SLOVENSKI STANDARD
SIST EN 61000-4-5:2014/A1:2018

01-januar-2018

Elektromagnetna združljivost (EMC) - 4-5. del: Preskusne in merilne tehnike - Preskus odpornosti proti napetostnemu udaru - Dopolnilo A1

Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

Elektromagnetische Verträglichkeit (EMV) - Teil 4-5: Prüf- und Messverfahren - Prüfung der Störfestigkeit gegen Stoßspannungen

Amendement 1 - Compatibilité électromagnétique (CEM) - Partie 4-5: Techniques d'essai et de mesure Essai d'immunité aux ondes de choc

Ta slovenski standard je istoveten z: **EN 61000-4-5:2014/A1:2017**

ICS:

33.100.20	Imunost	Immunity

SIST EN 61000-4-5:2014/A1:2018 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61000-4-5:2014/A1

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English Version

Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5:2014/A1:2017)

Compatibilité électromagnétique (CEM) - Partie 4-5: Techniques d'essai et de mesure - Essai d'immunité aux ondes de Choc (IEC 61000-4-5:2014/A1:2017)

Elektromagnetische Verträglichkeit (EMV) - Teil 4-5: Prüf- und Messverfahren - Prüfung der Störfestigkeit gegen Stoßspannungen (IEC 61000-4-5:2014/A1:2017)

This amendment A1 modifies the European Standard EN 61000-4-5:2014; it was approved by CENELEC on 2017-09-08. 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

European foreword

The text of document 77B/762/CDV, future IEC 61000-4-5:2014/A1, prepared by SC 77B "High frequency phenomena" of IEC/TC 77 "Electromagnetic compatibility" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61000-4-5:2014/A1:2017.

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)	2018-06-08
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-09-08

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 IEC 61000-4-5:2014/A1:2017 was approved by CENELEC as a European Standard without any modification.

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AMENDMENT 1

AMENDEMENT 1

Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test

Compatibilité électromagnétique (CEM) – Partie 4-5: Techniques d'essai et de mesure – Essai d'immunité aux ondes de choc

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

This amendment has been prepared by subcommittee 77B: High frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

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

CDV	Report on voting
77B/762/CDV	77B/773/RVC

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.

Introduction to the amendment

Rationale:

The method for testing DC products in the current revision of IEC61000-4-5 is causing many field related problems for test labs and manufacturers. Many products will not power up through the power CDN in the standard and in some cases may be damaged by the inductance that is necessary to apply the surge (see 77B/734/DC for further information).

The DC./DC converter problem is related to the switching of the converter which produces a voltage drop at the decoupling inductors on one hand and oscillations produced by the EUT impedance in combination with the source on the other hand. Measurements were performed using different brands of CDNs with a device known to show that problem as an EUT. The result shows different oscillations and signal forms of the voltage at the EUT for different CDNs. According to the outcome, the use of a CDN with a higher current rating (i.e. smaller decoupling inductivity) can solve the problem. At the meeting of SC77B/MT12 in Akishima, Japan on August 26, 2016, it was decided to add a statement into 7.3 allowing surge tests with higher current rated CDNs and to add a new Annex I to explain the problem in detail.

7.3 Test setup for surges applied to EUT power ports

Add, between the second and the third paragraph, the following new paragraph:

In case, where an EUT having DC/DC input converters cannot power up through the appropriate current-rated CDN, it is permitted to use a higher current-rated CDN with ratings up to and including 125 A, which fulfills the specifications according to its current rating given in Table 4. In such case, the use of this higher rated CDN shall be described in the test report. Annex I includes further information regarding this special case.

Annexes

Add, after Annex H, the following new Annex I:

Annex I
(informative)

Issues relating to powering EUTs having DC/DC converters at the input

I.1 General

As industry mandates energy saving equipment design, especially in classic data server 'farms' and central office locations that can contain hundreds or thousands of server/router communications equipment running continuously, the equipment manufacturers are re-designing their equipment to be more efficient and less wasting of energy in the form of heat dissipation. One of the largest wasteful components has been the power supply. By designing the equipment power supplies to operate from DC voltage and then converting the nominal input voltage to the voltages required by the circuits of the system, vast amounts of energy can be conserved when using modern switching design controlled by microprocessor technologies to only draw power from the source when actually needed by the loading circuits. Larger storage capacitors formerly used to store energy between conduction cycles are being eliminated or reduced dramatically. The result is that the input current of such DC/DC power supplies is no longer true direct current. It has become pulsed current. The frequency of this pulsed current is often a problem when passing through the inductor used in the decoupling network of the CDNs. The inductance of the decoupling network was selected to provide very low reactance to DC and AC power line frequencies typically up to 50 Hz or 60 Hz. As frequency increases, so does the inductive reactance. Thus, for a surge impulse having 1,2 µs rise time and 50 µs duration, the reactance becomes very high and effectively attenuates the surge impulse from passing through to the source supply connected to the CDN. The surge impulse is therefore 'steered' to the EUT output of the CDN. The frequency of the input current pulses of DC/DC converters is evolving to faster and faster speeds to more effectively increase efficiency. As these switching supply technologies are evolving to use PWM (pulse width modulation) techniques, the input current of these supplies is becoming a complex waveform actually containing many frequencies and their harmonics (due to the square wave nature of the pulses). As a result, the decoupling inductor, through which this current flows to its source, cannot pass these rapid changes in current. Its high reactance to these high frequency transitions causes the voltage supplied to the EUT to drop instantaneously. Because the EUT supply has little capacitance to 'hold up' voltage to its loads, its output voltage drops. This can cause the load equipment circuitry to stop working or to perform erratically. The DC/DC supply has rapidly responding circuitry so it immediately attempts to draw more current from its source. It would change its PWM (duty cycle) to increase current from the source. This change effectively changes the frequency of the chopped current through the decoupling inductor which can further reduce instantaneous voltage to the EUT or increase it depending upon frequency effect of the PWM, and the cycle starts over again.

Another issue for active DC/DC converters is that the presence of an inductance between the DC power source and the DC/DC converter input can cause self-oscillations due to the dynamic voltage/current ratio of the input signal. dI/dV is negative for small excursions from the nominal voltage, and for some converters this in combination with the gain/phase properties of the converter control loop can cause unwanted self-oscillation. The stability margin of the DC/DC converter in combination with the surge CDN is in general not known by the testing laboratory.

While the switch to EUT power supplies is evolving to employ more energy efficient DC power inputs to such telecommunications EUT equipment, test laboratories should acquire DC power supplies to supply power to the inputs of the CDNs used for compliance testing to power up those EUT products. Modern technology has also changed the world of laboratory DC power supplies. Today these supplies also use switching mode technologies and have very sophisticated circuitry employed to keep their output voltage and current constant under a variety of changing loads while also reducing wasted energy in the form of heat, unlike the aging linear power supply technologies. This circuitry can pose a problem when powering up devices having DC/DC converters on their inputs due to the changing current and complex