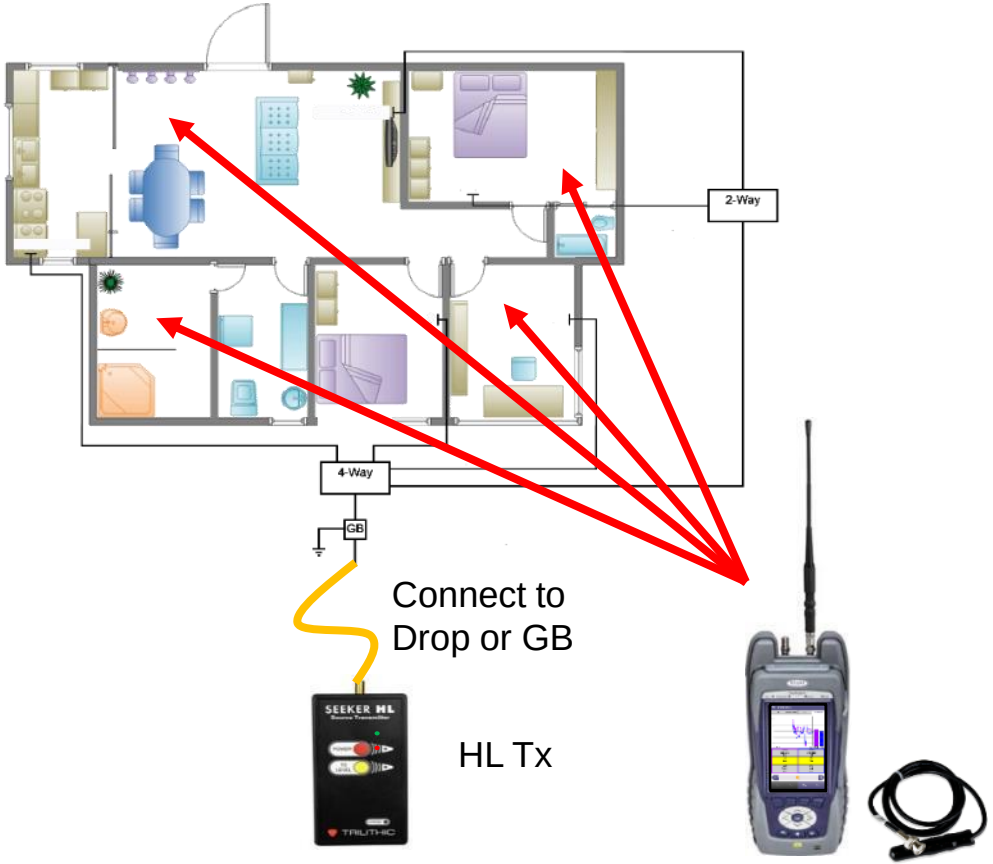
- New Ability to determine if reflection is a short or open
- Added a reflection table to the Drop Check mode to better understand what the ONX has discovered
  - Distance to reflection (ft)
  - Return Loss (dBrl
  - Reflection Type (open/short)





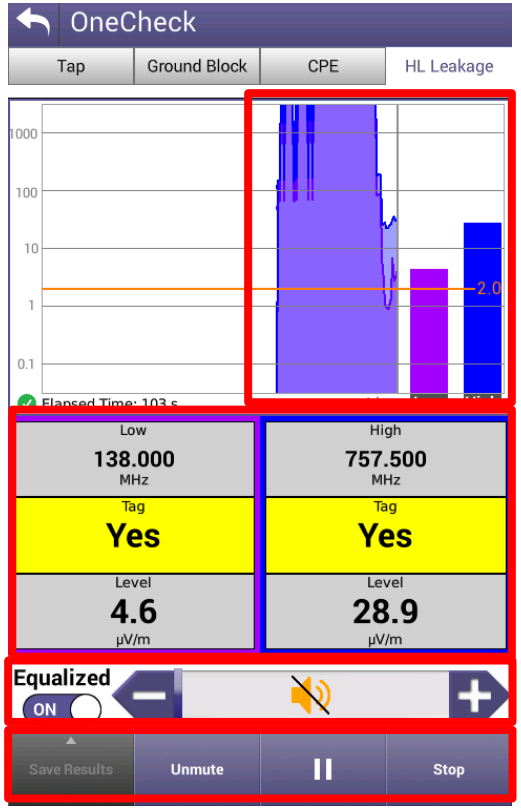
HL Leakage with Transmitter

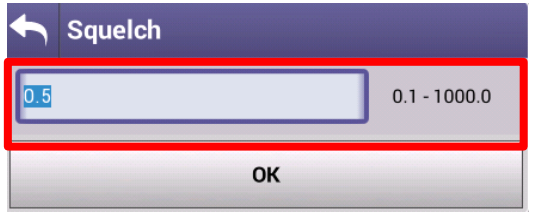
HL Leakage with Transmitter

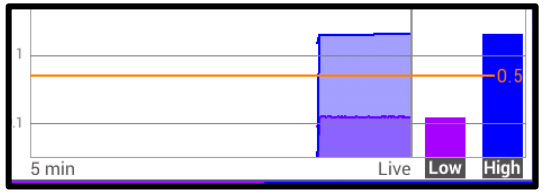


- Connect HL TRANSMITTER to GB or DROP and turn unit on.
- Proceed to attach ANTENNA to OneExpert CATV Port 1 and walk around the home or business
- Required Equipment Includes:
  - ONX-620 or ONX-630 with DOCSIS 3.1 hardware
  - HL Leakage software option must be present on the OneExpert CATV
  - HL Leakage Transmitter (60dBmv output [RED LIGHT] and 40dBmv output [GREEN LIGHT])
  - HL Leakage Antennas
    - 4a) Dual band rubber duck antenna
    - 4b) Near-Field Probe antenna
    - Used for detecting leaks when attached to OneExpert CATV
    - Tuned for 138MHz and 757.5MHz

HL Leakage with Transmitter







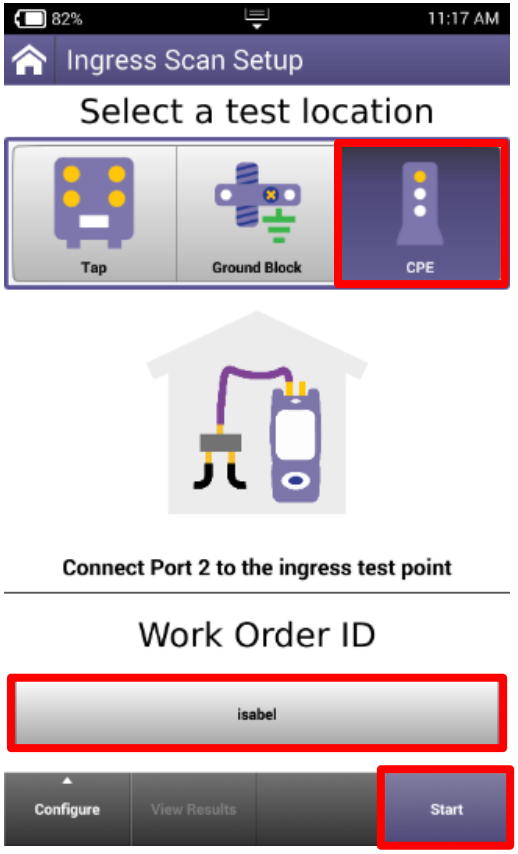
Leaks will be shown over time on the HL LEAKAGE display, while also emitting a siren that will signal proximity to leak

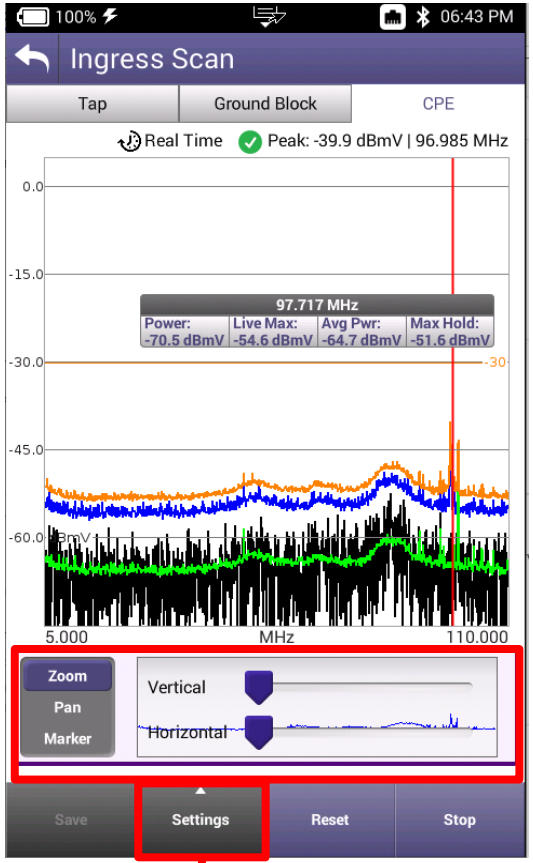
MUTE or UNMUTE and VOLUME controls as well as PAUSE and STOP/RETEST will be displayed across the bottom

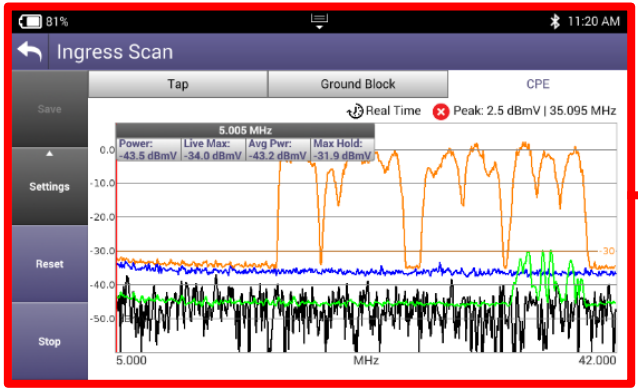
Since HL Leakage is LIVE, select STOP before adjusting the SQUELCH limit

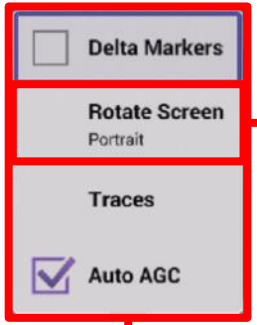
Ingress Scan

Ingress Scan

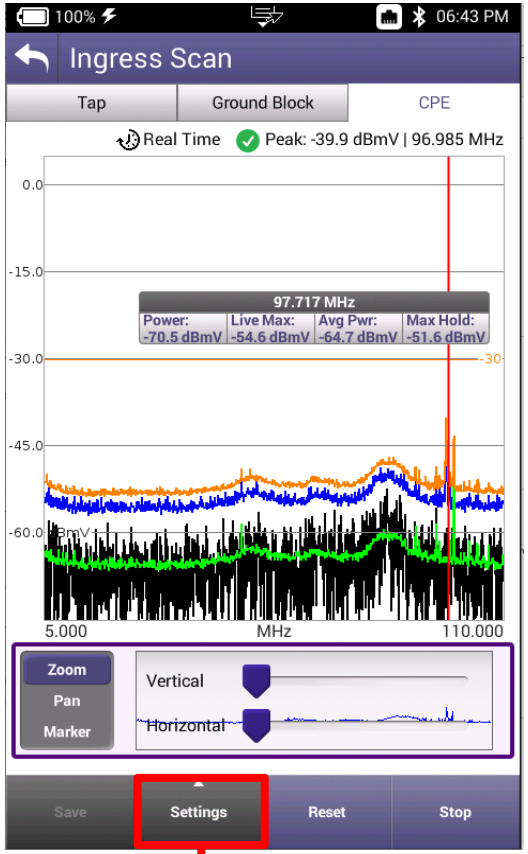


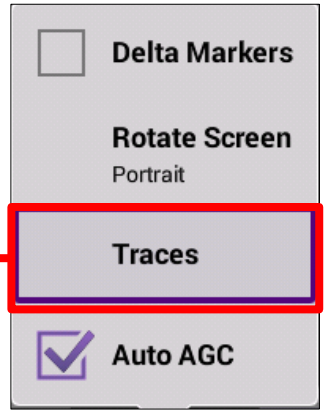


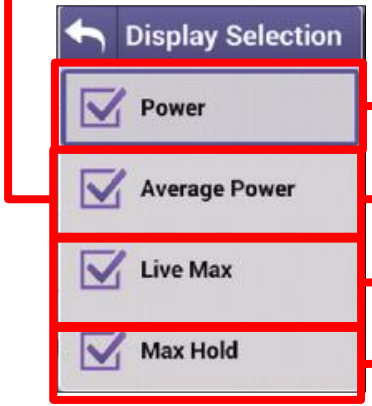


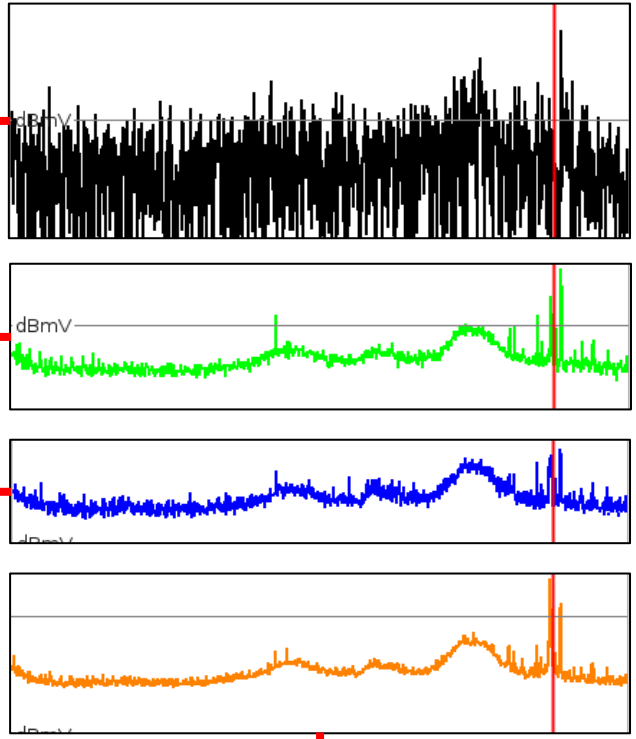


Ingress Scan



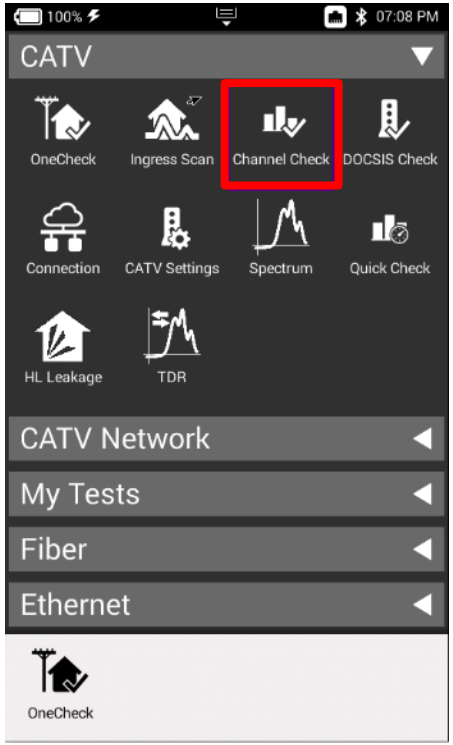


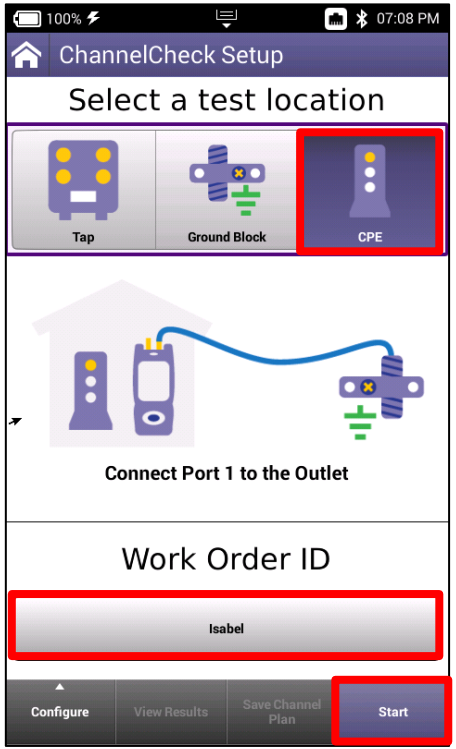


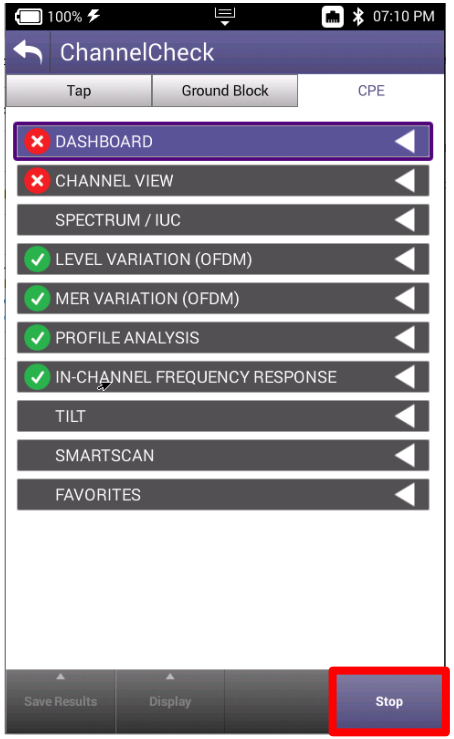


Channel Check

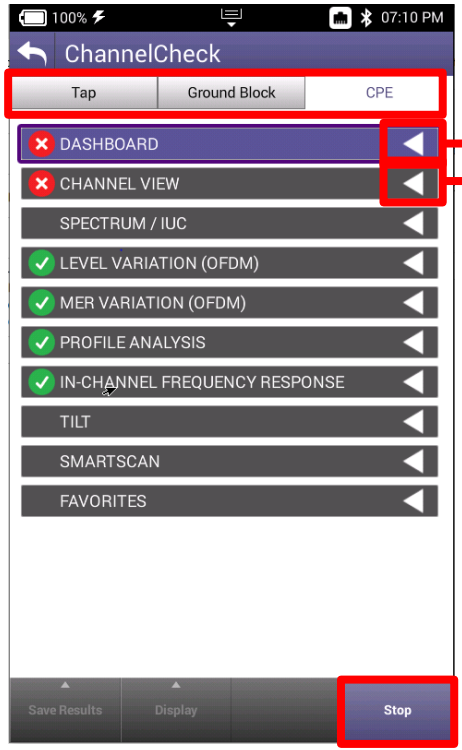
Channel Check

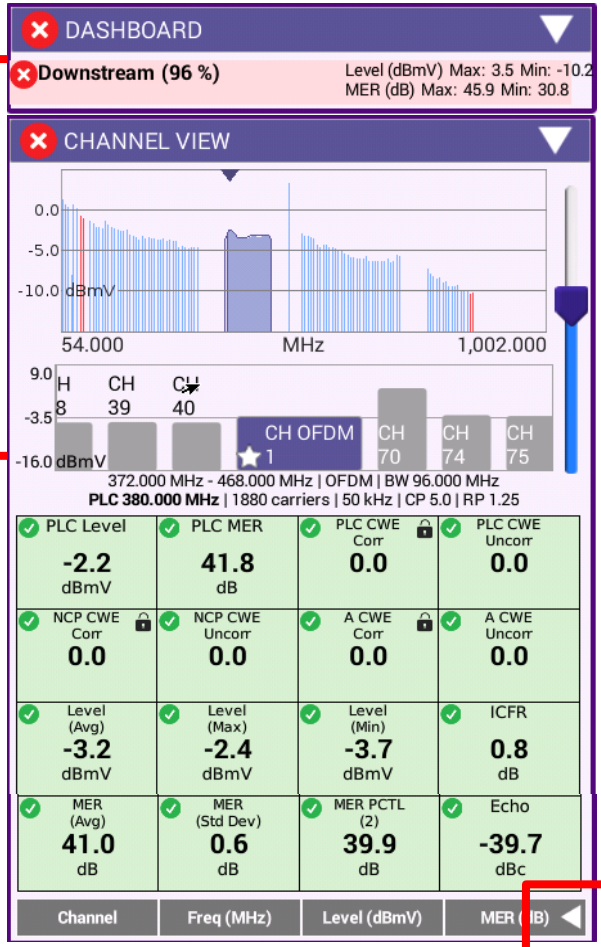






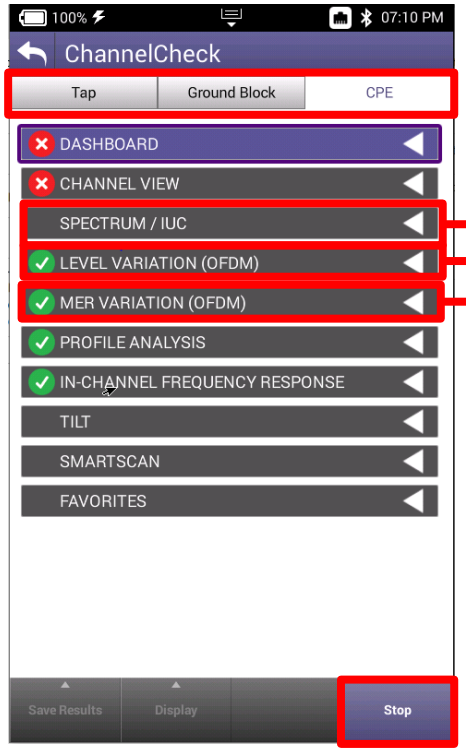
Channel Check

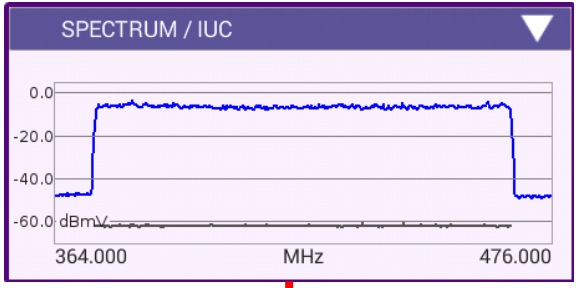


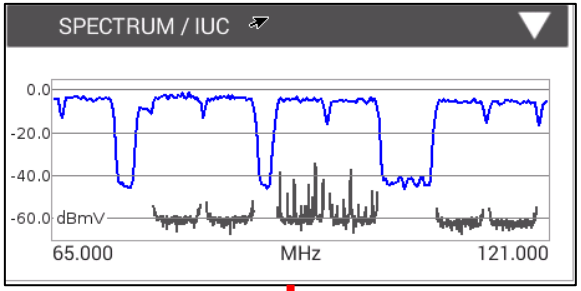


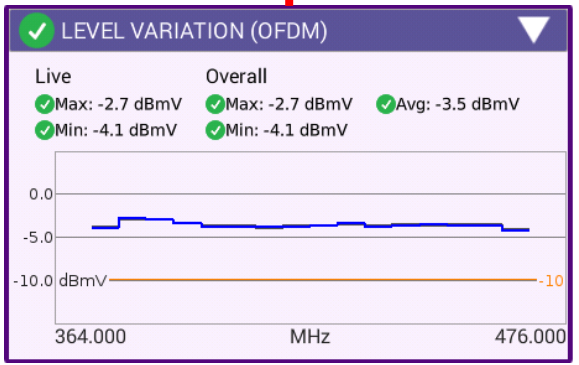
Channel	Freq (MHz)	Level (dBmV)	MER (dB)
37	303.000	-4.6	42.5
38	309.000	-4.7	42.5
39	315.000	-4.6	42.6
40	321.000	-4.6	42.5
OFDM 1	380.000	-3.2	—
70	499.250	3.4	—
74	525.000	-2.9	45.8
75	531.000	-3.1	45.8
76	537.000	-3.2	45.6

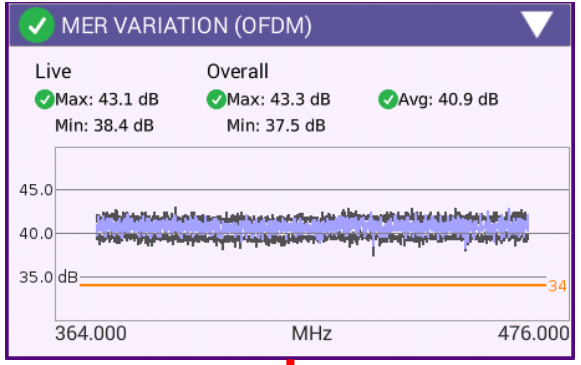
Channel Check



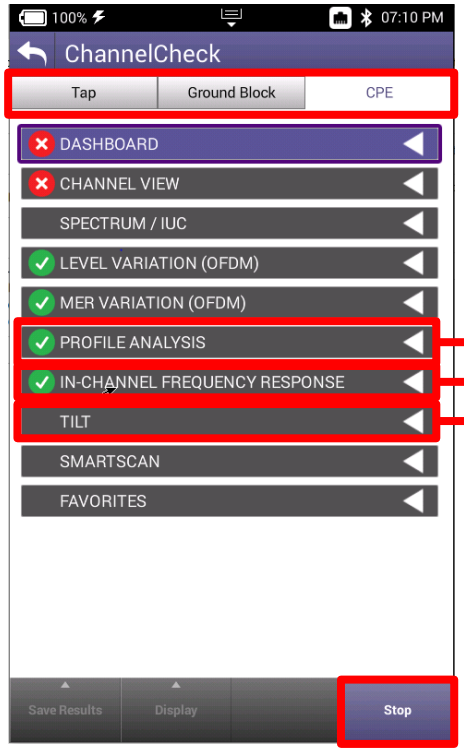


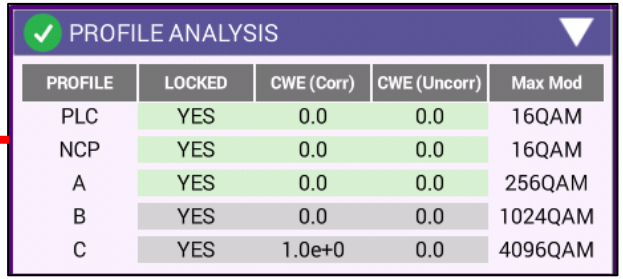


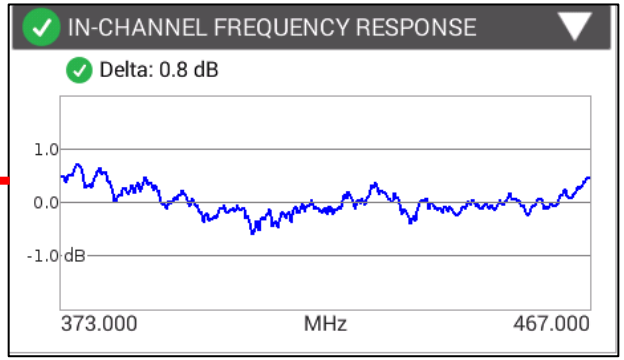


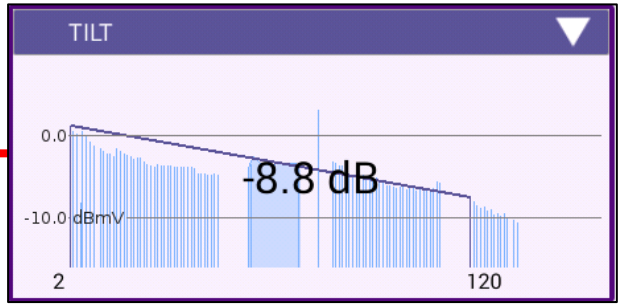


Channel Check

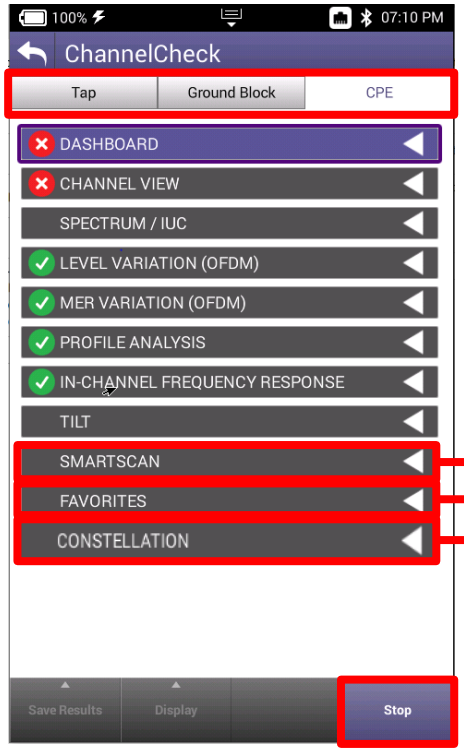


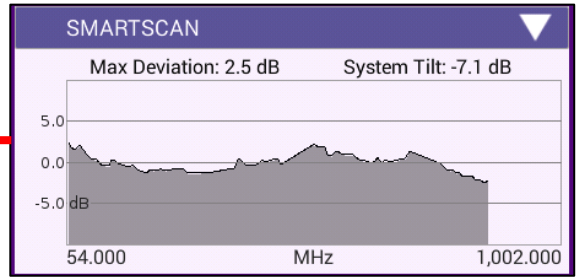


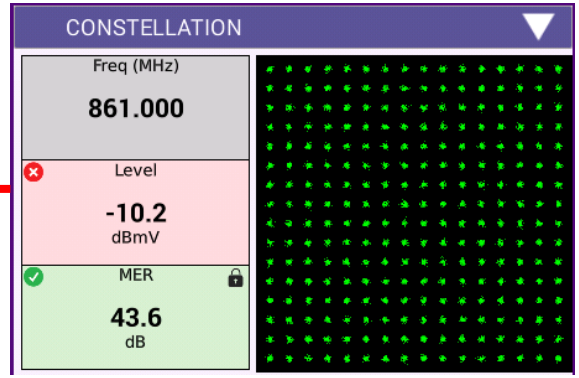


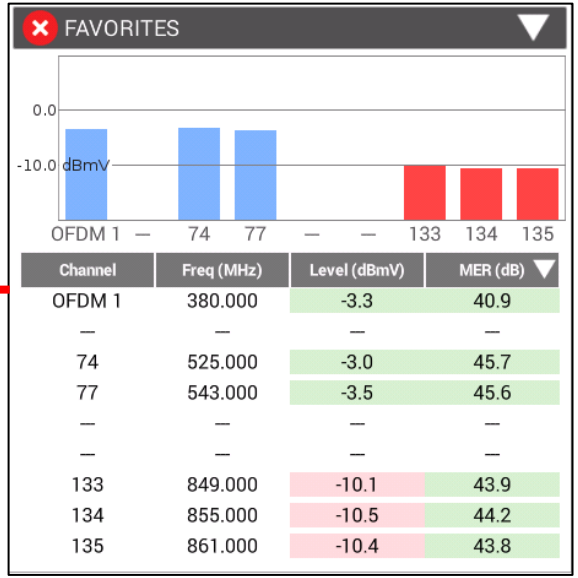


Channel Check





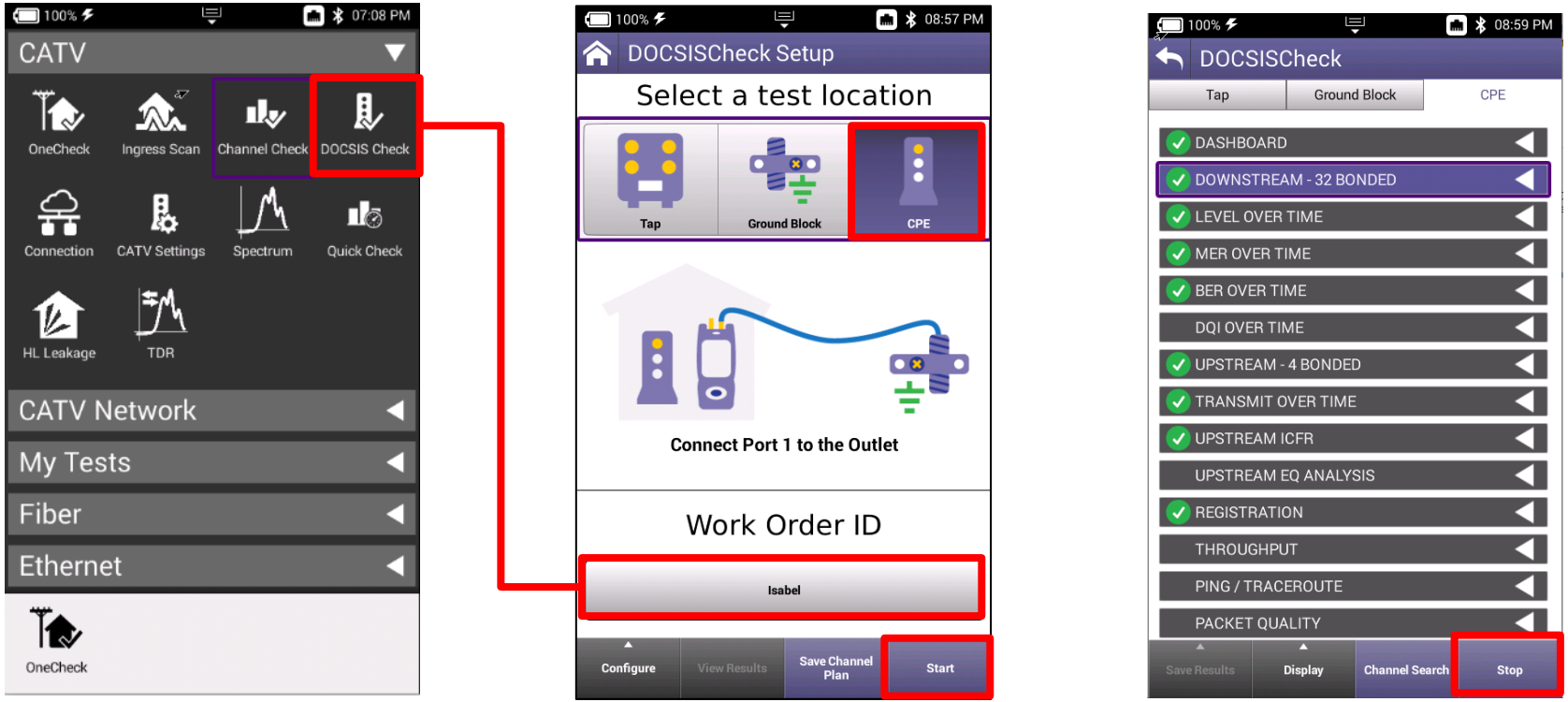




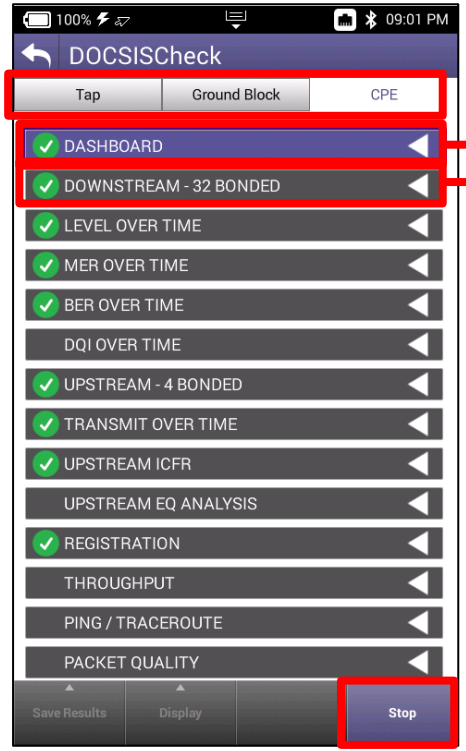
Channel	Freq (MHz)	Level (dBmV)	MER (dB)
OFDM 1	380.000	-3.3	40.9
—	—	—	—
74	525.000	-3.0	45.7
77	543.000	-3.5	45.6
—	—	—	—
—	—	—	—
133	849.000	-10.1	43.9
134	855.000	-10.5	44.2
135	861.000	-10.4	43.8

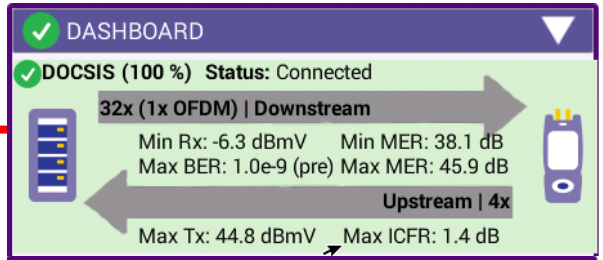
DOCSIS Check

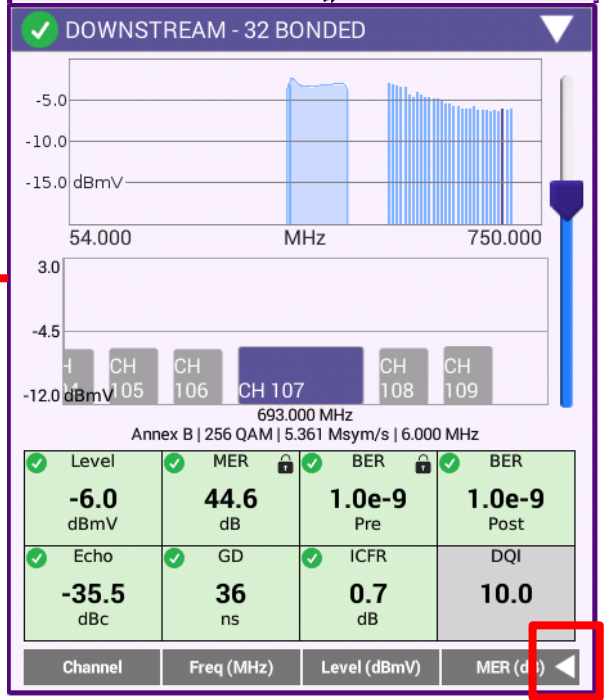
DOCSIS Check



DOCSIS Check

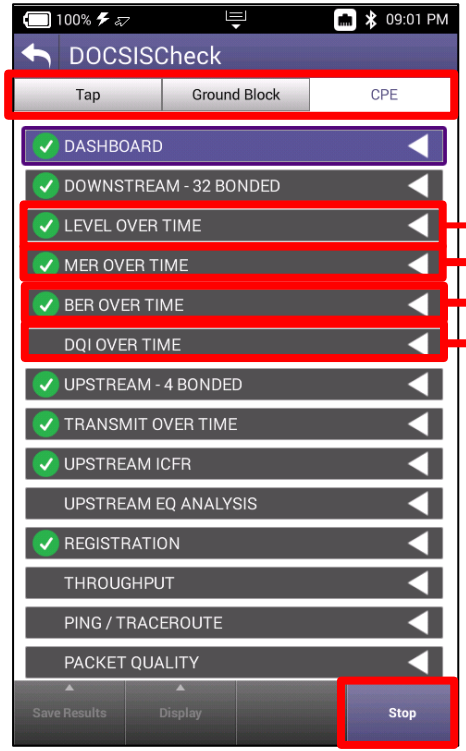


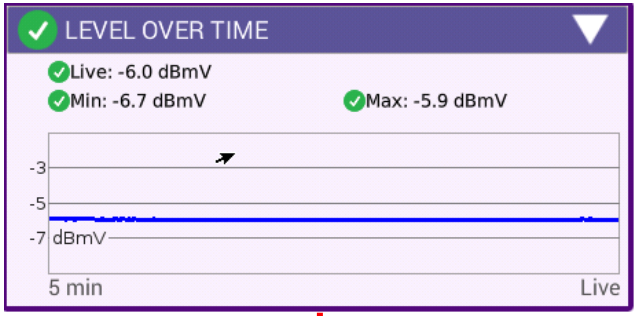


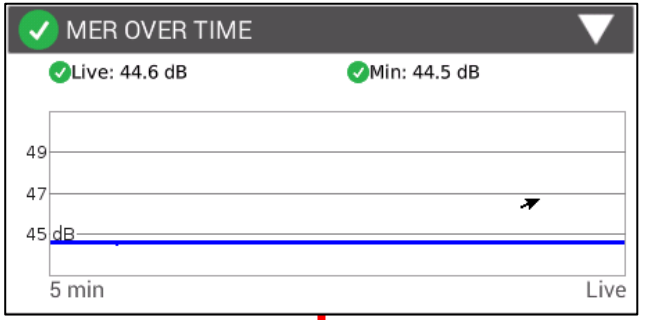


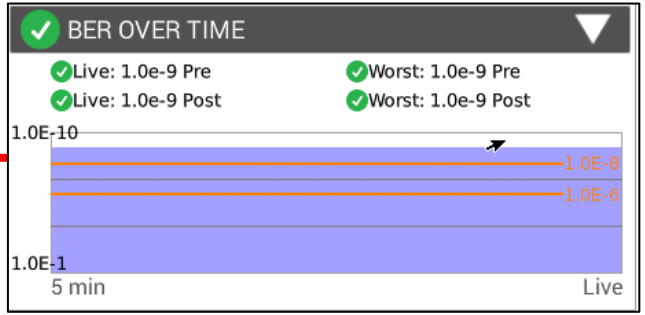
Channel	Freq (MHz)	Level (dBmV)	MER (dB)
103	669.000	-6.1	44.3
104	675.000	-6.3	44.6
105	681.000	-6.2	44.6
106	687.000	-6.3	44.2
107	693.000	-6.0	44.6
108	699.000	-6.2	44.6
109	705.000	-6.0	44.5

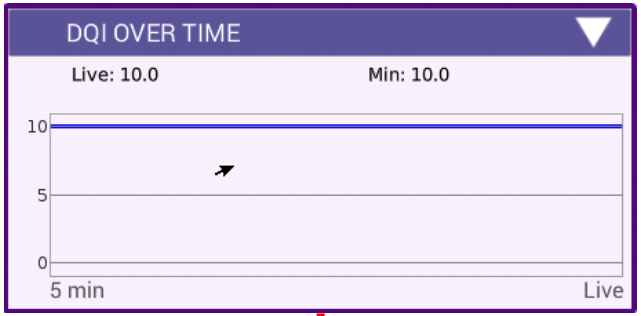
DOCSIS Check



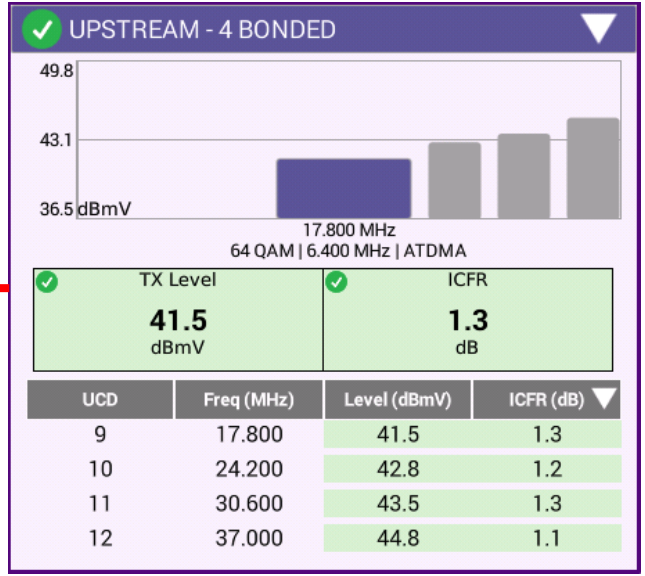


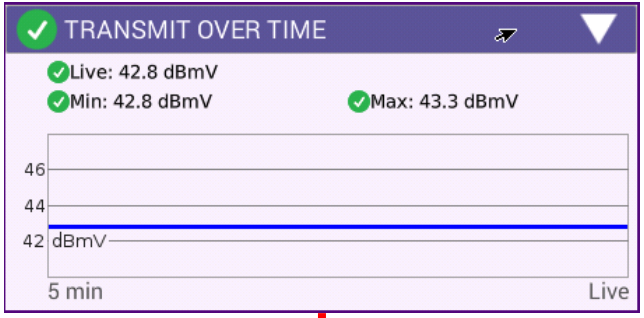


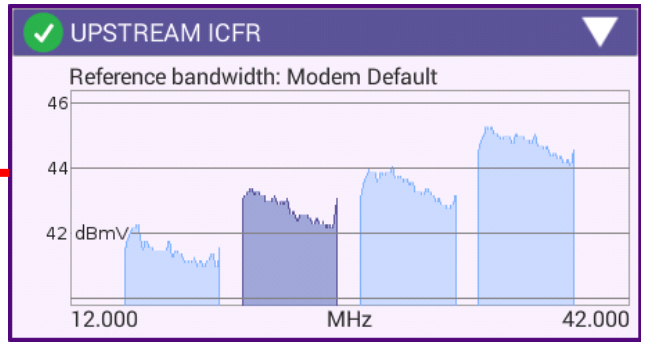


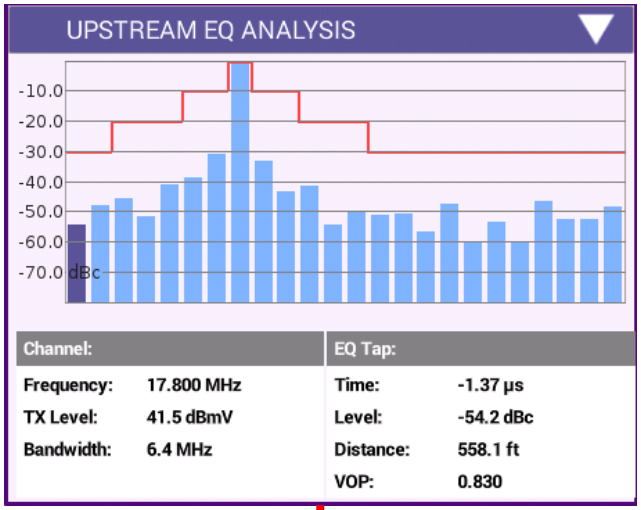


DOCSIS Check

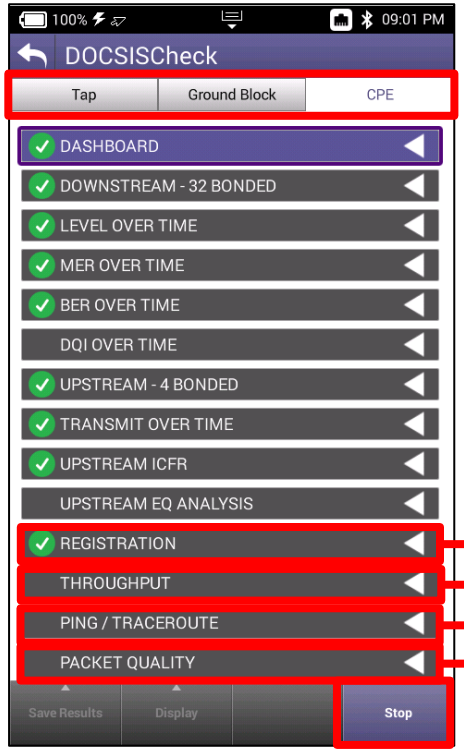


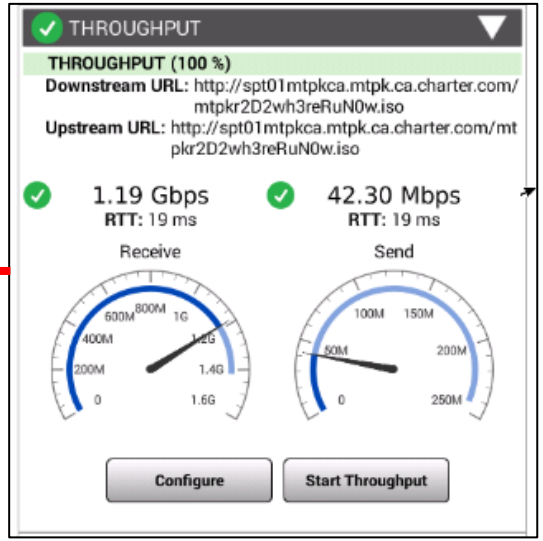


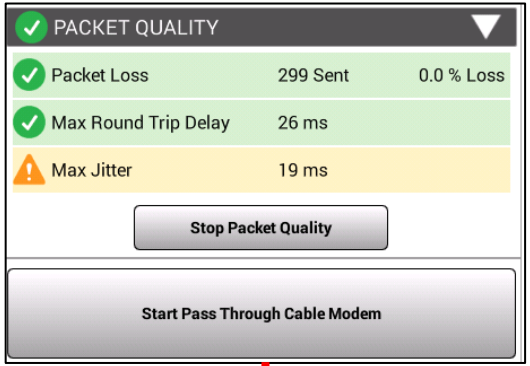




DOCSIS Check

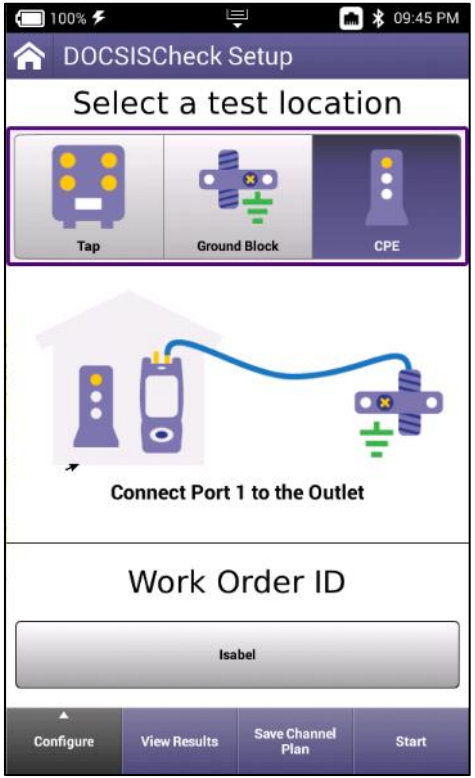




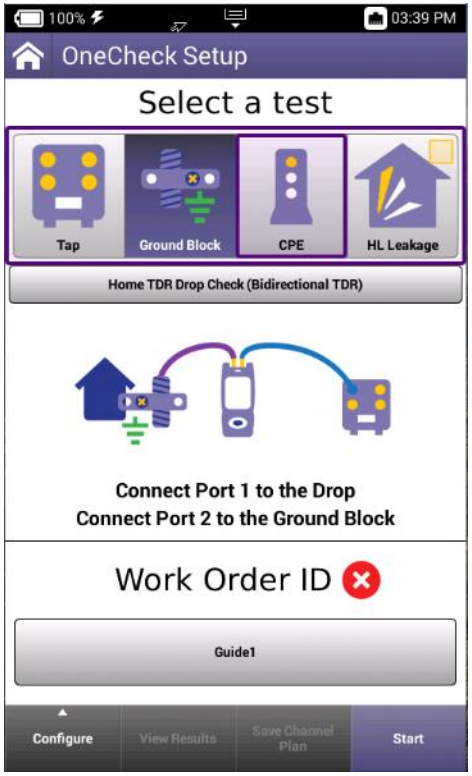


One Check

One Check

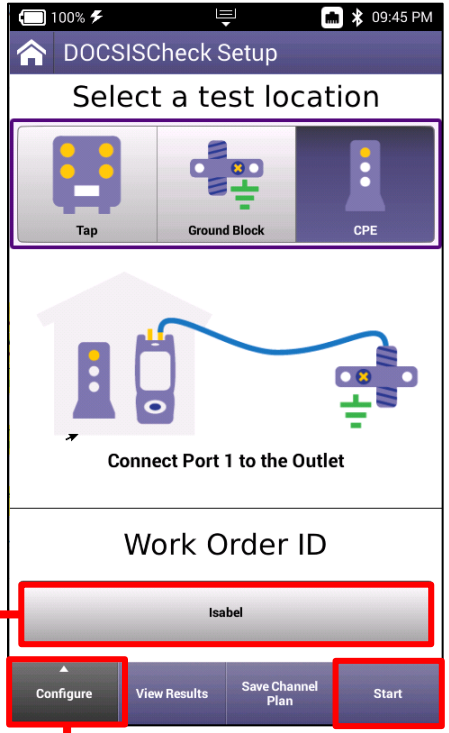


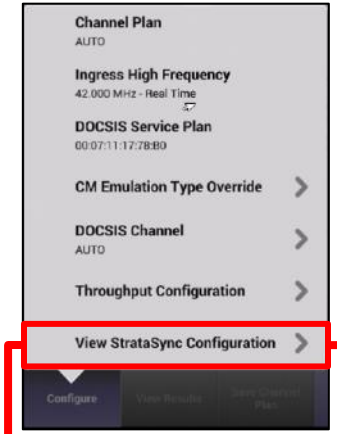
One Check without HL Leakage Requirement (Default)

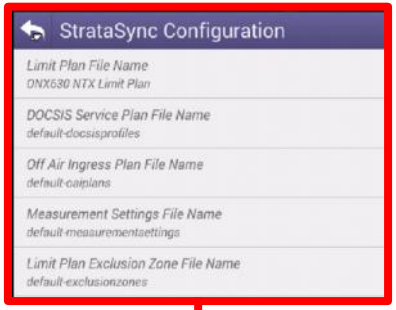


One Check with HL Leakage Requirement

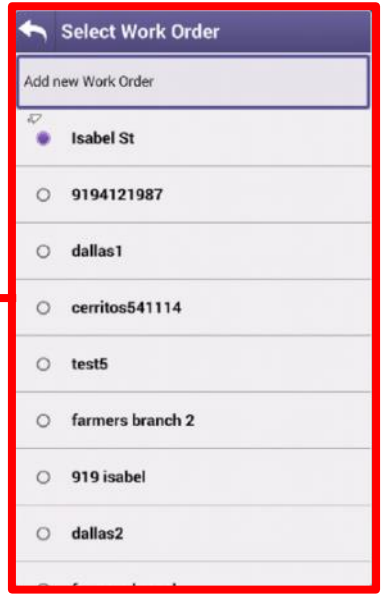
One Check

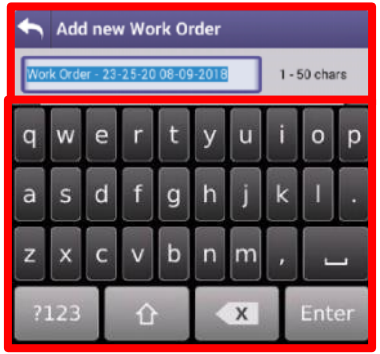




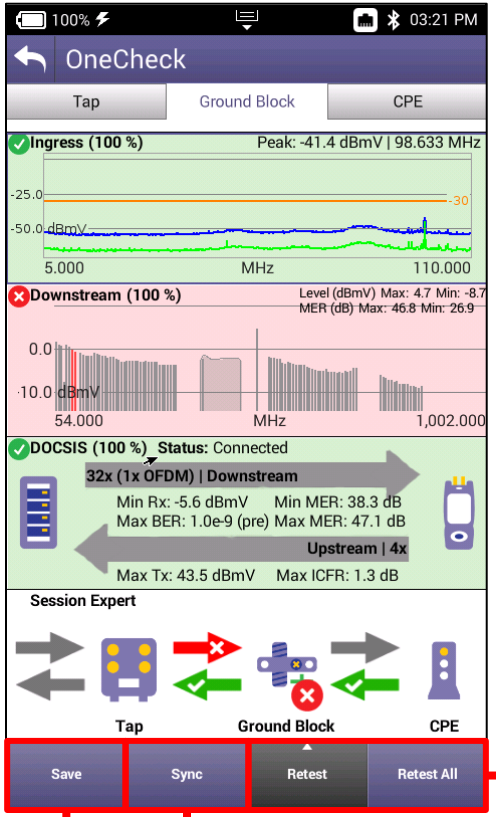


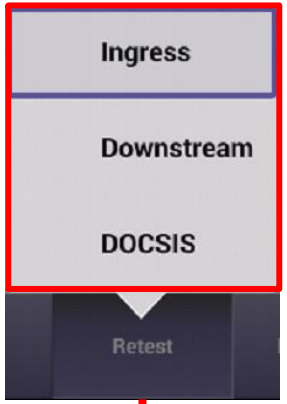
User can verify that configurations are correct and up to date by selecting VIEW STRASYNC CONFIGURATION

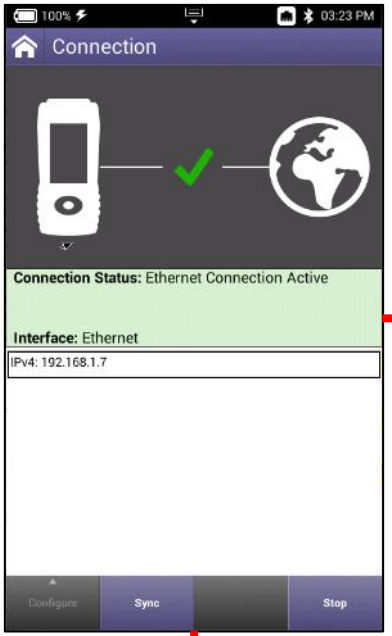


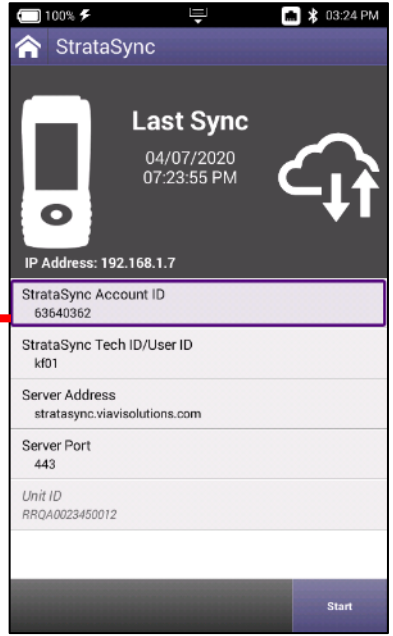


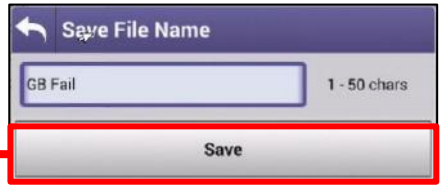
One Check



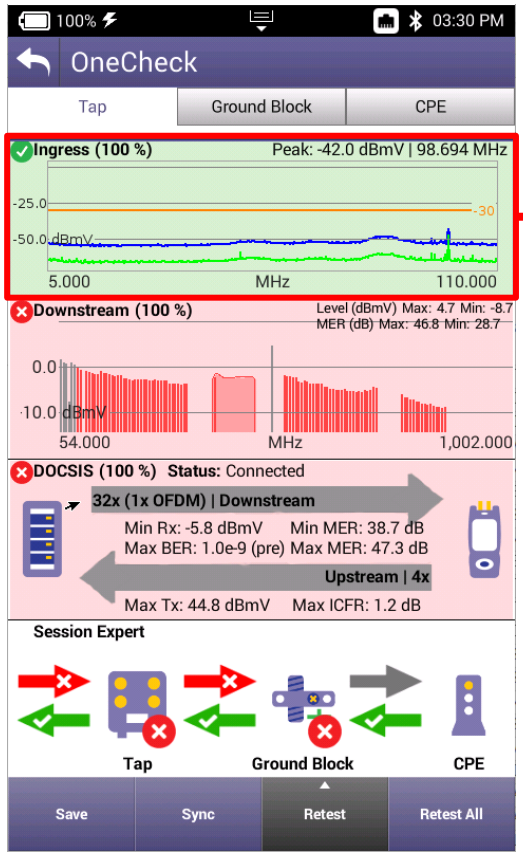


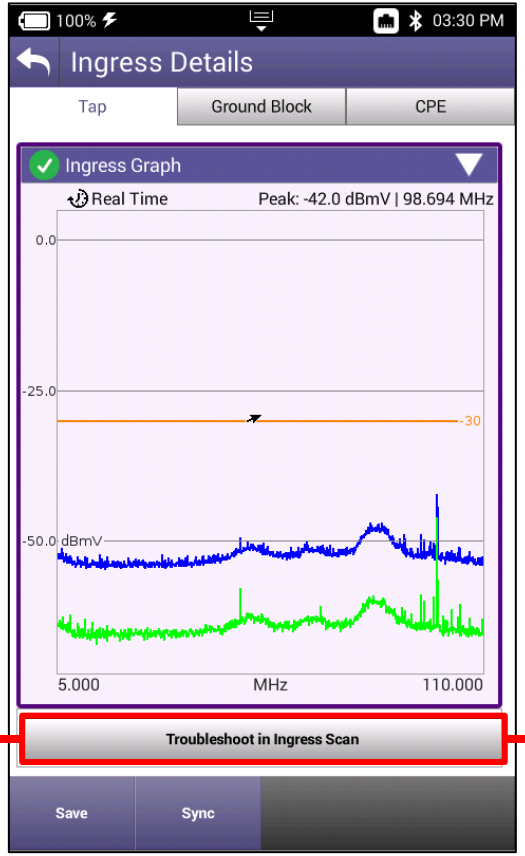


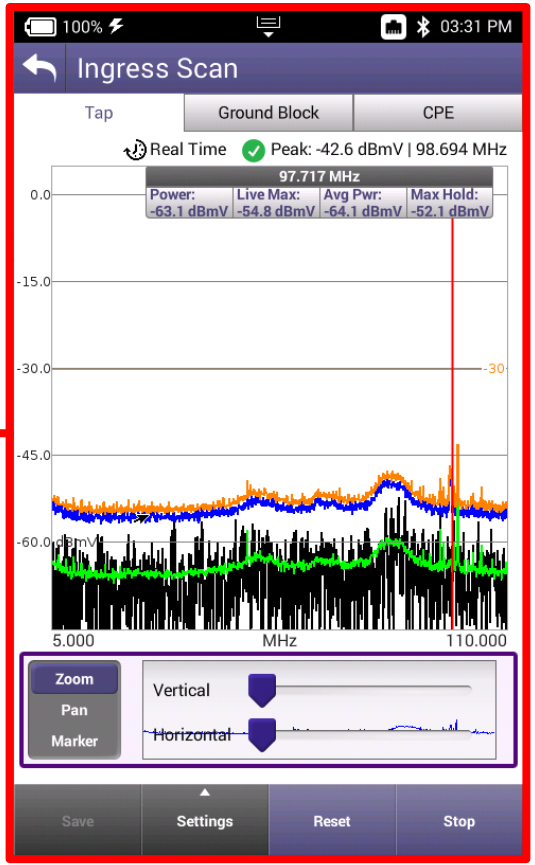




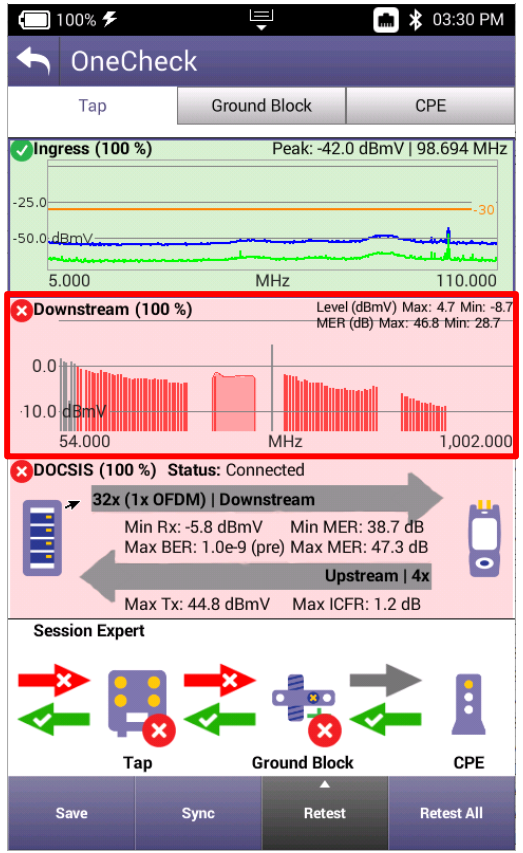
One Check - Ingress

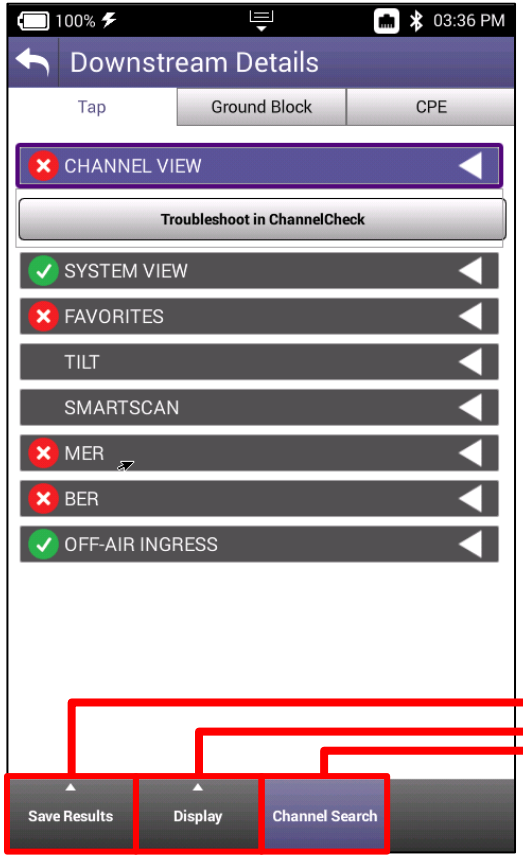


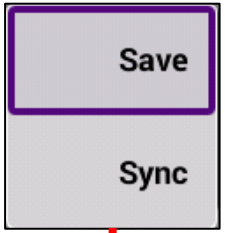


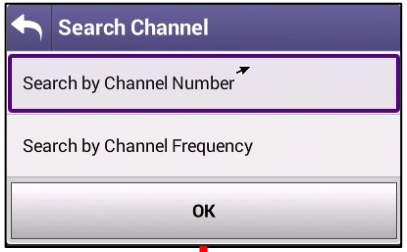


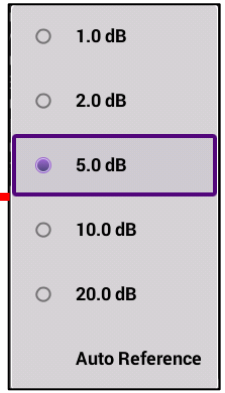
One Check - Downstream



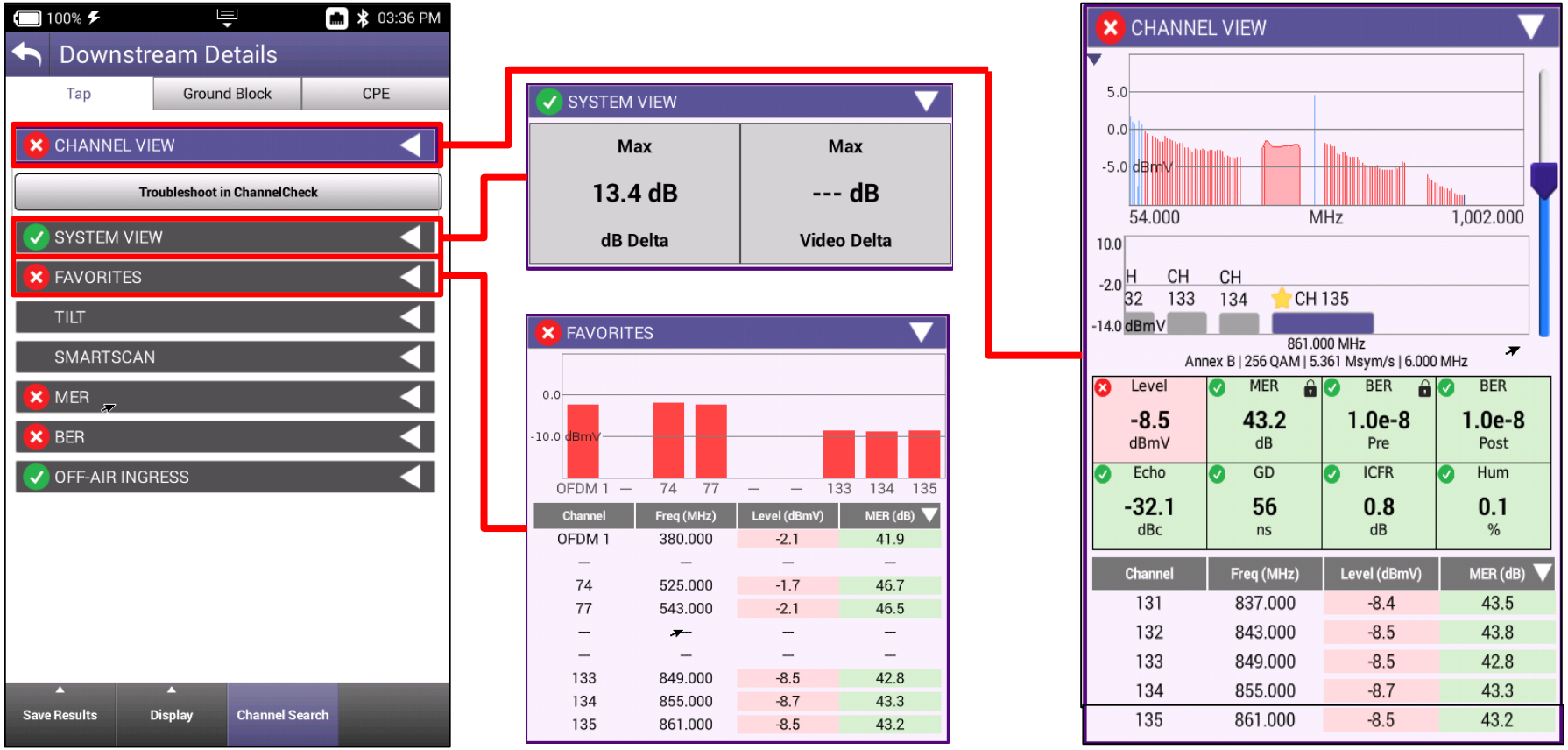




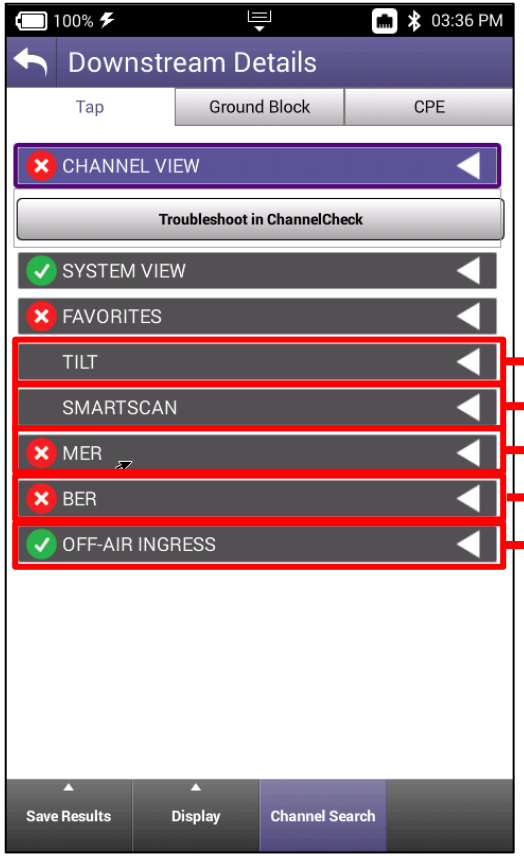


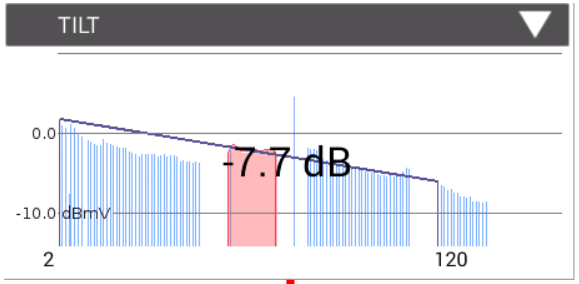


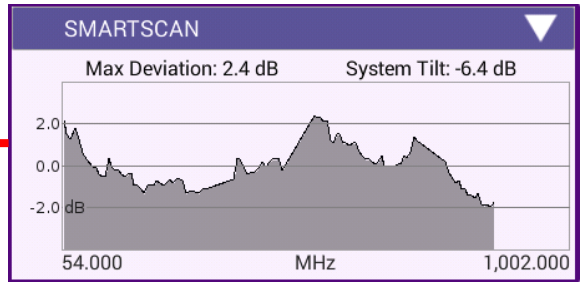
One Check - Downstream

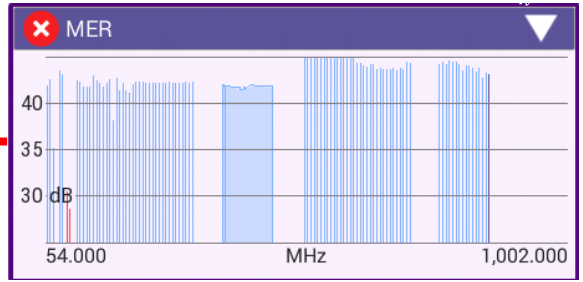


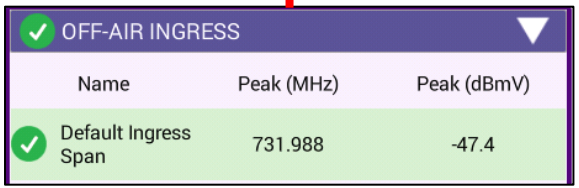
One Check - Downstream

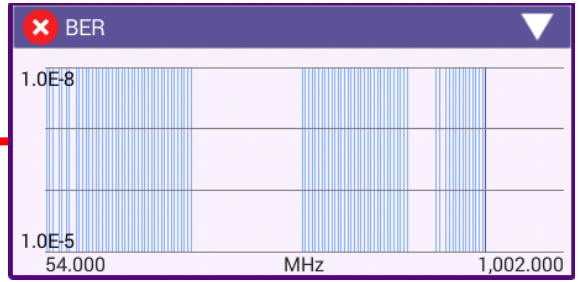




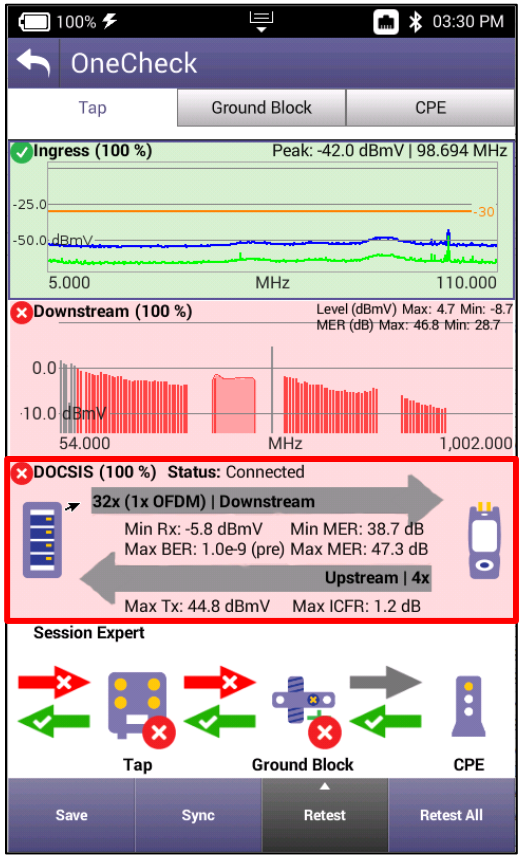


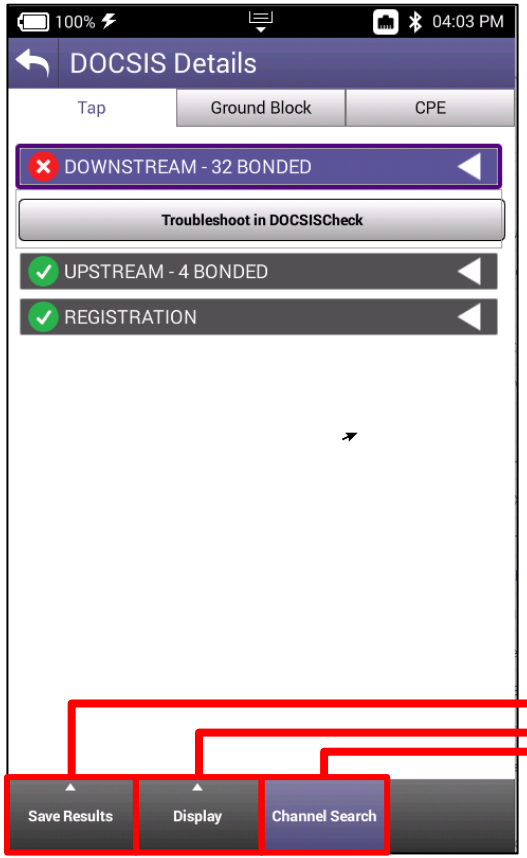


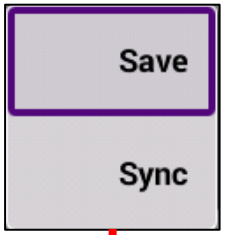


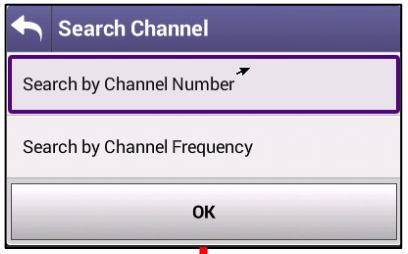


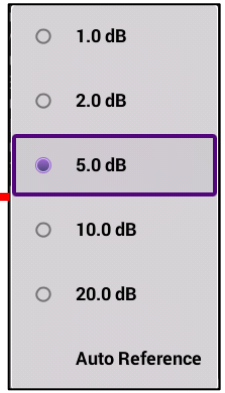
One Check - Upstream



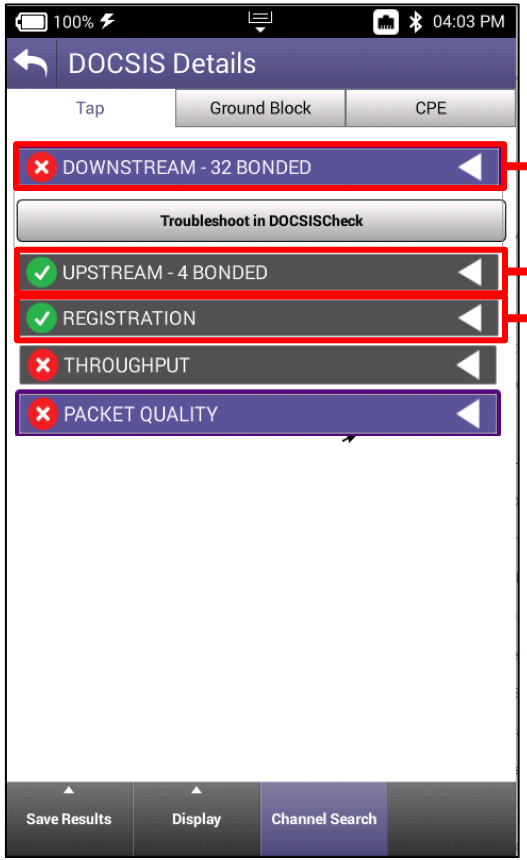


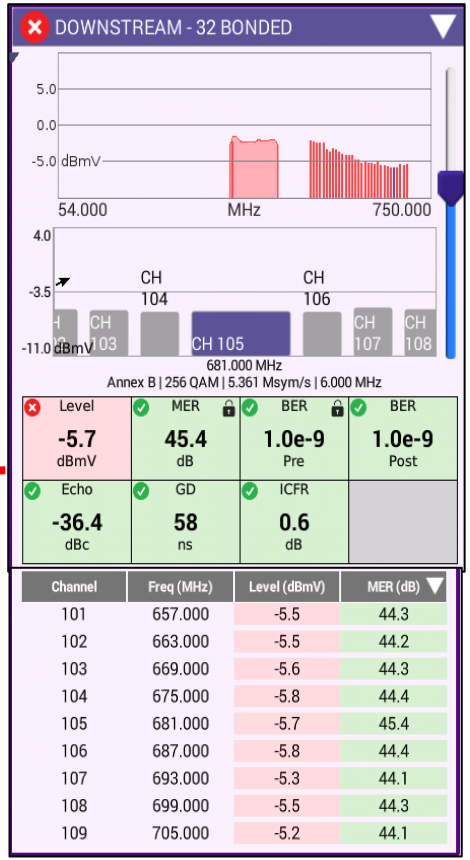


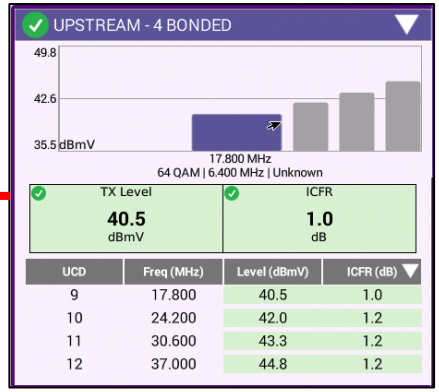


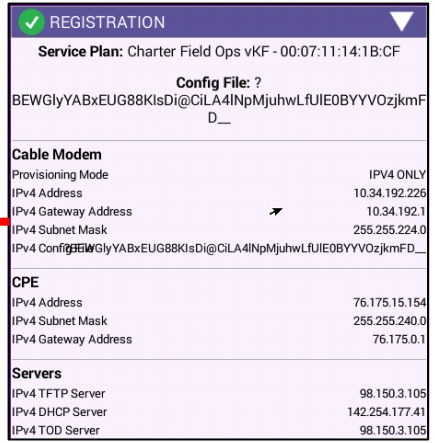


One Check - Upstream

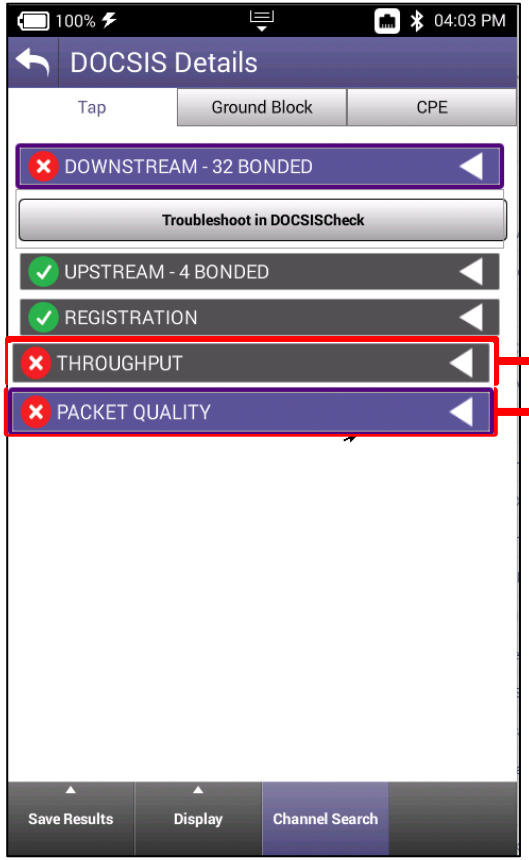


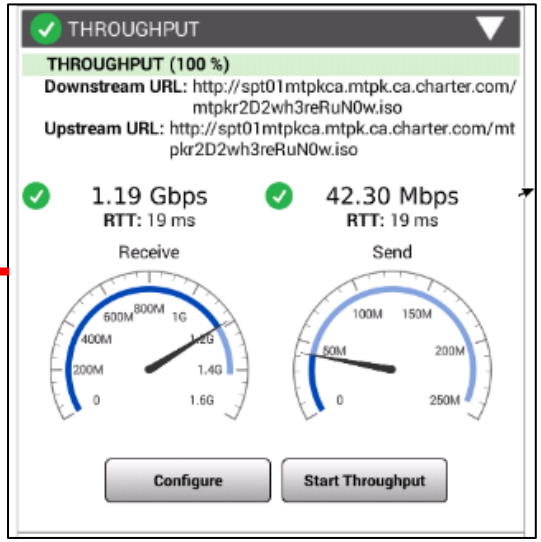


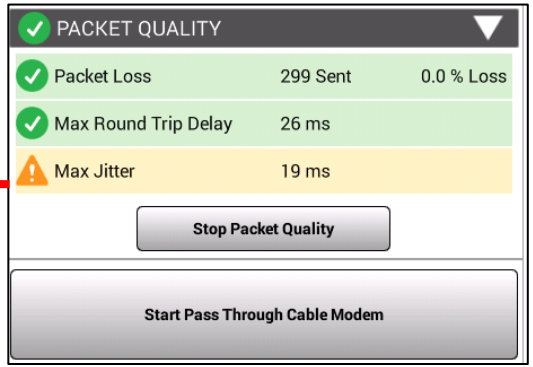




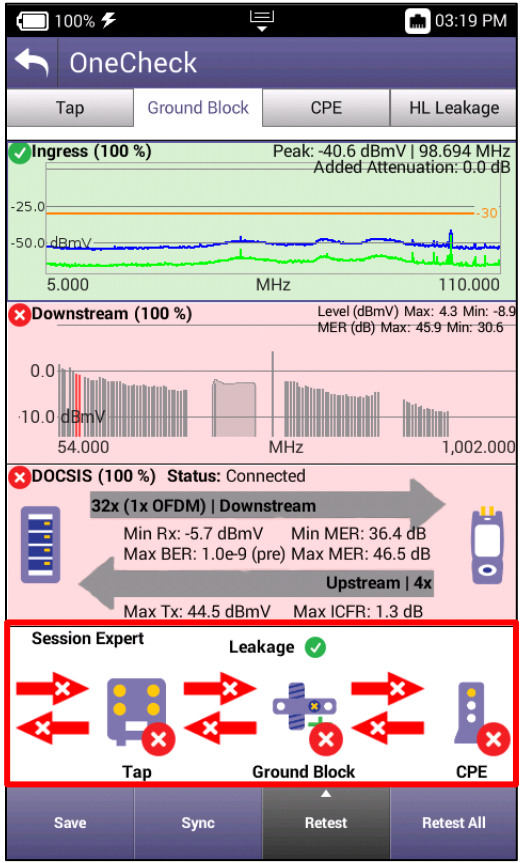
One Check - Upstream

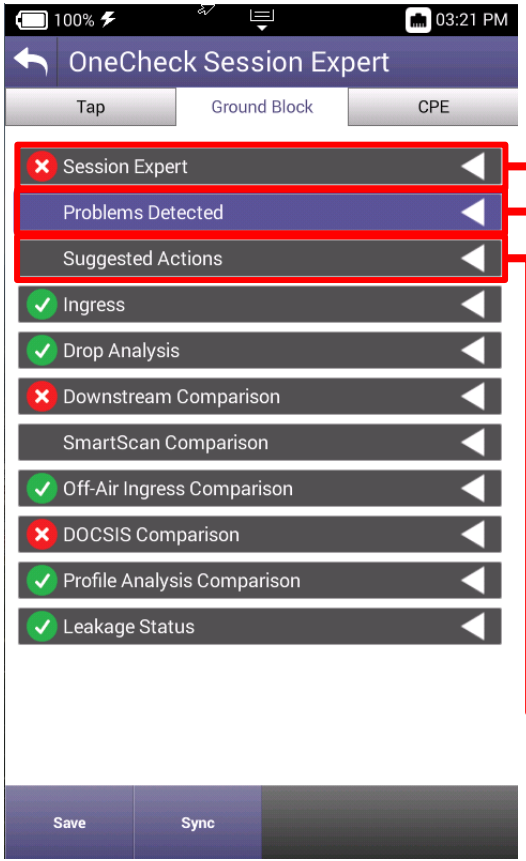


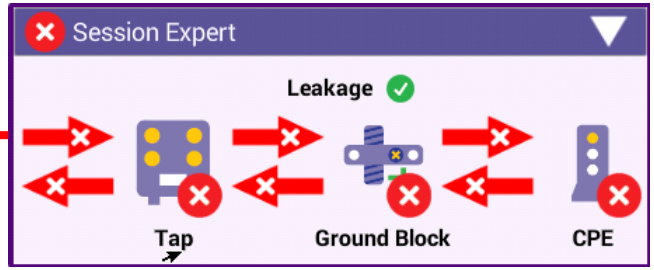


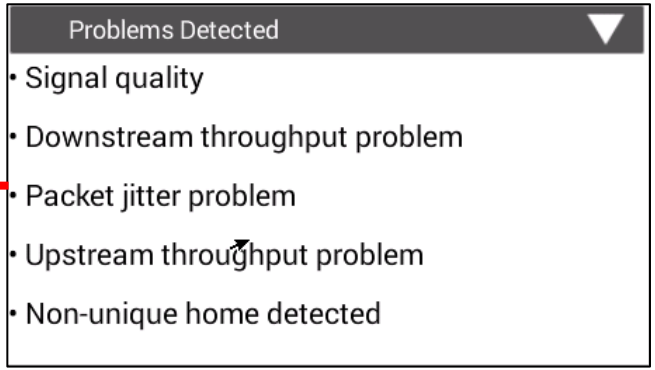


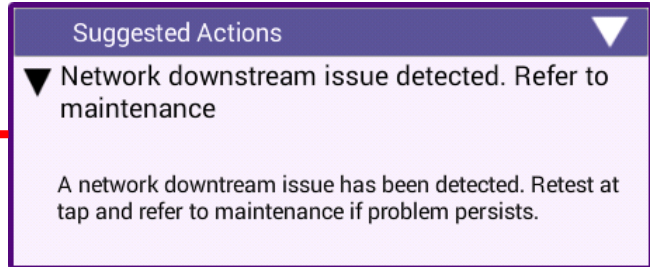
One Check – Session Expert



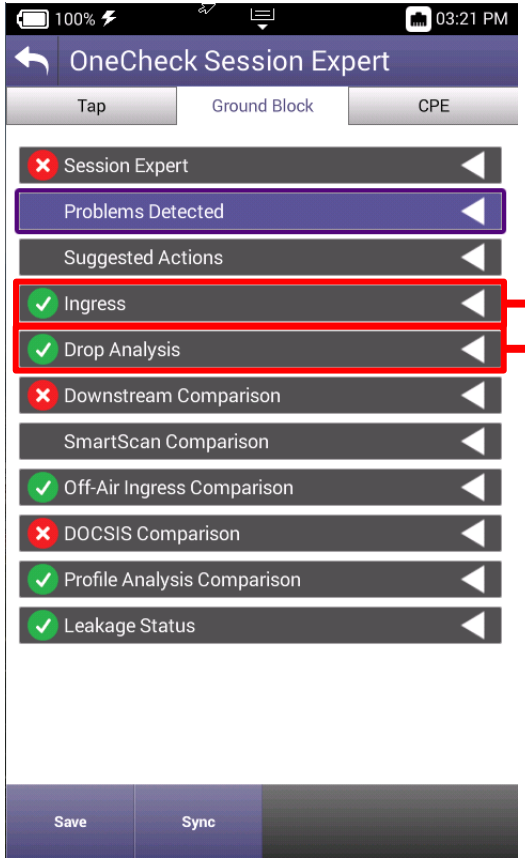


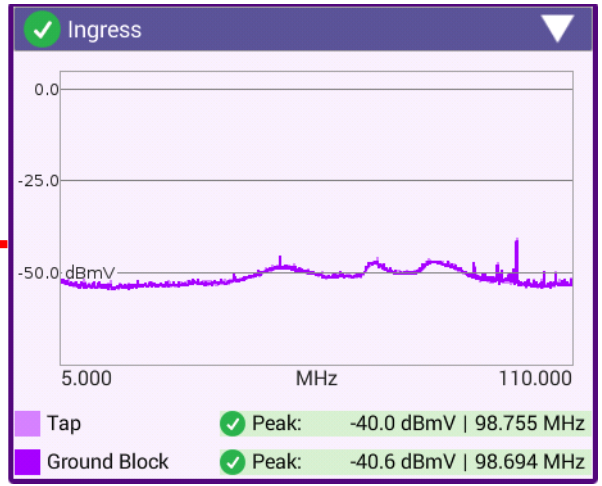


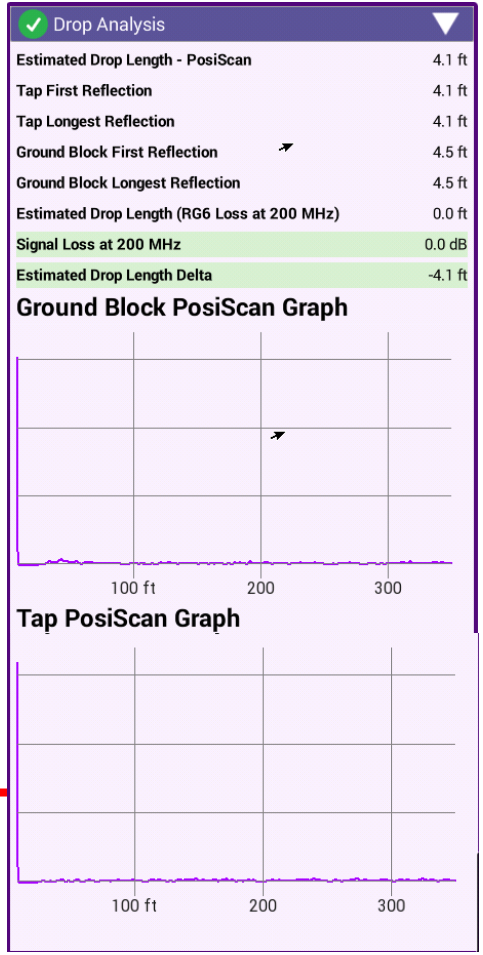




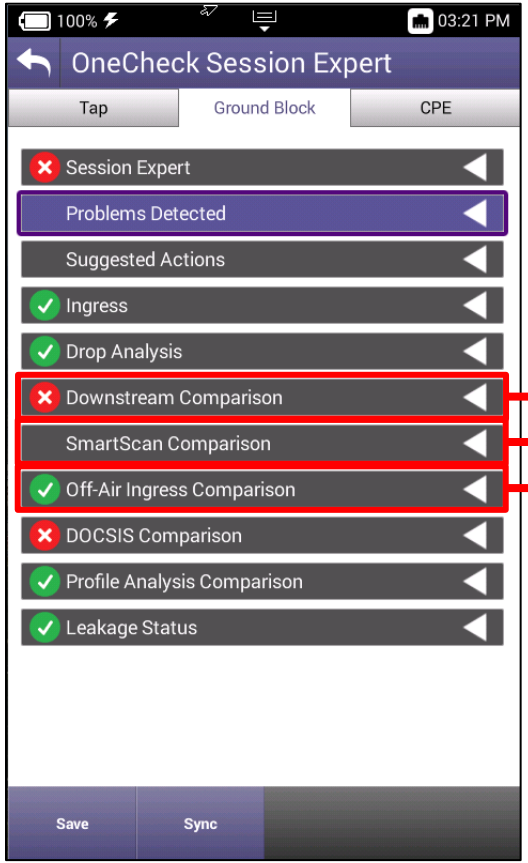
One Check – Session Expert







One Check – Session Expert



Downstream Comparison

	Tap	GB	CPE
Downstream			
Min Analog Level (dBmV)	4.3	4.3	4.3
Max Analog Level (dBmV)	4.3	4.3	4.3
Min Digital Level (dBmV)	-8.9	-8.9	-8.9
Max Digital Level (dBmV)	1.5	1.5	1.4
Min MER(dB)	31.0	30.6	30.0
Max MER (dB)	46.0	45.9	45.6
Max BER (Pre)	1.0e-8	1.0e-8	1.0e-8
Max BER (Post)	1.0e-8	1.0e-8	1.0e-8
Max Echo (dBc)	0.0	0.0	0.0
Max Group Delay (ns)	1.8	1.8	1.7
Max ICFR (dB)	4.5	4.5	4.5
Min Hum (%)	0.1	0.1	0.1
Max Hum (%)	0.3	0.4	0.4
OFDM			
Min Level (dBmV)	-3.1	-3.1	-3.0
Max Level (dBmV)	-1.8	-1.7	-1.8
Min MER PCTL (dB)	37.3	37.2	37.3
Max Stddev MER (dB)	0.6	0.6	0.6
Max ICFR (dB)	0.8	0.8	0.8
Max Echo (dBc)	-43.9	-42.9	-43.3

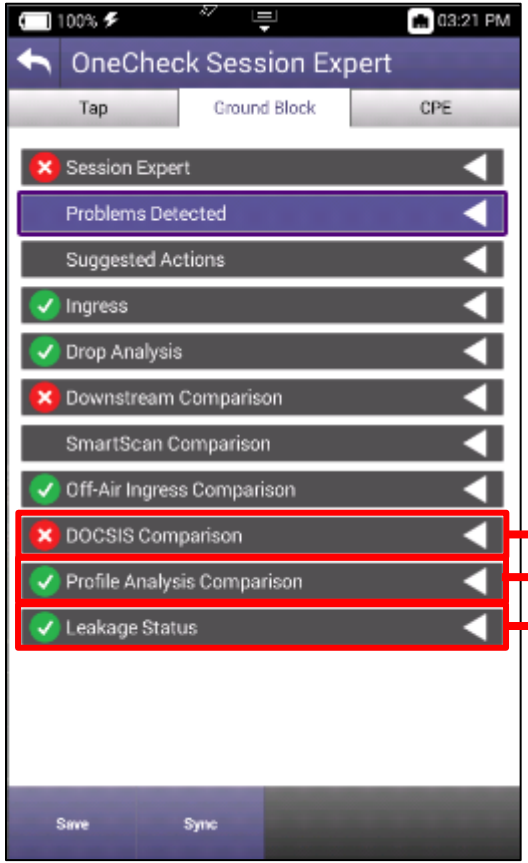
SmartScan Comparison

	Tap	GB	CPE
System Tilt (dB)	-5.8	-6.1	-5.9
Max Deviation (dB)	2.5	2.5	2.5

Off-Air Ingress Comparison

	Tap	GB	CPE
Default Ingress Span (dBmV)	-44.8	-46.4	-43.6

One Check – Session Expert



Profile Analysis Comparison

	Tap	GB	CPE
Profile A	Pass	Pass	Pass
Profile B	–	–	–
Profile C	–	–	–
Profile NCP	Pass	Pass	Pass
Profile PLC	Pass	Pass	Pass

Leakage Status

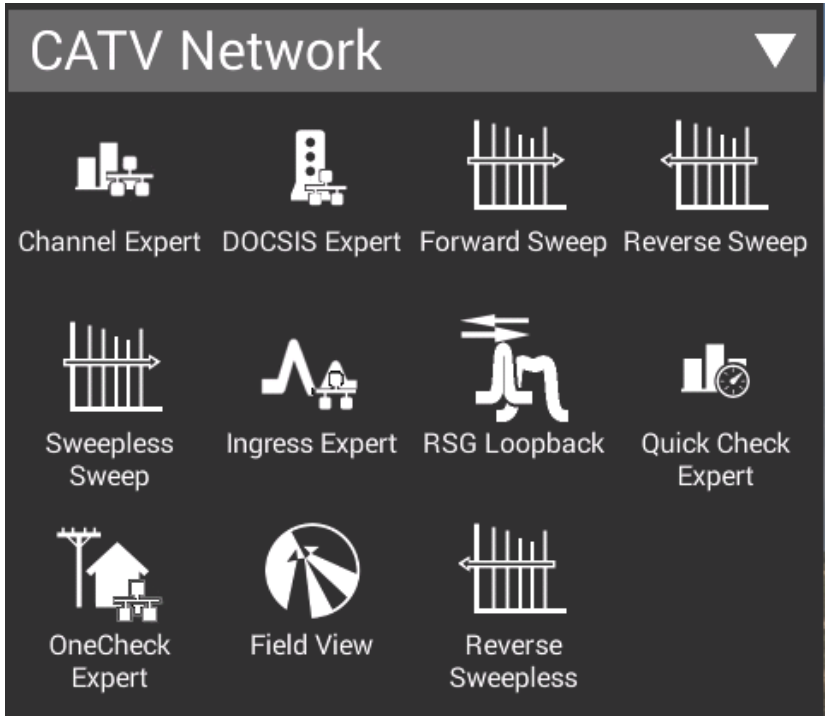
Duration	26 s	100%

DOCSIS Comparison

	Tap	GB	CPE
Status	Connected	Connected	Connected
Downstream			
Number Bonded	32	32	32
Min Level (dBmV)	-5.7	-5.7	-5.7
Max Level (dBmV)	-2.0	-2.0	-2.0
Min MER (dB)	44.7	44.5	44.5
Max MER (dB)	46.9	46.5	46.7
OFDM			
Min Level (dBmV)	-3.1	-3.0	-3.0
Max Level (dBmV)	-1.8	-1.8	-1.8
Min MER PCTL (dB)	37.2	37.3	37.1
Max Stddev MER (dB)	0.6	0.6	0.6
Max ICFR (dB)	0.9	0.8	0.8
Max Echo (dBc)	-43.2	-43.2	-43.2
Upstream			
Number Bonded	4	4	4
Max Tx Level (dBmV)	44.0	44.5	44.0
Max ICFR (dB)	1.3	1.3	1.4
Services			
DS Throughput (Mbps)	0.0	0.0	0.0
US Throughput (Mbps)	0.0	0.0	0.0
Packet Loss (%)	0.0%	0.0%	0.0%
Max Round Trip Delay (ms)	18	17	17
Max Jitter (ms)	10	10	10

CATV Network Configurations

CATV Network



- CATV NETWORK offers 8 test functions
  - Channel Expert
  - DOCSIS Expert
  - Forward Sweep (Active)
  - Reverse Sweep (Active)
  - Sweepless Sweep (Downstream)
  - Ingress Expert
  - Return Signal Generator w/ Loopback
  - Quick Check Expert
  - OneCheck Expert
  - Field View (with Return Signal Generator)
  - Reverse Sweepless (Upstream)

Quick Check Expert

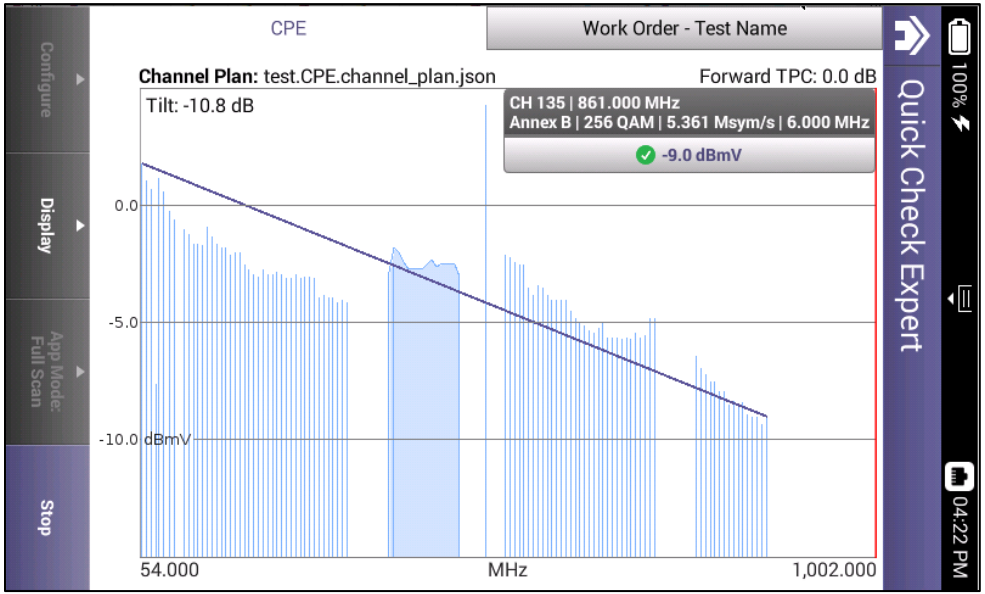
Quick Check Expert

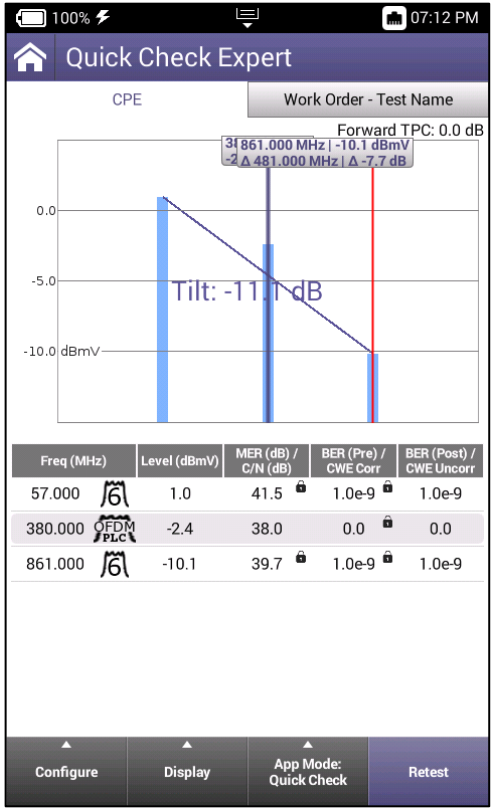
QuickCheck Expert can be run in two modes

- Quick Check
- Full Scan

To populate the FULL SCAN, user must first save a channel plan in ChannelCheck before loading it in QuickCheck Expert

To populate the QuickCheck mode with channels, user must add them manually



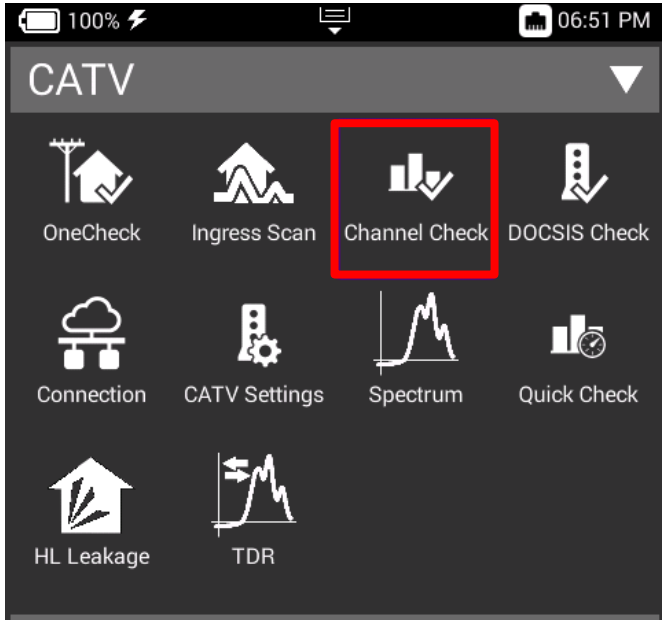


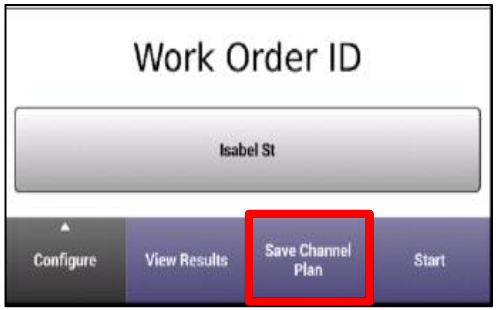
Quick Check Expert – Saving Channel Plans

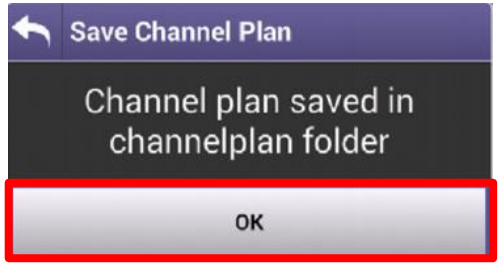
To save a Channel Plan, run the CHANNELCHECK test under CATV

After test completes, use the BACK button to return to CHANNELCHECK SETUP

Select SAVE CHANNEL PLAN. A message will display indicating the Channel Plan has ben saved. The Channel plan will be named after the WORK ORDER ID







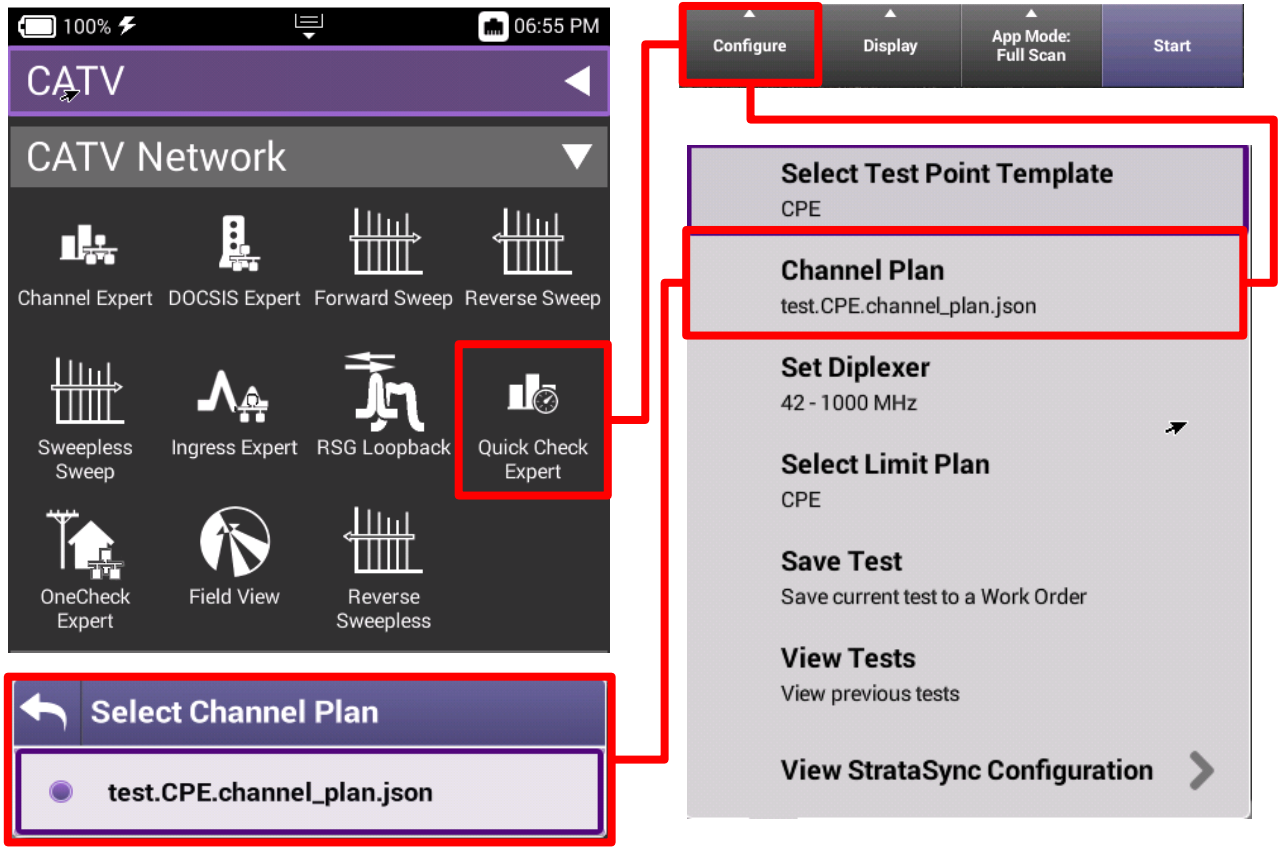
Quick Check Expert – Loading Channel Plans

Return to QUICKCHECK EXPERT under CATV NETWORK

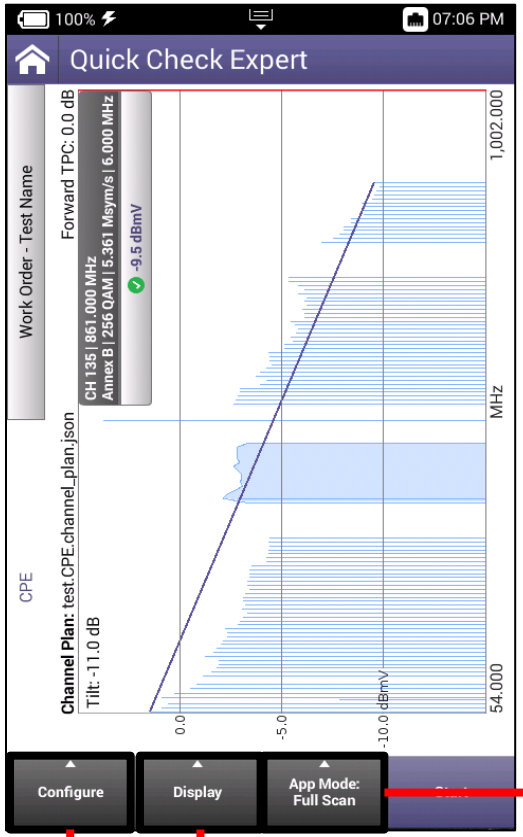
Test will automatically run, STOP test and change APP MODE to FULL SCAN

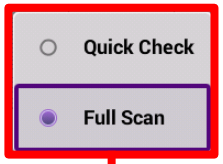
Select CONFIGURE and select CHANNEL PLAN

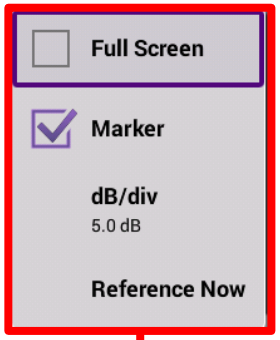
Select the appropriate saved CHANNEL PLAN

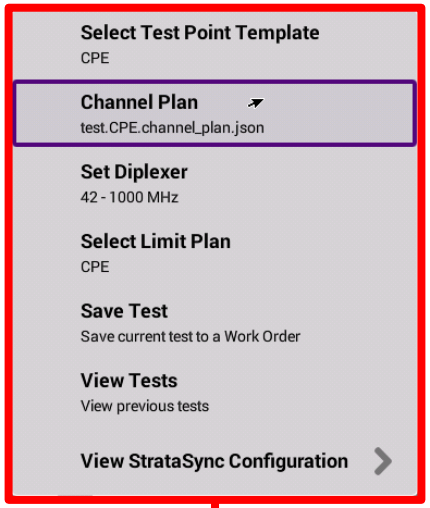


Quick Check Expert – Full Scan Mode

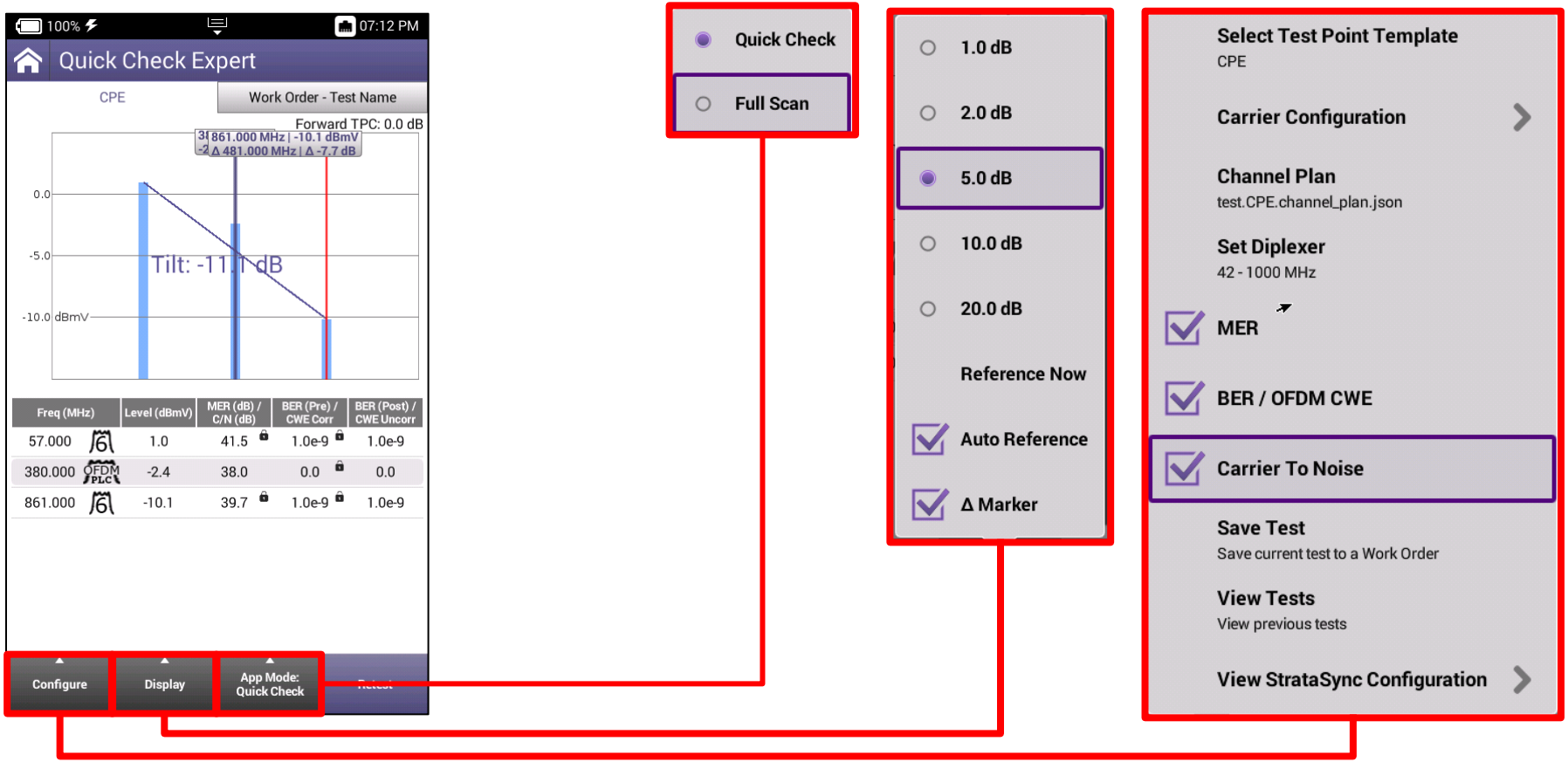








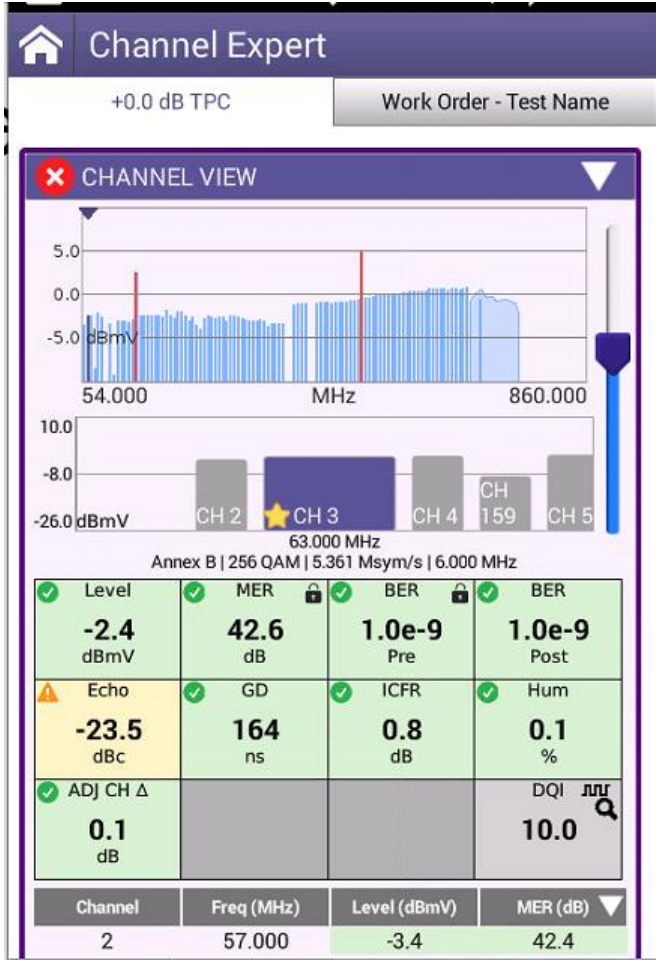
Quick Check Expert – Quick Check Mode



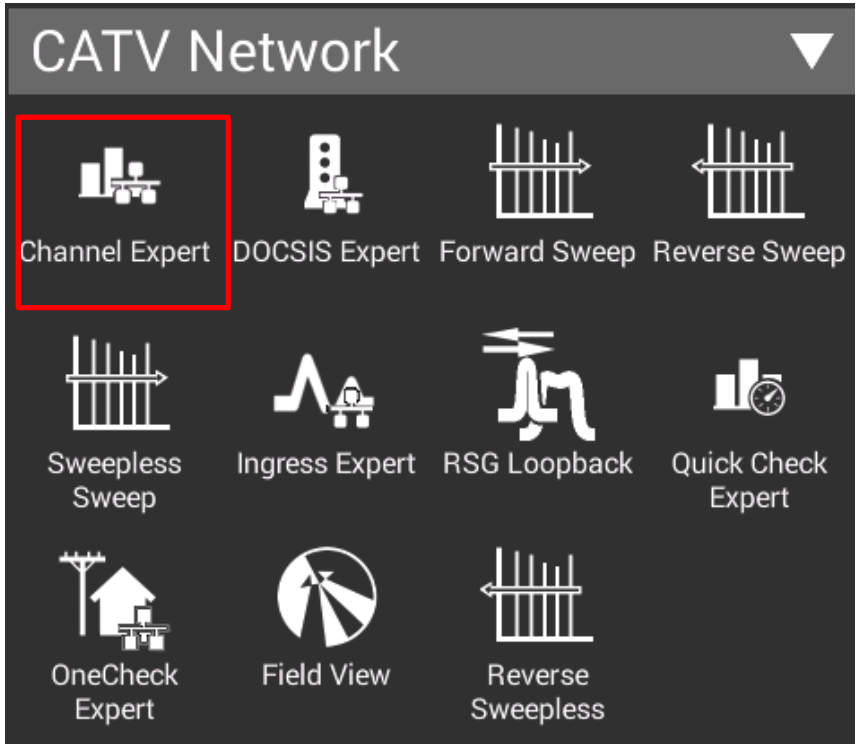
Channel Expert

Channel Expert Measurements

- Channel Scan no need for Channel plan
- Measures Video, QAM, OFDM
- Typical QAM Measurements include Level, MER, Pre and Post BER
- Measures Echo, GD, ICFR (This is an Adaptive Equalizer Test)
- Hum (Less than 1000 kHz)
- DQI (Digital Quality Index)
- Ingress Under Carrier
- ADJ Channel Delta

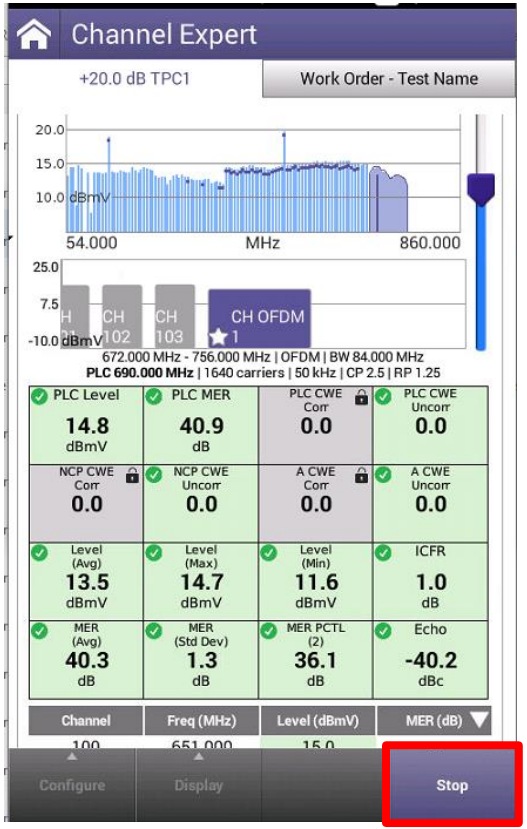


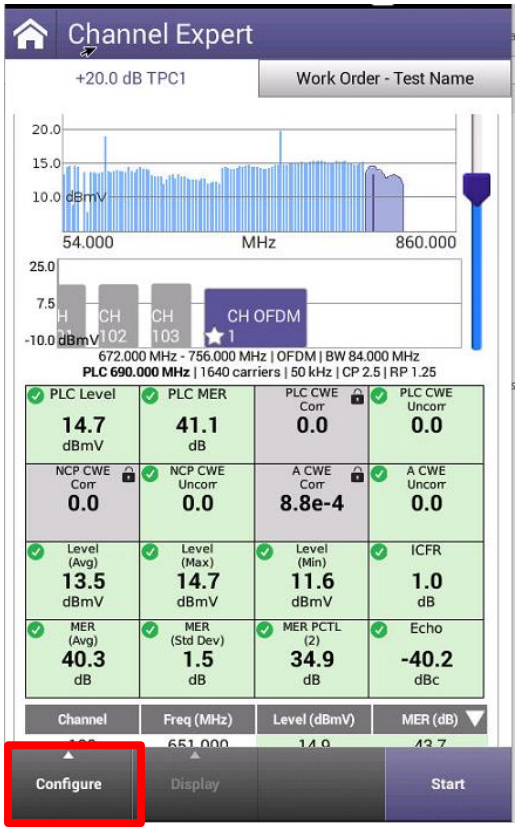
Channel Expert

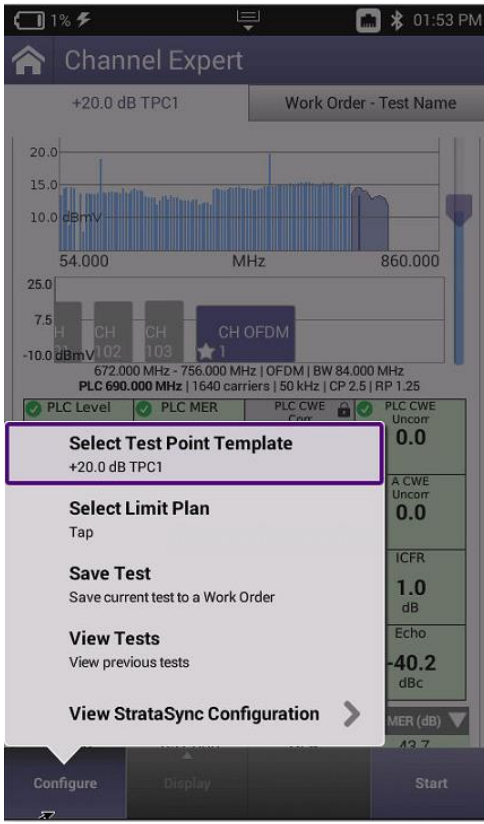


Channel Expert Configure

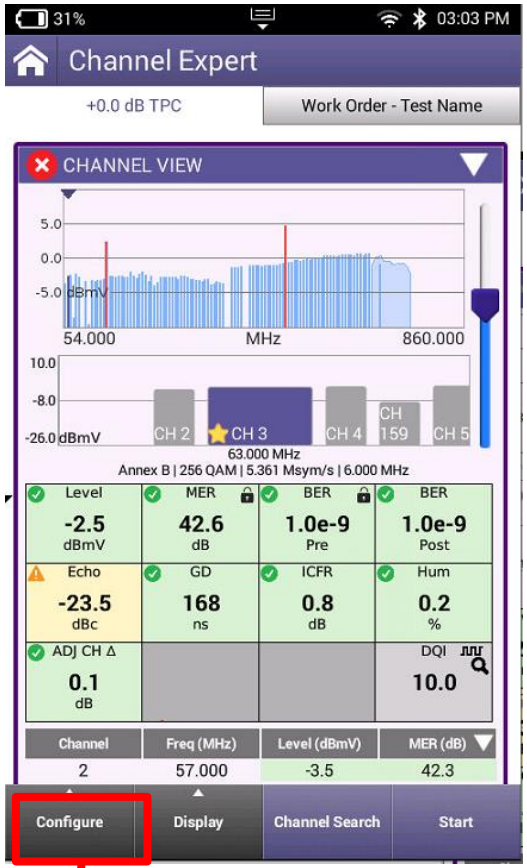
- All EXPERT test functions will feature a CONFIGURE button when the STOP function is pressed
- All new test functions are LIVE tests so to access CONFIGURE, test must be stopped first

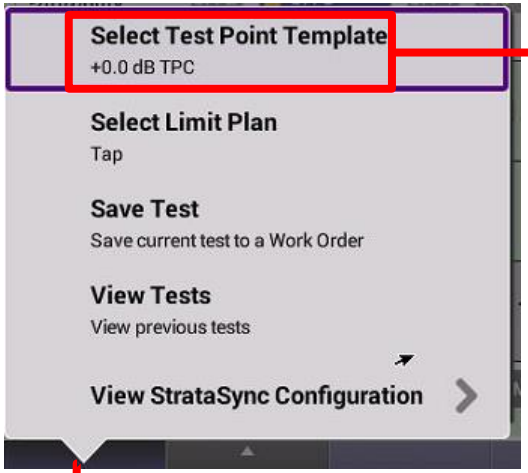


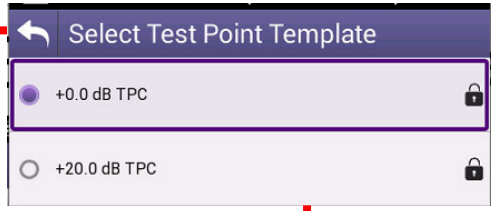


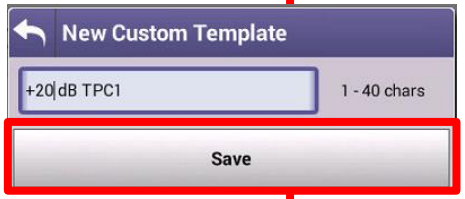


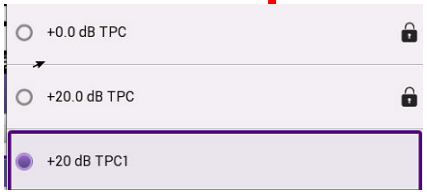
Channel Expert Configure Test point



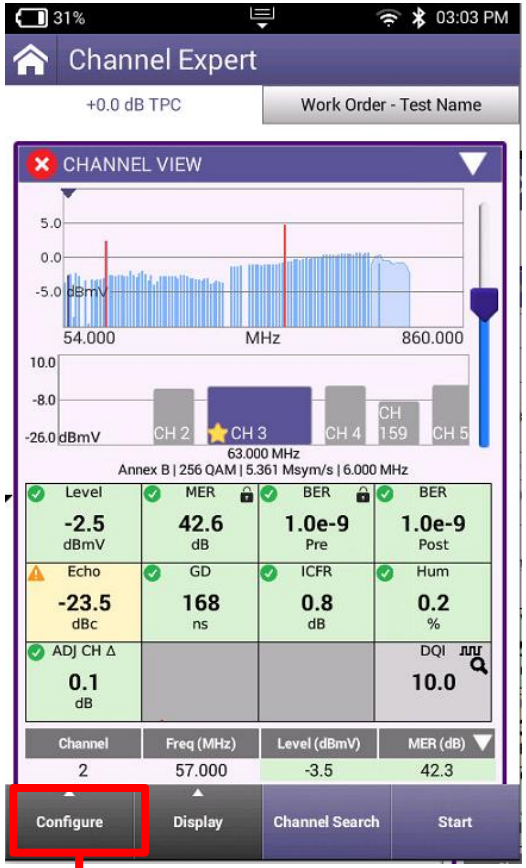


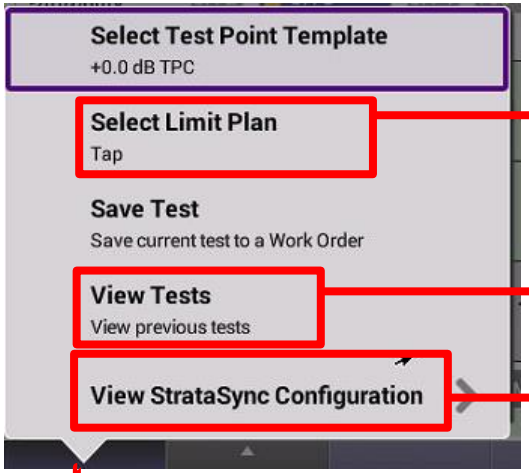


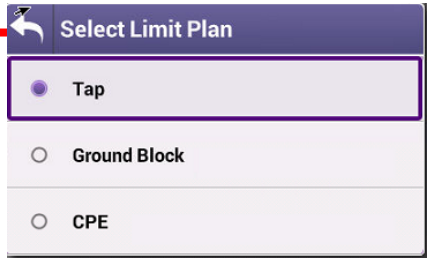


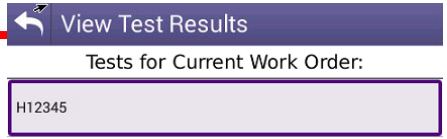


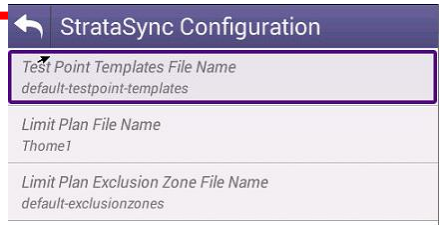
Channel Expert Configure



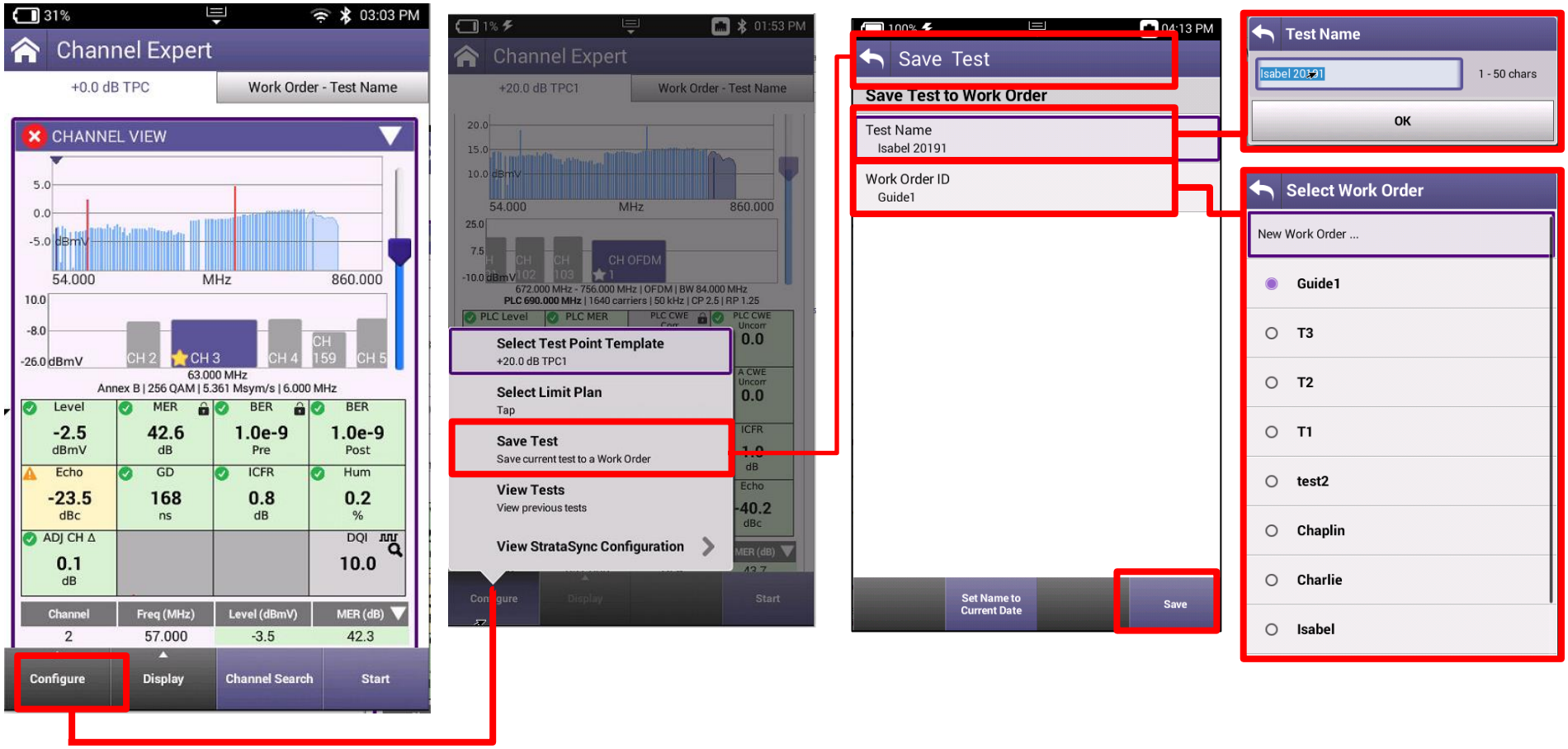




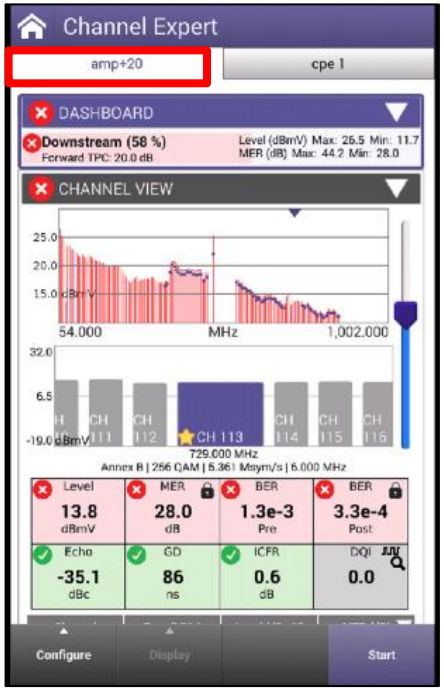


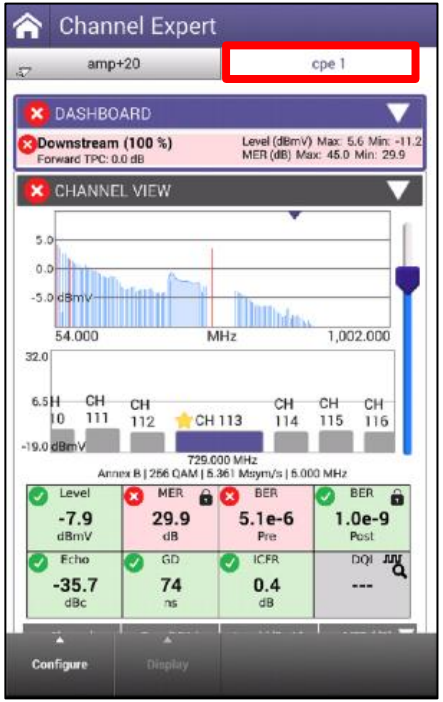


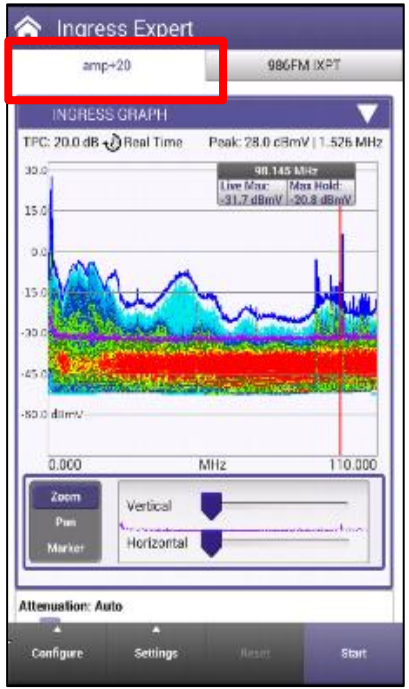
Channel Expert Configure Save Test

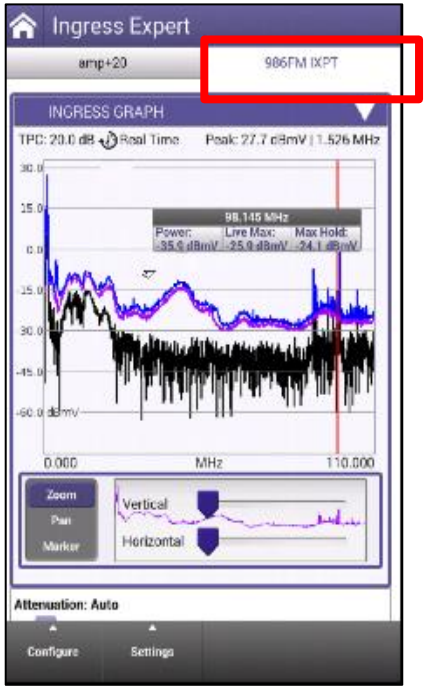


Configure – View Test – Delta Tab

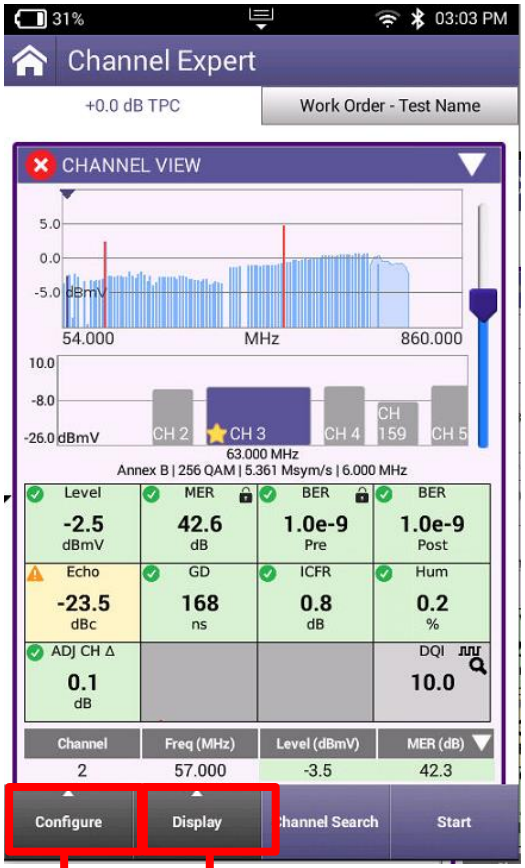


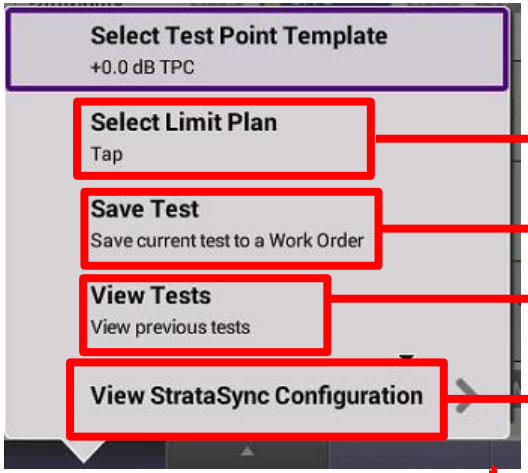


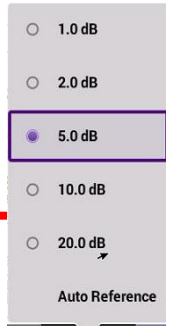


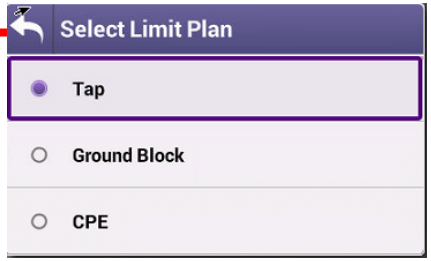


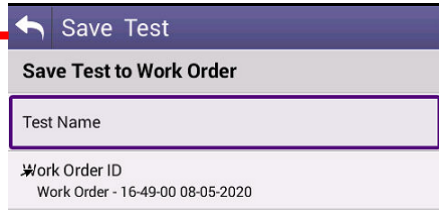
Channel Expert Configure

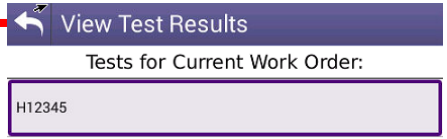


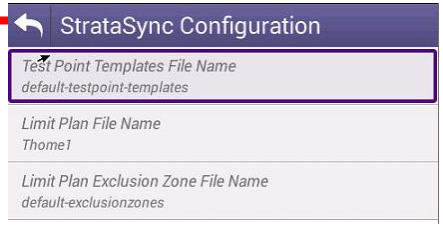




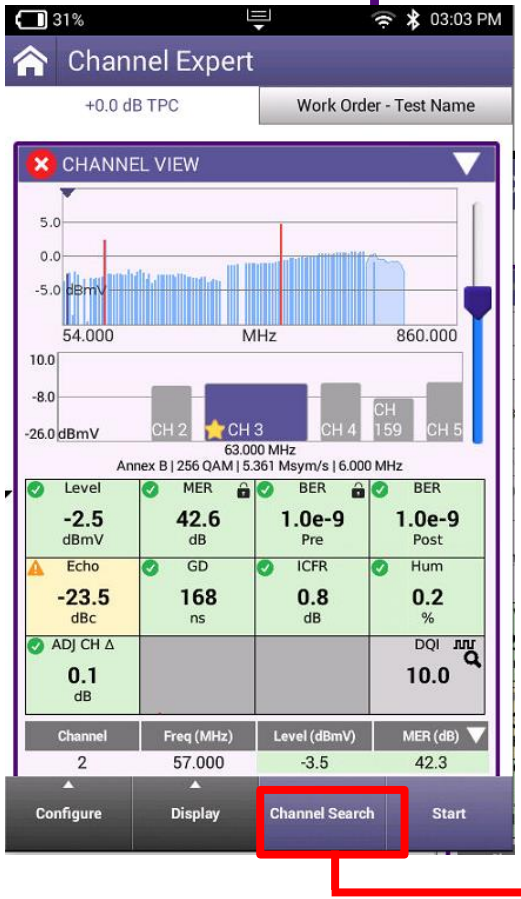


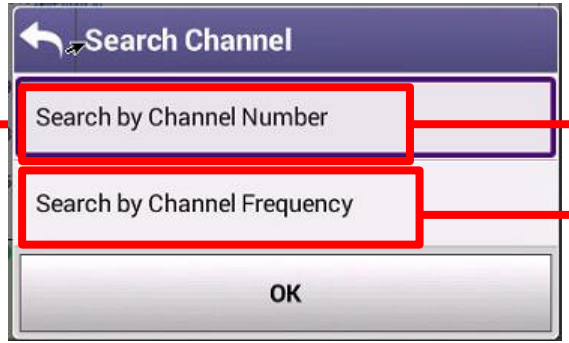




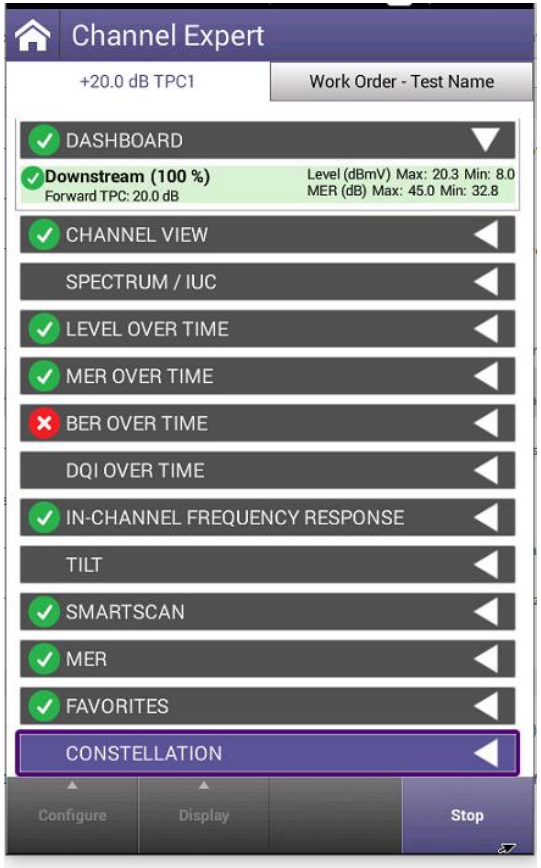


Channel Expert Configure



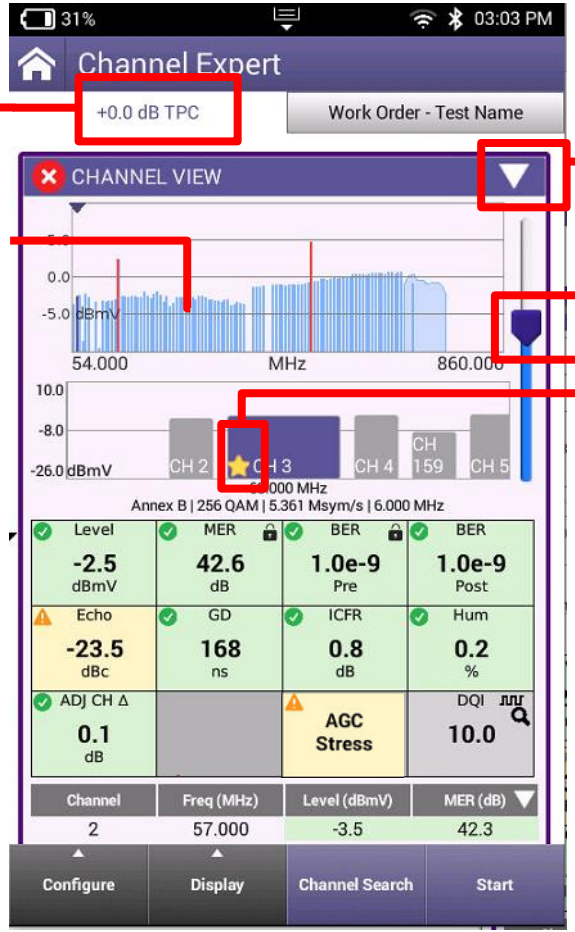


Channel Expert QAM



Test Point Compensation

Select Channel



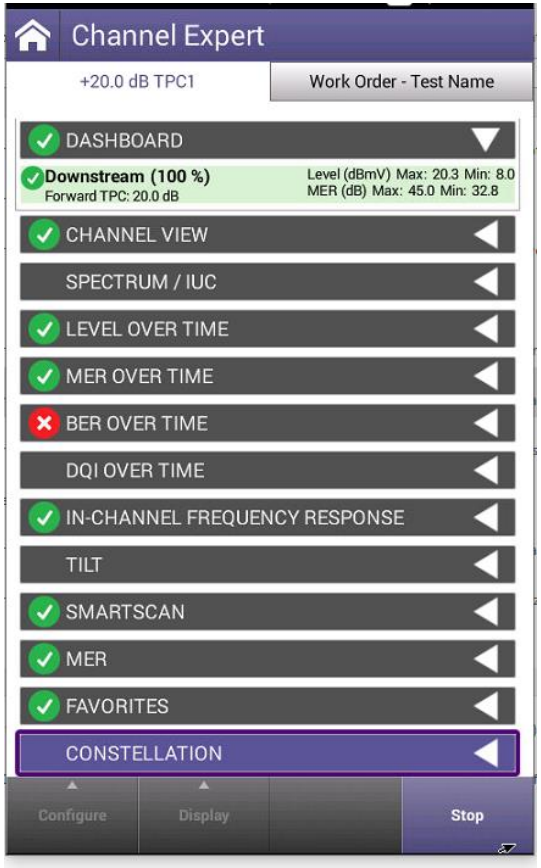
Open/close window

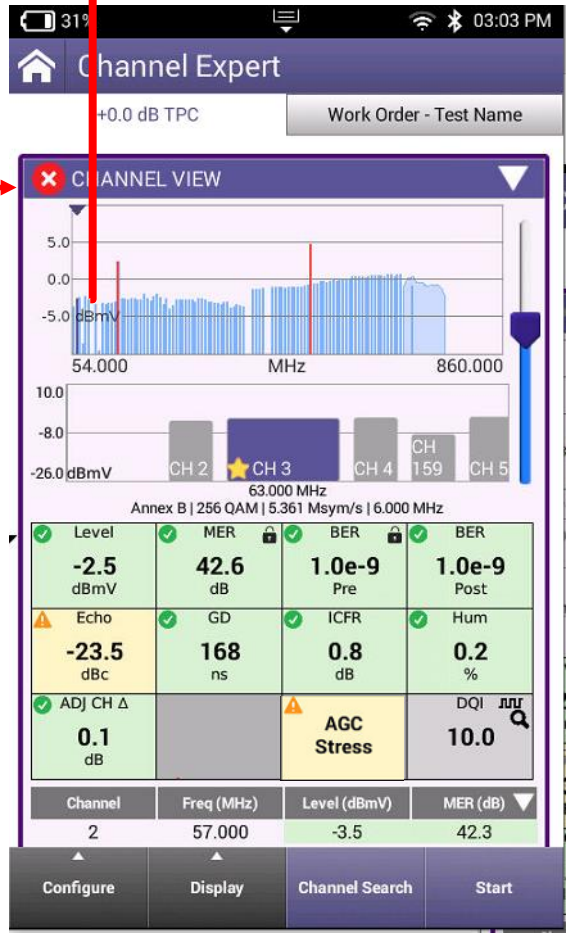
Reference

Press star to turn to gold color for marking as favorite channel

Slide left or right to change channel

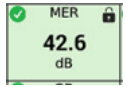
Channel Expert QAM





Selected Channel

Channel RF power Level



Modulation Error Ratio
Like Carrier to Noise Ratio
Composite Second Order and
Composite Third Order

Bit error rate that are detected

Bit error rated that pass through

Adaptive Equalizer Measurements

Highest tap stress level of reflection

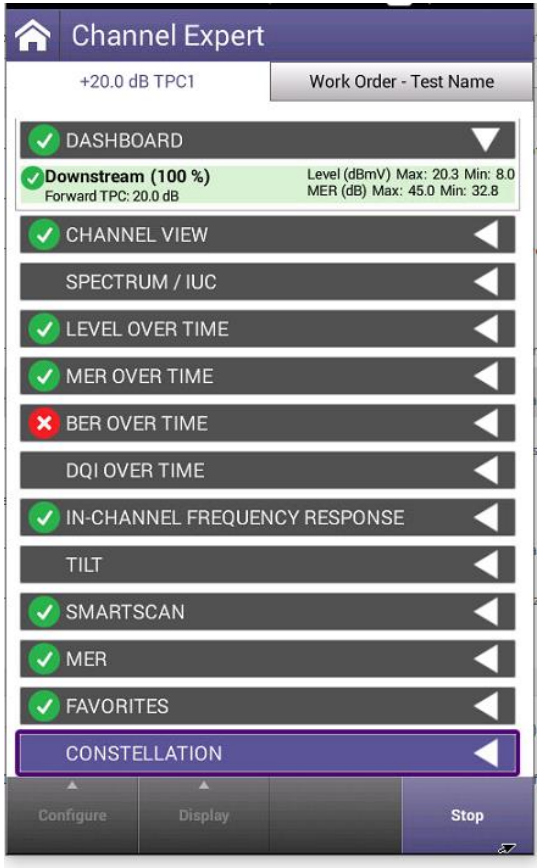
Highest delay of a group of signals

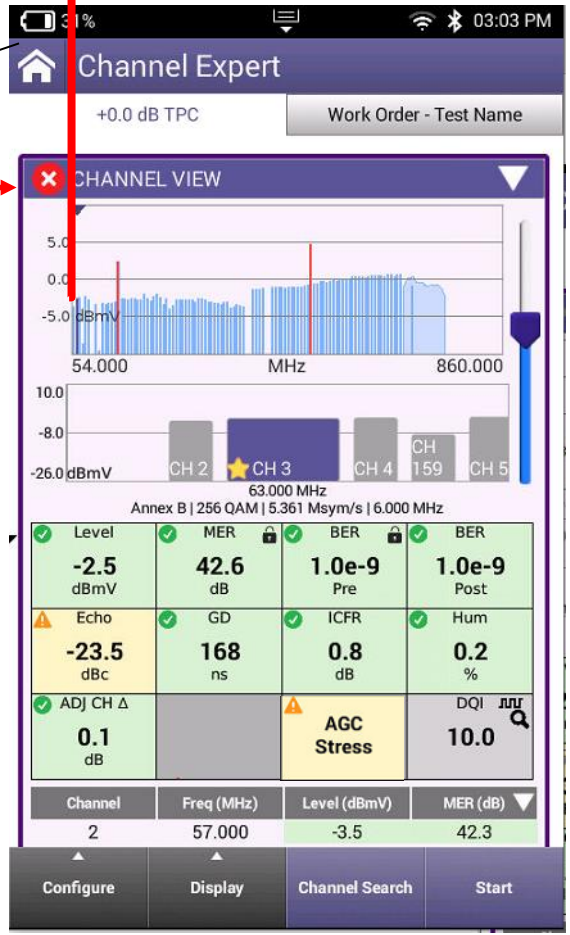
In Channel Peak to Valley measurement of a QAM carrier

Colors represent the Limit set value

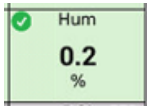
Pass	Warning	Fail	No limit

Channel Expert QAM





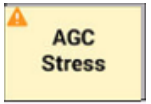
Selected Channel



Hum is a signal impairment which causes the amplitude of a modulated carrier to vary

Adjacent Channel video is the delta of the RF carrier that is next to it.

Digital Quality Index is the value assigned to show how good the RF signal is performing

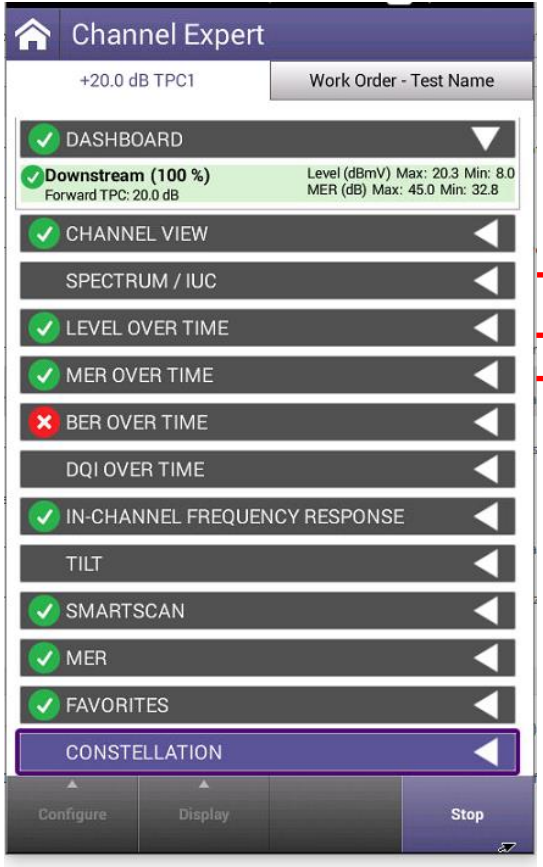


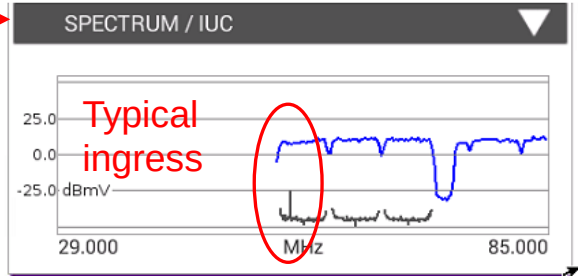
Automatic Gain Control level of the channel is not consistent and is varying in milliseconds

Colors represent the Limit set value

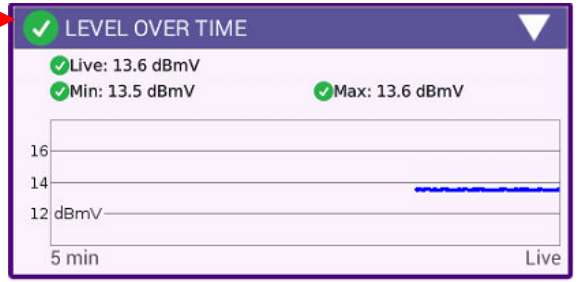
Pass	Warning	Fail	No limit

Channel Expert QAM

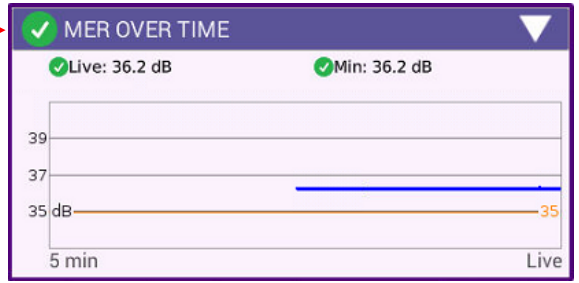




Spectrum/ICU
9 Channel Spectrum view of Ingress under the carrier

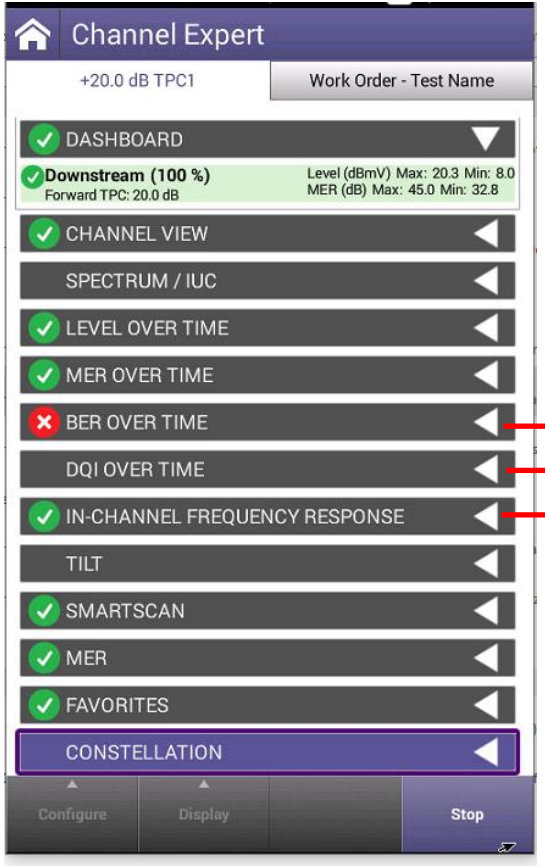


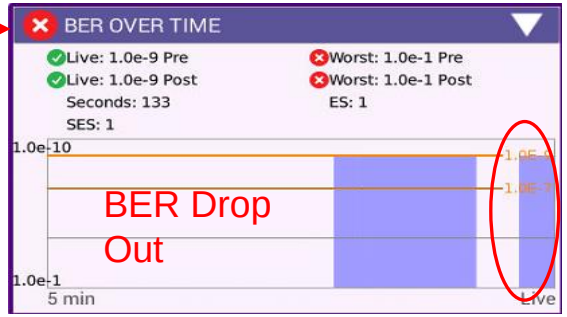
Measures the Level of selected channel in a 5-minute window



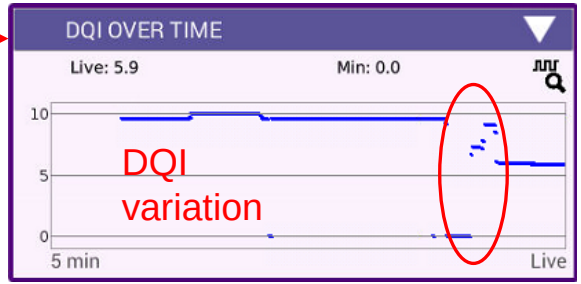
Measures the MER of selected channel in a 5-minute window

Channel Expert QAM

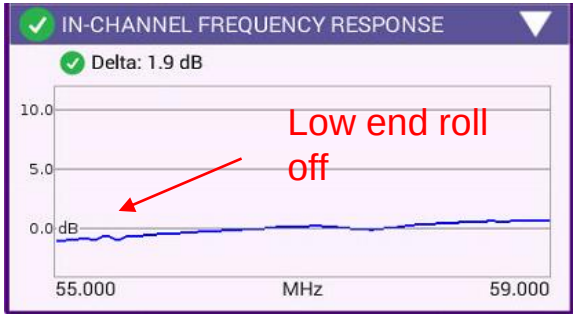




Measures the BER of selected channel in a 5-minute window

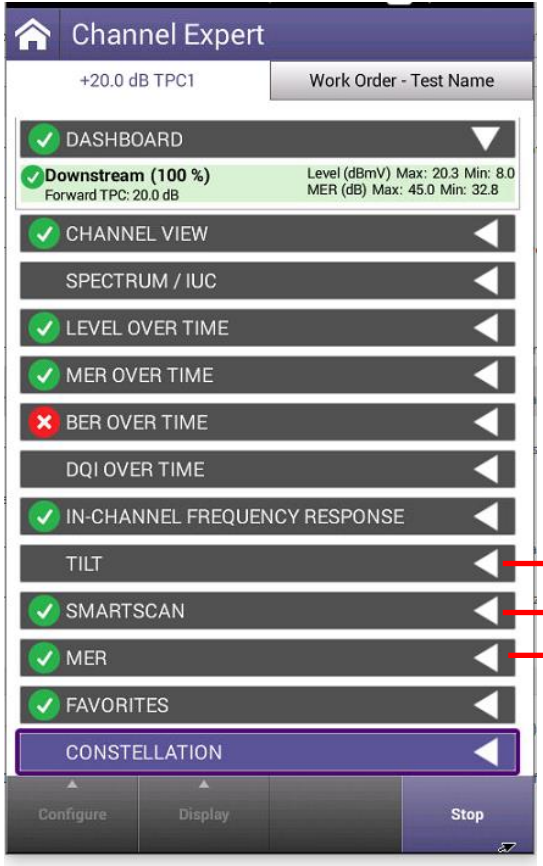


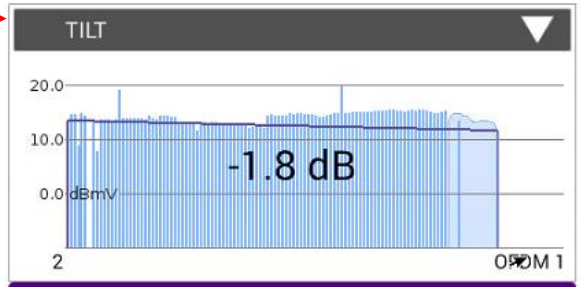
Measures the DQI of selected channel in a 5-minute window



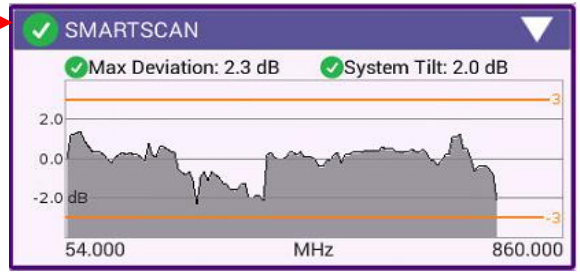
Measures the In-channel frequency response level of a QAM carrier

Channel Expert QAM

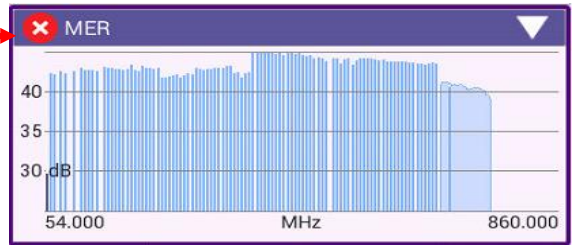




Tilt Measures the Difference in RF level or Delta between the lowest and highest channels

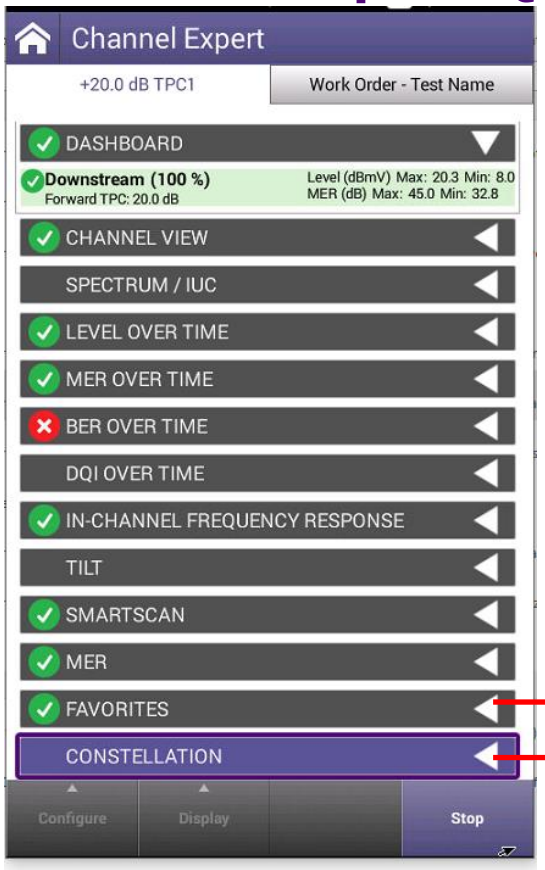


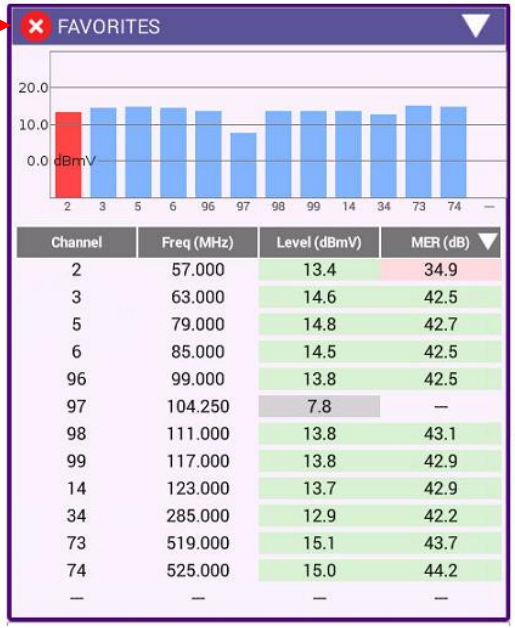
Smart scan removes the over all tilt to show typical deviation in a graph



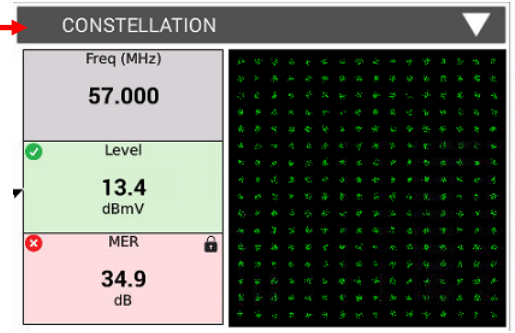
MER shows the value of all the QAM channels in the system in a bar graph

Channel Expert QAM



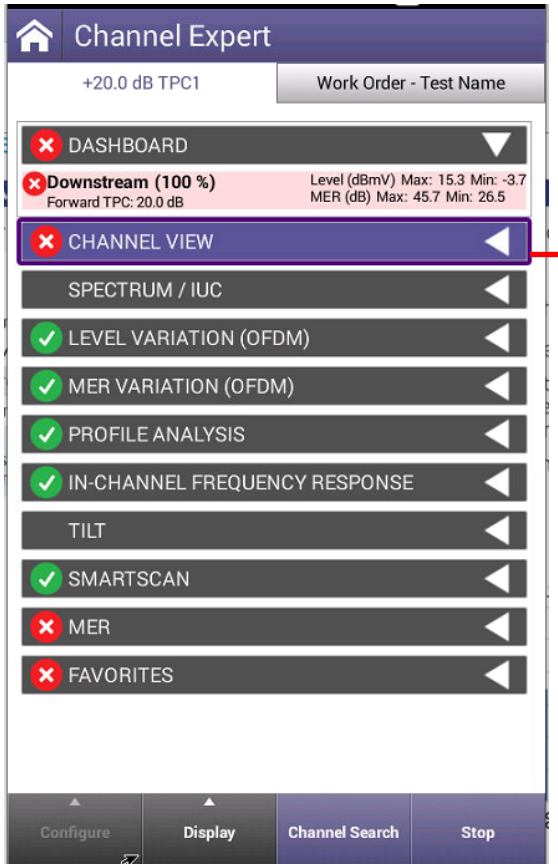


Up to 15 favorite channel can be selected by pressing the white star in the channel view and turning it gold



See the Constellation of the selected channel

Channel Expert OFDM

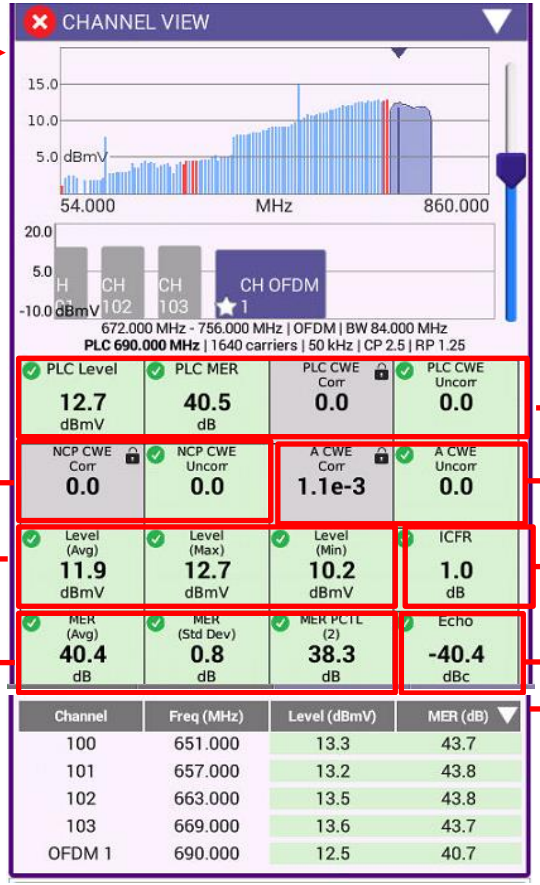


NCP Next Codeword Pointer
Tells the modem which codeword and present and in which profile

Level measurements of all the carriers based on 6 MHz

Average MER of all the QAM carriers.

MER Std Deviation
MER a 2%



PLC PHY Link Channel
Contains critical OFDM signal information

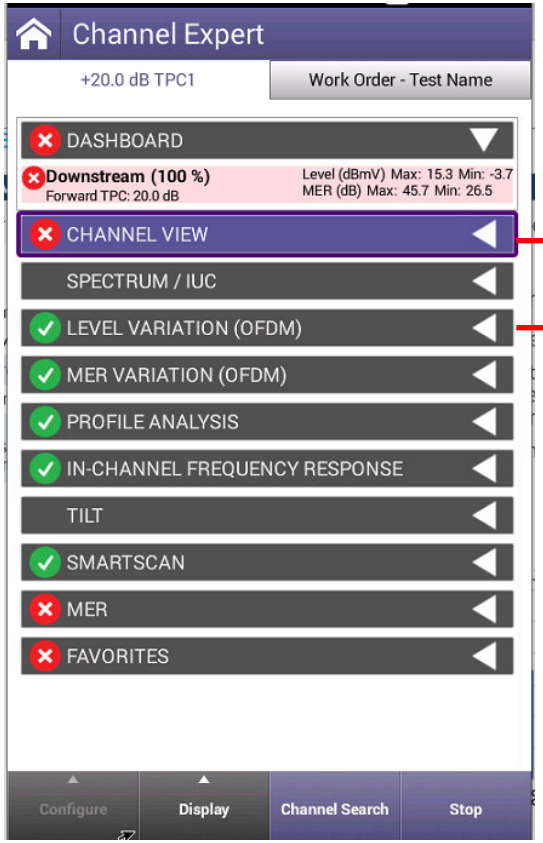
Codeword errors of profile A

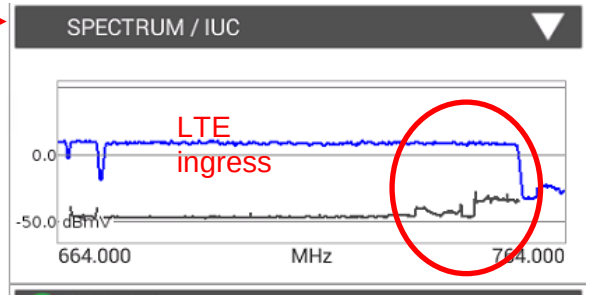
ICFR- In Channel Frequency Response

Adaptive equalizer worst case stress tap

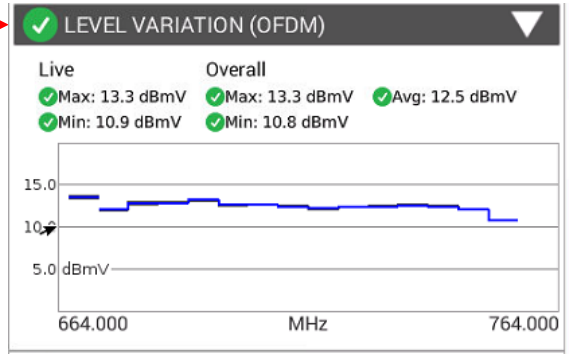
Level and MER of 4 adjacent SC-QAM and OFDM

Channel Expert OFDM



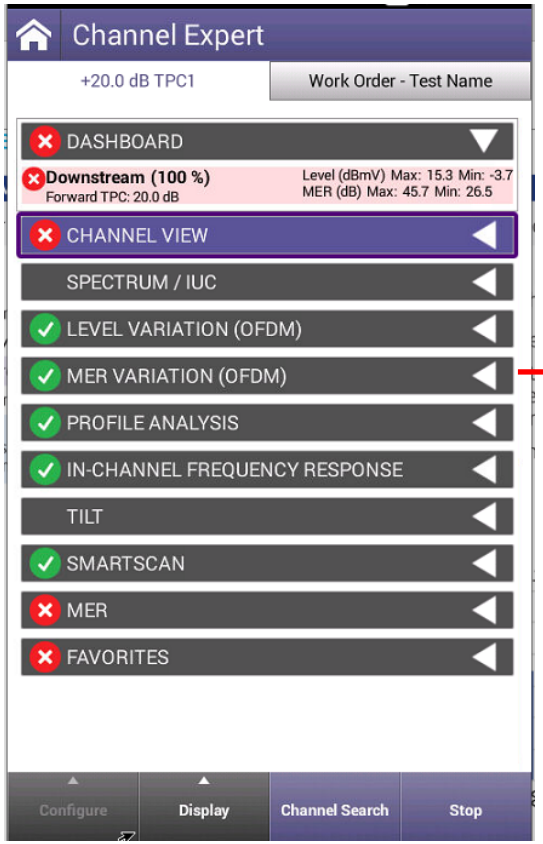


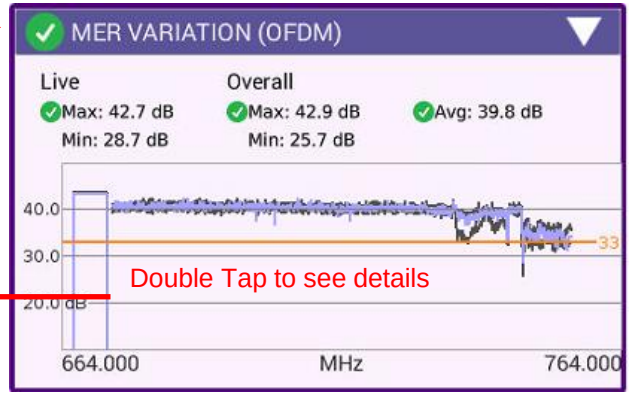
IUC Ingress under carrier



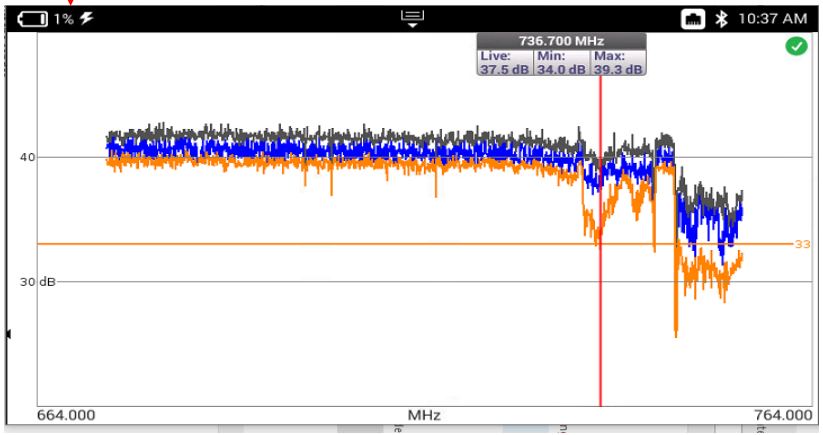
Level of OFDM carries measures at 6 MHz spacing

Channel Expert OFDM



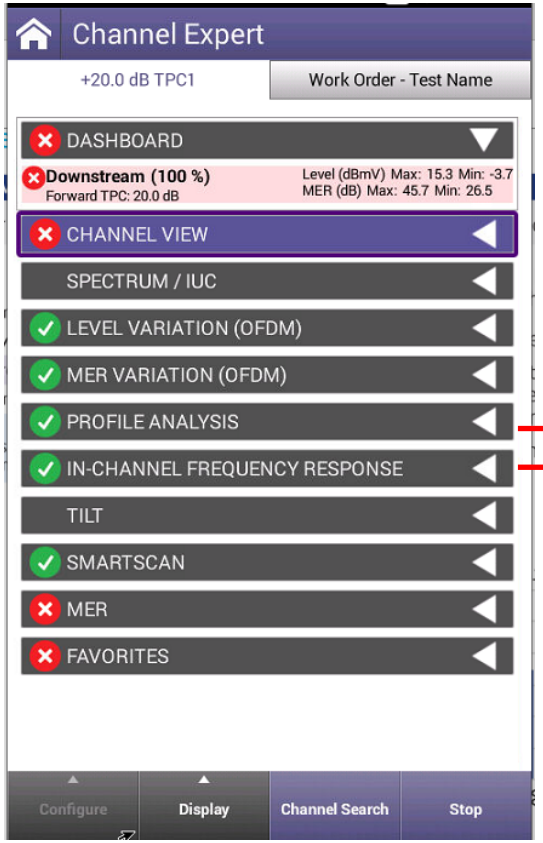


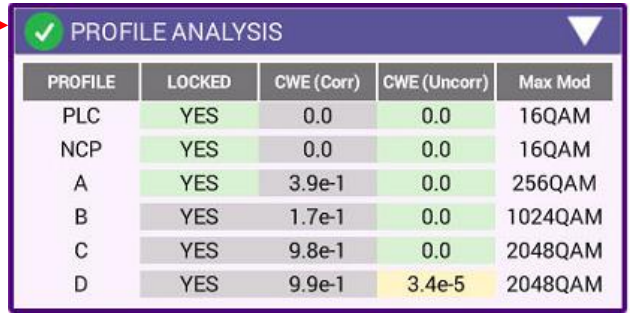
MER graph of OFDM



Can use marker to see exact frequencies of carriers and MER values

Channel Expert OFDM

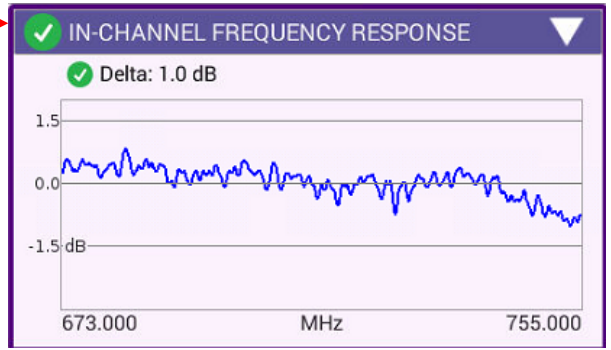




PROFILE	LOCKED	CWE (Corr)	CWE (Uncorr)	Max Mod
PLC	YES	0.0	0.0	16QAM
NCP	YES	0.0	0.0	16QAM
A	YES	3.9e-1	0.0	256QAM
B	YES	1.7e-1	0.0	1024QAM
C	YES	9.8e-1	0.0	2048QAM
D	YES	9.9e-1	3.4e-5	2048QAM

Profile View of Cable modem.

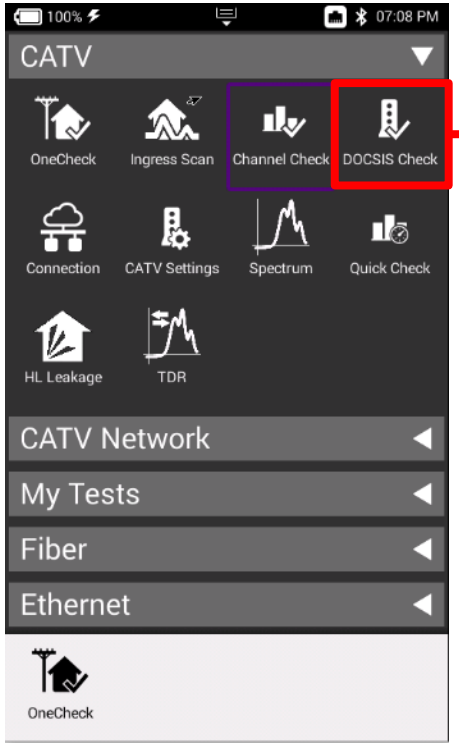
Helps determine how well the network is performing at this location

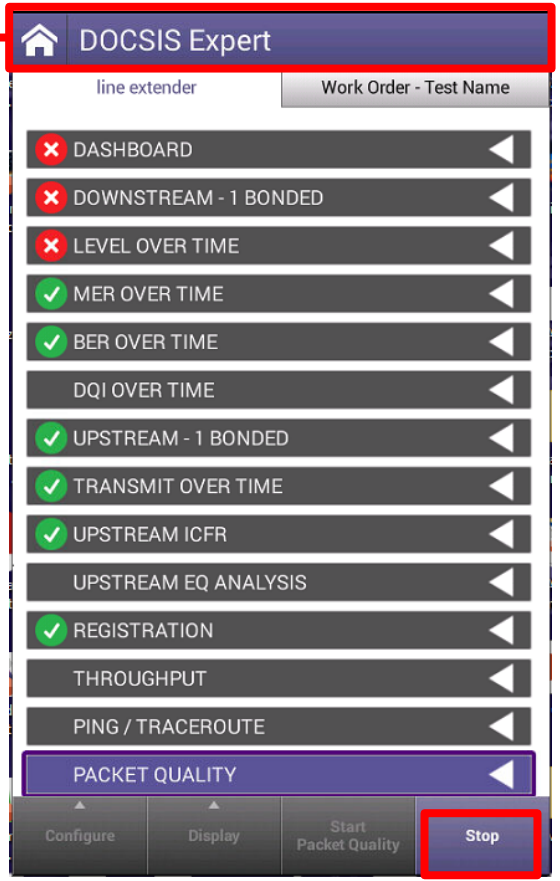


In channel Frequency Response across a OFDM band can help determine if a refection or roll off is occurring

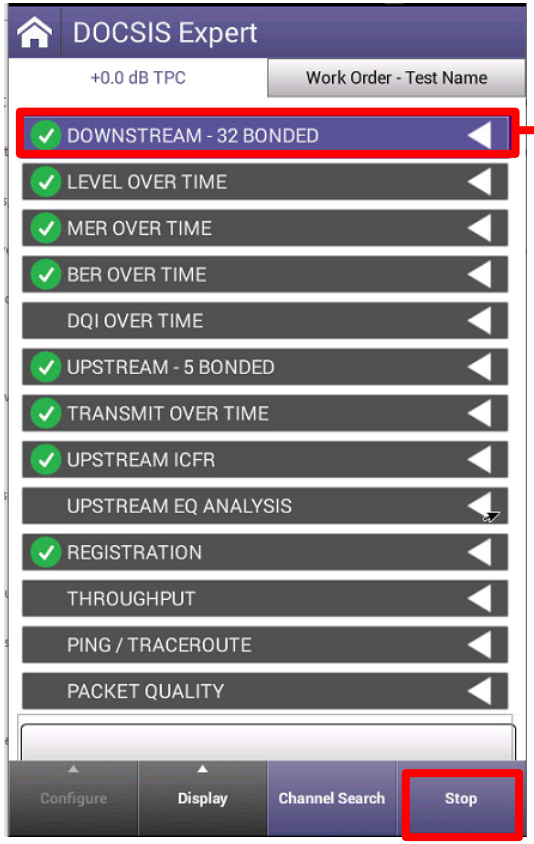
DOCSIS Expert

DOCSIS Check

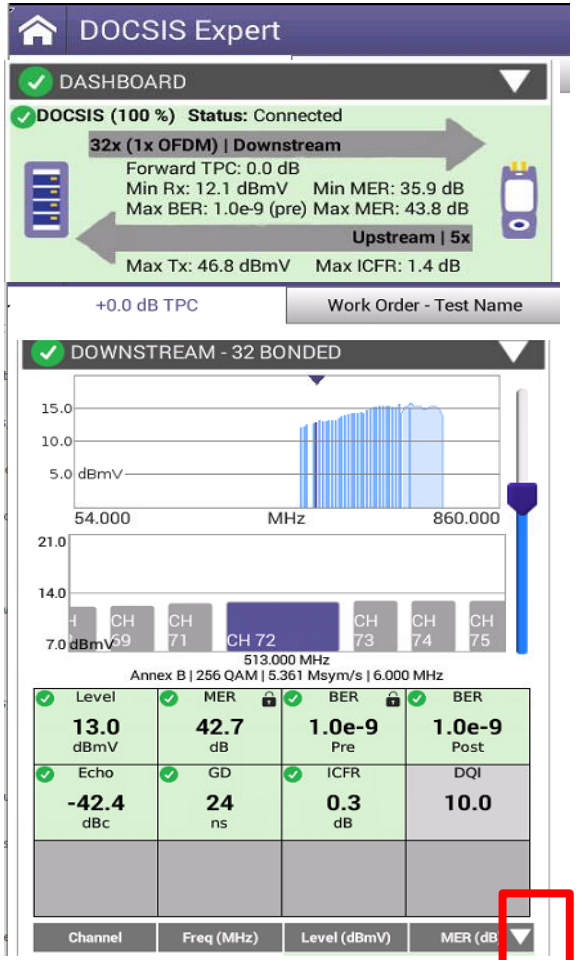




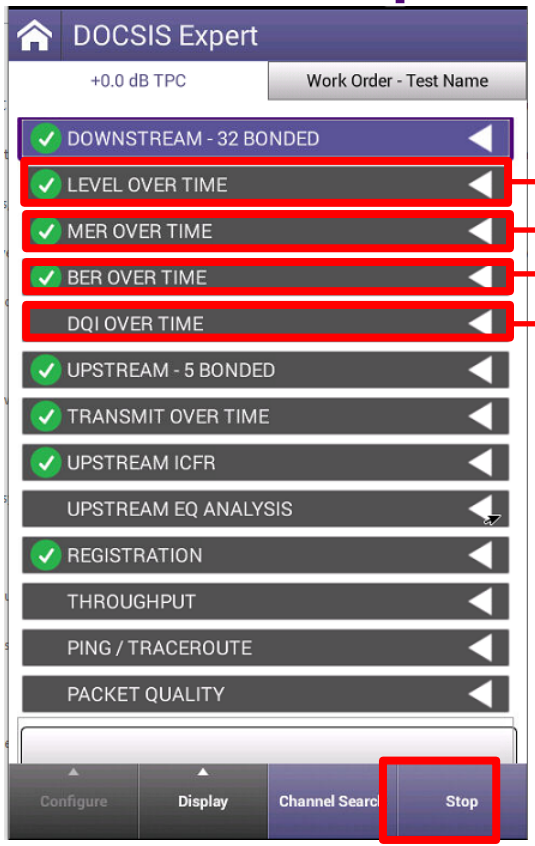
DOCSIS Check

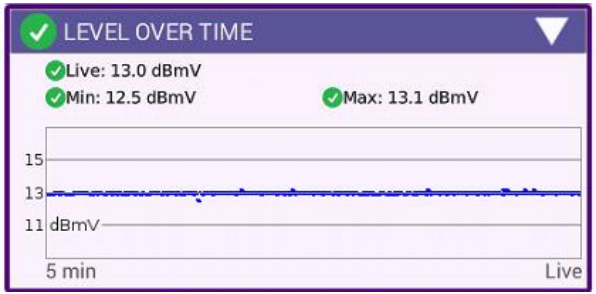


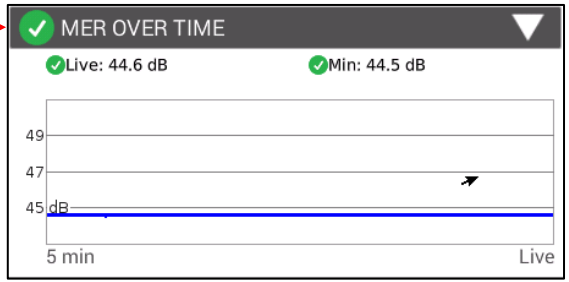
Channel	Freq (MHz)	Level (dBmV)	MER (dB)
67	483.000	12.1	42.4
68	489.000	12.5	42.2
69	495.000	12.6	41.9
71	507.000	12.9	42.7
72	513.000	12.9	42.7
73	519.000	13.2	42.2
74	525.000	13.2	42.5
75	531.000	13.1	42.7
76	537.000	13.2	42.0

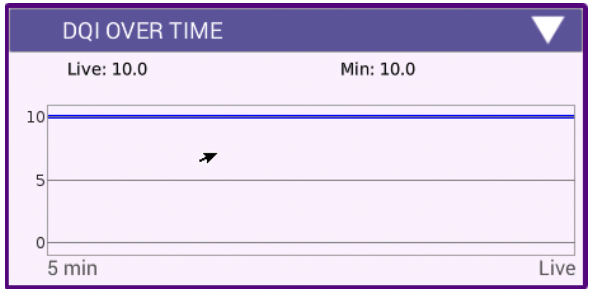


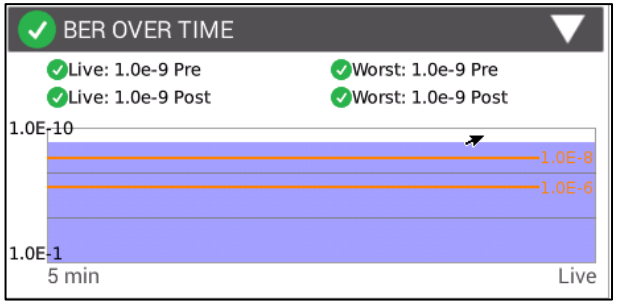
DOCSIS Expert



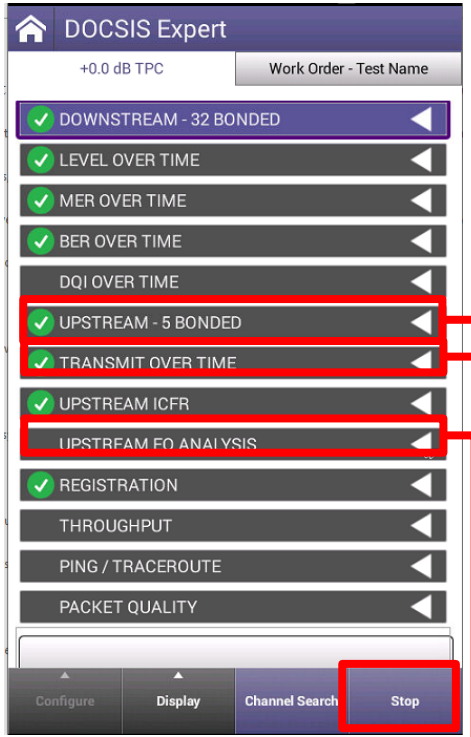


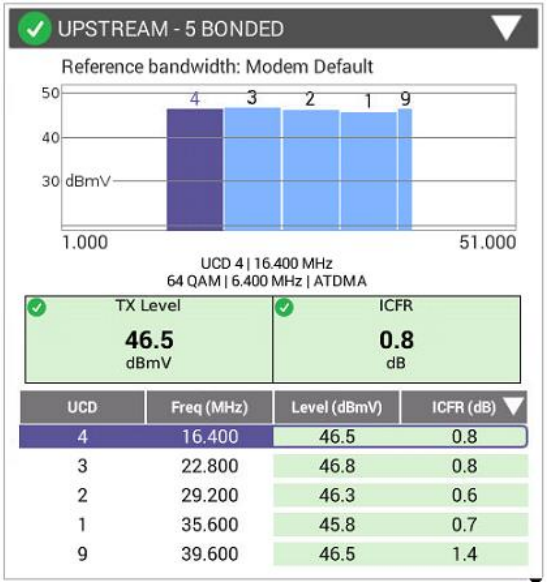


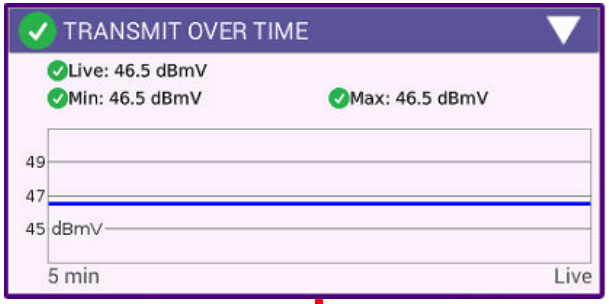


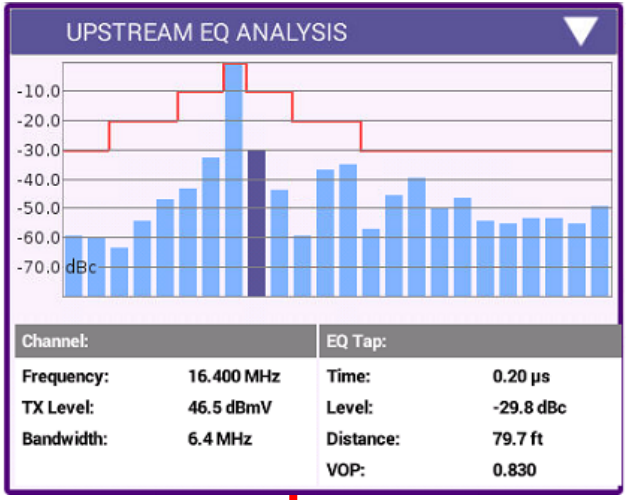


DOCSIS Expert

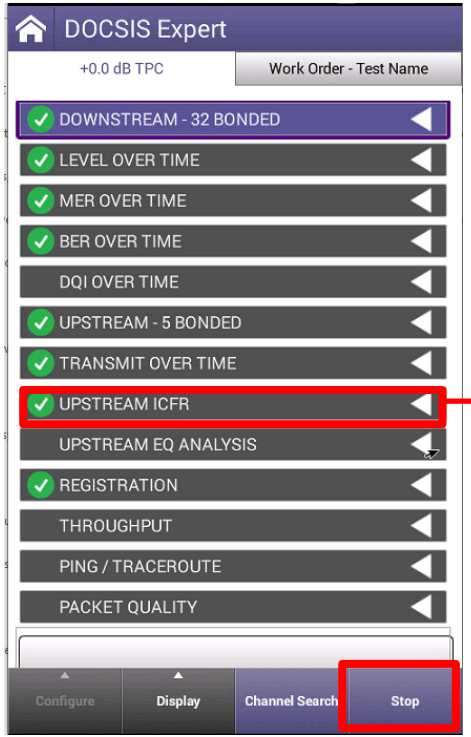


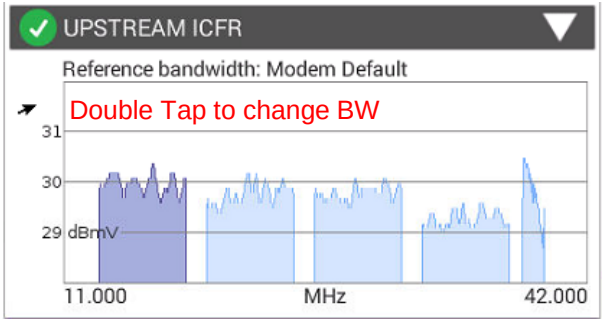


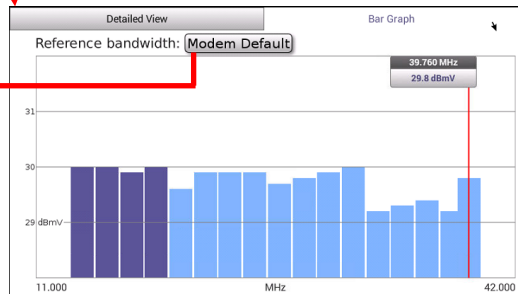


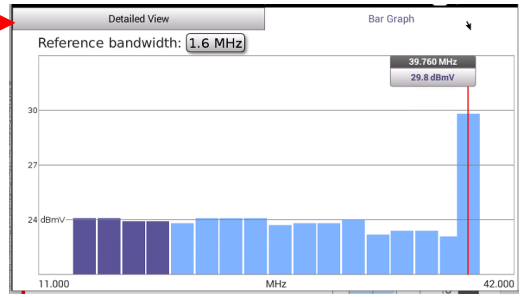


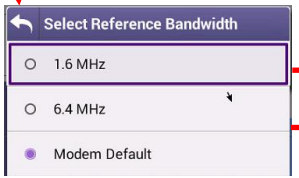
DOCSIS Expert

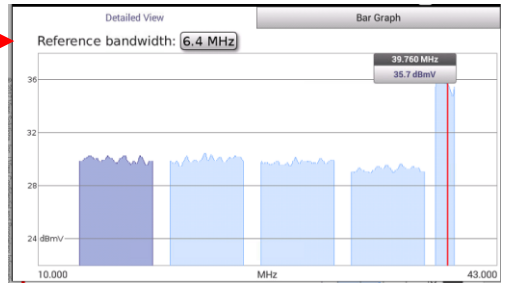




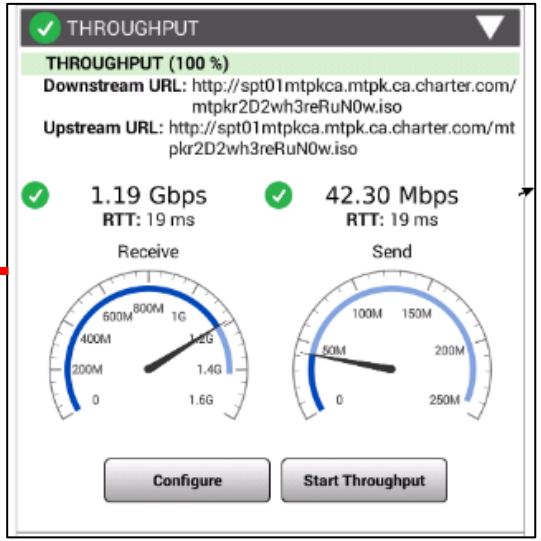


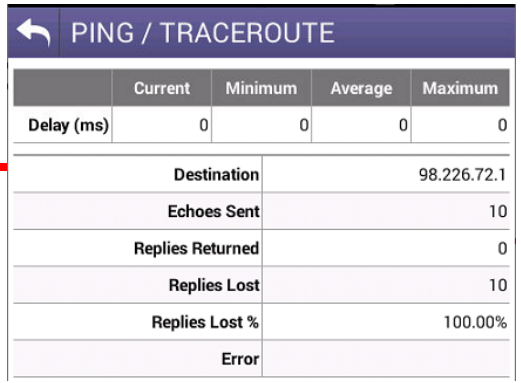


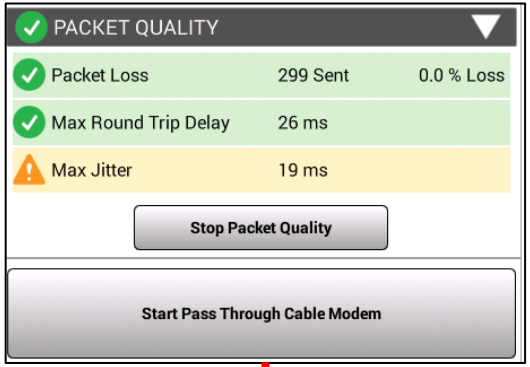




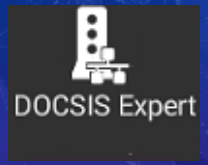
DOCSIS Expert





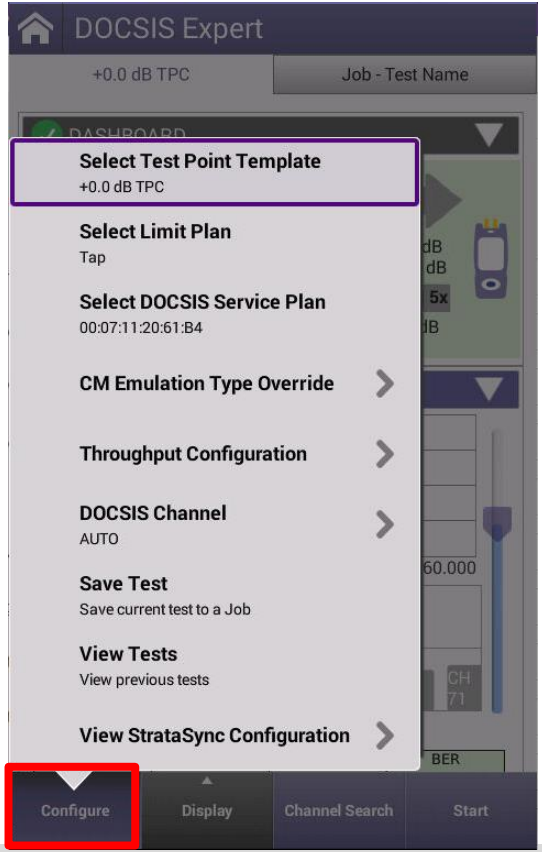


DOCSIS Expert Configure



VIAVI Solutions

DOCSIS Expert Configure Settings



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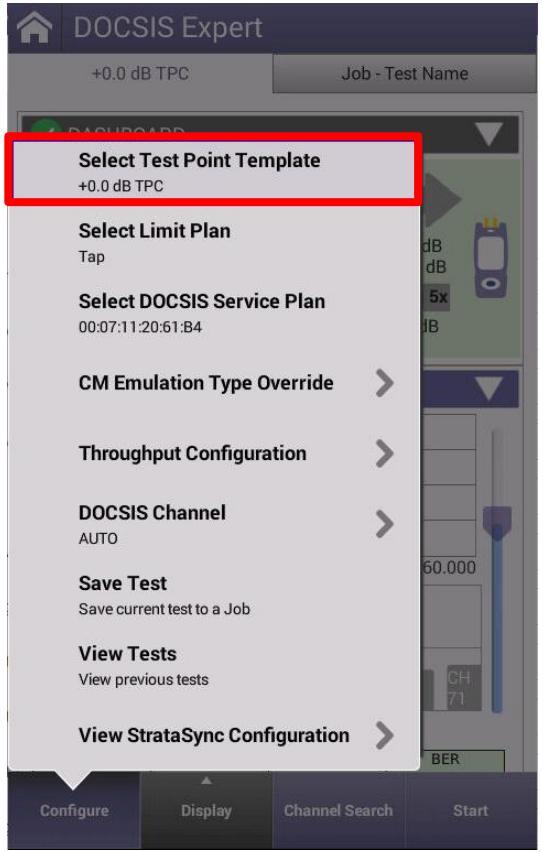

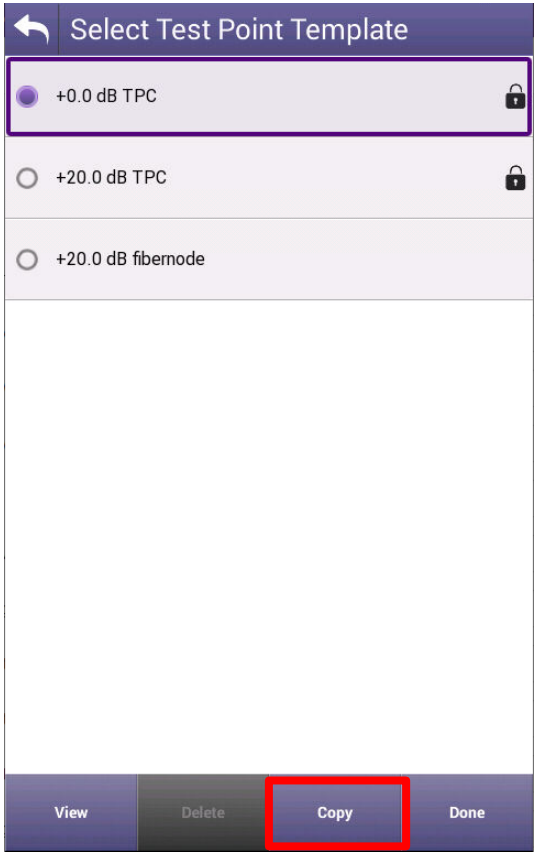

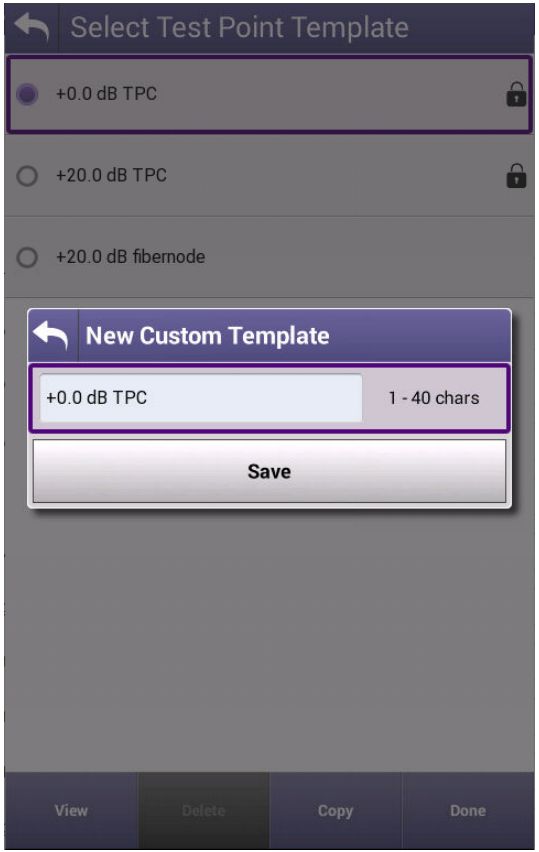

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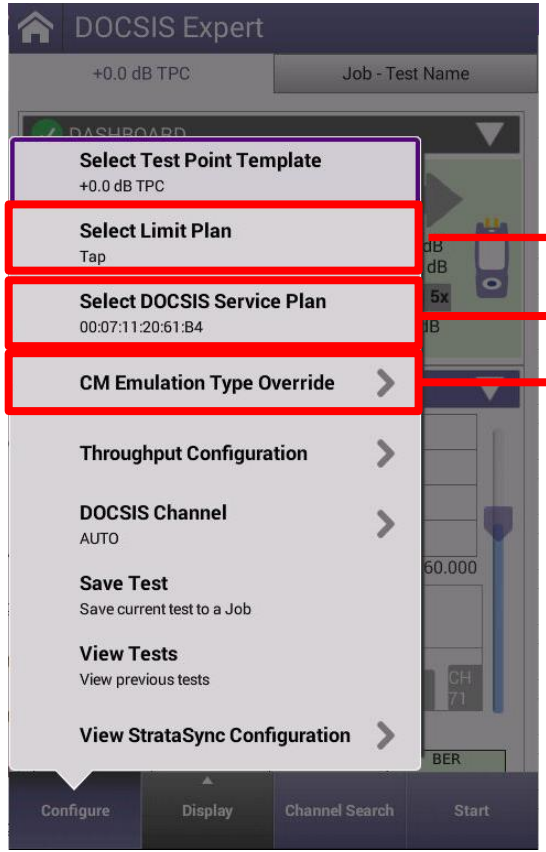

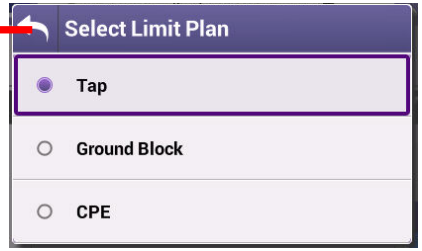

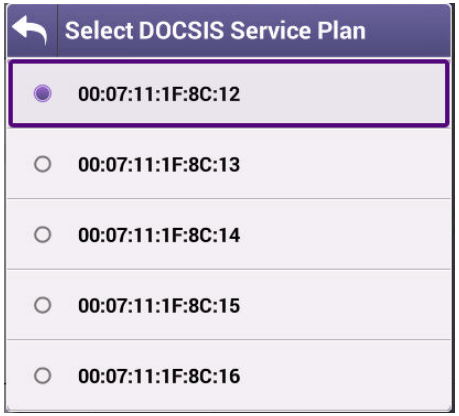

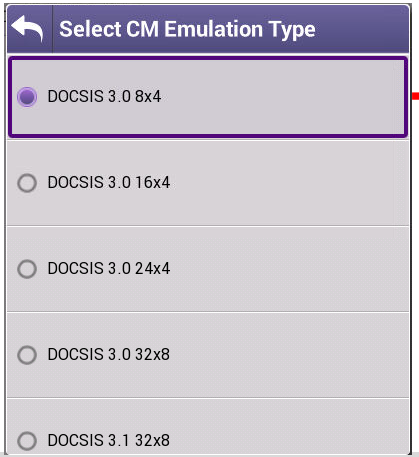

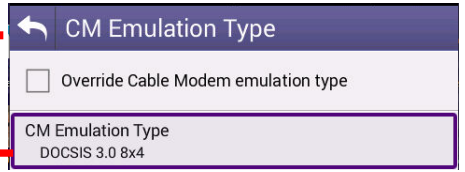

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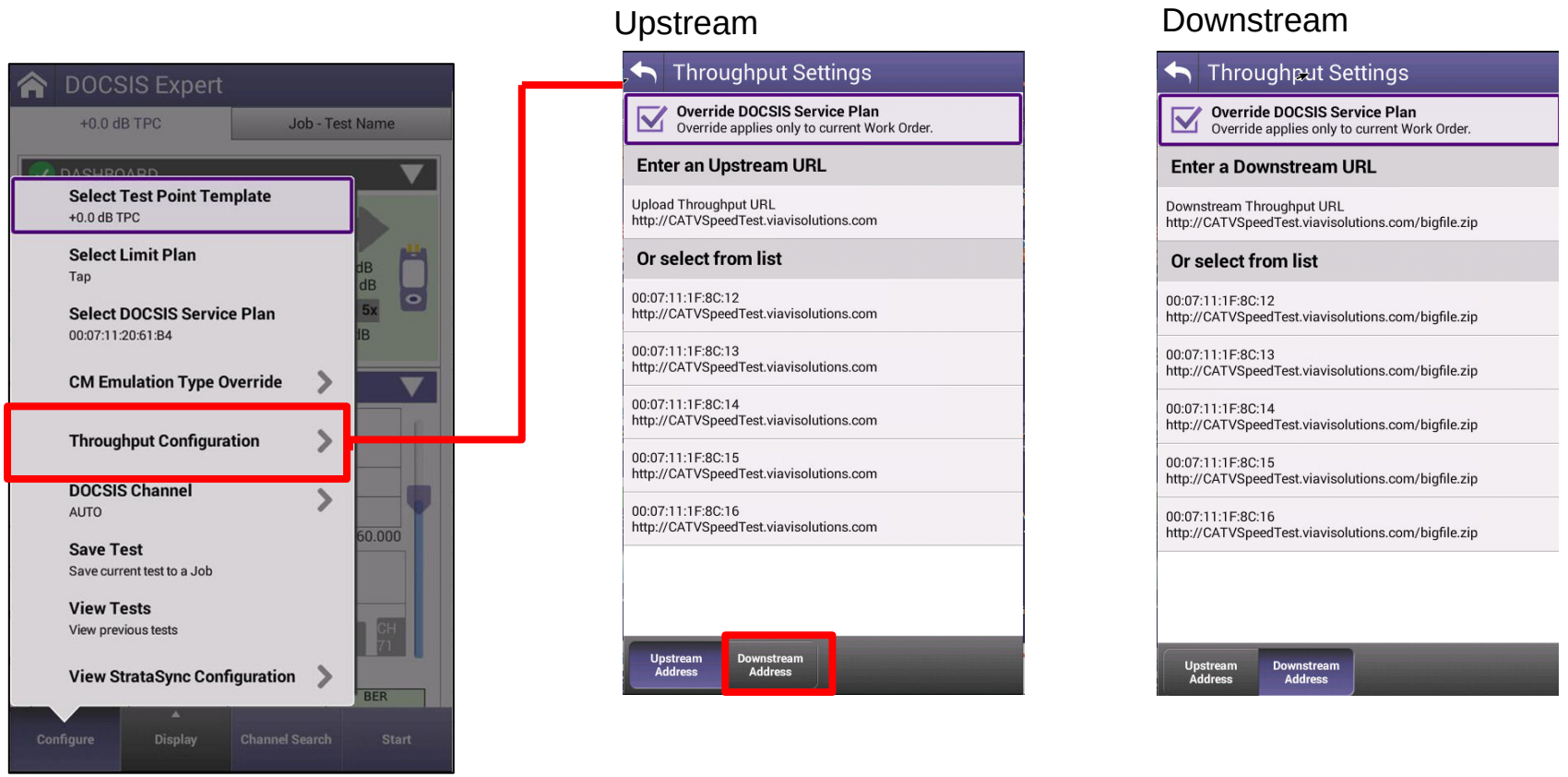

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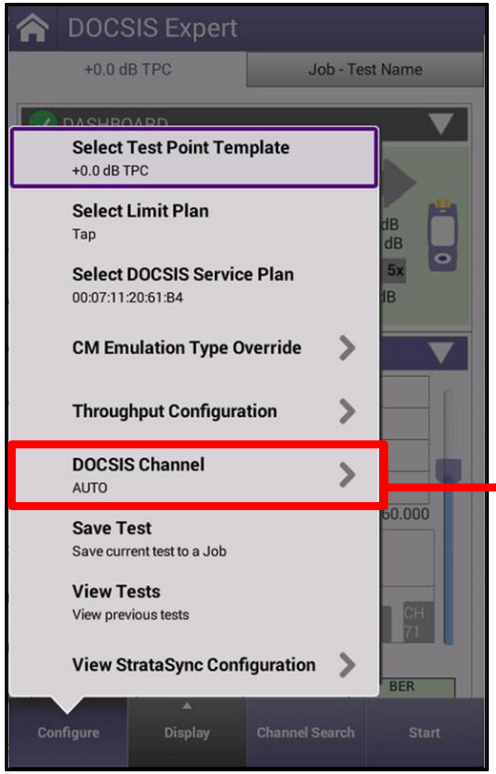
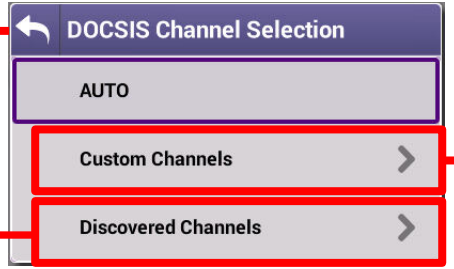
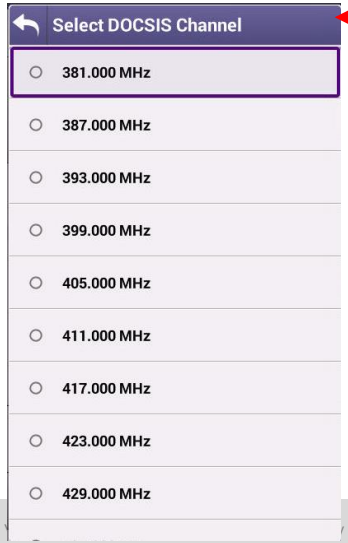
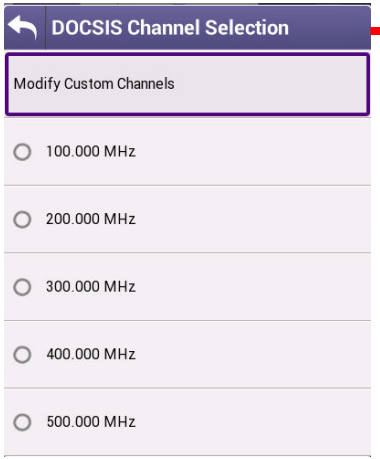
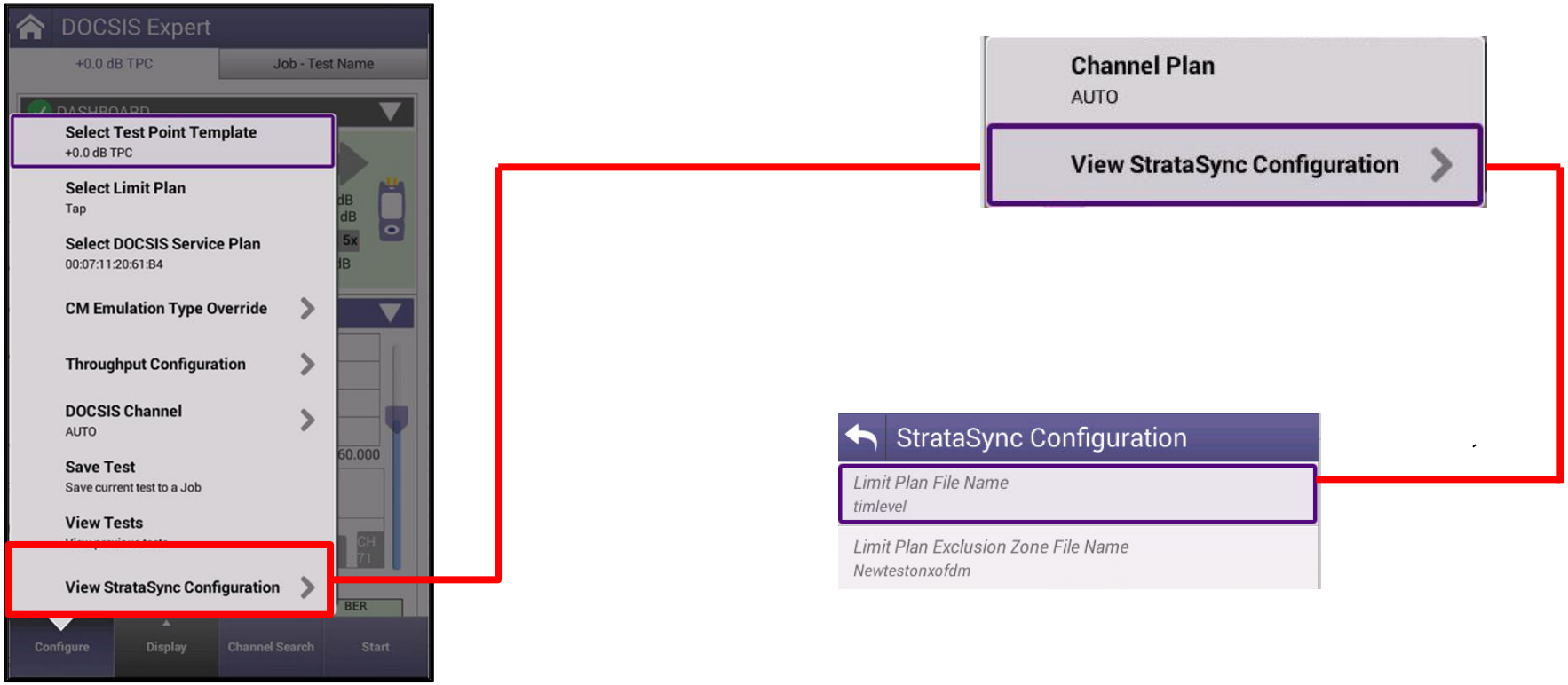








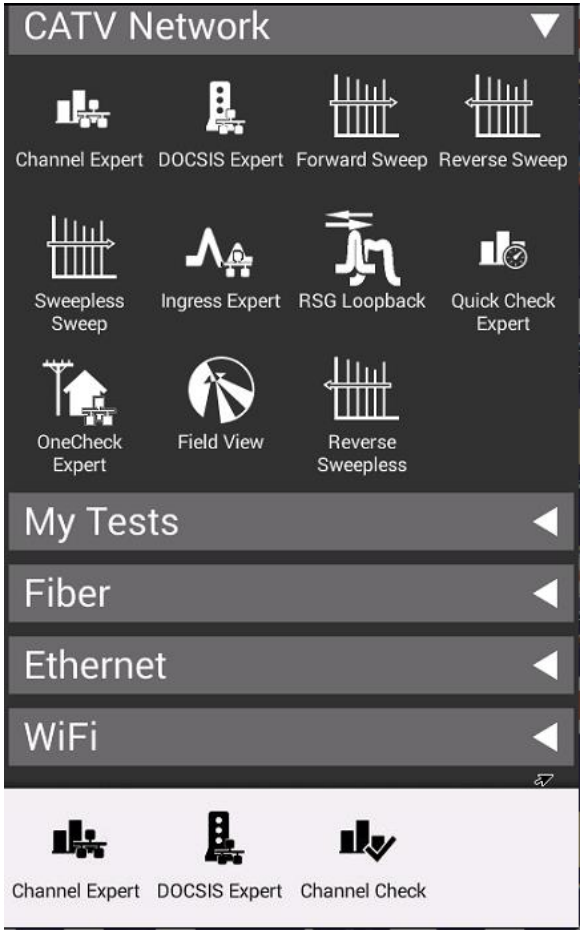
DOCSIS Expert Configure Settings



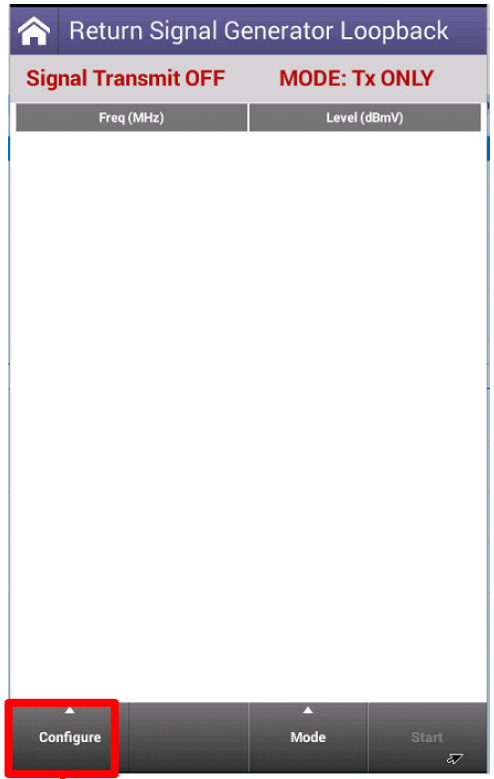
Return Signal Generator (RSG) w/ Loopback

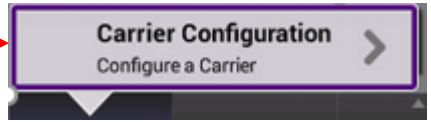
Getting Started with RSG Loopback

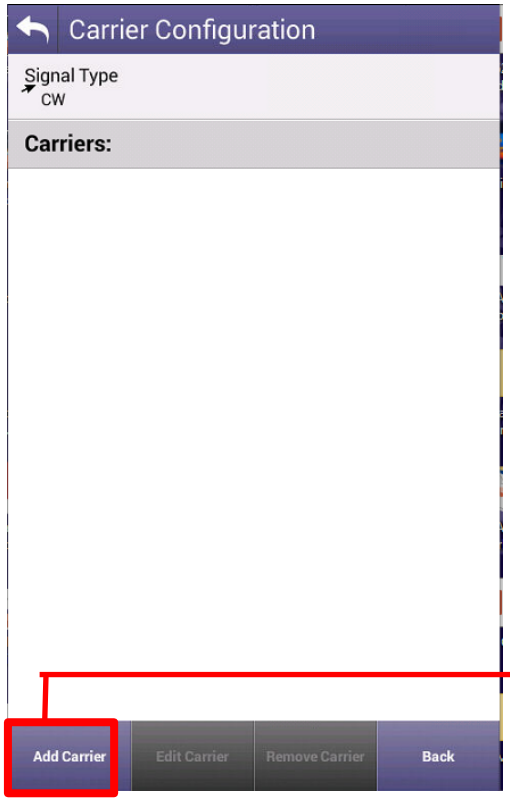
- RFG Loopback mode will appear in the CATV Network section on the ONX home screen
- To enter the mode press, or select, the RFG Loopback icon

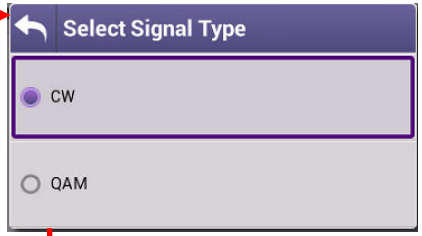


RSG Loopback

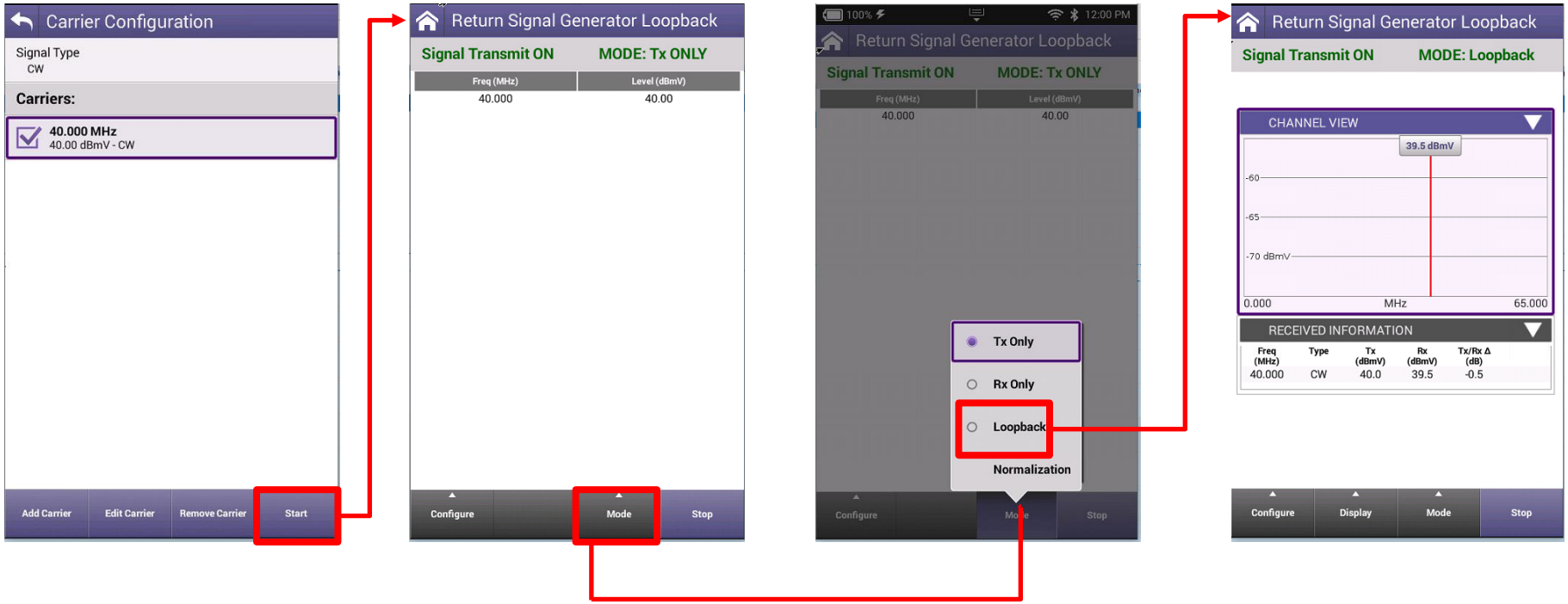








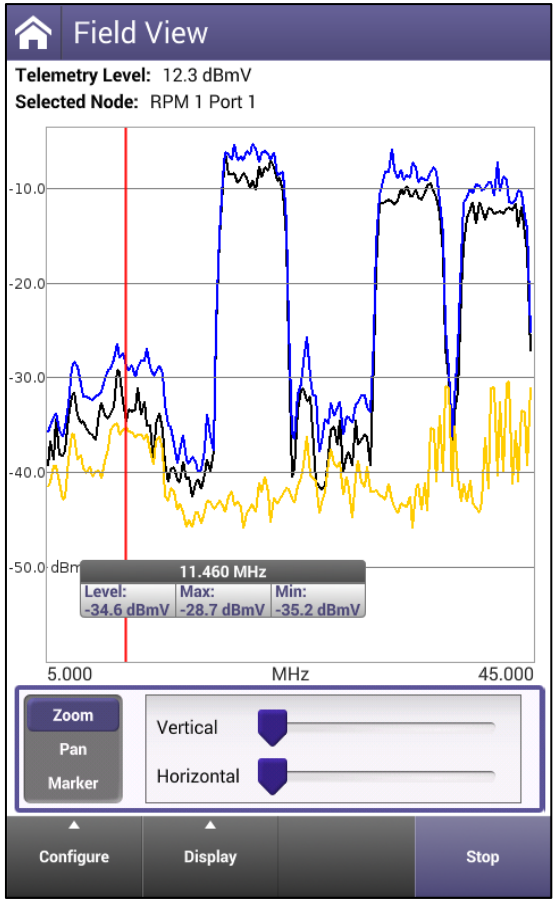
RSG Loopback



Field View with RSG

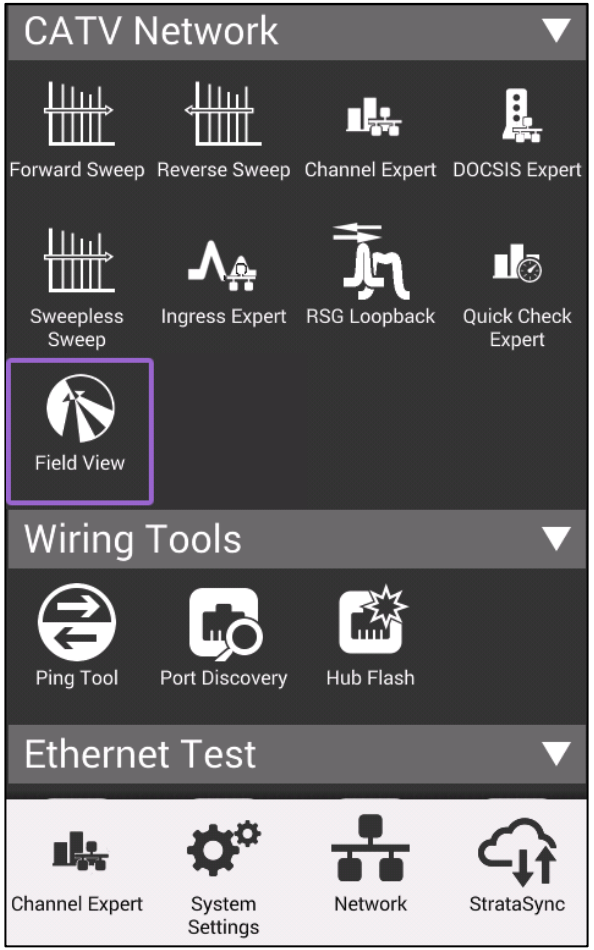
Ingress/Noise Mitigation Test Process

- Ingress/noise in the upstream path is very common and impacts subscriber services
- Ingress/noise can be constant, or intermittent
  - If ingress/noise is constant, and tech fixes an issue at a local test point, did that clean up the ingress/noise received in the headend, or is there still another issue at some other point in the network?
  - If ingress is intermittent, and spectrum is clean, tech doesn't know whether there is no ingress at this particular point, or the ingress isn't happening at this time
- Meter spectrum mode enables tech to test upstream spectrum only at their local test point



Getting Started with Field View

- If enabled on the ONX, Field View mode will appear in the CATV Network section on the ONX home screen
- To enter the mode press, or select, the Field View icon



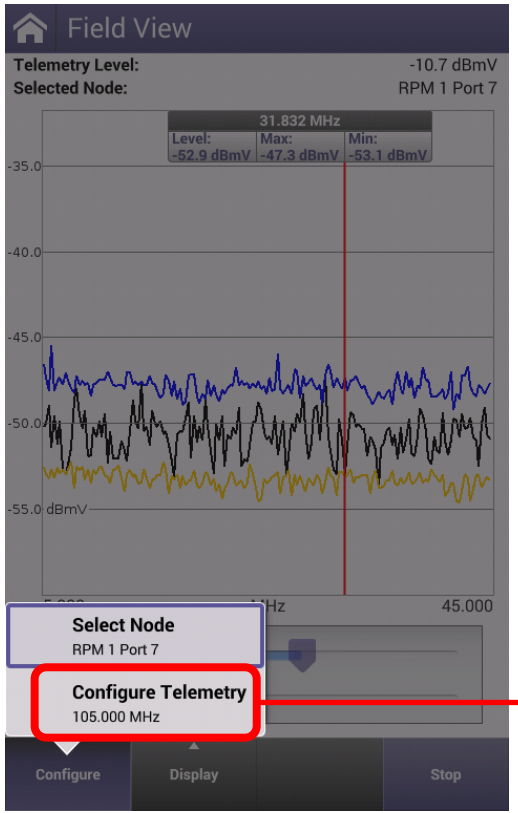
Using Field View

- Field View is the remote view of the headend return path on an instrument located in the field
- Isolates the noise source
- Using the remote display of the headend the tech can quickly confirm if actions taken are improving the network or if additional work is needed
- When an interfering ingress source is removed, the noise present at the headend will drop out revealing a lower noise floor at the headend
- A lower system noise floor eases demodulation of upstream carriers for the CMTS and leads to a better quality of experience for subscribers

Left: Noise visible between the active upstream carriers
Right: Noise source cleaned up reveals a much lower system noise floor

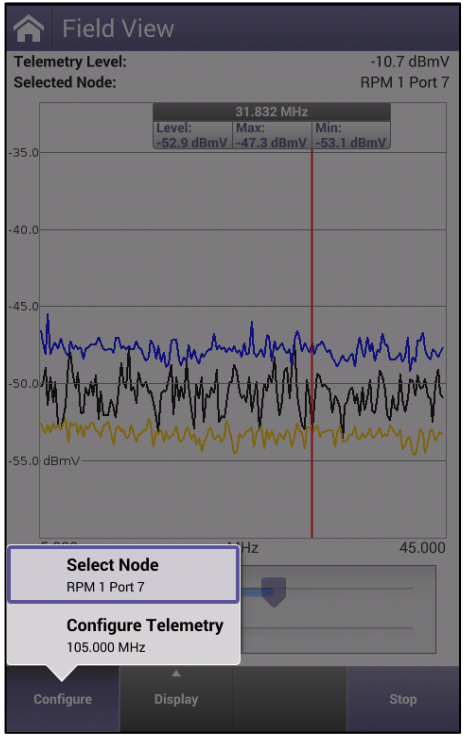
Setting Field View Telemetry Receive Frequency

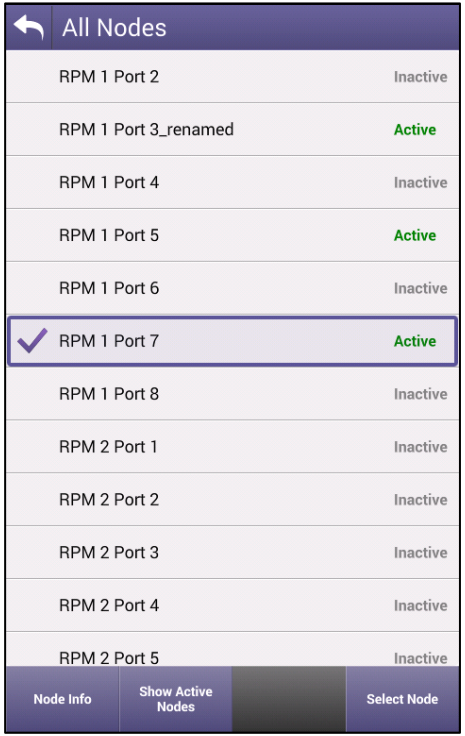
- An HSM connected to PathTrak at the headend is required for Field View
- The HSM sends a telemetry signal downstream for field devices, like the ONX or DSAM, providing visibility of the return spectrum remotely
- The telemetry receive frequency is entered on the ONX by pressing the Configure button then selecting “Configure Telemetry”
- This will bring up an entry box where the telemetry frequency can be entered

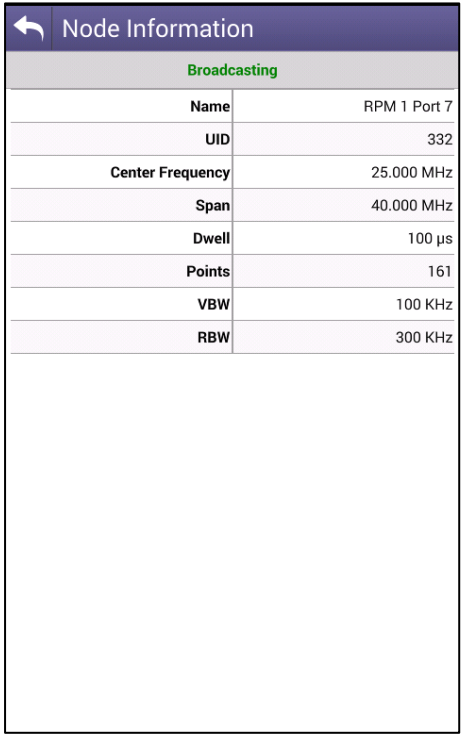


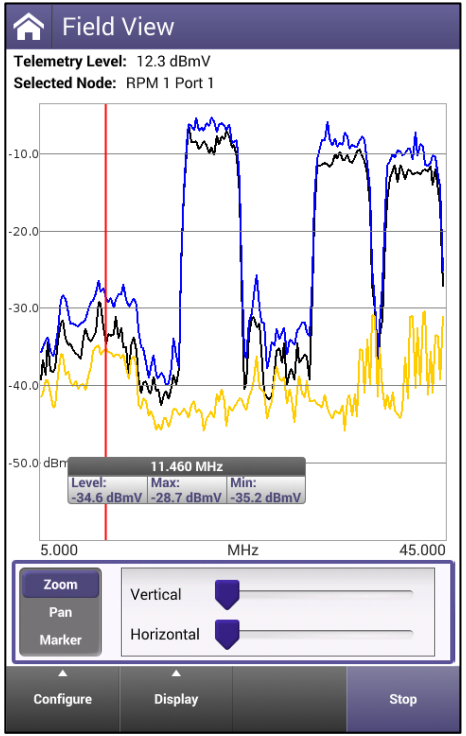
Field View Node Selection and Information

- Users can select the desired node from the list of actively broadcasting nodes from the PathTrak system
- Users can also get details of the specific broadcasting nodes

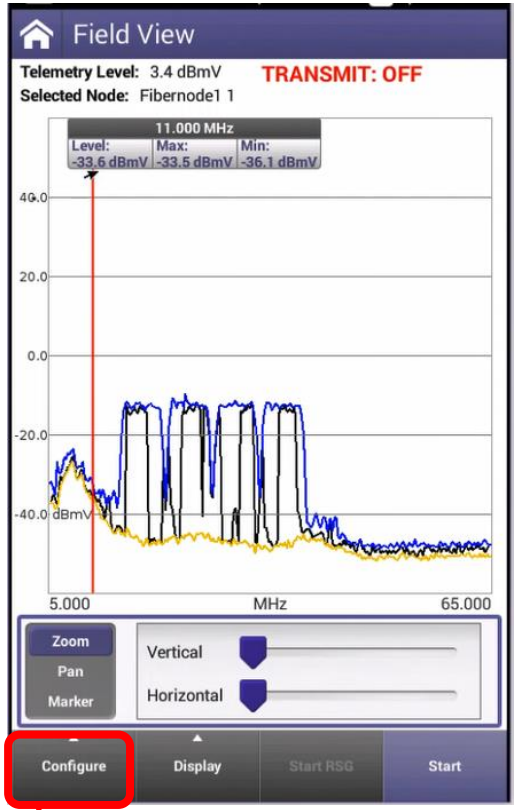


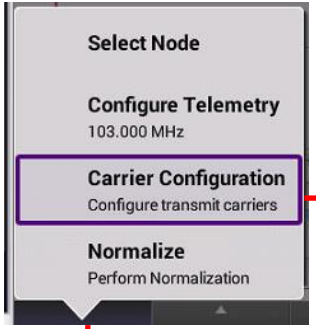


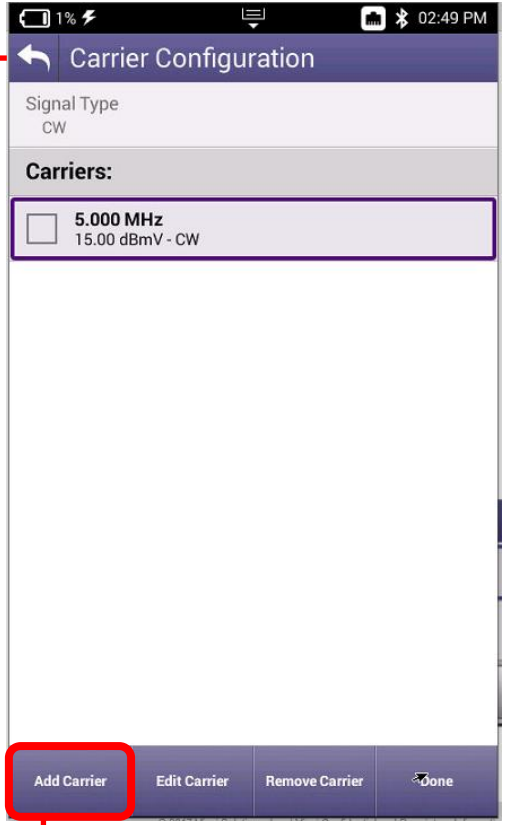


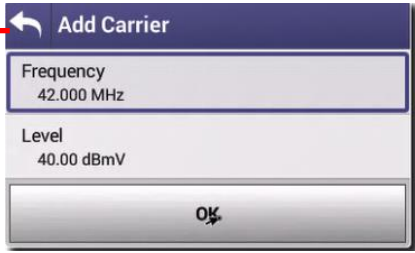


FieldView RSG Transmit Carriers

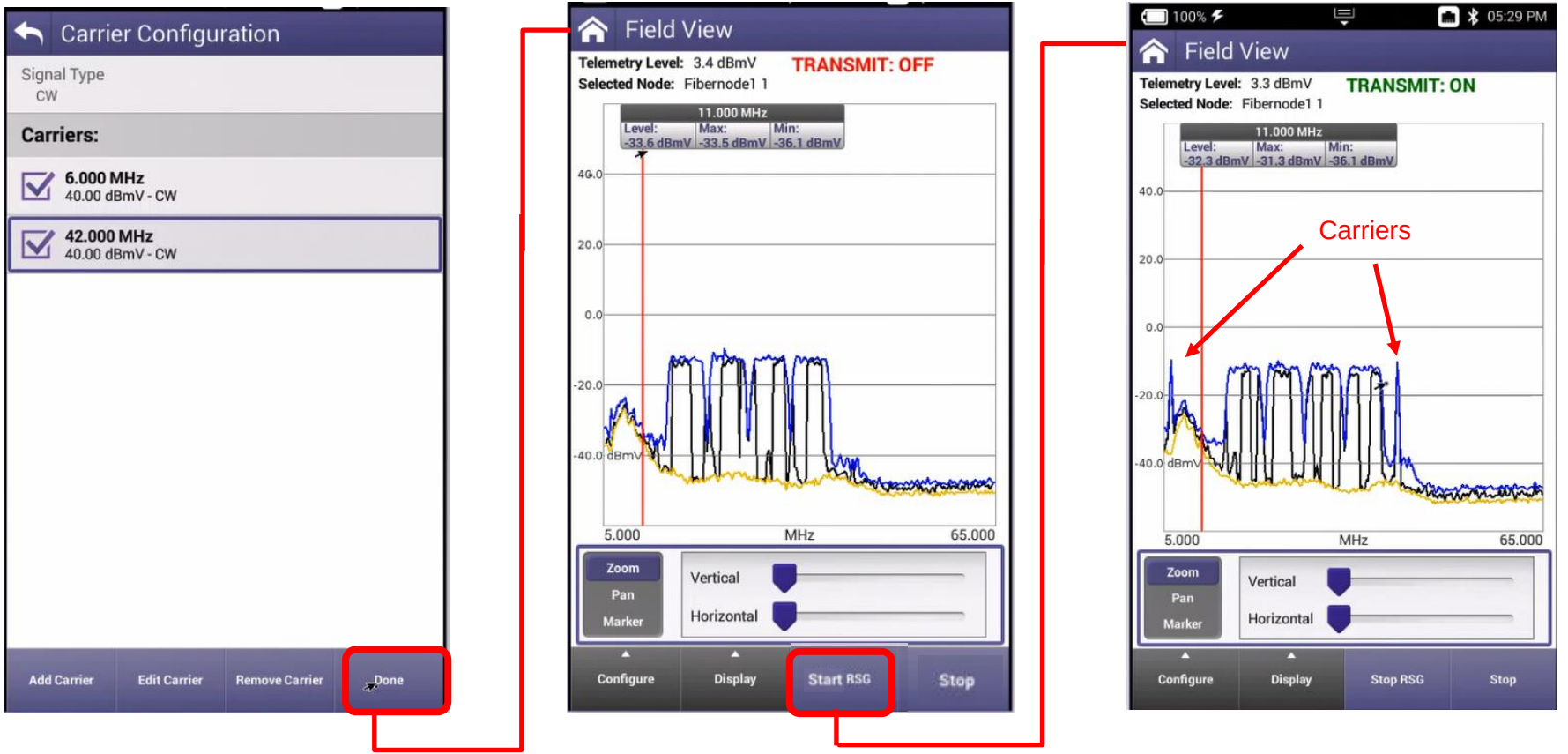




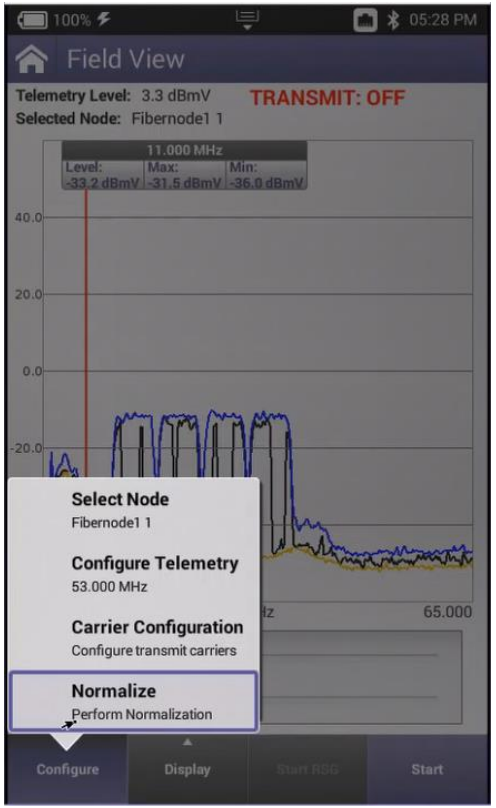


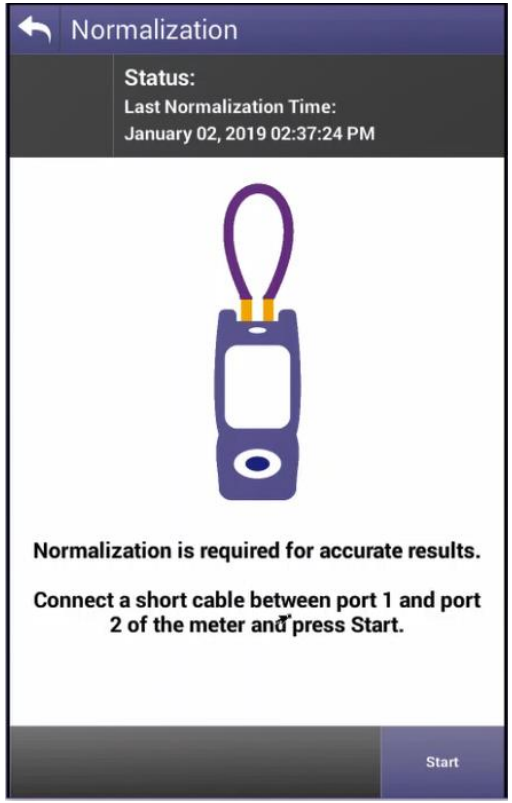


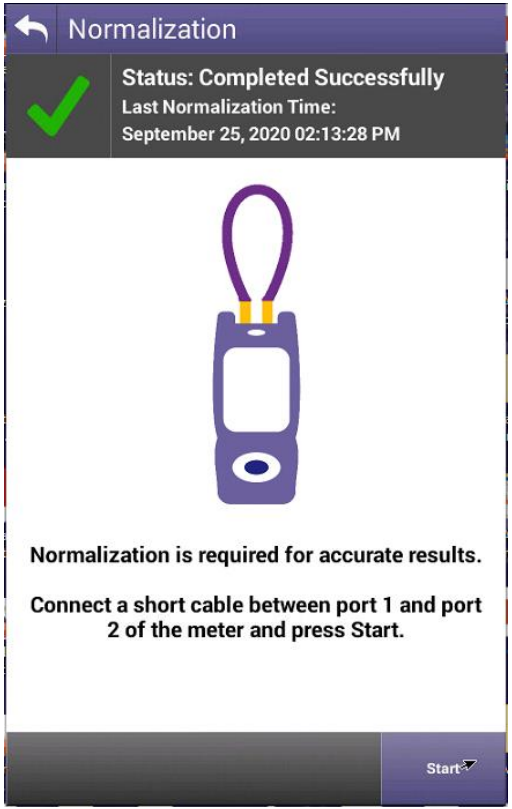
Field View RSG Transmit Carriers



Field View Normalization



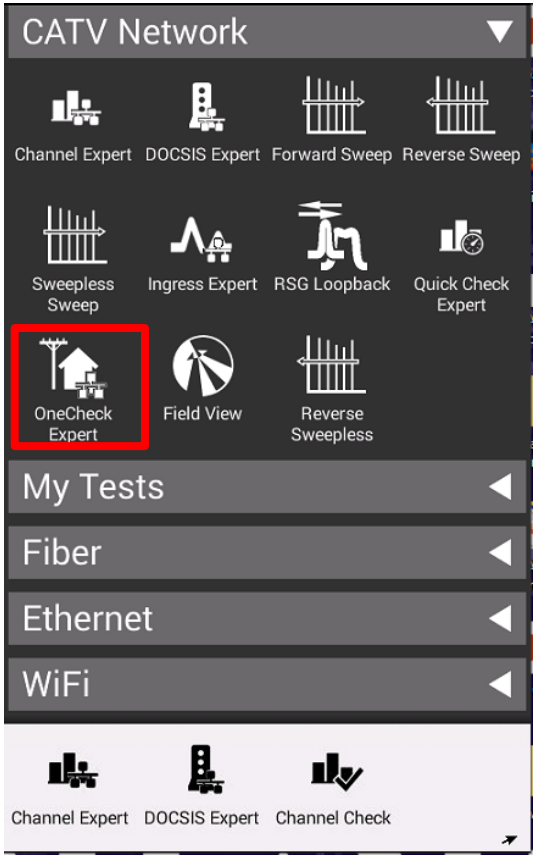




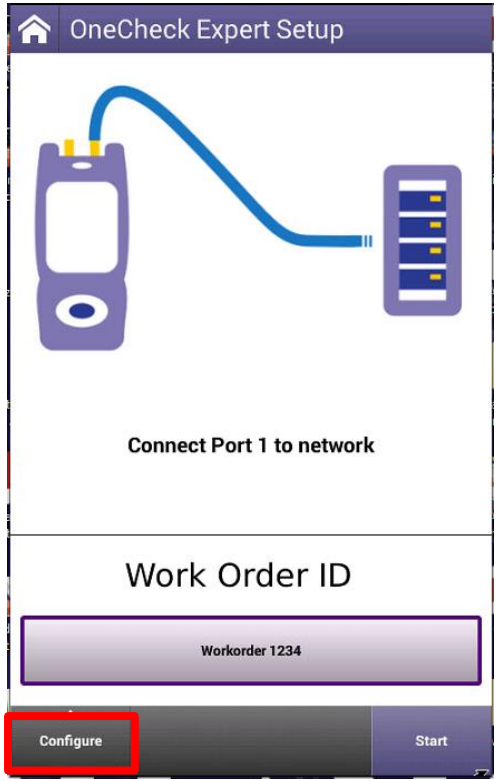
OneCheck Expert Configure Settings

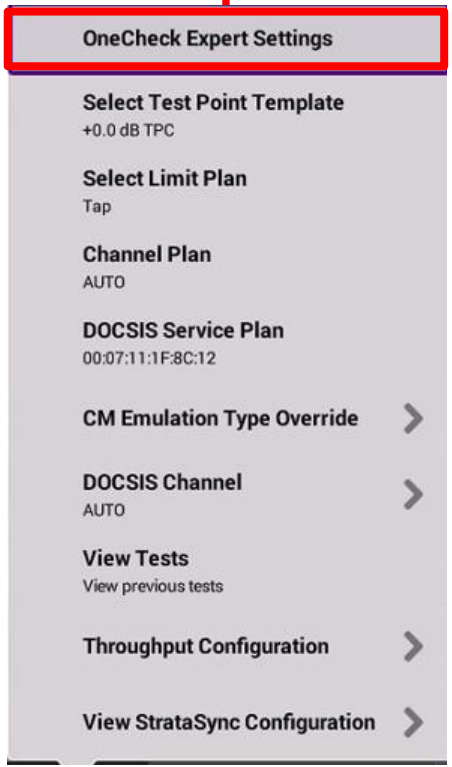
Getting Started with OneCheck Expert

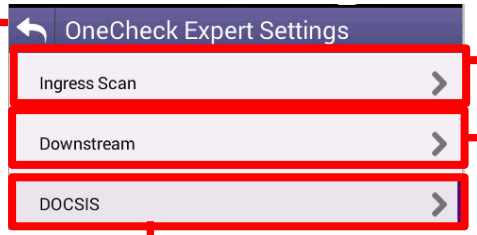
OneCheck Expert mode will appear in the CATV Network section on the ONX home screen
To enter the mode press, or select, the OneChek Expert icon

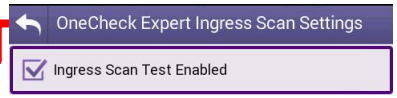


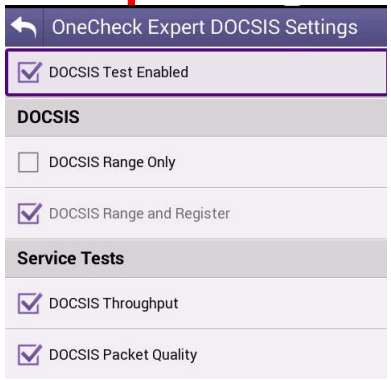
OneCheck Expert

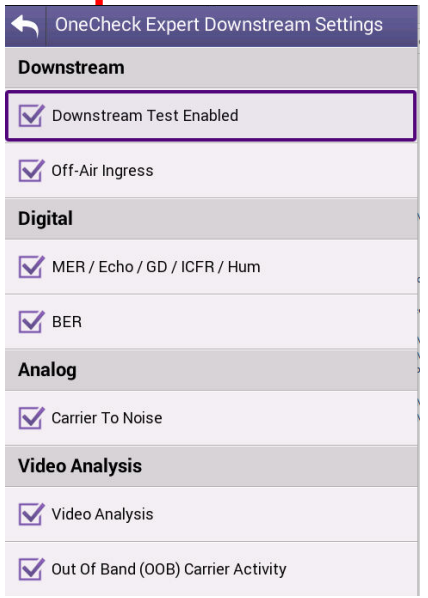




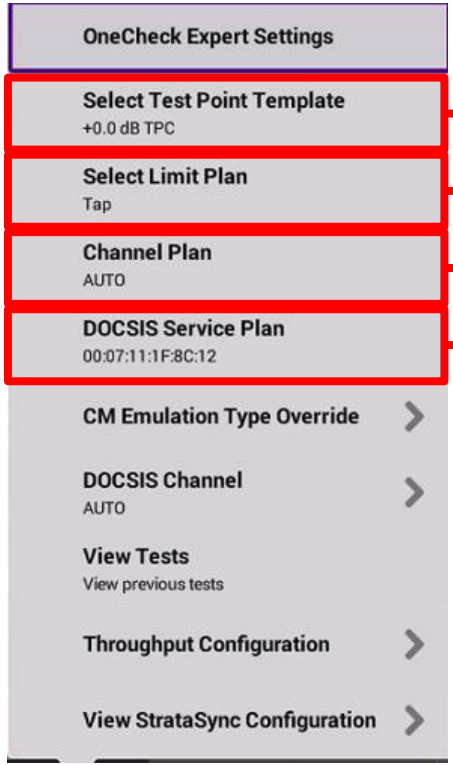


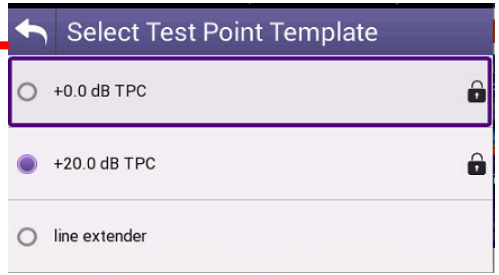


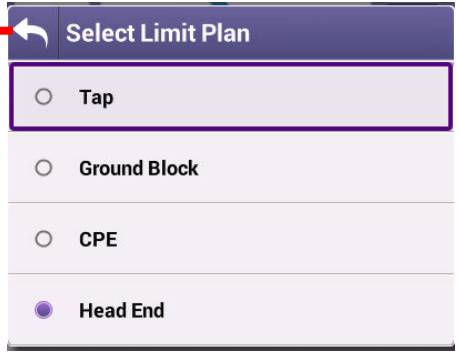


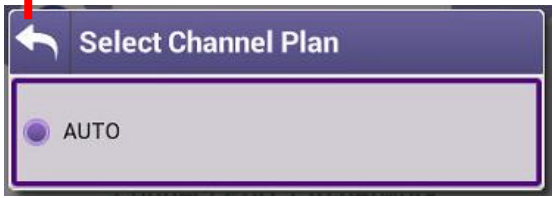


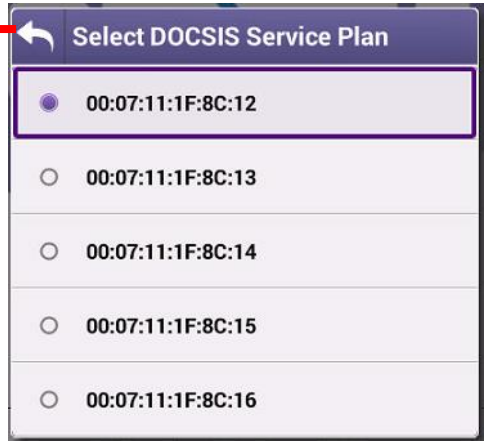
OneCheck Expert











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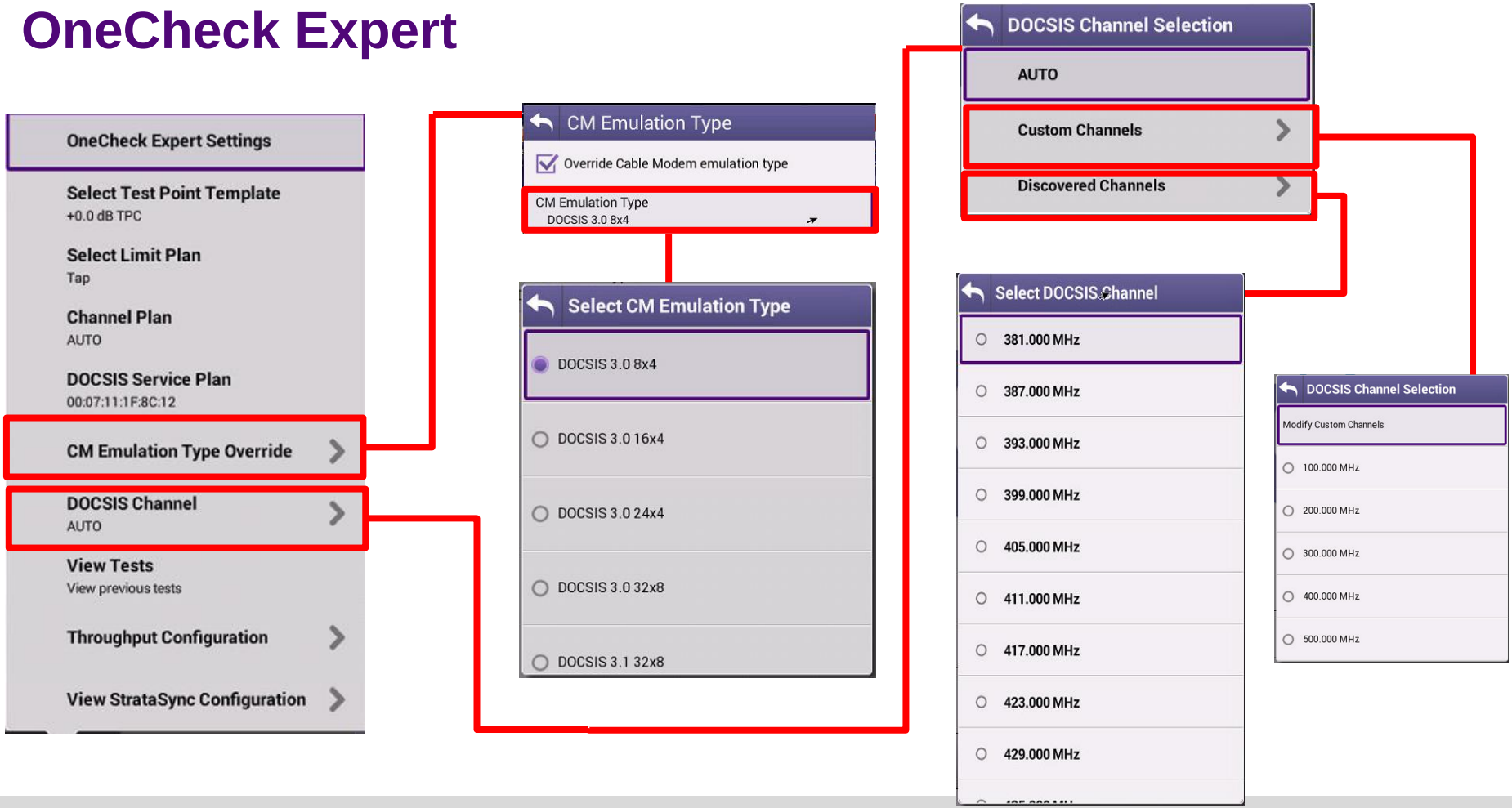
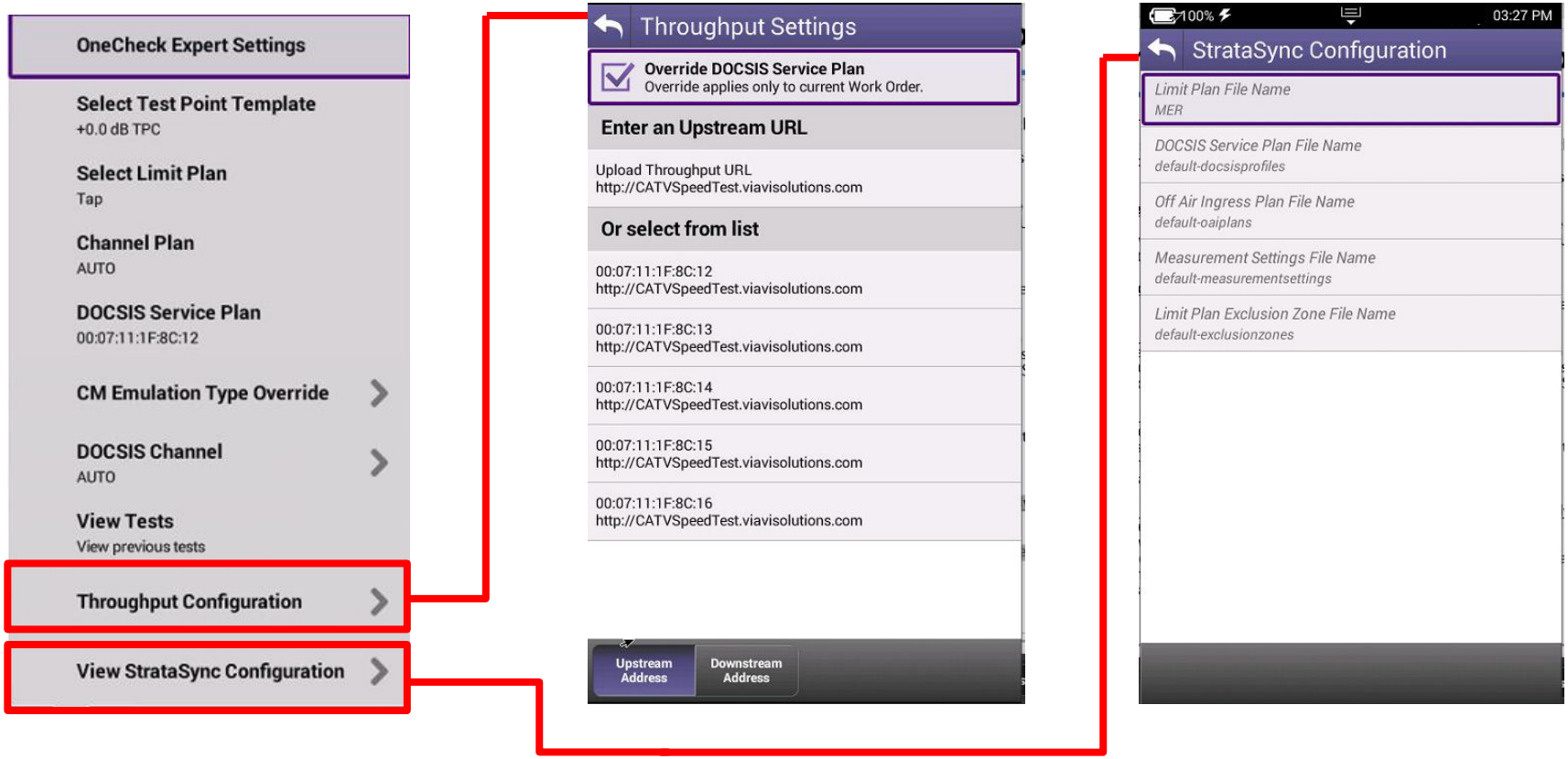
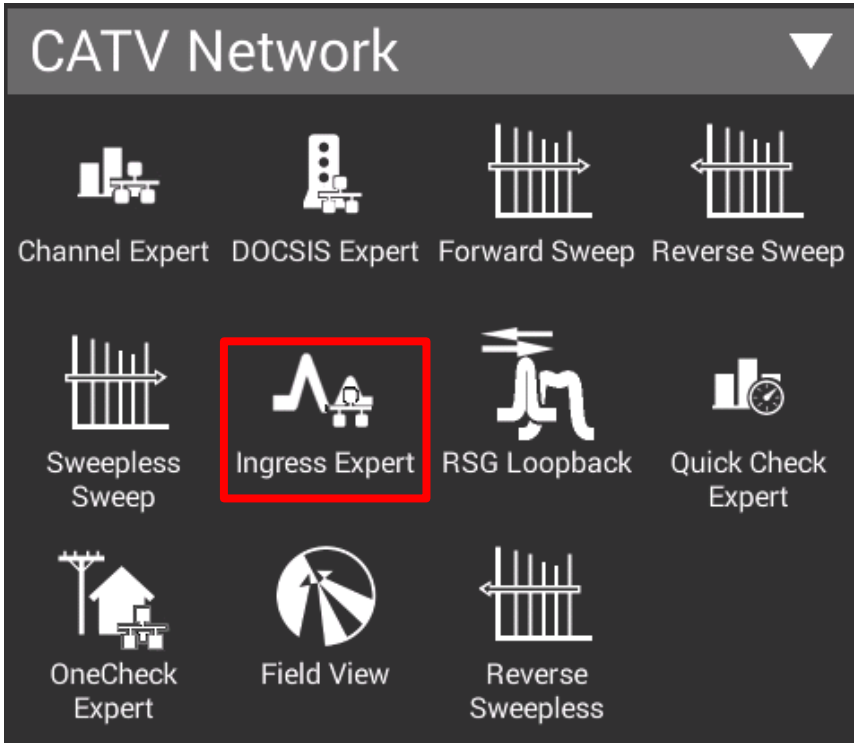


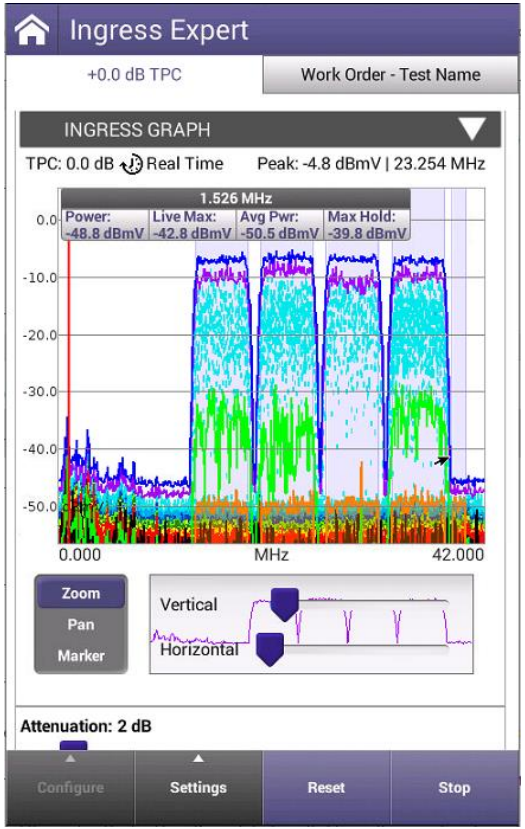
OneCheck Expert



Ingress Expert

Ingress Expert





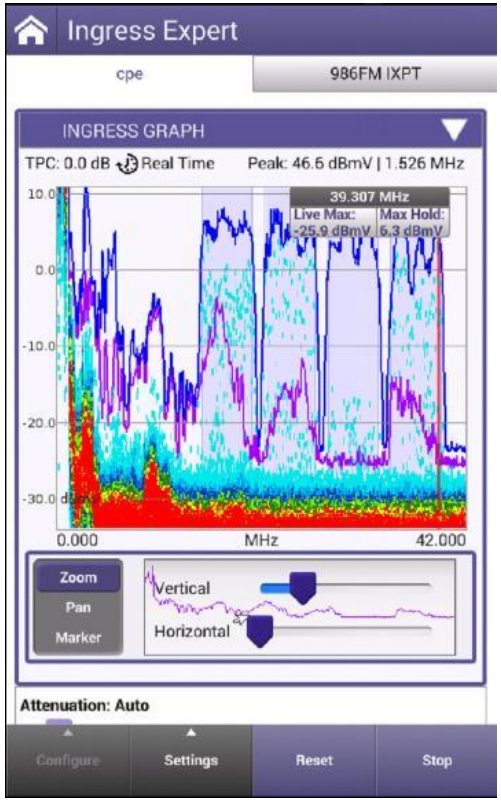
INGRESS EXPERT

INGRESS EXPERT is based on powerful OneExpert CATV HyperSpectrum technology (Real Time Spectrum Analyzer)

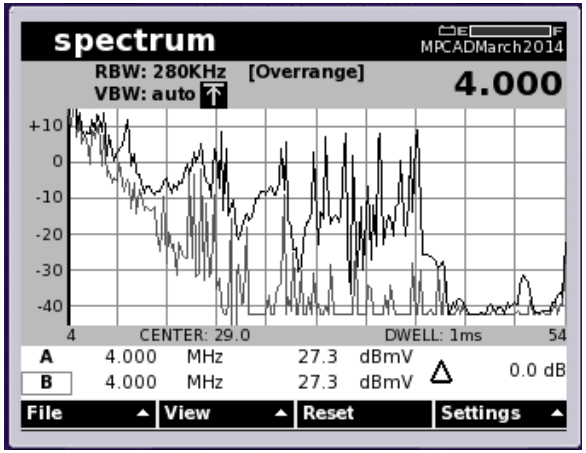
Innovative overlapping FFT (Fast Faurier transform) measures all transient interfering signals

INGRESS EXPERT is different from Swept Spectrum Analyzers (DSAM and Pathtrak) – its more accurate and has thousands of samples a second

Overlapping options provide additional detail

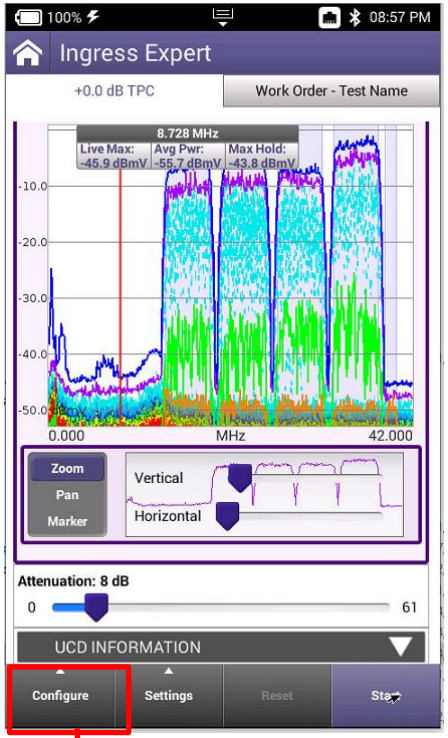


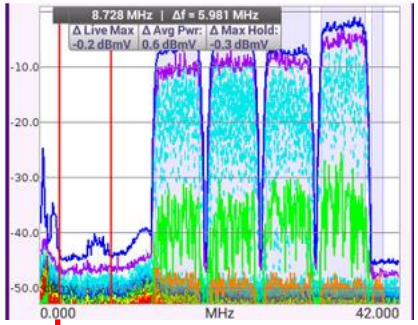
ONX630

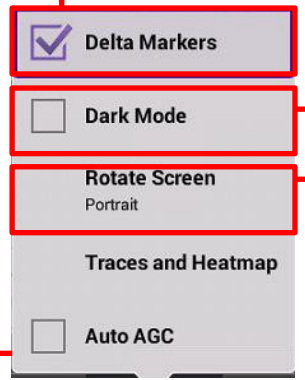


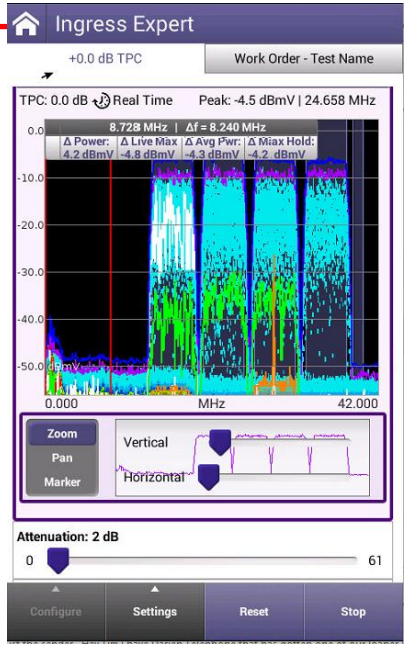
DSAM6300

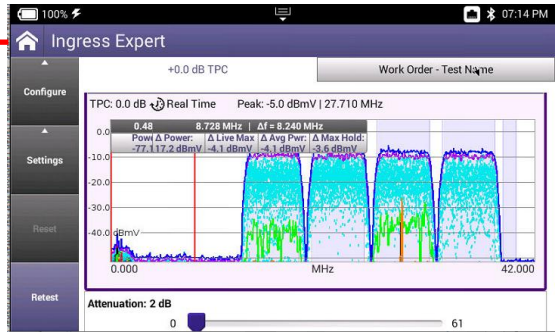
INGRESS EXPERT - CONFIGURE



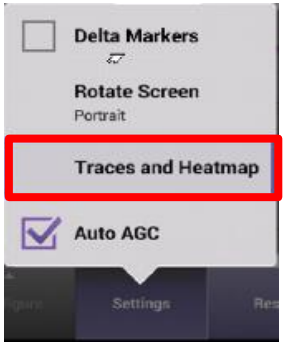


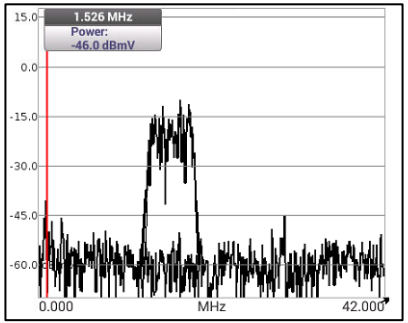




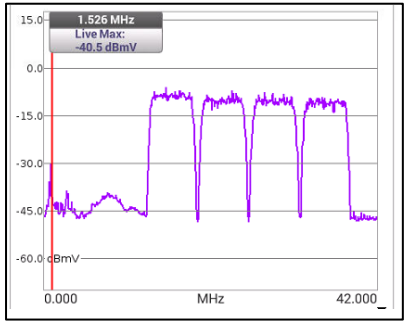


INGRESS EXPERT – HEATMAP OVERLAYS

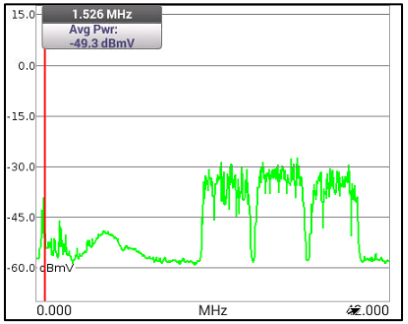




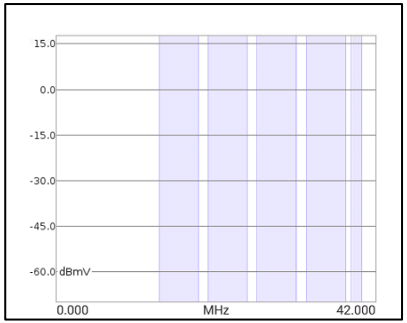
Power



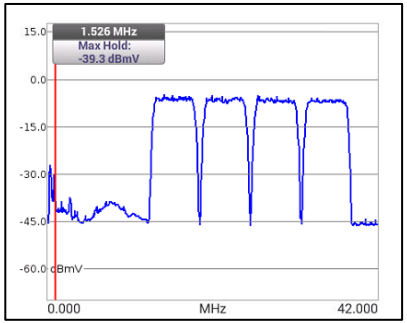
Live Max



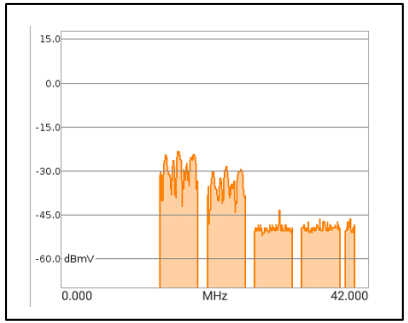
Average Power



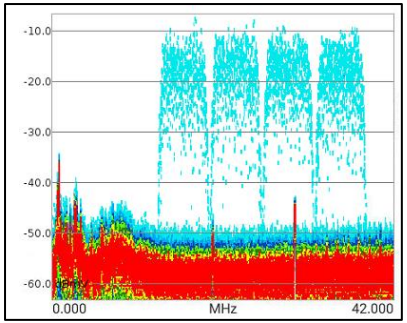
UCD



Max Hold

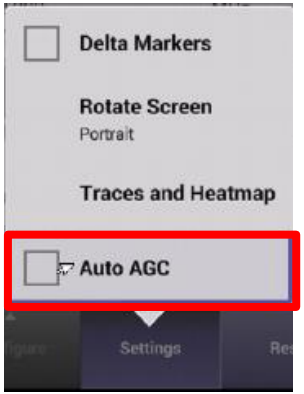


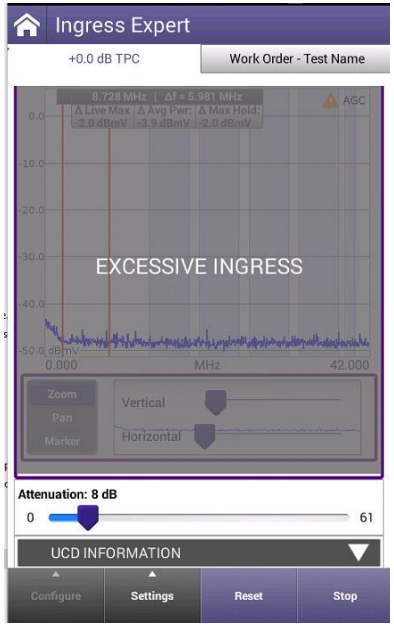
Noise

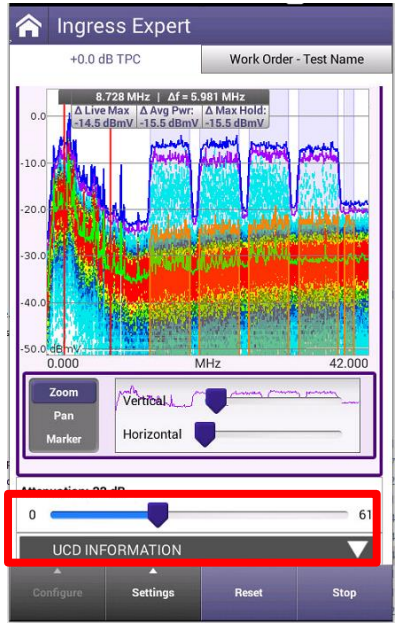


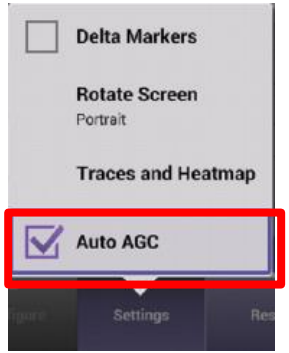
Heatmap

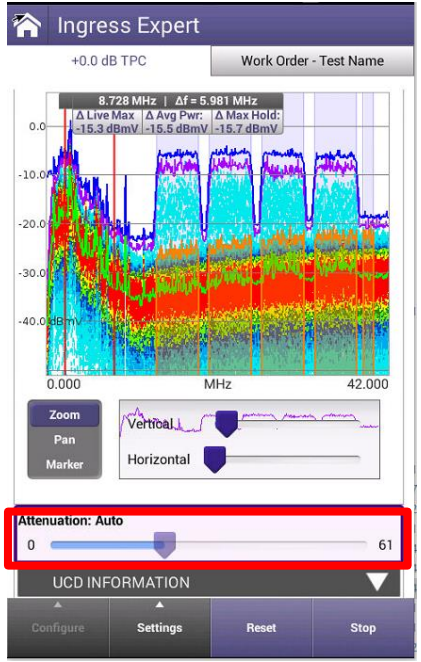
INGRESS EXPERT – AUTO-ACG







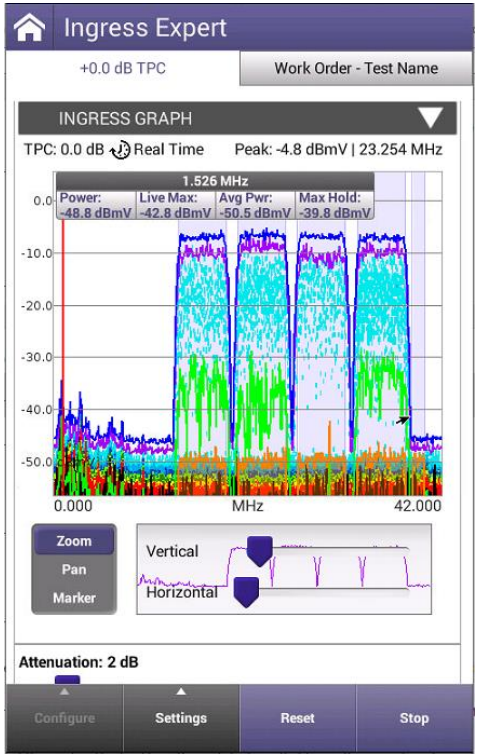


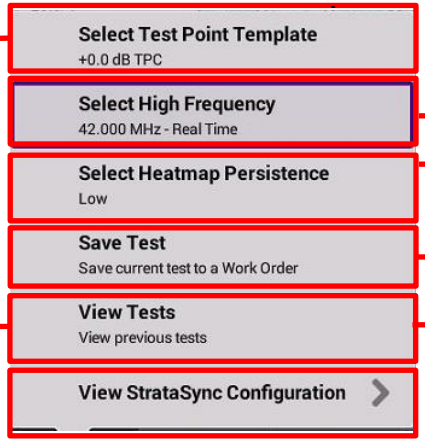


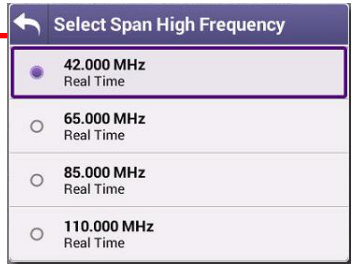
- DISABLING AUTO AGC requires the user manually attenuates the signal to prevent OVERRANGE
- NOTE: The spectrum Specification is 120 MHZ

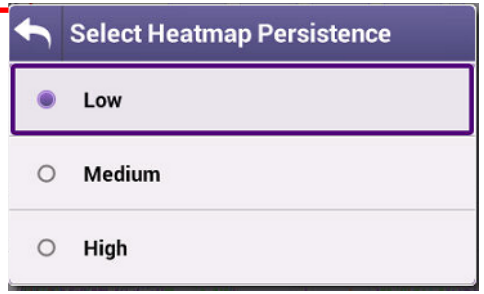
- AUTO AGC will attempt keep spectrum view references, up to 60dB dynamic range
- NOTE: The Attenuation scale is disabled when AGC is checked

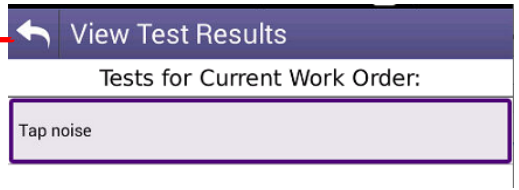
INGRESS EXPERT - CONFIGURE

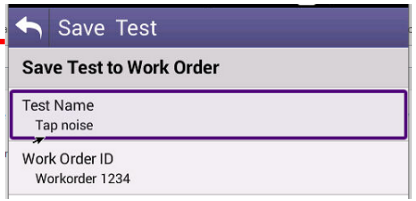


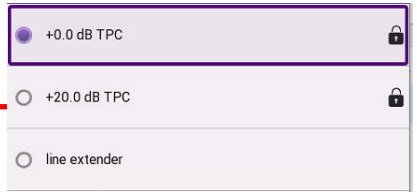






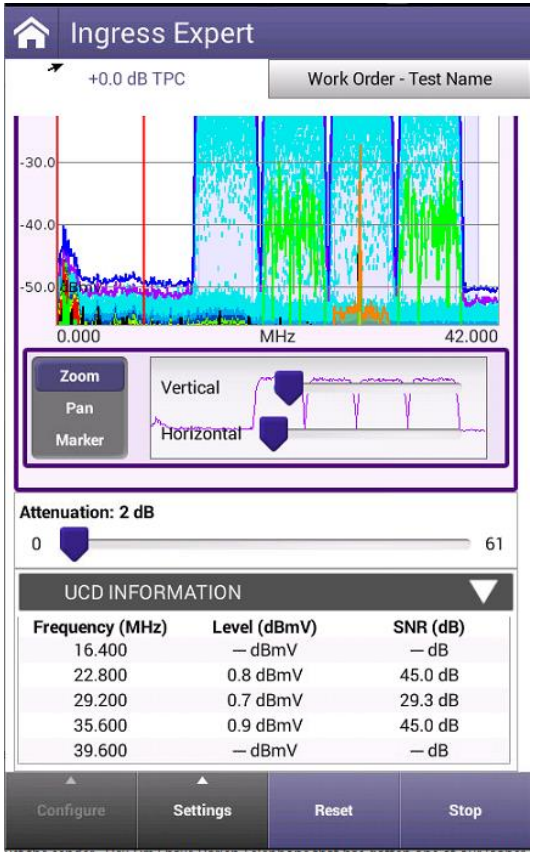






INGRESS EXPERT – SNR and NOISE

- The NOISE setting will allow users to see the noise floor under the upstream carriers
- If the user performs a DOCSIS EXPERT test before INGRESS EXPERT, UCDs will match that of the network and give clear indication of the carriers width and location
- Additionally, UCDs will be demodulated with FREQUENCY, LEVEL and SNR calculated and displayed



Sweep & Plant Maintenance System
ONX-630 & SCU-1800

SCU-1800

Advanced System Sweep

- **Fast — Sweep, align, and troubleshoot faster than ever**
- **Stealth Sweep™** with integrated Tilt/Align quickly validates amps and HFC networks faster than any other test
- Complete a downstream scan including MER/ BER in about 60 seconds
- **AutoChannel™** instantly identifies the channel lineup and eliminates guesswork

- **Powerful — Designed to find difficult problems**
- Combined DOCSIS 3.1 and sweep testing validates the complete HFC network
- **Ingress Expert** with Hyper Spectrum™ catches difficult return noise problems
- **Expert modes** with advanced parallel processing find hidden problems and root causes

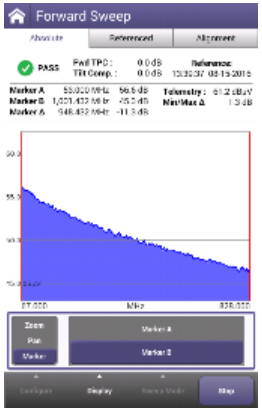
- **Flexible — Ready for your changing network needs**
- The ONX-630's **dual diplexer** 42/85 or 65/204 with 1.2GHz supports next generation networks
- The ONX-630 is compatible with DSAM-6300 and SDA-55XX providing seamless transition
- Common sweep reporting for ONX-630 and DSAM ensures consistency via **StrataSync™**

Next Generation Sweep Gear

OneExpert CATV ONX-630

- Field upgradable: Sweep + DOCSIS 3.1 module
- Reverse Sweep capable to 204MHz → compatible with SDA-5500/5510
- Extended Forward Sweep range to 1.2GHz with new SCU-1800

ONX-630



SCU-1800

Sweep Control Unit SCU-1800

- 1RU unit with Ethernet interface (web browser/remote)
- Compatible with DSAM-6300
- Forward TX to 1.2GHz with ONX
  - HW capable up to 1.8GHz
  - 50dB Spurious Free Range
  - Narrow Sweep Pulses – fit between carriers
- Sixteen switchable return sweep ports (sw optional)
- Flexible mode of operation
  - Forward Tx only (5500)
  - Forward + Single User Reverse (5500)
  - Multi-User Reverse (5510)

SCU-1800 Appearance

SCU-1800 Sweep Transmitter/Receiver

- The headend/hub rack-mounted SCU-1800 Sweep Control Unit provides non-interfering downstream sweep to 1.218 GHz and upstream sweep to 204 MHz on up to 16 ports.
- The sweep is remotely configurable via Ethernet and browser, and a sweep plan can be built from imported information from the **OneExpert ONX**
- Additionally, there is an auto-fill capability in which the sweep points are automatically injected in unoccupied spectrum areas.

SCU-1800 Field Unit Compatibility

SDA / DSAM sweep type

Forward Sweep
- 50 to 1000 MHz

Reverse Sweep
- 5 to 85 MHz
- Single User Reverse
- Multi User Optional

- **ONX sweep type**

Forward sweep
- 54 to 1218 MHz
- -20 to +20 dBmV input range

Reverse Sweep
- 5 to 204 MHz frequency Range
- -20 to +20 dBmV input level range

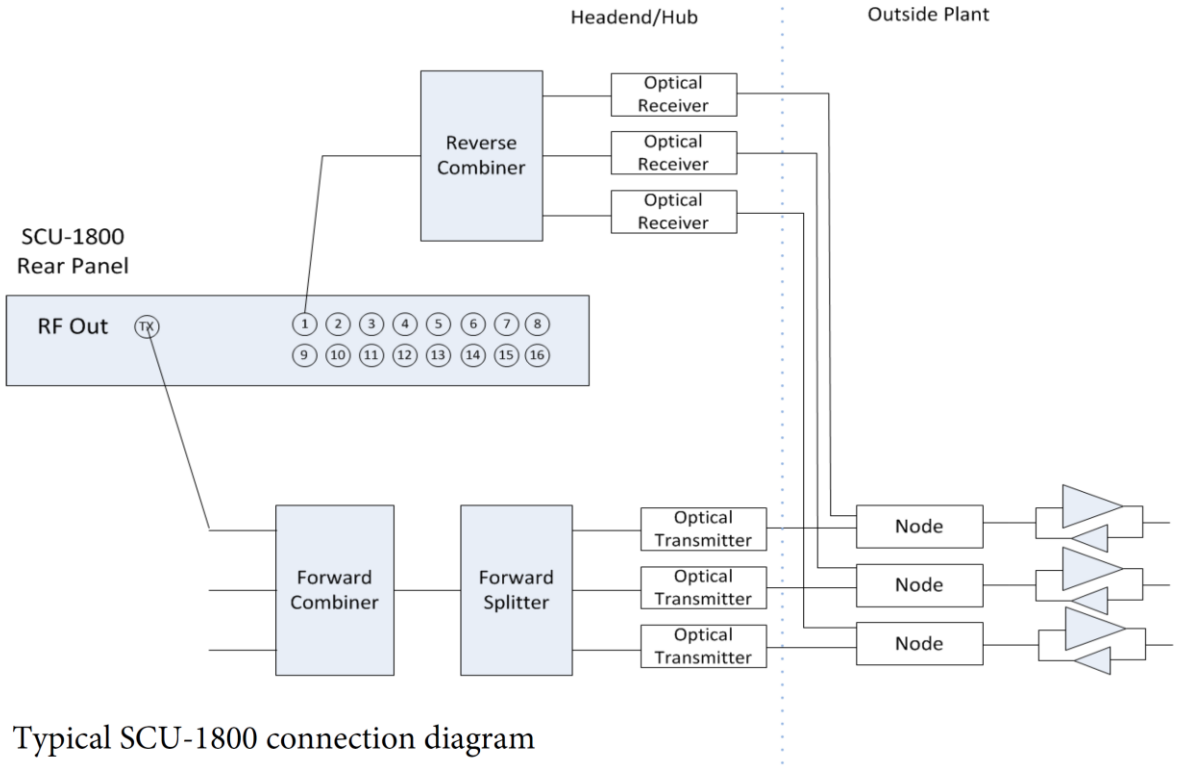
SCU - Forward Sweep
- Uses downstream plant and inserted carriers
- Up to 500 sweep points
- Future proof with 1800 MHz capable hardware
- SDA Protocol

SCU - Reverse Sweep

Inputs
- 16 isolated inputs
- Manual select standard
- Optional Auto input select

Frequency Range
- 5 to 204 MHz
- SDA Protocol

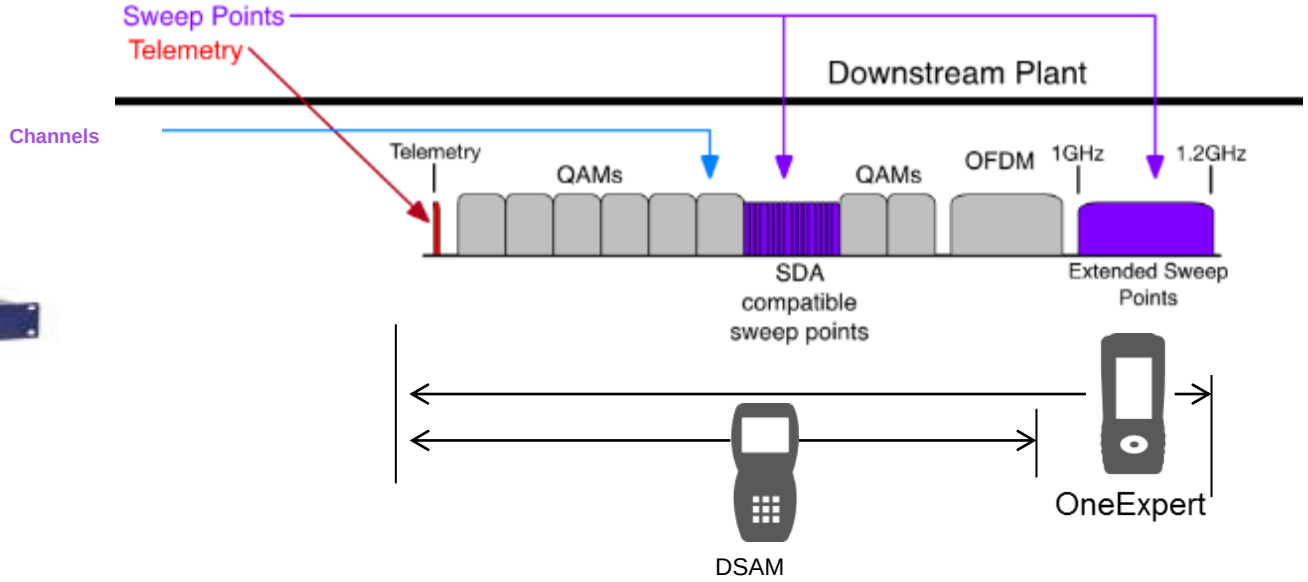
Typical SCU-1800 Connection diagram



Typical SCU-1800 connection diagram

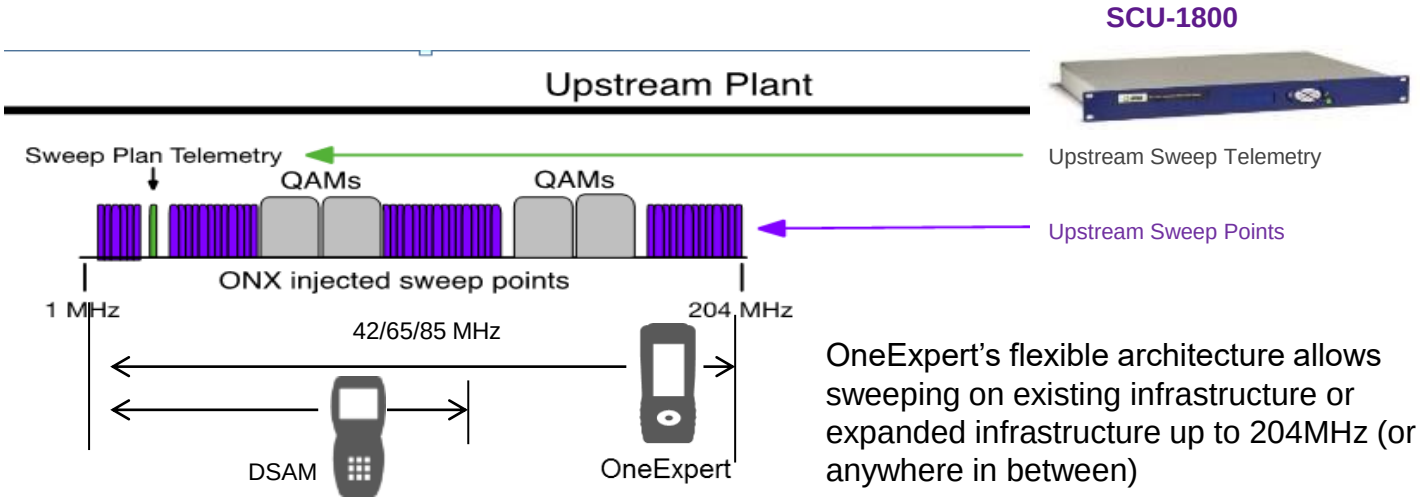
Sweep Beyond 1GHz

SCU-1800

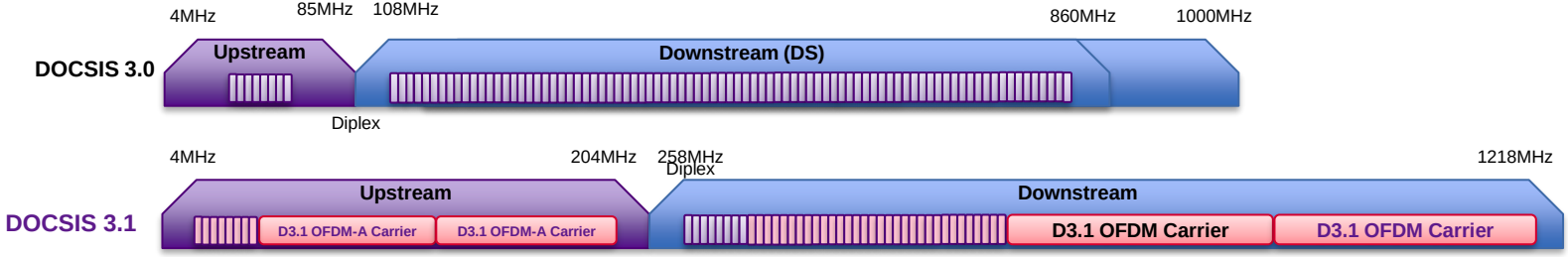


- ONX coupled with new Sweep Control unit can provide sweep to 1.2GHz and beyond
- DSAM units on same system are still compatible up to 1GHz.

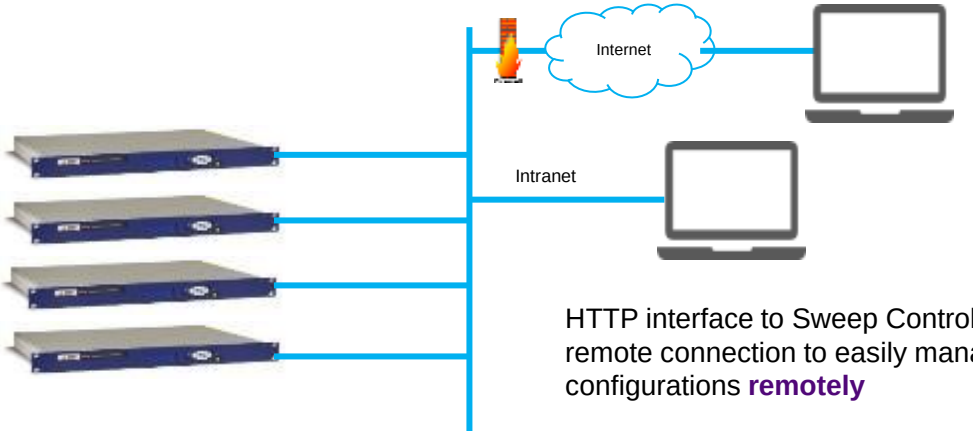
(New) Reverse Sweep to 204 MHz



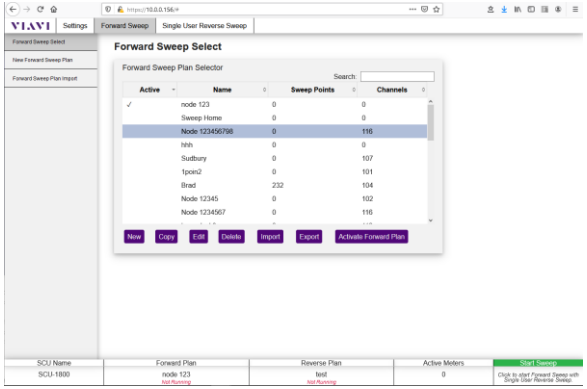
OneExpert's flexible architecture allows sweeping on existing infrastructure or expanded infrastructure up to 204MHz (or anywhere in between)



Configure Sweep Remotely



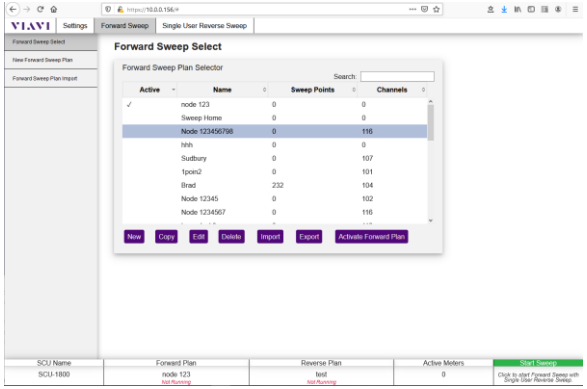
Sweep RCVR as an element



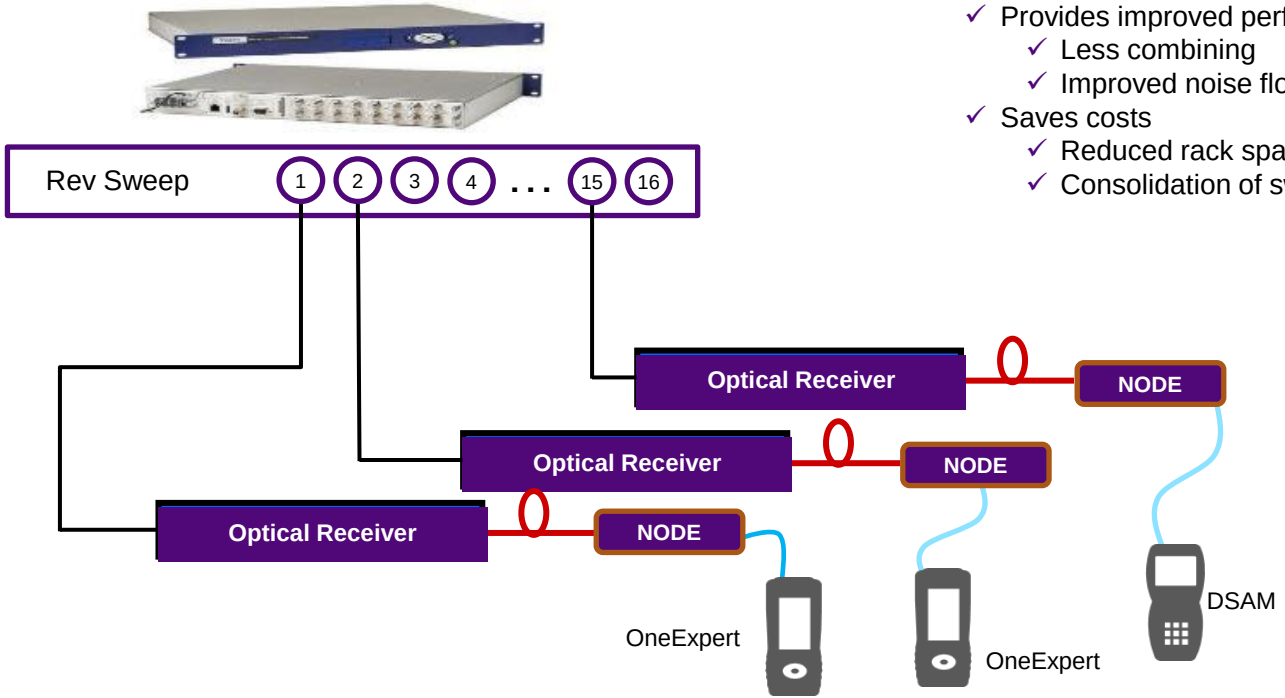
HTTP interface to Sweep Control Unit provides remote connection to easily manage configurations **remotely**

Configure Sweep Locally from a laptop

HTTP interface to Sweep Control Unit provides easy access to configurations **locally**



Multiple reverse sweep input ports
Reduces costs and improves performance



- ✓ Integrated 16 port capability (SW optional)
- ✓ Provides improved performance
  - ✓ Less combining
  - ✓ Improved noise floor
- ✓ Saves costs
  - ✓ Reduced rack space
  - ✓ Consolidation of sweep receivers

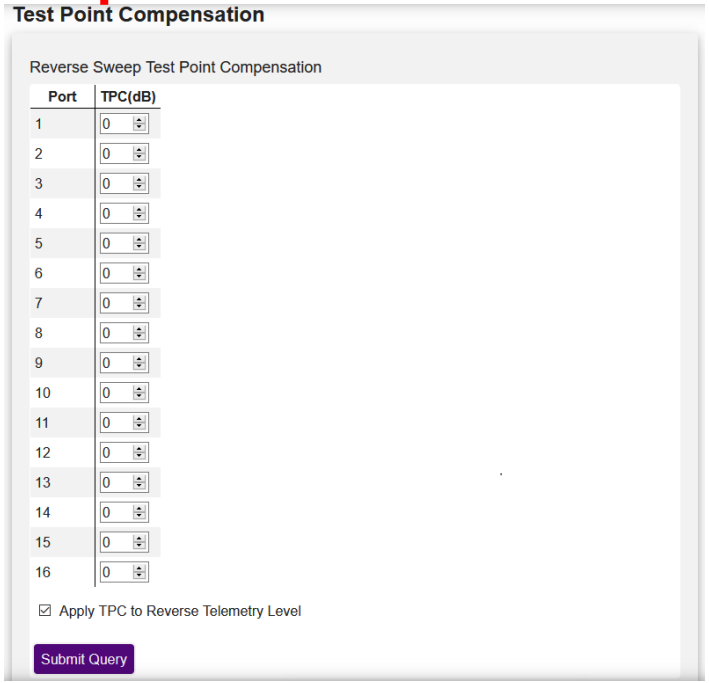
Sweep Specifications

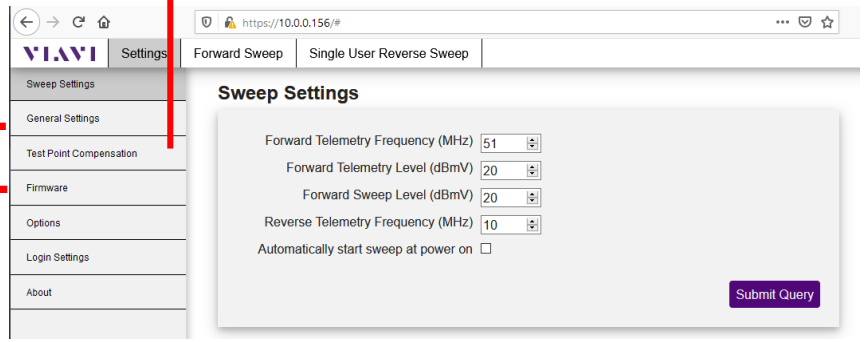
- **Telemetry**
  - Frequency Range: 42 to 1,218 MHz
  - Frequency Resolution: 10 kHz
  - Modulation FSK : ±100 kHz deviation; 65 kbps
  - Output Level: +20 to +50 dBmV, 1 dB resolution, 0.5dB accuracy typical,1 dB accuracy over temp
  - Spectral Purity: 50 dBc harmonics and spurious; recommend 1 MHz space from SC QAM edge

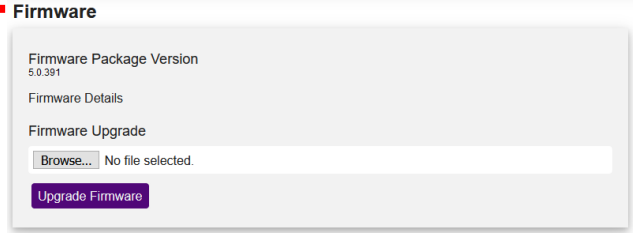
- **Sweep Pulse**
  - Frequency Range: 42 to 1,218 MHz
  - Bandwidth: <5 kHz @ 3dB BW; <50 kHz @ 50dB BW
  - Frequency Resolution: 10 kHz
  - Level : +20 to +50 dBmV, 1 dB resolution, 0.5dB accuracy typical,1 dB accuracy over temp
  - Spectral Purity: 50 dBc harmonics and spurious; recommend 1 MHz space from SC QAM edge

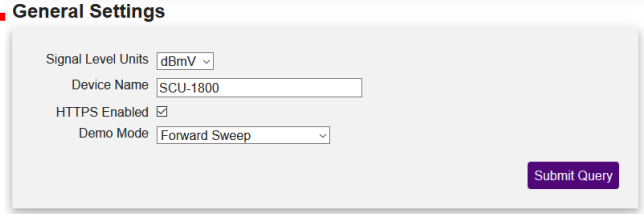
- **Forward Sweep**
  - Telemetry frequency: Diplexer dependent 50-1,218MHz
  - Forward sweep outputs: Up to 500 sweep points
  - Supported Sweep Plan Active Carrier types (for reference and measurement by the field instrument) Analog (NTSC, PALB, PAL GH, PAL I, PAL DK,) Digital (6 or 8MHz), OFDM (24-192MHz),
- **Reverse Sweep**
  - Frequency Range: 5 to 204 MHz
  - Recommended input level: 0 dBmV
  - Input range and accuracy: ± 20 dBmV allowable input range; ± 0.75 dB typical; ± 2 dB over temp
  - Minimum Signal-to-Noise Ratio: 20 dB signal-to-noise ratio required on received reverse telemetry from field meters
  - Reverse Sweep points injection: +20 to+50 dBmV
  - Reverse Telemetry Level: +20 to+50 dBmV

SCU-1800 Settings

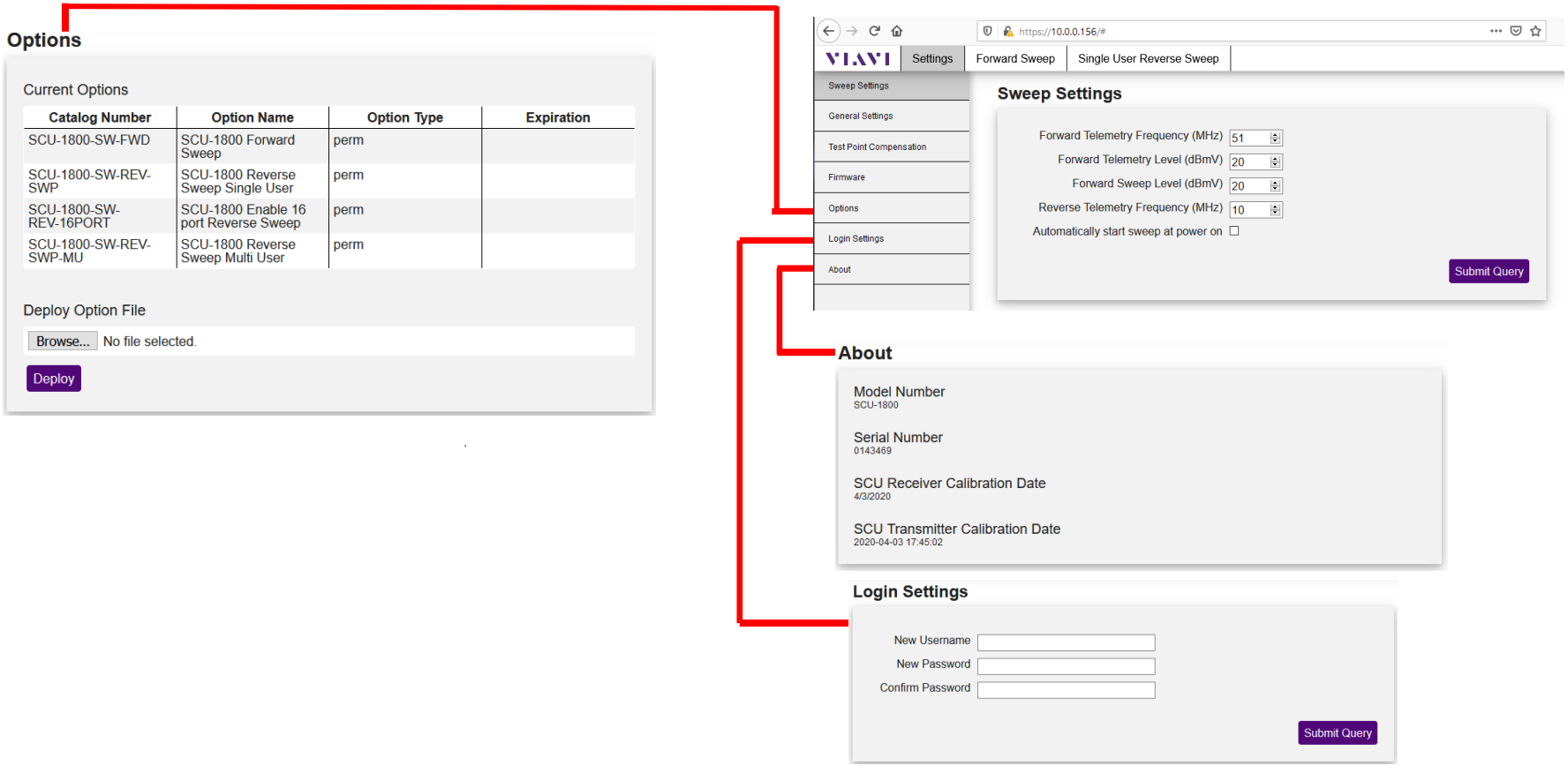




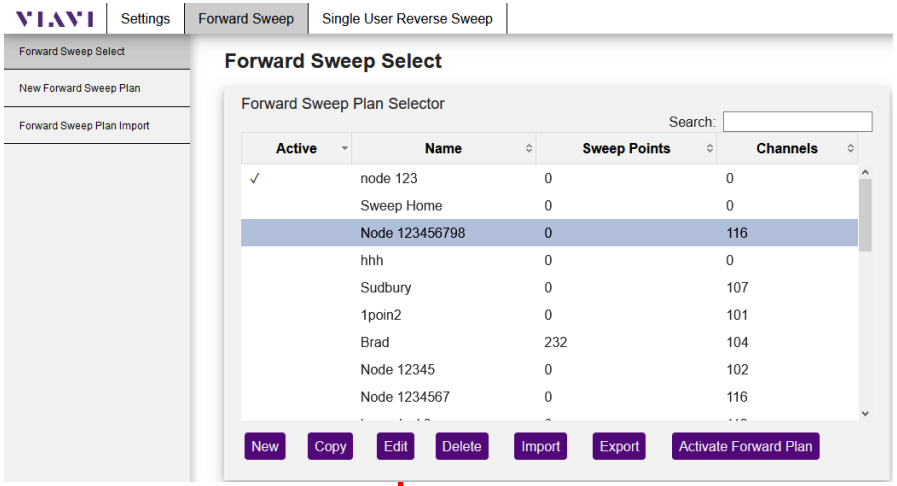


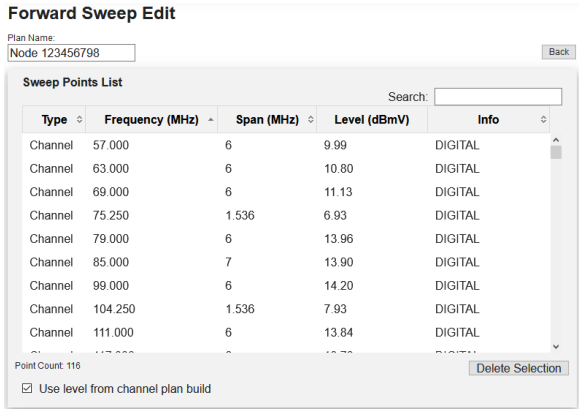


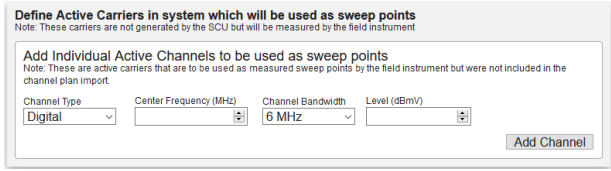
SCU-1800 Settings

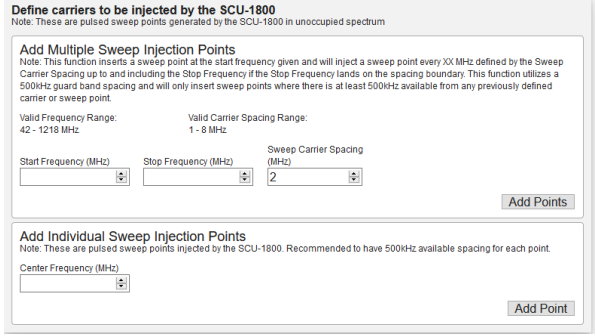


Edit Channel Plan

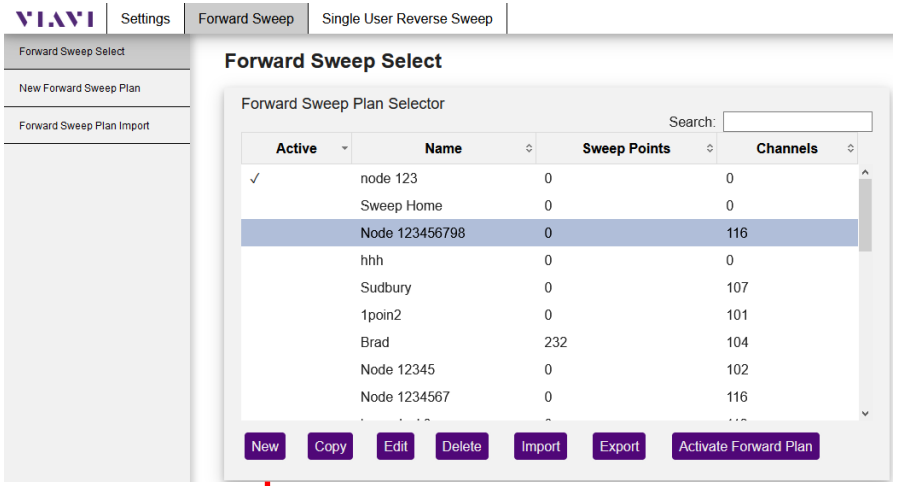


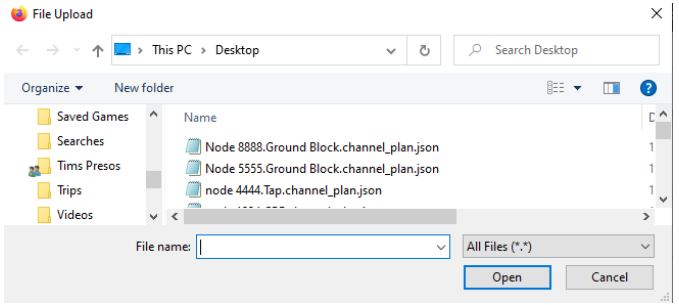


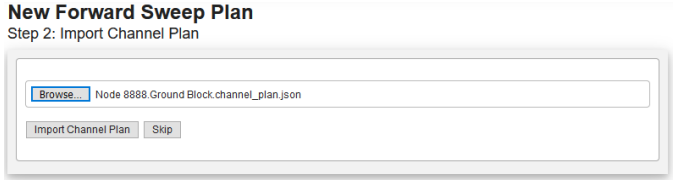




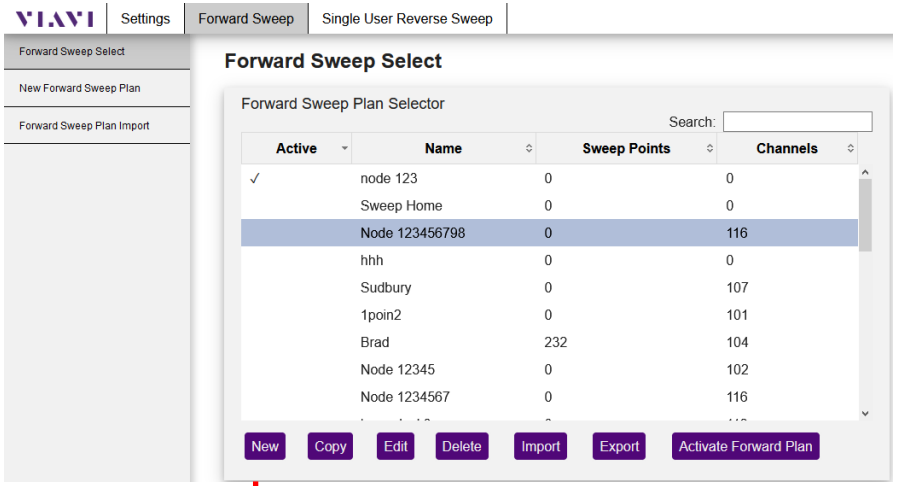
New Channel Plan from ONX

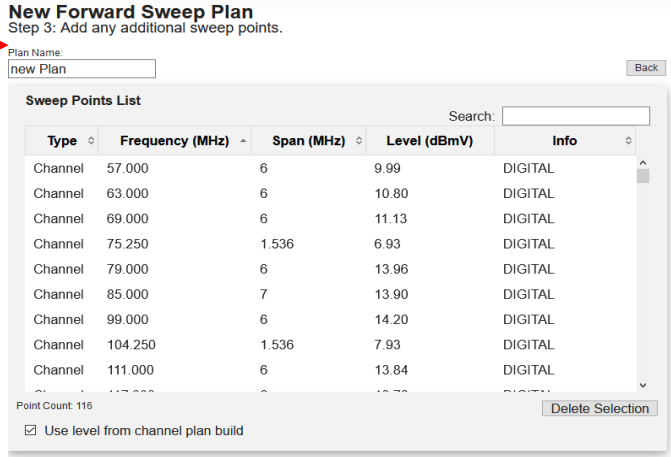


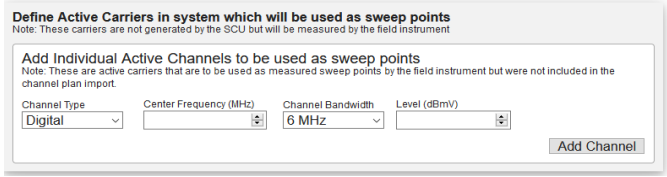


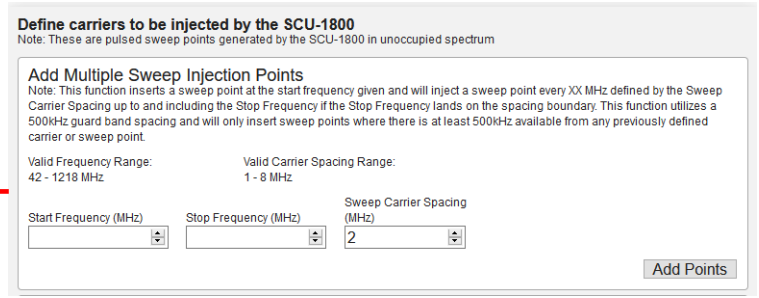


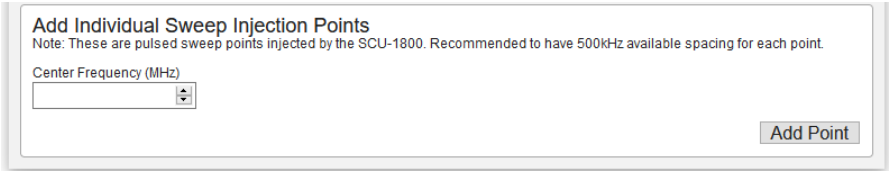
New Channel Plan



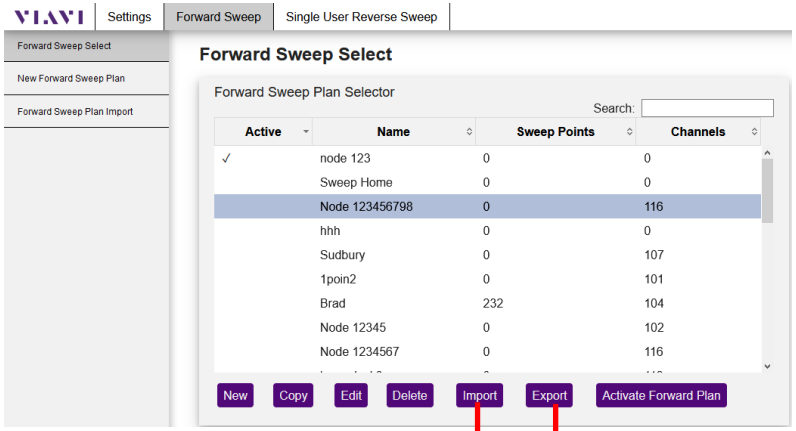


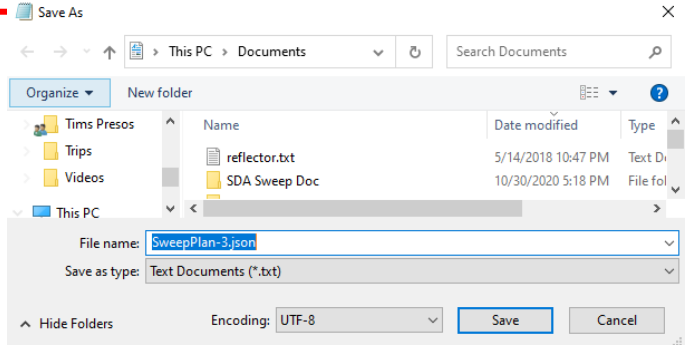


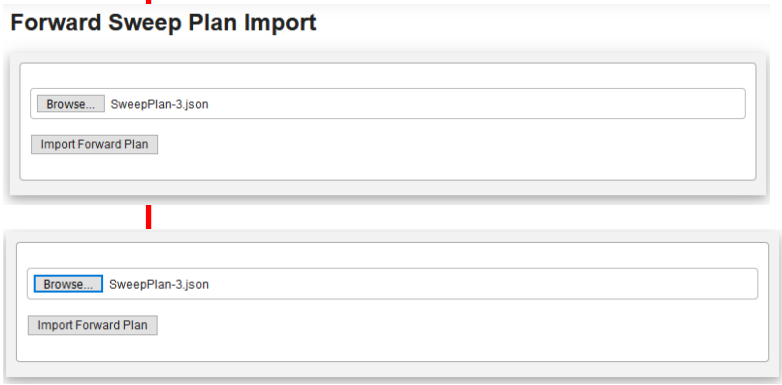




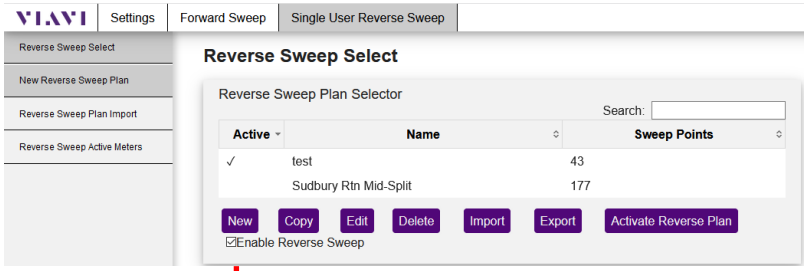
Export and Import Channel Plan

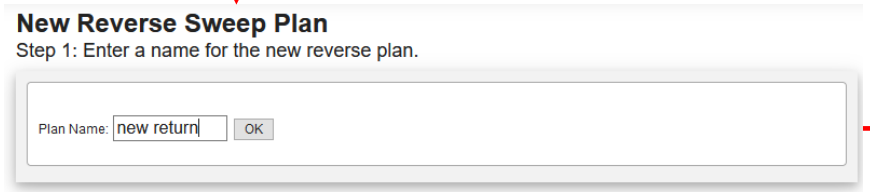


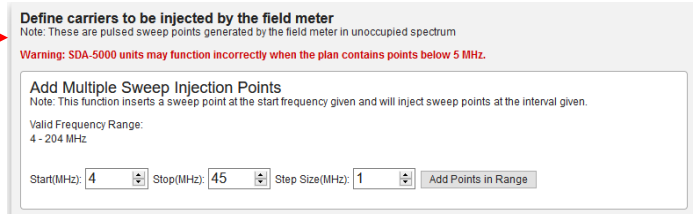


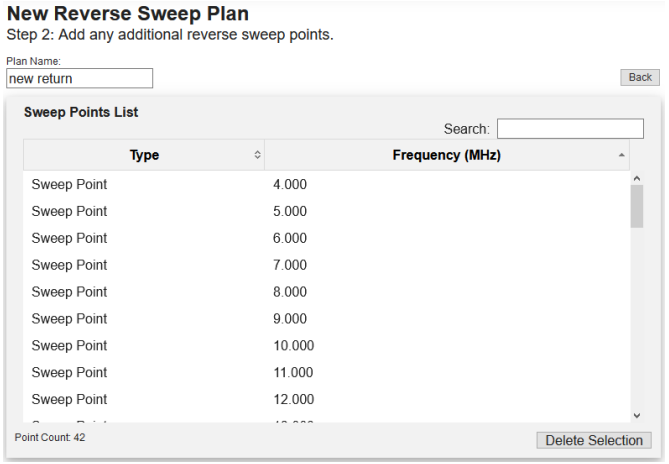


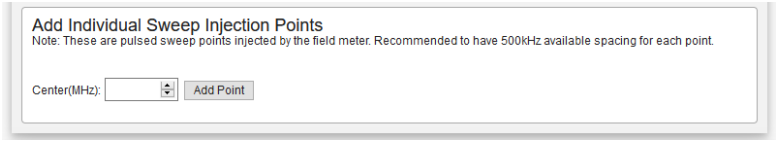
Reverse Channel Plan



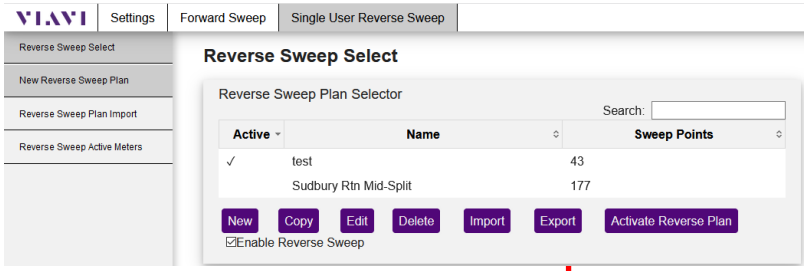


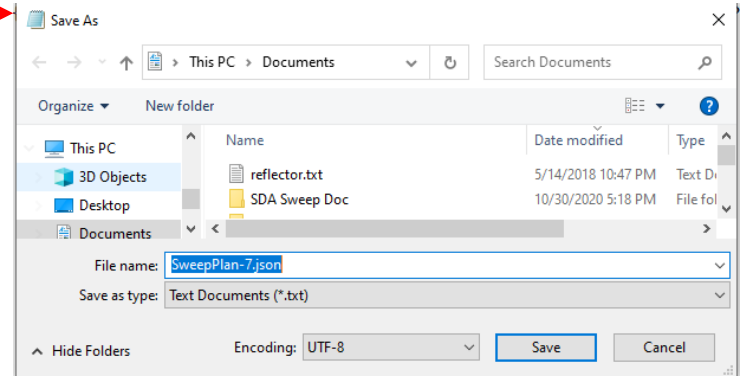


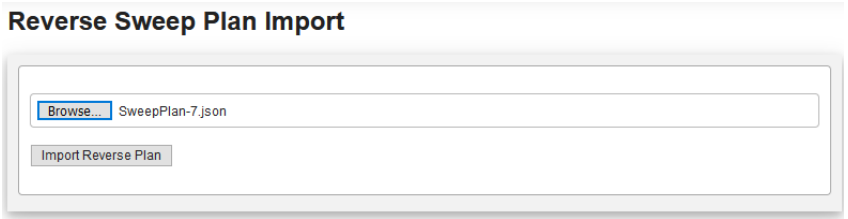




Export and Import Reverse Channel Plan

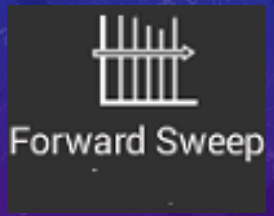






Forward Sweep Overview

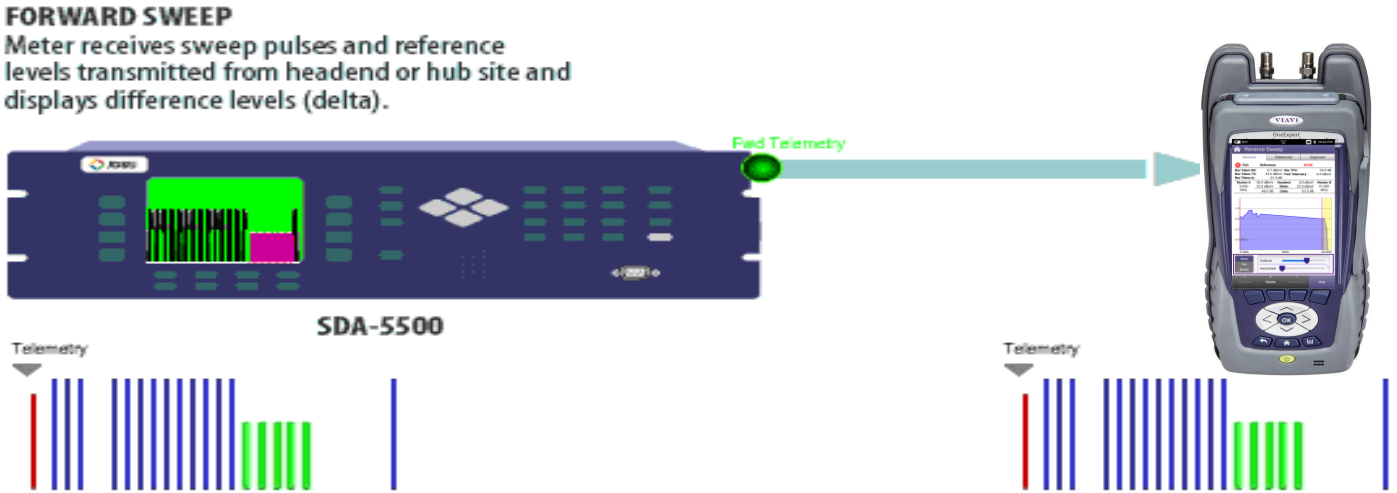
Ver 4.4.18



VIAVI Solutions

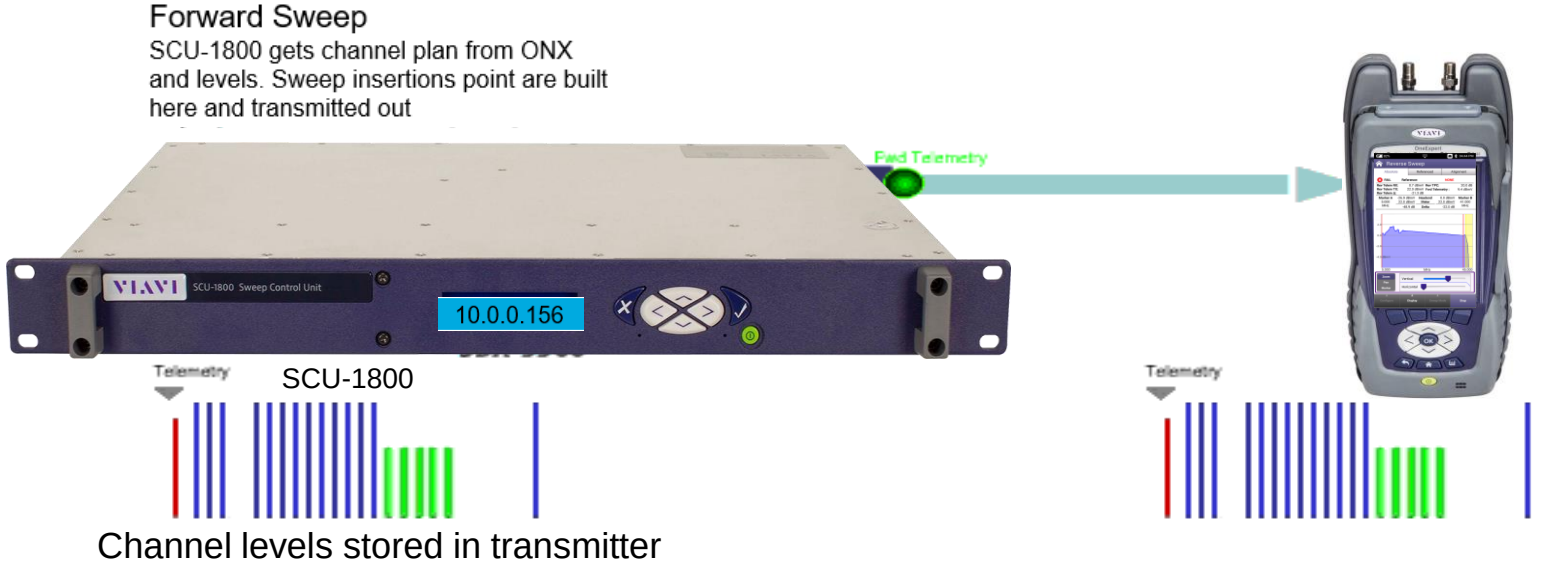
Forward Sweep with SDA 5500

- Sweep transmitter and headend monitor
- Constantly monitors video, audio, and digital carriers plus sweep insertion points
- Transmits any level variations to the Receiver on a telemetry carrier to update the reference
  - Keeps receiver up to date on headend levels



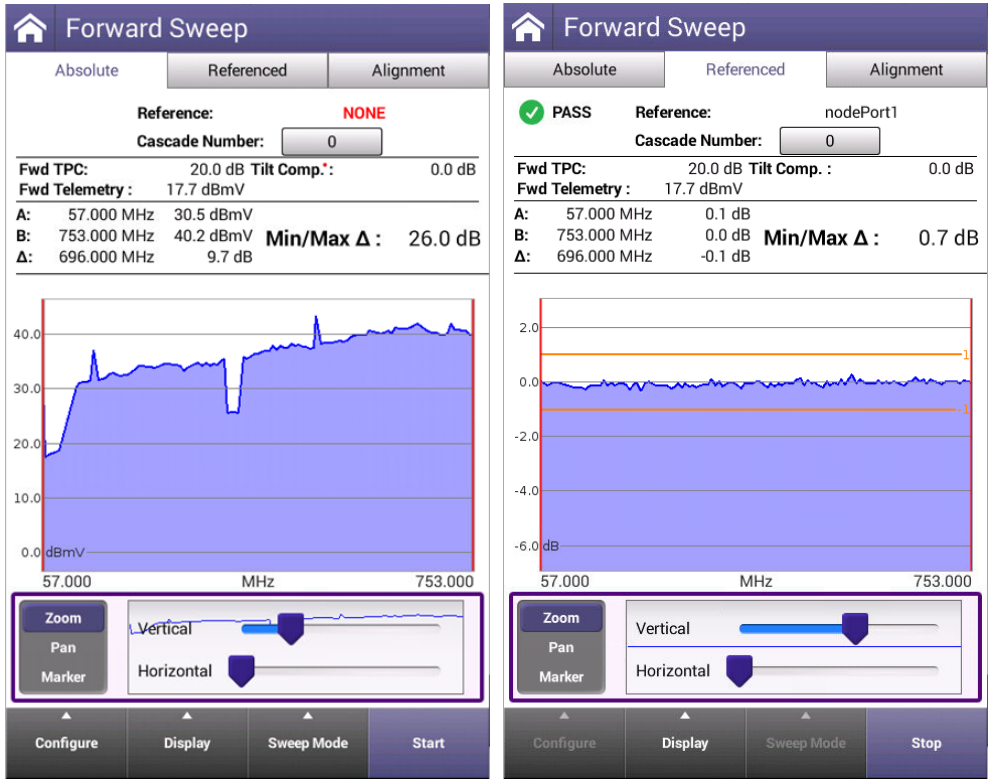
Forward Sweep with SCU-1800

- Sends sweep pulses telemetry and Channel level data to ONX via telemetry.
- Note: This channel level data is not constantly updated like the SDA



Forward Sweep Test

- Forward Sweep allows techs to see frequency response of the carriers that are programed in at the SDA 5500/SCU-1800
  - Helping techs find and correct plant issues
  - Saving a reference then allows delta comparisons to be made at various test points over time



Absolute Tab – Showing All Signals Power Levels

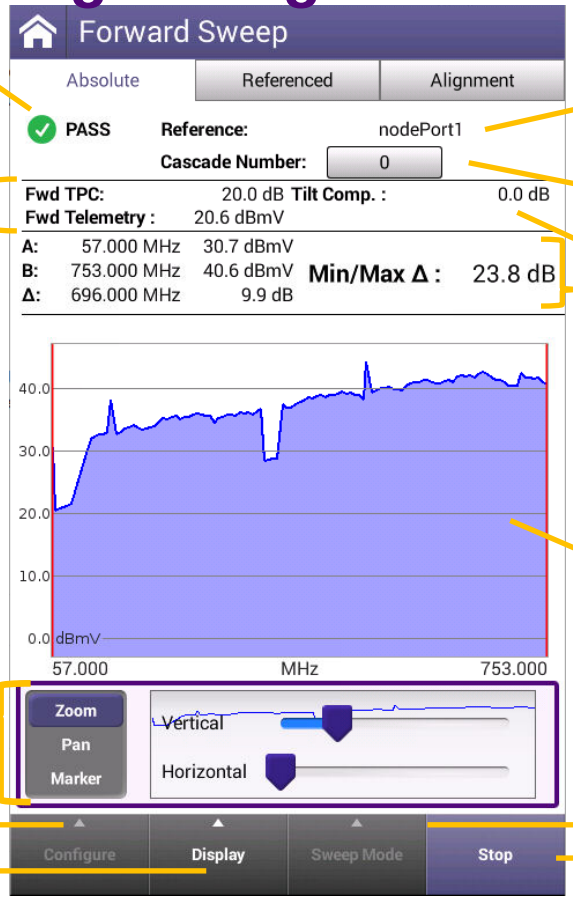
Referenced Sweep Limit Threshold

Fwd Test point Compensation
Forward telemetry received Level

Marker A & B Information:
Absolute Level of the carrier

Graphical and Marker Adjustments
Zoom, Pan, Marker

Configure Menu
Display Menu



If a Reference is set, the Reference File Name is displayed (None – if no reference is set)

Place amplifier cascade Tilt Comp

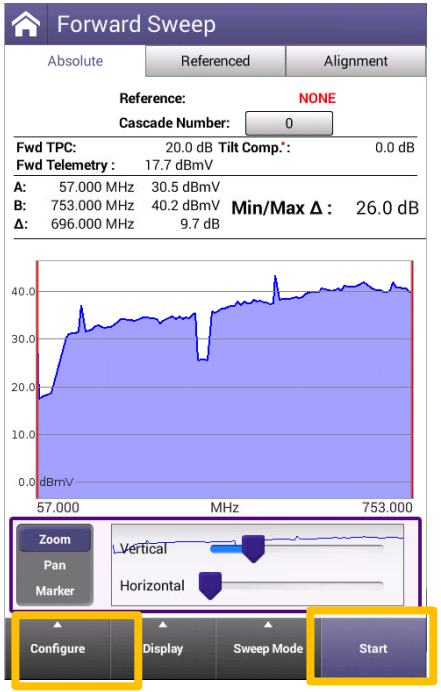
Min/Max delta

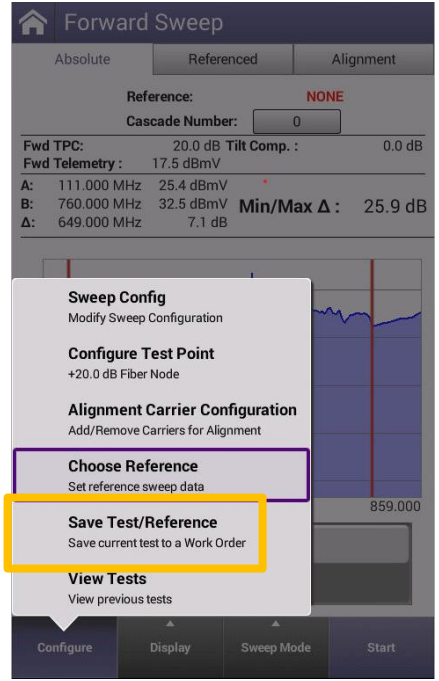
Absolute Sweep trace

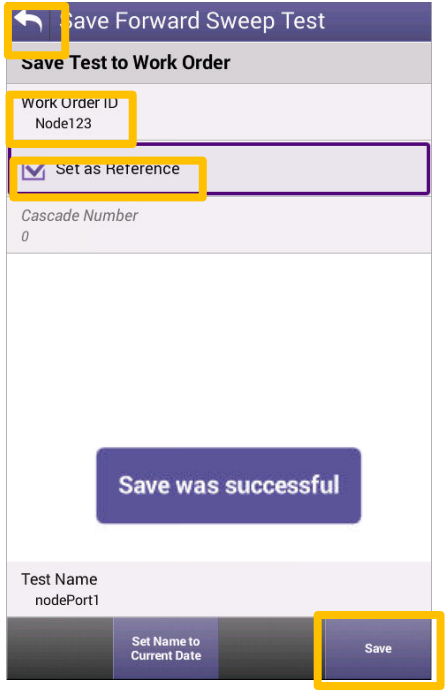
Go to Forward or Reverse Sweep
Stop / Start the test

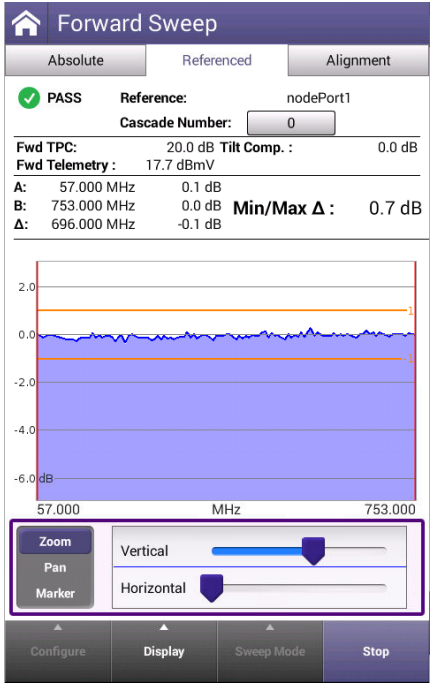
Saving a Reference

- Once ready, to save a reference first stop the test – Then press the Configure button and select “Save Test/Reference”
- Enter a Name for the reference and check the box “Set as Reference”
- Press the Save button - once saved, press the Back button to return to the test mode









ReferenceTab – Showing Relative RF Levels

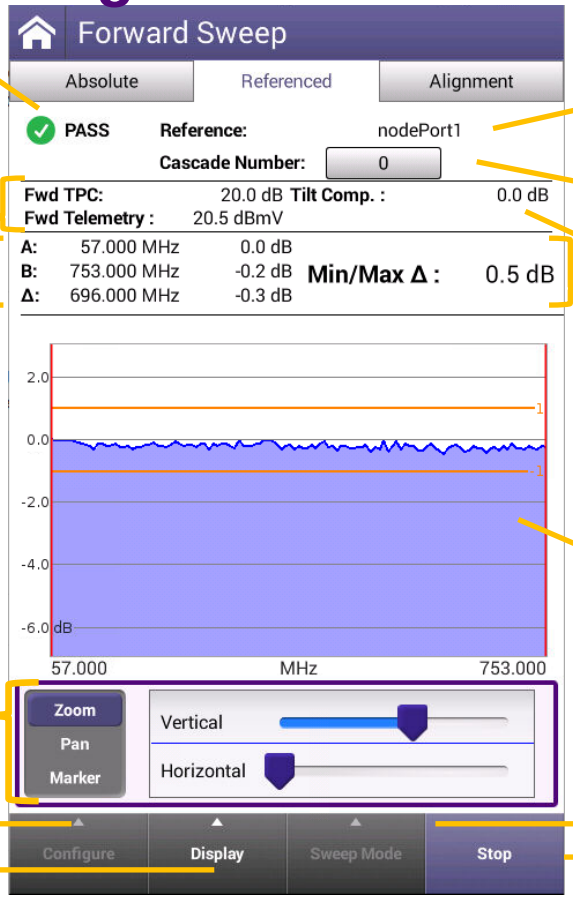
Referenced Sweep Limit Threshold

Fwd Test point Compensation
Forward telemetry received Level

Marker A & B Information:
Absolute Level of the carrier

Graphical and Marker Adjustments
Zoom, Pan, Marker

Configure Menu
Display Menu



If a Reference is set, the Reference File Name is displayed (None – if no reference is set)

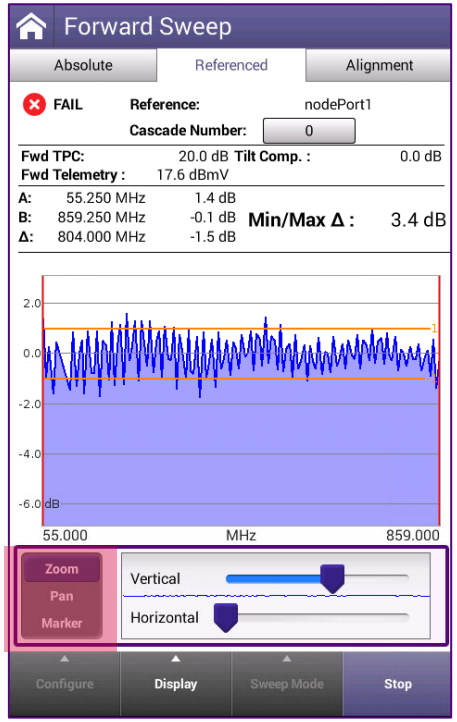
Place amplifier cascade Tilt Comp

Min/Max delta

Referenced Sweep trace

Go to Forward or Reverse Sweep
Stop / Start the test

Graphical and Marker Adjustments



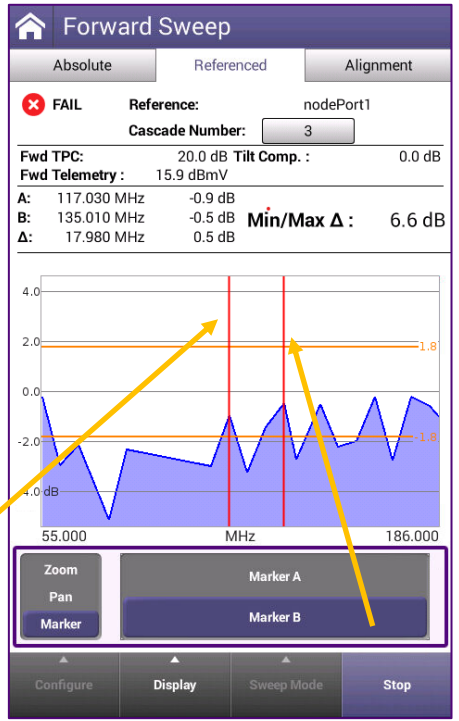
Zoom – Same as Pinch and Zoom on touch screen

- Vertical - Adjusts the dB/div
- Horizontal - Adjusts the frequency span

Pan – Adjust the bars to change the frequency span and slide the bar left or right to quickly change the displayed start and stop frequency based on the span

Marker – Select the “Marker A” or “Marker B” to move that marker left or right with the arrow keys

- CMTS values will adjust based on the frequency selected
- Markers can also be moved via touch screen




VIAVI
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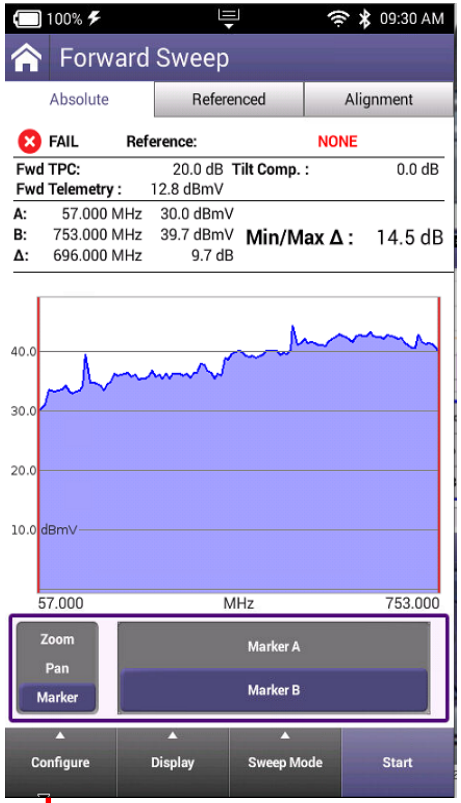
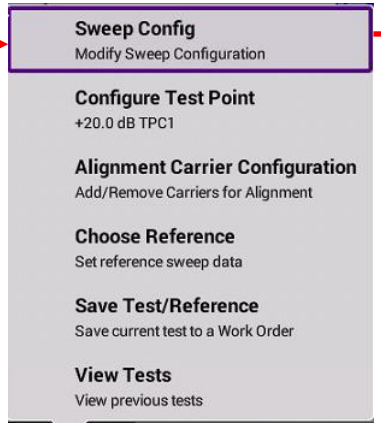
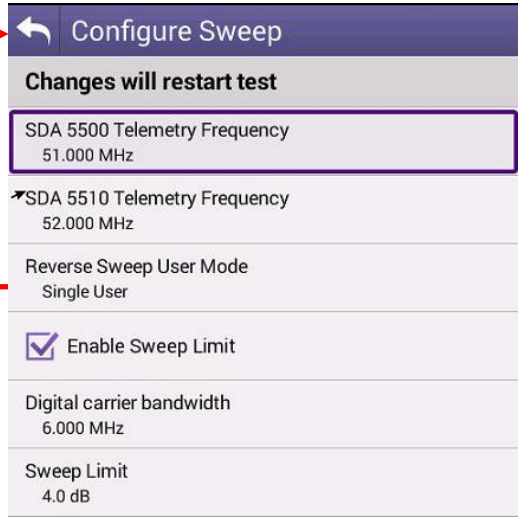
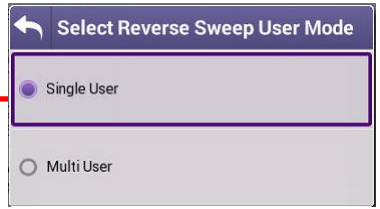
Forward Sweep

Forward Sweep Configure

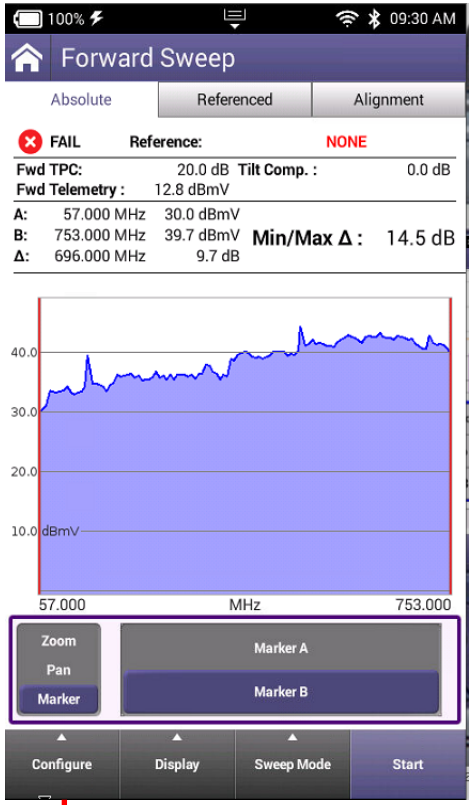


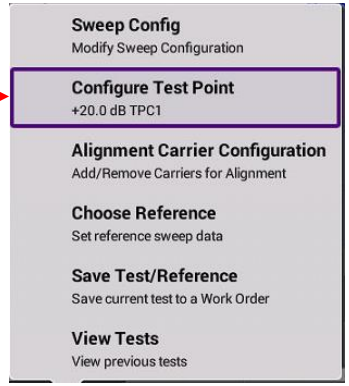


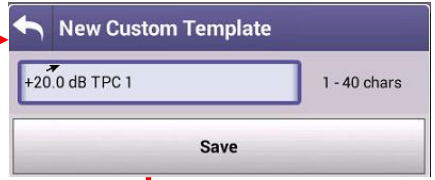


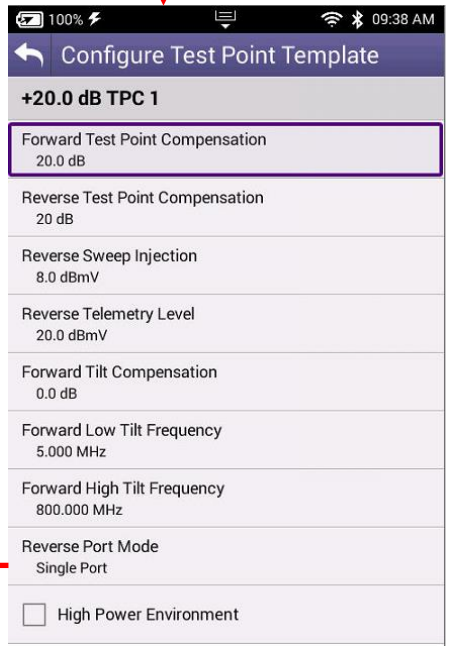


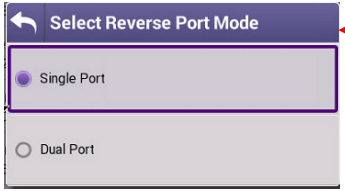
Forward Sweep Test Point



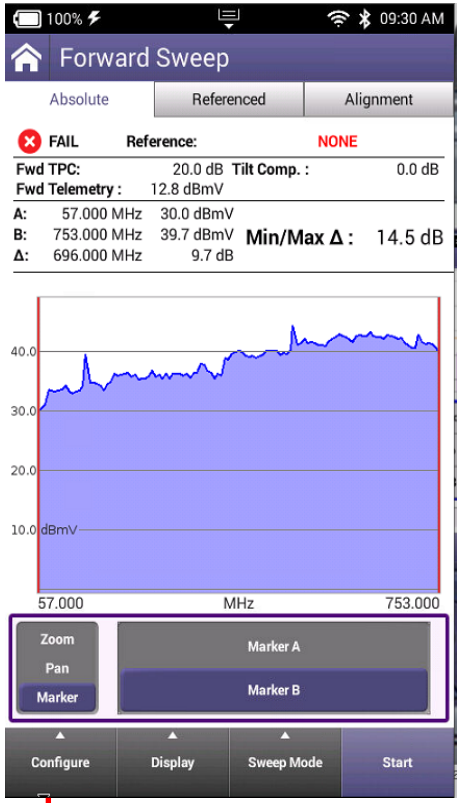


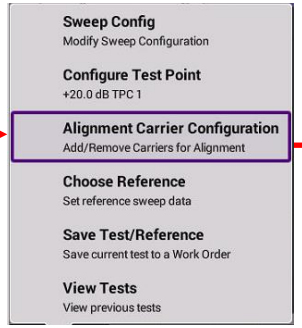


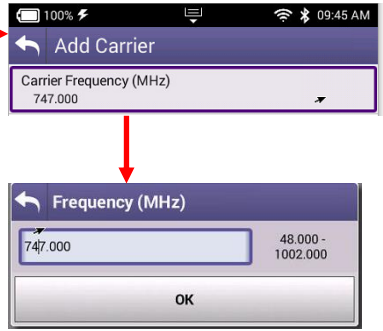




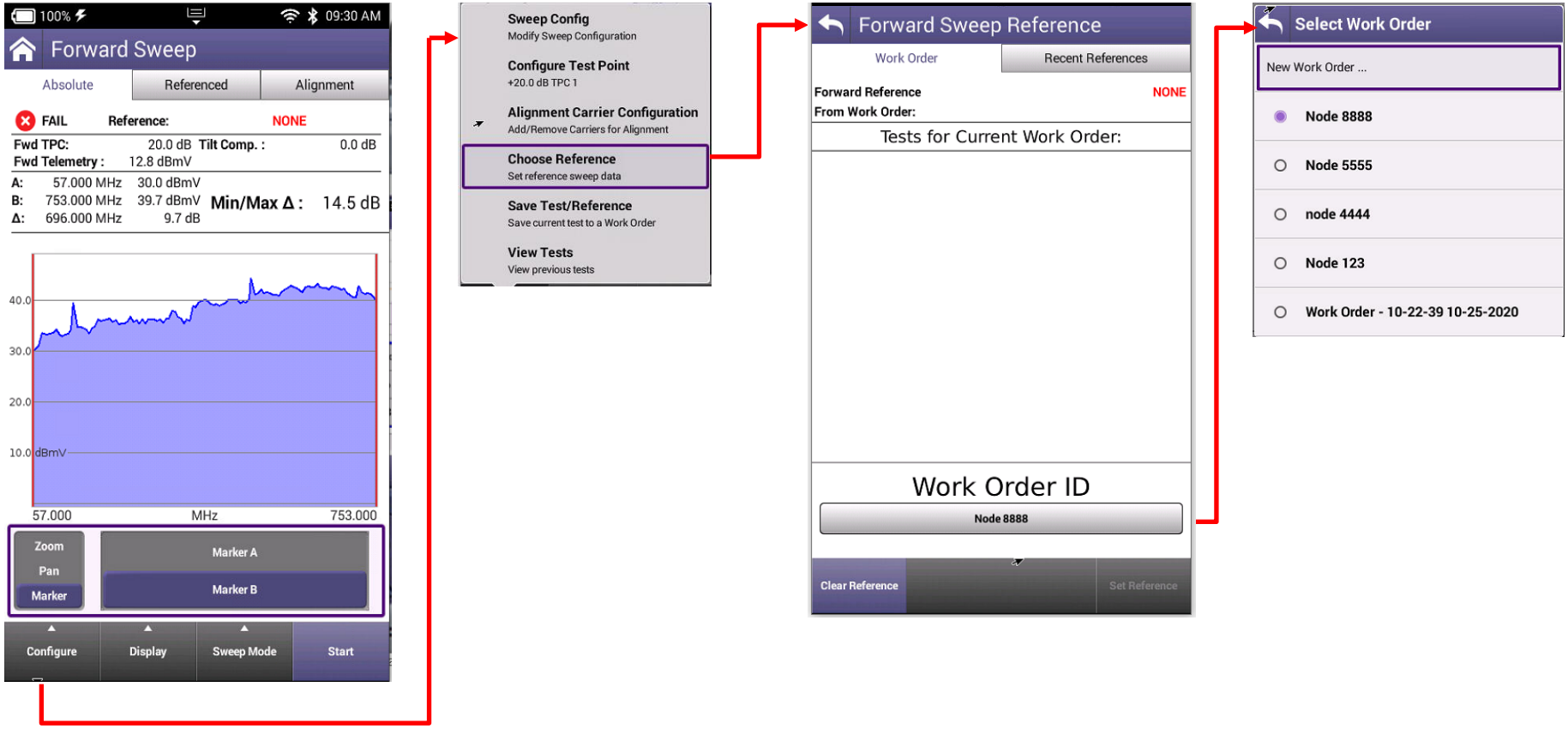
Forward Sweep Alignment



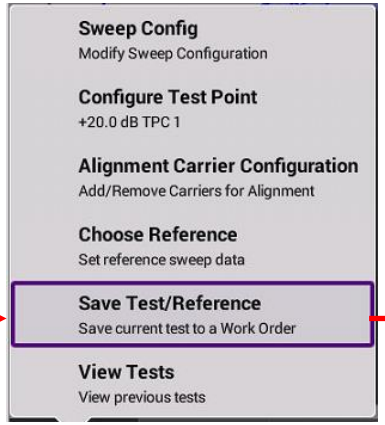


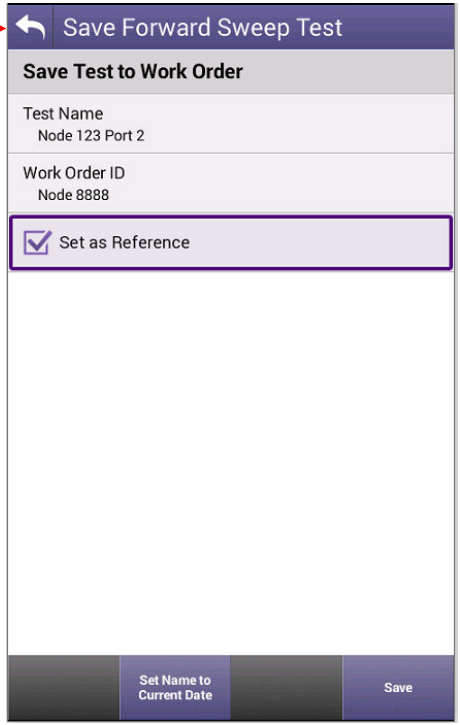


Forward Sweep Point Clear Reference

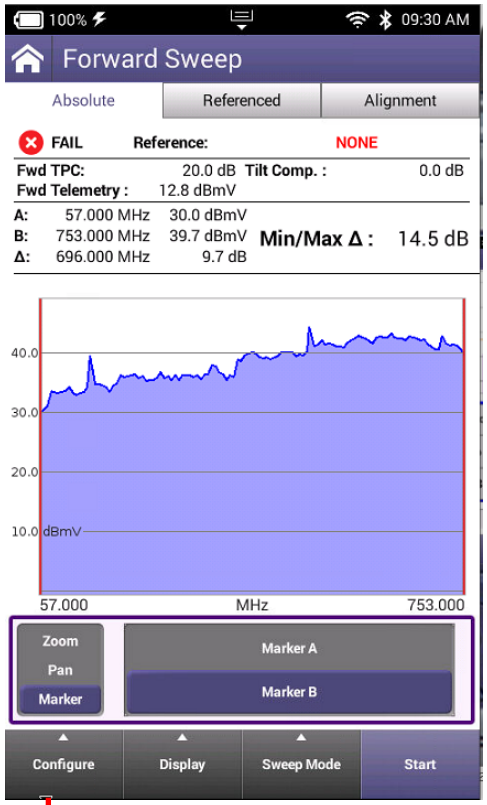


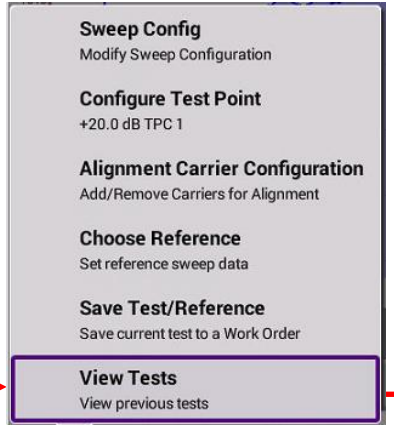
Forward Sweep Point Save Reference

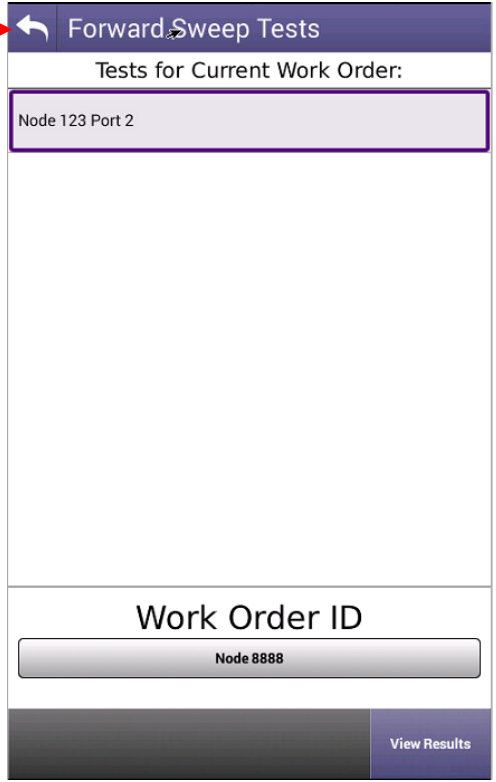




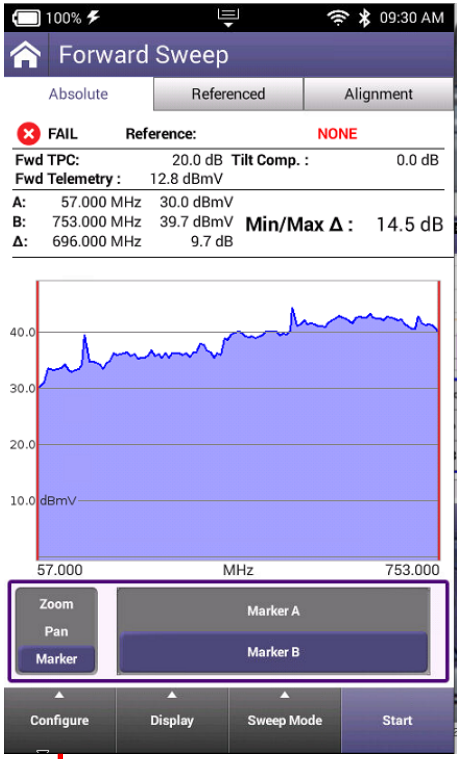
Forward Sweep Review Test

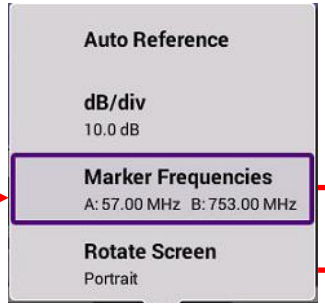


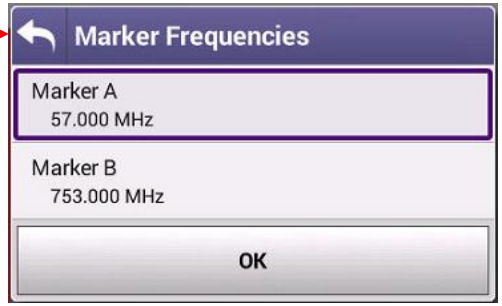


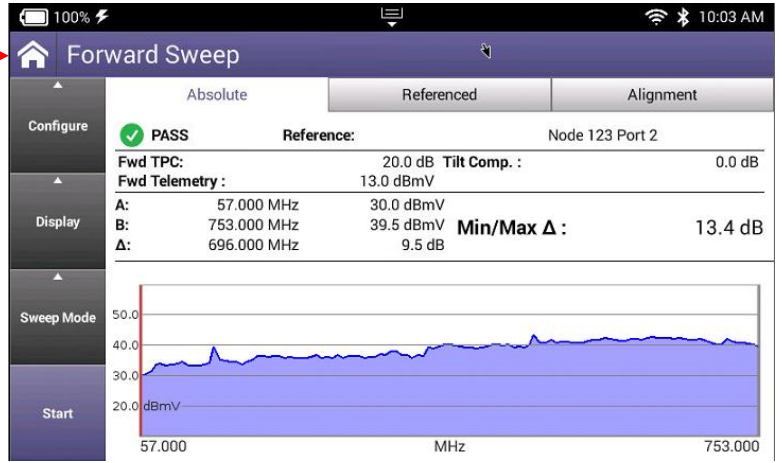


Forward Sweep Test Markers



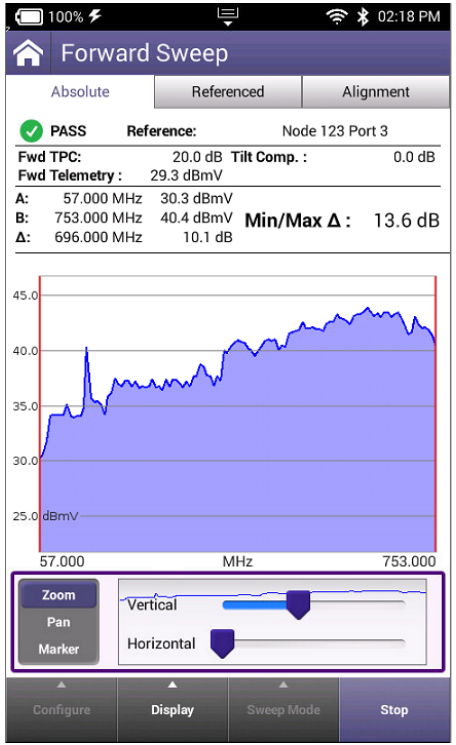




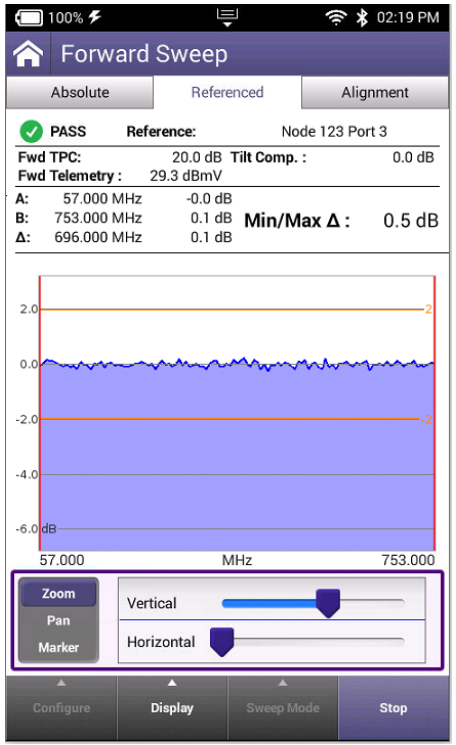


Forward Sweep Screens

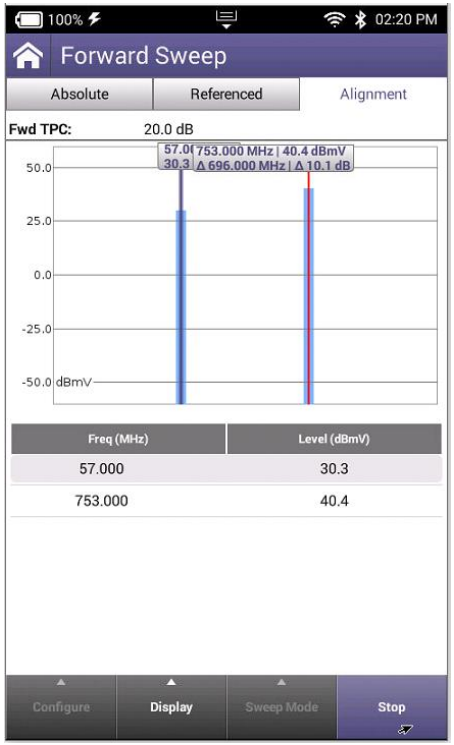
Absolute “Raw”



Referenced



Alignment



Reverse Sweep Overview

Ver 4.4.18

VIAVI Solutions

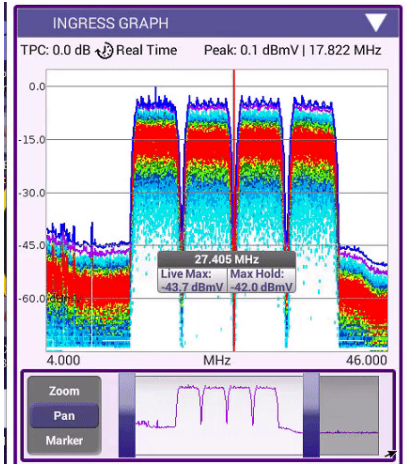
Return Sweep Principle

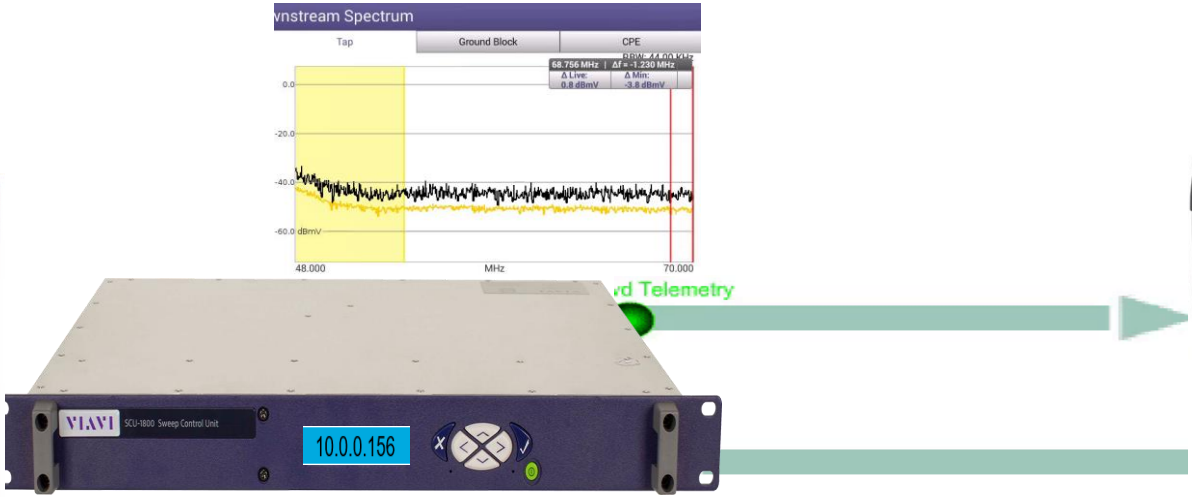
Sweep transmitter

Sends forward Telemetry carrier that contains the return sweep channel plan and a return telemetry frequency to the field units

The field unit captures the telemetry and transmits the return telemetry and sweep points to the headend device SDA5500/SCU-1800

The headend device measures the levels and returns the information to the field unit for display.

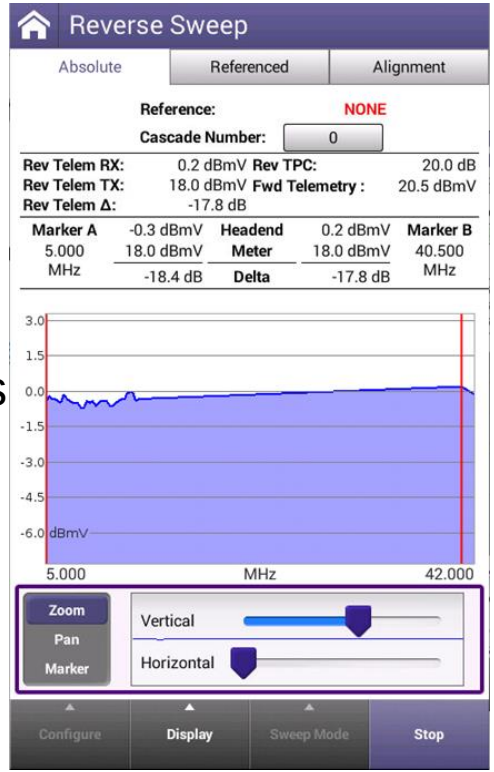


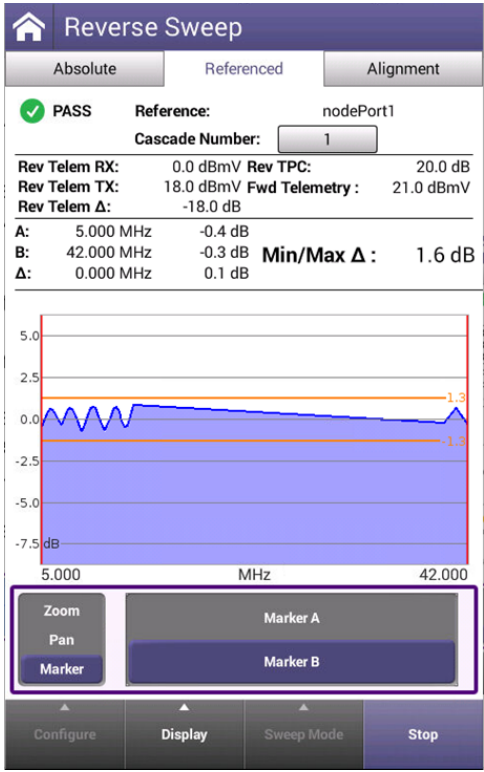


SCU-1800 Headend unit

Introducing Optional Reverse Sweepless Sweep mode

- The Absolute tab shows the live estimated response at the Headend
  - In Channel Frequency Response is adapted from upstream pre-equalization established between the ONX at the test location and the SDA/SCU .The Referenced tab shows any amplitude deltas over frequency from the original test location to the current test location





Absolute Tab – Showing Adjusted Headend Response

Referenced Sweep Limit Threshold

Telemetry level at the transmitter

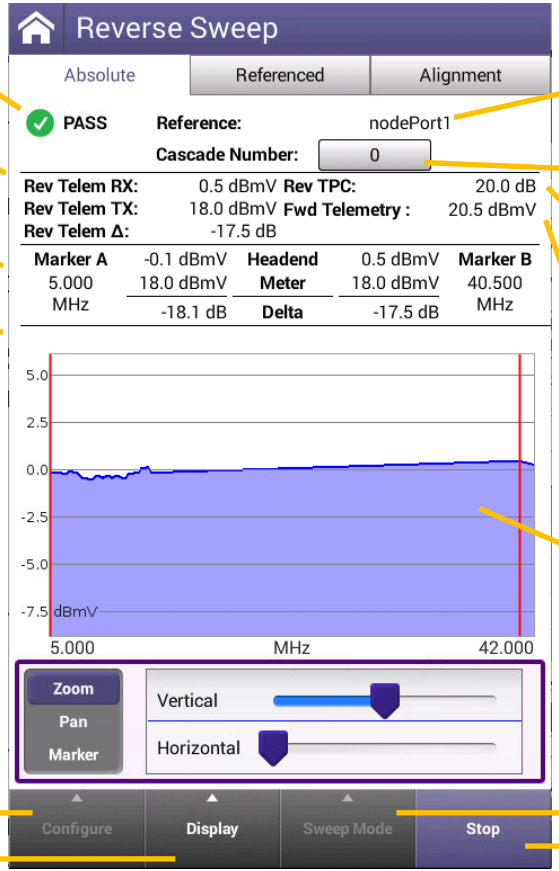
Telemetry level transmitted from ONX

Delta level

Marker A & B Information:
Frequency, adjusted level at the SDA/SCU, the meter's adjusted transmit level, the delta (loss / gain) between meter and SDA/SDU

Graphical and Marker Adjustments
Zoom, Pan, Marker

Configure Menu
Display Menu



If a Reference is set, the Reference File Name is displayed (None – if no reference is set)

Place amplifier cascade

Reverse Test Point Compensation Value

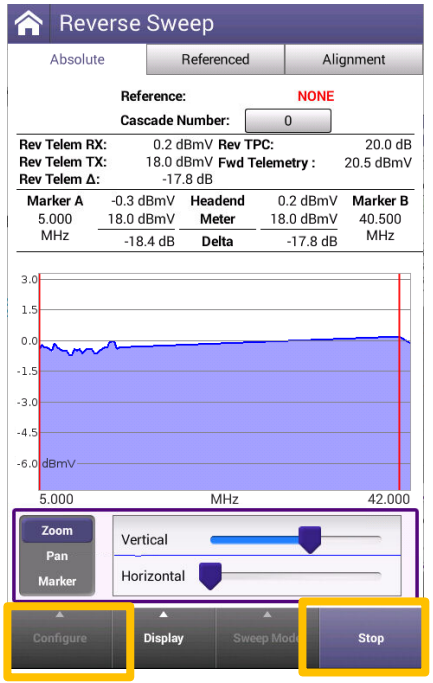
Forward Received Telemetry Level

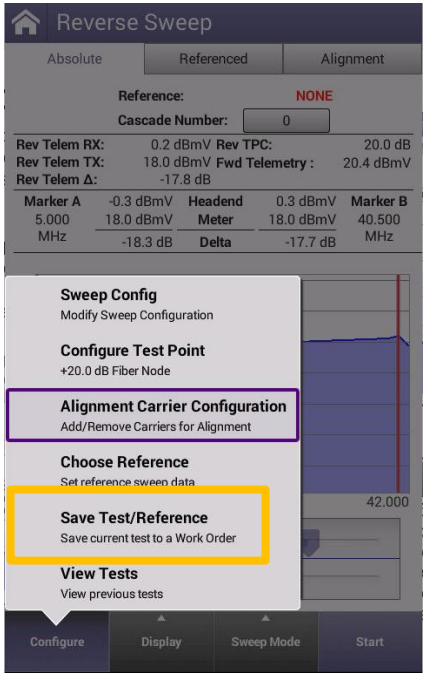
The absolute trace is the adjusted frequency response expected at the connected SDA/SCU located at the headend

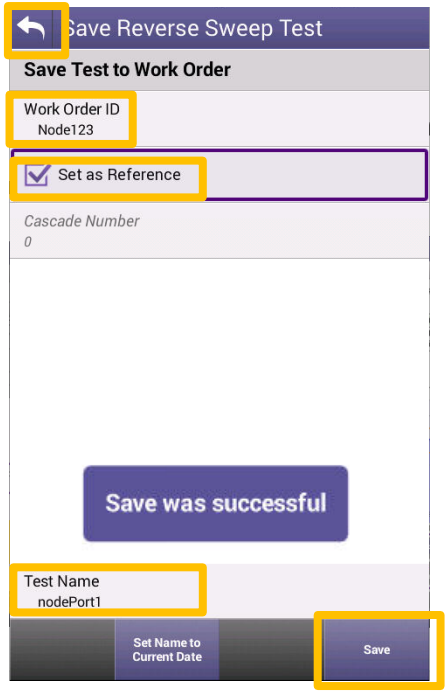
Go to Forward or Reverse Sweep
Stop / Start the test

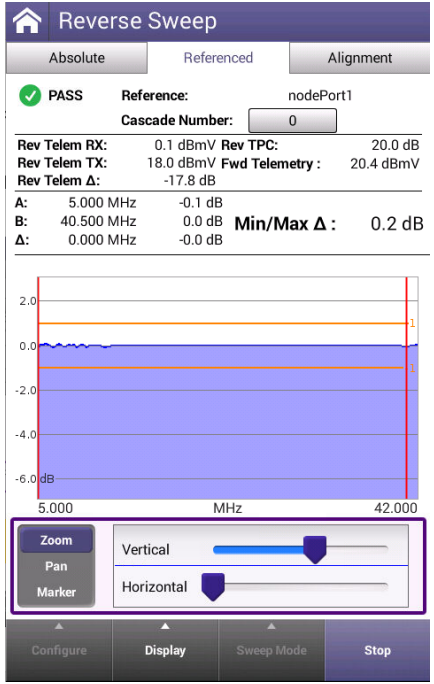
Saving a Reference

- Once ready, to save a reference first stop the test – Then press the Configure button and select “Save Test/Reference”
- Enter a Name for the reference and check the box “Set as Reference”
- Press the Save button - once saved, press the Back button to return to the test mode

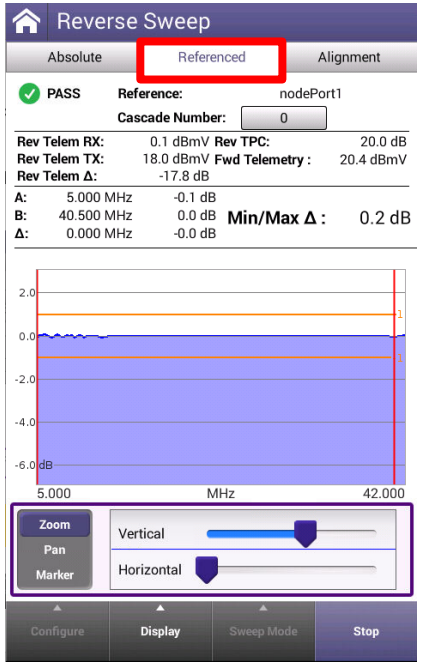








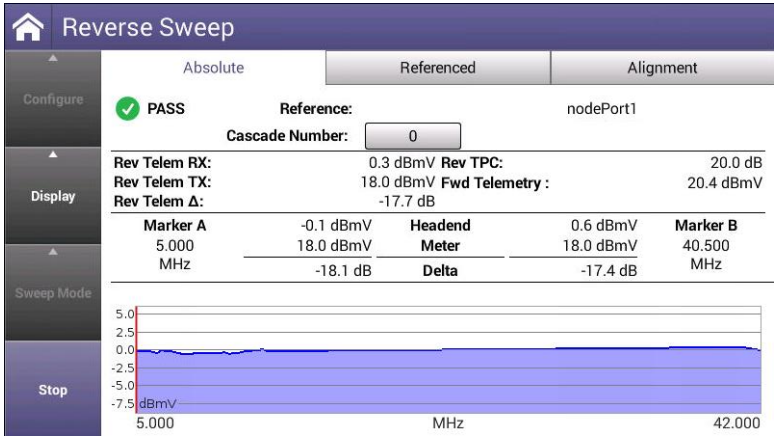
Referenced Tab – Displays frequency response deltas

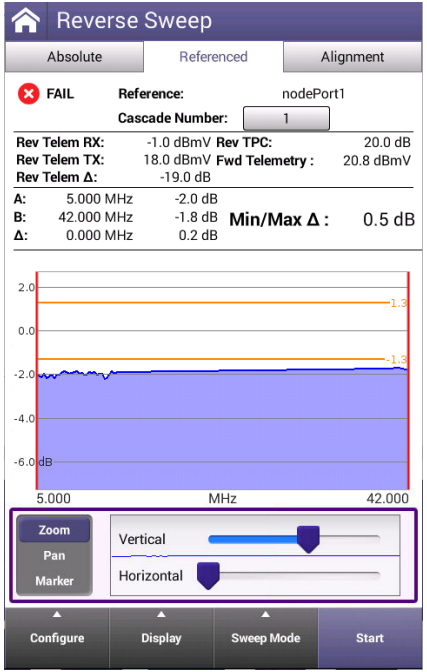


Just after saving a reference the reference trace will be very close to zero and may adjust slightly over time

As new test points are measured, and levels differ over frequency relative to the original test point, the Referenced sweep trace will update to reflect those deltas

Negative response shows where signal loss / attenuation occurs, while positive response shows where signal gain / amplification occurs relative to the reference test point





About 2.5 dB additional attenuation in this portion of the network than when compared to the originally referenced sweep response trace – Indicating there is 2.5dB of relative loss at this test location and should be corrected

Referenced Tab – Continued

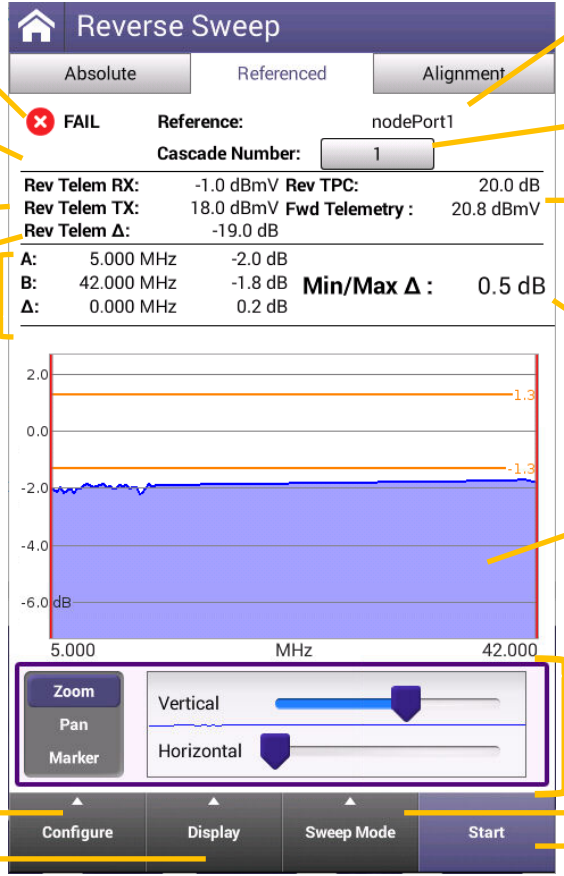
Referenced Sweep Limit Threshold

Telemetry level at the transmitter

Telemetry level transmitted from ONX
delta level

Marker A & B Information:
Frequency, the delta (loss / gain) between the originally referenced trace and the currently measured trace
Delta – difference in marker frequency and marker response difference

Configure Menu
Display Menu



The Reference File Name
(None – if no reference is set)

Place amplifier cascade

Reverse Test Point Compensation Value and Forward Telemtery received level

Minimum or Maximum delta in the trace between the markers

The referenced trace displays frequency response deltas between the original trace and the currently measured trace

Graphical and Marker Adjustments
Zoom, Pan, Marker

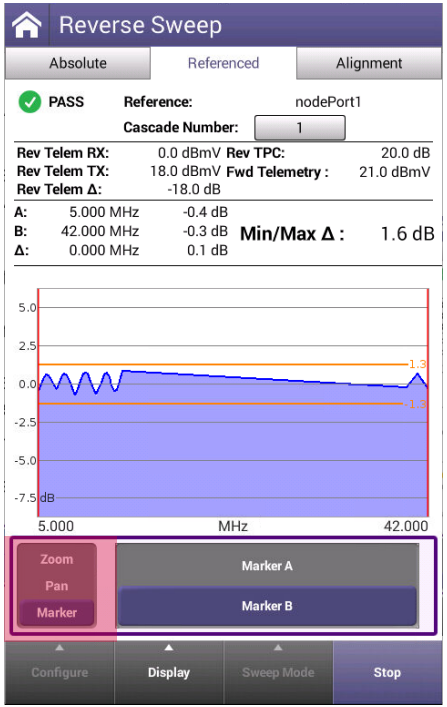
Go to Forward or Reverse Sweep
Stop / Start the test

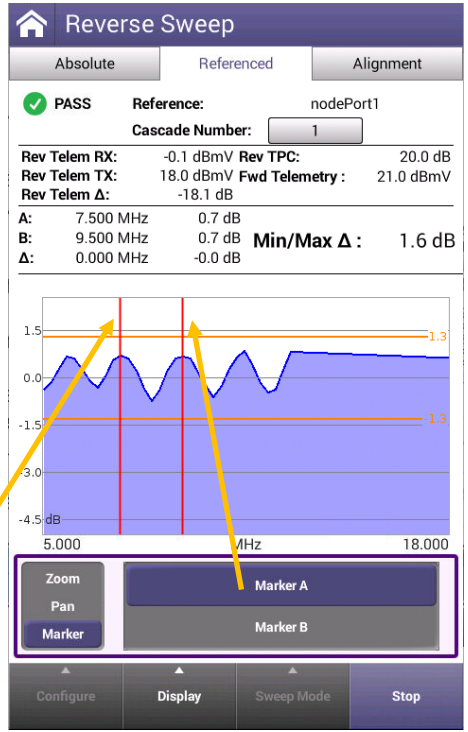
Graphical and Marker Adjustments

Zoom – Same as Pinch and Zoom on touch screen
- Vertical - Adjusts the dB/div
- Horizontal - Adjusts the frequency span

Pan – Adjust the bars to change the frequency span and slide the bar left or right to quickly change the displayed start and stop frequency based on the span

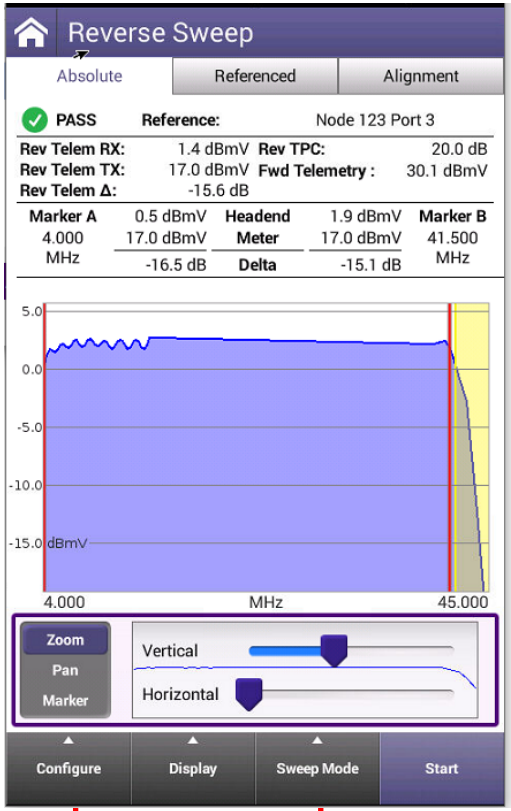
Marker – Select the “Marker A” or “Marker B” to move that marker left or right with the arrow keys
- CMTS values will adjust based on the frequency selected
- Markers can also be moved via touch screen

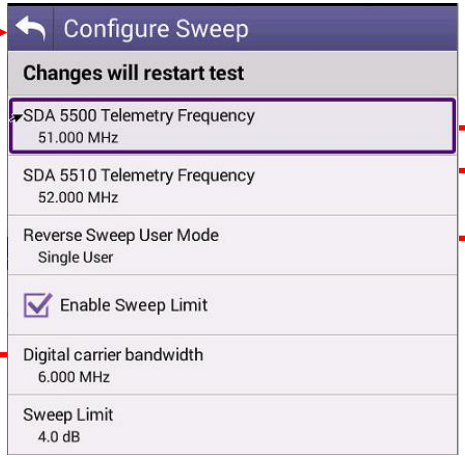


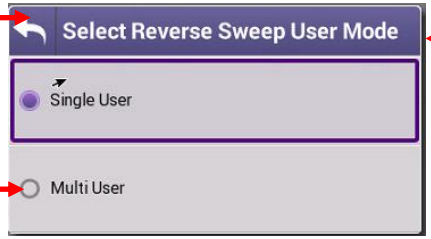


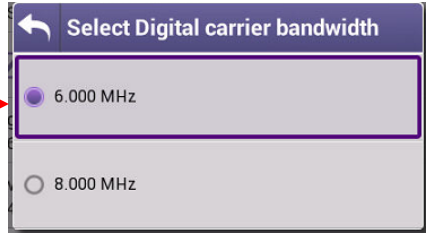
Return Sweep

Reverse Sweep Configure

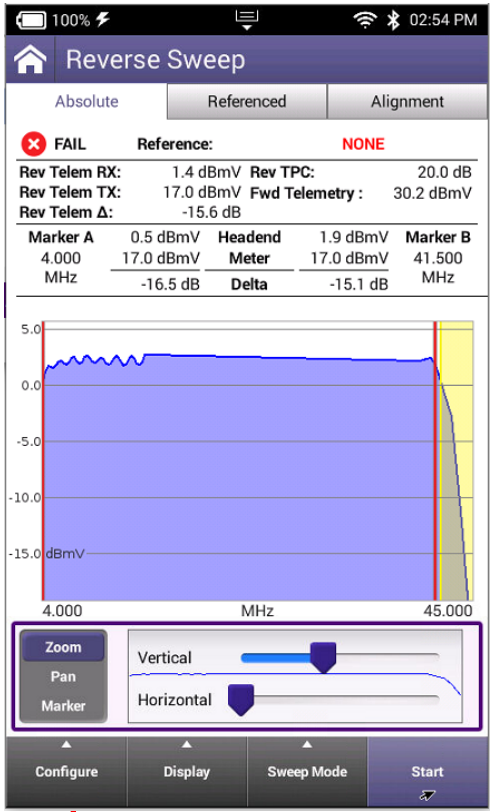


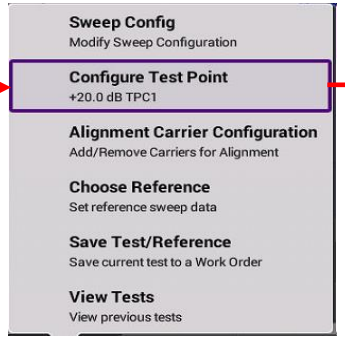


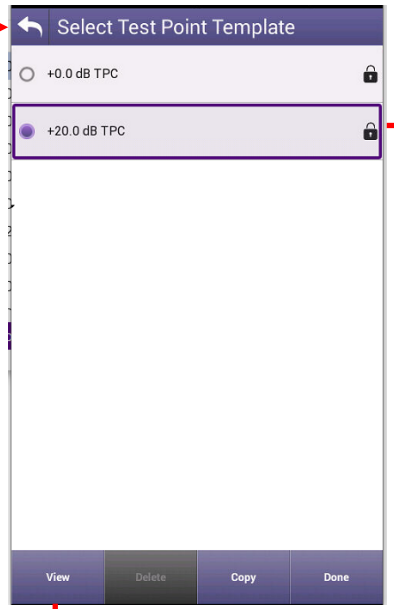


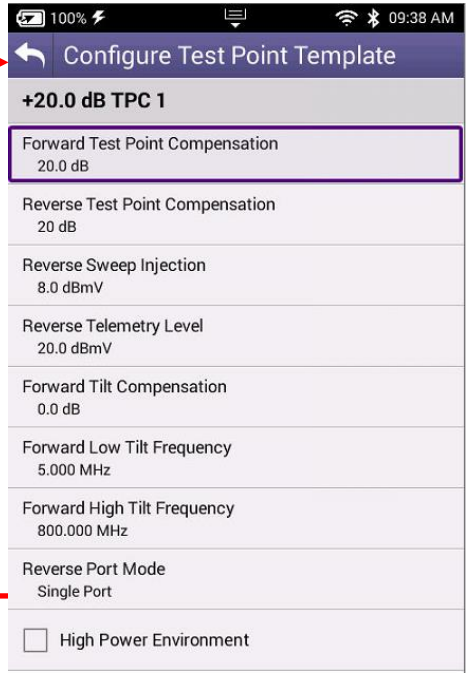


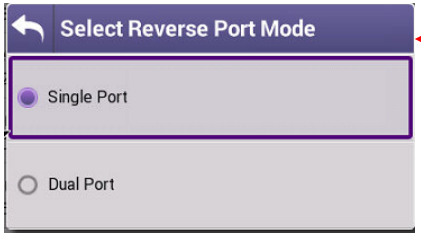
Reverse Sweep Configure Test Point



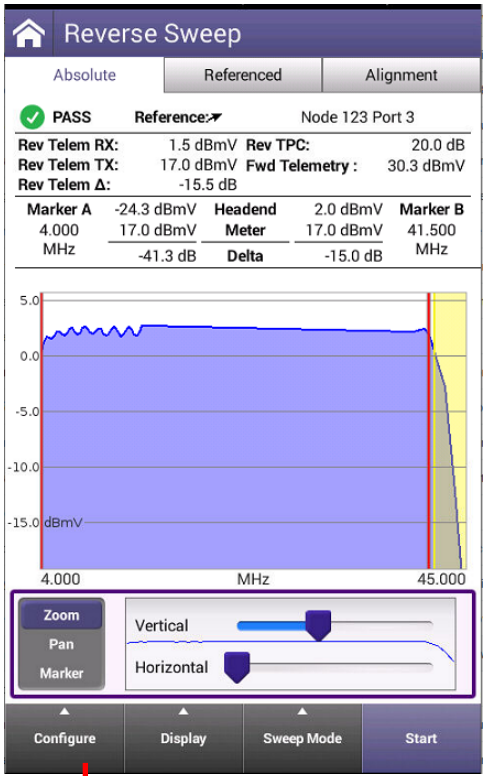


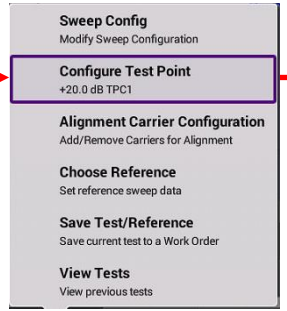


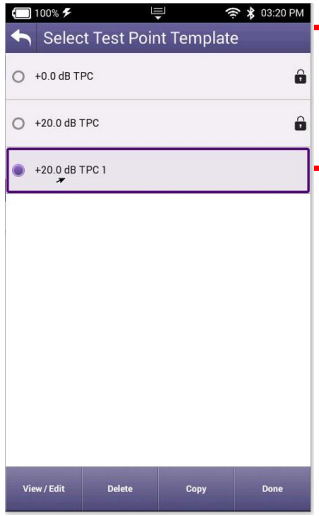


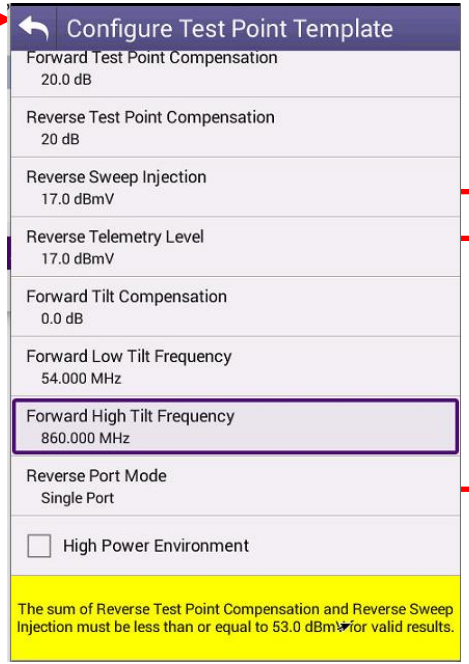


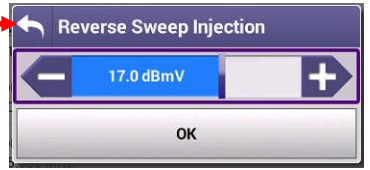
Reverse Sweep Configure Test Point Injection

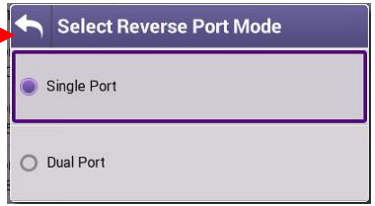




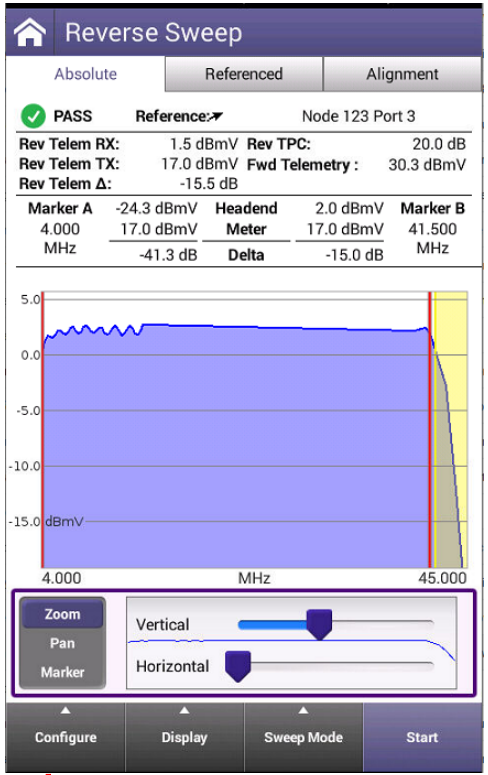


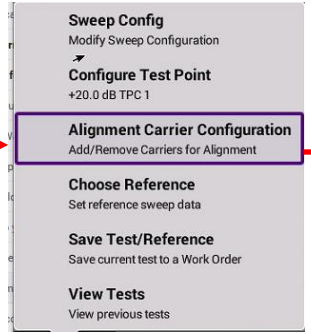


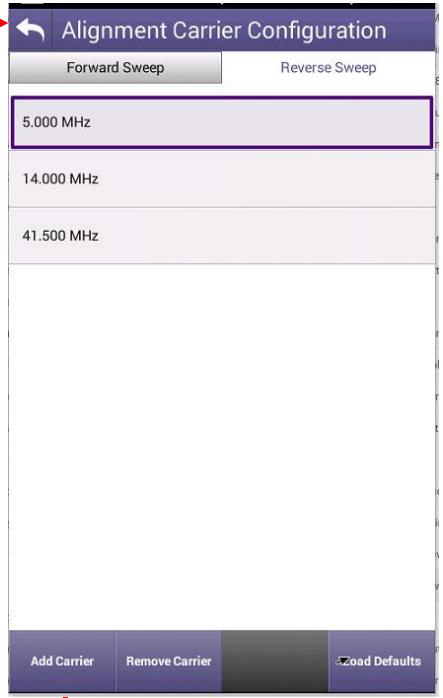


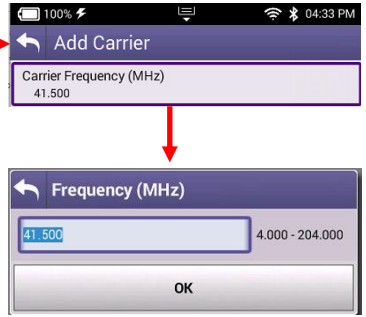


Reverse Sweep Alignment

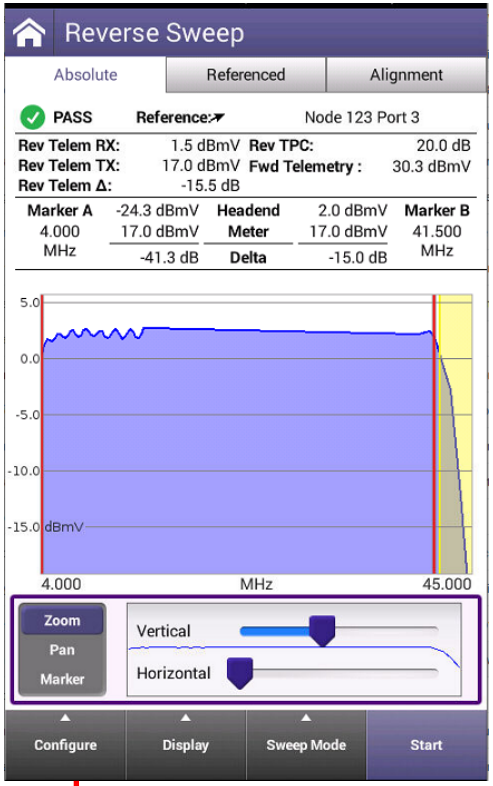


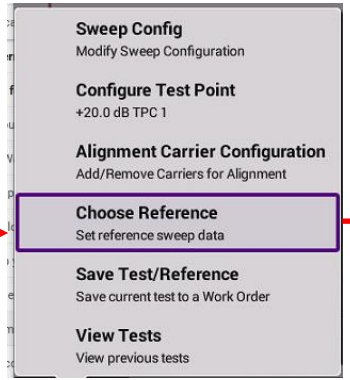


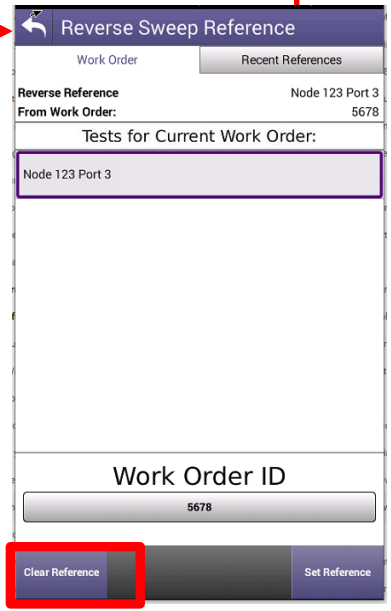


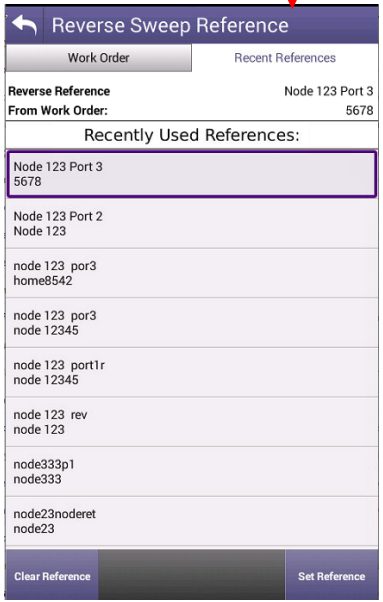


Reverse Sweep Clear Or Choose Reference

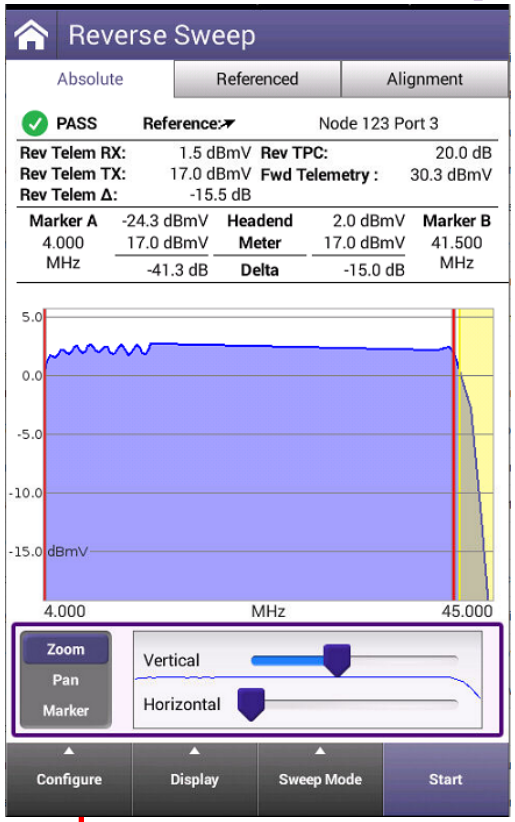


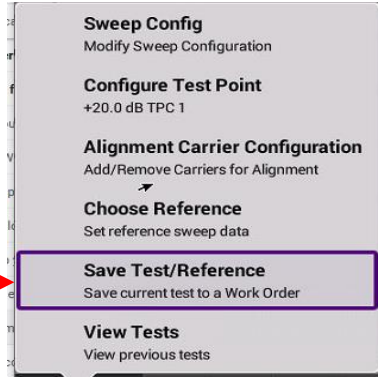


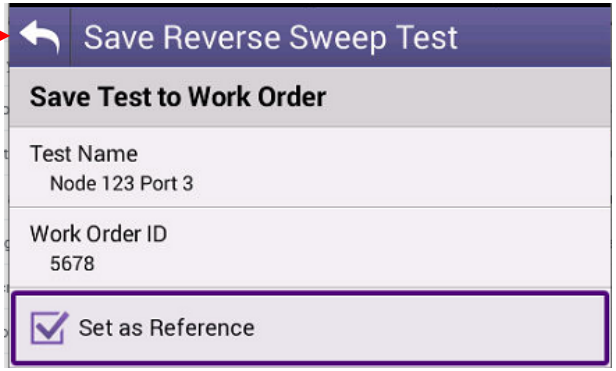


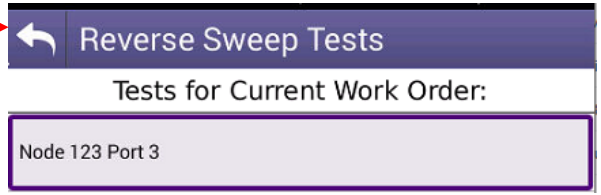


Reverse Sweep Save Reference

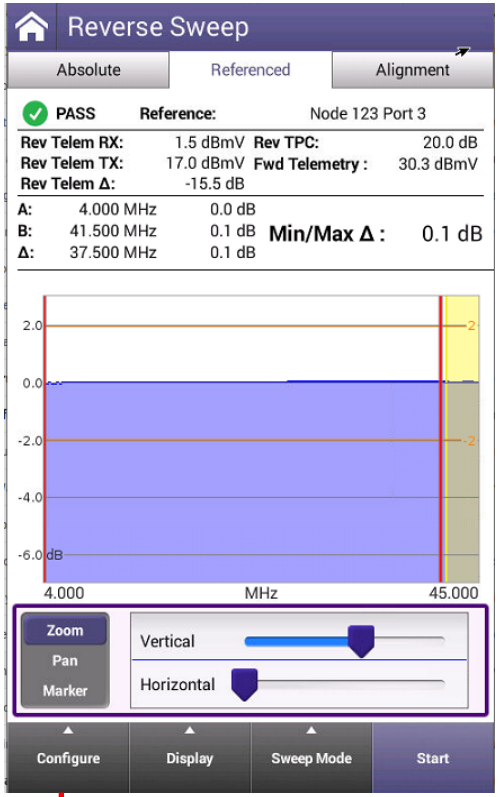


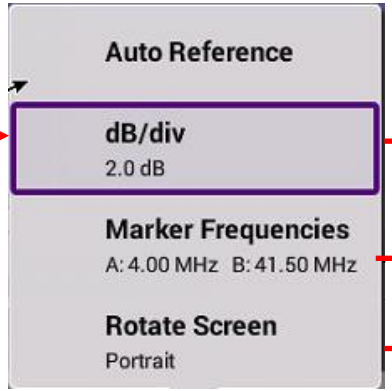


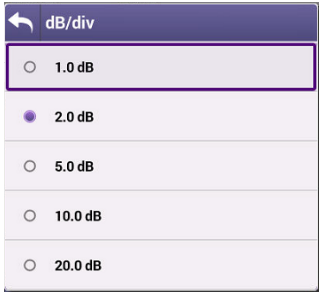


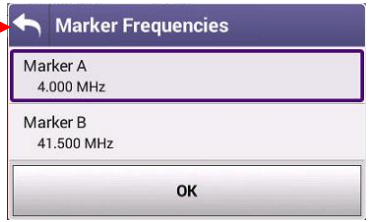


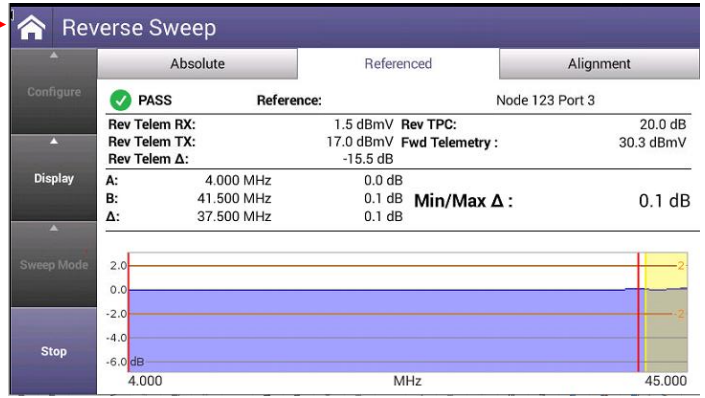
Reverse Sweep Display Settings





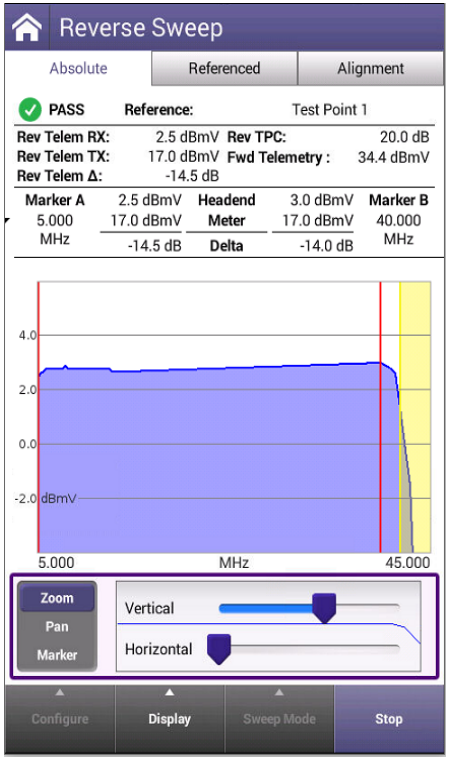




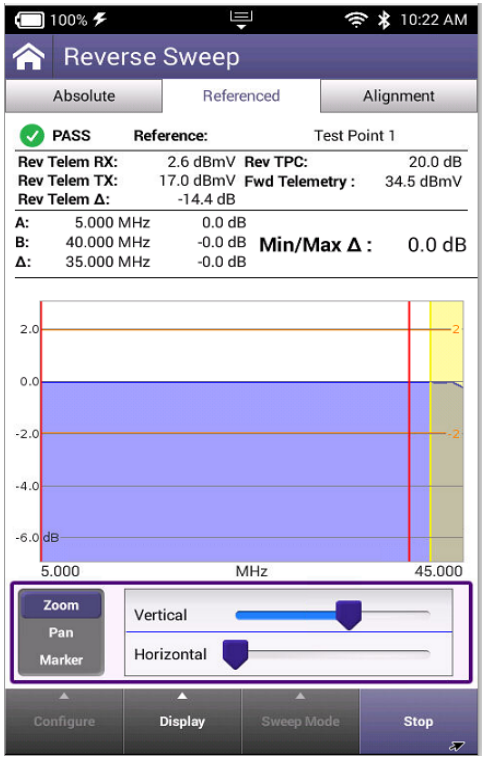


Reverse Sweep Screens

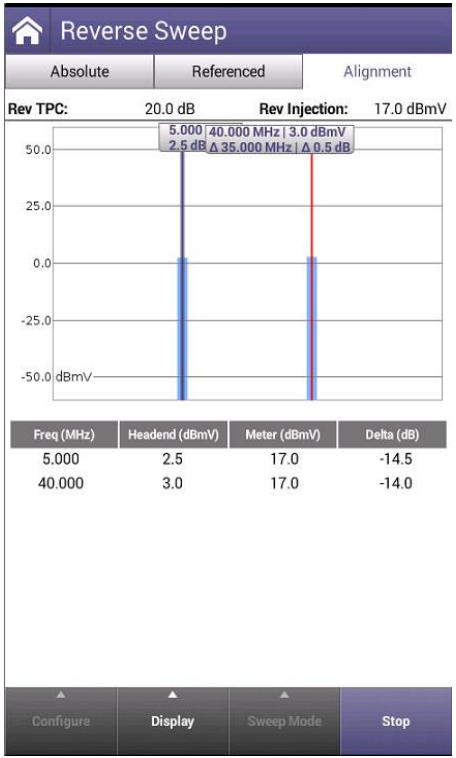
Absolute “Raw”



Referenced



Alignment



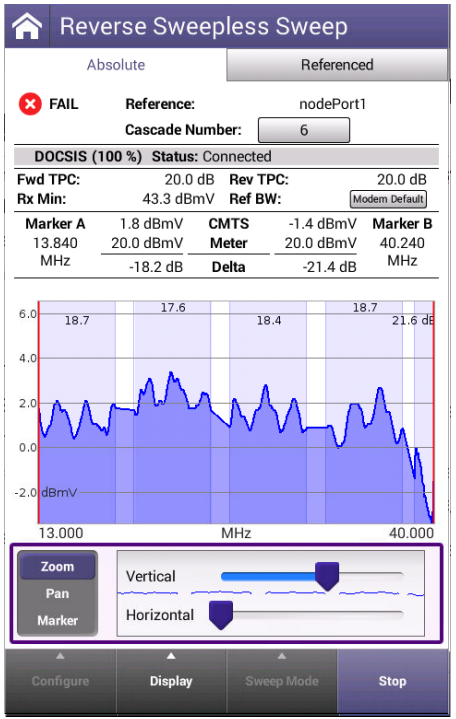
VIAVI Solutions

Reverse Sweepless Sweep Overview

Viavi ONX-CATV Optional Feature

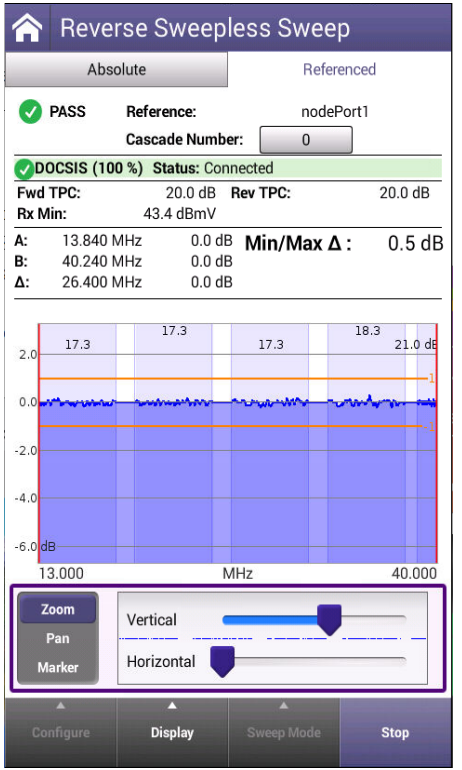
Upstream Sweepless Sweep

- Uses the CMTS/Modem technology for Upstream Sweepless Sweep
- Non-intrusive / Passive Sweep Solution
  - No effect on any system carriers
- No rack space needed for Upstream Sweepless Sweep
  - No Powering
  - No Cooling
  - No Operational Failure point (Transmitters)
- As Upstream carriers are added, Sweep coverage is simultaneously increased
  - As carriers are added, additional sweep points are also added to the solution
    - Therefore, increasing the sweep resolution throughout the entire frequency band
  - Wide-band carriers (6.4MHz / OFDMA) carriers make active sweep insertion more complex
- No need to swap out transmitters as technology changes / evolves
- R-Phy compatible, sweep passively today in your new deployments



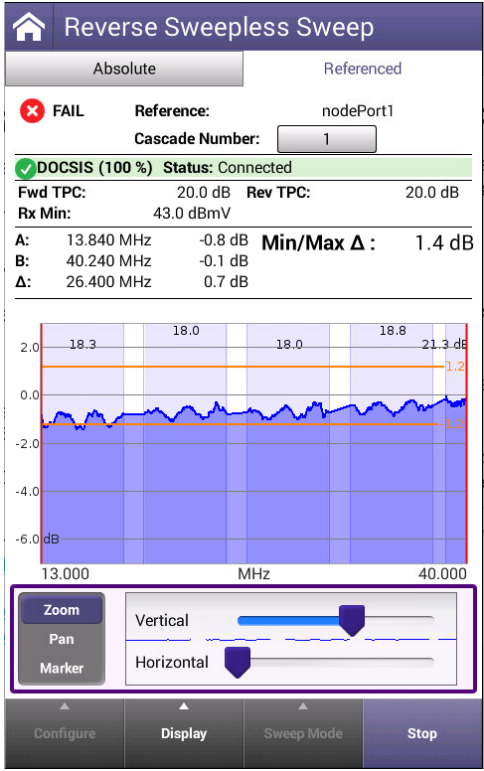
Introducing Optional Reverse Sweepless Sweep mode

- Reverse Sweepless Sweep allows techs to see frequency response issues in the active return frequencies
  - Helping techs find and correct plant issues similar to active reverse sweep
- Reverse Sweepless Sweep graphs combine active upstream transmitted DOCSIS channels with CMTS response information
- Saving a reference then allows delta comparisons to be made at various test points over time



Introducing Optional Reverse Sweepless Sweep mode

- The Absolute tab shows the live estimated response at the Headend
  - In Channel Frequency Response is adapted from upstream pre-equalization established between the ONX at the test location and the CMTS / RPHY device location
- The Referenced tab shows any amplitude deltas over frequency from the original test location to the current test location



Absolute Tab – Showing Adjusted Headend Response

Referenced Sweep Limit Threshold

DOCSIS Communication Status

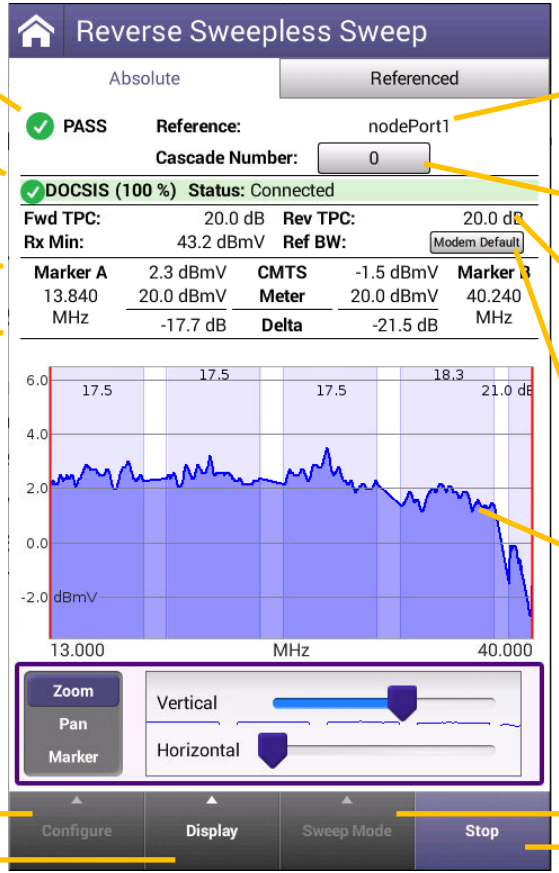
Forward Test Point Compensation Value

Minimum Received Downstream Channel level

Marker A & B Information:
Frequency, adjusted level at the CMTS, the meter's adjusted transmit level, the delta (loss / gain) between meter and CMTS

Graphical and Marker Adjustments
Zoom, Pan, Marker

Configure Menu
Display Menu



If a Reference is set, the Reference File Name is displayed (None – if no reference is set)

Place amplifier cascade

Reverse Test Point Compensation Value

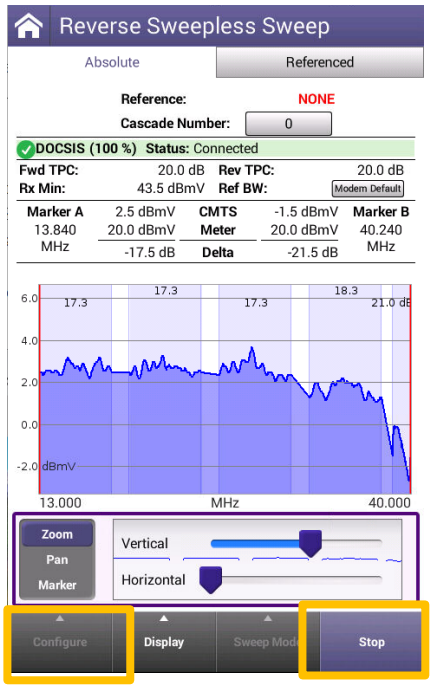
Reference Bandwidth – More details below

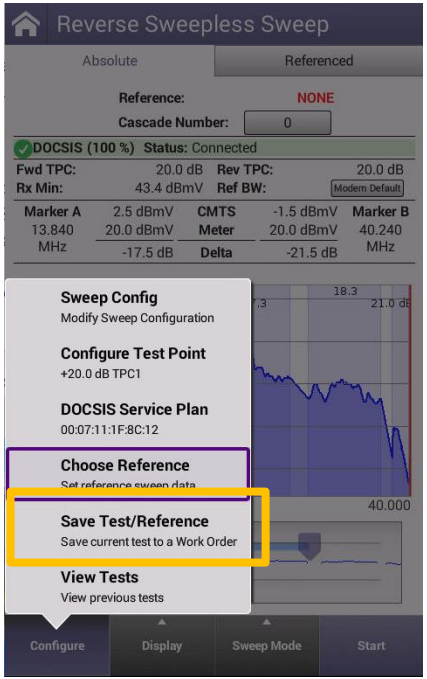
The absolute trace is the adjusted frequency response expected at the connected CMTS located at the headend or Remote PHY Node

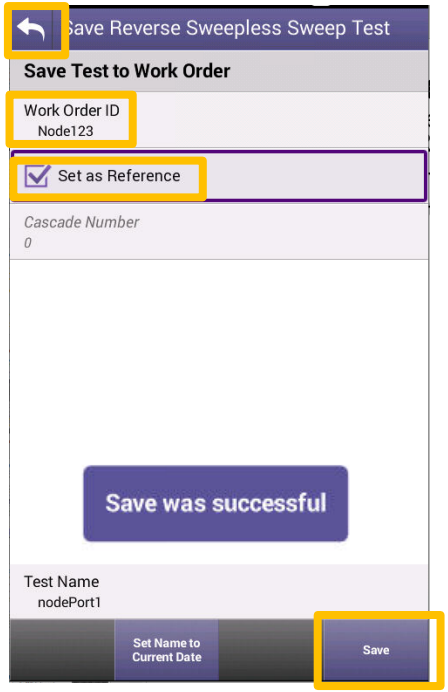
Go to Forward or Reverse Sweep
Stop / Start the test

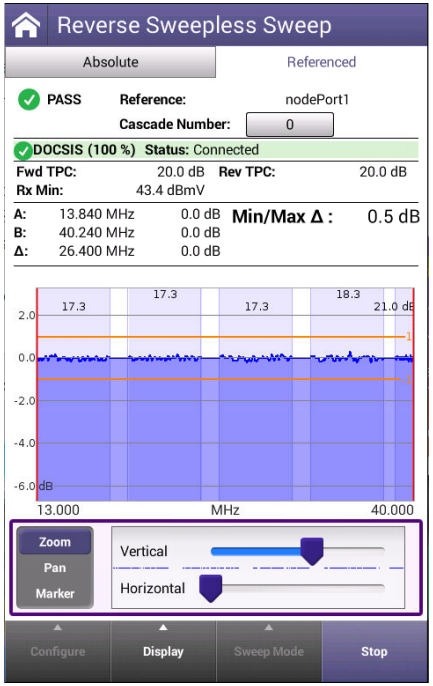
Saving a Reference

- Once ready, to save a reference first stop the test – Then press the Configure button and select “Save Test/Reference”
- Enter a Name for the reference and check the box “Set as Reference”
- Press the Save button - once saved, press the Back button to return to the test mode

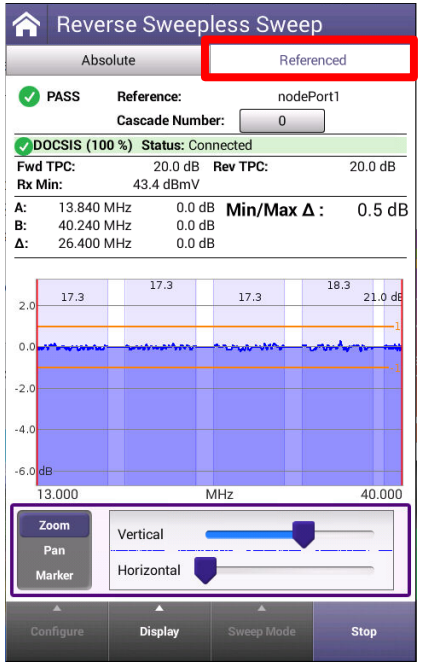








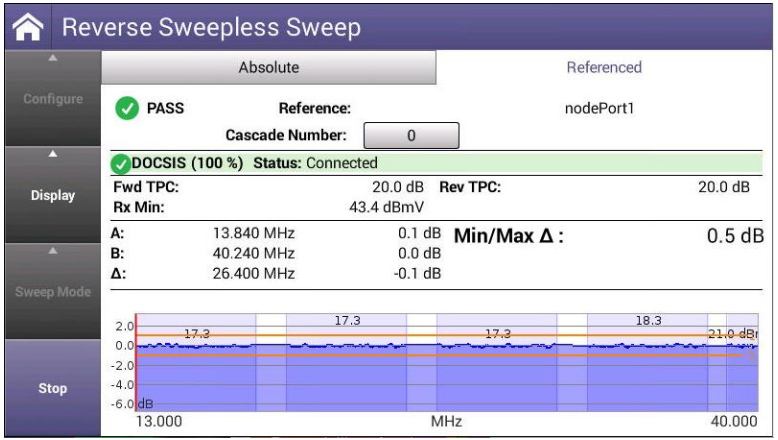
Referenced Tab – Displays frequency response deltas

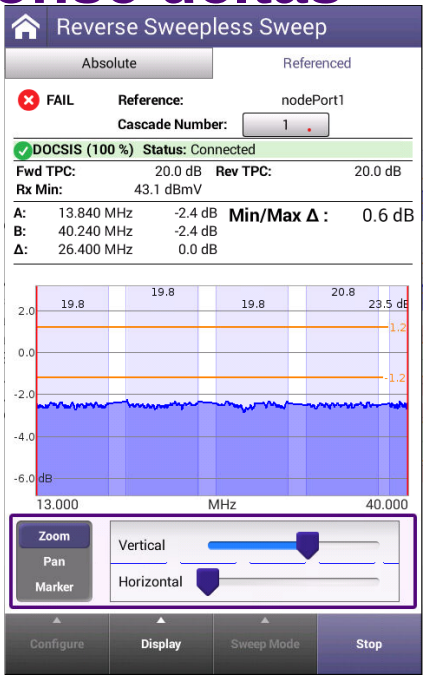


Just after saving a reference the reference trace will be very close to zero and may adjust slightly over time

As new test points are measured, and levels differ over frequency relative to the original test point, the Referenced sweep trace will update to reflect those deltas

Negative response shows where signal loss / attenuation occurs, while positive response shows where signal gain / amplification occurs relative to the reference test point





About 2.5 dB additional attenuation in this portion of the network than when compared to the originally referenced sweep response trace – Indicating there is 2.5dB of relative loss at this test location and should be corrected

Referenced Tab – Continued

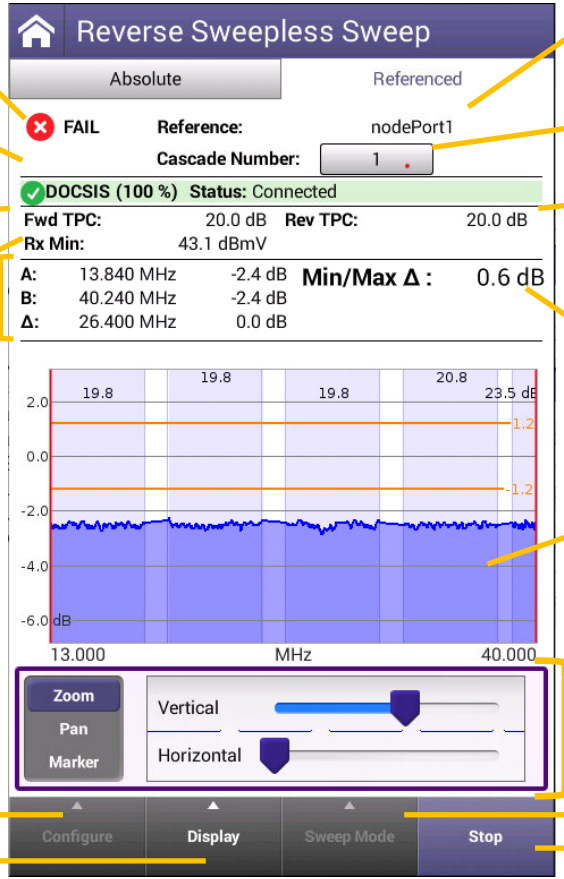
Referenced Sweep Limit Threshold

DOCSIS Communication Status

Forward Test Point Compensation Value

Minimum Received Downstream Channel level

Marker A & B Information:
Frequency, the delta (loss / gain) between the originally referenced trace and the currently measured trace
Delta – difference in marker frequency and marker response difference



The Reference File Name (None – if no reference is set)

Place amplifier cascade

Reverse Test Point Compensation Value

Minimum or Maximum delta in the trace between the markers

The referenced trace displays frequency response deltas between the original trace and the currently measured trace

Graphical and Marker Adjustments
Zoom, Pan, Marker

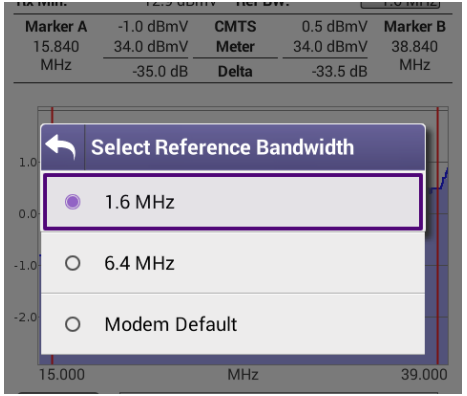
Configure Menu
Display Menu

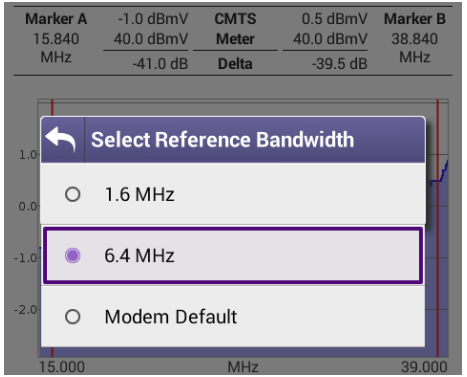
Go to Forward or Reverse Sweep
Stop / Start the test

Absolute Tab
Referenced Tab

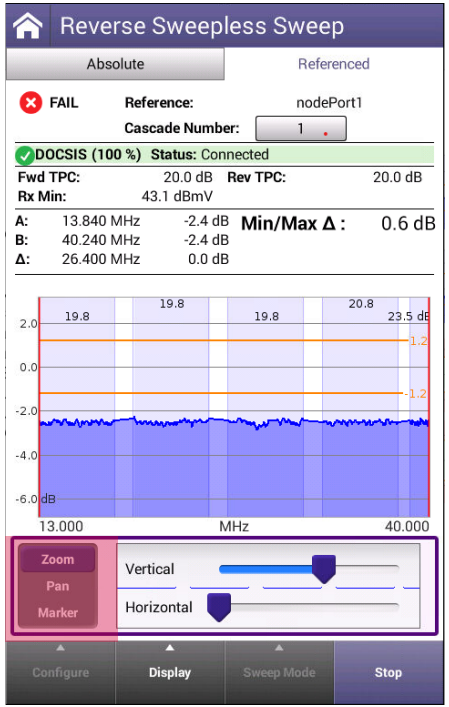
Reference Bandwidth (Ref BW)

- Reference Bandwidth adjusts how the ONX displays each upstream channel's power relative to the selected bandwidth
- Most techs know Upstream SC-QAM's transmitted power relative to a common 6.4MHz bandwidth
- Due to the variability of OFDMA channel widths, DOCSIS spec uses a 1.6MHz wide bandwidth for OFDMA channels
- On the ONX the Modem Default shows the transmit power for the SC-QAM's based on the channel's bandwidth of 3.2MHz or 6.4MHz and OFDMA channels based on the spec of 1.6MHz
- Selecting a Reference Bandwidth of either 1.6MHz or 6.4MHz will adjust the displayed channel transmit power levels for all channels of all types based on the selected bandwidth
  - 1.6MHz Ref BW 6.4MHz SC-QAMs will appear 6dB lower
  - 6.4MHz Ref BW OFDMA carriers appear 6dB higher





Graphical and Marker Adjustments



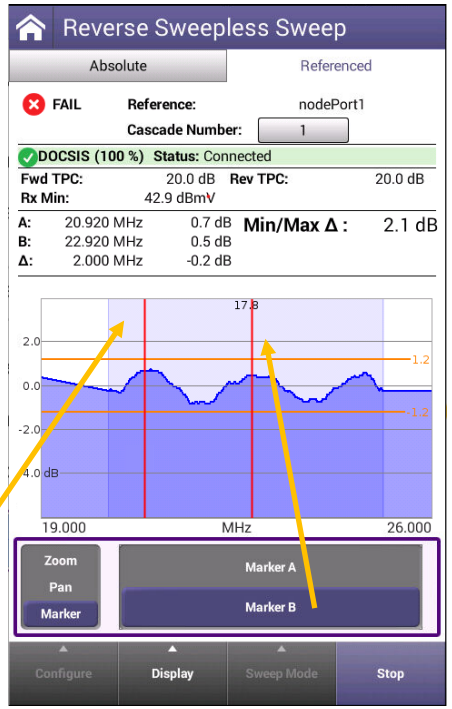
Zoom – Same as Pinch and Zoom on touch screen

- Vertical - Adjusts the dB/div
- Horizontal - Adjusts the frequency span

Pan – Adjust the bars to change the frequency span and slide the bar left or right to quickly change the displayed start and stop frequency based on the span

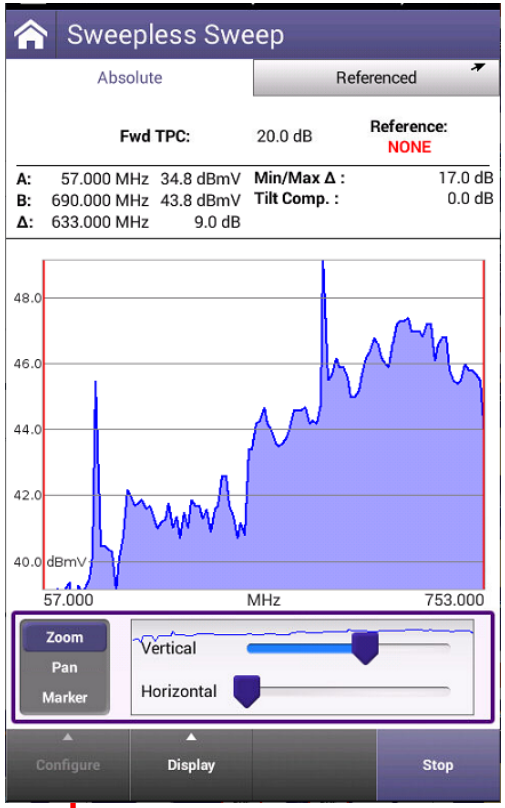
Marker – Select the “Marker A” or “Marker B” to move that marker left or right with the arrow keys

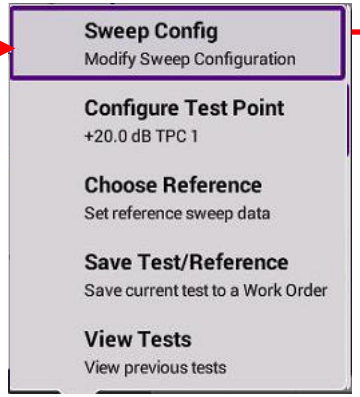
- CMTS values will adjust based on the frequency selected
- Markers can also be moved via touch screen

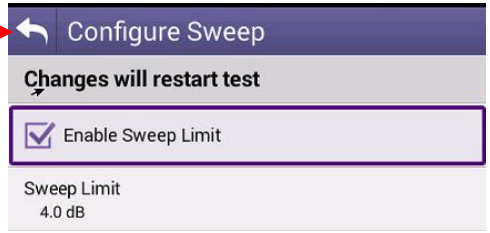


Sweepless Sweep

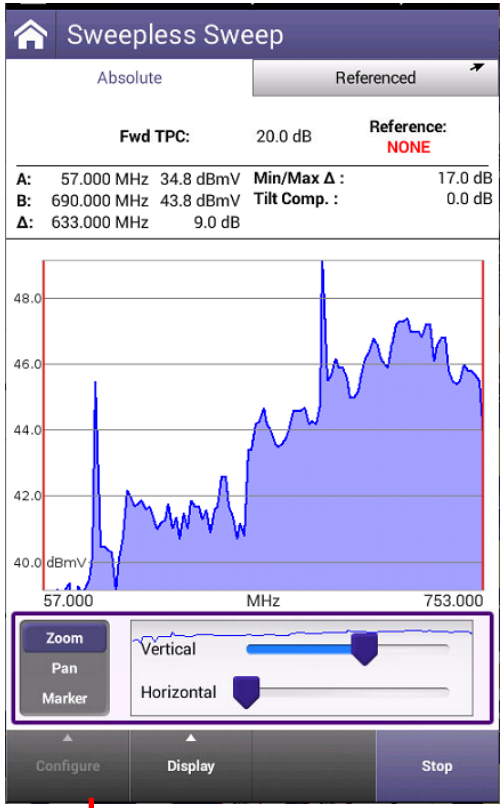
Sweepless Sweep Configure

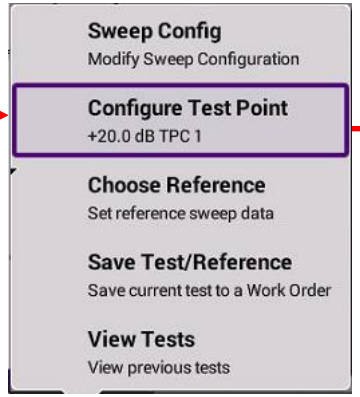


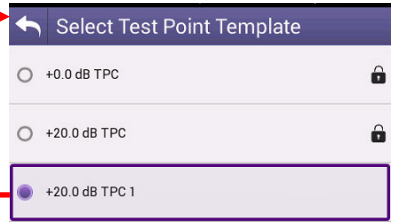


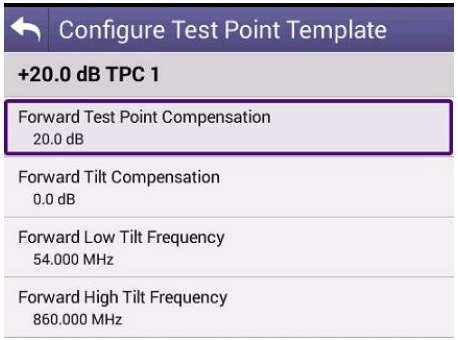


Sweepless Sweep Configure

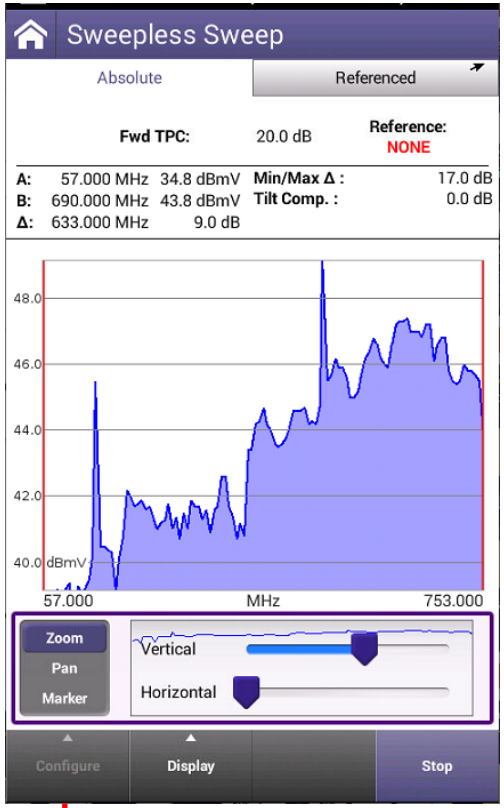


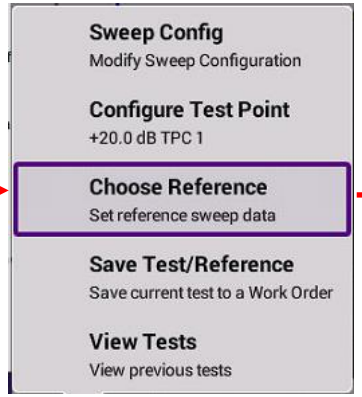


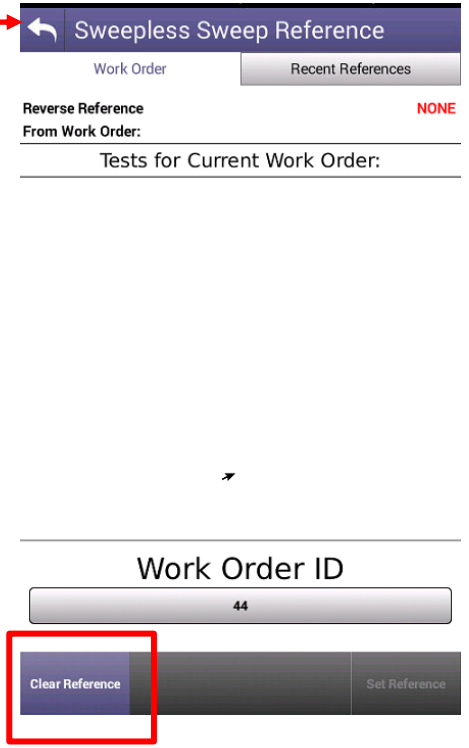




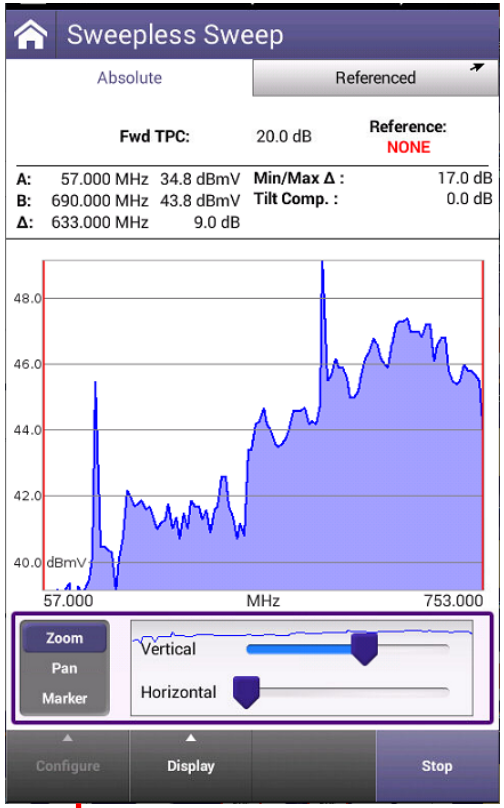
Sweepless Sweep Clear Reference

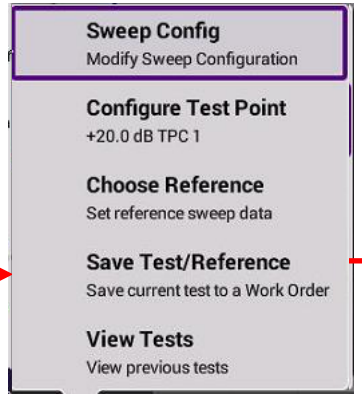


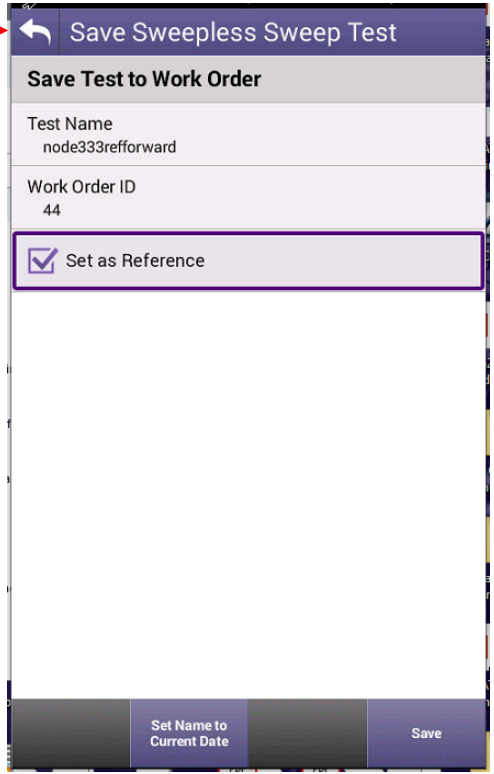




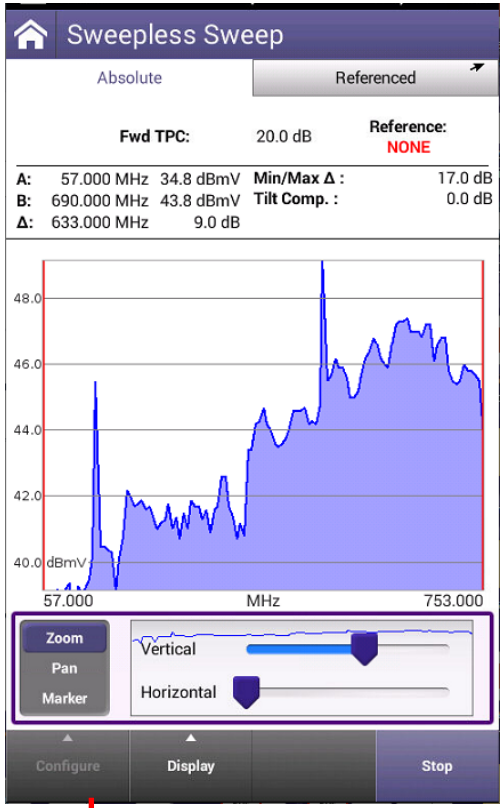
Sweepless Sweep Save File or Reference

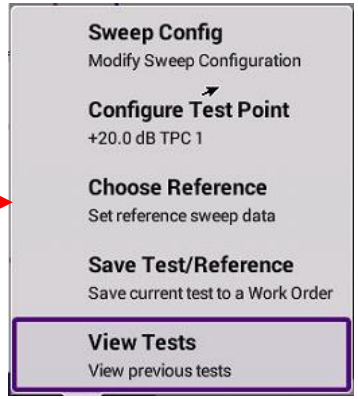


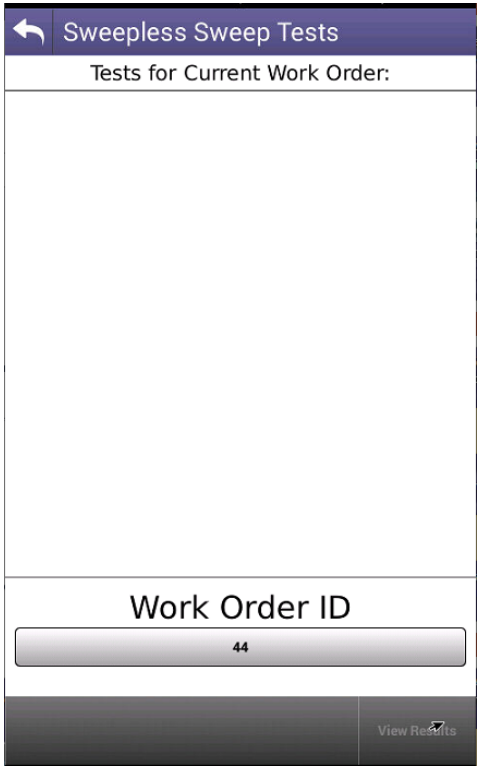




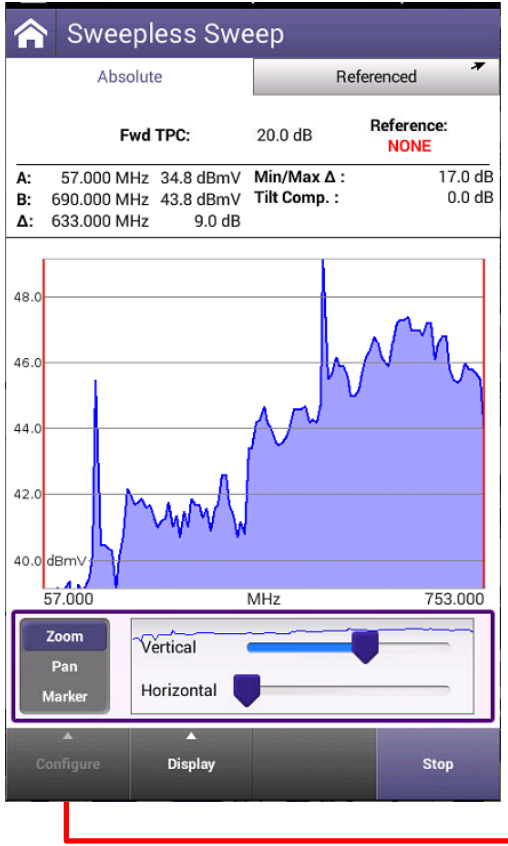
Sweepless Sweep Configure

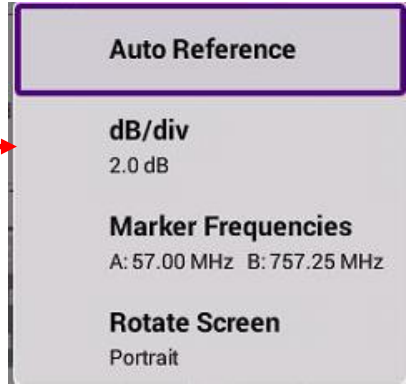


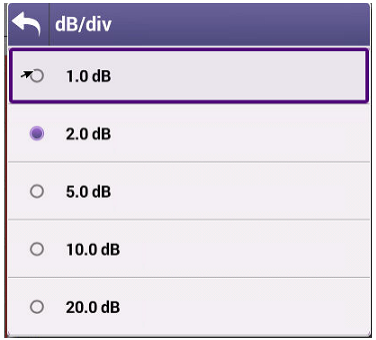


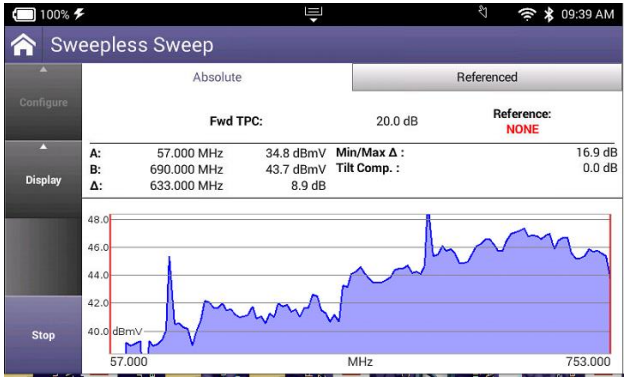


Sweepless Sweep Configure

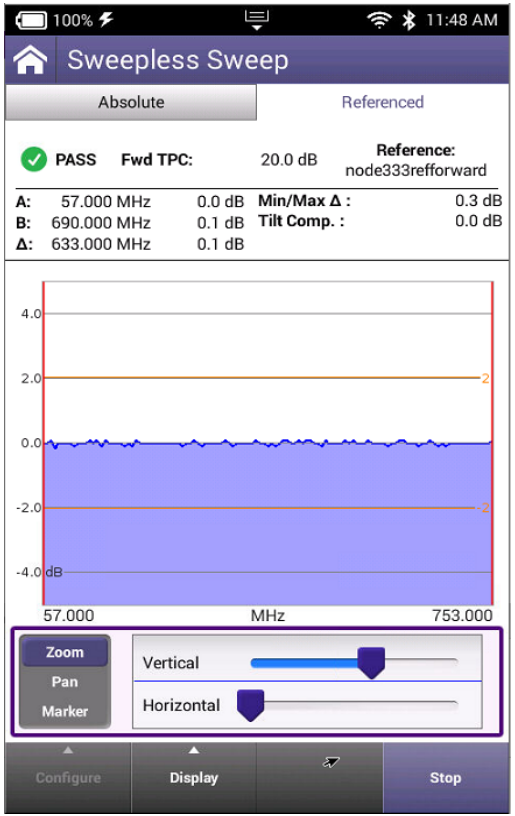






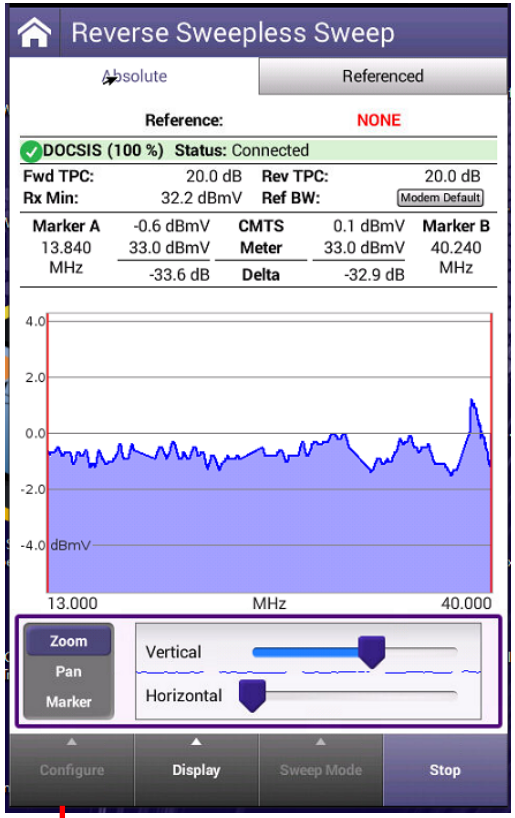


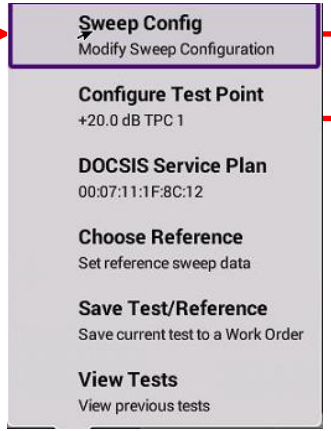
Sweepless Sweep Absolute and Referenced

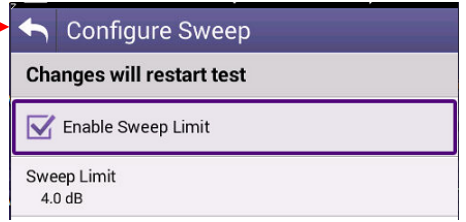


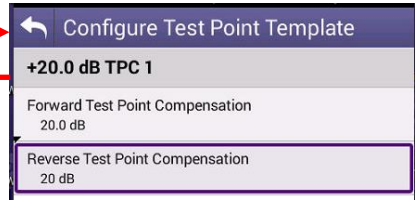
Sweepless Return Sweep

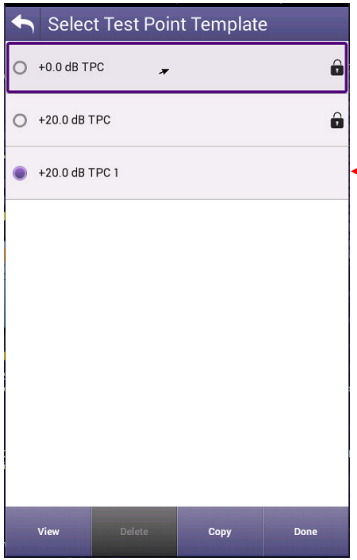
Reverse Sweepless Sweep Configure and Test Point



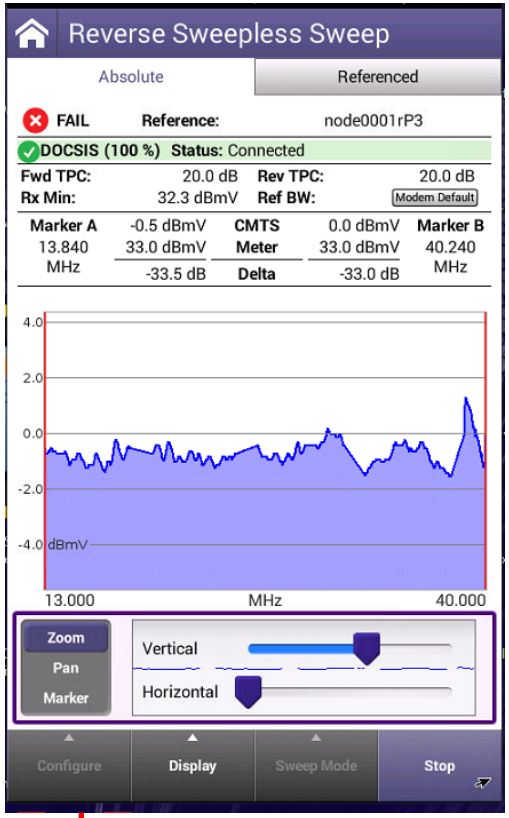


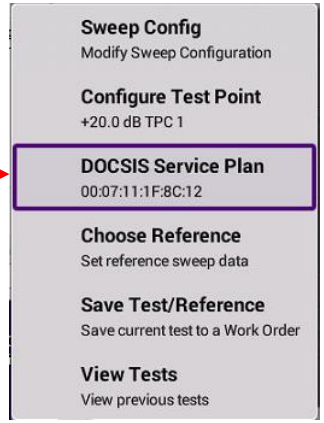




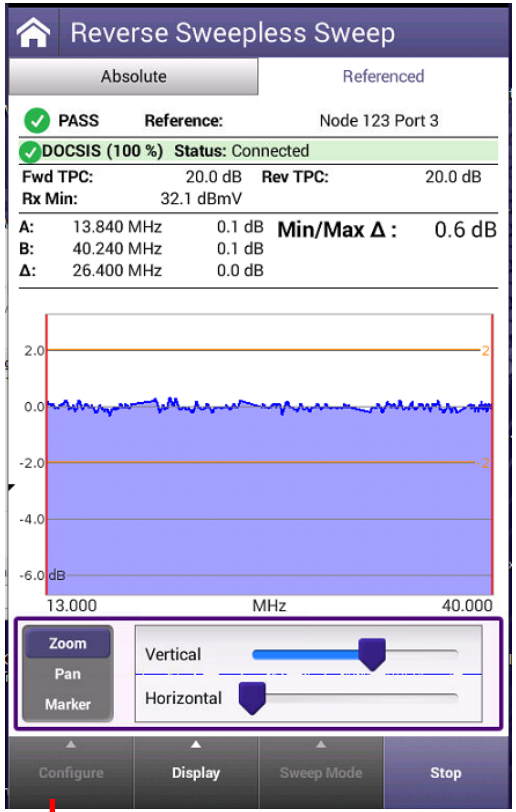


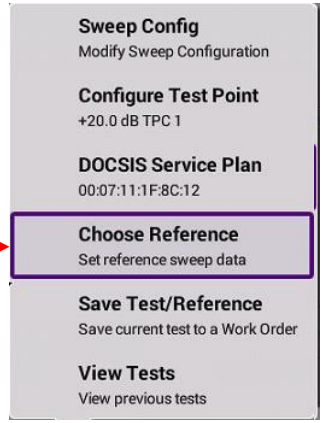
Reverse Sweepless Service plan Select

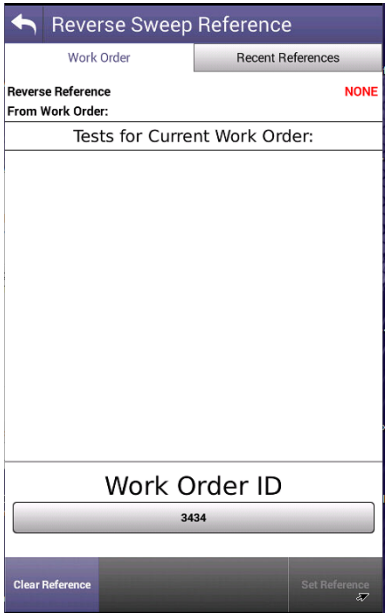


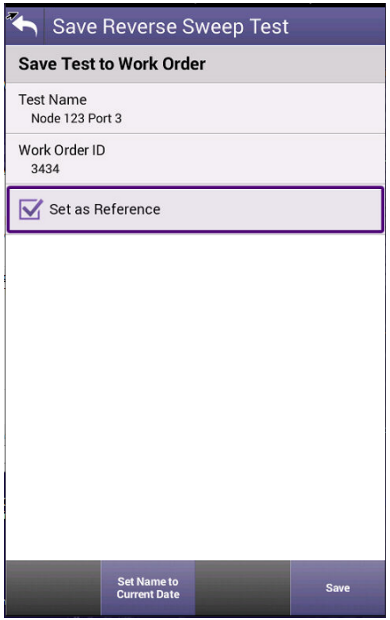


Reverse Sweepless Sweep Reference

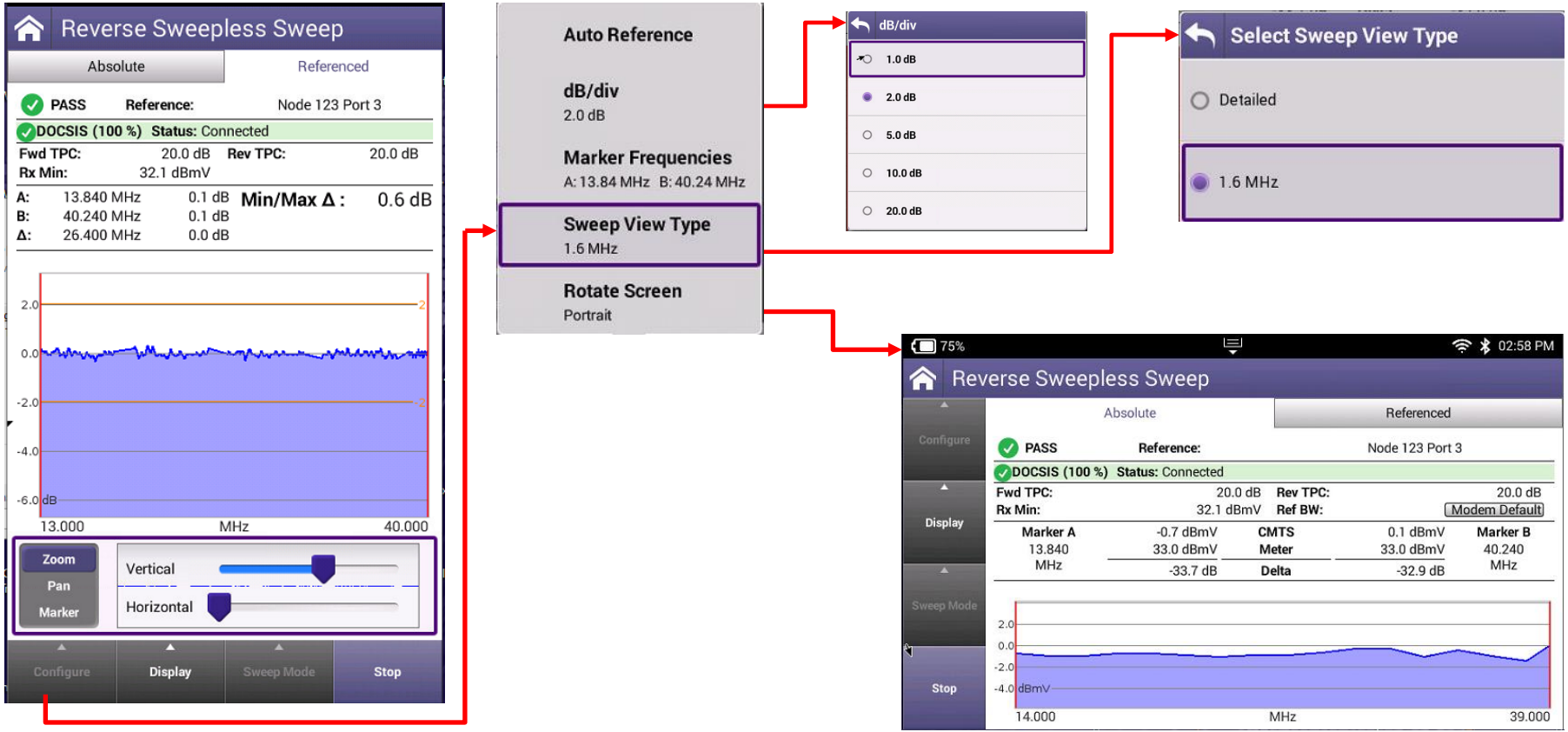




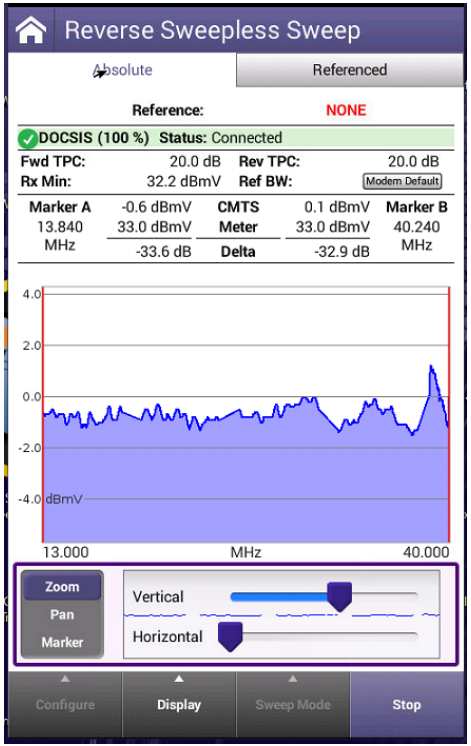


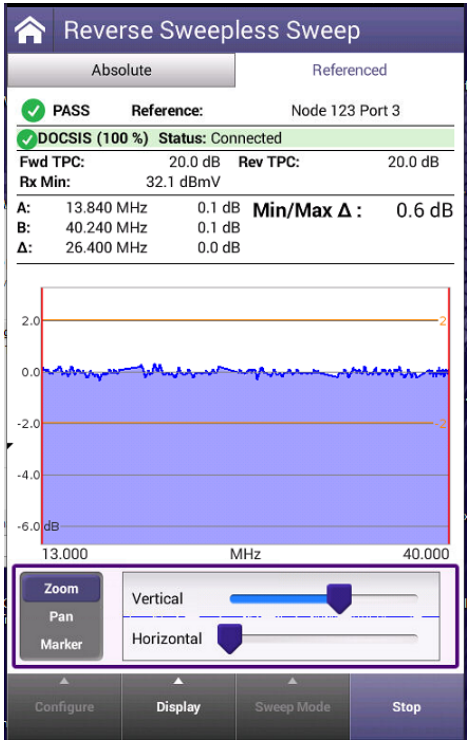


Reverse Sweepless Sweep Type



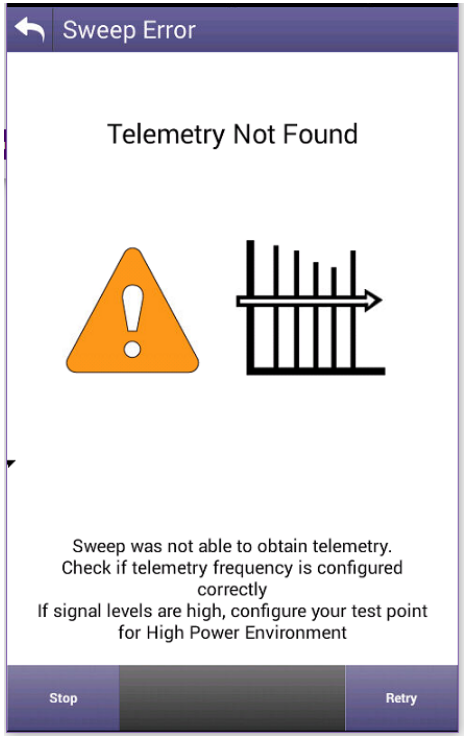
Reverse Sweepless Sweep Absolute and Referenced

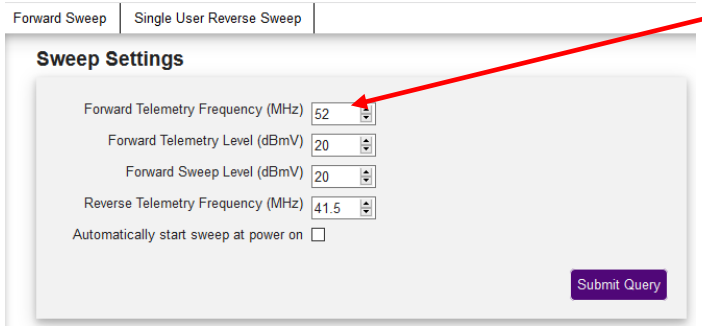


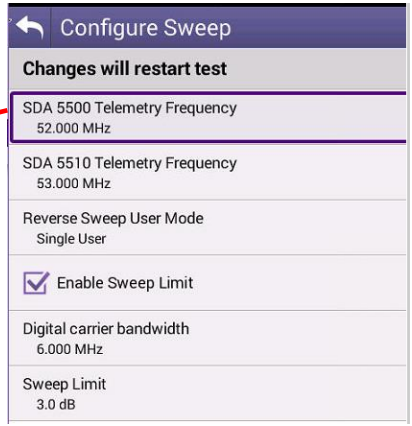


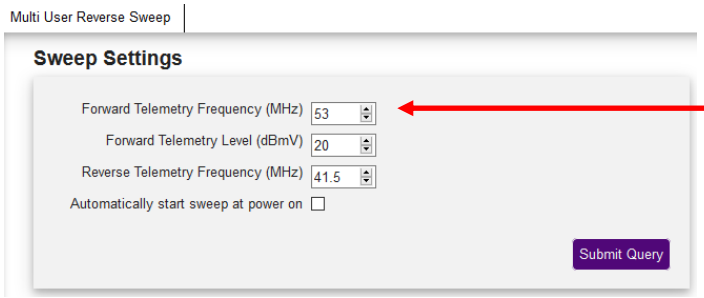
Typical Reverse Sweep Errors

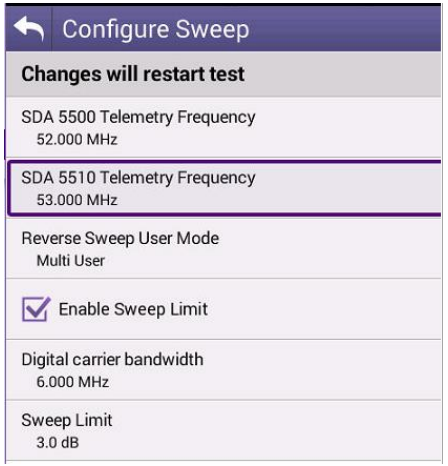
Telemetry not found











Invalid Telemetry

Invalid Telemetry
•3 possibilities

•#1. Using the multiple user frequency when sweeping the forward sweep single sweep or when sweeping forward. using multiple users frequency

Verify correct telemetry.
•#2. The input level is of telemetry exceed +25 dBmV into ONX
•#3. RF channel power into the ONX exceeds 20 dBmV.

Check the High Power Environment in the Test Point template

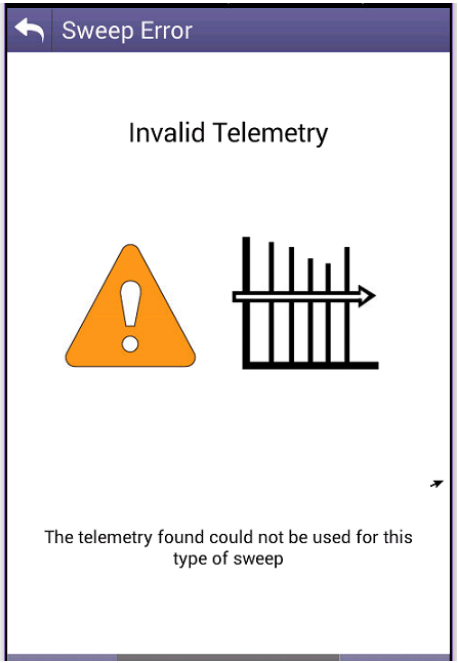


Figure 4: High Power setting

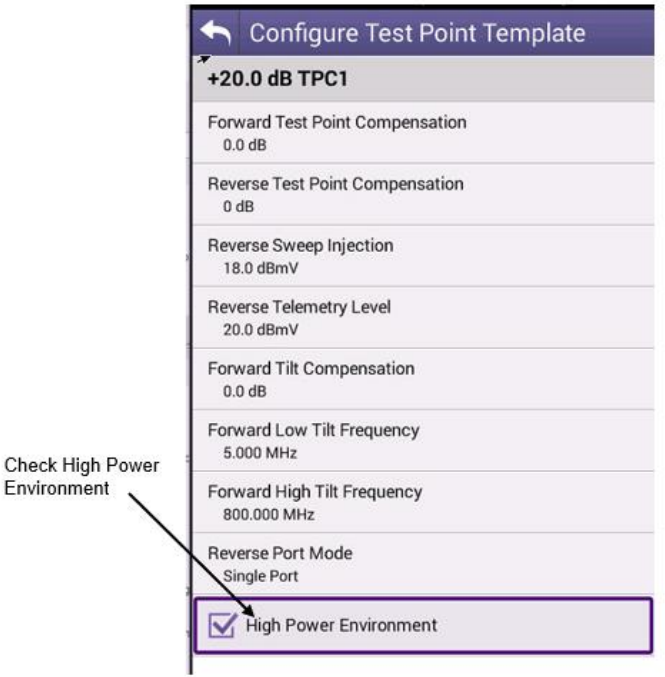
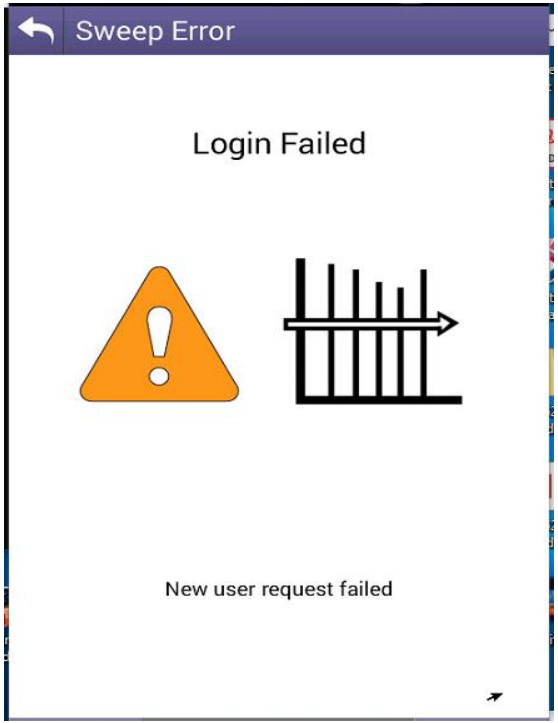


Figure 5: High Power setting

Login Falure

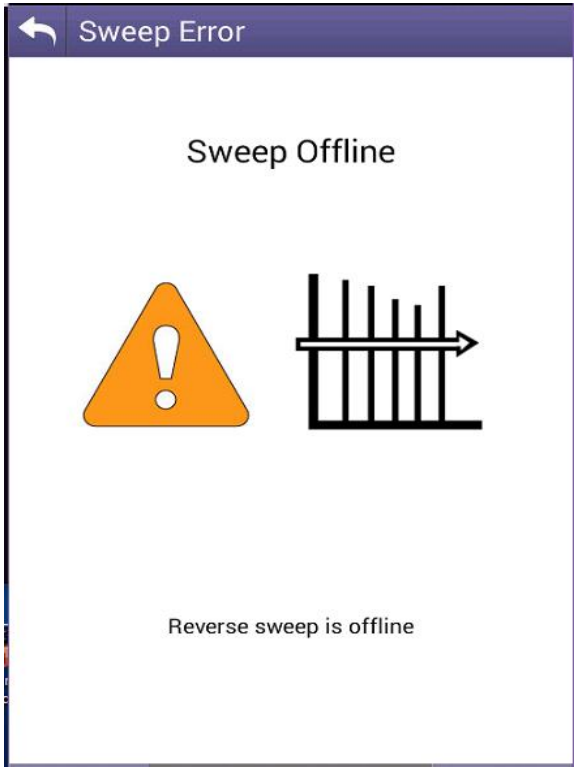
Return Sweep Error

- Login Failure
- Typically cause by the return Telemetry level is to low for the SCU-1800 to decode or not present at the SCU-1800
- Return Telemetry > 30 dB to the input of the SCU-1800
- Too much return RF power into the SCU-1800



Sweep Offline

- Sweep Offline
- Verify Reverse Sweep is check on SDA 5500 return sweep is on
- Too much return RF power. Verify out put on ONX is not too high.
- **Please Review SCU-1800 Getting Started Guide**



QAM Video Option

Need for Video Verification

- RPD Installation process step: RF verification and adjustment, provisioning verification
  - Each node port/service group can have a unique configuration
  - Adds process complexity, incorrect configuration provisioning is common

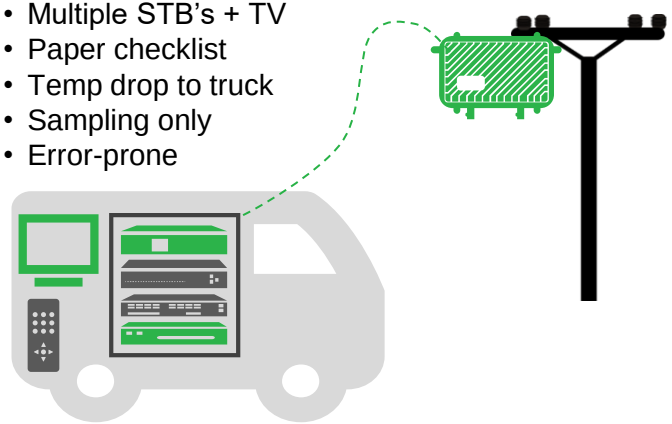
Common Configuration Problems

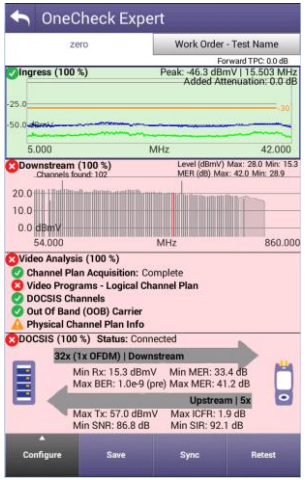
- A QAM carrier specified in Logical Channel Plan (LCP) is missing or impaired
- Programs defined in the LCP are not mapped within the QAM (missing PID/Program)
- Programs defined in the LCP are mapped to the QAM but there is no data in the program (stalled PID)
- Programs defined in the LCP are mapped to share same frequency as a DOCSIS carrier
- Out of Band (OOB) carriers are not enabled
- OOB Carrier is enabled but no data is flowing

<5 Minute Comprehensive RF/Service Test at RPD Output

Was:

- 30+ minutes/port
- Multiple STB's + TV
- Paper checklist
- Temp drop to truck
- Sampling only
- Error-prone





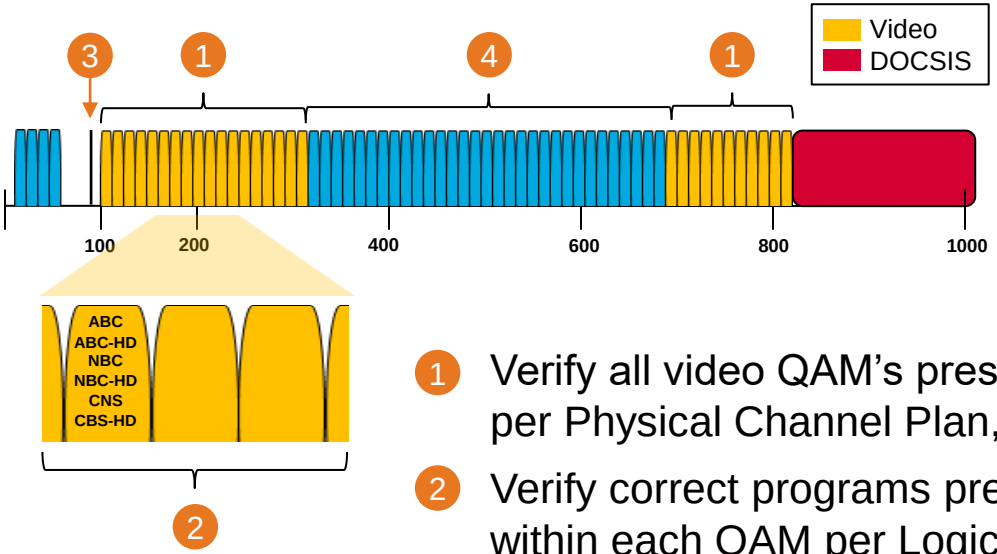
Is Now:

- <5 minutes/port
- Uses existing meter
- Comprehensive/100%
- Automated/Error-proof test

Efficiently verify ***ALL*** services present/operating properly on RPD RF output in <5 min

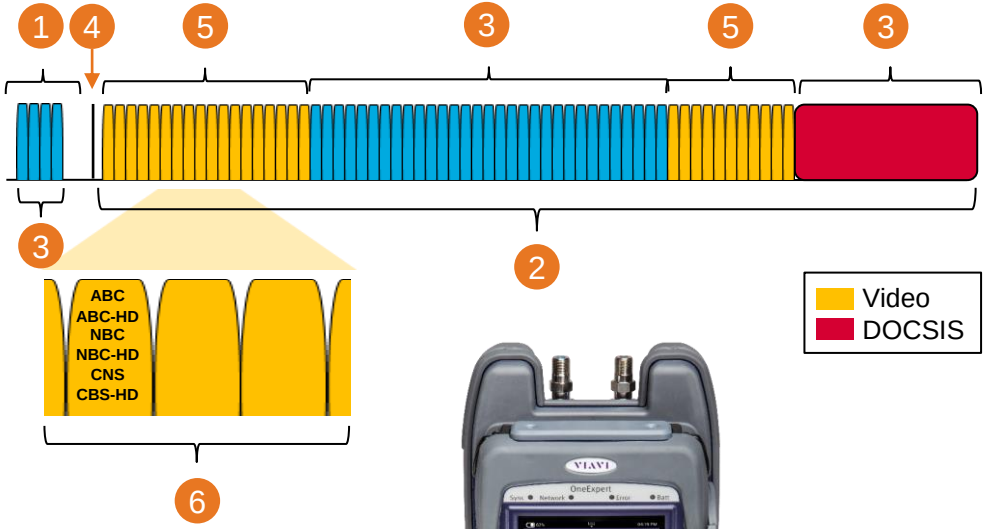
- Verify all DS/US RF and DOCSIS service characteristics
- Verify every program in the logical channel plan(LCP) is active and running on the specified QAM carrier
- Test that the OOB carrier is active and supplying data
- All in <5 min using meter Techs already carry

Video Verification Test Recommendations



1. Verify all video QAM's present at right freq's per Physical Channel Plan, not impaired
2. Verify correct programs present / active within each QAM per Logical Channel Plan
3. Verify Out of Band (OOB) carriers active and supplying data
4. Verify DOCSIS is not sharing channel with video

RF & DOCSIS/Video Service Certification Recommendations

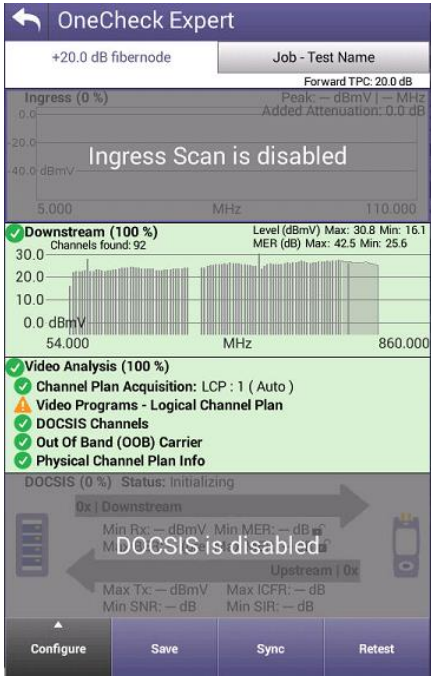


1. Verify no upstream ingress present in network downstream of RPD
2. Full System Analysis: Level, MER, Pre/Post BER, Echo, GD, ICFR, Hum, DQI on Every Channel
3. Full DOCSIS analysis of US and DS (OFDM/ODMA/ SC QAM), including Bonding, Profile Analysis, Through Put and Packet Quality
4. Verify Out of Band (OOB) carriers active and supplying data
5. Verify all video QAMs present at right frequencies per Physical Channel Plan, not impaired
6. Verify correct programs present / active within each QAM per Logical Channel Plan

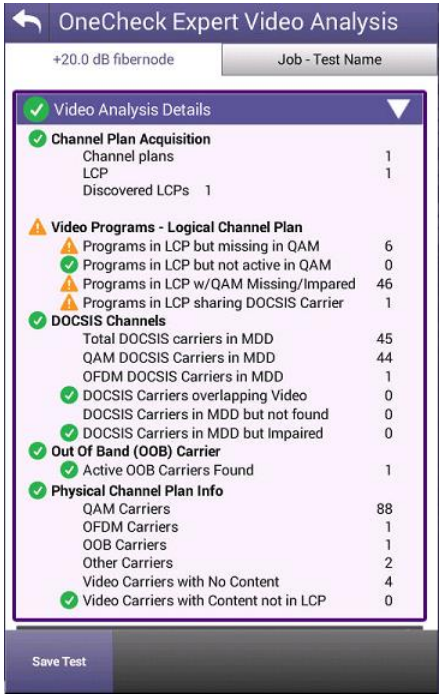
Plus Upstream and downstream Sweep

Video Test Identifies Configuration Problems

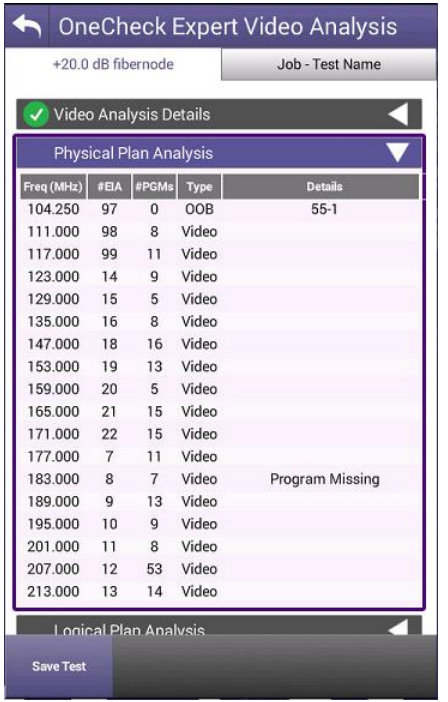
Video Test incorporated into OneCheck Expert



Video Analysis General Overview

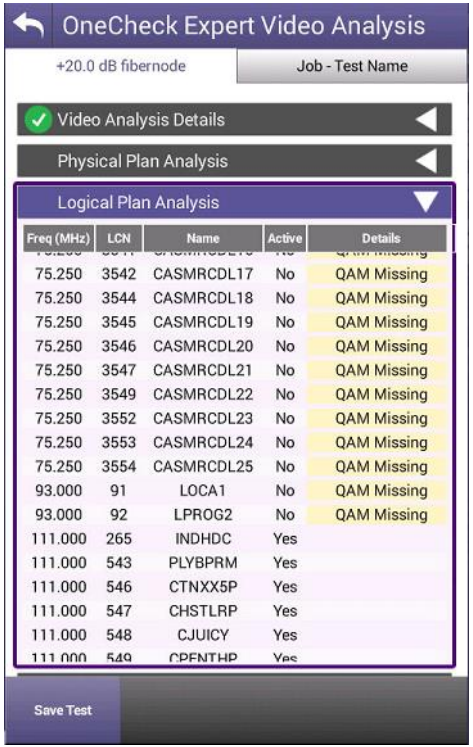


Physical Plant Analysis See missing programs

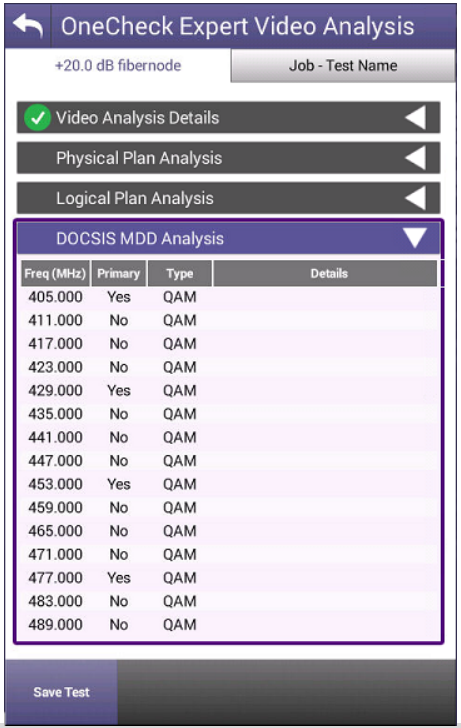


Video Test Identifies Configuration Problems

Logical Plan Analysis
See missing QAMs



DOCSIS MDD Mac Domain Descriptor Analysis
See missing QAMs



New MPEG Video option for DAA/RPHY turnup verification

Description	Catalog #	Option Type
QAM Video MPEG verification option	ONX-CATV-SW-QAM-VIDEO	New unit option available on ONX-630 NTX and ONX630 SWX
Field Upgrade via SS - QAM Video MPEG verification option	UPG-ONX-CATV-SW-QAMVIDEO	Field Upgrade to add QAM Video option to ONX-630 NTX and ONX-630 SWX

VIAVI Solutions

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