

Infrared transmission systems — Free air applications

The European Standard EN 61920:1998 has the status of a
British Standard

ICS 31.260; 33.100

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National foreword

This British Standard is the English language version of EN 61920:1998. It is identical with IEC 61920:1998. It supersedes DD ENV 50185-1, DD ENV 50185-2 and DD ENV 50185-3:1996, which will be withdrawn on 2001-01-01.

The UK participation in its preparation was entrusted by Technical Committee EPL/100, Audio, video and multimedia systems and equipment, to Subcommittee EPL/100/3, Equipment and systems in the field of audio, video and audiovisual engineering, which has the responsibility to:

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Attention is drawn to the fact that CEN and CENELEC Standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement these international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 22 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 June 1998

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English version

Infrared transmission systems Free air applications

(IEC 61920:1998)

Systèmes de transmission infrarouge
Applications en mode non guidé
(CEI 61920:1998)

Infrarot-Übertragungssysteme
Nicht-leitungsgebundene Anwendungen
(IEC 61920:1998)

This European Standard was approved by CENELEC on 1998-04-01. 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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

Foreword

The text of document 100C/198/FDIS, future edition 1 of IEC 61920, prepared by SC 100C, Audio, video and multimedia subsystems and equipment, of 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 61920 on 1998-04-01.

This European Standard supersedes ENV 50185-1:1995, ENV 50185-2:1996 and ENV 50185-3:1995.

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) 1999-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2001-01-01

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 Annex A, Annex B, Annex C and Annex D are informative. Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61920:1998 was approved by CENELEC as a European Standard without any modification.

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1 Scope and object

This International Standard describes the classification of IR devices into groups and classes in order to identify and clarify problems caused by mutual interference. Mutual interference is caused by the increasing parallel application of different infrared (IR) systems.

Due to its physical characteristics, the possibility of local limitation is a special feature of IR radiation.

In this standard, the wavelength range from 700 nm to 1 600 nm is considered. All systems based on free air application which intentionally or unintentionally use IR radiation in this range, are included. Products which unintentionally emit IR radiation, such as illumination equipment are not deemed to be IR application systems. They are, however, integrated into this standard in order to enable facility planners to take into consideration and to foresee provisions against disturbance of IR application systems by such unintentionally emitted radiation.

The object of this standard is to prevent or at least to minimize mutual interference and to allow the coexistence of different IR products. It is intended to identify each IR product by its characteristics, according to the classification criteria.

It is not the object of this standard to describe the consequences of interference between IR systems or safety aspects of optical radiation.

All applications of fibre-optic technology are excluded.

In this context “free air” means freely radiated IR in indoor or outdoor applications.

If the IR systems are used for information transmission, this standard is only relevant in connection with the physical layer of the open systems interconnection (OSI) reference model (ISO 7498-1).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of the IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(60):1970, *International Electrotechnical Vocabulary (IEV): Radiocommunications*¹⁾.

IEC 60050(845):1987, *International Electrotechnical Vocabulary (IEV) — Chapter 845: Lighting*.

IEC 60747-5:1992, *Semiconductor devices — Discrete devices and integrated circuits — Part 5: Optoelectronic devices*.

ISO 7498-1:1994, *Information technology — Open system interconnection — Basic reference model*.

3 Definitions

For the purpose of this International Standard the following definitions apply:

3.1

bandwidth of a receiver, amplifier or network

the extent of a continuous range of electrical frequencies or optical wavelengths over which the response does not differ from its nominal value by more than a specified amount [IEV 60-12-025 extended]

3.2

fluorescent lamp

a discharge lamp of the low pressure mercury type in which most of the light is emitted by one or several layers of phosphor excited by the ultraviolet radiation from the discharge [IEV 845-07-26]

3.3

harmonic

integral multiple of a basic frequency

¹⁾ Partially replaced by IEC 60050(725).

3.4
interference

disturbance experienced in the reception of a wanted signal, caused by an unwanted signal or noise

3.5
infrared radiation

optical radiation for which the wavelengths are longer than those for visible radiation
[IEV 845-01-04]

NOTE For infrared radiation, the range between 780 nm and 1 mm is commonly subdivided into:

IR-A 780 nm to 1 400 nm

IR-B 1,4 μm to 3 μm

IR-C 3 μm to 1 mm

3.6
infrared system

system which uses IR radiation in free air application consisting of IR emitters and IR receivers

3.7
modulation frequency

electrical signal frequency which modulates the IR radiation

3.8
peak intensity

maximum intensity I_p (mW/sr) of the optical radiation in the direction of maximum emission around the rated wavelength λ_p

3.9
radiant intensity

quotient of the radiant flux Φ_e leaving the source and propagated in the element of solid angle $d\Omega$ containing the given direction, by the element of solid angle [IEV 845-01-30]

3.10
radiation characteristic

defined by two angles α_1 and α_2 for describing the focusing of IR emission. References are the points of half optical radiant intensity. α_1 is the angle of maximum divergence, α_2 is the angle perpendicular to the plane expanded by α_1 , where $\alpha_1 \geq \alpha_2$.

3.11
steradian

SI unit of solid angle: solid angle that, having its vertex at the centre of a sphere, cuts off an area of the surface of the sphere equal to that of a square with sides of length equal to the radius of the sphere
[IEV 845-01-20] (ISO 31/1-2.1,1978)

3.12
subharmonic

integral divisor of a basic frequency

3.13
wavelength

distance in the direction of propagation of a periodic wave between two successive points at which the phase is the same [IEV 845-01-14]

4 Symbols

B_f	bandwidth of the modulated radiant intensity (kHz)
B_λ	bandwidth of the optical radiant intensity (nm)
f	modulation frequency (kHz)
f_p	frequency at the modulated peak intensity l_{pf} (kHz)
f_l	lower band limiting frequency (kHz)
f_u	upper band limiting frequency (kHz)
l_o	time averaged total optical radiant intensity (mW/sr)
l_p	total optical peak intensity (mW/sr)
$l_{p\lambda}$	spectral optical peak intensity [mW/(sr nm)]
$l_{e\lambda}$	spectral optical radiant intensity [mW/(sr nm)]
l_{ef}	spectral modulated radiant intensity [mW/(sr Hz)]
l_{pf}	spectral modulated peak intensity [mW/(sr Hz)]
sr	steradian
λ	wavelength (nm)
λ_p	wavelength at the optical peak intensity $l_p\lambda$ (nm)
λ_l	lower band limiting wavelength (nm)
λ_u	upper band limiting wavelength (nm)

5 Classification

The classification considers three main aspects for system description:

- physical characteristics (see 5.1);
- product groups (see 5.2);
- user areas (see 5.3).

NOTE In the future, the IR system definitions should include selective IR receivers.

5.1 Physical characteristics

There are five criteria on which the classification for physical characteristics is based. They are operating characteristics, selected from the rated values given by the manufacturer (see Table 1).