Standard ITU-T G.988 OMCI Managed Entity (ME) Interoperability Test Report - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

This document serves as the official technical datasheet and product overview for the Standard ITU-T G.988 OMCI Managed Entity (ME) Interoperability Test Report. Designed for Telecom Hardware Vendors, System Integrators, and Network Operators, this report provides a comprehensive validation framework for ensuring seamless interoperability of OMCI-managed Optical Network Terminals (ONTs) and Optical Line Terminals (OLTs) across diverse multi-vendor access network environments. The test report rigorously defines the behavioral characteristics, state machine transitions, and attribute management protocols for every Managed Entity as specified by the ITU-T G.988 standard, guaranteeing carrier-grade compliance and operational stability in Fiber-to-the-Home (FTTH) and Fiber-to-the-Building (FTTB) deployments.



HARDWARE ARCHITECTURE & SILICON

The test bed architecture is built upon a high-performance, modular hardware platform that incorporates a specialized OMCI processing engine capable of handling thousands of concurrent ME sessions without impacting the core data forwarding plane. The silicon integrates a hardware-accelerated transaction manager that validates ME attribute read/write operations, alarms, and performance monitoring data against the standardized Management Information Base (MIB). The physical layer includes redundant Gigabit Ethernet management interfaces for out-of-band control, a high-precision FPGA-based packet timestamping unit for latency-sensitive operations, and isolated test access points to facilitate non-intrusive monitoring of the OMCI protocol stack. This architecture ensures that all interoperability test cases—ranging from basic ME discovery to complex software image downloads — are executed with

deterministic accuracy.

KEY FEATURES & ROUTING LOGIC

- Comprehensive ME Coverage: Validates all mandatory and optional Managed Entities defined in G.988, including ONT-G, ANI-G, T-CONT, GEM Port, and Ethernet Performance Monitoring entities. The test logic ensures state alignment across all defined ME classes.

- State Machine Verification: Implements rigorous test sequences to validate the OMCI state machine transitions for MEs across Admin states (Disabled, Standby, Operational) and Operational states (Active, Inactive). It validates the correct handling of Create, Delete, Set, Get, and Action commands per the protocol specification.

- Attribute Validation Matrix: The routing logic includes a detailed correlation engine that cross-verifies ME attribute values against expected baseline configurations. It tests boundary conditions, default values, and the integrity of complex attributes like tables and pointers.

- Alarm & Performance Monitoring: Validates the generation, reporting, and clearing of OMCI alarms. The test suite simulates fault conditions (e.g., LOS, LOF,

DGi) and verifies the accurate reporting via the appropriate MEs. It also confirms that PM counters are updated and retrievable as per the defined 15-minute and 24-hour intervals.

- Software Image Management: Tests the end-to-end process of ONU software image download, activation, and commit phases as managed through the Software Image ME. The report confirms the correct handling of fragmentation, checksum validation, and reboot sequencing.

COMPLIANCE & STANDARDS

The test report is constructed to ensure absolute adherence to the following normative references:

- ITU-T G.988 (11/2023): ONU management and control interface (OMCI) specification.
- ITU-T G.984.4: Gigabit-capable passive optical networks (G-PON): ONU management and control interface specification.
- ITU-T G.987.3: 10-Gigabit-capable passive optical networks (XG-PON): Transmission convergence (TC) layer specification (for relevant extensions).
- Broadband Forum TR-069: For complementary remote management compatibility testing where applicable.

- MEF 63: Carrier Ethernet management for access devices.

All test cases are mapped to the relevant clauses of the G.988 standard to certify that the DUT (Device Under Test) is fully compliant and capable of interoperating with any standards-based OLT or ONT from a third-party vendor.

TECHNICAL SPECIFICATIONS

The technical specifications define the performance metrics and physical parameters of the test hardware used to execute the interoperability report.

Parameter	**Specification**
Form Factor	1RU Rack-mountable Test Chassis
Switching Capacity	64 Gbps (Backplane) for Control & Management Plane
Power Supply	Dual Hot-Swappable Redundant AC/DC (100-240VAC, 50-60Hz)
Management Interfaces	2x 1G Ethernet (RJ45) Out-of-Band, 1x Console RJ45 Serial
Test Ports (Internal)	4x 1G/10G SFP+ for Data/OMCI Traffic Injection
Processor	High-Performance ARM-based

	Network Processor for OMCI Stack
Memory	8 GB DDR4 ECC, 64 GB eMMC Flash for Test Logs & Firmware
Protocol Support	Full G.988 OMCI, G-PON, XG-PON, NG-PON2 (Backward Compatible)
Operating Temperature	0 ° C to 40 ° C (Standard Datacenter Environment)
Mean Time Between Failures (MTBF)	> 200,000 hours at 25°C

