VIAVI

Now with DOCSIS 3.1

OneExpert™ CATV

A full-featured handheld for technicians at any skill level

OneExpert CATV (ONX-610/620) helps field technicians fix problems right—the first time. A technician-friendly interface and OneCheck™ automated tests ease complex tasks with a simple dashboard that shows clear, pass/fail results. And, its future-proof modularity ensures years of use supporting CATV and home networks.

Comprehensive Tools Increase Productivity

We built expertise into OneExpert so that technicians at any skill level can quickly optimize performance. With a modular platform that adapts easily to rapidly changing technologies, OneExpert CATV is:

- Simple — Auto channel identification eliminates channel plan build, maintenance, and deployment overhead and enables automated testing without the potential for channel plan related test failures

- Fast — OneCheck™ uses powerful processing and exceptional speed to make more complete testing practical: a tech can run a comprehensive test, including MER and BER on all channels, in about a minute

- Powerful — More intelligent, powerful algorithms running in the background while testing enables the meter to point out any problems and suggest next troubleshooting steps

Benefits

- Simplifies and speeds testing and troubleshooting

- Improves compliance and audit performance

- Reduces rework

- Turns any technician into an expert

Features

- Real-time channel identification eliminates the need for channel plans and plan-related errors

- 32x8 DOCSIS 3.0, DOCSIS 3.1, WiFi, 1 Gigabit Ethernet capable, and TrueSpeed™ option

- Field-exchangeable DOCSIS/RF module

- A unique dual-diplexer design supports 42/85 MHz networks

- WiFi 2.4/5 GHz, Bluetooth, StrataSync™ enabled

- Simultaneous ingress and downstream testing

- Optional fiber scope and power meter

Applications

- Troubleshooting QAM carriers/home networks

- Verifying WiFi in 2.4 GHz and 5 GHz networks

- Turning up business services

- Testing Gigabit DOCSIS services

- Installing PON/RFoG including inspection, power levels, and RF performance

- Optional IP video testing

Data Sheet
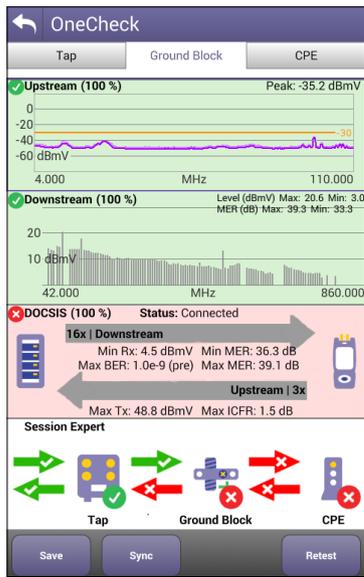
OneCheck dashboard simplifies identifying RF issues

Fast and easy connectivity, optional fiber scope and power meter

High-Powered Simplicity Turns Every Technician into an Expert

With OneExpert, expertise is built-in. We took decades of testing experience and incorporated that knowledge in a way that makes every technician an expert with the simple press of a button. OneExpert simplifies a technician's decision-making process by focusing on three primary tests:

• OneCheck comprehensive and automated testing of Ingress, Downstream and DOCSIS with Session Expert™ to help resolve problems

• DOCSISCheck real-time analysis and powerful troubleshooting of upstream and downstream DOCSIS carriers and data services

• ChannelCheck real-time analysis and powerful troubleshooting of downstream carriers

Additional OneExpert test capabilities ensure technicians master any QAM, PON/RFOG, IP video, business-service, or home-network challenge. Its future-proof design adapts easily to rapidly changing technologies, assuring low total-cost-of-ownership.
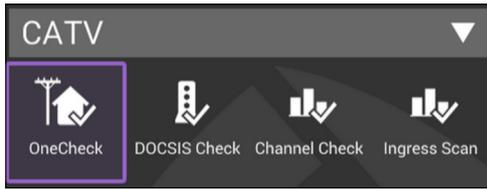
AutoChannel™

To simplify the testing process and day-to-day maintenance, the AutoChannel feature automatically identifies and instantly builds correct channel plans for testing QAM, DOCSIS, and analog services. It eliminates the need for managers and supervisors to pre-build and configure the meter before a technician can use the instrument. It also eliminates the need for the technician to choose the correct channel plan for the part of the system that they are working on, saving time and reducing improper testing.

OneCheck™

Home environments typically require testing ingress on the upstream, downstream carrier quality, and DOCSIS performance.
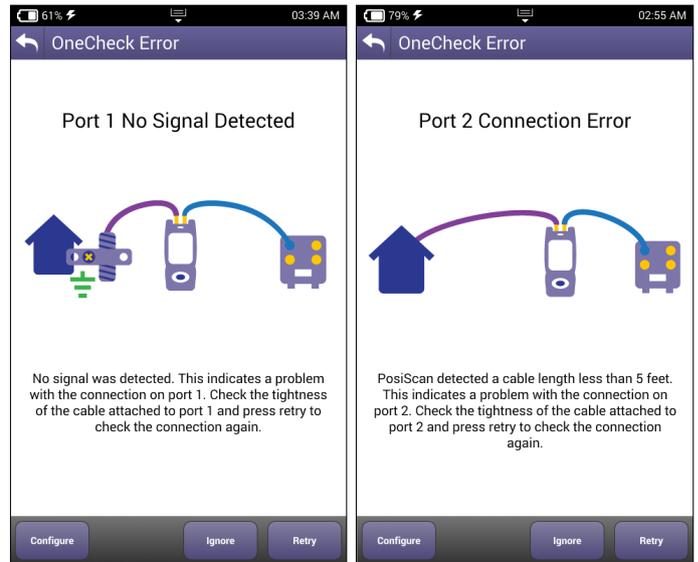
OneCheck is a fast and comprehensive test at three demarcation points: the tap, ground block, and CPE. Initiating the test is simple. The technician chooses the test location, enters the current job or work order, and starts the test.

Select test location

Connect the meter

Track by job/workorder
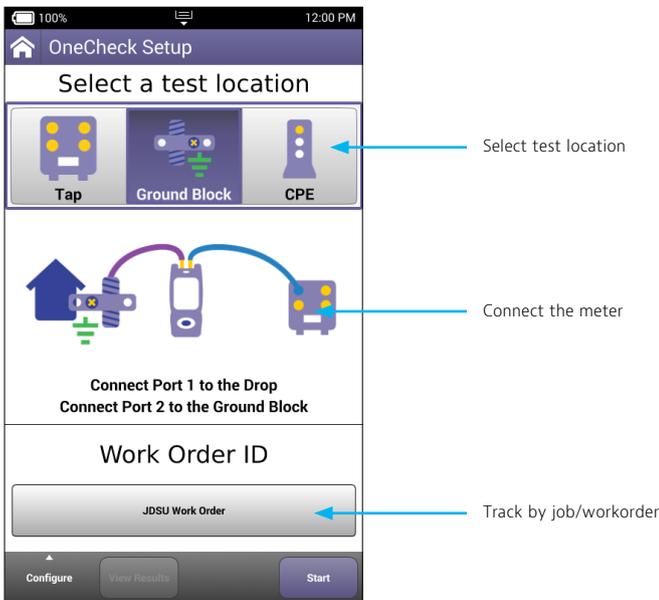
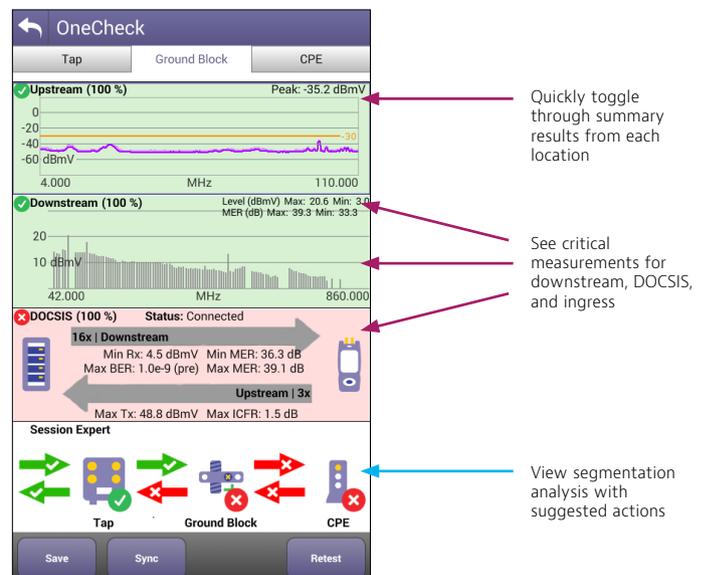## DuoPort™ with PosiScan™

Port 2 Not Connected
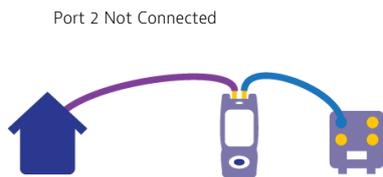
To help ensure that technicians properly connect their instruments and take valid ingress and downstream scans, OneExpert uses Viavi's exclusive DuoPort design with PosiScan. With DuoPort, one port scans ingress from the house while another port simultaneously tests downstream services. PosiScan increases compliance by making sure that a technician is properly connected to a unique home for each job before testing. This can dramatically reduce rework metrics by helping ensure that the technician scans the proper ingress.

Port 1 No Signal Detected

No signal was detected. This indicates a problem with the connection on port 1. Check the tightness of the cable attached to port 1 and press retry to check the connection again.

Port 2 Connection Error

PosiScan detected a cable length less than 5 feet. This indicates a problem with the connection on port 2. Check the tightness of the cable attached to port 2 and press retry to check the connection again.

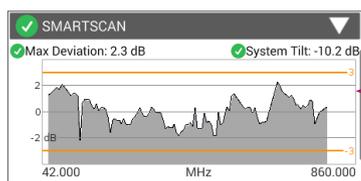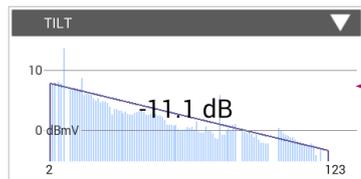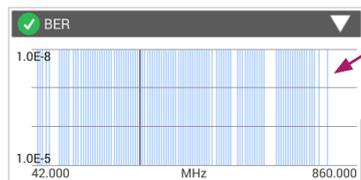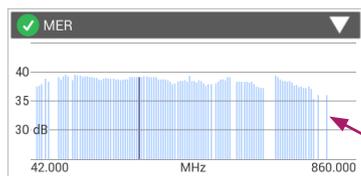Technicians see improper connections before testing

A Simple Dashboard and Drill-Down Details

The dashboard displays all critical parameters including worst carrier MER, maximum transmit level, and in-channel frequency response (ICFR) of upstream carriers. Progress bars indicate status and immediately show if tests are passing or failing. For drill-down details, tapping a panel such as downstream or DOCSIS displays all carrier line-test details for quick problem identification.

Quickly toggle through summary results from each location

See critical measurements for downstream, DOCSIS, and ingress

View segmentation analysis with suggested actions

During any specific test, OneExpert simultaneously performs a powerful suite of additional tests in the background. By simply swiping through results, technicians can evaluate system wide performance including MER and BER across all channels, DOCSIS results (showing individual channel details), SmartScan results, and off-air ingress such as LTE carriers that are infiltrating the plant and causing problems.

Downstream Details

MER
40
35
30 dB
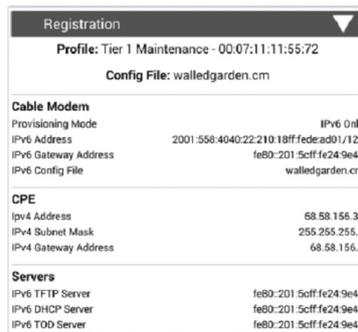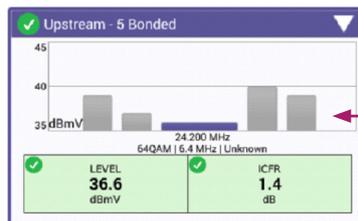42.000 — MHz — 860.000

BER
1.0E-8
1.0E-5
42.000 — MHz — 860.000
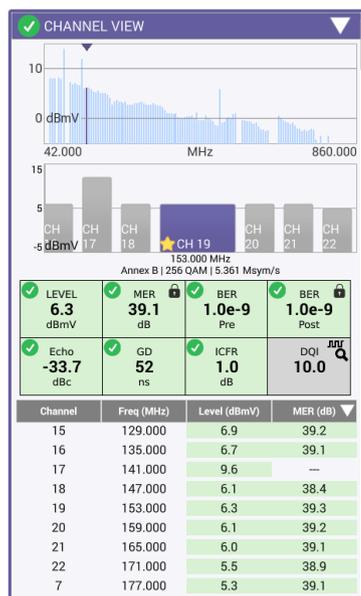
View MER and BER performance

TILT
10
0 dBmV
-11.1 dB
2 — 123

Identify if system is within spec at tap, ground block, or CPE

SMARTSCAN
Max Deviation: 2.3 dB — System Tilt: -10.2 dB
2
0
-2 dB
42.000 — MHz — 860.000

Quickly check levels to limits with automatically-compensated cable loss over frequency

CHANNEL VIEW
10
0 dBmV
42.000 — MHz — 860.000

15
5
-5 dBmV
CH 17 | CH 18 | CH 19 | CH 20 | CH 21 | CH 22
153.000 MHz
Annex B | 256 QAM | 5.361 Msym/s

View channel performance

Individual channel details

LEVEL	MER	BER	BER
6.3 dBmV	39.1 dB	1.0e-9 Pre	1.0e-9 Post

Echo	GD	ICFR	DQI
-33.7 dBc	52 ns	1.0 dB	10.0

Channel	Freq (MHz)	Level (dBmV)	MER (dB)
15	129.000	6.9	39.2
16	135.000	6.7	39.1
17	141.000	9.6	---
18	147.000	6.1	38.4
19	153.000	6.3	39.3
20	159.000	6.1	39.2
21	165.000	6.0	39.1
22	171.000	5.5	38.9
7	177.000	5.3	39.1

DOCSIS Details

Upstream - 5 Bonded
45
40
35 dBmV
24.200 MHz
64QAM | 6.4 MHz | Unknown

LEVEL	ICFR
36.6 dBmV	1.4 dB

Easily view each upstream carrier including TX level and ICFR value

Registration
Profile: Tier 1 Maintenance - 00:07:11:11:55:72
Config File: walledgarden.cm

Cable Modem
Provisioning Mode — IPv6 Only
IPv6 Address — 2001:558:4040:22:210:18ff:fede:ad01/128
IPv6 Gateway Address — fe80::201:5cff:fe24:9e41
IPv6 Config File — walledgarden.cm

CPE
Ipv4 Address — 68.58.156.37
IPv4 Subnet Mask — 255.255.255.0
IPv4 Gateway Address — 68.58.156.1

Servers
IPv6 TFTP Server — fe80::201:5cff:fe24:9e41
IPv6 DHCP Server — fe80::201:5cff:fe24:9e41
IPv6 TOD Server — fe80::201:5cff:fe24:9e41

See internal modem details and identify server issues

Packet Quality
| Packet Loss	1000 Sent	10.8 % Loss
Round Trip Delay	80 ms	
Jitter	12 ms	

Identify if packets are being lost over the RF portion of the data layer

Session Expert

Troubleshooting between demarcation points made easier

Session Expert is test location aware (tap, ground block, CPE) to help guide technicians to problems and ease troubleshooting between demarcation points. Built-in intelligence reduces learning time and helps resolve problems with less escalation or supervisor input.

Session Expert
Tap — Ground Block — CPE
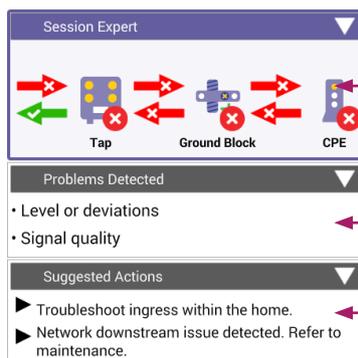
View upstream and down-stream status between locations

Problems Detected
• Level or deviations
• Signal quality

Use background intelligence to analyze test data and identify core problems

Suggested Actions
▶ Troubleshoot ingress within the home.
▶ Network downstream issue detected. Refer to maintenance.

See prioritized suggested next steps to find and fix problems based on best practices

Session Expert Details

Session Expert leverages additional expertise and processing power to provide the technician with tools to help divide and conquer problems between the TAP, GB and CPE. Background measurements like Posi-Scan are used to verify drop integrity.

Compare scans between the TAP and GB to see where ingress occurs

Identify problems in the drop between the tap and ground block

Compare measurements side-by-side between TAP, GB, and CPE to speed up technician analysis time and reduce callbacks

DOCSISCheck™

OneExpert simplifies DOCSIS service troubleshooting with automatic downstream DOCSIS channel identification and up to 32x8 bonded system operation. OneExpert harnesses parallel processing to provide multiple test results to the technician through a single interface. The user can simply swipe through the results to identify and eliminate physical layer and data layer problems.
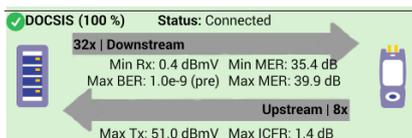
Identify upstream and downstream bonding with highlighted key metrics

- Downstream testing — by testing all the carriers within a bonding group simultaneously, technicians can quickly identify if problems lurk in the physical layer. And, OneExpert works with up to 5 different DOCSIS profiles to test different provisioning.
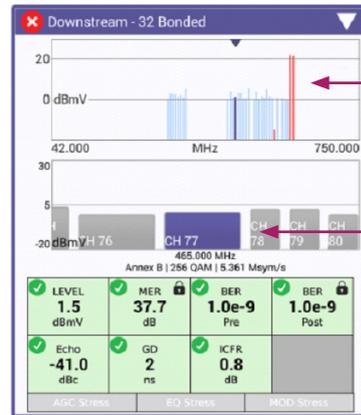
Touch a highlighted problem for quick access to troubled carriers

Swipe the screen to quickly access individual DOCSIS channel details

- Upstream testing — OneExpert is ready to test evolving return paths. It can automatically switch to an 85 MHz diplexer in expanded systems where operators can bond up to 8 upstream carriers.
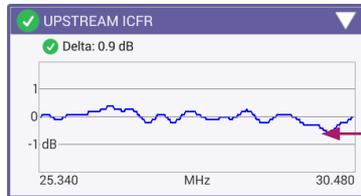
View upstream ICFR for problem isolation and correlation with PNM tools

- Service testing — OneExpert tests throughput over DOCSIS up to 1 G.
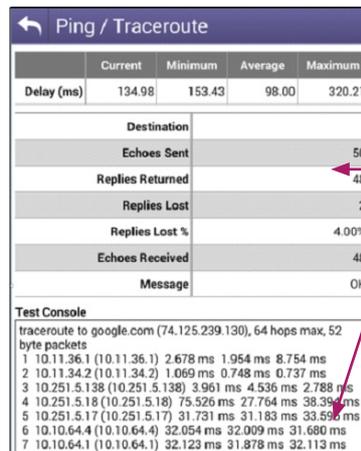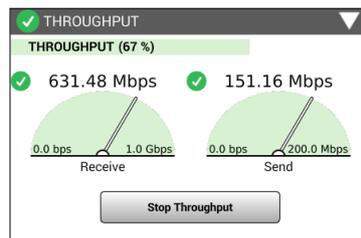
Isolate problems on the data layer with Ping/Traceroute

DOCSIS 3.1 Testing

With OneExpert, DOCSIS 3.1 testing is very intuitive. DOCSIS Check automatically identifies and locks on the 32 bonded QAM signals and the OFDM signal, so operation and results analysis is very similar to DOCSIS 3.0. Testing only the physical layer is inadequate to effectively analyze DOCSIS 3.1 performance. OneExpert uses a DOCSIS 3.1 chip set to test the service layer, enabling IP-related tests including throughput, codeword errors, and profile analysis.
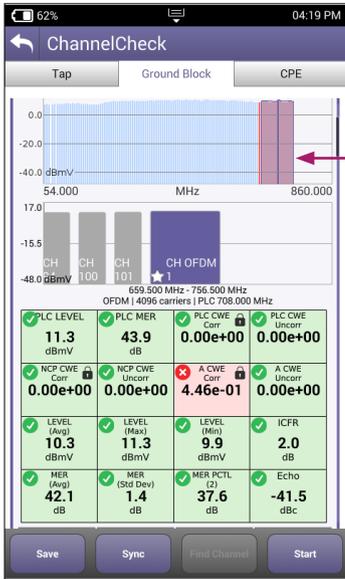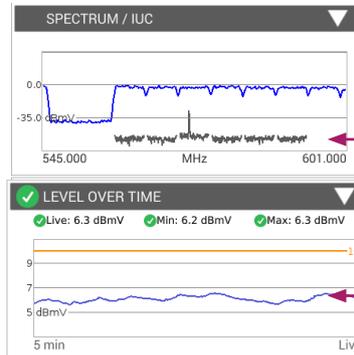

Identify downstream OFDM carrier in the lineup

Downstream scan measurement requires no learning curve, same as DOCSIS 3.0 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

ChannelCheck

When problems arise that require live, real-time troubleshooting, ChannelCheck provides a powerful suite of tests that help track down tough intermittent issues without requiring a technician to have years of field experience. ChannelCheck automatically performs an extensive set of measurements and analysis to help technicians quickly identify the root cause, if the problem is something they should fix, or if it requires escalation.

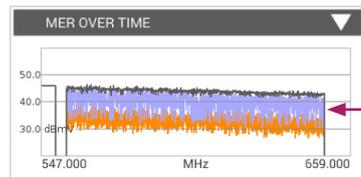Discover embedded ingress with ingress under the carrier trace

Monitor plant fluctuations with Level Over Time

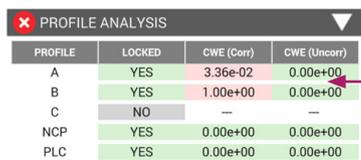### IP Data — Web and Speed Testing

Internet subscribers demand reliable connectivity and new applications require higher data throughput and network-delay time performance. OneExpert quickly tests internet connectivity using a built-in web browser. It tests data rates provided by DOCSIS with HTTP throughput for TCP/IP applications. Mature tests like IP ping delay are essential for real–time applications such as online gaming.
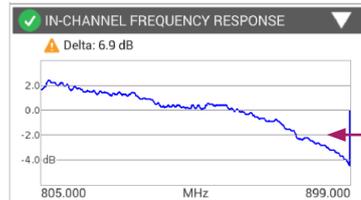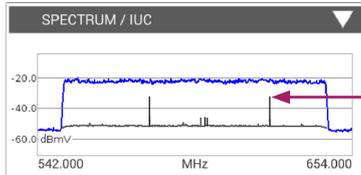
Table 1. IP data tests

IP Data Test	What It Tests	Why It Is Needed
User authentication	IPoE, PPPoE, IPv4, and IPv6	Customer service turn-up
Web browser	Connection to any website	Differentiates between network problems and web-server downtimes and isolates customer PC or mobile devices as points of failure
IP ping	Delay time through the network	Network delay is crucial, especially with high-interaction applications such as gaming
FTP/HTTP throughput	Upload and download rates	DOCSIS profile parameters such as IP, delay, and network aggregation issues, determine user-experienced data speeds

OneExpert web browser

Mobile App

The OneExpert iOS app speeds testing, letting technicians leave the test set plugged in at one location and run tests remotely from their iPhone or iPad.
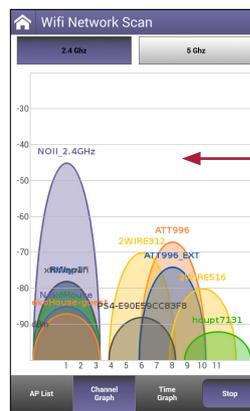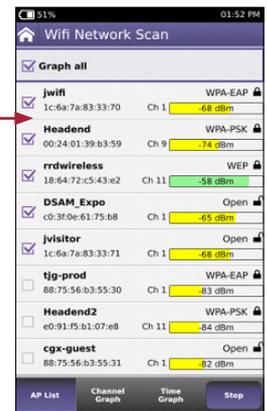
WiFi

Wireless devices and networks are increasingly common in households. With WiFi Scan, technicians have wireless 802.11 a/b/g/n (2.4 GHz and 5 GHz) testing capability to view signal strength, secure set identification (SSID), configured channel, security, MAC address, and 802.11 protocol at the test location of each wireless network in the area. It also indicates whether a network is secure or vulnerable to security threats.

Table 2. WiFi tests

WiFi Test	What It Tests	Why It Is Needed
WiFi scan	WiFi access point (AP) station scan	Discover potential interfering networks (which could cause slow data transfer speeds), and locate weak spots in the WiFi signal to help optimize router location
WiFi AP	Connect OneExpert CATV via Ethernet cable to a router or residential gateway to configure as a WiFi AP (Ethernet bridge to WiFi)	Verify Internet connectivity, configure CPE, and run tests from mobile devices

Identify overlapping channels and relative signal strength

WiFi Advisor

With support for the WiFi Advisor accessory on the OneExpert, technicians can evaluate wireless network performance seamlessly for both 2.4 and 5 GHz networks. With support for 802.11 standards a/b/g/n and ac, the ONX and WiFi Advisor combination make WiFi problem solving easier.

Using a single WFED-300AC device, users can quickly visualize, optimize, and troubleshoot WiFi networks with BSSID, Channel, and Spectral views. BSSID view provides quick visibility into active wireless networks and identifies the least-crowded channel to use for an access point. Channel view finds the best channels for an access point byshowing utilization, noise, co-channel interferers, adjacent channel interferers, and an overall channel score for each channel. Spectral view shows damaging RF interference with a real-time spectral analyzer configurable by 802.11 band, channel, and channel width.

WiFi Test	What It Tests	Why It Is Needed
BSSID details	View information for a specific AP	Determine whether an AP is running in legacy mode or with outdated security settings
BSSID view	View all APs by channel	See the WiFi environment across 2.4 GHz and 5 GHz bands to visually determine crowded channels
Channel view	Displays channel utilization, noise, channel score, and best channels	Quickly determine the best channel for WiFi deployment and troubleshooting
Spectral analyzer	Real time 802.11 and non-802.11 spectrum	Locate interference sources such as Bluetooth devices and microwave ovens
Site Assessment Assistant	Works with WiFi Advisor to determine throughput of a WiFi system	TrueMargin™ is the measure of throughput in the actual environment

Consolidate Your Test Investment

WiFi Advisor is fully integrated with the OneExpert broadband to the home test platform. This power combination allows you to test fiber, cable and the home WiFi network. The flexible Viavi platform architecture helps customers maximize their overall investment in broadband to the home test tools. There are two ways you can consolidate your toolset and minimize both OpEx and CapEx:

• Control a single WiFi Advisor from OneExpert to do BSSID, Spectral, and Channel View testing—this lets you avoid purchasing a separate tablet device to host the WiFi Advisor application and reports because OneExpert hosts it

• Conduct two-ended testing with a single WiFi Advisor, a tablet, and OneExpert—this eliminates the need for two WFEDs
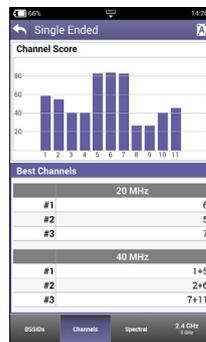

OneExpert CATV controls the Wifi Advisor for single-ended operation — troubleshoot common WiFi problems quickly

OneExpert CATV supports the Wifi Advisor for dual-ended operation — whole-home performance testing optimizes AP placement, ensures resilient WiFi network installation, identifies sources of WiFi degradation, and educates/sets proper end-user expectations on real WiFi performance
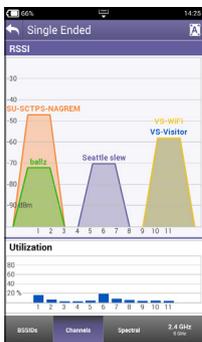

RSSI view per channel | The test application identifies the best channel for WiFi service

Fiber

Broadband CATV networks and broadband triple-play services often rely on fiber networks. For point-to-point fiber installations such as FTTC or business connections, field technicians can use the OneExpert CATV together with the Viavi MP-60 or MP-80 USB optical power meter (OPM) to ensure that fiber cable attenuation meets system requirement performance and is ready to survive network aging and environmental impacts. In combination with a Viavi SmartPocket optical laser source (OLS), the OneExpert CATV equipped with an MP-60 or MP-80 OPM can automatically perform optical link loss measurement at different wavelengths—resulting in a faster and more comprehensive fiber test.

Using the P5000i optical fiber scope, technicians can test the #1 cause for troubleshooting in optical networks—contaminated fiber connectors. The P5000i provides pass/fail analysis based on user-selectable acceptance profiles.
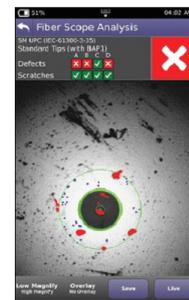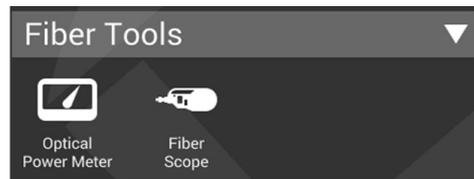
OneExpert integrates seamlessly with
Viavi optical power meters and fiber microscopes

Table 3. Fiber tests

Fiber Test	What It Tests	Why It Is Needed
Optical fiber scope	Pass/fail against a predefined profile; includes dual magnification	Contaminated fiber connectors are the #1 cause for troubleshooting in optical networks
Optical power level	Optical power level with pass/fail and reference values	Optical loss must be within budget at ONU site

TrueSpeed

Broadband IP networks and their throughput speeds are non-deterministic and their behavior is unpredictable. OneExpert CATV with TrueSpeed provides a standardized RFC-6349 speed test to measure the throughput at the TCP application layer just as a user would experience it. Other methods, such as FTP upload/download, cannot accurately test ultra-fast broadband rates.
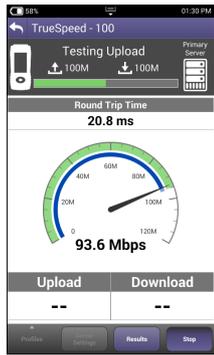
OneExpert CATV TrueSpeed throughput test

Table 4. TrueSpeed tests

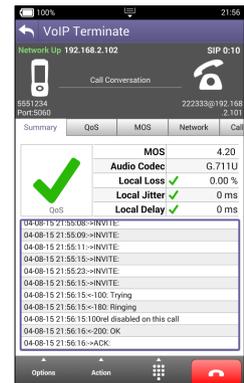| TrueSpeed Test	What it Tests	Why is it Needed?
Actual rate (up/down)	Actual achieved TCP throughput	Measure throughput as customers experience it at the application layer
Ideal rate (up/down)	Baseline for achievable TCP throughput without physical layer overhead	Provides a baseline for an ideal-expected-TCP throughput based on the physical layer rate
TCP Efficiency	Ratio of Successful TCP transmitted without retransmission to the total TCP transmitted.	A large throughput isn't very useful for the customer if a lot of IP packets need to be retransmitted
Round trip time (RTT)	Baseline round-trip delay measurement	Calculate the bandwidth delay product (BDP) to identify impact of RTT to network throughput
Maximum segment size (MSS)	Test-optimized segment size to achieve maximum throughput speed	Per RFC-4821 to ensure that the TCP payload remains unfragmented and unnecessary IP overhead is avoided
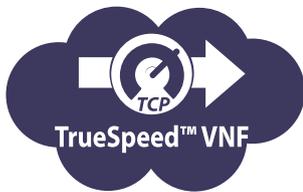
VoIP

The OneExpert CATV is the ideal test tool to quickly place VoIP calls and verify QoS via mean opinion score (MOS) values. An Ethernet interface tests VoIP anywhere in the access network, replacing the VoIP phone. The OneExpert also includes an Auto Answer mode in which the unit automatically responds to an incoming call. Viavi provides a wide range voice decoding controls such as G.711, G.722, G.723, G.726, and G.729.

VoIP Test	What It Tests	Why It Is Needed
Service setup/ provisioning	Registration with gateway as a SIP VoIP client	User setup and server availability. VoIP clients and servers can have complex setups — preclude setup errors
Connectivity beyond signaling gateway	Placing test calls on and off network	Call connection from VoIP-to-VoIP and VoIP-to-public switched telephone network (PSTN)
Call quality	MOS, near- and far-end QoS with packet loss, jitter, delay, and R-Factor	Test how VoIP calls are transferred through the network and received at the customer premises

VoIP test selection   VoIP call summary
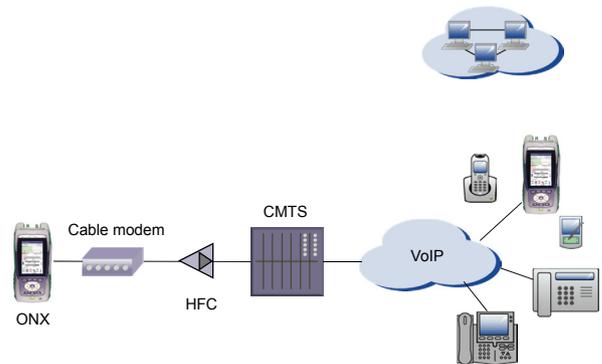
OneExpert tests VoIP throughout the IP network registration with gateway, test calls on and off the network, and measures near- and far-end IP QoS and MOS.

IP Video

OneExpert CATV can test multiple standard and high-definition television (SDTV/HDTV) streams regardless of compression format (MPEG-2, MPEG-4p10/H.264, VC-1, and others) and automatically detects the stream type with the Broadcast Auto feature. The OneExpert CATV IP Video application allows for termination of the IP video stream anywhere in the access network using the Ethernet interface.

Key performance indicators for real-time protocol (RTP) lets the OneExpert CATV precisely measure network QoS and QoE.

Table 5. IP video tests

IP Video Test	What It Tests	Why It Is Needed
IP video stream availability	Access to one or more SDTV or HDTV streams	Content might come from different sources; possible bandwidth limitations if more than one stream is active
Quality of service	Key IP video performance indicators such as jitter, loss, latency, error indicator; includes QoS Expert to compare performance between two streams	Easy-to-understand pass/fail metrics if IP video is of good quality
Packet loss analysis	Minimum distance, maximum period, RTP loss and errors	Detailed analysis on on Quality of Experience impact
Rates analysis	Video, audio, and data substream rates	Bandwidth consumption in relation to total available rates.
PID map	PID for video, audio, data	Availability of all stream components

IP Video QoS testing

OneExpert CATV IP Video — QoS Expert

Design Features

With the advent of cloud-based applications, touch-screen interfaces, and always-on, always-connected smartphones and tablets, instrument users have high expectations not only for usability, but also for seamless integration between their devices and the back office. OneExpert design takes all this into consideration to provide a test platform that helps technicians perform more efficiently and fix problems faster. It lets service providers invest in a long-term, open platform.

Upgradeable and Expandable

OneExpert accommodates continually evolving technologies. It includes a field-exchangeable module that offers a fast and simple way to manage, calibrate, and upgrade the RF/DOCSIS portion of the test unit. By simply removing six screws, the RF/DOCSIS portion can be sent for calibration, swapped out for a next-generation DOCSIS standard, or repaired/replaced for a lower total-cost-of-ownership.

Each DOCSIS/RF application module is individually calibrated without the mainframe. This lets operators swap, replace, or calibrate the important measurement section without sending back the entire unit.

Add-On Module Capable

In addition to the RF/DOCSIS application set, OneExpert works with add-on modules. This enables adding technologies in the future such as business-class Ethernet with Y.1564 and RFC.2544 with T1/PRI or OTDR modules. This flexibility addresses the needs of a diverse and ever-changing workforce.

StrataSync

Keeping track of test equipment inventory is typically a challenge for field operation groups. Asset management includes types of instruments, firmware versions, options, and automated test configurations that match standardized methods and procedures. The challenge increases every time a change occurs. Without a means to efficiently collect and analyze test data, valuable information about network health is missed.

StrataSync is a cloud-based, hosted solution that manages assets, configurations, and test data for Viavi instruments to ensure they are all equipped with the latest software and installed options. It manages inventory, test results, and performance data from anywhere with browser-based ease—improving both technician and instrument efficiency. Operators can then leverage data from the entire network for results analysis and to inform and train the workforce.

Table 6. StrataSync capabilities

StrataSync	What It Does	Why It Is Needed
Asset management	Manages and tracks test instruments by displaying assets, modules, versions, and locations. Maintains accurate instrument configuration and setup. Provides visibility into instrument usage.	Eliminate time wasted on instrument setup. Reduce repeats with correctly configured instruments. Improve results and reduce operating costs.
Data-result management	Collects and analyzes results with centralized collection and storage, secure visibility from anywhere, and consolidated test data/metrics.	Access more data with centrally collected results for better use. Speed problem resolution by sharing data for faster troubleshooting. Drive compliance by tracking and comparing technician performance.
Updates the workforce	Informs and trains the workforce through alerts, release notes and manuals, and a comprehensive product-knowledge library.	Inform the workforce using a single source for instrument status, new capabilities, and educational content. Improve performance with quick access to training and troubleshooting information. Stay current with alerts for expiring warranties and overdue calibrations.

Specifications

Frequency	
Range	4 to 1004 MHz
Accuracy	±10 ppm typical @25°C
Upstream Analysis — Port 2	
Ingress spectrum scan	4 – 200 MHz
Sensitivity	−45 dBmV
RBW	300 kHz
Min detectable level upstream	−55 dBmV
Dynamic range	45 dB
Max input power	55 dBmV, 4 −110 MHz
Accuracy	±2 dB typical at 25°C
Downstream Analysis	
AutoChannel plan builder	Auto detection of channel parameters (analog/digital, symbols, QAM)
Analog Channel Measurement	
Video and audio levels (dual)	
Standards	NTSC , PAL, SECAM
Min detectable signal	−50 dBmV (single channel)
Max detectable signal	+60 dBmV (single channel)
Level accuracy	±1.5 dB from −20 dBmV to +50 dBm V typical at 25°C ±2.0 dB, −20°C to +50°C
RBW	300 kHz
Downstream Digital Channel Analysis	
Modulation(s)	Q64, Q128, Q256
Annex A, B and C	
Annex B symbol rates	QAM 64, 5.057 Msym/S QAM 256, 5.361 Msym/S
Regional demods	DVB-C
Full span MER	
Ingress under carrier — full span ingress noise trace	
Group delay and in-channel response (ICR)	
Digital quality index (DQI) over time	
Errored/severely errored seconds	
Level, measured symbol rate, carrier frequency, modulation, interleaver depth	

Specifications

OFDM Signal Performance Metrics	
Level — max, min, average, standard deviation	
MER — max, min, average, standard deviation, percentile	
MER channel band graph — max, min, avg	
Noise — max	
Echo — dBc	
ICFR — in-carrier frequency response (dB)	
Spectrum/IUC — spectrum display, including carrier and ingress under carrier	

Scan	
OFDM signal identified	

Profile Analysis	
Profiles A, B, C, D, NCP, and PLC (more profiles as implemented) Lock status, codeword errors (corrected and uncorrected)	

MER*	
Calibrated range +20 to −5 dBmV	21 to 40 dB, QAM-64 28 to 40 dB, QAM-256
Max displayable range	45 dB
Resolution	0.1 dB
Accuracy	±2 dB typical at 25°C
Minimum lock level	−15 dBmV
BER — ChannelCheck and DOCSISCheck mode	Down to 1E-9 (pre and post FEC)
BER — OneCheck mode	Down to 1E-8 (pre and post FEC)
Interleaver depth	128, 8 max

Display/Interface/Usability	
High-brightness color LCD (800 x 480)	
Touch screen	Capacitive
Hard key navigation capable	
Boot time	Approximately 20 sec

Environmental		
For indoor/outdoor use	IP 54 light rain (0.5"/hr)	
Pollution	2°	
Drop	1 m onto concrete	
Temp range	Operating	−10 to 50°C
	Storage temp	−20 to 60°C
Humidity	10 – 90% RH non-condensing	
RF immunity	8.5 V/m (for CATV measurements)	
Maximum altitude	4000 m (13,123 ft)	

* Specifications are for Annex B. Additional uncertainty for Annex A,C.

Input/Outputs	
RF (2)	F connectors replaceable
Port 1	Downstream 54/85/108/258 MHz depending on diplexer
Port 2	Upstream 4 – 204 MHz and TDR
USB host (2)	
Ethernet (2)	RJ45 10/100/1000T
Power	Polarized

Diplexer Frequencies (Port 1)	
Diplexer return path options (may not be available on all units): · 42 MHz: upstream 4 – 42 MHz; downstream 54 – 1004 MHz · 85 MHz: upstream 4 – 85 MHz; downstream 108 – 1004 MHz	

Asset and Data Management	
StrataSync™	

StrataSync™ Reporting Capability	
Session based (job/work order) file saving of results gathered at TAP, GB, and CPE	
Measurement screen capture save and recall	
StrataSync data and asset management three-year license	

TrueSpeed Option	

Test Interface	
10/100/1000 Ethernet, RJ45	
Settings	
Primary server	
Fallback server	
Profile with committed information rate (CIR) for upload and download	

Measured and Calculated Results	
Actual rate download/upload	
Ideal rate download/upload	
TCP efficiency	
Round trip time (RTT)	
Maximum segment size (MSS)	

Specifications

Report Results
Committed information rate (CIR)
Actual throughput
Target throughput
Saturation window
Target TCP throughput
Maximum segment size (MSS)
Maximum transmit unit (MTU)
Round trip time (RTT)
Round trip time base
Maximum average throughput
Maximum peak throughput
Maximum window size
Window size per connection
Connections
Aggregate window
Actual throughput
Target throughput
Buffer delay
TCP efficiency
Total retransmits
Standards
Viavi TrueSpeed VNF
RFC-6349
IP Video Option
Test Interface
Ethernet 10/100/1000, RJ45
Modes
Terminate
Set-Top Box Emulation
IGMPv2 and v3 emulation client
RTSP emulation client
Service Selection
Broadcast auto
Broadcast MPEG2-TS/UDP
Broadcast MPEG2-TS/RTP/UDP
Broadcast RTP/UDP
Broadcast rolling stream
Broadcast TTS/UDP
Broadcast TTS/RTP/UDP
RTSP MPEG2-TS/(RTP)/UDP
RTSP MPEG2-TS/(RTP)/TCP
RTSP RTP/UDP
RTSP RTP/TCP

Video Settings
IPv4 IGMP version 2, 3
RTSP port
RTSP interoperability normal, Oracle, Siemens
IPv6 MLD version 2, 3
Video Source Address Selection
IP address and port number
IP address, port number, and VoD URL extension
RTSP port select
RTSP vendor select
Video Analysis Per Video Stream
Simultaneous stream support
6 terminate
Number of active streams
Combined rate, current/max
QoS
Error indicator current/score
IGMP latency current/score
RTSP latency current/max/score
PCR jitter current/max/score/history
RTP packet jitter current/max/score/history
RTP lost current/max/score/history
Continuity error lost current/max/score/history
Overall current/max/score/history
Packet Loss Statistics
RTP loss distance errors current/max/total
RTP loss period errors current/max/total
Minimum RTP loss distance
Maximum RTP loss period
RTP packets lost count
RTP OOS count
RTP errors count
Continuity errors count
Ethernet RX errors, RX drops count
Video Stream Data Results
Total current/min/max/average
IP current/min/max/average
Video current/min/max/average
Audio current/min/max/average
Data current/min/max/average
Unknown current/min/max/average

Specifications

Transport Stream Statistics	
Error indicator count	
Continuity errors count	
Sync errors count	
PAT errors count	
PMT errors count	
PID timeouts count	
Service name	
Program name	

QoS Expert	
Compare two streams for error indicator, lost packets, jitter, latency	

PID Analysis (each stream)	
PID number	
PID type (video, audio, data, unknown)	
PID description	

Layer Correlation	
Combined result view for Ethernet RX errors, RX dropped, video continuity error, video RTP lost, video loss distance total, video loss period total	

Standards	
RFC 2236, IGMP	
RFC 2326, RTSP	
ISO (IEC 13818), video transport stream and analysis	
ETSI TR 10-290 V2.1, video measurements	
TFC 1483, RFC-2684, ATM AAL5	

VoIP Software Option	
Test Interface	
Ethernet 10/100/1000, RJ45	
Supported Signaling Protocols	
SIP RFS 3621	
Supported Codec Configurations	
ITU-T G.711 u-law/A-law (PCM/64 kbps)	
ITU-T G.722 64K	
ITU-T G.723.1 (ACELP/5.3, 6.3 kbps)	
ITU-T G.726 (ADPCM/32 kbps)	
ITU-T G.729a (GS-ACELP/8 kbps)	
VoIP Settings	
Auto-answer	
Local alias	
Outbound alias	
Proxy gateway	
Call control port	
100Rel support	
SIP interoperability	

Remote Access/Connectivity	
VNC accessible via IP address	
HTTPS file access via IP address	
Mobile application via Bluetooth	

Fiber Test	
Optical Fiber Power Meter	
USB optical power meter	MP-60, MP-80
Min/max/average optical power level and wavelength	dBm, mW
Connector input	Universal 2.5 and 1.25 mm connectors
Power source	USB port
Selectable pass/fail threshold	
Signal QoS	
Reference value	
Optical Fiber Scope	
USB optical fiber scope	P5000i
Results for zone defects	Pass/fail
Results for zone scratches	Pass/fail
Low mag field-of-view (FOV)	Horizontal 740 µm, vertical 550 µm
High mag field-of-view (FOV)	Horizontal 370 µm, vertical 275 µm
Particle size detection	<1 µm
Power source	USB port
Setting for profile, tip, focus meter, button action	
Actions for live mode, test mode, high magnification	
Probe model, serial, firmware	

WiFi	
Test Interface	
802.11 a/b/g/n (2.4/5 GHz)	
Tests	
WiFi scan	
WiFi access point (2.4 GHz only)	
Scan Results	
SSID (secure set identification)	
Channel	
Security setting	
Power level	
MAC address	
Scan Modes	
AP list (access point)	
Channel graph	
Time graph	
Access Point	
Configure OneExpert CATV as WiFi access point (Ethernet to WiFi bridge)	

Specifications

WiFi Advisor (sold separately)	
Test Device	
WFED-300AC	
Test Interface	
802.11 a/b/g/n/ac 3x3	
Band support for 2.4 GHz and 5GHz	
BSSID View	
Real-time RSSI	
Noise	
SSID	
BSSID/MAC	
Channel utilization	
Channel width	
Security	
Standard	
SNR	
Channel View	
RSSI	
Channel utilization	
Noise	
Channel score by channel	
Best channels recommendation	
Spectral View	
Real-time spectral measurements	
Max hold	
Site Assessment Assistant	
TrueMargin™ measurement	
Battery	
ONX-620	96 W/hr 10.4 V, 10-cell LiIon
Typical battery life	6 – 8 hr continuous, 15 – 20 hr typical usage
Battery charge time	8 hr (AC charger)
ONX-610	48 W/hr 10.4 V, 6-cell LiIon
Typical battery life	3 – 4 hr continuous, 7 - 10 hr typical usage
Battery charge time	4 hr (AC charger)
Field replaceable	
Warranty	The OneExpert standard three-year warranty includes: · All parts and labor necessary to return an instrument to full performance specifications · Authorized Viavi repair processes performed by Viavi factory-trained engineers and technicians · Genuine Viavi parts · All relevant engineering changes and firmware upgrades · Thorough performance testing, adjustment, and calibration post-repair

Weight	
ONX-620	5.95 lb
ONX-610	5.45 lb
Standard Accessories	
Protective case with hand strap and detachable shoulder strap	
AC power supply with choice of country-specific adaptor plug	
Quick start guide	
Three years of StrataSync asset and data management	
Optional Accessories	
Deluxe accessory kit	Large carrying case, 12 V DC automobile power supply, strand hook, Ethernet cable, hand strap

Mainframe Hardware Models

Feature	ONX-610 — Value oriented	ONX-620 — Flexible and expandable
48 W/hr battery (3-4 hr)	■	
96 W/hr battery (6-8 hr)	Optional	■
Fixed diplexer	42 MHz	
Dual diplexer	N/A	42 and 85 MHz
16x4 DOCSIS channel bonding	■	■
32x8 DOCSIS channel bonding	Optional	■
Bluetooth and mobile app	Optional	■
Expansion module capable	N/A	■
Field-exchangeable DOCSIS and RF section	■	■
DQI measurement	■	■
Web browser	■	■
3-year warranty	■	■

Ordering Information

Description	Part Number
ONX 610	
Packages — Fixed 42 MHz	
Basic package	ONX-610D31-42-10-BAS
IPX package	ONX-610D31-42-10-IPX
TSX package	ONX-610D31-42-10-TSX
Options	
Extended-capacity 96 W/hr battery	ONX-CATV-BATT-96WHR
DOCSIS 32x8 capability	ONX-CATV-SW-D3-32
Bluetooth option	ONX-CATV-SW-BT
Mobile app option (requires Bluetooth option)	ONX-CATV-SW-MOBILE
Large accessory bag, fitted case, 12V adapter, strand hook, Ethernet patch cord (1 m), extra hand strap	ONX-CATV-DLX-ACCY-KIT
TrueSpeed	ONX-TRUESPEED
IP video	ONX-CATV-IPVIDEO
MoCA	ONX-CATV-SW-MOCA
DOCSIS 3.1	ONX-CATV-SW-D31

Description	Part Number
ONX-620	
Packages — Dual Diplexer 42 MHz and 85 MHz	
Basic package	ONX-620D31-4285-1010-BAS
IPX package	ONX-620D31-4285-1010-IPX
TSX package	ONX-620D31-4285-1010-TSX
Options	
TrueSpeed	ONX-TRUESPEED
IP video	ONX-CATV-IPVIDEO
VoIP	ONX-VOIP
MOS (requires VoIP software option)	ONX-MOS
DOCSIS 3.1	ONX-CATV-SW-D31
Large accessory bag, fitted case, 12V adapter, strand hook, Ethernet patch cord (1 m), extra hand strap	ONX-CATV-DLX-ACCY-KIT
Bronze and Silver Warranty Extensions	
Five-year warranty	BRONZE-5
One calibration	SILVER-3
Five-year warranty and two calibrations	SILVER-5
Accessories	
MP-80 USB optical power meter	MP-80A
MP-60 USB optical power meter	MP-60A
P5000i USB fiber scope	FBP-P5000I
WiFi Advisor standard package	WFED-300AC
WiFi Advisor test device, carrying case, USB cable, AC power supply, and power cord	WFED300AC-1PC

Feature Matrix

	Feature	Basic	IPX	TSX
OneCheck	Dashboard with ingress scan, downstream summary, DOCSIS summary, and Session Expert summary	■	■	■
OneCheck Details screens	Ingress scan — full graphic view	■	■	■
OneCheck Downstream Details	Full scan with channel details — level, MER, BER, C/N, Echo, GD, ICR	■	■	■
	System view (max dB delta, max video delta)	■	■	■
	Favorites	■	■	■
	Tilt	■	■	■
	Smart scan			■
	MER graph — all channels			■
	BER graph — all channels			■
	Off-air ingress detection (downsteam ingress under carrier)	■	■	■
OneCheck DOCSIS Details	Downstream DOCSIS channel scan with channel details — level, MER, BER, C/N, echo, GD, ICR	■	■	■
	Upstream DOCSIS channel scan with channel details — TX level, modulation type, ICR	■	■	■
	DOCSIS throughput		■	■
	DOCSIS packet quality		■	■
OneCheck — Session Expert Details	Problems detected table	■	■	■
	Suggested actions table	■	■	■
	Ingress comparison between TAP and GB	■	■	■
	Drop analysis between TAP and GB	■	■	■
	Detailed downstream comparison between TAP, GB, and CPE	■	■	■
	Detailed SmartScan comparison between TAP, GB, and CPE			■
	Detailed Off-air ingress comparison between TAP, GB and CPE	■	■	■
	Detailed DOCSIS comparison between TAP, GB, and CPE	■	■	■
	Detailed DOCSIS service test comparison between TAP, GB, and CPE		■	■
ChannelCheck	Full scan with channel details — level, MER, BER, C/N, Echo, GD, ICR	■	■	■
	DS Spectrum w/ Ingress under the carrier (7-channels wide)			■
	System view (max dB delta, max video delta)	■	■	■
	Favorites graph (up to 32 Ch)	■	■	■
	Tilt	■	■	■
	DQI over time	■	■	■
	Level over time			■
	MER over time			■
	BER over time			■
	Downstream in-channel response graph			■
	SmartScan™			■
	Constellation	■	■	■

Feature Matrix

	Feature	Basic	IPX	TSX
DOCSISCheck	Downstream DOCSIS channel scan with channel details — level, MER, BER, C/N, echo, GD, ICR	■	■	■
	DQI over time	■	■	■
	Level over time			■
	MER over time			■
	BER over time with ES/SES			■
	Downstream in — channel response graph			■
	Upstream DOCSIS channel scan with channel details — TX level, modulation type, ICFR			■
	Transmit over time	■	■	■
	DOCSIS upstream in channel frequency response graph			■
	Throughput		■	■
	Packet quality — packet loss, round trip delay, jitter		■	■
	VoIP check		■	■
	Trace route		■	■
	Ping		■	■
	Pass through modem RJ-45 port		■	■
Home Network Check	Ethernet		■	■
	Ping		■	■
	TrueSpeed™		Optional	Optional
	WiFi - 2.4GHz and 5GHz — SSID survey — graphical and tabular	■	■	■
	SSID levels over time	■	■	■
	Local WiFi access point		■	■
Mobile app integration		■*	■*	■*
Bluetooth		■*	■*	■*
Optical fiber scope support — P5000i		■	■	■
Optical power meter support — MP-60, MP-80		■	■	■

* Optional on ONX-610.