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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 61000-4-3

September 1996

ICS 29.020

Supersedes ENV 50140:1993 and HD 481.3 S1:1987

Descriptors: Electronic equipment, electric equipment, electromagnetic compatibility, radio frequencies, electromagnetic fields, tests



REPUBLIKA SLOVENIJA  
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO  
Urad RS za standardizacijo in meroslovje

English version

LJUBLJANA  
SIST. EN 61000-4-3

PREVZET PO METODI RAZGLASITVE

-03- 1997

**Electromagnetic compatibility (EMC)**  
**Part 4: Testing and measurement techniques**  
**Section 3: Radiated, radio-frequency, electromagnetic**  
**field immunity test**  
(IEC 1000-4-3:1995, modified)

Compatibilité électromagnétique (CEM)

Partie 4: Techniques d'essai et de mesure

Section 3: Essai d'immunité aux champs électromagnétiques rayonnés aux fréquences radioélectriques (CEI 1000-4-3:1995, modifiée)

Elektromagnetische Verträglichkeit (EMV)

Teil 4: Prüf- und Meßverfahren  
Hauptabschnitt 3: Prüfung der

Störfestigkeit gegen hochfrequente elektromagnetische Felder

(IEC 1000-4-3:1995, modifiziert)

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This European Standard was approved by CENELEC on 1996-07-02. 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.

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 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.

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

### Foreword

The text of the International Standard IEC 1000-4-3:1995, prepared by SC 65A, System aspects, of IEC TC 65, Industrial-process measurement and control, together with common modifications prepared by the Technical Committee CENELEC TC 210, EMC, was submitted to the formal vote and was approved by CENELEC as EN 61000-4-3 on 1996-07-02.

This European Standard supersedes ENV 50140:1993 and HD 481.3 S1:1987.

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) 1997-06-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1997-06-01

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 to H are informative.  
Annex ZA has been added by CENELEC.

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### Endorsement notice

The text of the International Standard IEC 1000-4-3:1995 was approved by CENELEC as a European Standard with agreed common modifications as given below.

### COMMON MODIFICATIONS

Replace the text of subclause 6.2 by:

#### 6.2 Calibration of field

The purpose of field calibration is to ensure that the uniformity of the field over the test sample is sufficient to ensure the validity of the test results. Modulation is not present during the calibration to ensure the proper indication of any field sensor.

This section of IEC 1000-4-3 uses the concept of a "uniform area" (see figure 3) which is a hypothetical vertical plane of the field in which variations are acceptably small. This uniform area is 1,5 m x 1,5 m, unless the EUT and its wires can be fully illuminated within a smaller surface; the size of the uniform area shall not be less than 0,5 m x 0,5 m (i.e. four point grid).

In the test set-up, the EUT shall have its face to be illuminated coincident with this plane (see figures 5 and 6).

Because it is impossible to establish an uniform field close to an earth reference plane, the calibrated area is established at a height no closer than 0,8 m above the earth reference plane, and where possible the EUT is located at this height.

In order to establish the severity of the test for EUTs and wires which must be tested close to the earth reference plane or which have larger sides than 1,5 m x 1,5 m, the intensity of the field is also recorded at 0,4 m height, and for the full width and height of the EUT, and reported in the test report.

The uniform area is calibrated in the empty enclosure. The set-up and positioning of the antenna, additional absorber (if used), etc. are recorded and kept. These can then be used in the chamber verification that is carried out before each batch of testing (see clause 8). It is intended that the full area calibration should be carried out at least annually and when changes have been made in the enclosure configuration (absorber replaced, area moved, equipment changed, etc.).

The transmitting antenna shall be placed at a distance sufficient to allow a calibration area, 1,5 m x 1,5 m, to fall within the beam width of the transmitted field. If the area intended to be occupied by the face of the actual EUT is larger than 1,5 m x 1,5 m then a calibration will be necessary at different radiating antenna locations to allow the EUT to be illuminated in a series of tests.

The field sensor shall be at least 1 m from the field generating antenna. A distance of 3 m between antenna and EUT is preferred. This dimension is taken from the centre of a biconical antenna, or from the tip of a log periodic antenna. The test report shall state the test distance from field generating antenna to the calibrated area used.

In case of dispute, measurements at 3 m take precedence.

A field is considered uniform if its magnitude over the defined area is within -0 dB to +6 dB of nominal value, over 75 % of the surface (i.e. if at least 12 of the 16 points measured are within the tolerance).

For the minimum uniformity area of 0,5 m x 0,5 m, the 4 points of the grid shall lie within this tolerance.

NOTE - At different frequencies, different measuring points may be within the tolerance.

The tolerance has been expressed as -0 dB to +6 dB to ensure that the field strength does not fall below nominal. The tolerance of 6 dB is considered to be the minimum achievable in practical test facilities.

A tolerance greater than +6 dB up to +10 dB but not less than -0 dB is allowed for a maximum of 3 % of the test frequencies, provided that the actual tolerance is stated in the test report. In case of dispute, the -0 dB to +6 dB tolerance takes precedence.

The procedure for carrying out the calibration, based on constant power, is as follows:

- a) Position the field sensor at one of the sixteen points in the grid (see figure 4).
- b) Apply a forward power to the field generating antenna so that the field strength obtained is in the range 3 V/m to 10 V/m, through the frequency range in steps of 1 % of the start frequency (and thereafter the preceding frequency), and record both (power and field strength) readings.
- c) With the same forward power, measure and record the field strength at the remaining 15 points.
- d) Taking all 16 points into consideration, delete a maximum of 25 % (i.e. 4 of the 16) of those with the greatest deviation from the mean value, expressed in V/m.
- e) The remaining points shall lie within  $\pm 3$  dB.
- f) Of the remaining points, take the location with the lowest field strength as reference (this ensures the -0 dB to +6 dB requirement is met).
- g) From knowledge of the forward power and the field strength, the necessary forward power for the required test field strength can be calculated (e.g. if at a given point 80 W gives 9 V/m, then 8,9 W is needed for 3 V/m). This shall be recorded.
- h) Repeat steps a) to g) for both horizontal and vertical polarizations.

An equivalent procedure is to establish a constant field strength in the range 3 V/m to 10 V/m and record the forward power delivered to the field generating antenna. The principles outlined in a), d), e), f) and h) shall be respected.

The calibration is valid for all EUTs whose individual faces (including any cabling) can be fully enclosed by the "uniform area".

The antennas and cables which have been used to establish the calibrated field shall be used for the testing. Since the same antennas and cables are used, the cable losses and antenna factors of the field generating antennas are not relevant.

The exact position, as much as reasonably possible, of the generating antennas and cables shall be recorded. Since even small displacements will significantly affect the field, the same position shall be used for testing.

## 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 50(161)	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility	-	-
IEC 1000-4-6	1996	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 6: Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	1996

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**NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD**

**CEI  
IEC  
1000-4-3**

Première édition  
First edition  
1995-02

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**Compatibilité électromagnétique (CEM) –**

**Partie 4:**

Techniques d'essai et de mesure –

Section 3: Essai d'immunité aux champs  
électromagnétiques rayonnés aux fréquences  
radioélectriques

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**Electromagnetic compatibility (EMC) –**

**Part 4:**

Testing and measurement techniques –

Section 3: Radiated, radio-frequency,  
electromagnetic field immunity test

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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Pour prix, voir catalogue en vigueur  
For price, see current catalogue

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 4: Testing and measurement techniques –  
 Section 3: Radiated, radio-frequency, electromagnetic field  
 immunity test

## 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 cooperation 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, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use 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.

International Standard IEC 1000-4-3 has been prepared by sub-committee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement and control.

It forms section 3 of part 4 of IEC 1000 and replaces the first edition of IEC 801-3 issued in 1984. It has the status of a basic EMC publication in accordance with IEC Guide 107.

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

DIS	Report on voting
65A <sub>40</sub> 77B (CO) <sub>24</sub>	77B/148/RVD 77B/148A/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 to H are for information only.

## INTRODUCTION

This standard is part of the IEC 1000 series, 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 (in so far as they do not fall under the responsibility 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 9: Miscellaneous

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[8e20c6c46b22/sist-en-61000-4-3-1997](https://standards.iteh.ai/catalog/standards/sist/8010a296-5443-40ca-8c5d-8e20c6c46b22/sist-en-61000-4-3-1997)

Each part is further subdivided into sections which are to be published either as International Standards or as technical reports.

This section is an international standard which gives immunity requirements and test procedures related to radiated, radio-frequency, electromagnetic fields.