

TESTING OF COPPER CABLING

PERMANENT LINKS AND CHANNEL

Class D, E, E_A F, F_A

Changes from Previous Version;

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Guide for tester set-up simplified	P 5
Content of document reduced to its essential elements	

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This is a living document and is subject to change.

This document is available as a free download from the TE Connectivity web site: -

www.adckrone.com/au
Support, Literature, Technical,
"Testing of Copper Cabling"

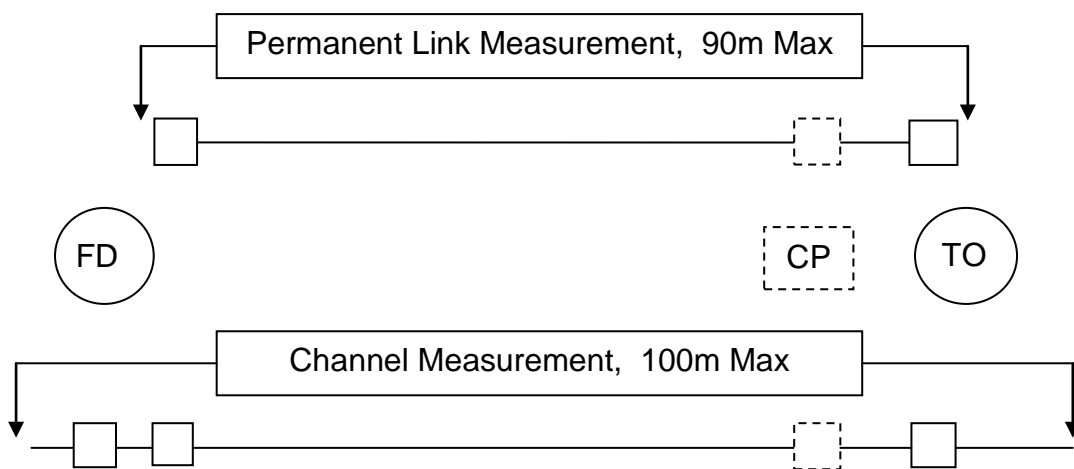
TE Connectivity, Enterprise Networks (ANZ)
Ver. 1

Testing of Copper Cabling Permanent Links and Channels

1. Permanent Links And Channels

The fundamental building blocks for a telecommunications data system are the permanent links (PL) and channels (Ch). Good quality test leads have to be used with the hand-held testers to obtain accurate PL test results. Channel testing still uses the Vendor’s patch cords, which are to be left in place after testing.

The configuration of the Permanent Link and Channel is shown below.



2. Acceptable Testers for Warranty

Acceptable Testers

The following testers can be used on any of the Classes D, E, E_A and F, Category 5e, 6 6_A and 7 (100, 250, 500 and 600 MHz frequency).

Tester	Class & Frequency (and all lower freq)
1. JDSU Certifier 40G	- Class F _A (1000 MHz)
2. WireXpert 4500	- Class F _A (1000 MHz)
3. Fluke DTX-1800	- Class E _A , F (700 MHz)
4. Agilent WireScope Pro N2640A	- Class E _A , F (700 MHz)
5. Fluke DTX-1200	- Class E (250 MHz)
6. Agilent WireScope WS350	- Class E (250 MHz)
7. LANTEK 6 and 7 - for up to	- Class E, Cat 6 at present.
8. LANTEK II - for up to	- Class E, Cat 6 at present.

DSP-4000, DSP-4100, DSP-4300, OmniScanner 1 and 2

These are no longer acceptable for Warranty Testing because they are no longer supported, software updated or calibrated by the tester manufacturer.

3. Unacceptable Tester Issues

The following issues will render the test results as unacceptable and the site will need to be re-tested.

Test Results in Tester Format Only

TE accepts results in native tester format only. Results in pdf or csv format are not accepted for warranty approval

Out of Date Calibration

All testers should be calibrated by the manufacturer's representative on a 1 or 2 year basis. This means they are not available for maybe 10 days while being re-calibrated. Periodically do the self-calibration, e.g. before the start of each new job site, then once per week to retain confidence in the tester readings.

Batteries Not Fully Charged

If the battery level drops below 25-30%, there can be false or inconsistent readings.

Incorrect NVP Setting on the Tester

NVP is used to calculating the correct length.

Selecting the correct cable type on the tester will automatically select the correct NVP. See the tables at the back of this document for acceptable generic NVP.

If the NVP is set HIGHER than specified for the cable, the tester length reading will be HIGHER than actual, by approx 1.35 m /1%NVP

"Margin Warning" or "Star-Pass" Not Turned On

Some testers do not have the Margin Warning (*PASS) enabled on the tester settings. This results in a false feeling of confidence while testing because no warnings are sounded indicating that the run needs attention. It is better to find & fix these while staff are on site.

TE Connectivity can accept *PASS for a Warranty but only if the tester set-up is correct and full plot data results have been approved by TE technical staff .

Incorrect Test Set-up & Performance Setting

Select the Test Set-up and Performance Level to the TE Connectivity Warranty requirements as set out in the Warranty Registration Form and the builder's project specification. If these requirements conflict with each other, contact TE Connectivity to get advice before you spend days of testing time that may have to be repeated.

TE Connectivity Australian and New Zealand requirements are listed in the following tables. They are the latest AS/NZS 3080 PL & Ch requirements for the Class required, or the latest ISO/IEC 11801 Class performance standards.

North American (TIA) Cat 5e, 6, 6A, standards limits are not accepted for Warranties by TE Connectivity in Australia and New Zealand. All ISO/IEC standards for PL and Ch up to Class F_A are now published and available in all updated tester software.

Wear On Test Leads & Test Plugs

All of the testers have issues with Permanent Link lead and plug wear. The coiling and uncoiling of test leads during their use over time will induce unwanted RL and crosstalk. Tester manufacturers have specifically addressed this issue with better leads like the special round leads on the WireScope, FrameScope and DTX testers. Sometimes the test plug may be damaged and thus cause more damage to sockets as testing continues. Inspect the test plugs regularly during testing.

3 dB & 4 dB Rules in Testing

3 dB Rule is if IL < 3 dB you can ignore any RL failures.

4 dB Rule is if IL < 4 dB you can ignore any NEXT failures.

Both rules were brought into the International Standards to account for short runs typically < 15 m, because of signal reflection problems that have nothing to do with incorrect installation or termination practices.

Memory Aid:

NEXT has 4 letters;
it is the 4 dB Rule

Under the 3dB and 4dB rules, the tester will ignore FAIL results for RL & NEXT. A negative result (eg – 0.5dB) for NEXT or RL on short runs is an indication of poor termination even though a PASS is indicated in the test results. It is unacceptable to leave these poor terminations. The Installer/Test Technician should check for a negative NEXT or RL result whenever testing short runs (< 15m). Use the tester analysis software to find the problem. E.g. they will show up in the 'Pair Data' window in LinkWare. There may be a high resistance on one or more pairs, or the HDTDX will show spikes >25 where poor termination issues occur.

For short runs < 15 m, check the HDTDX and fix any terminations with spikes > 25 by adding twist into the pairs and re-terminating.

PL-CAL on DTX Testers

Permanent Link Calibration (PL-CAL) is a calibration technique used on Fluke DTX series testers to 'zero out' the effects of any wear on the permanent link leads. The RL performance of a PL usually improves after the tester has been calibrated with a PL-CAL module.

The PL-CAL calibration is done by connecting the tester to the computer and initiating the Fluke LinkWare program. The PL-CAL process is located in the 'Utilities' section. Follow the on-screen prompts to conduct the PL-CAL process.

4. Guideline For Tester Set-up

TE Connectivity (AMP NETCONNECT & ADC KRONE) Tester set-up for Warranty Testing

Class	Cable	Type	NVP	Permanent Link	Channel
F _A	S/FTP	LSZH	80%	ISO 11801 PL2 Class Ea (or PL3 with CP)	ISO 11801 Channel Class Fa
F	F/FTP	LSZH	77%	ISO 11801 PL Class F	ISO 11801 Channel Class F
E _A	S/FTP	LSZH	79%	ISO 11801 PL2 Class Ea (or PL3 with CP)	ISO 11801 Channel Class Ea
	F/UTP	LSZH	72%		
	UTP	LSZH	65%		
	UTP	PVC	65%		
E	F/UTP	PVC	65%	ISO 11801 Class E	ISO 11801 Channel Class E
	UTP	LSZH	79%		
	UTP	PVC	69%		
D	F/UTP	PVC	69%	ISO 11801 Class D	ISO 11801 Channel Class D
	UTP	LSZH	70%		
	UTP	PVC	69%		

TIA Test Limits are not accepted for TE warranties in Australia & New Zealand

Always ensure that the latest software and test limits are downloaded from the tester manufacturer and stored in the testers.

END