

Optical Fibre Testing

Light Source – Power Meter

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Optical Fibre Testing



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BICSI, Athens, Greece
15th November 2019

Standards Activities



Member: JTC1 SC25 WG3 “Cabling Design”
ISO/IEC 11801-x series etc.



Leader: JTC1 SC25 WG3 “Cabling Implementation”
ISO/IEC 14763-2, ISO/IEC 30129, ISO/IEC 24383 (in development)

ex-Member: JTC1 SC39 “Data centres – Facilities and Key Performance Indicators”
ISO/IEC 22237-x series, 30134-x series



Chairman - CENELEC TC215
Electrotechnical Aspects of Telecommunication Equipment



Convenor: TC215 WG1: Cabling design
EN 50173-x series

ex-Meeting Sec: TC215 WG2: Cabling installation – QA and installation practices
EN 50174-x series, EN 50310

Member: TC215 WG3: Facilities and infrastructures (data centres)
EN 50600-x series

ex-Member: CEN/CLC/ETSI CG Green Data Centres



Member: TCT/7: Telecommunications - Installation Requirements
Chairman – TCT/7/1: Cabling - “Design, planning and commissioning”
ex-Meeting Secretary – TCT/7/2: “Cabling - “Installation and UK implementation””
Meeting Secretary – TCT/7/3: Facilities and infrastructures



Fibreoptic Industry Association
www.fia-online.co.uk

Director
standards@fia

Length Through the Ages

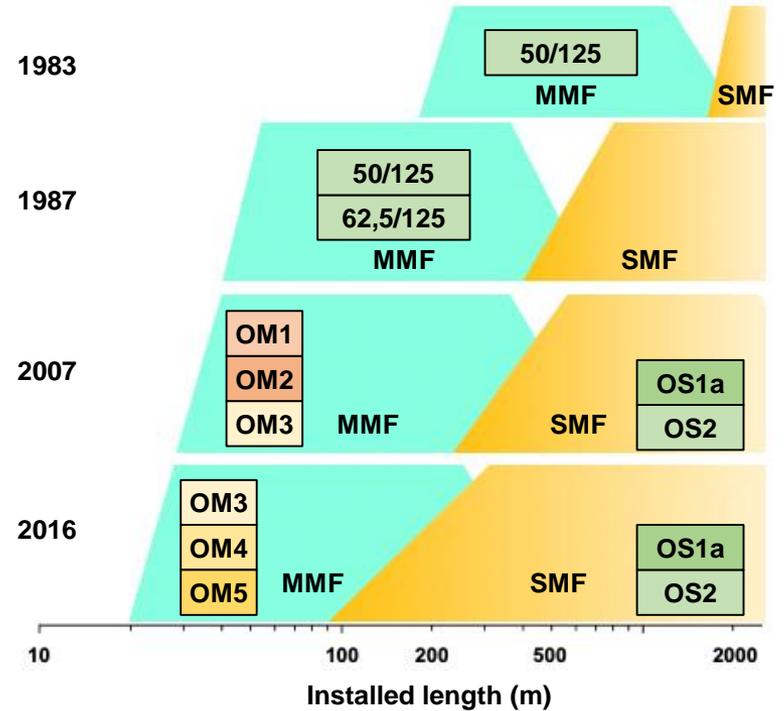
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OPTICAL FIBRE IN CUSTOMER PREMISES CABLING

MY FIRST INSTALLATION

1986-1991
 Managing Director
 Optical Core Technology
 400 + installations

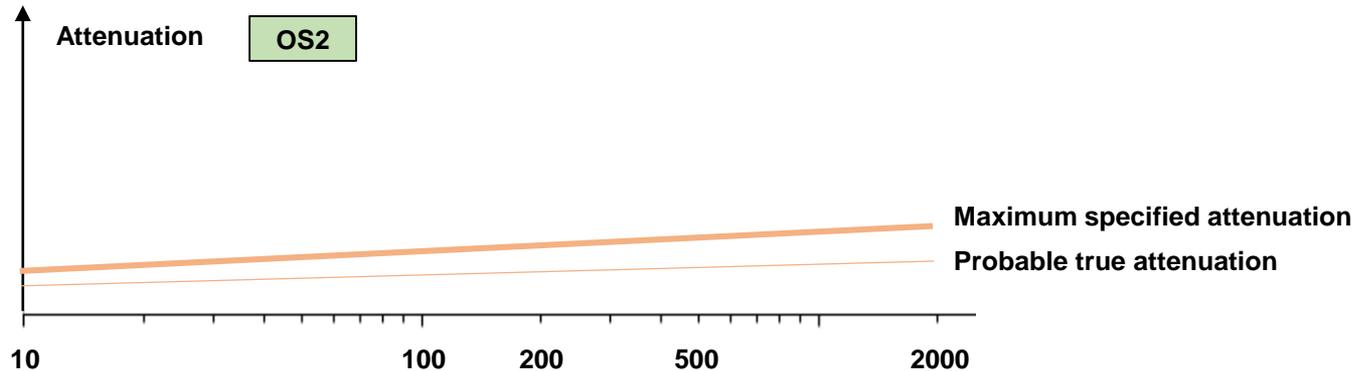
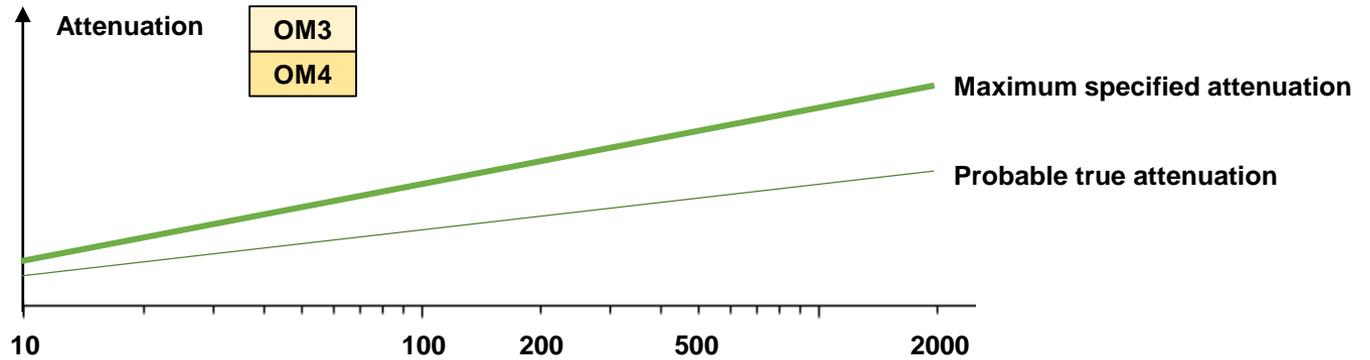
1991-2019
 Designer
 Auditor
 Expert Witness
 "Standards Man"



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Channel or Link Performance

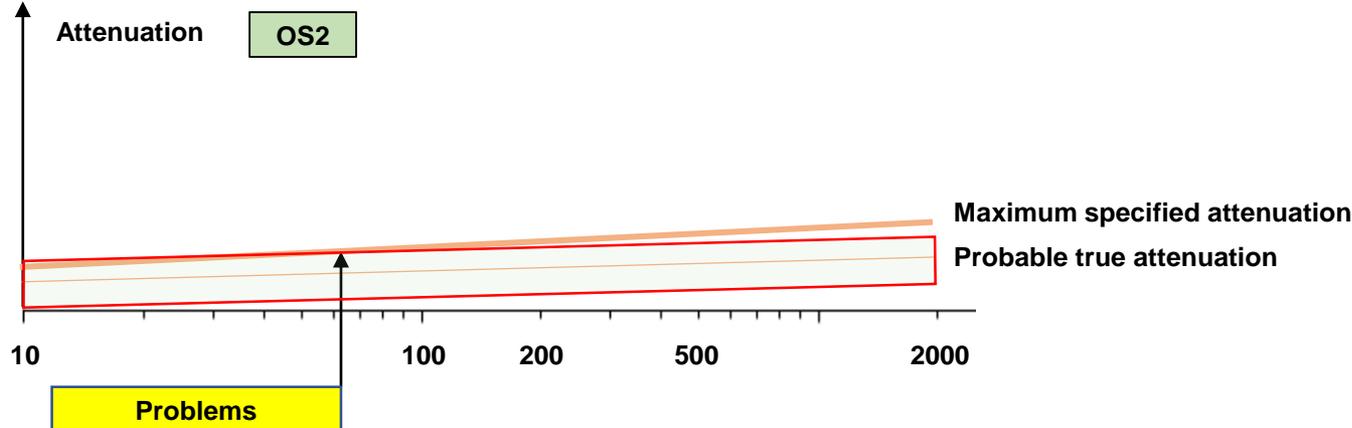
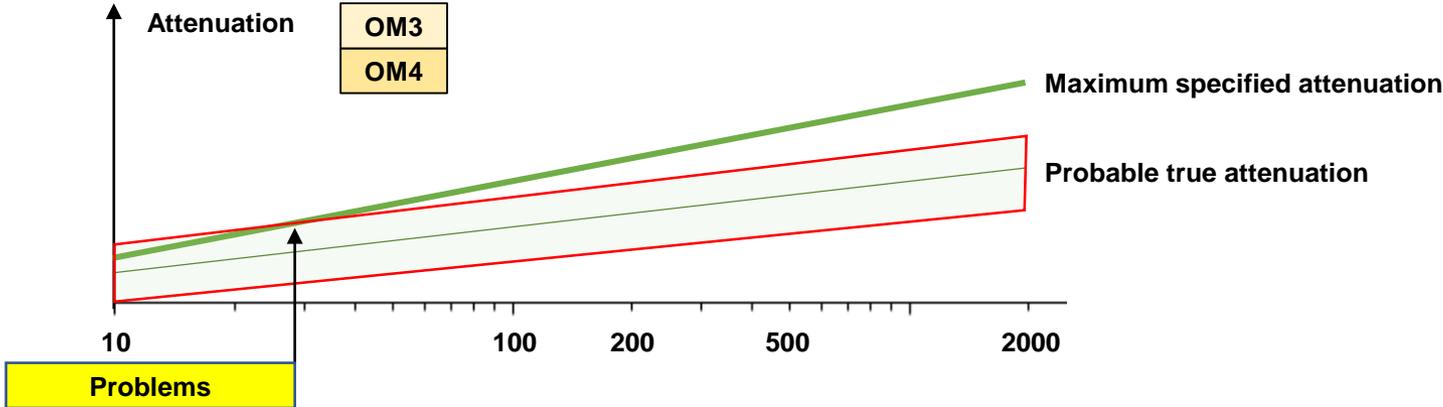
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Measurement Error

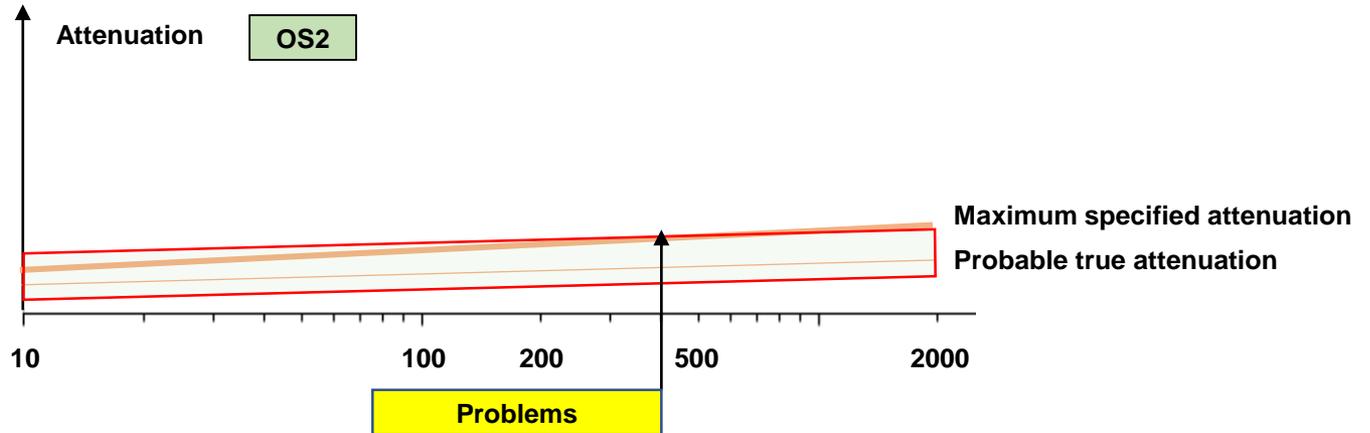
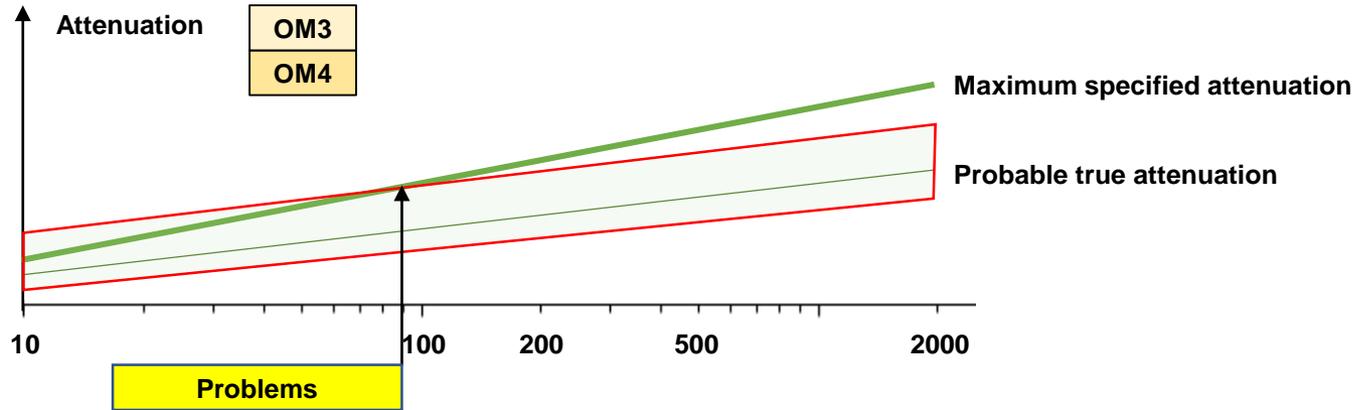
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Measurement Offset

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Fibre Optic Cabling Configurations - 1987

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My first standard

BS 7718:1994

Code of practice for
 installation of fibre optic cabling

Developed by BSI: 1987-90

Published :1991-1994



Replaced by EN 50174 and associated documents: 2001

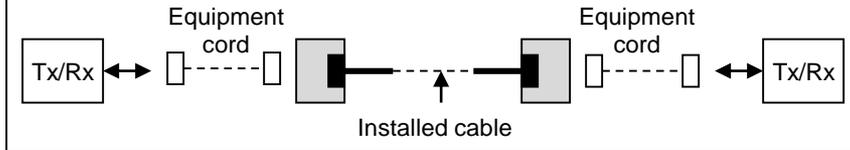
3 cabling configurations defined

- Configuration A: Panel-to-panel
- Configuration B: Plug-to-plug
- Configuration C: Panel-to-plug

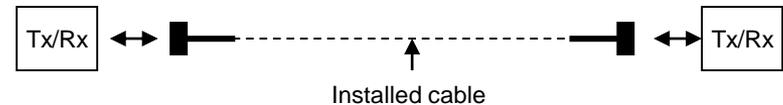
Each configuration had different

- measurement boundaries (test limits)
- normalisation procedures (reference-to-zero) to avoid measurement offset

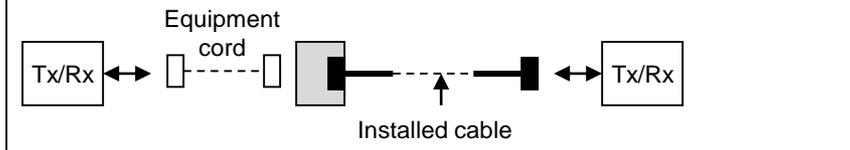
CABLING CONFIGURATION A



CABLING CONFIGURATION B



CABLING CONFIGURATION C



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Fibre Optic Cabling Configurations - 2019

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STANDARDS HAVE DEVELOPED

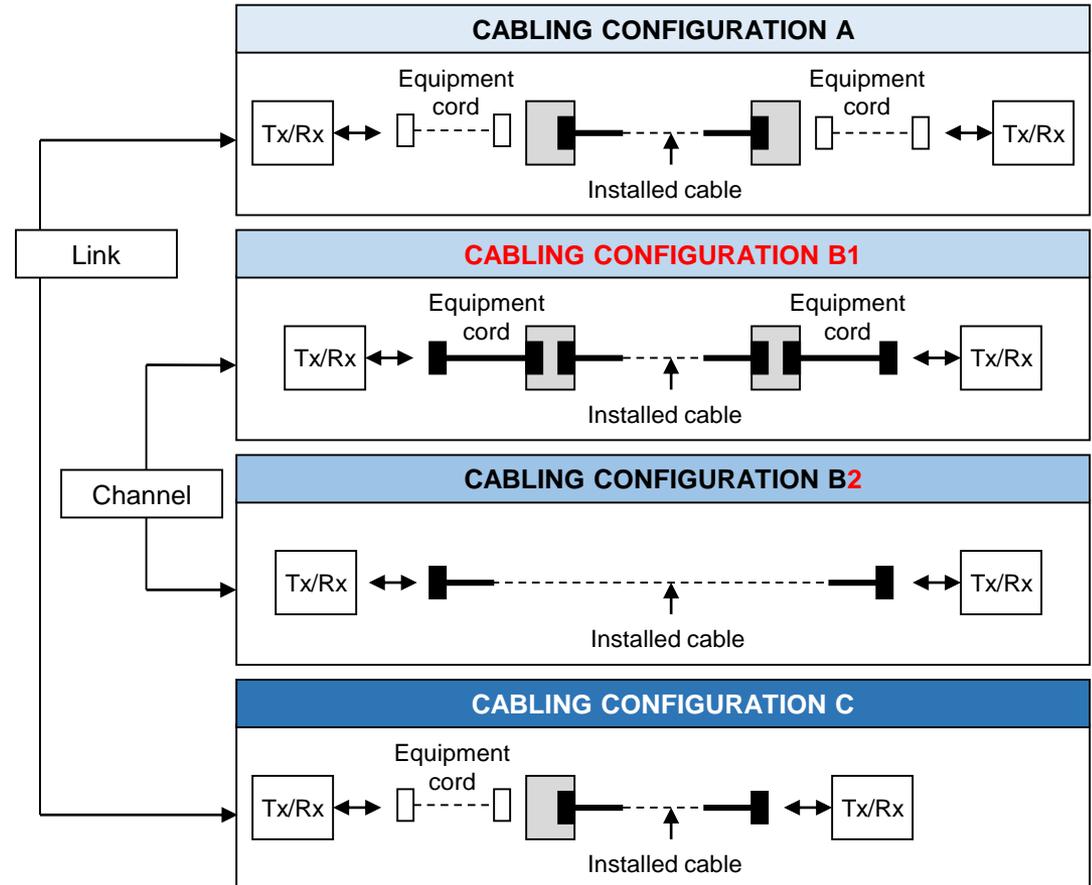
Channel and links have been further defined

4 cabling configurations defined

- Configuration A: Panel-to-panel
- Configuration B1: Cord-to-cord
- Configuration B2: Plug-to-plug
- Configuration C: Panel-to-plug

Each configuration has different

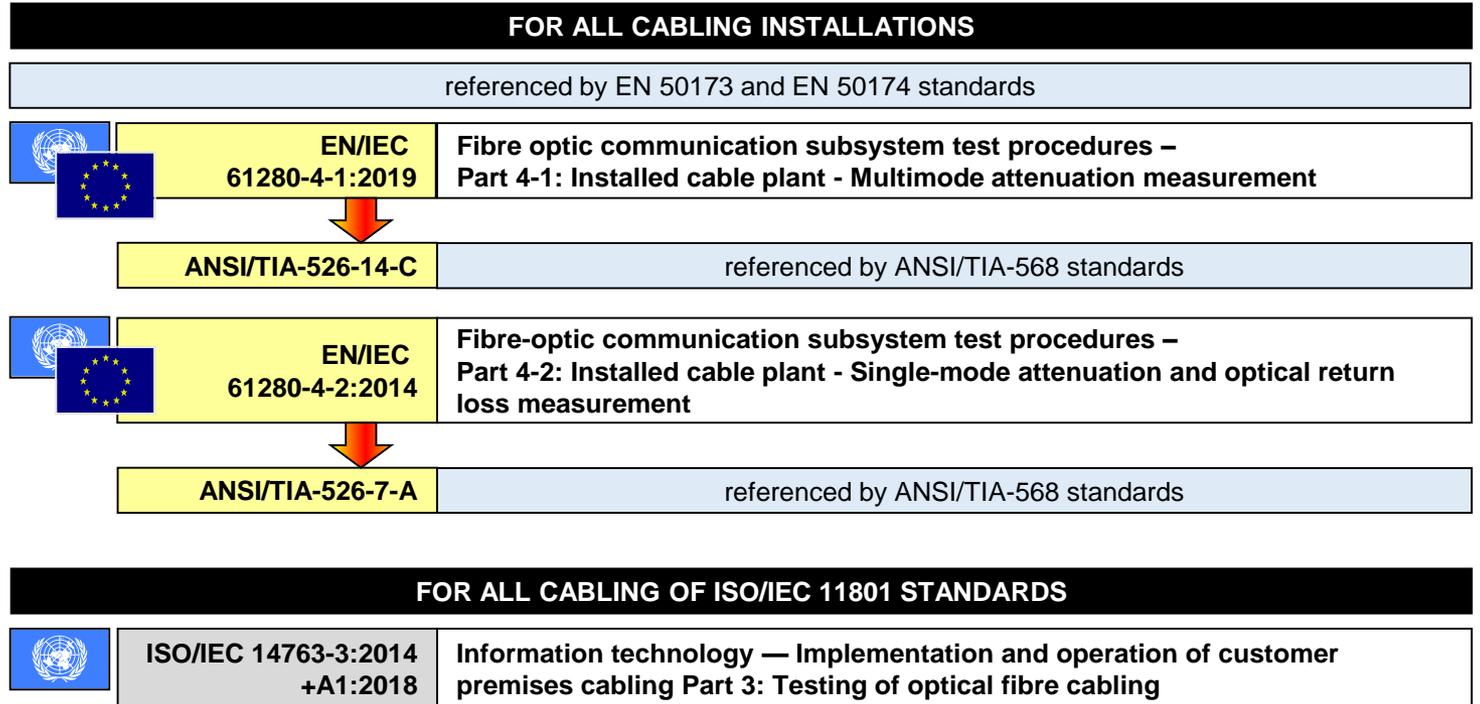
- measurement boundaries (test limits)
- normalisation procedures (reference-to-zero) to avoid measurement offset



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The Evolution of Test Method Standards

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Critical Issues

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REDUCTION OF MEASUREMENT OFFSET		
Correct normalisation techniques	CABLING CONFIGURATION A	<p>LS → [Launch cord] → [Installed cable] → [Tail cord] → PM</p>
	CABLING CONFIGURATION B1	<p>LS → [Installed equipment cord] → [Installed cable] → [Installed equipment cord] → PM</p>
	CABLING CONFIGURATION B2	<p>LS → [Dummy cord] → [Installed cable] → PM</p>
	CABLING CONFIGURATION C	<p>LS → [Installed cable] → PM</p>
Launch conditions	Multimode only	Controlled by LS or by "mode controller cord"
REDUCTION OF MEASUREMENT ERROR		
Reference grade terminations on test cords and test adaptors	Reduces variation of measured values AND changes test limits BUT not always available	

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Assessment versus Measurement

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<p>Incorrect normalisation technique will provide better (or worse) results than expected</p> <p>Some interface configurations prevent the correct method being applied</p> <p>For multimode, poor launch conditions will provide better (or worse) results than expected</p> <p>Using reference grade test components will provide better results but the limits should be reduced accordingly</p>	<p>CABLING CONFIGURATION A</p>	<p>ASSESSED attenuation = cable + 2 connections = LINK</p>
	<p>CABLING CONFIGURATION B1</p>	<p>MEASURED attenuation = cable + 2 connections = CHANNEL</p>
	<p>CABLING CONFIGURATION B2</p>	<p>ASSESSED attenuation = cable = CHANNEL</p>
	<p>CABLING CONFIGURATION C</p>	<p>ASSESSED attenuation = cable + 1 connection = LINK</p>

SYMPATHY FOR THE INSTALLER

Testing of installed optical fibre cabling is not always straightforward

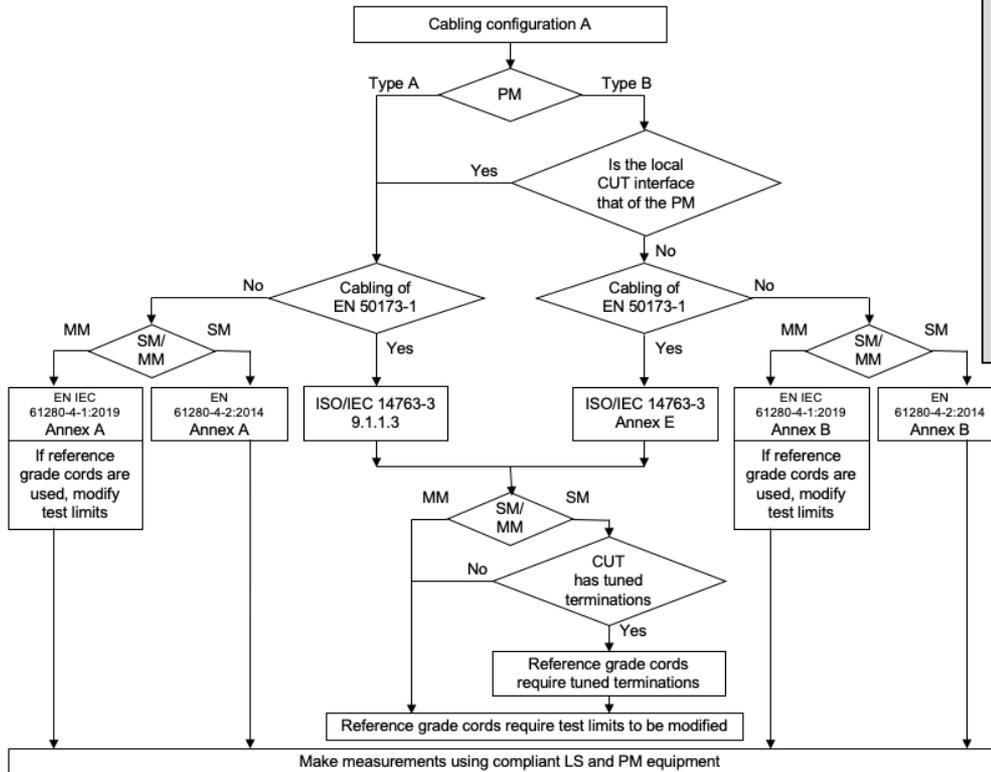
A Little Assistance

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EN 50174-1
Information technology - Cabling installation - Part 1: Installation Specification and quality assurance

FUTURE AMENDMENT

Flowchart guidance on correct methods based upon “specification of cabling” and specific “configuration” and “interfaces”



It is not the purpose of this diagram to describe the implications of the flowchart - only to highlight the decision-making necessary to identify the appropriate test method solution ... and then to apply the appropriate test limits

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THANK YOU!!

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