Data Sheet

VIAVI Solutions

VIAVI
400G Transport Modules

Portable Test Unit up for 400G on OneAdvisor 800 Transport and OneAdvisor 1000

OneAdvisor 800 Platform

Attributes	
The Transport OneAdvisor 800 (ONA-800A-MF2-T with ONA-800A-DISP-T) is a mainframe which supports modules providing test functionality	
Operating system is Linux to ensure optimum stability and offer high security	
Mainframe components	Display enclosure which includes the following components: • 8-inch display • Recessed power button to avoid accidental contact • Operational battery support; for all configs • Storage of 6.2 GBytes; additional via USB • Expandability for up to 2 expansion modules and 1 or 2 full-size modules
Modules available	• 400G Module TM400GB-QQ and TM400GB-QO Can be combined with: • E81FMC1/E81FMC2 (Fiber Module Carrier) with OSA-110 or high dynamic range OTDR or dispersion module And expansion modules: • OTDR modules of type E4100, including FiberComplete • OSA/OCV-4100 and Channel Checkers • PEM: Power Expansion Module • TEM2 • CAA: 6GHz Cable Antenna Analyzer • TEM2: Timing Expansion Module version 2 Optical USB pluggables such as fiber inspection scopes and power meters

Mainframe Interfaces

The OneAdvisor 800 supports the following interfaces:

- 2 USB ports (including USB3.0)
- 1 RJ-45 management port up to 1000Base-T
- WiFi and Bluetooth (optional, unit can be provided without radios). Wifi IEEE802.11 a/b/g/n/ac
- MicroSD port

Instrument Control and Management

- Local User Interface, same UI as all T-BERD/MTS
- SmartAccess Anywhere
  - Cloud access (Android, IOS, Windows) via SSH with encryption or locally
- VNC
- MobileTech
  - Supports file transfer, instrument management, StrataSync
- StrataSync
  - Cloud fleet management tool with automatic updates
- Job Manager
  - Workflow and Test plan management
- Report Generation
  - HTML, PDF, TXT, CSV, XML
- NTP server support
- Built-in web browser and video player
- Onscreen Lock

Power and Battery	
Power supply	330 Watts
Supports battery operation with seamless swapping between AC and DC	
Built-in battery charges as unit operates	
Built-in battery is high current, 96Whours, Lithium Ion	
Battery is field replaceable	
Additional supplemental battery available via 1 or 2 Power Expansion Modules (PEM)	
Adding 1 PEM is recommended for battery operation of concurrent dual 400GE and/or ZR/ZR+ pluggable optics at 400GigE and 4x100GigE	
Battery Operation	
Built-in battery only	>45 mins. at 400GigE with optics
Built-in battery and 2 PEMs	2 hours at 400GigE with optics
Built-in battery only	1 hour 30 mins at 100GigE with optics
Built-in battery and 1 PEM	Running dual 400GE about 30 minutes
Industry Standards and Compliance	
EMC	IEC/EN 61326-1, FCC part 15B, ICES-003
Safety	IEC/EN/UL/CSA 61010-1
Environmental	
Operating	0°C to +40°C (32°F to +104°F) (dual 400GE, max 35 C ambient)
Temperature Range	-20°C to +60°C (-4°F to +140°F)
Storage Temperature Range	10-95% without condensing
Drop Test and Vibration	
Shock and vibration	MIL-PRF-28800F
Drop	MIL-PRF-28800F, ETSI EN 300 019-2-7
Cooling	
Adaptive based on 4 temperature controlled cooling areas	
Calibration	
Interval of 3 years	

Size and Weight		
Size		
OneAdvisor 800 with battery	17.0 x 27.0 x 6.0 cm	6.7 x 10.6 x 2.3 in
400G Module	17.0 x 27.0 x 5.5 cm	6.7 x 10.6 x 2.2 in
Weight		
OneAdvisor 800 with battery	2.0 kg	4.4 lbs
400G Module	2.0 kg	4.4 lbs

Hardware Option	
ONA-PMVFL	
Power Meter	• Power range: +10 to –60 dBm • Calibrated Wavelength: 850, 1310, 1550 nm • Connector Type: Universal push/pull (UPP)
Visual Fault Locator	• Wavelength: 650 nm +/-15 nm • Output power level: <1 mW • Laser Safety: Class 2

Power Expansion Module		
ONA-MF2-PEM-T		
Energy	14.4V, 69Whours, 4800 mAh	
Weight	650 g	1.45 lbs
Hot swapping as per OneAdvisor Getting Started guide procedure		

OneAdvisor 1000 Platform

Attributes	
The OneAdvisor 1000 (ONA-1000A-MF) is a mainframe which supports modules providing test functionality	
Always delivered with a soft case	
Operating system is Linux to ensure optimum stability and offer high security	
Mainframe components	Display enclosure which includes the following components: • 10-inch display • Lit power button • 2 batteries • Storage for operation • GNSS • Back termination which is either: • Blank termination (ONA10-BACK) • Dual Module Carrier (ONA10-DMC) • Power Supply
Modules available	• 400G Module • 100G Module • Concurrent support of 1 400G module and 1 100G Module • Concurrent support of 2 400G modules including battery operation • When equipped with Dual Module Carrier: - OTDR modules of type E4100 , including FiberComplete - Channel Checkers • OCV-4100 and OSA-4100 • Optical USB pluggables such as fiber inspection scopes and power meters

Mainframe Interfaces

The OneAdvisor 1000 supports the following interfaces:

- 2 USB ports
- 1 RJ-45 management port
- SMA antenna connector for GNSS
- WiFi and Bluetooth (optional, version available without radios)
- MicroSD port

Instrument Control and Management

- Local User Interface, same as all T-BERD/MTS
- SmartAccess Anywhere
  - Cloud access (Android, IOS, Windows) via SSH with encryption or locally
- Mobile Tech
  - Supports file transfer, instrument management, StrataSync
- StrataSync
  - Cloud fleet management tool with automatic updates
- Job Manager
  - Workflow and Test plan management
- Report Generation
  - HTML, PDF, TXT, CSV, XML
- NTP server support
- Built-in web browser and video player
- Onscreen Lock

Power and Battery	
Supports battery operation with seamless swapping between AC and DC	
Built-in battery charger as unit operates	
Each of the 2 batteries is 96W hours, Lithium Ion	
Batteries are field replaceable	
Power supply	330 Watts
Can perform a 400GigE test for at least 1:30 hours on battery power including with ZR optics	
Can perform a 100GigE test for at least 2:20 hours on battery power	
Industry Standards and Compliance	
EMC	IEC/EN 61326-1, FCC part 15B, ICES-003
Safety	IEC/EN/UL/CSA 61010-1
Environmental	
Operating Temperature Range	0°C to +45°C (32°F to +113°F)
Storage Temperature Range	- 20°C to +60°C (-4°F to +140°F)
Operating Humidity	10-95% without condensing
Drop Test and Vibration	
Shock and vibration	MIL-PRF-28800F
Drop	MIL-PRF-28800F, ETSI EN 300 019-2-7
Calibration	
Interval of 3 years	

Size and Weight		
Size		
OneAdvisor 1000 with dual batteries	24.1x30.9x8.3 cm	9.5x12.2x3.3 in
400G Module	24.1x30.9x5.5 cm	9.5x12.2x2.2 in
100G Module	24.1x30.9x5.5 cm	9.5x12.2x2.2 in
Dual Module Carrier	23.7x30.5x2.0 cm	9.3x12.0x0.8 in
Blank Termination	23.7x30.5x1.5 cm	9.3x12.0x0.6 in
OneAdvisor 1000 400G Mod Blk Term	24.1x30.9x15.3 cm	9.5x12.2x6.0 in
Weight		
OneAdvisor 1000 with dual batteries	3.9 kg	8.5 lbs
400G Module	2.3 kg	5.1 lbs
100G Module	1.9 kg	4.1 lbs
Dual Module Carrier	0.9 kg	1.9 lbs
Blank Termination	0.4 kg	1.0 lbs
OneAdvisor 1000 400G Mod Blk Term	6.6 kg	14.6 lbs

400G Module on OneAdvisor 800: TM400GB-QQ

Physical Interfaces
The TM400GB-QQ on OneAdvisor 800 provides the following physical ports: • 2 x QSFP56-DD (QSFPx capable) • 2 x SFP56-DD (SFPx capable) • 1 x EXT CLK REF • 1 x CLK OUT (future) • 1 x 1PPS IN REF (future) • GNSS antenna (a GNSS is in the module)

400G Module on OneAdvisor 800: TM400GB-QO

Physical Interfaces
The TM400GB-QO on OneAdvisor 800 provides the following physical ports: • 1 x OSFP • 1 x QSFP56-DD (QSFPx capable) • 2 x SFP56-DD (SFPx capable) • 1 x EXT CLK REF • 1 x CLK OUT (future) • 1 x 1PPS IN REF (future) • GNSS antenna (a GNSS is in the module)

400G Module on OneAdvisor 1000: TM400GA

Physical Interfaces
The TM400GA on OneAdvisor 1000 provides the following physical ports: • 2 x QSFP56-DD • 2 x QSFP56 (QSFP28 capable) • 2 x SFP56-DD (SFP capable) • 1 x EXT CLK REF • 1 x CLK OUT (future) • 1 x 1PPS IN REF (future)

400G Functionality (all 400G modules)

Application Control	
Test Time Control	Not Timed, Timed Test, Delayed Start
Auto Create Report upon Completion	
Automatic Timed Report Creation	
Auto-start traffic with laser on	
Split Screen Reporting	Results in 1 to 4 areas
Full customization of result presentation information on screen	
On screen help via 'What's This?'	
On UI Screen capture into PNG	
On Unit User Manuals	
Remote automation via SCPI	
Timing	
Internal Reference	+/-1.5 ppm. Designed for Stratum 3. Yearly degradation 1 ppm/year
Clocking	Internal, recovered, external
PPM offset	Report incoming in PPM and Hz, injection +/-150 ppm range
Interface Type and Applications	
OSPF (CMIS)	On TM400GB-QO Application: 400GigE, Unframed BERT. Via adapter to QSFP: 100GigE, OTU4, 40GigE, 4x100GigE KP4
QSFP56-DD (CMIS)	Application: 400GigE, Unframed BERT, 4x100GigE KP4
QSFP56 (CMIS)	Application: 200GigE
QSFP28 (SFF-8636 and CMIS)	Application: 100GigE, OTU4
QSFP+	Application: 40GigE
SFP56	Application: 50GigE, 64GFC
SFP28	Application: 25GigE

SFP+	Application: 10GigE LAN, OTU2e, OTU1e, OTU2
SFP	Application: 1GigE optical and 10/100/1000 using CSFP-1G-CU
QSFP and OSFP Optics Support	
QSFP and OSFP Optics Support	Nominal Wavelength, Vendor, Part Number, Serial Number, Vendor Rev, Date Code, Lot Code, Connector Type, Max Link Length, Transceiver Info, Rx Power level Type, Rx Max Lambda Power, Tx max Lambda power, Power Class, Module ID, Rev Compliance, Cable Length if applicable
QSFP and OSFP Expert Mode	Advanced host transmit settings with Pre-emphasis settings with Pre-Cursor, Post-Cursor and Swing
	Advanced Module Rx Output Pre-emphasis Settings with Pre-Cursor, Post-Cursor and Swing
	Indication for 100GigE single lambda QSFP28 on Media bypass support
	CMIS pluggable module reset
QSFP and OSFP I2C Peek/Poke	Full read and write device register access, Full register dump to .txt file upon module insertion and app loading (in bert/reports). Can also dump multiple registers to file via a button press; user can also specify a specific page.
Per Lambda	Signal present, Rx optical power, Tx optical power, Laser Bias current CMIS Host-Media Apps Support As per CMIS4.0/5.0 up to 16 applications
Pluggable Power Reporting	Module voltage, current, power Current, minimum, maximum values
Temperature	
ZR/ZR+ Tunable Optics Support	
Line Rates	400GigE, 4x100GigE, 200GigE, 100GigE both with CAUI-4 and 100GAUI-2
Grid Spacing Reporting and Setting	3.125GHz to 100GHz
Tuning Mode	Channel number, Frequency (THz), Wavelength (nm)
Fine Tuning support (GHz)	
Output Power setting support (dBm)	
Report Current Frequency, Tuning in Progress, Wavelength lock/unlock	
Display First and Last Tunable Frequency, Fine tuning Low and High offset, Min and Max Output Power	

Coherent Statistics	
Errors	Host pre-FEC BER (cur, min, max, avg), Host FERC (cur, accumulated), Media pre-FEC BER (cur, min, max, avg), Media FERC (cur, accumulated), Q Factor (cur, min, max), Q Margin (cur, min, max)
Statistics	Chromatic Dispersion (ps/nm) (cur, min, max, avg), Differential Group Delay (ps) (cur, min, max, avg), Second Order Polarization Mode Dispersion (ps^2) (cur, min, max, avg), Polarization Dependent Loss (dB) (cur, min, max), OSNR (dB) (cur, min, max), Carrier Frequency Offset (MHz) (cur, min, max, avg), State of Polarization Rate of Change (krad/sec) (cur, min, max, avg)
CMIS Application Codes	
Programmable application code	Such codes are displayed under Interface | CMIS Host-Media Apps. Programmable in expert mode
Datapath ID	Displayed in expert mode
SFP Optics Support	
SFP Optics Support	Wavelength, Recommended Rates, Vendor, Vendor PN, Vendor SN, Vendor Rev, Min Rx Level, Min Tx Level, Diagnostic Monitoring, Module ID, Transceiver, Nominal Rate, Min Rate, Max Rate, Power Level Type, Max Rx Level, Max Tx Level, Diagnostic Byte
SFP Expert Mode	Ignore LOS, Rate Select
SFP I2C Peek/Poke	Full read and write device register access, Full register dump to .txt file upon module insertion and app loading (in bert/reports)
Pluggable Power Reporting	Module voltage, current, power, current, minimum, maximum values

Temperature

Optics Self-Test
Built-in PRBS theory test duration calculator
User controlled test duration or auto calculated
BER pass/fail threshold with choice of pre or post FEC (except 10GigE)
PPM max offset settings
Reporting of QSFP Info or SFP Info
Monitoring of temperature, optical power, and total power consumed by the pluggable
Pre-FEC and Post-FEC results as applicable
Report generation with full information
Integration into job manager
Setting of max temperature threshold

Cable Test for AOC DAC	
Cable testing functionality in data centers	AOC (Active Optical Cable) DAC (Direct Attach Copper) AEC (Active Electrical Cable)
Available rates	10GigE, 25GigE, 40GigE, 100GigE, 100GigE KP4 (106.25Gbps) used for AOC/DAC on 100GAUI-2 PAM3 electrical bus, 200GigE, 400GigE (400G-400G cable can be tested with single TM400GB-QQ module)
Applies to straight and breakout cables	
Calculate recommended test times based on Bit Error Rate theory using the Bit Error Rate Threshold and Confidence Level	
Utilize a pattern with a Bit Error Rate result to evaluate pass/fail	
Pre- and post-FEC BER results available	25GigE, 50GigE, 100GigE FEC, 200GigE, 400GigE
Provide a test report indicating pass/fail result and the serial number of the cable	
Test using one unit (with loopback strictly on OneAdvisor 800) or two units if cable is already installed	
Dual Applications	
Provides dual application, dual port testing simultaneously on port 1 and port 2	
Any of the two applications can be reloaded at any time without affecting the other application/test. This applies to the following rates: 10/100/1000, 1GigE optical, 10GigE LAN, 25GigE, 40GigE, 50GigE, 100GigE (no FEC or KR4 FEC), 100GigE KP4, 106.25Gbps NRZ, 106Gbps PAM4, 200GigE, 400GigE	
With license CADUAL400G on OneAdvisor 800 TM400GBQQ or TM400GB-QO, dual port testing simultaneously for 400GigE on port 1 and port 2. Also supports the mixing of 400GigE together with another Ethernet rate from 10/100/1000 up to 200GigE.	
Unframed BERT	
License CAUNFBERT provides different functionality on OneAdvisor 800 and OneAdvisor 1000. In the case of OneAdvisor1000 only, there is support for a single line rate which is 8x53G (425 Gbps) PAM4 on Port 1.	
On OneAdvisor 800, this function supports multiple rates on both port 1 and port 2 (QSFP-DD and OSFP) without requiring a dual applications license. In this case, Unframed BERT can also work simultaneously with Layer 1 loopback on port 2. That means there is support using either PAM4 or NRZ host lanes. In addition, there is support for different BERT engines per lane, pass/fail BER thresholds per lane, and error/alarm Rx reporting disable applicable on user selected Media Lanes. Clock settings include internal, external, and recovered with host lane selection. There also is support of both optical pluggables and electrical breakout based on VIAVI device 402-090.01;QSFP-DD 8x50G PAM4 Electrical Adapter. All lanes are fully independent.	

LED Indicators	Per Media Lane Signal Present Per Host Lane Signal Present Per Lane Pattern Sync
Per lane Statistics	Bit Error Count Bit Error Rate Pattern Sync Losses Sync Loss Seconds
Settings	
PAM4 patterns	PRBS31Q regular and inverted
	PRBS13Q regular and inverted
	SSPRQ
NRZ patterns	PRBS31 regular and inverted
	PRBS23 regular and inverted
	PRBS15 regular and inverted
Rx threshold settings for pass fail	10^{-3} to 10^{-11}
Pattern Bit Error Injections	Single, Rate: 10^{-3} to 10^{-9}
Layer 1 Loopback	
This applies strictly to OneAdvisor 800 TM400GB-QQ or TM400GB-QO on port 2 QSFPx	
Rates Supported	8x53 (425Gbps) PAM4, 4x53 (212.5Gbps) PAM4, 8x25 (206.25Gbps) NRZ, 4x26.5 (106.25Gbps) NRZ, 2x53 (106.25Gbps) PAM4, 4x25 (103.125Gbps) NRZ, 4x10 (41.25Gbps) NRZ
Number of Media Lane selection	
Number of Host Lane selection	
Host recovered lane selection (recovered clock)	
Ethernet Rates	
Rates	
400GigE (425 Gbps) with RS (544,514) FEC	Supports 400GBASE-ZR pluggables
4x100GigE with KP4 RS (544,514)	User can select the number of active ports to be all 4 or down to a single port
200GigE (212.5 Gbps) with RS (544,514) FEC	
100GigE (103.125 Gbps) with no FEC or RS (528,514)	
100GigE (106.25Gbps) with RS (544,514) FEC. Support of both 100GAUI-4 (NRZ) and 100GAUI-2 (PAM4) electrical buses selectable by the user.	
50GigE (53.125Gbps) with RS (544,514) FEC	
40GigE (41.25Gbps)	
25GigE (25.78125Gbps) with no FEC or RS (528,514) FEC selectable	
10GigE (10.3125 Gbps) LAN	
1GigE (1.25Gbps)	
10/100/1000Base-T	

FEC	
FEC Types	
RS (544,514) FEC	Application: 400GigE, 4x100GigE, 200GigE, 100GigE KP4 application,, 50GigE, 64GFC
RS (528,514) FEC	Application: 100GigE or 25GigE used with or without FEC. OTU4 also uses this FEC
Alarms and LEDs	
LOAMPS	Loss of Alignment Marker Payload Sequence
LOA	Loss of Alignment
HI SER	
Errors and Stats	
RS-FEC Error Stats	Correctable counts and rates per codeword symbol and bits, uncorrectable counts and rates per codewords, A and B per engine and aggregate for 400GigE, 200GigE
RS-FEC Per Lane	Physical to virtual mappings, Corr. Symbol Errors, Corr. Bit Errors, Corr. BER, A and B per engine and aggregate for 400GigE, 200GigE
RS-FEC Error Distribution	Correctable per symbol bin, error count, and error%, Uncorrectable codeword count
Injections	
LOAMPS, LOAML, LOCWMS	
HI SER	
FEC Error Injections	Correctable, uncorrectable, single, burst, rates 10^{-2} to 10^{-9} including number of symbols
FEC Per Engine (400GigE, 200GigE)	Aggregate, A FEC, B FEC
Local Degraded SER (400GigE, 200GigE)	
Remote Degraded SER (400GigE, 200GigE)	
Setups	
Incoming FEC settings	Find and fix errors, Find but don't fix errors, Ignore FEC
FEC Type (100GigE, 25GigE)	No FEC, RS (528,514) FEC
Disable Hi SER Alarm	
Enable Degrade SER (400GigE, 200GigE)	
Enable Local/Remote Degrade SER (400GigE, 200GigE)	
Correctable RS-FEC BER Threshold Alarm support (400GigE, 200GigE), defaults to $2.4x10^{-4}$	
PCS	
Alarms and LEDs	
Signal Present	
Sync Acquired and link active	
Marker Lock	LOAML (Loss of Alignment Marker Lock)
HI BER	
Excessive skew	User settable threshold defaults to 180ns
Local Fault	
Remote Fault	
Errors and Stats	
Invalid alignment markers	Counts and rates
Alignment marker lock	
BIP-8 Alignment Marker	Errors, rate
PCS Invalid Blocks	
Skew reporting	Per lane, max, min, current
Results per lane	Sync acquired, marker locked, code violations, invalid alignment markers, BIP-8 bit and block errors
Injections	
LOAML	Loss of Alignment Marker Lock, Per lane
LOAMPS	Loss of Alignment Marker Payload Sequence
LOCWMS	Loss of Codeword Marker Sequence
LOBL	Loss of Block Lock. Per lane
HI BER	
Local Fault	
Remote Fault	
Invalid Alignment Marker	Per lane, single, burst, rate 10^{-3} to 10^{-10}
BIP-8	Per lane, single, burst, rate 10^{-3} to 10^{-10}
Coding error	Per lane, single, burst, rate 10^{-3} to 10^{-10}
Skew injection per lane (100GigE no FEC)	
Auto-negotiation	Applicable to 1GigE Optical and 10/100/1000Base-T
MAC	
LED Indicators	
Frame Detect	
ATP (Acterna Type Packet) Detect	
VLAN and SVLAN Detect, up to 4-VLAN tags deep	
Statistics	
Link Stats	Util % stats, Frame Rate, Frame Size, Tx/Rx Mbps at L1/L2, ATP Util %, Round Trip Delay, Packet Jitter, VLAN info

Link Counts	Tx/Rx Frame Counts, Tx/Rx ATP Frame Counts, Rx VLAN Frames, Unicast, Multicast, Broadcast, Tx/Rx Byte Counts, Frame size bin counts
Filter Stats	Util % stats, Frame Rate, Frame Size, Tx/Rx Mbps at L1/L2, Round Trip Delay, Packet Jitter, VLAN info
Filter Counts	Rx Frame Counts, Rx ATP Frame Counts, Rx VLAN Frames, Unicast, Multicast, Broadcast, Rx Byte Counts, Frame size bin counts
Peak Interframe Gap (service disruption)	
BERT	Pattern Losses, BER, Bit Errors, Bit Error Second
Errors	Undersized Frames, Runts, Jabbers, FCS errors, Errored Frames, Errored Seconds, Acterna Payload Errors, Packet Error Rate, Lost Frames, Frame Loss Ratio, Out of Sequence Frames
Graphs	Throughput, Frame Loss, Packet Jitter, Latency, Errors
Injections	
Undersize	Single, burst
Runts	Single, burst
FCS	Single, burst
Pause Frames	
Tx Insert	
Pause Quanta - Definable	
Pause Frame Analysis (counts etc)	
LBM Frames (Y.1731)	
At 1GE/10GE, can inject Y.1731 LBM frames up to line rate for testing.	
A router can reflect such frames as LBR and those can be analyzed for frame loss and round-trip latency	
Pause Quanta - Definable	
Pause Frame Analysis (counts etc)	
Setups	
MAC Address types	Unicast, Multicast, Broadcast
Encapsulation	None, VLAN, Q-in-Q, up to 4 levels of VLAN tags
VLAN/CVLAN edits	ID, User priority
SVLAN edits	ID, User priority, DEI bit, TPID
Ethertype value	
Frame Type	DIX, 802.3
Payload type	ATPv3 (Acterna Test Payload) with fill byte, BERT
BERT payload	PRBS2[31], PRBS2[31] Inv, User defined byte (10GigE, 100GigE), and for 10GigE
Frame Size	64 to 16,000 bytes
Frame Variations	Fixed including Jumbo, Random, EMIX
Filters	Destination Address, Source Address, VLAN/CVLAN/SVLAN ID, DEI Bit, User priority, TPID, Payload Analysis
IPv4	
LED Indicators	
IP Packet Detect	
Statistics	
Link Stats	Util % stats, Packet Rate, Packet Size, Tx/Rx Mbps at L3, TOS
Link Counts	Tx/Rx Packet Counts, Unicast, Multicast, Broadcast
Config Status	Source IP, Gateway, Subnet Mask, Dest IP, Dest MAC
Errors	IP Checksum Errors, IP Packet Length Errors, Acterna Payload Errors, Packet Error Rate, Lost Frames, Frame Loss Ratio, Out of Sequence Frames
Graphs	Throughput, Frame Loss, Packet Jitter, Latency, Errors
Injections	
Errors	IP Checksum
Setups	
Ping Support	
ARP Support	
IP Source Address	Address, Default Gateway, Subnet Mask
IP Destination Address	
TOS Type	TOS, DSCP
TTL Value	
Protocol Value	
Payload type	ATPv3 (Acterna Test Payload), Fill Byte
IPv6	
LED Indicators	
IP Packet Detect	
Statistics	
Link Stats	Util % stats, Packet Rate, Packet Size, Tx/Rx Mbps at L3
Link Counts	Tx/Rx Packet Counts, Tx Router Solicitations, Rx Router Advertisements, Unicast Packets, Multicase Packets, Binned sized packets in categories
Config Status	Src Global IP Address, Src Link-Local IP Addresss, IP Gateway, Subnet Prefix Length, Dest IP Address, Dest MAC Address
Errors	IP Packet Length Errors, Acterna Payload Errors, Packet Error Rate, Lost Frames, Frame Loss Ratio, Out of Sequence Frames
Graphs	Throughput, Frame Loss, Packet Jitter, Latency, Errors

Setups	
Ping Support	
NDP Support	
IP Source Address	Manual, Stateful, Stateless
IP Destination Address	
Traffic Class	
Flow Label	
Hop Limit	
Payload Type	ATPv3 (Acterna Test Payload), Fill Byte
Traffic Generation and Analysis	
Line Rate Traffic Tx and RX for all Interfaces	
Single Stream Generation/Analysis	
Up to 16 Streams Generation/Analysis	
Currently available at Layer 2; Layer 3 IPv4	
Traffic Load	
Load Type	Constant, Burst, Ramp
Constant Load Unit	Bit rate, Percent, Frames per second
Burst Load Unit	Bytes and Information Rate, Burst Time and Information Rate, Bytes and Gap Time, Burst Time and Gap Time, Frames and Duty Cycle
Ramp	Time step and load step
Capture/Decode	
Line rate Capture	All Ethernet rates
Integrated Wireshark	Viewing capture files can be performed directly on the test set and not require a separate laptop/PC.
Triggers and filters	Tx control plane and full Rx Capture Frame Slicing
Enhanced RFC 2544	
VLAN Q-IN-Q Support, up to 4 levels	
Throughput	
Latency	
Frame Loss	
Back-to-back	
Packet Jitter	
Burst Test (advanced)	
Extended Load	
Throughput, latency, packet jitter run concurrently for speed	
Up to 10 frame sizes	
Built-in QuickCheck	
Graphical results	
Integration into job manager	

OTN

OTN Rates	
Rates	
OTU4 (111.8Gbps) with RS (528,514) FEC	
OTU2e (11.1Gbps) with RS (528,514) FEC	
OTU1e (11.05Gbps) with RS (528,514) FEC	
OTU2 (10.709Gbps) with RS (528,514) FEC	
FEC	
See FEC under Ethernet, OTN uses RS (528,514) FEC	
Traffic Mappings	
Bulk BERT for all supported OTN rates	
PRBS Patterns	2^{9-1}, 2^{9-1} Inv, 2^{23-1}, 2^{23-1} Inv, 2^{31-1}, 2^{31-1} Inverse, Delay
OTU4 with 100GigE client GFP-F OTU1e/OTU2e with 10GigE client transparent	
OTL/OTN Injection/Detection	
Set Tx Scramble on/off	
Set Rx Descramble on/off	
Skew injection per Virtual Lane:	
Skew alarm (Rx) threshold settings	Defaults to 180nsec
Skew reporting per virtual lane	
Transcoding HI BER Detection on/off	
Errors	
Alarm Suppression Setting enable/disable	Considers low rate FAS, MFAS, LLM and correctable FEC errors as statistics rather than errors as these may natually occur in PAM4 environments
OTL FAS	Per lane/all lanes; Single/Burst (up to 128)/Rate (10-3 to 10-10)
OTL MFAS	Per lane/all lanes; Single/Burst (up to 128)/Rate (10-3 to 10-10)
OTL LLM	Per lane/all lanes; Single/Burst (up to 128)/Rate (10-3 to 10-10)
FEC Uncorrectable	Single/Rate (10-2 to 10-5)
FEC Correctable	Single/Rate (10-2 to 10-5)
OOM	
SM-BIP	Single/Rate (10-5 to 10-7)
SM-BEI	Single/Rate (10-5 to 10-7)
PM-BIP	Single/Rate (10-5 to 10-7)
PM-BEI	Single/Rate (10-5 to 10-7)
TCM1-6 BIP	Single/Rate (10-5 to 10-7)
TCM1-6 BEI	Single/Rate (10-5 to 10-7)
Bit Error/TSE	Single/Rate (10-3 to 10-10)

Alarms	
OTL OOF	
OTL LOF	
LOM	
SM-IAE	
SM-TIM	
SM-BDI	
SM-BIAE	
ODU AIS	
ODU LCK	
ODU OCI	
PM-BDI	
PM-TIM	
Fwd Sig Fail	
Fwd Sig Degrade	
Bwd Sig Fail	
Bwd Sig Degrade	
TCM1-6 IAE	
TCM1-6 BDI	
TCM1-6 BIAE	
TCM1-6 TIM	
PT Mismatch	
Client Loss	
OTN Overhead	
Support of AMP, GMP, BMP as per client mapping	
GCC Transparency Test	Selection of GCC0, GCC1, GCC2, GCC1+2. PRBS verification on Rx interface with bits, errors, and BER.
Round-Trip Delay (RTD) as per G.709 section 15.8 (100 nsec accuracy)	Selection of PM or TCM1-6
Overhead Manipulation Analysis	
Setting of Tx and Rx Tributary Ports	
SM/PM and TCM1-6 Trace (TTI) messages	
Fault Signaling (FTFL) processing	
Payload Type (PT) Label generation/display	
FEC Settings	
Outgoing FEC: GFEC (G.709 FEC) or all-zeroes	
Incoming FEC: ignore, correct errors, do not correct errors	
Service Disruption Measurement	
Measurement Parameters	
SD Separation/Debounce Time Setting	
SD Threshold Time Settings	
Triggers	
Signal Loss / LOS	
Bit/ TSE Error	
LOF	
FAS	
MFAS	
OTL LLM	
OTU LOM	
OTU OOM	
OTU SM-IAE	
OTU SM-BIAE	
ODU PM-BIP	
ODU PM-BEI	
ODU AIS	
ODU LCK	
ODU OCI	
ODU PM-BDI	
Results	
LEDs	
Signal Present	
Frame Sync	
OTL Lanes Aligned (OTU4)	
OTL Marker Lock (OTU4)	
OTU OH Pattern Sync	
Pattern Sync	
Summary Status	
Event Log	
Histogram	
Service Disruption	Summary Table, Disruption Details, Disruption Statistics Time
Interface	
Invalid Rx Signal Seconds	
Signal Losses / LOS	
Signal Losses Seconds / LOS Seconds	
QSFP/SFP State	
Optical Rx Level (dBm)	
Rx Frequency (Hz)	
Rx Frequency Deviation (ppm)	
Rx Frequency Max Deviation (ppm)	
Tx Clock Source	
Tx Frequency (Hz)	
Tx Frequency Deviation (ppm)	
Tx Freq Max Deviation (ppm)	
Round-Trip Delay Current, Avg, Min, Max (100 nsec res.)	

OTL
Frame Sync Loss Seconds / LOF Seconds
OOF Seconds
OOMFAS Seconds
Marker Lock Loss Seconds / LOR Seconds
OOR Errors (out of recovery)
Lane Aligned Loss Seconds / LOL Seconds
OOL Seconds
OOLLM Seconds
FAS Errors, Rate, Seconds
MFAS Errors, Rate, Seconds
Logical Lane Marker Errors, Rate, Seconds
Max Skew (Bits)
Current Max Skew (Bits)
Max Skew (ns)
Current Max Skew (ns)
Max Logical Lane Skew (LL ID)
Min Logical Lane Skew (LL ID)
Multiple per lane statistics
FEC
Uncorrected Word Errors, Rate, Seconds
Corrected Word Errors, Rate, Seconds
Corrected Bit Errors, Rate, Seconds
Framing
OOM Seconds
OTU
OOM Seconds
AIS Seconds
SM-IAE Seconds
SM-BIP Errors, Rate
SM-BDI Seconds
SM-BIAE Seconds
SM-BEI Errors, Rate
SM-BEI Error Rate
SM-SAPI
SM-DAPI
SM-Operator Specific
GCC BERT Bits
GCC BERT Bit Errors
GCC BERT Bit Error Rate
ODU
ODU-AIS Seconds
ODU-LCK Seconds
ODU-OCI Seconds
PM-BIP Errors
PM BIP Error Rate
PM-BDI Seconds
PM-BEI Errors
PM-BEI Error Rate
PM-SAPI
PM-DAPI
PM-Operator Specific
GCC BERT Bits
GCC BERT Bit Errors
GCC BERT Bit Error Rate
PM Round Trip Delay Recent
PM Round Trip Delay Last
OPU
Payload Type
PT Mismatch Seconds
FTFL
Forward-Fault Type
Forward-SF Seconds
Forward-SD Seconds
Forward-Operator Identifier
Forward-Operator Specific
Backward-Fault Type
Backward-SF Seconds
Backward-SD Seconds
Backward-Operator Identifier
Backward-Operator Specific
TCM1-6
IAE Seconds
BIP Errors
BIP Error Rate
BDI Seconds
BIAE Seconds
BEI Errors
BEI Error Rate
SAPI
DAPI
Operator Specific
PM Round Trip Delay Recent
PM Round Trip Delay Previous
Payload
Pattern Sync Losses \ LSSs
Pattern Sync Loss Seconds \ LLS Seconds
TSE/Bit Errors
TSE/Bit Error Rate
TSE/Bit Error Seconds
Bit Error-Free Seconds
Bit Error-Free Seconds, %

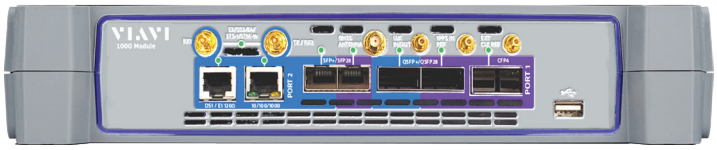
OTN Check	
Automated workfolw is available at all OTN rates for OTN Bulk	**Comments:** · Key use case is OTN service activation
Set test duration based on Bit Error Rate Theory or actual time	
Bit Error Rate Therory paramters for test duration:	
Data Rate (e.g. OTU4)	
BER Threshold	
Confidence Level (% value)	**Comments:** · Statistical degree of certainty
Key automated tests	
Payload BERT	
PRBS pattern selection	
Pass/Fail BER Threshold	
Round Trip Delay	
Selection of applicable OH fields: PM, TCM1-6	
Measurement Frequency	
Pass/Fail Threshold (ms)	
GCC Transparency/encryption keys	
Selection of GCC0, GCC1, GCC2, GCC1+2	
Pass/Fail BER Threshold	
Far-end loopback auto-detect function	
Report generation and formats	

Fibre Channel

Fibre Channel Rates	
64G FC (57.8 Gbps)	On SFP56 PAM4 electrical
FEC	
See FEC under Ethernet, 64GFC uses RS(544,514)	
Fibre Channel Generator	
Frame Length	28 (no payload), 32, 76 (ATP), 128, 256, 512, 1024, 1536, 2076, 2140 settings
	User defined (28 to 2140)
Fibre Channel Fields	Unicast or Broadcast
	Destination ID
	Source ID
	Sequence ID
	Originator ID
	Responder ID
FC Frame Payload	BERT/PRBS Pattern (2^{31-1}, 2^{23-1}, User Byte)
	Acterna Test Protocol Version 3
Auto-traffic start on laser on	
Traffic Load	
Load Type	Constant, Burst, Ramp
Constant Load Unit	Bit rate, Percent
Burst Load Unit	Burst time and Gap time, Frames and Duty Cycle
Ramp	Time step and Load step
Flow Control Login	
Link Init	Enable/bypass (bypass for Tx only traffic generation)
TTS and LSN Support	Enable/disable
Tx and Rx	Couple/Decouple (for Peak IFG/ Service Disruption)
Flow Control	On/off
Login Type	Implicit, E-Port, Fabric/N-Port
MAC ID	Unit Identifier
	Port Name
Fabric/N-Port login	Topology
	Source N-Port Name
	Source Node Name/ Source ID
	Dest N-Port Name
	Dest Node Name/Dest ID
Traffic Filtering	
Routing Control	
Destination ID	
Source ID	
Data Type	
Sequence Control	
Data Type	BERT Tx=Rx
	Payload Analysis
	Rx BERT Pattern
Injection/Detection	
HI SER	
Code	Single/Rate
CRC	Single/Burst
Bit Error (PRBS)	Single/Rate (10^{-3} to 10^{-9})
FEC as in FEC section	
Results	
LEDs	Signal Present, RS-FEC, Sync Acquired, Link Active, ATP Detect, Pattern Sync
SLA/KPI	Frame Loss, Round Trip Delay
Event Log	
Histogram	
Time	
Interface	Signal Loss, Sync Loss, Link Loss, Optical Rx Overload, Tx Clock Source
Link Statistics	

Link Counts	Rx Frames, Tx Frames, Rx Acterna, Tx Acterna, 28-64 Byte Frames, 68-124 Byte Frames, 128-252 Byte Frames, 256-508 Byte Frames, 512-1020 Byte Frames, 1024-2140 Byte Frames Rx Frame Bytes, Tx Frame Bytes, Rx R_RDY's, Tx R_RDY's, Near-end B-B Credits, Tx Avail B-B Credits, Class F Frames, Class 1 Frames, Class 2 Frames, Class 3 Frames
Filtered Counts	
BERT Stats	Pattern Losses, Bit Error Rate, Bit Errors
Login Status	Login Status, Fabric Present, Fabric Login Status, F Port Name, Fabric Name, N Port Login Status, Dest N Port ID, Dest N Port Name, Dest Node Name, Source N Port ID, Source N Port Name, Source Node Name
RS-FEC Stats	
TTS Results	LSN Process Status, TTS Process Status, Rx LSN TF Control Field, Rx LSN TF Status Field, Rx TTS TF Control Field, Rx TTS TF Status Field
Error Stats	Symbol Errors, CRC Errored Frames, Fiber Runts, Fiber Jabbers, Undersized Frames, Errored Frames, Code Violations
Graphical Displays	

100G Module on OneAdvisor 1000



Physical Interfaces

The 100G Module (TM100GA) provides the following physical ports:

- 1 x CFP4
- 2 x QSFP28
- 2 x SFP28
- 1 x RJ-45 for 10/100/1000Base-T
- 1 x RJ-48c
- 2 x Mini-BNC
- 1 x SMA for GNSS Antenna
- 1 x CLK IN/OUT
- 1 x 1PPS IN REF
- 1 x EXT

Functionality

The functionality on the 100G module is analogous to that of the MAP-2100. More information can be found in the 5800-100G/MAP-2100 datasheet (5800-100g-ds-tfs-nse-ae).

The 100G Module has its own onboard processor and storage just as with 5800-100G/MAP-2100.

The 100G Module runs the same software applications as 5800-100G/MAP-2100

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