

Cabled distribution systems for television, sound, and interactive multimedia signals —

Part 2: Electromagnetic compatibility for equipment

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Committees responsible for this British Standard

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- British Radio and Electronic Equipment Manufacturers' Association
- British Telecommunications plc
- Cable Communications Association
- Confederation of Aerial Industries
- Electricity Association
- Institution of Electrical Engineers
- Radiocommunications Agency
- Society of Cable Telecommunication Engineers

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National foreword

This British Standard has been prepared by Subcommittee EPL/12/7 and is the English language version of EN 50083-2:1995 *Cabled distribution systems for television, sound and interactive multimedia signals — Part 2 Electromagnetic compatibility for equipment* including amendment A1:1997, published by the European Committee for Electrotechnical Standardization (CENELEC).

It forms Part 2 of a multi-Part standard on cabled distribution systems for television and sound signals.

Other Parts already published are as follows:

BS EN 50083-1:1994, *Safety requirements*.

BS EN 50083-3:1995, *Active coaxial wideband distribution equipment*.

BS EN 50083-4:1995, *Passive coaxial wideband distribution equipment*.

BS EN 50083-5:1994, *Headend equipment*.

BS EN 50083-6:1995, *Optical equipment*.

Other Parts to follow will include terms and definitions, system requirements, and electromagnetic compatibility for installations.

This Part applies to the radiation characteristics and immunity to electromagnetic disturbances of active and passive equipment for the reception, processing and distribution of television and sound signals, as covered in Parts 3, 4, 5 and 6 of this British Standard, from the headend or the interface with another signal source, up to the system outlet or, where no system outlet exists, up to the terminal input.

Coaxial cables for cabled distribution systems are outside the scope of this standard. Electromagnetic compatibility for user terminals (e.g. tuners, receivers, decoders, multimedia terminals, etc.) is also excluded from this standard. For this kind of equipment BS 905-1 and BS EN 55020 apply.

Cross-references

Publication referred to	Corresponding British Standard
	BS EN 50083 <i>Cabled distribution systems for television and sound signals</i>
EN 50083-3:1994	Part 3:1995 <i>Active coaxial wideband distribution equipment</i>
EN 50083-4:1994	Part 4:1995 <i>Passive coaxial wideband distribution equipment</i>
EN 50083-5:1994	Part 5:1995 <i>Headend equipment</i>
EN 50083-6:1994	Part 6:1995 <i>Optical equipment</i>
EN 55013:1990	BS 905 <i>Sound and television broadcast receivers and associated equipment: electromagnetic compatibility</i> Part 1:1991 <i>Specification for limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment</i> Part 1:1991 <i>Specification for limits</i>
EN 55020:1994	BS EN 55020:1995 <i>Electromagnetic immunity of broadcast receivers and associated equipment</i>
EN 61079-1:1993 (IEC 1079-1:1992)	BS EN 61079 <i>Methods of measurement on receivers for satellite broadcast transmissions in the 12 GHz band</i> Part 1:1995 <i>Radio-frequency measurements on outdoor units</i>

HDD 481.3 S1:1987 (IEC 801-3:1984)	BS 6667 <i>Electromagnetic compatibility for industrial process measurement and control equipment</i> Part 3:1985 <i>Method of evaluating susceptibility to radiated electromagnetic energy</i>
IEC 50(161):1990	BS 4727 <i>Glossary of electrotechnical power, telecommunication, electronics, lighting and colour terms</i> Part 1 <i>Terms common to power, telecommunications and electronics</i> Group 09:1991 <i>Electromagnetic compatibility</i>

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the EN title page, pages 2 to 38, an inside back cover 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.

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Descriptors: Telecommunications, television broadcasting, sound broadcasting, communication cables, electronic components, television systems, electromagnetic compatibility

English version

Cabled distribution systems for television, sound and interactive multimedia signals

Part 2: Electromagnetic compatibility for equipment

(includes amendment A1:1997)

Systèmes de distribution par cables destinés
aux signaux de radiodiffusion sonore, de
télévision et multimédias interactifs
Partie 2: Compatibilité électromagnétique pour
les matériaux
(inclut l'amendement A1:1997)

Kabelverteilsysteme für Fernseh-, Ton- und
interaktive Multimedia-Signale
Teil 2: Elektromagnetische Verträglichkeit von
Bauteilen
(enthält Änderung A1:1997)

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

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Foreword

This European Standard was prepared by CENELEC Technical Committee TC 109, Cabled distribution systems for television and sound signals.

After having failed in the UAP, started in October 1992, a reworked draft was submitted to the formal vote and was approved by CENELEC as EN 50083-2 on 1995-07-04.

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) 1996-09-01
- latest date by which the national standard conflicting with the EN have to be withdrawn (dow) 1996-09-01

Foreword to amendment A1

This amendment to the European Standard EN 50083-2:1995 was prepared by Technical Committee CENELEC TC 209, Cabled distribution systems for television, sound and interactive multimedia signals.

The text of the draft was submitted to the Unique Acceptance Procedure (UAP) and was approved by CENELEC as amendment A1 to EN 50083-2 on 1996-12-09.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-09-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1997-09-01

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1 Scope

1.1 General

Standards of the EN 50083 series deal with cabled distribution systems for television, sound and interactive multimedia signals including equipment

- 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 systems such as

- CATV-systems,
- MATV- and SMATV-systems,
- individual receiving systems.

and all kinds of equipment installed in such systems.

The extent of these standards is from the antennas, special signal source inputs to the headend or other interface points to the system up to the system outlet or the terminal input, where no system outlet exists.

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

1.2 Specific scope of this part 2

This standard

- applies to the radiation characteristics and immunity to electromagnetic disturbance of active and passive equipment for the reception, processing and distribution of television, sound and interactive multimedia signals as dealt with in the following parts of EN 50083 series:

- EN 50083-3 “Active coaxial wideband distribution equipment”
- EN 50083-4 “Passive coaxial wideband distribution equipment”
- EN 50083-5 “Headend equipment”
- EN 50083-6 “Optical equipment”

- covers the following frequency ranges:

Disturbance voltage injected into the mains		9 kHz to 30 MHz
Radiation from active equipment	(5 MHz)	30 MHz to 25 GHz
Immunity of active equipment		150 kHz to 25 GHz
Screening effectiveness of passive equipment	(5 MHz)	30 MHz to 3,0 GHz(25 GHz)

- specifies requirements for maximum allowed radiation, minimum immunity and minimum screening effectiveness

- describes test methods for conformance tests.

Coaxial cables for cabled distribution systems do not fall under the scope of this standard. Reference is made to the European standard series EN 50117 “Coaxial cables used in cabled distribution networks”.

Standardization in the field of “Electromagnetic compatibility” for any user terminals (e.g. tuners, receivers, decoders, multimedia terminals etc.) is covered by the European Standards EN 55013 and EN 55020.

2 Normative references

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).

EN 50083, *Cabled distribution systems for television and sound signals*.

EN 50083-3:1994, *Part 3: Active coaxial wideband distribution equipment*.

EN 50083-4:1994, *Part 4: Passive coaxial wideband distribution equipment*.

EN 50083-5:1994, *Part 5: Headend equipment*.

EN 50083-6:1994, *Part 6: Optical equipment*.

EN 50083-8 (in preparation), *Part 8: Electromagnetic compatibility for installations*.

EN 55013:1990, *Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment (CISPR 13:1975 + A1:1983, modified)*.

EN 55020:1994, *Electromagnetic immunity of broadcast receivers and associated equipment*.

EN 61000-3-2:1995, *Electromagnetic compatibility (EMC) — Part 3: Limits — Section 2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)*.

EN 61079-1:1993, *Methods of measurement on receivers for satellite broadcast transmissions in the 12 GHz band — Part 1: Radio-frequency measurements on outdoor units (IEC 1079-1:1992)*.

EN 61000-4-3:1996, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 3: Radiated, radio-frequency, electromagnetic field immunity test (IEC 1000-4-3:1995, modified)*.

IEC 50(161):1990, *International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility*.

IEC 728-1:1986 + A1:1992, *Cabled distribution systems — Part 1: Systems primarily intended for sound and television signals operating between 30 MHz and 1 GHz*.

CISPR 16-1:1993, *Specification for radio disturbance and immunity measuring apparatus and methods — Part 1: Radio disturbance and immunity measuring apparatus*.

3 Terms, definitions, symbols and abbreviations

For the purposes of this standard, the definitions contained in IEC 50(161) “Electromagnetic compatibility” apply. The most important definitions of IEC 50(161) are repeated hereafter with the IEC-numbering given in brackets. In addition some more specific definitions, used in this standard, are listed.

3.1 Terms and definitions

3.1.1

radiation (electromagnetic) (161-01-10)

1. The phenomenon by which energy in the form of electromagnetic waves emanates from a source into space.
2. Energy transferred through space in the form of electromagnetic waves.

NOTE By extension, the term “electromagnetic radiation” sometimes also covers induction phenomena.

3.1.2

immunity (to a disturbance) (161-01-20)

the ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance

3.1.3

internal immunity (161-03-06)

ability of a device, equipment or system to perform without degradation in the presence of electromagnetic disturbances appearing at its normal input terminals or antenna

3.1.4

external immunity (161-03-07)

ability of a device, equipment or system to perform without degradation in the presence of electromagnetic disturbances entering other than via its normal input terminals or antenna

3.1.5

mains immunity (161-03-03)

immunity to mains-borne disturbance

3.1.6**immunity level** (161-03-14)

the maximum level of a given electromagnetic disturbance incident on a particular device, equipment or system for which it remains capable of operating at a required level of performance

3.1.7**immunity limit** (161-03-15)

the specified minimum immunity level

3.1.8**immunity margin** (161-03-16)

the difference between the immunity limit of a device, equipment or system and the electromagnetic compatibility level

3.1.9**electromagnetic disturbance** (161-01-05)

any electromagnetic phenomenon which may degrade the performance of a device, equipment or system, or adversely affect living or inert matter

NOTE An electromagnetic disturbance may be an electromagnetic noise, an unwanted signal or a change in the propagation medium itself.

3.1.10**screening effectiveness**

the ability of an equipment or system to attenuate the influence of electromagnetic fields from outside the equipment or system or to suppress the radiation of electromagnetic fields from inside the equipment or system

3.1.11**well-matched**

the matching condition when the return loss of the equipment complies with the requirements of Table 1 of EN 50083-3

3.1.12**well-screened**

a test set-up can be considered “well-screened” if its radiation level, when terminated with a matched load, is at least 20 dB below the expected radiation level of the equipment under test, the test set-up and the equipment being supplied with the same input signal level

3.1.13**electromagnetic interference (EMI)**

degradation of the performance of an equipment, transmission channel or system caused by an electromagnetic disturbance

3.1.14**operating frequency range**

the passband for the wanted signals for which the equipment has been designed

3.1.15**wanted signal**

during measurements, the wanted signal shall be simulated using a sinewave test signal having the frequency within the operating frequency range and the appropriate level

3.1.16**unwanted signal**

signals inside and outside of the operating frequency range that are not considered as wanted signals when measuring immunity (to unwanted signals), the unwanted signal shall be simulated using two sine-wave test signals

3.1.17**first satellite intermediate frequency range**

the output frequency range of the outdoor unit which is comprised of the frequency band between 950 MHz and 3 GHz or parts thereof

3.1.18**carrier-to-interface ratio**

the minimum level difference measured at the output of an active equipment between the wanted signal and

- intermodulation products of the wanted signal and/or unwanted signals generated due to non-linearities;
- harmonics generated by an unwanted signal;
- unwanted signals that have penetrated into the operating frequency range;
- unwanted signals that have been converted to the frequency range to be protected (operating frequency range).

3.1.19**individual receiving system**

a system designed to provide television and sound signals to an individual household

3.1.20**spurious signals**

all unwanted signals in the frequency range of interest

3.2 Symbols

Under consideration.

3.3 Abbreviations

AC	alternating current
ALC	automatic level control
AM	amplitude modulation
BSS	broadcast satellite services
CATV	Community Antenna Television (system)
COFDM	Coherent Orthogonal Frequency Division Multiplex
CW	continuous wave
DBS	direct broadcast satellite
DSR	digital satellite radio
EMC	electromagnetic compatibility
emf	electromagnetic force
EMI	electromagnetic interference
FM	frequency modulation
FSS	fixed satellite services
IF	intermediate frequency
LNB	low noise broadband-converter
MATV	Master Antenna Television (system)
QAM	quadrature amplitude modulation
QPSK	quadrature phase shift keying
RF	radio frequency
SAT	satellite
S-channel	special channel
SMATV	Satellite Master Antenna Television (system)
TV	television
VHF	very high frequency
VSF	vestigial side band