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INTERNATIONAL STANDARD

colour inside

Cable networks for television signals, sound signals and interactive services – Part 13: Optical systems for broadcast signal transmissions



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 13: Optical systems for broadcast signal transmissions

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International Standard IEC 60728-13 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.

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

FDIS	Report on voting
100/1623/FDIS	100/1646/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 list of all the parts of the IEC 60728 series, under the general title *Cable networks for television signals, sound signals and interactive services,* can be found on the IEC website.

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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Standards of the IEC 60728 series deal with cable networks including equipment and associated methods of measurement for headend reception, processing and distribution of television signals, sound signals and their associated data signals and for processing, interfacing and transmitting all kinds of signals for interactive services using all applicable transmission media.

This includes

- CATV[1]-networks;
- MATV-networks and SMATV-networks;
- individual receiving networks;

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

The extent of this standardization work is from the antennas and/or special signal source inputs to the headend or other interface points to the network up to the terminal input.

The standardization of any user terminals (i.e., tuners, receivers, decoders, multimedia terminals, etc.) as well as of any coaxial, balanced and optical cables and accessories thereof is excluded.

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1 This word encompasses the HFC (Hybrid Fibre Cable) networks used nowadays to provide telecommunications services, voice, data, audio and video both broadcast and narrowcast.

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

Part 13: Optical systems for broadcast signal transmissions

1 Scope

This part of IEC 60728 is applicable to optical transmission system for broadcast signal transmission that consists of a head-end equipment, optical transmission lines, in-house wirings and a system outlet. The system is primarily intended for television and sound signals using analogue and/or digital transmission technology. This standard specifies the basic system parameters and methods of measurement for optical distribution system having a system outlet in order to assess the system performance and its performance limits.

The purpose of this part of IEC 60728 is to describe the system specification of FTTH (fibre to the home) network for broadcast signal transmission. This standard is also applicable to the broadcast signal transmission using telecommunication network if it satisfies the optical portion of this standard. This standard describes RF transmission for broadcast and narrowcast (limited area distribution of broadcast) signals over FTTH, and introduces xPON system as a physical layer media. The detailed description of physical layer is out of the scope of this standard. The scope is limited to RF signal transmission over FTTH, thus, it does not include IP transport technologies, such as IP Multicast and associate protocols. Some interference descriptions between telecommunication system and broadcast system addressed in Clause 7 and Annex D should be referred to for detailed explanations. Annex A describes actual service systems with design consideration based on this standard. Annex B gives an overview of the optical transmission systems applicable for broadcast signal transmission.

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 60068-1:1988, *Environmental testing – Part 1: General and guidance*

IEC 60728-1:2007, *Cable networks for television signals, sound signals and interactive services – Part 1: System performance of forward paths*

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

IEC/TR 60728-6-1:2006, *Cable networks for television signals, sound signals and interactive services – Part 6-1: System guidelines for analogue optical transmission systems*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

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

IEC 60825-12, *Safety of laser products – Part 12: Safety of free space optical communication systems used for transmission of information*

IEC 61291-1:2006, *Optical amplifiers – Part 1: Generic specification*

IEC 61755-1:2005, *Fibre optic connector optical interfaces – Part 1: Optical interfaces for single mode non-dispersion shifted fibres – General and guidance*

IEC 61930:1998, *Fibre optic graphical symbology*

IEC 61931:1998, *Fibre optic – Terminology*

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

ITU-T Recommendation G.694.2, *Spectral grids for WDM applications: CWDM wavelength grid*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
optical transmitting unit
optical transmitter
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

[IEC 61931, definition 2.9.6]

NOTE 1 For the purposes of this document, optical transmitters may have more than one input port accepting electrical RF signals.

NOTE 2 This piece of equipment amplifies frequency multiplexed electrical signals and converts these electrical signals into optical signals. The optical wavelength is a 1 500 nm band (1 550 ± 10 nm in 1 530 nm to 1 625 nm region).

3.1.2
optical receiving unit
optical receiver
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)

[IEC 61931, definition 2.9.7]

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

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]

NOTE 1 In this document, Erbium Doped Fibre Amplifier (EDFA) is used for amplification in the 1 550 nm band.

NOTE 2 There are several methods based on wavelength to be used for amplification. The term “Erbium Doped Fibre Amplifier (EDFA)” is the synonym of optical amplifier in this document.