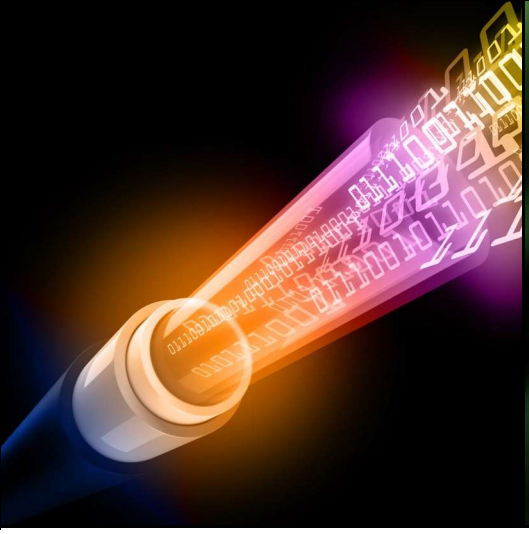
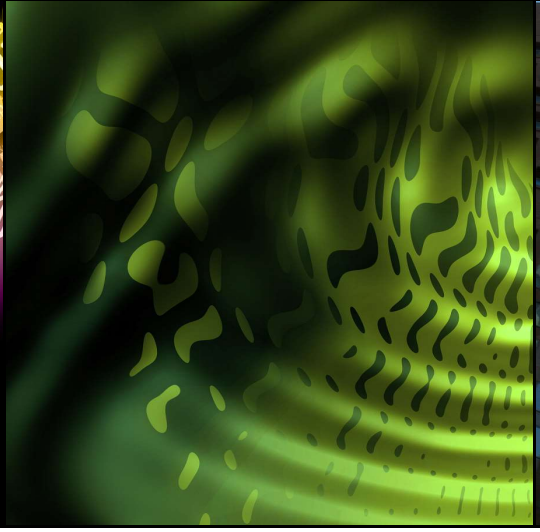
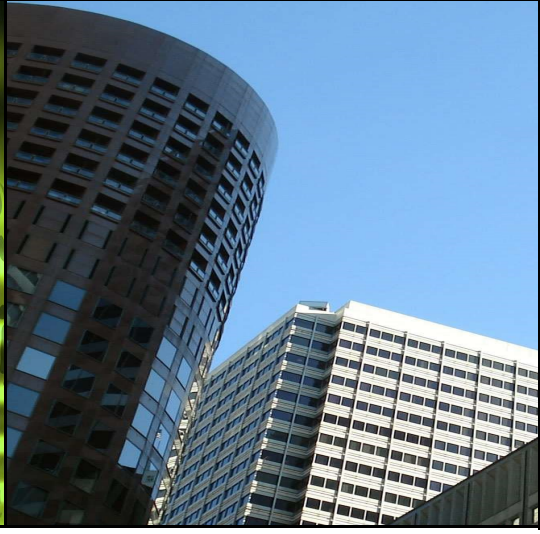




GPONDoctor OLTe the smart OLT

OLT emulator for FTTH labs

GPONDoctor OLTe is an OLT emulator that behaves like a normal OLT acting as the termination point of the PON. It is connected to the ODN (Optical Distribution Network) with the ONTs connected to the other end of the ODN. A simple case can be an ODN consisting of just one optical fibre with the OLT emulator at one end and an ONU/ ONT at the other end.

Designed primarily for ONT/ONU conformance and network interoperability testing, the GPONDoctor OLT-e is a perfect tool for lab application engineers involved in the GPON pre-deployment phase, as well as GPON network element vendors.

OLTe is programmable behaving as any OLT

It is also ideal for ONU manufacturing/ auditing applications to test ONUs during the production chain, as well as for auditing the ONUs replaced within the customers' premises. As an OLT emulator the GPONDoctor OLTe is completely flexible, allowing users to configure as many different provisioning models as desired. OMCI messages can be sent individually or grouped in scripts.

Flexibility

Fully configurable OLT that can receive and report events, messages and alarms associated with the responses to each of the OMCI messages sent to the ONUs. As well as acting as an OMCI master, it also supports the generation of PLOAM messages to perform various tests at GTC level to enable and configure the GEM OMCC port, password authentication tests, etc.

OLT Emulation

GPON Doctor OLTe is capable of emulating various commercial OLT behaviours. It allows the creation of specific deployment models and the individual and sequential configuration of OMCI entities.

The capture card hardware is purposely designed with advanced optical modules and processing capabilities. It can extract and decode Ethernet traffic, including real-time video or VoIP, from GEM ports.

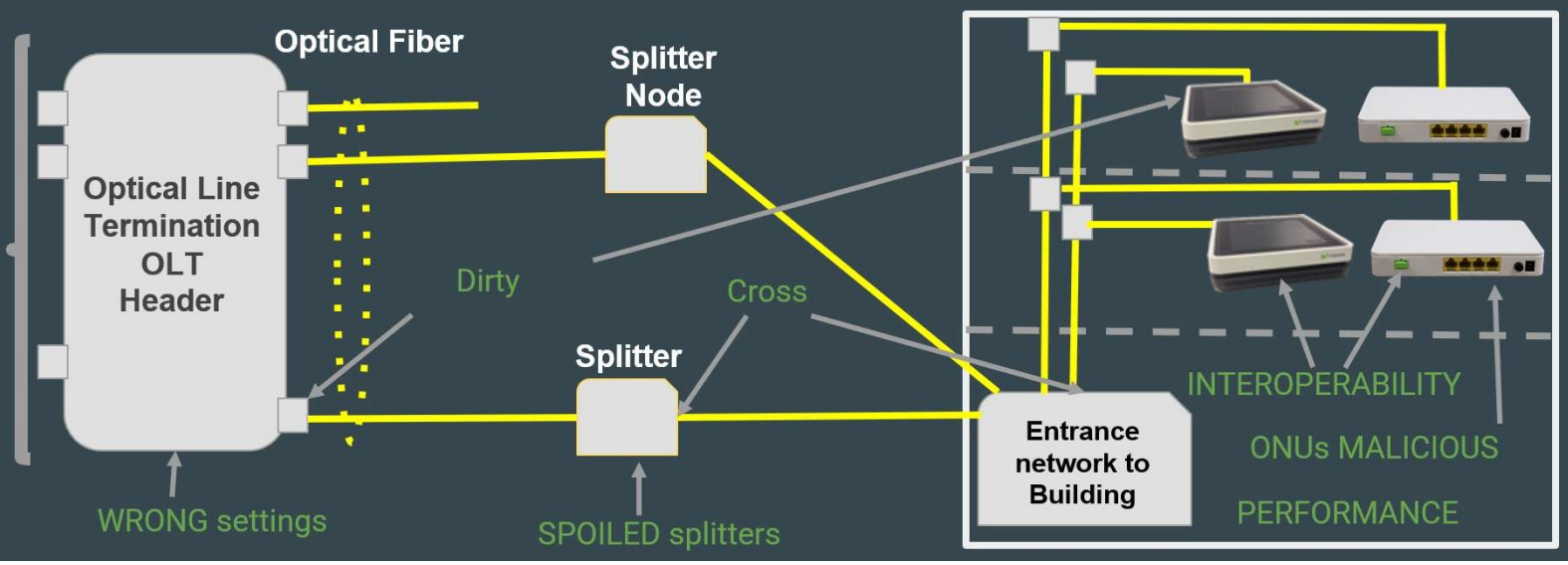
ALBEDO

Points of Vulnerability in an FTTH PON deployment

Low Vulnerability
(affects to many customers)

LOW to MEDIUM Vulnerability
(It affects many customers)

Multiple interactions
(High Vulnerability



Features & Benefits

Capture and Replay

Captures from any point of the GPON Doctor network analyser can be imported into the OLT Emulator to replicate PON behavior.

GPONDoctor OLT provides full control of PON parameters:

- 802.1ad/802.1Q/802.1p compliant with BBF TR-156 VLAN scenarios
- Implements DBA algorithm
- Allows FEC coding in both directions
- 128-bit AES encryption
- IGMP snooping supported
- Multicast filtering

OLT emulation

The GPON Doctor OLT-e provides the same functionality as a GPON OLT. It is fully configurable and can emulate any commercial OLT behaviour by using different templates. This feature enables the replication of any Optical Line Terminations and the execution of advanced functionalities:

- It involves receiving and reporting events, messages and alarms in response to each OMCI message that is sent to the ONT.
- The emulator can be programmed with scripts or manually at the OMCI level. Messages are used to configure OMCI entities in each ONT, including creation, destruction, reading, writing, testing, etc.

Suitable for modeling and OMCI setups

- Generation of PLOAM messages to perform different functions at GTC level: Enable and configure the GEM OMCC port and password authentication tests.
- OLT-e manages traffic in GEM frames, carrying real Ethernet traffic through a 10Gbp/s or 4 x 1Gbps interfaces. Through this port, a traffic generator can be connected. This interface also supports configurations for filtering and VLAN tagging at ONT / OLT levels.

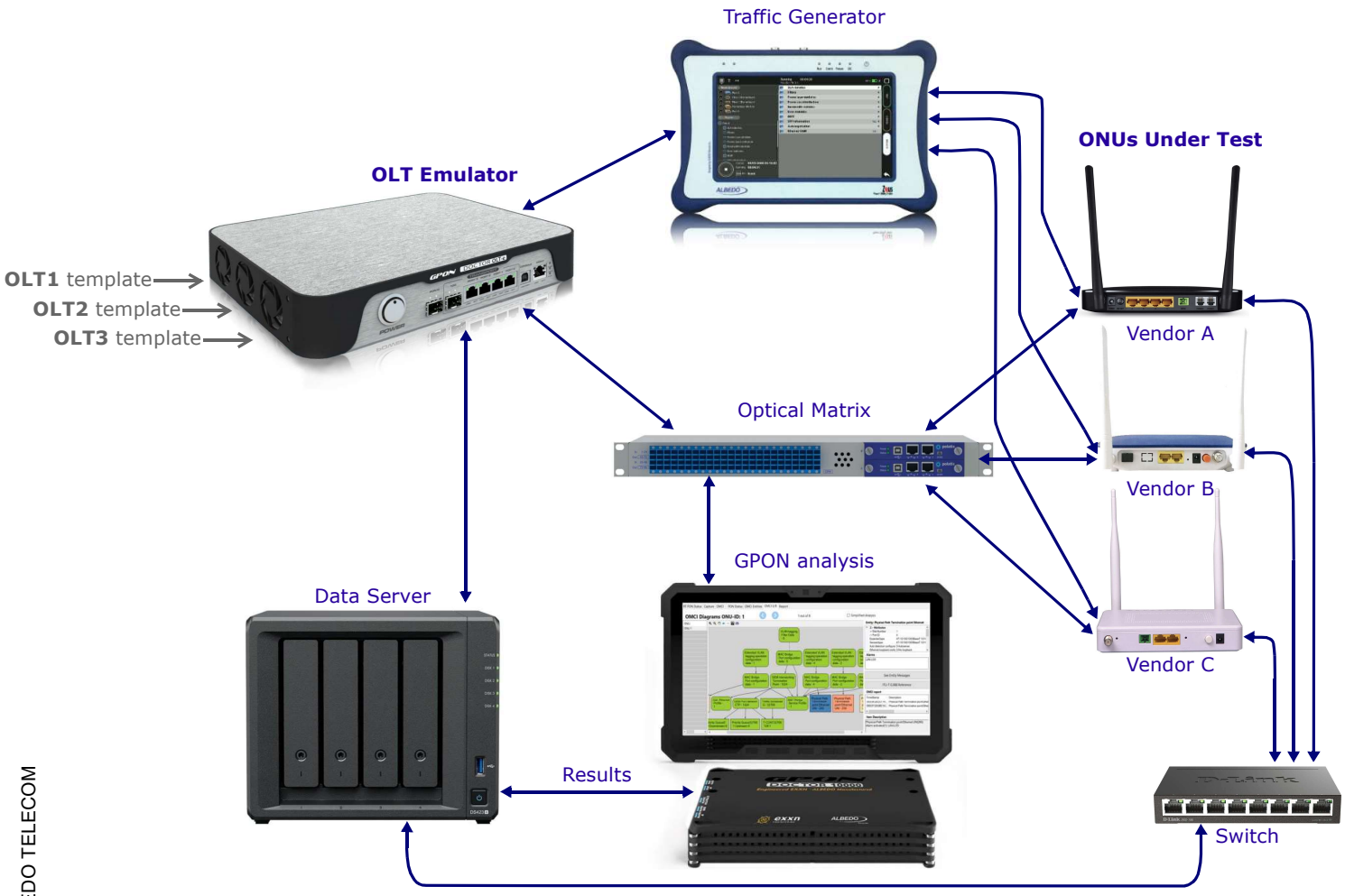


Fig 3. ONU Conformance test with GPONDoctor, xGenius and OLTe that can use templates to emulate any model of OLTs.

GPD applications

ONU Conformance test

GPON Doctor OLTe serves as an OLT, designed specifically for ONT/ONU interoperability testing. It is a reference tool for laboratory engineers involved in the planning phase of GPON networks and manufacturers of active GPON elements. The OLTe is an ideal complement to the GPONDoctor 4K7, 9K7 or 10K7 as it converts the captured data into scripts that enable commercial OLT behaviors to be emulated.

As an OLT emulator, this tool is highly adaptable, enabling users to manually configure provisioning models or use scripts. Please note that ONUs and OLTs produced by different manufacturers may not be compatible.

Lab appliance

A laboratory may require various configurations and testing methods, which cannot all be listed. However, here are some examples:

- The interoperability test is intended to pinpoint any potential errors in the negotiation and transmission between devices resulting from non-compliance with the standards. In multi-vendor validation scenarios, it is essential to detect interoperability issues.

The process involves diagnosing and analyzing events and deviations in already deployed GPON networks, assessing protocol compliance during the development of GPON ONTs, and identifying poor performing or erratic ONTs.

❑

APPLICATIONS

- ONU Conformance test
- Diagnosis and analysis
- ONU-OLT interoperability
- ONTs performance
- Protocol compliance

USERS

- Operators
- Installers
- Manufacturers
- Regulators

KEY FEATURES

- 802.1ad, 802.1Q and 802.1p
- Multiple OLT templates
- Implements DBA algorithm
- FEC coding both directions
- 128-bit AES encryption
- IGMP snooping supported
- Multicast filtering

Functional Specification

GPON Doctor OLTe Features	
Operation and Applications	• Essential tool for optimal deployment of GPON networks • Interoperability troubleshooting between multi-vendor equipment coexisting in the access network • Assess protocol compliance in OLT/ONT development • New GPON network deployment, equipment development and certification • Diagnosis and testing of events and deviations for already deployed GPON networks • Interoperability troubleshooting of multi-vendor equipment co-existing in a Telco access network • Protocol compliance assessment during GPON ONT development • Detect rogue and underperforming ONTs • GPON troubleshooting within a deployed FTTH network • ONU testing within the production chain
Features	• Meets the requirements of ITU-G984.3 • Supports management entities defined in ITU-T G.988 • GPON B+ SFP optical interface compliant with ITU-T G.984.2 standard • Supports up to 60 km range and 1:64 splitting ratio • OMCI message creation using programmable templates • Sending of individual OMCI messages • TCL scripts for multiple OMCIs • OMCI master behaviour • Multiple OLT templates • Generating and forwarding Ethernet traffic encapsulated in GEM frames • Receive asynchronous events and alarms from the ONTs • Generation of PLOAM messages to activate and configure a detected ONT • Simultaneously manage and monitor multiple ONTs • Fault injection and GEM encapsulation manipulation • Supports 802.1 ad, 802.1Q and 802.1p
Interfaces	GPON • 1 x SFP GPON ports • B+ and C+ transceivers available • 1 x SFP+ 10G for transport , allowing 100% GPON BW utilisation • 1 x 10/100 Ethernet management port • Downstream: SFP Single mode 1490nm (2,5Gbps) module • SM 1310nm optional • Upstream: Single mode 1310nm (1,25Gbps) Transport • 10Gbps XFP interface • 4 x 1000BASE-T Console • 1 x USB • 10/100/1000BASE-T
Platform	• External power supply • Independent power button • Size: 202 x 278 x 44.45mm • Operating Temperature: 0 to +50°C • Optional rack mounting accessories • Rugged portable form factor