



**SLOVENSKI STANDARD**  
**SIST EN 60244-9:1999**

**01-januar-1999**

---

**Methods of measurement for radio transmitters - Part 9: Performance characteristics for television transposers (IEC 60244-9:1993)**

Methods of measurement for radio transmitters -- Part 9: Performance characteristics for television transposers

Meßverfahren für Funksender -- Teil 9: Übertragungseigenschaften von Fernsehumsetzern

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

Méthodes de mesure applicables aux émetteurs radioélectriques -- Partie 9: Qualité de fonctionnement des réémetteurs de télévision

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4c8a-aed8-469ae51f2c87/sist-en-60244-9-1999>

**Ta slovenski standard je istoveten z: EN 60244-9:1994**

---

**ICS:**

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
-----------	-----------------------------	--------------------------------------

**SIST EN 60244-9:1999**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 60244-9:1999](https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999)

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999>

EUROPEAN STANDARD

EN 60244-9

NORME EUROPEENNE

EUROPÄISCHE NORM

September 1994

ICS 33.060.20

Descriptors: Radio transmitters, measurement, television, transposers,  
properties

## ENGLISH VERSION

Methods of measurement for radio transmitters  
Part 9: Performance characteristics for television  
transposers  
(IEC 244-9:1993)

Méthodes de mesure applicables  
aux émetteurs radioélectriques  
Partie 9: Qualité de  
fonctionnement des réémetteurs  
de télévision  
(CEI 244-9:1993)

Meßverfahren für  
Funksender  
Teil 9: Übertragungseigenschaften von  
Fernsehumsetzern  
(IEC 244-9:1993)

iTeh STANDARD PREVIEW

This European Standard was approved by CENELEC on 1994-07-05.  
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.

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4c8a-aed8-469ac512c87/iec-en-60244-9-1999>

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

### FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 244-9:1993 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 60244-9 on 5 July 1994.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-07-15
- latest date of withdrawal of conflicting national standards (dow) 1995-07-15

Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given only for information. In this standard, annexes A, B, and ZA are normative and annex C is informative.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

ENDORSEMENT NOTICE

SIST EN 60244-9:1999

The text of the International Standard IEC 244-9:1993 was approved by CENELEC as a European Standard without any modification.

The following editorial correction applies to the English text of IEC 244-9:1993:

Replace the title of figure 1 by:

Example for a template for an amplitude/intermediate frequency and amplitude/radio frequency characteristic for System B and G.

-----

## 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
-----	----	-----	-----	----
215	1987	Safety requirements for radio	EN 60215	1989
A1	1990	transmitting equipment	A1	1992
244-1	1968	Methods of measurement for radio transmitters - Part 1: General conditions of measurement, frequency, output power and power consumption	HD 236.1 S1*	1977
244-5	1992	Part 5: Performance characteristics of television transmitters	EN 60244-5	1994
244-10	1986	Part 10: Methods of measurement for television transmitters and transposers employing insertion test signals	EN 60244-10	1993
244-12-1	1989	Part 12: Guideline for drawing up descriptive leaflets for transmitters and transposers for sound and television broadcasting Characteristics to be specified	EN 60244-12-1	1993
244-12-2	1989	Specification sheets	EN 60244-12-2	1993
244-13	1991	Part 13: Performance characteristics for FM sound broadcasting	EN 60244-13	1993
487-1	1984	Methods of measurement for equipment used in terrestrial radio-relay systems Part 1: Measurements common to sub-systems and simulated radio-relay systems	HD 477.1 S1	1987

\* HD 236.1 S1 is based on IEC 244-1:1968 + A1:1973 + IEC 244-1A:1968 + A1:1973

IEC Publication	Date	Title	EN/HD	Date
-----	----	-----	-----	----
864-1	1986	Standardization of interconnections	HD 577 S1	1990
A1	1987	between broadcasting transmitters or transmitter systems and supervisory equipment - Part 1: Interface standards for systems using dedicated interconnections		

## Other 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

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 60244-9:1999](#)

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 60244-9:1999](https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999)

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999>

NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

CEI  
IEC  
244-9

Deuxième édition  
Second edition  
1993-03

---



---

Méthodes de mesure applicables aux émetteurs  
radioélectriques

Partie 9:  
Qualité de fonctionnement des réémetteurs  
de télévision

(standards.iteh.ai)

Methods of measurement of radio transmitters

[https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-](https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-19951f2c87/sist-en-60244-9-1999)

Part 9:  
Performance characteristics for  
television transposers

© CEI 1993 Droits de reproduction réservés — Copyright — all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur.

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembe Genève, Suisse



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

X

Pour prix, voir catalogue en vigueur  
For price, see current catalogue



## CONTENTS

	Page
FOREWORD .....	5
INTRODUCTION .....	7
Clause	
1 Scope .....	9
2 Normative references .....	9
3 General terms and definitions .....	11
4 General conditions of operation .....	13
5 General conditions of measurements .....	15
6 General transposer characteristics .....	19
7 Stability of the characteristic vision levels and output power .....	31
8 Linear distortion .....	33
9 Non-linear distortion .....	41
10 Wave-form distortion .....	45
11 Unwanted modulation .....	47
12 Unwanted emissions and changes in performance caused by feedback from output to input .....	53
13 Impairments of the performance caused by coupling between output and input .....	59
14 Special measurements for data signals in the vision signal .....	61
15 Method of measurement of the sound channel(s) .....	61
Annexes	
A Input and output signal arrangements .....	67
B Input impedance .....	71
C Noise figure and signal-to-noise ratios .....	75

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF MEASUREMENT  
FOR RADIO TRANSMITTERSPart 9: Performance characteristics  
of television transposers

## 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 cooperation 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, 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.
- 3) They have the form of recommendations for international use published in the form of standards, 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.

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999>

International Standard IEC 244-9 has been prepared by sub-committee 12C: Transmitting equipment, of IEC technical committee 12: Radiocommunications.

This second edition cancels and replaces the first edition published in 1982 and its amendment 1 (1983) and constitutes a technical revision.

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

DIS	Report on Voting
12C(CO)224	12C(CO)228

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

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

Annex C is for information only.

## INTRODUCTION

International Standard IEC 244-9 is one of a series of parts of IEC 244.

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

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 60244-9:1999

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4c8a-aed8-469ae51f2c87/sist-en-60244-9-1999>

## METHODS OF MEASUREMENT FOR RADIO TRANSMITTERS

### Part 9: Performance characteristics of television transposers

#### 1 Scope

This part of IEC 244 contains the method of measurement to assess the performance characteristics of television transposers. To assess all other characteristics, this standard is 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 makes 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.

[SIST EN 60244-9:1999](https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999)

<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4cba-aed8-469ae51f2c87/sist-en-60244-9-1999>

#### 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.

IEC 215: 1987, *Safety requirements for radio transmitting equipment*  
Amendment 1 (1990)

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)*

IEC 244-5: 1992, *Methods of measurement for radio transmitters – Part 5: Performance characteristics of television transmitters*

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 radiotransmitters – Part 13: Performance characteristics for FM sound broadcasting*

IEC 487-1: 1984, *Methods of measurement for equipment used in terrestrial radio-relay systems – Part 1: Measurements common to sub-systems and simulated radio-relay systems*

IEC 864-1: 1986, *Standardization of interconnections between broadcasting transmitters or transmitter systems and supervisory equipment – Part 1: Interface standards for systems using dedicated interconnections*  
Amendment 1 (1987)

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*  
<https://standards.iteh.ai/catalog/standards/sist/6d2ff4dd-851d-4c8a-aed8-469ae51f2c87/sist-en-60244-9-1999>

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 transposer

The term "television transposer" is used in this standard to refer to the equipment in a television relay station which is connected between the feeder terminations of the receiving aerial and the transmitting aerial and in which a frequency transposition is performed without demodulation and modulation.

In some television relay stations, equipment is used in which no frequency transposition takes place. Such equipment is termed an "active deflector". Most of the measurements described in this standard also apply to active deflectors.

#### 3.2 Description of the television system and other relevant information

See annex A of IEC 244-5.

### 3.3 *Definition of performance characteristics*

The definitions are given in the clause describing the method of measurements, and are in line with those given in IEC 244-12.

### 3.4 *Standard video test signals*

The video test signals are identified by a letter symbol. They are described in annex B of IEC 244-5.

### 3.5 *Definitions relating to the transposer output signal*

#### 3.5.1 *Rated output power*

The rated output power is defined as the peak envelope power of the vision signal. The term "rated output power" is used for various measurements in this standard.

#### 3.5.2 *Reference output level*

The reference output level is the level corresponding to the specified rated output power.

### 3.6 *Definitions relating to the transposer input signal*

#### 3.6.1 *Input voltage*

The voltage of the vision signal at the input of a transposer with negative (or positive) modulation of the vision carrier is the r.m.s. voltage, expressed in millivolts (dB(mV)) or microvolts (dB( $\mu$ V)), of a sinusoidal signal with an amplitude corresponding to the peak envelope level of the vision signal.

#### 3.6.2 *Reference input level*

The reference input level (100 % or 0 dB) is the level corresponding to the peak envelope value of a vision signal of given voltage (see 3.6.1 above) which produces the rated output power after appropriate adjustment of the transposer gain controls.

#### 3.6.3 *Input voltage range*

The input voltage range of a transposer is the range of input voltages within which the transposer's performance specification applies.

## 4 **General conditions of operation**

The transposer shall be tested under the following conditions:

- a) Any device for the suppression of unwanted signals, irrespective of whether or not it is located inside the transposer, shall be considered as a part of the transposer for the purpose of this standard.

b) Unless otherwise specified, the measurements shall be made under normal operating conditions and at rated output power. If required, they shall be repeated under extreme environmental conditions, in accordance with the equipment specification.

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

c) Due to practical limitations on the position of receiving and transmitting aerials, there will be some coupling between them.

Where such coupling is specified, all the transposer tests shall be carried out with the coupling simulated by feeding part of the output signal to the input of the transposer by means of directional couplers inserted in the input and output connections of the transposer. For further details, see figures A.1 to A.3 of annex A.

## 5 General conditions of measurements

Because a television transposer is a piece of equipment with radio-frequency input and output, most of the measurements are based on radio-frequency input and output signals only. Some measurements shall be carried out on video and audio signals using a DSB (double-sideband) modulator or test transmitter and a VSB (vestigial-sideband) demodulator.

### 5.1 Measuring arrangements

For the purposes of measurement, the transposer can be considered in terms of input and output characteristics, and of transmission performance.

Depending on the particular measurements, one of the three measuring arrangements described below may be employed.

Details of the arrangements are given in annex A.

#### – Arrangement A (figure A.1 of annex A)

The arrangement is built up from three (four) radio-frequency generators, each connected to a passive matching and combining network. The combined output is connected to the transposer input via an adjustable attenuator.

With this arrangement, the tests do not rely upon the process of modulation and demodulation as in B and C below.

NOTE – Before starting the measuring procedures using arrangement A, the transposer should be adjusted in accordance with 6.2.2.

#### – Arrangement B (figure A.2 of annex A)

A double-sideband vision test modulator equipped with a receiver pre-correction group delay filter (if required) in accordance with the system concerned, and two (three) radio-frequency generators simulating the vision and sound carriers are used. The outputs of the modulator and the sound carrier generators are connected to a passive matching and combining network. The combined output is connected to the transposer input via an adjustable attenuator.