VTI SERVICES

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VTI Services Technical Bulletin (TB)

Optical Fibre Testing, Changes to AS/NZS 14763-3:2017

Text in *Blue Italics* is derived from Standards.

Applicability

The following is applicable to conformance testing of optical fibre cabling and highlights the changes between the 2012 and 2017 versions of AS/NZS 14763.3.
Note: Because the standard is a modified adoption of ISO/IEC 14763-3, its now numbered AS/NZS 14763.3

Summary

1. The definitions of Link, Permanent Link and Channel are clarified.
2. The Three-Test-Cord Reference Method has been removed from the Standard.
3. An Enhanced Three-Test-Cord Reference Method has been established for mismatched connector Links and Permanent Links.
4. Connector loss values for reference-to-random are relaxed (i.e. larger loss allowance)
5. A new Channel attenuation test method has been introduced.
6. Measurement Uncertainty has been quantified for Links, Permanent Links and Channels.
7. Information on connector inspection and cleaning is made available as a pre-cursor to its introduction in a future revision of the standard.

Conformance requirements

For Conformance to AS/NZS 3080:2013, LSPM testers must use 'Test Limits' set to:-

- ISO 14763-3:2014 or
- ISO/IEC 14763-3:2014 or
- AS/NZS ISO/IEC 14763.3:2017 (if available in the tester)

1. Link, Permanent Link, Channel

A Link is defined as any fibre transmission path between any two cabling interfaces, including the end connectors on the link.

A Permanent Link is a Link that runs from an FD to a TO.

A Channel is a Link or Permanent Link either single or interconnected plus any interconnecting cords and equipment cords, excluding the equipment interfacing connectors.

2. Three-Test-Cord Reference Method - Removed

The three-test-cord reference method has been removed from the standard and its use for reference setting is no longer acceptable for compliance to AS/NZS 3080:2013.

This method has been replaced by the Enhanced Three-Test-Cord Reference Method that has better accuracy and less measurement uncertainty.

Enhanced Three-Test-Cord Reference Method

The Enhanced Three-Test-Cord Reference Method is available for Links and Permanent Links whose connectors on each end are different from each other. The power meter must be capable of accepting different adaptors to suit if different connectors are involved in the test.

The enhanced method sets the reference with just the launch cord, then verifies that the substitution and tail cords, whose interfacing connectors match those on the link under test, are less than the permitted attenuation. *The maximum permitted attenuation shall be the value of two sets of reference connections combined; i.e.(≤0.20 dB multimode, ≤0.40 dB singlemode).*

3. Connector Loss Values

For both the One-Test-Cord and the Enhanced Three-Test-Cord reference methods the connector loss values used to determine loss budgets are shown in Table 1.

Table 1 Connector Loss Values

Connection Type	Mode	Attenuation Limit Max	Comment
Reference to Reference	Multimode Singlemode	≤0.1 dB ≤0.2 dB	Un-changed from previous values
Reference to Random	Multimode Singlemode	*0.5 dB* *0.75 dB*	Previously was 0.3 dB * Previously was 0.5 dB *
Random to Random	Multimode Singlemode	0.75 dB 0.75 dB	Un-changed from previous values

* The change in optical attenuation limits is due to the improved/enhanced method of handling measurement uncertainty. The values are based on extensive research by IEC members.

4. Channel Test Method

A new test method for channel attenuation is established that utilises the customer's equipment cords at both ends of the channel and these cords are left in place after testing. The channel test method is normally used to measure the attenuation of a channel at the time of service implementation or maintenance.

The channel test method was developed to correctly align with the ISO/IEC 11801 active equipment reference planes.

Channel testing is to be carried out from the equipment transmit ends. This means that channel testing needs to done in both directions since both ends transmit onto the network.

The channel test method requires a new reference setting for each change of connection at the light source and/or the power meter.

5. Measurement Uncertainty

Measurement uncertainty has been quantified for links, permanent links and channels. This has been made possible due to the changes in connector loss values and the changes to the methods of reference setting.

For Link and Permanent Link testing with either the One-Test-Cord or the Enhanced Three-Test-Cord reference method, the measurement uncertainty is;

- *SM: ± 0.24 dB.*
- *MM: ± 0.27 dB when attenuation ≤ 1.9 dB.*
- *MM: ± 0.14 × attenuation when attenuation > 1.9 dB*.

For Channel testing the measurement uncertainty is;

- *SM: ± 0.15 dB.*
- *MM: ± 0.19 dB when attenuation ≤ 1.4 dB.*
- *MM: ± 0.14 × attenuation when attenuation > 1.4 dB.*

6. Connector Inspection and Cleaning

Although connector inspection and cleaning has not yet been included in AS/NZS 14763.3, it is available in in the international version of 14763-3 and will be incorporated into the AS/NZS version in the next revision. ISO/IEC 14763-3 Annex B contains information, images, scratch & defect requirements, and cleaning techniques for simplex/duplex connectors and MPOs.

Cleaning is based on the concept of “Inspect ... Clean, if necessary ... Inspect”, then connect.

Users of microscopes with automated analysis should realise that there will be system to system variability and that 100% match between multiple microscopes is not achievable.

Some microscopes are available with side illumination lighting and these are particularly useful when inspecting MPO connectors for contaminants outside the immediate area of the multiple fibre ends. It is expected that side illumination will become the norm for inspecting MPOs.

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