SLOVENSKI STANDARD
SIST HD 560.3 S1:1999

01-julij-1999

Methods of measurement on radio receivers for various classes of emission - Part 3: Receivers for amplitude-modulated sound-broadcasting emissions (IEC 60315-3:1989)

Methods of measurement on radio receivers for various classes of emission -- Part 3: Receivers for amplitude-modulated sound-broadcasting emissions

Meßverfahren für Funkempfänger für verschiedene Sendearten -- Teil 3: Radiofrequenzmessungen an Empfängern für amplitudenmodulierte Sendungen

Méthodes de mesure applicables aux récepteurs radioélectriques pour diverses classes d'émission -- Partie 3: Récepteurs pour émissions de radiodiffusion à modulation d'amplitude

Ta slovenski standard je istoveten z: **HD 560.3 S1:1992**

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HARMONIZATION DOCUMENT

HD 560.3 S1

DOCUMENT D'HARMONISATION

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Descriptors: Radio equipment, sound broadcasting, amplitude modulation, receiver, method of measurement

ENGLISH VERSION

Methods of measurement on radio receivers for various classes of emission
Part 3: Receivers for amplitude-modulated sound-broadcasting emissions
(IEC 315-3:1989)

Méthodes de mesure applicables aux récepteurs radioélectriques pour diverses classes d'émission
Troisième partie: Récepteurs pour émissions de radiodiffusion à modulation d'amplitude
(CEI 315-3:1989)

Meßverfahren für Funkempfänger für verschiedene Sendearten
Teil 3: Radiofrequenzmessungen an Empfängern für amplitudenmodulierte Sendungen
(IEC 315-3:1989)

This Harmonization Document was approved by CENELEC on 1992-09-15. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

Up-to-date lists and bibliographical references concerning national implementation may be obtained on application to the Central Secretariat or to any CENELEC member.

This Harmonization Document exists in three official versions (English, French, German).

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

FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 315-3:1989 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as Harmonization Document.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as HD 560.3 S1 on 15 September 1992.

The following dates were fixed:

- latest date of announcement of the HD at national level	(doa)	1992-12-01
- latest date of publication of a harmonized national standard	(dop)	1993-06-01
- latest date of withdrawal of conflicting national standards	(dow)	1993-06-01

Annexes designated "normative" are part of the body of the standard. In this standard, annex ZA is normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 315-3:1989 was approved by CENELEC as a Harmonization Document without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
268-2	1987	Sound system equipment Part 2: Explanation of general terms and calculation methods	HD 483.2 S1	1989
268-3	1988	Part 3: Amplifiers	HD 483.3 S2*	1992
315-1	1988	Methods of measurement on radio receivers for various classes of emission - Part 1: General considerations and methods of measurement, including audio-frequency measurements	HD 560.1 S1	1990
CISPR 13 (mod)	1975	Limits and methods of measurement of radio interference characteristics of sound and television receivers	EN 55013*	1990
CISPR 20	1985	Measurement of the immunity of sound and television broadcast receivers and associated equipment in the frequency range 1.5 MHz to 30 MHz by the current-injection method - Guidance on immunity requirements for the reduction of interference caused by radio transmitters in the frequency range 26 MHz to 30 MHz	-	-

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* HD 483.3 S2:1992 includes amendments 1:1990 + 2:1991 to IEC 268-3
EN 55013:1990 includes amendment 1:1983 to CISPR 13

NORME INTERNATIONALE

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Méthodes de mesure applicables aux récepteurs radioélectriques pour diverses classes d'émission –

Troisième partie: Récepteurs pour émissions de radiodiffusion à modulation d'amplitude

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF MEASUREMENT ON RADIO RECEIVERS FOR VARIOUS CLASSES OF EMISSION –

Part 3: Receivers for amplitude-modulated sound-broadcasting emissions

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

PREFACE

This standard has been prepared by IEC subcommittee 12A: Receiving equipment, of IEC technical committee 12: Radiocommunications.

This consolidated version of IEC 60315-3 is based on the second edition (1989) [documents 12A(CO)118 and 12A(CO)125], its amendment 1 (1999) [documents 100A/110/FDIS and 100A/118/RVD] and the corrigendum of March 1994.

It bears the edition number 2.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

The following IEC publications are quoted in this standard:

IEC 60268-2:1987, *Sound system equipment – Part 2: Explanation of general terms and calculation methods*

IEC 60268-3:1988, *Part 3: Amplifiers*

IEC 60315-1:1988, *Methods of measurement on radio receivers for various classes of emission – Part 1: General considerations and methods of measurement, including audio-frequency measurements*

CISPR 13:1975, *Limits and methods of measurement of radio interference characteristics of sound and television receivers*

CISPR 20:1985, *Measurement of the immunity of sound and television broadcast receivers and associated equipment in the frequency range 1,5 MHz to 30 MHz by the current-injection method. Guidance on immunity requirements for the reduction of interference caused by radio transmitters in the frequency range 26 MHz to 30 MHz*

METHODS OF MEASUREMENT ON RADIO RECEIVERS FOR VARIOUS CLASSES OF EMISSION –

Part 3: Receivers for amplitude-modulated sound-broadcasting emissions

SECTION ONE – GENERAL

1 Scope

This standard applies to radio receivers for the reception of amplitude-modulated sound-broadcasting emissions. It deals mainly with measurements using radio-frequency signals applied to the antenna terminals of the receiver, or induced in a magnetic antenna.

This part is intended to be read in conjunction with Part 1 (IEC 60315-1, Second edition).

Immunity is not covered, except for an explanation with cross-reference to CISPR publications. For radiation from receivers, reference is required to CISPR Publication 13.

NOTE 1 – Receivers without volume controls or a.f. power output stages ("tuners") are included.

NOTE 2 – Receivers for single-sideband and independent-sideband emissions are not included, nor are receivers for stereophonic emissions as far as characteristics involving the encoding system are concerned.

2 Conditions for measurement

2.1 Standard measuring conditions

A receiver is operating under standard measuring conditions when:

a) the power supply voltage and frequency are equal to the rated values;

b) the standard radio-frequency input signal is applied via the appropriate antenna simulation network to the antenna terminals of the receiver (see Table III and Figure 5 of Part 1) or applied to a standard magnetic field generator to induce the signal into the magnetic antenna of the receiver;

c) the audio-frequency output terminals for connection to loudspeakers (if any) are connected to audio-frequency substitute loads, as are any other audio-frequency output terminals, if measurements are to be made at those terminals;

d) the receiver is tuned to the applied signal in accordance with Sub-clause 2.2;

e) the volume control (if any) is adjusted so that the output voltage at the main audio-frequency output terminals is 10 dB below the rated distortion-limited output voltage, or corresponds to a preferred reference value (see Part 1, Sub-clause 15.1);

f) the environmental conditions are within the rated ranges;

g) for stereo receivers, the balance control or its equivalent (if any) is adjusted so that output voltages of the two channels are equal;

h) the tone controls (if any) are adjusted for the flattest possible audio-frequency response (e.g. for equal response at 100 Hz, 1 kHz and 10 kHz). This shall be carried out using an a.f. input signal if a.f. input terminals are available, otherwise the frequency of 10 kHz given above should be reduced to 2 kHz;

i) the automatic frequency control is inoperative, if this can be achieved by means of a user control (see note).

NOTE – Where a user control for automatic frequency control is provided, measurements should in general be made both with automatic frequency control off (which will allow easy analysis of the results), and with automatic frequency control on (which represents the situation when the receiver is in normal use). The two sets of results should be clearly identified.

If the automatic frequency control cannot be made inoperative by means of a user control, it may nevertheless be necessary (or desirable) for the automatic frequency control to be disabled for certain measurements. In this case the automatic frequency control should be disabled by temporarily modifying the receiver, the action taken being detailed with the results (see Sub-clause 2.2);

j) the muting control (if any) is in the "muting off" position.

2.2 Tuning and automatic frequency control

2.2.1 Preferred tuning method

If the manufacturer gives instructions on tuning the receiver, such as the use of a tuning indicator, these instructions shall be followed. In the absence of instructions or of a tuning indicator, the receiver shall be tuned for maximum output voltage at the main audio-frequency terminals under the conditions (with exception of Item d)) given in Sub-clause 2.1, care being taken to avoid overloading the audio-frequency part of the receiver.

2.2.2 Effect of automatic frequency control

All tuning operations shall be made with arrangements for automatic frequency control inoperative, if this is possible, except when the performance of the automatic frequency control is being investigated.

When provision is made for the user to render the automatic frequency control inoperative, measurements may be made both with the automatic frequency control in operation, and with it disabled. The results shall clearly show whether the automatic frequency control was in operation or not (see also Section Six).

2.3 Precautions

Many of the measurements described in this Part are likely to be adversely affected by interfering emissions and radio-frequency noise. It is usually essential that a screened room or screened enclosure is available in which to carry out these measurements. It is also highly desirable to monitor the audio-frequency output signal continuously with a loudspeaker or headphones in order to detect any interference or spurious output signals due to unwanted signals from the test equipment or elsewhere, or spurious responses of the receiver.

Measurement accuracy is also affected by inadequate signal-to-noise ratio. When the noise output is independent of the modulation factor (which is not always so), the output with zero modulation should be checked and if it is larger than –10 dB (unless otherwise stated in this Part) with respect to the output with modulation, the result of the measurement shall be rejected and measurement made using an a.f. band-pass filter to improve the signal-to-noise ratio sufficiently to restore accuracy.

SECTION TWO – SENSITIVITY AND INTERNAL NOISE

3 Output/input characteristics

3.1 Introduction

Virtually all commercially-available receivers for amplitude-modulated sound-broadcasting emissions use some form of automatic gain control (a.g.c.). To investigate the sensitivity and noise characteristics of such receivers, it is useful to measure the a.f. output with a fixed modulation factor, and the noise output with zero modulation factor, as functions of the r.f. input signal level and to plot the curves on the same graph.

An example of such a graph is given in Figure 1, which also shows the characteristics whose values may be determined from the curves or the tabulated results of the measurements.

3.2 Method of measurement

a) The receiver is brought under standard measuring conditions (see Sub-clause 2.1). An a.f. voltmeter (preferably a true r.m.s. meter) and a noise weighting filter and quasi-peak meter (see Part 1, Sub-clause 6.2.2) are connected across the audio-frequency substitute load at the terminals where a.f. output measurements are to be made.

NOTE 1 – Unweighted noise measurements using a wide-band filter or A-weighting noise measurements may be made if required (see clause 6 of IEC 60315-1). In these methods, noise is measured with an r.m.s. meter (preferably a true r.m.s. meter). The method used should be clearly stated with the results.

NOTE 2 – If ultrasonic components within the bandwidth of the a.f. voltmeter may be present in the a.f. output voltage, the voltmeter should be preceded by a band-limiting filter in accordance with Sub-clause 6.1 of Part 1.

b) The a.f. output voltage on the a.f. voltmeter is noted. The modulation factor is then reduced to zero and the noise output voltage on the noise meter is noted.

c) The measurements are then repeated for different values of r.f. input signal level, measurements being made at signal levels low enough to give very low signal-to-noise ratios and high enough (if possible) to explore the overloading of the r.f. part of the receiver (see Clause 20).

If overloading of the a.f. part of the receiver occurs at high r.f. input signal levels, the volume control attenuation is increased by a known amount to eliminate the overloading, and measurements are continued. This increased attenuation is taken into account in presenting the results. If no volume control is fitted, the onset of a.f. overload sets a limit to the permissible r.f. input signal level and measurements should be discontinued.

d) Particularly at high input signal levels, the receiver tuning should be checked by adjusting the carrier frequency of the signal source before each result is recorded, since the receiver may detune. The extent of any detuning shall be recorded in terms of frequency at each input signal level during this measurement sequence, as the results are of value for the measurement of variation of operating frequency with r.f. input signal level (see Part 1, Clause 3).

NOTE – It should be decided whether to record the results of the output/input characteristic measurement with or without retuning. Unless the tuning variations are large, it is usual to record the result obtained without retuning. If retuning is carried out, this should be noted with the results.