



SLOVENSKI STANDARD

SIST EN 60835-2-9:2002

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Methods of measurement for equipment used in digital microwave radio transmission systems - Part 2: Measurements on terrestrial radio-relay systems - Section 9: Service channels (IEC 60835-2-9:1995)

Methods of measurement for equipment used in digital microwave radio transmission systems -- Part 2: Measurements on terrestrial radio-relay systems -- Section 9: Service channels

Meßverfahren für Geräte in digitalen Mikrowellen - Funkübertragungssystemen -- Teil 2: Messungen an terrestrischen Richtfunkssystemen -- Hauptabschnitt 9: Dienstkanäle

Méthodes de mesure applicables au matériel utilisé pour les systèmes de transmission numérique en hyperfréquence -- Partie 2: Mesures applicables aux faisceaux hertziens terrestres -- Section 9: Voies de service

Ta slovenski standard je istoveten z: EN 60835-2-9:1995

ICS:

33.060.30	Radiorelejni in fiksni satelitski komunikacijski sistemi	Radio relay and fixed satellite communications systems
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EUROPEAN STANDARD

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NORME EUROPÉENNE

EUROPÄISCHE NORM

December 1995

ICS 33.060.30

Descriptors: Telecommunications, radiocommunications, communication equipment, digital technics, radio-relay systems, microwave frequencies, transmission channels, measurements

English version

**Methods of measurement for equipment used in
digital microwave radio transmission systems
Part 2: Measurements on terrestrial radio-relay systems
Section 9: Service channels
(IEC 835-2-9:1995)**

Méthodes de mesure applicables
au matériel utilisé pour les systèmes
de transmission numérique en
hyperfréquence
Partie 2: Mesures applicables aux
faisceaux hertziens terrestres
Section 9: Voies de service
(CEI 835-2-9:1995)

Meßverfahren für Geräte in digitalen
Mikrowellen
Funkübertragungssystemen
Teil 2: Messungen an terrestrischen
Richtfunksystemen
Hauptabschnitt 9: Dienstkanäle
(IEC 835-2-9:1995)

This European Standard was approved by CENELEC on 1995-11-28. 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

Foreword

The text of document 12E/246/DIS, future edition 1 of IEC 835-2-9, prepared by SC 12E, Radio-relay and fixed satellite communication systems, of IEC TC 12, Radiocommunications, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60835-2-9 on 1995-11-28.

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 standards conflicting with the EN have to be withdrawn (dow) 1996-09-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 835-2-9:1995 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)**Normative references to international publications
with their corresponding 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 (including amendments).

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 835-1-2	1992	Methods of measurement for equipment used in digital microwave radio transmission systems Part 1: Measurements common to terrestrial radio-relay systems and satellite earth stations Section 2: Basic characteristics	EN 60835-1-2	1993
IEC 835-1-3	1992	Section 3: Transmission characteristics	EN 60835-1-3	1995
IEC 835-1-4	1992	Section 4: Transmission performance	EN 60835-1-4	1995
IEC 835-2-4	1993	Part 2: Measurements on terrestrial radio-relay systems Section 4: Transmitter/receiver including modulator/demodulator	EN 60835-2-4	1995

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**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

60835-2-9

Première édition
First edition
1995-11

**Méthodes de mesure applicables au matériel
utilisé pour les systèmes de transmission
numérique en hyperfréquence**

Partie 2:

**Mesures applicables aux faisceaux hertziens
terrestres**
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**Methods of measurement for equipment used in
digital microwave radio transmission systems**

Part 2:

Measurements on terrestrial radio-relay systems
Section 9: Service channels

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF MEASUREMENT FOR EQUIPMENT
USED IN DIGITAL MICROWAVE RADIO TRANSMISSION SYSTEMS –

Part 2: Measurements on terrestrial radio-relay systems –
Section 9: Service channels

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.

International Standard IEC 835-2-9 has been prepared by sub-committee 12E: Radio-relay and fixed satellite communication systems, of IEC technical committee 12: Radio-communications.

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

DIS	Report on voting
12E/246/DIS	12E/260/RVD

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

Annex A is for information only.

METHODS OF MEASUREMENT FOR EQUIPMENT USED IN DIGITAL MICROWAVE RADIO TRANSMISSION SYSTEMS –

Part 2: Measurements on terrestrial radio-relay systems – Section 9: Service channels

1 General

1.1 Scope

This section of IEC 835-2 deals with measurements pertaining to the service channels used in digital microwave radio-relay systems.

In digital radio-relay systems, two basic methods are commonly used for the transmission of service channel signals (that is voice, supervisory and control signals) (see annex A, ref. [6]).

The first transmission method uses *analogue transmission* techniques where the i.f. or r.f. carrier signal of the digital modulator is directly frequency-modulated by the analogue service channel signal, which is then recovered at the receive end by an f.m. demodulator (for example in the carrier recovery circuit of a coherent digital demodulator).

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In the second method of transmission, *digital transmission* is used and the service channel signal is transmitted in the form of separate bits inserted into the main bit stream by a multiplexer (possibly together with a bit stream carrying additional information).

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For digital transmission, the service channel signal may be *either an analogue signal* which is digitally encoded for bit insertion *or a digital signal*, in which case suitable code conversion is normally applied in order to convert the line code into a code suitable for the radio equipment. At the receive end, a demultiplexer is used to recover the service channel bits and thus supply, after suitable decoding or code conversion, the service channel output signal.

Normally, more than one service channel is transmitted. Sometimes an additional bit stream (for example alarm control signals for protection switching and supervisory equipment) may also be transmitted. Suitable multiplexing and demultiplexing equipment is then used, such as frequency division multiplexing for analogue transmission, and time division multiplexing for digital transmission. The use of time division multiplexing also allows the simultaneous digital transmission of analogue and digital service channel signals.

Figure 1 shows the simultaneous application of all the above possible service channel transmission systems. However, in a given radio-relay link, only one or two of these systems is used at a time.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of IEC 835-2. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this section of IEC 835-2 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 835-1-2: 1992, *Methods of measurement for equipment used in digital microwave radio transmission systems – Part 1: Measurements common to terrestrial radio-relay systems and satellite earth stations – Section 2: Basic characteristics*

IEC 835-1-3: 1992, *Methods of measurement for equipment used in digital microwave radio transmission systems – Part 1: Measurements common to terrestrial radio-relay systems and satellite earth stations – Section 3: Transmission characteristics*

IEC 835-1-4: 1992, *Methods of measurement for equipment used in digital microwave radio transmission systems – Part 1: Measurements common to terrestrial radio-relay systems and satellite earth stations – Section 4: Transmission performance*

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IEC 835-2-4: 1993, *Methods of measurement for equipment used in digital microwave radio transmission systems – Part 2: Measurements on terrestrial radio-relay systems – Section 4: Transmitter/receiver including modulator/demodulator*

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2 Analogue interface of service channels transmitted by analogue techniques

2.1 Return loss

See IEC 835-1-2.

2.2 Input deviation sensitivity

2.2.1 Definition

The input deviation sensitivity, S_m , of a frequency modulator, for a sinusoidal signal with a given frequency, is expressed as the ratio of the frequency deviation, Δf , to the baseband voltage, V_b , at the input of the service channel, i.e.:

$$S_m = \Delta f / V_b \quad [\text{kHz/V}]$$

V_b and Δf are both expressed in either peak or r.m.s. values. The deviation sensitivity of the modulator is a function of the baseband frequency if a pre-emphasis network is applied.