



Copper Certification Testing

Best Practices Pocket Guide



Cabling certification is a “best practice” of world class installers because it shows the true quality of the installation and reduces the risk of expensive rework.



Why are Copper Testing Best Practices so important?
Installers save time by doing it right the first time and customers accept the work faster when the manufacturer systems warranty is issued promptly.

- Cabling Certification lowers risk for network owners because it ensures that the installed system meets cabling industry standards and network requirements.
- Cabling Certification lowers risk for Architects, Consultants, and Engineers responsible for designing communications networks because it is the only way to prove that the system performance meets the intended purpose as designed.
- Cabling Manufacturers lower their risk by offering system warranties that require cabling certification.
- By certifying all their jobs, installers lower their own risk. Finger pointing and callbacks are every contractor's worst nightmare.

Risk of liability far outweighs any excuses to avoid Cabling Infrastructure Certification.

This Copper Certification Testing Best Practices pocket guide was designed by Fluke Networks to share important handling best practices, including:

- Assessing the correct normative requirements to ensure certification by industry standards.
- Performing the actual certification.
- Troubleshooting.
- Documentation.

Whether you handle copper infrastructure on a regular basis or just occasionally, this pocket guide will serve as a useful tool to ensure you never miss a critical step during your copper testing or troubleshooting.

Best Practice #1: Assess Normative Requirements

When should you do it?
Prior to starting any job



Why should you do it?

Selecting the correct Test Limit ensures all required measurements are made in the required frequency range. If tests are performed against the wrong limit, the team may have to return to the site to redo the work. This can seriously impact profitability and cause the contractor to incur liability risks.

Ensure the tester is properly configured

Contractual specifications will cover the testing of the copper cabling. The contractor should fully understand the field test requirements expected upon completion of the installation. In case of 500 MHz cabling being installed it may state: "Every cabling link in the installation shall be tested in accordance with the field test specifications defined in ISO/IEC 11801:2010 Amd.2 Class E_A Permanent Link or ANSI/TIA-568-C.2 Category 6A Permanent Link."

It is recommended that a knowledgeable user configures the tester upfront using the ProjX™ Management system allowing the testing to be performed by an entry-level technician. The tester now can roam from project to project. Measurements will continue where left off, minimizing the chance for human error, guaranteeing time savings. Configuring can be done both in the field or remotely through a web browser (using LinkWare™ Live).

Test Leads

As indicated in the standard, crimping an RJ45 plug onto a patch cord to make a test lead results in unpredictable performance. The removable test plug referenced as an option in the TIA-568-C.2 and ISO/IEC 61935-1 is found on the end of the DSX-PLA004 Permanent Link Adapter. Every tip is fully compliant for NEXT, FEXT and Return Loss.



DSX-PLA004 Permanent Link Adapter



Example of a test plug using a PCB substrate



Best Practice #2: Certification Testing

When should you do it?

After any link installation or modification to ensure the job meets the cabling infrastructure standards' specifications.

Why should you do it?

It is required by internationally recognized standards such as ISO/IEC 11801 and ANSI/TIA-568-C to ensure a quality installation.

What instruments should you use?

A CableAnalyzer™ or cable tester that consists of a main unit and a remote unit. The main unit is typically used in the cabinet to connect to the patch panels and the remote units gets connected to the far end of the links.

Before you begin testing, you should verify the basics:

- Are you using the most current version of the tester software? Is the tester within its operating temperature range and in calibration?
- Has the correct test standard been selected? Pay particular attention to the NVP as it plays a critical role when the tester reports length or distance to a defect.
- Has the correct link model (Permanent Link or Channel) been selected?
- Are you using the appropriate test adapter with a plug that matches the jack in the telecommunication outlet (TO) or the patch panel?
- Has the test reference recently been set? It is recommended to set the reference on a regular basis and at a time that is easy to remember (such as the start of each week).

You are now ready to press “TEST” and the cable tester will display results as a “Pass” or “Fail” based on the outcome of the comparison of the measurements against the standards limits.

By uploading test results the quality of the executed work can then be checked as the LinkWare™ Live Professional software provides instant notification about incorrect test setups and cable IDs.

Fluke Networks Certification Testing Solutions

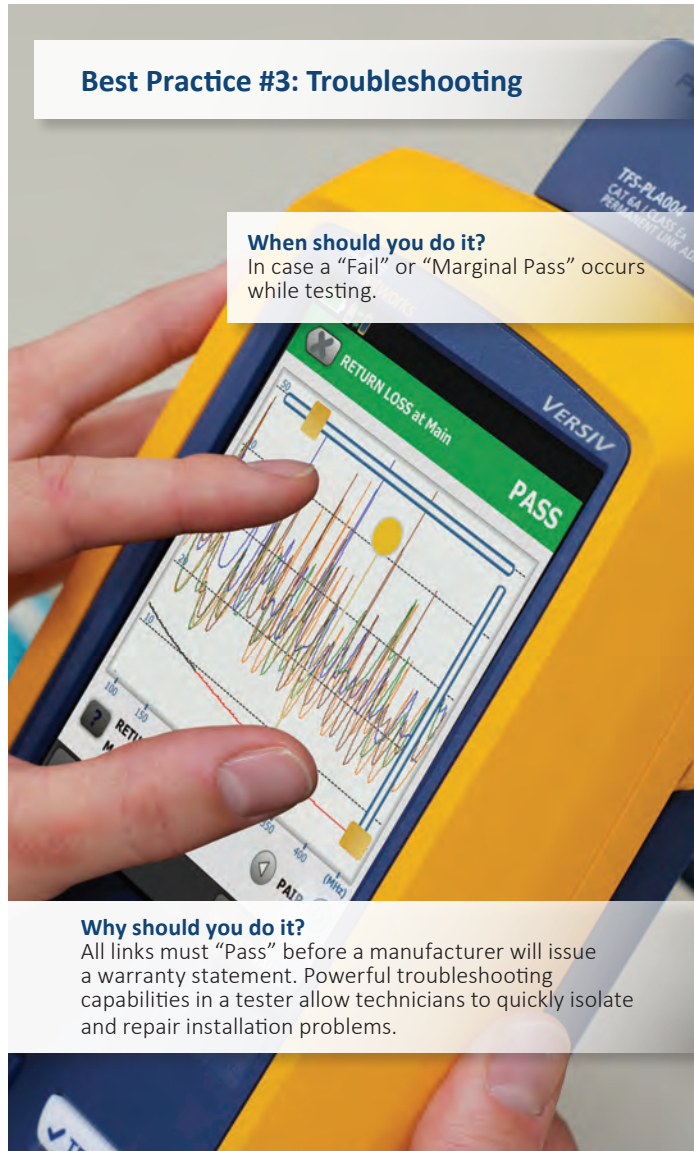


DSX-5000 CableAnalyzer™

Best Practice #3: Troubleshooting

When should you do it?

In case a "Fail" or "Marginal Pass" occurs while testing.



Why should you do it?

All links must "Pass" before a manufacturer will issue a warranty statement. Powerful troubleshooting capabilities in a tester allow technicians to quickly isolate and repair installation problems.

What instrument should you use?

A CableAnalyzer™ or cable tester that produces diagnostic information for the cabling link that “fails” or “marginally passes” (a so called “Pass*” result).

Troubleshooting Procedure

- If you prefer to leave the troubleshooting to your experts, use the FIX LATER feature when a “Fail” or “Pass*” occurs. FIX LATER creates a punch list of links that an experienced technician can troubleshoot and repair, allowing technicians to continue their regular certification testing without interruption.
- Look under DIAGNOSTICS for a schematic view of the location and cause of any faults.
- For in-depth insight, use the tester’s ability to report the distance to a location along the link-under-test where crosstalk or Return Loss is excessive. The two parameters that provide this time domain information are HDTDx (High Definition Time Domain Crosstalk) and HDTDxR (High Definition Time Domain Reflectometry).
- Once a link has been fixed, connect the CableAnalyzer to the fixed link and tap TEST again. The result for the passing link can then be stored, and the link identifier will be cleared from the punch list.

Powerful DSX-5000 Troubleshooting Capabilities



DSX-5000 uses patent-pending technology to detect connector problems.



DSX-5000 HDTDx Analyzer.

A man in a blue shirt is shown from the side, looking down at a tablet he is holding. The tablet screen displays a checklist application with a grid of green and red checkmarks. He is standing on a construction site, with a white building and a fence visible in the background. A white text box is overlaid on the top left of the image, and another white text box is overlaid on the right side of the image. A third white text box is overlaid on the bottom left of the image.

Best Practice #4: Documentation

When should you do it?
save results after completing a measurement.

Why should you do it?
Good record-keeping is a smart practice. It enforces installation accountability and integrity, helps to resolve disputes and facilitates more efficient troubleshooting.

What documentation software should you use?

LinkWare™ PC Cable Test Management Software that lets you manage all the results from multiple testers and jobs using one application.

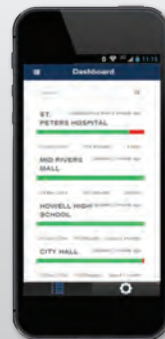
Documentation Procedure

- After each measurement save the results.
- For troubleshooting purposes always consult results in their unabridged format in order to have the most complete and accurate troubleshooting data.
- Upon completion of the job or at any desired moment you can either upload the results from the tester via a direct connection to the PC or via LinkWare Live, a SaaS (Software as a Service) solution from Fluke Networks.
- Once test results are downloaded into the LinkWare PC Cable Test Management Software, you can deliver results in the complete LinkWare file format or generate professional reports in a common format (such as PDF).

Fluke Networks Documentation Solutions



LinkWare PC Report



LinkWare Live
SmartPhone Interface



Best Practice #5: Maintenance and Technical Support

When should you consider it?

From the day you acquire a tester and on a yearly basis to ensure equipment stays in top shape.

Why should you worry about it?

To ensure service and support is there when you need it, minimizing business downtime and ensuring a high return on your investment.

What kind maintenance and support agreement do you need?

One that is like insurance. A comprehensive support and maintenance program that covers all products and accessories as well as access to technical specialists 24/7.

Versiv Maintenance & Support Solutions



Benefits	Standard Warranty	Gold Support
Live technical support with exclusive phone number		✓
FREE Annual Calibration and Factory Refresh		✓
FREE Repair with "first on bench" turnaround service		✓
Loaner Equipment Service*		✓
FREE Accessory Replacements**		✓
Lifetime Buyback Guarantee		✓
Member Only Promotions		✓
Tech Support Response Time	< 24 Hours	< 2 Hours
Support – Phone and Email	Working hours	24 x 7 x 365
Software and Firmware upgrades	✓	✓
Online training video and Knowledge Base access	✓	✓
LinkWare Live Professional		✓

*Available in certain geographies

**Applies to accessories in the original product purchase

Gold support provides similar benefits for other products – contact your Fluke Networks representative for details.

LinkWare™ Live Test Results Management Service

LinkWare Live is a SaaS (Software as a Service) that provides cable installation professionals with project and test result management capabilities to get unmatched job visibility and superior job control from anywhere at any time.



With LinkWare Live, Professional Project Managers have an extremely powerful tool available to ensure jobs get done right first time:

- Real-time access to test results ensures issues are diagnosed in the early stages of the job eliminating expensive rework and
- Instant notification about incorrect test setups and cable IDs for uploaded test results ensures testing is completed to specification.

 LinkWare™ Live

DSX-5000 CableAnalyzer



The DSX-5000 improves the efficiency of copper certification with a 10 second CAT 6A test while meeting the most stringent accuracy requirements. Endorsed by more than twenty five manufacturers worldwide. ProjX™ management system ensures jobs are done right the first time. The modular Versiv™ platform supports fiber testing and upgrades to future standards. Analyze test results and create professional test reports using LinkWare reporting software. Upload results and manage multiple jobs from any smart device through LinkWare Live.

“The Versiv tester has increased our technicians’ productivity in the field allowing for easy setup and faster testing of cables. The ease of which we can download stored test results and leave the tester in the field has also contributed to their productivity. Using the same unit for copper and fiber testing keeps everyone familiar with the setup and testing procedures”

Bill Quinn, Estimator/Project Manager, Global Security International, LLC