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Fibre optic communication subsystem test procedures –

Part 1-4: General communication subsystems – Collection and reduction of two-dimensional nearfield data for multimode fibre laser transmitters

Procédures d'essai des sous-systèmes de télécommunication à fibres optiques –

Partie 1-4: Procédures d'essai des sous-systèmes généraux de télécommunication – Recueil et réduction de données à deux dimensions de champs proches pour les émetteurs de laser à fibres multimodales

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FOREWORD

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International Standard IEC 61280-1-4 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics

The text of this standard is based on the following documents:

FDIS	Report on voting
86C/465/FDIS	86C/494/RVD

Full information on the voting for the approval of this standard 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.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

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- withdrawn;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

FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 1-4: General communication subsystems – Collection and reduction of two-dimensional nearfield data for multimode fibre laser transmitters

1 General

1.1 Scope and object

This part of IEC 61280 sets forth a standard procedure for the collection of two-dimensional fibre optic nearfield grayscale data and subsequent reduction to one-dimensional data expressed as a set of three sampled parametric functions of radius from the fibre's optical center. The object of this standard is to reduce measurement errors and inter-laboratory variation, supporting accurate mathematical prediction of minimum guaranteed link length in gigabit and ten gigabit fibre optic data communications systems.

These radial functions are intended to characterize fibre optic laser sources for use in mathematical models predicting the minimum guaranteed length of a communications link.

Although available as a byproduct, estimation of the nearfield diameter is not an objective.

1.2 Assumptions

The 50-micron or 62,5-micron core near-parabolic graded-index multimode fibre used as the "test jumper assembly" is treated as if it possessed perfect circular symmetry about its optical center, as asymmetries in the launched optical flux distributions will dominate any lopsidedness of the test jumper assembly. It is further assumed that all cladding modes will be stripped by passage through the specified ten meters or more of fibre. The modes of a mode group need not carry equal flux. (In fact, with such short fibres, one thousand meters or less, unequal distribution of flux in the modes of a group is the norm, not the exception.)

The fibre micropositioner that moves the fibre in the receiving camera's field of view, being used to calibrate the camera for geometric distortions, is used as a reference standard. The microscope objective, used to project the magnified nearfield onto the CCD chip, is treated as an optically perfect thick lens.

The flux detectors are required to be both linear and memoryless; this excludes for instance lead sulphide vidicon detectors. Detectors shall meet the detector requirements of IEC 60793-1-43. Absolute radiometric measurement of flux (optical power flow) is not required. A computer is required to perform the needed computations, which are too extensive to be performed manually. Although the present measurement method assumes a CCD camera, mechanically-scanned "slitscan" and pinhole cameras may also be used.

Safety: all procedures in which an LED or laser source is used as the optical source shall be carried out using safety precautions in accordance with IEC 60825-2.

2 Normative references

The following referenced documents are indispensable for the application 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 60793-1-20: *Optical fibres – Part 1-20: Measurement methods and test procedures – Fibre geometry*

IEC 60793-1-41: *Optical fibres – Part 1-41: Measurement methods and test procedures – Bandwidth*

IEC 60793-1-43: *Optical fibres – Part 1-43: Measurement methods and test procedures – Numerical aperture*

IEC 60825-2: *Safety of laser products – Part 2: Safety of optical fibre communication systems*