SLOVENSKI STANDARD
SIST EN IEC 55016-1-4:2019/A1:2020

01-november-2020

Specifikacija merilnih naprav in metod za merjenje radiofrekvenčnih motenj in odpornosti - 1-4. del: Merilne naprave za merjenje radiofrekvenčnih motenj in odpornosti - Antene in preskuševališča za meritve sevanih motenj - Dopolnilo A1

Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements

Anforderungen an Geräte und Einrichtungen sowie Festlegung der Verfahren zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit – Teil 1-4: Geräte und Einrichtungen zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit – Antennen und Messplätze für Messungen der gestrahlten Störaussendung

Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques - Partie 1-4: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques - Antennes et emplacements d'essai pour les mesures des perturbations rayonnées

Ta slovenski standard je istoveten z: **EN IEC 55016-1-4:2019/A1:2020**

ICS:

17.240	Merjenje sevanja	Radiation measurements
33.100.20	Imunost	Immunity

SIST EN IEC 55016-1-4:2019/A1:2020 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 55016-1-4:2019/A1

August 2020

ICS 33.100.10; 33.100.20

English Version

Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements (CISPR 16-1-4:2019/A1:2020)

Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques - Partie 1-4: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques - Antennes et emplacements d'essai pour les mesures des perturbations rayonnées
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(CISPR 16-1-4:2019/A1:2020)

This amendment A1 modifies the European Standard EN IEC 55016-1-4:2019; it was approved by CENELEC on 2020-07-20. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 55016-1-4:2019/A1:2020 E

European foreword

The text of document CIS/A/1316/FDIS, future CISPR 16-1-4/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 IEC 55016-1-4:2019/A1:2020.

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)	2021-04-20
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2023-07-20

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

Endorsement notice

The text of the International Standard CISPR 16-1-4:2019/A1:2020 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

CISPR 11	NOTE	Harmonized as EN 55011

CISPR 16-1-4

Edition 4.0 2020-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE
COMITÉ INTERNATIONAL SPÉCIAL DES PERTURBATIONS RADIOÉLECTRIQUES

AMENDMENT 1
AMENDEMENT 1

Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements

Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 1-4: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Antennes et emplacements d'essai pour les mesures des perturbations rayonnées

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FOREWORD

This amendment has been prepared by subcommittee CISPR A: Radio-interference measurements and statistical methods, of IEC technical committee CISPR: International special committee on radio interference.

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

FDIS	Report on voting
CIS/A/1316/FDIS	CIS/A/1320/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 website 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

3.2 Abbreviated terms

Add the following new abbreviated terms to the existing list:

DRH double ridged horn

XP cross polarization

PDF probability density function

4.5.5 Cross-polar response of antenna

Delete, in the first sentence of the existing last paragraph, the cross-reference to [21].

4.7 Special antenna arrangements – large-loop antenna system

Replace the first sentence of the third paragraph with the following new sentence:

The EUT shall be positioned in the centre of the LLAS on a non-conductive support table.

Replace the third sentence of the third paragraph with the following new sentence:

Guidelines for routing of EUT cables are given in C.3 and Figure C.6.

Add, after the existing third paragraph, the following new paragraph:

The LLAS may be placed in any environment. Placement inside a shielded room, SAC, FAR, or weather-protected OATS is permitted. Placement in a shielded environment is recommended to eliminate ambient signals allowing for better sensitivity to EUT emissions. A minimum distance of 0,5 m between the LLAS and any metallic plane is recommended. The validation of the LLAS shall be performed at the location where the LLAS measurements normally take place to take into account the effect of the environment (see C.4).

Replace, in the NOTE, "Correction factors" *with* "Conversion factors".

C.3 Construction of a large-loop antenna (LLA)

Replace the existing third paragraph with the following paragraph:

The standard diameter of each LLA is defined as D = 2 m (i.e. the reference diameter). If necessary, e.g. in the case of a large EUT, D may be increased. However, in the frequency range up to 30 MHz, the maximum diameter allowed is 4 m. Further increase of the diameter can result in non-reproducible resonances of the LLAS response at the high-frequency end of the measuring range. The validation method specified in C.4 applies for LLAS loops with diameters of 2 m, 3 m, or 4 m.

Replace the second sentence of the seventh paragraph "The insertion loss of the current probe shall be sufficiently low (see NOTE 1)." *with "*The insertion impedance of the current probe should be sufficiently low (see NOTE).*"*

Delete the existing NOTE 1 and NOTE 2.

Add, between the seventh and eighth paragraphs, the following new NOTE:

NOTE To obtain a flat frequency response for each LLA at the lower end of the 9 kHz to 30 MHz frequency range, the resistive part of the insertion impedance, R_c, of the current probe is designed to be much smaller than $2\pi f L_c$ at f = 9 kHz, where L_c represents the inductance of the current probe. In addition, $R_c + R_i$ is to be less than or equal to X_i/10 = $(2\pi f L)$/10 at 9 kHz, where R_i is the resistance of the inner conductor of the loop and L is the loop inductance. This inductance is about 1,5 µH/m along the circumference; thus, for each standard LLA whose diameter is 2 m, $X_i \approx$ 0,5 Ω at f = 9 kHz.

Add, at the end of the existing text (before Figure C.1), the following new paragraph:

To avoid unwanted capacitive coupling between the EUT and the LLAS, the distance between the EUT and components of the LLAS shall be at least 0,10 times the loop diameter. Particular attention should be paid to the leads of an EUT. Cables shall be routed together and leave the test volume in the same octant of the LLAS, no closer than 0,4 m to any of the LLAS loops (see Figure C.6).

C.4 Validation of an LLA

Replace the existing title of this clause with the following new title:

C.4 Validation of the LLAS

Replace the first paragraph of this clause with the following three new paragraphs:

The validation of the LLAS shall be carried out by measuring the current induced in each of the three LLAs by means of the LLAS verification dipole connected to a 50 Ω RF generator, as described in C.5. The magnetic field emitted by the dipole allows verification of the magnetic field sensitivity of the LLAS. The electric field emitted by the LLAS verification dipole is intended to verify that the electric field sensitivity of the LLAS is sufficiently low.

The validation of an LLAS shall be performed at the site where the LLAS measurements normally take place. This is to account for the effect of the floor, walls, and similar objects or surfaces in the specific environment of the LLAS.

Validation measurements shall be performed at least at the following frequencies: 9 kHz, 100 kHz, 1 MHz, 2 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz, 25 MHz, and 30 MHz.

Replace the existing second and third paragraphs with the following new paragraphs:

The induced current shall be measured as a function of frequency in the range of 9 kHz to 30 MHz at the eight positions of the LLAS verification dipole shown in Figure C.7. During this measurement, the LLAS verification dipole shall be in the plane of the LLA under test.

In each of the eight positions, the measured validation factor, expressed in dB(Ω) as 20 lg(V_{go}/I_l), where V_{go} is the open circuit voltage of the RF generator and I_l is the measured current, shall not deviate by more than ±3 dB from the applicable reference validation factor given in Figure C.8 and Table C.1.

Delete the existing fourth paragraph.

Add, before Figure C.7, three new paragraphs as follows:

The reference validation factors given in Figure C.8 and Table C.1 are valid for an LLAS with circular loops having diameters of D = 2 m, 3 m, or 4 m.

Tabular values of the curves presented in Figure C.8 are given in Table C.1. These tabular values shall be used for the LLAS validation.

Background material and the equations for calculating the reference validation factors are given in CISPR TR 16-3:2020 [23].

Figure C.7 – The eight positions of the LLAS verification dipole during validation of an LLA

Replace the existing figure with the following new figure:

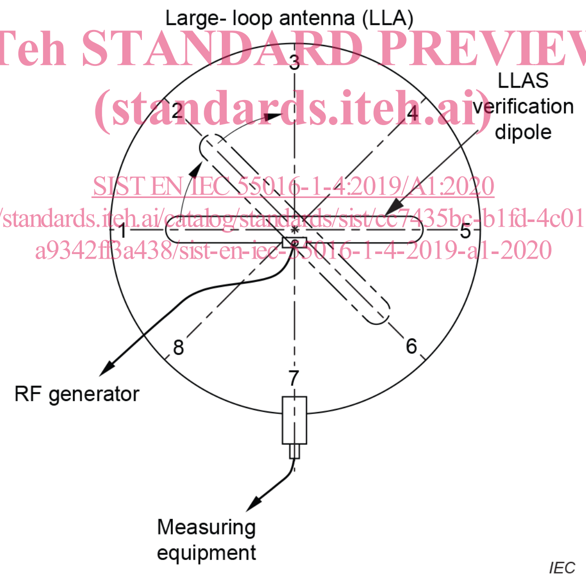

Figure C.7 – The eight positions of the LLAS verification dipole during validation of an LLA

Figure C.8 – Validation factor for an LLA of 2 m diameter

Replace the existing figure, including its title, with the following new figure:

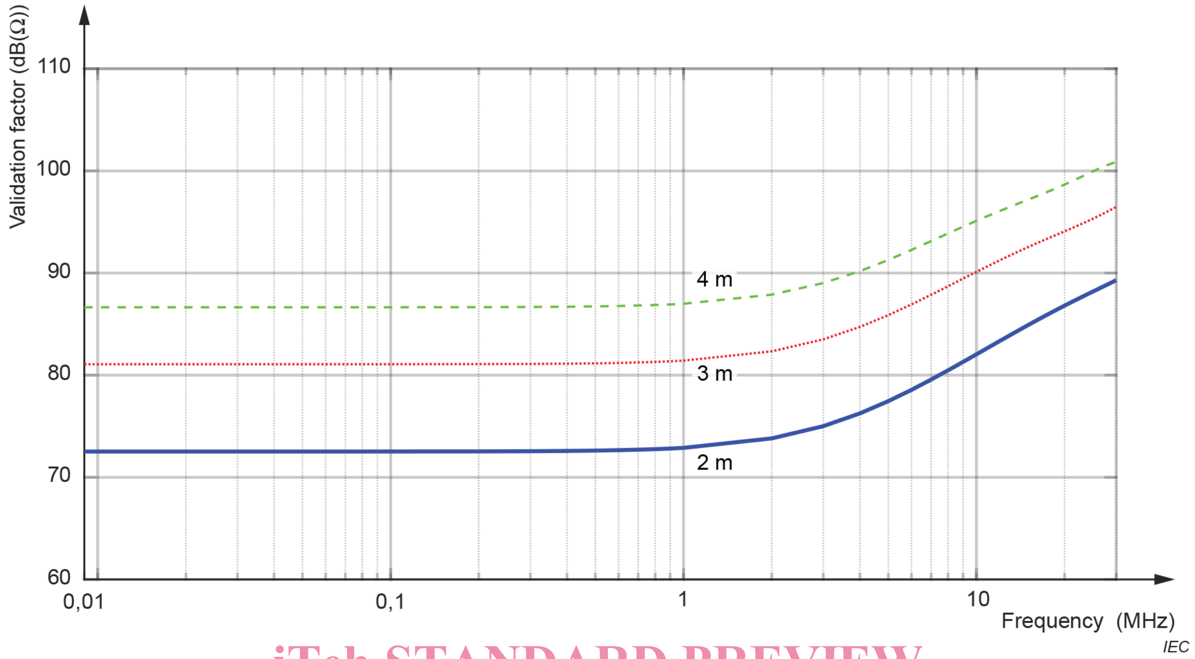

Figure C.8 – Reference validation factors for loops of 2 m, 3 m, and 4 m diameters

Add, after the new Figure C.8, the following new table:

Table C.1 – Reference validation factors of Figure C.8 for loops of 2 m, 3 m, and 4 m diameters

Frequency	Reference validation factor			Frequency	Reference validation factor		
	2 m LLAS	3 m LLAS	4 m LLAS		2 m LLAS	3 m LLAS	4 m LLAS
MHz	dB(Ω)			MHz	dB(Ω)		
0,009	72,52	81,07	86,64	7	79,57	87,87	93,13
0,01	72,52	81,07	86,64	8	80,47	88,71	93,88
0,02	72,52	81,07	86,64	9	81,30	89,45	94,54
0,03	72,52	81,07	86,64	10	82,04	90,12	95,11
0,04	72,52	81,07	86,64	11	82,72	90,71	95,62
0,05	72,52	81,07	86,64	12	83,34	91,24	96,07
0,06	72,52	81,07	86,65	13	83,90	91,72	96,47
0,07	72,52	81,07	86,65	14	84,42	92,15	96,84
0,08	72,52	81,07	86,65	15	84,90	92,54	97,18
0,09	72,52	81,07	86,65	16	85,34	92,89	97,50
0,1	72,52	81,07	86,65	17	85,75	93,22	97,80
0,2	72,54	81,08	86,66	18	86,13	93,53	98,10
0,3	72,55	81,10	86,68	19	86,48	93,82	98,39
0,4	72,58	81,13	86,70	20	86,81	94,09	98,67
0,5	72,61	81,16	86,73	21	87,12	94,35	98,94
0,6	72,65	81,20	86,77	22	87,41	94,60	99,21
0,7	72,70	81,24	86,82	23	87,68	94,85	99,47
0,8	72,75	81,30	86,87	24	87,94	95,09	99,72
0,9	72,81	81,36	86,93	25	88,19	95,32	99,96
1	72,88	81,42	86,99	26	88,43	95,56	100,18
2	73,81	82,33	87,88	27	88,66	95,79	100,38
3	75,01	83,51	89,02	28	88,88	96,02	100,57
4	76,26	84,72	90,19	29	89,09	96,25	100,73
5	77,46	85,88	91,28	30	89,30	96,47	100,88
6	78,56	86,93	92,26	-	-	-	-

C.5 Construction of the LLAS verification dipole antenna

Replace the first paragraph with the following paragraph:

The LLAS verification dipole, shown in Figure C.9, has been designed to emit simultaneously a magnetic field, which should be measured by the LLAS, and an electric field, which should be rejected by the LLAS.