SLOVENSKI STANDARD

SIST EN 60728-6:2004

september 2004

Kabelska omrežja za televizijske signale, zvokovne signale in interaktivne storitve – 6. del: Optična oprema (IEC 60728-6:2003)

Cable networks for television signals, sound signals and interactive services - Part 6: Optical equipment (IEC 60728-6:2003)

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Cable networks for television signals, sound signals and interactive services Part 6: Optical equipment (IEC 60728-6:2003)

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs Partie 6: Matériels optiques (CEI 60728-6:2003)

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste Teil 6: Optische Geräte (IEC 60728-6:2003)

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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.

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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 60728-6:2003 E

Foreword

The text of document 100/680/FDIS, future edition 2 of IEC 60728-6, prepared by IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60728-6 on 2003-10-01.

This European Standard supersedes EN 50083-6:1997.

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) 2004-07-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-10-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A and B are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60728-6:2003 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60793-2-50	NOTE	Harmonized as EN 60793-2-50:2002 (not modified).
IEC 60825-1	NOTE	Harmonized as EN 60825-1:1994 (not modified).
IEC 61290-1-1	NOTE	Harmonized as EN 61290-1-1:1998 (not modified).
IEC 61290-1-2	NOTE	Harmonized as EN 61290-1-2:1998 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

Publication	Year	Title	EN/HD	Year
IEC 60068-1	- [1)]	Environmental testing Part 1: General and guidance	EN 60068-1	1994 [2)]
IEC 60068-2	series	Part 2: Tests	EN 60068-2	series
IEC 60169-2	- [1)]	Radio-frequency connectors Part 2: Coaxial unmatched connector	HD 134.2 S2	1984 [2)]
IEC 60169-24	- [1)]	Part 24: Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (Type F)	EN 60169-24	1993 [2)]
IEC 60417 database	2002	Graphical symbols for use on equipment	-	-
IEC 60529	- [1)]	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 [2)] 1993
IEC 60617 database	series	Graphical symbols for diagrams	-	-
IEC 60728-1	- [1)]	Cabled distribution systems for television and sound signals Part 1: Methods of measurement and system performance	-	-
IEC 60728-2	- [1)]	Part 2: Electromagnetic compatibility for equipment	-	-
IEC 60728-3	- [1)]	Part 3: Active coaxial wideband distribution equipment	-	-

1) Undated reference.

2) Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
IEC 61280-2-2	- [1]	Fibre optic communication subsystem basic test procedures Part 2-2: Test procedures for digital systems - Optical eye pattern, waveform, and extinction ratio	EN 61280-2-2	1999 [2]
IEC 61280-4-2	- [1]	Part 4-2: Fibre optic cable plant - Single-mode fibre optic cable plant attenuation	EN 61280-4-2	1999 [2]
IEC/TR 61282-4	- [1]	Fibre optic communication system design guides Part 4: Accomodation and utilization of non-linear effects	-	-
IEC 61290-1-3	- [1]	Optical fibre amplifiers - Basic specification Part 1-3: Test methods for gain parameters - Optical power meter	EN 61290-1-3	1998 [2]
IEC 61290-3	- [1]	Part 3: Test methods for noise figure parameters	EN 61290-3	2000 [2]
IEC 61290-3-2	- [1]	Part 3-2: Test methods for noise figure parameters - Electrical spectrum analyzer method	EN 61290-3-2	2003 [2]
IEC 61290-5	series	Part 5: Test methods for reflectance parameters	EN 61290-5	series
IEC 61291-1	- [1]	Optical fibre amplifiers Part 1: Generic specification	EN 61291-1	1998 [2]
IEC/TR3 61931	- [1]	Fibre optic - Terminology	-	-
IEC 80416	series	Basic principles for graphical symbols for use on equipment	EN 80416	series
ITU-G.692	- [1]	Optical interfaces for multichannel systems with optical amplifiers	-	-
EN 300019-1-3	-	Environmental Engineering (EE) - Environmental conditions and environmental tests for telecommunications equipment Part 1-3: Classification of environmental conditions - Stationery use at weatherprotected locations	-	-

INTERNATIONAL STANDARD

IEC 60728-6

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Cable networks for television signals, sound signals and interactive services –

Part 6: Optical equipment

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CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 7
2 Normative references 7
3 Terms, definitions, symbols and abbreviations 8
4 Methods of measurement 17
4.1 General measurement requirements 17
4.2 Optical power 17
4.3 Loss, isolation, directivity and coupling ratio 18
4.4 Return loss 19
4.5 Saturation output power of an optical amplifier 20
4.6 Polarization dependent loss 21
4.7 Centroidal wavelength and spectral width under modulation 22
4.8 Linewidth and chirping of transmitters with single mode lasers 23
4.9 Optical modulation index 25
4.10 Reference output level of an optical receiver 26
4.11 Slope and flatness 27
4.12 Composite second order distortion (CSO) of optical transmitters 29
4.13 Composite triple beats (CTB) of optical transmitters 30
4.14 Composite crossmodulation of optical transmitters 31
4.15 Receiver intermodulation 33
4.16 CSO of optical amplifiers 36
4.17 CTB of optical amplifiers 36
4.18 Carrier-to-noise ratio 36
4.19 Method for combined measurement of relative intensity noise (RIN), optical modulation index and equivalent input noise current 40
4.20 Noise figure of optical amplifiers 42
4.21 Influence of fibre 43
4.22 SBS threshold 43
5 Universal performance requirements and recommendations 44
5.1 Safety 44
5.2 Electromagnetic compatibility (EMC) 44
5.3 Environmental 44
5.4 Marking 45
6 Active equipment 45
6.1 Optical downlink transmitters 45
6.2 Optical uplink transmitters 47
6.3 Optical receivers 49
6.4 Optical amplifiers 51
7 Passive equipment 52
7.1 Connectors and splices 52
7.1.1 Data publication requirements 52
Annex A (informative) A simplified method of measurement for return loss 53
Annex B (informative) Product specification worksheets for optical amplifiers 55

Bibliography 58

Figure 1 – Measurement of optical power 18
Figure 2 – Measurement of optical loss, directivity and isolation 19
Figure 3 – Measurement of the optical return loss 20
Figure 4 – Optical saturation output power 21
Figure 5 – Measurement of the polarization dependent loss 21
Figure 6 – Measurement of central wavelength and spectral width under modulation 22
Figure 7 – Measurement of the chirping and the linewidth of transmitters 24
Figure 8 – Measurement of the optical modulation index 26
Figure 9 – Measurement of the reference output level of an optical receiver 27
Figure 10 – Measurement of the frequency range and flatness 28
Figure 11 – Evaluation of the slope 28
Figure 12 – Evaluating the flatness 29
Figure 13 – Device under test for measuring CSO of optical transmitters 30
Figure 14 – Device under test for measuring CTB of optical transmitters 31
Figure 15 – Arrangement for measuring composite crossmodulation of optical transmitters 32
Figure 16 – Arrangement of test equipment for measuring receiver intermodulation 35
Figure 17 – System with internal noise sources 36
Figure 18 – PIN diode receiver 37
Figure 19 – Optical transmission system under test 38
Figure 20 – Arrangement of test equipment for carrier-to-noise measurement 38
Figure 21 – Measurement set-up for determination of the noise parameters and the optical modulation index 42
Figure 22 – Arrangement for measuring the SBS threshold 44
Figure 23 – Classification of uplink transmitters 48
Figure A.1 – Test set-up for calibration 53
Figure A.2 – Measurement of the optical power of the light source 54
Figure A.3 – Test set-up for device under test 54
Figure A.4 – Measurement of the optical power at port A 54

Table 1 – Noise correction factors C_n for different noise level differences D 40
Table 2 – Data publication requirements for optical downlink transmitters 46
Table 3 – Recommendations for optical downlink transmitters 46
Table 4 – Requirements for optical downlink transmitters 47
Table 5 – Data publication requirements for optical uplink transmitters 48
Table 6 – Recommendations for optical uplink transmitters 49
Table 7 – Requirements for optical uplink transmitters 49
Table 8 – Classification of optical receivers 50
Table 9 – Data publication requirements for optical receivers 50
Table 10 – Recommendations for optical receivers 50
Table 11 – Performance requirements for optical receivers 51
Table B.1 – Minimum list of relevant parameters of power amplifiers to be specified for analogue applications 55
Table B.2 – Minimum list of relevant parameters of line amplifiers to be specified for analogue applications 56
Table B.3 – Minimum list of relevant parameters of optically amplified transmitters (OAT) to be specified for analogue applications 57

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES –

Part 6: Optical equipment

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, 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 60728-6 has been prepared by technical area 5: Cable networks for television signals, sound signals and interactive services, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2001 of which it constitutes a technical revision.

The text of this standard is based on

FDIS	Report on voting
100/680/FDIS	100/697/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 this publication remains valid until 2006. At this date, in accordance with the committee's decision, the publication will be:

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

INTRODUCTION

Standards of the IEC 60728 series deal with cable networks for television signals, sound signals and interactive services including equipment, systems and installations:

- for headend-reception, processing and distribution of sound and television signals and their associated data signals, and
- for processing, interfacing and transmitting all kinds of interactive multimedia signals using all applicable transmission media.

They cover all kinds of networks that convey modulated RF carriers such as

- CATV-networks;
- MATV-networks and SMATV-networks;
- individual receiving networks;

and all kinds of equipment, systems and installations installed in such networks.

The scope of these standards extends from antennas and special signal source inputs to headend or other interface points, to networks as a whole up through system outlets, or terminal inputs where no system outlet exists.

The standardization of any user terminals (i.e. tuners, receivers, decoders, multimedia terminals, etc.) is excluded.

CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES –

Part 6: Optical equipment

1 Scope

This part of IEC 60728 lays down the measuring methods, performance requirements and data publication requirements of optical equipment of cable networks for television signals, sound signals and interactive services.

This standard

- applies to all optical transmitters, receivers, amplifiers, directional couplers, isolators, multiplexing devices, connectors and splices used in cable networks;
- covers the frequency range 5 MHz to 3 000 MHz;

  NOTE The upper limit of 3 000 MHz is an example, but not a strict value. The frequency range or ranges, over which the equipment is specified, shall be published.
- identifies guaranteed performance requirements for certain parameters;
- lays down data publication requirements with guaranteed performance;
- describes methods of measurement for compliance testing.

All requirements and published data relate to minimum performance levels within the specified frequency range and in well-matched conditions as might be applicable to cable networks for television signals, sound signals and interactive services.

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 60068-1, *Environmental testing. Part 1: General and guidance*

IEC 60068-2, (all parts), *Environmental testing – Part 2: Tests*

IEC 60169-2, *Radio-frequency connectors – Part 2: Coaxial unmatched connector*

IEC 60169-24, *Radio-frequency connectors – Part 24: Radio-frequency coaxial connectors with screw coupling, typically for use in 75 ohm cable distribution systems (Type F)*

IEC 60417-DB:2002*, *Graphical symbols for use on equipment*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60617 (all parts) [DB]*, *Graphical symbols for diagrams*

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* "DB" refers to the IEC on-line database.

IEC 60728-1, *Cabled distribution systems for television and sound signals – Part 1: Methods of measurement and system performance*

IEC 60728-2, *Cabled distribution systems for television and sound signals – Part 2: Electromagnetic compatibility of equipment*

IEC 60728-3, *Cabled distribution systems for television and sound signals – Part 3: Active coaxial wideband distribution equipment*

IEC 61280-2-2, *Fibre optic communication subsystem basic test procedures – Part 2-2: Test procedures for digital systems – Optical eye pattern, waveform, and extinction ratio*

IEC 61280-4-2, *Fibre optic communication subsystem basic test procedures – Part 4-2: Fibre optic cable plant – Single-mode fibre optic cable plant attenuation*

IEC 61282-4, *Fibre optic communication system design guides – Part 4: Guideline to accommodate and utilize nonlinear effects in single-mode fibre optic systems*

IEC 61290-1-3, *Optical fibre amplifiers – Basic specification – Part 1-3: Test methods for gain parameters – Optical power meter*

IEC 61290-3, *Optical fibre amplifiers – Basic specification – Part 3-1: Test methods for noise figure parameters*

IEC 61290-3-2, *Optical fibre amplifiers – Part 3-2: Test methods for noise figure parameters – Electrical spectrum analyzer*

IEC 61290-5, *Optical fibre amplifiers – Basic specification – Part 5: Test methods for reflectance parameters*

IEC 61291-1, *Optical fibre amplifiers – Part 1: Generic specification*

IEC 61931, *Fibre optics – Terminology*

IEC 80416, *Basic principles for graphical symbols for use on equipment*

ITU G.692, *Optical interfaces for multichannel systems with optical amplifiers*

EN 300019-1-3, *Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at weatherprotected locations*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the definitions given in IEC 60728-1, IEC 61931 and the following terms and definitions apply.

3.1.1
optical transmitting unit; optical transmitter; Tx (abbreviation)
transmit fibre optic terminal device accepting at its input port an electrical signal and providing at its output port an optical carrier modulated by that input signal

NOTE For the purposes of this standard, optical transmitters may have more than one input port accepting electrical RF signals.

[IEC 61931, definition 2.9.6]

3.1.2
optical receiving unit; optical receiver; Rx (abbreviation)
receive fibre optic terminal device accepting at its input port a modulated optical carrier, and providing at its output port the corresponding demodulated electrical signal (with the associated clock, if digital)

NOTE For the purposes of this standard, optical receivers may have more than one output port providing electrical RF signals.

[IEC 61931, definition 2.9.7]

3.1.3
optical amplifier
optical waveguide device containing a suitably pumped, active medium which is able to amplify an optical signal

[IEC 61931, definition 2.7.75]

3.1.4
(optical) isolator
two port non-reciprocal optical device intended to suppress backward reflection, while having minimum insertion loss in the forward direction, based on Faraday effect

NOTE 1 An isolator is commonly used to prevent return reflections along a transmission path.

NOTE 2 An isolator is generally polarization dependent; however fibre optic polarization independent isolators exist.

[IEC 61931, definition 2.6.30]

3.1.5
(optical (fibre)) splice
permanent, or semi permanent, joint whose purpose is to couple optical power between two optical fibres

[IEV 731-05-05 modified]
[IEC 61931, definition 2.6.8]

3.1.6
fibre optic branching device; (optical) (fibre) branching device; (optical) (fibre) coupler (deprecated)]

optical fibre device, possessing three or more optical ports, which shares optical power among its ports in a predetermined fashion, at the same wavelength or wavelengths, without wavelength conversion

NOTE The ports may be connected to fibres, sources, detectors, etc.

[IEC 61931, definition 2.6.21]

3.1.7
directional branching device; directional coupler (deprecated)
device which distributes an optical signal among the output ports in a predetermined fashion only when light is launched into one preselected input port

[IEC 61931, definition 2.6.22]

NOTE For the purposes of this standard, directional coupler is the preferred term because this is also the term for its electrical equivalent.

3.1.8
multiplexing device; WDM device
wavelength selective branching device (used in WDM transmission systems) in which optical signals can be transferred between two predetermined ports, depending on the wavelength of the signal