



SLOVENSKI STANDARD
oSIST prEN IEC 60728-115:2020
01-december-2020

Vgradni optični sistemi za razpršeno oddajanje signalov (TA 5)

In-Building Optical systems for broadcast signal transmissions (TA 5)

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Ta slovenski standard je istoveten z: prEN IEC 60728-115:2020

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IEC TA 5 : CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES	
SECRETARIAT: Japan	SECRETARY: Mr Hiroo Tamura
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
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TITLE:

In-Building Optical systems for broadcast signal transmissions (TA 5)

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

The committee draft vote and comments will be discussed with the WG5 members in the Frankfurt meeting that will be held on November 12th.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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**Part 115: In-Building Optical systems for broadcast signal
transmissions**

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FOREWORD

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International Standard IEC 60728-115 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.

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

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

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Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

304 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

305 The committee has decided that the contents of this document will remain unchanged
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309 • withdrawn,
310 • replaced by a revised edition, or
311 • amended.

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313 The National Committees are requested to note that for this document the stability date
314 is 2025.

315 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE
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CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES –

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Part 115: In-Building Optical systems for broadcast signal transmissions

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1 Scope

327 This part of IEC 60728 is applicable to in-building optical transmission systems for
328 broadcast signal transmission that consist of optical transmitter, optical amplifiers,
329 splitters, V-ONUs, etc. These systems are primarily intended for television and sound
330 signals using digital transmission technology. This document specifies the basic system
331 parameters and methods of measurement for in-building optical distribution systems
332 between building network interface (BNI) and home network interface (HNI) in order to
333 assess the system performance and its performance limits.

334 This document is also applicable to broadcast signal transmission using a
335 telecommunication network if it satisfies the requirements of optical section of this
336 document. This document describes RF transmission for fully digitalized broadcast and
337 narrowcast (limited area distribution of broadcast) signals over an FTTH network and
338 introduces xPON system as a physical layer media. The detailed description of the
339 physical layer is out of the scope of this document. The scope is limited to RF signal
340 transmission over optical network, thus, it does not include IP transport technologies,
341 such as IP Multicast and associate protocols.

342 This standard specifies the required system performance of all-optical building networks
343 in order to connect with FTTH networks which are defined by IEC60728-113 and
344 IEC60728-13-1. Use of In-building optical networks is very effective for saving cost
345 (installation and maintenance) and enabling future network up-grades, especially in huge
346 apartment buildings. In this document, the optical wavelengths and electrical frequency
347 bands listed in Table 1 – and Table 2 – are considered to be used.

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Table 1 – Optical wavelength for FTTH system

Optical signal	Wavelength	Document
Video transmission	1 550 nm	IEC 60728-113, IEC 60728-13-1
RF return (RFoG)	1 610 nm	IEC 60728-14
Data (Downstream)	1 490 nm / 1 577 nm	ISO/IEC/IEEE 8802-3
Data (Upstream)	1 310 nm / 1 270 nm	ISO/IEC/IEEE 8802-3

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Table 2 – Frequency range

Frequency band	Document
47 MHz to 862 MHz (only digitally modulated signals)	IEC 60728-101, IEC 60728-113
950 MHz to 3 300 MHz (satellite signal transmission)	IEC 60728-13-1

351

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.

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 60728-3:2017, *Cable networks for television signals, sound signals and interactive services – Part 3-1: Active wideband equipment for cable networks – Methods of measurement of non-linearity for full digital channel load with DVB-C signals*

IEC 60728-6:2011, *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 60728-101:2016, *Cable networks for television signals, sound signals and interactive services – Part 101: System performance of forward paths loaded with digital channels only*

IEC 60728-113:2018, *Cable networks for television signals, sound signals and interactive services – Part 113: Optical systems for broadcast signal transmissions loaded with digital channels only*

<https://standards.iteh.ai/catalog/standards/sist/21fb6a4e-e961-4a17-af0e->

IEC 60728-13-1:2017, *Cable networks for television signals, sound signals and interactive services – Part 13-1: Bandwidth expansion for broadcast signal over FTTH system*

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

IEC TR 61930, *Fibre optic graphical symbology*

IEC TR 61931:1998, *Fibre optic – Terminology*

IEC 61280-1-3:2013, *Fibre optic communication subsystem test procedures – Part 1-3: General communication subsystems – Central wavelength and spectral width measurement*

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

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

392 ITU-T Recommendation J.83, *Digital multi-programme systems for television, sound and*
393 *data services for cable distribution*

394 ITU-T Recommendation J.382, *Advanced digital downstream transmission systems for*
395 *television, sound and data services for cable distribution*

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397 **3 Terms, definitions, graphical symbols and abbreviated terms**

398 **3.1 Terms and definitions**

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

400 ISO and IEC maintain terminological databases for use in standardization at the following
401 addresses:

402 IEC Electropedia: available at <http://www.electropedia.org>

403 ISO Online browsing platform: available at <http://www.iso.org/obp>

404 **3.1.1**

405 **BER**

406 **bit error ratio**

407 **ratio between erroneous bit and the total number of transmitted bits.**

408 **[SOURCE: IEC 60728-1:2014, 3.1.60]**

409

410 **3.1.2**

411 **central wavelength**

412 the average of those wavelengths at which the amplitude of a light source reaches or last
413 falls to half of the maximum amplitude.

414 [SOURCE: IEC 60728-6:2011, 3.1.26, modified – The term "centre wavelength" has been
415 replaced by "central wavelength".]

416 **3.1.3**

417 **MER**

418 **modulation error ratio**

419 sum of the sequence of the squares of the magnitudes of the ideal symbol vector divided
420 by the sum of the squares of magnitudes of the symbol error vectors of a sequence of
421 symbols.
422

423 [SOURCE: IEC 60728-1:2014, 3.1.61]

424 **3.1.4**

425 **optical amplifier**

426 optical waveguide device containing a suitably pumped, active medium which is able to
427 amplify an optical signal.

428 Note 1 to entry: There are several methods based on wavelength to be used for amplification. The term
429 "Erbium Doped Fibre Amplifier (EDFA)" is the synonym of optical amplifier in this document.

430 [SOURCE: IEC TR 61931:1998, 2.7.75, modified – Note 1 has been added.]

431 **3.1.5**

432 **optical modulation index**

433 optical modulation index of k^{th} RF signal, OMI_k is defined as

$$434 \quad OMI_k = \frac{\phi_h - \phi_l}{\phi_h + \phi_l}$$

435 where