GPONDoctor 10K7 FTTH expert

Dual GPON and XGSPON protocol analyser

GPD 10k7

GPONDoctor 10K7 is a powerful GPON and XGSPON protocol analyzer that captures both upstream and downstream bit-level data, interprets PLOAM and OMCI level control information, extracts user traffic at the Ethernet layer, measures optical power, detects and reports line faults. This makes it an excellent solution for troubleshooting, certification, and interoperability analysis, catering to the needs of operators, installers, and manufacturers alike.

The tool is highly valuable for ensuring network compliance. It performs interoperability checks and conformance validation, offering the functionalities of the GPONDoctor 9k7 and GPONDoctor 4k7 in a self-contained unit through its two operating modes, XGS-PON mode and GPON mode. It processes OAM, PLOAM, and OMCI management information and allows for real-time traffic extraction of multimedia services.

The GPON Doctor 10K7 is the essential self-contained test solution for maintaining optimal network performance. Its portability and interoperability testing capabilities make it the ideal solution for GPON and XGSPON telecom operators during the deployment, maintenance, and troubleshooting phases. Additionally, it provides valuable conformity and interoperability validation for ONU and OLT vendors.

Protocol Analysis

The analysis software interprets the captured data and allows the user to trace all control frames. It estimates the network topology of ONT state machines, established data channels, exchanged configurations, E/R OMCI diagrams, analyses, and bandwidth graphs for each ONT, T-CONT and port with high precision and accuracy.

Vendor interoperability & Protocol certification tool

Traffic Capture

The GPD 10k7 is an incredibly powerful tool that includes a high-performance hardware capture card and a robust software application. With the ability to capture all upstream and downstream data simultaneously, it allows for the identification of PON status, entities, and their relations, as well as bandwidth allocation, consumption, and deviations from the standard. Its capture card hardware is designed with advanced optical modules and processing capabilities, allowing it to easily extract and decode Ethernet traffic from GEM ports, including TV and interactive applications.
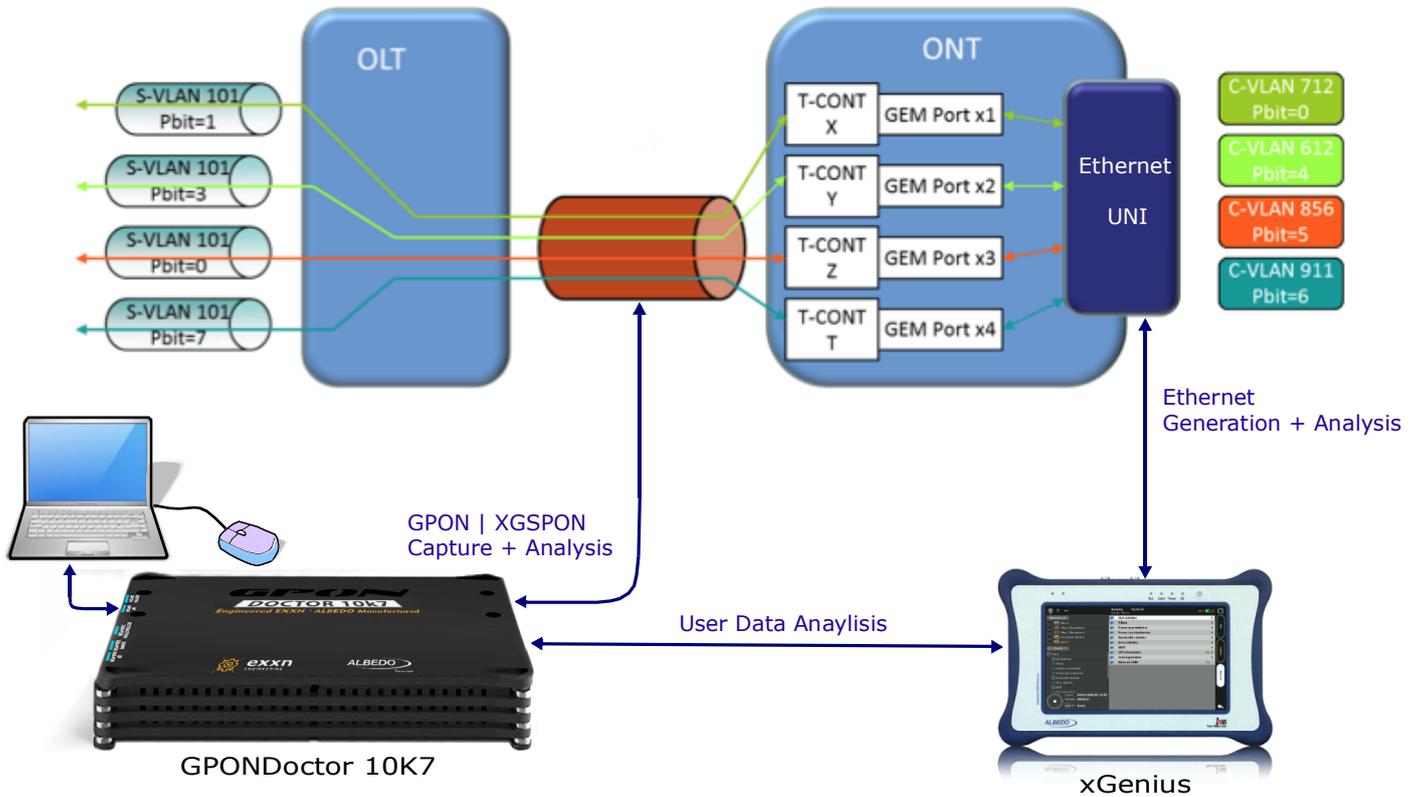
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Features

Traffic Capture

GPONDoctor 10K7 captures OMCI and OAM messages in real-time over the fiber to monitor negotiation processes and configurations. It displays the status of ONTs, GEM / XGEM ports, and T-CONTs in real-time. The software analyses data and presents it graphically for the analysis of PON installations. It identifies the offending devices and the cause of failure with precision and accuracy, making it an essential tool for troubleshooting and maintenance.

With just one click

GPON Doctor can identify any issues in real-time by connecting to a fiber termination point within the PON network.

Evaluation rules

Evaluates and detects problems in XGS-GPON or GPON networks, detailing the offending devices and the cause of the failure.

GPON and XGSPON Capture

The capture hardware features with state-of-the-art optical modules and high processing capacity. Capable of synchronizing with the downlink and uplink at any point in the network and calibrating itself automatically, allowing long duration captures.

Network topology

GPD 10K7 uses the captured data to deduce the network topology and applies a set of rules to certify whether the ITU-T G.9807.x or ITU-T G.984.x recommendation is met. It continuously updates the status of ONTs, XGEM ports, and T-CONTs while displaying the topology.

QoS assessment

It is possible to regenerate established services on a PON network and evaluate the QoS and QoE of services configured over a PON. For example, multicast video can be extracted and reassembled in real-time to be displayed on the GPONDoctor screen.

Diagrams

OMCI entity/relationship diagrams with alarms and errors, bandwidth allocation diagrams by ONT and T-CONT, and optional diagrams of the time evolution of bandwidth allocation.

Ethernet data traffic

External tools can effectively monitor and analyze user traffic in real-time through AES decryption by hardware.

New features

Optical Power Meter, Line Errors detection and reporting.

Fig 3. GPON Doctor 10K7 in operation, a xGenius as traffic generator

GPD 10k7 applications

GPON & XGSPON analysis

Implementing multi-vendor ONUs will significantly reduce CAPEX. Any OLT can communicate with any ONT, regardless of the manufacturer. Addressing the concerns of FTTH networks is crucial:

- Commercial use of various versions of the standard.
- ONUs and OLTs manufactured by different vendors may not be accepted.
- OMCI is complex and vendors may misinterpret the standard.
- The heterogeneity of IP service provisioning is also a reason for errors.

FTTH acceptance

It is crucial to understand the fundamentals of PON networks as only a portion of the power arriving at an ONT results from the splitter. Keeping this attenuation in check is important to avoid failures during challenging conditions.

Test ensures the compliance

The procedure for implementing FTTH GPON and XGSPON networks utilizes passive optical components to divide the fibre stretch and create a tree-like topology. This results in a single point of origin and N destinations. These standards are outlined by the FSAN and detailed in the ITU-T G.9807.x/G.984.x/G.988.

Vendor Interoperability

The protocol test identifies errors in negotiation and transmission between devices caused by non-compliance with the standards. GPONDoctor 10K7 is necessary to identify interoperability deficiencies in cases of multi-vendor validation.

IP Services certification

The GPONDoctor, in combination with xGenius, a synthetic traffic generator, ensures the accurate transmission of IP services, including video and data, over the FTTH network. This functionality enables the emulation of IPTV channels, VoD flows, and real-time reproduction of voice streams to analyze QoS and QoE and identify the sources of degradation and failures with confidence.

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USERS

- ONT & OLT Manufacturers
- Acceptance Laboratories
- GPON + XGSPON Operators
- GPON + XGSPON Installers

APPLICATIONS

- Installation
- Troubleshooting
- Interoperability
- Analysis of protocols
- Protocol compliance

KEY FEATURES

- GPON + XGSPON analysis
- Topology representation
- Bandwidth allocation
- QoS assessment
- Events and deviations
- Chipset-Less
- Transparent captures
- Automatic calibration
- Windows application
- IP Services certification
- Optical Power Meter

GPON Doctor 10k7 Features

Capture	• Inference of PON topology: ONU IDs, GEM ports • Real-time detection of activity on GEM ports • Capture and interpretation of PLOAM messages • Capture and interpretation of OMCI messages • Capture and interpretation of Bandwidth Maps for ONT discovery • Capture and interpretation of Bandwidth Maps for bandwidth allocation on operation • Real time capture mode • Background capture mode • Scheduled capture mode • Messages color scheme to facilitate visualization and analysis of the capture • Capture exportable to CBIN5 format (Included in XGSPON license) • Capture exportable to CBIN6 format (Included in GPON license) • Capture exportable to XML format • Powerful filtering system for visualization and capture analysis
Analysis engine	PON characterization • Topology • PON parameters • ONU status (ID, timing parameters, keys negotiated, operation status, Alloc-IDs and GEM ports) Features • List of discovered OMCI entities. Interpretation of their attributes and values • Generation of accurate E/R diagrams • TU-T G.988 reference integrated: quick access to the entity's definition • Evaluation of conformity with ITU-T G.984 and generation of a list of specification violations (Included in XGSPON license) • Evaluation of conformity with ITU-T G.9807 and generation of a list of specification violations (Included in GPON license) • Evaluation of conformity with ITU-T G.988 and generation of a list of specification violations • Characterization of type and level of violations discovered • Direct access to the messages of the entities presenting nonconformities • Exportable analysis in HTML format
User traffic extraction	• Extraction of user traffic of up to 6 simultaneous GPON through virtual Ethernet interface over USB 3.0 (Included in GPON license) • Extraction of XGSPON user traffic through virtual Ethernet interface over USB 3.0 (Included in XGSPON license)
Bandwidth monitor	• Bandwidth used per port • Bandwidth assigned per Alloc-ID • Bandwidth utilized per ONU • Real-time graphical visualization • Exportable to CSV
Link integrity monitor	• Upstream FEC errors monitor (Included in GPON license) • Downstream FEC errors monitor (Included in GPON license) • Downstream HEC errors in SFC, OC, HLend, BWMap and XGEM header (Included in XGSPON license) • Upstream HEC errors in Fixed FS Header and XGEM header. BIP errors (Included in XGSPON license) • Real-time graphical visualization • Exportable to CSV
Automation	• Integrated CLI for remote operation and/or integration into automated certification or verification workflows • Protocol: Telnet • Configurable port
Interfaces	• USB 3.0 • SFP GPON ONT SC/PC TX 1310 nm / RX 1490 nm B+ (2.5Gbps) (Included in GPON license) • SFP GPON OLT SC/UPC TX 1490 nm / RX1310 nm (1.25Gbps) (Included in GPON license) • SFP+ XGSPON ONT SC/UPC TX 1270 nm / RX1577 nm (9.953Gbps) (Included in XGSPON license) • SFP+ XGSPON OLT SC/UPC TX 1577 nm / RX1270 nm (9.953Gbps) (Included in XGSPON license)
Platform Requirements	• USB 3.0 Interface • Windows Operating System • Accessories included: extraction splitter, optical modules, set of attenuators (4, 8 and 15 dB), SC/UPC-SCAPC patch cords