Quick guide to testing FTTH

Solutions and insights from installation to repairs.

Smarter network in sight™

EXFO

> We bring you the essential tools to power through your transformation.

Quick guide to testing FTTH

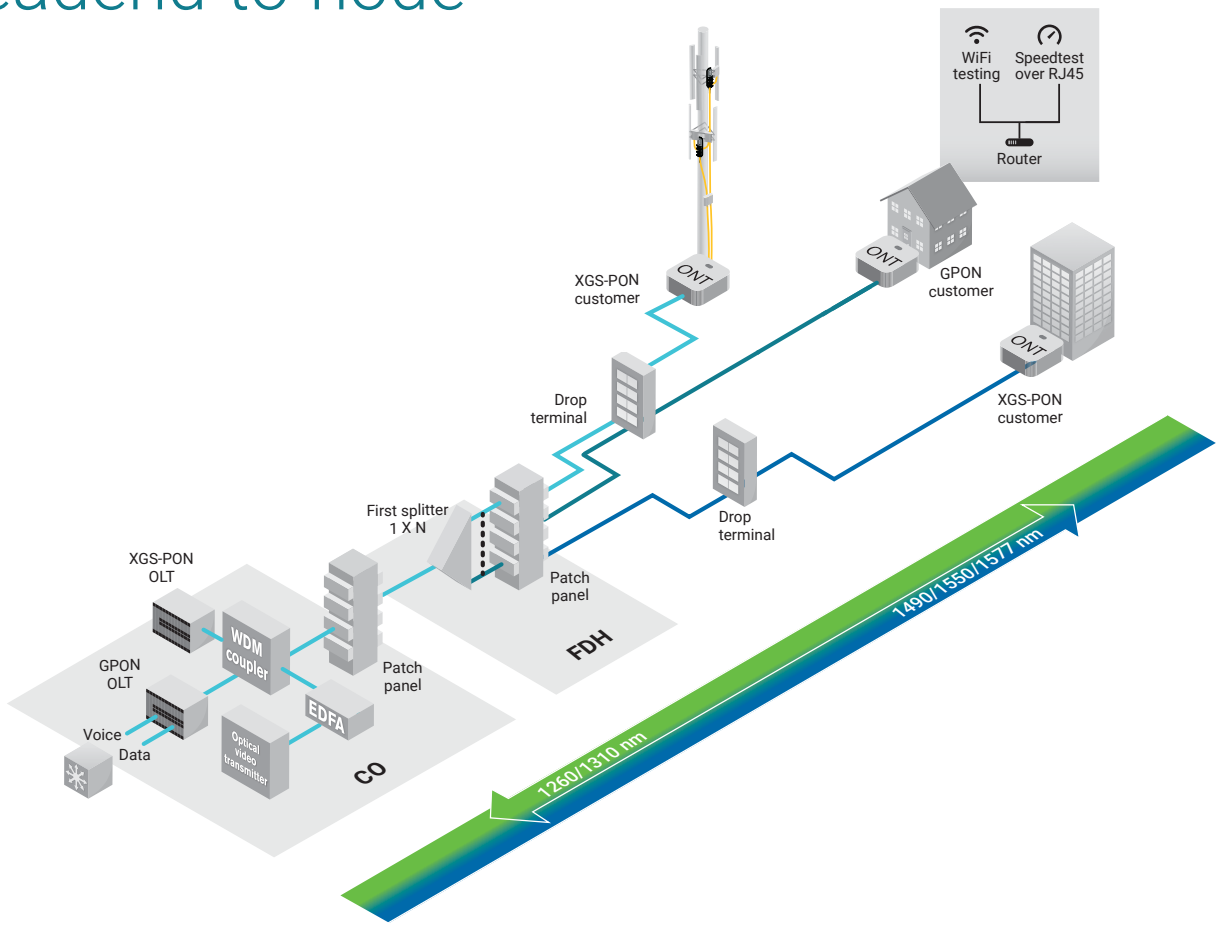
The demand for high-quality broadband services is driving FTTH rollouts worldwide. With more stringent service-level agreements, it is vital to install optical networks right the first time and to keep them running at the highest standards.

In today's complex network landscape, the right tool set gives technicians a powerful edge in addressing typical tasks from construction to service activation.

About EXFO

EXFO develops smarter test, monitoring and analytics solutions for the global communications industry. We are trusted advisers to fixed and mobile network operators, hyperscalers and leaders in the manufacturing, development and research sector. They count on us to deliver superior visibility and insights into network performance, service reliability and user experience. Building on 35 years of innovation, EXFO's unique blend of equipment, software and services enable faster, more confident transformations related to 5G, cloud-native and fiber-optic networks.

Empowering technicians from headend to node



Essential tools for testing FTTH

FIP-500
(Fiber inspection scope)

Connector inspection

Optical Explorer (OX1)
(Optical fiber multimeter)

Last-mile activation, troubleshooting and maintenance

MaxTester 945
(Multifunction optical loss test set)

Fiber certification

MaxTester 730C
(OTDR + iOLM)

FTTx construction and troubleshooting

PX1
(Optical power expert)

Activation

EX1
(FTTH and Business Services tester)

Service activation and troubleshooting

PPM-350D
(Next-gen PON power meter)

Service activation and troubleshooting

Data Post-processing and reporting

FastReporter

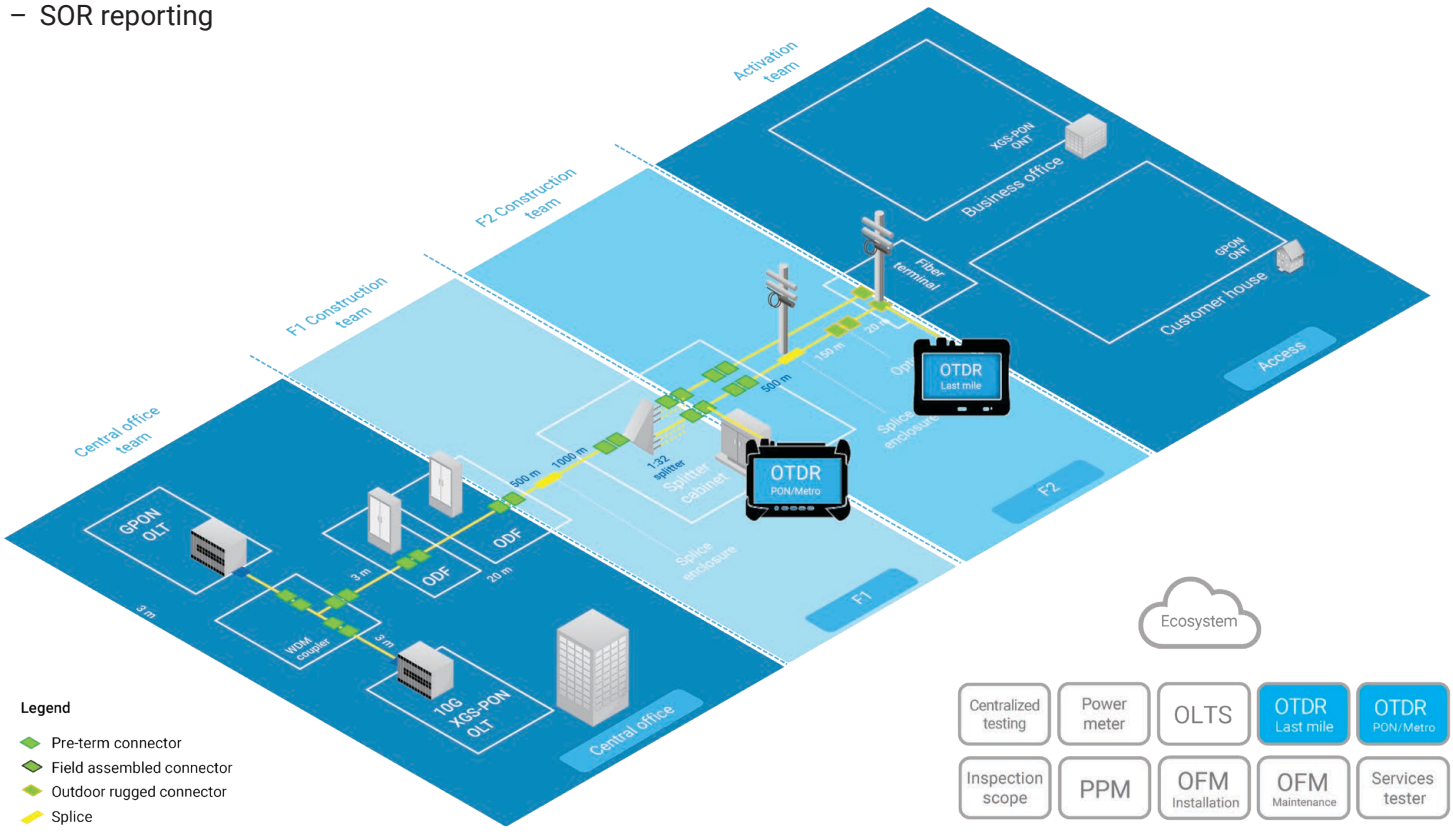
OTDR/iOLM

F1/F2 characterization and advanced troubleshooting

Learn more

Key features

- Length, loss, ORL, splices, connectors and splitter characterization
- Filtered out-of-band laser with in-line power meter (broadband or PON dual layer) for live construction or live troubleshooting
- Fault identification
- SOR reporting



On any FTTH construction job, it is critical to have the right tools to fully characterize cables before moving on to the installation phase. An optical time-domain reflectometer (OTDR) is an absolute necessity.

When it comes to the wide variety of FTTH splitter configurations, classic OTDRs are not suited for high concentrations of high-loss components. EXFO's PON-optimized OTDRs (e.g., FTBx-730, MAX-730) are designed to characterize any kind of FTTH network as they can detect and measure balanced and unbalanced splitters, splices, connectors or locate anything potentially impacting total budget loss (e.g., macrobends, splices, bad connectors, fiber breaks).

With the award-winning iOLM, all the expert-level work is done by pressing one button; performing first-time-right analysis and closing jobs faster.

Cloud-based workflow management (TestFlow) and post-analysis reporting (FastReporter) complete the toolbox.

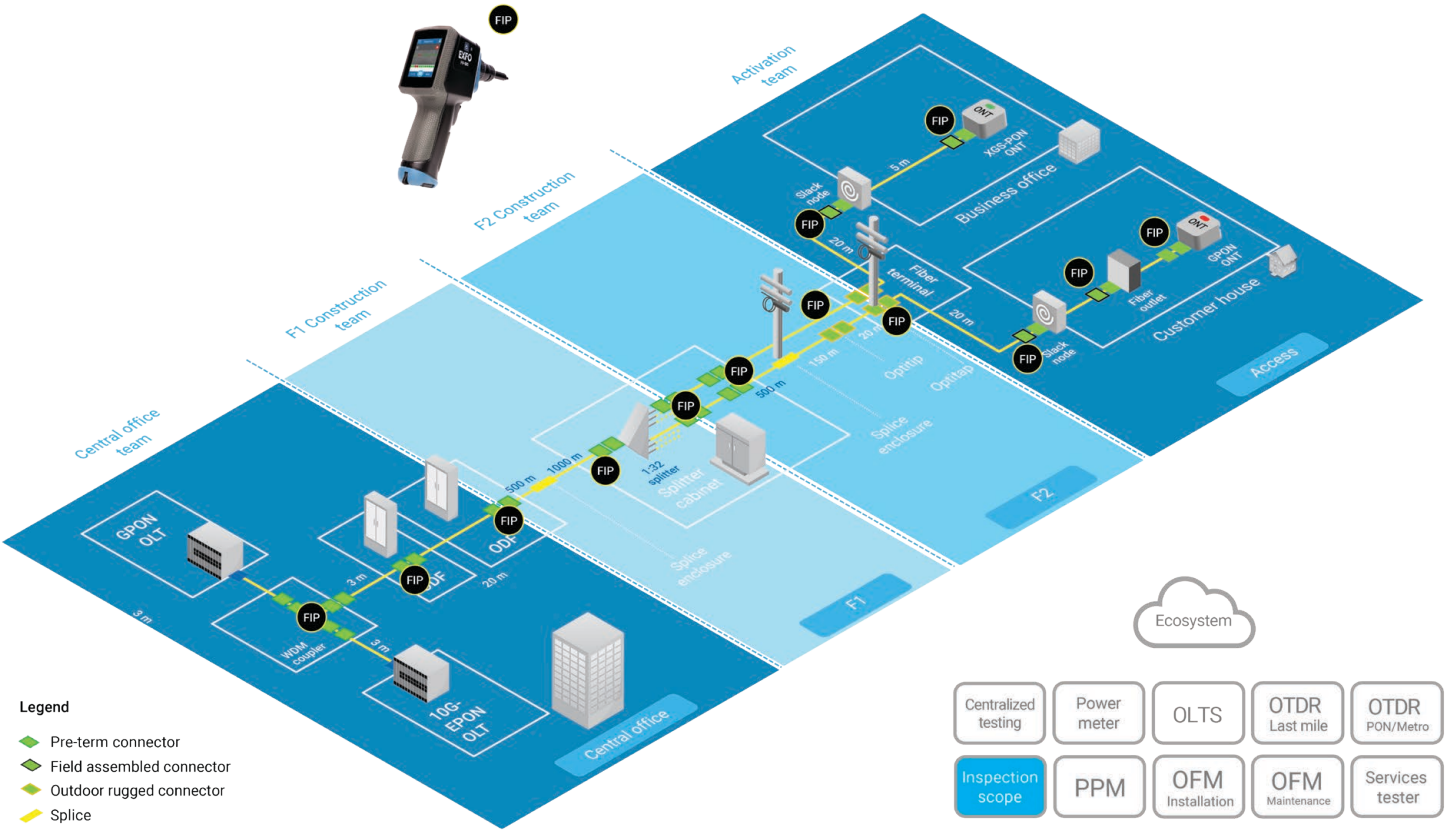
Fiber inspection scopes

Fiber inspection for both singlefiber and multifiber connectors

Key features

- Certify connector endfaces
- Verify cleanliness and no damage on ferrule

Learn more



Connectors are the no. 1 cause of network failures.

Dirty or damaged connectors can have a huge impact on the loss budget, signal quality degradation and service availability. It is essential to inspect each and every connector before it is mated.

EXFO's fiber inspection scopes (e.g., FIP-400/FIP-500) have been designed to simplify the verification and validation of connectors through a fully automated system that includes fiber recognition, auto-center, auto-focus, auto-capture and pass/fail auto-analysis. You only have to mate the fiber inspection scope to your connector and read the outcome.

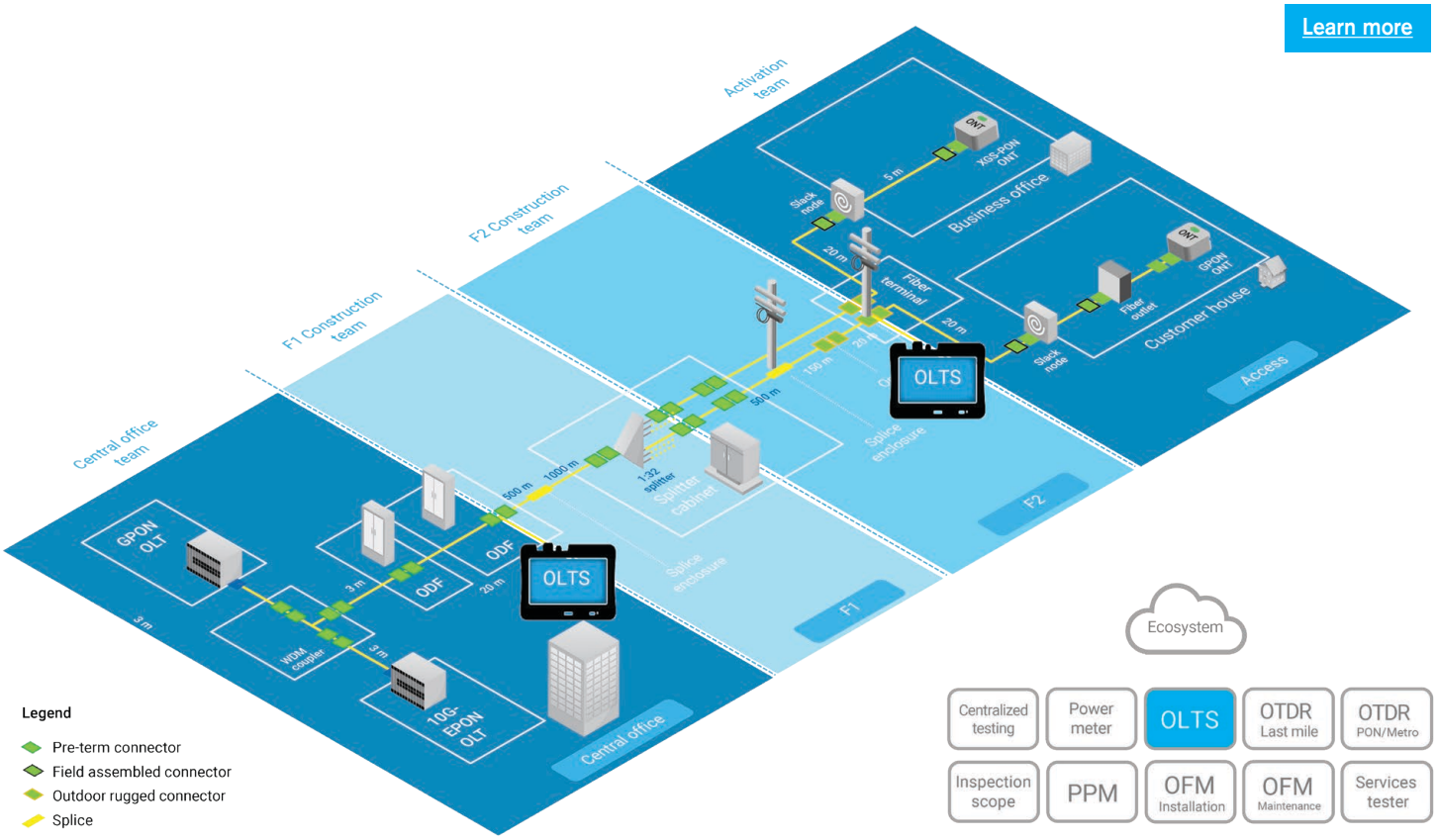
Bidirectional OLTS

Length, loss, ORL, continuity

Key feature

– F1/F2 and splitter characterization

Learn more



Once the splitter(s) have been installed, it is important to quantify the total loss and confirm whether it is within the loss budget.

Why do we need bidirectional OLTS testing?

Bidirectional testing minimizes possible differences by measuring specific events that may have different losses depending on the test direction. It is recommended to perform bidirectional testing and analysis.

One method uses an optical loss test set (OLTS) with a light source at one end, and a power meter at the remote side. Using EXFO's OLTS kit (MAX-945), characterization is just a matter of seconds thanks to the power meter/light souce dual function, enabling bidirectional testing.

One device can stand at the optical distribution frame (ODF) side while a second one can be placed after the splitter, or at any other position up to the customer premises, for bidirectional characterization.

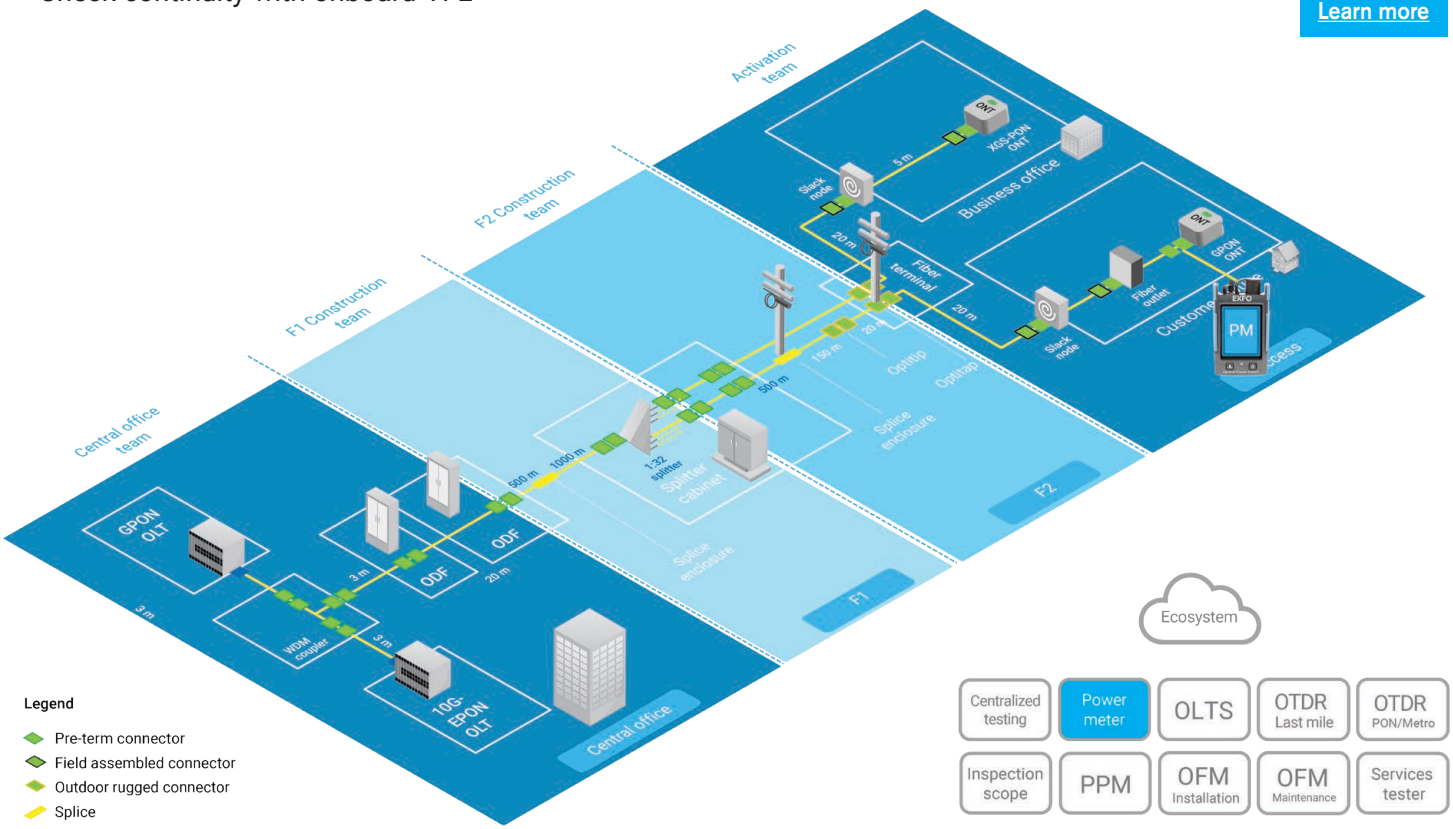
Power meter

Service activation

Key features

- Measure downstream power (single-layer PON)
- Check continuity with onboard VFL

Learn more



After the fiber is installed and prior to FTTH service activation, the power at the optical network terminal (ONT) socket has to be checked. It is crucial to ensure that there is enough power for the ONT to function.

Using EXFO's power meter (PX1), it is possible to measure the signal power received from the central office optical line terminal (OLT) device (a.k.a the downstream), in under 1 second.

A report can easily be shared through your smartphone with managers or customers.

An onboard red-light visual fault locator (VFL) speeds up identification when multiple fiber cables are being installed, as well as troubleshooting in case of a fiber break or macrobend problems.

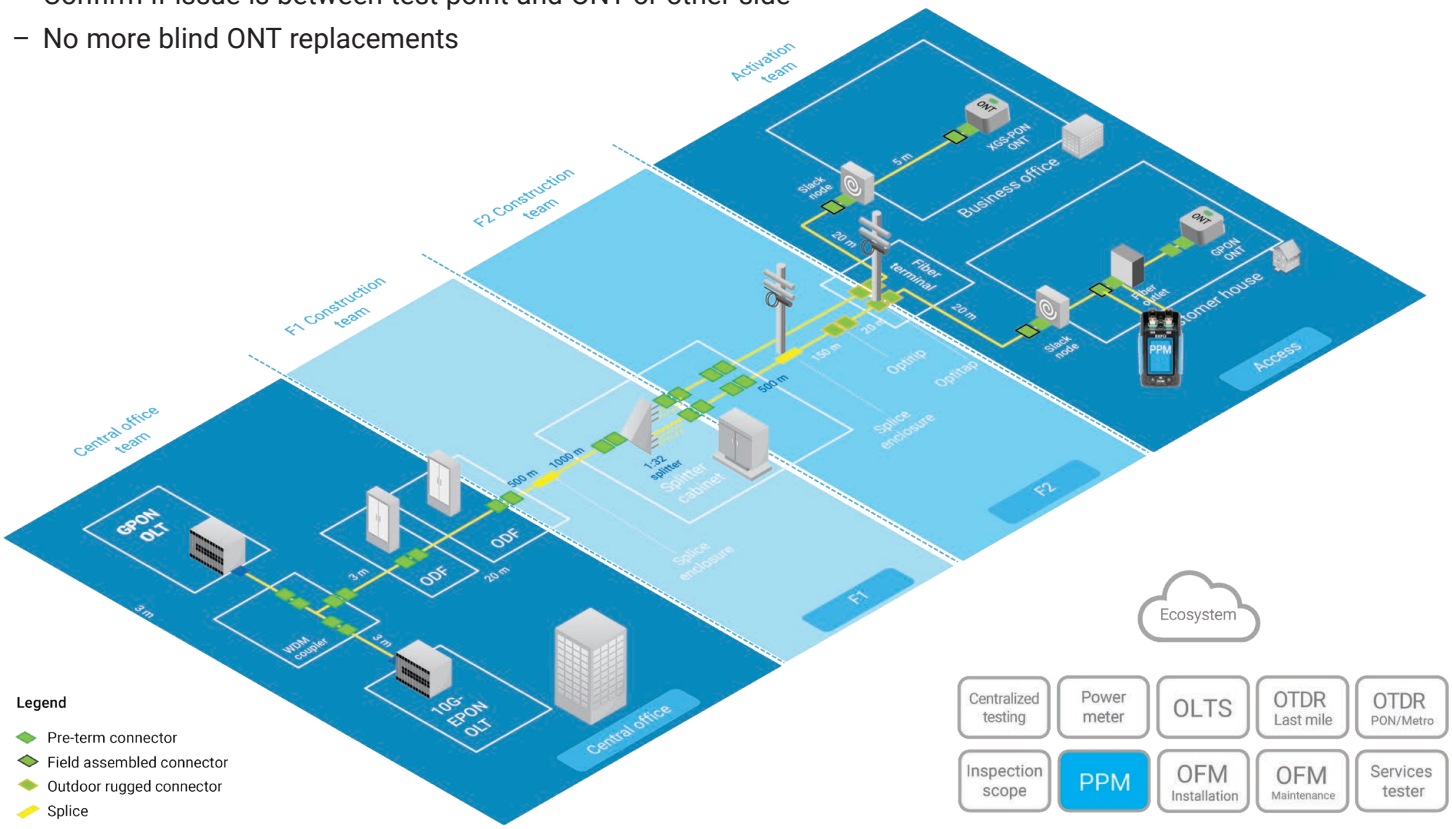
PON power meter

Service activation and troubleshooting

Key features

- Verify downstream PON wavelengths (up to three: 1490, 1550 and 1577 nm)
- Passthrough measurement to verify upstream wavelength
- Confirm if issue is between test point and ONT or other side
- No more blind ONT replacements

Learn more



If the same fiber cabling carries multiple services (e.g., GPON and XGS-PON double services), a standard power meter can lead to misleading results as it measures the total power received without distinguishing between single services.

EXFO's PON power meter (PPM-350) is capable of filtering and measuring the signal for each service independently. This guarantees the correct measurement per service, which greatly helps when troubleshooting. This tester can also measure the signal when the ONT is connected to know whether the issue is between test point and the ONT.

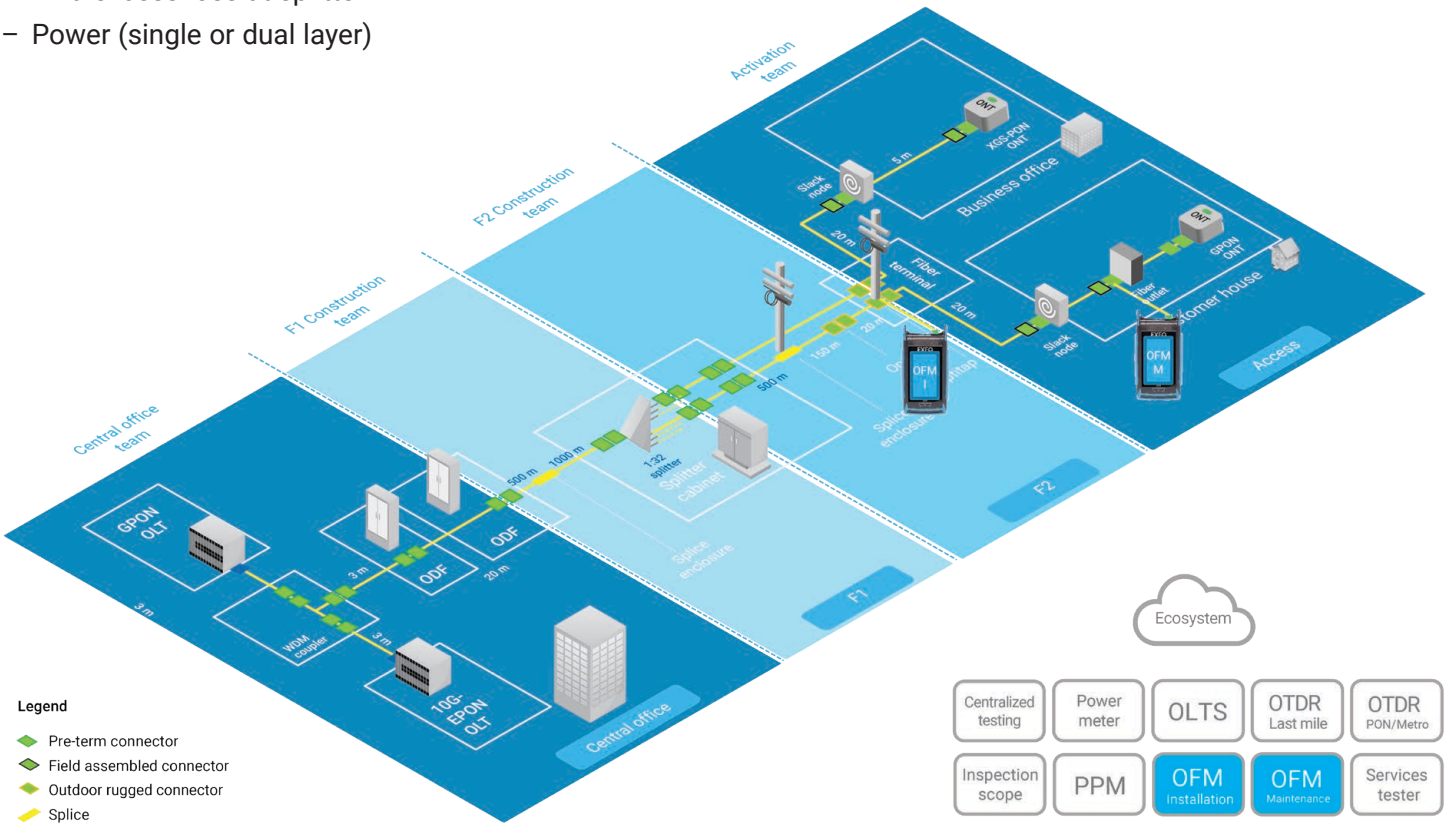
Optical fiber multimeter (OFM)

F2 verification, service activation and troubleshooting

Key features

- Length, loss, fault up to splitter, continuity at splitter
- Live network testing
- Find excess loss at splitter
- Power (single or dual layer)

Learn more



Activating an FTTH customer means completing fiber installation from cabinet/splitter to customer premises. Once this task is done, it is vital to verify the optical link on-site to avoid issues and repeat truck rolls during service activation. Measuring the length of fiber, its loss and ORL, and verifying the absence of any fault (e.g., fiber break, macrobending, dirty connector, bad splice) are basic yet essential checks in ensuring link quality. It is also important to confirm whether the fiber is connected to the splitter or if signal power is adequate without excessive losses at the splitter.

These measurements become handy for maintenance tasks, considering the need to perform tests on a live network.

The industry's first optical fiber multimeter (EXFO's Optical Explorer also known as the OX1) was specifically built for these tests. Just connect the fiber under test and push the start button; all the rest is done by the tester, including fault analysis within a few seconds and reporting.

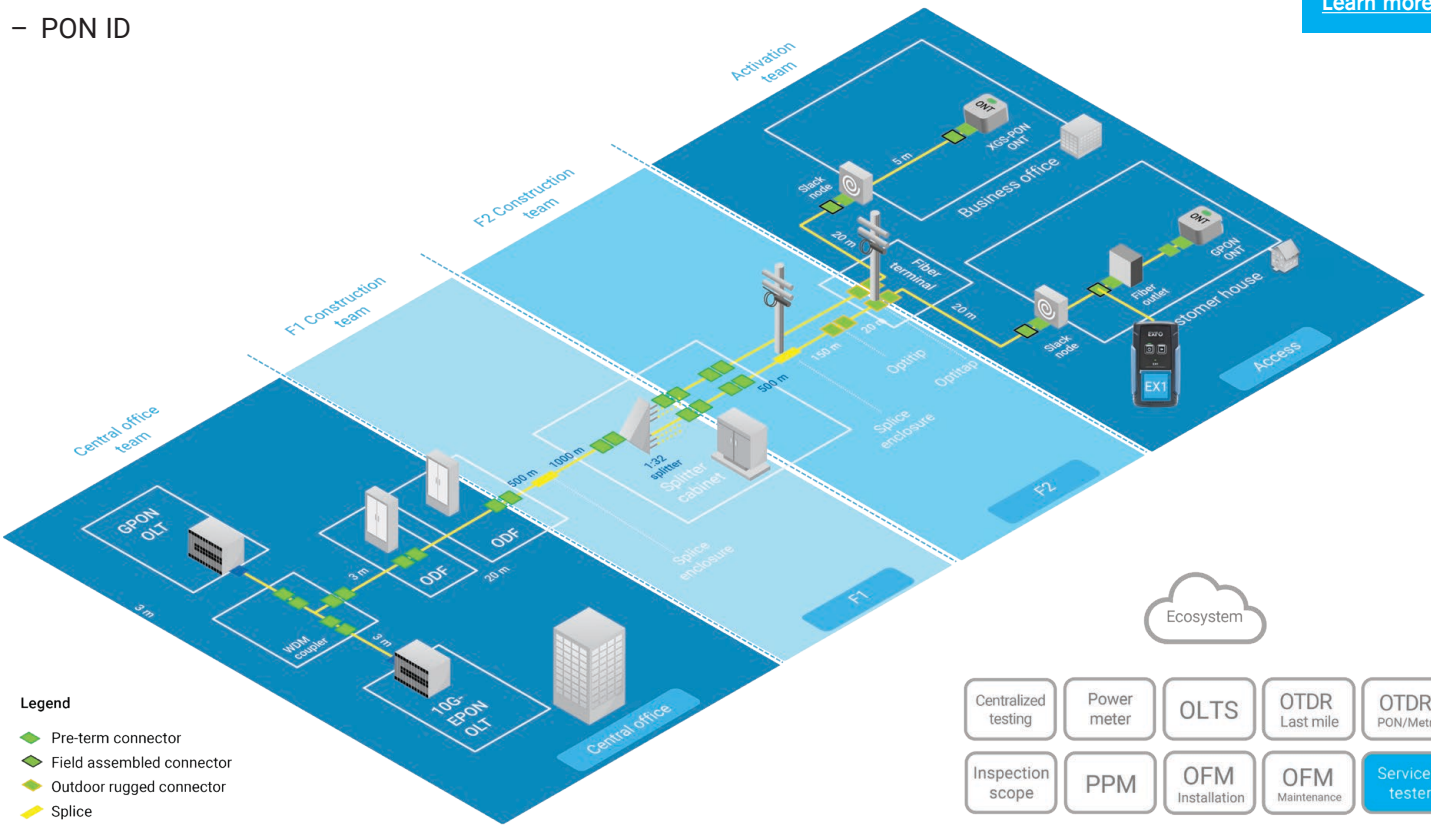
Services tester

Service activation/troubleshooting

Key features

- Speedtest® by Ookla®
- ONT emulation
- PON ID

Learn more



Everything is ready to activate the service... but is the fiber connected to the right OLT port?

The splitter in the cabinet is cabled, but there are vast amounts of patch cables entailing the possibility of earlier mistakes. In cases like this, it is key to have a portable, battery-powered device that can read the PON ID to identify the OLT port.

EXFO's FTTH and Business Services tester (the EX1) can be connected directly to the fiber under test to automatically measure the optical signal level and read the PON ID.

Knowing the optical service level is very helpful in debugging complex connection issues. Moreover, the tester can emulate the customer's ONT and check internet availability along the link.

The tester also does Ethernet and WiFi speed tests. This gives the possibility to test the service after the ONT is installed and to configure the customer's router for optimal WiFi coverage inside the building.

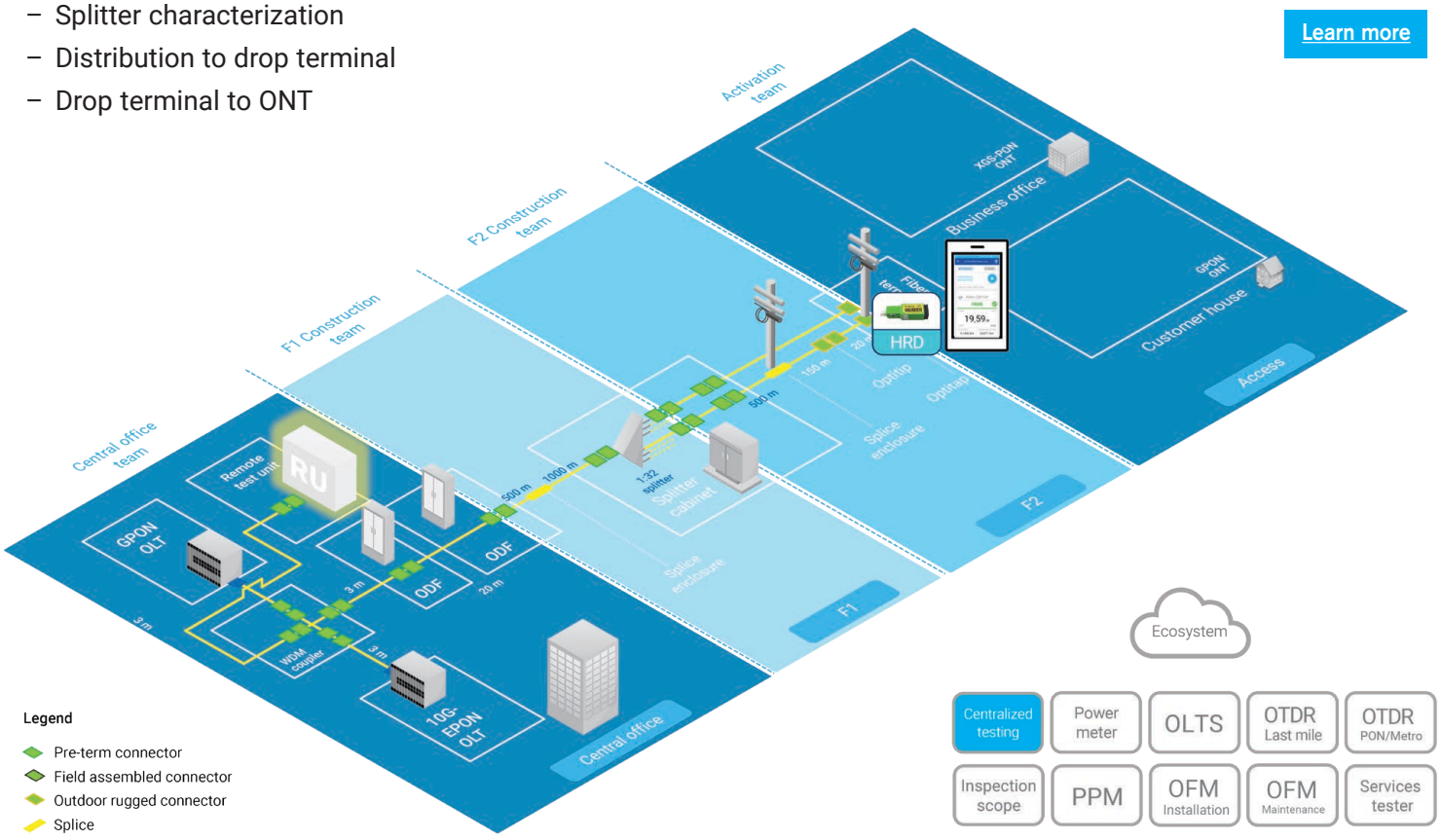
Remote fiber testing solutions (RFTS)

Construction, activation and monitoring

Key features

- F1 feeder baselining
- Splitter characterization
- Distribution to drop terminal
- Drop terminal to ONT

Learn more



The use of field portable testers is vital for fully characterizing, installing, troubleshooting the optical link from customer premises to the OLTs in the exchanges or central offices.

Operators have the possibility of further optimizing the system to avoid issues and ensure service quality and availability.

EXFO's Nova Fiber is a remote fiber testing system that leverages a smart OTDR at the central office or in any central places for benchmarking and verifying fiber infrastructure integrity.

During construction, Nova Fiber can be used to create a complete map of the network with baseline information. This can in turn be used for on-demand troubleshooting and fiber verification after repairs.

Nova Fiber monitors and detects fiber-related issues 24/7. It is strategically important to manage fiber SLAs with real-time fault alerts.

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