SLOVENSKI STANDARD
SIST EN 60835-2-8:2002/A1:2002

01-oktober-2002

Methods of measurement for equipment used in digital microwave radio transmission systems - Part 2: Measurements on terrestrial radio-relay systems - Section 8: Adaptive equalizer - Amendment 1 (IEC 60835-2-8:1993/A1:1996)

Methods of measurement for equipment used in digital microwave radio transmission systems -- Part 2: Measurements on terrestrial radio-relay systems -- Section 8: Adaptive equalizer

Meßverfahren für Geräte in digitalen Mikrowellen-Funkübertragungssystemen -- Teil 2: Messungen an terrestrischen Richtfunksystemen -- Hauptabschnitt 8: Adaptative Entzerrer

Méthodes de mesure applicables au matériel utilisé pour les systèmes de transmission numérique en hyperfréquence -- Partie 2: Mesures applicables aux faisceaux hertziens terrestres -- Section 8: Egaliseur auto-adaptatif

Ta slovenski standard je istoveten z: EN 60835-2-8:1993/A1:1996

ICS:

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

SIST EN 60835-2-8:2002/A1:2002 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

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Descriptors: Radiocommunications, telecommunications, communication equipment, earth stations, radio-relay systems, microwave frequencies, measurements, characteristics

English version

Methods of measurement for equipment used in digital microwave radio transmission systems
Part 2: Measurements on terrestrial radio-relay systems
Section 8: Adaptive equalizer
(IEC 835-2-8:1993/A1:1996)

Méthodes de mesure applicables au matériel utilisé pour les systèmes de transmission numérique en hyperfréquence
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Teil 2: Messungen an terrestrischen Richtfunksystemen
Hauptabschnitt 8: Adaptative Entzerrer
(IEC 835-2-8:1993/A1:1996)

This amendment A1 modifies the European Standard EN 60835-2-8:1993; it was approved by CENELEC on 1996-03-05. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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.

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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

Ref. No. EN 60835-2-8:1993/A1:1996 E

Foreword

The text of document 12E/255/FDIS, future amendment 1 to IEC 835-2-8:1993, 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 amendment A1 to EN 60835-2-8:1993 on 1996-03-05.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1996-12-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1996-12-01

Endorsement notice

The text of amendment 1:1996 to the International Standard IEC 835-2-8:1993 was approved by CENELEC as an amendment to the European Standard without any modification.

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
60835-2-8

1993

AMENDEMENT 1
AMENDMENT 1

1996-01

Amendement 1

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

Partie 2:
Mesures applicables aux faisceaux hertziens terrestres
Section 8: Egaliseur auto-adaptatif

Amendment 1

Methods of measurement for equipment used in digital microwave radio transmission systems

Part 2:
Measurements on terrestrial radio-relay systems
Section 8: Adaptive equalizer

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IEC

Commission Electrotechnique Internationale
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FOREWORD

This amendment has been prepared by sub-committee 12E: Radio relay and satellite communication systems, of IEC technical committee 12: Radiocommunications.

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

FDIS	Report on voting
12E/255/FDIS	12E/264/RVD

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

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CONTENTS

Replace the existing title of clause 5 by the following:

Page 5

Add the titles of the following new figures:

Page 23

Replace the title and text of clause 5 by the following new title and text:

5 Measurement of dynamic fading effects

5.1 *Definition and general consideration*

The radio channel, being subject to multipath propagation, is not time-invariant. Therefore it is important to evaluate the ability of the system to cope with fast events (movements of notches) in the channel by simulating rapid changes of propagation conditions.

The general approach in testing system sensitivity to dynamic selective fading is firstly to sweep the notch offset frequency while slowly increasing the notch depth, and secondly to sweep the relative echo amplitude while slowly decreasing the magnitude of the notch offset frequency (see figure 10).

5.2 *Method of measurement*

The basic arrangement for this measurement is derived from that in the measurement of the signature as shown in figure 3.

5.2.1 *Sweep of the notch offset frequency*

This method allows the behaviour of the system to be tested as the notch crosses the radio channel.

The notch offset frequency is swept with a triangular waveform in order to maintain a constant speed over the band under consideration (see figure 11a). The sweep width is chosen to be large enough (e.g. twice the symbol rate) to include the outage signature (measured as in 3.2), and to avoid the possible measurement errors due to the discontinuities at the edges of the sweep range.

The measurement is carried out by slowly increasing the notch depth B from a small value until the BER averaged over several sweep periods reaches the outage value and the corresponding notch depth is noted. The measurement should be carried out at several sweep speeds and for both minimum-phase (MP) and non-minimum-phase (NMP) situations.

5.2.2 *Sweep of the relative echo amplitude*

This method allows the behaviour of the system to be tested as the MP/NMP boundary is crossed.

The relative echo amplitude (b) is swept with a triangular waveform. The sweep width is chosen to be large enough to include the signature and over both MP and NMP situations (e.g. b = 0,5 to 2), and to avoid possible measurement errors due to the discontinuities at the edges of the sweep range. In order to achieve the same notch speed variation for the MP and NMP partial sweeps, it is necessary to vary 1/b (rather than b) linearly with time during the NMP half-cycle (see figure 12a).

The measurement is carried out by slowly reducing the magnitude of the notch offset frequency from a large value until the BER averaged over several sweep periods reaches the outage value and the corresponding notch offset frequency is noted. The measurement should be carried out at several sweep speeds and for both positive and negative notch offset frequencies.

NOTE – The nature of the sweep may be quantized and a controller external to the fading simulator may be necessary in order to program the triangular sweep waveform of the relative echo amplitude.

5.3 *Presentation of results*

5.3.1 *Sweep of the notch offset frequency*

The results are presented graphically in a coordinate system showing the notch depth which gives rise to a BER (detected and averaged over several sweep periods) exceeding the outage criterion. Figure 11b shows an example of this presentation. ΔB is the notch depth degradation at the specified speed V_x with respect to the notch depth corresponding to the minimum sweep speed (V_{min}) applicable during the test. Since the BER is averaged over several sweep periods, V_{min} will depend on the maximum integration period chosen for the BER evaluation.

5.3.2 *Sweep of the relative echo amplitude*

The results are presented graphically in a coordinate system showing the notch offset frequency (f_n) which gives rise to a BER (detected and averaged over several sweep periods) exceeding the outage criterion. Figure 12b shows an example of this presentation. Δf is the notch offset frequency degradation at the specified speed V_x with respect to the notch offset frequency corresponding to the minimum sweep speed (V_{min}) applicable during the test.

Since the BER is averaged over several sweep periods, V_{min} will depend on the maximum integration period chosen for the BER evaluation.

5.4 *Details to be specified*

The following shall be included, as required, in the detailed equipment specification:

a) Main system data, e.g. bit-rate, modulation format.
b) Outage signature mask.
c) Ports between which the two-path simulator is to be inserted.
d) BERL (Bit Error Ratio Limit), sync loss or AIS respectively.
e) Two-path delay difference.
f) Type of equalizer used in the system.
g) Test signal from the pattern generator.

Specifically for the sweep of the notch offset frequency:

h) Notch depth at a specified speed for which the outage criterion is exceeded.

i) Sweep width (including the outage signature), e.g. ± X MHz.

j) Maximum speed, e.g. Y MHz/s.

k) Statement of the type of simulation (MP or NMP).

Specifically for the sweep of the relative echo amplitude:

l) Notch offset frequency at a specified speed for which the outage criterion is exceeded.

m) Sweep width (including the outage signature) defined by MIN(b).

n) Maximum speed, e.g. Z 1/s.

o) Statement of the type of simulation (positive or negative notch offset frequency).

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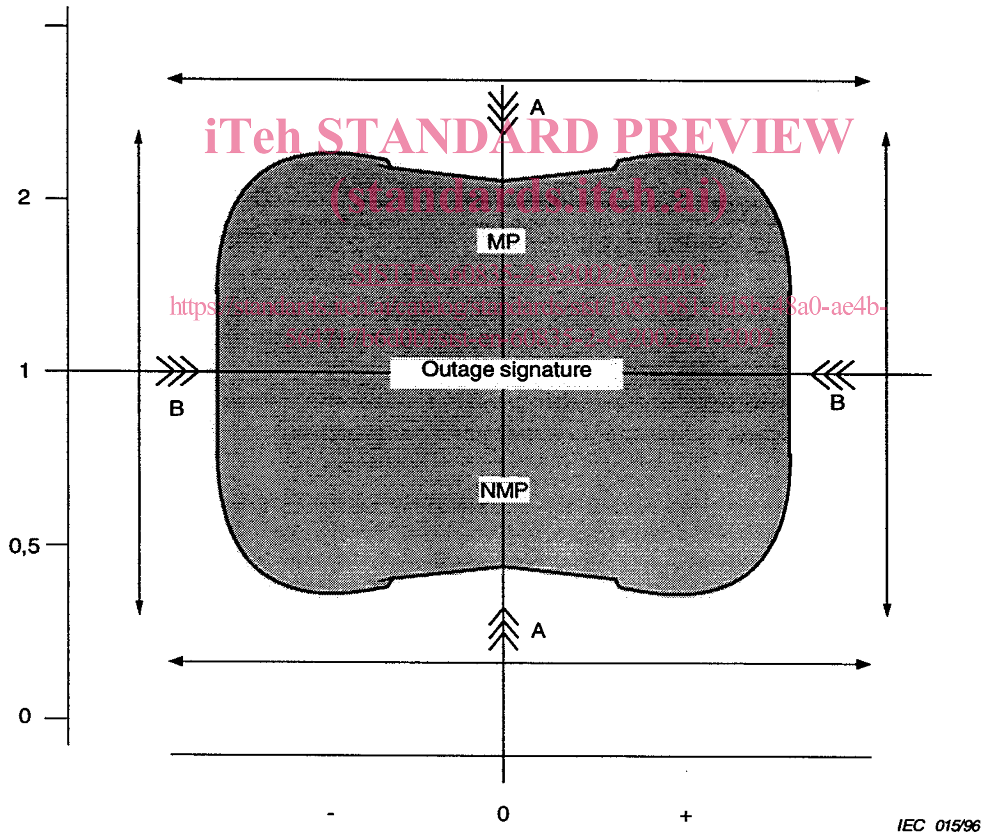
Add the following new figures:



A = Sweep of the notch offset frequency (f_n)
B = Sweep of the relative echo amplitude (b)

Figure 10 – Schematic for the measurement of dynamic fading effect