SLOVENSKI STANDARD
SIST EN 55016-4-2:2011/A1:2014

01-oktober-2014

Specifikacija za merilne naprave in metode za merjenje radijskih motenj in odpornosti - 4-2. del: Modeliranje negotovosti, statistike in mejnih vrednosti - Negotovost merilnih instrumentov - Dopolnilo A1

Specification for radio disturbance and immunity measuring apparatus and methods -- Part 4-2: Uncertainties, statistics and limit modelling - Measurement instrumentation uncertainty

Anforderungen an Geräte und Einrichtungen sowie Festlegung der Verfahren zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit - Teil 4-2: Unsicherheiten, Statistik und Modelle zur Ableitung von Grenzwerten (Störmodell) - Messgeräte-Unsicherheit

Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques -- Partie 4-2: Incertitudes, statistiques et modélisation des limites - Incertitudes de mesure de l'instrumentation

Ta slovenski standard je istoveten z: **EN 55016-4-2:2011/A1:2014**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

SIST EN 55016-4-2:2011/A1:2014 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 55016-4-2:2011/A1

July 2014

ICS 33.100.10; 33.100.20

English Version

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This amendment A1 modifies the European Standard EN 55016-4-2:2011; it was approved by CENELEC on 2014-03-21. 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.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document CISPR/A/1049/FDIS, future CISPR 16-4-2:2011/A1, prepared by CISPR SC A "Radio-interference measurements and statistical methods" of CISPR "International special committee on radio interference" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 55016-4-2:2011/A1:2014.

The following dates are fixed:

– latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-11-01
– latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-03-21

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard CISPR 16-4-2:2011/A1:2014 was approved by CENELEC as a European Standard without any modification.

CISPR 16-4-2

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AMENDMENT 1
AMENDEMENT 1

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FOREWORD

This amendment has been prepared by subcommittee A of CISPR: Radio-interference measurements and statistical methods.

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

FDIS	Report on voting
CISPR/A/1049/FDIS	CISPR/A/1058/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.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

3.3 Abbreviations

Add the following new abbreviation to the existing list:

CDNE coupling decoupling network for emission measurement

Table 1 – Values of U_{cispr}

Add, before the existing NOTE 1, the following new line:

Conducted disturbance at mains port using CDNE	(30 MHz to 300 MHz)	3,8 dB	B.7

Add, after the existing 5.5.3, the following new subclause:

5.6 Conducted disturbance measurements using a CDNE (see also B.7)

5.6.1 Measurand for measurements using a CDNE

V Asymmetric (common-mode) disturbance voltage, in dB(μV), measured on the connection lead of the EUT through a CDNE referred to reference ground

5.6.2 Symbols of input quantities specific to CDNE measurements

F_{CDNE} Voltage division factor (VDF) of the CDNE, in dB

δF_{CDNE} Correction for VDF frequency interpolation error, in dB

δZ_{CDNE} Correction for the imperfect common mode impedance of the CDNE, in dB

δD_{amb} Correction for the effect of ambient disturbances, in dB

$\delta V_{grounding}$ Correction for the effect of imperfect grounding, in dB

δV_{env} Correction for the effect of the environment, in dB

5.6.3 Input quantities to be considered for conducted disturbance measurements at a mains port using a CDNE

– Receiver reading
– Cable attenuation between CDNE and receiver
– CDNE VDF
– CDNE VDF frequency interpolation
– CDNE impedance
– Receiver related input quantities
  • Receiver sine wave voltage accuracy
  • Receiver pulse amplitude response
  • Receiver pulse repetition rate response
  • Receiver noise floor proximity
– Mismatch effects between CDNE receiver port and receiver
– Effect of ambient disturbances
– Effect of the grounding
– Effect of the environment

A.1 General

Add, after the last paragraph of this subclause, the following new paragraph:

In the uncertainty budgets a normal distribution function is used, unless otherwise identified in the tables.

A.2 Rationale for the estimates of input quantities common to all disturbance measurements ("A" comments)

Replace the existing text of the item A2) by the following new text, keeping the original NOTES 1, 2 and 3:

An estimate of the attenuation a_c of the connection between the receiver and the AMN, AAN, CDNE, CP, CVP, VP, absorbing clamp or antenna is assumed to be available from a calibration report, along with an expanded uncertainty and a coverage factor.

Add, after the existing B.6, the following new subclauses:

B.7 Uncertainty budget for conducted disturbance measurements at a mains port using a CDNE

The measurand V is calculated using:

$$V = V_r + a_c + F_{CDNE} + \delta Z_{CDNE} + \delta V_{sw} + \delta V_{pa} + \delta V_{pr} + \delta V_{nf} + \delta F_{CDNE} + \delta M + \delta D_{amb} + \delta V_{grounding} + \delta V_{env} \quad \text{(B.6)}$$

Table B.7 – Uncertainty budget for conducted disturbance measurements from 30 MHz to 300 MHz

Input quantity[a]	X_i	Uncertainty of x_i		c_i u(x_i)[b]
		dB	Probability distribution function	dB
Receiver reading[A1)]	V_r	± 0,1	k = 1	0,10
Attenuation: CDNE-receiver[A2)]	a_c	± 0,1	k = 2	0,05
CDNE VDF[B20)]	F_{CDNE}	± 0,4	k = 2	0,20
CDNE impedance tolerances [B21)]	δZ_{CDNE}	+2,69/–2,25	Triangular	1,01
Receiver corrections:				
Sine wave voltage[A3)]	δV_{sw}	± 1,0	k = 2	0,50
Pulse amplitude response[A4)]	δV_{pa}	± 1,5	Rectangular	0,87
Pulse repetition rate response[A4)]	δV_{pr}	± 1,5	Rectangular	0,87
Noise floor proximity[A5)]	δV_{nf}	± 0,0	Rectangular	0,00
CDNE VDF frequency interpolation[A6)]	δF_{CDNE}	± 0,1	Rectangular	0,06
Mismatch: CDNE-receiver[A7)]	δM	+0,19/–0,20	U-shaped	0,14
Effect of ambient disturbances[B22)]	δD_{amb}	± 0,0	–	0,00
Grounding related factors[B23)]	$\delta V_{grounding}$	± 1,5	Triangular	0,61
Effect of the environment [B24)]	δV_{env}	± 1,5	Triangular	0,61
[a] Superscripts (e.g. [A1)]) correspond to comments in A.2 and B.8.				
[b] All c_i = 1 (see A.1).				

NOTE The influence of differential-mode emission from the EUT is negligible under the conditions specified in CISPR 16-1-2 and/or CISPR 16-2-1.

Hence, expanded uncertainty $U(V) = 2u_c(V)$ = 3,79 dB

B.8 Rationale for the estimates of input quantities specific to the measurement method using a CDNE

B20) The uncertainty associated with the calibration of the CDNE voltage division factor. This quantity includes the uncertainty of the internal attenuator of the CDNE.

B21) CISPR 16-1-2 defines the common-mode impedance of the CDNE as 150 Ω with a magnitude tolerance of +10 Ω/-20 Ω and a phase tolerance of 0° ± 25°. Taking the extremes of all combinations of the constrained CDNE common-mode impedance and the unconstrained EUT impedance, the estimate of the correction δZ_{CDNE} is zero with a deviation of +2,69/-2,25 dB. A triangular probability distribution is assumed, because there is only a small chance of encountering the particular combinations of CDNE impedance and EUT impedance needed to produce those extremes.

The estimation of the uncertainty is caused by the tolerance of the common-mode (CM) impedance. The tolerances of the differential-mode impedance and phase of the CDNE-M2 and CDNE-M3 are not taken into account.

B22) This factor includes the uncertainty from all radiated and conducted disturbances from the ambient and can be neglected. This can be guaranteed only if the measurement takes place in a shielded room. Therefore the estimate of the correction δD_{amb} is zero with an uncertainty of zero. If conducted disturbances are not negligible, and their effect on the receiver reading has not been reduced adequately by appropriate

suppression measures, a non-zero estimate of the correction and its uncertainty should be included.

B23) The uncertainty associated with imperfect grounding related factors is generalized with $\delta V_{\text{grounding}}$. The influence is due mainly to the variation of the capacitive coupling between the EUT and the reference ground. The influence of imperfect grounding related factors has been estimated as a correction $\delta V_{\text{grounding}}$ of zero and a deviation of 1,5 dB. A triangular probability distribution is assumed, because there is only a small chance of reaching maximum deviation.

NOTE 1 The conductive floor of a shielded room is an adequate way of implementing the reference ground plane.

NOTE 2 Grounding related factors include the effect of the variability of position of EUT, CDNE and cables:

- electrical properties of non-conducting blocks;
- variation of dimension of the reference ground plane;
- different ways of earthing the reference ground plane;
- electrical bonding of the CDNE with the reference ground plane;
- tolerance of height of EUT above reference ground plane.

B24) The uncertainty given in Table B.7 can be applied if the distance between the EUT and any conductive obstacle is greater than 0,8 m. If the distance is reduced to 0,4 m, an uncertainty of 0,2 dB should be applied, as explained in CISPR 16-2-1. The influence is due mainly to the capacitive coupling between the EUT and the conductive obstacles or wall in question.

NOTE 3 A reference source can generally be used to determine the magnitude of this input quantity for a single port EUT.