SLOVENSKI STANDARD
SIST EN 61000-2-10:2001

01-marec-2001

Electromagnetic compatibility (EMC) - Part 2-10: Environment - Description of HEMP environment - Conducted disturbance

Electromagnetic compatibility (EMC) -- Part 2-10: Environment - Description of HEMP environment - Conducted disturbance

Elektromagnetische Verträglichkeit (EMV) -- Teil 2-10: Umgebungsbedingungen - Beschreibung der HEMP-Umgebung - Leitungsgeführte Störgrößen

Compatibilité électromagnétique (CEM) -- Partie 2-10: Environnement - Description de l'environnement IEMN-HA - Perturbations conduites

Ta slovenski standard je istoveten z: **EN 61000-2-10:1999**

ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

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EN 61000-2-10

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Descriptors: Electromagnetic compatibility, environments, pulses, electromagnetism, nuclear radiation, explosions, altitude, electromagnetic waves, radio disturbances

English version

Electromagnetic compatibility (EMC)
Part 2-10: Environment - Description of HEMP environment Conducted disturbance
(IEC 61000-2-10:1998)

Compatibilité électromagnétique (CEM)
Partie 2-10: Environnement
Description de l'environnement
IEMN-HA - Perturbations conduites
(CEI 61000-2-10:1998)

Elektromagnetische Verträglichkeit (EMV)
Teil 2-10: Umgebungsbedingungen
Beschreibung der HEMP-Umgebung
Leitungsgeführte Störgrößen
(IEC 61000-2-10:1998)

This European Standard was approved by CENELEC on 1999-01-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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This European Standard 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

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Foreword

The text of document 77C/61/FDIS, future edition 1 of IEC 61000-2-10, prepared by SC 77C, Immunity to high altitude nuclear electromagnetic pulse (HEMP), of IEC TC 77, Electromagnetic compatibility, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61000-2-10 on 1999-01-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1999-10-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2001-10-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A, B, C and D are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61000-2-10:1998 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60050(161)	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility	-	-
IEC 61000-2-9	1996	Electromagnetic compatibility (EMC) Part 2: Environment Section 9: Description of HEMP environment - Radiated disturbance - Basic EMC publication	EN 61000-2-9	1996
IEC 61000-4-24	1997	Part 4: Testing and measurement techniques Section 24: Test methods for protective devices for HEMP conducted disturbance Basic EMC publication	EN 61000-4-24	1997

NORME INTERNATIONALE

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Compatibilité électromagnétique (CEM) –

Partie 2-10:
Environnement – Description de l'environnement
IEMN-HA – Perturbations conduites

Electromagnetic compatibility (EMC) –

Part 2-10:
Environment – Description of HEMP environment – Conducted disturbance

International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site http: //www.iec.ch

Commission Electrotechnique Internationale
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTROMAGNETIC COMPATIBILITY (EMC) –

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FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61000-2-10 has been prepared by subcommittee 77C: Immunity to high altitude nuclear electromagnetic pulse (HEMP), of IEC technical committee 77: Electromagnetic compatibility.

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

FDIS	Report on voting
77C/61/FDIS	77C/65/RVD

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

Annexes A, B, C and D are for information only.

INTRODUCTION

IEC 61000 is published in separate parts according to the following structure:

Part 1: General

General considerations (introduction, fundamental principles)

Definitions, terminology

Part 2: Environment

Description of the environment

Classification of the environment

Compatibility levels

Part 3: Limits

Emission limits

Immunity limits (insofar as these limits do not fall under the responsibilty of the product committees)

Part 4: Testing and measurement techniques

Measurement techniques

Testing techniques

Part 5: Installation and mitigation guidelines

Installation guidelines

Mitigation methods and devices

Part 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into several parts, published either as International Standards or technical reports, some of which have already been published as sections. Others will be published with the part number followed by a dash and a second number identifying the subdivision.

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 2-10: Environment – Description of HEMP environment – Conducted disturbance

1 Scope

This International Standard defines the high-altitude electromagnetic pulse (HEMP) conducted environment that is one of the consequences of a high-altitude nuclear explosion.

Those dealing with this subject consider two cases:

– high-altitude nuclear explosions;

– low-altitude nuclear explosions.

For civil systems the most important case is the high-altitude nuclear explosion. In this case, the other effects of the nuclear explosion: blast, ground shock, thermal and nuclear ionizing radiation are not present at the ground level.

However, the electromagnetic pulse associated with the explosion may cause disruption of, and damage to, communication, electronic and electric power systems thereby upsetting the stability of modern society.

The object of this standard is to establish a common reference for the conducted HEMP environment in order to select realistic stresses to apply to victim equipment for evaluating their performance.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61000. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of IEC 61000 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(161):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic Compatibility*

IEC 61000-2-9:1996, *Electromagnetic compatibility (EMC) – Part 2: Environment – Section 1: Description of HEMP environment – Radiated disturbance* – Basic EMC publication

IEC 61000-4-24:1997, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 24: Test methods for protective devices for HEMP conducted disturbance* – Basic EMC publication

3 General

A high-altitude (above 30 km) nuclear burst produces three types of electromagnetic pulses which are observed on the earth's surface:

– early-time HEMP (fast);
– intermediate-time HEMP (medium);
– late-time HEMP (slow).

Historically most interest has been focused on the early-time HEMP which was previously referred to as simply HEMP. Here we will use the term high-altitude EMP or HEMP to include all three types. The term NEMP [1] covers many categories of nuclear EMPs including those produced by surface bursts (SREMP) [2] or created on space systems (SGEMP) [3].

Because the HEMP is produced by a high-altitude detonation, we do not observe other nuclear weapon environments such as gamma rays, heat and shock waves at the earth's surface. HEMP was reported from high-altitude nuclear tests in the South Pacific by the US and over the USSR during the early 1960s, producing effects on electronic equipment far from the burst location.

This standard presents the conducted HEMP environment induced on metallic lines, such as cables or power lines, external and internal to installations, and external antennas.

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[1] NEMP: Nuclear electromagnetic pulse.
[2] SREMP: Source region EMP.
[3] SGEMP: System generated EMP.

4 Definitions

For the purpose of this International Standard, the definitions given in IEC 60050(161) apply, as well as the following definitions:

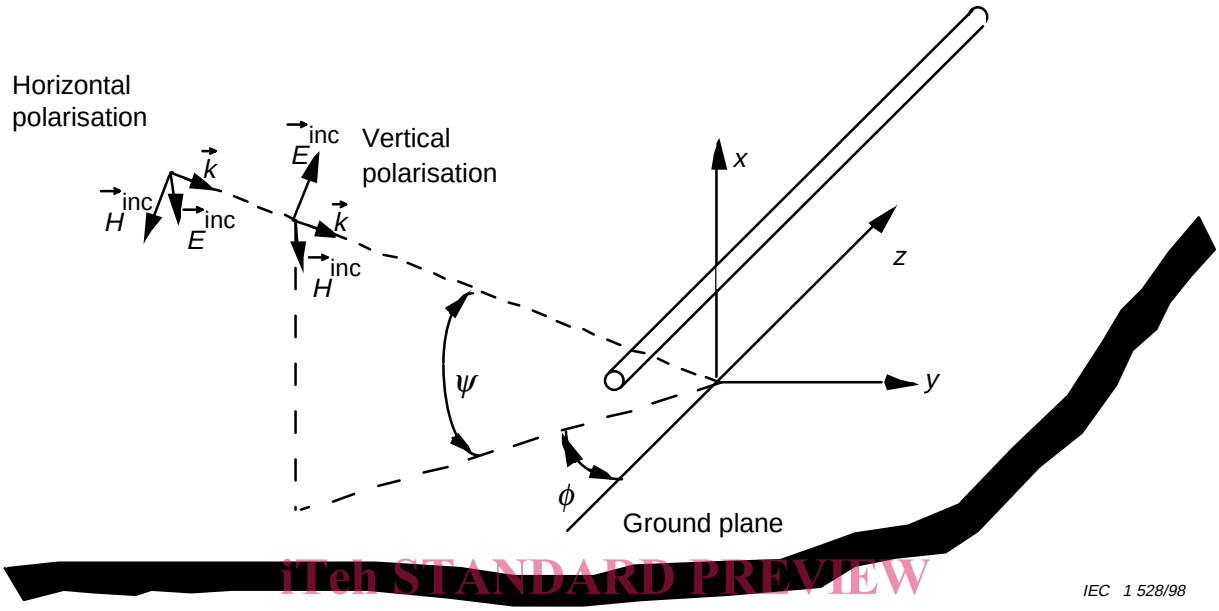

Figure 1 – Geometry for the definition of polarization and of the angles of elevation ψ and azimuth ϕ

4.1
angle of elevation in the vertical plane, ψ
angle ψ measured in the vertical plane between a flat horizontal surface such as the ground and the propagation vector (see figure 1)

4.2
azimuth angle, ϕ
angle between the projection of the propagation vector on the ground plane and the principal axis of the victim object (z axis for the transmission line of figure 1)

4.3
composite waveform
waveform which maximizes the important features of a waveform

4.4
coupling
interaction of the HEMP field with a system to produce currents and voltages on system surfaces and cables. Voltages result from the induced charges and are only defined at low frequencies with wavelengths larger than the surface or gap dimensions