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PD IEC/TR 61282-13:2014



BSI Standards Publication

Fibre optic communication system design guides

Part 13: Guidance on in-service PMD and
CD characterization of fibre optic links

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TECHNICAL REPORT



Fibre optic communication system design guides – Part 13: Guidance on in-service PMD and CD characterization of fibre optic links

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC COMMUNICATION SYSTEM DESIGN GUIDES –

Part 13: Guidance on in-service PMD and CD characterization of fibre optic links

FOREWORD

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The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 61282-13, which is a technical report, has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
86C/1201/DTR	86C/1236/RVC

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

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

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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 publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication 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- withdrawn,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

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning optical frequency-sensitive analyser given in 5.1.3.4 and concerning CD measurement using multi-tone probe signal given in 6.1.

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he/she is willing to negotiate licences either free of charge or under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

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FIBRE OPTIC COMMUNICATION SYSTEM DESIGN GUIDES –**Part 13: Guidance on in-service PMD and
CD characterization of fibre optic links****1 Scope**

This part of IEC 61282, which is a technical report, presents general information about in-service measurements of polarization mode dispersion (PMD) and chromatic dispersion (CD) in fibre optic links. It describes the background and need for these measurements, the various methods and techniques developed thus far, and their possible implementations for practical applications.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60793-1-42, *Optical fibres – Part 1-42: Measurement methods and test procedures – Chromatic dispersion*

IEC 61280-4-4, *Fibre optic communication subsystem test procedures – Part 4-4: Cable plants and links– Polarization mode dispersion measurement for installed links*

3 Symbols, acronyms and abbreviated terms

$D(\lambda)$	group velocity dispersion coefficient at optical wavelength λ
F	frequency of amplitude modulation in CD measurement
L	length of arc of the SOP rotation on the Poincaré sphere
L_f	length of fibre or fibre link
P_p, P_s	optical signal powers in two orthogonal SOPs
\hat{P}	normalized optical power
$\Delta\hat{P}$	normalized optical power difference
S_1, S_2, S_3	Stokes parameter
\hat{S}	normalized Stokes vector
N	number of statistically independent effective DGD measurements
N_t	number of statistically independent effective DGD measurements in time
N_v	number of statistically independent signal wavelengths
c	speed of light in vacuum
Δf	optical frequency interval or spacing
f	electrical signal frequency in dual-wavelength frequency generator
f_{clock}	clock frequency of digital data modulation
Δt	time interval between effective DGD measurements or differential time delay in CD measurement