

400G and 800G Transport Modules

Portable Test Unit up for 400G and 800G 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: <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 400G Module TM400GB-QQ and TM400GB-QO • 800G Module TM800GB <p>Can be combined with:</p> <ul style="list-style-type: none"> • E81FMC1/E81FMC2 (Fiber Module Carrier) with OSA-110 or high dynamic range OTDR or dispersion module <p>And expansion modules:</p> <ul style="list-style-type: none"> • 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 <p>Optical USB pluggables such as fiber inspection scopes and power meters</p>



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
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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 400G, 800G, 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

Data Sheet
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
800G Module	17.0 x 30.0 x 5.8 cm	6.7 x 11.8 x 2.3 in

Weight

OneAdvisor 800 with battery	2.0 kg	4.4 lbs
400G Module	2.0 kg	4.4 lbs
800G Module	2.1 kg	4.5 lbs

Hardware Option
ONA-PMVFL

Power Meter	<ul style="list-style-type: none"> • Power range: +10 to -60 dBm • Calibrated Wavelength: 850, 1310, 1550 nm • Connector Type: Universal push/pull (UPP)
Visual Fault Locator	<ul style="list-style-type: none"> • Wavelength: 650 nm ±15 nm • Output power level: <1 mW • Laser Safety: Class 2

Power Expansion Module
ONA-MF2-PEM-T

Energy	14.4V, 69 Whours, 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	<p>Display enclosure which includes the following components:</p> <ul style="list-style-type: none"> • 10-inch display • Lit power button • 2 batteries • Storage for operation • GNSS • Back termination which is either: <ul style="list-style-type: none"> – Blank termination (ONA10-BACK) – Dual Module Carrier (ONA10-DMC) • Power Supply
Modules available	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – 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



OneAdvisor 1000 Platform continued
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 96 W hours, Lithium Ion

Batteries are field replaceable

Power supply	330 Watts
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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
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Safety	IEC/EN/UL/CSA 61010-1
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Environmental

Operating Temperature Range	0°C to +45°C (32°F to +113°F)
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Storage Temperature Range	- 20°C to +60°C (-4°F to +140°F)
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Operating Humidity	10-95% without condensing
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Drop Test and Vibration

Shock and vibration	MIL-PRF-28800F
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Drop	MIL-PRF-28800F, ETSI EN 300 019-2-7
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Calibration

Interval of 3 years

OneAdvisor 1000 Platform continued
Size and Weight
Size

OneAdvisor 1000 with dual batteries	24.1 x 30.9 x 8.3 cm	9.5 x 12.2 x 3.3 in
400G Module	24.1 x 30.9 x 5.5 cm	9.5 x 12.2 x 2.2 in
100G Module	24.1 x 30.9 x 5.5 cm	9.5 x 12.2 x 2.2 in
Dual Module Carrier	23.7 x 30.5 x 2.0 cm	9.3 x 12.0 x 0.8 in
Blank Termination	23.7 x 30.5 x 1.5 cm	9.3 x 12.0 x 0.6 in
OneAdvisor 1000 400G Mod Blk Term	24.1 x 30.9 x 15.3 cm	9.5 x 12.2 x 6.0 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

800G Module on OneAdvisor 800: TM800GB

Physical Interfaces

The TM800GB on OneAdvisor 800 provides the following physical ports:

- 2 x QSFP-DD800 (QSFPx capable)
- 2 x OSFP800 (OSFP capable)
- 2 x SFP56-DD (SFPx capable)
- 1 x EXT CLK REF
- 1 x CLK OUT (future)
- 1 x 1PPS IN REF (future)

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-Q0



Physical Interfaces

The TM400GB-Q0 on OneAdvisor 800 provides the following physical ports:

- 1x QSFP
- 1x QSFP56-DD (QSFPx capable)
- 2 x SFP56-DD (SFPx capable)
- 1x EXT CLK REF
- 1x CLK OUT (future)
- 1x 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)
- 1x EXT CLK REF
- 1x CLK OUT (future)
- 1x 1PPS IN REF (future)

General Functionality

Application Control

Test Time Control	Not Timed, Timed Test, Delayed Start
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Auto Create Report upon Completion

Automatic Timed Report Creation

Auto-start traffic with laser on

Split Screen Reporting	Results in 1 to 4 areas
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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

General Functionality continued

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	
OSFP800 and QSFP-DD-800 (CMIS)	On TM800GB Application: 800GigE, 800G FEC; 2x400GigE
OSPF (CMIS)	On TM400GB-Q0 and TM800GB 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. 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	

General Functionality continued

ZR/ZR+ Tunable Optics Support	
Line Rates	800GigE, 2x400GE, 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 FER (cur, accumulated), Media pre-FEC BER (cur, min, max, avg), Media FER (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
<i>Datapath ID</i>	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	Current optic temperature and graph of temperature over time
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	

General Functionality continued

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)
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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), 800GigE
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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, 800GigE
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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 TM800GB, TM400GB-QQ, or TM400GB-QQ, 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.

General Functionality continued

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

Rates Supported	8x106 (850Gbps) PAM4 (on TM800GB only), 4x53 (212.5Gbps) PAM4, 8x25 (206.25Gbps) NRZ, 4x26.5 (106.25 Gbps) 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
Ethernet Rates
Rates

800GigE (850 Gbps) with RS(544, 514) FEC	Supports 800GBASE-ZR pluggables (TM800GB only)
2x400GE (850 Gbps) with RS(544,514) FEC	User can select the number of active ports (TM800GB only)
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 (53.125 Gbps) with RS(544,514) FEC	
40GigE (41.25 Gbps)	
25GigE (25.78125 Gbps) with no FEC or RS(528,514) FEC selectable	
10GigE (10.3125 Gbps) LAN	
1GigE (1.25 Gbps)	
10/100/1000Base-T	

FEC
FEC Types

RS(544,514) FEC	Application: 800GigE, 2x400GigE, 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

Ethernet continued
Injections

LOAMPS, LOAML, LOCWMS

HI SER

FEC Error Injections	Correctable, uncorrectable, single, burst, rates 10^{-2} to 10^{-9} including number of symbols
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FEC Per Engine	Aggregate, A FEC, B FEC
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Local Degraded SER

Remote Degraded SER

Setups

Incoming FEC settings	Find and fix errors, Find but don't fix errors, Ignore FEC
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FEC Type (100GigE, 25GigE)	No FEC, RS (528,514) FEC
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Disable Hi SER Alarm

Enable Degrade SER

Enable Local/Remote Degrade SER

 Correctable RS-FEC BER Threshold Alarm support, defaults to 2.4×10^{-4}
PCS
Alarms and LEDs

Signal Present

Sync Acquired and link active

Marker Lock	LOAML (Loss of Alignment Marker Lock)
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HI BER

Excessive skew	User settable threshold defaults to 180ns
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Local Fault

Remote Fault

Errors and Stats

Invalid alignment markers	Counts and rates
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Alignment marker lock

BIP-8 Alignment Marker	Errors, rate
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PCS Invalid Blocks

Skew reporting	Per lane, max, min, current
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Results per lane	Sync acquired, marker locked, code violations, invalid alignment markers, BIP-8 bit and block errors
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Injections

LOAML	Loss of Alignment Marker Lock, Per lane
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LOAMPS	Loss of Alignment Marker Payload Sequence
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LOCWMS	Loss of Codeword Marker Sequence
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Ethernet continued

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)	

Ethernet continued

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
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Setups

Ping Support

ARP Support

IP Source Address	Address, Default Gateway, Subnet Mask
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IP Destination Address

TOS Type	TOS, DSCP
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TTL Value

Ethernet continued

Protocol Value	
Payload type	ATPv3 (Acterna Test Payload), Fill Byte
IPv6	
<i>LED Indicators</i>	
IP Packet Detect	
<i>Statistics</i>	
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, Multicast Packets, Binned sized packets in categories
Config Status	Src Global IP Address, Src Link-Local IP Address, 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
<i>Setups</i>	
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

Ethernet continued
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
Available for Ethernet into OTN
For 4x100GigE KP4, user selects the applicable port

QuickCheck

VLAN Discovery
Frame length setting
Measures maximum throughput
Integration into job manager

ITU-T Y.1564

Up to 16 Traffic Streams
Service Configuration Test
Service Performance Test
Committed Information Rate (CIR)
Extended IR (EIR)
Maximum IR (MIR)
Frame Loss Rate (FLR)

Ethernet continued

 Frame Delay (FD)

 Frame Delay Variation (FDV)

 Committed Burst Size (CBS)

 Policer Test

 Round Trip Testing

 Configurable VLAN, Priority, Addressing and Pass/Fail Thresholds

 Programmable Pass/Fail Thresholds

 Graphical Results

 Screenshot Support

 Auto-Negotiation Check

 Saved Test Profiles

 Saved Reports

 Configurable DEI, TPID, TOS/DSCP

 Inclusive of L2 Ethernet, IPv4, and IPv6

IETF RFC 6349 TrueSpeed

 Supported on 10/100/1000 through 100GigE Interfaces

 Automated TCP Throughput test per RFC 6349

 Path MTU Detection Test

 Round Trip Time Test

 Walk the Window Test

 TCP Throughput Test

 Traffic Shaping Test

 TCP Efficiency Metric

 Buffer Delay Metric

 Up to 64 TCP Stateful Sessions Simultaneously

 1 KB TCP Window Size Granularity

 Jumbo Frame Support

 Graphical Results and Report Generation

 Configurable File Sizes and Window Sizes

 Total Test Time Display

 Configurable Saturation Window Test

OTN

OTN Rates	
Rates	
OTU4 (111.8 Gbps) with RS (528,514) FEC	
OTU2e (11.1 Gbps) with RS (528,514) FEC	
OTU1e (11.05 Gbps) with RS (528,514) FEC	
OTU2 (10.709 Gbps) with RS (528,514) FEC	
OTU1 (2.7 Gbps) 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 180 nsec
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 naturally 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 continued

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	

OTN continued

 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

OTN continued

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 workflow 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 Theory parameters 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

Fiber Channel
Fiber Channel Rates

64G FC (57.8 Gbps)	On SFP56 PAM4 electrical
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FEC

See FEC under Ethernet, 64GFC uses RS(544,514)

Fiber Channel Generator

Frame Length	28 (no payload), 32, 76 (ATP), 128, 256, 512, 1024, 1536, 2076, 2140 settings User defined (28 to 2140)
Fiber 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

Fiber Channel continued
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

Fiber Channel continued

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

