BRITISH STANDARD

BS EN 55013:1997

Implementing Amendments Nos. 1 and 2 to BS 905-1: 1991 (Amendment No. 2 renumbers BS as BS EN 55013: 1997) and Incorporating Amendments Nos. 1 and 2 to BS EN 55013:1997

Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment

The European Standard EN 55013:1990, with the incorporation of Amendments A12:1994, A13:1996 and A14:1999 has the status of a British Standard

ICS 33.100

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

Cooperating organizations

The European Committee for Electrotechnical Standardization (CENELEC), under whose supervision this European Standard was prepared, comprises the National Committees of the following countries:

Austria	Italy
Belgium	Luxemburg
Denmark	Netherlands
Finland	Norway
France	Portugal
Germany	Spain
Greece	Sweden
Iceland	Switzerland
Ireland	United Kingdom

This British Standard was published under the authority of the Standards Board and comes into effect on 31 May 1991

© BSI 03-2000

The following BSI references relate to the work on this standard:
Committee references GEL/110
Draft for comment 87/25369 DC

ISBN 0 580 19089 7

Amendments issued since publication

Amd. No.	Date	Comments
8523	March 1995	
9511	July 1997	
9960	April 1998	
10707	March 2000	Indicated by a sideline

Contents

	Page
Cooperating organizations	Inside front cover
National foreword	ii
Foreword	2
Text of EN 55013	5
National appendix NA	26

© BSI 03-2000

National foreword

This British Standard has been prepared by Technical Committee GEL/210/5 (formerly GEL/110) and is the English language version of EN 55013:1990 *Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment,* including amendments A12:1994, A13:1996, corrigendum December 1997 and amendment A14:1999, published by the European Committee for Electrotechnical Standardization (CENELEC).
EN 55013 is related to CISPR Publication 13:1975 including Amendment No. 1 [1983] *Limits and methods of measurement of radio interference characteristics of sound and television receivers.* It supersedes BS 905-1:1985 which is withdrawn.

NOTE There is no CENELEC amendment A11 to EN 55013:1990.

The "physiological" correction referred to in subclause **5.2.3.3** is commonly known as "loudness" correction.

Cross-references

The British Standards which implement 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.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 26, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Sidelining in this document indicates the most recent changes by amendment.

© BSI 03-2000

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 55013

June 1990

+ A12

August 1994

+ A13

December 1996

+ A14

May 1999

ICS 33.100; 33.160.20; 33.160.40
UDC 621.396.62:621.391.8:621.317

Incorporating corrigendum December 1997

Descriptors: Electromagnetic compatibility, radio disturbance, broadcast receivers, associated equipment, methods of measurement, electromagnetic disturbance

English version

Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment

(includes amendments A12:1994, A13:1996 and A14:1999)
(CISPR 13:1975/Amdt 1:1983, modified)

Limites et méthodes de mesure des caractéristiques de perturbations électromagnétiques des récepteurs de radiodiffusion et des appareils associés
(inclut les amendements A12:1994, A13:1996 et A14:1999)
(CISPR 13:1975/Amdt 1:1983, modifée)

Grenzwerte und Meßmethoden für die Funkstöreigenschaften von Rundfunkempfängern und angeschlossenen Geräten
(enthält Änderungen A12:1994, A13:1996 und A14:1999)
(CISPR 13:1975/Amdt 1:1983, modifiziert)

This European Standard was approved by CENELEC on 6 December 1988; amendment A12 was approved by CENELEC on 1993-12-08, amendment A13 on 1996-07-02 and A14 on 1998-08-01. 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, 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

© 1990 Copyright reserved to CENELEC members

Foreword

This European Standard has been prepared by the Ad Hoc Working Group, installed during the CENELEC/CISPR meeting in November 1985.

The aim of this standard is to prevent receivers and associated equipment causing electromagnetic disturbance and to avoid trade barriers between the CENELEC countries by providing a common standard on limits and methods of measurement of electromagnetic disturbance characteristics of receivers and associated equipment.

This standard is based largely on the recommendations in CISPR 13 (1975) and Amendment No. 1 (1983) to CISPR 13 which are currently being updated.

A draft standard was circulated for vote within the CENELEC countries until September 1988. Thirteen National Committees voted in favour and two National Committees were against approval. All editorial comments which led to an improvement of this standard have been incorporated.

Following the general policy of CENELEC to stay in line with IEC/CISPR as much as possible the CENELEC Technical Committee recommends that where possible this European Standard should be adapted to the updated CISPR Publication as soon as this international standard becomes available.

EN 55013 has been prepared by CLC/CISPR. It is based on CISPR Publication 13 (1975) and Amendment No. 1 (1983) to CISPR 13 and contains common modifications. It was approved by CENELEC on 6 December 1988.

The following dates are applicable:

- latest date of announcement of the EN at national level (doa):1989-03-01
- latest date of publication of a new harmonized standard (dop):1989-09-01
- date of withdrawal of conflicting national standards (dow):1989-09-01

Reference documents:

EN 55011 (1998):

Industrial, scientific and medical (ISM) radio-frequency equipment — Radio disturbance characteristics — Limits and methods of measurement

EN 55022 (1987):

Limits and methods of measurement of radio interference characteristics of information technology equipment:

CISPR 16 (1987):

CISPR specification for radio interference measuring apparatus and measurement methods.

IEC Publication 107-1 (1977) and Amendment No. 1 (1987):

Recommended methods of measurement on receivers for television broadcast transmissions, Part 1: General considerations. Electrical measurements other than those at audio-frequencies.

ETS 300 158 (1992)	Satellite Earth Stations (SES) Television Receive Only (TVRO-FSS)
ETS 300 249 (1993)	Satellite Earth Stations (SES) Television Receive-Only (TVRO-BSS)

Foreword of amendment A12

This amendment to the European Standard EN 55013:1990 has been prepared by CENELEC Sub-Committee SC 110A, EMC Products.

In October 1992, a draft amendment (prA11) concerning requirements for satellite broadcast receivers was submitted to the Unique Acceptance Procedure (UAP). This draft was approved by CENELEC as amendment A11 to EN 55013 on 1993-07-06.

In April 1993, at the request of CLC/SC 110A, the text of documents CISPR/E(C.O.) 60, 61 and 62 was submitted to UAP as prA12. This text was approved by CENELEC as amendment A12 to EN 55013 on 1993-12-08.

CLC/SC 110A has combined the text of the two amendments and adapted it to be read with EN 55013 as amendment A12.

© BSI 03-2000

The following dates were fixed:

— latest date of publication of an identical national standard (dop) 1995-03-01

— latest date of withdrawal of conflicting national standards (dow) 1998-12-31

NOTE Amendment numbers commencing A1 refer to the endorsement of CISPR amendments, while those commencing A11 originate in CENELEC.

Foreword of amendment A13

This amendment was prepared by SC 210A, EMC Products, of Technical Committee CENELEC TC 210, EMC.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A13 to EN 55013:1990 on 1996-07-02.

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) 1997-06-01

— latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1999-06-01

Foreword of amendment A14

This amendment was prepared by SC 210A, EMC Products, of Technical Committee CENELEC TC 210, EMC.

The text of the draft was submitted to the formal vote and was approved by CENELEC as amendment A14 to EN 55013:1990 on 1998-08-01.

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) 1999-12-01

— latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2001-08-01

© BSI 03-2000

Contents

		Page
Foreword		2
1	Scope	5
2	Definitions	5
3	Limits of electromagnetic disturbance	5
3.1	General	5
3.2	Limits of mains terminal disturbance voltage	5
3.3	Limits of antenna terminal disturbance voltage	6
3.4	Limits of disturbance radiation	6
3.5	Limits of disturbance power	6
3.6	Wanted signal and disturbance voltage at the RF output terminals of equipment with incorporated FR video modulator	6
4	Measuring apparatus	9
4.1	Measuring receivers	9
4.2	Artificial mains network	9
4.3	Absorbing clamp	9
5	Methods of measurement	9
5.1	General	9
5.2	Measurement of mains terminal disturbance voltage in the frequency range 9 kHz to 30 MHz	10
5.3	Measurement of antenna terminal disturbance voltage in the frequency range 30 MHz to 1 000 MHz	12
5.4	Measurement of disturbance radiation in the frequency range 80 MHz to 1 000 MHz	13
5.5	Radiation measurements: 1 GHz to 18 GHz	14
5.6	Measurement of disturbance power of associated equipment (excluding video recorders) in the frequency range 30 MHz to 1 000 MHz	15
5.7	Measurement of the wanted signal and disturbance voltage at the RF output terminals of equipment with an RF video modulator incorporated in the frequency range 30 MHz to 1.75 GHz	16
6	Application of limits in tests for conformity of appliances in series production	16
Annex A (normative) Recommendation 471-1 Nomenclature anddescription of colour bar signals		24
Figure 1a — Measurement of the radio frequency disturbance voltage injected into the mains		17
Figure 1b — Measurement of the radio-frequency disturbance voltage injected into the mains (layout, top view)		17
Figure 2a — Measuring arrangement (side view) for AM sound receivers provided with a monopole aerial		18
Figure 2b — Measuring arrangement (top view) for AM sound receivers provided with a monopole aerial		18
Figure 3a — Measuring arrangement (side view) for AM sound receivers with built-in ferrite antenna		19
Figure 3b — Measuring arrangement (top view)		19
Figure 4 — Circuit arrangement for measurement of disturbance voltages at the coaxial antenna terminals		20
Figure 5 — Circuit arrangement for measurement of disturbance voltages at the balanced antenna terminals		20
Figure 6 — Measuring site for radiation measurements		20
Figure 7 — Open-field measurement at 3 m distance		21
Figure 8 — Calibration of the 3 m test site		22
Figure 9 — Theoretical site attenuation curve for the range 80 MHz to 1 000 MHz		22
Figure 10 — Circuit arrangement for the measurement of the wanted signal and disturbance voltage at the RF output of video recorders (see **5.7**)		23
Figure A.1 — Relative amplitudes of colour bars for different types of generator		25
Table 1 — Limits of mains terminal disturbance voltage		6
Table 2 — Limits of disturbance voltage at the antenna terminals		7
Table 3 — Limits of radiated disturbances		7
Table 3A — Limits of radiated disturbances of outdoor units of direct to home satellite receiving systems		8
Table 3B — Limits of radiated disturbances of tuner cards inserted in PCs at a measurement distance of 3 m		8
Table 4 — Limits of disturbance power		8
Table 4A — Limits of the wanted signal and disturbance at RF output terminals of video modulator incorporated		8
Table 5 — The non-central t-distribution factor k as a function of the sample size n		17

© BSI 03-2000

1 Scope

1.1 This standard specifies limits and methods of measurement of electromagnetic disturbance caused by sound broadcast receivers, television receivers and associated equipment.

1.2 The frequency range covered is 9 kHz to 18 GHz.

2 Definitions

For the purpose of this standard, the definitions contained in IEC Publication 50: International Electrotechnical Vocabulary (IEV), Chapter 161: Electromagnetic Compatibility, apply, extended with the following specific definitions:

2.1

Sound receivers are appliances intended for the reception of sound broadcast and similar services for terrestrial, cable and satellite transmissions.

It may also concern digital apparatus (with digital incoming signals) or apparatus with digital processing (of digital or analogue incoming signals).

NOTE For the purpose of this standard the VHF band II covers frequencies from 87.5 MHz to 108 MHz.

2.2

Television receivers are appliances intended for the reception of television broadcast and similar services for terrestrial, cable and satellite transmission.

It may also concern digital apparatus (with digital incoming signals) or apparatus with digital processing (of digital or analogue incoming signals).

NOTE 1 For the purpose of this standard the following frequency bands are defined:

Band I	from 47 MHz to 68 MHz
Band III	from 174 MHz to 230 MHz
Band IV	from 470 MHz to 598 MHz
Band V	from 598 MHz to 862 MHz
S-bands	U.C.
Hyperband	U.C.

In practice not all television receivers are tunable over these complete frequency ranges. On the other hand many television receivers are tunable over additional channels, exclusively used in cable distribution networks.

NOTE 2 Modular units which are part of sound or television receiving systems like tuners, frequency converters, modulators, etc. are considered to be sound or television receivers respectively.

Tuners may be provided with a broadcast-satellite-receiving stage and with demodulators, decoders, demultiplexers, D/A converters, encoders (e.g. PAL encoders) etc.

Frequency converters may be provided with a broadcast-satellite-receiving stage and with devices which convert the signals to other frequency bands.

Receivers, tuners or frequency converters may be tunable or may only be able to receive a fixed frequency.

2.3

Associated equipment is either intended to be connected directly to sound or television receivers, or to generate or reproduce audio or visual information (for example, audio amplifiers, active loudspeaker units, record players, compact disc players, magnetic recording and playback equipment, infrared devices, electronic organs).

Information technology equipment is excluded even if it is intended to be connected to a television broadcast receiver.

Connections via the mains plug, local area network or home network are not considered to be direct connections.

NOTE Information technology equipment is covered by EN 55 022.

2.4

Multifunction equipment has two or more functions which are provided in the same unit, for instance television reception, radio reception, digital clock, tape recording or disc player.

2.5

Outdoor unit of Direct To Home satellite receiving systems for individual reception (Type B of ETS 300 158:1992). See clause **3** of ETS 300 249:1993.

NOTE Satellite receiving systems for collective reception (Type A of ETS 300 158:1992) in particular:

— cable distribution head ends (Community Antenna Television, CATV)

— community reception systems (Master Antenna Television, MATV) are covered by EN 50083-2.

3 Limits of electromagnetic disturbance

3.1 General

The disturbance signal shall not exceed the limits specified in subclauses **3.2** to **3.5** when measured using the methods given in clause **5**. At the transition frequencies, the lower limit applies. For equipment in volume production, it is required that, with 80 % confidence, at least 80% of production complies with the limits (see clause **6**).

For receivers intended exclusively for use in motor vehicles (for example car radios), only the limits for FM car radios in Table 2 shall apply.

3.2 Limits of mains terminal disturbance voltage

Measurements shall be made in accordance with subclause **5.2**.