SLOVENSKI STANDARD

SIST EN 61280-2-2:2006

marec 2006

Postopki preskušanja optičnega komunikacijskega podsistema – 2-2. del: Digitalni sistemi – Merjenje po vzorcu optičnega očesa, valovne oblike in hitrosti ugašanja (IEC 61280-2-2:2005)

Fibre optic communication subsystem test procedures - Part 2-2: Digital systems - Optical eye pattern, waveform, and extinction ratio measurement (IEC 61280-2-2:2005)

ICS 33.180.01

Referenčna številka
SIST EN 61280-2-2:2006(en)

EUROPEAN STANDARD **EN 61280-2-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM July 2005

ICS 33.180.01 Supersedes EN 61280-2-2:1999

English version

Fibre optic communication subsystem test procedures Part 2-2: Digital systems - Optical eye pattern, waveform and extinction ratio measurement

(IEC 61280-2-2:2005)

Procédures d'essai des sous-systèmes de télécommunications à fibres optiques
Partie 2-2: Systèmes numériques - Mesure du diagramme de l'œil optique, de la forme d'onde et du taux d'extinction
(CEI 61280-2-2:2005)

Prüfverfahren für Lichtwellenleiter-Kommunikationsuntersysteme
Teil 2-2: Digitale Systeme - Messung des optischen Augendiagramms, der Wellenform und des Extinktionsverhältnisses
(IEC 61280-2-2:2005)

This European Standard was approved by CENELEC on 2005-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 61280-2-2:2005 E

Foreword

The text of document 86C/642/FDIS, future edition 2 of IEC 61280-2-2, prepared by SC 86C, Fibre optic systems and active devices, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61280-2-2 on 2005-04-01.

This European Standard supersedes EN 61280-2-2:1999.

Significant changes include updating the extinction ratio measurement and eye-mask definitions to coincide with TIA OFSTP-4A and inclusion of methods for return-to-zero (RZ) eye measurements.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2006-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2008-04-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61280-2-2:2005 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
ITU-T Recommendation G.957	1999	Optical interfaces for equipments and systems relating to the synchronous digital hierarchy	-	-
A1	2003		-	-

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
61280-2-2

Deuxième édition
Second edition
2005-04

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

Partie 2-2:
Systèmes numériques – Mesure du diagramme de l'œil optique, de la forme d'onde et du taux d'extinction

Fibre optic communication subsystem test procedures –

Part 2-2:
Digital systems – Optical eye pattern, waveform and extinction ratio measurement

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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PRICE CODE U

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 2-2: Digital systems – Optical eye pattern, waveform and extinction ratio measurement

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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International Standard IEC 61280-2-2 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 1998. This second edition constitutes a technical revision. Significant changes include updating the extinction ratio measurement and eye-mask definitions to coincide with TIA OFSTP-4A and inclusion of methods for return-to-zero (RZ) eye measurements.

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

FDIS	Report on voting
86C/642/FDIS	86C/661/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.

IEC 61280 consists of the following parts under the general title *Fibre optic communication subsystem test procedures* [1] :

Part 1: General communication subsystems [2]

Part 2: Digital systems [3]

Part 4: Cable plant and links [4]

Part 3 is in preparation.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

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1) The general title of the IEC 61280 series has changed. Previous parts were published under the general title *Fibre optic communication subsystem basic test procedures*

2) The title of Part 1 has changed. Parts 1-1 and 1-3 were published under the title *Test procedures for general communication subsystems.*

3) The title of Part 2 has changed. Parts 2-1, 2-2, 2-4 and 2-5 were published under the title *Test procedures for digital systems.*

4) The title of Part 4 has changed. Part 4-2 was published under the title *Fibre optic cable plant*.

FIBRE OPTIC COMMUNICATION SUBSYSTEM TEST PROCEDURES –

Part 2-2: Digital systems – Optical eye pattern, waveform and extinction ratio measurement

1 Scope

This part of IEC 61280 describes a test procedure to measure eye pattern and waveform parameters, such as rise time, fall time, overshoot, and extinction ratio. Alternatively, the waveform may be tested for compliance with a predetermined waveform mask.

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.

ITU-T Recommendation G.957:1999, *Optical interfaces for equipments and systems relating to the synchronous digital hierarchy*
Amendment 1 (2003)

3 Apparatus

The primary components of the measurement system are a photodetector, a low-pass filter, an oscilloscope, and an optical power meter, as shown in Figure 1.

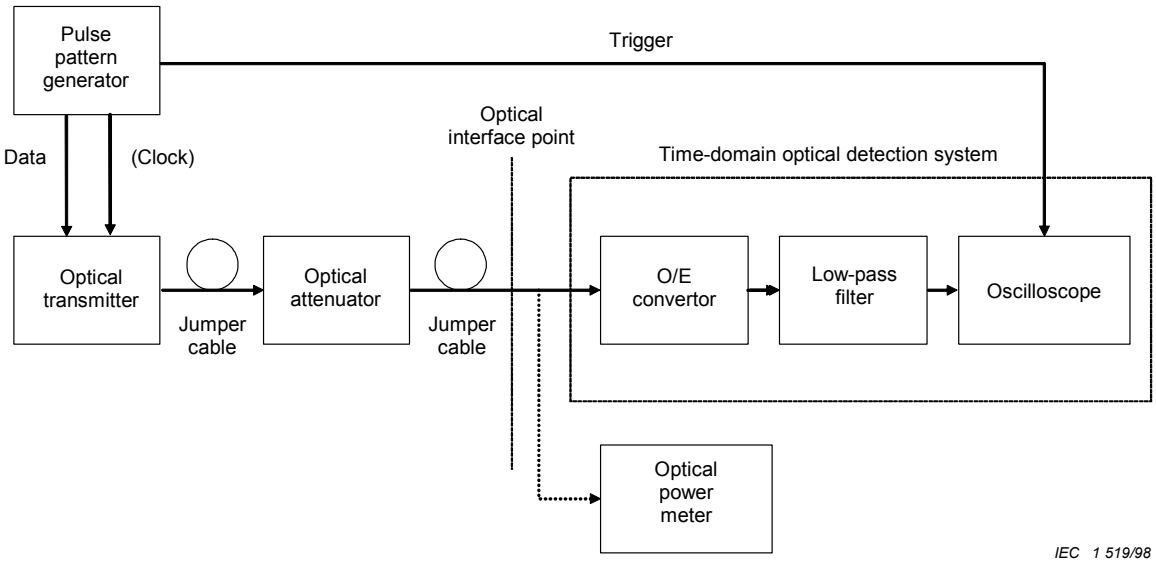

Figure 1 – Optical eye pattern, waveform, and extinction ratio measurement configuration

3.1 Time-domain optical detection system

The time-domain optical detection system displays the intensity of the optical waveform as a function of time. The optical detection system is comprised primarily of an optical-to-electrical (O/E) converter, a linear-phase low-pass filter, and an oscilloscope. The detection system is shown in Figure 2. More complete descriptions of the equipment are listed in the following subclauses.

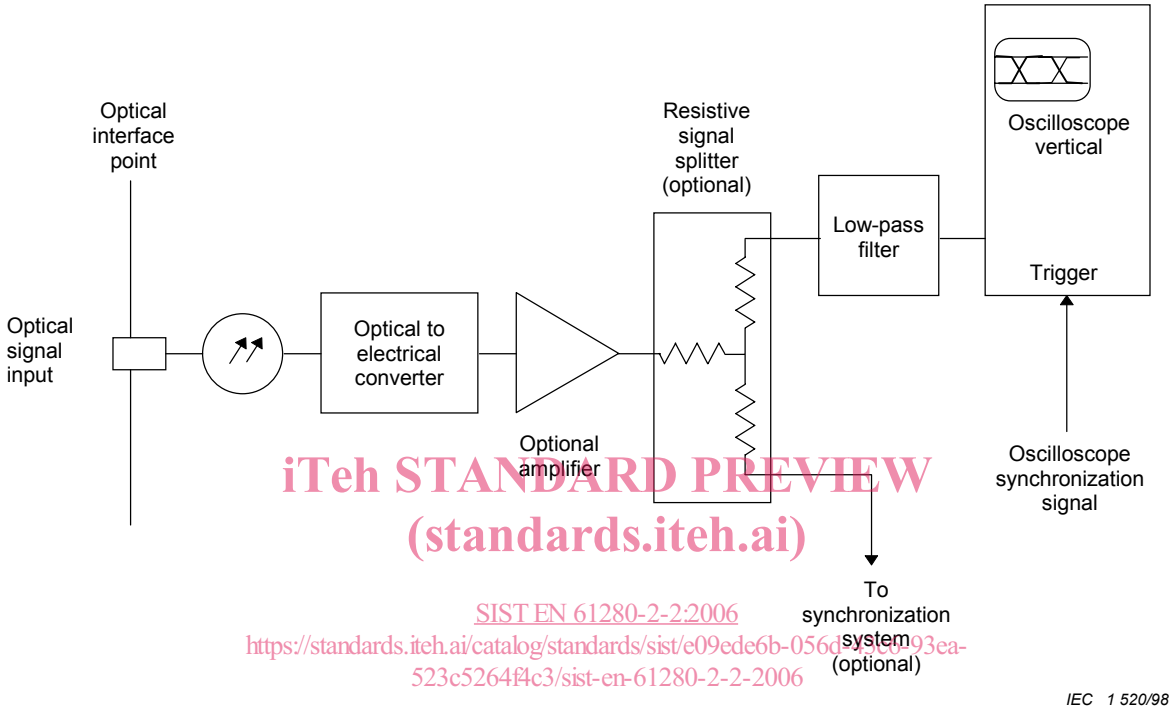

Figure 2 – Time-domain optical detection system

3.1.1 Optical-to-electrical (O/E) converter

The O/E converter is typically a high-speed photodiode, followed by electrical amplification. The O/E converter is equipped with an appropriate optical connector to allow connection to the optical interface point, either directly or via an optical jumper cable.

The O/E converter (including any optional amplification following the O/E converter) shall be able to reproduce the optical waveform with sufficient fidelity to ensure a meaningful measurement. Precise specifications are precluded by the large variety of possible implementations, but general guidelines are as follows:

a) acceptable input wavelength range, adequate to cover the intended application;

b) input optical reflectance, low enough to avoid excessive back-reflection into the transmitter being measured;

For example, assume that an optical transmitter is specified to tolerate –24 dB reflectance maximum. If the input reflectance of the O/E converter is –30 dB, the converter can be directly connected to the transmitter. If, however, the input reflectance of the O/E converter is –14 dB, a common value, the effective reflectance can be lowered to –24 dB (or less) by inserting either an optical isolator or a low-reflectance attenuator of 5 dB (or more) between the transmitter and the O/E converter.