OneExpert ONX CATV 630

Extended Quick Start Guide v1

August 2017

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High Sensitivity **Touch Screen**

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Short Cut Hard keys – **Functions keys**

Navigation Directional Buttons

Back, Home Screen, and Utility Buttons

Power On/Off Button

ONX Interfaces

Port 2 – RF Ingress Port
Connect to upstream from house for Ingress Scan

Port 1 – RF US/DS Analysis
DOCSIS, QAM

D-Ring

Dual 10/100/1000 RJ45 Ports

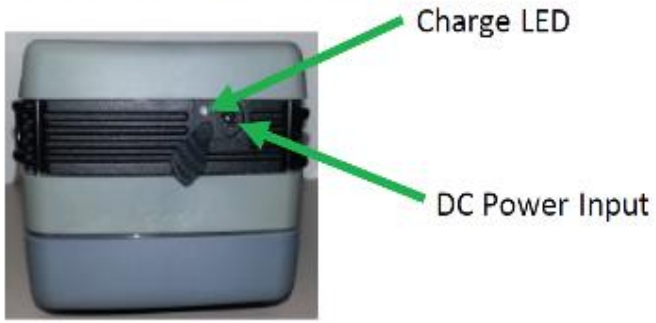
Dual USB 2.0 Ports

Battery Charger Port (under flap)

Power LED - Systems Keys

Bottom Panel

The right side panel contains the following ports:



SYSTEM KEYS

Under the Navigation arrow keys, there are three System keys:

Back/Cancel	Home	Tray
Go back to the previous menu	Return to the main/home screen	Launch the Tray Menu

The DC Power Input, located on the bottom of the instrument, is used to connect the AC adapter.

The Charge LED located next to the power input indicates that the adapter is connected.

- ✓ 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. The unit can continue to run, and no user intervention necessary.
- ✓ Solid amber indicates that the battery is charging.

LED's

Sync – Reports the status of modem synchronization.

- ✓ Blinking green indicates that the modem is ranging.
- ✓ Solid green indicates that the modem has successfully ranged.

Network – Indicates the status of network connectivity.

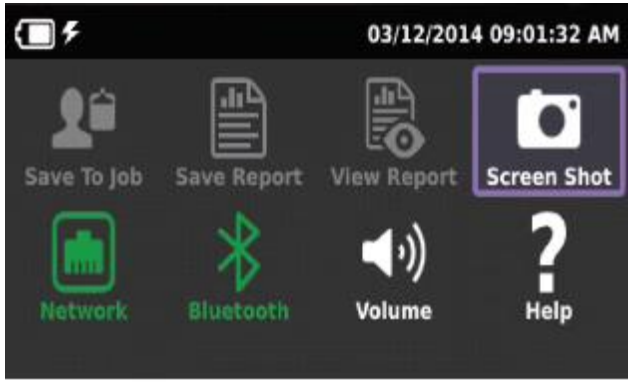
- ✓ Blinking green indicates that the unit is acquiring an IP address.
- ✓ Solid green indicates that an IP address has been acquired.
- ✓ Blinking amber indicates a timeout – the unit was unable to acquire an IP address.
- ✓ If the LED is not illuminated, the network is not active – either the unit is not connected or it is logged off.

Batt – A multi-color LED that indicates the battery status.

- ✓ Solid green indicates that either the battery charge is higher than 30%, or that an external source is powering the unit.
- ✓ Solid red indicates that the battery charge is critically low, and less than 10%.
- ✓ Solid amber indicates that the battery is getting low, and the charge is between 10% and 30%.

Error – Solid red indicates error and alarm conditions. The type of error varies and depends on the application.

Tray Menu



USING THE TRAY MENU

The tray menu allows access to commonly used functions. It can be accessed either by pressing the Tray system key or by swiping downward from the top of the LCD.

Hint:

A long push on TRAY key will automatically start a screen capture. It is useful when a short Tray key push doesn't open the Tray menu (when for example a function key menu is open)

SAVE TO JOB – Saves the results to job ticket.

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

VIEW REPORT – Views a saved report. Select View Report and then select the saved report to view. If there are no saved reports, the text will be grayed out.

SCREENSHOT – Takes a screen capture of the current menu (the screen you were viewing when you launched the tray menu).

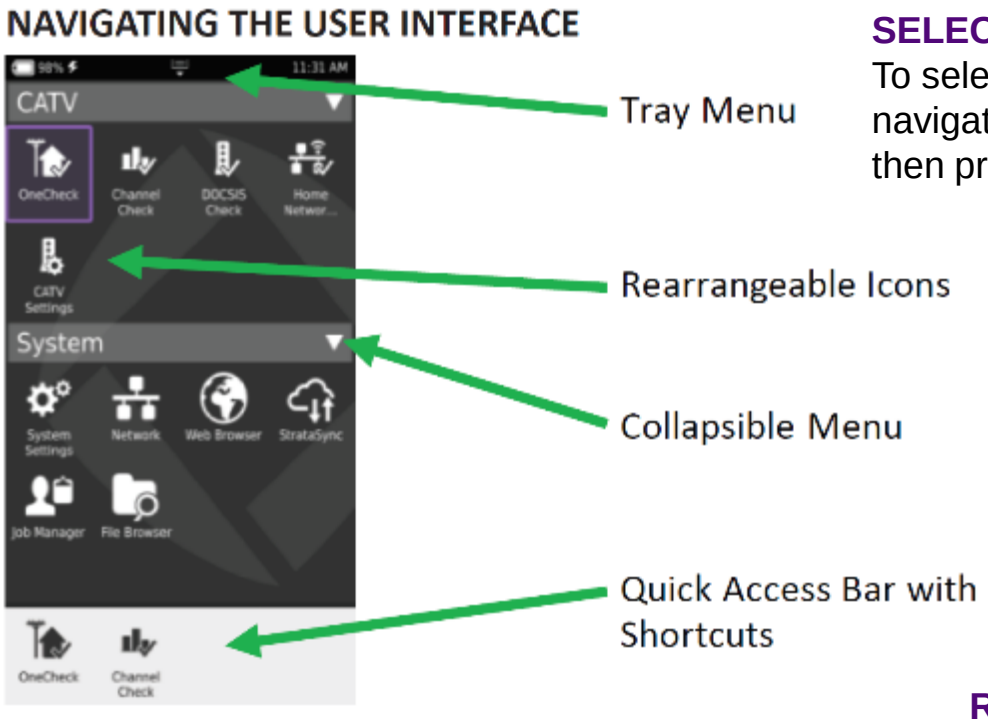
NETWORK – Enables or disables the home/Ethernet network.

BLUETOOTH – Enables or disables Bluetooth.

VOLUME – Control the device volume.

HELP – Provides TAC phone numbers.

User interface



SELECTING A MENU

To select a menu, either touch the item or use the arrow navigation keys to highlight the desired menu item and then press the OK key.

COLLAPSIBLE MENUS

Each main item is a collapsible menu. Touch the triangle on the right (the triangle rotates from pointing left to pointing down) or use the arrow keys to highlight the menu item and then press the OK key.

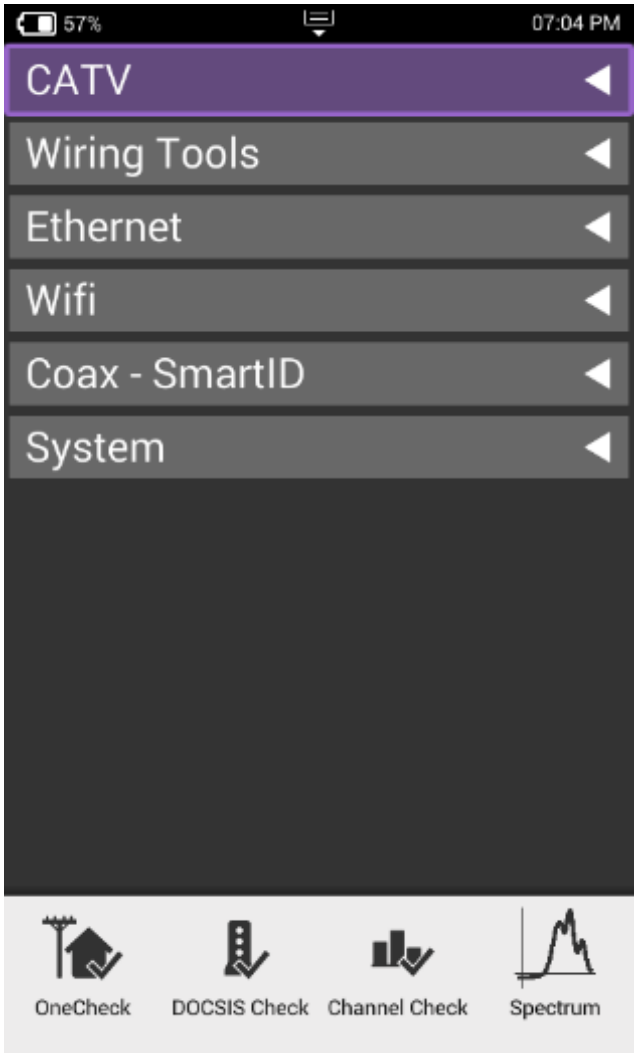
SHORTCUTS

- ✓ If you have a test or function that you use frequently you can make it a shortcut.
- ✓ Touch and hold the icon for the function and then drag it to the bottom of the screen to create a shortcut.
- ✓ You can create up to four shortcuts.
- ✓ To remove the shortcut, drag it off the shortcut bar.

REARRANGING ICONS

- ✓ You can rearrange icons within a menu for tests or functions you use frequently.
- ✓ To rearrange icons inside a menu, touch and hold the icon and then drag it to the new location.

Home Screen



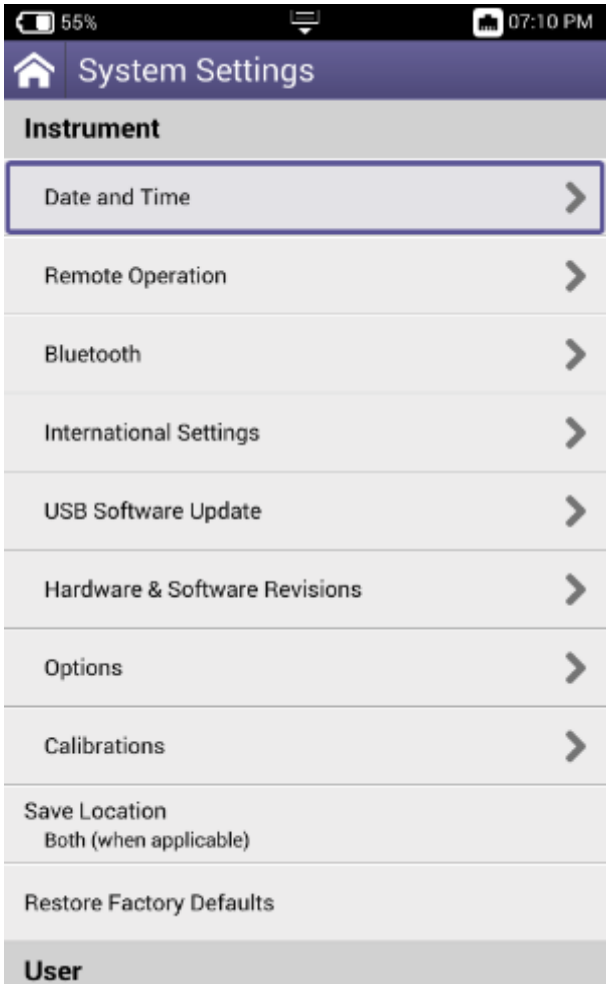
Home Screen is default when ONX is turned on

- ✓ It can be reached by selecting the Home Screen button above the On/Off Button
- ✓ Back Button also returns the user to the Home Screen

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

Shortcuts are located across the bottom and can be customized by selecting an icon and dragging it to the shortcut bar

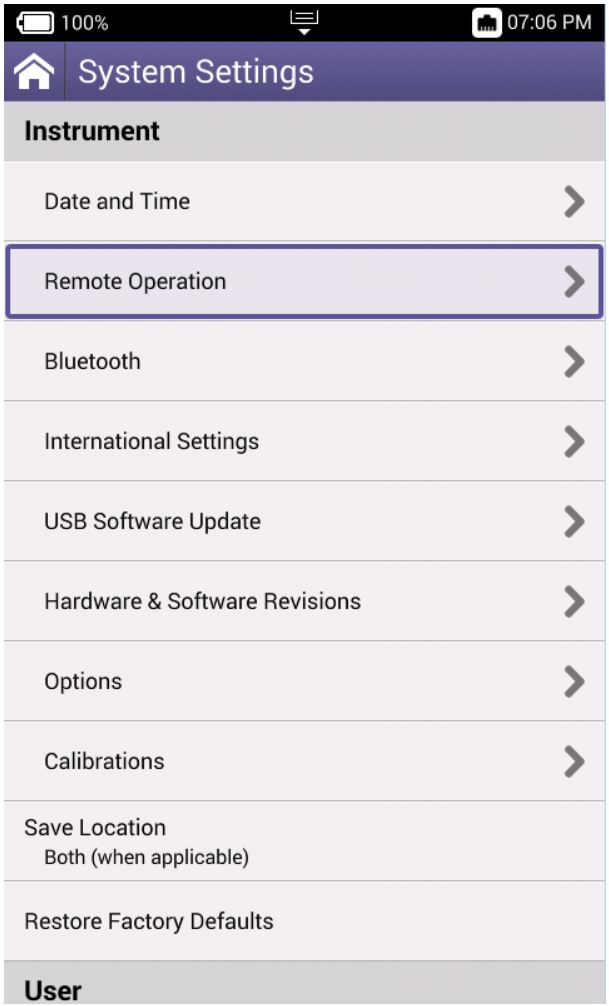
System Settings



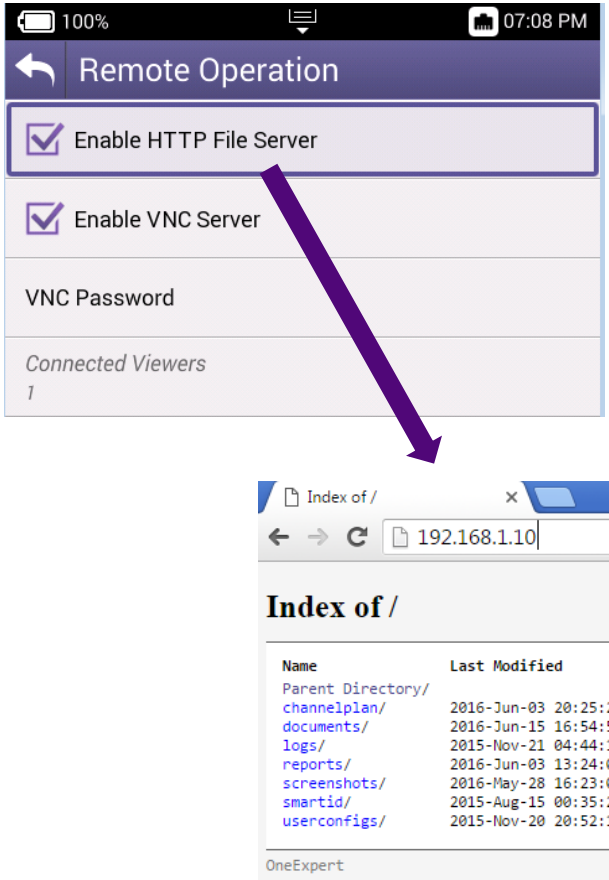
System Settings menu offers the ability to

- ✓turn on Remote Operation (via VNC Viewer),
- ✓change power and screen settings,
- ✓view Hardware and Software versions,
- ✓view Options purchased with ONX 620 meter and
- ✓ complete USB Software updates

System Settings – Remote Operation of ONX



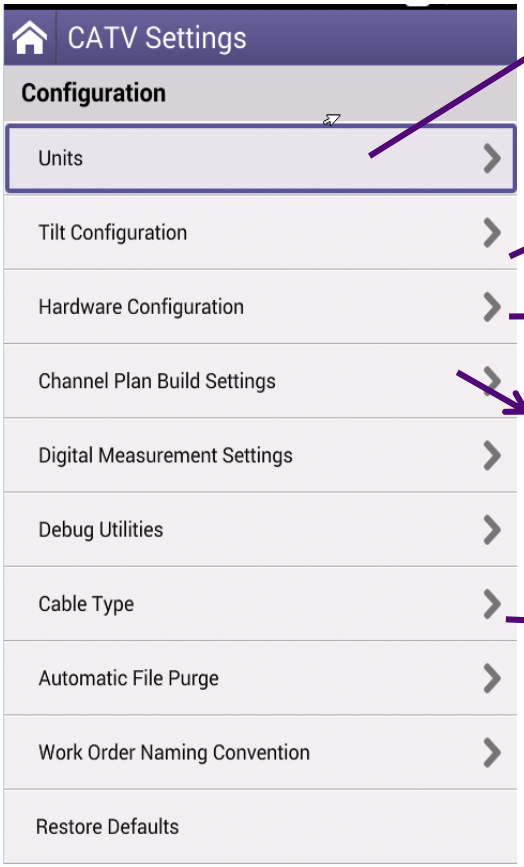
- ✓The ONX CATV support interoperability Via IP connection such as Tight VNC or VNC Viewer
- ✓Under Systems Settings is **Remote Operation** allowing IP connection and control and also remote file browsing over HTTP

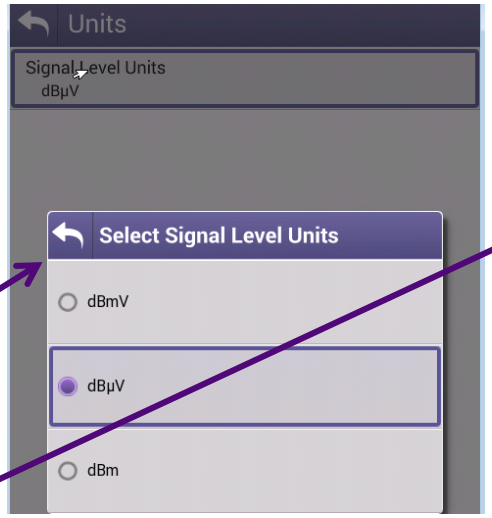


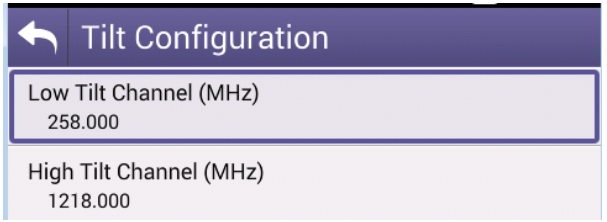
OneExpert CATV – Mobile App

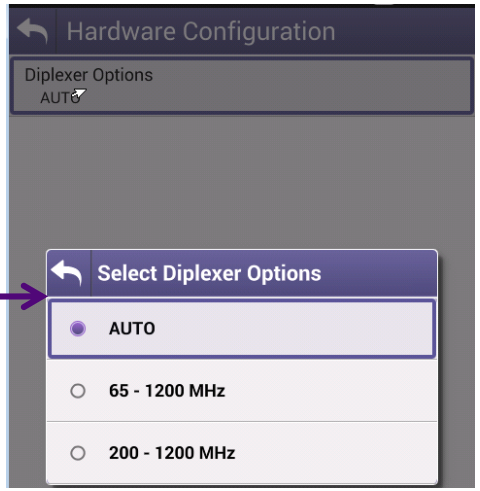
- **Remote Operations**
  - All under one screen
  - Troubleshoot faster & more efficiently
    - Fault & test point often at different locations
  - Integrate with StrataSync
- **Technician Aids On App**
  - Tutorials, videos, manuals
  - Accessory guide

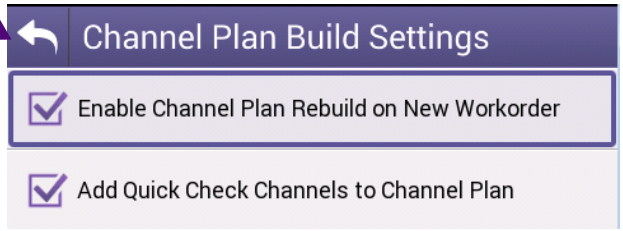
CATV Settings

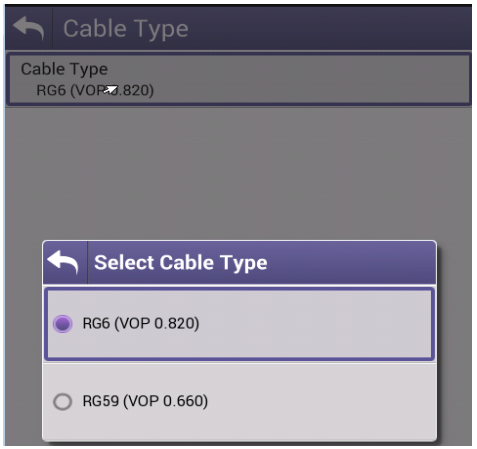






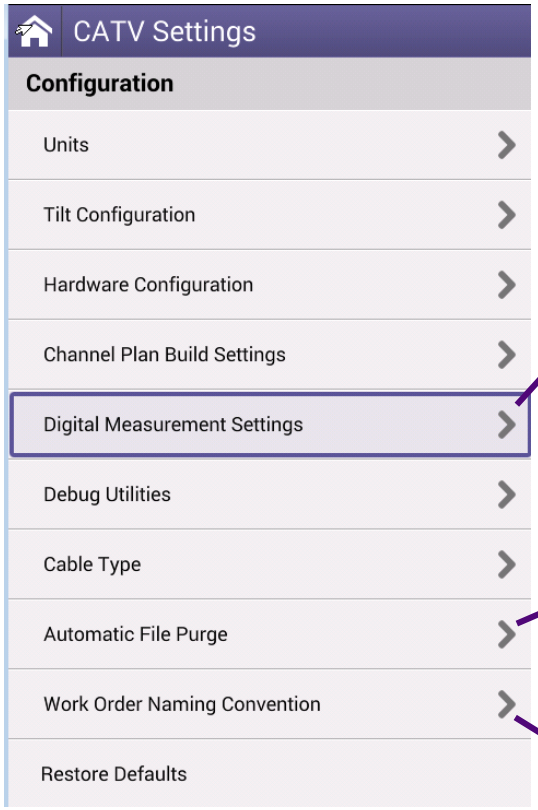


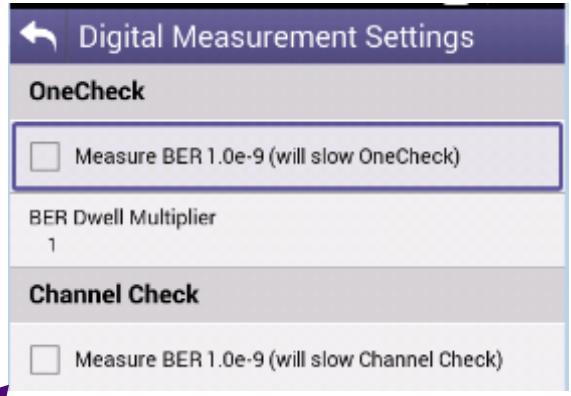




If the applicable setting is enabled, Quick Check CW channels are added to the channel plan build process. This should assist with discovery of any CW channels that are being missed or misidentified.

CATV Settings



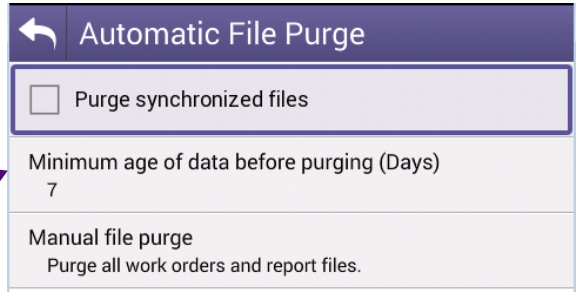


OneCheck

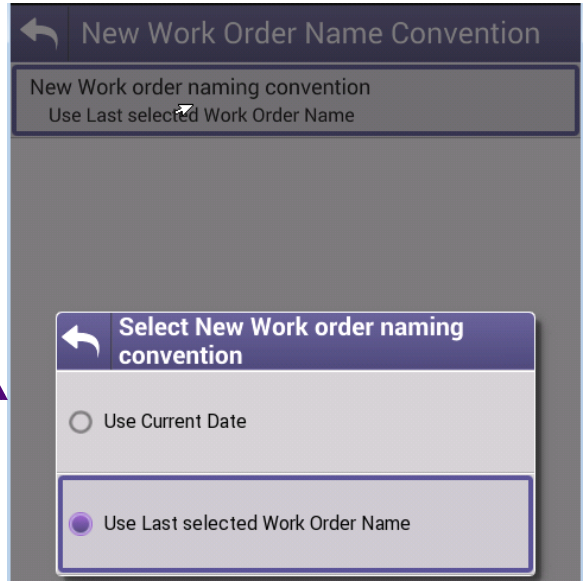
- ✓ Measure BER 1.0e-9 setting can now be locked.
- ✓ BER dwell multiplier configuration has been added to make BER dwell time 1 - 10 times as long as normal.

ChannelCheck

- ✓ Measure BER 1.0e-9 setting has been added to ChannelCheck.

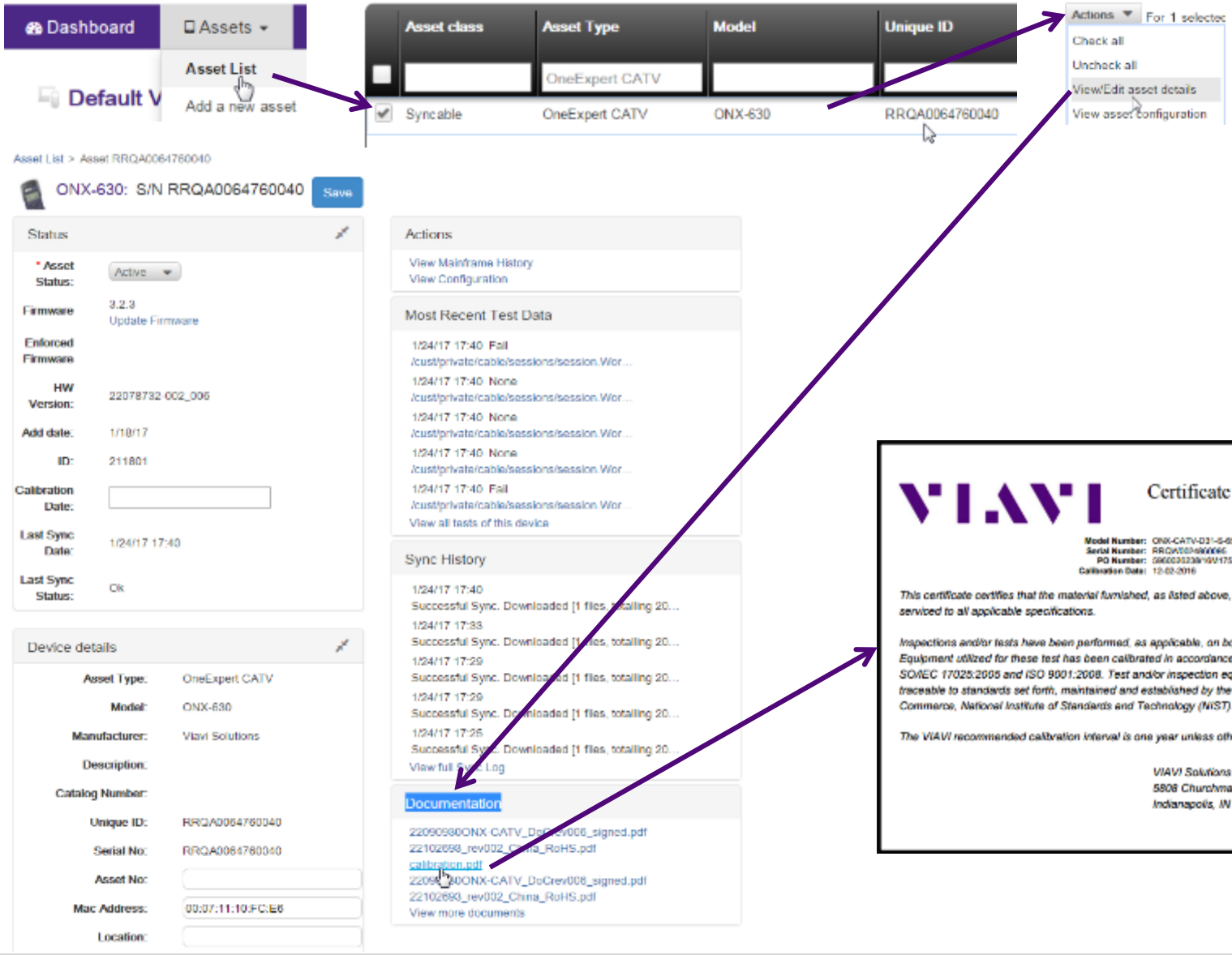


- ✓ StrataSync Workflow - **Auto-purge** functionality is now supported



- ✓ **CATV Settings** now provides the option for default work order ID to be the last selected work order instead of “Work Order” with date/time stamp.

ONX Calibration Certificate (StrataSync)

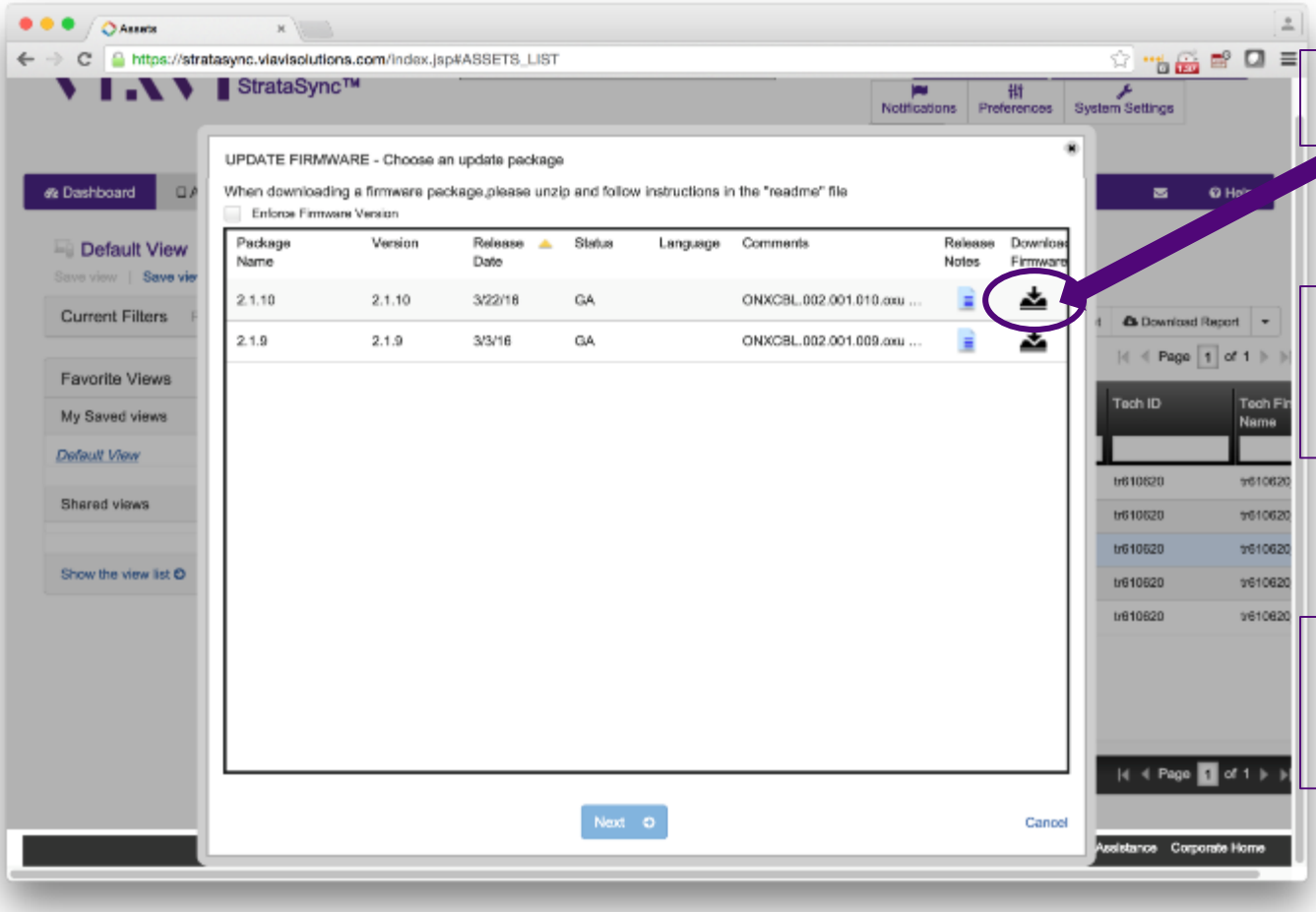


ONX CATV - SW Upgrade and Data Synchronization

ONX Software / Firmware Upgrades

- Software (SW) and Firmware (FW) releases are the best way to ensure your VIAVI OneExpert ONX is functioning at its best.
- VIAVI delivers SW and FW easily via **StrataSync** and **USB Stick**
- All ONX 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 Upgrade Process



1) Click here to download the newest firmware

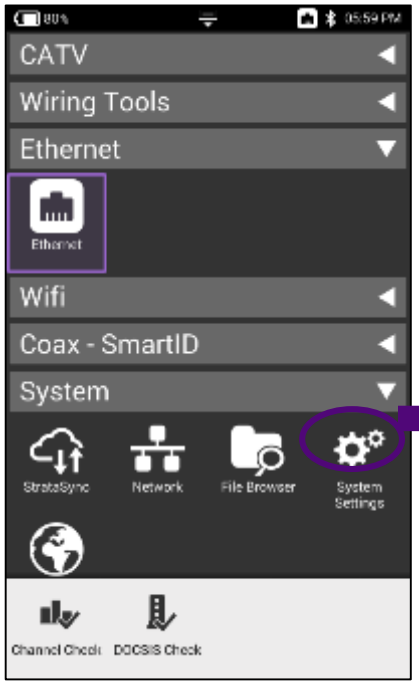
2) Copy the downloaded file ONXCBL.xxx.xxx.xxx.oxu to the root directory of a USB thumb drive.

3) Press Cancel once the download has completed and you have placed the file on the USB thumb drive.

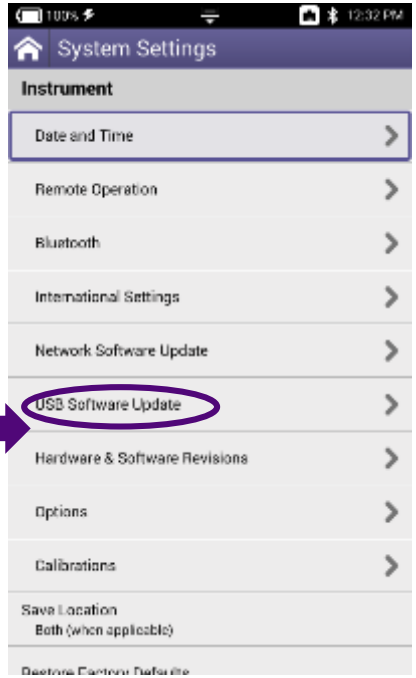
Note: Firmware must be downloaded from StrataSync first

USB Upgrade Process

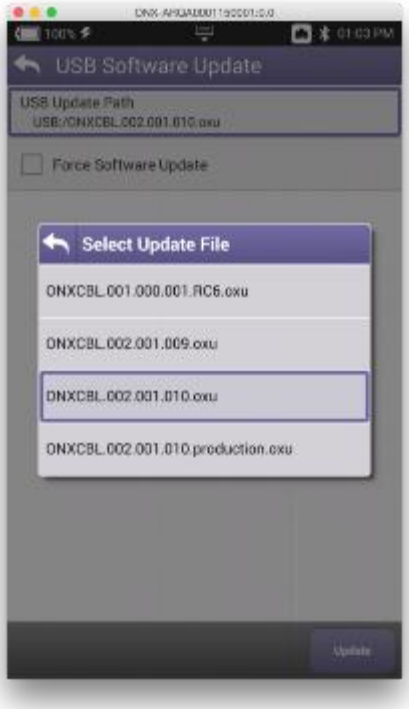
1) Insert the thumb drive into either USB port on the side of the ONX. Then start System Settings



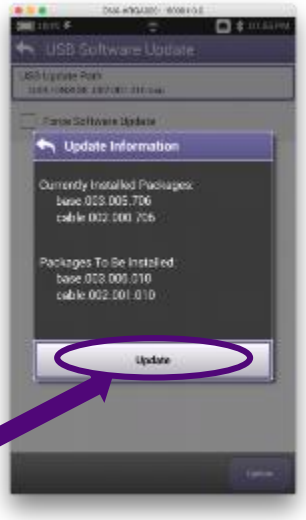
2) Select USB Software Update



3) At the popup, select the firmware image you wish to select for upgrade.



4) Press Update to start the upgrade



5) Press Update to confirm and start the upgrade. The meter will power off when the update is complete.

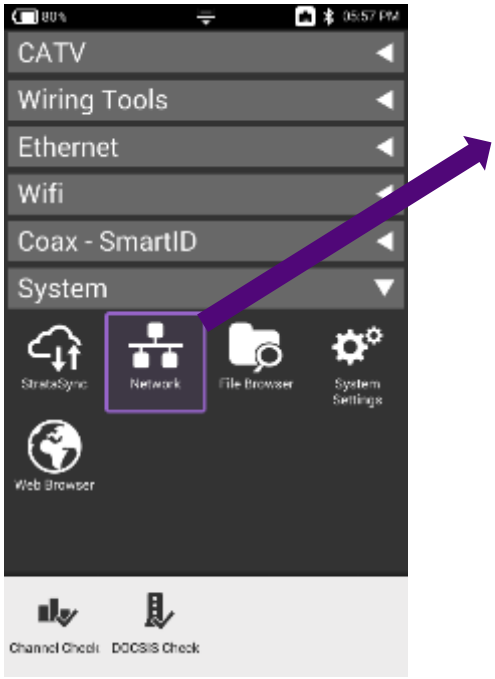
Note: Make sure you do not have an Ethernet cable plugged in when upgrading by USB

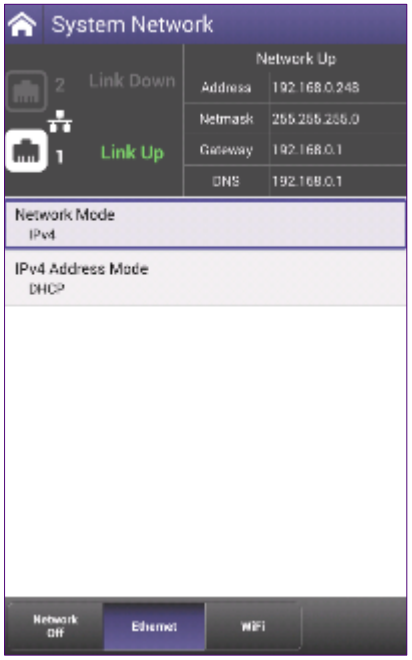
StrataSync Synchronization

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

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

2) From the ONX home screen navigate to ***System Menu*** and select ***Network*** **-** Verify the ONX has a valid IP address*



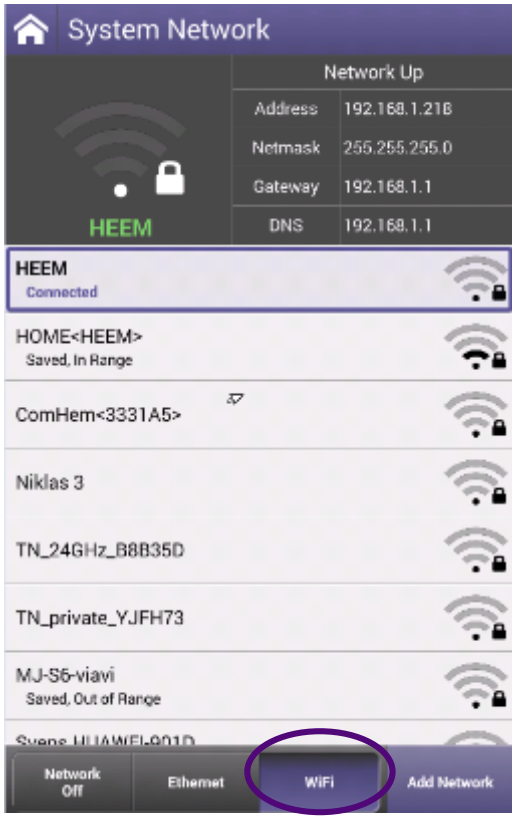


StrataSync Synchronization

- 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.

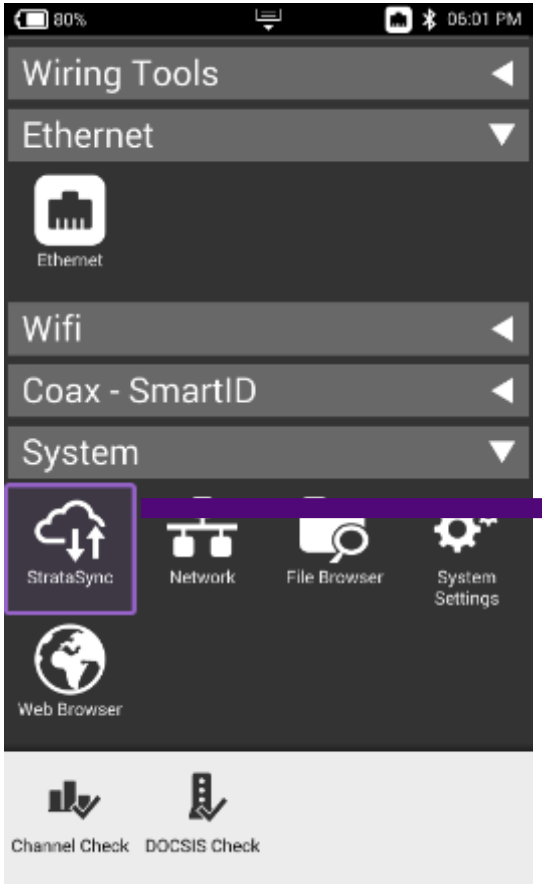
1) Connect with WiFi from an active internet connection (Cable Modem or router/gateway)

2) From the ONX home screen navigate to **System Network / WiFi-** Verify the ONX has a valid IP address

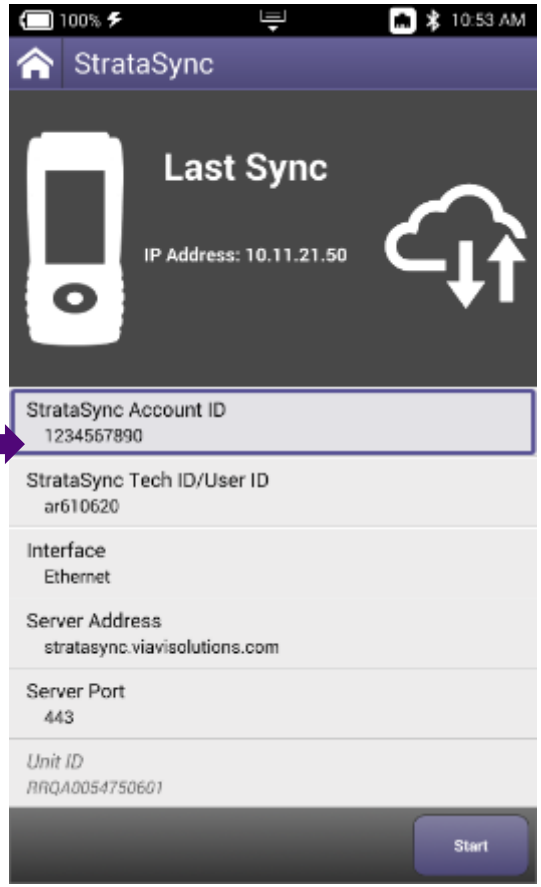


StrataSync Synchronization

3) Back to the ONX Home Screen – navigate to the ***System*** Menu and select ***StrataSync***



4) ***StrataSync Account ID*** = xxxxxxxxx
Interface* = Ethernet
Server Address = stratasync.jdsu.com
(*stratasync.viavisolutions.com* also works)
Server Port = 443

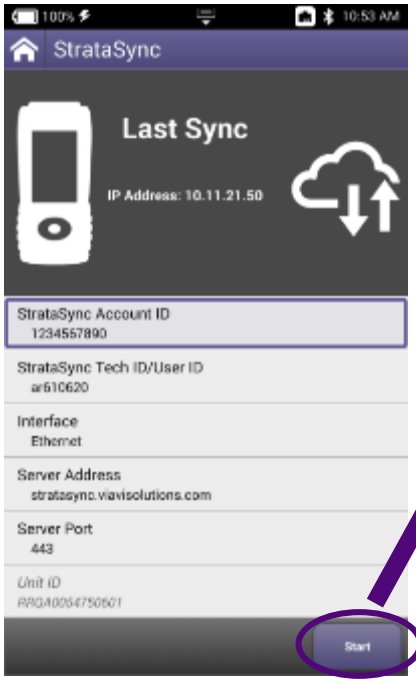


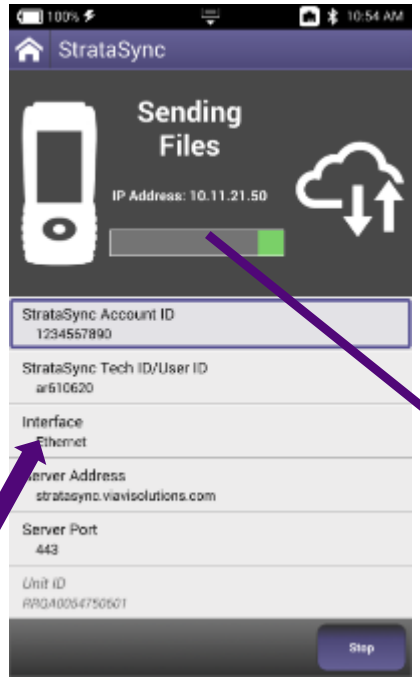
*If the "Interface" is set to DOCSIS the firmware update will be skipped with no other warning.

Also this "Interface" selection does not determine if the StrataSync communication is performed over the Ethernet or RF/DOCSIS. To Sync via RF Port 1 please use the "Connection" app in the CATV section at the top of the Home screen to establish a live connection with the CMTS prior to syncing to StataSync.

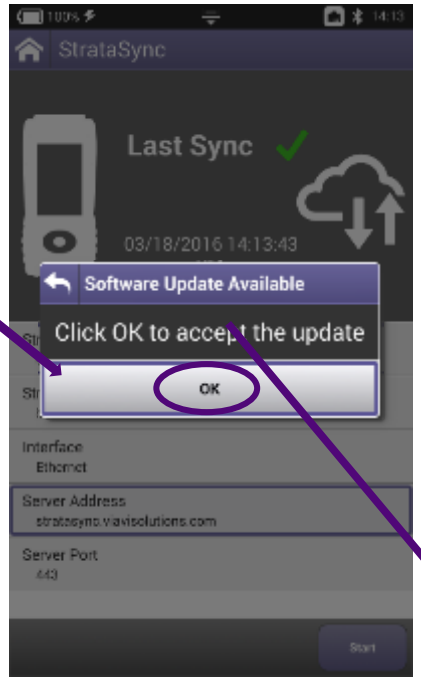
Firmware Update Via StrataSync

5) Select **Start**

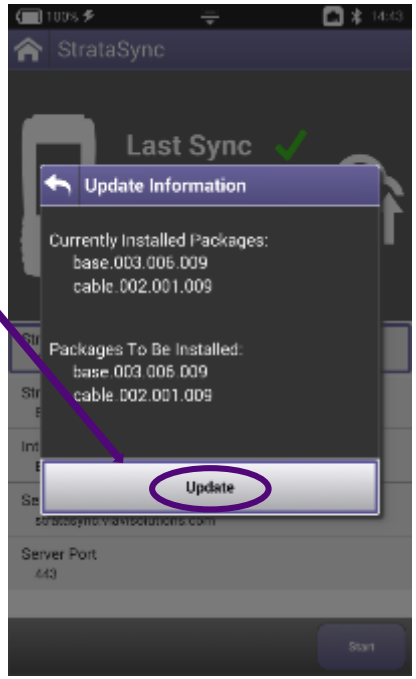




6) ONX will connect to StrataSync and determine there is a “Software Update Available” - Select ***OK***.



7) Software packages will be confirmed – Select **Update**



NOTE: SW update will proceed. The unit will Power off completely after completion. Update process will take 10-15 minutes based on the size of the update file and connection speed

The ONX will require that it is plugged into AC power or above 50% battery life prior to updating

Troubleshooting the ONX FW/SW Upgrade Process

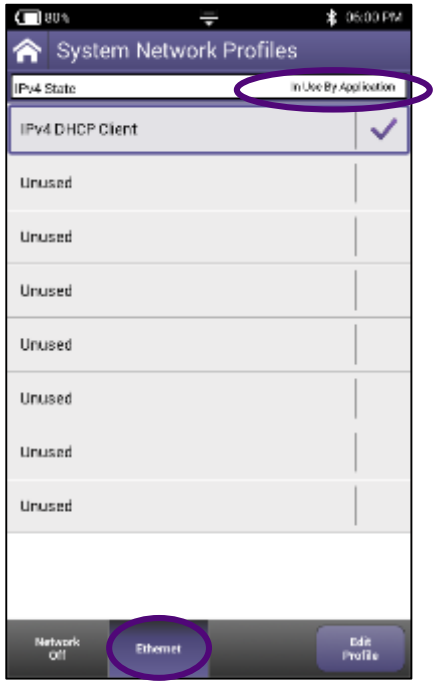
- **No IP address**

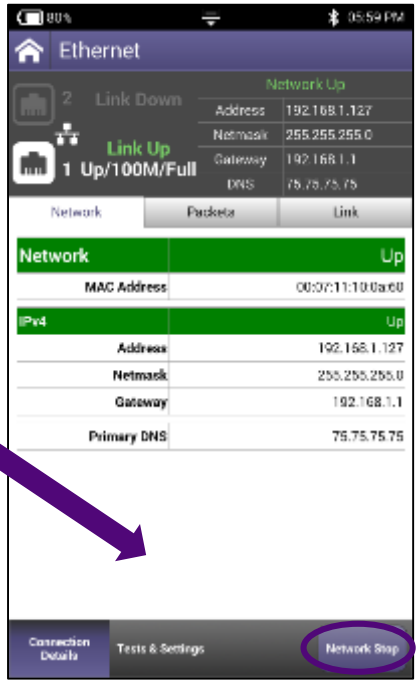
1) Confirm the Ethernet port is turned on by selecting the ***Ethernet*** option at the bottom

2) If the IPv4 State = “In Use By Application” – From the Home Screen and navigate to the ***Ethernet*** menu – Select ***Ethernet***

3) Select the ***Network Stop*** button at the bottom – This dis associates the Ethernet port with the Ethernet testing function

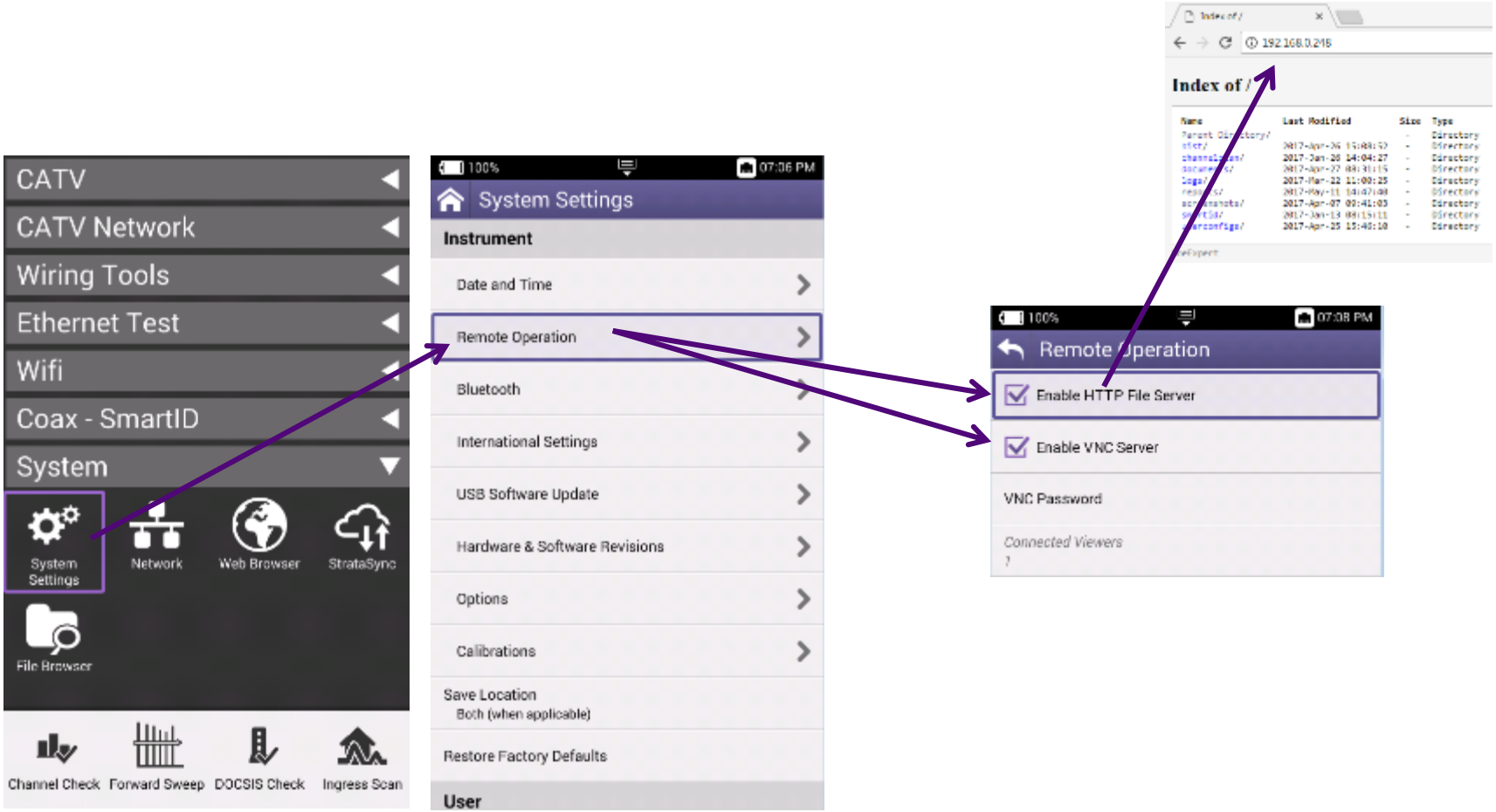
4) Press the ***Back*** button and Power Cycle the Meter





*When the meter returns to the Home screen start from Step 1 at the beginning of this document

System Settings – Remote Operation of ONX



ONX CATV - Engineering Mode

ONX Demo mode (Simulator Settings)

Enable Demo mode:

1. The unit is switch off
2. Press and hold the Tray key
3. Press shortly the Power on key
4. Hold the Tray key until the for top led are orange (takes about 3sec)

5. Release the Tray key
6. Go in CATV setting and select Engineering Utilities
7. Select “Use Simulator”
8. Reboot the unit

IMPORT: NEVER UPGRADE A ONX CATV in Demo Mode !

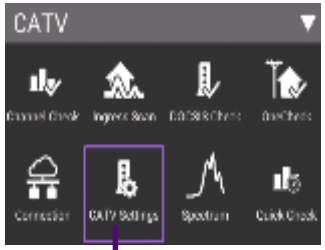
Disable Demo mode:

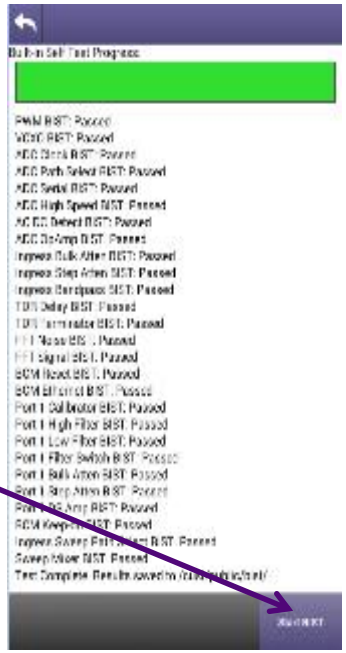
1. The unit is switch off
2. Press and hold the Tray key
3. Press shortly the Power on key
4. Hold the Tray key until the for top led are orange (takes about 3sec)
5. Release the Tray key
6. Go in CATV setting and select Engineering Utilities
7. Unselect “Use Simulator”
8. Reboot the unit

ONX Engineering Mode and Build-in Self Test (BIST)

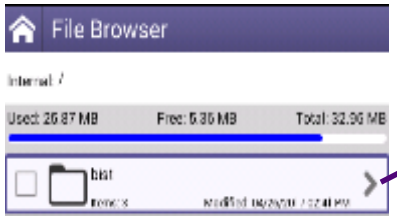
Enable Engineering mode and run a BIST:

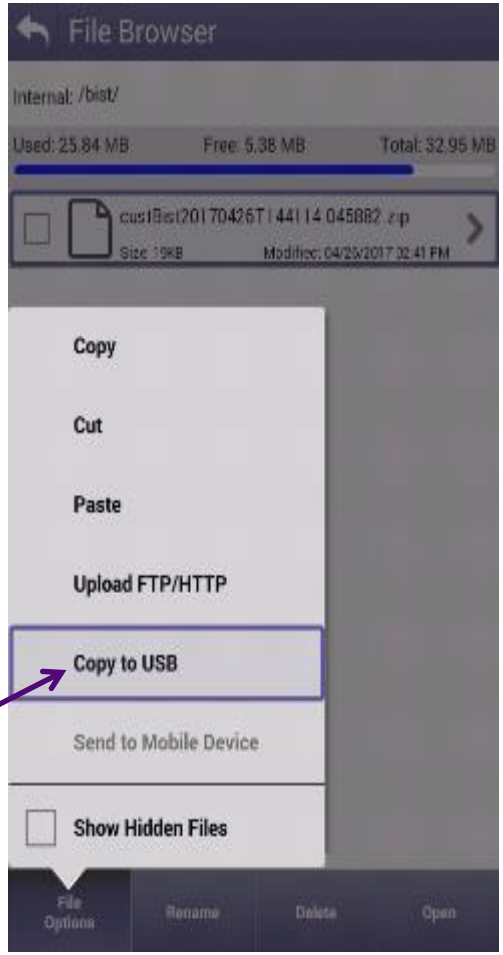
1. The unit is switch off
2. Press and hold the Tray key
3. Press shortly the Power on key
4. Hold the Tray key until the for top led are orange (takes about 3sec)
5. Release the Tray key
6. Go in CATV setting and select Engineering Utilities
7. Select “Built-in Self Test” and Start BIST :





8. Go to File Browser and copy the custBist*.zip file to a plugged USB memory stick :



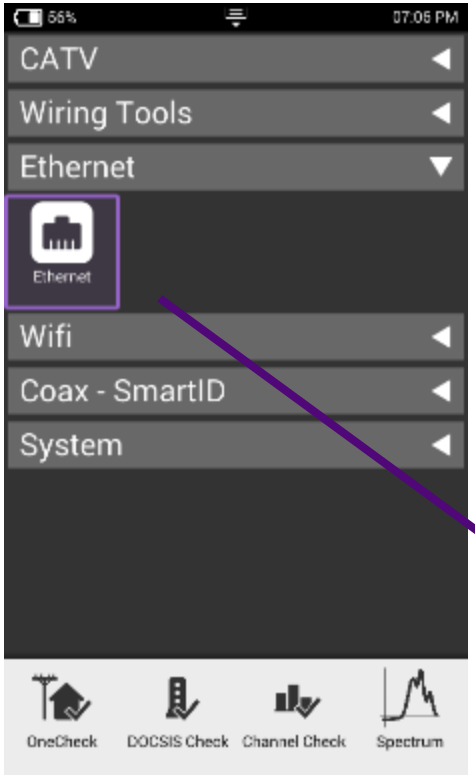


30 - ONX CATV - Ethernet Testing

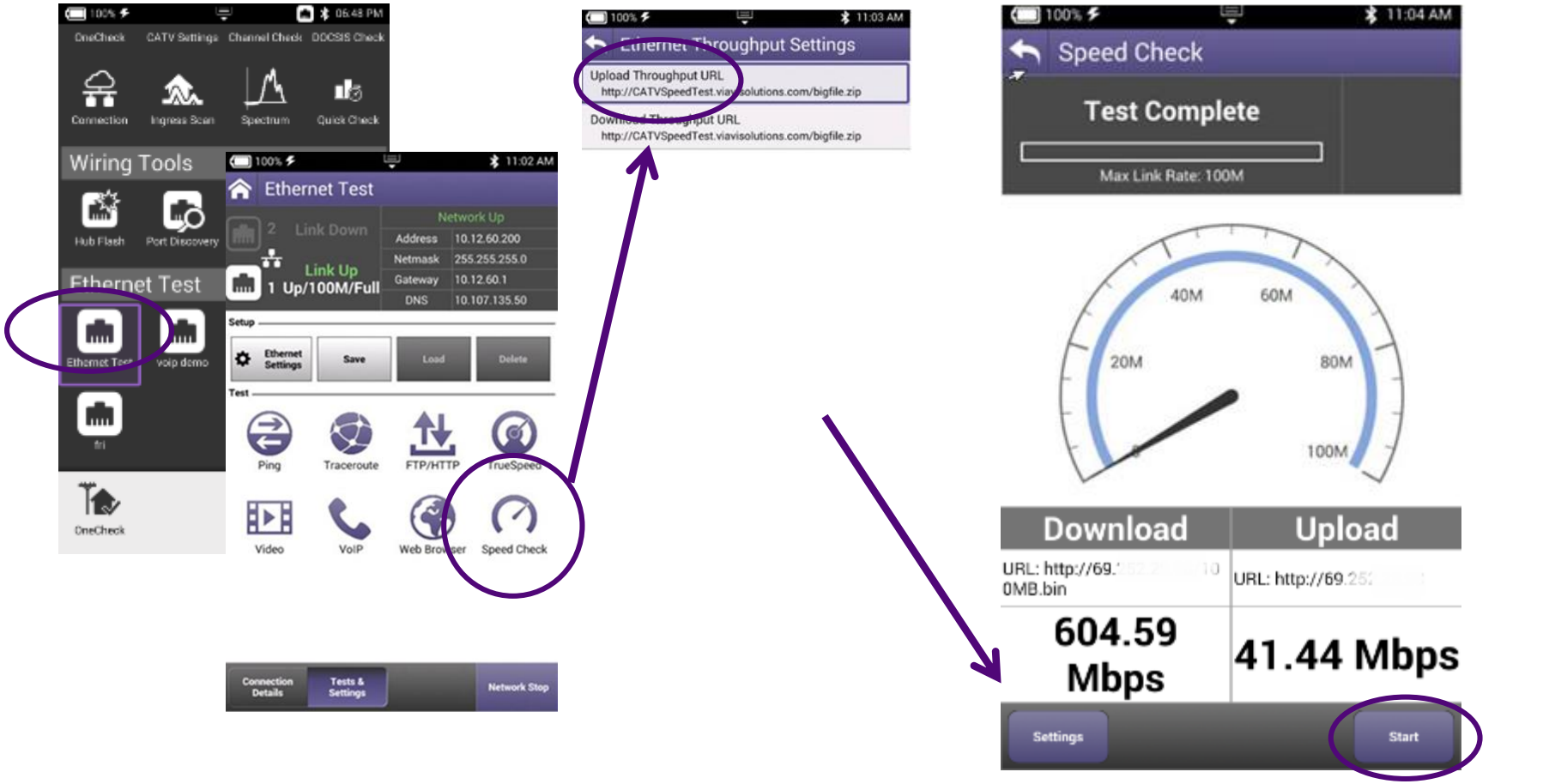
Ethernet – Tests and Settings

From Home Screen, select Ethernet

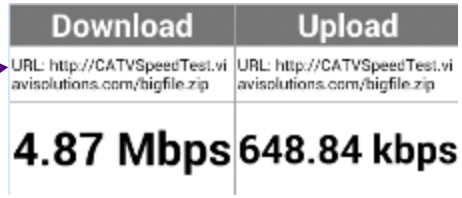
✓ Once Network Up is indicated with green, select Test and Settings



Ethernet – Speed Check

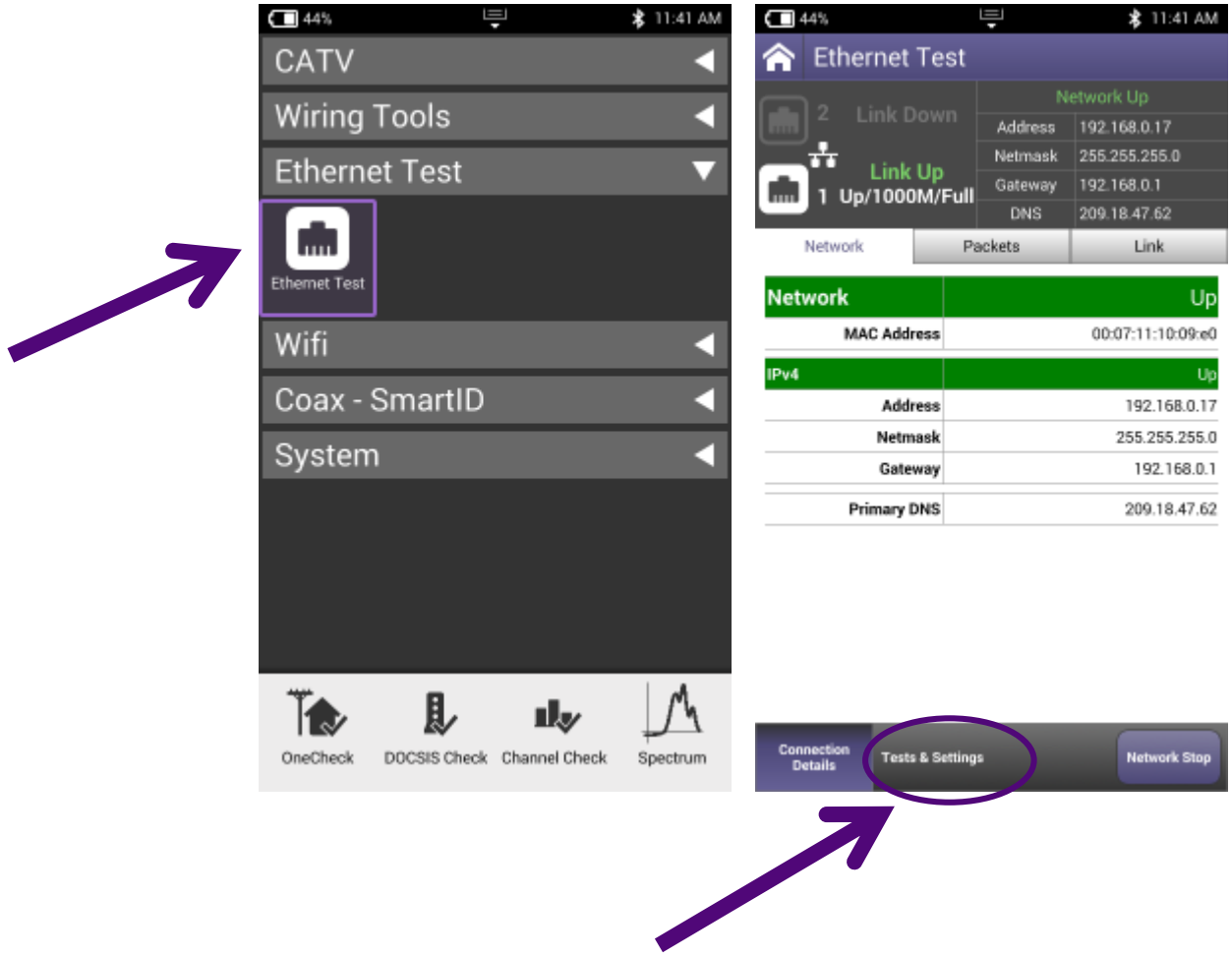


- CATV Ethernet's throughput IP Address/URL is configured in the mode under Settings.
- Default value are for booth Downstream/Upstream the same: http://CATVSpeedTest.viavisolutions.com/bigfile.zip
- If the upstream url change, the file name need to be the same: bigfile.zip

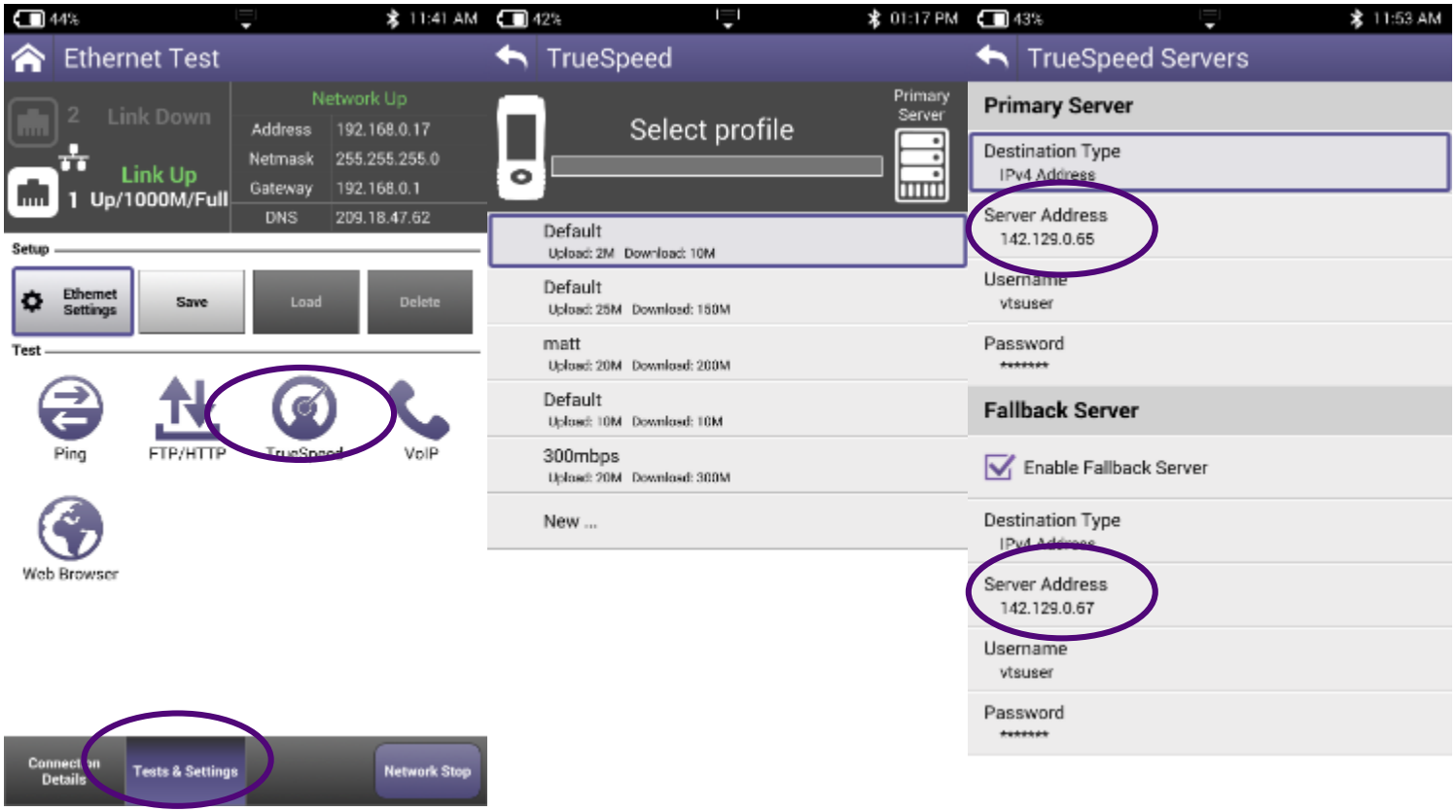


TrueSpeed Setup

- TrueSpeed can be found under Tests and Settings and REQUIRES TrueSpeed VNF Server IP Address



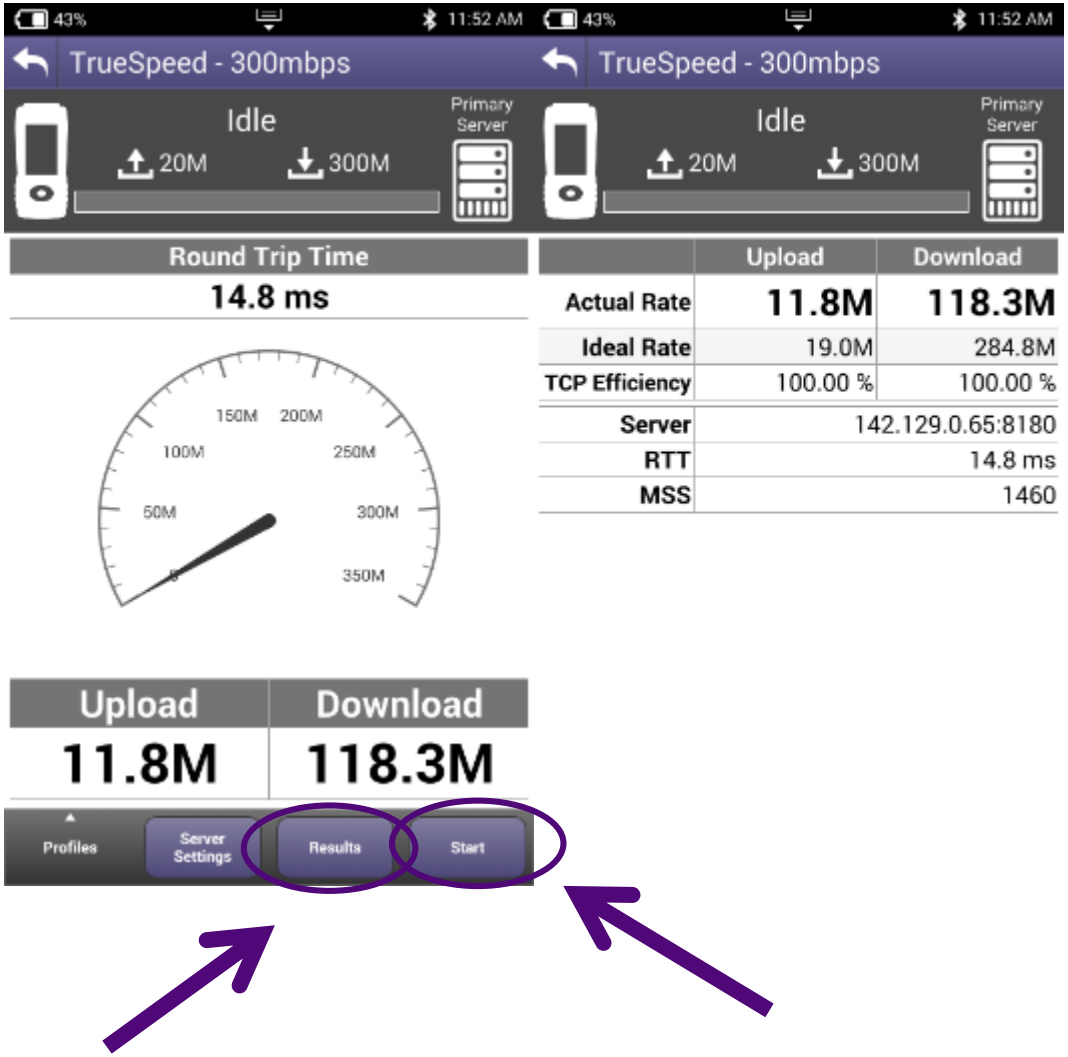
TrueSpeed Setup



- 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

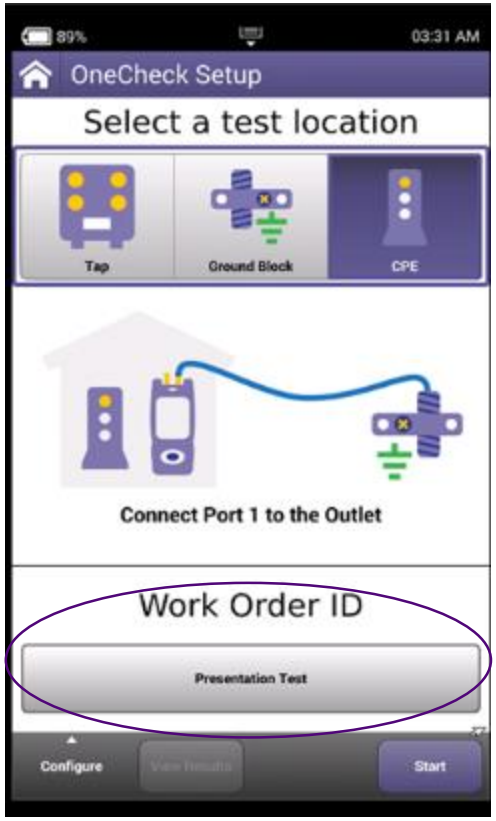
TrueSpeed Results

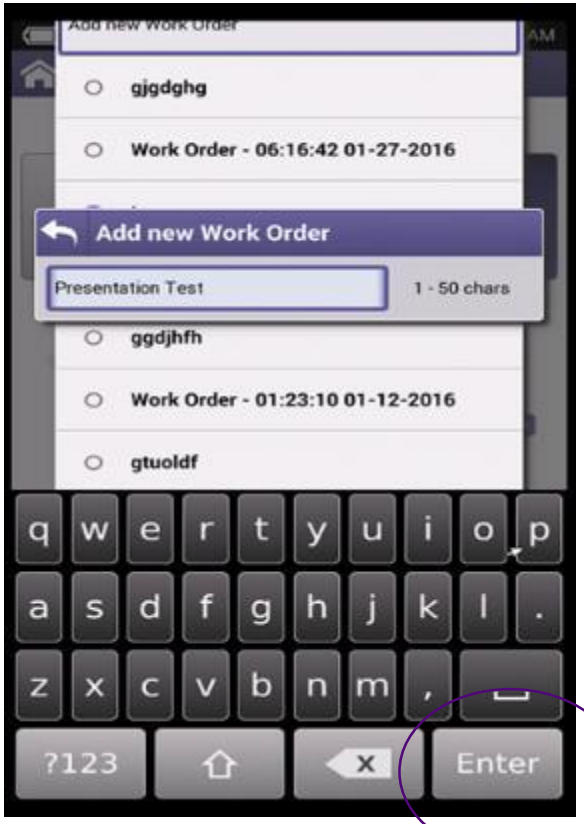
- After test completes, Results are displayed as either the Speedometer or an a simple list



ONX CATV - Testing

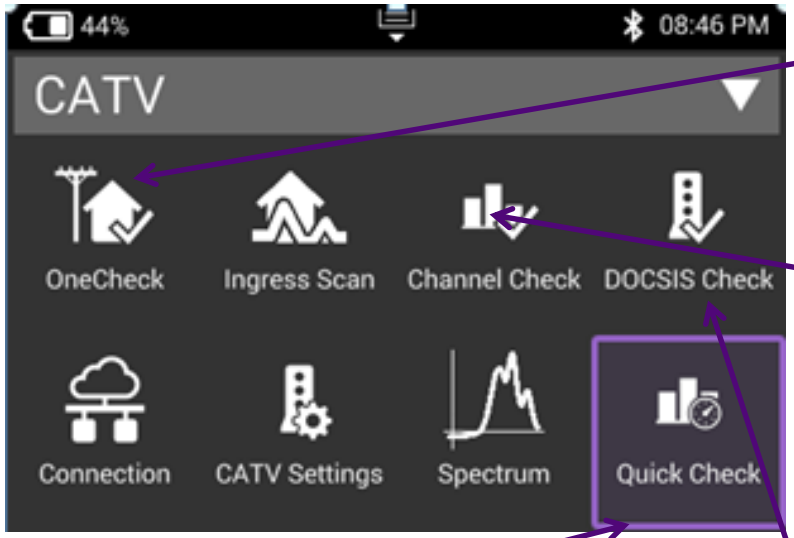
Work Order ID Creation and Management





- ✓ Entering Work Order ID enables test correlation and faster Auto channel plan build functionality
- ✓ Entering a Work Order ID is optional
- ✓ If Work Order ID is not entered before a test is started in a new location (different channel plan area), the unit will display error below. Press Clear Session to ignore and run test.

CATV Testing on the OneExpert CATV



OneCheck

- ✓ Comprehensive and automated testing of Ingress, Downstream & DOCSIS with Session Expert™ to help resolve problems

ChannelCheck

- ✓ Real-time analysis and powerful troubleshooting of downstream carriers
- ✓ Analyze OFDM carriers including analysis of multiple DS profiles
- ✓ Use ChannelCheck to quickly check levels and signal performance

DOCSIS Check

- ✓ Real-time analysis of DOCSIS services
- ✓ Only shows the DOCSIS carriers to allow you to focus on HSD services
- ✓ Troubleshoot and analyze Downstream and Upstream DOCSIS carriers including OFDM and channel bonding

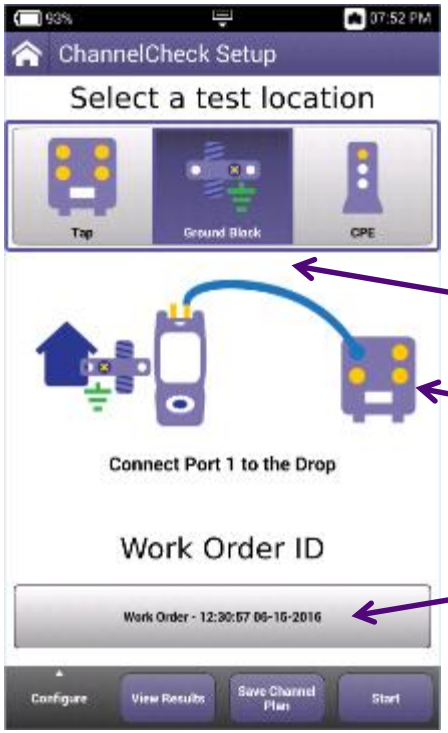
QuickCheck

- ✓ Use QuickCheck to see a small number of manually added channels and quickly determine if signal is present

Testing Workflow with the OneExpert CATV

Test Flow

Choose your test to run:
Each test asks for basic information prior to running



Choose current test location

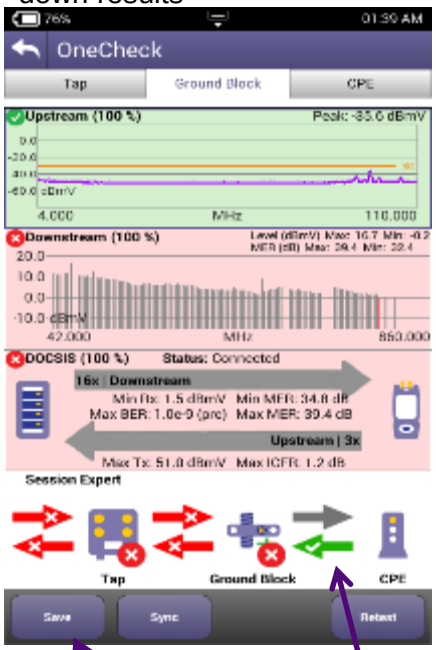
Connect the meter properly

Input a unique Work order/job identifier for each household
This is important since ONX uses test data at each location for data analysis (Default will be current date and time stamp)

Important!

Test Results

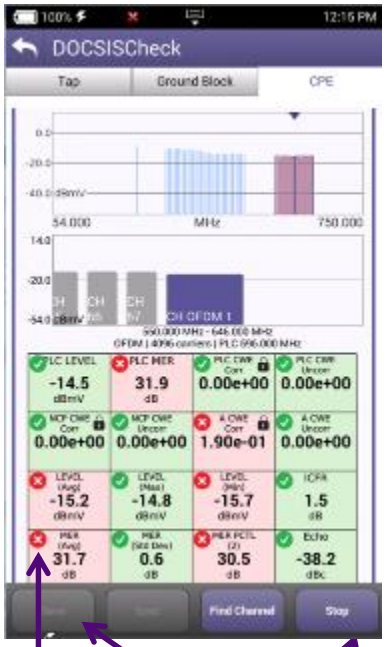
OneCheck
Provides dashboard with drill down results



OneCheck will automatically save the last run test. Hit Save and give a new name if you want to capture a specific result prior to Retesting

Tap on a panel to drill down to detailed results

ChannelCheck & DOCSIS Check
Provides live analysis



Hit Stop and then Save if you want to capture live data results

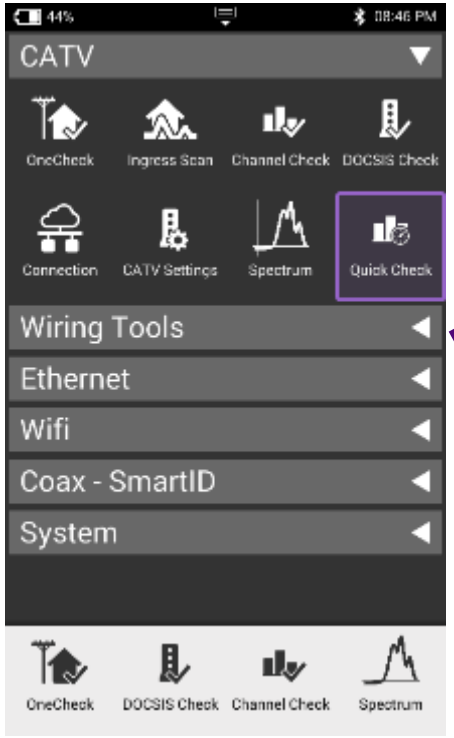
Based upon limit set downloaded into the ONX through StrataSync determines a Pass or Fail, at each test location Session Expert determines downstream or upstream issue.

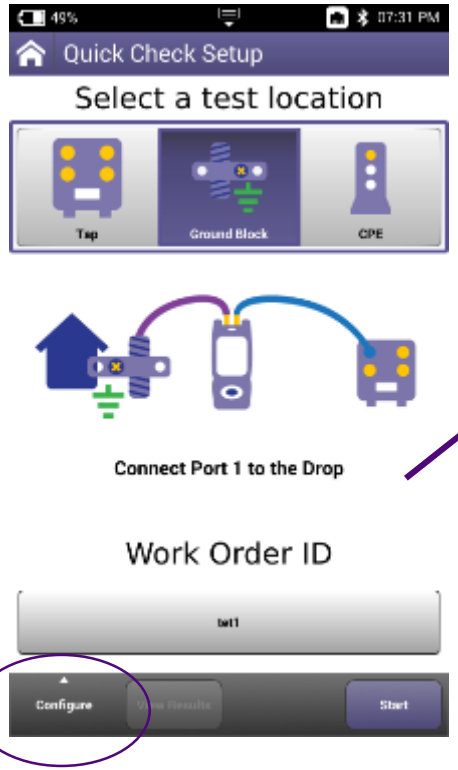
ONX CATV – Quick Check

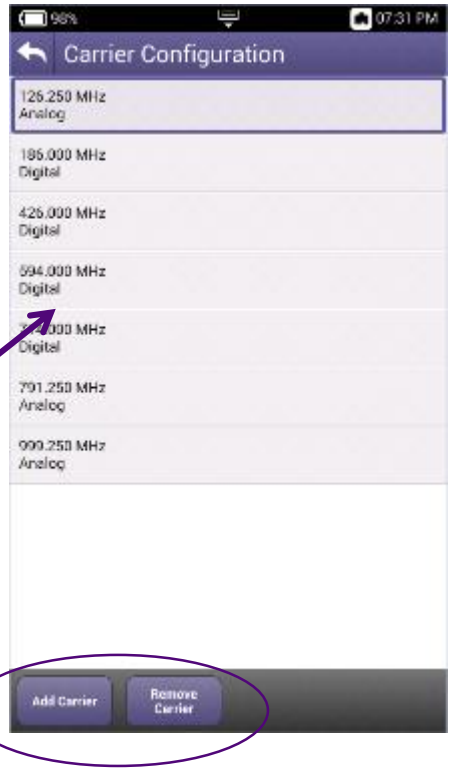
Quick Check Setup

Use **QuickCheck** to see a small number of manually added channels and quickly determine if signal is present

- ✓Enter Work Order ID and choose demarcation point and press Start
- ✓Navigate the Results Screen (shown to the right) using touchscreen or Directional Buttons

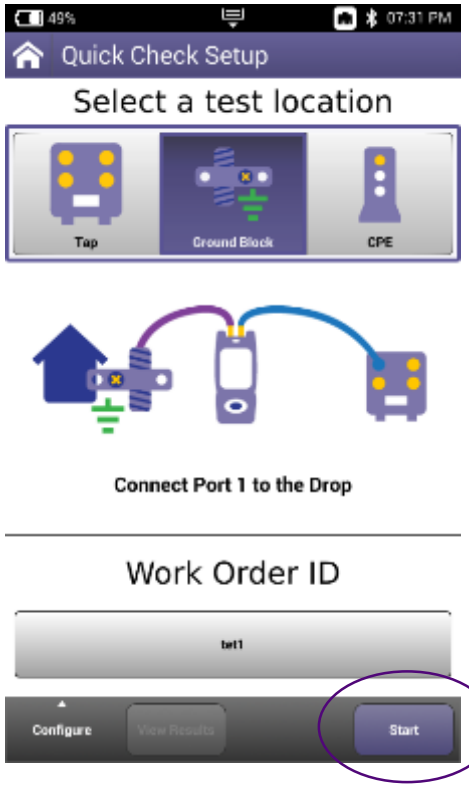


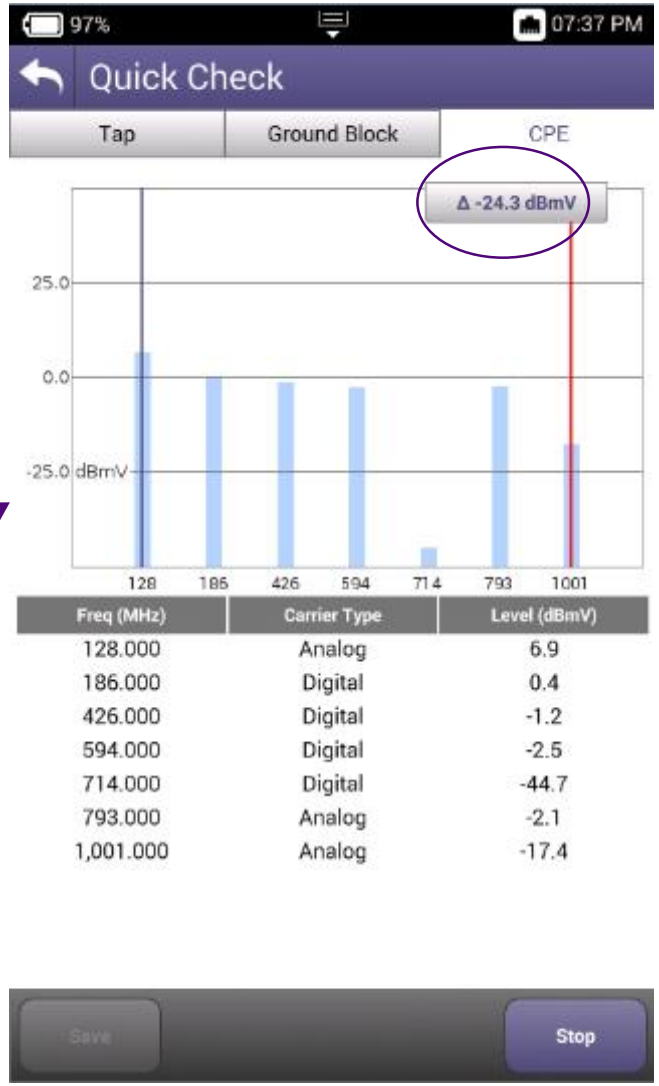




✓ Add/remove frequency and type of carrier

QuickCheck Results





ONX CATV – Channel Expert

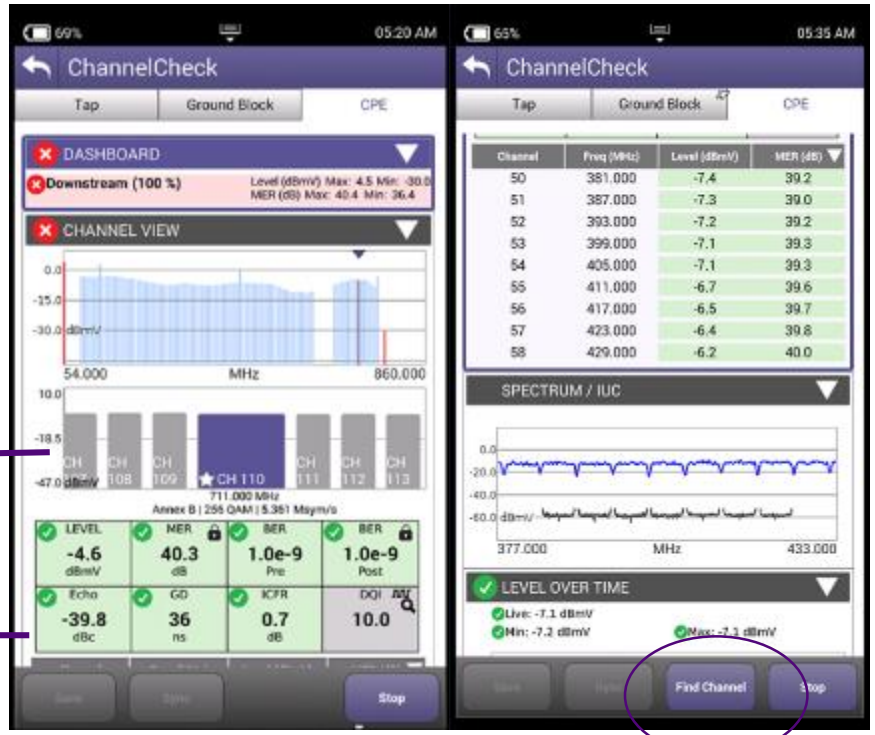
Channel Expert Results

Dashboard
Level, MER, Deviation

Full Scan

Adjacent channels and channel under test

Measurements



Adjacent channels table

Live spectral data including **Ingress under channel**

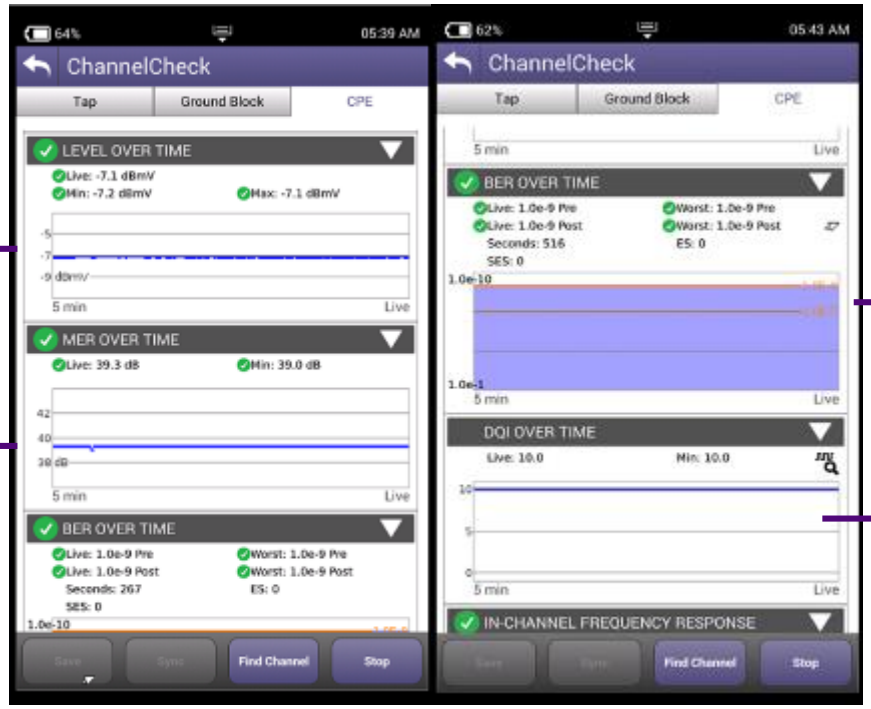
Find channel

Note: Find Channel should be entered as “4” and not “04”
Note: All results are live updated every time channel under test is changed

Channel Check Results

Level Over Time

MER Over Time



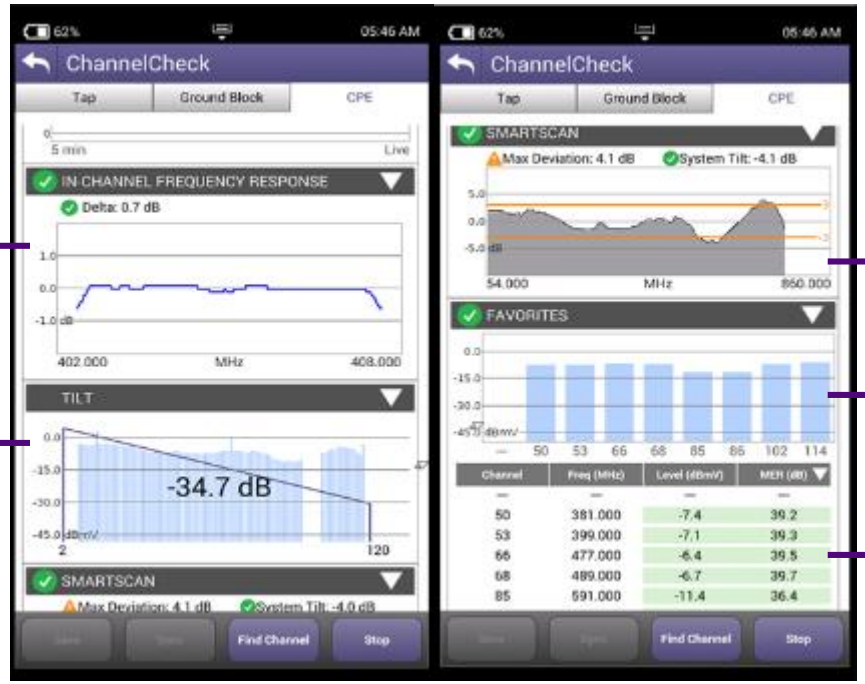
BER, Pre and Post, over Time

DQI Over Time

Channel Expert Results

ICFR

Tilt



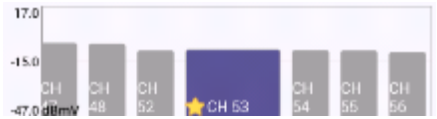
Smartscan

Graph View of **Favorites**

Table View of **Favorites**

Channel Expert Results

Favorite selection in **Channel View**



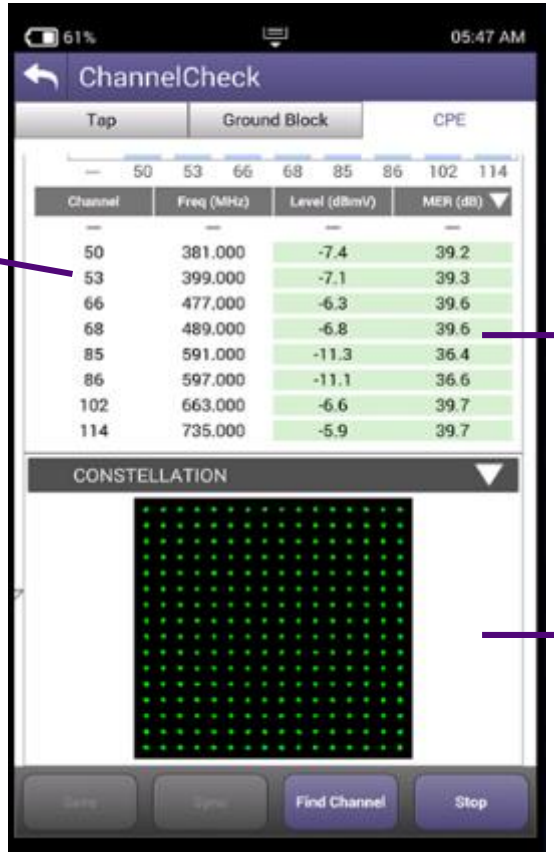


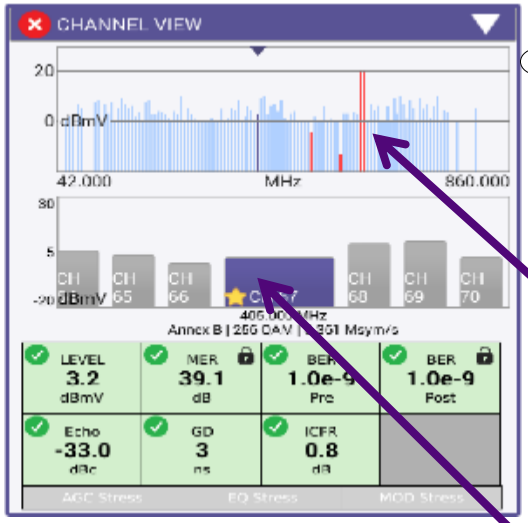
Table View of **Favorites**

Constellation

Channel Expert Details

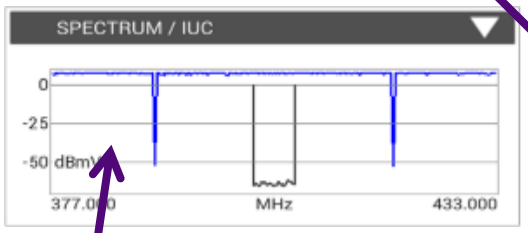
Dashboard shows progress and key metrics of best and worst carriers

B I T



B I T

Full Scan view highlights problems in the lineup. Touch Screen capability allows quick access to troubled carriers

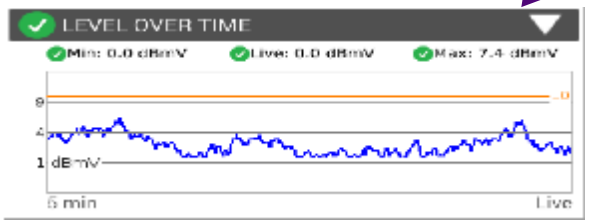


T

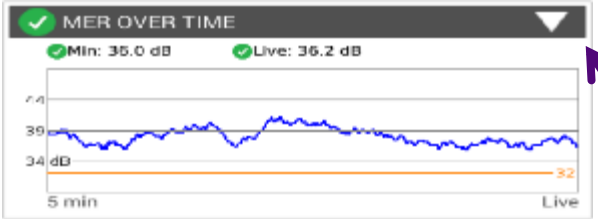
Familiar “swipe” navigation provides access to individual channel details

VIAVI Exclusive **Spectrum view** with embedded **Ingress Under the Carrier** trace

Level over time shows plant fluctuations

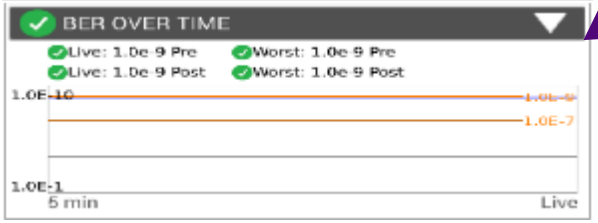


T

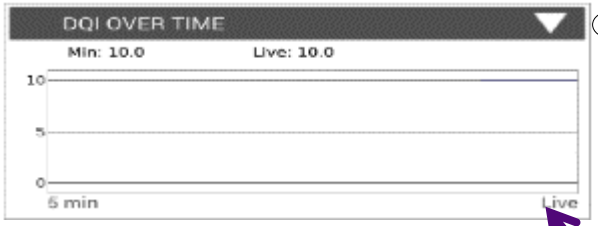


T

MER & BER over time identify traditional carrier performance issues



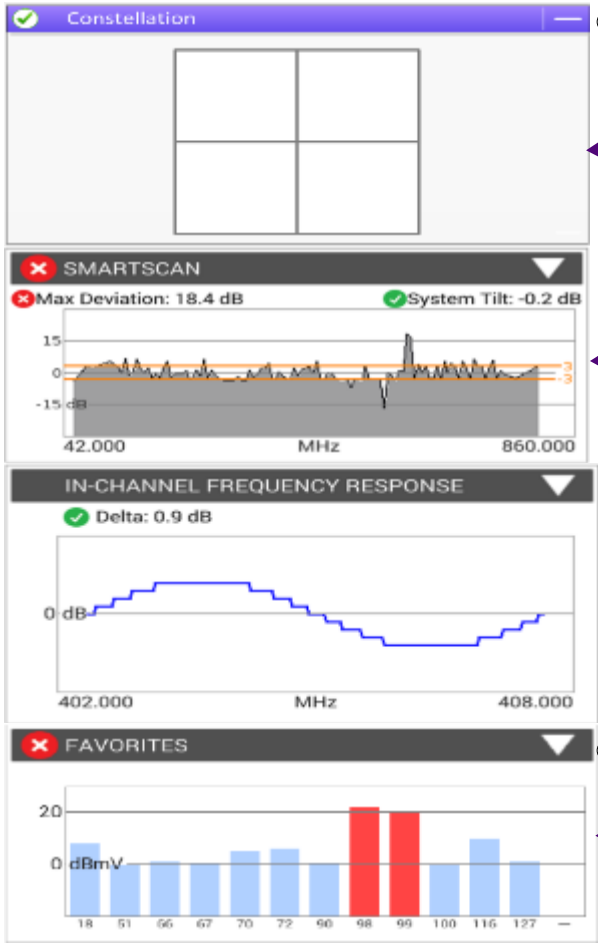
T



B I T

DQI over time identifies intermittent issues

Channel Expert Details



B I T

Constellation measurement helps identify noise problems and interferers

T

SmartScan simplifies system analysis by taking out the effects of tilt and different carrier types at TAP, GB and CPE

T

ICFR highlights roll-off and suck-out problems within a downstream carrier

B I T

Favorites view provides technicians with a quick mini-scan of critical carriers

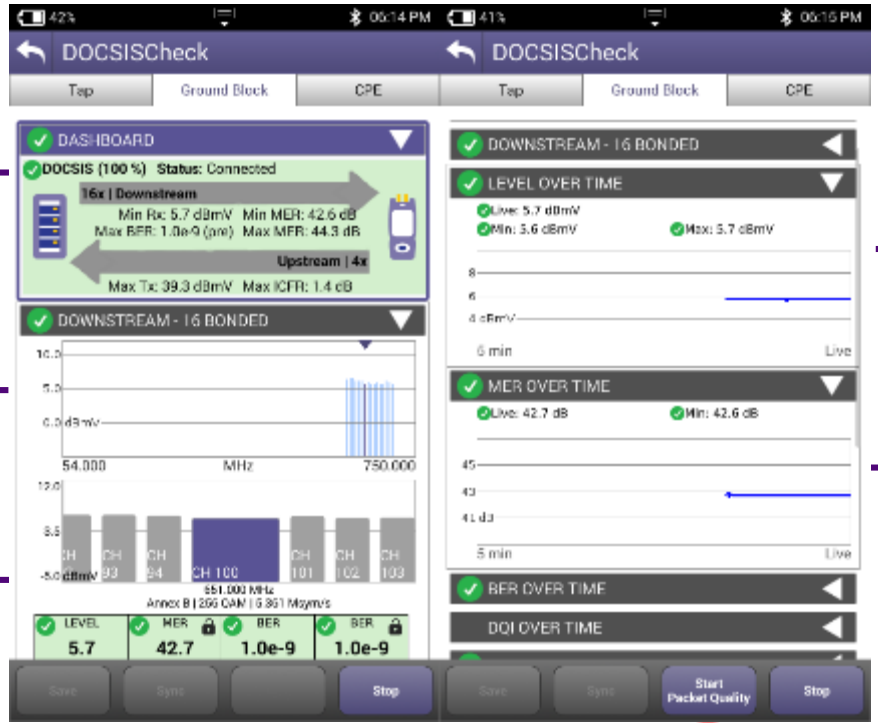
ONX CATV – DOCSIS Expert

DOCSIS Expert Results

Dashboard

Downstream bonded DOCSIS Channels

Adjacent Channels and channel under test



Level Over Time

MER Over Time

Note: All results are live updated every time channel under test is changed

DOCSIS Expert Results

BER Over Time

DQI Over Time

Upstream bonded
DOCSIS Carriers

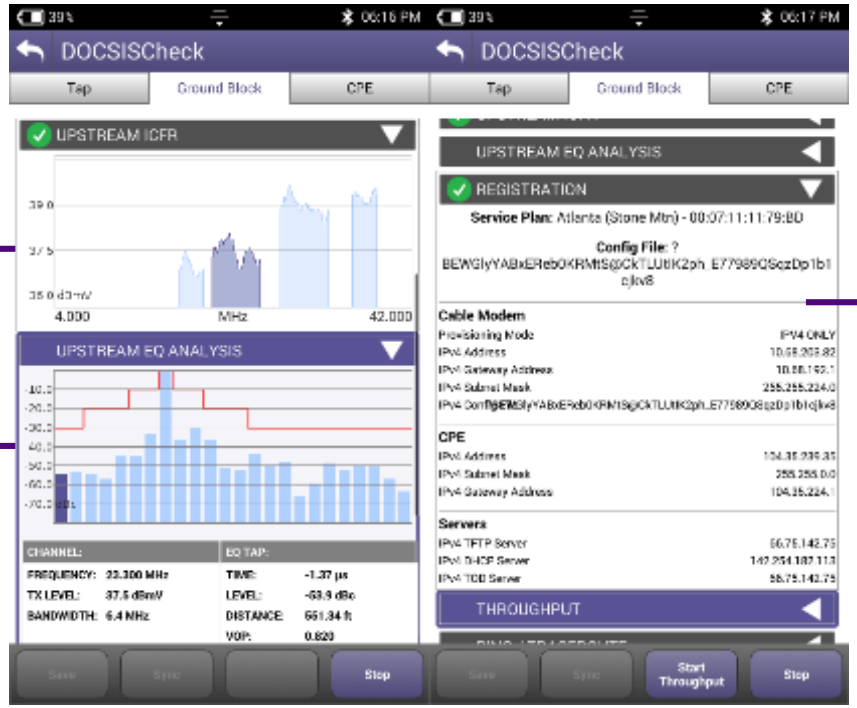
Transmit Over Time
(based on Upstream carrier under test)

Note: All results are live updated every time channel under test is changed

DOCSIS Expert Results

Upstream ICFR Across all Bonded Carriers

Upstream EQ Analysis with Footage to Impedance Mismatch



DOCSIS Registration and Config File Info @IP

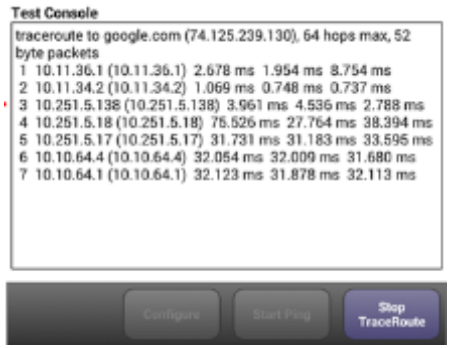
- ✓ Cable Modem
- ✓ CPE
- ✓ Servers

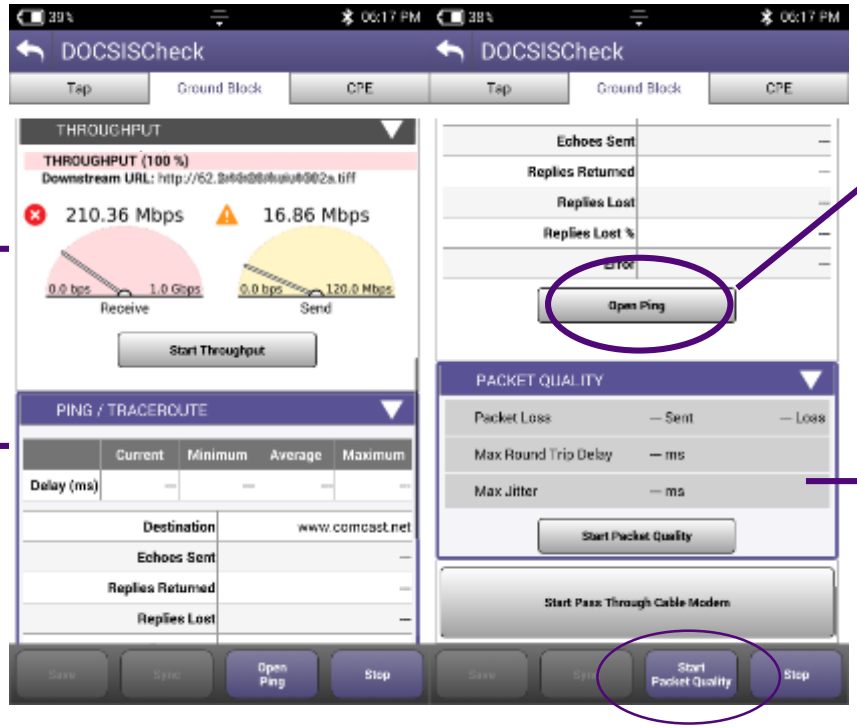
Note: All results are live updated every time channel under test is changed

DOCSIS Expert Results

DOCSIS Throughput
Setup configuration
via StrataSync

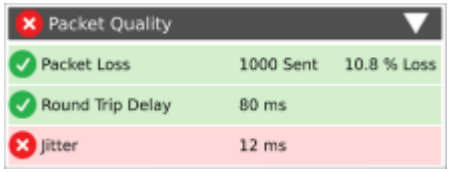
Ping/Traceroute
Test over
DOCSIS





	Current	Minimum	Average	Maximum
Delay (ms)	134.98	153.43	98.00	320.21

Destination	
Echoes Sent	50
Replies Returned	48
Replies Lost	2
Replies Lost %	4.00%
Echoes Received	48
Message	OK

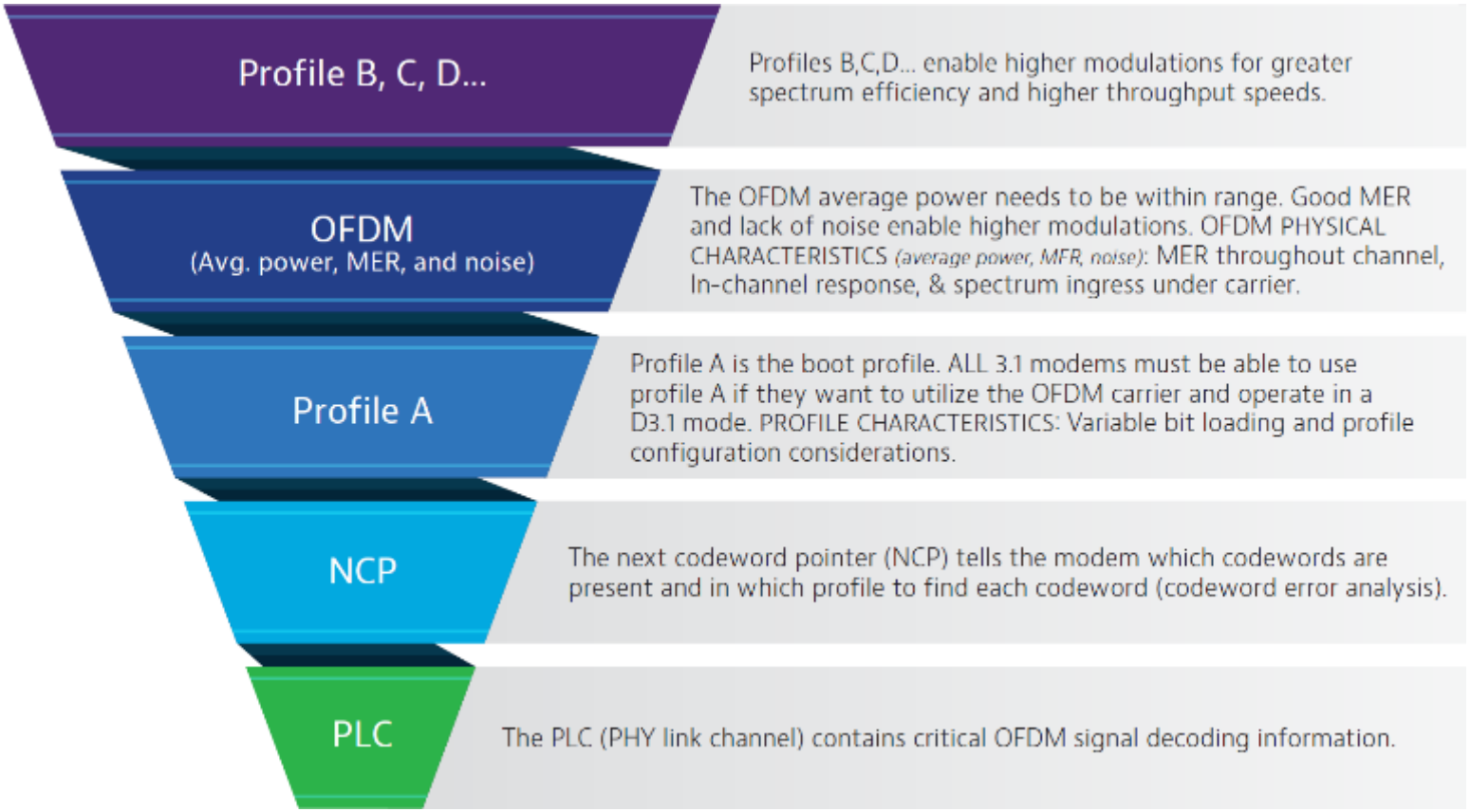


Packet Quality
- ✓ Packet Loss
- ✓ Max Round Trip delay
- ✓ Max jitter

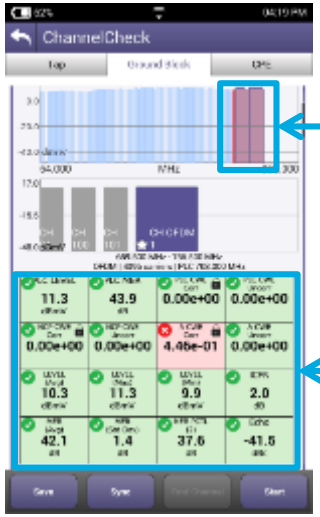
Note: Throughput and Packet Quality requires config in StrataSync,
Refer to Administrator Settings section for details

ONX DOCSIS 3.1 Measurements

Testing OFDM

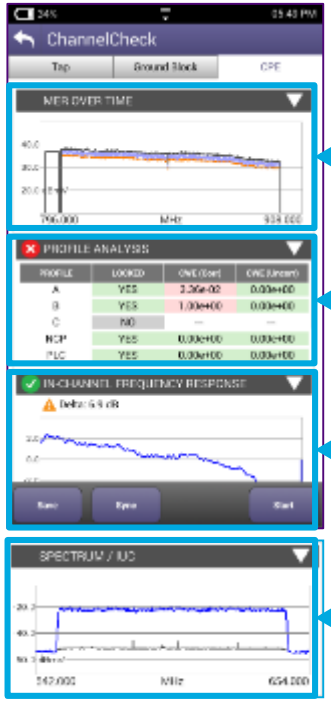


OneExpert CATV DOCSIS 3.1 measurements



Identify OFDM carrier in the lineup: Downstream scan measurement requires no learning curve, same as D3.0 scan, but shows OFDM signal

Overall OFDM carrier performance metrics including best and worst case; simple pass/fail indications



MER over entire OFDM channel provides insight into why higher tier profiles are failing

Analysis of different profiles available and which profiles can be supported at test location

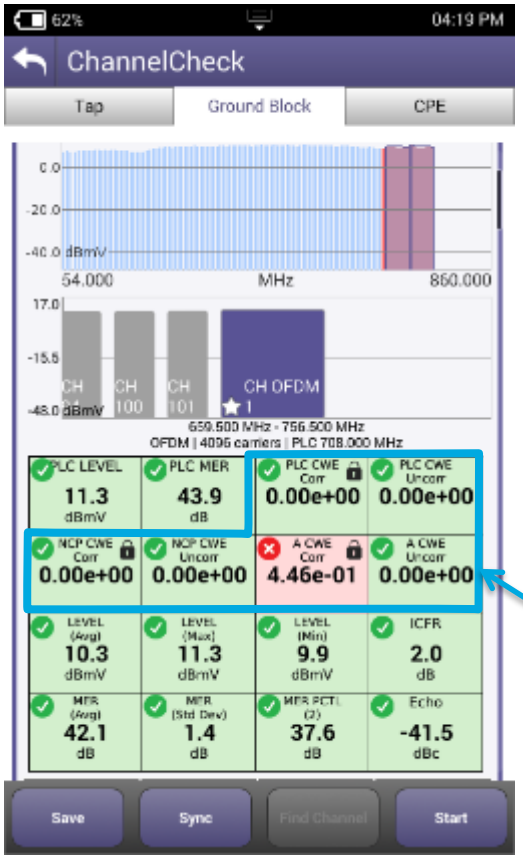
In-Channel Response identifies roll-off and excessive ripple

Spectrum and noise identify portions of carrier where degradation may occur

OneExpert CATV with DOCSIS 3.1

- ✓ OFDM demodulation with D3.1 Profile Analysis
- ✓ **Full DOCSIS service testing including 32 Bonded + D3.1 OFDM carrier**
- ✓ Upstream **DOCSIS 3.1 OFDM-A capable**

DOCSIS 3.1 Codeword Errors (CWE)

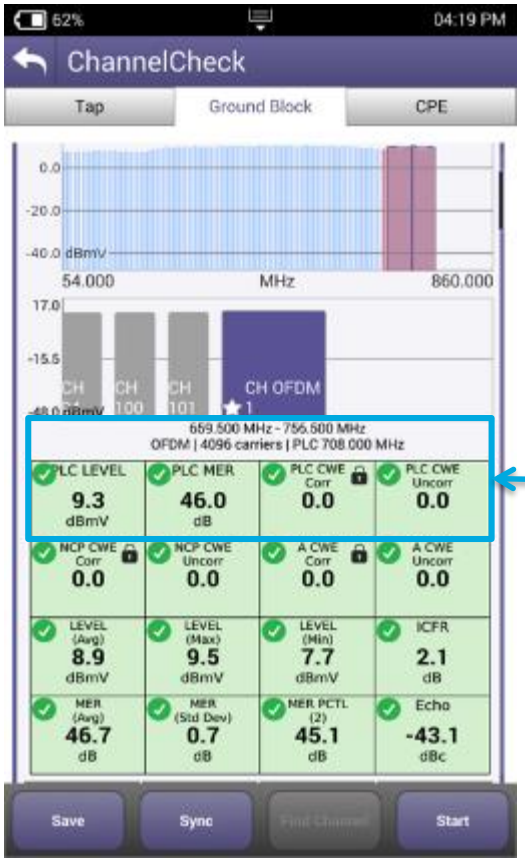


- ✓ **Codeword (CW):** a data bucket within a DOCSIS packet
- ✓ **CW Error (CWE)**: a byte-level data packet corruption resulting from QAM symbol displacement across constellation decision boundaries
- ✓ Correctable vs. Uncorrectable determined by number of corrupted symbols relative to CMTS forward error correction level settings
- ✓ If you are having CWEs, you may be losing data
- ✓ **Uncorrectable CWEs** indicate dropped packets (think post-FEC BER)
- ✓ Retransmit is required for recovery
- ✓ There is no recovery from dropped packets for real-time apps like VoIP!
- ✓ **Correctable CWEs** are an early warning that the uncorrectable threshold may be near! (think pre-FEC BER)

THINGS TO CHECK:

To make sure there are **no uncorrectable CWE**

Testing PLC – PHY Link Channel



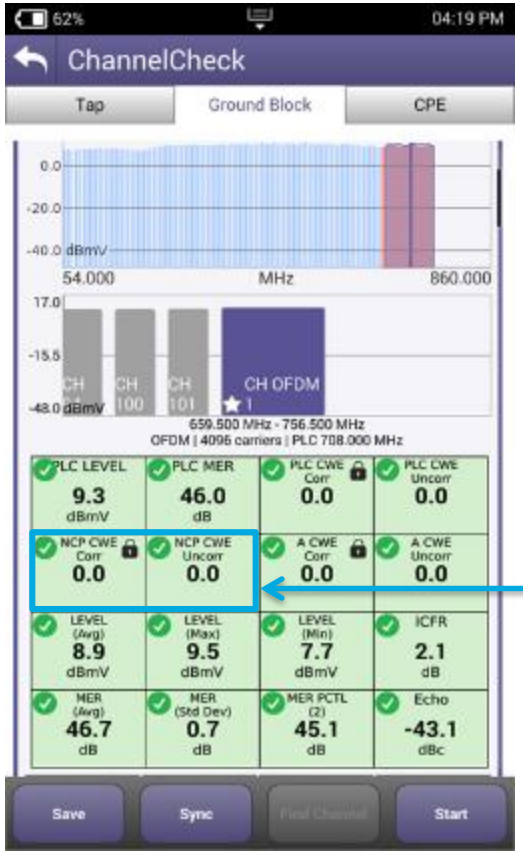
PLC

PLC contains CRITICAL OFDM signal decoding information

THINGS TO CHECK:

Level: >-15 dBmV (6 MHz)
MER: >15 dB (min)
Lock status: locked
Uncorrectable CWE: none
Other info: PLC center frequency

Testing Next Codeword Pointer (NCP)



NCP

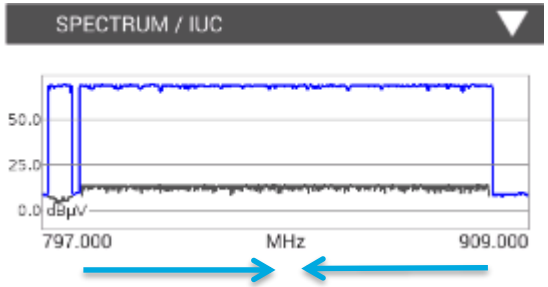
The **NCP** tells the modem which CW are present and in which profile to find each CW (CWE analysis), it is CRITICAL for proper data communication

✓ Don't disregard OFDM performance at high end or low end. Roll off of either could impair a CM's ability to correctly receive NCP or CWs.

THINGS TO CHECK:

Lock status: locked

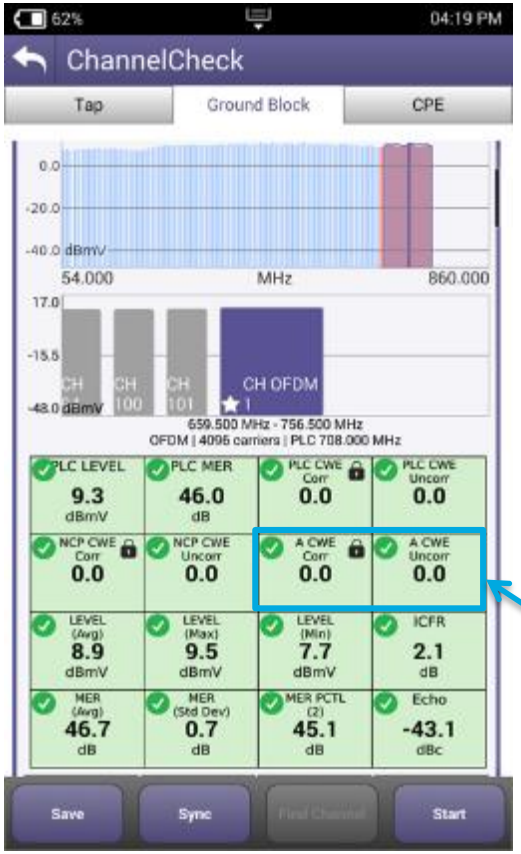
Uncorrectable CWE: none



Codewords start at LOW frequencies and populate UP

NCP's start at HIGH frequencies and populate down

Testing Profile A



Profile A

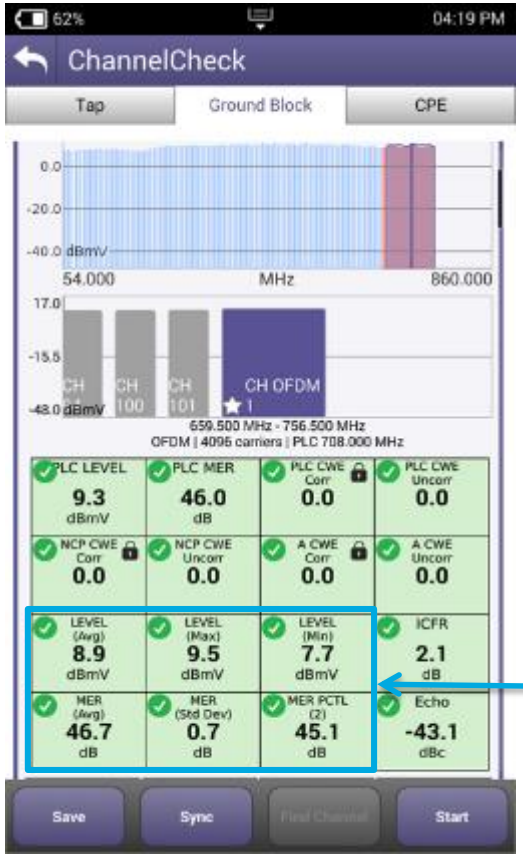
Profile A is boot profile; ALL 3.1 modems must be able to use profile A

- ✓ Profile A is key to D3.1 modem communication via an OFDM carrier. This is where command and control, range, and registration occurs.
- ✓ In practice, profile A may be assigned lower mixed modulations, like QAM 64/16, so every D3.1 modem can communicate. Lower modulation profiles can operate at lower MER/CNR and power levels.
- ✓ If profile A isn't locked or has uncorrectable CWE, a modem may roll back and use only SC QAMs in 3.0 mode.

THINGS TO CHECK:

Lock status: locked
Uncorrectable CWE: none

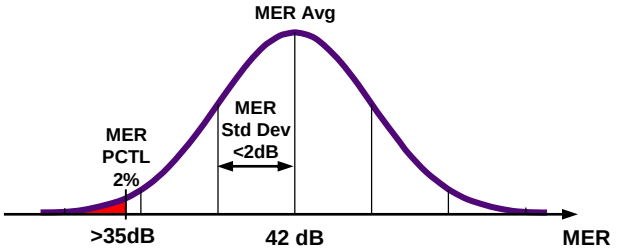
Physical Measurements (Level, MER)



OFDM
(Avg. power, MER, and noise)

OFDM Avg power must be within range. Good MER and low noise enable higher modulations.

- ✓ **MER 2 percentile** shows how well 98% of the subcarriers are working and filters out underperforming ones that LDPC error correction will likely clear up.

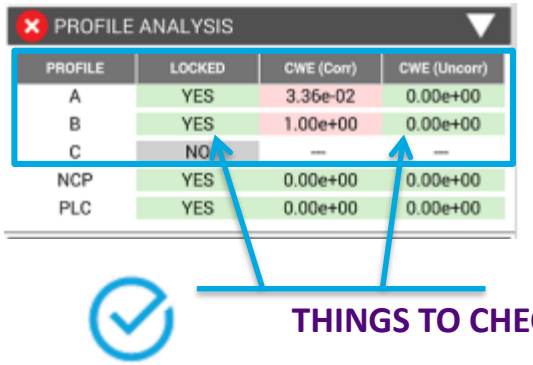


THINGS TO CHECK:

Avg level, variable: >-6 dBmV recommended
Avg MER, variable: >36 dB recommended
MER at 2 percentile: >35 dB recommended
MER standard deviation: <2 dB recommended

CM Minimum CNR/MER Performance in AWGN		
Channel Modulation	Up to 1 GHz CNR(dB)	Min P_{6AVG} dBmV
4096	41.0	-6
2048	37.0	-9
1024	34.0	-12
512	30.5	-12
256	27.0	-15
128	24.0	-15
64	21.0	-15
16	15.0	-15

Testing Higher Profiles



THINGS TO CHECK:

Lock status: locked

Uncorrectable CWE: none

Profile B, C, D…

Profiles B,C,D… enable higher modulations for greater efficiency

- ✓ Higher profiles improve network efficiency. Optimally, more CM run on higher profiles for overall network efficiency and improved customer QoE.
- ✓ Profiles enable tiers of service, and allow best case service when consistent network constraints inhibit maximum performance
- ✓ Testing viability of all profiles provides quick assessment of network performance to any given test point (service outlet)
- ✓ Tech must be able to troubleshoot failing profiles and identify degradations
- ✓ Profile changes highlight drop or home wiring problems:

	TAP		Ground Block		Outlet/CPE	
	Profile Locked?	Uncorrectable CWE	Profile Locked?	Uncorrectable CWE	Profile Locked	Uncorrectable CWE
Profile A	YES	NO	YES	NO	YES	NO
Profile B	YES	NO	YES	NO	NO	YES
Profile C	YES	NO	YES	YES	NO	YES
Profile D	YES	NO	NO	YES	NO	YES

OFDM Characterization

✓ Profiles and CWE analysis are important

Component	Tasks	Importance	CWE expectations and impact
PLC PHY Link Channel	Contains CRITICAL OFDM signal decoding information	Critical	Should have 0 Uncorrectable-CWE otherwise OFDM may not work
NCP Next CW Pointer	Tells modem which CW are present and in which profile to find each CW	Critical	Should have 0 U-CWE otherwise OFDM may not work
Profile A	Boot profile. ALL 3.1 modems must be able to use profile A	Critical	U-CWE will cause poor QOE and possibly make OFDM carrier unusable, forcing data to standard QAM carriers instead of OFDM
Profile B,C,D	Enable higher modulations for greater efficiency	High	U-CWE will affect bandwidth and overall QOE

THINGS TO CHECK:

❶ PLC is working well

❷ NCP is working well

❸ Profile A is working well with some correctible (in this case running 256 QAM)

❹ Profile B (running 1024 QAM in this case) is on the edge: 100% correctable CWE but LDPC is correcting them all!

❺ This makes sense, 1024 QAM level should be ≥12dBmV and MER > 34 dB

PROFILE ANALYSIS

PROFILE	LOCKED	CWE (Corr)	CWE (Uncorr)
A	YES	9.20e-01	0.00e+00
B	YES	❹ 1.00e+00	0.00e+00
NCP	YES	0.00e+00	0.00e+00
PLC	YES	0.00e+00	0.00e+00

CM Minimum CNR/MER Performance in AWGN		
QAM Modulation	Up to 1 GHz CNR(dB)	Min P_{6AVG} dBmV
4096	41.0	-6
2048	37.0	-9
❺ 1024	34.0	-12
512	30.5	-12
256	27.0	-15
128	24.0	-15
64	21.0	-15
16	15.0	-15

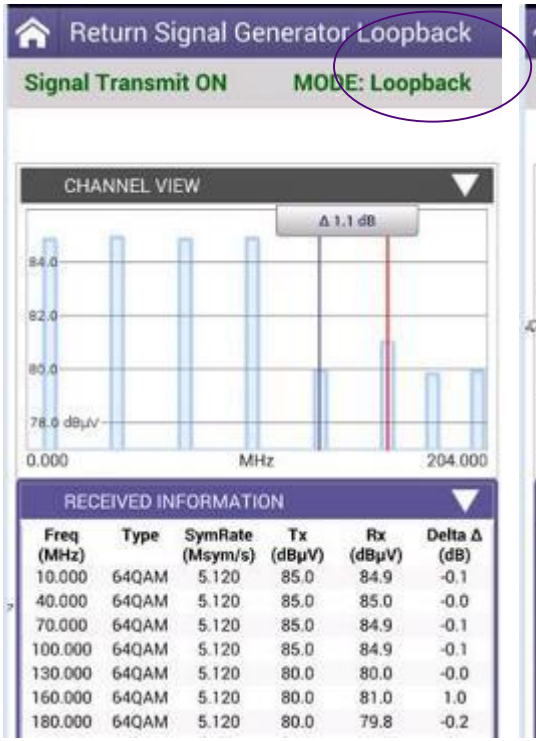
DOCSIS 3.1 OFDM Carrier Level Measurements

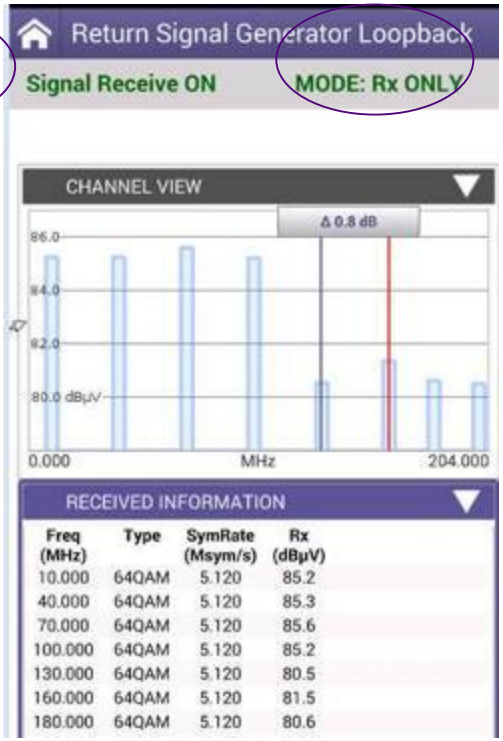
- Measure and reference OFDM carriers in comparison to power in a 6 MHz bandwidth (CableLabs® recommendation).
- With 8 MHz QAM in Europe → Set the OFDM level (ref. 6 MHz) **1.2 dB below the 8 MHz QAM 256** to maintain the same power/Hz.
- PLC carrier average power will be approximately 0.8dB higher than other carriers due to additional pilots and data patterns
- Total OFDM carrier (up to 192MHz) power is greatly different than average power in a 6 MHz bandwidth:
  - For a 96 MHz wide OFDM carrier, the total power will be 12.04 dB higher.
  - For a 192 MHz wide OFDM carrier, the total power will be 15.05 dB higher
- Do not use the total OFDM power to adjust CMTS output power: this would be like using total integrated power of 32 DOCSIS QAM carriers to set level.

ONX CATV – RSG Loopback
- Return Signal Generator
- Loopback

Return Signal Generator with Loopback

- Generate up to **8 return band test signals** to test component or network gain/loss
- **Loopback** capability allows normalization and provides a table listing simultaneous, continuously updated measurements of carriers relative to stored reference
- Three modes
  - **TX only** mode (just like RSG mode)
  - **Loopback** Mode – TX and Receive
  - **RX only** mode – receive signals from other source – e.g. 2nd ONX





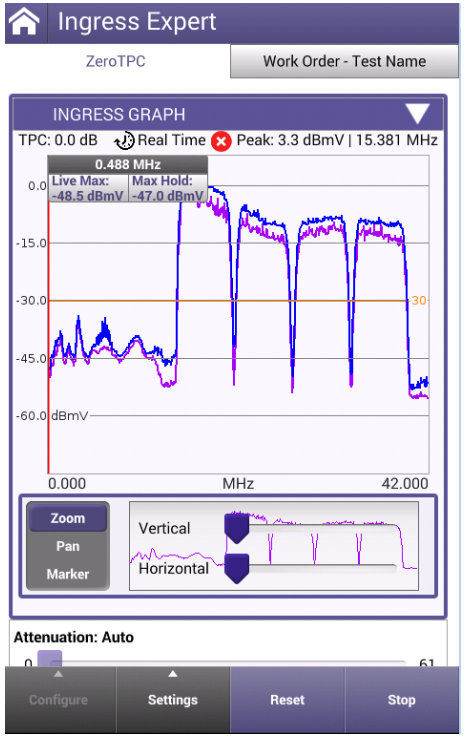
ONX CATV – Ingress Expert

Ingress Expert – Advanced Upstream Spectrum Testing

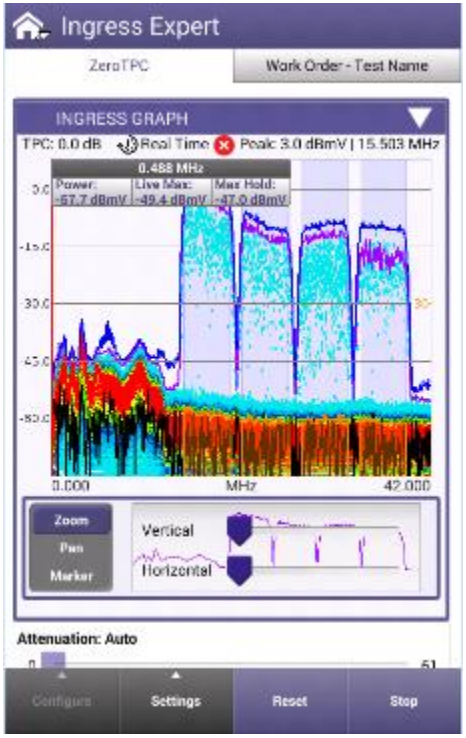
- Upstream ingress/noise issues – much time spent identifying, locating, and suppressing
- As upstream spectrum fills with carriers new test capabilities are needed

- **Ingress Expert** mode offers advanced ingress troubleshooting capabilities
  - Available on already powerful OneExpert CATV
  - Standard in NTX (Network Expert) and SWX (Sweep Expert) feature bundles
  - Optional in other bundles

Ingress Expert Overview



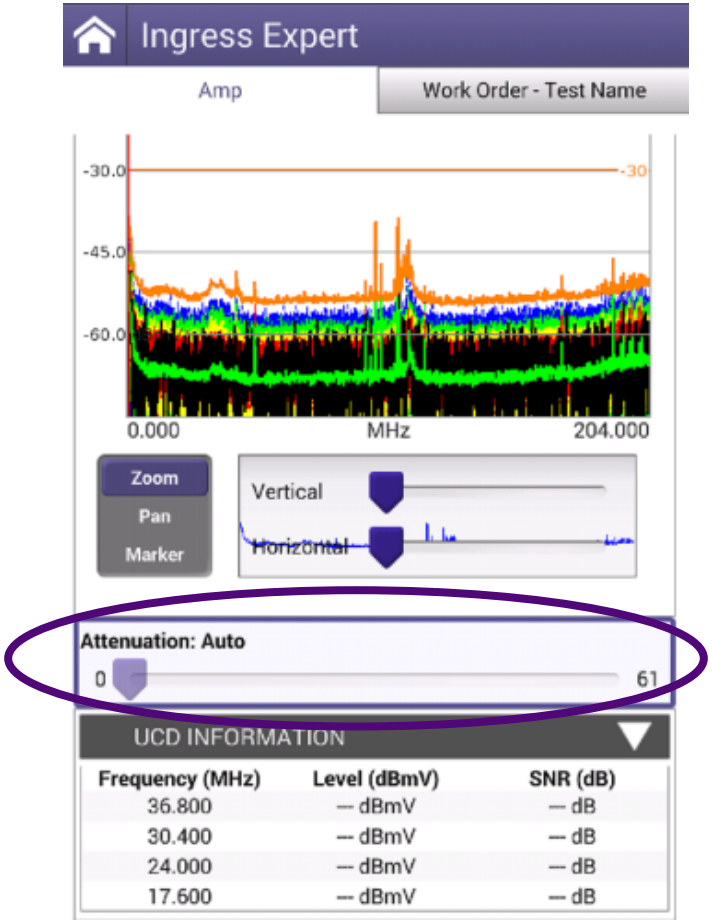
Live Upstream Carriers Normal Spectrum Analyzer type view



Use different traces to better visualize the upstream and noise below carriers

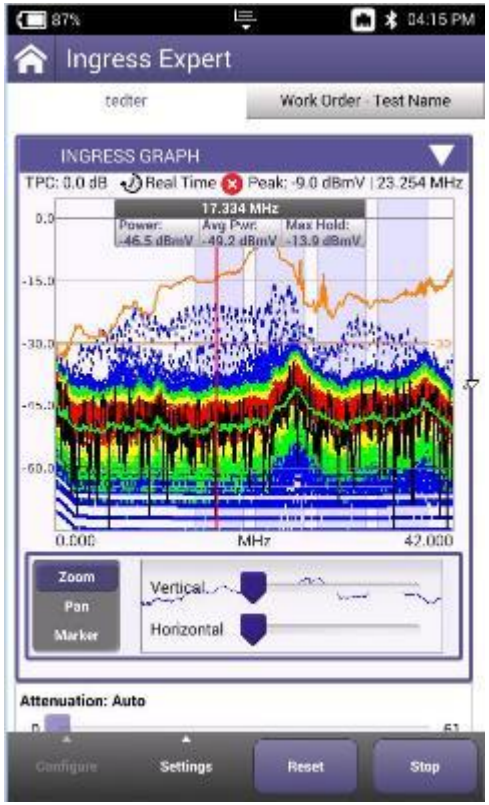
- ✓ **Ingress Expert** is based on powerful OneExpert CATV HyperSpectrum technology
  - ✓ Innovative overlapping FFT analysis means that no transient interfering signals will go undetected
- ✓ Unprecedented frequency coverage in a handheld gives techs full visibility of all upstream ingress noise
  - ✓ 0.5MHz up to a selectable 42, 65, 85, 110, or 204MHz
- ✓ Easily configurable, Ingress Expert allows techs to toggle persistence measurement and available traces for best visibility of ingress signals

Ingress Expert Update



- Real-Time icon has been added to the UI to indicate when the RT Analyzer is 100% engaged.
- **Auto-AGC** is now selectable. If disabled, user can control port 2 attenuator setting.
- Traces now more closely align with VSE.
- **Upstream Channel Information** – average level and SNR values are now displayed based for each UCD based on the previous DOCSIS test performed.
- Noise under the carrier trace has been added to the graph.
- Dynamic range has been improved to meet desired 60 dB target.
- **Heatmap** colors have been updated

Ingress Expert – Advanced Upstream spectrum testing



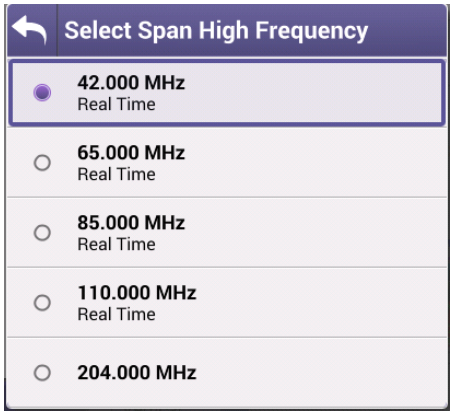
- Technicians spend much of their time trying to identify, locate, and suppress ingress issues on the plant
- As more of the upstream spectrum is filled with upstream carriers, traditional ingress mitigation processes are being re-written
- The Ingress Expert mode offers advanced ingress troubleshooting capabilities to help fight ingress
  - Included in ONX-CATV - **NTX** (**Network Expert**) package & **SWX** (**Sweep Expert**) package
  - Optional on other ONX-CATV packages

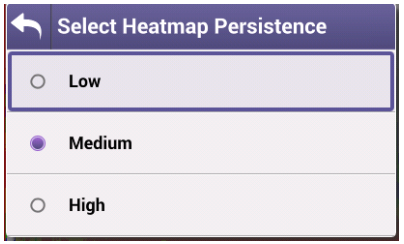
Ingress Expert - Use Port 2 for Ingress measurement

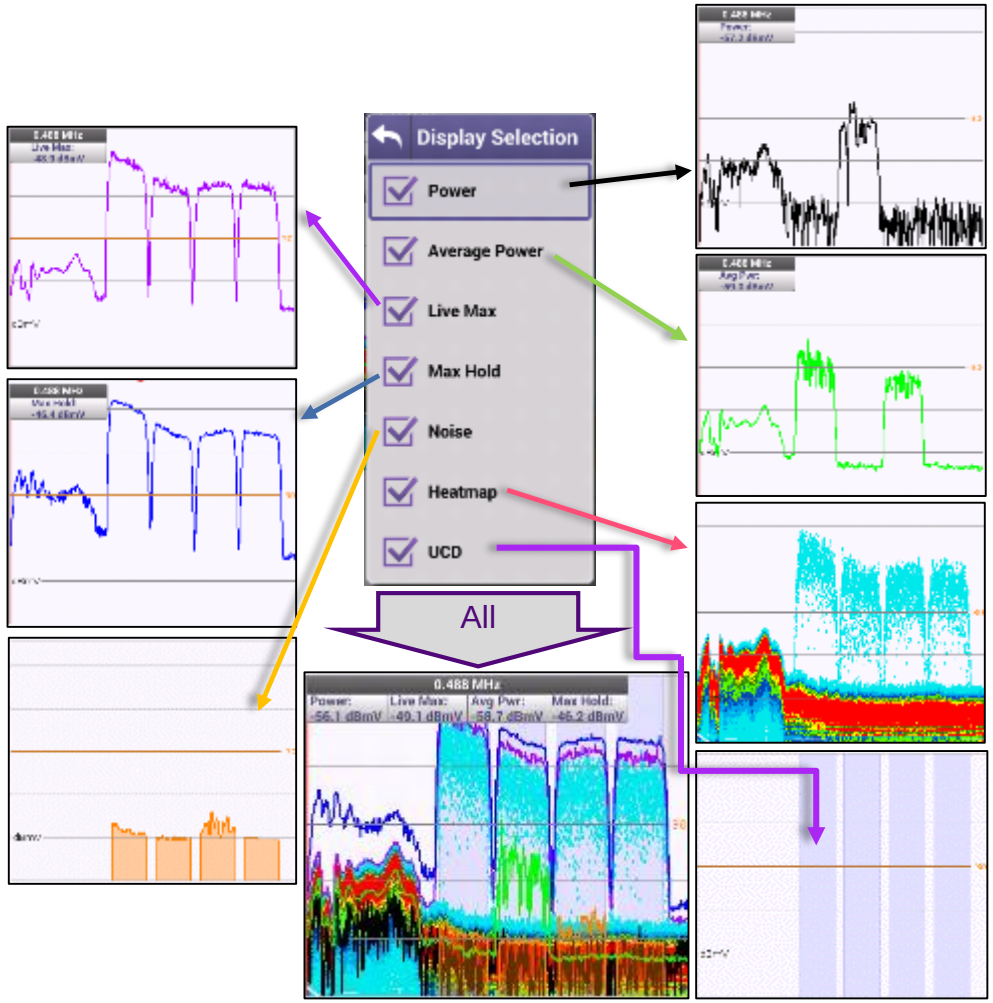
- Two RF ports on top of unit
  - **Port 1** is for
    - All services testing like Video and DOCSIS tests
    - Downstream Spectrum
    - Bi-Directional Sweep
  - **Port 2** is for Upstream spectrum and Ingress troubleshooting
    - Overlapping FFTs allow for gapless ingress detection

Ingress Expert - Configurable Traces and Frequency Span

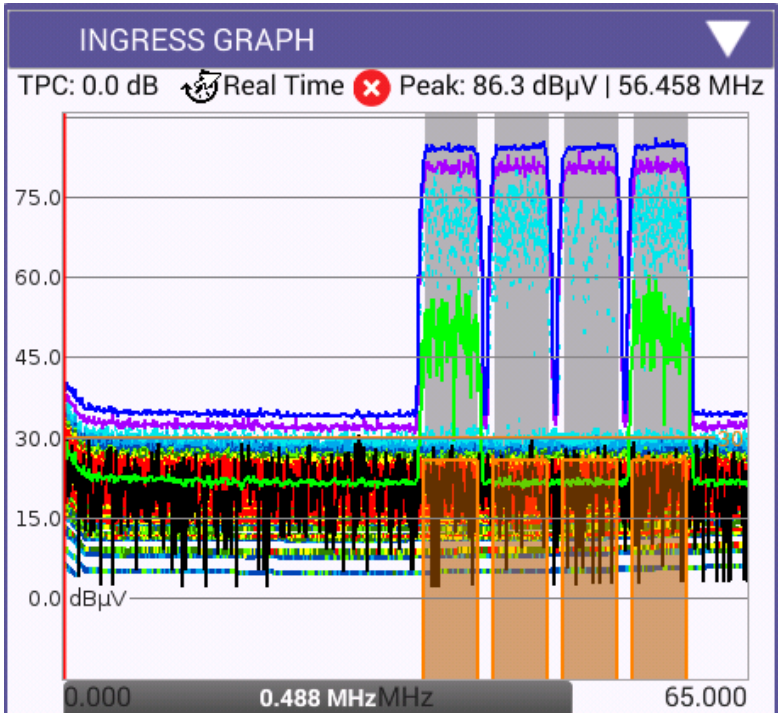
- Adjustable views allow users to select view that works best for troubleshooting situation
- Selectable upstream frequency range and heatmap persistence level







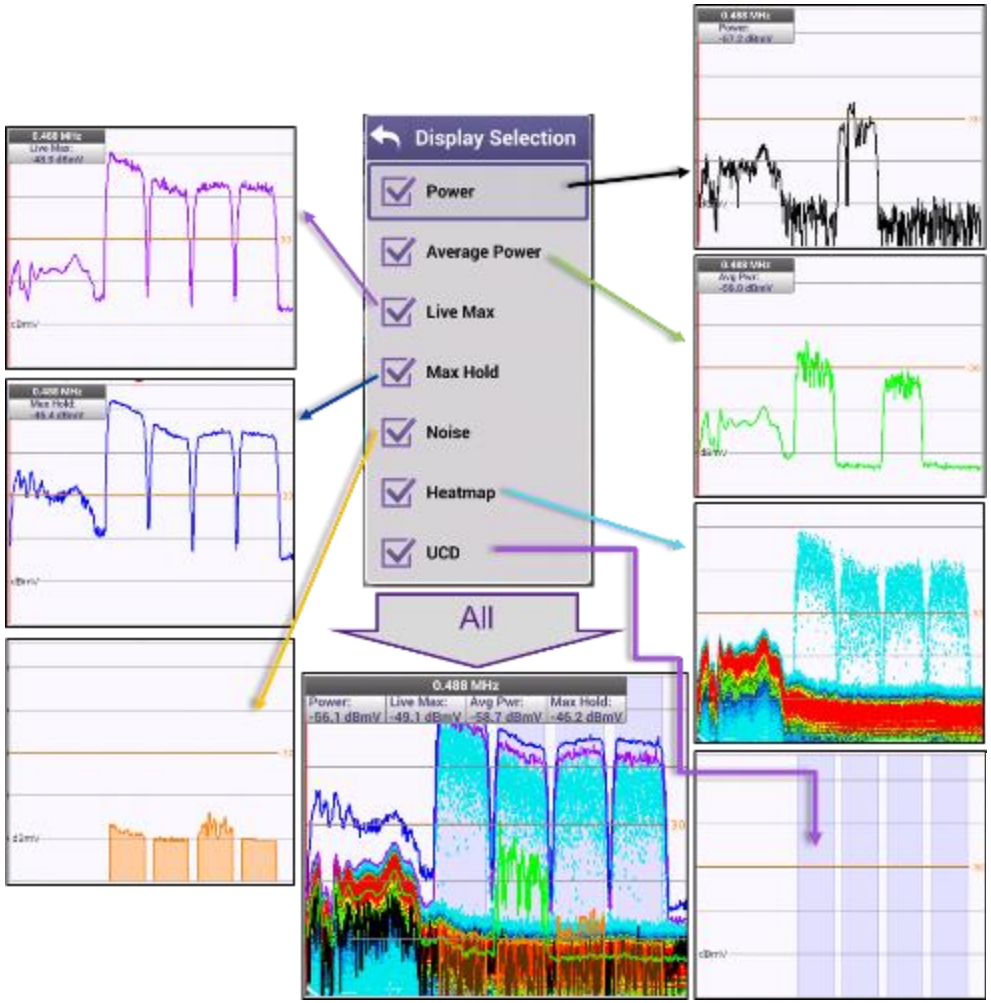
Ingress Expert – Traces Definition



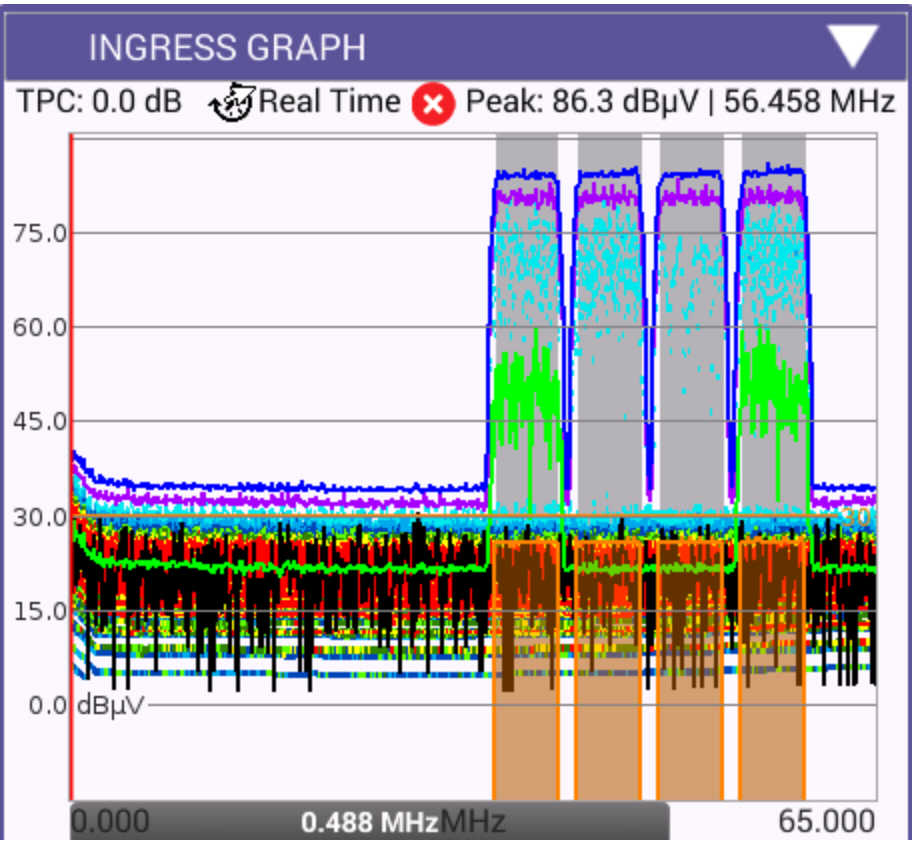
- **Ingress Expert** has several different traces that each highlight a different way of looking at the upstream noise & carrier information
  - **Power** – a single trace randomly selected from the several thousands taken each second by the Real Time Analyzer RTA
  - **Average Power** – the average power over the last second
  - **Live Max** – the highest power at each frequency over the last second
  - **Max hold** – the highest power at each frequency since the beginning of the test
  - **UCD** – the Upstream Channels Descriptors are acquired from the last DOCSIS test performed – highlights were upstream carriers should appear and helps the ONX perform additional measurements
  - **Noise** – signals within the highlighted UCD frequencies which occur less frequently but are higher than the average noise floor below the carriers

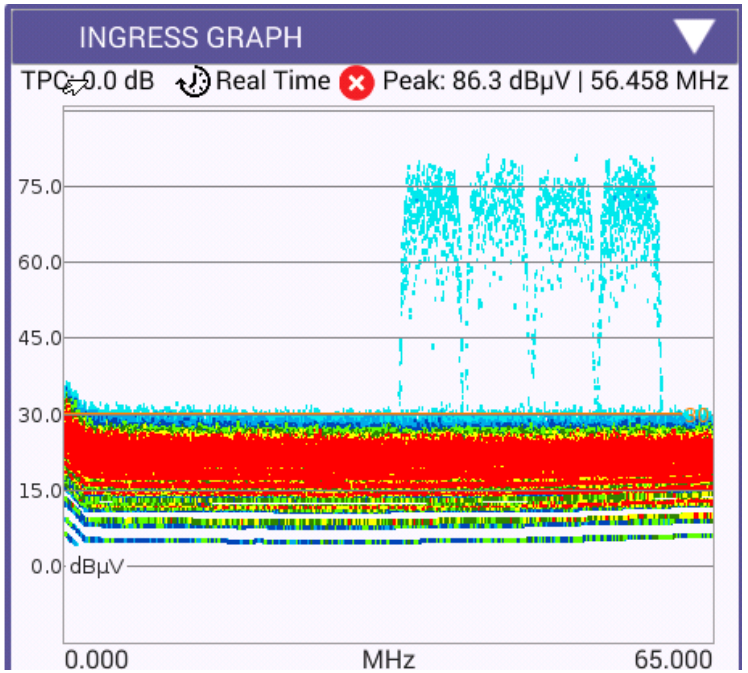
Ingress Expert - Trace Definition

- Highest power at each frequency over the last second
- **Max power** over test period
- Signals within highlighted **UCD** frequencies, occurring less frequently but higher than the average **noise** floor below carriers

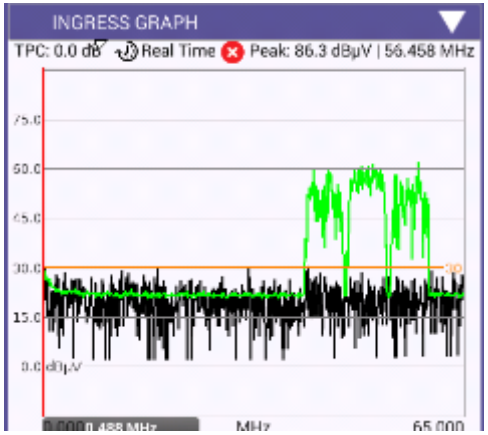


- A single trace randomly selected from several thousand taken each second by real-time analyzer
- **Average power** over the last second
- **Persistence** represented by color variation
- **Upstream Channel Descriptors** acquired from last DOCSIS test performed – Highlights where upstream carriers should appear and helps ONX perform additional measurements

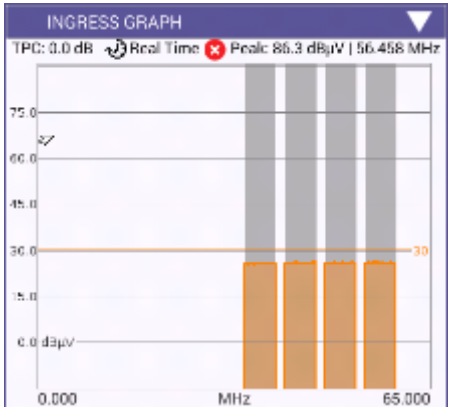




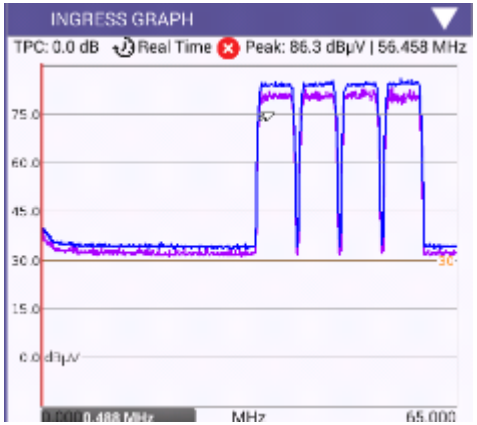
heatmap



Power & average power



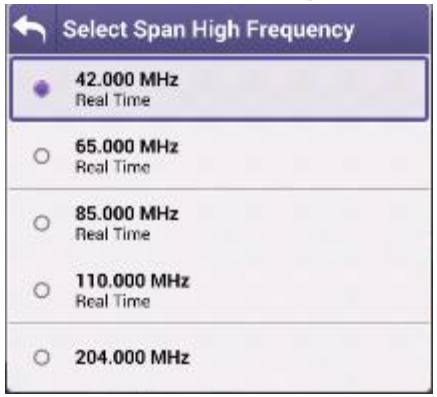
UCD & Noise



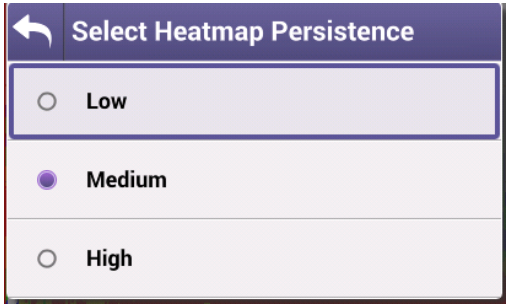
Live Max & Max hold

Ingress Expert recommended settings

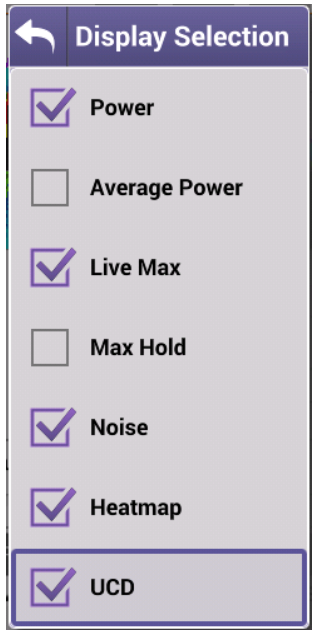
- Set frequency span to desired test span
  - 42 / 65 / 85 / 110 / 204*



- For most scenarios **Heatmap Persistence** can be set at Medium



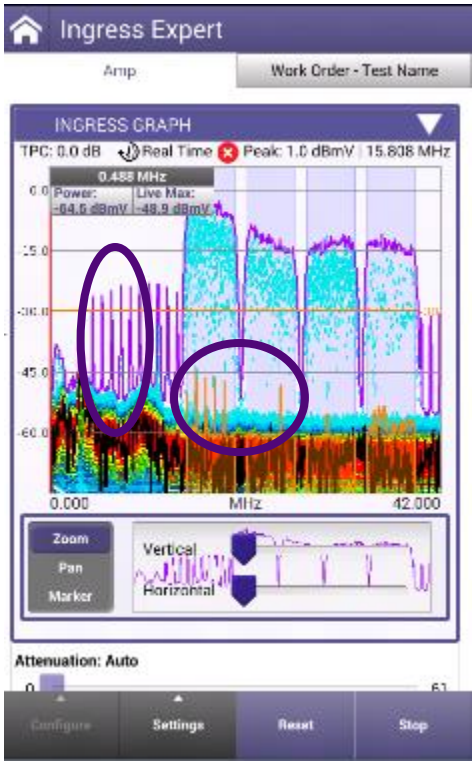
- Set traces based on preference after experience with mode
- Many users find that enabling the following traces is most effective for capturing noise in the numerous ways it appears:
  - Power,
  - Max Live,
  - Noise,
  - Heatmap, and
  - UCD



*204 MHz is the only configuration which does not allow the ONX's Real Time Analyzer to be gapless

ONX CATV – Ingress Expert
- finding and troubleshooting Ingress issues

Find Intermittent Noise

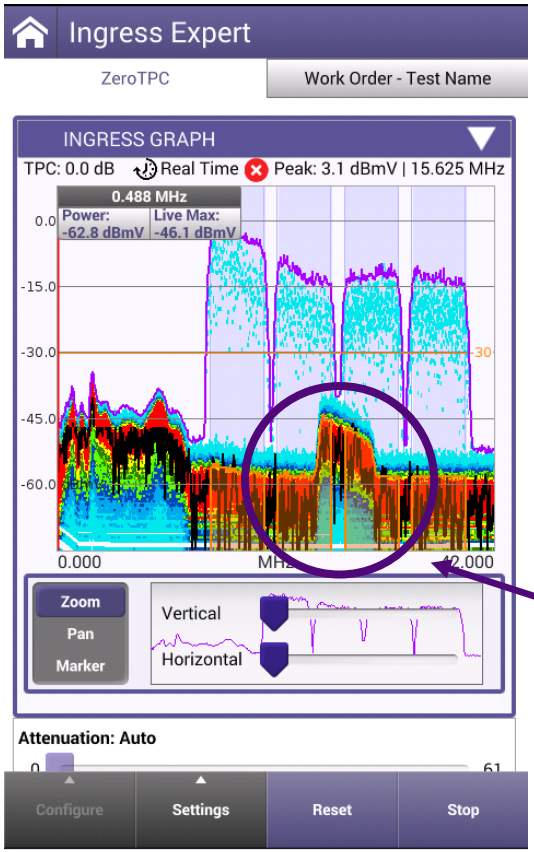


- One of technicians' toughest tasks is to find and fix impulse noise impairments
  - Fast transient noise is difficult to measure and identify
- **HyperSpectrum** easily catches these quick transient impulses, even when below active upstream carriers
  - The various traces make these impairments visible
  - The Noise trace shows reoccurring impulse ingress under active carriers

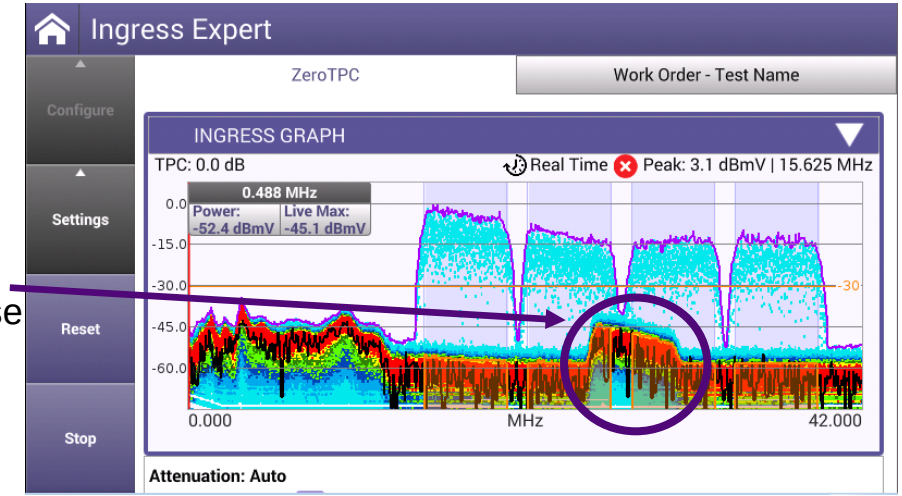
Traces show interference outside of active carriers
Ingress Expert's Noise trace shows reoccurring ingress inside carriers

Find Consistent Noise

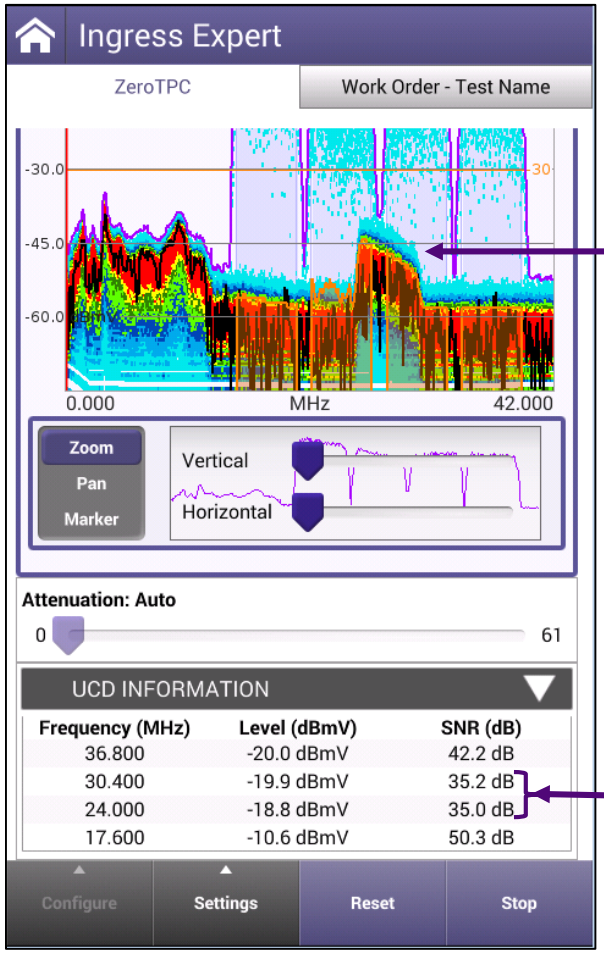
- Consistent ingress/noise sources have traditionally been easier to troubleshoot, however as vacant upstream spectrum becomes scarce finding and fixing noise under active QAM carriers is more important than ever.
- Ingress Expert mode's **persistence measurement** catches and displays noise even under active upstream carriers



Ingress Expert clearly shows elevated noise under active carriers



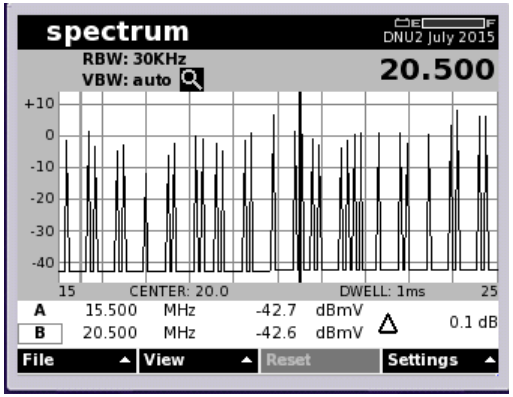
UCD Table – Upstream Channel Descriptor



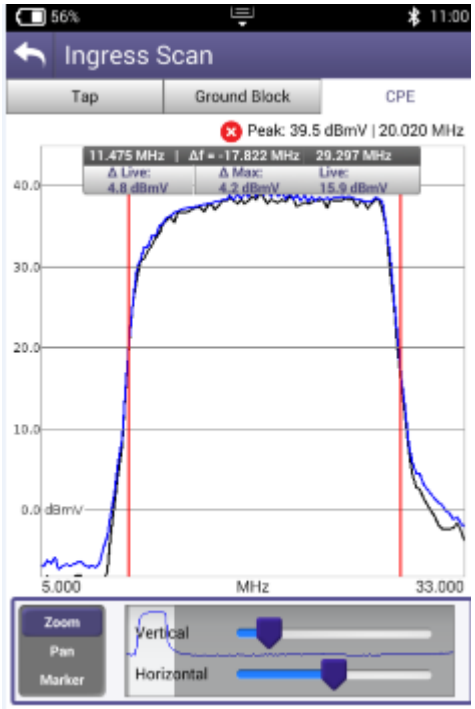
The impact of the noise floor can be clearly seen in the SNR calculated for the 24 and 30.4MHz carriers

- The ONX will populate the **UCD table** at the bottom of the Ingress expert mode based on its last successful DOCSIS range test performed.
- Knowing exactly where to anticipate the upstream carriers enables additional measurements to be displayed:
  - Carrier Frequency
  - Upstream carrier level
    - [as measured at test point]
  - **Signal to Noise Ratio (SNR)**
    - [as measured for level and noise at test point]

Improved Impulse Noise Detection



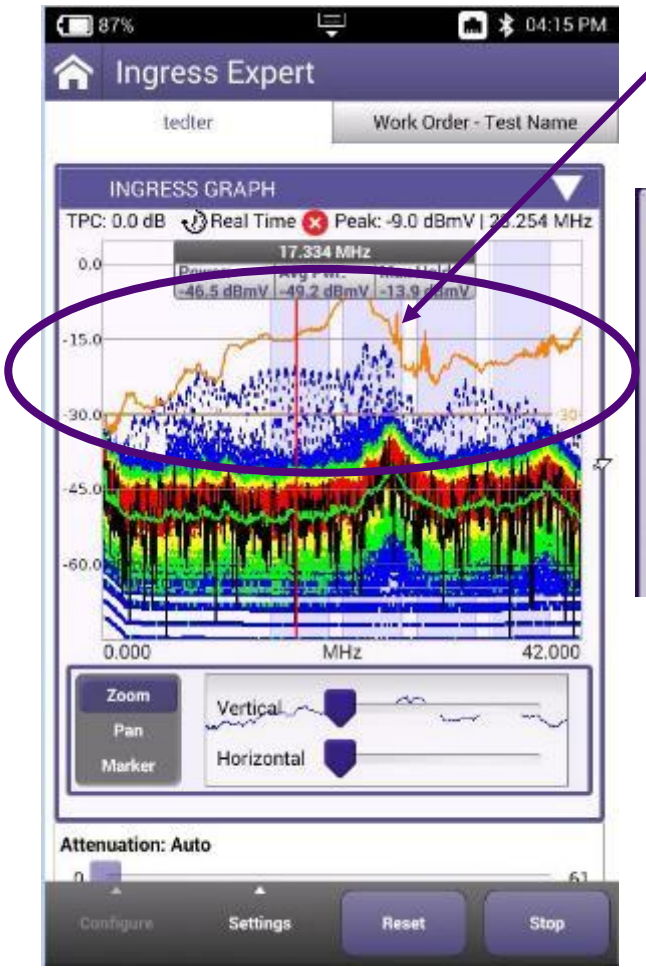
- DSAM scanning analyzer catches samples within its resolution bandwidth as it scans spectrum
- Max Hold is needed to capture complete noise “envelope” over time



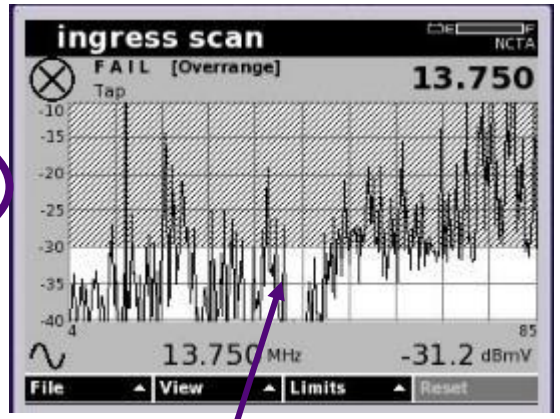
- **OneExpert FFT** captures the whole noise envelope at once
- No need to wait for multiple scans to see complete interference impact

Application Note on Real Time Analyzer

- Problem:
  - DSAM users are accustomed to the “view” they get from a swept spectrum
  - ONX with Real Time analysis (like VSE) capture ENTIRE Spectrum.
  - The signatures look different
  - Perception from DSAM user is that DSAM catches it better
- Solution:
  - **Educate your technicians team on the technology and benefits**



ONX shows **“smooth”** Max Hold across whole spectrum



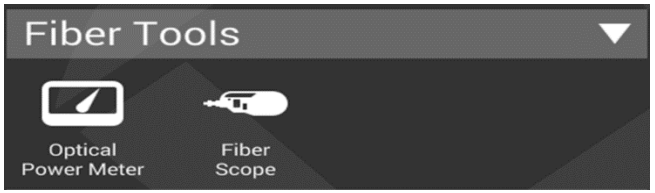
DSAM shows “spikey” Max Hold across whole spectrum

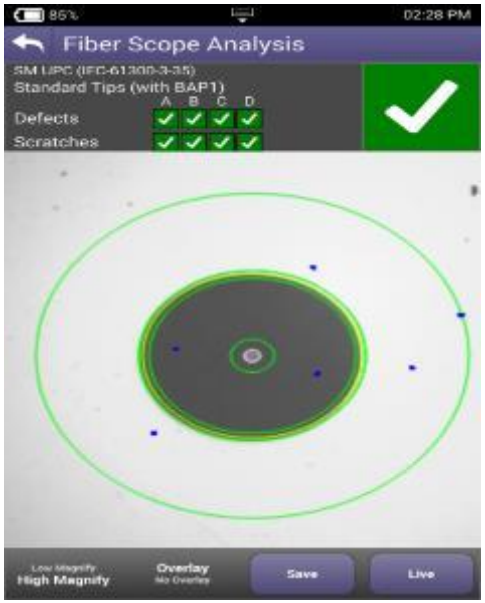
DSAM is actually missing some of the noise

ONX CATV - Fiber Testing
- P5000i Probe Microscope
- MP60, MP80 power meters

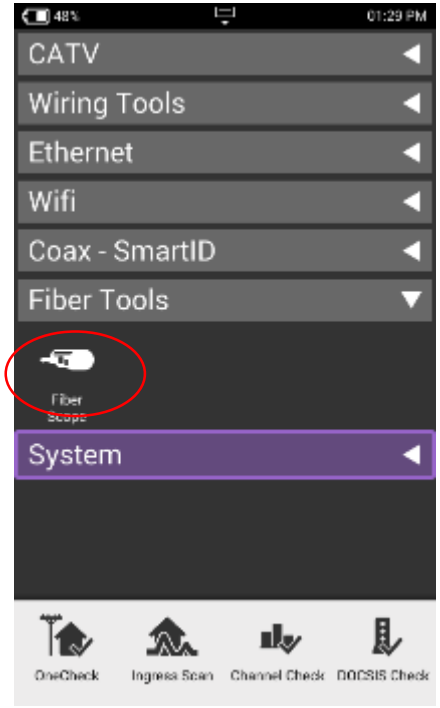
OneExpert CATV
Fiber Optic Testing made easier

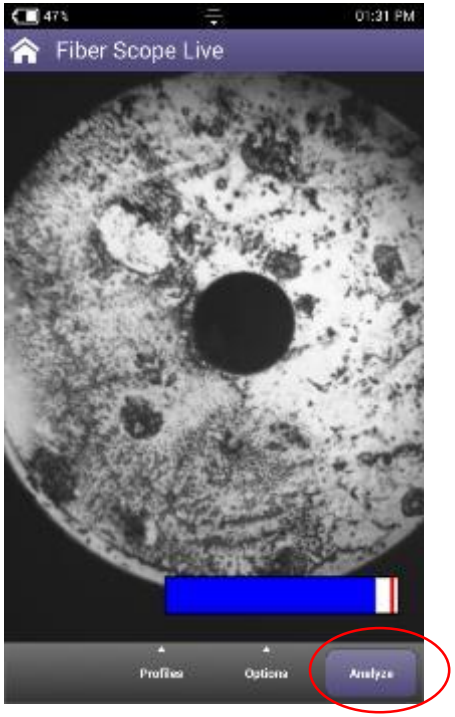
- ✓ **Fiber testing made easier**
- ✓ **Inspect before you connect**
  - ✓ Fiber Inspection
    - ✓ **P5000i** Automatic fiber scope support
      - ✓ Auto Centering
      - ✓ Automated testing
      - ✓ Simple pass/fail
  - ✓ **Power Meter**
    - ✓ USB power meter support
    - ✓ **MP-60 & MP-80**

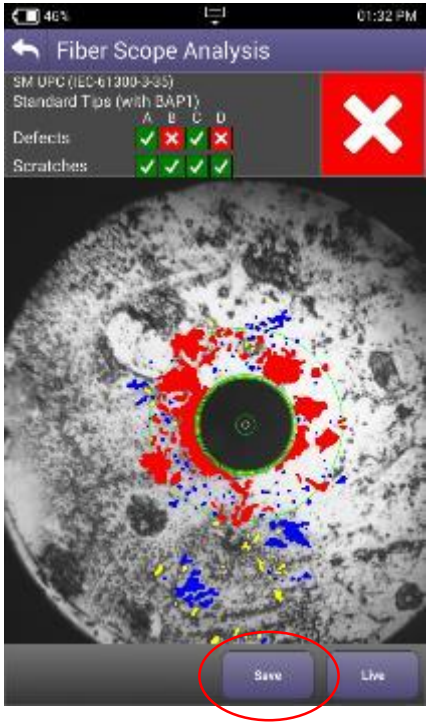




Optical Accessories – P5000i Probe Microscope







When **P5000i Probe Microscope** is attached to ONX through USB, Fiber Tools menu automatically appears

- After plugging in patch cord or inserted probe into bulkhead, fiber end face will appear and can be focused or auto centered using controls on P5000i.
- Autotest can be conducted and results saved from results screen

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

Introducing OneExpert CATV Sweep: ONX-630

- Maintenance technician focused OneExpert platform enables **sweeping** and **DOCSIS 3.1** test with **simplified** process, to **speed testing** and **documentation**
- **ONX-630** is used **for all DOCSIS 3.1 phases**
  - D3.1 Network **construction** ➔ Sweep transmission performance analysis
  - D3.1 **Turn-Up** ➔ Sweep + DOCSIS 3.1 physical and service test capability
  - D3.1 **Maintenance** ➔ Sweep + D3.1 PHY and Service tests
- **Compatible with existing sweep control unit**
  - SDA-5510/5500: Reverse Sweep up to 204MHz
  - SDA-5500: Forward Sweep up to 1GHz
  - Offer smooth, seamless integration and transition to next generation
- **Documenting performance is simpler with StrataSync,** making detailed sweep results easily accessible via browser

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

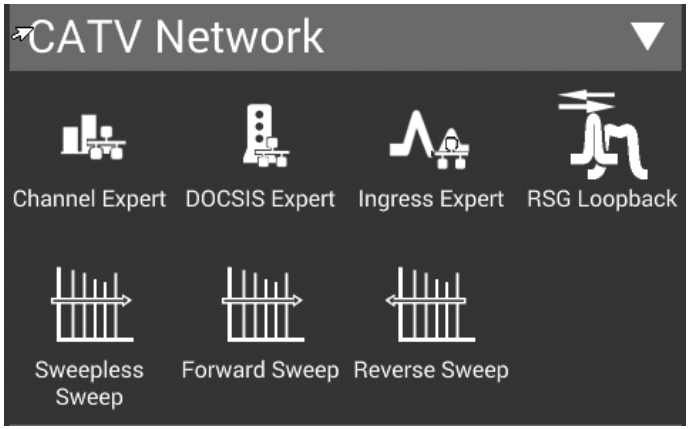
- **Powerful — Designed to find difficult problems**
- Combined DOCSIS 3.1 and sweep testing validates the complete HFC network
- **Ingress Expert** with Hyper Spectrum™ catches difficult return noise problems
- **Expert modes** with advanced parallel processing find hidden problems and root causes

- **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™**

CATV Network Section

- ✓ **SWX & NTX software** packages reveal the CATV Network session, RF features designed for advanced services and maintenance use

- ✓ **NTX package** (ONX-620/630) includes:
  - ✓ Channel Expert
  - ✓ DOCSIS Expert
  - ✓ Ingress Expert
  - ✓ RSG / RSG Loopback (optional in 620)
  - ✓ Test Point Compensation (TPC)
  - ✓ Custom Limits
  - ✓ Sweepless Sweep

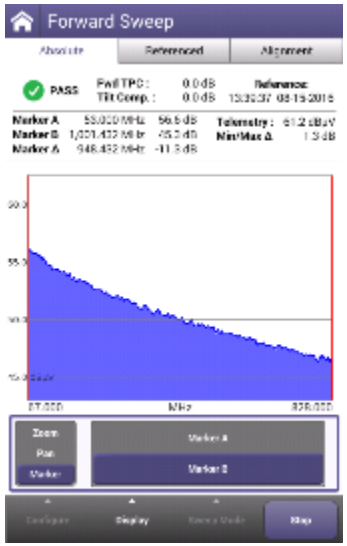


- ✓ **SWX package** (ONX-630 only) adds NTX plus:
  - ✓ Forward Sweep & Alignment
  - ✓ Reverse Sweep & Alignment
  - ✓ Associated with Headend Sweep Control Units (SDA55x0, SCU-1800)

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

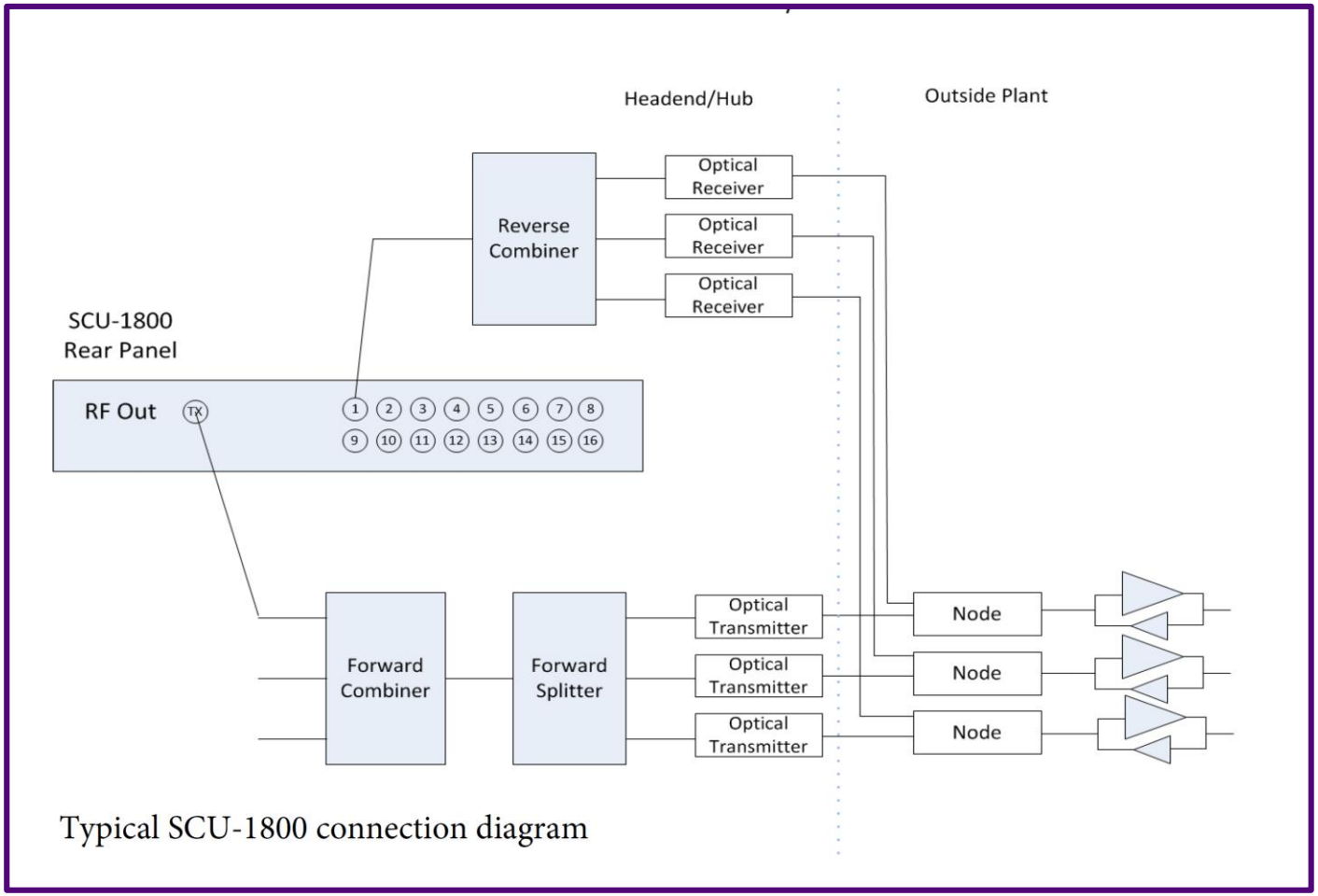
SCU - Forward Sweep

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

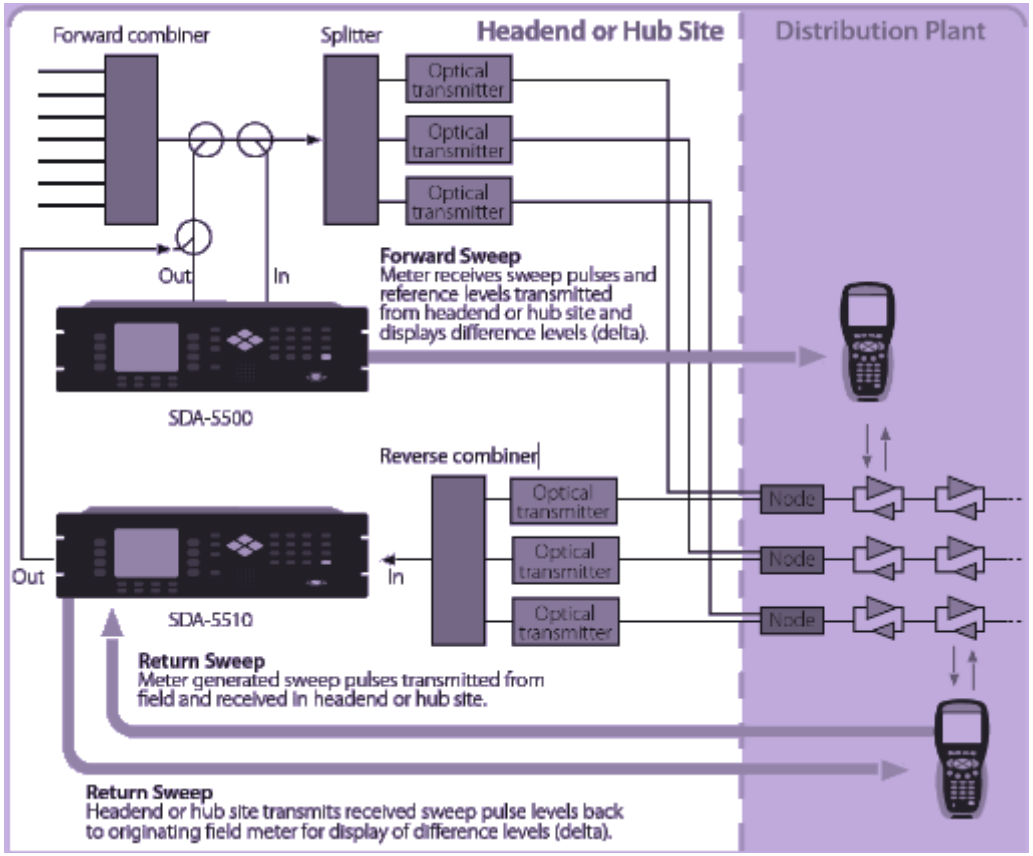
✓SCU - Reverse Sweep

- ✓**Inputs**
  - ✓16 isolated inputs
  - ✓Manual select standard
  - ✓Optional Auto input select
- ✓**Frequency Range**
  - ✓5 to 204 MHz
  - ✓SDA Protocol

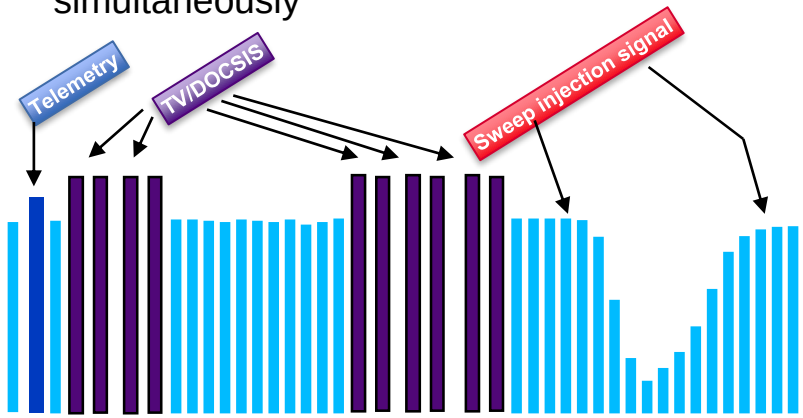
Typical SCU-1800 Connection diagram



For memo: Forward & Reverse Sweep with DSAM 6300

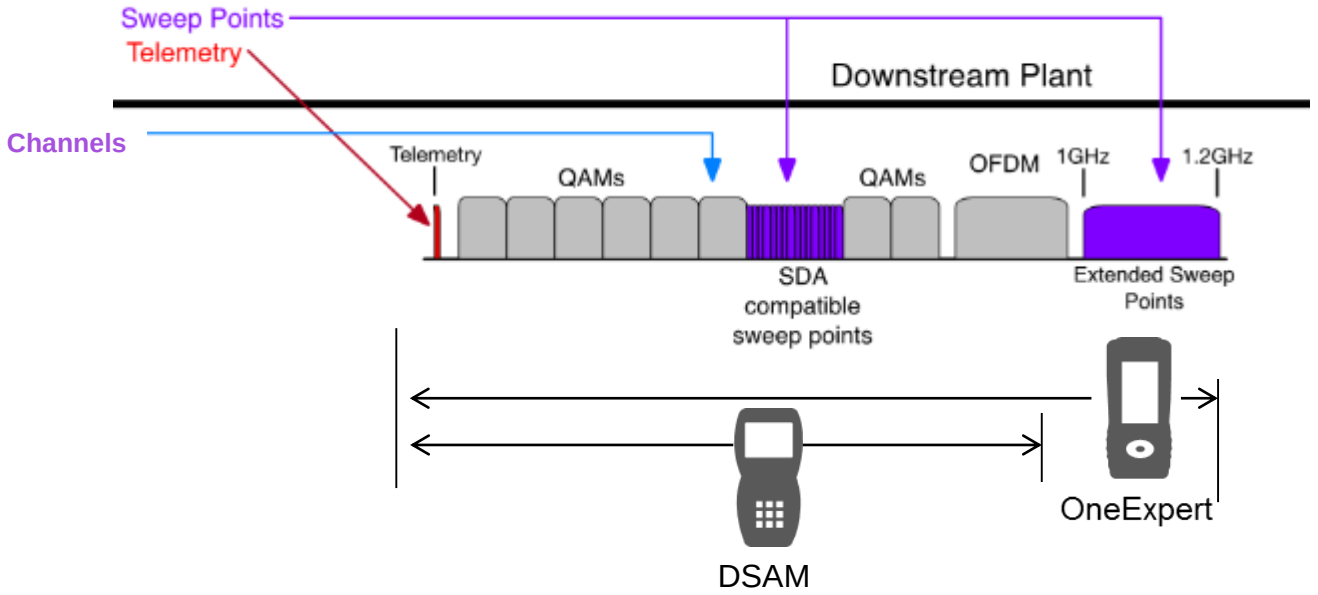


- Provides non-interfering forward and reverse sweep operation
- Continuously provides updating between the headend and field units
- Sweeps analog, digital and DOCSIS carriers
- Covers 4–1000MHz frequency band
- References active carriers with out degrading service quality
- Sweep the return path with up to 10 units simultaneously



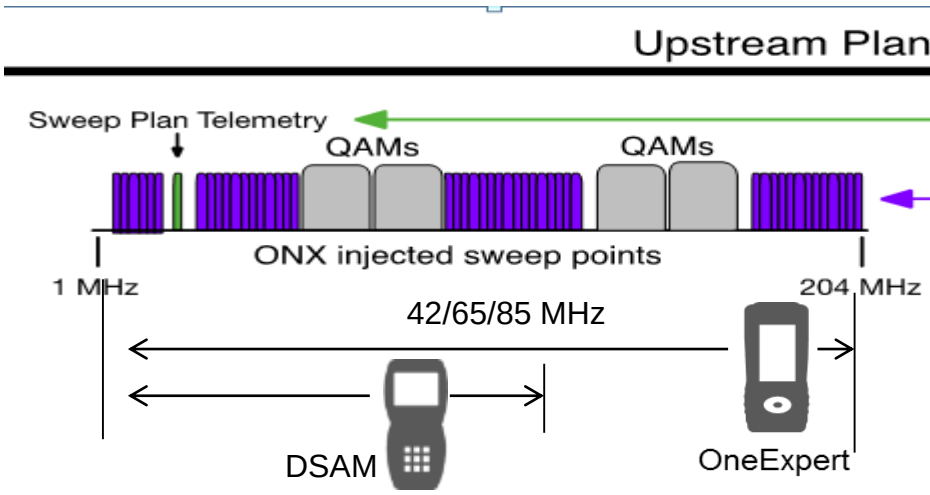
Sweep Beyond 1GHz

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



SCU-1800

Upstream Sweep Telemetry

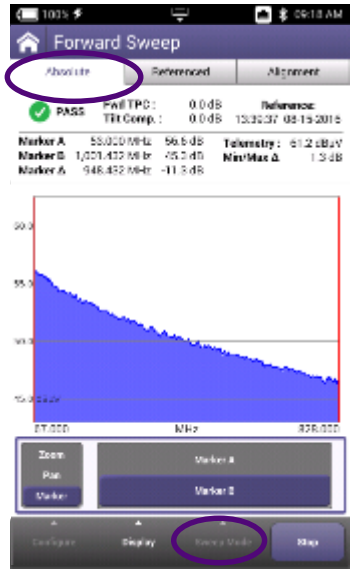
Upstream Sweep Points

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

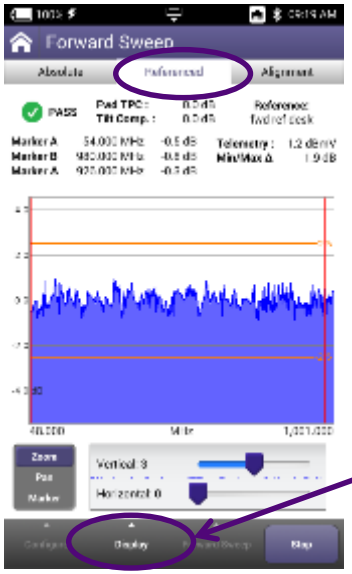
Improved Forward Sweep Workflow

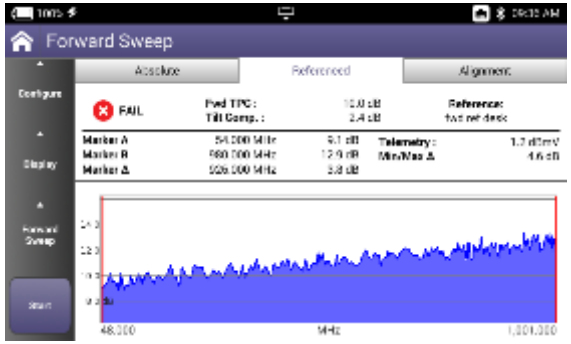
Consolidated sweep screens expedite the test process

View the raw/absolute unreferenced sweep to save as a reference



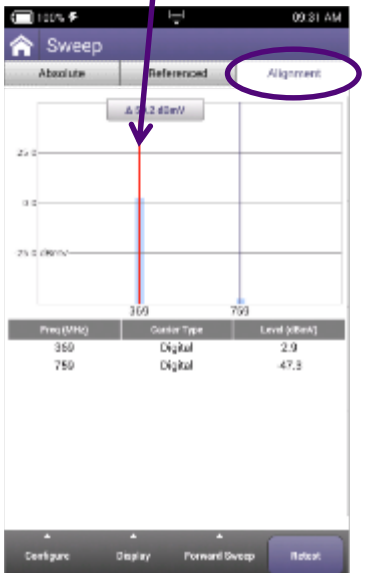
View the normalized referenced sweep to identify issues





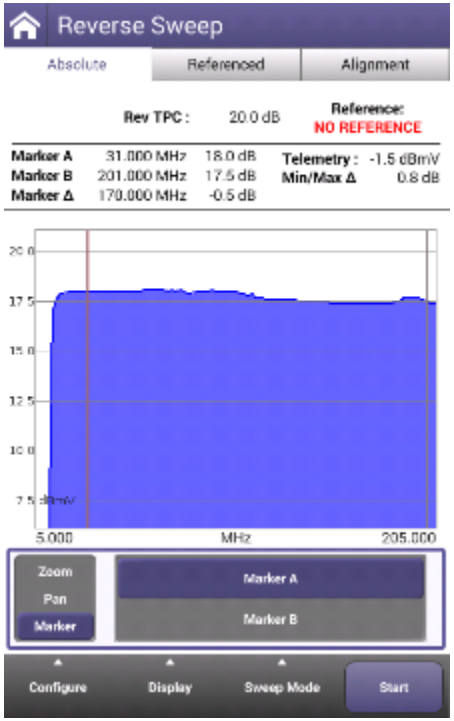
Toggle between Portrait and Landscape mode

Pick tilt carriers for fast gain and alignment check. Sweep points or live carriers



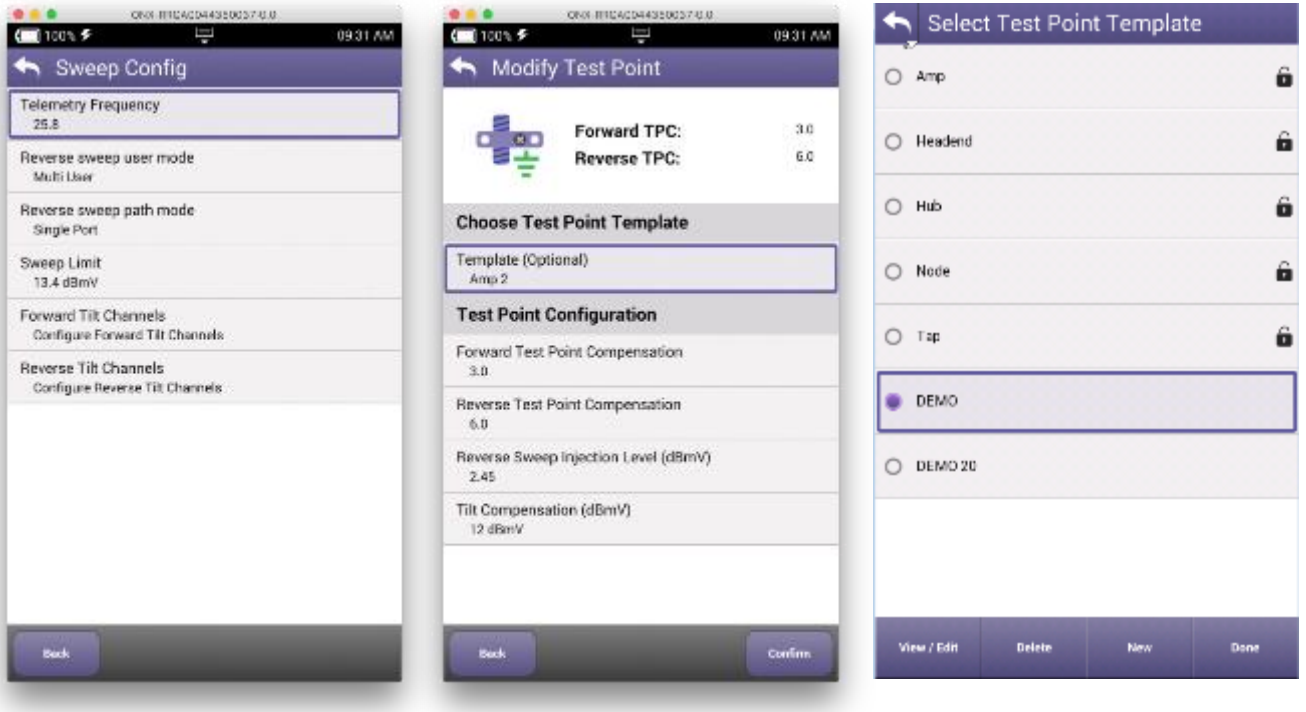
Easily change sweep modes Forward/Reverse

Improved Reverse Sweep



Simplified Templates for Test Point Locations

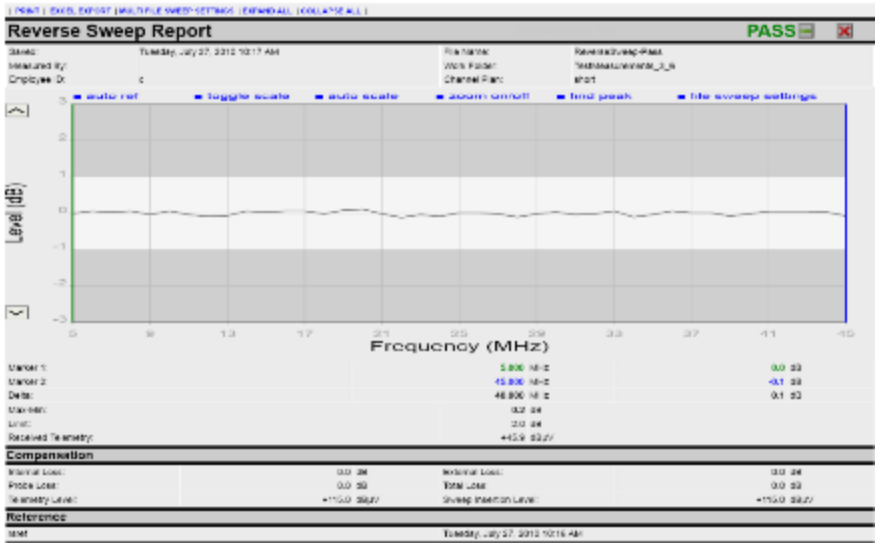
- Configure Test Points for loss and sweep settings
- Easily switch between Test Points at any test
- Multiple test point locations can be customized and stored

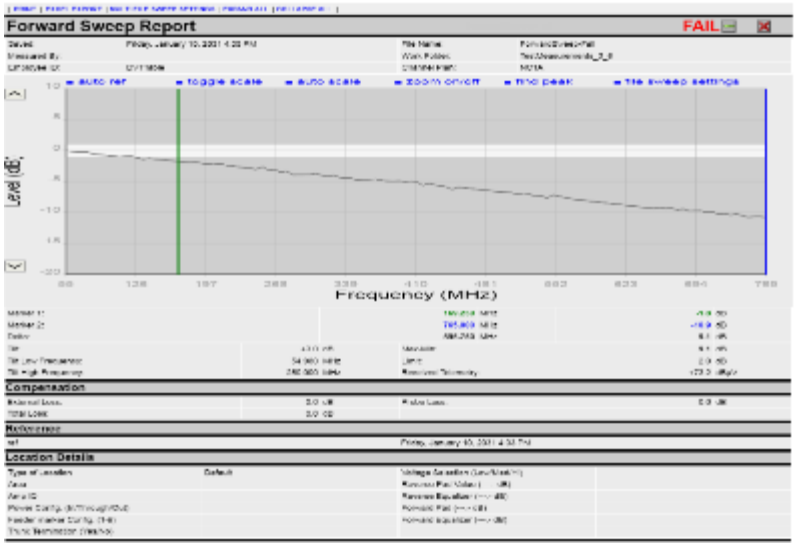


Sweep Reporting – Same reports for ONX and DSAM

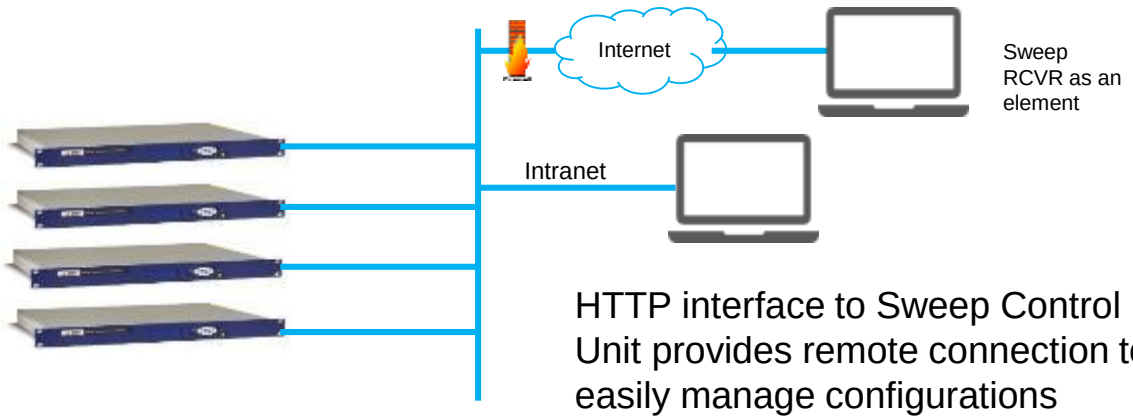
Utilize the same sweep reporting tool in **StrataSync** for DSAM and ONX

- Same flexibility
- Same capability
- Same user interface
- Mix and match reports done from DSAM and ONX for sweep reports
- StrataSync cloud management simplifies usage





Configure Sweep Remotely

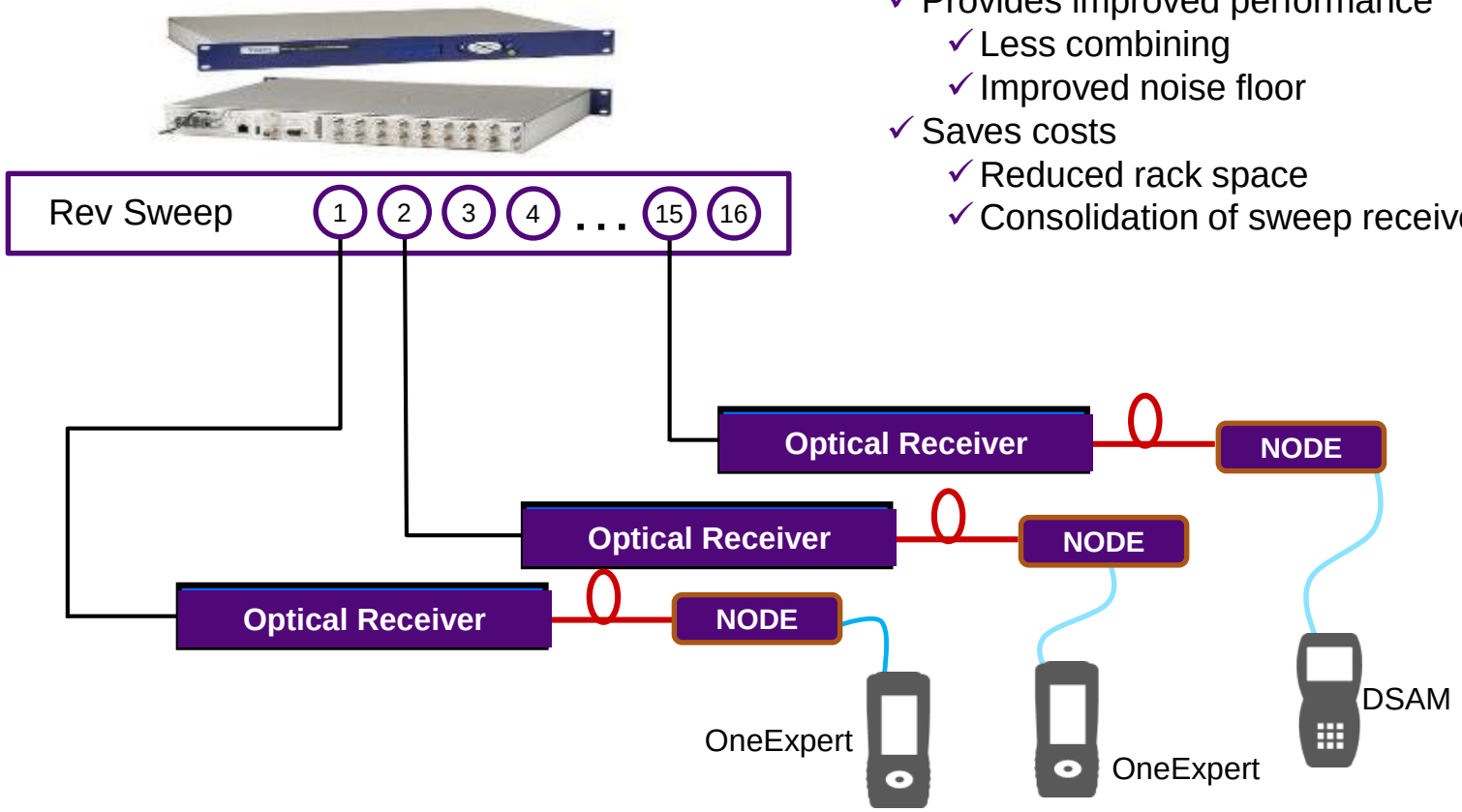


HTTP interface to Sweep Control Unit provides remote connection to easily manage configurations **remotely**

Configure Sweep Locally from a laptop

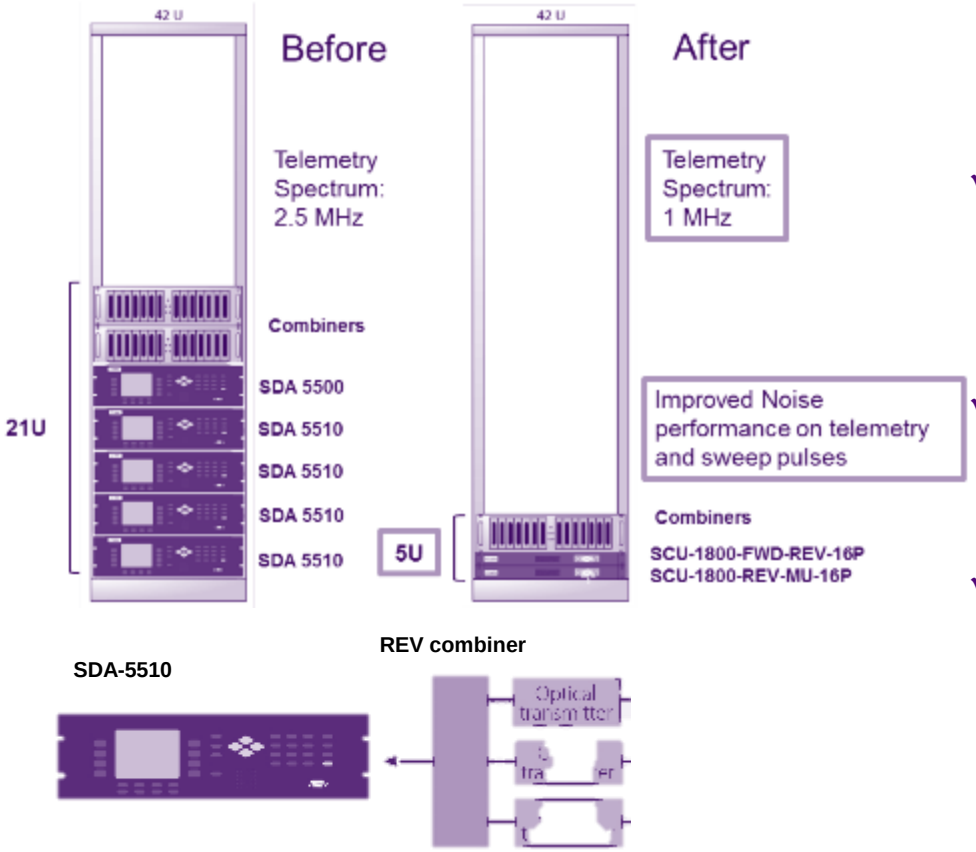
HTTP interface to Sweep Control Unit provides easy access to configurations **locally**

Multiple reverse sweep input ports
Reduces costs and improves performance



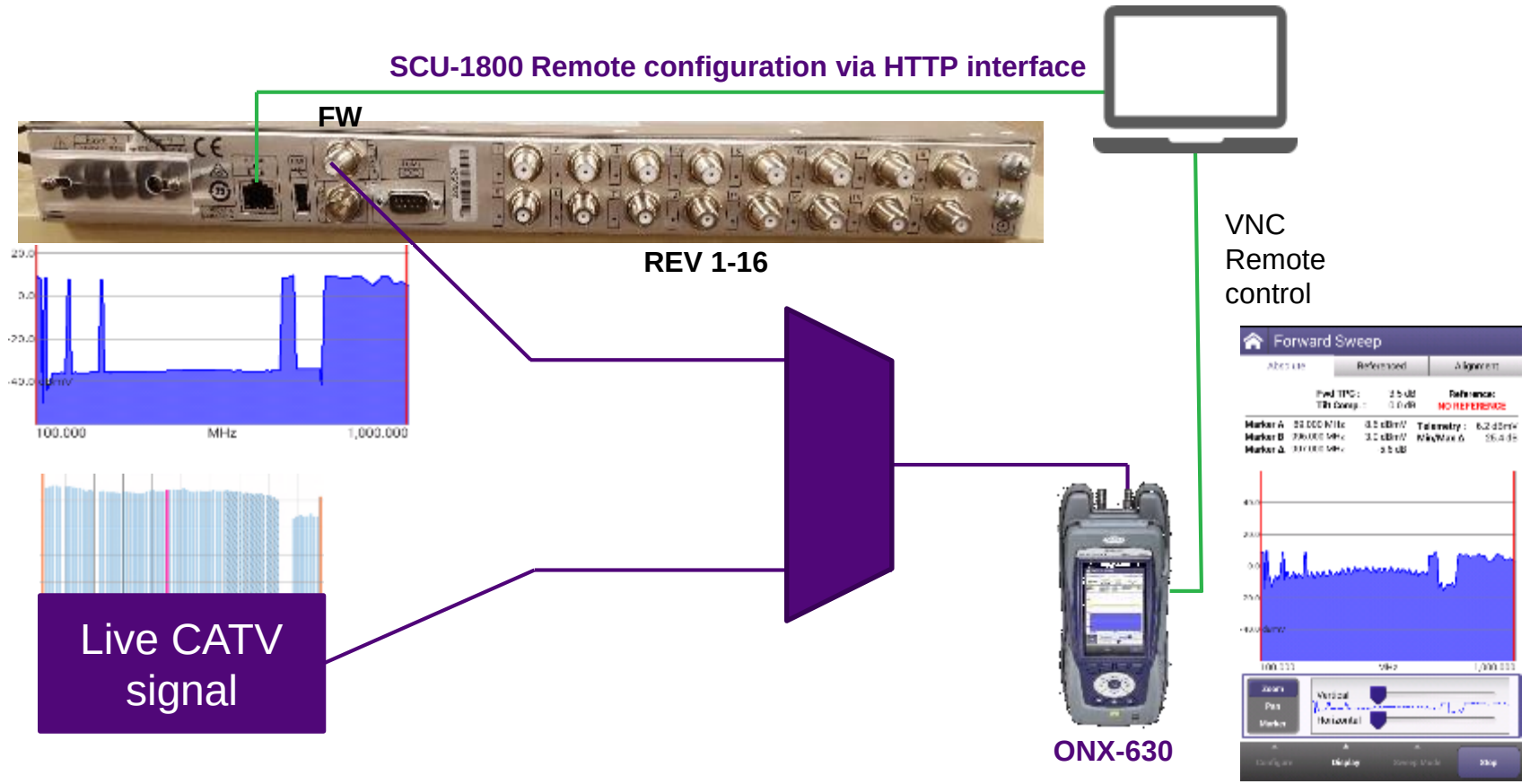
- ✓ Integrated 16 port capability (SW optional)
- ✓ Provides improved performance
  - ✓ Less combining
  - ✓ Improved noise floor
- ✓ Saves costs
  - ✓ Reduced rack space
  - ✓ Consolidation of sweep receivers

SCU-1800 Benefits



- ✓ **Space conserving 1RU sweep control unit with 16 switchable return sweep ports**
  - ✓ Less combining required
  - ✓ Improved noise performance
- ✓ The headend/hub 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 **OneExpert CATV channel plan**
- ✓ Additionally, there is an **auto-fill** capability in which the **sweep points** are automatically injected in **unoccupied spectrum** areas.

Live demo Forward Sweep



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

ONX CATV – Sweep settings

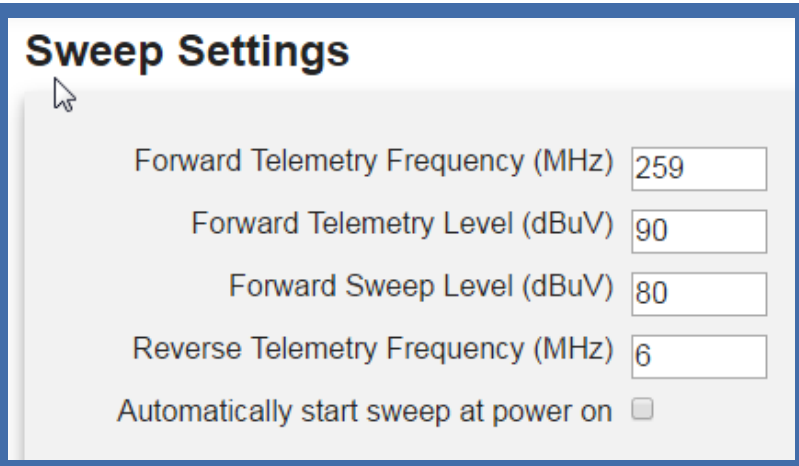
- **Templates, settings for TPC**
- **Method – Operations- Procedures**
- **Examples**
- **Forward Tilt compensation**

Sweep settings examples:

Settings in ONX should match settings in Sweep Control Units

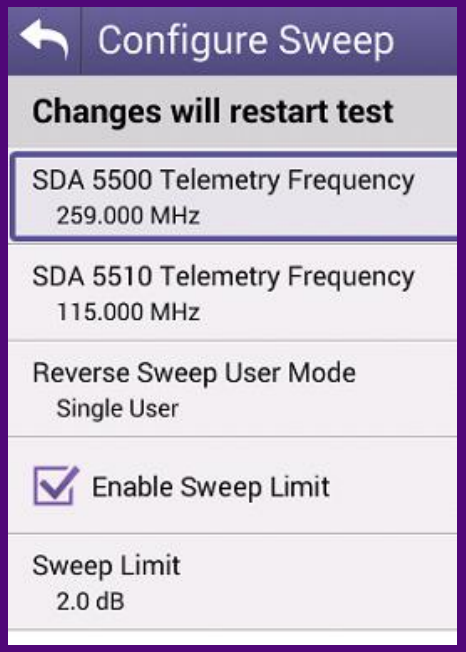
SCU-1800 sweep settings

- ✓ **Forward Telemetry**
  - ✓ Frequency= 259 MHz
  - ✓ Level = 90 dBµV (80-110)
- ✓ **Forward Sweep**
  - ✓ Level = 80 dBµV (80-110)
- ✓ **Reverse Telemetry**
  - ✓ Frequency= 6 MHz



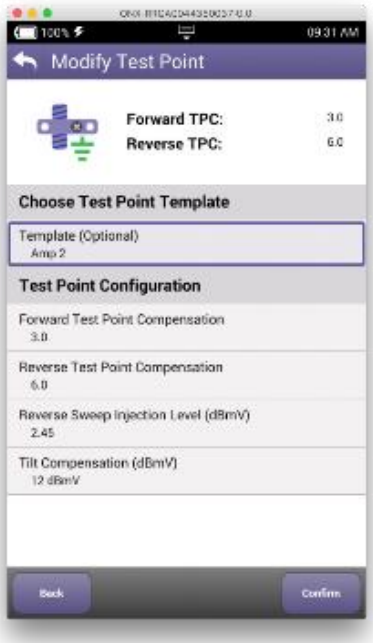
✓ **ONX sweep settings**

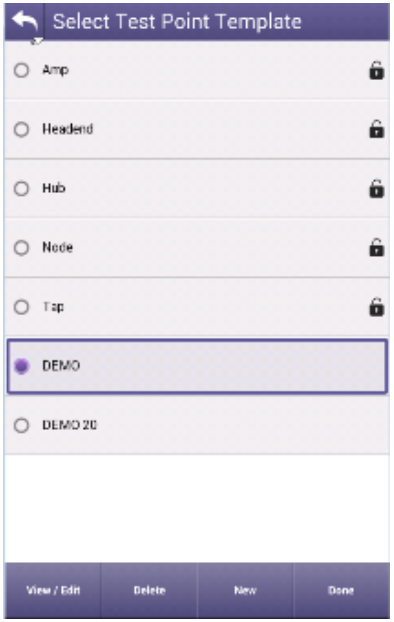
- ✓ SDA5500 Telemetry = Forward Telemetry
  - ✓ Frequency= 259 MHz
- ✓ SDA5510 Telemetry = Forward Telemetry
  - ✓ Frequency= 259 MHz
- ✓ Reverse sweep User mode
  - ✓ Single user (SDA5500)
  - ✓ Multiple user (SDA5510)
- ✓ Sweep limits (0-20dB)



ONX: Templates for Test Point Locations

- Configure Test Points for loss and sweep settings
- Easily switch between Test Points at any test
- Multiple test point locations can be customized and stored



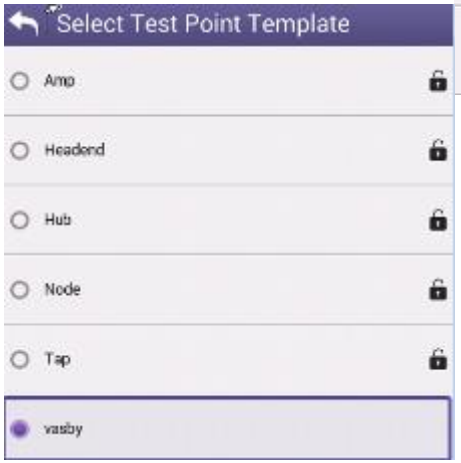


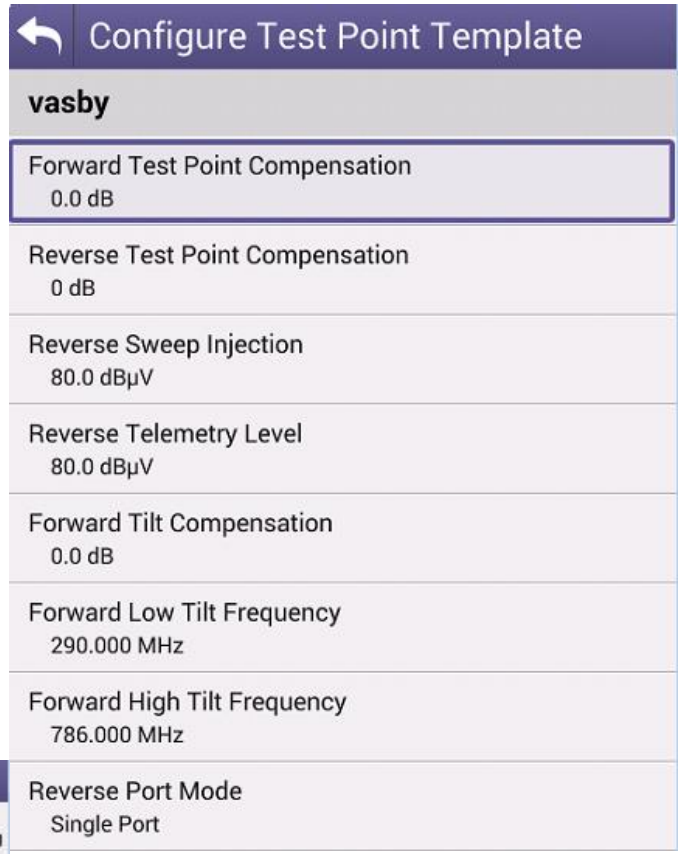
ONX: Test Point Template settings

- **Forward TPC** Test Point Compensation (-100, +100 dB)
- **Reverse TPC** Test Point Compensation (-100, +100 dB)
- **Reverse Sweep injection** (68-113 dBµV)
- **Reverse Telemetry Level** (68-113 dBµV)

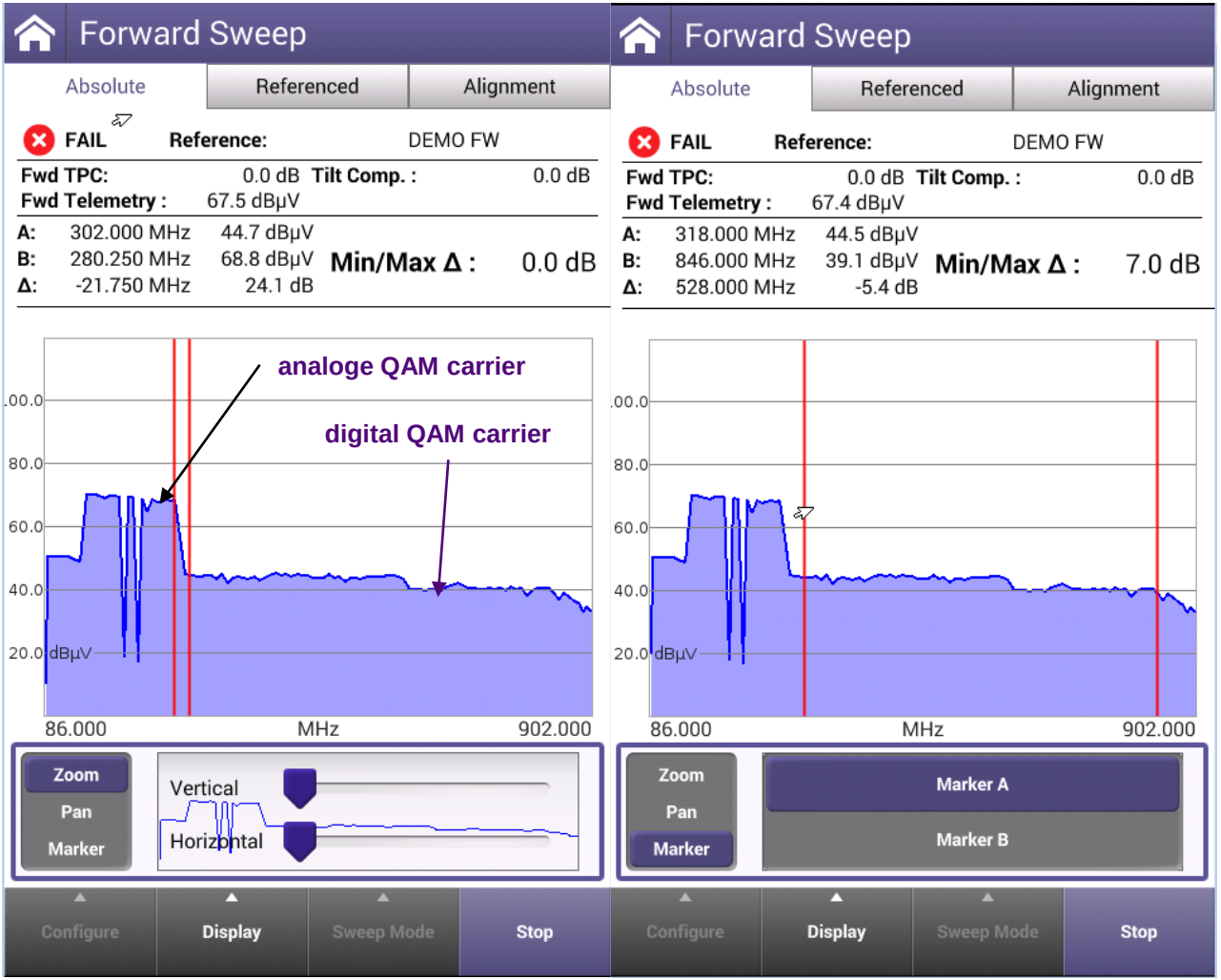
- **Forward Sweep Tilt Compensation** (-100, +100 dB)
- **Forward sweep Low Tilt Frequency**
- **Forward sweep High Tilt Frequency**

- **Reverse Port mode**
  - Single port (port 1 – ONX)
  - Dual port (port 1=FW, port 2=RV)

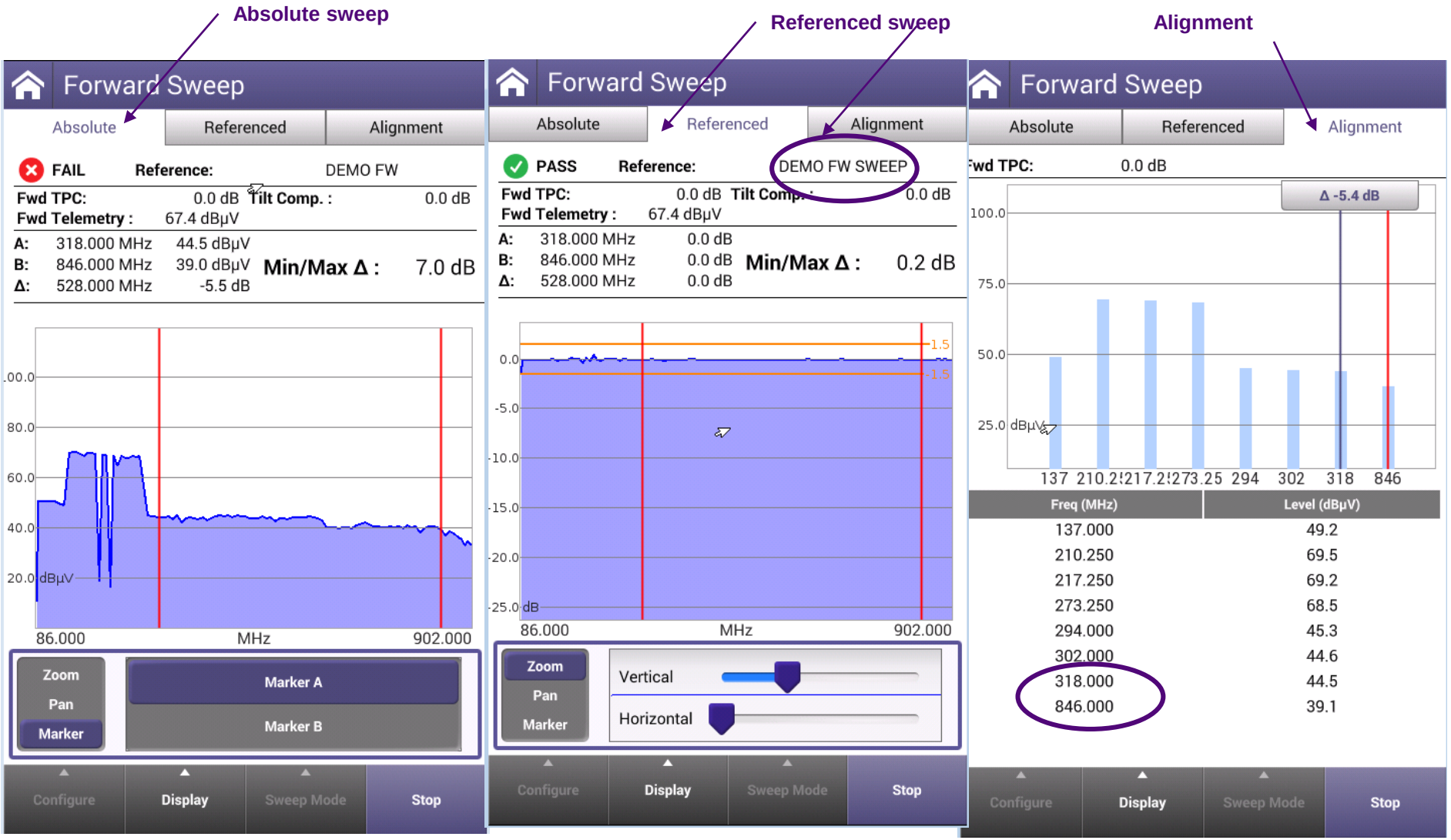




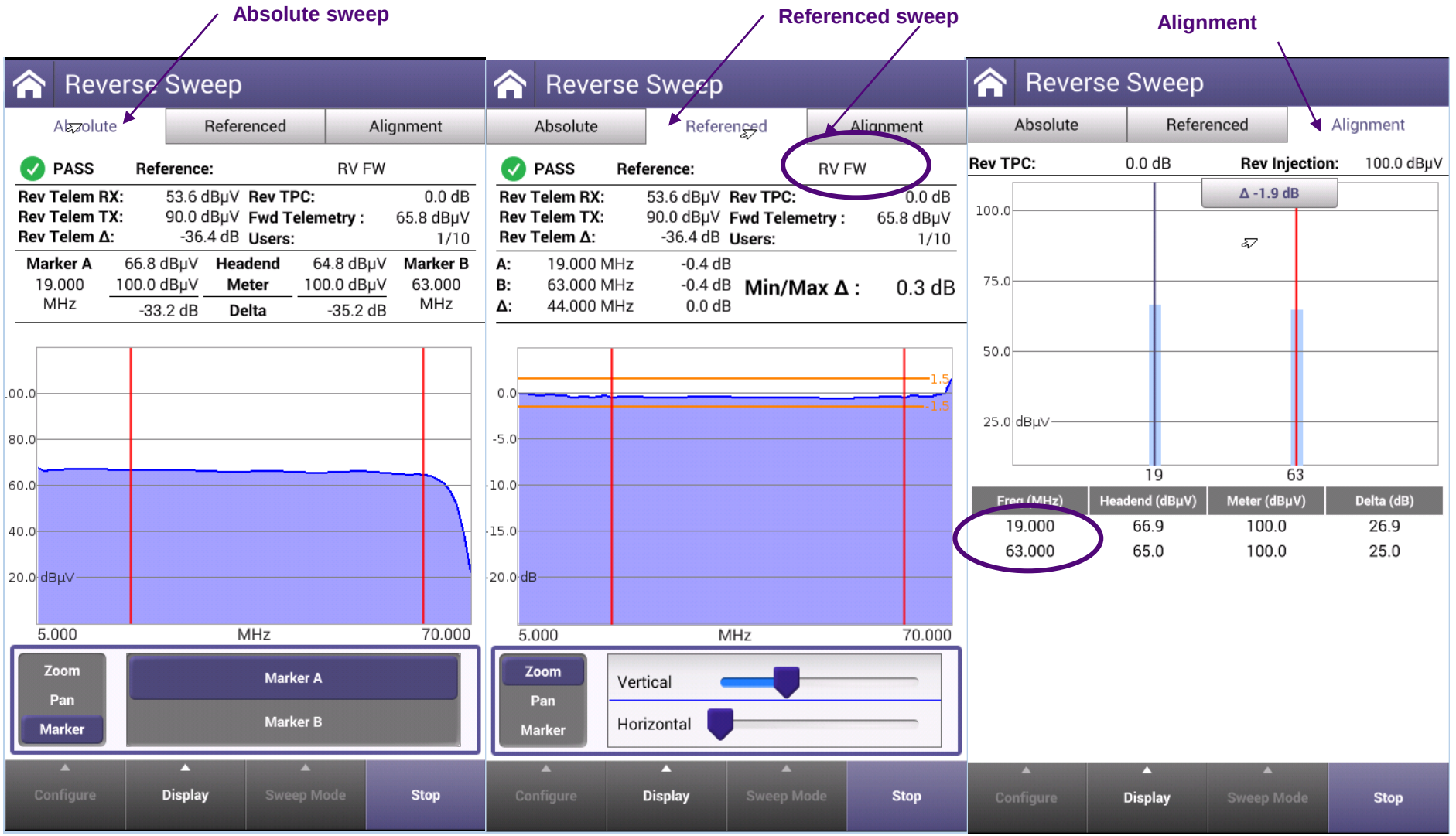
Forward Sweep Example



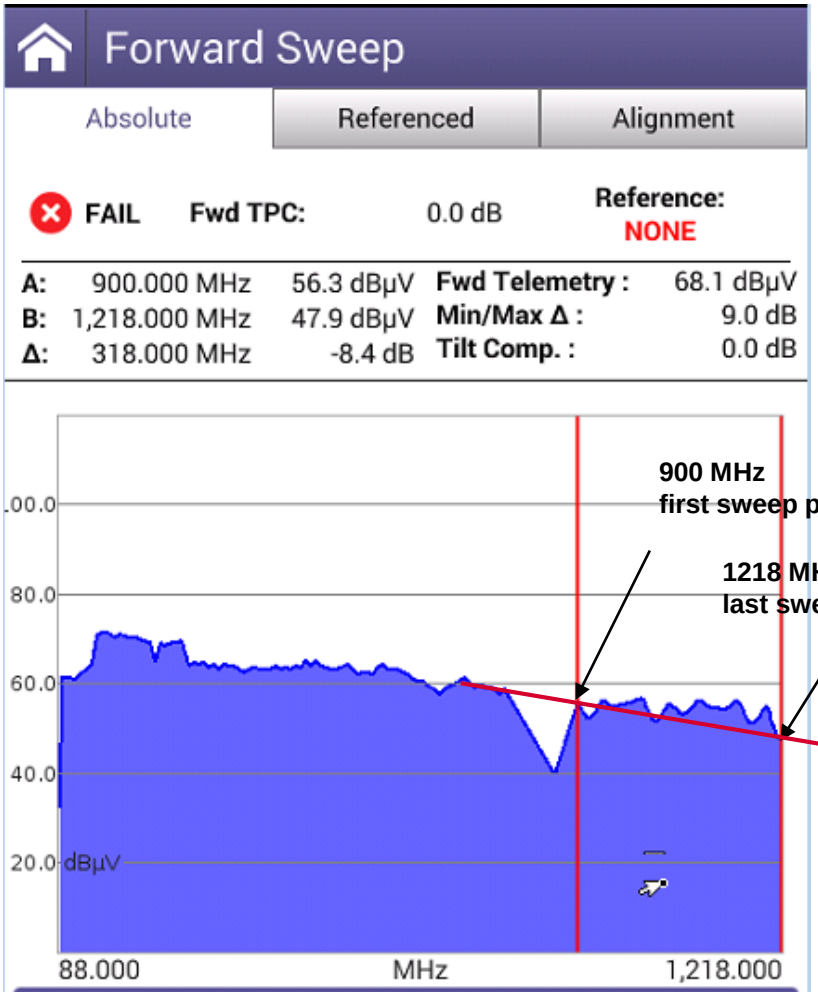
Forward Sweep Example



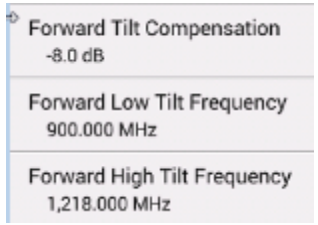
Reverse Sweep Example

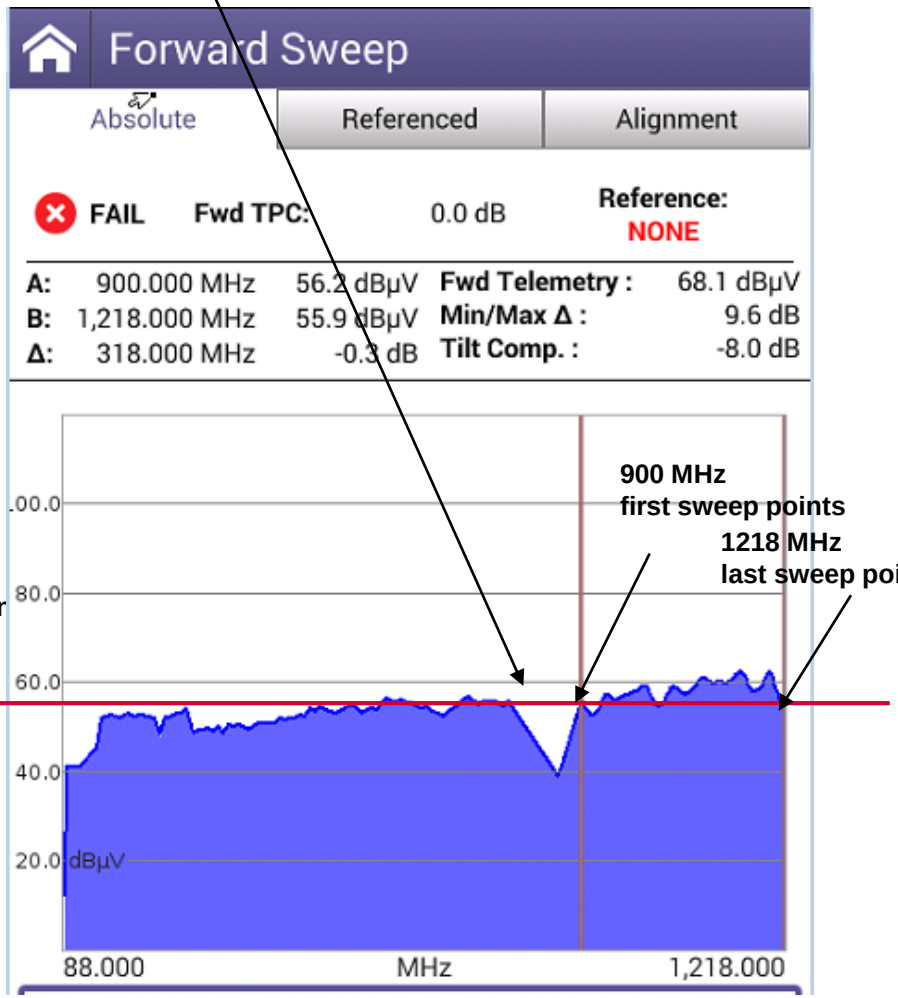


Forward Tilt Compensation

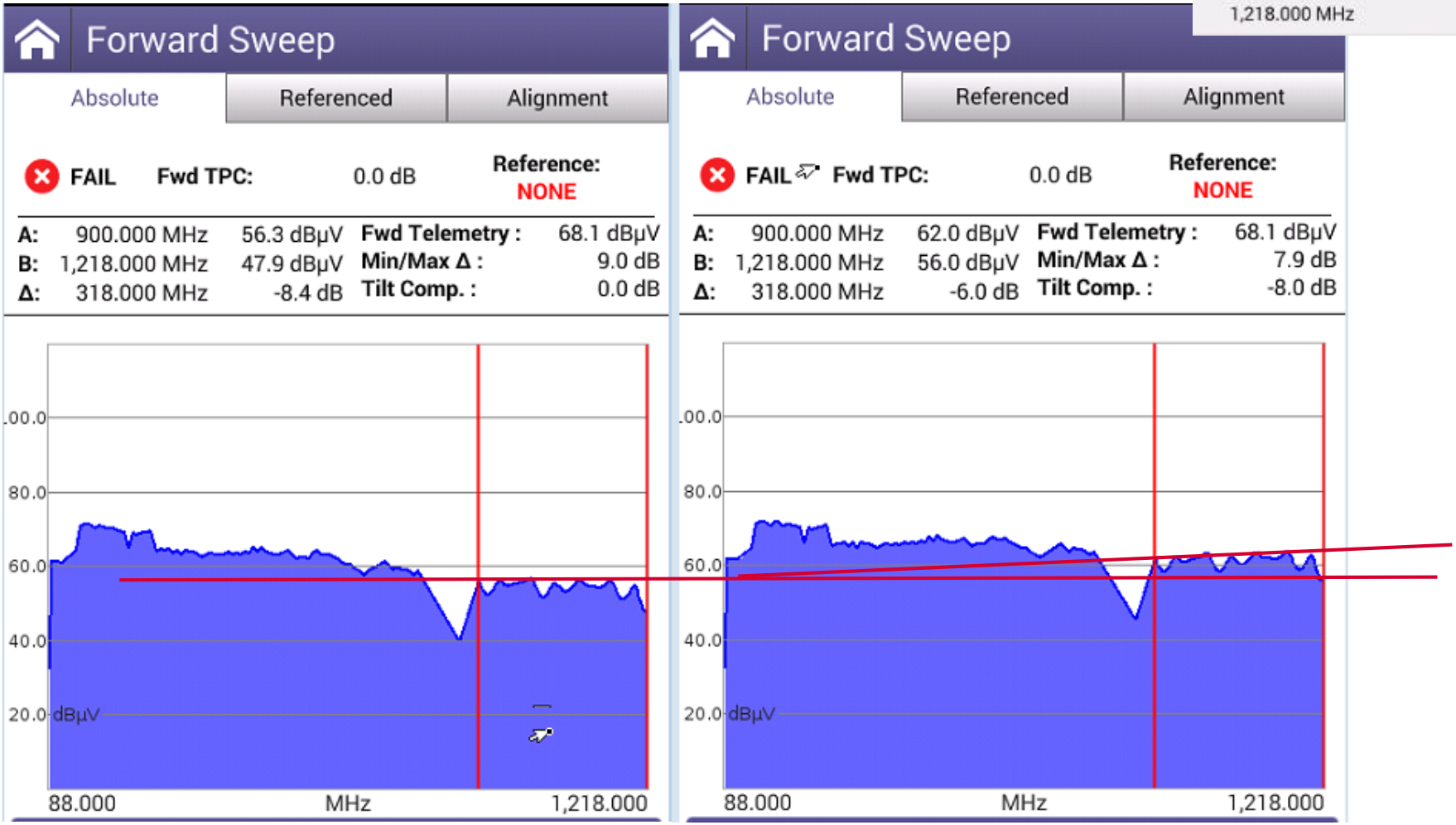


Apply sweep tilt compensation

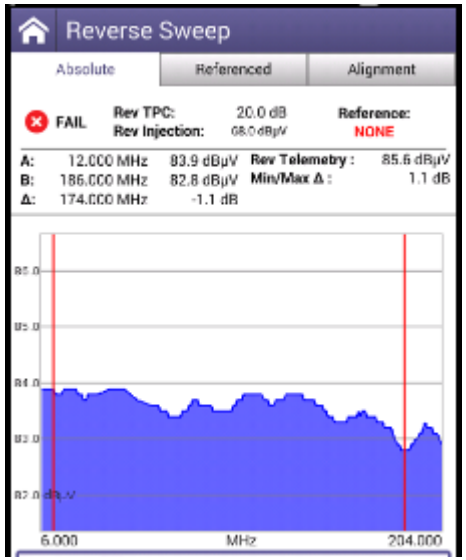


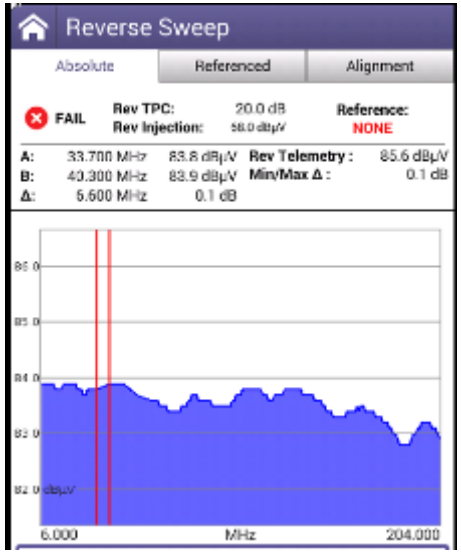


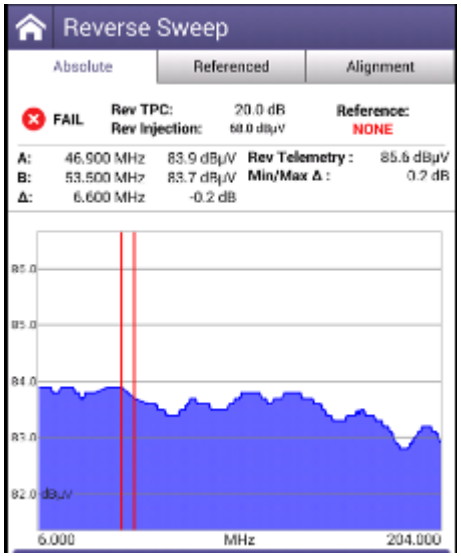
Forward Tilt Compensation

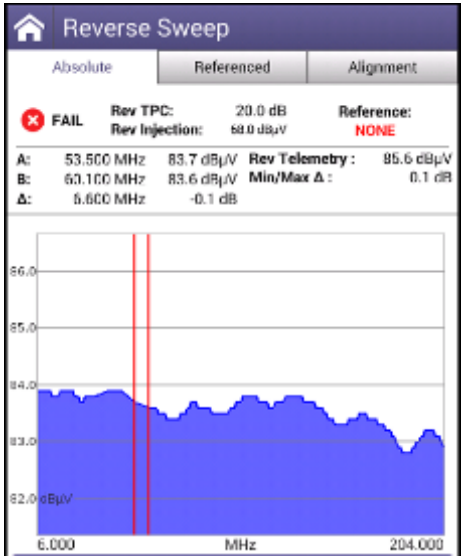


Reverse Sweep example





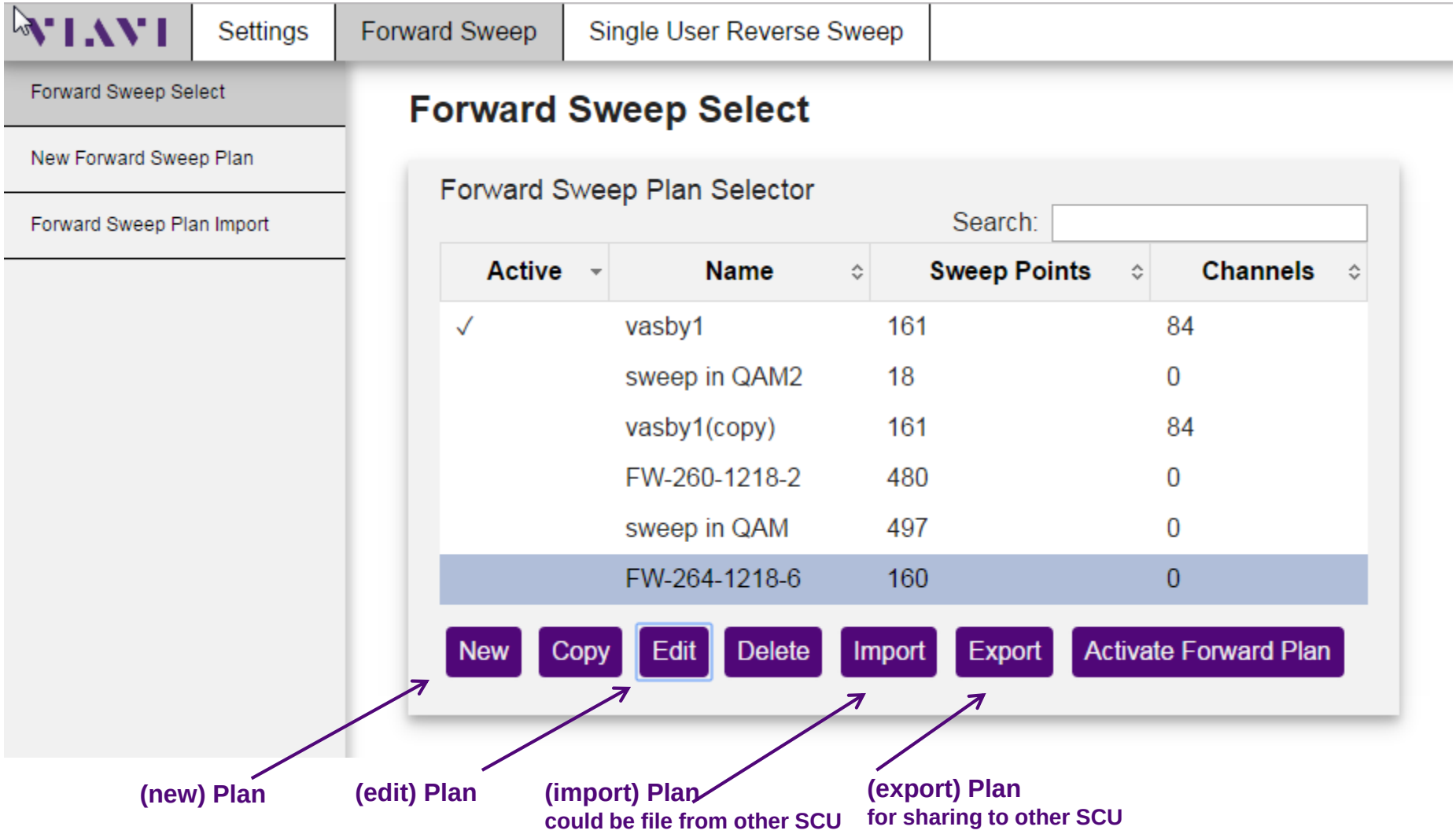




SCU-1800 – Sweep settings
- forward sweep
- new forward sweep plan (edit, build)
- save channel plan with ONX
- Examples

SCU-1800 Forward Sweep Configuration

SCU-1800 web access
user: **scuadmin**
password: **scuadmin**



(new) Plan

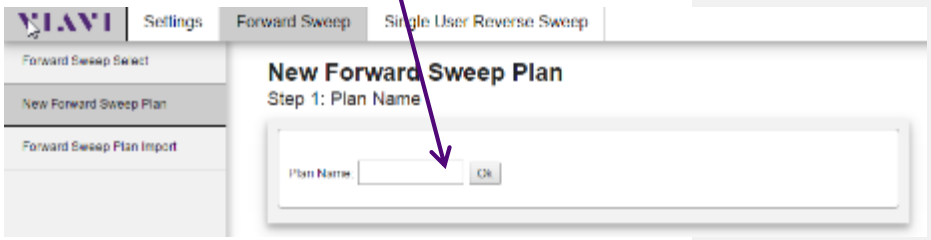
(edit) Plan

(import) Plan
could be file from other SCU

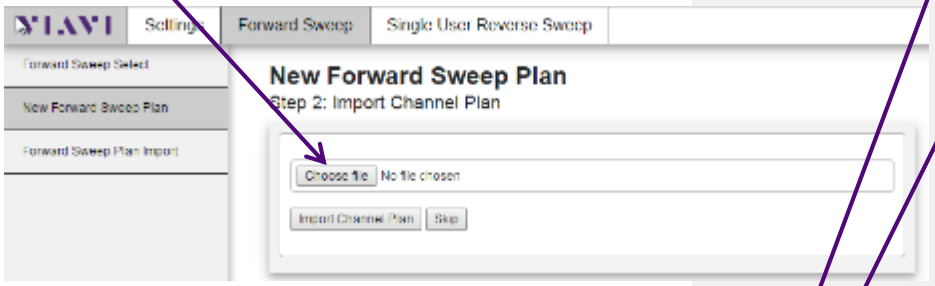
(export) Plan
for sharing to other SCU

New Forward Sweep Plan

Step1: (new) Plan name

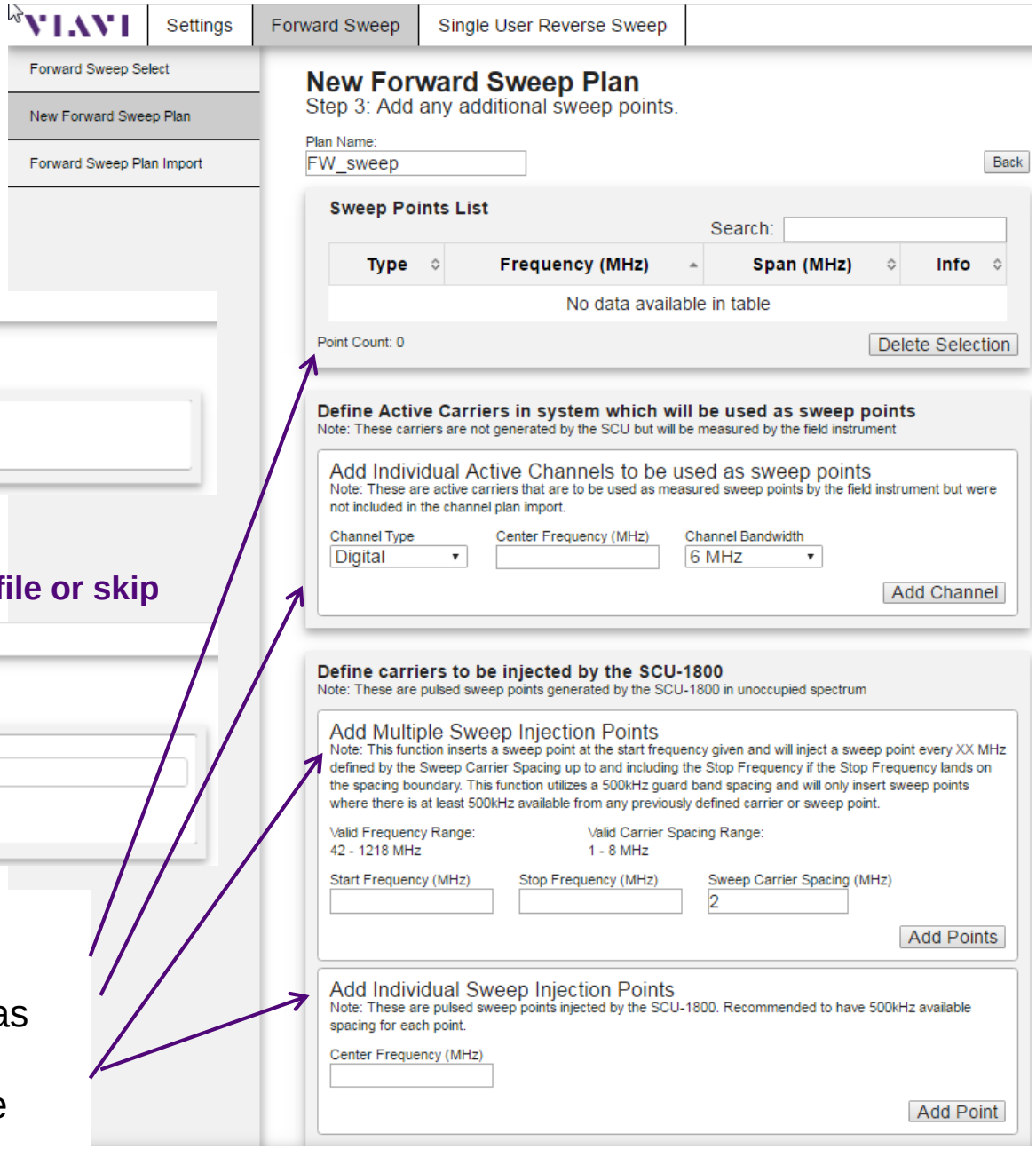


Step2: import channel plan from file or skip

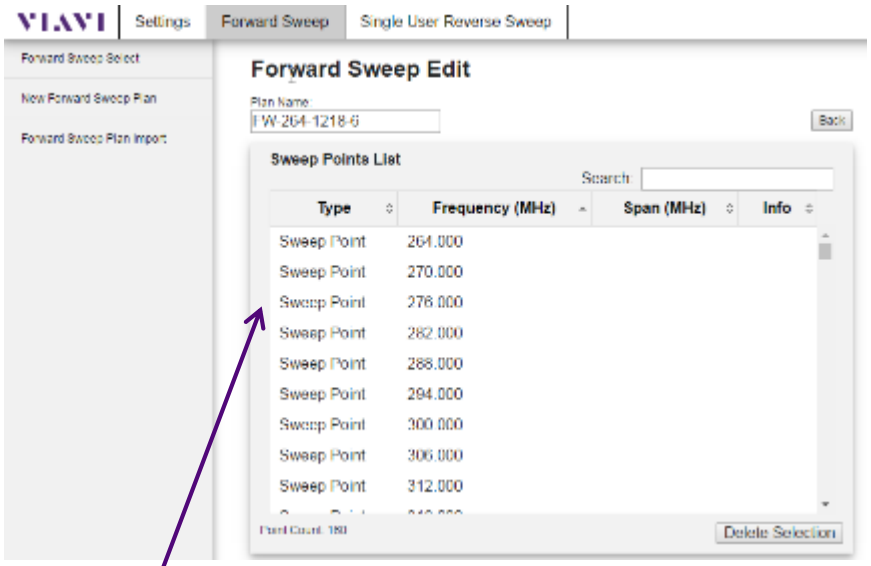


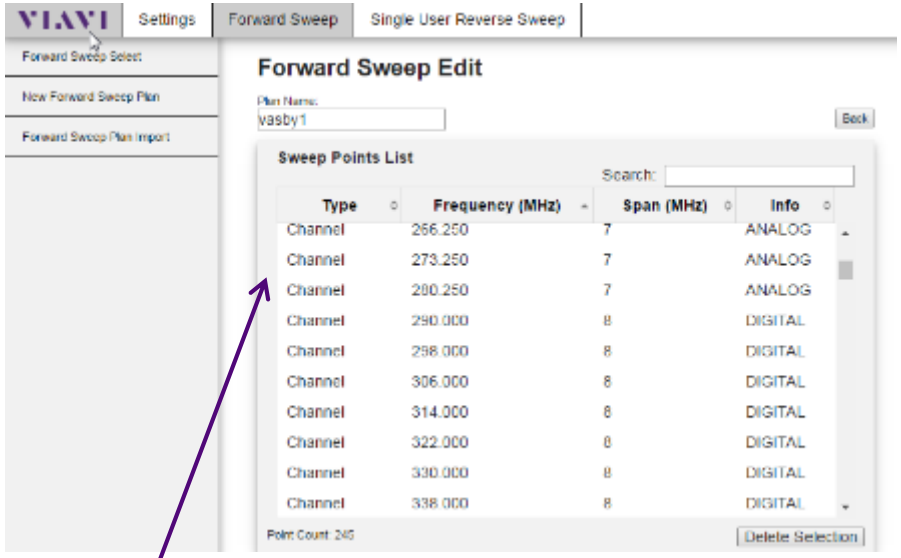
Step3: new forward sweep plan

- ✓ Sweep point list
- ✓ Define active carriers to be used as sweep points
- ✓ Define sweep points carriers to be injected (Multiple or individual)



Edit Forward Sweep Plan

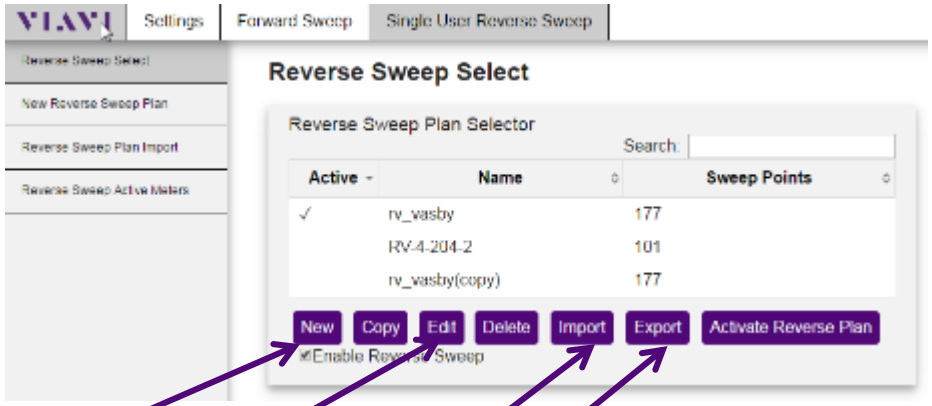


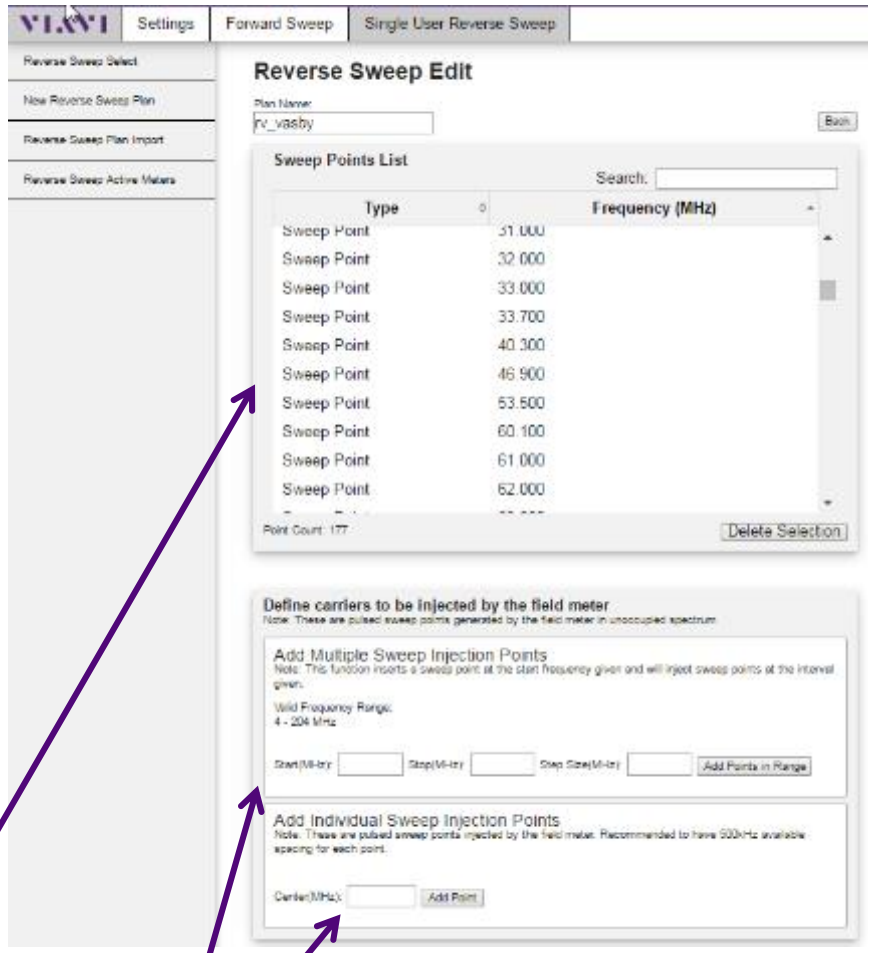


- **Sweep point** list
- Define sweep points carriers to be injected (Multiple or individual)

- **Sweep points** (channel) list
- Define active carriers to be used as sweep points

Build Reverse Sweep Plan





(new) Plan

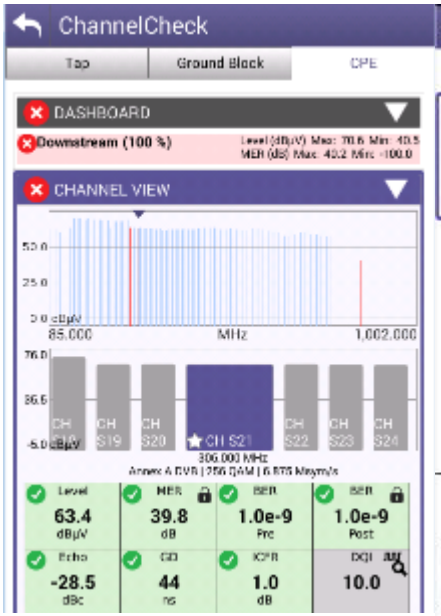
(edit) Plan

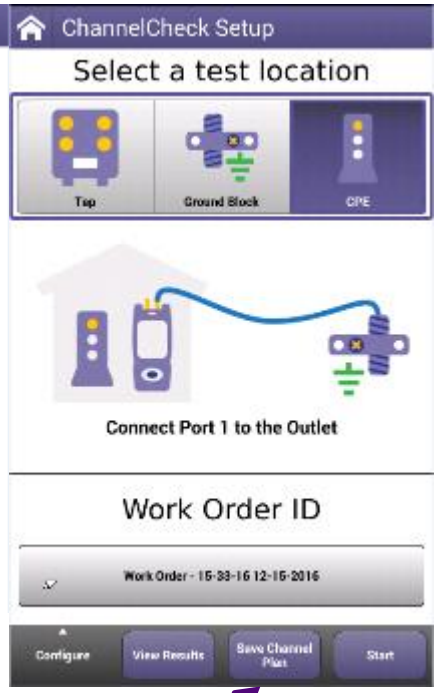
(import) Plan
(a saved file from other SCU)

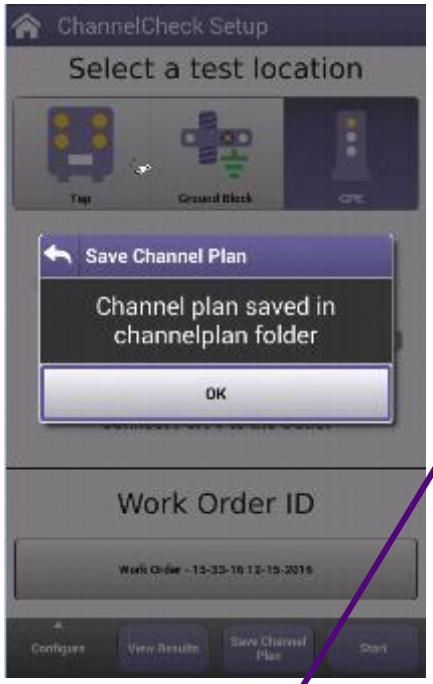
(export) Plan
(for sharing to other SCU)

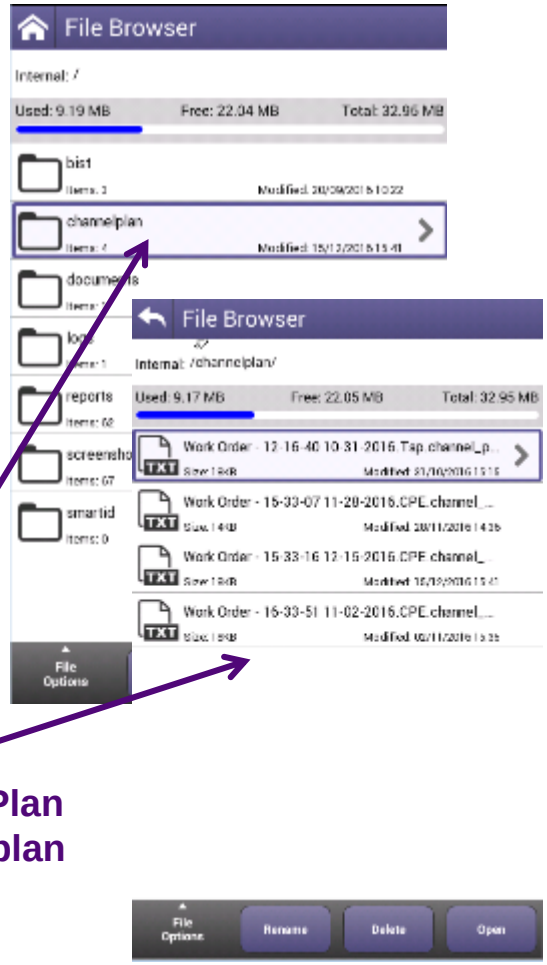
- **Sweep point** list
- Define sweep points carriers to be injected (Multiple or individual)

Save Channel Plan with ONX CATV









- ✓ **Step1: ChannelCheck**
- ✓ **Step2: Save Channel Plan**
- ✓ **Step3: Channel Plan saved in channel plan folder**
- ✓ **Step4: export channel plan to USB or StrataSync**
- ✓ **Step5: Retrieve channel plan and import file (json) into SCU-1800**

ONX CATV - StrataSync - Test Results

StrataSync – ONX CATV test result

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onx50094

Save view | Save view as... | Customize view | Schedule Email

FILTERS & VIEWS

Download Report

Actions For 0 selected record(s)

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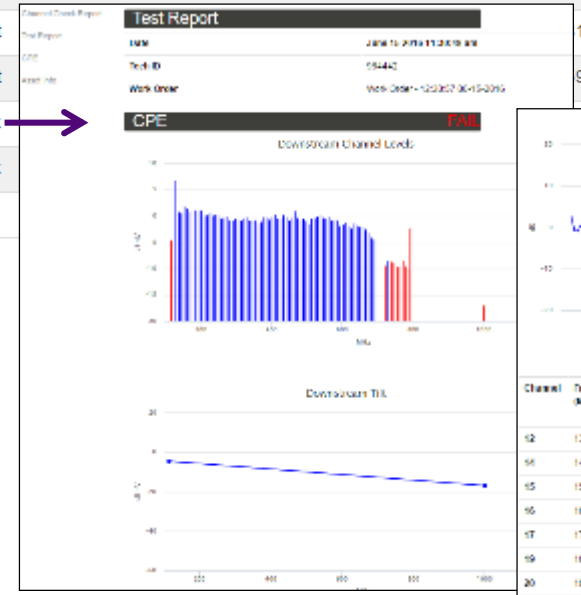
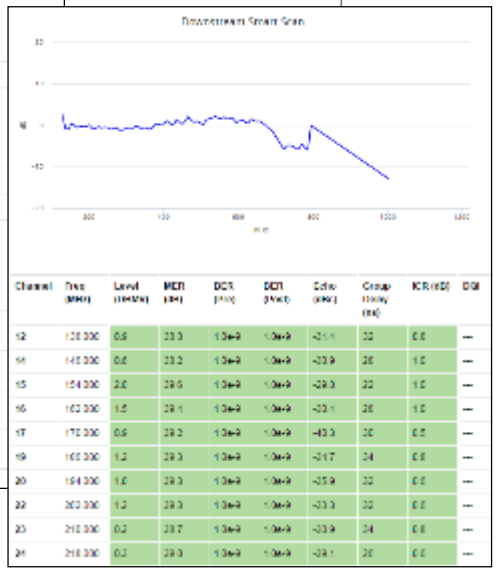
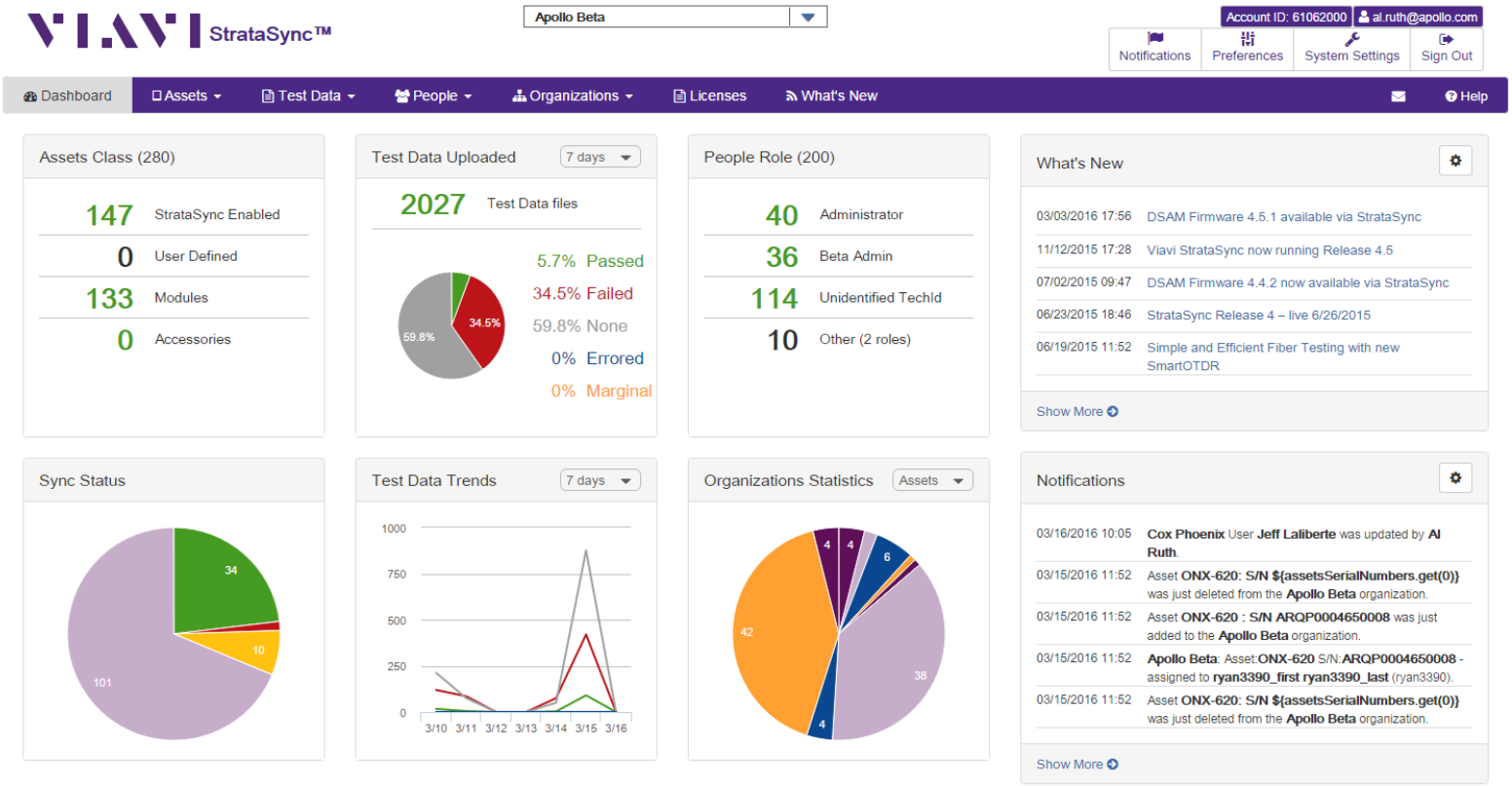
Asset Type	Asset Serial No	Asset Unique ID	Data Type	Data Format	Status	Creation Time	Filename	Full p filena
		ARQA0001150094,				This week		
OneExpert CATV	ARQA0001150094	ARQA0001150094	channelcheck	application/zip	None	06/13/2016 15:47	Work Order - 11:23:16 06...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	TESTDATA	application/zip	None	06/14/2016 14:59	session.Work Order - 13:...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	sessionexpert			1	session.Work Order - 12:...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	sessionexpert			9	session.Work Order - 13:...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	channelcheck					
OneExpert CATV	ARQA0001150094	ARQA0001150094	channelcheck					
OneExpert CATV	ARQA0001150094	ARQA0001150094	docsischeck					



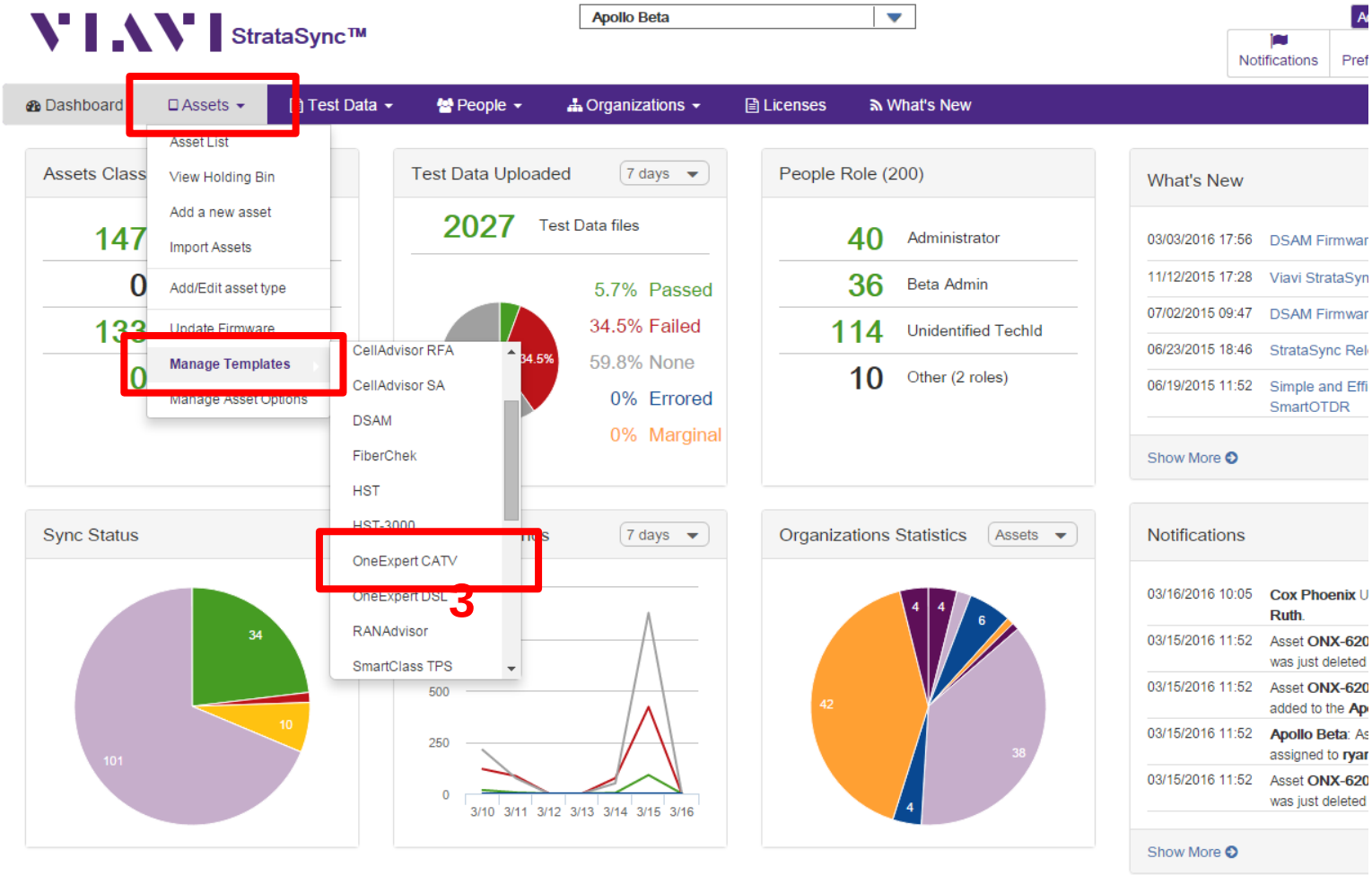


StrataSync – Cloud-Based Meter Management

- All high-level features for StrataSync are accessible from the main landing page
- Asset and Test Data information is displayed and details are available

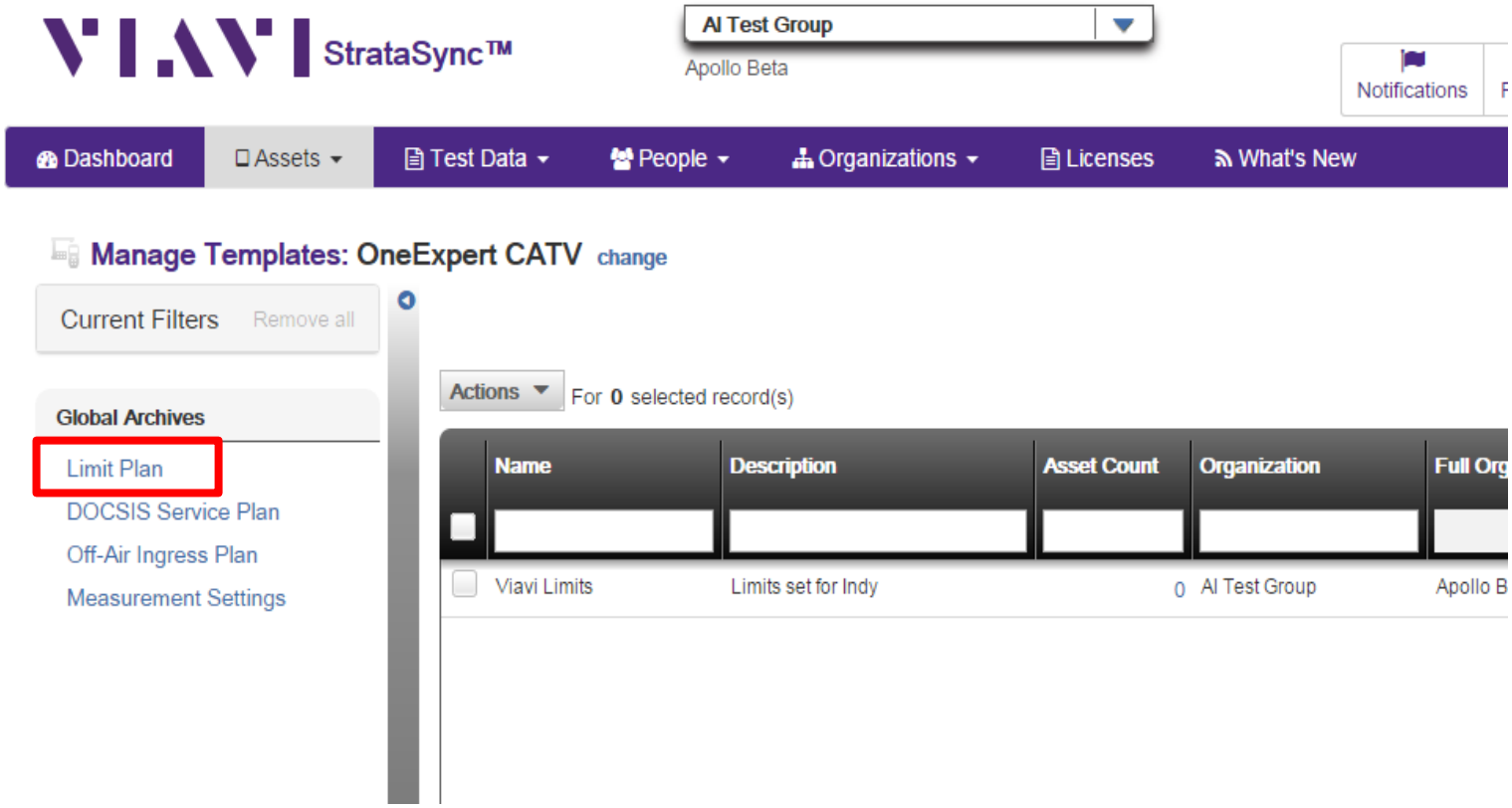


To access Configuration Templates

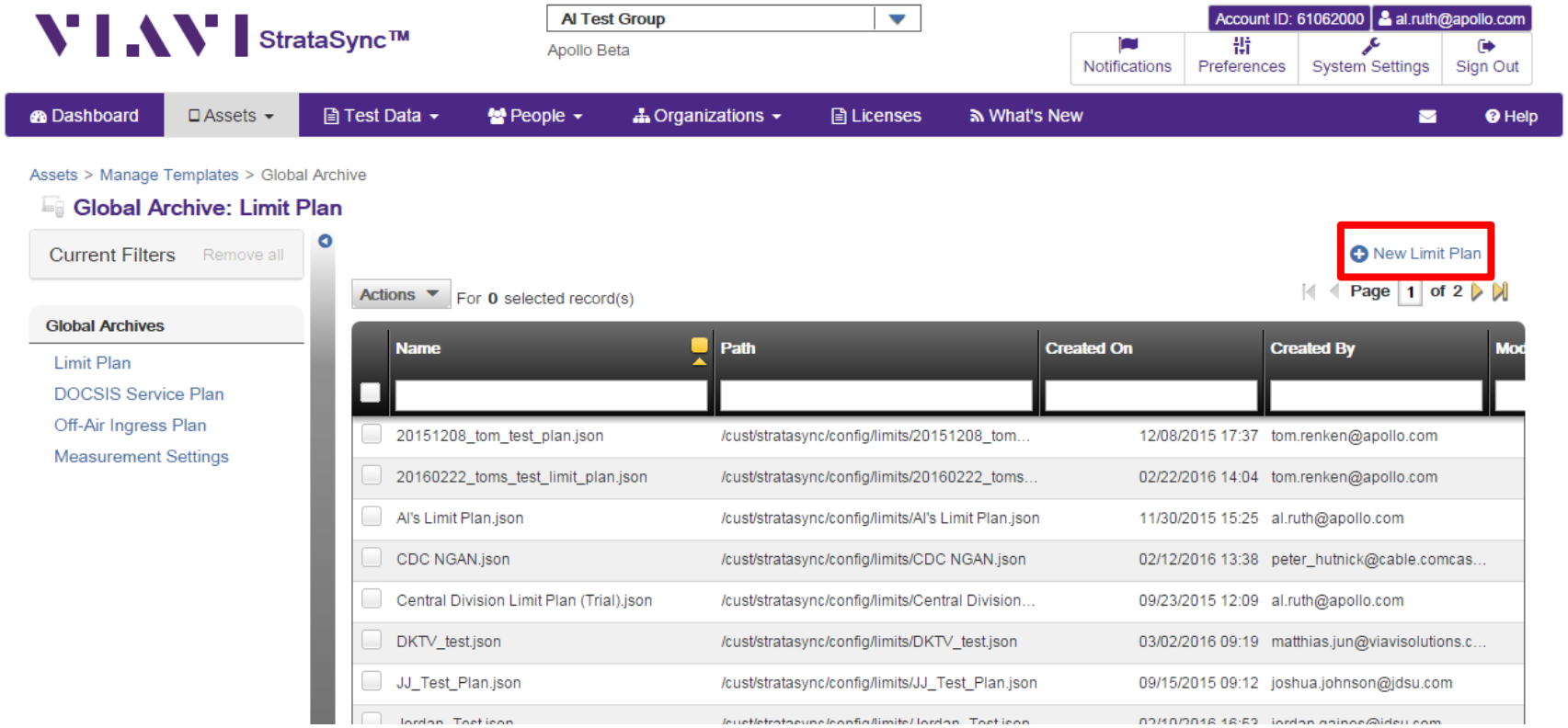


Access or Create a New Limit Plan

- Limit Plans determine when a test result will end up being a Pass or Fail in relation to thresholds set
- In the Template screen, click on one of the selections in the “Global Archives” bubble on the left of the screen
- Users can create Limit Plans, DOCSIS Service Plans, Off Air Ingress Plans, and default Measurement Settings



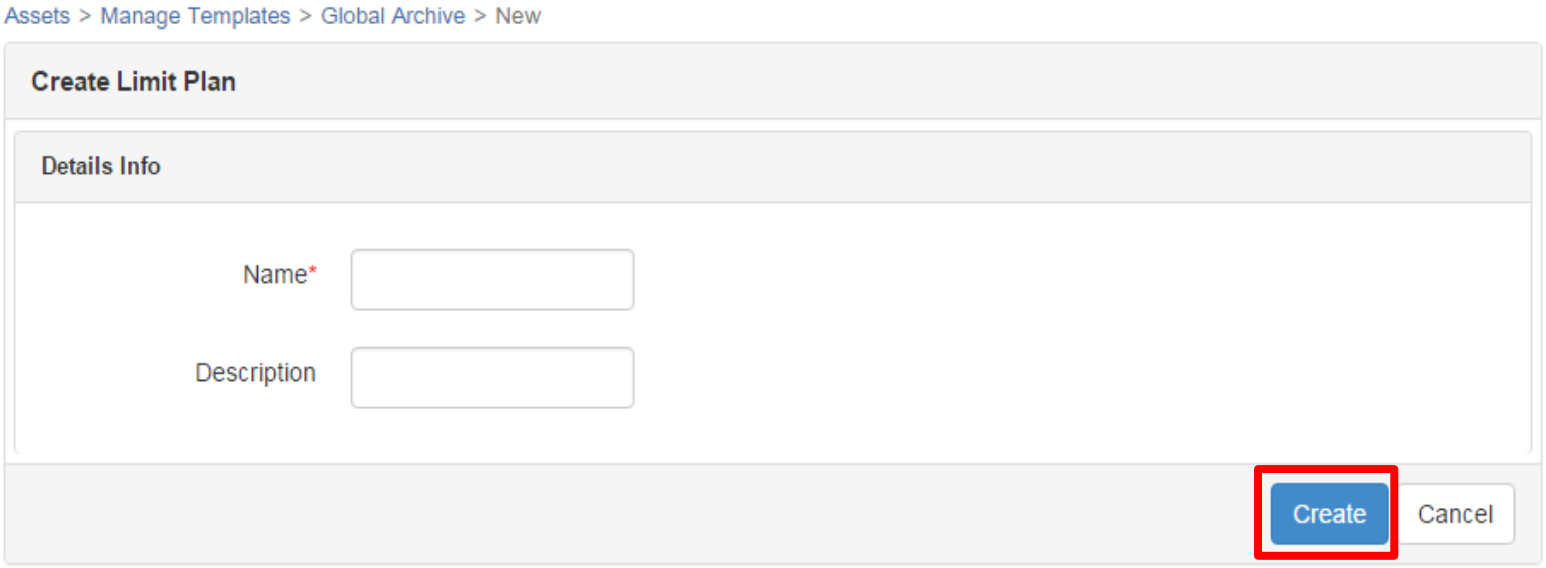
Limit Plan Window



- Choose from existing Limit Sets or select New Limit Plan

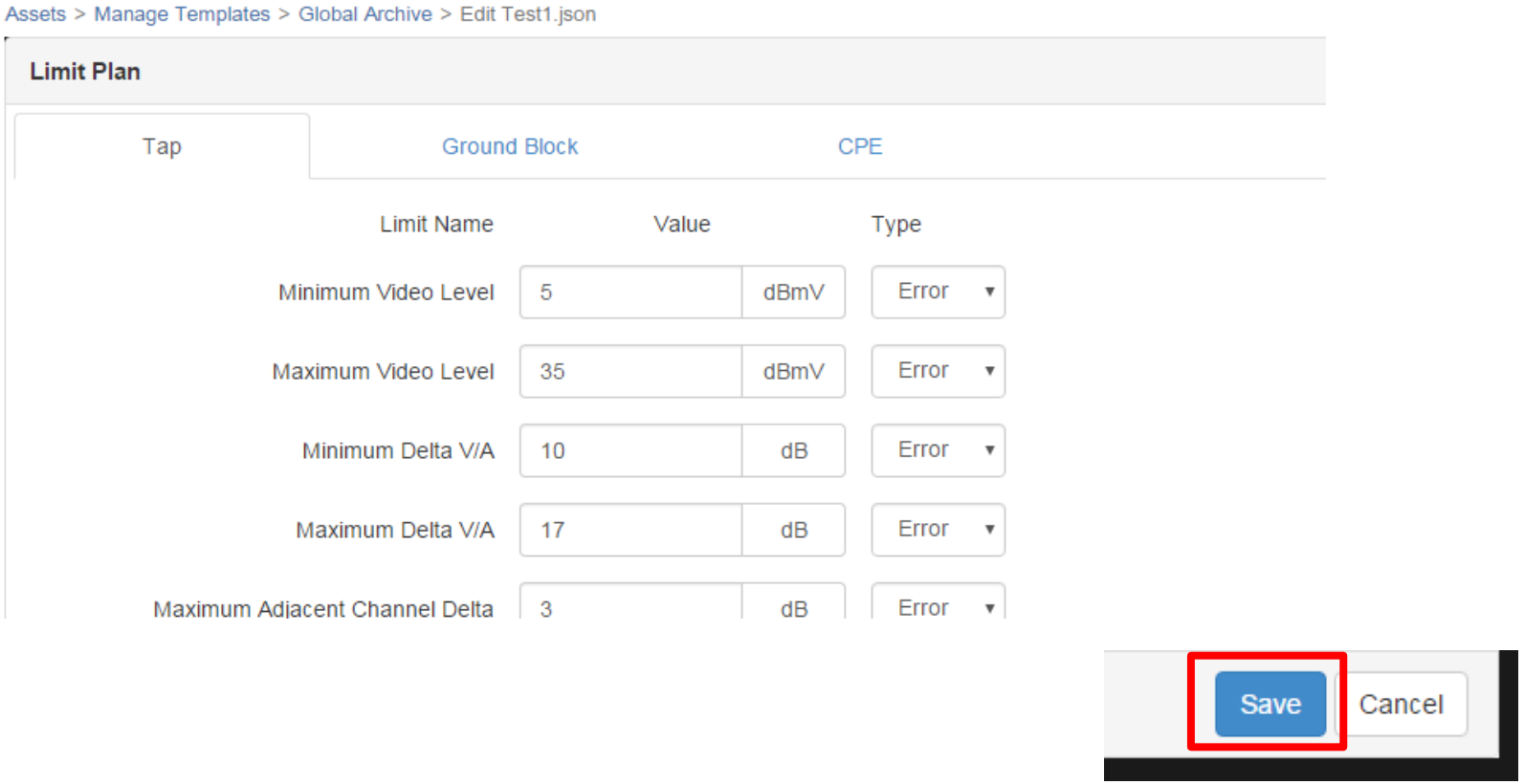
Limit Plan Creation – Name New Limit Plan

- Enter Limit Plan name and Description and select Create



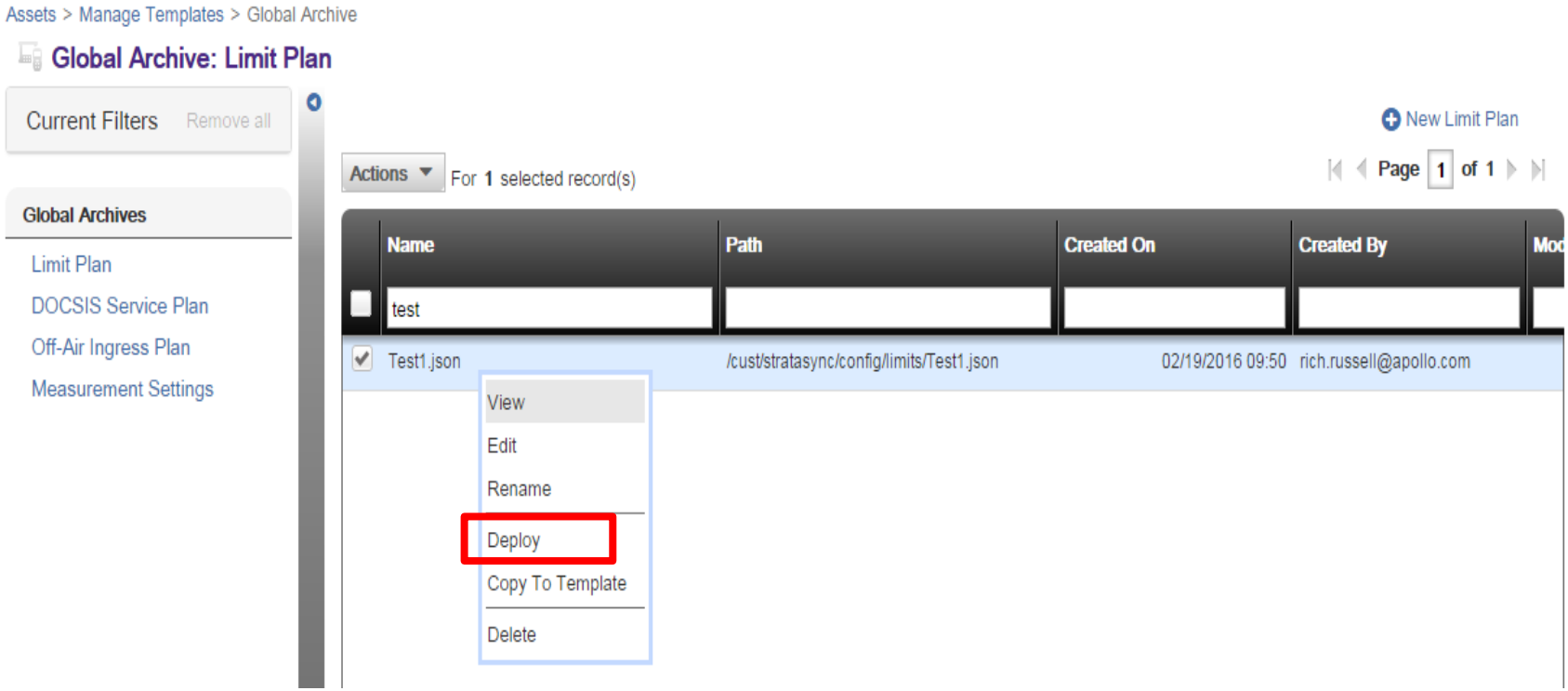
Limit Plan Creation – Editing Limit Values/Types

- Set Limits for Tap, Ground Block or CPE
- The Type of limit is also selectable –
  - Error = Pass if results meet the limit requirements or Fail if results exceed limit
  - Warning = Pass but No Fail – rather the measurement is highlighted to bring attention to it if the result exceeds the limit
  - None = Test result is shown but no Pass or Fail criteria is applied to the result



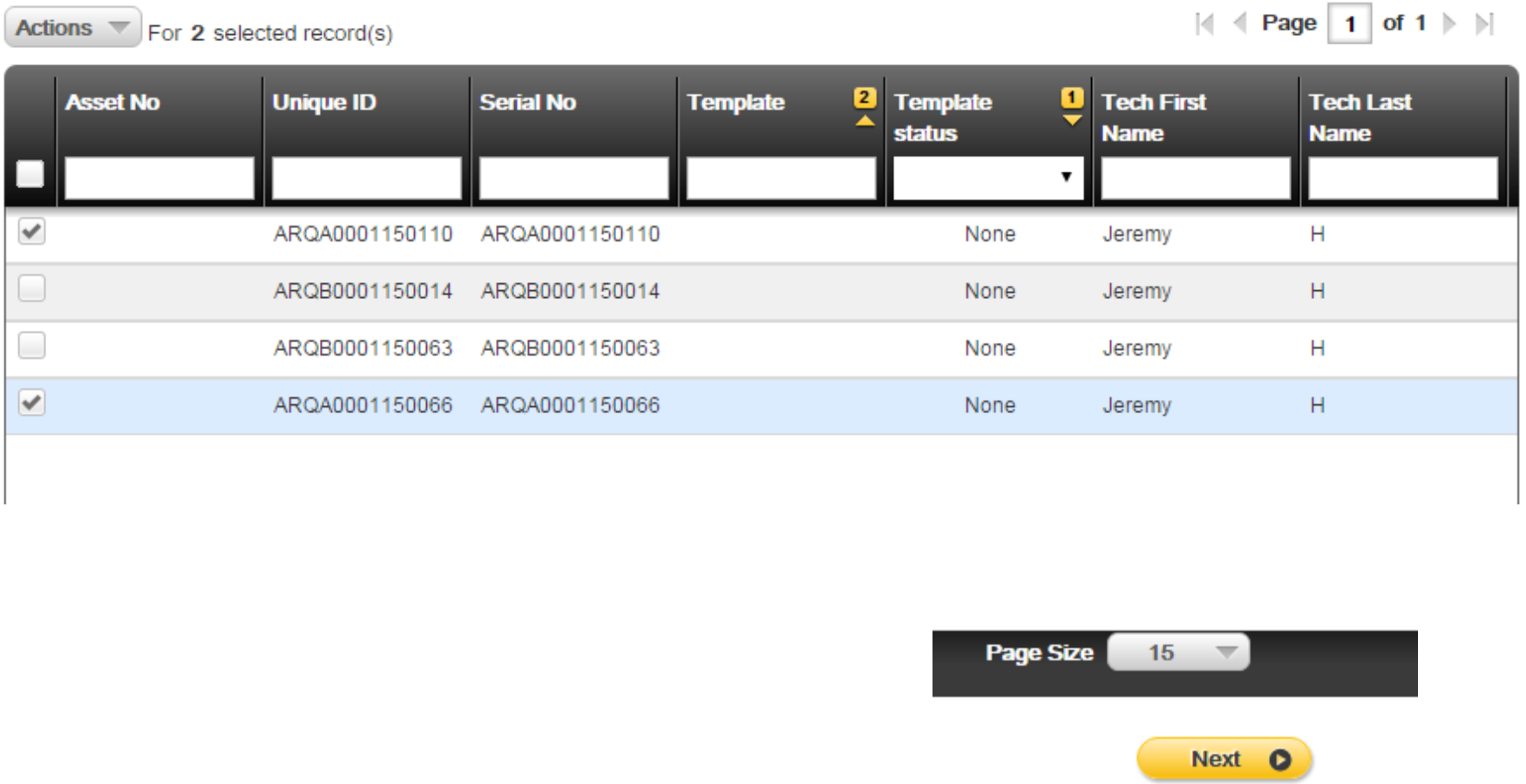
Limit Plan – Deploy Limits

- Limit Plans can be deployed to Meter or Copied to Templates
- Check the box of the limit plan to be deployed, right click or select Actions
  - Click “Deploy” or Copy to Template



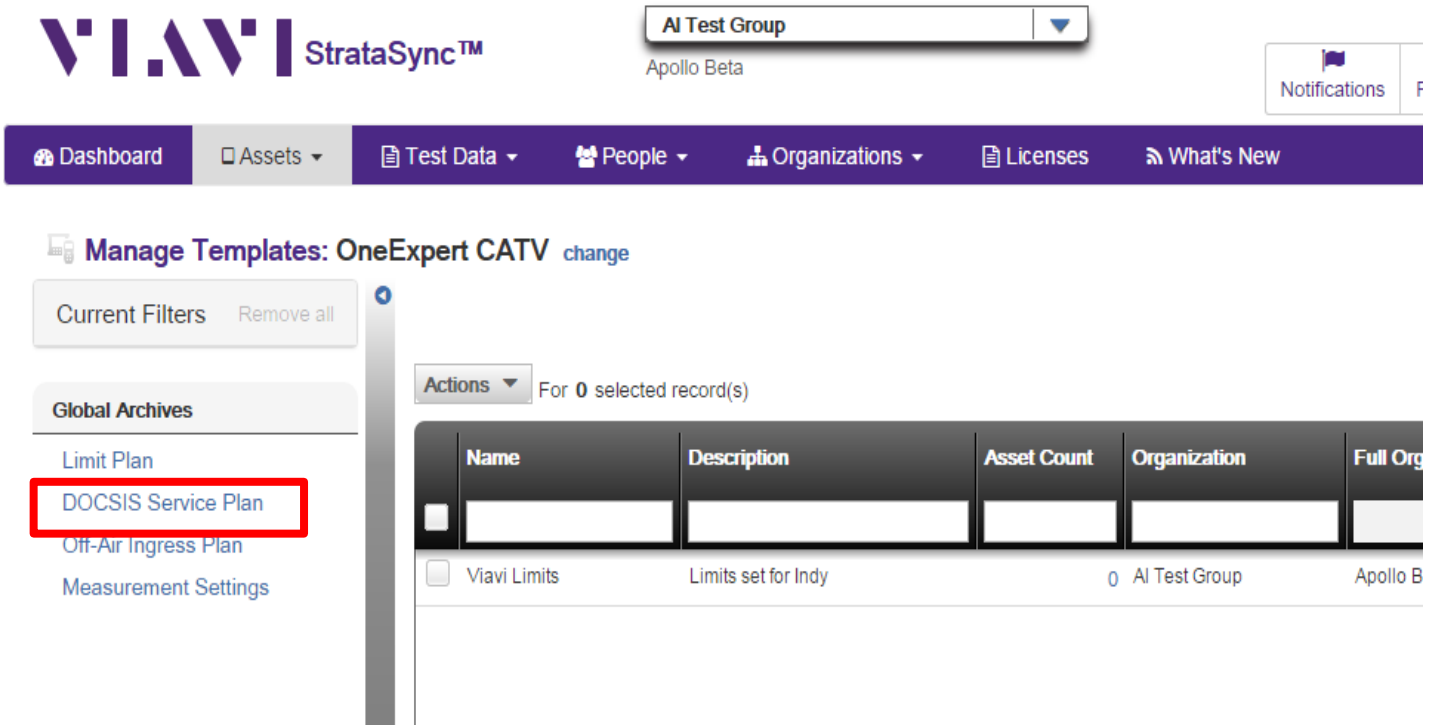
Deployment – Meter Selection

- Check the boxes next to one or more OneExpert and then select Next in bottom right corner of the screen



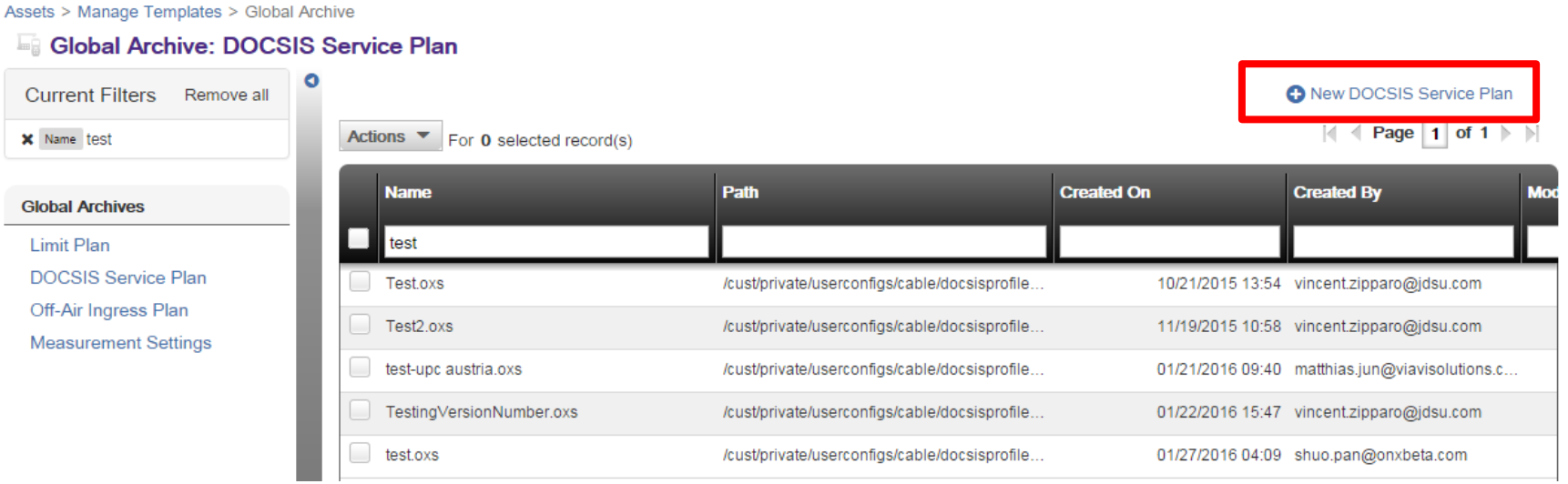
Access or Create a New DOCSIS Service Plan

- In the Template screen, click on one of the selections in the “Global Archives” bubble on the left of the screen
- Select DOCSIS Service Plans



DOCSIS Service Plan Window

- Choose from existing Limit Sets or select New Limit Plan

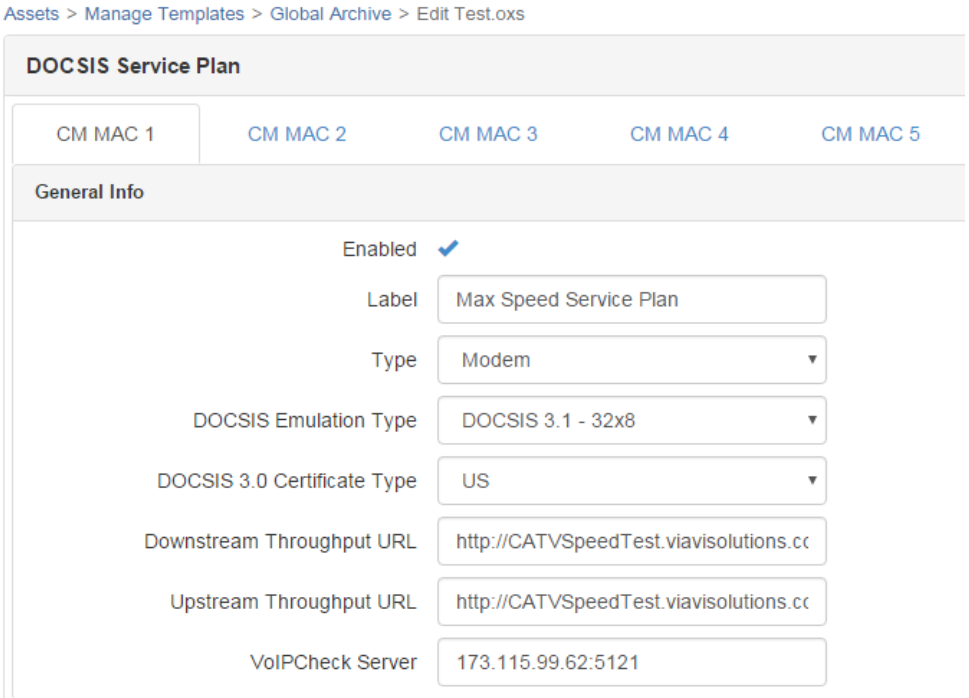


DOCSIS Service Plan – Name New DOCSIS Service Plan

- Enter DOCSIS Service Plan name and Description and select Create

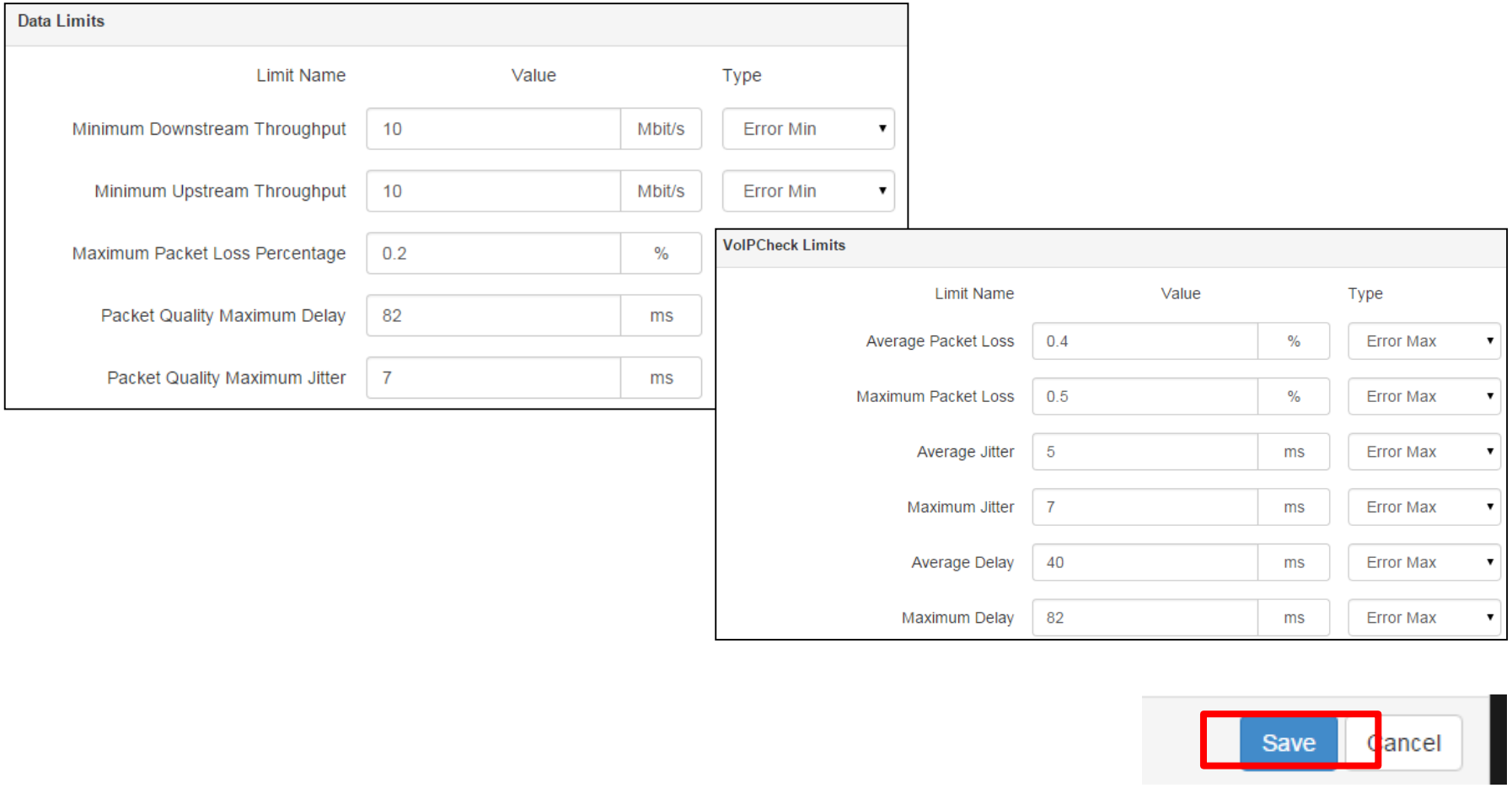
DOCSIS Service Plan – Configuration

- Each of the ONX's 5 different Cable Modem MAC addresses can be configured independently
  - Label – This name will appear on the ONX under the Registration Information presented during a DOCSIS test to ensure the proper Service plan was selected
  - Downstream Throughput URL – Enter the IP/URL address and file name of the HTTP server and test file that the ONX will use to download and calculate downstream throughput speeds (Ex: http://testurl.com/testfile.zip or http://12.34.56.78/testfile.zip)
  - Upstream Throughput URL - Enter the IP/URL address of the HTTP server the ONX will use to send data to and calculate upload throughput speeds (Ex: http://testurl.com or http://12.34.56.78) typically is the same IP/URL as downstream
  - VoIPCheck Server – If a VoIPCheck reflection server is available this can be entered into the VoIPCheck Server field (Note: VoIPCheck is not yet implemented on ONX)



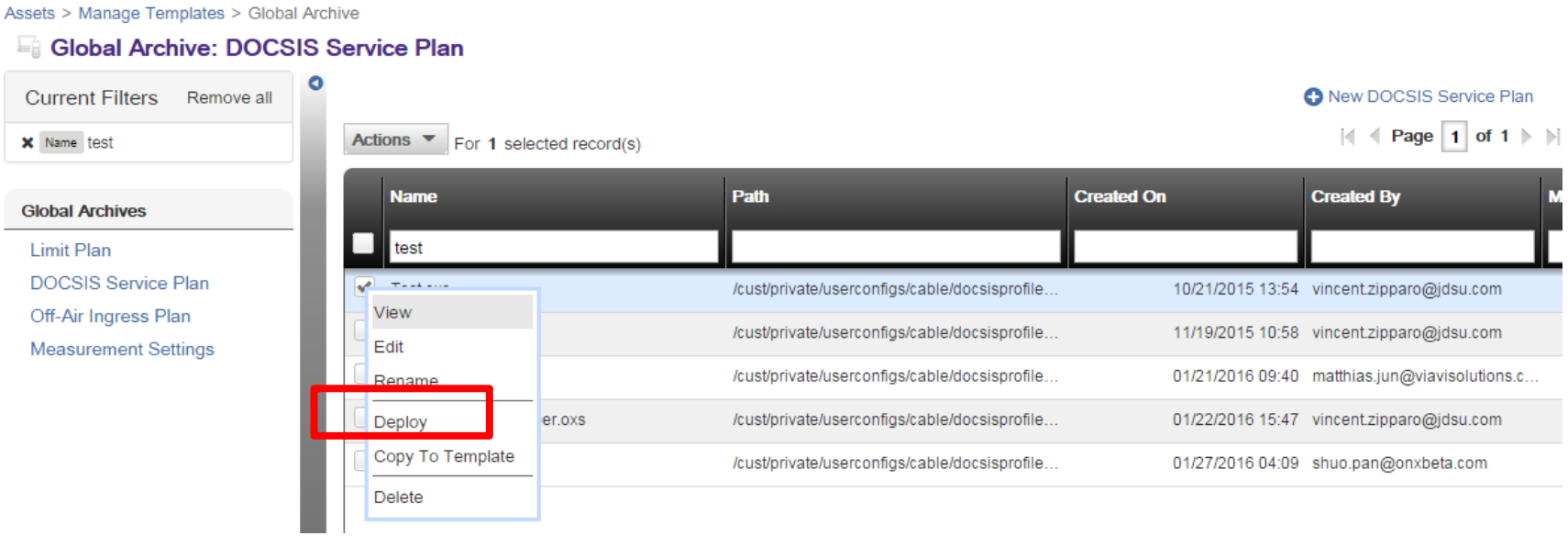
DOCSIS Service Plan – Configuration Cont.

- Data Limits can be set in the DOCSIS Service Plan to perform Pass/Fail, Warn, or None for each one of the Limits configured
  - Type, like in the Limit Plans, determine how the test result is presented on the ONX
- The VoIPCheck Limits are also configurable (Note: ONX does not currently perform VoIPCheck testing, these limits can be set for future use)



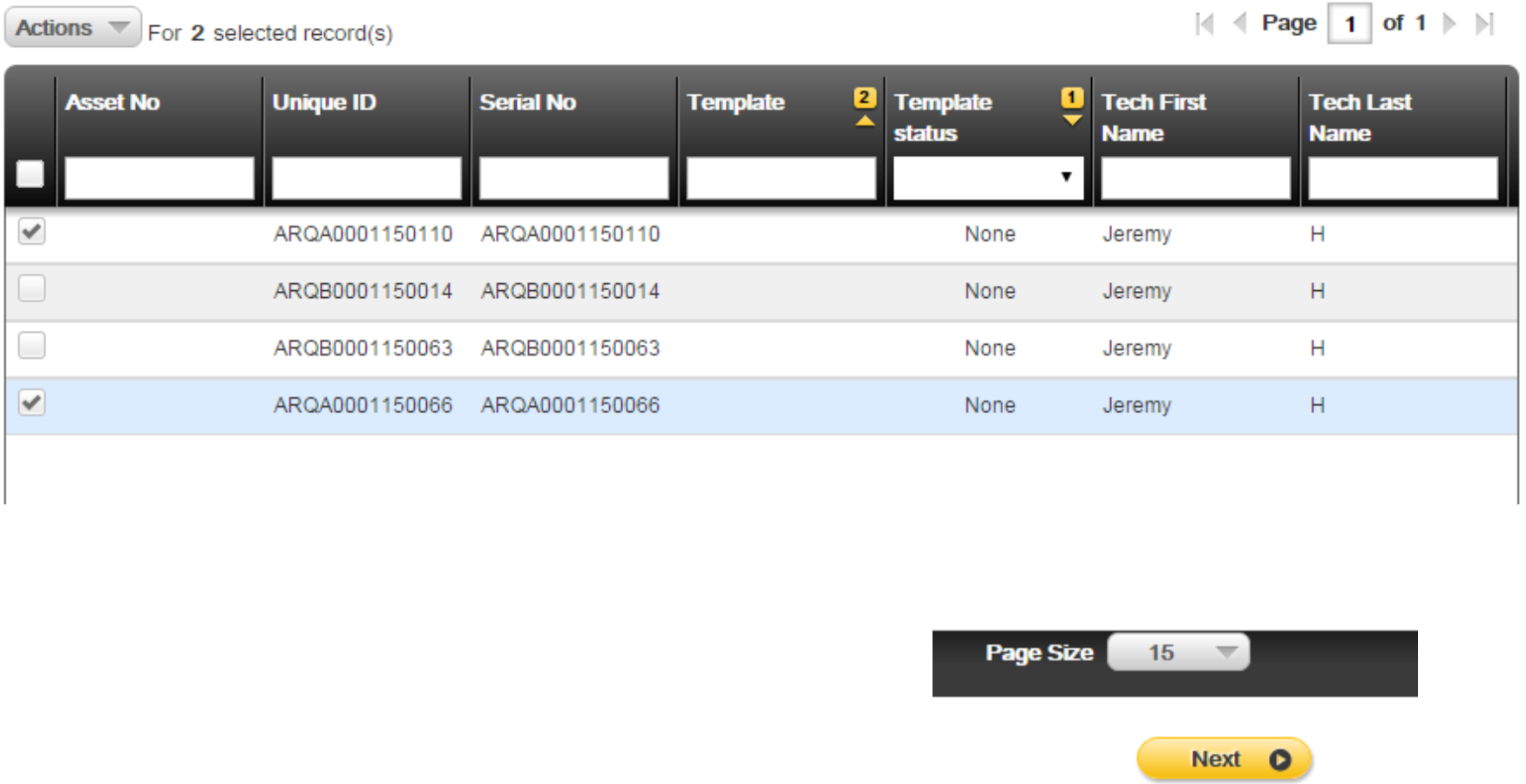
DOCSIS Service Plan – Deploy

- DOCSIS Service Plans can be deployed to Meter or Copied to Templates
- Check the box of the DOCSIS Service Plan to be deployed, right click or select Actions
  - Click “Deploy” or Copy to Template



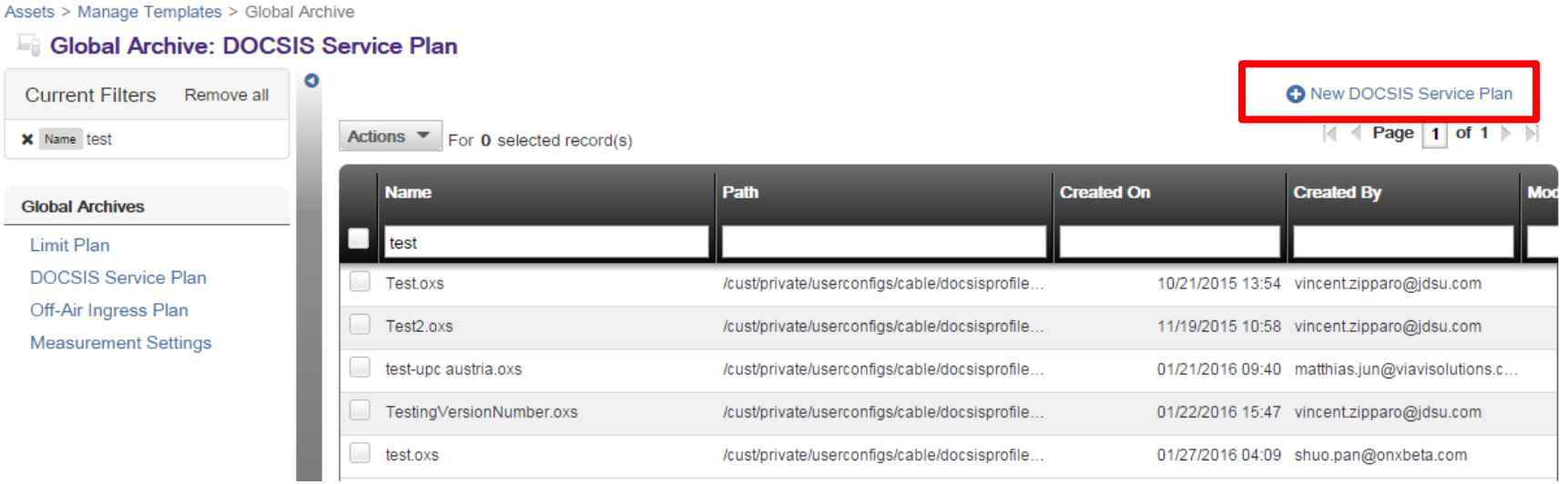
Deployment – Meter Selection

- Check the boxes next to one or more OneExpert and then select Next in bottom right corner of the screen



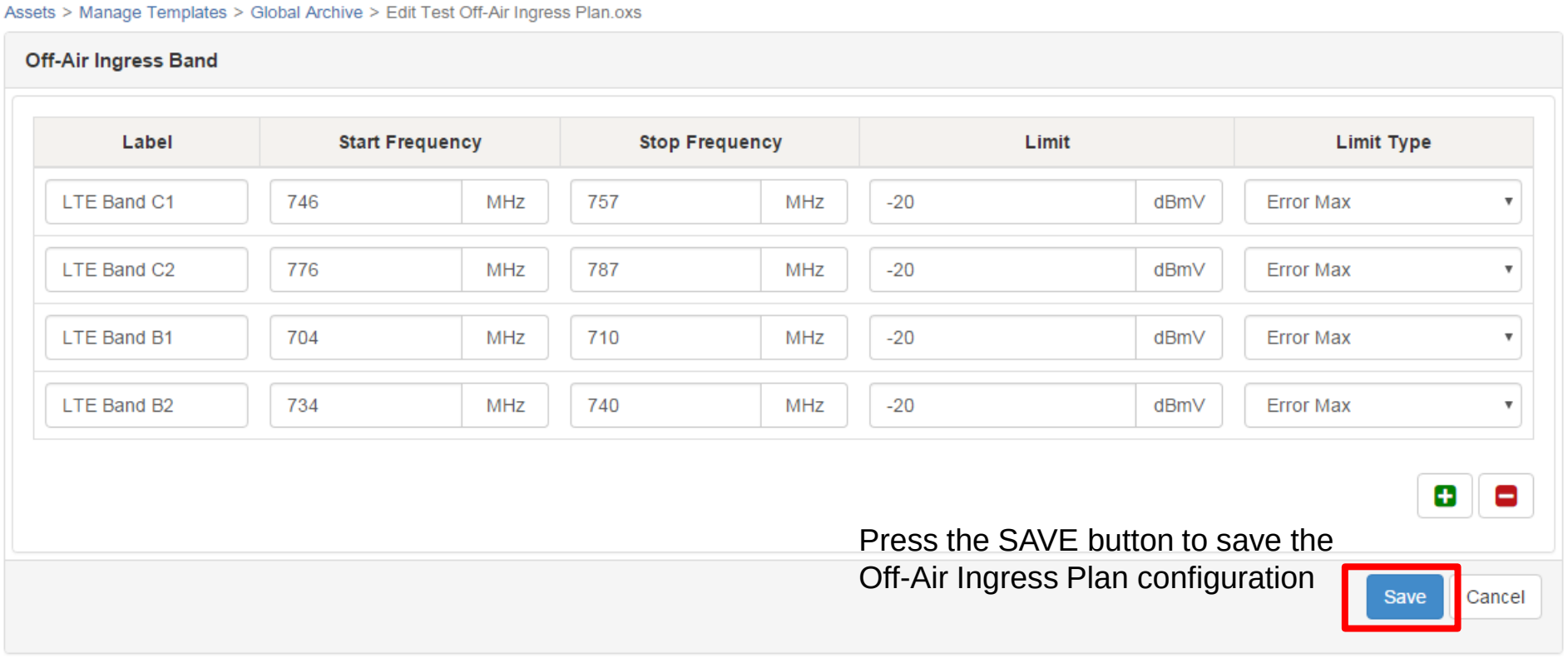
Off-Air Ingress Plan Window

- Choose from existing Off-Air Ingress Plan or select New Off-Air Ingress Plan



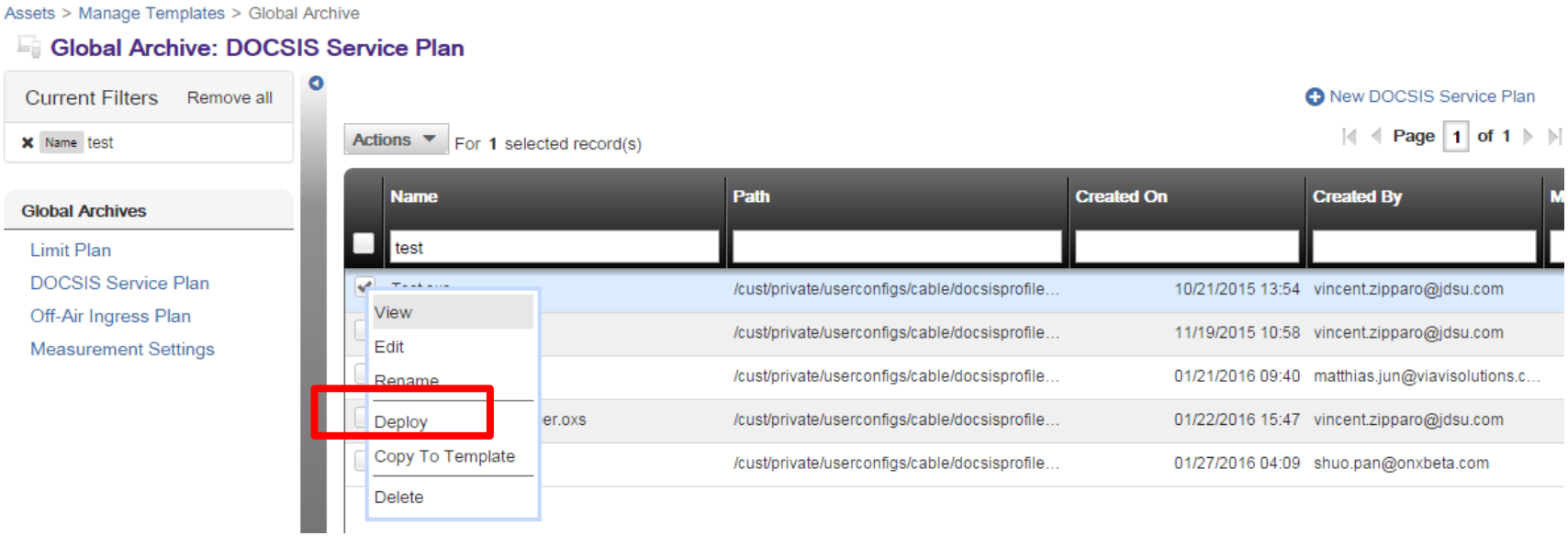
Off-Air Ingress Plan – Configuration

- Off-Air Ingress Plans are used to designate which frequencies the ONX will measure during the OneCheck test for ingress interferers in the downstream frequency range
  - Find LTE or terrestrial broadcast interferers on the HFC network
  - If a QAM carrier is in the band the ONX uses its Ingress Under the Carrier feature to see the noise floor below a QAM channel, if the spectrum is vacant the ONX will look at the spectral response in the band(s) to see if the limit is exceeded
- Enter the Label, Start, Stop, Limit value, and Limit Type for each Ingress band desired
- Use the green + or red – to add or delete Off-Air Ingress bands



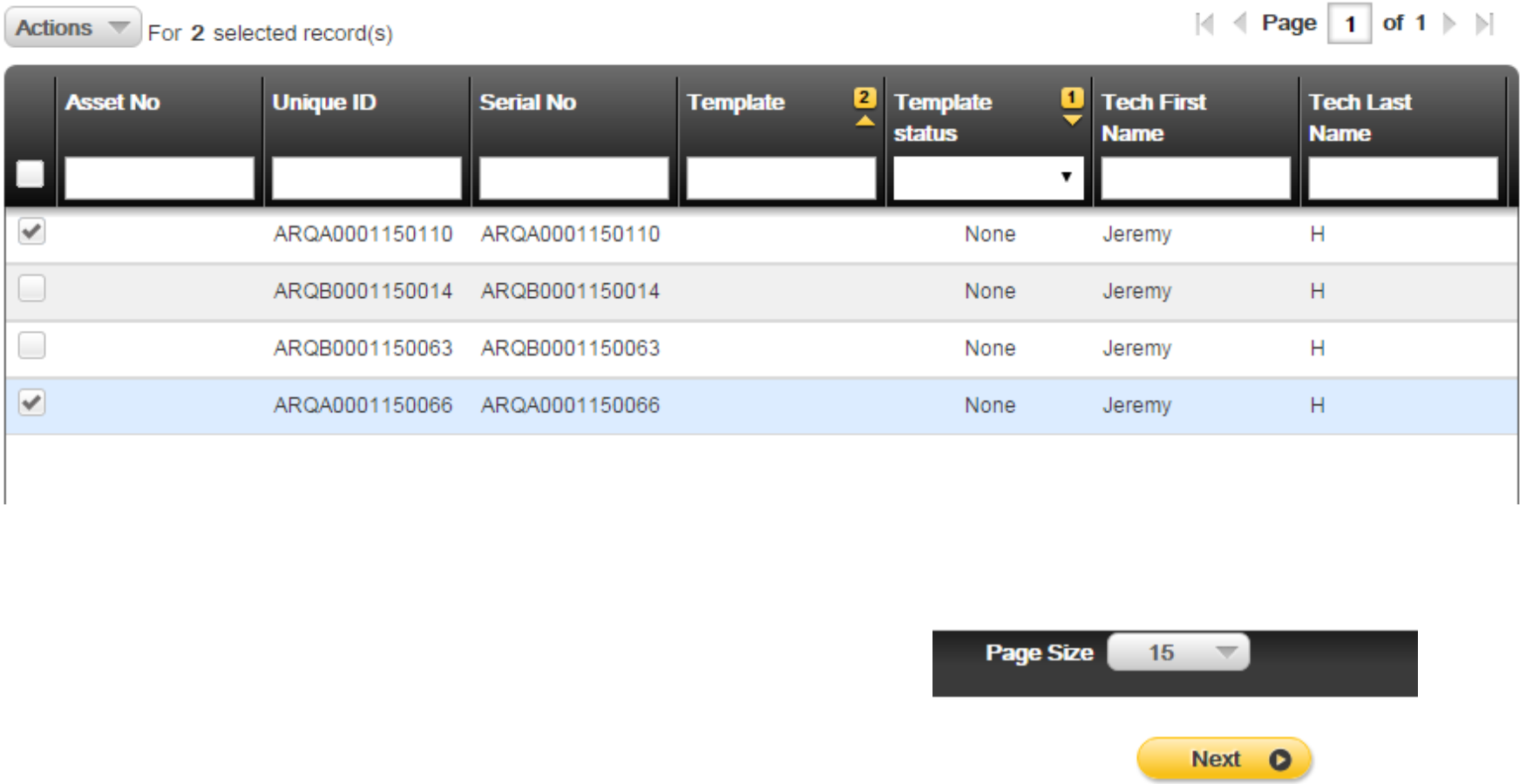
Off-Air Ingress Plan – Deploy

- Off-Air Ingress Plan can be deployed to Meter or Copied to Templates
- Check the box of the Off-Air Ingress Plan to be deployed, right click or select Actions
  - Click “Deploy” or Copy to Template



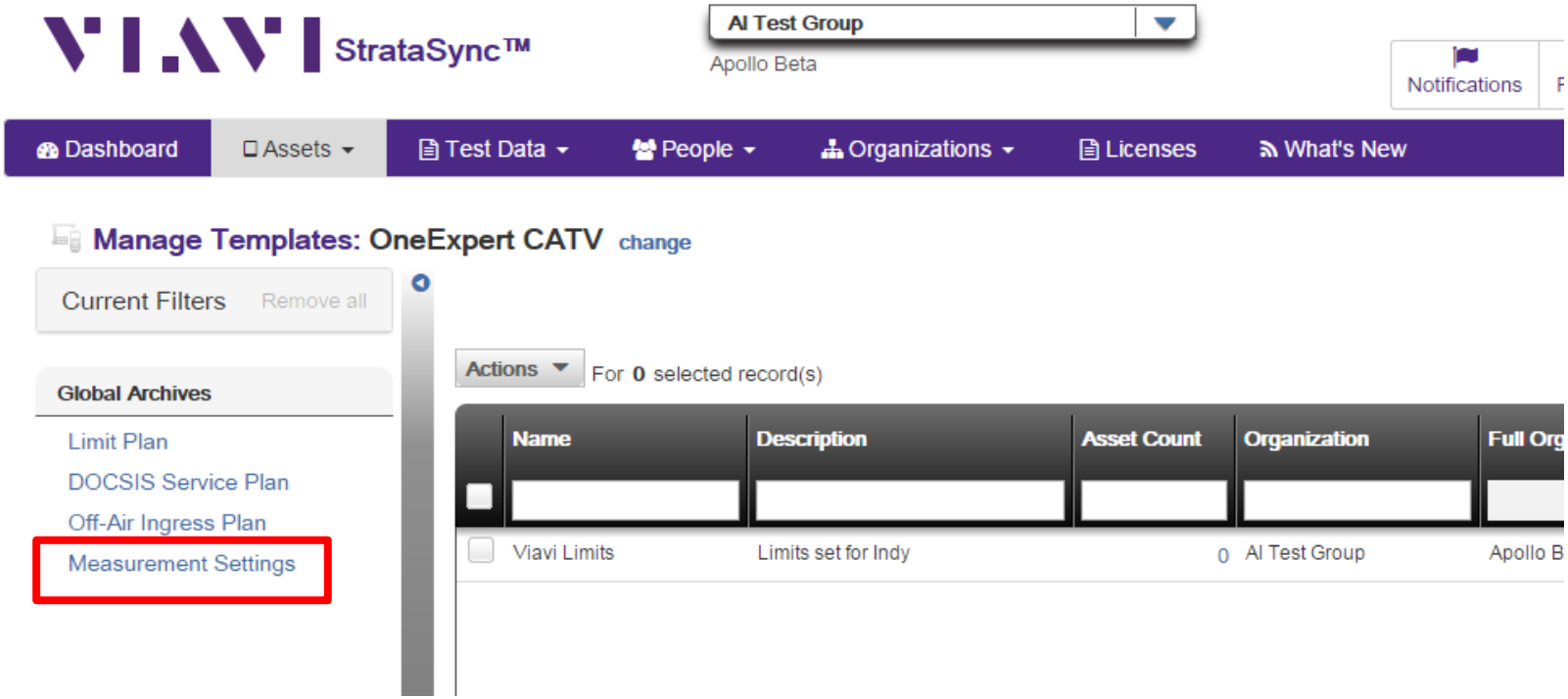
Deployment – Meter Selection

- Check the boxes next to one or more OneExpert and then select Next in bottom right corner of the screen



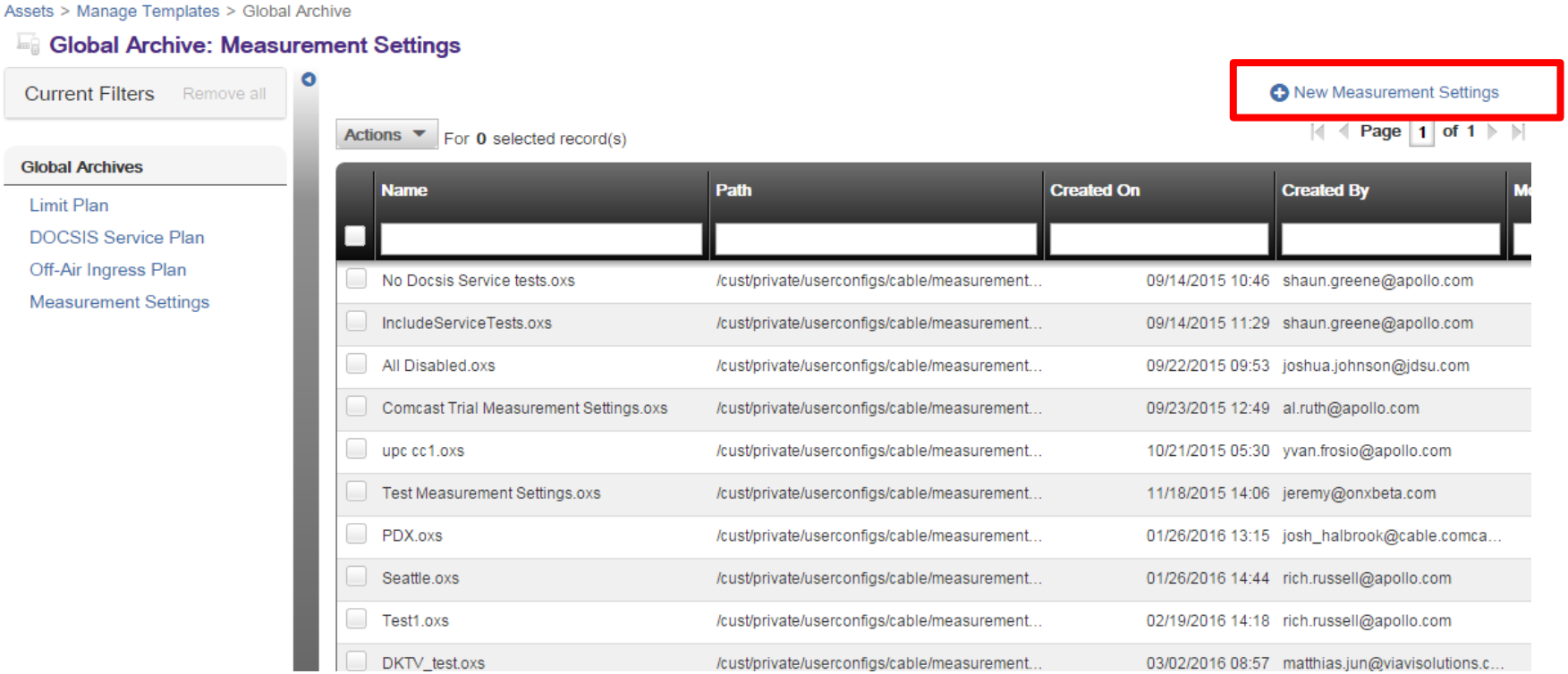
Access or Create a New Measurement Settings

- Access or Create a New Measurement Settings



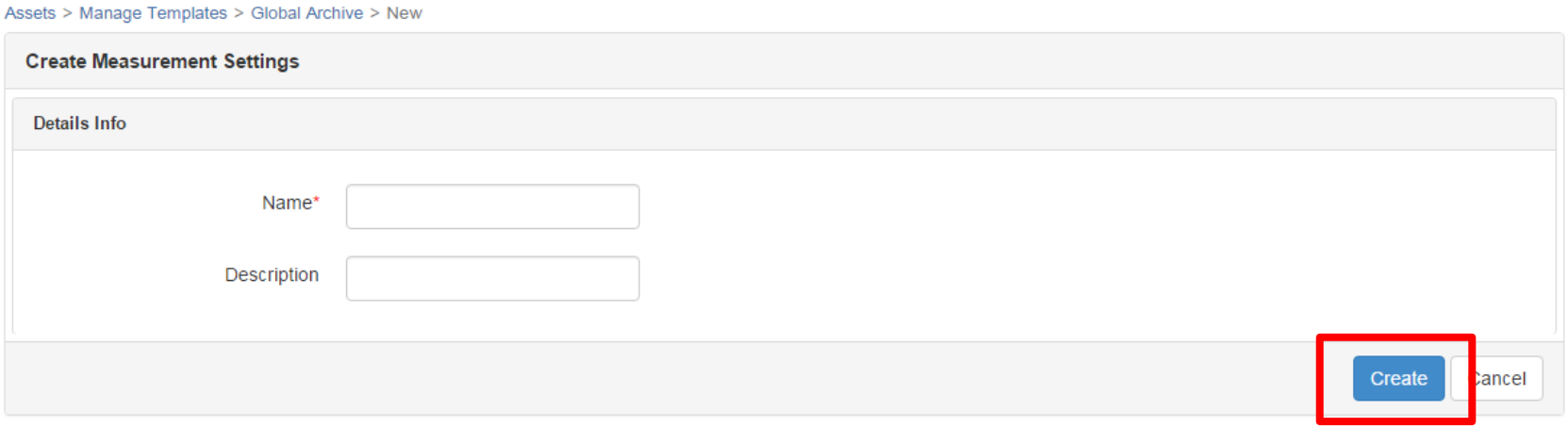
Measurement Settings Window

- Choose from existing Measurement Settings or select New Measurement Settings



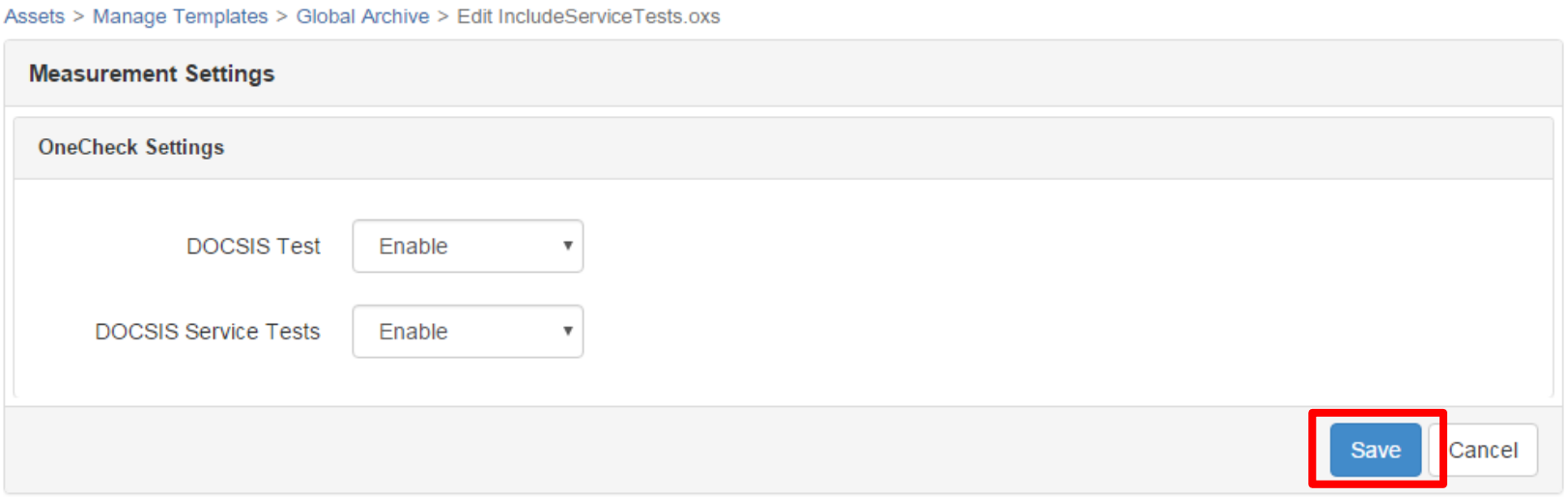
Measurement Settings – Name New Measurement Settings

- Enter Measurement Settings name and Description and select Create



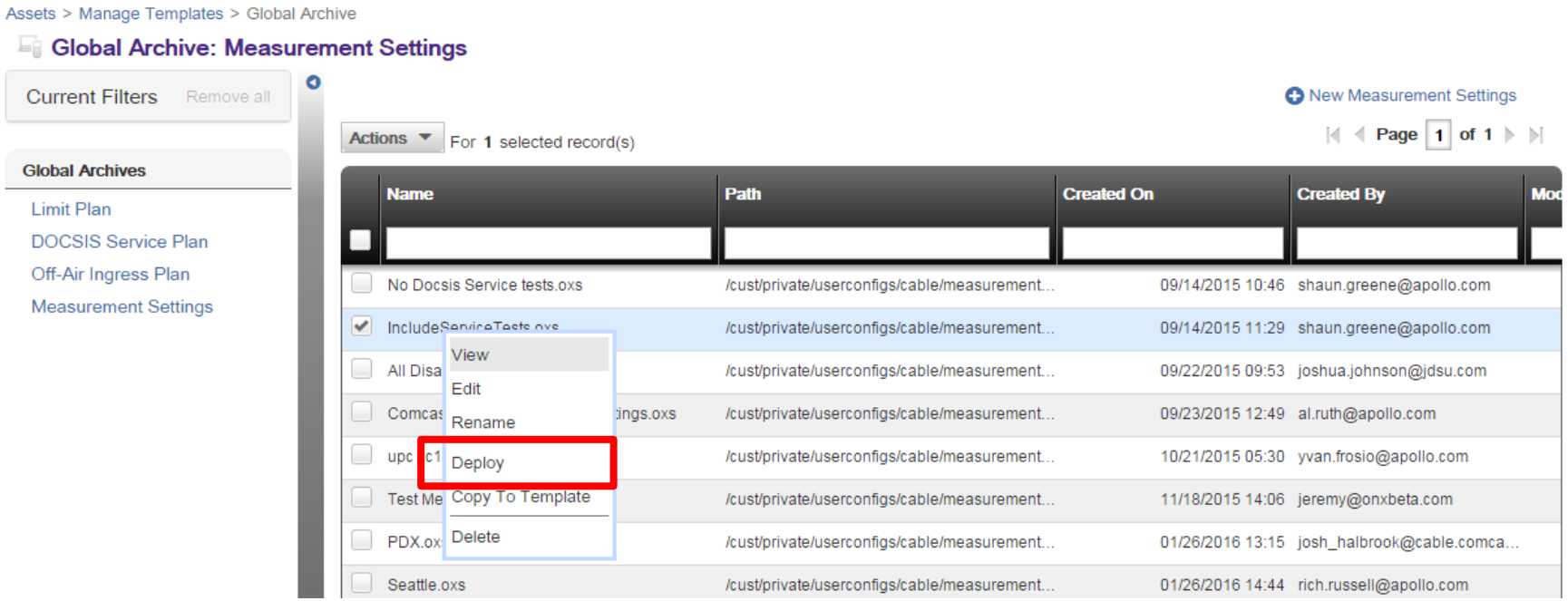
Measurement Settings - Configuration

- Measurement Settings on the ONX currently determines if a DOCSIS test (range and registration) is performed and if DOCSIS Service tests (throughput & packet loss) is performed when a OneCheck test is ran
  - This applies to All OneCheck tests at all Locations (Tap, Ground Block, CPE)
- DOCSIS Test - If a OneCheck test should perform communications with the CMTS then the DOCSIS Test should be enabled – If disabled the OneCheck test will only run the Ingress and Downstream channel tests only
- DOCSIS Service Tests – If a OneCheck test should also perform IP service tests the DOCSIS Service Tests should be enabled – If disabled then the ONX will not perform IP service testing during a OneCheck test
  - Note: To enable DOCSIS Service Tests the DOCSIS Test must be enabled as well



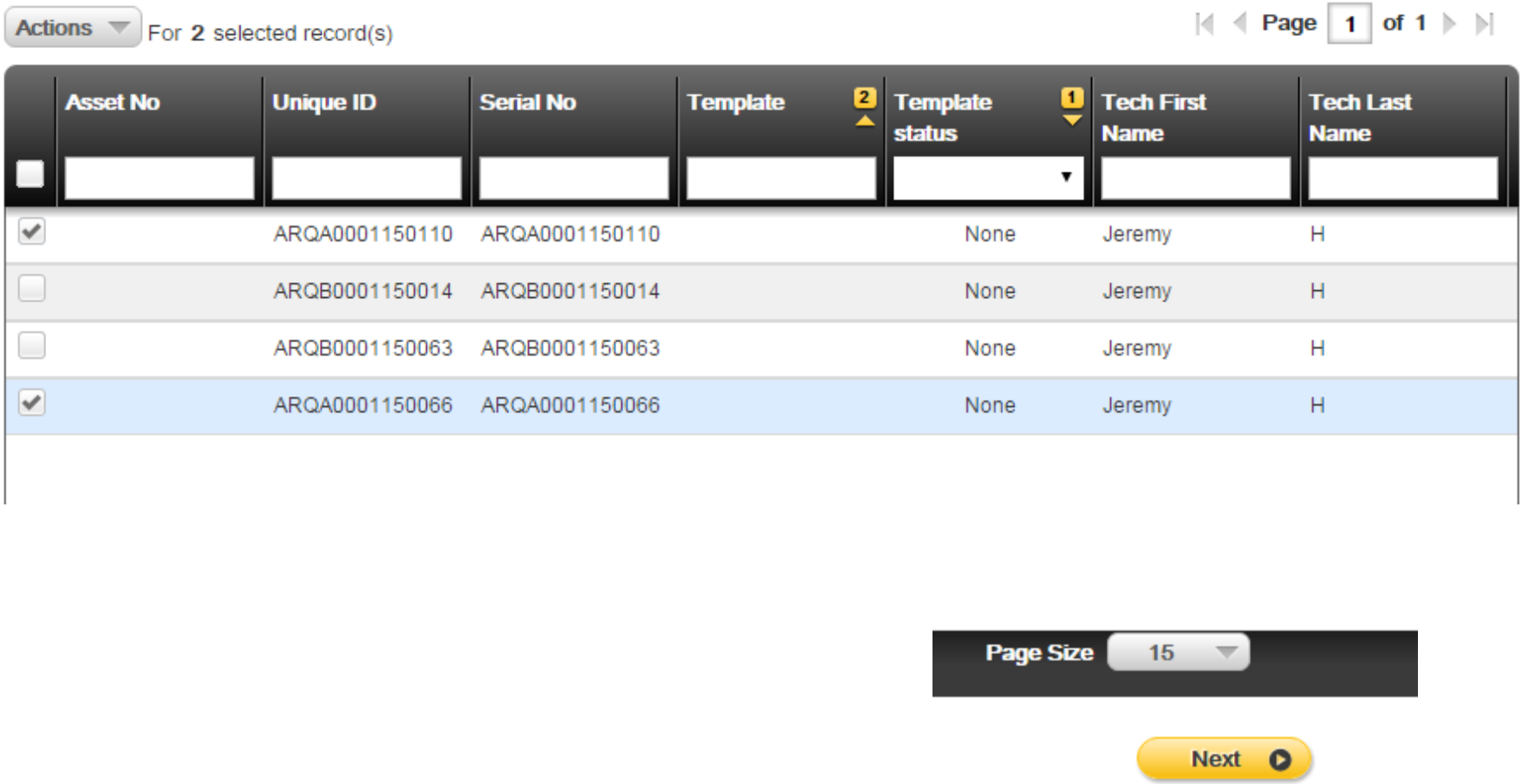
Measurement Settings - Deploy

- Measurement Settings can be deployed to Meter or Copied to Templates
- Check the box of the Measurement Settings to be deployed, right click or select Actions
  - Click “Deploy” or Copy to Template



Deployment – Meter Selection

- Check the boxes next to one or more OneExpert and then select Next in bottom right corner of the screen



ONX CATV - StrataSync - Test Results

StrataSync – ONX CATV test result

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Save view | Save view as... | Customize view | Schedule Email

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Actions For 0 selected record(s)

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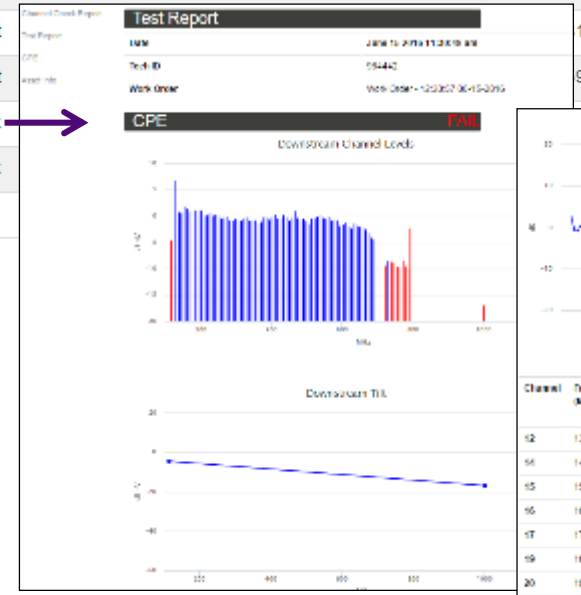
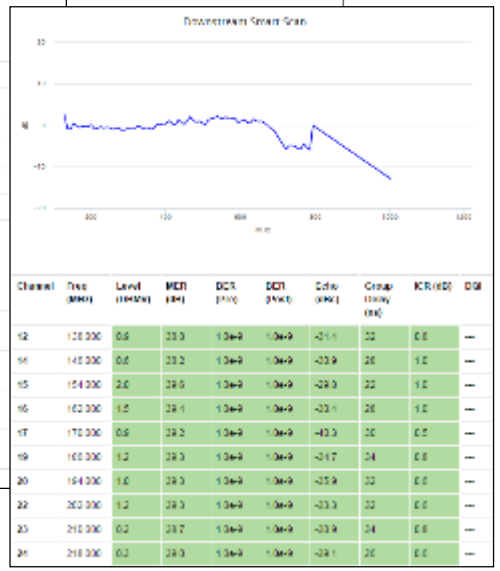
Asset Type	Asset Serial No	Asset Unique ID	Data Type	Data Format	Status	Creation Time	Filename	Full p filena
		ARQA0001150094,				This week		
OneExpert CATV	ARQA0001150094	ARQA0001150094	channelcheck	application/zip	None	06/13/2016 15:47	Work Order - 11:23:16 06...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	TESTDATA	application/zip	None	06/14/2016 14:59	session.Work Order - 13:...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	sessionexpert			1	session.Work Order - 12:...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	sessionexpert			9	session.Work Order - 13:...	/cust/p
OneExpert CATV	ARQA0001150094	ARQA0001150094	channelcheck					
OneExpert CATV	ARQA0001150094	ARQA0001150094	channelcheck					
OneExpert CATV	ARQA0001150094	ARQA0001150094	docsischeck					





VIAVI