SLOVENSKI STANDARD
SIST EN 50083-7:1999/A1:2001

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Cabled distribution systems for television and sound signals - Part 7: System performance - Amendment A1

Cable networks for television signals, sound signals and interactive services -- Part 7: System performance

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste -- Teil 7: Systemanforderungen

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs -- Partie 7: Caractéristiques des systèmes

Ta slovenski standard je istoveten z: **EN 50083-7:1996/A1:2000**

ICS:

33.060.40 Kabelski razdelilni sistemi Cabled distribution systems

SIST EN 50083-7:1999/A1:2001 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50083-7/A1

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ICS 33.060.40

English version

Cable networks for television signals, sound signals and interactive services Part 7: System performance

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs
Partie 7: Caractéristiques des systèmes

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste
Teil 7: Systemanforderungen

This amendment A1 modifies the European Standard EN 50083-7:1996; it was approved by CENELEC on 1999-10-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, 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

Ref. No. EN 50083-7:1996/A1:2000 E

Foreword

This amendment was prepared by the Technical Committee CENELEC TC 209, Cable networks for television signals, sound signals and interactive services.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A1 to EN 50083-7:1996 on 1999-10-01.

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)	2001-02-01
– latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	2002-10-01

Contents

Add new subclauses 1.1 and 1.2:

Replace clause 3 by:

Replace subclause 3.2 by:

Add new subclause 3.3:

Add new subclauses 4.10 and 4.11:

Add new annexes H, J and K:

1 Scope

Replace the present scope by the following new one:

1 Scope

1.1 General

Standards of EN 50083 series deal with cable networks for television signals, sound signals and interactive services including equipment, systems and installations

- for headend reception, processing and distribution of television and sound signals and their associated data signals and
- for processing, interfacing and transmitting all kinds of signals for interactive services

using all applicable transmission media.

All kinds of networks like

- CATV-networks,
- MATV-networks and SMATV-networks,
- Individual receiving networks

and all kinds of equipment, systems and installations installed in such networks, are within this scope.

The extent of this standardization work is from the antennas, special signal source inputs to the headend or other interface points to the network up to the system outlet or the terminal input, where no system outlet exists.

The standardization of any user terminals (i.e. tuners, receivers, decoders, multimedia terminals etc.) as well as of any coaxial and optical cables and accessories therefor is excluded.

1.2 Specific scope of this part 7

This standard is applicable to any cable network having a coaxial cable output and primarily intended for television and sound signals operating between about 30 MHz and 2150 MHz.

This standard lays down the basic methods of measurement of the operational characteristics of cable networks having coaxial cable outputs in order to assess the performance of those networks and their performance limits.

All requirements refer to the performance limits which shall be obtained between the input(s) to the headend or headends and any system outlet when terminated in a resistance equal to the nominal load impedance of the system, unless otherwise specified. Where system outlets are not used, the above applies at the susbcriber's end of the susbcriber's feeder.

NOTE 1: Methods of measurement described in this standard are considered as basic. However, any equivalent method that ensures at least the same accuracy may be used.

NOTE 2: If the system operator wishes to subdivide the system into a number of parts, the accumulation of degradations should not exceed the figures given below.

NOTE 3: An extension of the frequency range to that from 5 MHz to 3000 MHz will be considered for future work.

NOTE 4: System performance requirements of return paths as well as special methods of measurement for the use of the return paths in cable networks are described in EN 50083-10.

2 Normative references

Replace the list of normative references by the following new one:

EN 50083		Cable networks for television signals, sound signals and interactive services
EN 50083-2 + A1	1995 1997	Part 2: Electromagnetic compatibility for equipment
EN 50083-3	1998	Part 3: Active wideband equipment for coaxial cable networks
EN 50083-4	1998	Part 4: Passive wideband equipment for coaxial cable networks
EN 50083-5	2000*)	Part 5: Headend equipment
EN 50083-6	1997	Part 6: Optical equipment
EN 50083-10	1999	Part 10: System performance for return paths

*) To be published

EN 60068/ HD 323 series		Environmental testing / Basic environmental testing procedures
EN 300 421 V1.1.2	1997	Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for 11/12 GHz satellite services
EN 300 429 V1.2.1	1998	Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems
EN 300 473 V1.1.2	1997	Digital Video Broadcasting (DVB); Satellite Master Antenna Television (SMATV) distribution systems
EN 300 744 V1.2.1	1999	Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television
ETS 300 158 ed. 1	1992	Satellite Earth Stations (SES); Television Receive Only (TVRO) Satellite Earth Stations operating in the 11/12 GHz FSS bands
ETS 300 249 ed. 1	1993	Satellite Earth Stations (SES); Television Receive Only (TVRO) Satellite Earth Stations operating in the 12 GHz BSS band
ETS 300 457 ed. 1	1995	Satellite earth stations and systems (SES); Test methods for Television Receive Only (TVRO) operating in the 11/12 GHz frequency bands
IEC 60050(60)	1970	International Electrotechnical Vocabulary Chapter 60: Radiocommunications
CISPR 16-1	1993	Specification for radio disturbance and immunity measuring apparatus and methods — Part 1: Radio disturbance and immunity measuring apparatus

3 Terms, definitions and abbreviations

Replace the title by:

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definition

Replace the normative reference IEC 50(60) *in the first sentence by* IEC 60050(60).

3.1.47 frequency designations

Replace the normative reference IEC 50(60) *by* IEC 60050(60).

3.1.51 Definitions for satellite broadcasting

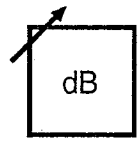
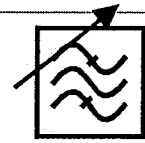
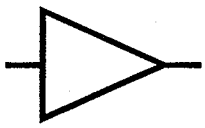
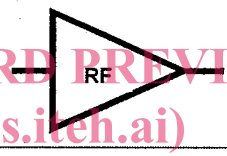
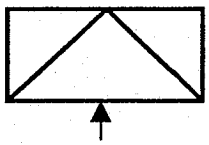
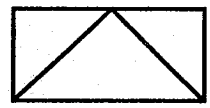
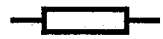
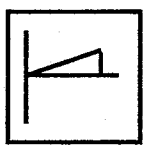
Replace the text by:

See ETS 300 158, ETS 300 249 and ETS 300 457 respectively, under consideration.

Renumber subclause 3.2 as 3.3.

Add new subclause 3.2:

3.2 Symbols

Symbols	Terms	Symbols	Terms
	attenuator		variable attenuator
	sine-wave generator		low-pass filter
	band-pass filter		variable band-pass filter
	amplifier		RF amplifier
	oscilloscope		mixer
	modulator		demodulator
	RF-choke		resistor
	detector		

3.3 Abbreviations

Insert the following new abbreviations:

BW	Bandwidth
COFDM	Coded Orthogonal Frequency Division Multiplex
DVB	Digital Video Broadcasting
DVB-C	Digital Video Broadcasting - Cable
DVB-S	Digital Video Broadcasting - Satellite
DVB-T	Digital Video Broadcasting - Terrestrial
ITS	Insertion Test Signal

QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RSBW	Resolution Bandwidth
SHF	Super High Frequency
S/N	Signal-to-Noise (ratio)

NOTE: Only the abbreviations used in the English version of this part of EN 50083 are mentioned in this subclause. The German and the French versions of this part may use other abbreviations. Refer to 3.3 of each language versions for details.

4 Methods of measurement

Add new subclause 4.10:

4.10 Signal level for digitally modulated signals

4.10.1 Introduction

This measuring method applies to the measurement of the level of digitally modulated signals using QPSK (EN 300 421), QAM (EN 300 429, EN 300 473), and COFDM (EN 300 744) formats.

Because the modulated signal is similar in characteristics to white noise, the measurement is based on the use of a suitable spectrum analyser, able to tune the frequency range of the channel and to display the whole bandwidth, to measure spectral power density. The result may be expressed as dB(mW/Hz). The signal level in dB(mW) or in dB(µV) can be calculated if the bandwidth is known.

The measurement can be performed at the system outlet, at the output of distribution equipment (passive or active), at the output of the headend or at the output of an outdoor unit (SHF receiver) for satellite reception.

4.10.2 Equipment required

The equipment required is a spectrum analyser having a known noise bandwidth and a calibrated display of the tuned signal. The calibration accuracy should be preferably within ± 0,5 dB and shall be stated with the results.

The equipment shall be able to tune over the nominal frequency range of the system.

4.10.3 Connection of the equipment

Connect the measuring equipment to the system outlet or to the point where the measurement must be performed, using a suitable cable and connectors, taking care to maintain correct impedance matching.

4.10.4 Measurement procedure

a) When signal levels are to be measured where a high ambient field is present, the measuring equipment shall be checked for spurious readings. Connect a shielded termination to its input cable, place both the meter and the lead approximately in their measuring positions and check that there is a negligible reading at the frequency(ies) and on the meter ranges to be used.

b) Tune the channel that must be measured (selecting the centre frequency of the spectrum analyser) and select the span and level settings to show the whole channel whose bandwidth depends on the type of modulation used (see annex J).

c) Set the resolution bandwidth (*RSBW*) of the spectrum analyser to 100 kHz and set the video bandwidth low enough to obtain a smooth display (100 Hz if available).

d) Measure the level (*S*) of the flat top of the displayed signal in dB(µV) or in dB(mW), using the display line cursor if this feature is available.

NOTE: If the spectrum of the signal does not have a flat top, due to echoes, measure the signal level at the centre frequency of the channel.

e) Measure on the displayed channel the two frequencies at which the level is 3 dB lower than the maximum level (*S*); the difference between these two frequencies is assumed to be the equivalent signal bandwidth (BW), expressed in Hz.

f) Calculate the level (*LS*) of the signal using the following formula:

$$LS = S + 10\log_{10}\left[\frac{BW}{RSBW}\right] + K$$

The correction factor (*K*) depends on the measuring equipment used and must be provided by the manufacturer of the measuring equipment or obtained by calibration. The value of the correction factor for a typical spectrum analyser is about 1,7 dB.

The correction factor is not necessary if the measuring equipment can be set to display the level in dB(mW/Hz) units. In this case the level (*LS*) of the signal can be obtained from the measured maximum level (*S*) using the following formula:

$$LS = S + 10\log_{10}(BW)$$

In this formula the bandwidth BW has to be expressed in Hz.

NOTE: This measuring method actually measures the *S+N* level. The contribution of noise is considered negligible if the level of noise displayed outside the channel band is at least 15 dB lower than the maximum level displayed within the channel band. This noise level includes that of the measuring equipment (spectrum analyser) which should be at least 10 dB lower than the noise level displayed outside the channel band in order not to affect the results. Otherwise the contribution of noise (due to the system or the equipment under test and to the measuring equipment) must be taken into account in the measurement of signal level (*S*) (see annex H).

4.10.5 Presentation of the results

The measured level is expressed in dB(µV) referred to 75 Ω or in dB(mW/Hz). The accuracy of the measuring equipment shall be stated with the results.

4.11 Signal to noise ratio (*S/N*) for digitally modulated signals

4.11.1 Introduction

This measuring method applies to the measurement of the signal to noise ratio (*S/N*) of digitally modulated signals using QPSK, QAM, COFDM formats.

Because the modulated signal is similar in characteristics to white noise, the measurement is based on the use of a suitable spectrum analyser, able to tune the frequency range of the channel and to display the whole bandwidth, to measure spectral power densities of both the signal and the noise.

The measurement can be performed at the system outlet, at the output of distribution equipment (passive or active), at the output of the headend or at the output of an outdoor unit (SHF receiver) for satellite reception.

4.11.2 Equipment required

The equipment required is a spectrum analyser having a calibrated display of the tuned signal. The equipment shall be able to tune over the frequency range of the system under test.

4.11.3 Connection of the equipment

Connect the measuring equipment to the system outlet or to the point where the measurement must be performed, using a suitable cable and connectors, taking care to maintain correct impedance matching.

4.11.4 Measurement procedure

a) Tune the channel that must be measured (selecting the centre frequency of the spectrum analyser) and select the span and level settings to show the whole channel whose bandwidth depends on the type of modulation used. In table J.1 of annex J are indicated examples of the equivalent signal bandwidth (*BW*) of digitally modulated signals.

b) Set the resolution bandwidth (*RSBW*) of the spectrum analyser to 100 kHz and set the video bandwidth low enough to obtain a smooth display (100 Hz if available). If a different setting is used, this must be the same when measuring the signal level and the noise level.

c) Measure the level (*S*) of the flat top of the displayed signal in dB(µV) or in dB(mW), using the display line cursor if this feature is available.

NOTE: If the spectrum of the signal does not have a flat top, due to echoes, measure the signal level at the centre frequency of the channel.

d) Switch-off the channel at the input of the system or of the device under test, terminating the input port with a matched impedance (or depointing the antenna, if the measurement is performed at the output of an outdoor unit for satellite reception) and measure the noise level (*N*) in the same units as the signal level (in dB(µV) or in dB(mW)).

e) Calculate the signal to noise ratio (*S/N*) by the following formula:

$$(S/N)_{dB} = S[\text{dB}(\mu\text{V})] - N[\text{dB}(\mu\text{V})]$$

or

$$(S/N)_{dB} = S[\text{dB(mW]} - N[\text{dB(mW)}].$$

NOTE: This measuring method actually measures the *(S+N)/N* ratio. The measuring equipment (spectrum analyser) should have a noise level at least 10 dB lower than the noise level displayed outside the channel band in order not to affect the results. Otherwise the contribution of the measuring equipment noise in the measurement of the noise level (*N*) must be taken into account (see H.2).

4.11.5 Presentation of the results

The measured signal to noise ratio (*S/N*) is expressed in dB.