GPONDOCTOR 9500

GPONDOCTOR
FTTH analysis & monitoring tools

RUGGEDIZED FTTH XGS-PON
Networks Analyzer

Capture+Analyze+Evaluate in 1 click

GPONDoctor™ 9500 gathers all control and management information from a 10G PON and by using a smart analysis engine it is capable of inferring the network topology and verifying the ITU-T G. 9807.1/ G.987.2/G.989.3/G.988 recommendation level of compliance. Its automatic adaptive synchronization, automatic calibration and easy interface makes it ready to be used from the first day.

Troubleshooting XGS-PON networks

Evaluates and detects problems in a XGS-PON, identifying the origin of the malfunction and its source.

Real time user traffic extraction

GPON Doctor™ 9500 extracts, decrypts and reassembles user traffic at Ethernet layer, in real time. This traffic is made available at the 1000BaseT interface. Possible applications are: QoS/QoE monitoring, network performance and upper layer analysis. Its hardware decoder fully supports AES automatic decryption combined with FEC encoding.

QoS/ QoE Evaluation- Option

GPONDoctor™ 9500 can regenerate services established over a PON network. Multicast video can be sniffed & reassembled in real time and played as in Customers' premises. This feature is perfect to identify services optimum performance deviation over a PON.

Real time XGS-PON Capture

GPONDoctor™ 9500 captures XGS-TC and OMCI messages within the PON in Real Time. Highlight negotiation processes and configurations, while showing the current status of ONTs, XGEM and TCONT.

Detailed diagrams of OMCI entities and BW allocation- Option

Easy to understand and complete entity-relation OMCI diagram, including alarms and errors. Bandwidth allocation per ONT and TCONT and its evolution in time. Real time Upstream bandwidth consumption. CRIPTION

Portable and Autonomous

Rugged and portable chassis with a weight of less than 1,5Kg and a dual battery with an autonomy of more 1 hour at full working operation and Hot Swap.

DESCRIPTION

GPONDoctor 9500 is a portable, passive, chipset-less GPON FTTH protocol sniffer and analyzer. Connected to any location within your PON distribution network (ODN), will capture downstream and upstream bit-level information. Provides comprehensive analysis of the XGS TC layer: OAM, PLOAM, and OMCI. GPON Doctor 9500 is mainly oriented for **problem detection, certification and interoperability tests**, being a perfect tool for lab application engineers engaged in XGS-PON deployment phase or XGS-PON active elements developers/ integrators.

GPONDoctor 9500 is a complete and autonomous solution: Composed by a XGS-PON capture + evaluator card, a "state of the art" chassis and a processing software capable of analyzing and evaluating the captured data. Based on our own implementation, the capture hardware includes last generation optical modules and great processing power. Capable of synchronizing with the downstream and upstream data flow of the PON fiber, performing automatic calibration, and allowing long length captures. It also extracts and **decrypts in real-time Ethernet traffic** from the upper layer ,allowing to regenerate services like video or VoIP.

The Analysis Software interprets the captured data and allows the operator to inspect the control flow from the first to the last frame, selecting and filtering data following configurable criteria. It also analyses the content of the control information, inferring the topology and state of a XGS-PON network: ONTs detected, data channels established, configuration exchanged, **OMCI E/R diagram, bandwidth analysis and, graphics for every ONT and by TCONT.**

Based in **Windows 10 Pro**, GPON Doctor can include (according to customer needs) other office and a analyze tools for other service protocols used over XGS-PON. Very intuitive and usable, with a very low learning curve that lets you start using it right from the start.

Troubleshooting in PON and GPON networks

With the aim of reducing the ONTs price it is important that any OLT is capable to interact with any ONT regardless its manufacturer. However, XGS-PON has a number of intrinsic characteristics that could make difficult the interoperability among manufacturers:

- Commercial implementations from earlier versions of the standard.
- Problems during the activation process.
- Misinterpretation of the standard.
- OMCI, a very broad standard open to interpretations.
- Heterogeneity among operators.
- Attenuation in a XGS-PON path can be very high due to the sum of fibre splitting, connections (Insertion loss), fusion splice, and distance in the fiber.

All these factors imply a great challenge in the deployment of XGS-PON networks.

Non-invasive Capture

The GPONDoctor 9500 transparently analyses traffic within a FTTH network. Moreover, its automatic calibration and built in touch screen, makes it possible with just one click to have a full capture of XGS-PON network traffic. The capture can be very long and allows captured data export to XML format for later analysis.

Smart Network analysis and evaluation

The smart analysis software interprets the captured data and translates it into a graphical and categorized format that can be easily used for in-depth analysis of XGS-PON protocol conformance, interoperability evaluation, bandwidth assignments and field deployment troubleshooting.

The data captured by the GPONDoctor 9500 are analyzed to enable the view of:

- XGS-PON network topology: ONTs detected, ONTs and OLT. operational status, data channels established.
- Entities created and the detailed relationships among them, including errors and alarms generated.
- Bandwidth assignment plots per ONT and TCONT and its evolution in time.
- Degree of compliance with the standard, by applying an evaluation system for the ITU-T G.9807.x/G.987.2/G.989.3/G.988 recommendation based on contextualized dynamic rules.

## Real time upper layer Ethernet traffic extraction

GPONDoctor 9500 allows clear-text user traffic extraction in real-time for both upstream and downstream. The traffic is extracted at Ethernet layer.

This traffic can be further analyzed by upper layer protocol analyzers, either external or by a network protocol analyzer software installed within the GPONDoctor 9500.

The combination of the GPONDoctor 9500 with a traffic generator, and an external or internal analyzer that incorporates GPONDoctor 9500, is a powerful setup to verify the correct transmission of data over the network.

This feature can be also used to regenerate in real-time services in GPONDoctor 9500 itself: watching Multicast Video flows in its screen, hearing sound of voice services, analyze QoS & QoE, etc.
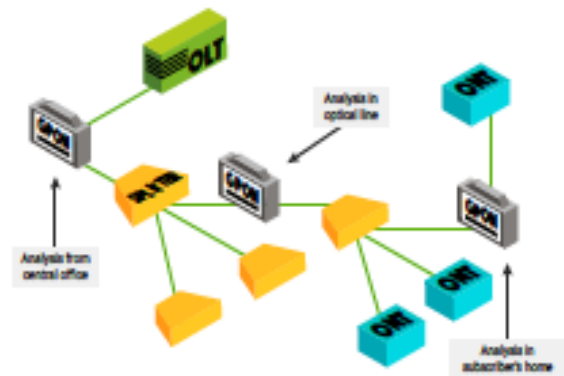
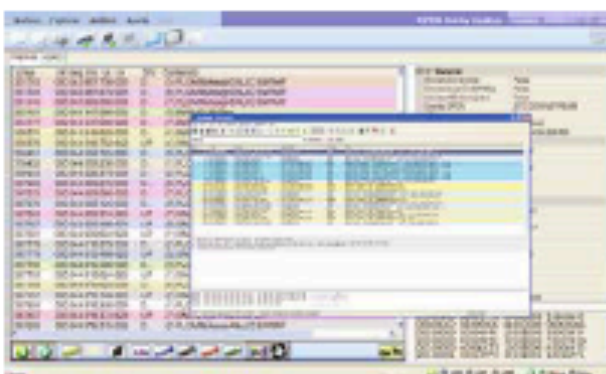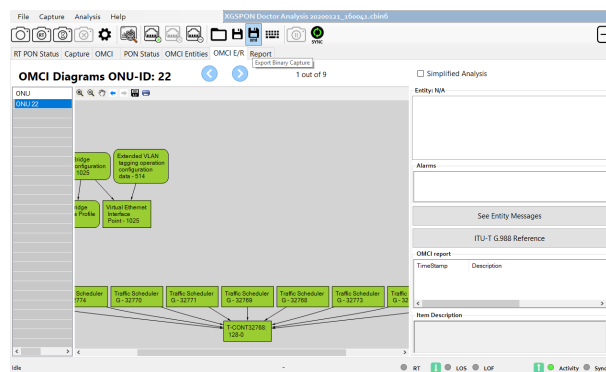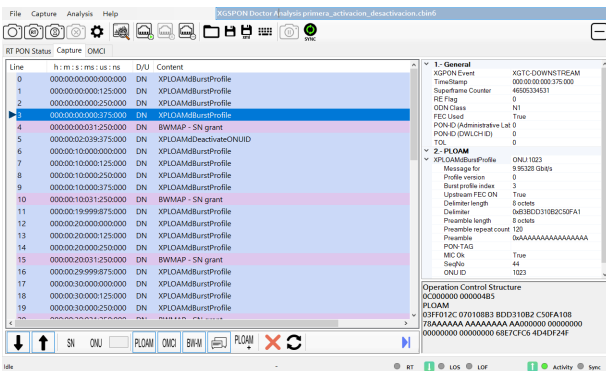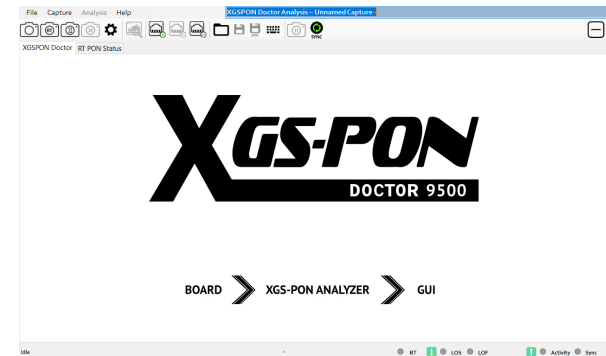Analysis and identification in GPON Networks
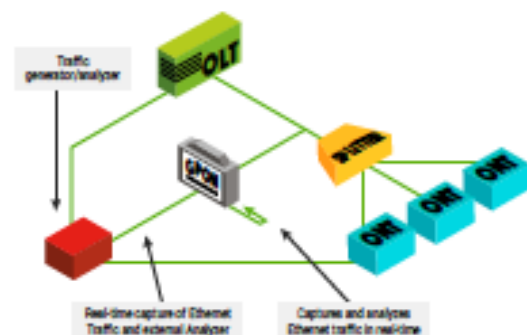
Real-time user traffic extraction

Screenshots examples

Applications

1. XGS-PON networks deployment, equipment development and certification.
2. Interoperability troubleshooting among different vendors equipment coexisting in a Telco access network.
3. Diagnosis and Analysis of events and deviations for already deployed XGS-PON networks.
4. Evaluation of protocol compliance during the development of XGS-PON OLTs and ONTs.
5. Analysis of user traffic and evaluation of quality of services in the XGS-PON Networks through its Ethernet interface.
6. XGS-PON Auditing and Optimization.
7. Real time supervision of the Network state and all its active elements (ONTs).

Technical features

1. Capture OAM + PLOAM control data and OMCI messages (full support).
2. Real Time PLOAM + OMCI + Negotiation messages capture.
3. Long duration captures.
4. Low attenuation (<1.5 dB) external fibre tap module, perfect for field environment. Can be installed as fixed testing point.
5. Ruggedized (MIL-STD-810G & IP-810G) portable form factor. Very Low Weight: <1.8 kg.
6. Battery Powered: more than 1 hour of full power operational time.
7. Infers the XGS-TC machines in ONTs state and the ONTs OMCI entities state/ value.
8. Infers network topology: ONU/ONTs, OLT.
9. Evaluation of the compliance degree with the ITU-G.987.2/G.989.3/G.988 standard, generating a list of standard inconsistencies and violations.
10. Bandwidth distribution analysis per T-CONTs for every ONT.
11. Real Time Service regeneration and monitoring: Multicast Video, Voice.
12. Adaptive synchronization and automatic calibration.
13. Real time Ethernet traffic extraction and services decryption, regeneration and monitoring: Multicast Video, Voice...
14. Windows10 Pro Operating System.
15. Automatic behavior: capture, analyze and evaluate in one click.
16. Captures storage for further analysis by the GPONDoctor 9500.
17. Size with transport case: 311 x 232 x 100 mm.

Interfaces

1. 11.6" HD (1366 x 768) 16:9 Direct-View outdoor-readable display with glove-capable multi-touch and Gorilla Glass 3.
2. Wi-Fi 802.11ac interface, both for sniffing and IP management purposes.
3. Gigabit Ethernet over XGS-PON Real Time Extraction port: External network protocol analyzer plug in.
4. USB Tyce-C port
5. USB 3.0 to easy transfer data, traces and reports export.
6. XGS-PON capture interfaces:
   - Downstream: SC/APC Single Mode 1577nm (10Gbps).
   - Upstream: SC/APC Single Mode 1270nm (10 Gbps).

CONTACT INFORMATION
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