
Methods of measurement for radio equipment used in satellite earth stations - Part 2: Measurements for sub-systems - Section 5: Frequency modulators (IEC 60510-2-5:1992)

Methods of measurement for radio equipment used in satellite earth stations -- Part 2: Measurements for sub-systems -- Section 5: Frequency modulators

Meßverfahren für Funkgerät in Satelliten-Erdfunkstellen -- Teil 2: Messungen an Untersystemen -- Hauptabschnitt 5: Frequenzmodulatoren

Méthodes de mesure pour les équipements radioélectriques utilisés dans les stations terriennes de télécommunication par satellites -- Partie 2: Mesures sur les sous-ensembles -- Section 5: Modulateurs de fréquence

Ta slovenski standard je istoveten z: EN 60510-2-5:1994

ICS:

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

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EUROPEAN STANDARD

EN 60510-2-5

NORME EUROPEENNE

EUROPÄISCHE NORM

June 1994

UDC 621.389.6:629.783:621.317.08

Descriptors: Radiocommunications, telecommunications, satellite broadcasting, radio equipment, earth stations, characteristics, measurements, frequency modulation, modulators

ENGLISH VERSION

Methods of measurement for radio equipment used in satellite earth stations
Part 2: Measurements for sub-systems
Section five: Frequency modulators
(IEC 510-2-5:1992)

Méthodes de mesure pour les équipements radioélectriques utilisés dans les stations terriennes de télécommunication par satellites
Partie 2: Mesures sur les sous-ensembles
Section cinq: Modulateurs de fréquence
(CEI 510-2-5:1992)

Meßverfahren für Funkgerät in Satelliten-Erdfunkstellen
Teil 2: Messungen an Untersystemen
Hauptabschnitt Fünf: Frequenzmodulatoren
(IEC 510-2-5:1992)

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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 510-2-5:1992 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 60510-2-5 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. In this standard, annex ZA is normative.

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The text of the International Standard IEC 510-2-5:1992 was approved by CENELEC as a European Standard without any modification.

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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
510-1-3	1980	Methods of measurement for radio	-	-
A1	1988	equipment used in satellite earth stations - Part 1: Measurements common to sub-systems and combinations of sub-systems - Section three: Measurements in the 1 f. range	-	-
510-1-4	1986	Section four: Measurement in the baseband	-	-
510-2-6	1992	Part 2: Measurements for sub-systems Section six: Frequency demodulators	EN 60510-2-6	1994
510-3-4	1994	Part 3: Methods of measurement on combinations of sub-systems Section four: Measurements for frequency division multiplex (f.d.m.) transmission	EN 60510-3-4	1994

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**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

60510-2-5

Première édition
First edition
1992-05

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

Deuxième partie:

Mesures sur les sous-ensembles

Section cinq – Modulateurs de fréquence

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SIST EN 60510-2-5:2002

**Methods of measurements for radio equipment
used in satellite earth stations**

Part 2:

Measurements for sub-systems

Section Five – Frequency modulators

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International Electrotechnical Commission
Telefax: +41 22 919 0300

e-mail: inmail@iec.ch

3, rue de Varembé Geneva, Switzerland
IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**METHODS OF MEASUREMENT FOR RADIO EQUIPMENT
USED IN SATELLITE EARTH STATIONS**

**Part 2: Measurements for sub-systems
Section five: Frequency modulators**

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.

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

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

Six Months' Rule	Report on Voting
12E(CO)119	12E(CO)130

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. 510-1-3 (1980): Methods of measurement for radio equipment used in satellite earth stations - Part 1: Measurements common to sub-systems and combinations of sub-systems - Section three: Measurements in the i.f. range. Amendment 1 (1988).
- 510-1-4 (1986): Section four: Measurements in the baseband.
- 510-2-6 (1992): Part 2: Measurements for sub-systems - Section six: Frequency demodulators.
- 510-3: Part 3: Methods of measurement for combinations of sub-systems.
- 510-3-4 (1992): Section four: Measurements for frequency division multiplex (f.d.m.) transmission.

METHODS OF MEASUREMENT FOR RADIO EQUIPMENT USED IN SATELLITE EARTH STATIONS

Part 2: Measurements for sub-systems Section five: Frequency modulators

1 Scope

Methods are given in this section for the measurement of the electrical characteristics of frequency modulators. Furthermore, where possible, only measurements involving the basic modulator are considered, that is excluding the baseband section comprising the pre-emphasis network and the networks associated with sound sub-carrier signals, pilot signals and auxiliary signals.

Methods of measurement for frequency demodulators are given in section six of part 2 of this publication. Measurements between baseband terminals of modulator/demodulator assemblies are covered by various sections of part 3 of this publication.

2 Definition

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For the purpose of this standard, a frequency modulator is a sub-system which, by analogue means, modulates an intermediate frequency (i.f.) carrier by a baseband signal: this may be a multi-channel f.d.m. telephony signal or television signal with associated sound sub-carrier signals, pilot signals and auxiliary signals.

Such baseband signals are normally analogue but digital signals are not excluded. However the methods of measurement described in this section are intended for assessing the performance of the modulator when analogue signals are transmitted.

A modulator sub-system usually comprises the following three main sections:

- a baseband section;
- a baseband to i.f. section (modulator);
- an i.f. section.

3 General

A block diagram for a typical modulator sub-system is shown in figure 1. The characteristics to be measured can be divided into three principal categories:

- non-transfer characteristics;
- baseband to i.f. characteristics;
- certain baseband-to-baseband transmission characteristics in conjunction with a measurement demodulator.

The first category concerns measurements at the baseband port only or at the i.f. port only including frequency and spurious/harmonic signal measurements at the i.f. output. These measurements are described elsewhere in this publication.

The second category of measurements forms an essential part of this section because of the nature of the device under test - transfer from baseband to i.f.

The third category of measurements includes those to be carried out on a complete modulator/demodulator (modem) assembly except that the actual or system demodulator is replaced by a measurement demodulator.

It is very important to know the separate contribution of a modulator to the total permitted tolerances of performance characteristics because in an operational situation, modulators of one design or manufacturer may have to work with demodulators of another design or manufacturer. Compensation effects between modulator and demodulator are therefore undesirable and each modulator should fulfill the prescribed specification in association with a measurement demodulator. This procedure requires the measurement demodulator to have a better performance than that specified for the modulator under test.

4 I.F. output characteristics

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4.1 *Return loss*

See part 1, section three of this publication: Measurements in the i.f. range.

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The measurement shall be made without the modulator output signal being present. This can be achieved, for example, by disabling the oscillator within the modulator.

4.2 *Level*

See part 1, section three of this publication: Measurements in the i.f. range.

4.3 *Carrier frequency*

See part 1, section three of this publication: Measurements in the i.f. range (Amendment 1).

4.4 *I.F. spurious and/or harmonic signals*

4.4.1 *Method of measurement*

The i.f. output of the modulator shall be checked by means of a suitable spectrum analyzer or selective level-meter to verify that the level of any i.f. spurious and/or harmonic signals is within specified limits. It shall be noted that the measurement of i.f. spurious and harmonic signals shall be made without modulation and with the energy-dispersal generator disabled.