SLOVENSKI STANDARD
SIST EN 60510-3-4:2002

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Methods of measurement for radio equipment used in satellite earth stations - Part 3: Methods of measurement on combinations of sub-systems - Section 4: Measurements for frequency division multiplex (f.d.m.) transmission

Methods of measurement for radio equipment used in satellite earth stations -- Part 3: Methods of measurement on combinations of sub-systems -- Section 4: Measurements for frequency division multiplex (f.d.m.) transmission

Meßverfahren für Funkgerät in Satelliten-Erdfunkstellen -- Teil 3: Meßverfahren für Kombinationen von Untersystemen -- Hauptabschnitt 4: Messungen der Frequenzmultiplex (FDM)-Übertragung

Méthodes de mesure pour les équipements radioélectriques utilisés dans les stations terriennes de télécommunication par satellites -- Partie 3: Méthodes de mesure applicables aux combinaisons de sous-ensembles -- Section 4: Mesures pour la transmission de la téléphonie multivoie à multiplexage par répartition en fréquence (m.r.f.)

Ta slovenski standard je istoveten z: **EN 60510-3-4:1994**

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ENGLISH VERSION

Methods of measurement for radio equipment used in satellite earth stations
Part 3: Methods of measurement on combinations of sub-systems
Section four: Measurements for frequency division multiplex (f.d.m.) transmission
(IEC 510-3-4:1992)

Méthodes de mesure pour les équipements radioélectriques utilisés dans les stations terriennes de télécommunication par satellites
Partie 3 Méthodes de mesure applicables aux combinaisons de sous-ensembles
Section quatre: Mesures pour la transmission de la téléphonie multivoie à multiplexage par répartition en fréquence (m.r.f.)
(CEI 510-3-4:1992)

Meßverfahren für Funkgerät in Satelliten-Erdfunkstellen
Teil 3: Meßverfahren für Kombinationen von Untersystemen
Hauptabschnitt Vier: Messungen für Frequenzmultiplex (FDM)-Übertragung
(IEC 510-3-4:1992)

This European Standard was approved by CENELEC on 1994-03-08. 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

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 510-3-4:1992 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 60510-3-4 on 8 March 1994.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1995-03-15
- latest date of withdrawal of conflicting national standards	(dow)	1995-03-15

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

ENDORSEMENT NOTICE

The text of the International Standard IEC 510-3-4:1992 was approved by CENELEC as a European Standard without any modification.

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
50(55)	1987	International Electrotechnical Vocabulary (IEV) Chapter 55: Telegraphy and telephony	-	-
510-1-4	1986	Methods of measurement for radio equipment used in satellite earth stations - Part 1: Measurements common to sub-systems and combinations of sub-systems - Section Four: Measurement in the baseband	-	-

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Méthodes de mesure pour les équipements radioélectriques utilisés dans les stations terriennes de télécommunication par satellites

Troisième partie: Méthodes de mesure applicables aux combinaisons de sous-ensembles

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Methods of measurements for radio equipment used in satellite earth stations

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Section Four – Measurements for frequency division multiplex (f.d.m.) transmission

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF MEASUREMENT FOR RADIO EQUIPMENT USED IN SATELLITE EARTH STATIONS

Part 3: Methods of measurement on combinations of sub-systems
Section four: Measurements for frequency division multiplex (f.d.m.) transmission

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.

This standard has been prepared by Sub-Committee 12E: Radio relay and fixed-satellite communications systems, of IEC Technical Committee No. 12: Radiocommunications.

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

Six Months' Rule	Report on Voting
12E(CO)120	12E(CO)128

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

The following IEC publications are quoted in this standard:

Publications Nos. 50(55) (1987): International Electrotechnical Vocabulary (IEV) - Chapter 55: Telegraphy and telephony.

510-1-4(1986): Methods of measurement for radio equipment used in satellite earth stations - Part 1: Measurements common to sub-systems and combinations of sub-systems - Section four: Measurements in the baseband.

METHODS OF MEASUREMENT FOR RADIO EQUIPMENT USED IN SATELLITE EARTH STATIONS

Part 3: Methods of measurement on combinations of sub-systems
Section four: Measurements for frequency division multiplex (f.d.m.) transmission

1 Scope

This section deals with baseband-to-baseband measurements for frequency division multiplex (f.d.m) telephony. These measurements are additional to those already given in part 1, section four of this publication: Measurements in the baseband, which are common to telephony and to television, for example group-delay and amplitude/frequency characteristics.

All of the following measurements are carried out on a system loop either by establishing a transmission path through the transmitting and receiving chain via a test loop translater or by means of an i.f. loop.

2 Noise-loading performance

2.1 *Definitions and general considerations*

The noise-loading performance of a system is the noise power measured in a chosen narrow measuring channel, which simulates an unloaded telephone channel, when the baseband is loaded with random noise of uniform spectrum (white noise) at a conventional loading level (see 2.1.1). The white noise applied to the baseband input of the system under test is limited to the frequency band occupied by the telephone channels by means of a high-pass and a low-pass filter. Noise-measuring channels are provided by means of narrow band-stop filters which allow performance to be measured at several frequencies including channels located close to the bottom, middle and top of the baseband, frequency range.

The total noise appearing within a noise-measuring channel at the system output comprises basic noise and intermodulation noise (sometimes referred to as "idle noise" and "distortion noise" respectively). It is, therefore, common practice to measure the noise within each noise-measuring channel with the baseband loaded with noise and then unloaded, in order to obtain the total noise and basic noise separately; from these results the intermodulation noise may be obtained.

The noise performance may be expressed as a noise power ratio (*n.p.r.*), a signal-to-noise ratio, in units of noise power or noise power level referred to the system zero relative level point. The units used may be picowatts, decibels above 1 pW or decibels below 1 mW, and they may be specified as a weighted or unweighted psophometric value.

Noise power ratio is defined as the ratio of the noise power in a measuring channel when the baseband is fully loaded with the white noise load, to the power in that channel either with all the baseband loaded except the measuring channel (i.e. total noise) or with all the baseband unloaded (i.e. basic noise); n.p.r. is always expressed as a positive number of decibels.

Signal-to-noise ratio is defined as the ratio of the power of the standard test tone (0 dBm0) to the noise power, in a specified bandwidth within the noise-measuring channel, both being referred to the same point in the circuit. Signal-to-noise ratio may be measured weighted or unweighted and is expressed as a positive number in decibels.

Conversion between commonly encountered noise-loading measurement units may be made by reference to appendix A.

2.1.1 *Conventional load*

The conventional loading level, which is defined by the CCITT (reference 1, see clause 6) and recommended by the CCIR (reference 2, see clause 6), is shown in table 1 for some typical channel capacities. For other channel capacities the mean power level L_c of the conventional load may be calculated from the following expressions:

$$L_c = -15 + 10 \log_{10} N \text{ dBm0} \quad \text{for } N \geq 240 \tag{2-1}$$

$$L_c = -1 + 4 \log_{10} N \text{ dBm0} \quad \text{for } 12 \leq N < 240 \tag{2-2}$$

where N is the system channel capacity.

Notes

1 These levels simulate the mean power of speech plus signalling currents, etc., transmitted over the system during the busy hour. Where a significant proportion of the baseband is used for v.f. telegraphy or data transmission, these expressions do not apply.

2 Equations 2-1 and 2-2 give a good approximation to actual signals when $N \geq 60$. For smaller channel capacities, however, tests with white noise are less realistic owing to the differing nature of actual signals and test signals.