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INTERNATIONAL STANDARD

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AMENDMENT 1

Information technology – Implementation and operation of customer premises cabling – Part 3: Testing of optical fibre cabling

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Information technology – Implementation and operation of customer premises cabling – Part 3: Testing of optical fibre cabling

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FOREWORD

Amendment 1 to International Standard ISO/IEC 14763-3 was prepared by subcommittee 25: Interconnection of information technology equipment, of ISO/IEC joint technical committee 1: Information technology.

This International Standard has been approved by vote of the member bodies, and the voting results may be obtained from the address given on the second title page.

IMPORTANT – The "colour inside" logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

2 Normative references

Delete the following references:

IEC 60793-1-20, *Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre geometry*

IEC/PAS 61300-3-43, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-43: Examination and measurements – Mode Transfer Function Measurement for fibre optic sources*

Add the following new references:

IEC 61280-1-4, *Fibre optic communication subsystem test procedures – Part 1-4: General communication subsystems – Light source encircled flux measurement method*

IEC 61280-4-1, *Fibre optic communication subsystem test procedures – Part 4-1: Cable plant and links – Multimode fibre-optic cable plant attenuation measurement*

IEC/PAS 62614, *Fibre optics – Launch condition requirements for measuring multimode attenuation*

3.1 Definitions

Replace the existing term and definition 3.1.7 by the following:

3.1.7
field calibration cord
test cord used for referencing when using the three test cord reference test method

Delete the following terms and definitions:

3.1.5
coupled power ratio (CPR)

3.1.14
relative power distribution

Add, after 3.1.19, the following new terms and definitions:

3.1.20

attenuation
reduction of optical power induced by transmission though a medium such as optical fibre; this is sometimes called insertion loss, L, and is given in dB as L = 10 $\log_{10}(P_{in}/P_{out})$, where P_{in} and P_{out} are the power, typically measured in mW, into and out of the cabling

3.1.21
encircled flux
EF
fraction of cumulative near-field power to the total output power as a function of radial distance from the optical centre of the core

3.1.22
OTDR dead zone
distance in which an OTDR cannot detect an event following a reflective event

3.2 Abbreviations

Add, in the existing list, the following:

EF Encircled flux

Remove, from the existing list, the following:

CPR, MPD and RPD

5.4 Documentation

Replace the existing item d) by the following:

d) optical fibre cabling details (fibre core size/MFD; fibre type, e.g. A1a, A1b, A1a.2, B1.1, B1.3)

6.1.3 Power meters

Add, after the first paragraph, the following new paragraphs and NOTE:

When the test set-up (LSPM) is used for a link or channel attenuation, the measurement uncertainty shall not be greater than ±0,02 dB.

When the test set-up (LSPM) is used for a field check of the reference connectors by measuring the attenuation, the measurement uncertainty should be <0,02 dB.

NOTE It is therefore recommended to use a power meter with a power resolution of at least 2 decimal places.

6.3.2 Reference connector requirements

Add, after Table 3, the following new paragraphs and NOTE:

When the test set-up (LSPM) is also used for a link or channel attenuation the measurement uncertainty should be <0,2 dB.

When the test set-up (LSPM) is used for a field check of the reference connectors by measuring the attenuation, the measurement uncertainty should be <0,02 dB.

NOTE It is therefore recommended to use a power meter with a power resolution of at least 2 decimal places.

6.3.3.6 OTDR launch cord

Replace the second paragraph by the following new text:

The launch cord shall be

- longer than the attenuation dead zone of the OTDR (see Annex C for further details),
- long enough for a reliable straight-line fit to be made to the backscatter trace following the dead zone (C1 to C2 in Figure 11) so that reliable insertion loss measurements may be carried out. For example, in multimode fibre installations the length of the launch cord should be at least 75 m,
- terminated at one end with one or more connectors suitable for attachment to the OTDR,
- terminated at the other end with one or more reference connectors compatible with the interface to the installed cabling.

6.3.3.7 OTDR tail cord

Replace the first paragraph by the following new text:

The tail cord shall be

- of a different length than the corresponding launch cord (but longer than the attenuation dead zone of the OTDR, see Annex C for further details),
- long enough for a reliable straight-line fit to be made to the backscatter trace following the dead zone (C3 to C4 in Figure 11), so that reliable insertion loss measurements may be made). For example, in multimode installations the length of the tail cord should be at least 75 m,
- terminated at one end with one or more reference connectors compatible with the interface to the installed cabling.

6.3.4.6 OTDR launch cord

Replace the first paragraph by the following new text:

The launch cord shall be

- longer than the attenuation dead zone of the OTDR,
- long enough for a reliable straight-line fit to be made to the backscatter trace following the dead zone (C1 to C2 in Figure 11), so that reliable insertion loss measurements may be carried out. For example, in single-mode installations the length of the launch cord should be at least 150 m,
- terminated at one end with one or more connectors suitable for attachment to the OTDR, see Annex C for further details,
- terminated at the other end with one or more single-mode reference connectors compatible with the interface to the installed cabling.

6.3.4.7 OTDR tail cord

Replace the first paragraph by the following new text:

The tail cord shall be

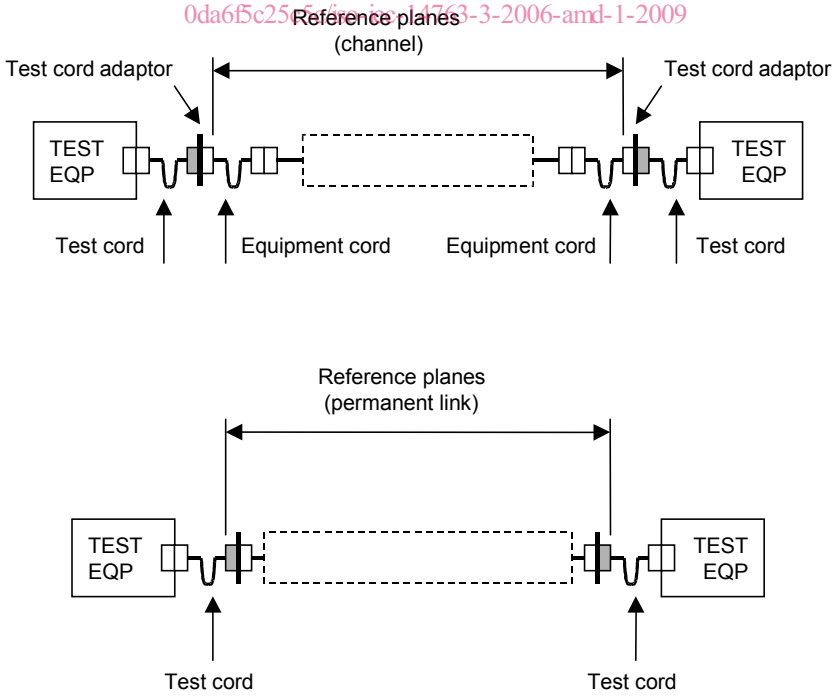
- of a different length than the corresponding launch cord (but longer than the attenuation dead zone of the OTDR, see Annex C for further details),
- long enough for a reliable straight-line fit to be made to the backscatter trace following the dead zone (C3 to C4 in Figure 11), so that reliable insertion loss measurements may be carried out. For example, in single-mode installations the length of the tail cord should be at least 150 m,
- terminated at one end with one or more reference connectors compatible with the interface to the installed cabling.

8.1.2 Reference planes

Replace the third paragraph by the following new text:

The test configuration reference planes of a channel are within the equipment cords next to, but excluding, the connections of the equipment cords into the test cords (see Figure 8). The test configuration reference planes of a permanent link are within the test cords next to, and including, the test cord connections which mate to the termination points of the permanent link under test (see Figure 8).

Replace the existing Figure 8 by the following new Figure 8:



NOTE The dotted area contains cable and may contain splices and additional connections.

Figure 8 – Channel and permanent link test configuration

In the second bullet point after Figure 8 replace “this variable factor” *by* “these variations”.

9.1.1.2 Test method

Replace, in the first paragraph, "3-jumper" *by* "three test cord reference".

Replace, in the second paragraph, "1-jumper" *by* "one test cord reference".

Replace the fifth paragraph by the following new text:

The reference measurement, P_0, shall be recorded in watts or dBm.

Replace the ninth paragraph by the following new text:

The cabling under test shall be connected between the launch and tail cords and the test measurement, P_1, shall be recorded in watts or dBm.

Figure 9 LSPM 3-jumper attenuation measurement of installed cabling

Replace the title of Figure 9 by the following:

Figure 9 – SSPM three test cord attenuation measurement of installed cabling

Figure 10 LSPM 1-jumper attenuation measurement of installed link

Replace the title of Figure 10 by the following:

Figure 10 – SSPM one test cord attenuation measurement of installed cabling

9.1.1.3 Test result

Replace the first paragraph by the following new text:

For a given wavelength and in a given direction, measured loss is calculated using P_0 and P_1 as follows:

$$L = P_0 - P_1 \quad \text{(dB)} \tag{1}$$

where P_1 and P_0 are expressed in dBm.

Add, before the last paragraph, the following new paragraph:

For example, if the reference power level P_0 is −20 dBm (0,01 mW) and the measured power level P_1 is −23 dBm (0,005 mW) then the loss is 3 dB.

9.1.1.5 Treatment of channel test results

Add, before the existing paragraph, the following new text:

The use of reference terminations on the test cords affects the calculation of limits of testing for channel attenuation. The referencing procedure involves the interconnection of reference terminations in accordance with Table 2. The measurement of the channel includes connection of the test cords to non-reference terminations, which for ISO/IEC 11801 compliant connecting hardware, are specified in Table 4.

Using the default three test cord reference method specified in 9.1.1.2, the limit of testing for channel attenuation is

- for MMF: Limit = 0,4 dB + Σ (cable attenuation) + Σ (embedded connection attenuation);
- for SMF: Limit = 0,6 dB + Σ (cable attenuation) + Σ (embedded connection attenuation).

NOTE Where the performance of the interfaces to the cabling under test is not in accordance with ISO/IEC 11801, information should be sought from the manufacturers of the interfaces to determine the relevant information for Table 3 and Table 4. The general formula for the value = 2 × {(reference/embedded) − (reference/reference)}.

Examples of these calculations are shown in Annex G.

9.1.1.6 Treatment of permanent link test results

Replace the first and second paragraphs by the following new text:

The use of reference terminations on the test cords affects the calculation of limits of testing for permanent link attenuation. The referencing procedure involves the interconnection of reference terminations in accordance with Table 2. The measurement of the channel includes connection of the test cords to non-reference terminations, which for ISO/IEC 11801 compliant connecting hardware, are specified in Table 3.

Using the default three test cord reference method specified in 9.1.1.2, the limit of testing for permanent link attenuation is

- for MMF: Limit = 0,4 dB + Σ (cable attenuation) + Σ (embedded connection attenuation);
- for SMF: Limit = 0,6 dB + Σ (cable attenuation) + Σ (embedded connection attenuation).

NOTE 1 Where the performance of the interfaces to the cabling under test is not in accordance with ISO/IEC 11801, information should be sought from the manufacturers of the interfaces to determine the relevant information for Tables 3 and 4. The general formula for the value = 2 × {(reference/random) − (reference/reference)}.

Using the alternative one test cord reference method specified in 9.1.12, the limit for testing for permanent link attenuation is

- for MMF: Limit = 0,6 dB + Σ (cable attenuation) + Σ (embedded connection attenuation);
- for SMF: Limit = 1,0 dB + Σ (cable attenuation) + Σ (embedded connection attenuation).

NOTE 2 Where the performance of the interfaces to the cabling under test is not in accordance with ISO/IEC 11801, then information should be sought from the manufacturers of the interfaces to determine the relevant information for Table 4. The general formula for the value = 2 × (reference/embedded).

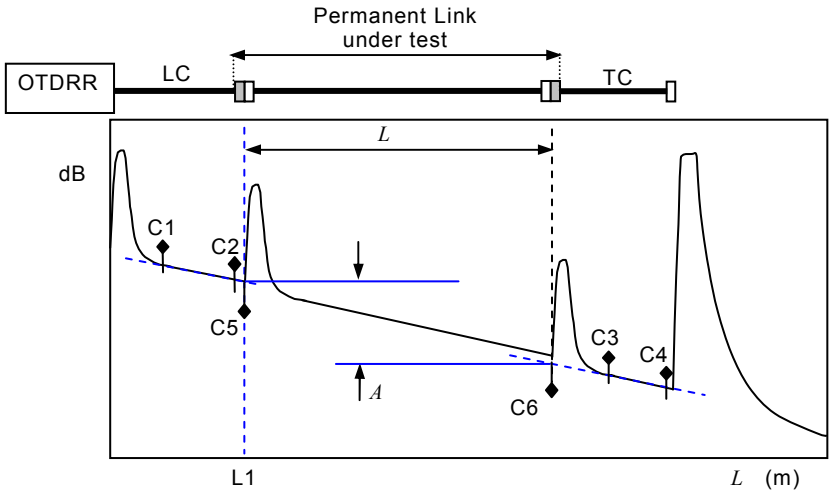
Examples of these calculations are shown in Annex G.

9.1.2.1 Test method

Replace the existing second paragraph before the bullet points as follows:

The OTDR/optical source shall be selected for the mode/wavelength as defined in Annex C and the appropriate settings established:

Replace the existing Figure 11 by the new Figure 11:

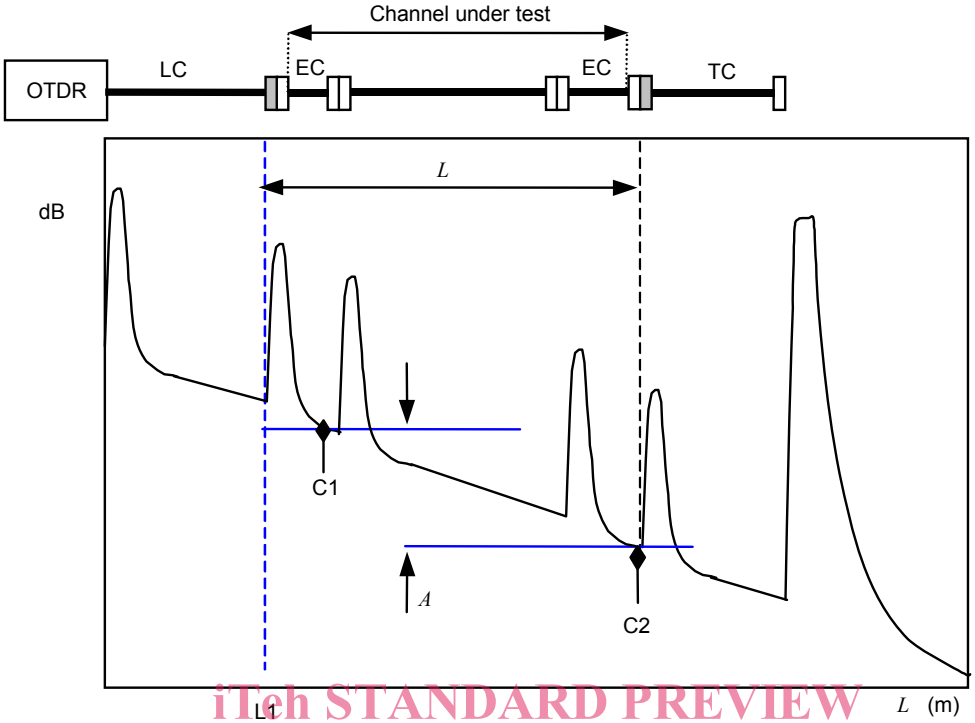


Key

LC	Launch cord
TC	Tail cord
C1, C2, C3, C4	Cursors for linear regression definition
C5, C6	Cursors at attenuation location
A	Attenuation/Insertion loss of permanent link
L	Length of permanent link

Figure 11 – OTDR measurement of installed cabling (permanent link)

Replace the existing Figure 12 by the new Figures 12a and 12b as follows:



Key

LC	Launch cord
TC	Tail cord
EC	Equipment cord
C1, C2	Cursors for 2-point channel insertion loss/attenuation measurement
A	Attenuation/Insertion loss of channel plus equipment connectors
L	Length of channel

Figure 12a – Alternative a