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Fibre optic communication subsystem test procedures – Part 1-3: General communication subsystems – ~~Central wavelength and spectral width measurement~~ Measurement of central wavelength, spectral width and additional spectral characteristics

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FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 61280-1-3 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

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

a) addition of measurement of signal-to-source spontaneous emission ratio in 8.9;
b) change of document title to reflect the additional measurement;
c) additional information on the resolution bandwidth used in the measurement of the side-mode suppression ratio in 8.8;
d) use of a calibrated optical wavelength meter for accurate wavelength measurements of single-longitudinal mode lasers.

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

Draft	Report on voting
86C/1701/CDV	86C/1717/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 1-3: General communication subsystems – ~~Central wavelength and spectral width measurement~~ Measurement of central wavelength, spectral width and additional spectral characteristics

1 Scope

This part of IEC 61280 provides definitions and measurement procedures for several wavelength and spectral width properties of an optical spectrum associated with a fibre optic communication subsystem, an optical transmitter, or other light sources used in the operation or test of communication subsystems. This document also provides definitions and measurement procedures for side-mode suppression ratio and signal-to-source spontaneous emission ratio.

The measurement is done for the purpose of system construction and/or maintenance. In the case of communication subsystem signals, the optical transmitter is typically under modulation.

NOTE Different properties ~~may~~ can be appropriate to different spectral types, such as continuous spectra characteristics of light-emitting diodes (LEDs), as well as multilongitudinal-mode (MLM), multitransverse-mode (MTM) and single-longitudinal mode (SLM) spectra, which are characteristic of laser diodes (LDs).

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.

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IEC 62129-2, *Calibration of wavelength/optical frequency measurement instruments – Part 2: Michelson interferometer single wavelength meters*

3.1.1
centre wavelength
λ_0
mean of the closest spaced half-power wavelengths in an optical spectrum, one above and one below the peak wavelength

Note 1 to entry: Centre wavelength is also called “half-power mid-point”.

3.1.2
half-power wavelength
λ_{3dB}
wavelength corresponding to a half-peak power value of the optical spectrum

3.1.3
peak wavelength
λ_p
wavelength corresponding to the maximum power value of the optical spectrum

3.1.4
centroidal wavelength
λ_c
mean or average wavelength of an optical spectrum

3.2 Spectral width

3.2.1
RMS spectral width
$\Delta\lambda_{rms}$
square root of the second moment of the power distribution about the centroidal wavelength

3.2.2
***n*-dB-down spectral width**
$\Delta\lambda_{n\text{-}dB}$
positive difference of the closest spaced wavelengths, one above and one below the peak wavelength λ_p, at which the spectral power density determined in a specified resolution bandwidth is n dB down from its peak value

3.2.3
full-width at half-maximum
$\Delta\lambda_{fwhm}$
~~a special case of n-dB-down width with n = 3~~
positive difference of the closest spaced wavelengths, one above and one below the peak wavelength λ_p, at which the spectral power density determined in a specified resolution bandwidth is 3 dB down from its peak value

3.3 Additional spectral characteristics

3.3.1
side-mode suppression ratio
SMSR
ratio of the largest peak of the optical spectrum to the second largest peak under non-modulated (continuous wave) operating condition, which is determined in a specified wavelength resolution bandwidth (RBW), for a nominally single-longitudinal mode (SLM) spectrum

Note 1 to entry: See 8.8.

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IEC 61280-1-3:2021-07(en)

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