SLOVENSKI STANDARD
SIST EN 60244-5:1999

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Methods of measurement for radio transmitters - Part 5: Performance characteristics for television transmitters (IEC 60244-5:1992)

Methods of measurement for radio transmitters -- Part 5: Performance characteristics for television transmitters

Meßverfahren für Funksender -- Teil 5: Übertragungseigenschaften von Fernsehsendern

Méthodes de mesure applicables aux émetteurs radioélectriques -- Partie 5: Qualités de fonctionnement des émetteurs de télévision

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ENGLISH VERSION

Methods of measurement for radio transmitters
Part 5: Performance characteristics of television transmitters
(IEC 244-5:1992)

Méthodes de mesure applicables aux émetteurs radioélectriques Partie 5: Qualités de fonctionnement des émetteurs de télévision
(CEI 244-5:1992)

Meßverfahren für Funksender Teil 5: Übertragungseigenschaften von Fernsehsendern
(IEC 244-5:1992)

This European Standard was approved by CENELEC on 1993-12-08. 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

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FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 244-5:1992 could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as European Standard.

The reference document was submitted to the CENELEC members for formal vote and was approved by CENELEC as EN 60244-5 on 8 December 1993.

This European Standard replaces HD 236.5 S4:1979.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1994-12-01
- latest date of withdrawal of conflicting national standards	(dow)	1994-12-01

Annexes designated "normative" are part of the body of the standard. In this standard, annexes A, B and ZA are normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 244-5:1992 was approved by CENELEC as a European Standard without any modification.

Editorial correction to the English version of IEC 244-5:

Under 2.2, CCIR Publications, replace "CCIR Recommendation 567-1:1986" by "CCIR Recommendation 567-3:1990" (the title is unchanged).

ANNEX ZA (normative)

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

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.

NOTE : 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
244-1 A2	1968 1989	Methods of measurement for radio transmitters - Part 1: General conditions of measurement, frequency, output power and power consumption	HD 236.1 S1* -	1977 -
244-10	1986	Part 10: Methods of measurement for television transmitters and transposers employing insertion test signals	EN 60244-19	1993
244-12-1	1989	Part 12: Guideline for drawing up descriptive leaflets for transmitters transposers for sound and television broadcasting Characteristics to be specified	EN 60244-12-1	1993
244-12-2	1989	Part 12: Guideline for drawing up descriptive leaflets for transmitters and transposers for sound and television broadcasting Specification sheets	EN 60 236-12-2	1993
244-13	1991	Part 13: Performance characteristics for FM sound broadcasting	EN 60244-13	1993

Other publications quoted:

CCIR Recommendation 468-4:1986, Measurement of audio frequency noise voltage level in sond broadcasting

CCIR Recommendation 567-3:1990, Transmission performance of television circuits designed of use in international connections

CCIR Recommendation 653:1986, Teletext systems

CCIR Report 624-3:1986, Characteristics of television systems

CCIR Report 795-2:1986, Transmission of two of more sound programmes or information channels in television

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* HD 236.1 S1 includes A1:1973 to IEC 244:1

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Partie 5:
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Part 5:
Performance characteristics of television transmitters

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF MEASUREMENT FOR RADIO TRANSMITTERS

Part 5: Performance characteristics of television transmitters

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

International Standard IEC 244-5 has been prepared by Sub-Committee 12C: Transmitting equipment, of IEC Technical Committee No. 12: Radiocommunications.

The text of this standard is based on the following documents:

Six Months' Rule	Reports on Voting	Two Months' Procedure	Report on Voting
12C(CO)214	12C(CO)218	12C(CO)220	12C(CO)225
12C(CO)207	12C(CO)216		

Full information on the voting for the approval of this standard can be found in the Voting Reports indicated in the above table.

This standard incorporates all recommended measurements for television transmitters in a single publication and supersedes all clauses dealing with television transmitters in the following existing publications:

IEC 244-5, 1971
IEC 244-5A, 1971
IEC 244-5B, 1975 and Amendment 1, 1978
IEC 244-5C, 1977

Annexes A and B form an integral part of this standard.

INTRODUCTION

This International Standard is one of a series of parts of IEC 244.

Some of the existing parts of IEC 244 are currently under review and several of these will be revised or withdrawn. When this process is completed, this series of publications will comprise one part dealing with general characteristics, with cross-references to relevant CCIR publications and Radio Regulations (CCIR), and a number of specialized parts, each dealing with particular types of transmitters.

METHODS OF MEASUREMENT FOR RADIO TRANSMITTERS

Part 5: Performance characteristics of television transmitters

1 Scope

This International Standard describes the methods of measurement for assessing the performance characteristics of television transmitters. To assess all other characteristics, this standard needs to be used in conjunction with the publications quoted in clause 2.

This standard is intended to be used for type tests and acceptance or factory tests.

It is not mandatory to measure all the described characteristics. Additional measurements may be carried out by agreement between customer and manufacturer.

The performance characteristics measured in accordance with this standard make possible the comparison of the results of measurements made by different observers.

Limiting values for acceptable performance are not covered by this standard but, in connection with the presentation of measured characteristics, some data are given for clarity.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 244. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 244 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

2.1 *IEC publications*

IEC 244-1: 1968, *Methods of measurement for radio transmitters – Part 1: General conditions of measurement, frequency, output power and power consumption (revision under consideration).*
Amendment 2, 1989. (Amendment 2 replaces IEC 244-1A.)

IEC 244-10: 1986, *Methods of measurement for radio transmitters – Part 10: Methods of measurement for television transmitters and transposers employing insertion test signals.*

IEC 244-12-1: 1989, *Methods of measurement for radio transmitters – Part 12: Guideline for drawing up descriptive leaflets for transmitters and transposers for sound and television broadcasting - Characteristics to be specified.*

IEC 244-12-2: 1989, *Methods of measurement for radio transmitters - Part 12: Guideline for drawing up descriptive leaflets for transmitters and transposers for sound and television broadcasting - Specification sheets.*

IEC 244-13: 1991, *Methods of measurement for radio transmitters - Part 13: Performance characteristics for FM sound broadcasting.*

2.2 *CCIR publications*

CCIR Recommendation 468-4: 1986, *Measurement of audio frequency noise voltage level in sound broadcasting.*

CCIR Recommendation 567-1: 1986, *Transmission performance of television circuits designed for use in international connections.*

CCIR Recommendation 653: 1986, *Teletext systems.*

CCIR Report 624-3: 1986, *Characteristics of television systems.*

CCIR Report 795-2: 1986, *Transmission of two or more sound programmes or information channels in television.*

3 General terms and definitions

3.1 *Television transmitter*

The term "television transmitter" is used in this part to refer to that equipment with a video input and one or more audio inputs and a combined vision and sound radio frequency output.

3.2 *Description of the television systems and other relevant information*

See annex A, clause A.3.

3.3 *Definitions of performance characteristics*

These definitions are given in the clauses describing the method of measurement and are in line with those given in IEC 244-12-1 and IEC 244-12-2.

3.4 *Standard test signals*

The test signals to be used for measuring the vision signal are given in annex B.

4 General conditions of operation

– The television transmitter shall be tested in the normal operating conditions and at its rated output power.

– The power supply voltage and the environmental conditions shall be stated with the measurement results.

– The television transmitter shall be connected to a test load having a VSWR ≤1,05 within the channel bandwidth.

5 General conditions of measurement

5.1 *Input and output signal arrangements*

– For each method of measurement, the input and output signal arrangement is given in the form of a diagram (see annex A).

– The impedance of the test equipment, the test object and all connections between them shall be accurately matched.

– The performance characteristics shall be measured via a directional coupler with a directivity ≥34 dB, at the combined vision and sound signal output of the transmitter. A lower directivity can be agreed upon between customer and manufacturer.

5.2 *Measuring equipment*

Measurements in the videofrequency domain shall be carried out after demodulation of the RF output signal of the directional coupler with a VSB test demodulator with synchronous detection and with sound trap switched on, unless otherwise stated.

The group delay frequency characteristics shall be in accordance with the television system concerned (see annex A, clause A.3).

Measurement in the audio-frequency domain shall be carried out with a selective sound demodulator or after an intercarrier demodulator.

5.3 *Modulation and power conditions*

– The video input signal shall have the basic characteristics given in CCIR Report 624 for the standard concerned (see annex A, clause A.3). Unless otherwise stated; for example, for field-time measurements, video input signals without field synchronizing signals may be used. The sound carrier shall be unmodulated, unless otherwise stated.

– All performance characteristics shall be measured under the following conditions:

a) the characteristic vision levels shall first be set to nominal values given in CCIR Report 624 for the standard concerned (see annex A, clause A.3). This shall be measured using the method of measurement given in clause 7;

b) the vision transmitter shall deliver rated output power. This shall be measured using the method of measurement given in clause 6;

c) the ratio between this rated output power and that of the sound carrier or carriers shall be in accordance with the standard concerned, given in CCIR Report 624 (see annex A, clause A.3).

5.4 *General characteristics*

The methods of measurement of the general characteristics of the transmitter such as frequency stability are described in IEC 244-1.

6 Output power, power consumption and power factor

6.1 *Definitions*

– The rated output power of a television transmitter is the peak envelope power of the vision signal at the transmitter output.

– The power consumption of the television transmitter is the total input power, from the mains supply measured in watts (W) or kilowatts (kW) including the power requirements for auxiliary equipment. It is defined for specified modulation conditions and at rated output power.

– Power factor is defined in IEC 244-1.

6.2 *Measuring arrangement*

The measuring arrangement is given in figure 1a.

The mean output power P_m is measured directly with a calorimetric testload or after a calibrated attenuator or a calibrated directional coupler with a milliwattmeter. Using an RF peak voltmeter, the peak envelope power can be calculated directly.

6.3 *Test signal*

The vision part of the transmitter shall be modulated with an all black signal (A1) for systems with negative modulation (see annex B).

The sound carrier(s) shall be unmodulated for systems using FM modulation. In the case of AM modulation (system L), the sound carrier shall be modulated with a test signal ≤1 kHz with m = 90 %.

6.4 *Measuring procedure*

6.4.1 *Output power*

The output power of the television transmitter shall be measured with the sound carrier(s) switched off.

6.4.2 *Power consumption and power factor*

The power consumption is the input active power of the transmitter and shall be measured with the vision and sound parts in operation, both delivering rated output power. The vision and sound parts of the transmitter shall be modulated in accordance with 6.3.

The input active power (P_c), the input apparent power (P_a) and the power factor shall be measured in accordance with IEC 244-1.

NOTES

1 To compare power consumption relative to cost of ownership the power should be measured with a video input signal at mid-grey level (see test signal A3 in annex B). In the case of AM sound, 54 % modulation should be used.

2 Some specifications give the statistical average power consumption for estimating the costs of ownership. This can only be checked during service with programme signals over an agreed period of time and by measuring the power consumption in this period.