VIAVI

LASER COMPONENTS®

Data Sheet

VIAVI T-BERD®/MTS-5800 Specifications

Platform

Platform Requirements

The mainframe shall be non modular

The product shall be field upgradeable

The test system shall utilize Linux operating system to ensure optimum stability

Display

The size of the display shall be 7 inches minimum, and 1200x600 type for best resolution

The Test Set shall support a Screen Saver

The Test Set shall support a mode that 'locks' the touchscreen for use without a password

T-BERD®/MTS-5800

Power/Battery

The Test Equipment must be battery operated

The Test Equipment must have a built-in battery charger

The battery must be field replaceable

The equipment shall perform a 10G test for a minimum of 3 hours on battery power.

Operating time Between 2 to 5 hours depending on the application

Charging time Approximately 7 hours from empty

Unit power input 12VDC, 60 Watt Max

Power supply input 100 to 240 VAC, 50/60 Hz, auto-sensing

Power supply output 12VDC, 5 AMP Max

Industry Standards and Compliance

CE Class A Compliant

EMI/ESD: CE compliant, FCC part 15 subpart A Class A

FCC Part 15 Compliant

Physical and Environment Specifications

Temperature range:
· Operating, all options: 0°C to +50°C (+32°F to +122°F)
· Storage: - 20°C to +60°C (-4°F to +140°F)

Storage Humidity: 10-95% without condensing.

Operating Humidity: 10-90% without condensing.

Drop Test - Shock

per IEC 68-2-27 and 68-2-29 Ed. 2.0

Drop Test - Durability

per IEC 721-3-7 2nd Ed./IEC 61010-1

Vibration

per IEC 68-2-6 and MIL-PRF-28800F (Class 2)

Field Operation

The Test Equipment shall be portable, battery operated and rugged for field operations.

The Test Equipment must be protected by bumpers.

Weight and Size

The weight of the test set shall not be greater than 4.2 lbs/1.9kg while supporting up to 10G rates

The size of the test set shall not be greater than 17.78 x 24.13 x 7.62cm (7"x9.5"x3") while supporting up to 10G rates

Operation

The base unit shall be able to be turned on and operational in less than 2 minute

The Test Equipment shall accept operations with an external keyboard.

The unit will boot to a simplified launch page allowing the user to select previous test configurations and/or favorite test configurations.

I/O's

The Test Equipment shall include the following I/O interfaces
· VT100 (RJ-45)
· 2 x USB
· RJ-45 (Ethernet/IP)
· Serial
· Wifi (optional)
· Bluetooth (optional)

The Test Equipment shall be able to download data to PC or compatible device via standard interface or protocol:

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Test, Files and Data Storage

Report Generation - HTML, PDF, TXT, CSV, XML

Ability to create a customized name structure.

The Test Set UI supports a screen capture

The internal storage capacity shall be at least 1GB.

Job Manager to push common job information into multiple test applications.

Ability to create summary reports including all tests performed in a job with pass/fail verdict of each

Remote Operation

The Test Equipment shall be remotely controlled via Web browser.

In remote operation, the remote user can FTP files from the test set.

In remote operation, the remote user can FTP files to the test set.

The Test Equipment should not require the installation of client software on a PC for remote operation.

Access via Smart Access Anywhere Codes

Calibration

Minimum calibration interval must be 3 years

Warranty

The Product shall support a 3 year warranty

Included Items

User manual

AC Power Source

AC Power cords

Optical Fiber Microscope

The Test Equipment shall be able to accept an optical video microscope with autofocus capability.

The connector image shall be displayed on the Test Equipment and saved into a .JPEG file format.

The microscope shall offer a switchable 200/400x magnification capability.

It shall be provided with the dedicated tips to connect to the patch panel or directly to the connector ferrule.

Saved Configurations

Users shall be able to save test configurations for future recall

Users shall be able to transfer pre-defined test configurations between test sets

Ethernet

Test Interfaces/Bit Rates

10/100/1000M Electrical	Dual Port Capable
100M Ethernet Optical	Dual Port Capable
GigE (Optical)	Dual Port Capable
10GigE WAN Phy (9.9G)	Dual Port Capable
10GigE LAN Phy (10.3G)	Dual Port Capable

Interface Type

RJ-45

SFP

SFP+

SFP+Tunable

General

Line Rate Traffic Tx and RX for all Interfaces

Single Stream Generation/Analysis

10 Streams Generation/Analysis

Auto Discovery of Test Sets

Modes of Operation

Terminate

Monitor

Thru (Intrusive)

Loopback

Half Duplex

Full Duplex

Timing

Recovered from Rx

Internal (Stratum 3)

Recoverd from External (BITs/SETs)

Freq Offset Transmit/Receive

Ethernet Features

Layer 1 (Unframed) Bit Error Testing Patterns

High Frequency test pattern

Low frequency test pattern

Mixed frequency test pattern

Random Data Pattern (RPAT)

Jitter Tolerance Test Pattern (JTPAT)

Supply Noise Test Sequence (SPAT)

Layer 2 (Framed) Bit Error Testing Patterns

Compliant Random Data Pattern (CRPAT)

Compliant Jitter Tolerance Pattern (CJPAT)

Compliant Supply Noise Pattern (CSPAT)

VIAVI T-BERD/MTS-5800 Specifications

Framed Pattern Test

PRBS (2^11-1, 2^15-1, 2^20-1, 2^23-1, 2^31-1 and inverse)

All 1s, All 0s

1:3, 1:7, 3:1, 7:1, 2 in 8

User defined

MAC Frame Payload

PRBS Pattern

Editable Digital Word

Flow Control

Emulation On/Off

Pause Frames

Tx Insert

Pause Quanta - Definable

Pause Frame Analysis (counts etc)

Ethernet Generator

Frame Type

802.3

DIX

VPLS with inner and outer MAC

MAC in MAC 802.1ah

EtherType Field-Editable

MAC Addressing

Destination MAC Address - Unicast

Destination MAC Address - Broadcast

Destination MAC Address - Multicast

Source MAC Address - User Defined

Source MAC Address - Auto Increment

MAC Frame Size

64, 128, 256, 512, 1024, 1280, 1518

User defined

Jumbo (to 10k)

EMIX

Random

VLAN

VLAN Tagging 802.1q

VLAN Tag Editable Fields
· Priority
· VID
· VLAN Scan

VLAN Stacking (Q-in-Q)

SVLAN Tag Editable Fields

SVLAN ID

SVLAN Priority

SVLAN DEI

SVLAN TPID

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CVLAN ID	**Ethernet OAM**	**IPv6 Editable Fields**
CVLAN Priority	**Y.1731 Service OAM and 802.1ag CFM**	Traffic Class
Supports up to 8 stacked VLAN Tags	CCM Messages	Flow Label
VPLS	Programmable CCM Rate	Next Header
VPLS Parameters - MAC Addresses	CCM Type - Unicast, Multicast	Hop Limit
VPLS Parameters - Frame Type	MEG ID End Point	**IP Ping**
VPLS Parameters - EtherType	Maintenance Domain Level	**Fast Ping**
VPLS Tunnel and VC Label - Label, CoS, TTL	AIS Tx/Rx	**IP TraceRoute**
VPLS Control Word - Reserved Bits, Sequence Number	RDI Tx/Rx	**Traffic Generator**
MAC in MAC/PBT/PBB	LBR/LBM (Ping) - Unicast, Multicast	Number of Traffic Engines
Parameters - MAC Address	LTM/LTR (Trace)	Bandwidth Controlled
B-Tag - TPI, VID, Priority, DEI	MEP Discovery	Bandwidth Specification in Mbps or kbps
I-Tag - TPI, SID, Priority, DEI, NCA, Res1, Res2	**802.3ah Link OAM**	Bandwidth Granularity
MPLS	Mode - Passive/Active	Bandwidth Specification in %
Single Label Support	Vendor OUI	Bandwidth Utilization Accuracy - 0.1%
Stacked Label Support - Up to 2	Vendor Specific Info	Burst Mode - Burst Size - 1 to 2M frames
Editable Parameters/Results - Label	Max PDU Size	Bandwidth Specified - Definable
Editable Parameters/Results - CoS	Unidirectional Links	Continuous Tx
Editable Parameters/Results - TTL	Remote Loopback	Once Tx - Definable frames/burst
MPLS-TP	Link Events	Traffic generation in LBM frames at line rate
MPLS-TP Label Support (Tunnel and VC)	Variable Retrieval	Analysis of LBR frames at line rate
VLAN Tag Support	Dying Gasp	**Traffic Profiles**
Linerate Traffic Generation	Link Fault	Constant B/W
Traffic Analysis	Critical Event	Ramp B/W
Editable Parameters/Results - Label	Errored Symbol Period Event	Bursty B/W
Editable Parameters/Results - Priority	Errored Frame Event	Flood B/W
Editable Parameters/Results - TTL	Errored Frame Period Event	Traffic generation in Mbps, kbps, or % utilization
Rx Filters	Errored Frame Second Summary Event	B/W configurable based on L1 or L2
GAL (Label 13) + ACH from ITU-T G.8113.1 · Common Header Label - PW, LSP, Section · CCM Generation and Analysis · LBM/LBR Generation and Analysis · AIS Generation and Analysis	**IP Packet Generator**	**TCP Throughput**
	IP	10/100/1000M Linerate Stateful Emulation
	IPv4 Frame Format	1GigE Linerate Stateful Emulation
	IPv6 Frame Format	10GigE Linerate Stateful Emulation
OAM Alert Label (Label 14) from ITU-T G.8114 · Common Header Label - PW, LSP, Section · CCM Generation and Analysis · LBM/LBR Generation and Analysis · AIS Generation and Analysis	TCP Port Number	Configurable Src and Dest IP address
	UDP Port Number	Packet length
	IP Addressing	TCP/UDP Traffic Modes
	Destination IP Address - User Defined	Source Port
	Source IP Address - User Defined	Destination Port
OAM Alert Label (Label 14) from ITU-T Y.1711 Common Header Label - PW, LSP, Section · CCM Generation and Analysis · FFD Generation and Analysis · BDI Generation and Analysis · FDI Generation and Analysis	**IPv4 Editable Fields**	Listen Port
	ToS	Configurable TCP Window Size
	DSCP	Measures TCP Efficiency
	Flags	Measures Buffer Delay
	Protocol	TCP Client Emulation
Simultaneous OAM and background traffic generation	TTL	TCP Server Emulation

VIAVI T-BERD/MTS-5800 Specifications

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Up to 64 TCP Stateful Sessions Simultaneously	Graphical Results	Send/Receive Ethernet Control Plane Traffic
Supports 4 Background Streams	Screenshot support	· Spanning Tree Frames Tx/Rx
Compatible with IPERF	Auto-Negotiation Check	· Cisco Discovery Protocol
RFC 2544	Saved Test Profiles	· LDP Frames Tx/Rx
Asymmetric Testing	Saved Reports	· Link Aggregation LACP
Symmetric Testing	Configurable DEI, TPID, TOS/DSCP	· Cisco UDLD, ISL, PagP, DTP, PVST-PVST+
Throughput	Inclusive of L2 Ethernet, IPv4, and IPv6	· MAC Bridging 802.1d
Frame Loss	Integrated TrueSpeed TCP traffic stream with background streams	· VLAN-BRDGSTP
Out of sequence frames	Optional Testing with line rate LBM frames	· Custom Frame Builder
Errored Frames	Asymmetric Testing	**Synchronous Ethernet**
Delay	LAG support	1GE and 10GigE Tx/Rx
Back to Back	· Sequential MAC Addresses	1000M/100M/10M Electrical Tx/Rx
Committed Burst Size (CBS)	· Suppression of OOS Frames	100M/1000M Optical Tx/Rx
Policer Test	One Way Delay with GPS or CDMA receiver	G.826x Compliant
Jitter	**IETF RFC 6349**	Frequency offsets ± 100 ppm in 1 or 10 ppm increments
Master/Slave	Supported on 10/100/1000 M Electrical and 1/10 G Optical Interfaces	Recovered Interface Timing
Pass/Fail Thresholds per MEF 23.1	Automated TCP Throughput test per RFC 6349	4.6ppm Frequency Accuracy
Connectivity QuickCheck	Path MTU Detection Test	SSM Message Decode
Parallel Testing	Round Trip Time Test	ESMC Message Transmit & Capture
Optional Testing with line rate LBM frames	Walk the Window Test	Quality Message Decode
Definable Frame Size	TCP Throughput Test	Definable SSM PDU Rate (pps)
LAG Support	Traffic Shaping Test	Background Dataplane traffic generation
· Sequential MAC Addresses	TCP Efficiency Metric	**IEEE 1588v2 PTP**
· Suppression of OOS Frames	Buffer Delay Metric	1GE and 10G Tx/Rx
Report formats	Up to 64 TCP Stateful Sessions Simultaneously	1588v2 Master Emulation
Graphical Results	1 KB TCP Window Size Granularity	1588v2 Slave Emulation
Total Test Time Display	Jumbo Frame Support	1G Dual Monitor
One Way Delay with GPS or CDMA receiver	Graphical Results and Report Generation	
ITU-T Y.1564	Configurable File Sizes and Window Sizes	
10 Traffic Streams	Total Test Time Display	
Service Configuration Test	Configurable Saturation Window Test	Packet Delay Variation Measurements on Control Plane Traffic
Service Performance Test	Compatible with the following endpoints:	Generate up to 4 streams of Background Dataplane traffic
Committed Information Rate (CIR)	· T-BERD/MTS instruments	Frame/Packet Capture and Decode via Wireshark
Extended IR (EIR)	· QT-600 Ethernet Probes	Layer 2 1588v2 Messaging
Maximum IR (MIR)	· TrueSpeed VNF Server	Layer 4 1588v2 Messaging
Frame Loss Rate (FLR)	**Layer 2 Transparency Testing**	Message rates Multicast: Fastest = 16/128/8 (Announce/Sync/Delay); Slowest = one message every 16 seconds
Frame Delay (FD)	Send/Receive Ethernet Control Plane Traffic	Message rates Unicast: Fastest = 16/128/8 (Announce/Sync/Delay); Slowest = one message every 16 seconds
Frame Delay Variation	Encapsulation supported	Support for Unicast and Multicast Address Mode
Committed Burst Size (CBS)	· VLAN	Support for Forwardable and Non-forwardable Address
Policer Test	· Q-in-Q	Static Unicast message negotiation: ON or OFF
Round Trip Testing	· Spanning Tree	Thresholds for Sync and Delay PDV and FPP (Floor Packet Processing)
Concurrent Bi-directional Testing	· Cisco Protocols (Discovery etc.)	
Configurable VLAN, Priority, Addressing and Pass/Fail Thresholds	· GARP	
Programmable Pass/Fail Thresholds	· STP	

Encapsulations supported: None, VLAN, and Q-in-Q

VIAVI T-BERD/MTS-5800 Specifications

Single- & Dual Step operation in both slave and master modes	Far End	Frame Type/Length
Master Mode Clock Classes Supported · Primary · Primary Holdover · Arbitrary · Arbitrary Holdover · Primary A · Arbitrary A	Auto Discovery of Test Sets	VLAN ID
	Delay	VLAN Priority
	Round Trip Delay	VLAN Discovery
	Acterna Test Protocol Version 3 (default) · 10GE High Precision - low delay · GE Optical High Precision - low delay	**VLAN (Layer 2.5) Tags - 802.1q**
1588v2 Delay Measurements (Master/Slave)		TPI
One-way (Master to Slave and Slave to Master) Delay	Acterna Test Protocol Version 2 with Fill byte · High Precision - low delay · Lower Precision — high delay	Priority
Differential Delay and Delay Asymmetry Measurements		CFI/DEI
	One Way Delay	VID
Time Error Measurements (1ns resolution)	Delay Measurement Accuracy	**VLAN (Layer 2.5) Tags - QnQ, 802.1ah**
Max |TE| and cTE Measurement	**CAT-5 Testing**	SVLAN ID
PktSelected2wayTE Measurements including: APTS: pk to pk PTS: Abs Max	Link speed	SVLAN Priority
	Link status	SVLAN TPI
	Cable status	CVLAN ID
Wander Analysis of Time Error Measurement	Crossover/straight (MDI/MDIX)	CVLAN Priority
	Distance to fault	**IP (Layer 3) Traffic Filtering**
Automated Time Error Measurement workflow.	Pin mapping	Source and destination IP address
	Pair length	Subnet mask
NTP Features	Polarity	IPv6 Traffic Class
Capture	Skew	TOS/DSCP Fields
Analyze	**Capture/Decode**	**TCP/UDP (Layer 4) Traffic Filtering**
Monitor	Wirespeed Capture up to 10Gb/s	ATP Listen Port
PDV Analysis	Wirespeed Capture up to 10/100/1000 Mb/s	**Protocol Analysis**
Supports distribution analysis of PDV and comparison against ITU limits	Integrated Wireshark on the TestSet	**CDP and LLDP Frame Discovery and Decode**
	256MB Capture Buffer per port	**CDP Analysis**
Graph resolution of up to 5ns	Triggers	Device Identifier
Supports evaluation according to MAFE	Tx and Rx Capture	Port Identifier
Supports FPP analysis according to G.8261.1 and comparison against ITU limits	Frame Slicing	VLAN ID
	Expert Decode/Analysis	Source MAC Address
Supports masks defined by user	Decode/Analysis Capture Files	IP Subnet Addresses
Supports sample rates up to 100 samples per second	Detect Half-Duflex Ports	**LLDP Analysis**
	Detect ICMP Layer Issues	Chassis Identifier
Supports offline data analysis	Identify Top Talkers	Port Identifier
Supports packet synchronization data analysis for NTP protocols	TCP Layer Diagnosis - ex. Retransmissions	Time To Live
	Traffic Profiling	Source MAC address and optional VLAN ID
Supports measured data analysis according to PDD packet delay allocation level	Detect and display up to 128 streams of live traffic	Management IP Address
		MAU Type Information
Supports measured data analysis according to FPP minimum packet rate	Specify Filters for stream detection	**Errors Tx/Rx**
	Stream Classification	Code Error Tx/Rx
Supports PDV data collection of PTP for laboratory analysis and corrective path	**Network Discovery**	FCS Error Tx/Rx
	Automatically detect networks, domains, devices, and hosts	IP Checksum Tx/Rx
Loopback		Bit Error Tx/Rx
Manual (LLB)	**Traffic Filtering**	Insertion Profile - Once
Automatic	**Ethernet (Layer 2) Traffic Filtering**	Insertion Profile - Rate
Local	MAC source and destination address	Insertion Profile - Burst

VIAVI T-BERD/MTS-5800 Specifications

Alarms Tx/Rx		Packet length		Event, Date, Start Time, Stop Time, Duration, Value
Local Fault Tx/Rx		Packet jitter, Avg		**Real Time Histogram**
Remote Fault Tx/Rx		Packet jitter, Max		Seconds, Minutes, Hours, Days
Ethernet Results		**Errored Counts**		**Time**
Custom Results		Symbol errors		Current Date, Current Time, Test Elapsed Time
Histogram and Graphical Results Script		Code violation		**Graphical Displays**
Link Status		FCS errored frames		Errors versus Time
Loss of signal		Runts		Frame Loss versus Time
Link active		Jabbers		Packet Jitter versus Time
Frame detected		Oversized frames		Latency versus Time
Sync obtained		Undersized frames		Throughput versus Time
VLAN tagged frame detected		OOS frames		**Application Testing**
Auto-negotiation status		Lost frames		Walk the Window
Link configuration ack		IP checksum errors		FTP Throughput
Link advertisement status		IP packet length errors		HTTP Throughput
Pause capable		Pkt Payload Errors		
Remote fault		Bit error		
Destination MAC address when using ARP		Bit error rate		
Link counts/statistics		**QoS Measurements**		
Bandwidth utilization		Throughput		
Frame rate		Frame Loss		
Tx Mbit/s		Packet Jitter		
Rx Mbit/s		Delay		
Round trip delay		Out of Sequence		
Service disruption time		Frame/Packet Size Binning		
Received frames		MAC Throughput Rx		
Transmitted frames		IP Throughput Rx		
Received packets		TCP/UDP Throughput Rx		
Transmitted packets		Payload Throughput Rx		
Pause frames		Service Disruption Measurements · Definable Threshold Time		
Lost frames		Round Trip Delay Measurements		
Out of sequence frames		One Way Delay Measurements		
Out of sequence packets		Rx Bytes		
VLAN frames		Rx Mbits		
CVLAN ID		Rx Frames		
SVLAN ID		Rx frames per Second		
CVLAN Priority		Utilization %		
SVLAN Priority		Current Rx Results		
Unicast frames		Min Rx Results		
Unicast packets		Average Rx Results		
Multicast frames		Max/Peak Rx Results		
Multicast packets		Ratio Rx Results		
Broadcast frames		Seconds Rx Results		
Broadcast packets		**Event Log**		
Frame length				

SONET/SDH

Test Interfaces/Bit Rates	
STS-1 (e)	Dual Port Capable
STM-1 (e)	Dual Port Capable
STM-1 (o)	Dual Port Capable
OC-3	Dual Port Capable
OC-12	Dual Port Capable
STM-4	Dual Port Capable
OC-48	Dual Port Capable
STM-16	Dual Port Capable
OC-192	Dual Port Capable
STM-64	Dual Port Capable
Laser Type	
SFP	
SFP+	
SFP - Tunable	
Modes of Operation	
Terminate	
Monitor	
Thru (Intrusive)	
Tributary Scan	
Drop and Insert	
Timing	
Recovered from Rx	
Internal (Stratum 3)	
Recovered from External (BITs/SETs)	
Recovered from 10 MHz clock	

VIAVI T-BERD/MTS-5800 Specifications

SONET/SDH Features
SONET/SDH Framing
Overhead Manipulation/Analysis
Optical/Electrical Power Level
PRBS Generation
PM/SM TTI messages Tx/Rx
Overhead Byte Viewing/Manipulation
Service Disruption Measurements · SD Separation/Debounce Time Setting · SD Threshold Time Settings
Signal Label generation/display
Freq Offset Transmit/Receive
Round Trip Delay Measurement
RTD Measurement Accuracy
PRBS Patterns
215-1, 215-1 Inverse
2^20-1, 2^20-1 Inverse
2^23-1, 2^23-1 Inverse
2^31-1, 2^31-1 Inverse
Programmable - 32 bit
ANSI and ITU implementations
Anomaly/Error generation
Bit/TSE
Frame Word
B1
B2
B3
HP-REI
MS-REI, LP-BIP
LP-REI
Insert - Single
Insert - Rate
Multiple
Defects/Alarms Generation/Analysis
LOS
LOF
RS-TIM
MS-AIS
MS-RDI
AU-LOP
AU-AIS
HP-UNEQ
HP-RDI
HP-TIM
HP-PLM
TU-LOP

TU-AIS		
TU-LOM		
LP-UNEQ		
LP-RDI		
LP-TIM		
LP-PLM		
LP-RFI		
SDH Mappings		
VC4 Bulk, AU-4-4c, AU-4-16c, AU-4-64c		
VC12		
VC4		
VC3		
E4		
DS3		
E3		
E1		
SONET Mappings		
STS-1, STS-3c, STS-12c, STS-48c, STS-192c		
VT1.5		
DS3		
DS1		
E1		
Results		
Signal Category		
Signal Present		
Signal Loss Count		
Signal Loss Seconds		
Receive Frequency		
Receive Frequency Deviation		
Receive Frequency Maximum Deviation		
Transmit Frequency		
Electrical Input Level STS-1 STM-1e	dBdsx, dBm, volts dBnom only	
BPV Count (STS-1 only)		
BPV-Error Rate (STS-1 only)		
Regenerator/Section OH Category		
FAS/Frame Word Error Count		
FAS/Frame Word Error Rate		
LOF Count		
OOF Count		
B1-BIP error Count		
B1-BIP Error Rate		
Severely Errored Seconds		
OOF Seconds		

Section Trace Mismatch	TIM
J0-Regenerator Trace	
Multiplexer/Line OH Category	
APS Message Count	
APS Bridge Request Code	Ring
APS Destination Node	Ring
APS Source Node	Ring
APS Path Code	Ring
APS Status	Ring
APS Request Code	Linear
APS K1 Channel Number	Linear
APS K2 Channel Number	Linear
APS MSP Architecture	Linear
APS Status	Linear
B2-BIP Error Count	
B2-BIP Error Rate	
SES	
Unavailable Seconds	
AIS Seconds	
REI Count	
REI Rate	
S1 Synchronization Message	
Z1 Byte Value	
High Path (AU, VC3/4) OH Category	
Pointer Justification Count	
Pointer Increment Count	
Pointer Decrement Count	
Pointer NDF Count	
Pointer Value	
Pointer Size	SS Bits
LOP Count	
B3 (BIP) Error Count	
B3 (BIP) Error Rate	
B3 (BIP) Errored Seconds	
REI Count	
VC-3/4 REI Rate	
POH SES	
POH Unavailable Seconds	
Signal Label	C2
J1 Trace Message	
Path Status	G1

VIAVI T-BERD/MTS-5800 Specifications

Low Path (VC3/12, TU3/12, VT1.5) Category	
Pointer Transmitted	
Pointer Received	
Pointer Just Count	
Pointer Increment Count	
Pointer Dec Count	
Pointer NDF Count	
LOP Count	
LOP Seconds	
B3/V5 BIP Count	
B3/V5 BIP Error Rate	
REI Count	
Pointer Transmitted	
Pointer Received	
Signal Label	C2/V5
Signal Label Mismatch	
J2-Lower Order Trace Message	
J2 Lower Order TIM	

Logic Category

Pattern loss Count	
Bit Error/TSE Count	
Bit Error/TSE Rate	
Pattern Slip Count	
Pattern Slip Secs	
Pattern Loss Count	
Pattern Synchronization Loss Secs	
Pattern Synchronization Status	

Alarms

Signal Loss Status

Frame Synchronization Loss Status
Pattern Synchronization Loss Status
MS/Line-AIS
AIS (HP)
AIS (LP)
LOP (HP)
LOP (LP)
LOS
OOF
LOF
MS/Line RDI
LP RDI
HP RDI
MS/Line-REI

Regenerator Trace Identifier Mismatch	TIM
High Path Trace Identifier Mismatch	TIM
HP-UNEQ/UNEQ-P	
Low Path Trace Identifier Mismatch	TIM
Loss of Multiframe	TU-12, TU-3, VT-1.5

Overhead Byte Manipulation/Viewing – High Path

A1, A2, J0, J1, D1, D2, D3, C2, H1, H2, H3, G1, B2, K1, K2, F2, D4, D5, D6, H4, D7, D8, D9, H4, D7, D8, D9, Z3/F3, D10, D11, D12, Z4/K3, S1, Z1, M1/Z2, E2, Z5/N1

SDH Low Order View (AU/VT)

V5, S2, N6, K4

SOH and POH Evaluation

Text decode of S and C bytes for the trace identifier. J0 display of 16-byte ASCII sequence. J1, J2 display of 16- or 64-byte ASCII sequence.

Tandem Connection Monitoring (TCM)

Analysis of the N1 and N2 bytes, Monitoring/Display of: AIS, ODI, RDI, OEI, REI, APId, incoming B3/Computed BIP Comparison, IEC, TC-UNEQ

Performance Measures

G.826	ISM/OOS
G.828	ISM/OOS
G.829	ISM/OOS
M.2101	
T1.231	
T1.514	

K1/K2 Event Log

Date, Time, K1 Value, Code, Channel, K2, Bridge, MSP, Status

Event Log

Event, Date, Start Time, Stop Time, Duration, Value

Real Time Histogram

Seconds, Minutes, Hours, Days

Time

Current Date, Current Time, Test Elapsed Time

OTN G.709

Test Interfaces/Bit Rates

OTU1 (2.7G)	Dual Port Capable
OTU2 (10.7G)	Dual Port Capable
OTU1e (11.045G)	Dual Port Capable
OTU2e (11.095G)	Dual Port Capable

VIAVI T-BERD/MTS-5800 Specifications

Laser Type	
SFP	
SFP+	
SFP+ - Tunable	

Modes of Operation

Terminate
Monitor
Monitor/Thru

OTN Layer

OTN/ODU Framing
ODU1 in ODU2 Multiplexing

ODU0 Multiplexing
· ODU-0 Bulk BERT from an OTU-2
· ODU-0 1-Gigabit Ethernet Layer 2 & IPv4 traffic from an OTU-2
· ODU-0 Bulk BERT from an OTU-1
· ODU-0 1-Gigabit Ethernet Layer 2 & IPv4 traffic from an OTU-1
· ODUflex Bulk BERT from an OTU-2
· ODUflex 1-Gigabit Ethernet Layer 2 from and OTU-2
· Generic Mapping Procedure (GMP) supported
· GFP-T encapsulation of Ethernet 8B/10B PCS

GFP-T
· CID
· UPI

Overhead Manipulation/Analysis
Power Level
PM/SM TTI messages Tx/Rx
Overhead Manipulation/Analysis

Service Disruption Measurements
· SD Separation/Debounce Time Setting
· SD Threshold Time Settings

Payload Type (PT) Label generation/display
Transfer Delay
Freq Offset Transmit/Receive

PRBS Patterns

2^20-1, 2^20-1 Inverse
2^23-1, 2^23-1 Inverse
2^31-1, 2^31-1 Inverse
Programmable - 32 bit
ANSI and ITU implementations

Error Insertion Capability

Single, Rate

OTU Error Tx/Rx

FAS
MFAS
SM-BIP/BEI

PM-BIP/BEI	FTFL Fwd Sig Degr.	Tx Frequency (Hz)
FEC Uncorrectable	FTFL Bwd Sig Fail	Tx Frequency Deviation (ppm)
FEC Correctable	FTFL Bwd Sig Degr	**FEC**
TCM1-6 BIP	TCM1-6 IAE	Uncorrected Word Errors
TCM1-6 BEI	TCM1-6 TIM	Uncorrected Word Error Rate
Bit Error	TCM 1-6 BDI	Corrected Word Errors
Code Word Errors (Corr/Incorrect)	TCM1-6 BIAE	Correctable Word Errors
OTU Alarm Tx/Rx	**OPU Errors/Alarms Tx/Rx**	Corrected Word Errors Rate
LOF	PT Label Mismatch	Correctable Word Error Rate
OOF	Client Loss	Corrected Bit Errors
LOM	Bit Error	Corrected Bit Errors Rate
OOF	**ODU Mappings**	Correctable Bit Errors
OOM	Bulk	Correctable Bit Error Rate
SM-IAE	ODU0	**Framing**
SM-TIM	ODU1	Frame Sync Loss Seconds
SM-BDI	ODU2	Frame Sync Losses
SM-BIAE	**SDH Mappings**	OOF Seconds Count
PM-TIM	VC4 Bulk, AU-4-4c, AU-4-16c, AU-4-64c	FAS Errors
PM-BDI	VC4	FAS Error Rate
FTFL Fwd Sig Fail	VC3	LOF
FTFL Fwd Sig Degr.	**SONET Mappings**	LOF Seconds
FTFL Bwd Sig Fail	STS-1, STS-3c, STS-12c, STS-48c, STS-192c	Multiframe Sync Loss Seconds
FTFL Bwd Sig Degr	**Ethernet Mappings**	OOM Seconds Count
TCM1-6 IAE	10GigE	MFAS Errors
TCM1-6 TIM	1GigE	MFAS Error Rate
TCM 1-6 BDI	**Results**	**OTU**
TCM1-6 BIAE	**LEDS**	OTU-AIS
ODU Errors Tx/Rx	Signal Present	OTU AIS Seconds
FAS	Frame Sync	SM-IAE
MFAS	Pattern Sync	SM-IAE Seconds
PM BIP/BEI	LOS	SM-BIP Error Counts
TCM BIP/BEI	LOF	SM-BIP Error Rate
Bit Error	LSS	SM-BDI Seconds
ODU Alarms Tx/Rx	**Interface**	SM-BDI Count
LOF	Invalid Rx Signal Seconds	SM-BIAE Seconds
OOF	LOS Count	SM-BIAE Count
LOM	Optical Rx Level (dBm)	SM-BEI Count
OOM	Reference Frequency	SM-BEI Error Rate
AIS	Round Trip Delay	SM-TIM Count
OCI	Rx Frequency Max Deviation (ppm)	SM-TIM Seconds
LCK	Rx Frequency (Hz)	SM-SAPI
PM-TIM	Rx Frequency Deviation (ppm)	SM-DAPI
PM-BDI	Signal Losses Count	SM-Operator Specific
FTFL	Tx Clock Source	GCC BERT Bits
FTFL Fwd Sig Fail	Tx Freq Max Deviation (ppm)	GCC BERT Bit Errors

VIAVI T-BERD/MTS-5800 Specifications

LASER
COMPONENTS

GCC BERT Bit Error Rate	
ODU	
ODU-AIS	
ODU-AIS Seconds	
ODU-LCK	
ODU-LCK Seconds	
ODU-OCI	
ODU-OCI Seconds	
PM-BIP Count	
PM BIP Error Rate	
PM-BDI Seconds	
PM-BDI Count	
PM-BEI Count	
PM-BEI Error Rate	
PM-TIM Seconds	
PM-TIM Count	
PM-SAPI	
PM-DAPI	
PM-Operator Specific	
PM Round Tip Delay Recent	
PM Round Trip Delay Last	
FTFL	
Forward-Fault Type	
Forward-SF Seconds	
Forward-Operator Specific	
Forward-Operator Identifier	
Backward-Fault Type	
Backward-SF Seconds Count	
Backward-SD Seconds Count	
Backward-Operator Identifier	
Backward-Operator Specific	
TCM 1-6	
IAE Seconds	
BIP Errors	
BIP Error Rate	
BDI Seconds	
BIAE Seconds	
BEI Errors	
BEI Error Rate	
TIM Seconds	
SAPI	
DAPI	
Operator Specific	
GCC BERT Bits	
GCC BERT Bit Errors	
GCC BERT Bit Error Rate	

OPU

Payload Type Mismatch Seconds
Payload Type

Payload

Pattern Sync Loss Seconds
Pattern Sync Losses
TSE/Bit Errors
TSE/Bit Error Rate

Ethernet Client

As per Ethernet results
RFC 2544 on 10 GE client

SONET/SDH Client

As per SONET/SDH results

OTN Check

Automated workflow is available at all OTN rates for OTN Bulk
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)

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 · Selection of applicable OH field: GCC0, GCC1 or GCC2 · Pass/Fail BER Threshold

Report generation and formats

Fibre Channel

Laser Type

SFP
SFP+

Modes of Operation

Terminate
Monitor
Thru

Test Interfaces/Bit Rates

1.0625 Gbit/s	Dual Port Capable
2.125 Gbit/s	Dual Port Capable
4.25 Gbit/s	Dual Port Capable
8.5 Gbit/s	Dual Port Capable
10.519 Gbit/s	Dual Port Capable
14.025 Gbit/s	Dual Port Capable

Fibre Channel Features

General

Flow Control
Login
Buffer Credits

Fibre Channel Login

at "F-Port"
at "N-Port"

Layer 1 (Unframed) Bit Error Testing Patterns

High frequency test pattern
Low frequency test pattern
Mixed frequency test pattern
Random Data Pattern (RPAT)
Jitter Tolerance Test Pattern (JTPAT)
Supply Noise Test Sequence (SPAT)

Layer 2 (Framed) Bit Error Testing Patterns

Compliant Random Data Pattern (CRPAT)
Compliant Jitter Tolerance Pattern (CJPAT)
Compliant Supply Noise Pattern (CSPAT)

Framed Pattern Test

PRBS (2^23-1, 2^31-1 and inverse)
All 1s
All 0s
User defined

Fibre Channel Traffic Generation

Transmit Traffic profiles	
Constant	
Ramp	
Bursty	
Traffic generation in Mbit/s and % utilization	
Configurable Source and Destination ID	
Sequence ID	
Originator ID	
Responder ID	
Frame length	28, 32, 76, 512, 1024, 1536, 2076, 2140, User defined
Packet payload	
Granularity	1 to 6.7%

VIAVI T-BERD/MTS-5800 Specifications

Fibre Channel Traffic Filtering		Tx/Rx ELP Request		Interface Type	
Routing Control		**L2 Link Statistics**		BNC	
Destination Identifier		Total Utilization %		Bantam	
Source Identifier		Frame Rate		RJ48	
Data Structure Type		Frame Size		**E4**	
Sequence Count		Rx Mbps		**Modes of Operation**	
Fibre Channel Error Insertion		Tx Mbps		Terminate	
Bit error		Round Trip Delay (us)		Monitor	
CRC		Service Disruption (us)		Thru (Intrusive)	
Framed Bit		**L2 Link Counts**		**Timing**	
Code violation		Rx Frames		Recovered from Rx	
Insertion Type - Single, Rate, Burst		Tx Frames		Internal (Stratum 3)	
Enhanced Fibre Channel Test (RFC 2544 like)		Rx Acterna Frames		Recoverd from External (BITs/SETs)	
Selectable Configuration Template		Tx Acterna Frames		**Framing**	
Throughput		Rx Frame Bytes		Framed	
Latency		Tx Frame Bytes		Unframed	
Frame Loss		Class F Frames		**Test Patterns**	
Back to Back		Class 1 Frames		2^15-1* (Inverse)	
Buffer Credits		Class 2 Frames		2^20-1* (Inverse)	
Buffer Credit Throughput		Class 3 Frames		2^23-1* (Inverse)	
Selectable Flow Control Login Type		**BERT Stats**		User Programmable	
Definable Frame Length		Pattern Losses		Round Trip Delay	
Pass Fail Thresholds		Pattern Loss Seconds		ANSI and ITU	
Report Generation		Bit Error Rate		**Mappings**	
Screen Capture Support		Bit Errors		E3	
Graphical Results		Bit Errored Seconds		E1	
8 Gig Fibre Channel Specific		Bit Error-Free Seconds		64 k	
Scrambling in FC-1/MAC layer, on total FC frame		Bit Error-Free Seconds (%)		**Anomaly/Error Insert/Analysis**	
Supported IDLE and FILL WORD patterns include IDLE on Link INIT and as FILL WORD; IDLE on INIT and ARBFF on FILL WORD; ARBFF on INIT and as FILL WORD		**Error Stats**		Frame Errors	
		Symbol Errors		TSE/Bit Error	
		CRC Errored Frames		Single	
Results		Fiber Runts		Rate	
Interface		Fiber Jabbers		**Defect/Alarm Insert/Analysis**	
Signal Losses		Undersized Frames		AIS	
Signal Loss Seconds		Code Violations		RDI/FAS Distant	
Sync Loss Seconds		Code Violation Rate		**General**	
Optical Rx Overload		Code Violation Seconds		Frequency Offset ±100 ppm	
Optical Rx Level (dBm)				National Bit Support	
Login Status				**Performance Measures**	
Far-end Buffer to Buffer Credits		**PDH**		G.821	OOS
Login Status				G.826	ISM/OOS
Tx/Rx ELP Accept		**Test Interfaces**		M.2100	ISM/OOS
Tx/Rx ELP Ack1		E4		**Results**	
Tx/Rx ELP Reject		DS3		**Signal Category**	
		E3		Receive Frequency	
		E1 Balanced			
		E1 Unbalanced			
		T1			

VIAVI T-BERD/MTS-5800 Specification

12

Receive Frequency Deviation	**Mappings**	Frame Error Rate
Receive Frequency Max Deviation	E1	Frame Error Seconds
Transmit Frequency	T1	Frame Synchronization Loss Count
Round Trip Delay	64k	Near End Out of Frame Seconds
Frame Category	**Anomaly/Error/Insert/Analysis**	Far-End Out of Frame Seconds
FAS TSE Count	BPV/Code Error	C-Bit Format
FAS TSE Rate	Frame	RX X-Bits
FAS Word Error Count	Parity	FEAC Word
FAS Word Error Rate	C-Bit Parity	Parity Error Count
Frame Synchronization Loss Count	TSE/Bit Error	Parity Error Rate
Frame Synchronization Loss Seconds	Single	Parity Error Seconds
Logic Category	Rate	C-Bit Parity Error Count
TSE/Bit Error Count	Multiple	C-Bit Parity Error Rate
TSE/Bit Error Rate	**Defect/Alarm Insert/Analysis**	C-Bit Error Seconds
Pattern Slips	AIS	FEBEs
Pattern Slip Seconds	RDI/FAS Distant	DS2 Frame Synchronization Loss Count
Pattern Synchronization Loss Count	REBE	**Logic**
Pattern Synchronization Loss Seconds	TS-16 AIS	Bit Error/TSE Count
DS3	TS-16 RDI/MFAC Distant	Bit Error/TSE Rate
Modes of Operation	**General**	Pattern Slips
Terminate	Frequency Offset +/- 100ppm	Pattern Slip Seconds
Monitor	Loop Codes Tx NIU, CSU, Line	Pattern Synchronization Loss Count
Through (Intrusive)	Rx Compensation - High - 0 ft	Pattern Synchronization Loss Seconds
Timing	Rx Compensation - Low - 450 ft	Pattern Synchronization Status
Recovered from Rx	Rx Compensation - Low - 900 ft	**E3**
Internal (Stratum 3)	Service Disruption	**Modes of Operation**
Recoverd from External (BITs/SETs)	**Performance Measures**	Terminate
Framing	G.826	ISM/OOS	Monitor
M13	G.821	Thru (Intrusive)
C-bit	M.2100	**Timing**
Unframed	M.2101	Recovered from Rx
Test Patterns	T1.231	Internal (Stratum 3)
All 1s	T1.510	Recoverd from External (BITs/SETs)
All 0s	**Results**	**Framing**
2^15-1* (Inverse)	**Signal Category**	Framed
2^20-1* (Inverse)	Receive Frequency	Unframed
2^23-1* (Inverse)	Receive Frequency Deviation	**Test Patterns**
Round Trip Delay	Receive Frequency Maximum Deviation	All 1s
User Programmable (3,,,,32 bits)	Transmit Frequency	All 0s
User Byte	BPV/Code Rate	2047
100	BPV/Code Count	2^11-1* (Inverse)
1100 (aka IDLE)	Electrical Input Level	2^15-1* (Inverse)
1010 (aka BLUE)	Round Trip Delay (ms)	2^20-1* (Inverse)
ANSI and ITU	**Frame**	2^23-1* (Inverse)
	Frame Error Count	User Programmable (3,,,,32 bits)

VIAVI T-BERD/MTS-5800 Specifications

User Byte	8M FAS Word Error Rate	**Anomaly/Error Insert/Analysis**
Round Trip Delay	8M FAS Bit Error Count	Code Error
1:1	8M FAS Bit Error Rate	FAS Error
1:3	8M FAS Word Error Count	MFAS Error
1:4	8M FAS Word Error Rate	TSE/Bit Error
1:7	**Logic Category**	Single
ANSI and ITU	TSE/Bit Error Count	Multiple
Mappings	TSE/Bit Error Rate	Rate
E1	Pattern Slips	**Defect/Alarm Insert/Analysis**
64k	Pattern Slip Seconds	AIS
Anomaly/Error Insert/Analysis	Pattern Synchronization Loss Count	REBE
Code Error	Pattern Synchronization Loss Seconds	TS-16 AIS
FAS Error	Pattern Synchronization Status	TS-16 RDI/MFAS Distant
TSE/Bit Error	**E1**	**General**
Single	**Modes of Operation**	Frequency Offset Tx +/- 100ppm
Rate	Terminate	Service Disruption
Defect/Alarm Insert/Analysis	Monitor	**Performance Measures**
AIS	Thru (Intrusive)	G.826 / ISM/OOS
RDI/FAS Distant	**Timing**	G.821
General	Recovered from Rx	G.829 / ISM/OOS
Frequency Offset Tx +/- 100ppm	Internal (Stratum 3)	M.2100
Tx LBO - 0 dB Loss	Recoverd from External (BITs/SETs)	**Results**
Tx LBO - 6 dB Loss	**Framing**	**Signal Category**
National Bit Support - On/Off	Unframed	2M Receive Frequency
Service Disruption	PCM30	2M Reference Frequency
Performance Measures	PCM30C	2M Receive Frequency Deviation
G.826 / ISM/OOS	PCM31	2M Receive Frequency Maximum Deviation
G.821	PCM31C	2M Transmit Frequency
M.2100	**Test Patterns**	Electrical Input Level
Results	All 1s	Code Error Count
Signal Category	All 0s	Code Error Rate
Transmit Frequency	$2^{15}-1$* (Inverse)	Round Trip Delay (ms)
Receive Frequency	$2^{20}-1$* (Inverse)	Timing Slips
Receive Frequency Maximum Deviation	$2^{23}-1$* (Inverse)	Frame Slips
Electrical Input Level	QRSS	APS Switch Time
Code Error Count	User Programmable (32 bits)	**Logic Category**
Code Error Rate	Round Trip Delay	TSE/Bit Error Count
Round Trip Delay (ms)	1:1	TSE/Bit Error Rate
APS Switch Time (ms)	1:3	Pattern Slips
Frame Category	1:4	Pattern Slip Seconds
FAS Bit Error Count	1:7	Pattern Synchronization Loss Count
FAS Bit Error Rate	ANSI and ITU	Pattern Synchronization Status
FAS Word Error Count	**Mappings**	**Alarm Category**
FAS Word Error Rate	64k	FAS/Frame Synchronization
Frame Synchronization Loss Count		MFAS Synchronization

VIAVI T-BERD/MTS-5800 Specifications

CRC Synchronization	QRSS	Loop Code Tx - Repeater
AIS	User Programmable (3,,,32 bits)	HDSL Loop Code Tx CO to Customer direction Customer to CO direction
RDI	User Byte	
Power Loss Count	BridgeTap	
2M Alarm	MultiPat	User Defined Loop Code Support
Frame Category	Round Trip Delay	**Results**
FAS Bit Error Count	1:1	**Signal Category**
FAS Bit Error Rate	1:3	Receive Frequency
FAS Word Error Count	1:4	Reference Frequency
FAS Word Error Rate	1:7	Receive Frequency Deviation
Non-Frame Alignment Word	2 in 8	Receive Frequency Maximum Deviation
MFAS Word Error Count	3 in 24	Transmit Frequency
MFAS Word Error Rate	MIN/MAX	Simplex Current
Time Slot Rx Byte	T1 DALY	Receive Level (Vp)
CRC Error Count	55 OCTET	Receive Level (dBdsx)
CRC Error Rate	T1-2/96	Receive Level (dBm)
CRC Synchronization Loss Count	T1-3/54	BPV Error Count
FAS Synchronization Loss Count	T1-4/120	BPV Error Rate
MFAS Synchronization Loss Count	T1-5/53	Frame Slip Count
Remote End Block Error (REBE)	**Mappings**	Signal Loss Count
T1	64k	Signal Loss Seconds
Modes of Operation	56k	Round Trip Delay (ms)
Terminate	**Anomaly/Error Insert/Analysis**	Timing Slips
Monitor	Frame Errors	Frame Slips
Through (Intrusive)	BPV Errors	APS Switch Time
Timing	TSE/Bit Error	**Frame Category**
Recovered from Rx	Single	Frame Error Count
Internal (Stratum 3)	Rate	Frame Error Rate
Recoverd from External (BITs/SETs)	Multiple	Frame Error Seconds
Framing	**Defect/Alarm Insert/Analysis**	Frame Loss Count
Unframed	AIS	Frame Loss Seconds
SF	REBE	Severely Errored Seconds
ESF	**General**	CRC Error Count
SLC-96	Frequency offset Tx ±100 ppm	CRC Error Rate
Test Patterns	**Performance Measures**	CRC Errored Seconds
63	G.826 — ISM/OOS	CRC Severely Errored Seconds
511	G.828 — ISM/OOS	**Logic Category**
511 QRSS	G.829 — ISM/OOS	Bit Error/TSE Count
2047 QRSS	M.2100	Bit Error/TSE Rate
2047	T1.231	Bit Error/TSE Seconds
All 1s	Tx LBO — 0, 7.5, 15, 22.5 dB Loss	Pattern Slips
All 0s	Service disruption	Pattern Slip Seconds
2^15-1* (Inverse)	**Loop Codes**	Pattern Synchronization Loss Count
2^20-1* (Inverse)	Loop Code Tx — NIU, CSU	Pattern Synchronization Loss Seconds
2^23-1* (Inverse)	Loop Code Emulation — NIU, CSU	**Channel**
		DSO Channel Payload View
		ABCD Bit Signaling View

VIAVI T-BERD/MTS-5800 Specifications

DS1 Dual HDLC Monitor and PPP Ping
Modes of Operation
Bridge
Terminate
DSX Monitor
Line Code
B8ZS
AMI
Clock Source (PPP Ping Only)
Internal
Recovered
External
Selectable Clock Offset
Transmit LBO (PPP Ping only)
0 dB
–7.5 dB
–15.0 dB
–22.5 dB
Framing
Unframed
ESF
D4 (SF)
SLC-96
Payload
Bulk
Fractional Rate
HDLC
Normal or inverted HDLC Mode
CRC16 or CRC32
PPP (PPP Ping Only)
PPP Mode (Client or Server)
IP Mode (Static or Auto)
Optional Authentication
IP (PPP Ping Only)
IPv4 Frame Format
Local IP
Remote IP
Destination IP Address - User Defined
Subnet Mask
Preferred & Alternate DNS Server
IPv4 Editable Fields
ToS
DSCP
TTL
IP Ping

Editable Packet Length (46 - 1500 bytes)
Single
Multiple
Continuous
Fast
Alarms/Errors Generation and Analysis (PPP Ping only)
LOS
LOF
AIS
RAI
BPV
Frame
Results
Interface
Signal Losses
Signal Loss Seconds
Rx Level (Vpp)
Rx Level (dBsx)
Rx/Tx Frequency (Hz)
Rx/Tx Frequency Deviation (ppm)
Rx/Tx Frequency Max Deviation (ppm)
Bi-Polar Violations (BPVs)
BPV Rate
Excess Zeros State Count
Ones Density State Count
DS1
Frame Sync Losses
Frame Sync Loss Seconds
AIS Alarms
AIS Seconds
T1 Alarm Seconds
Frame Errors
Frame Error Rate
Frame Error Seconds
Excess Zeros
Maximum Consecutive Zeros
HDLC
Rx/Tx Frame Count
Rx/Tx Octet Count
Frame Aborts
Short Frames
FCS Errored Frames
Percent Utilization (Average, Current, Maximum)
Throughput (Average, Current, Maximum)

Average Frame Rate (frames/sec)
Average Frame Size (octets)
PPP (PPP Ping Only)
PPP Status
Local IP
IP Subnet Mask
Remote IP
Preferred & Alternate DNS Server
Destination IP Address
Resolved Host Name
Ping (PPP Ping Only)
Ping Requests Tx
Ping Replies Rx
Lost Pings
Lost Ping %
Delay (ms)
Ping Requests Rx
Ping Replies Tx
Capture/Decode
Wirespeed Capture
Integrated Wireshark on the TestSet
256MB Capture Buffer
Triggers
Frame Slicing
DS3 HDLC Dual Monitor
Modes of Operation
DSX-MON
Terminate
Framing
Unframed
M13
C-Bit
HDLC
Normal or Inverted HDLC Mode
CRC16 or CRC32
Results
Interface
Signal Losses
Signal Loss Seconds
Rx Level (Vpeak)
Rx Level (dBdsx)
Rx Frequency (Hz)
Rx Frequency Deviation (ppm)
Rx Frequency Max Deviation (ppm)
Bi-Polar Violations (BPVs)

VIAVI T-BERD/MTS-5800 Specifications

BPV Rate		
BPV Error Seconds		
Excess Zeros Count		
Excess Zeros Seconds		
DS3		
Frame Sync Losses		
Frame Sync Loss Seconds		
Near End OOF Seconds		
Far End OOF Seconds		
AIS Seconds		
RAI Seconds		
FEAC Word		
Frame Errors		
Frame Error Rate		
Parity Errors		
Parity Error Bit Rate		
C-Bit Errors		
C-Bit Error Rate		
C-Bit Error Seconds		
C-Bit Frame Mismatch Seconds		
C-Bit Sync Loss Seconds		
FEBEs		
FEBE Rate		
FEBE Seconds		
Rx X-Bits		
HDLC		
Rx Frame Count		
Rx Octet Count		
Frame Aborts		
Short Frames		
FCS Errored Frames		
Percent Utilization (Average, Current, Maximum)		
Throughput (Average, Current, Maximum)		
Average Frame Rate (frames/sec)		
Average Frame Size (octets)		

CPRI

Test Interfaces/Bit Rates	
614 Mbps optical (Rate 1)	Dual Port Capable
1.2 Gbps optical (Rate 2)	Dual Port Capable
2.4 Gbps optical (Rate 3)	Dual Port Capable

3.1 Gbps optical (Rate 4)	Dual Port Capable
4.9 Gbps optical (Rate 5)	Dual Port Capable
6.1 Gbps optical (Rate 6)	Dual Port Capable
9.8 Gbps optical (Rate 7)	Dual Port Capable
10.137 Gbps optical (Rate 8)	Dual Port Capable
12.2 Gbps Optical (Rate 9)	Dual Port Capable
Laser Type	
SFP	
SFP+	
SFP+ Tuneable	
Modes of Operation	
Terminate	
Monitor/Thru	
Timing	
Recoverd from Rx (Slave)	
Internal (Stratum 3) (Master)	
Recoverd from External (BITs/SETs) (Master)	
Recoverd from 10MHz clock (Master)	
CPRI Automation	
CPRI Service Activation automated workflow	
CPRI Features	
Optical/Electrical Power Level	
Freq Offset Transmit/Receive	
CPRI Startup Sequence - Normal or Bypass	
Signal Generation and Monitoring	
L1 - PRBS Pattern Inserted in Hyperframe Structure	
L2 - PRBS Pattern Inserted in CPRI Basic Frame	
L2 - PRBS Pattern Inserted in CPRI Antenna-carrier (AxC) Group	
L2 Test Waveform Inserted in CPRI Antenna-carrier (AxC) Group	
Interface Type	
Master	
Slave	
Selectable CPRI Protocol Verion	
Control and Management (C&M) Channel	
Ethernet	
HDLC	
Selectable C&M Channel Rate	
Service Disruption Measurements	

SD Separation/Debounce Time Setting	
SD Threshold Time Settings	
Round-Trip Delay Measurement	
RTD Measurement Accuracy	
PRBS Patterns	
2^15-1, 2^15-1 Inverse	
2^20-1, 2^20-1 Inverse	
2^23-1, 2^23-1 Inverse	
2^31-1, 2^31-1 Inverse	
Delay	
Live	
Digital Word	
ANSI and ITU implementations	
Anomaly/Errors Generation	
Bit/TSE	
Code	
K30.7	
Running Disparity	
Insert - Single	
Insert - Rate	
CPRI AxC Mapping	
Mapping Method: Method 1	
Sample Width	
Bandwidth	
AxC Group Number	
Offset	
Test Waveform Selections	
Continuous Wave (CW)	
LTE-FDD TM1.1	
LTE-FDD TM1.2	
LTE-FDD TM2	
LTE-FDD TM3.1	
LTE-FDD TM3.2	
LTE-FDD TM3.3	
Loopback AxC (ALU/Nokia RRH)	
Set Power levels and Bands (ALU/Nokia RRH)	
Defects/Alarms Generation/Analysis	
LOS	
LOF	
SDI	
RAI	
Results	
Results Accuracy	
1ns	
Signal Category	
Signal Losses	

VIAVI T-BERD/MTS-5800 Specifications

Sync Loss Seconds	RAI Seconds	Selectable Number of Message Slots in Message Group
Optical Rx Overload	SDI	Selectable Number of Idle Bytes After Message Group
Optical Rx Level (dBm)	SDI Seconds	
Receive Frequency	Running Disparity Errors	FCB Message Generation
Receive Frequency Deviation	Running Disparity Error Rate	**Round Trip Delay Measurement**
Receive Frequency Maximum Deviation	**RRH Testing (available for ALU RRH)**	RTD Measurement Accuracy
Transmit Frequency	RRH SW version	**PRBS Patterns**
Tx Frequency Deviation (Hz)	RRH serial number	2^15-1, 2^15-1 Inverse
Tx Frequency Deviation (ppm)	RRH SFP information	2^20-1, 2^20-1 Inverse
Tx Frequency Max Deviation (ppm)	RRH CPRI Reset	2^23-1, 2^23-1 Inverse
CPRI Inband Protocol	RRH Alarm Insertion	2^31-1, 2^31-1 Inverse
Tx/Rx Protocol Version		D6.6 D25.6
Tx/Rx C&M HDLC Rate		Delay
Tx/Rx C&M Ethernet Subchannel Number	**OBSAI**	Live
Port Type (Master/Slave)		Digital Word
Start-up State		**Anomaly/Errors Generation**

OBSAI

Test Interfaces/Bit Rates	
768 Mbps Optical	Dual Port Capable
1.5 Gbps Optical	Dual Port Capable
3.1 Gbps Optical	Dual Port Capable
6.1 Gbps Optical	Dual Port Capable

CPRI Counts	
Code Word Count Tx/Rx	
Frame Count Tx/Rx	
Error Stats	
Word Sync Loss Events	
Word Sync Loss Seconds	
Code Violations	
Code Violation Rate	
Code Violation Seconds	
K30.7 Words	
Frame Sync Loss Events	
Frame Sync Loss Seconds	
Pattern Sync Losses	
Pattern Sync Loss Seconds	
Bit Error Rate	
Bit Errors	
Errored Seconds	
Error-Free Seconds	
Error Free Seconds, %	
Total bits Received	
Round Trip Delay Current (ms)	
Round Trip Delay Average (ms)	
Round Trip Delay Minimum (ms)	
Round Trip Delay Maximum (ms)	
Remote LOS	
Remote LOS Seconds	
Remote LOF	
Remote LOF Seconds	
RAI	

Laser Type
SFP
SPF+
SFP+ Tunable

Modes of Operation
Terminate
Monitor/Thru

Timing
Recoverd from Rx (Slave)
Internal (Stratum 3) (Master)
Recoverd from External (BITs/SETs) (Master)
Recoverd from 10MHz clock (Master)

OBSAI Features
Optical/Electrical Power Level
Freq Offset Transmit/Receive

PRBS Generation and Monitoring
Unframed
L1 - Pattern Inserted in Frame Structure
L2 - Pattern Inserted in OBSAI Message

OBSAI Interface
Selectable Port Type (Master or Slave)
LOS Enable (On or Off)
Force Tx Idle (On or Off)
Definable RP3 Address
Selectable RP3 Type (WCDMA/FDD, GSM/ EDGE, WiMAX 802.16, LTE)
Selectable Number of Message Groups in Master Frame

Anomaly/Errors Generation
Bit
Code
Insert - Single
Insert - Rate

Results
Signal Category
Signal Losses
Sync Loss Seconds
Optical Rx Overload
Optical Rx Level (dBm)
Receive Frequency
Receive Frequency Deviation
Receive Frequency Maximum Deviation
Transmit Frequency
Tx Frequency Deviation (Hz)
Tx Frequency Deviation (ppm)
Tx Frequency Max Deviation (ppm)
OBSAI Counts
Code Word Count Tx/Rx
Frame Count Tx/Rx
Message Group Counts Tx/Rx
Receive Message Counts: Control, Measurement, WCDMA/FDD, WCDMA/TDD, GSM/EDGE, TETRA, CDMA2000, WLAN, Loopback, Frame Clock Burst, Ethernet, RTT, WiMAX, Virtual HW Reset, LTE, Generic Packet, Multi-hop RTT
Error Stats
Word Sync Loss Events
Word Sync Loss Seconds
Code Violations

VIAVI T-BERD/MTS-5800 Specifications

Code Violation Rate

Code Violation Seconds

K30.7 Words

Frame Sync Losses

Frame Sync Loss Seconds

Pattern Sync Losses

Pattern Sync Loss Seconds

Bit Error Rate

Bit Errors

Errored Seconds

Error-Free Seconds

Error Free Seconds, %

Total bits Received

Round Trip Delay Current (ms)

Round Trip Delay Average (ms)

Round Trip Delay Minimum (ms)

Round Trip Delay Maximum (ms)

Tx/Rx OBSAI State

Jitter O.172

General Features	
Generate and measure Jitter on electrical interfaces	DS1, E1, DS3, E3, E4, STM1e

Automatic Measurement Sequences
· Maximum Tolerable Jitter (MTJ)
· Measure Intrinsic Jitter
· Jitter Transfer Function (JTF)

Support different Measurement Bands
· High Band
· Wide Band
· Extended Band
· Ability to set user definable band

Common Jitter mask selectable

Ability to create user definable masks

Results	

Jitter Results per measurement band

Current peak to peak jitter [UI]
· Peak to peak jitter [UI]
· Positive peak jitter [UI]
· Negative peak jitter [UI]

Maximum peak to peak jitter [UI]
· Peak to peak jitter [UI]
· Positive peak jitter [UI]
· Negative peak jitter [UI]

Phase Hits

Percentage of mask

RMS Jitter [UI]

Jitter Graphs

VIAVI T-BERD/MTS-5800 Specifications

Wander

General Features

Measure Wander on 1PPS Signal

Measure Wander on 1G Optical SyncE Interface

Measure Wander on T1, E1, & unframed 2.048 MHz Signals

Measure Wander on 10 MHz Signal

Selectable Peak Time Offset Threshold

Resolution 1 ns

Sample Rate 1, 30, 60 samples per second

Internal Data Storage - 256M

External Data Storage on USB stick

Start Stop via key

Results

Time Interval Error (TIE)
· Current TIE(s)
· Maximum TIE(s)
· Minimum TIE(s)

Maximum Peak-to-Peak TIE (MTIE) [s]

Offset Between Test Signal and Reference
· Current Offset (µs)
· Minimum Offset (µs)
· Maximum Offset (µs)

Pass/Fail Result

TIE Graph

Reference Clock for 1 pps wander	1 pps reference signal
Reference Clock for 1G SyncE Optical, T1, E1, 2 MHz, & 10 MHz wander	2 MHz or 10 MHz reference signal

Cables for 1 pps Wander

Wander Analysis Tool

Offline analysis of captured/imported TIE measurements

Maximum Peak-to-Peak TIE (MTIE) [s]

TDEV (Time Deviation)

Frequency Offset (ppm)

Drift Rate (ppm/s)

Masks		
ANSI	SMC holdover (T1.105.109)	
ETSI	SEC (ETS 300 462-5-1) SEC network IF (ETS 300 462-3-1) SSU (ETS 300 462-4-1) SSU network IF (ETS 300 462-3-1)	
GR253	SMC transient	

ITU	G.8261 SEC network IF (G.832, G.825) SEC option 1 (G.813) SEC option 2 (G.813) SEC holdover option 2 (G.813) SEC trans. option 2 (G.813) SSU network IF (G.823, G.825) SSU Type I (G.812) SSU Type II, III (G.812) SSU Type IV (G.812) PRC (G.811) EEC-1 Noise Generation (G.8262 constant temp.) EEC-1 Noise Generation (G.8262 with temp. effects) EEC-2 Noise Generation (G.8262 constant temp.) EEC-1 Noise Tolerance (G.8261) EEC-1 Noise Tolerance (G.8262) PRC (G.811) DTE Network Limit (G.8271.1) Wander Generation (G.8272) DTE Noise Generation (G.8273.2 constant temp.) DTE Noise Generation (G.8273.2 variable temp.)

Masks

PRC/SSU/SEC: Masks for G.811/G.812/G.813 clocks (ETS 300 462-2)

Networks: According to G.823/G.824

SyncE: According to G.8261, G.8262

ANSI-Standard: DS1 masks

Services

VoIP Testing

10/100/1000M Electrical Ethernet Interfaces

1GigE Optical Ethernet Interface

10GigE Optical Ethernet Interface

SIP, Cisco SCCP and H.323 Fast Connect

Supported SIP Parameters

Dial by phone/URL/e-mail

Nortel & Huawei SIP emulation

Proxy login and proxyless operation

Supported SCCP Parameters

Selectable Cisco Phone emulation supporting at least 15 models

Configurable device name

Supported H.323 Parameters

H.323 ID

Bearer Capability including Unrestricted Digital, Speech & 3.1K Audio

Configurable Calling & Called Party Number Plans and Number Types

Static, auto-discoverable and no gatekeeper operation

Configurable Local and Gatekeeper RAS port and Call Control Port

Configurable Time Zone

Configurable RTP port range

General Parameters

Auto answer on/off

Codecs:
- G.711 A Law
- G.711 U Law
- G.723 5.3 K
- G.723 6.3 K
- G.729A
- G.726
- G.722

Configurable Call Manager port

Selectable silence suppression

Configurable jitter buffer and speech per frame parameters

ACR or G.107 MOS Scoring

Configurable Jitter, Loss, Delay and Content Threshold pass/fail

Mean Opinion Score Results (MOS)

Graphical Summary Results including Ethernet, transport & Content

Transaction Log including call log and protocol signaling

Phone book of last 10 numbers and IP addresses called

DTMF Digits

Triple Play Automated Test Script

10/100/1000M Electrical Ethernet Interfaces

1GigE Optical Ethernet Interface

10GigE Optical Ethernet Interface
- Over 11,000 simulated calls with configurable Codec and sampling rate
- Configurable voice call or tone with configurable silence suppression, sampling rate and jitter buffer
- Up to 250 simulated SDTV channels with configurable frame size and MPEG-2/4 compression
- Up to 52 simulated HDTV channels with configurable frame size and MPEG-2/4 compression
- 2 configurable data streams with individual constant or ramp traffic and configurable frame sizes including random frames

IPTV

10/100/1000M Electrical Ethernet Interfaces

1GigE Optical Ethernet Interface

10GigE Optical Ethernet Interface
- Single Program Transport Stream (SPTS) and Multiple Program Transport Stream (MPTS) formats
- Video explorer capable of detecting 512 SPTS and 32 MPTS and a video analyzer that supports 16 SPTS and 1 MPTS
- Supported measurements include bandwidth utilization, packet loss, packet jitter, PCR jitter, continuity error bit and error bit indicator
- TR 101 290 priority 1 errors such as program identification (PID), program association table (PAT) and program map table (PMT)
- Loss distance and period errors per RFC3357, results per transport stream and per PID
- Media Delivery Index (MDI) measurements
- Measure ICC latency and R-UDP latency
- Microsoft Television (MSTV) Support
- Internet Group Management Protocol (IGMP) support

Primary Rate ISDN

Test Access	T1
TE Emulation	
NT Emulation	
D-Channel Signaling Decodes	
Call Control	National 5ESS NI-1
D-Channel Rate	64 k 56 k
Call Type	Data Voice 3.1 k audio
Channel Number	1 to 24
D-Channel Rate	56 k
DTMF digits	

Primary Rate E1 ISDN

Test Access	E1
TE Emulation	
NT Emulation	
D-Channel Signaling Decodes	
Codec μ-law, A-law	

Call Control	1TR6
	1TR67
	EDSS-1
	VN3
	VN4
	VN6
	TPH1962
	Q.SIG
	Q.931
	TN-1R6
	SwissNet-3
	CorNet-N
	CorNet-NQ
	DREX
	Alcatel
	QSIG
Services	Speech
	3.1 KHz
	Data
	Fax G4
	Teletex
	Videotex
	Speech BC
	Data BC
	Data 56Kb
	Fax 2/3

Channel Number - 1 to 31	
DTMF Digits	

Signaling—Place/Receive Call

Test access	T1
E&M Signaling	
Loop Start Signaling	
Ground Start Signaling	
Audio Drop/Insert	
Signaling Bits	
Place Call	
Receive Call	
MF Digits	
DTMF Digits	
Event Log	
VF Tone Insertion	

Fractional T1/E1

Test Access	T1
Fractional T1	n x 64 k
Fractional T1	n x 56 k
Contiguous Channels	
Non Contiguous Channels	
V.54 Loop Codes Support	

Voice Frequency

Test Access - T1	
Listed to an Audio Call	
Insert VF Tones	404, 1004, 1804, 2713, and 2804 Hz

VIAVI T-BERD/MTS-5800 Specifications

User Frequency

Quiet Tone

Holding Tone

Three Tone

Frequency Sweep

Impulse Noise

Rx Frequency

Level (dBm)

DC Offset mV

Fiber Inspection

Optical Fiber Microscope

The Test Equipment shall be able to accept an optical video microscope.

The connector image shall be displayed on the Test Equipment and saved into a .JPEG file format.

The microscope shall offer a switchable 200/400x magnification capability.

It shall be provided with the dedicated tips to inspect fiber connectors on the patch panel and the patch cords.

The microscope shall be capable of automatically centering the fiber image

The microscope shall be capable of performing on-board Pass/Fail analysis

The microscope shall be compatible with Android tablets/smartphones

OTDR

OTDR Solution for Troubleshooting from Central Offices

Wavelengths: 1310 & 1550nm

Connector type: UPC or APC (Note: Only one should be selected)

Adapter type: FC or SC (Note: Only one should be selected)

Dynamic Range:
· at 1310nm: 35dB
· at 1550nm: 33dB

Event Dead Zone:
· at 1310nm/1550nm: 1.5m maximum

Attenuation Dead Zone:
· at 1310nm/1550nm: 6m maximum

Pulse width: 5ns to 20msPulse width: 5ns to 20ms

Number of data points: up to 128,000

Light source:
· On the OTDR port
· Wavelength: same as the OTDR
· Output power: -3.5 dBm typical

Test results shall be stored in SOR format (Telcordia GR-196-CORE) as well as in PDF format

The test result page shall display the graphical OTDR trace and event table

The test solution shall be able to convert automatically the OTDR trace into an icon-based map that makes OTDR results interpretation quick and easy

OTDR Solution for FTTA & DAS Singlemode & Multimode Network Testing

Wavelengths: 850, 1300, 1310, 1550 nm

Connector type: UPC or APC for 1310nm/1550nm (Note: Only one should be selected) and UPC for 850/1300nm

Adapter type: FC, SC, LC or ST (Note: One or several can be selected)

Dynamic Range:
· at 850nm: 26 dB
· at 1300nm: 24 dB
· at 1310nm: 37 dB
· at 1550nm: 35 dB

Event Dead Zone:
· at 850nm/1300nm: 0.8m maximum
· at 1310nm/1550nm: 0.9m maximum

Attenuation Dead Zone:
· at 850nm/1300nm: 4m maximum
· at 1310nm/1550nm: 4m maximum

Pulse width:
· at 850nm/1300nm: 3ns to 1ms
· at 1310nm/1550nm: 3ns to 20µs

Number of data points: up to 128,000

Light source:
· On the OTDR port
· Wavelength: same as the OTDR
· Output power: -3.5 dBm typical

Power meter:
· On the OTDR port
· Calibrated wavelengths: 850, 1300, 1310, 1490, 1550, 1625, 1650 nm
· Power level range (MM/SM): -3 to -30dBm / -2 to -50 dBm

The test result page shall display the graphical OTDR trace and event table

The test solution shall be able to convert automatically the OTDR trace into an icon-based map that makes OTDR results interpretation quick and easy

The test solution shall be able to identify and label network elements

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OTDR Solution for Cloud RAN & Access/ Backhaul Network Testing

Wavelengths: 1310, 1550, 1625 nm (Note: 1625nm is optional)

Connector type: UPC or APC (Note: Only one should be selected)

Adapter type: FC, SC, LC or ST (Note: One or several can be selected)

Dynamic Range:
· at 1310nm: 40 dB
· at 1550nm: 38 dB
· at 1625nm : 37 dB

Event Dead Zone:
· at 1310/1550/1625nm: 0.9m maximum

Attenuation Dead Zone:
· at 1310/1550/1625nm: 4m maximum

Pulse width: 3ns to 20ms
Number of data points: up to 128,000

Light source:
· On the OTDR port
· Wavelength: same as the OTDR
· Output power: -3.5 dBm typical

Power Meter:
· On the OTDR port
· Calibrated wavelengths: 1310, 1490, 1550, 1625, 1650 nm
· Power level range: 0 to -50 dBm

The test result page shall display the graphical OTDR trace and event table

The test solution shall be able to convert automatically the OTDR trace into an icon-based map that makes OTDR results interpretation quick and easy

OTDR Solution for Metro & Access/ Backhaul Network Testing

Wavelengths: 1310, 1550, 1625 nm (Note: 1625nm is optional)

Connector type: UPC or APC (Note: Only one should be selected)

Adapter type: FC, SC, LC or ST (Note: One or several can be selected)

Dynamic Range:
· at 1310nm: 43 dB
· at 1550nm: 43 dB
· at 1625nm : 41dB

Event Dead Zone:
· at 1310/1550/1625nm: 0.8m maximum

Attenuation Dead Zone:
· at 1310/1550/1625nm: 4m maximum

Pulse width: 3ns to 20ms

Number of data points: up to 256,000

Light source:
· On the OTDR port
· Wavelength: same as the OTDR
· Output power: -3.5 dBm typical

VIAVI T-BERD/MTS-5800 Specifications

Power Meter:
· On the OTDR port
· Calibrated wavelengths: 1310, 1490, 1550, 1625, 1650 nm
· Power level range: 0 to -50 dBm

The test result page shall display the graphical OTDR trace and event table

The test solution shall be able to convert automatically the OTDR trace into an icon-based map that makes OTDR results interpretation quick and easy

OTDR Solution for CWDM Network Testing

8 CWDM wavelengths should be available on 1 optical port

Wavelengths:1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611nm

Connector type: UPC or APC (Note: Only one should be selected)

Adapter type: FC, SC or LC (Note: One or several can be selected)

Dynamic Range: 35dB

Event Dead Zone:
· at 1310/1550/1625nm: 1.5m maximum

Attenuation Dead Zone:
· at 1310/1550/1625nm: 5m maximum

Pulse width: 10ns to 20ms

Number of data points: up to 256,000

Light source:
· On the OTDR port
· Wavelength: same as the OTDR
· Output power: -3.5 dBm typical

The test result page shall display the graphical OTDR trace and event table

The test solution shall be able to convert automatically the OTDR trace into an icon-based map that makes OTDR results interpretation quick and easy

Optical Spectrum Analyzer

Optical Spectrum Analyzer Solution for Mobile Backhaul Service Activation

Connector type: PC

Adapter type: FC, SC, LC or ST (Note: One or several can be selected)

Spectral measurement

Wavelength range: From 1260 to 1625 nm

Wavelength accuracy: ±0.5 nm

Readout resolution: 0.001nm

Resolution bandwidth FWHM: 4nm

Minimum channel spacing: 8 nm

Power measurement

Dynamic range: −55 to +10 dBm

Noise floor RMS -55 dBm

Absolute accuracy: ±0.5 dB

Linearity: ±0.1 dB

Readout resolution: 0.01 dB

Scanning time (1260 to 165 nm): <4 sec

Maximum total safe power: +15 dBm

Optical return loss: > 35 dB

The Optical Spectrum Analyzer shall be equipped with a bay for up to 2 SFPs (optional)

Precision Timing Reference

Precision Timing Reference for Mobile Backhaul (PTP) Service Activation

Connector types:
· SMA for GPS Antenna,
· SMB for 1PPS and
· 10 MHz Timing Inputs and Outputs

Integral GPS Receiver

Support for GNSS tuning including GPS, GLONASS, Beidou, and SBAS

Support for Cable/Antenna Calibration factor

GPS Synchronization Modes; Dynamic, Static, and Survey

Capable of savings surveyed locations and recalling saved locations

Capable of powering external antenna with 5 VDC or 3.3 VDC

Capable of detecting short circuit and open circuit fault conditions with external antenna

Capable of providing accurate timing with only a single satellite visible in static timing mode

Support for user tuning of minimum satellite elevation angle

Provides realtime satellite constellation sky plot identifying potential visible satellites and those being used

Provides realtime bar graph of satellite Carrier to Noise Ratio (CNR) for all visible satellites

Support for 72 channels; 32 for satellite tracking, 40 for acquisition aiding and noise estimation

Rubidium Clock

Support for two 1PPS inputs and capable of measuring phase difference between them down to 5nsec

Support for measuring ToD offset for a device under test with NMEA and G.8271 (draft) formats

Support for a 10MHz input

Support for a 1PPS output disciplined to the Rubidium clock

Support for a 10MHz output disciplined to the Rubidium clock

Selectable auto-power on for the Rubidium clock upon instrument power-up

Minimum holdover of 7 usec over 24 hours over full temperature range

Minimum oscillator stability of 1.5E-11 over 2 hours.

GPS Results

Number of satellites used

UTC Time

Estimated position error

Sky plot

Carrier to Noise bar graph

Carrier to Noise (C/No) measurement per satellite

Mean C/No measurement (current and average)

C/No Bar Chart

Mean 3D Accuracy

Position Dilution of Precision (current and average)

Leap seconds

Event Log

Rubidium Clock Results

Total holdover time elapsed

Holdover time remaining (for selectable clock accuracy)

Synchronization state (Course tune, Intermediate Tune, Fine Tune)

Event Log

VIAVI T-BERD/MTS-5800 Specifications

LASER COMPONENTS

C37.94

Test Interfaces/Bit Rates	
2.048Mhz	Dual Port Capable
Laser Type	
SFP	
Modes of Operation	
Terminate	
Framing	
Framed	
Payload	
N x 64 kbps	
Test Patterns	
2^11 -1 (INV)	
2^15 -1 (INV)	
2^20 -1 (INV)	
2^23 -1 (INV)	
QRSS	
All Ones	
All Zeros	
Delay	
Live	
ANSI and ITU	
Performance	
G.826	
G.821	
M.2100	
Alarms	
LOF	
RDI	
Errors	
FAS	

Results
Interface
Signal Losses
Signal Loss Seconds
Optical Rx Overload
Optical Rx Level (dBm)
Optical Tx Level (dBm)
Laser Bias Current (mA)
Rx Frequency (Hz)
Rx Frequency Deviation (ppm)
Rx Frequency Maximum Deviation (ppm)
Tx Clock Source
Tx Frequency (Hz)
Tx frequency Deviation (ppm)
Tx Frequency Maximum Deviation (ppm)
C37.94 - Frame
Frame Sync Losses
Frame Sync Loss Seconds
LOFs
LOF Seconds
RDI Alarms
RDI Seconds
FAS Word Errors
FAS Word Error Rate
FAS Bit Errors
FAS Bit Error Rate
N x 64 kbps
Payload - BERT
Pattern Sync Losses
Pattern Sync Loss Seconds
Round Trip Delay (ms)
Round Trip Delay Avg (ms)
Round Trip Delay Minimum (ms)
Round Trip Delay Maximum (ms)