

Fiber Best Practice: Loss-Length (Tier 1) Fiber Certification

Introduction to fiber best practices

The Fiber Best Practice Series was designed by Fluke Networks to educate about important optical fiber best practices, including:

- *Fiber inspection and cleaning*
- *Loss-length (Tier 1) fiber certification*
- *Fiber plant characterization and troubleshooting (Tier 2 certification)*

This white paper details the best practice of loss-length (tier 1) fiber certification.

With 40 G/100 G infrastructure deployments in the datacenter becoming reality, the shrinking loss budgets of optical fiber cabling due to increasing bandwidth demands mean that reliable and efficient initial installations are now more important than ever. To minimize costly installer/contractor callbacks, network technician troubleshooting time, and unnecessary network downtimes, fiber-handling best practices should always be followed.

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Why you should care

By conducting loss-length certification of the cabling infrastructure, you are ensuring that it can support the associated bandwidth demand and network applications according to prescribed specifications. Fiber cabling testing in accordance with such guidelines is not only a best practice that enables your network applications to run at peak performance, but also helps to prevent costly network troubleshooting and downtimes. Loss-length certification is required for virtually all fiber links today and is detailed in industry standards such as Telecommunication Industry Association's (TIA) TIA-568-C.0 titled "Generic Telecommunications Cabling for Customer Premises."

How it works

Loss-length certification is a test for the overall loss over a fiber link. It requires an optical loss test set (OLTS) - or at a minimum, a light source and power meter set. To measure loss, an output source on a main unit connected to one end of the link-under-test will emit a continuous wave at specified wavelengths, while a remote unit on the far end measures the optical power being received to calculate the total amount of light lost. Commonly referred to as "Tier 1" certification, it includes:

- confirming cable length
- checking for polarity
- measuring the fiber link's overall attenuation to ensure that it is less than the specified loss budget

After the measurement is made, it is then compared to industry cabling or channel application standards, or customized limits to ensure that it meets the requirements. Depending on the results, the tester will typically show either a PASS or FAIL. A passing measurement implies meeting the minimum requirements for infrastructure reliability and integrity in accordance with industry standards. A failing measurement, on the other hand, means noncompliance and suggests questionable installation quality and a network stability risk, requiring proper troubleshooting procedures and subsequent retesting to obtain a PASS result.

Loss-length testing procedures

- Verify polarity with a visual fault locator (VFL).
- Connect the main (or power meter) to the remote (or source) using a test-reference cord.
- Set and record a reference power level from the output source as the baseline for the subsequent power-loss calculation.
- Connect the OLTS main and remote (or power meter and source) on opposite ends of the fiber link to be tested.
- Measure the level of optical power being transmitted through the link, ensuring that the wavelength settings on both the source and meter are matching.
- Compare it to the reference power level recorded earlier; the difference will be the total amount of light lost. If this amount is within the limits for the tested fiber length, as specified by the relevant standards, the fiber link passes.
- Note that newer, advanced OLTS like Fluke Networks' DTX-CLT CertiFiber or DTX-1800 CableAnalyzer with fiber modules will automatically measure the length of the fiber being tested, eliminating the possibility of errors from unreliable methods such as pacing out distances.

Additional fiber best practice resources

To download other Fiber Best Practice white papers and for additional resources, visit www.flukenetworks.com/FiberBP

Contact Fluke Networks: Phone **800-283-5853** (US/Canada) or **425-446-4519** (other locations).
Email: info@flukenetworks.com.



The Fluke Networks DTX CableAnalyzer with Fiber Modules provides a reliable method for loss-length certification.

NETWORK SUPERVISION

Fluke Networks
P.O. Box 777, Everett, WA USA 98206-0777

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