VIAVI Solutions

Brochure

Verifying Optical Transport Networks

OTN test options for T-BERD®/MTS-8000, 6000A, 5800, 5800–100G and OneAdvisor-1000

OTN test options let users generate and analyze OTN signals at full line rates of OTU4, OTU3, OTU2, OTU2e, OTU1e, and OTU1. The tests check for signal integrity, bit errors, FEC errors, and section and path overhead (SM/PM) errors/alarms. These tests are performed with bulk, SDH/SONET, or Ethernet payloads. Users also can perform tests with lower-rate, multiplexed payloads, such as ODU3, ODU2, ODU1, ODU0, or ODUflex.

Value Proposition

Quickly verify new OTN circuit integrity end to end by simultaneously testing payload BERT, G.709 round-trip delay (RTD), and general communications channel (GCC) data-link transparency data-link (GCC) overhead transparency. These functions are integrated in the OTN Check service activation tool which is somewhat analogous to what an RFC 2544 test is to Ethernet. Using FEC in OTN networks extends the optical reach and eliminates the need for optical regenerators in many applications. In fact, for Ethernet-into-OTN, it is possible to run RFC 2544 at the Ethernet level. OTNs also deliver transparent SONET/SDH and Ethernet signals, alleviating the need to terminate these signals before testing.

ODU multiplexing enables OTN nodes to multiplex lower-rate payloads without the need for SONET/SDH cross-connect and/or Ethernet switches, cutting capital expenses and simplifying operational procedures.

Benefits

- Test OTN service activation quickly and reliably using the OTN Check automated tool.
- Verify the correct node configuration and the line card and optics functions
- Extend OTN network reach by testing the optical node forward error correction (FEC) functions
- Guarantee customer traffic quality and indicates service quality problems early on
- Help providers effectively manage multiple interconnected networks
- Let operators switch lower-rate (lower than 2.5 Gbps) payloads by verifying an OTN node's ODU multiplexing functions

Intended Audience

- Central office and metro technicians who install, turn up services, and troubleshoot OTN circuit faults
- Engineers who maintain, troubleshoot, and evolve OTNs

Applications

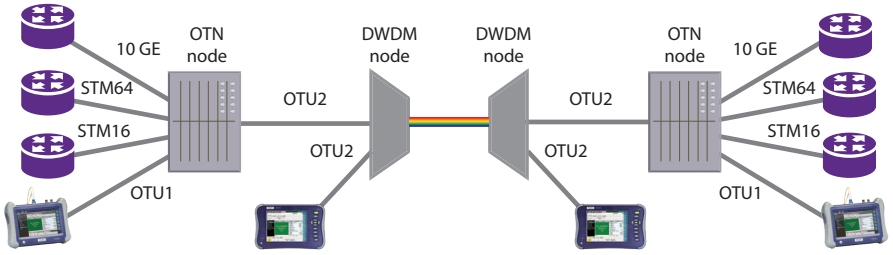
- Install, verify, and troubleshoot OTN circuits

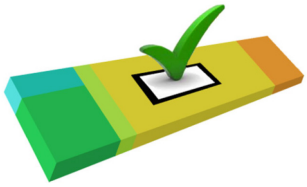
Use Cases

Use the OTN together with the T-BERD/MTS-6000A and -8000 MSAM to verify optical transport network (OTN) circuit installations.

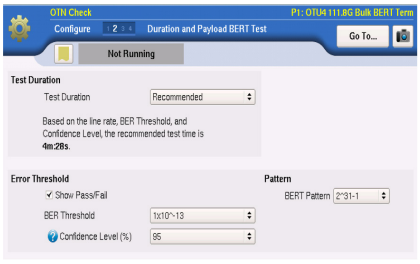
Use Case: End-to-End OTN Testing

T-BERD/MTS network testers verify the end-to-end integrity of OTN connections. The OTN Check workflow simplifies configuration, testing, and report generation so that techs at all skill levels can validate the key metrics for an OTN signal: payload BERT, GCC BERT, and G.709-compliant round trip delay.

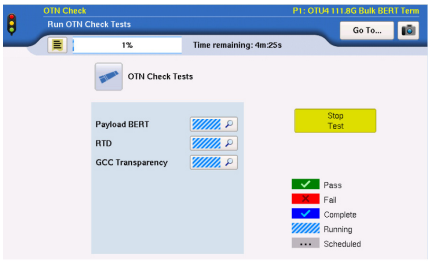




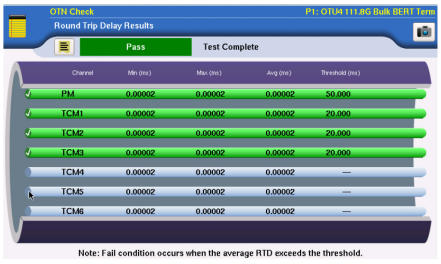
Simplify OTN testing with the industry's first guided OTN workflow



Guided setup



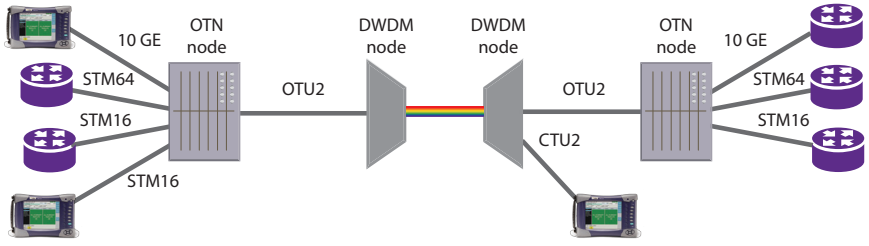
One touch to run test



Graphical results and reports

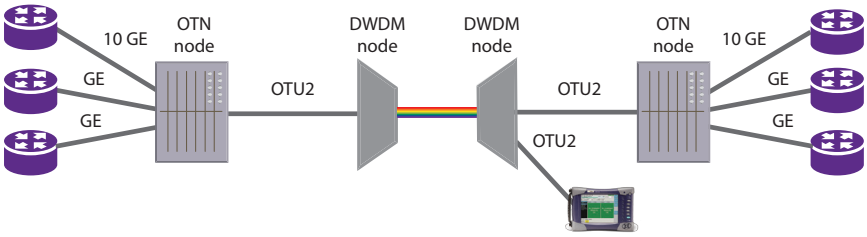
Use Case: Client Analysis Mode

The T-BERD/MTS-6000A, 8000, 5800, and 5800-100G can generate SONET/SDH or Ethernet signals and analyze embedded SONET/SDH/Ethernet clients inside OTN interfaces so operators can verify client signal performance at OTN ports without using an external OTN mux/demux function. And, embedded RFC 2544 Ethernet tests make validating Ethernet clients simple.



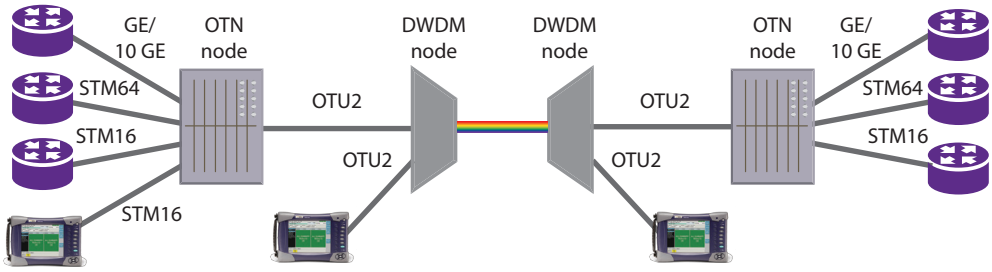
Use Case: Ethernet Layer 2/Layer 3 Monitoring/Troubleshooting

The T-BERD/MTS-6000A, 8000, 5800, and 5800-100G can analyze Layer 2 and Layer 3 SLA that are ODU0/ODU2/ODU2e/ODUflex mapped into OTN signals, simplifying Ethernet services troubleshooting with an OTN to efficiently transport Ethernet services inside one- or multi-operator networks.



Use Case: Ethernet Multiplexing/Wrapping Test

Using two T-BERD/MTS units lets operators verify the correct Ethernet signal mapping inside of OTN networks as well as identify misconfigured ODU0/ODU1/ODU2/ODU2e/ODU3/ODUflex mappings for ODU channels.



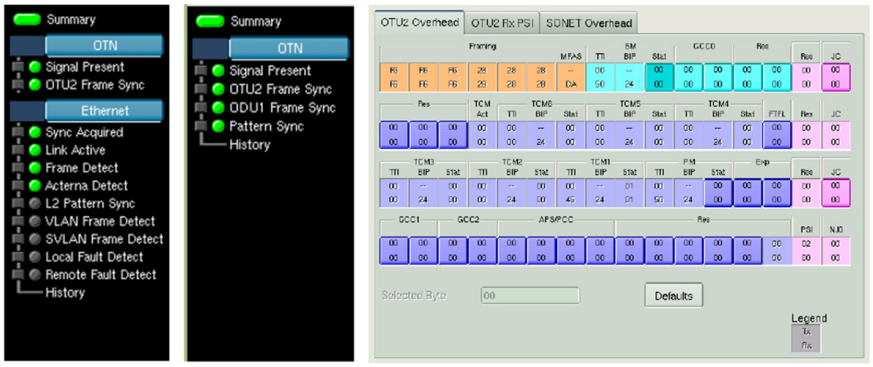
Feature/Benefit Summary

Feature	Description	Advantage	Benefit
OTN Check Workflow	Tests payload BERT, GCC BERT, and round trip delay in one simple-to-use workflow	The industry's first automated, repeatable OTN layer test for all OTN rates	Simplifies OTN testing to deploy circuits faster with higher confidence
OTN Line Rate Traffic Generation	Generates OTN signal at configurable line rates	Connects to any OTN node port	Verifies correct node configuration and line card and optics functionality
OTN FEC	Generates and monitors for correctable and uncorrectable FEC errors	Verifies OTN node response to FEC errors	Correcting FEC errors extends transport network reach without adding optical regenerators
OTN SM/PM Error/Alarms	Generates and monitors section and path monitoring errors/alarms	Identifies and localizes bit errors (BIP) and alarms, such as BEI and AIS	Guarantees customer traffic quality and indicates service quality problems early
OTN Tandem Connection Monitoring (TCM)	Generates and monitors bytes for up to six TCM levels	Simultaneously operates six nested/cascaded monitoring channels	Helps operators effectively manage multiple interconnected networks

Feature	Description	Advantage	Benefit
ODU Multiplexing	Generates and analyzes ODU3, ODU2, ODU1, ODU0, and ODUflex containers in OTN payloads	Analyzes channelized OTN signals containing lower-rate payloads	Allows operators to switch lower-rate payloads within OTN nodes without the need for external SONET/SDH cross-connects or Ethernet switches
ODU1/ODU2 with SONET/SDH payload Generation Analysis	Generates and analyzes SONET/SDH traffic mapped into an OTN signal	Verifies SONET/SDH signals inside OTN payloads	Verifies the correct node configuration and line card and optics functionality
ODU0/ODU2/ODU2e/ ODUflex with Ethernet Traffic Generation/Analysis	Generates and analyzes Layer 2/Layer 3 single-stream traffic mapped into an OTN signal	Verifies Layer 2/Layer 3 SLA inside OTN payloads	Measures SLA directly inside OTN networks without an Ethernet port
GCC BERT	Generates and analyzes BERT patterns in the GCC0, GCC1, or GCC2 overhead locations	Verifies end-to-end connectivity and error-free transmission in the OTU overhead management channels	Performing this during installation eliminates the need to troubleshoot management channel issues later
Measuring Round-Trip Delay	Uses OTU overhead PM/TCM byte to measure round-trip delay	Standards-based approach to measuring round-trip delay and payload BERT tests simultaneously	Guarantees round-trip delay measurements for critical customers, such as financial services firms
Ethernet RFC 2544 Test for Ethernet inside OTN	Tests throughput, latency, packet jitter, frame loss, and CBS on client Ethernet signals	Automated, repeatable test based on industry-standard Ethernet test methodology integrated into an OTN transport	Operators can verify the end-to-end Ethernet client to eliminate finger-pointing

Simplified, Multilayer SONET/SDH, Ethernet, and OTN Setup/Result Overview

Using two T-BERD/MTS-6000A and two -8000 MSAMs lets operators verify the correct Ethernet signal mapping inside of OTN networks as well as identify misconfigured ODU0/ODUflex mappings for ODU channels.



Ordering Information

Description	Part Number
T-BERD/MTS-6000A and -8000 MSAM	
OTU1 line rate and bulk testing	CTOTU1(-U1)
OTU2 line rate and bulk testing	CTOTU2(-U1)
OTU2e and OTU1e line rate and bulk testing	CTOTU2e(-U1)
ODU1 mux/demux	CTODUMUX12(-U1)
ODU0 mux/demux	CTODU0(-U1)
ODUflex mux/demux	CTODUFLEX(-U1)
T-BERD/MTS-5800, 5800-100G* and OneAdvisor-1000	
OTU1 line rate and bulk testing	C5OTU1(-U1)
OTU2 line rate and bulk testing	C5OTU2(-U1)
OTU2e and OTU1e line rate and bulk testing	C5OTU2e(-U1)
OTU3 line rate and bulk testing	C5OTU3(-U1)
OTU4 line rate and bulk testing	C5OTU4(-U1)
ODU3 mux/demux	C5ODU3(-U1)
ODU2 and ODU2e mux/demux	C5ODU2(-U1)
ODU1 mux/demux	C5ODU1(-U1)
ODU0 mux/demux	C5ODU0(-U1)
ODUflex mux/demux	C5ODU1(-U1)

Description	Part Number
T-BERD/MTS-6000A and -8000 MSAM	
OTU4 line rate and bulk testing	CCOTU4(-U1)
OTU3 line rate and bulk testing	CCOTU3(-U1)
OTU2 line rate and bulk testing	CCOTU2(-U1)
OTU2e and OTU1e line rate and bulk testing	CCOTU2E(-U1)
OTU1 line rate and bulk testing	CCOTU1(-U1)
IP video option	CCODU1(-U1)
ODU1 mux/demux	CCODU0(-U1)
ODU0 mux/demux	CCODUFLEX(-U1)
ODUflex mux/demux	CCODU3(-U1)
ODU3 mux/demux	CCODU2(-U1)
ODU2 mux/demux	CCODU2(-U1)

*Note: options not available on model number T-BERD/MTS-5811P

These OTN functions are based on standards G.709, G.798, and G.872

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