



# **Field testing Procedure LANmark-6A**

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## **1 Introduction**

The purpose of field testing is to validate the installation against both the requirements of the standards and the demands of the Nexans warranty process.

This document serves to describe how to test LANmark-6A cabling systems and to validate the installation against the international standards ISO/IEC 11801:2002/A1:2008 and ANSI/TIA/EIA568B.2-10. By doing so, the LANmark-6A warranty can be achieved.

If testing throws up errors or failures in the results the information gathered should be used to identify the source of the problem so that the installer can rectify and re-test.

To pass testing for the Nexans warranty all Permanent Links and/or Channels in an installation should be tested, and all should pass.

You should agree with the client before starting the contract how to deal with marginal pass results, as they may not be aware that a marginal result may be because of the accuracy and tolerances of the tester.

## 2 How to proceed?

### 2.1 Introduction

This procedure is meant as a support tool for field-testing copper cabling networks. The definitions in the standard ISO/IEC 11801:2002/A1:2008 or ANSI/TIA/EIA568B.2-10 are applied into practical recommendations.

After describing some general definitions, the second half of this chapter is especially focused on measuring Class EA/Cat 6A links.

The procedure is to be followed in case of applying for Nexans Certified System Warranty.

### 2.2 Permanent link testing vs. Channel testing

In the ISO and TIA standards two different ways of testing are described.

A **permanent link** is the fixed part of the cabling, which is tested after installation, these test results give information on installation quality. The permanent link extends from the patch panel in the cabinet to the telecommunications outlet at the user side. It excludes work area cords, equipment cords and crossconnections, but does include the optional consolidation point.

A **channel** represents the complete end-to-end path between the user equipment (PC, phone, video, printer, ...) and the active equipment at the cabinet side (switch, hub, PBX, video equipment). The channel includes the work area cord, the equipment cord and the cross-connection.

For LANmark-6A channel testing is recommended as the more complete measurement method.

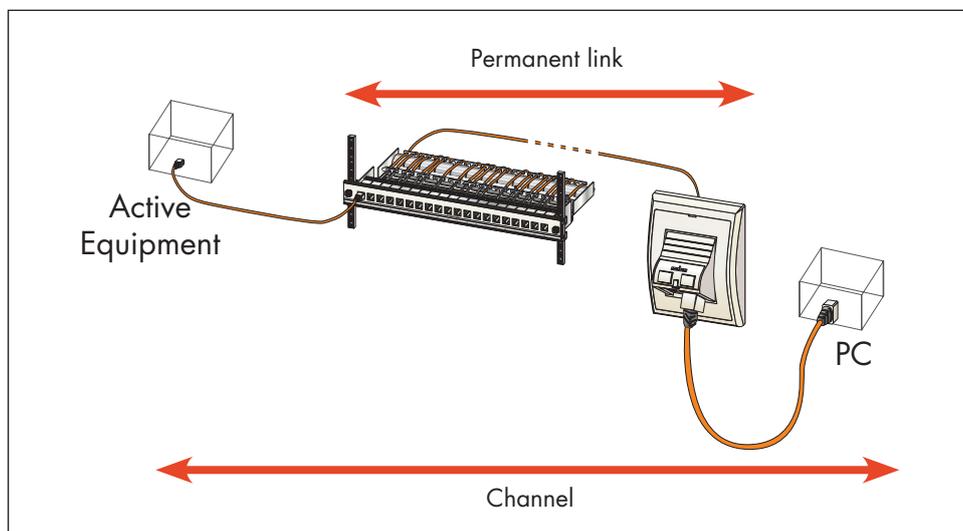


Figure 1: Model of Permanent Link and Channel testing

### 2.3 Category 6A and connecting hardware

Before you go to the test site, please make sure to prepare your tester in accordance to the right standard. In the next paragraphs following issues are covered: 'How the different installation models of Class EA and Cat 6A links can be tested?' and 'Which specific models of test-equipment and test heads can be used.'

## 2.4 Installation models

### 2.4.1 2-connector model: Interconnect - TO

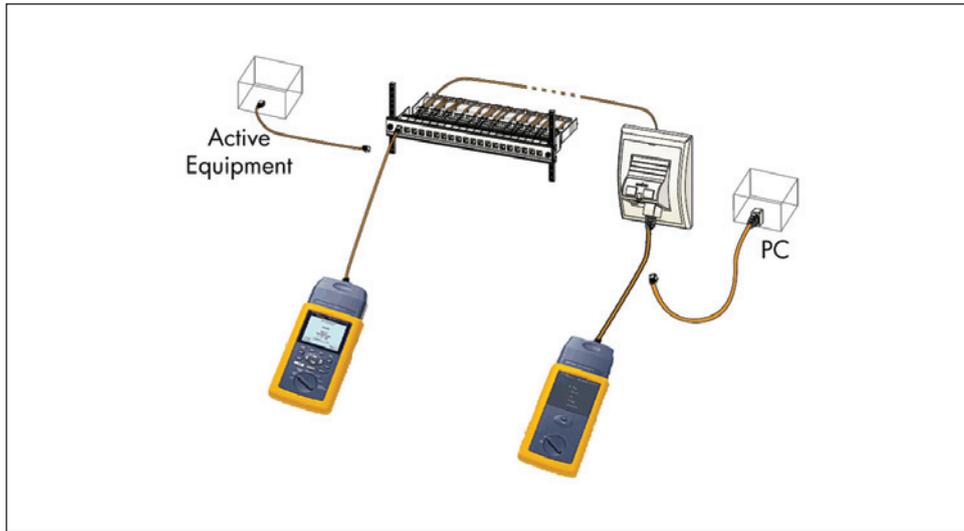


Figure 2.1: Testing a permanent link in a 2 connector model

Figure 2.1 shows the two-connector model as described in the standard. In this installation model both Channel and Permanent Link testing methods can be applied depending the Standard limits applied with the available Class EA/Cat 6A testheads.

### 2.4.2 3-connector model: Cross connect - TO



Figure 2.2: Testing at 3 connector Cross connect - TO model

The installation includes a cross connect lead existing of a 'single ended' LANmark-6A Ultim patch cord which must be terminated using a Nexans N420.67A Evo Snap-in connector to represent the active equipment ports.

If LANmark-6A Ultim patch cords are used to cross connect the patch panels, testing as a 2-connector test model, described in 2.4.1 and testing the separate Crossconnect lead in channel is needed do to acquire a Nexans Certified Systems Warranty on the complete installation (= 3 connector installation).

Note: An alternative way of testing is to test only as a 2-connector installation ignoring the separate Cross-connect lead testing, see Figure 2.1. (With these test results only a Certified Systems Warranty on the 2-connector installation can be obtained.)

### 2.4.3 3-connector model: Interconnect - CP - TO

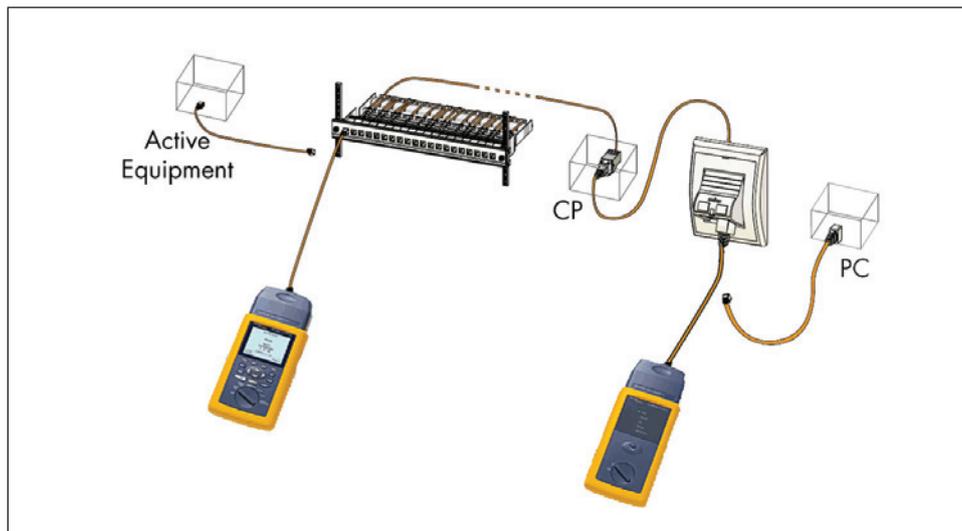


Figure 2.3: Testing at 3 connector Interconnect - CP - TO model

In this model of installation 1 option of testing is possible:

The installation includes a consolidation point lead existing of a 'single ended' LANmark-6A Ultim patch cord which must be terminated using a Nexans N420.67A Evo Snap-in connector connecting the Consolidation Point (CP) to the Terminal Outlet (TO)

Testing in a 3 connector test model as shown in Figure 2.3 is mandatory to acquire a LANmark-6A Certified Systems Warranty on the complete installation (= 3 connector installation) under the condition that the correct test heads are in use.

*Note: An alternative way of testing is to test as a 2-connector installation from the Interconnect to the Consolidation Point (CP) ignoring the consolidation link mentioned above. (With these test results only a Certified Systems Warranty on the 2 connector installation can be obtained.)*

## 2.4.4 4-connector: Cross connect - CP - TO

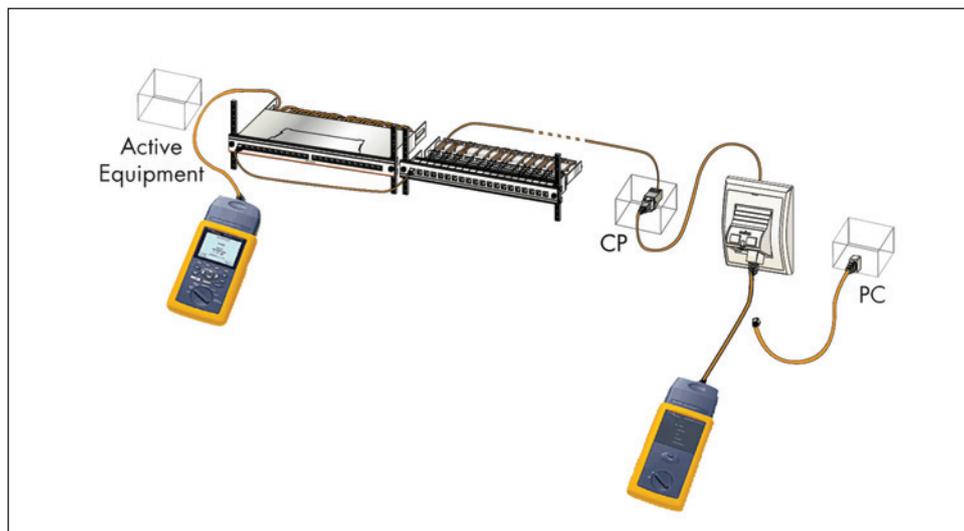


Figure 2.4: Testing at 4 connector Cross connect – CP –TO model

If LANmark-6A Ultim patch cords are used to cross connect the patch panels, testing as a 3-connector test model, described in 2.4.3 and testing the separate cross connect lead in channel will do to acquire a Nexans Certified Systems Warranty on the complete installation (= 4 connector installation). The installation includes a Consolidation point lead existing of a 'single ended' LANmark-6A Ultim patch cord which must be terminated using a Nexans N420.67A Evo Snap-in connector connecting the Consolidation Point (CP) to the Terminal Outlet (TO). Testing in a 3 connector test model as shown in Figure 2.3 is mandatory to acquire a LANmark-6A Certified Systems Warranty on the complete installation (= 4 connector installation) under the condition that the correct test heads and test limits are used.

*Note: An alternative way of testing is to test as a 2-connector installation from the Patch Panel to the Consolidation Point (CP) ignoring the conditions mentioned above. (With these test results only a Certified Systems Warranty on the 2 connector installation as described in paragraph 2.4.1 can be obtained.)*

## 2.4.5 Summary

2 connectors	3 connectors	3 connectors	4 connectors
Interconnect - TO	Cross connect - TO	Interconnect - CP - TO	Cross connect - CP TO
PL (TIA only) or CH	PL or CH as 2 connector and Crossconnect CH	PL or CH	PL or CH as 3 connector and Crossconnect CH

Class EA/Cat 6A  
 PL= Permanent Link Measurement  
 CH= Channel Measurement

## 3 What equipment is available to test for compliance?

### 3.1 Level IV tester

Nexans strongly recommends the use of equipment with baseline accuracy that exceeds ISO/IEC 61935-1/Ed.2 (8-2005) Level IV, as indicated by independent laboratory testing.

Test equipment must be capable of certifying Class EA/Cat 6A links.

Nexans have endorsed 5 testers and configurations for use in validating the LANmark-6A solutions against the Warranty and performance requirements on installations.

At present these are:

1. Agilent Wirescope Pro (Level IV)
2. Fluke DTX 1800 (Level IV)
3. Ideal Lantek 6A - 7 - 7A (Level IV)

The following testing guidelines are to be adhered to:

- All lines must be installed so that the maximum fixed link distance is 90m.
- All personnel must be competent with the operation of the chosen tester and be familiar with the manufacturer's operating manual.

### 3.2 Care of the Tester and leads

Cabling Field testers are an accurate piece of equipment and as such needs to be looked after. Please follow manufacturer recommendations for the care and maintenance of your tester. Have your tester calibrated at least once a year by the tester manufacturer.

The test leads are susceptible to wear and damage. Please follow manufacturer recommendations for the care and maintenance of your test leads and do not fold or exceed the bend radius of the test cables.

Do not allow the weight of the tester to be supported by the test lead.

**Always put your tester on charge the day before a new testjob and place both units on charge overnight during the testing phase of the project.**

### 3.3 Test Adapters and limits to be used

#### 1. AGILENT Wiroscope Pro



Firmware Version

- Version 3.0.18 or higher

Channel

- N2644A-100 CAT 6A Universal Channel Adapter
- Cat6A Ultim Patchcord N101.22Gxx

Limits:

- CLASS EA: Channel (ISO)
- Category 6A: Channel (TIA)

Permanent link

- N2644A-101 CAT 6A Universal Link Adapter

Limits:

- Category 6A : Link (TIA)

#### 2. FLUKE Networks DTX 1800



Firmware Version

- Version 2.12 or higher

Channel

- DTX-CHA001A Cat6/Class E Channel Adapter
- Cat6A Ultim Patchcord N101.22Gxx

Limits:

- ISO ClassEa Ch AMD 1
- TIA CAT6A Channel

Permanent Link

- DTX-PL002 Cat6A/CLASSEA Permanent Link Adapter

Limits:

- TIA CAT6A perm.Link.

#### 3. IDEAL Industries Lantek 6A/7/7G



Firmware version:

- Version 2.701 or higher

Channel

- High Performance Category 6A Adapter (0012-00-0656A)
- Cat6A Ultim Patchcord N101.22Gxx

Limits:

- ISO ClassEa 500D 1324 STP Chan
- CAT6A 500 Draft 7.0 STP Chan

### 3.4 Selecting the correct cable type

When setting up your tester you should pay attention to the correct cable selection and the NVP (Nominal Velocity of Propagation) for the cable under test. This setting will determine the length and skew parameters and will therefore affect the results obtained. Some testers set themselves to pre-set or default settings each time they are switched on. You therefore must check this and configure the tester according to the cable data sheet for the product you are testing. Generally for Nexans cabling systems, the values to be used are:

Commercial cable name	NVP
<b>LAN</b> mark-6A F1/UTP 500MHz	0.67
<b>LAN</b> mark-6A F/FTP 500MHz	0.80
<b>LAN</b> mark-7 S/FTP 600MHz	0.80
<b>LAN</b> mark-7A S/FTP 1000MHz	0.80
<b>LAN</b> mark-7A 1200 S/FTP 1200MHz	0.80
<b>LAN</b> mark-7A 1500 S/FTP 1500MHz	0.80

### 3.5 Before you go to site

For all testers ensure you have the latest version of the tester firmware loaded, the update can be obtained from the manufacturer Internet site along with the latest software and limits database which should also be loaded into the tester. The firmware update and the version of the software database on the tester are important. The firmware from the tester manufacturer provides the tester with the correct parameters to test and how to interact with the test head. The software database holds the test parameters and limits for the standards that you will be comparing the cabling installation against.

You must calibrate the tester local and remote ends to each other before you go to site.

If you are using some testers you will also need to have the test leads calibrated onto the tester units.

This will improve the accuracy of the tester.

Make sure you have the latest version of the upload and diagnostic software on your PC on to which you will download the test results from the tester (available on Internet sites of the manufacturers).

Always download each day's worth of test results at the end of the day onto your PC.

Always put your tester on charge the day before it will be needed and afterwards place it on charge overnight during the testing phase of the project.

## 4 Understanding the test results

### 4.1 What the test results show

One can only hope that first time of testing a link the results will show a pass with headroom. However the first thing most testers will show is a wire map failure. As there is an insertion life on tester heads and leads a number of installers make use of a more basic test tool which just checks for wire mapping before running with a full set of tests for Class Ea/Cat 6A. This releases the tester for use elsewhere and saves on head wear.

If a failure is detected then make use of the tester diagnostics to locate the problem. Some of the later testers come with analysis software and tools that will locate the problem to a point along the length of the cable or at the termination.

The treatment of marginal asterisked (\*) results should be clarified with the client in advance.

Due to the known experience of tester inaccuracies due to test head variations it is our experience that results are usually on the pessimistic side. Nexans will therefore consider a \*PASS as acceptable within the warranty.

A \*FAIL however should be investigated and is not acceptable.

### 4.2 What to do with the result – Warranty Certification

When submitting results for the Nexans Warranty, a 'Nexans Warranty application form' for the site has to be filled in and submitted including the original testresults file to [warranty.ncs@nexans.com](mailto:warranty.ncs@nexans.com).

This warranty application form can be freely downloaded from the Nexans LANsystems website [www.nexans.com/LANsystems](http://www.nexans.com/LANsystems)

- Upload and Save – Which format ?

Fluke DTX-1800: \*.flw using Fluke Linkware

Ideal Lantek 6A/7/7G: Backup zip file using LANTEK Reporter

Agilent Wirescope Pro: \*.sdf using Scopedata Pro II

It is preferable to save the test results with plots if they are available on your tester as re-certification of graphical test result is only possible when plots are saved.

**! Please check regularly our website if you have the latest version of this paper !**



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