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elektronické měřicí přístroje

Sítě GPON a jejich analýza pomocí GPON Tracer™

Praha

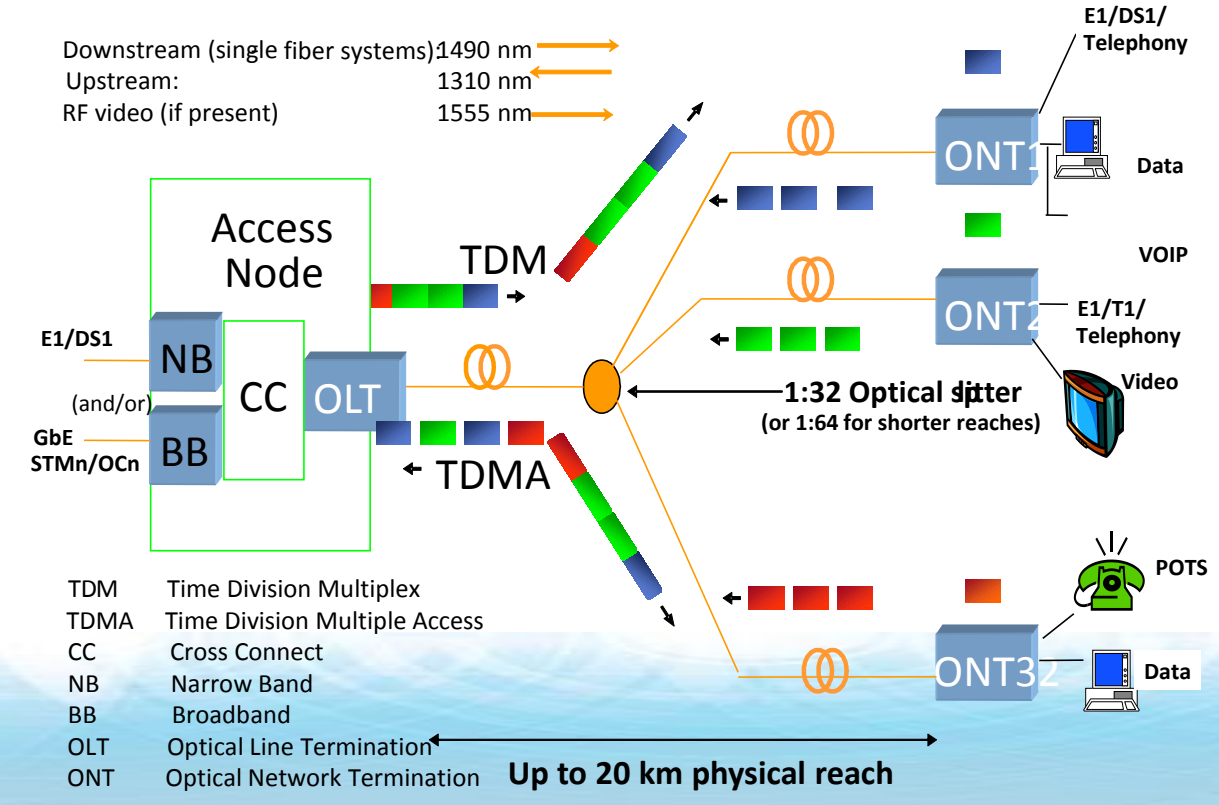
16.4.2015

TraceSpan™ Communications

Oživení základů PON

- **Downstream** – TDM transmission with multiple “listeners” (encryption to insure privacy by AES (Advanced Encryption Standard, 128-bit key)

- **Upstream** – TDMA transmission with upstream transmissions (bursts) scheduled to prevent overlap



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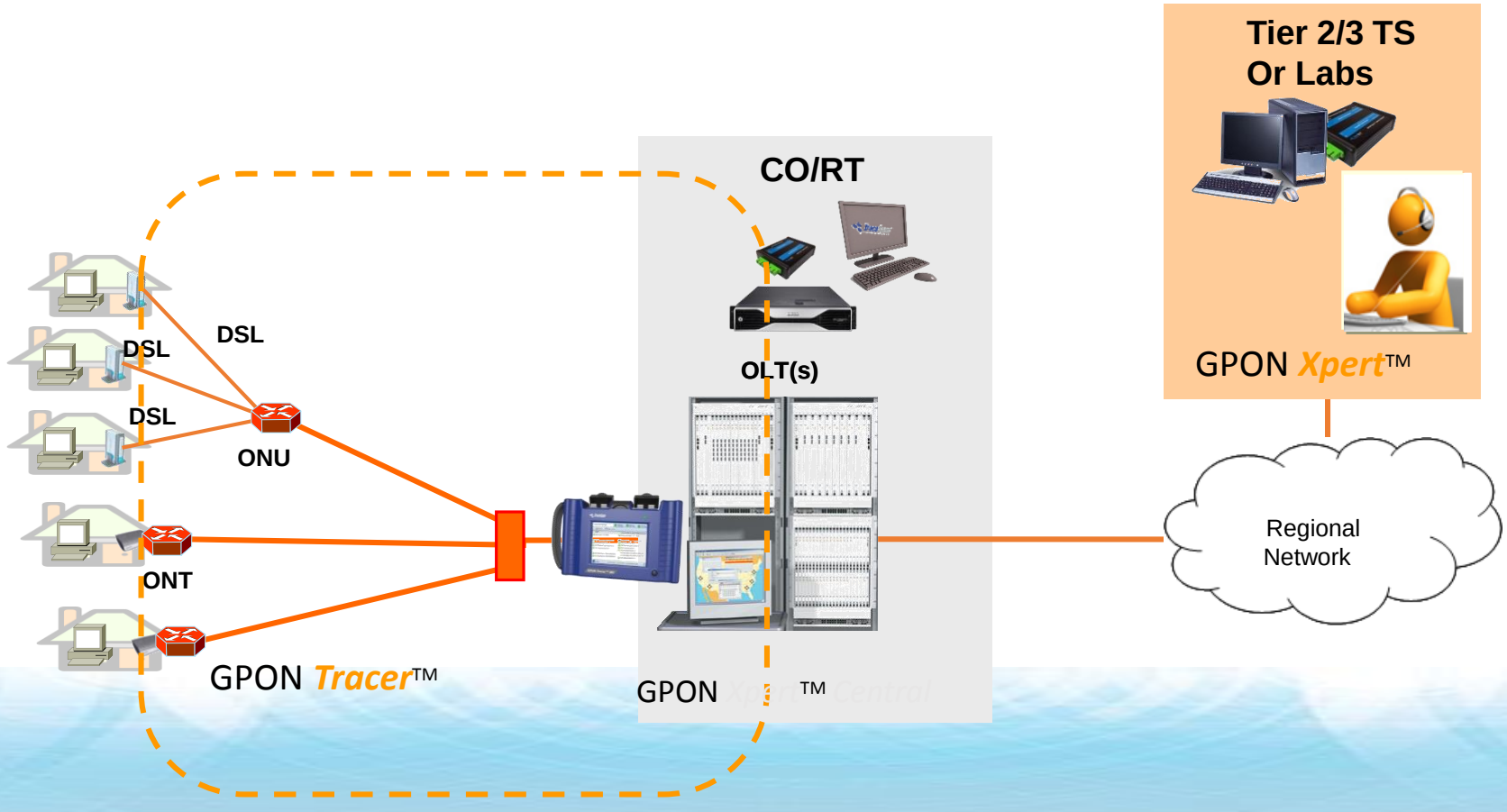
GPON Tracer™ – GPON Handheld Testing Solution

GPON Tracer Positioning



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GPON Tracer™ - Support and Operation Tester

- Network Topology – available for field engineers
- Downstream and upstream optical signal existence and optical power levels
- Data rates (downstream and upstream)
- Transmission errors (physical, protocol and data layers)
- Indications of ONU disconnections and service interruptions
- Graphs of network characteristics over time
- PON ID Identification
- Serial ID Identification, Password Identification
- Rogue ONU – Indication and Isolation

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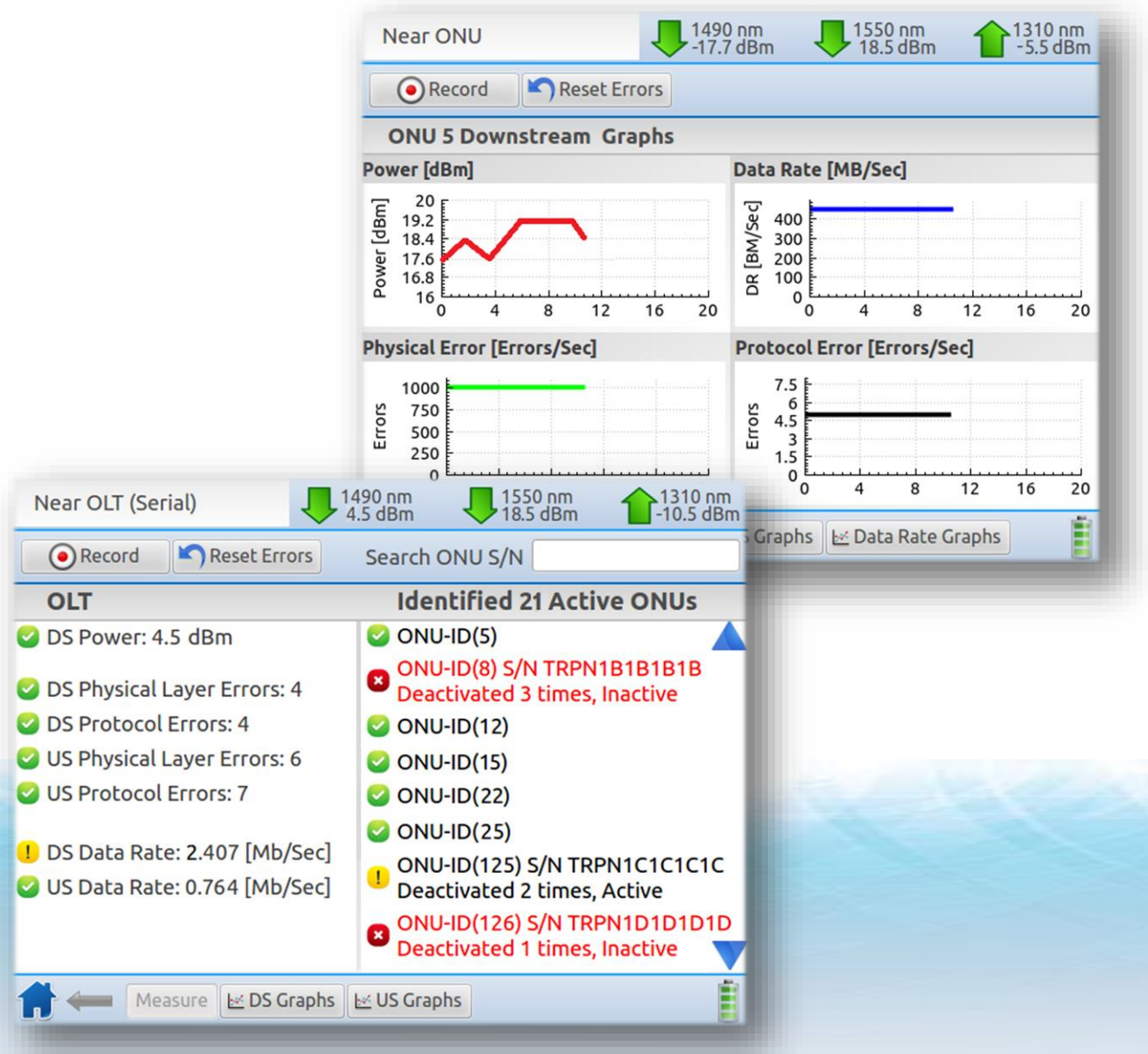
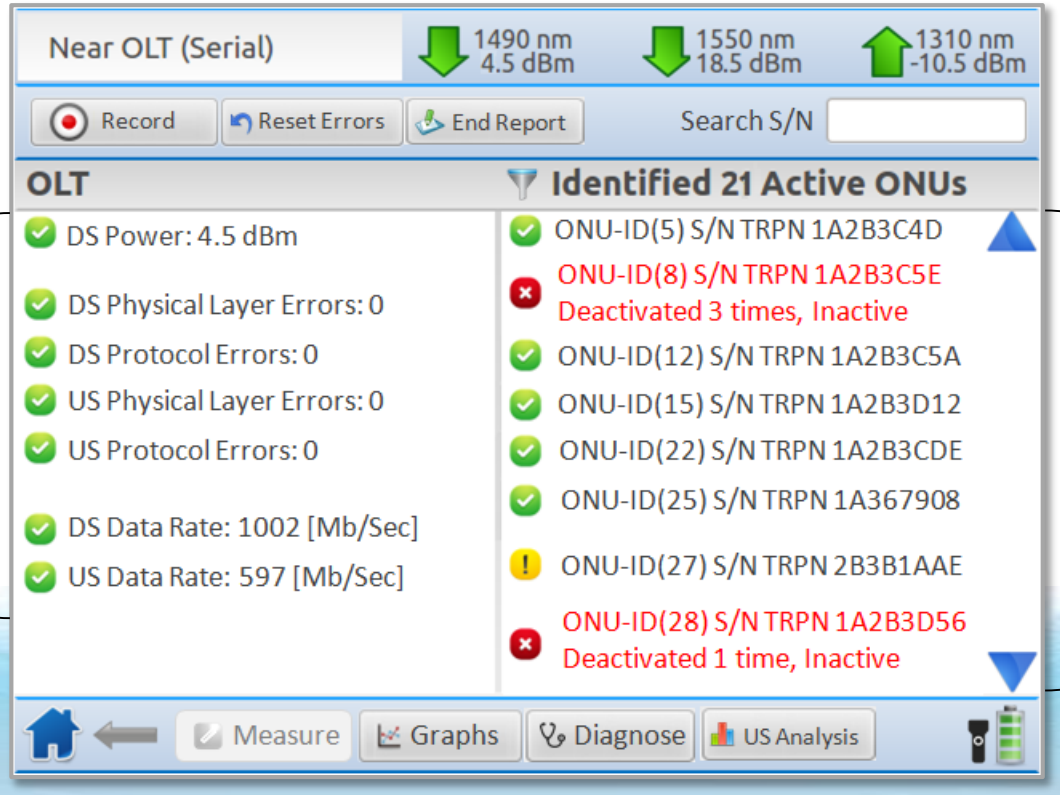
Identify and Isolate Problems

- Poor service...
  - Congestion - utilization, errors
  - Low power level caused by reflection or power budget
- Network Issues...
  - Equipment Problem such as Rogue ONU, disconnects, faulty OLT or ONT, IOP
  - Firmware problems
- *RCA “Root Cause Analysis”
  - Automatic Detection of Typical Problems



GPON Tracer Measurement Screen – OLT Side

- The indications at the OLT side are green, yellow or red according to the definitions in the Settings => Thresholds screen

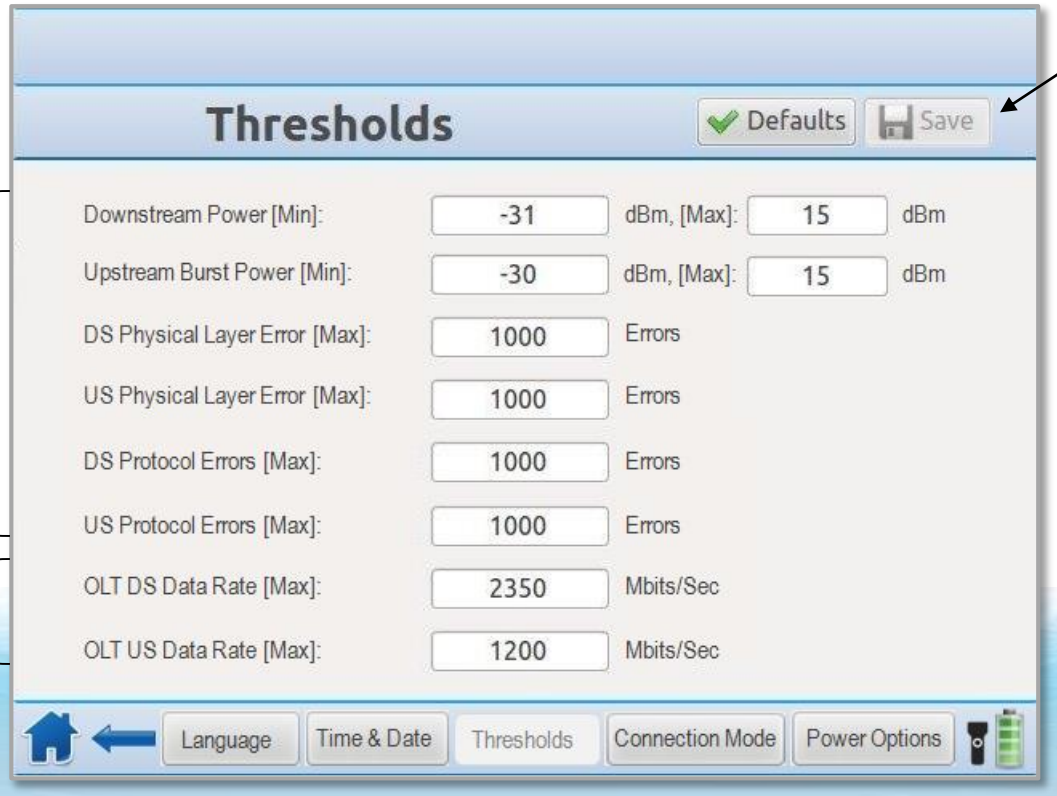


OLT (whole PON) Parameters

List of identified ONUs and their status (active/inactive) and deactivation history

Thresholds Screen

- The Thresholds determine the green, yellow and red indications in the Measure screens



After updating parameters you must save them for the update to take effect

These items will appear as green when within the thresholds and **red** when exceeding thresholds

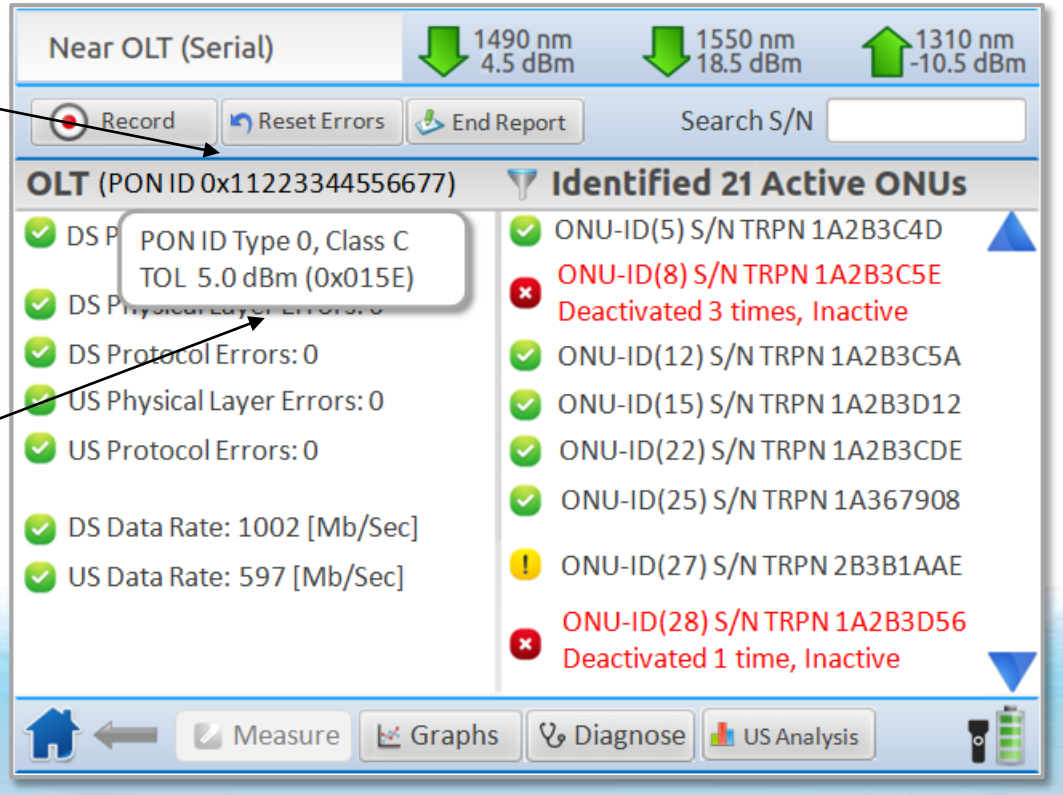
These items will appear as green when within the thresholds and **yellow** when exceeding thresholds

PON-ID Indication

- Displays the PON-ID and its details (whenever PON-ID maintenance is supported by the OLT)

PON-ID

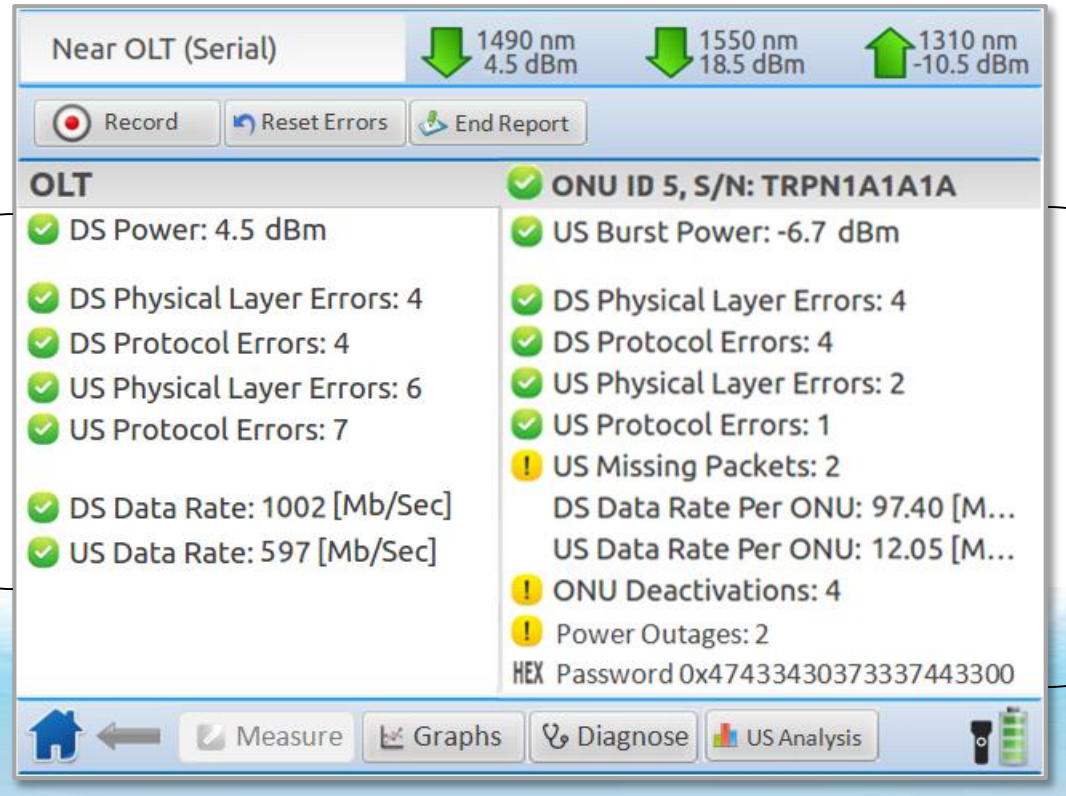
PON-ID Details – Appear when Touching the PON-ID



GPON Tracer Measurement Screen – Selected ONU

- The indications at the OLT side and the ONU side are green, yellow or red according to the definitions in the Settings => Thresholds screen

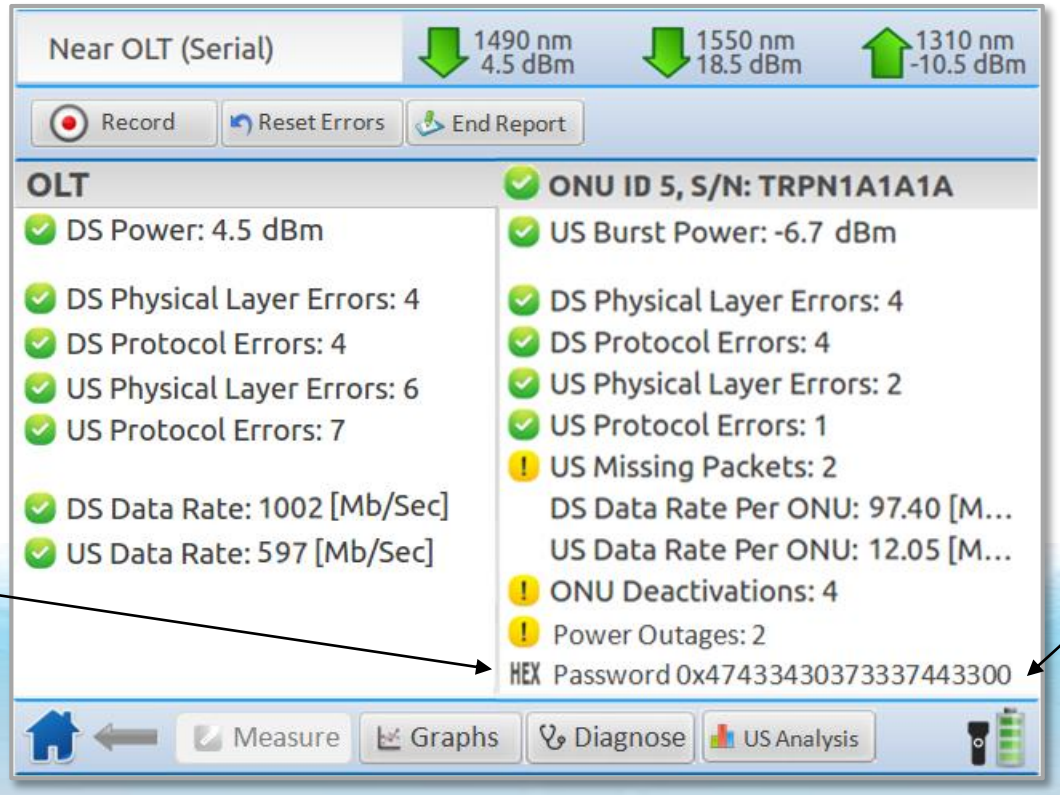
OLT (whole PON) Parameters



Parameters for the selected ONU

ONU Password Indication

- Indicates the password sent by the ONU
- Helps identify issues of ONU deactivation due to password conflict

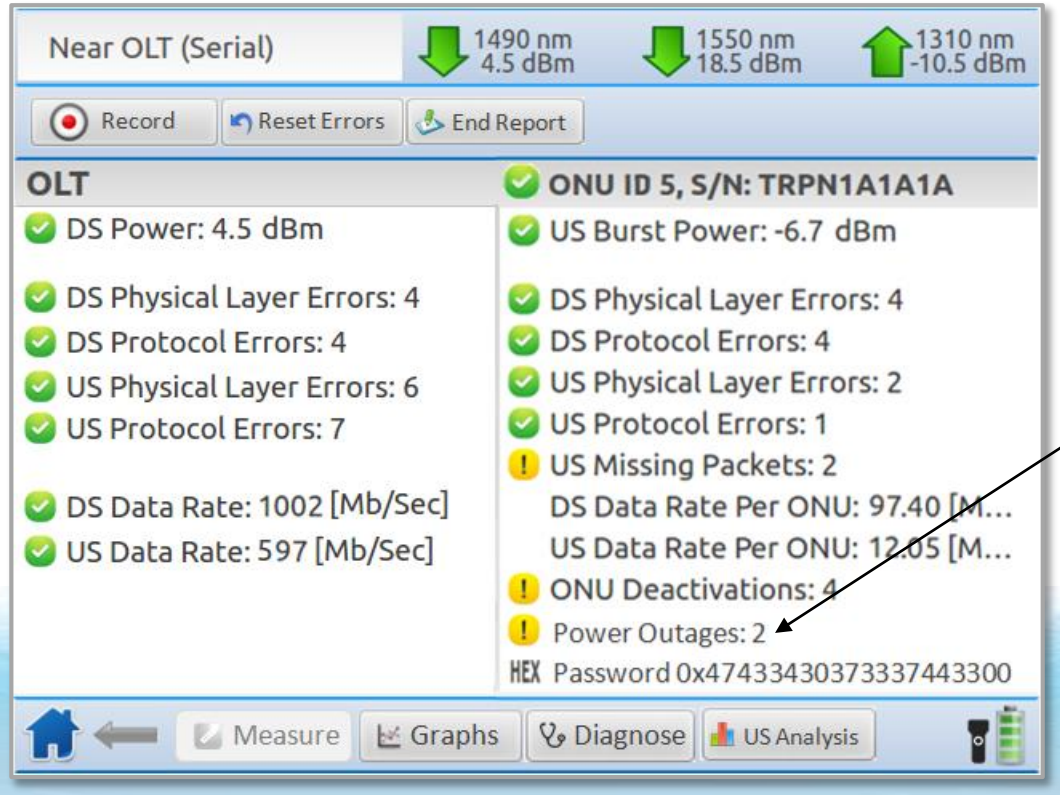


Clicking this icon toggles the password format between hexadecimal and ASCII

Password

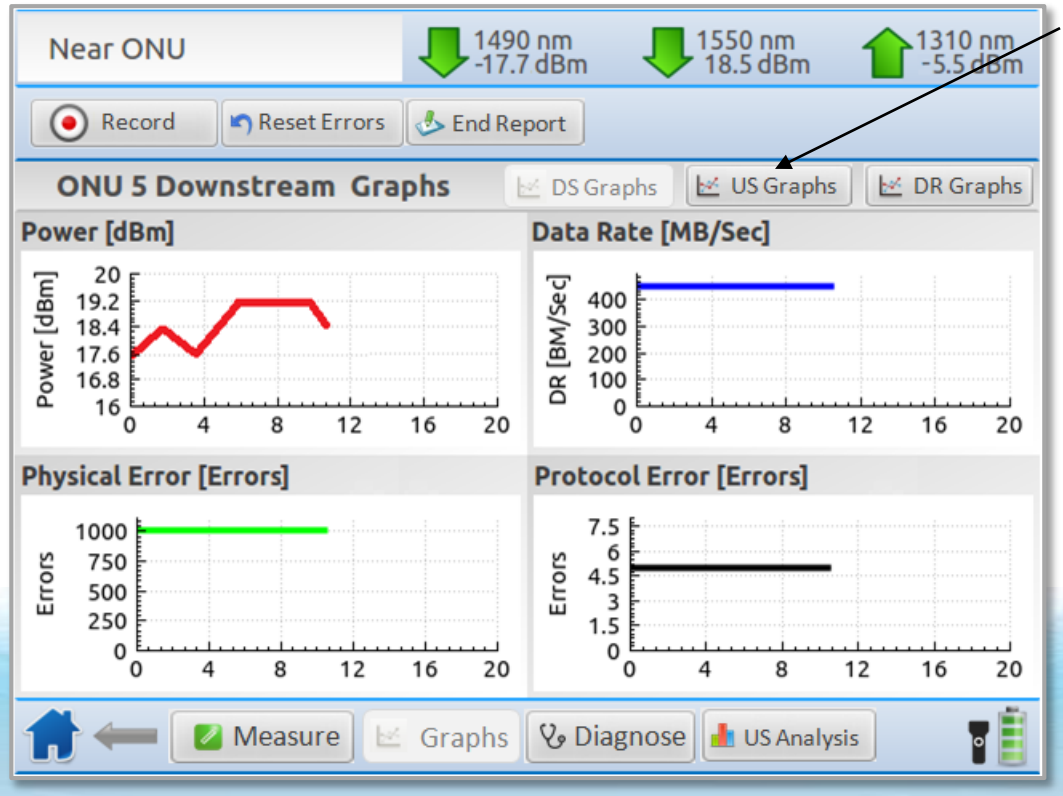
ONU Power Outage Indication

- Identifies ONU deactivations resulting from power outages or power disconnections



Indicates the number of ONU deactivations resulting from power outages

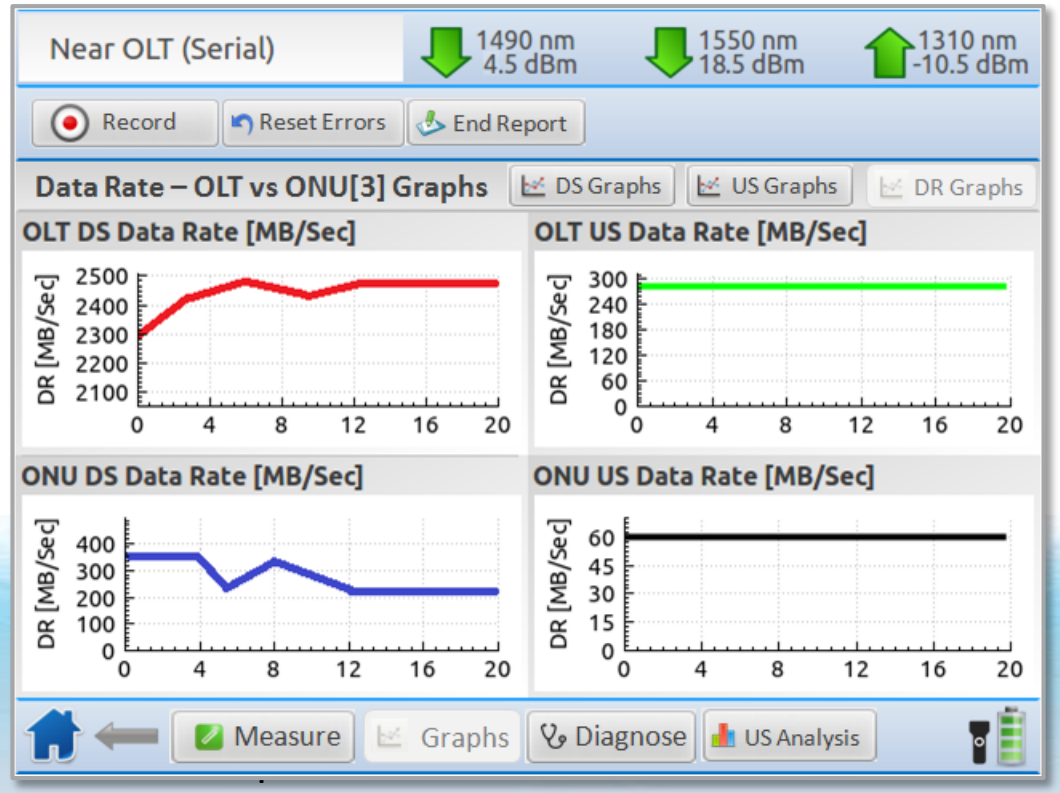
Downstream Graphs



The upstream graphs show similar information for the upstream direction

Data Rate Graphs

- Available when selecting a specific ONU
- Side-by-side presentation of the data rate for the selected ONU and the whole PON



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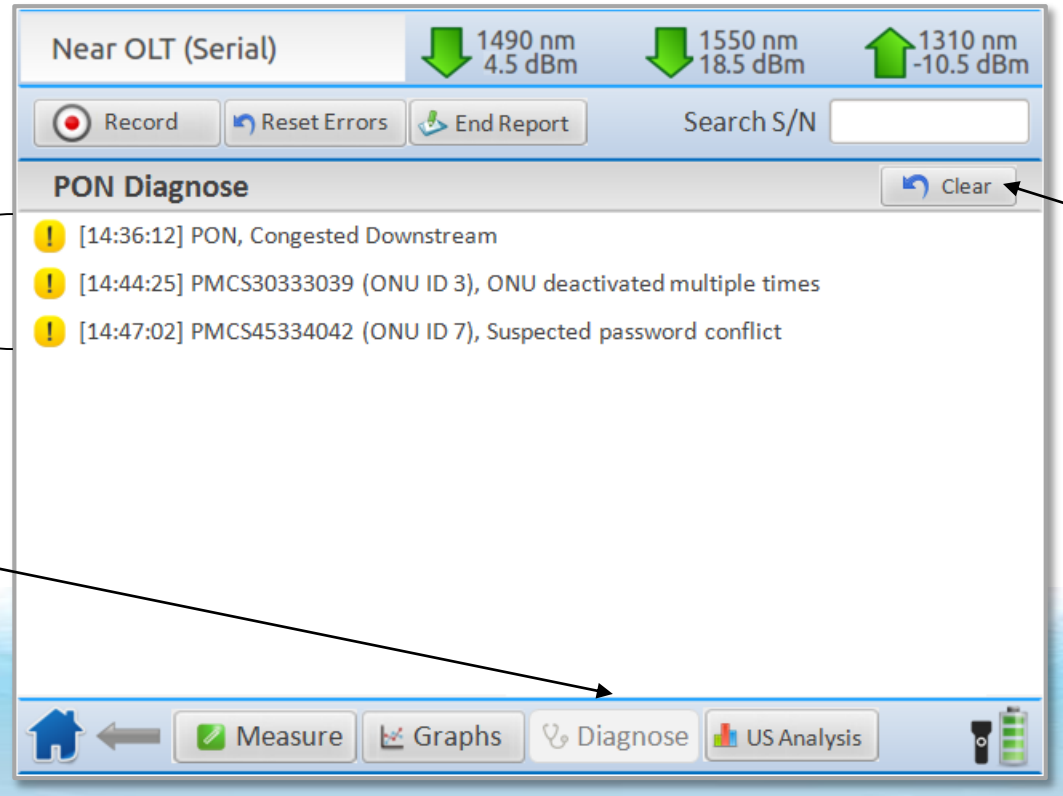
Identification and Diagnosis of Typical Issues

- Correlates the GPON Tracer measurements and indications with typical problems and failure scenarios, thus speeding up the troubleshooting process

Timestamp, severity indication and the suspected network element are indicated for every identified issue

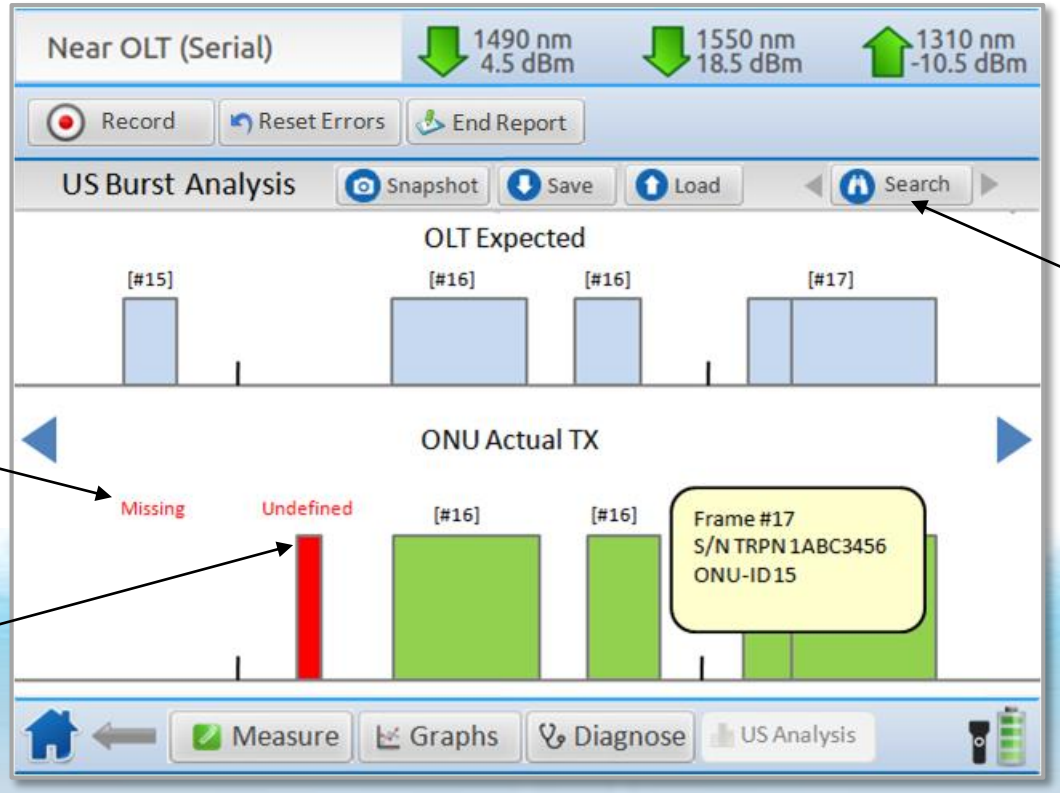


The list remains on the screen until cleared by the user

To view the list of identified issues navigate to the 'Diagnose' screen

Upstream Burst Analysis Screen

- Compares the planned upstream transmission (OLT BWmap allocations) with the actual transmission and presents it in a graphical format
- Immediately and easily highlights collision problems, missing bursts and Rogue ONU

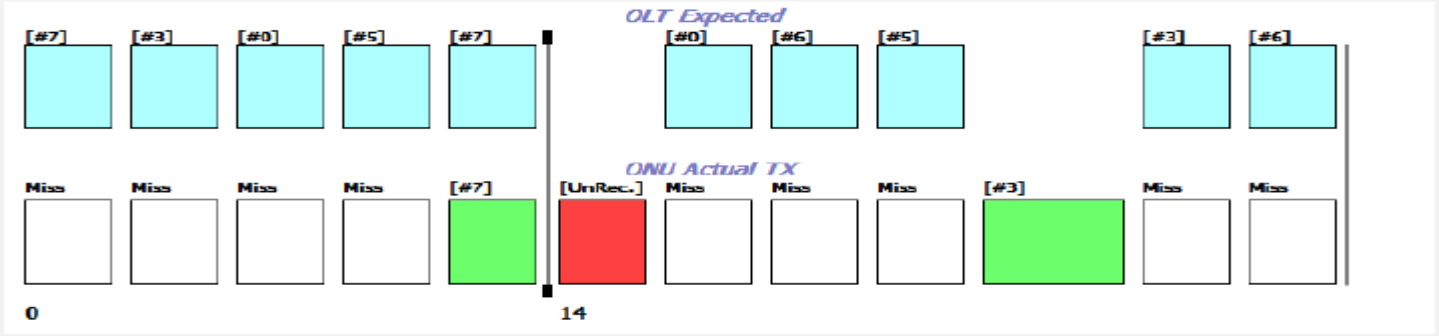


Missing burst (faulty or disconnected ONU)

Out-of-band transmission (rogue ONU)

Search function allows searching for specific ONU ID or type of problem

Rogue ONU



OLT Expected

	Frame #	ONU ID	Size	S/N
	0	7	87	PMCS44373039
	0	3	13	PMCS39383039
	0	0	6	PMCS38463039
	0	5	6	PMCS45333039
	0	7	6	PMCS44373039
	1	0	13	PMCS38463039
	1	6	13	PMCS35393039
	1	5	13	PMCS45333039
	1	3	6	PMCS39383039
	1	6	6	PMCS35393039

ONU Actual TX

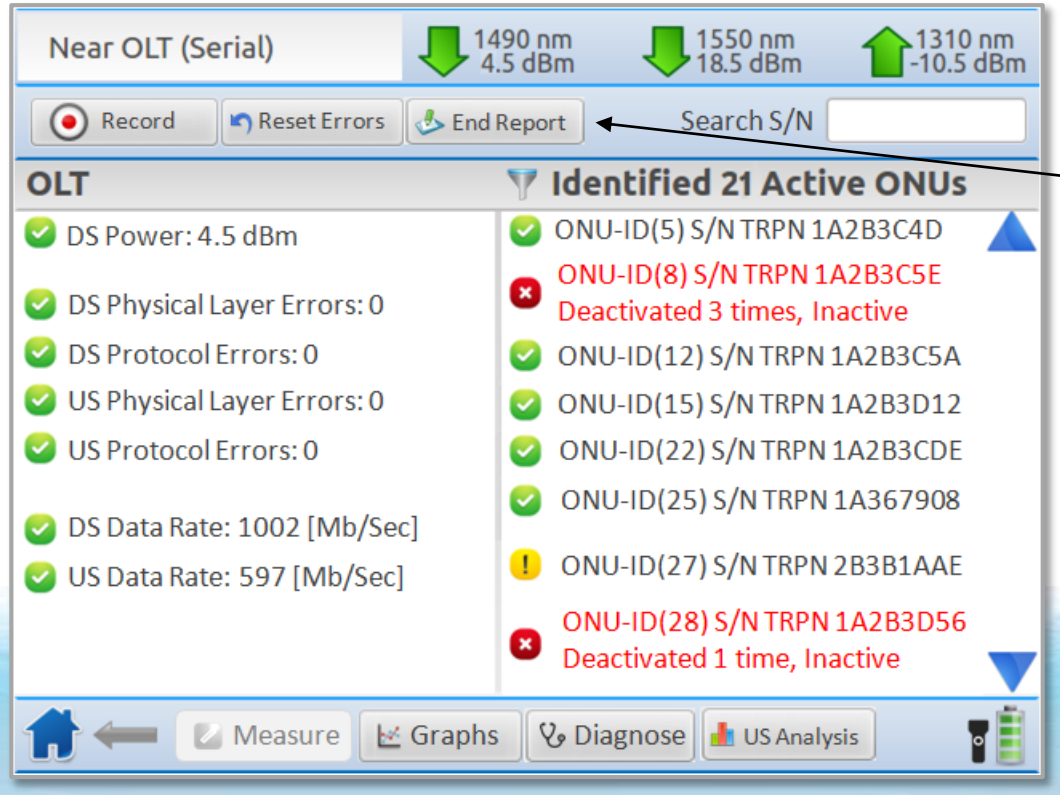
	Frame #	ONU ID	Size	S/N
	0	Miss	87	
	0	Miss	13	
	0	Miss	6	
	0	Miss	6	
	0	7	6	PMCS44373039
	1	UnRec.	10	PMCS45333039
	1	Miss	13	
	1	Miss	13	
	1	Miss	13	
	1	3	150	PMCS39383039
	1	Miss	6	
	1	Miss	6	

Legend

	Proper upstream transmission
	Proper downstream transmission
	Missing upstream transmission
	Upstream ranging transmission
	Unrecognized upstream transmission

Report/End Report Button (1)

- A report file is generated automatically for each measurement
- The user can stop saving data to the file by touching the 'End Report' button



Touch the button to end the report generation

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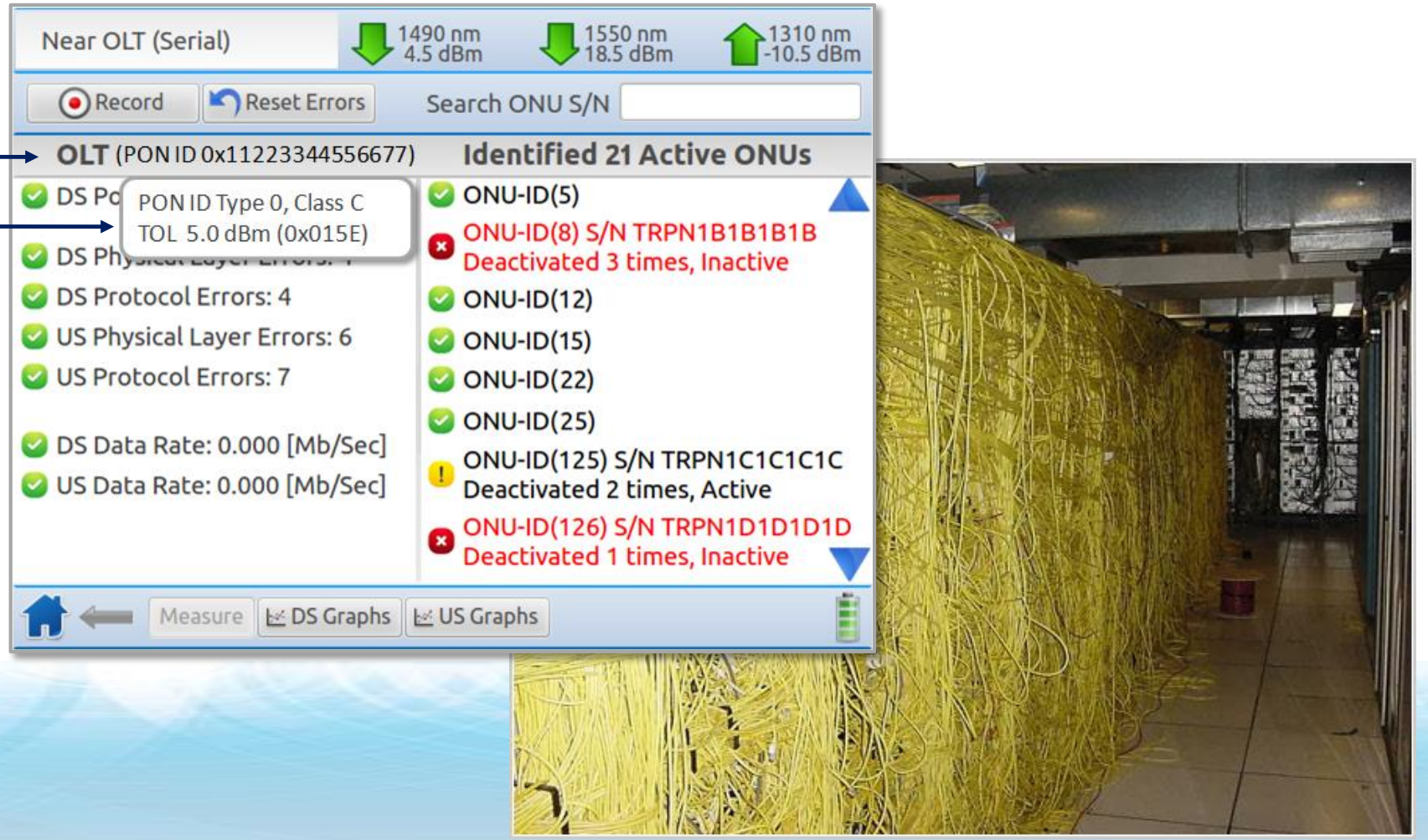
Cable Identification (PON ID)



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GPON Tracer IPTV Service Analysis Solution

- Expands the functionality of GPON Tracer by allowing its users to **troubleshoot IPTV services on-site**
- Analyzes the IPTV channels on the network and presents a variety of service quality metrics for each these channels
- Runs on a laptop and analyzes a recording file

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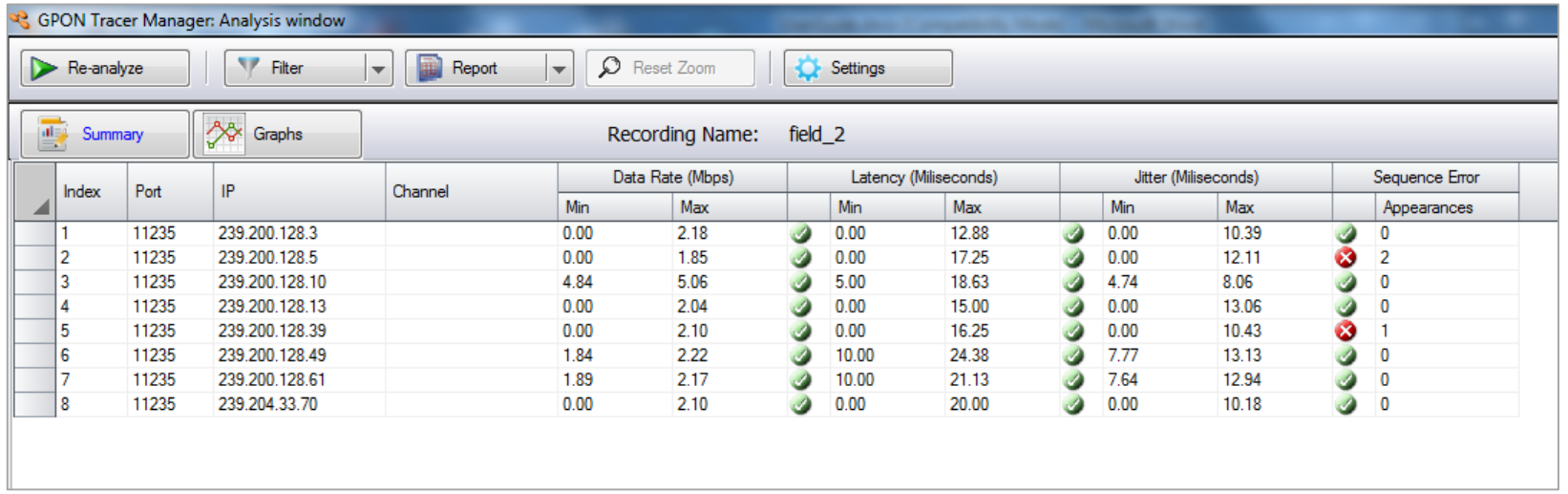
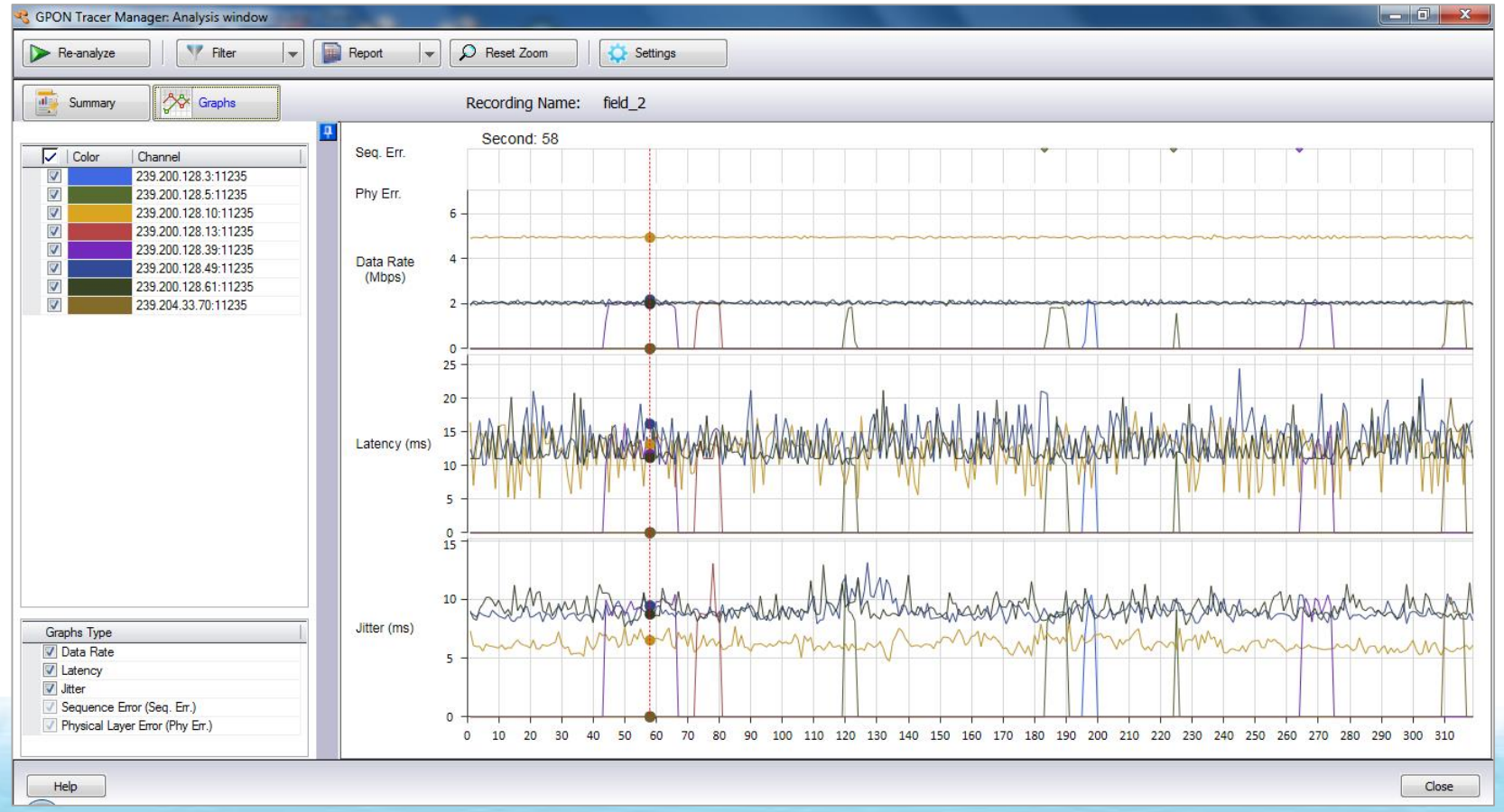
Service Analysis Tool – Summary Screen

- Presents the list of identified Multicast IPTV channels and service metrics for each one



Index	Port	IP	Channel	Data Rate (Mbps)		Latency (Miliseconds)		Jitter (Miliseconds)		Sequence Error
				Min	Max	Min	Max	Min	Max	Appearances
1	11235	239.200.128.3		0.00	2.18	0.00	12.88	0.00	10.39	0
2	11235	239.200.128.5		0.00	1.85	0.00	17.25	0.00	12.11	2
3	11235	239.200.128.10		4.84	5.06	5.00	18.63	4.74	8.06	0
4	11235	239.200.128.13		0.00	2.04	0.00	15.00	0.00	13.06	0
5	11235	239.200.128.39		0.00	2.10	0.00	16.25	0.00	10.43	1
6	11235	239.200.128.49		1.84	2.22	10.00	24.38	7.77	13.13	0
7	11235	239.200.128.61		1.89	2.17	10.00	21.13	7.64	12.94	0
8	11235	239.204.33.70		0.00	2.10	0.00	20.00	0.00	10.18	0

Service Analysis Tool – Graphs



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GPON Tracer – Additional features

- IPTV Service Analysis
- ONU stand-alone test (OLT emulation)
- Infrastructure for multi-language support
- Triggers
- Remote Access

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Děkuji za pozornost !

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