

# GPON Doctor **OLT<sub>e</sub>**



OLT emulator that behaves like a normal OLT acting as the termination point of the PON.



**ALBEDO**

# New generation GPON Analyzers: GPONDOCTOR 2

## GPON product line



GPONDOCTOR **2k5**



GPONDOCTOR **4k5**



OLT **Emulator**



GPONDOCTOR **10K**

## XGSPON product line



GPONDOCTOR **9k5**



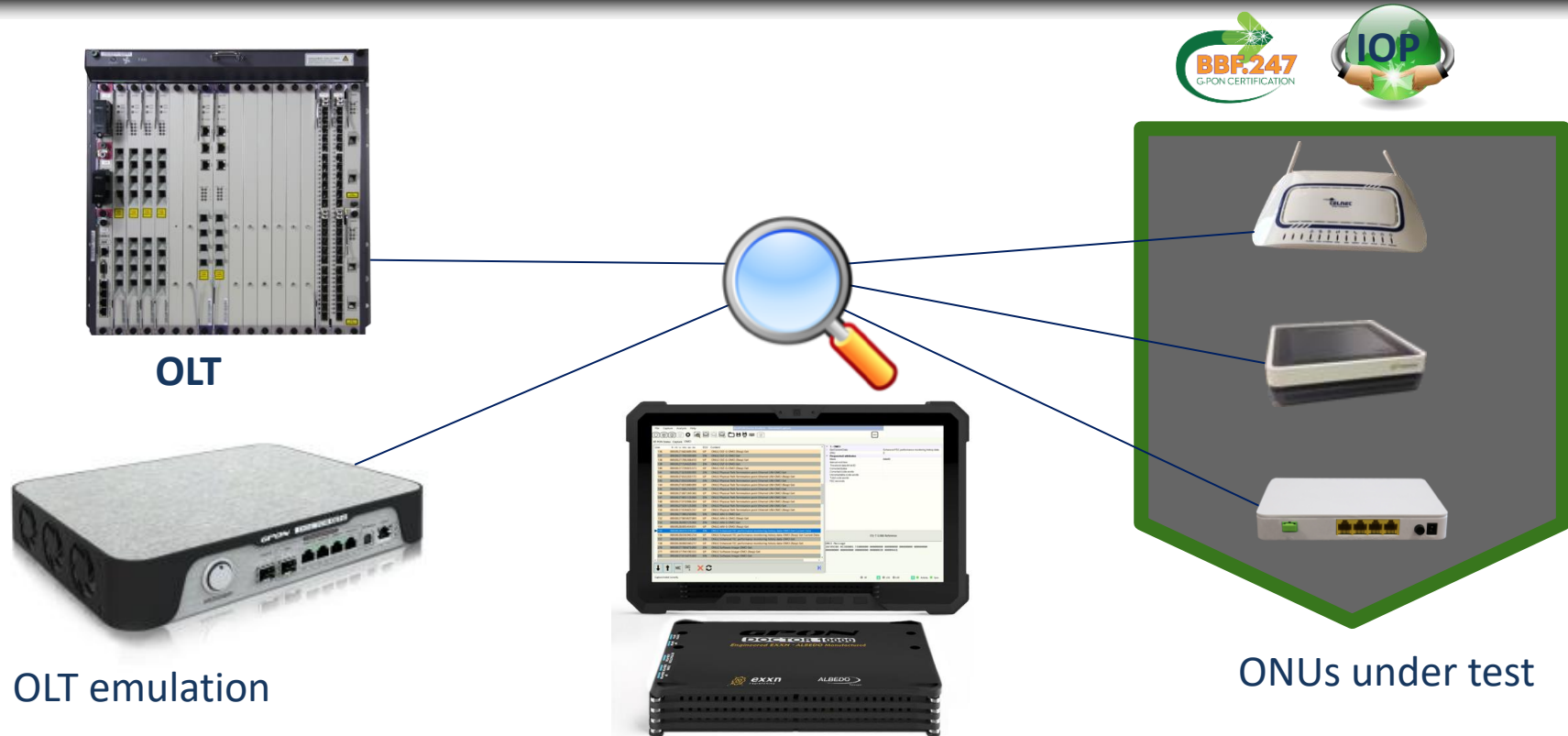
GPONDOCTOR **9k7**



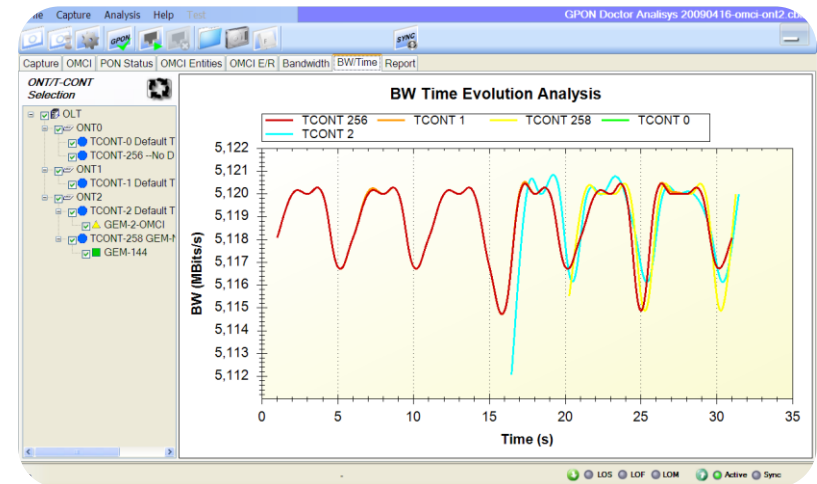
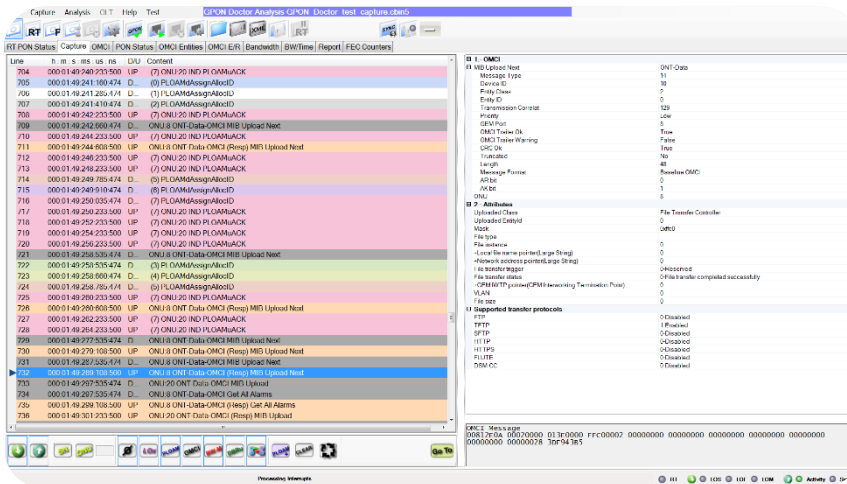
GPONDOCTOR **10K**



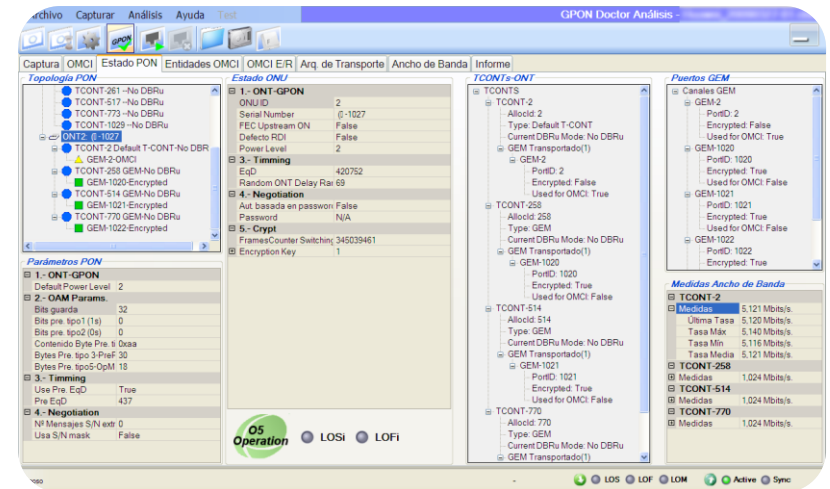
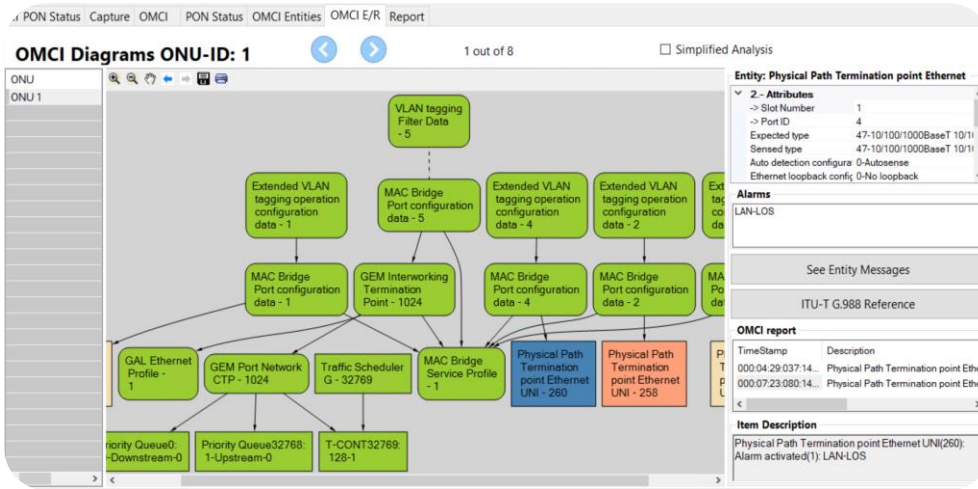
- Troubleshooting operator GPON & XGS-PON deployments
- GPON & XGS-PON network optimisation
- Interoperability analysis between OLT and ONT vendors
- GPON & XGS-PON chipset development
- Real-time IP services traffic extraction
- Automation of GPON test plans



- 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 2500/4500/10000, 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.
- Note that ONUs and OLTs produced by different manufacturers may not be compatible.

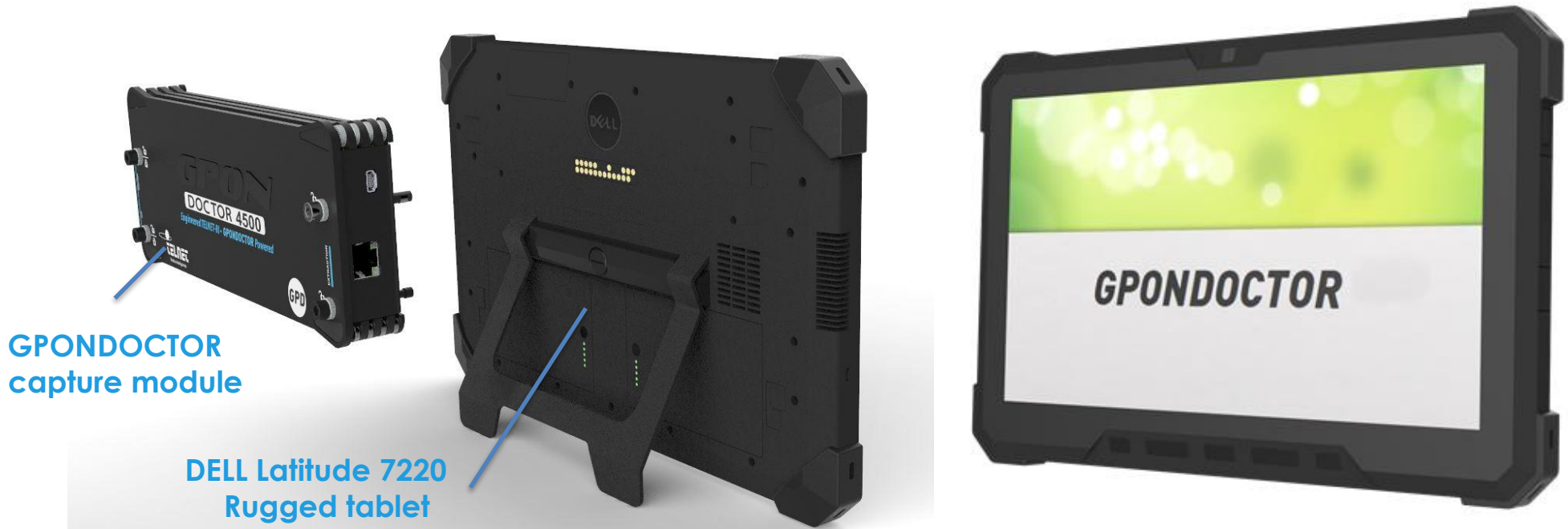


- Fundamental tool for optimisation of GPON network deployment
- Events, deviation diagnosis and analysis for deployed GPON networks
- Interoperability troubleshooting between multi-vendors equipment coexisting in a telco access network
- Analysis of user traffic within the GPON through the Ethernet interface
- ITU-T G984.x, G988 interoperability test (GPON)
- ITU-T G.9807.1/G.987.2/G.987.3/G.988 interoperability test (XGSPON)
- GPON issues delimitation within an FTTH network.
- Full knowledge of the PON state and all its active elements (OLT/ONTs)



## Main features

- Capture of GTC frames
- Real-time capture of PLOAM + OMCI + Negotiation BWMaps
- Several capture modes:
  - Real time
  - Scheduled
  - Full
- Displays the PON topology: ONUs, T-CONTs, Ports
- Reports ONTs state
- Report of inconsistencies and violations of ITU-G.984.x/G988
- Real-Time IP Services regeneration and monitoring: Multicast Video, Voice
- Runs on Windows 10 Pro

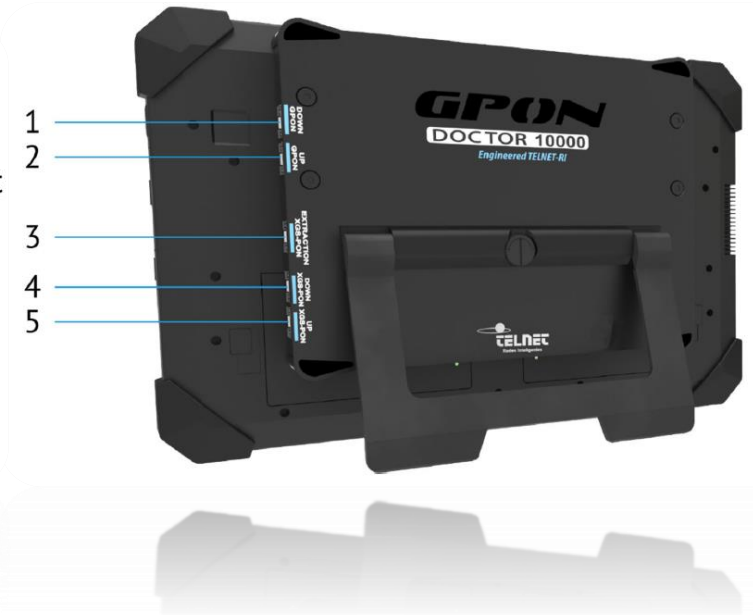


GPONDOCTOR  
capture module

DELL Latitude 7220  
Rugged tablet

## Interfaces:

- Touch screen. 11,6" HD (1366×768) 16:9 direct-view outdoor-readable display with glove-capable multi-touch and Gorilla Glass 3 (except GD 2K5)
- Gigabit Ethernet Capture/Management Port: QinQ VLAN Transparent/Stripping configurable
- WiFi 802.11ac interface, both for sniffing and IP management purposes
- IP Services Real-Time Extraction port: 1000Base-T External network protocol analyser plugin
- USB Type C port (GD4K5, GD9K5, GD10K)
- USB 3.0 to easy transfer data, traces and reports (all range)



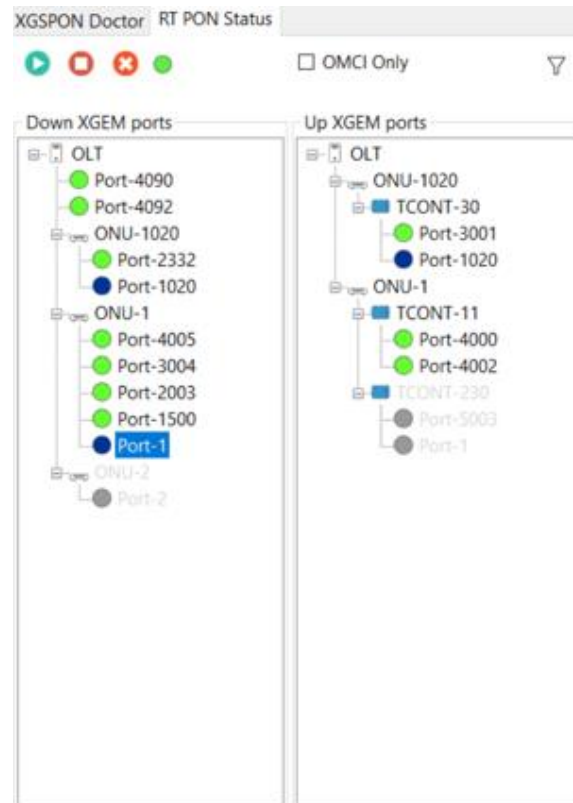
## ◆ GPON Doctor 4k5

- Downstream: SFP single mode 1490nm @2,5Gbps
- Upstream: SFP single mode 1310nm @1,25Gbps
- RJ45 interface for traffic extraction

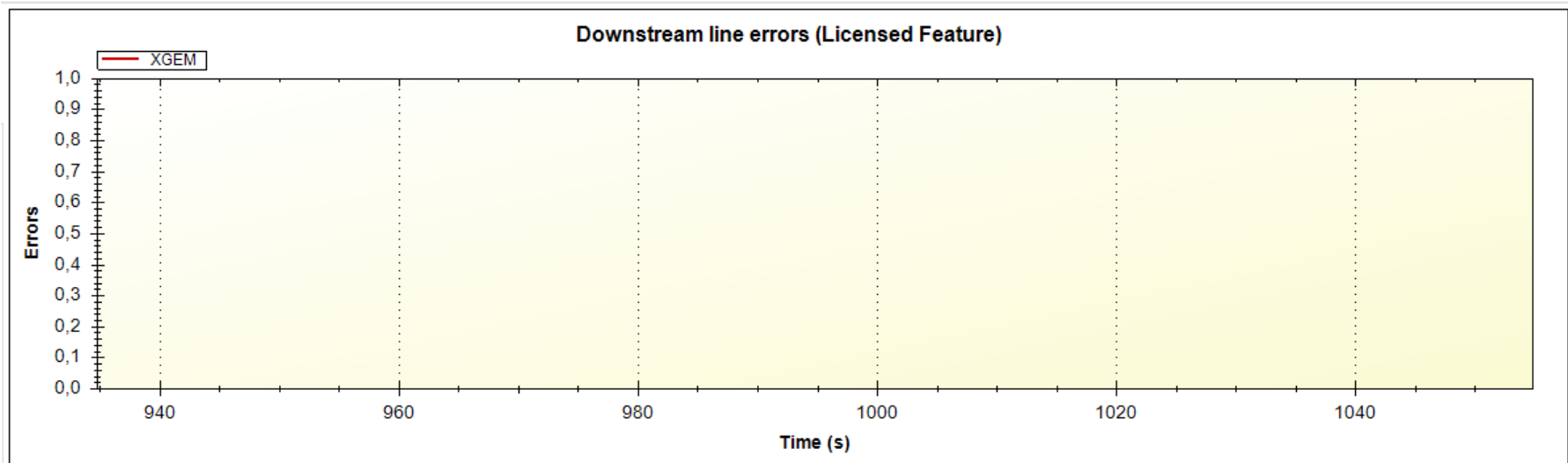
## ◆ GPON Doctor 10k

- 1: DS XGSPON: SFP single mode 1578nm @10Gbps
- 2: US XGSPON: SFP single mode 1270nm @10Gbps
- 3: Reserved for future use
- 4: DS GPON: SFP single mode 1490nm @2,5Gbps
- 5: US GPON: SFP single mode 1310nm @1,25Gbps

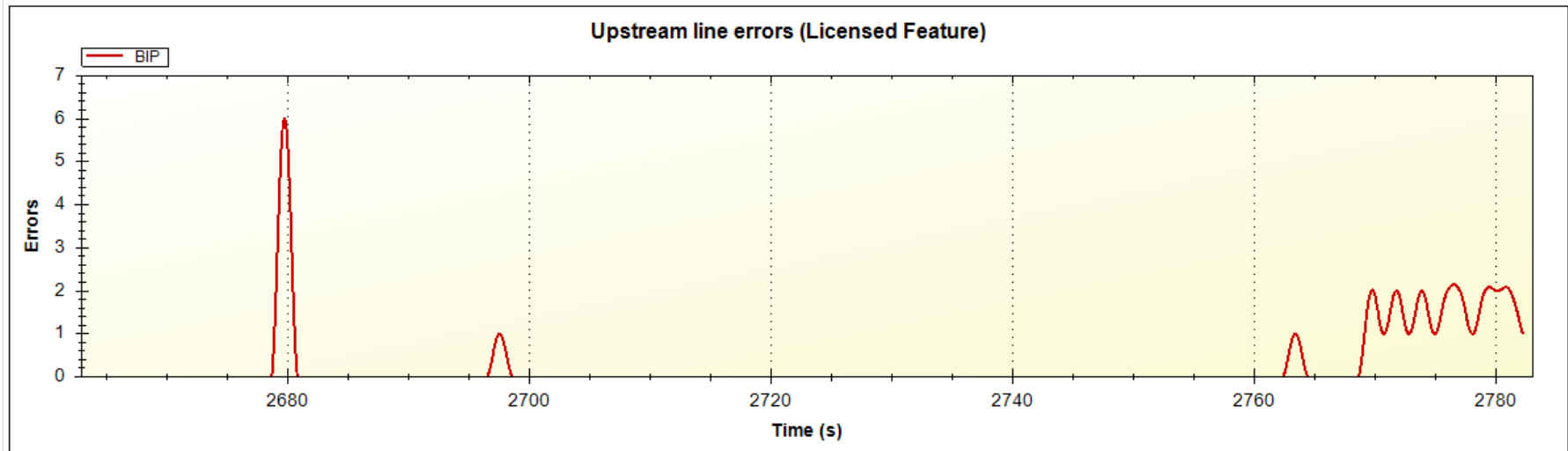




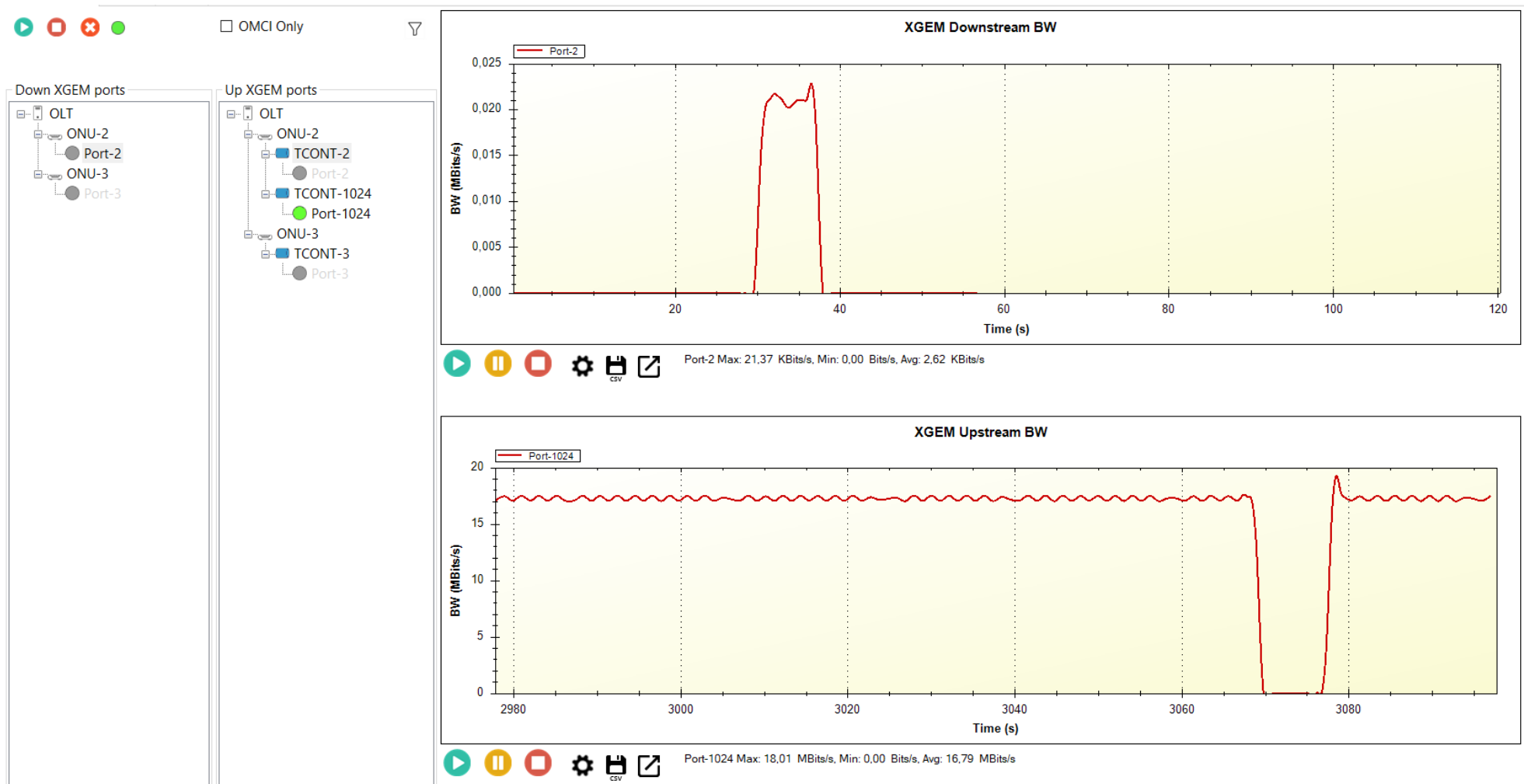
- Downstream hierarchy: ONTs and Ports detected
- Upstream hierarchy: ONTs, T-CONTs, and Ports detected
- Port Activity



SFC and OC HEC: 0 / 0 / 16,86 M Uncorrectable / Correctable / Received  
HLend and BWMap HEC: 0 / 0 / 11,59 M Uncorrectable / Correctable / Received  
XGEM header HEC: 0 / 0 / 142,72 G Uncorrectable / Correctable / Received



Fixed FS Header HEC: 0 / 0 / 5,40 M Uncorrectable / Correctable / Received  
XGEM header HEC: 0 / 0 / 208,97 M Uncorrectable / Correctable / Received  
BIP: 29 / 5,40 M Errors / Bursts



- Assigned to a T-CONT
- Utilisation: Port, ONU, Aggregated

The screenshot displays a network capture tool interface with the following components:

- RT PON Status** tabs: Capture, OMCI
- Message List Table:**

MIC	Line	h:m:s.ms:us:ns	D/U	Content
42		000:05:44:986:125:000	DN	PLOAM Burst Profile
43		000:05:44:986:250:000	DN	PLOAM Burst Profile
44		000:05:44:986:375:000	DN	PLOAM Burst Profile
45		000:05:44:986:500:000	DN	PLOAM Assign ONU ID
46		000:05:45:017:625:000	DN	BWMAP - Ranging grant
47		000:05:45:017:662:712	UP	ONU:1 PLOAM Registration
48		000:05:45:077:625:000	DN	BWMAP - Ranging grant
49		000:05:45:077:662:712	UP	ONU:1 PLOAM Registration
50		000:05:45:077:875:000	DN	PLOAM Ranging Time
51		000:05:46:322:750:000	DN	ONU:1 ONU-Data-OMCI Get
52		000:05:46:828:609:619	UP	ONU:1 ONU-Data-OMCI (Resp) Get
53		000:05:47:825:625:000	DN	ONU:1 ONU-Data-OMCI Get
54		000:05:48:837:609:625	UP	ONU:1 ONU-Data-OMCI (Resp) Get
55		000:05:49:826:750:000	DN	ONU:1 T-CONT-OMCI Get
56		000:05:49:828:609:625	UP	ONU:1 T-CONT-OMCI (Resp) Get
57		000:05:49:829:500:000	DN	ONU:1 T-CONT-OMCI Get
58		000:05:49:831:609:625	UP	ONU:1 T-CONT-OMCI (Resp) Get
59		000:05:49:832:625:000	DN	ONU:1 T-CONT-OMCI Get
60		000:05:49:834:609:625	UP	ONU:1 T-CONT-OMCI (Resp) Get
61		000:05:49:835:500:000	DN	ONU:1 T-CONT-OMCI Get
62		000:05:49:837:609:625	UP	ONU:1 T-CONT-OMCI (Resp) Get
- Message Details Panel (Right):**
  - 1.- General**
    - GPON Event: XGTC-UPSTREAM
    - TimeStamp: 000:05:45:077:662:712
    - BIP (hex): 0x14CF27DF
    - BIP (bin): 10100110011110010011111011111b
  - 2.- PLOAM**
    - PLOAMuRegistration**
      - ONU:1
      - Registration-ID: 0x2020202020202020E3F6B8C4C3FFB8C4C3FF
      - Response Ranging Grant?: True
      - Response Request Registration?: False
      - MIC Ok: True
      - SeqNo: 0
      - ONU ID: 1
      - PLOAM ID: 2
- Hex Dump (Bottom Right):**

```

BIP
14CF27DF
PLOAM
00010200 20202020 20202020 2020E3F6 B8C4C3FF B8C4C3FF
00030000 DC830300 00000000 8C3CF9F6 1B8CF69F 7FBED4C7
    
```
- Control Panel (Bottom):**
  - Navigation: Down arrow, Up arrow, Play/Pause
  - Filters: MIC, SN, ONU, PLOAM, OMCI, BW-M, PLOAM+
  - Actions: Stop (X), Refresh (C), Next (Play)

- ◆ Real Time capture:
  - PLOAM and OMCI messages
  - BWMAPs: SN Request and Ranging grant
  - Message interpretation
  
- ◆ Full Capture
  - All GTC messages

RT PON Status Capture OMCI PON Status OMCI Entities OMCI E/R Report

## OMCI Diagrams ONU-ID: 1

1 out of 8  Simplified Analysis

ONU  
ONU 1

**Entity: Physical Path Termination point Ethernet**

**2.- Attributes**

- > Slot Number 1
- > Port ID 4
- Expected type 47-10/100/1000BaseT 10/11
- Sensed type 47-10/100/1000BaseT 10/11
- Auto detection configura 0-Autosense
- Ethernet loopback config 0-No loopback

**Alarms**

LAN-LOS

See Entity Messages

ITU-T G.988 Reference

**OMCI report**

TimeStamp	Description
000:04:29:037:14...	Physical Path Termination point Ether
000:07:23:080:14...	Physical Path Termination point Ether

**Item Description**

Physical Path Termination point Ethernet UNI(260):  
Alarm activated(1): LAN-LOS

- OMCI E/R diagrams
- Issues detection

A screenshot of a network traffic capture tool interface. The top part shows a list of captured packets with columns for No., Time, Source, Destination, Protocol, Length, and Info. Packet 106 is highlighted. Below the list, there is a detailed view of the selected packet (Frame 106), showing it is 128 bytes on wire and captured on interface \Device\NPF\_{7D152ADD-580C-4A6D-9D20-482336}. The details include Ethernet II, Src: 00:00:00\_00:00:04 (00:00:00:00:00:04), Dst: 00:00:00\_00:00:01 (00:00:00:00:00:01), and 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 10. Below this, there is a hex dump of the packet data.

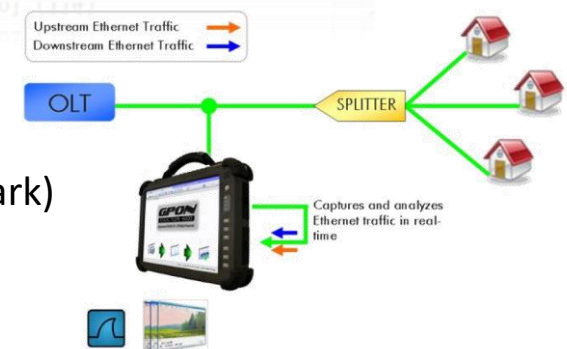
No.	Time	Source	Destination	Protocol	Length	Info
100	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
101	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
102	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
103	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
104	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
105	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
106	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
107	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
108	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
109	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
110	58.300064	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
111	58.301051	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
112	58.301051	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
113	58.301051	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
114	58.301051	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)
115	58.301051	198.19.1.2	198.19.1.1	IPv4	128	any 0-hop protocol (114)

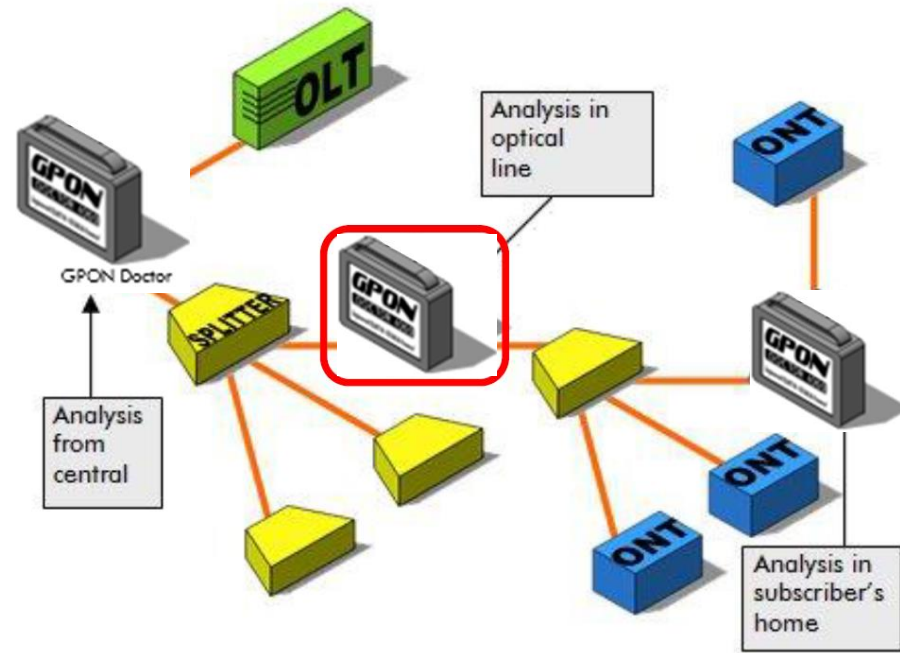
> Frame 106: 128 bytes on wire (1024 bits), 128 bytes captured (1024 bits) on interface \Device\NPF\_{7D152ADD-580C-4A6D-9D20-482336}

> Ethernet II, Src: 00:00:00\_00:00:04 (00:00:00:00:00:04), Dst: 00:00:00\_00:00:01 (00:00:00:00:00:01)

> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 10

- Unlimited ports in downstream and upstream
- Extracted traffic ready to be analysed with a third-party App (WireShark)







- GPON and XGSPON network (remote) diagnostic assistance
- Advanced GPON and XGSPON training
- Customized development of automated test suites
- Tailored development of new functionalities





That's all



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*in Test we Trust*