



Fronthaul—The New Wireless Network Extension

To increase network capacity and coverage while reducing operating costs, wireless providers are turning to the deployment of alternative infrastructures, such as fiber-to-the-antenna (FTTA), remote radio heads (RRH), and other small cell alternatives, most of which are fiber-based.

› **Existing cell-tower upgrades**

Replace old coax cable with fiber running from the base station to the RRH at the top of the antenna.

› **New cell-tower deployment**

Run fiber from base station to the RRH at the top of the antenna.

› **Common public radio interface (CPRI)**

A standard that defines a communication link between a base station and RRH.

› The base station can be connected to the backhaul via fiber, or wirelessly via radio frequency (RF) signals.

KEY CONSIDERATIONS AND CHALLENGES

› **Operational expenditures (OPEX) challenges**

Dispatching tower-climber technicians for repairs and repeat jobs can be very costly.

› **Technology gap**

Tower-climber technicians usually have a background in copper or RF, but only limited fiber-testing knowledge. Lack of training can lead to basic errors, incorrect results interpretation, and other issues.

› **Future-proofing mobile networks**

FTTA is the foundation of the radio access network (RAN) evolution. Validation of FTTA at the rollout stage ensures the readiness of the antenna sites to support the next phase of centralized RAN and virtualization, as well as the increase of fronthaul communication rates.

Key Test Applications in a Fronthaul Environment

Installation, turn-up and troubleshooting of cell towers fitted with fiber-optic cabling

CONSTRUCTION PHASE

Physical-layer installation and troubleshooting

- 1 Fiber connector inspection and maintenance (at each connection point)
- 2 Installation of a fiber loop (Rx to Tx) for loopback testing (at the RRH)
- 3 Characterize end-to-end fiber link, validate loss budget and identify faults (from base station)
- 4 Connect fiber to SFP (at the RRH)

Troubleshooting steps: validate connector cleanliness, test fiber continuity, perform fault-finding tasks/distance to fault (from base station)

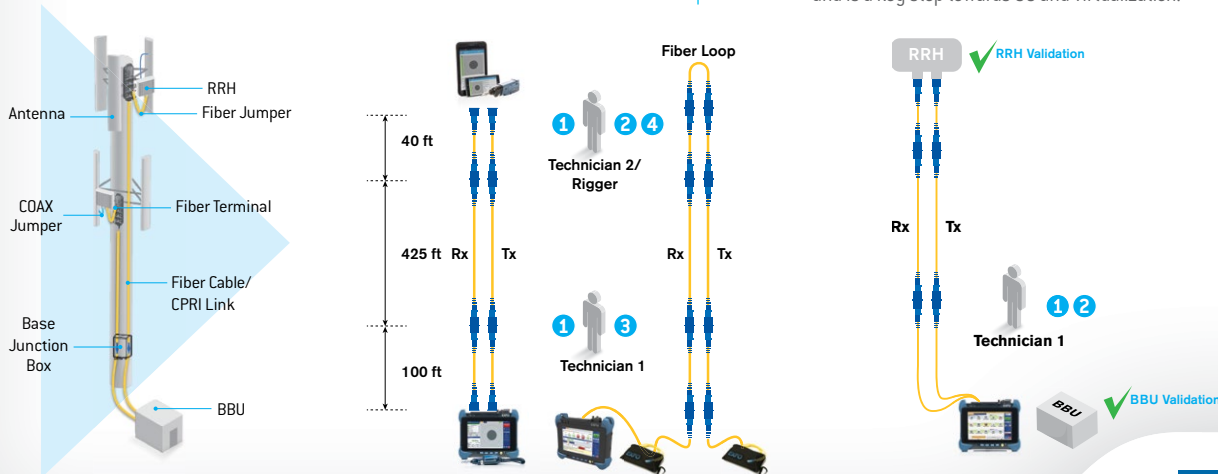
ACTIVATION/TURN-UP PHASE

Service validation and troubleshooting

- 1 Validate RRH operation with a CPRI protocol analyzer at the specified rate (from base station)
- 2 Activate the CPRI protocol (from base station)

Troubleshooting steps:

- › RRH validation using baseband-unit (BBU) emulation
- › BBU validation using RRH emulation
- › Verification that small form-factor pluggable (SFP) transceivers are installed and connected correctly
- › Test at the bottom of the base station, or kilometers away [C-RAN architecture]
 - › Centralized RAN [C-RAN] is the next phase of the wireless network infrastructure. Placing BBUs at the central office reduces operational costs and is a key step towards 5G and virtualization.

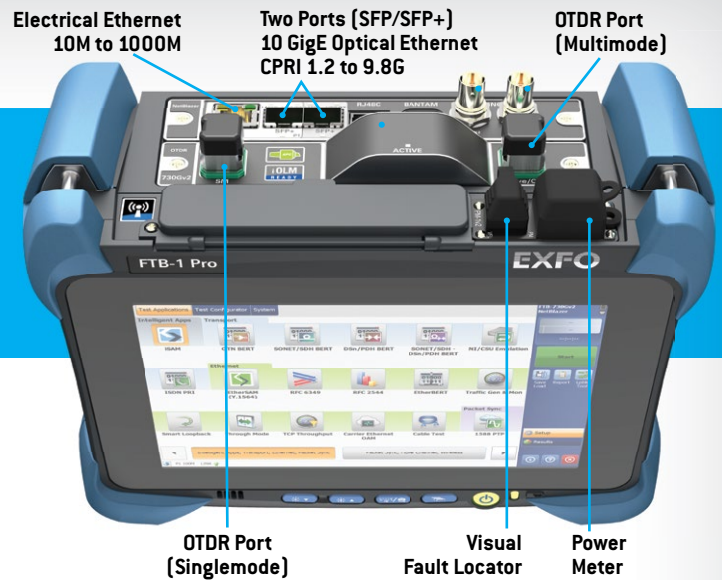


FTB-700G V2 Series

A Truly Intelligent and Automated Test Tool that Certifies Complete Installation, Turn-Up and Service Assessment of Fronthaul Networks in Just **One Visit**

THERE'S MORE TO IT THAN JUST WIRELESS

Fiber is at the core of new mobile cell towers, but the physical and transport layers remain the foundation of the network. Having access to the **right test tool** is a critical component of **managing and optimizing network performance**.



Validate Connector Endface Cleanliness

- › Performs automated pass/fail connector endface analysis against industry standards (IEC, IPC or custom).
- › 100% automated, fast and easy one-step process: detect, center, focus, capture, analyze and save results automatically.
- › Removes any risk of false positives or misinterpretation of results.
- › **A true wireless solution** available for tower climbers. The use of a smart device eliminates the need to carry a platform to the top of the tower.

Complete Fiber-Link Characterization

- › Eliminates the need to configure parameters, or analyze and interpret multiple complex OTDR traces.
- › Correlates multipulse widths on multiple wavelengths to identify and locate each event with maximum resolution.
- › Turns traditional OTDR testing into clear, automated first-time-right results for technicians of any skill level.
- › The iLOOM feature, based on the loopback test method, is used to test two fibers at once directly on-site from the ground or base station, and without any post-processing.

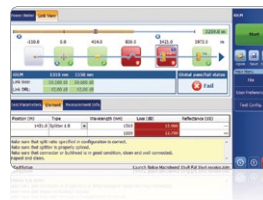
Validate CPRI Transport Links

- › Eliminates unnecessary tower climbs by testing the health of the RRH from the bottom of the tower via BBU emulation.
- › Validates the proper CPRI start-up sequence and reports any issues between the BBU and RRH negotiation.
- › Validates that the RRH is properly connected to avoid unnecessary replacement of equipment.
- › Verifies that the right SFP transceivers are installed and connected correctly.
- › Fronthaul validation for CPRI rates from 1.2 Gbit/s to 9.8 Gbit/s via BBU and RRH emulation.

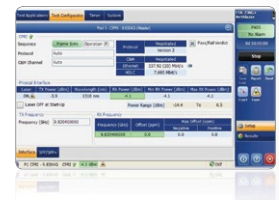
FIP-400B Series



iOLM | intelligent Optical Link Mapper



CPRI Protocol Testing



TestFlow

Drive Your Operational Efficiency with Process Automation and Contextual Analytics

- › Digitize and distribute methods of procedure (MOPs) to test sets via TestFlow
- › Perform compliant, consistent and efficient job-specific tests
- › Upload test results to a central server
- › Real-time step-by-step tracking of job status and progress
- › Transform test results into actionable information via analytics and reporting capabilities

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