FX81T-25G 1G/10G/25G PON Terminated Meter

While XGS-PON deployments continue to rapidly grow, some cutting-edge technology and high-density applications require even higher data rates. 25G PON is filling that role, and trials and deployments have begun with no dedicated test equipment available.

The FX81T-25G is the first 25G PON test solution on the market, measuring 25G PON downstream (1358 nm) power along with GPON/EPON and XG-PON/10G-EPON. It provides instant and accurate readings as well as automatic pass/fail testing based on recommendations from the 25GS-PON MSA Group and standards bodies.

The FX81 PON power meter supports legacy EPON/GPON and next generation XG(S)-PON/10G EPON technologies. The unit is available in four or five wavelength configurations depending on RF Video Overlay (RVO) test requirements. The four-wavelength version can be equipped with a broadband power option which is suited to legacy applications including CWDM.

A key feature of all FX81 pass-through versions is its low loss coupler that automatically taps and filters the downstream and upstream wavelengths of each PON technology present. The filtered signals are measured using calibrated, high-performance photo-detectors.

Key Features

- Compatible with both GPON and EPON fiber networks
    - GPON, XG(S)-PON, and 25G PON test applications
    - EPON and 10G-EPON test applications

- 4 models available:
    - 2 λ non-pass-through/terminated DS: 1490/1577nm (FX81T)
    - 3 λ non-pass-through/terminated DS: 1358/1490/1577nm
    - 4 λ pass-through DS: 1490/1577nm, US: 1310/1270nm
    - 5 λ pass-through DS: 1490/1550/1577nm, US: 1310/1270nm

- Concurrent measurements display

- Fixed SC/APC Interface for ONU and OLT test ports

- Programmable thresholds with Pass/Fail indication

- Optional broadband power meter with universal adapters
    - WaveID support when paired with compatible VeEX source

- Non-volatile storage for 1920 OPM

- Flexible data transfer, test result management and report generation options using:
    - Patent-pending NoAppTM QR code transfer
    - LT-Sync PC software (microUSB or optional Bluetooth)

- FiberizerTM for Android, Windows, and cloud

- High contrast LCD - visible outdoors, programmable backlight for indoor or low light conditions

- Battery: Built-in, rechargeable Li-polymer
- Battery operating time (with backlight):
    - FTTx PON mode: >25 hours

Optical Power Meter (OPM) Comparison for Passive Optical Networks (PON)

| VeEX Model #	FX40/45/48	FX41xT	FX81T (2WL)	FX81 (4WL)	FX81 (5WL)
Measurement Type - Broadband OPM - Filtered PON OPM	Yes No	Yes - optional Yes	Yes - optional Yes	Yes - optional Yes	No Yes
PON Technology - GPON/EPON - XGS-PON/10G EPON	Yes Yes - Unfiltered	Yes Yes	Yes Yes	Yes Yes	Yes Yes
Signal Connection Method	Terminated	Terminated	Terminated	Pass-Through	Pass-Through
Downstream Level (dBm) - GPON/EPON (1490 nm) - XGS-PON/10G EPON (1577 nm)	Yes - Unfiltered Yes - Unfiltered	Yes - Filtered Yes - Filtered	Yes - Filtered Yes - Filtered	Yes - Filtered Yes - Filtered	Yes - Filtered Yes - Filtered
Upstream Level (dBm) - GPON/EPON (1310 nm) - XGS-PON/10G EPON (1270 nm)	Not supported Not supported	Not supported Not supported	Not supported Not supported	Yes - Filtered Yes - Filtered	Yes - Filtered Yes - Filtered
RF Video Overlay (RVO) - 1550 nm	Yes – Unfiltered*	Yes – Unfiltered (BB-OPM option)	Yes – Unfiltered (BB-OPM option)	Yes – Unfiltered (BB-OPM option)	Yes - Filtered
Visual Fault Locator (VFL)	Optional Certain models	Yes – optional Check limitations	No	No	No
Interfaces - Micro-B USB - Bluetooth	Yes No	Yes - charging No	Yes Optional	Yes Optional	Yes Optional
Test Results Transfer	PC software or QR code	QR code	QR code	QR code	QR code
Optical Adapters - BB-OPM port - PON OPM port	SC, FC, LC* N/A	SC, FC, LC* SC/APC	SC, FC, LC* SC/APC	SC, FC, LC* SC/APC	N/A SC/APC
Battery Type	Alkaline NiMH optional	Alkaline NiMH optional	Li-Polymer	Li-Polymer	Li-Polymer

PON Test Application

Optical power measurements can be performed at the OLT, co-existence filter (CEx), splitters, and ONT depending on the operational status of the network. Pass/Fail signal level limits are typically based on ODN class or user defined thresholds.

Network Construction Testing

"Terminated" signal type OPMs are generally used to test out-of-service networks. In some legacy GPON situations where only a single wavelength is present, a standard broadband OPM can be used - however a specialized filtered PON OPM is always recommended.

- **GPON/EPON networks without 1550 nm RF Video Overlay (RVO)** - A standard, unfiltered Broadband Optical Power Meter (OPM) can be used to conduct downstream power measurements at 1490 nm. Upstream PON level measurements at 1310 nm are not possible.

- **GPON/EPON networks with 1550 nm RF Video Overlay** – A standard, unfiltered Broadband Optical Power Meter (OPM) cannot be used, since the two wavelengths present on the fiber will result in a composite measurement of both. A PON OPM is required to separate the 1490 nm and 1550 nm signals to perform downstream level measurements. Upstream level measurements at 1310 nm are not possible.

- **Hybrid GPON/XG(S)-PON networks** – A suitable PON OPM is required to filter the 1490 and 1577 nm signals to perform downstream level measurements. The OPM's photodetectors must be calibrated at each wavelength to ensure the levels of the respective GPON and XG(S)-PON services are correct. Upstream PON level measurements at 1270 and 1310 nm are not possible.

Combo PON deployment
(G-PON with XGS-PON or 1G EPON with 10G EPON)
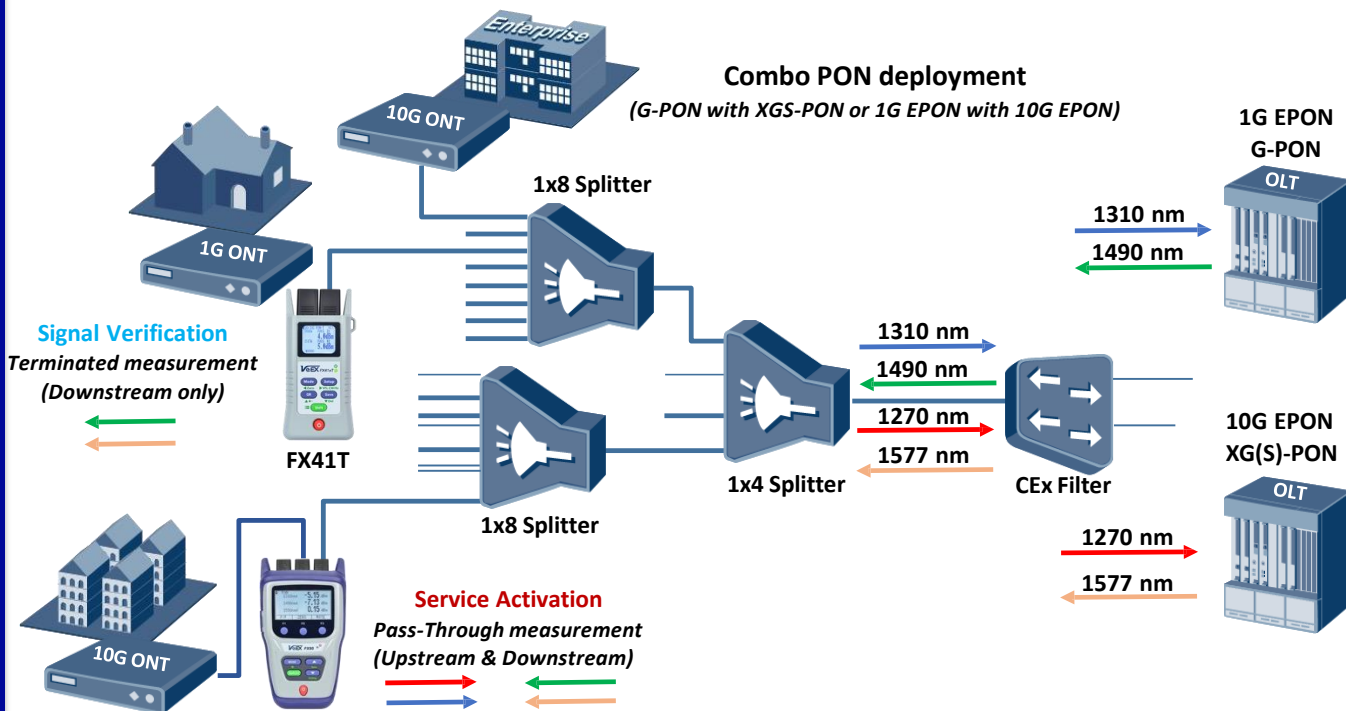
PON Test Results

The short- and long-term value of test data cannot be overstated – the inability to collect this crucial information from field technicians at the   job site hampers any diligent record keeping effort needed to establish accurate key performance indicators (KPI) of FTTx network installation and service activation performance. Until now, service providers have been somewhat "handicapped" trying to capture test results from basic instruments such as optical power meters simply because the price point of these types of instruments limits their test result transfer and connectivity options. Some premium optical power meters can be equipped with USB or Bluetooth connectivity, but often these options exceed already strained customer budgets or are incompatible with Apple mobile platforms. On the other hand, maintaining and updating multiple versions of PC software or "bug free" Apps for different mobile operating systems (OS) and their different derivatives takes enormous time and skilled resources - new releases are usually not vetted or accepted by large service providers' IT departments impeding their immediate or agile implementation.

VeEX "NoApp™" Feature

VeEX has well understood these basic instrument limitations along with the dilemma it poses for service providers. Thanks to some pioneering thinking, coupled with advances in mobile device technology, VeEX has introduced its patent pending "NoApp" connection-less feature for all its handheld instruments, including its PON optical power meters. The tester operates and saves test data as usual, and the results can be displayed in an industry standard QR code format. After scanning the QR code with their mobile device, field technicians have the option to geo-tag, augment, comment and save results, print in PDF format, or simply email or upload results to a cloud-based VeEX R-server workflow, asset and results management system. No mobile app IT approvals, installation or updates required.

| PON OPM Measurement | PON Results in QR code | Scan QR code with Mobile Device | Process/Upload PON OPM Results |

Installers/Contractors

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NoApp enables installers and contractors to securely upload their PON OPM test results to a segregated area in VeEX's R-Server using their mobile device. The ability to upload test results directly from the job site via a mobile internet connection ensures the data is captured quickly and efficiently as soon as the on-site work is completed. R-Server not only serves as a repository for test records, but various attributes embedded in the test data can be used to monitor compliance reporting, analyze installation trends, and workforce performance, including related productivity improvements.