VIAVI Solutions

VIAVI
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 real-time close-out and reporting.

OneExpert CATV ONX-220

- 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

- Compatible with P5000i optical inspection scope, MP-60/80 optical power meter

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

Specifications

Frequency

Range	Diplexer	Upstream	Downstream
Automatically Switching Diplexer	42/85	4 - 42 MHz and 4 - 85 MHz	54 - 1,004 MHz and 108 - 1,218 MHz
	65/204	4 - 65 MHz and 4 - 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
Power detection/ notification	Notify of AC/DC power presence above 2 Volts
Return loss	>6 dB

Upstream Analysis

Ingress spectrum scan	0.5 – 204 MHz
Sensitivity	–38 dBmV
RBW	300 kHz
Min detectable level upstream	–38 dBmV
Accuracy	±2 dB typical at 25°C
Sampling rate	Hyper Spectrum™ FFT gapless technology - no missed samples, spans 0.5 -110 MHz, 110 to 160 MHz, and 160 to 204 MHz
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

Specifications Continued

Hum Specification

Hum frequency range	25 Hz to 1000 Hz
Minimum MER	33 dB
Accuracy up to 5% hum	+/- 0.8%
From 5 to 10%	+/- 1.0%

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	54/85/108/258 to 1,000/1,218 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

Specifications Continued

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
Hard key navigation capable	
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 connector replaceable
	Downstream 54/85/108/258 MHz depending on diplexer
	Upstream 4 – 204 MHz
Charge Port	USB-C
USB Port	USB 2.0 (Type A)
Ethernet	RJ45 10/100/1000T
Power	USB-C

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

Battery	
Field replaceable 48 W/hr 10.4 V, 4-cell LiIon	
Typical battery life	8 hr typical usage
Battery charge time	4 Hrs (90%) 6 - 8 Hrs 100% (AC 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 (See http://www.viavisolutions.com/services-and-support/support/warranty-terms-and-conditions for warranty details)
Accessories and battery	One-year warranty

Specifications Continued

Dimensions	
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 & Pro Models Only)	
Test interface	802.11 a/b/g/n/ac (2.4/5 GHz)
Tests	WiFi scan
Scan results	SSID (secure set identification); Channel; Security setting; Power level; MAC address
Scan modes	Channel graph; Time graph

Fiber Test	

Optical Fiber Power Meter

USB optical power meter	MP-60, MP-80, FI-60 Fiber Identifier
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	

Standard Accessories	
Protective case with hand strap and detachable shoulder strap	
AC power supply with choice of country-specific adaptor plug (USA, UK, Euro, Australia, China)	
Quick start guide	
StrataSync Core support	

Ordering Information

Description		Part Number
ONX-220 Packages	*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-DSP-SW-OPT-HL-LKG
HL Leakage Test Kit		TRI-LKG-HL-METER-KIT
Source Transmitter		ONX-DSP-SW-OPT-SRC
Frequency-Domain Reflectometer		ONX-DSP-SW-OPT-FDR
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
Optional Accessories		
OneExpert DSP - Fitted Case		ONX-DSP-FITTED-CASE
AC USB-C 45W Power Adapter with International Power Plugs		PWR-ADPT-WALL-AC-USBC-45W
DC USB-C 45W Vehicle Power Adapter		PWR-ADPT-VEH-DC-USBC-45W
USB-A to USB-C Charging Cable		PWR-CBL-DC-USBA-USBC
Strand Hook		1019-00-1366
Replacement Screen Protector (5 Pack)		ONX-SCREEN-PROTECTION
Large Accessory Bag		ONX-CATV-DLX-ACCY-KIT
MP-80 USB Optical Power Meter		MP-80A
MP-60 USB Optical Power Meter		MP-60A
P5000i USB Fiber Scope		FBP-P5000I

ONX-220 Feature Matrix

OneCheck – Dashboard

Measurement Feature	ONX-220		
	BASE	**PLUS**	**PRO**
Ingress Scan	■	■	■
Downstream Summary	■	■	■
DOCSIS Summary	■	■	■

OneCheck – Downstream Details

Measurement Feature	ONX-220		
	BASE	**PLUS**	**PRO**
Full Channel Scan	■	■	■
Basic Channel Details – Level, MER, BER, C/N	■	■	■
Advanced Channel Details – Echo, GD, ICFR			■
System View – Max dB Delta, Max Video Delta	■	■	■
Favorites (up to 16 Channels)	■	■	■
Tilt	■	■	■
Off-Air Ingress Detection (Downstream IUC)	■	■	■
MER & BER Graph (All Channels)			■
Smart Scan			■

OneCheck – DOCSIS Details

Measurement Feature	ONX-220		
	BASE	**PLUS**	**PRO**
Downstream DOCSIS Channel Scan	■	■	■
Basic Downstream Channel Details – Level, MER, BER, C/N	■	■	■
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	ONX-220 BASE	PLUS	PRO
Full Channel Scan	■	■	■
Basic Channel Details – Level, MER, BER, C/N	■	■	■
Advanced Channel Details – Echo, GD, ICFR			■
System View – Max dB Delta, Max Video Delta	■	■	■
Favorites (up to 16 Channels)	■	■	■
Tilt	■	■	■
DQI Over Time			■
Level Over Time			■
MER Over Time			■
BER Over Time			■
Downstream ICFR			■
Downstream IUC			■
SmartScan			■
Constellation	■	■	■

DOCSISCheck

Measurement Feature	ONX-220 BASE	PLUS	PRO
Downstream DOCSIS Channel Scan	■	■	■
Basic Downstream Channel Details – Level, MER, BER, C/N	■	■	■
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

Service Troubleshooting Modes

Measurement Feature	ONX-220		
	BASE	PLUS	PRO
Return Signal Generator (Transmit up to 8 CW or QAM Signals)	Option	Option	Option
HomeFDR	Option	Option	Option
Home Leakage Test	Option	Option	Option
SmartID Support	■	■	■

Network Connectivity Modes

Measurement Feature	ONX-220		
	BASE	PLUS	PRO
DOCSIS Cable Modem	■	■	■
Pass Through Modem RJ-45 Port		■	■
Ethernet	■	■	■
WiFi	■	■	■
Bluetooth	■	■	■
Mobile App Integration	■	■	■

DOCSIS 3.0 Testing

Measurement Feature	ONX-220		
	BASE	PLUS	PRO
Automatic SC QAM Signal Detection, Identification, and Measurement in Scan	■	■	■
Bonding Verification – SC QAM (32 x 8)	■	■	■
Basic Downstream Channel Details – Level, MER, BER, C/N	■	■	■
Advanced Downstream Channel Details – Echo, GD, ICFR			■
Basic Upstream Channel Details Tx Level, Modulation Type	■	■	■
Advanced Upstream Channel Details – ICFR			■
Web Browser	■	■	■
Ping & Trace Route		■	■
FTP/HTTP Upload/Download		■	■
Speed Check – Throughput		■	■
Speedtest (Ookla)		■	■
TrueSpeed		Option	Option

ONX-220 Feature Matrix

DOCSIS 3.1 Testing

Measurement Feature	ONX-220 BASE	ONX-220 PLUS	ONX-220 PRO
Automatic SC QAM Signal Detection, Identification, and Measurement in Scan	Option	Option	Option
Bonding Verification SC QAM (32 x 8) and OFDM (2 x 2)	Option	Option	Option
OFDM Signal Level Variation – Min/Avg/Max	Option	Option	Option
PLC – Detection, Lock Status, Level, MER, and CWE	Option	Option	Option
NCP – Lock Status and CWE	Option	Option	Option
Profile Analysis – Lock Status and CWE	Option	Option	Option
OFDM Ingress Under Carrier Analysis	Option	Option	Option
Web Browser	■	■	■
Ping & Trace Route		■	■
FTP/HTTP Upload/Download		■	■
Speed Check – Throughput		■	■
Speedtest (Ookla)		■	■
TrueSpeed		Option	Option

Ethernet Testing

Measurement Feature	ONX-220 BASE	ONX-220 PLUS	ONX-220 PRO
Web Browser	■	■	■
Ping & Trace Route		■	■
FTP/HTTP Upload/Download		■	■
Speed Check – Throughput		■	■
Speedtest – Ookla		■	■
TrueSpeed		Option	Option

WiFi Testing

Measurement Feature	ONX-220		
	BASE	PLUS	PRO
2.4 & 5 GHz Network Scan	■	■	■
Wireless Access Point	■	■	■
WiFi Advisor Support SmartChannel Wizard & Coverage Expert	■	■	■
Web Browser	■	■	■
Ping & Trace Route		■	■
FTP/HTTP Upload/Download		■	■
Speed Check – Throughput		■	■
Speedtest – Ookla		■	■
TrueSpeed		Option	Option
Wireless Client Scan & Device Finder	Option	Option	Option
Multi Channel Usage Scan	Option	Option	Option
Single Channel Usage Over Time	Option	Option	Option

Fiber Optic Modes

Measurement Feature	ONX-220		
	BASE	PLUS	PRO
Optical Fiber Scope Support – P5000i	■	■	■
Optical Power Meter Support – MP 60/80	■	■	■
SmartOTDR Support	■	■	■

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