

OneExpert DSP (ONX-220)



Installation/service meter with ONX DNA, making it unequalled in speed, simplicity and value.

When home network quality is unreliable, customers become dissatisfied and are more likely to churn. At the same time technical complexity is increasing, but technician skill and experience at the installation service tier is typically minimal. It's never been more important to have quick, effective troubleshooting tools that enable techs to quickly and efficiently verify performance as advertised. The ONX-220 is fast, complete, and follows up testing with simple cloud data storage to enable realtime close-out and reporting.

KEY BENEFITS

- Fastest and most comprehensive tool for verifying high speed DOCSIS service activation and performance
- Rugged build quality, workmanship, and reliability expected from VIAVI and our years of measurement experience
- Technicians now have access to a rugged, precise measurement instrument at a budget minded price
- Best balance of features, performance, and cost – designed to meet the budgets of installers and contractors

KEY FEATURES

- **AutoChannel™** instantaneous channel lineup detection eliminates need for lineup editing, updating and deploying
- **OneCheck** comprehensive mistake-proof automated tests, including: ingress, downstream channels and DOCSIS carriers at three demarcation points (Tap, GB, CPE)
- **DOCSISCheck** real-time analysis and powerful DOCSIS carrier and data service troubleshooting; upstream and/or downstream
- **ChannelCheck** real-time analysis and powerful downstream QAM, OFDM, and Analog carriers troubleshooting
- **DQI (Digital Quality Index)** focuses on raw information condition on the physical path, immediately detects intermittent and sustained issues within the stream
- Integrated Bluetooth connectivity enables leveraging mobile device GPS and multi-media capabilities with VIAVI Android/iOS Mobile Tech App
- Ready for high-speed Gigabit Ethernet and DOCSIS and WiFi* service testing, unavailable with other low-cost competing products
- **OneCheck Fiber** consolidates tests with P5000i and FiberChek Pro optical inspection scopes, SmartOTDR optical time domain reflectometer and MP60/80 optical power meter
- Certify home WiFi performance as part of a complete verification process and test coverage throughout the home, including throughput, airtime (traffic) and SNR with Advanced WiFi Option.

* Network service testing is included only on Plus and Pro models.

Specifications

Frequency			
Range	Diplexer	Upstream	Downstream
Automatically Switching Diplexer	42/85	5 - 42 MHz and 5 - 85 MHz	54 - 1,004 MHz and 108 - 1,218 MHz
	65/204	5 - 65 MHz and 5 - 204 MHz	83 - 1,218 MHz and 258 MHz - 1,218 MHz
Accuracy	±10 ppm typical @25°C		
Downstream Analysis			
AutoChannel plan builder	Auto detection of channel parameters (analog/digital, symbols, QAM)		
Max input power	38 dBmV total integrated power		
Return loss	>6 dB		
Upstream Analysis			
Ingress spectrum scan	5.0 – 204 MHz		
Sensitivity	–38 dBmV		
RBW	100 kHz		
Min detectable level upstream	–38 dBmV		
Accuracy	±2 dB typical at 25°C		
Return loss	>6 dB		

Analog Channel Measurement	
Video and audio levels (dual)	
Standards	NTSC , PAL
Min detectable signal	–50 dBmV (single channel)
Level accuracy	±1.5 dB from –20 dBmV to +15 dBmV typical at 25°C; ±2.0 dB, –10°C to +50°C
RBW	300 kHz
Carrier to Noise	
Channel types	NTSC , PAL, non-scrambled
Range	30 to 51 dB (NTSC, 4 MHz measurement bandwidth)
Required input level	0 to +15 dBmV with 77 analog channels present, maximum ±15 dB tilt 50 to 1,000 MHz
Accuracy	±2.0 dB within specified measurement range ≤ 600 MHz
Downstream Digital Channel Analysis	
Calibrated power levels	–20 dBmV to +15 dBmV
Level accuracy	±1.5 dB from –20 dBmV to +15 dBmV typical at 25°C; ±2.0 dB, –10°C to +50°C
Modulation(s)	64, 128, and 256 QAM, OFDM
Annex A: 5.057 to 6.952 MSPS Annex B: 5.057 for 64 QAM and 5.361 MSPS for 256 QAM Annex C: 5.274 MSPS for 64 QAM and 5.361 MSPS for 256 QAM	
Full span MER	
Ingress under carrier — full span ingress noise trace	
Group delay and in-channel frequency response (ICFR)	
Digital quality index (DQI) over time	
Errored/severely errored seconds	
Level, measured symbol rate, carrier frequency, modulation, interleaver depth (data log only)	

OFDM Signal Performance Metrics	
OFDM Channels	24 - 192 MHz wide - up to 3 active OFDM channels
Level — max, min, average, standard deviation	Relative to a 6 MHz carrier per CableLabs
MER — max, min, average, standard deviation, percentile	16 to 44 dB
MER channel band graph	max, min, avg across entire OFDM carrier
Noise	Max
Echo	dBc
ICFR	In-carrier frequency response (dB)
Spectrum/IUC	Spectrum display, including carrier and ingress under carrier
OFDM Profile Analysis	
Profiles A, B, C, D, NCP, and PLC (more profiles as implemented) Lock status, codeword errors (corrected and uncorrected)	
DOCSIS Testing	
Supports DOCSIS 3.1 bonding up to 32 SC-QAM + 2 OFDM downstream channels, 8 SC-QAM + 2 OFDMA upstream channels	
Compliant with CableLabs® specifications for DOCSIS 3.1	
Compliant with CableLabs® specifications for DOCSIS 3.0 (32x8 bonding)	

Displayed DOCSIS Results	
Top level	Number of bonded channels, min receive level, max BER (pre-FEC), min and max MER, max transmit level, max ICFR (in-channel frequency response)
Details	Downstream SC-QAM (over time charts: level, MER, BER, DQI), Upstream (charts: transmit over time, upstream ICFR, upstream EQ taps)
Service tests	Registration, Throughput, Ping/Traceroute, Packet Quality; cable modem pass-through
OFDM	OFDM selected in scan, number of subcarriers, PLC lock status, frequency, level, and MER, CWE (corr, uncorr); OFDM channel(s) - Level variation (max, min, avg), MER variation (max, min, avg), ICFR, profile analysis (locked, CWE corr, CWE uncorr)
Downstream	
Frequency range	42/65/85/204 to 1,218 MHz (dependent on currently active diplexer frequency)
Upstream	
Frequency range	5 to 204 MHz (dependent on currently active diplexer frequency)
OFDMA channels	≥2, per DOCSIS specification
Transmit level range (max)	+61 to +48 dBmV depending on modulation format and number of bonded carriers, per DOCSIS specification
SC-QAM channels	Up to 8 per DOCSIS specification

MER		
Specified range ¹ (with input level -5 to +15 dBmV)	21 to 40 dB, 64 QAM; 28 to 40 dB, 256 QAM; 16 to 44 dB OFDM	
Max displayable range	50 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) default; 1E-9 user selectable	
Interleaver depth	128, 8 max	
Display/Interface/Usability		
High-brightness color LCD (800 x 480)	5 inch diagonal	
Touch screen	Capacitive	
Boot time	Approximately 20 sec	
Environmental		
For indoor/outdoor use	IP 54 light rain (0.5 in/hr; 1.27 cm/ hr)	
Pollution	2°	
Drop	1 m (3.3 ft) onto concrete	
Temp range	Operating	-10 to 50°C (14 to 122°F)
	Storage temp	-20 to 60°C (-4 to 140°F)
Humidity	10 – 90% RH non-condensing	
RF immunity	8.5 V/m (for CATV measurements)	
Maximum altitude	4000 m (13,123 ft)	

1. MER range declines as input levels decrease. Expected MER range at MIN LOCK level of -15 dBmV

Input/Outputs	
RF	F connectors replaceable
Charge Port	USB-C
USB Port	USB 3.0 (Type A)
Ethernet (2)	Rj45 10/100/1000T
Power	USB-C
Remote Access/Connectivity	
VNC accessible via IP address	
HTTPS file access via IP address	
Mobile Tech application via Bluetooth	
Smart Access Anywhere (option) via IP network or the Internet, which can be via Ethernet, WiFi or mobile hot-spot	
Battery	
Field replaceable 48 WHr 7.4 V, 6-cell Lilon	
Typical battery life	8 hr typical usage
Battery charge time	2 Hrs (90%) 3 Hrs 100% (included USB-C charger)
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 Core	Asset and data management
StrataSync Plus	Optional extended data management (6 years)
Warranty	
Instrument	1-year warranty
Accessories and battery	One-year warranty

MER		
Width	5.27 in (133.88 mm)	
Height	9.96 in (252.89 mm)	
Depth	2.23 in (57.33 mm)	
Weight		
Device (without protective case)	3.10 lb (1.41 kg)	
Protective case and shoulder strap	1.10 lb (0.50 kg)	
WiFi (Plus and Pro Models Only)		
Test interface	802.11 a/b/g/n/ac (2.4/5 GHz)	
Tests	WiFi scan	
Antennas	3x3	
Scan results	SSID (secure set identification); Channel; Security setting; Power level; MAC address	
Scan modes	Channel graph; Time graph	
Advanced WiFi Option		
Test Results	WiFi Expert (Passive Mode)	Up to 802.11 a/b/g/n/ac/ax (WiFi 6 8x8) Signal strength (RSSI), Channel, Standard, Width, Channel Noise, Total Airtime, Noise Airtime, Estimated Throughput, Recommendations
Test Results	OneCheck WiFi (Connected Mode)	Up to 802.11 a/b/g/n/ac/ax (WiFi 6 8x8 with ONX connected as WiFi 5 3x3) Signal strength (RSSI), Standard, Width, Max Router PHY Rate Up to 802.11 a/b/g/n/ac (WiFi 5 3x3) Adds IP/Web connectivity, Throughput Tests

Return Signal Generator Option	
Number of signals generated simultaneously	From 1 to 8
Signal types	Signals either all CW or all modulated
Modulation supported	QPSK, 16 QAM, and 64 QAM
Symbol rates supported	5.12, 2.56, 1.28, 0.64, 0.32, and 0.16 Msym/s
Fiber Test	
Optical Fiber Power Meter	
USB optical power meter	MP-60, MP-80
Measurement units	dBm, mW, dB
Connector input	Universal 2.5 and 1.25 mm connectors
Power source	USB port
Optical Fiber Scope	
USB optical fiber scope	P5000i
Results for zone defects	Pass/fail
Results for zone scratches	Pass/fail
Low mag field-ofview (FOV)	Horizontal 740 µm, vertical 550 µm
High mag field-ofview (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	
Standard Accessories	
Protective case with hand strap and detachable shoulder strap	
AC power supply with country-specific adaptor plugs (USA, UK, Euro, Australia, China)	
Quick start guide	
StrataSync Core support	

Ordering Information

Description		Part Number
SW Pkg	Dual Diplexer	Model
Base	42/85 MHz	ONX-220-42-85-D31-BASE
	65/204 MHz	ONX-220-65-204-D31-BASE
Plus	42/85 MHz	ONX-220-42-85-D31-PLUS
	65/204 MHz	ONX-220-65-204-D31-PLUS
Pro	42/85 MHz	ONX-220-42-85-D31-PRO
	65/204 MHz	ONX-220-65-204-D31-PRO
Options		
Home Leakage Software Option		ONX-2XX-SW-OPT-HL-LKG
Cable Fault Finder		ONX-2XX-SW-OPT-XDR
Advanced WiFi Option (w/unit purchase)		ONX-2XX-SW-OPT-ADV-WIFI
Smart Access Anywhere (w/unit purchase)		ONX-2XX-SW-OPT-SAA
Upstream Source Transmitter		ONX-2XX-SW-OPT-SRC
Field Upgrades		
Home Leakage Software Option		UPG-ONX-DSP-SW-HL-LKG
Cable Fault Finder		UPG-ONX-DSP-SW-XDR
Advanced WiFi Option		UPG-ONX-DSP-SW-ADV-WIFI
Smart Access Anywhere		UPG-ONX-DSP-SW-SAA
Upstream Source Transmitter		UPG-ONX-DSP-SW-SRC
Bronze and Silver Warranty Extensions		
Three-Year Warranty		BRONZE-3
Five-Year Warranty		BRONZE-5
Three-Year Warranty and One Calibration		SILVER-3
Five-Year Warranty and Two Calibrations		SILVER-5
General Accessories		
ONX-220 Vehicle Charger with Integrated Cable		ONX-2XX-PWR-ADPT-VEH
Strand Hook for OneExpert and DSP Meters		1019-00-1366
ONX-220 Soft-Sided Case with Shoulder Strap		ONX-2XX-CASE-BASIC
Test Accessories		
Home Leakage Test Kit with Antenna		TRI-LKG-HL-METER-KIT
P5000i USB Fiber Scope		FBP-P5000I
MP-80 USB optical power meter		MP-80A
MP-60 USB optical power meter		MP-60A
Replacement Parts		
ONX-220 Wall Charger with Integrated Cable		ONX-2XX-PWR-ADPT-WALL
ONX-220 Field Replaceable Battery (48 WHR)		ONX-2XX-BATT-48WHR
OneExpert Field Replaceable F-connectors (25 pack)		ONX-CATV-FCON-25PK
ONX-220 Form-Fitted Case with Shoulder Strap		ONX-2XX-CASE-DELUXE
Replacement Screen Protector (5 Pack)		ONX-SCREEN-PROTECTION

ONX-220 Feature Matrix

OneCheck – Dashboard			
Measurement Feature	BASE	PLUS	PRO
Ingress Scan	■	■	■
Downstream Summary	■	■	■
DOCSIS Summary	■	■	■

OneCheck – Downstream Details			
Measurement Feature	BASE	PLUS	PRO
Full Channel Scan	■	■	■
Basic Channel Details – Level, MER, BER, C/N, DQI	■	■	■
Advanced Channel Details – Echo, GD, ICFR			■
System View – Max dB Delta, Max Video Delta	■	■	■
Favorites (up to 32 Channels)	■	■	■
Tilt	■	■	■
Off-Air Ingress Detection (Downstream IUC)	■	■	■
MER & BER Graph (All Channels)			■
Smart Scan			■

OneCheck – DOCSIS Details			
Measurement Feature	BASE	PLUS	PRO
Downstream DOCSIS Channel Scan	■	■	■
Basic Downstream Channel Details – Level, MER, BER, C/N, DQI	■	■	■
Advanced Downstream Channel Details – Echo, GD, ICFR			■
Upstream DOCSIS Channel Scan	■	■	■
Basic Upstream Channel Details – Tx Level, Modulation Type	■	■	■
Advanced Upstream Channel Details – ICFR			■
DOCSIS Throughput		■	■
DOCSIS Packet Quality		■	■

ONX-220 Feature Matrix

ChannelCheck			
Measurement Feature	BASE	PLUS	PRO
Full Channel Scan	■	■	■
Basic Channel Details – Level, MER, BER, C/N, DQI	■	■	■
Advanced Channel Details – Echo, GD, ICFR			■
System View – Max dB Delta, Max Video Delta	■	■	■
Favorites (up to 32 Channels)	■	■	■
Tilt	■	■	■
DQI Over Time			■
Level Over Time			■
MER Over Time			■
BER Over Time			■
Downstream ICFR			■
Downstream IUC			■
SmartScan			■
Constellation	■	■	■

DOCSISCheck			
Measurement Feature	BASE	PLUS	PRO
Downstream DOCSIS Channel Scan		■	■
Basic Downstream Channel Details – Level, MER, BER, C/N, DQI		■	■
Advanced Downstream Channel Details – Echo, GD, ICFR			■
DQI Over Time			■
Level Over Time			■
MER Over Time			■
BER Over Time with ES/SES			■
Downstream ICFR			■
Downstream IUC			■
Upstream DOCSIS Channel Scan			■
Basic Upstream Channel Details – Tx Level, Modulation Type			■
Advanced Upstream Channel Details – ICFR			■
Transmit Over Time			■
Upstream ICFR			■
Speed Check – Throughput		■	■
Packet Quality – Packet Loss, Round Trip Delay, Jitter		■	■
Ping & Traceroute		■	■
Pass Through Modem RJ-45 Port		■	■

ONX-220 Feature Matrix

Network Connectivity Modes			
Measurement Feature	BASE	PLUS	PRO
DOCSIS Cable Modem	■	■	■
Pass Through Modem RJ-45 Port		■	■
Ethernet	■*	■	■
WiFi	■	■	■
Bluetooth	■	■	■
Mobile App Integration	■	■	■

* Base model has WiFi connectivity only (no testing)

DOCSIS 3.1 Testing			
Measurement Feature	BASE	PLUS	PRO
Automatic SC QAM Signal Detection, Identification, and Measurement in Scan	■	■	■
Bonding Verification SC QAM (32 x 8) and OFDM (2 x 2)	■	■	■
OFDM Signal Level Variation – Min/Avg/Max	■	■	■
PLC – Detection, Lock Status, Level, MER, and CWE	■	■	■
NCP – Lock Status and CWE	■	■	■
Profile Analysis – Lock Status and CWE	■	■	■
OFDM Ingress Under Carrier Analysis	■	■	■
Web Browser	■	■	■
Ping & Trace Route		■	■
Speed Check – Throughput		■	■

Ethernet Testing			
Measurement Feature	BASE	PLUS	PRO
Web Browser	■	■	■
Ping & Trace Route		■	■
Speed Check – Throughput		■	■
Ookla Speed Test		■	■

ONX-220 Feature Matrix

WiFi Testing			
Measurement Feature	BASE	PLUS	PRO
2.4 & 5 GHz Network Scan		■	■
Web Browser	■	■	■

Fiber Optic Modes			
Measurement Feature	BASE	PLUS	PRO
OneCheck Fiber	■	■	■
Optical Fiber Scope Support – P5000i	■	■	■
Optical Power Measurement Support – MP60/MP80	■	■	■
Optical Time Domain Reflectometer Support – Smart OTDR	■	■	■