MORE INFORMATION IS FOUND IN MODULE 04 STRUCTURED CABLING INSTALLATION PRACTICES AND MODULE 5 STRUCTURED CABLING TESTING AND TEST EQUIPMENT MODULE OF BP100.

APPROVED LIST OF TEST EQUIPMENT

List of Copper Test Equipment

All at least Level III and current generation of testers from the following manufacturers are accepted by Molex Premise Networks. To warrant installations completed by Molex Business Partner companies, using end-to-end Molex products in the installed Channel / Permanent Link, the test results to be submitted by the certified business partners company must be in their native formats only. Molex Premise Networks insists that the test equipment be factory calibrated annually (or as recommended by the tester manufacturer), in order to have the latest firmware before installs are tested for warranty purposes.
The list of test equipment is as follows:

1 **Fluke Networks**

DTX-1500 CableAnalyzer test equipment with the latest firmware updates. (Available in selective countries only)

DSX 5000 CableAnalyzer test equipment with the latest firmware updates.

Note: Fluke has discontinued DTX 1200 and DTX 1800 tester models. Please co-ordinate with Fluke for the availability of support on these Products. Molex accepts the test reports from both these testers until Fluke offers their support on these Products.

2 **Agilent Technologies**

Agilent WireScope 350 and WireScope Pro
Note: Agilent Technologies have discontinued manufacturing of Hand-held Certification test equipment. It is recommended that Molex business partners approach Agilent Technologies to inquire the annual factory calibration process, up-gradation of firmware and the latest test adapters.

3 **Ideal Industries**

LanTEK II-350, LanTEK II-500, LanTEK II-1000, LanTEK III – 500 & LanTEK III - 1000
Note: Ideal Industries has obsolete LANTEK 6, LANTEK 6A and LANTEK 7. It is recommended that Molex business partners approach Ideal Industries to inquire the annual factory calibration process, up-gradation of firmware and the latest test adapters.

4 **JDSU (Viavi Solutions)**

Certifier40G test equipment with latest firmware updates.

5   **Psiber Data (A Softing Company)**

WireXpert WX4500 test equipment with latest firmware updates.

List of Fiber Optic Test Equipment

Factors that affect the integrity and performance of the installed fiber optic cable may be severe cable bends, poorly installed connectors or presence of dirt on the face of the connector. The attenuation measurement result should always be less than the **loss budget** or the link attenuation allowance and is dependent the cable length, number of terminations and number of splices, if any.
An Optical Loss Test Set (OLTS) can measure the optical attenuation quite accurately. Testing the installed fiber optic cabling with an OLTS and verifying the cable length and the polarity add up to **Tier 1** testing as specified in the standard. **Tier 2**, which is optional, includes Tier 1 testing plus an OTDR trace. Tier 1 testing is sufficient for Molex Warranty Certification.

The list of test equipment is as follows:

1. **Fluke Networks**
    a. SimpliFiber Pro Optical Power Meter and Fiber Test Kit with latest software updates as well as adapters approved by Fluke Networks. This can be used for Tier 1 test.
    b. CertiFiber Pro Optical Loss Test Set with latest firmware updates.
    c. OptiFiber Pro OTDR with latest firmware updates.

Note: Some of the testers which were part of our approved testers list are discontinued by Fluke. The tester models are DTX 1200 and DTX 1800 with XFM2 modules, DTX CLT CertiFiber, DTX Compact OTDR, and OptiFiber OTDR. Please co-ordinate with Fluke for the availability of their support on these products. Molex accepts the test reports from these testers until Fluke offers there support on these Products.

2. **Ideal Industries**

FiberTEK III Certifier test equipment with latest firmware updates.

3. **EXFO**

a. MaxTester 940 Fiber Certifier OLTS - Optical Loss Test Set with latest software updates as well as adapters approved by EXFO. This can be used for Tier 1 test.

4. **Psiber Data (A Softing Company)**

WireXpert WX4500 test equipment with latest firmware updates.

5. **Agilent Technologies**
6. **JDSU (Viavi Solutions)**

SmartClass Fiber OLTS-85/85P Optical Loss Test Sets test equipment with latest firmware updates.

7. **Anritsu**
8. **Noyes**
9. **OWL**

Test result documentation are generally recorded and stored by the test instrument for subsequent downloading to a personal computer. Documentation that should be recorded for OLTS test results must include:

Date of the test

Test personnel

Description of field-test instrument used (including the source CPR Category for multimode measurement); manufacturer model number and serial number.

Date of the latest field-test instrument calibration

Type and length of test jumpers

Fiber identifier (ID)

Test procedure and method used (TIA-526-14-A, Method B for multimode; TIA-526-7, Method A.1 for singlemode) to include launch condition description (for diameter of the mode suppression loop and number of turns).

Link loss result (including direction) and tested wavelengths. **Molex insists on tests be conducted in both direction and at both wavelengths for sites seeking warranty.**

NOTE: If any of the tester model is not listed in this document and has the ability to test the installed cable to our requirements, please send a mail to mpn.support@molex.com giving the tester details. This has to done prior to the purchase of the tester/testing of the installation.

GUIDELINES FOR FIELD TESTS IN GENERAL

MPN only accepts Permanent Link test reports for all architectures for warranty purposes. Additionally, End Users should require Channel test reports for any cross-connect channel to confirm that the Equipment Cord (EQ) and Patch Cord (PC) are functioning properly.
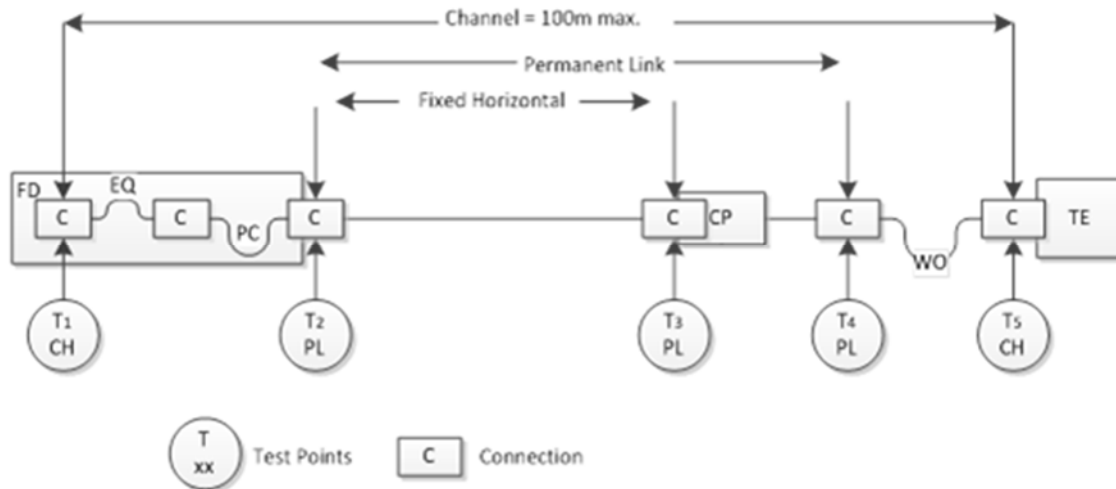
HEED THE FOLLOWING TO AVOID DELAYS IN YOUR WARRANTY PROCESSING AS EACH IS CONFIRMED BY MOLEX FOR EVERY WARRANTY APPLICATION:

- Calibrate tester annually or as recommended by the tester manufacturer and ensure use of the latest version of its software
- Use correct (link or channel) adapters on the tester as well as select that adapter in your tester's settings
- Ensure channels segments are within the allowable lengths in the applicable standard (not too long or not too short)
- Specify Molex part numbers used
- Submit un-editable, native test result files from Molex-approved testers contained within this document
- Fiber Test Results must contain (a) Attenuation measurements from both wavelengths and in both directions, (b) Length measurements from both ends, and (c) correct Polarity of the installed segment for Tier 1 requirements as specified by TIA-568-C standard. OTDR only reports without test reports from an OLTS and/or Fiber Modules may not be entertained.
- Do not submit test results containing FAIL, FAIL*, or more than 5% PASS* results, and instead rectify onsite immediately upon their discovery.
- You are strongly encouraged to sample test the first 5% of installed channels to detect any issues before they recur within your entire installation or test.
- Test the entire fiber optic cable reel before use in any given link

Guidelines for field–testing Cat-6A

Molex recommends a minimum length of 15m for Category 6A Permanent links to avoid any issues relating to short link resonance. However Molex accepts links shorter than 15m that pass permanent link test. It may be difficult to be able to show a pass result on links shorter than 15m, as you may find failures in RL and NEXT. If this is the case, try re-terminating the jack and panel, and if a failure still occurs, the cable will need to be replaced for a longer link.

Guidelines for testing Direct attach links

Direct attach link refers to the Permanent link terminated over the field terminable plug.

The schematic of the test setup is shown in the image below:

A permanent Link adapter is used at the patch panel side and a channel adapter is used at the remote end.

An interface "Field Plug Test adapter" is connected between the field terminable plug and the channel adapter. This interface is required to know the quality of termination of the field terminable plug.

This test set up is tested to Permanent link test limit.

Note:

- During testing, Plugs connected to the channel adapter directly is not a part of the channel under test and hence the quality of termination is ignored.
- The "Field plug test adapter" can be purchased from OCC. For more information on this product, please click on the link http://www.occfiber.com/main/index.php?m=1&p=2&l=en&i=364.
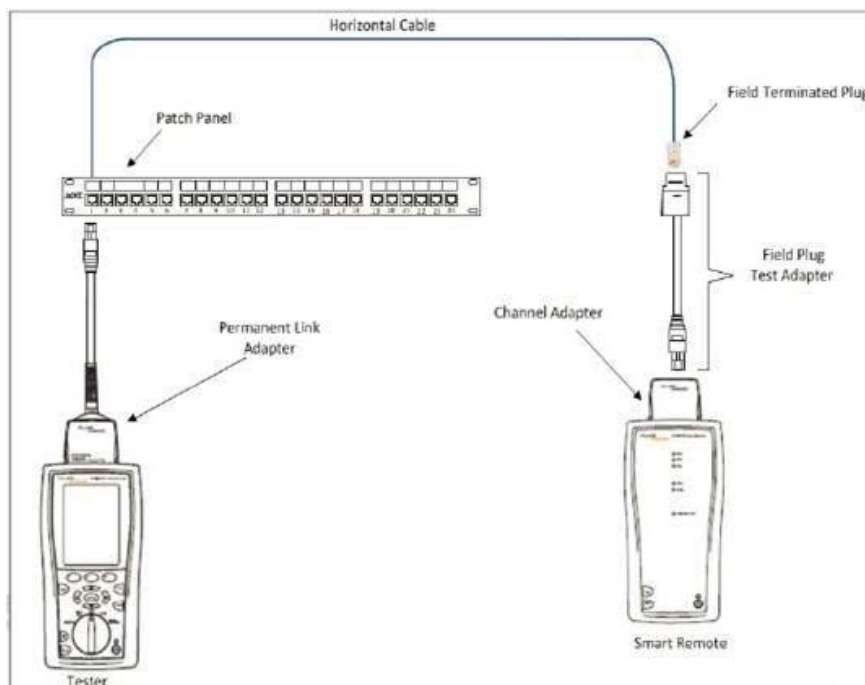
GUIDELINES FOR FIBER OPTIC FIELD TESTS

Guidelines for field–testing Length, Loss and Polarity of Optical Fiber Cabling (ANSI/TIA-568-C.0)

Testing installed optical fiber for attenuation with an optical loss test set (OLTS), as described in cabling standards, and verifying the cabling length and polarity constitutes **Tier 1** testing. **Tier 2** testing, which is optional, includes the Tier 1 tests plus the addition of an optical time domain reflectometer (OTDR) trace. An OTDR trace can be used to characterize the installed fiber link resulting in an indication of the uniformity of cable attenuation and connector insertion loss.

Submission of Tier 1 test results are for Molex Warranty Certification process. It should be further noted that submission of **OTDR test results is accepted only if accompanied with Tier 1 test results in the native format.**

Further, though the same guidelines in ANSI/TIA-568-C.0 states, "Testing can be conducted at one or more wavelengths and in one or both directions. A published standard should be referenced to identify the wavelength(s) and direction(s) required for the test", **Molex insists its business partners conduct tests at both (or more) wavelengths are in both directions**.

It is mandated that Molex Business Partners have their testers calibrated by the manufacturers annually or as recommended by the tester manufacturer and update the same to the latest firmware and software upgrades.

An install is incomplete until the ANSI/TIA/EIA 606 Administrative Standard is followed and appropriate labelling is implemented.

CATEGORY 6A PATCH CORD ASSEMBLIES

It is to be noted that the Molex Category 6A Patch Cords are stranded, as would be also in other lower Category Patch Cord assemblies.

When using single-ended equipment cord assemblies in Cross-connect architecture, the cable construction will be stranded and NOT solid conductor construction. This solution is also applicable to MIIM installs with Cross-connect architecture. It is confirmed that the Category 6A Patch Cord assembly can be terminated well on the Equipment Panel and secured with cable ties on the cable support tray at the rear of the Equipment Panels.