

INTERNATIONAL STANDARD



**Fibre optic communication subsystem test procedures –
Part 4-4: Cable plants and links – Polarization mode dispersion measurement
for installed links**



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for installed links**

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CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	10
3 Terms, definitions, symbols and abbreviated terms.....	10
3.1 Terms and definitions.....	10
3.2 Symbols and abbreviated terms	11
4 Background on PMD properties	12
5 Measurement methods	13
5.1 Methods of measuring PMD	13
5.1.1 General	13
5.1.2 Method A: Fixed analyzer with Fourier transformation (FA-FT)	14
5.1.3 Method B: Stokes parameters evaluation (SPE).....	14
5.1.4 Method C: Interferometric	15
5.1.5 Method D: Stokes parameter evaluation using back-reflected light.....	15
5.1.6 Method E: Modulated phase-shift technique.....	15
5.1.7 Method F: Polarization phase shift (PPS).....	15
5.1.8 Method G: Wavelength scanning OTDR and SOP Analysis (WSOSA).....	16
5.2 Document structure.....	16
5.3 Reference test method.....	16
6 Measurement configurations.....	16
6.1 Passive cabling link	16
6.2 Link including amplifiers.....	17
6.3 Link including chromatic dispersion compensating modules	17
6.3.1 General	17
6.3.2 Grating based DCM	17
6.4 Link including ROADMs	17
6.4.1 General	17
6.4.2 Multi-channel point to point configuration.....	18
6.4.3 Single channel configuration.....	18
7 Measurement considerations	18
7.1 General.....	18
7.2 Wavelength range.....	18
7.3 PMD measurement range.....	18
7.4 Measurement dynamic range	19
7.5 Fibre movement.....	19
7.6 Input and output SOP scrambling.....	19
7.6.1 General	19
7.6.2 Polarizers/scramblers	19
7.6.3 The 9-states Mueller set	20
7.6.4 Random scrambling	20
7.7 Polarization dependent loss	20
7.8 Amplifier considerations.....	20
7.8.1 General	20
7.8.2 Optical isolators.....	20
7.8.3 Wavelength range.....	20

7.8.4	Power levels	20
7.8.5	Amplified spontaneous emission (ASE) noise	21
7.9	Considerations on location of equipment	21
8	Apparatus	21
8.1	General	21
8.2	Light source and polarizers	21
8.3	Input optics	22
8.4	Cladding mode stripper	22
8.5	High-order mode filter	22
8.6	Output connection	22
8.7	Output optics	23
8.8	Detector	23
8.9	Computer or test platform	23
8.10	Means to reduce the effects of amplified spontaneous emission	23
9	Sampling and specimens	23
10	Procedure	23
11	Calculation or interpretation of results	24
12	Documentation	24
12.1	Information required for each measurement	24
12.2	Information to be available	24
13	Specification information	25
Annex A (normative)	Fixed analyzer method	26
A.1	Apparatus	26
A.1.1	Block diagrams	26
A.1.2	Light source	28
A.1.3	Analyzer	29
A.1.4	Optional polarization control at the input and output of the link under test	29
A.2	Procedure	29
A.2.1	Wavelength range and increment	29
A.2.2	Complete the scans	30
A.3	Calculations – Fourier transform	31
A.3.1	General	31
A.3.2	Data pre-processing and Fourier transformation	32
A.3.3	Transform data fitting	32
A.3.4	Spectral range	34
Annex B (normative)	Stokes parameter evaluation method	36
B.1	Apparatus	36
B.1.1	Block diagrams	36
B.1.2	Light source	37
B.1.3	Polarimeter	37
B.2	Procedure	37
B.3	Calculations	38
B.3.1	General	38
B.3.2	Jones matrix eigenanalysis (JME)	38
B.3.3	Poincaré sphere analysis (PSA) DGD calculation	40
Annex C (normative)	Interferometric method	41
C.1	General	41

C.2	Traditional analysis (TINTY).....	42
C.2.1	Apparatus.....	42
C.2.2	Procedure.....	43
C.2.3	Calculations.....	44
C.3	General analysis (GINTY)	45
C.3.1	Benefit.....	45
C.3.2	Apparatus.....	45
C.3.3	Procedure.....	46
C.3.4	Calculations.....	47
Annex D (informative)	Stokes parameter evaluation method using back-reflected light.....	49
D.1	Utility	49
D.2	Apparatus	49
D.2.1	Block diagram.....	49
D.2.2	Directional coupler.....	49
D.2.3	Angled connector.....	49
D.2.4	Far-end termination	49
D.3	Procedure	50
D.4	Calculation and interpretation of results	50
Annex E (informative)	Modulation phase-shift method.....	51
E.1	Apparatus	51
E.1.1	Overview and block diagrams	51
E.1.2	Light source(s).....	52
E.1.3	Modulation.....	53
E.1.4	Polarization control.....	54
E.1.5	Input and output optics	54
E.1.6	Optical detector and phase detection electronics	55
E.1.7	Reference signal.....	55
E.2	Procedure	55
E.2.1	Modulation frequency	55
E.2.2	Scan the wavelengths and measure DGD	55
E.2.3	Calibration.....	58
E.3	Calculations.....	58
E.3.1	DGD calculations.....	58
E.3.2	PMD calculation.....	59
Annex F (informative)	Polarization phase shift method.....	60
F.1	Apparatus	60
F.1.1	Block diagram.....	60
F.1.2	Light source.....	60
F.1.3	Modulation.....	60
F.1.4	Polarization control.....	61
F.1.5	Output optics	61
F.1.6	Optical detectors	61
F.1.7	Amplitude and phase comparator.....	61
F.1.8	Reference signal.....	62
F.2	Procedure	62
F.2.1	Modulation frequency	62
F.2.2	Wavelength increment	62
F.2.3	Scanning wavelengths and measuring DGDs.....	62
F.2.4	Calibration.....	63

F.3	Calculations	63
F.3.1	Results overview	63
F.3.2	DGD determination	64
F.3.3	PMD calculation.....	65
Annex G (normative) Wavelength scanning OTDR and SOP analysis (WSOSA) PMD test method.....		66
G.1	General.....	66
G.2	Apparatus	66
G.2.1	Block diagram.....	66
G.2.2	Light source.....	67
G.2.3	Launch polarization	67
G.2.4	Polarization scrambling.....	68
G.2.5	Input/output optics	68
G.3	Specimen stability.....	68
G.4	Procedure	68
G.4.1	Set instrument parameters.....	68
G.4.2	Action of the instrument after measurement initiation.....	69
G.5	Calculations	71
G.5.1	Power normalisation	71
G.5.2	Transmission differences	72
G.5.3	Mean-square transmission difference and round trip PMD	73
G.5.4	Determination of PMD.....	74
G.6	Procedures for measuring PMD on installed aerial links	74
G.6.1	Instability compensation	74
G.6.2	Approaches to reducing the effects of instabilities	75
Annex H (informative) PMD determination by Method C.....		77
H.1	General.....	77
H.2	Traditional analysis.....	77
H.3	General analysis	79
Bibliography.....		81
Figure 1 – Typical passive cabling link configuration.....		16
Figure 2 – Example configuration of link including amplifiers.....		17
Figure A.1 – Block diagrams for fixed analyzer		28
Figure A.2 – Example of the R-function for the fixed analyzer method.....		31
Figure A.3 – A chirped sine wave.....		33
Figure A.4 – PMD by Fourier analysis		34
Figure B.1 – Block diagram for Method B using a narrowband (tuneable laser) source.....		36
Figure B.2 – Block diagram for Method B using a broadband (ASE) source.....		36
Figure C.1 – Generic set-up for Method C (INTY).....		41
Figure C.2 – Schematic diagram for Method C (TINTY).....		42
Figure C.3 – Typical data obtained by Method C (TINTY).....		44
Figure C.4 – Schematic diagram for Method C (GINTY)		45
Figure C.5 – Typical random-mode-coupling data obtained by Method C (GINTY)		47
Figure C.6 – Typical mixed-mode-coupling data obtained by Method C (GINTY)		47
Figure D.1 – Layout for Method D		49
Figure E.1 – Basic apparatus		51

Figure E.2 – Apparatus layout for polarization modulation..... 52

Figure E.3 – Mueller states on Poincaré sphere 57

Figure E.4 – DGD versus wavelength..... 58

Figure E.5 – DGD in histogram format 58

Figure F.1 – Block diagram for Method F (polarization phase shift method)..... 60

Figure F.2 – DGD versus wavelength for a random mode coupling device 64

Figure G.1 – Illustration of the frequency domain and parameters for WSOSA 66

Figure G.2 – Typical generic experimental implementation for WSOSA..... 67

Figure G.3 – Typical power measurement results..... 71

Figure G.4 – Typical $s(\omega)$ for random I/O-SOP 72

Figure G.5 – Typical transmission difference for a frequency pair and I/O-SOP 73

Figure G.6 – Example of 2-pulse implementation in presence of instabilities..... 76

Table E.1 – Example of Mueller set..... 57

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FIBRE OPTIC COMMUNICATION SUBSYSTEM
TEST PROCEDURES –****Part 4-4: Cable plants and links – Polarization mode dispersion
measurement for installed links**

FOREWORD

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International Standard IEC 61280-4-4 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2006. This second edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) theory is removed and replaced with a reference to IEC TR 61282-9;
- b) a new method, wavelength scanning OTDR and SOP analysis (WSOSA), is added as Annex G;
- c) a brief description of each method is added to Clause 5;
- d) Methods E and F are converted to informative Annexes E and F;

- e) a new Clause (6) on measurement configurations is added;
- f) a new Clause (7) on measurement considerations is added;
- g) Clause 10 on procedure is expanded;
- h) several of the apparatus diagrams are improved;
- i) several clarifications about what is measured and what is calculated have been made in Annex H.

The text of this International Standard is based on the following documents:

CDV	Report on voting
86C/1378/CDV	86C/1419/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61280 series, published under the general title *Fibre optic communication subsystem test procedures*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

Polarization mode dispersion (PMD) is a statistical parameter. The reproducibility of measurements depends on the particular method, but is limited also by the PMD level of the link and the accessible wavelength range. Gisin [1]¹ derived a theoretical limit to this reproducibility independent of the measurement method by assuming ideal measurement conditions.

Originally, the principles of IEC 61280-4-4:2006 were closely aligned with those of IEC 60793-1-48:2003 on optical fibre and optical fibre cable test method, which focuses on aspects related to the measurement of factory lengths. However, IEC 60793-1-48:2007 removed some of the test methods that are no longer of interest to fibre and cable manufacturers. These have been retained as informative Annexes D, E, and F in this document, and a new test method G has been added.

This document also updates test methods A, B and C and adds more information applicable to testing of installed cabling.

NOTE 1 Test methods for factory lengths of optical fibres and optical fibre cables are given in IEC 60793-1-48.

NOTE 2 Test methods for optical amplifiers (OAs) are given in IEC 61290-11-1 and IEC 61290-11-2.

NOTE 3 Test methods for passive optical components are given in IEC 61300-3-32.

NOTE 4 Guidelines for the calculation of PMD for links that include components such as dispersion compensators or optical amplifiers are given in IEC TR 61282-3.

NOTE 5 Further general guidance on PMD measurements and background theory is contained in IEC TR 61282-9.

¹ Figures in square brackets refer to the Bibliography.

FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 4-4: Cable plants and links – Polarization mode dispersion measurement for installed links

1 Scope

This part of IEC 61280 provides uniform methods of measuring polarization mode dispersion (PMD) of single-mode installed links. An installed link is the optical path between transmitter and receiver, or a portion of that optical path. These measurements can be used to assess the suitability of a given link for high bit rate applications, or to provide insight on the relationships of various related transmission attributes. This document focuses on the measurement methods and requirements for measuring long lengths of installed cabling that can also include other optical elements, such as splices, connectors, amplifiers, chromatic dispersion compensating modules, dense wavelength division multiplexing or multiplexer (DWDM) components, multiplexers, wavelength selective switches, re-configurable optical add drop multiplexer (ROADMS).

This document focuses on the apparatus, procedures, and calculations needed to complete measurements. IEC TR 61282-9 explains the theory behind the test methods.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60793-1-44, *Optical fibres – Part 1-44: Measurement methods and test procedures – Cut-off wavelength*

IEC 61300-3-35, *Fibre optic interconnecting devices and passive components – Basic test and measurement procedures – Part 3-35: Examinations and measurements – Visual inspection of fibre optic connectors and fibre-stub transceivers*

IEC TR 61282-9, *Fibre optic communication system design guides – Part 9: Guidance on polarization mode dispersion measurements and theory*

IEC TR 62627-01, *Fibre optic interconnecting devices and passive components – Part 01: Fibre optic connector cleaning methods*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>