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BSI Standards Publication

Fibre optic communication system design guidelines

Part 5: Accommodation and compensation of chromatic dispersion

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National foreword

This Published Document is the UK implementation of IEC TR 61282-5:2019. It supersedes PD IEC TR 61282-5:2002, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/86/3, Fibre optic systems and active devices.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIBRE OPTIC COMMUNICATION SYSTEM DESIGN GUIDELINES –

Part 5: Accommodation and compensation of chromatic dispersion

FOREWORD

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IEC TR 61282-5, which is a Technical Report, 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 2002, and constitutes a technical revision.

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

a) extends the application space for dispersion compensation and accommodation to communication systems that employ non-zero dispersion-shifted fibres;
b) adds a discussion on the suitability of fibre types for long-haul transmission of wavelength-multiplexed signals;
c) updates the dispersion coefficient limits for dispersion-unshifted fibres;

d) adds information on the dispersion coefficients of dispersion-shifted fibres;

e) updates the naming of the fibre types to the revised naming conventions defined in IEC 60793-2-50:2018;

f) updates Table 2 to include the dispersion tolerance of phase-shift-keyed modulation formats used for the transmission of 40 Gbit/s and 100 Gbit/s signals;

g) adds information on dispersion management in terrestrial and submarine communication systems;

h) extends the description of passive dispersion compensators based on fibre Bragg gratings and etalons;

i) adds information on electronic dispersion accommodation in coherent communication systems (including transmitters and receivers);

j) updates the description of optical accommodation techniques to include soliton transmission and mid-span spectral inversion;

k) extends the list of system parameters for passive dispersion compensators to include wavelength-dependent loss, phase ripple, and latency;

l) updates the description of dispersion compensator applications in long-haul communication systems.

The text of this Technical Report is based on the following documents:

Draft TR	Report on voting
86C/1573/DTR	86C/1581/RVDTR

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.

A list of all parts in the IEC 61282 series, published under the general title *Fibre optic communication system design guidelines*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document 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 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.

FIBRE OPTIC COMMUNICATION SYSTEM DESIGN GUIDELINES –

Part 5: Accommodation and compensation of chromatic dispersion

1 Scope

This part of IEC 61282, which is a Technical Report, describes various techniques for accommodation and compensation of chromatic dispersion in fibre optic communication systems. These techniques include dispersion compensation with passive optical components, advanced dispersion management, and electronic accommodation of dispersion in the transmitters and receivers.

2 Normative references

There are no normative references in this document.

3 Terms, definitions 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/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.2 Abbreviated terms

ADC	analogue-to-digital converter
BER	bit-error ratio
CD	chromatic dispersion
CW	continuous wave
DAC	digital-to-analogue converter
DCF	dispersion-compensating fibre
DCM	dispersion compensation module
DGD	differential group delay
DPSK	differential phase-shift keying
DQPSK	differential quaternary phase-shift keying
DSF	dispersion-shifted fibre
DWDM	dense wavelength-division multiplexing
FBG	fibre Bragg grating
FWM	four-wave mixing
I	in-phase component
IL	insertion loss
ITU	International Telecommunication Union