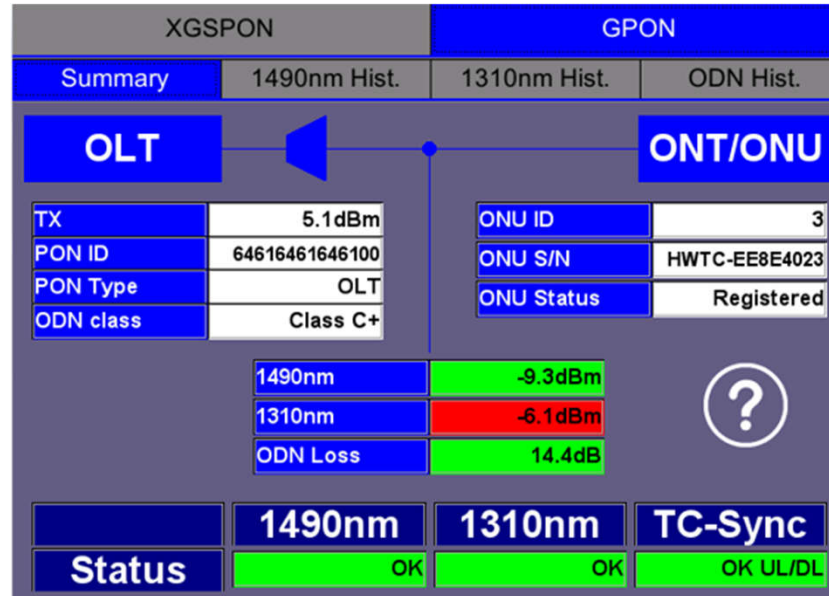
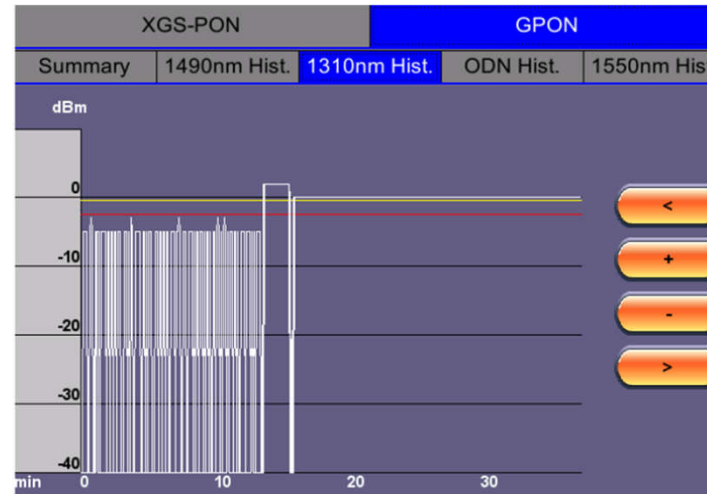
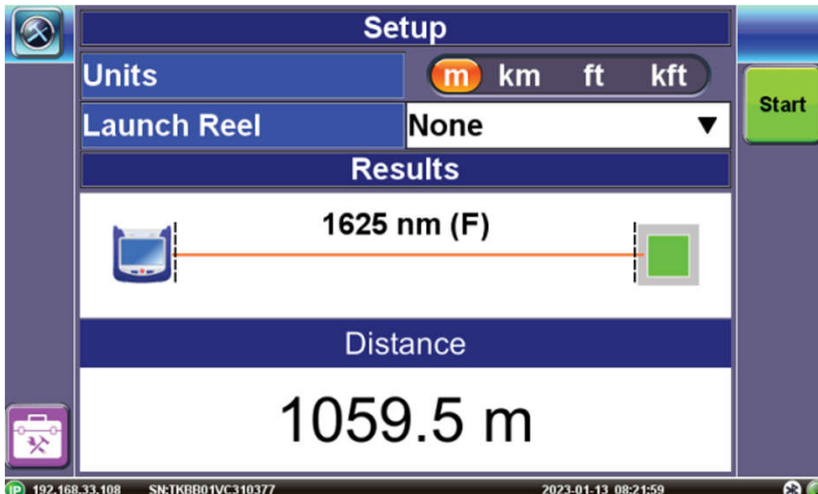


1. PON Optical Measurements

- Dual Pass-Through Meter
- ODN Link Loss
- OLT Tx Level (with Pass/Fail)
- Fault Locator
- Power Level Histogram



Next Gen FX120 PON Analyzer



2. PON Service Verification

- PON-ID/Type/Class
- **ONU Status**
(Registered/Unregistered/Deactivated)
- TC-Sync per ITU-T
- Active ONT/ONU list
- **PLOAM Capture/Decoding**
- **OC Decoding**
- **Super PM** – Advanced Splitter and Distribution Cabinet Analysis

| ONU S/N | ONU ID | ONU S/N | ONU ID |
|--------------|--------|---------------|--------|
| HWTC-a52ffb2 | 0 | HWTC-d13a0b48 | 1 |
| * | * | * | * |
| * | * | * | * |

| PLOAM Decoder | |
|------------------------------|-------|
| Filter Upstream Overhead | Allow |
| Filter Serial Number Mask | Allow |
| Filter Assign ONU-ID | Allow |
| Filter Ranging Time | Allow |
| Filter Deactivate ONU-ID | Allow |
| Filter Disable Serial Number | Allow |
| Filter Configure VP/VC | Allow |
| Filter Encrypted Port-ID | Allow |
| Filter Request Password | Allow |
| Filter Assign Alloc-ID | Allow |
| Filter POPUP | Allow |
| Filter Request Key | Allow |
| Filter Configure Port-ID | Allow |
| Filter PFE | Allow |

| | | |
|-------------|----------------------------|-----------|
| PON-ID Type | RE Flag | 0b1 |
| | ODN class | 0b1 |
| | DS FEC Flag | 0b0 |
| | P Flag | 0b0 |
| | Link Type | 0b0 |
| PON ID | Administrative Label | 0x6465646 |
| | DWLCH ID | 0x5 |
| R | Reserved | 0b0 |
| C | TX Optical Level Reference | 0b0 |
| TOL | Transmit Optical Level | 0x161 |

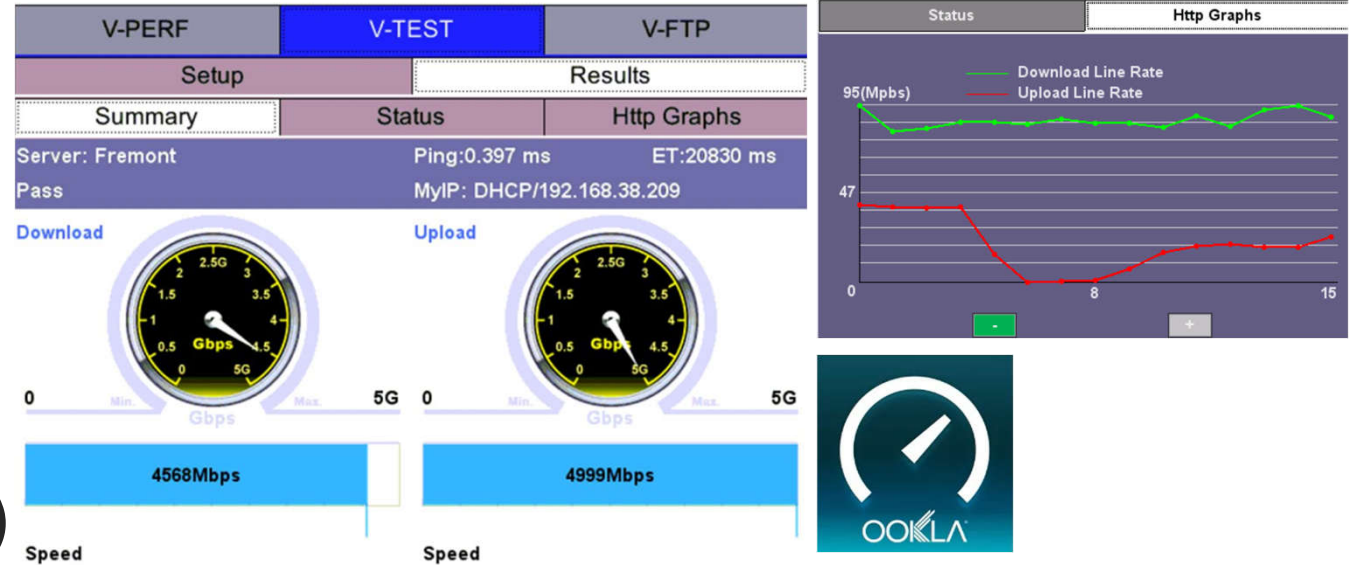
Decode Details

Dir: Down
 ID: Broadcast
 Message: Upstream_Overhead
 Number of Guard bits: 32
 Number of Type 1 pre-amble bits: 0
 Number of Type 2 pre-amble bits: 0
 Delimiter byte 1: 0xab
 Delimiter byte 2: 0x59
 Delimiter byte 3: 0x83
 Delay pre-equalization status: Use pre-assigned value
 SN_Mask status: Disabled
 Max extra SN transmissions: 0
 Default ONU transmit level: Mode 0: Normal

| Dir | Time | Id | Message |
|------|--------------------------|-------|-------------------|
| Down | 23/01/13 07:01:44.985375 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:44.985500 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:47.338000 | Broad | PON-ID |
| Down | 23/01/13 07:01:50.685500 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:50.685625 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:50.685750 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:52.338500 | Broad | PON-ID |
| Down | 23/01/13 07:01:56.385625 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:56.385750 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:56.385875 | Broad | Upstream Overhead |
| Down | 23/01/13 07:01:57.338125 | Broad | PON-ID |
| Down | 23/01/13 07:02:02.085875 | Broad | Upstream Overhead |
| Down | 23/01/13 07:02:02.086000 | Broad | Upstream Overhead |
| Down | 23/01/13 07:02:02.086125 | Broad | Upstream Overhead |

3. IP & Layer-4 Testing

- Ookla Speedtest (Manual/Auto Selection)
- TCP/UDP Throughput as per RFC6349 (Client/Server)
- iPerf3 Client/Server, MTU Search, RTT
- FTP Throughput (Client/Server)
- **Loopback Mode (Local/Remote) (L2/L3)**
- PCAP, Built-in Wireshark, Ping, Traceroute



Packet Capture

Result Saved
as: 20170517_142041DUAL.pcap

OK

Remote Partner Control Tool

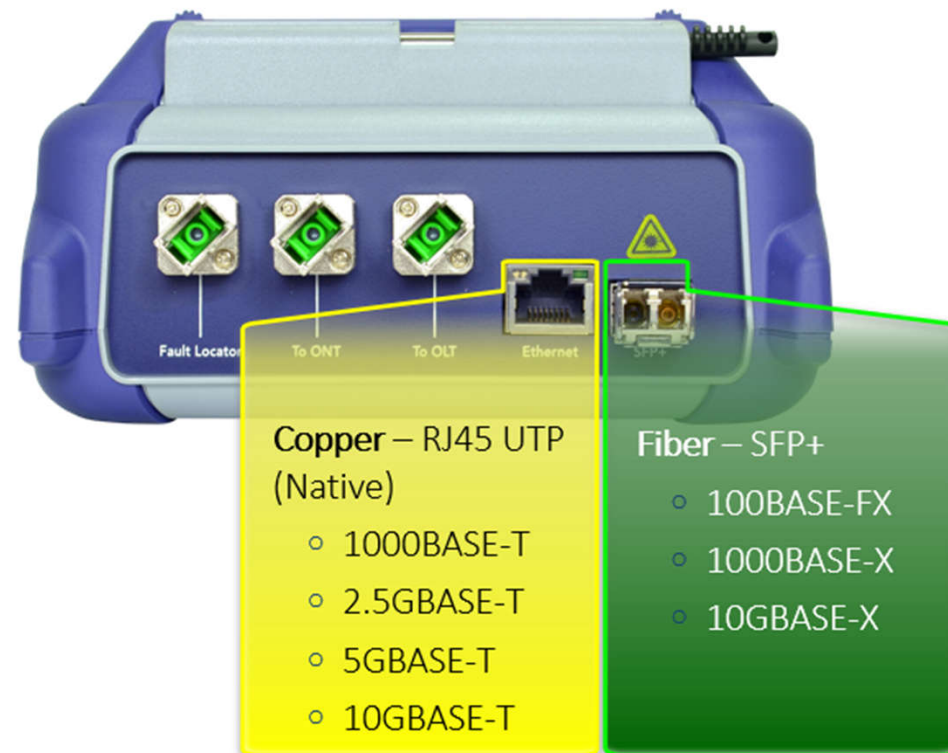
Loopback Control

| | |
|-----------------|-------------------|
| Partner Address | X-Loop |
| Test Layer | Layer 2 |
| Loop Mode | Broadcast |
| Mac | 00-18-63-01-21-EE |
| VLAN | Disabled |

| V-PERF | | V-TEST | | V-FTP | |
|-----------------|---------|-----------------|------------|--------|-------|
| Setup | | | Results | | |
| Global | | | Per Stream | | |
| Status | Summary | Graphs | MTU | RTT | Event |
| MTU Size(bytes) | 10000 | MSS Size(bytes) | 9960 | Status | PASS |

All Rates, All Interfaces, Native Multi-Gig Port

- Native port for Electrical 1G/2.5G/5G/10G (no Copper SFP required)
- SFP+ Port
- Test results encoded to QR code for ease of sharing via mobile devices (NoApp)
- 5" Display, battery operated, WiFi/BT, touchscreen
- Full remote control (VNC & Cloud) with result management (EZRemote)
- Lifetime Free FW updates



**Copper – RJ45 UTP
(Native)**

- 1000BASE-T
- 2.5GBASE-T
- 5GBASE-T
- 10GBASE-T

Fiber – SFP+

- 100BASE-FX
- 1000BASE-X
- 10GBASE-X

Add-on OTDR Companion Module

- 1310/1550/1625nm with support for PON/Splitter loss analysis
- Fiber link map
- SOR files
- Fits in the same pouch with FX120 and charged via FX120



Splitter & Distribution Cabinet Audit

- Survey fiber connections in street cabinets – verify all ONTs serial numbers plugged into each panel port – test on the splitter side and on distribution panel side.
- Sync database records with actual field results, all saved in a single test result file; repair connection discrepancies that may be result of undocumented changes by service technicians.
- Libraries and graphical displays limit risk of errors
- Bind ONTs by SN to providers when multiple providers co-locate in a street cabinet; simplifies full audit of the street cabinet.

| | A | B | C | D |
|---|------|----------|---------------|----------------|
| 1 | Rack | Position | SSN | PON ID |
| 2 | 1 | A01 | HWTC-EE8E4023 | 64616461646100 |
| 3 | 1 | A02 | HWTC-42800E9A | 64616461646100 |
| 4 | 1 | A03 | No S/N | 64616461646100 |
| 5 | 1 | A04 | Empty | * |
| 6 | 1 | A05 | Empty | * |
| 7 | 1 | A06 | Empty | * |
| 8 | 1 | A07 | Empty | * |

- O = SN Assigned
- L = Empty port
- N = No SN assigned
- ... scanning/processing

