

10G-EPON Xpert™

Multi-layer Analyzer for 10G-EPON
Products and Networks



Complete Analysis of the 10G-EPON and OAM Protocols

Neutral Unbiased Testing Tool – No PON Chipset

Multi-Layer Analysis Including MPCPDUs, OAM PDUs and Data PDUs

Intuitive User Interface, Variety of Exporting & Reporting Options

Unique Multi-layer 10G-EPON Analyzer

The 10G-EPON Xpert is a unique, non-intrusive multi-layer protocol analyzer for 10G-EPON networks and products. It tests and compares the functionality of OLTs and ONUs and verifies the standard compliance and interoperability of 10G-EPON products from different vendors. It is a powerful tool for telecom operators, MSOs and equipment vendors, as well as for technology and chipset companies.

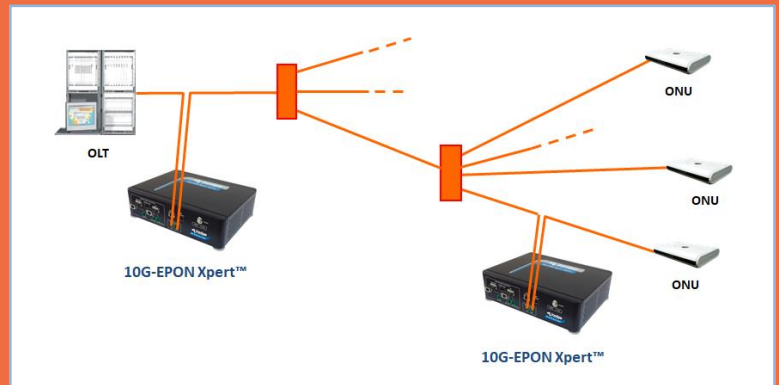
Specifically designed for R&D, laboratory and field application engineers, the 10G-EPON Xpert is a neutral, unbiased testing tool that helps telecom operators, MSOs and vendors accelerate time-to-market by cutting significant time from development, deployment and troubleshooting of 10G-EPON solutions.

Independent Multi-Layer Analysis

As an independent and unbiased testing platform, the 10G-EPON Xpert is built without using any PON chipset. Using its unique multi-layer probing capability, it lays out a comprehensive picture of the protocols and traffic running line. It analyzes and displays the MPCPDUs and the OAM PDUs as well as the upper layers, including Ethernet, PPP, PPPoE, IPv4/IPv6, TCP, UDP, DHCP, IGMP and HTTP.

Passive Connection to the PON

The 10G-EPON Xpert connects to the fiber between the OLT and the ONUs, either at the OLT side or the ONU side and monitors the message exchange on the PON.



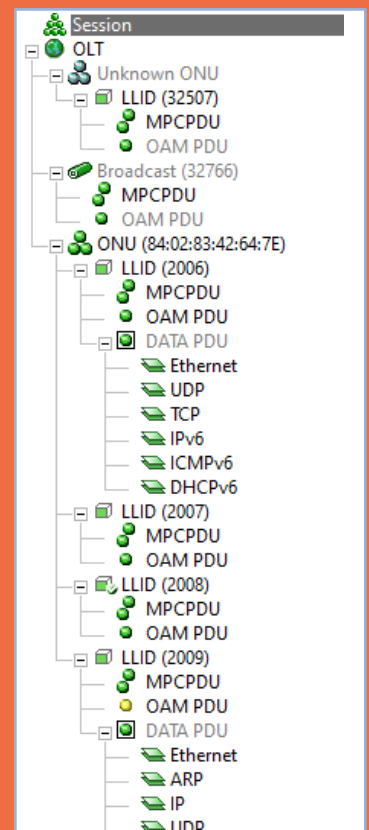
PON Topology Detection and Display

The 10G-EPON Xpert automatically detects and lays out a comprehensive picture of the PON topology. It displays it in an intuitive tree format, which includes the ONUs, the Multicast LLID, the MPCPDUs, OAM PDUs and Data PDUs and the upper layer protocols.

Every node on the tree is color-coded to indicate expected or abnormal behaviors (events) with customizable severity levels.

The topology tree allows direct navigation from any node on the tree to the relevant messages and events. Navigation is also available through the protocol stack from any protocol layer to the protocols above and below it.

The PDUs can be viewed as a single unified list, or as separate lists according to the PDU types. Extensive searching and filtering options allow zooming in and focusing on the exact types of messages or issues that the user is interested in.



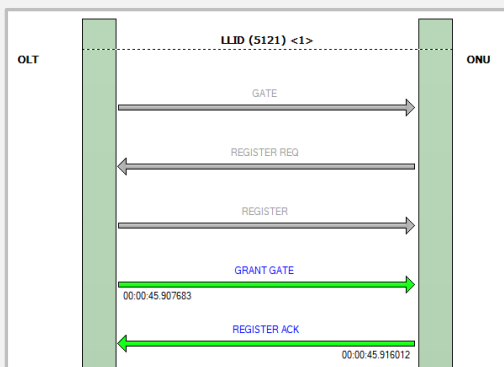
From the Optical Signals and Up

The 10G-EPON Xpert analyzer captures the optical signals from the PON and provides comprehensive analysis of the 10G-EPON layer, including errors and statistics, indications about optical signal loss, the number of MAPs and the number of PDUs of various types in a given time period.

By further analyzing the signals, it identifies and displays the gates and the corresponding upstream bursts. From there it proceeds and displays the messages and their contents, and simultaneously presents the message exchange in both the downstream and upstream directions, as well as the relations between the two.

Intuitive User-Friendly Tool

The 10G-EPON Xpert features a rich array of intuitive displays, graphs and tables for testing and troubleshooting of the 10G-EPON OLTs and ONUs. The displayed information includes downstream and upstream frames and messages, discovery processing diagrams, performance monitoring graphs, validation tests and more.



Discovery Processing
Color-Coded Diagram of the Discovery Handshake Message Exchange

The screenshot displays the 'Protocol Data' section of the tool, showing a list of packets and their details. The table includes columns for Line #, Timestamp, Destination MAC, Source MAC, PDU Type, Opcode, Message, Extended Message, and various status fields.

Line #	Timestamp	Destination MAC	Source MAC	PDU Type	Opcode	Message	Extended Message	VID	Bursts	Internal Gate N.	LLID
106	00:00:55.901704	01:80:C2:00:00:02	54:48:23:00:00:02	GAM PDU	N/A	Organization Sp...	eOAM_Get_Request	N/A	N/A	N/A	2009
107	00:00:55.902054	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
108	00:00:55.902064	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
109	00:00:55.903004	01:80:C2:00:00:01	84:02:83:42:64:7E	MPCPDU	REPORT	N/A	N/A	N/A	N/A	N/A	2009
110	00:00:55.903004	01:80:C2:00:00:02	84:02:83:42:64:7E	GAM PDU	N/A	Organization Sp...	eOAM_Get_Response	N/A	N/A	N/A	2009
111	00:00:55.904013	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
112	00:00:55.906063	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
113	00:00:55.906472	01:80:C2:00:00:01	84:02:83:42:64:7E	MPCPDU	REPORT	N/A	N/A	N/A	N/A	N/A	2009
114	00:00:55.907013	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
115	00:00:55.907462	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
116	00:00:55.908024	01:80:C2:00:00:01	84:02:83:42:64:7E	MPCPDU	REPORT	N/A	N/A	N/A	N/A	N/A	2009
117	00:00:55.910712	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
118	00:00:55.912282	01:80:C2:00:00:01	54:48:23:00:00:02	MPCPDU	GATE	N/A	N/A	N/A	N/A	N/A	2009
119	00:00:55.912778	01:80:C2:00:00:01	84:02:83:42:64:7E	MPCPDU	REPORT	N/A	N/A	N/A	N/A	N/A	2009

Protocol Data
Detailed Packet Contents, Message Contents and Events

The screenshot displays the 'Management Entities' section, showing a list of OAM attributes organized by Name, Leaf, Instance, Value, Hex, and Description. The table includes various attributes such as aMACEnableStatus, aMACEnableStatus <2>, aMACEnableStatus <3>, aMACEnableStatus <4>, and aMACEnableStatus <5>.

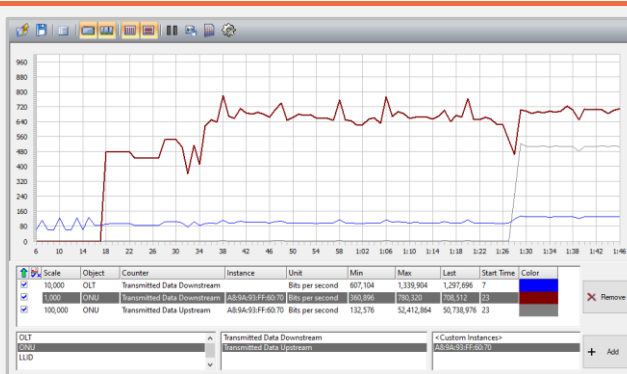
Name	Leaf	Instance	Value	Hex	Description	Extended Message
aMACEnableStatus	0x00-1A	0	0x01	0x01	Status of the MAC	eOAM_Set_Request
aMACEnableStatus <2>	0x00-1A	1	0x00	0x00	Status of the MAC	eOAM_Set_Request
aMACEnableStatus <3>	0x00-1A	2	0x01	0x01	Status of the MAC	eOAM_Set_Request
aMACEnableStatus <4>	0x00-1A	3	0x01	0x01	Status of the MAC	eOAM_Set_Request
aMACEnableStatus <5>	0x00-1A	4	0x01	0x01	Status of the MAC	eOAM_Set_Request

Management Entities
OAM Attributes – Branches, Leaves and Field Values

The screenshot displays the 'Data Comparison' section, showing a comparison of processes, message contents, and OAM attributes. The table includes columns for Name, Value, Timestamp, Destination, Source MAC, and various status fields.

Name	Value	Timestamp	Destination	Source MAC	Identical	Value	Timestamp	Destination	Source MAC
Variable Container TV	0x01	00:00:55.901704	01:80:C2:00:00:02	54:48:23:00:00:02	Yes	0x01	00:00:55.901704	01:80:C2:00:00:02	54:48:23:00:00:02
Variable Leaf	0x0002	00:00:55.902054	01:80:C2:00:00:01	54:48:23:00:00:02	Yes	0x0002	00:00:55.902054	01:80:C2:00:00:01	54:48:23:00:00:02
Variable Value	84 02 83 42 64 7E	00:00:55.903004	01:80:C2:00:00:01	84:02:83:42:64:7E	Yes	84 02 83 42 64 7E	00:00:55.903004	01:80:C2:00:00:01	84:02:83:42:64:7E
ONU identification number	0x07	00:00:55.904013	01:80:C2:00:00:01	54:48:23:00:00:02	Yes	0x07	00:00:55.904013	01:80:C2:00:00:01	54:48:23:00:00:02

Data Comparison
Comparison of Processes, Message Contents and OAM Attributes



Performance Monitoring
Graphical Monitoring of Traffic Rates, FEC Blocks and Errors

The screenshot displays the 'Validation Testing' section, showing a table of test results. The table includes columns for Name, Status, Type, Failed if occurred, and Details.

Name	Status	Type	Failed if occurred	Details
DHCP Address Allocation (Continue Analysis)	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
Sequential	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
OLT/ONU/LLID/DATA PDU/DHCP/DHCP	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
OLT/ONU/LLID/DATA PDU/DHCP/DHCP	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
Discovery Processing (Continue Analysis)	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
Non Sequential	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
MPCPDU	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
MPCPDU	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
MPCPDU	Pass	Message	No	Not Occurred or Occurred in wrong Sequence
MPCPDU	Pass	Message	No	Not Occurred or Occurred in wrong Sequence

Validation Testing
Pass/Fail Results for Predefined and User-Defined Procedures

Standard Compliance Verification and Interoperability Testing

Ensuring proper operation of the 10G-EPON network elements enables equipment manufacturers and chipset vendors to build high-quality products and shorten time-to-market. It also provides flexibility to operators and MSOs in providing reliable high-bandwidth services to their customers.

The 10G-EPON Xpert clearly indicates abnormal behaviors and deviations from the relevant standards, thus verifying standard compliance and interoperability between different vendors' OLTs and ONUs.

Stand Alone or Combined Multi-Protocol Analyzer

The 10G-EPON Xpert is available as a stand-alone product, or in combination with TraceSpan's NG-PON Xpert, to allow the capture and analysis of the XG-PON, XGS-PON and/or NG-PON2 protocols using the same hardware platform.

Extensive Reporting and Exporting Capabilities

The 10G-EPON Xpert supports the generation of detailed analysis reports in a user-friendly HTML format. Selected information can also be exported for further analysis in various formats, such as PCAP and XML.

Test Automation

The 10G-EPON Xpert includes a Command Line Interface (CLI), enabling its integration into automated test environments. The built-in Command Line Wizard application eases the generation of CLI command for various test scenarios, thus speeding up the testing process, saving time and labor and minimizing human errors.

Specifications

Standards Compatibility	IEEE 802.3 – IEEE Standard for Ethernet IEEE 1904.1 – IEEE Standard for Service Interoperability in Ethernet Passive Optical Networks (SIEPON) CableLabs DPOE – DOCSIS® Provisioning of EPON Specifications
EMC Standards	FCC 47CFR Part 15, Subpart B, Class A EN 61326-1, Class A
Safety Standards	IEC 61010-1, EN 61010-1

For More Information

Visit: www.tracespan.com

Contact us: info@tracespan.com

Copyright © 2023 TraceSpan™ Communications Ltd. All rights reserved.
Product design and specifications are subject to change without notice.



Access Network Visibility