SLOVENSKI STANDARD
oSIST prEN IEC 61000-4-41:2024

01-april-2024

Elektromagnetna združljivost (EMC) - 4-41. del: Preskusne in merilne tehnike - Preskusi odpornosti proti širokopasovnemu sevanju

Electromagnetic compatibility (EMC) - Part 4-41: Testing and measurement techniques - Broadband radiated immunity tests

Ta slovenski standard je istoveten z: **prEN IEC 61000-4-41:2024**

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33.100.20 Imunost Immunity

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77B/884/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61000-4-41 ED1**	
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IEC SC 77B : HIGH FREQUENCY PHENOMENA

SECRETARIAT: France	SECRETARY: Mr Franck GRUFFAZ
OF INTEREST TO THE FOLLOWING COMMITTEES: CIS/A,CIS/F,CIS/H,CIS/I	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☒ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

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TITLE:

Electromagnetic compatibility (EMC) - Part 4-41: Testing and measurement techniques - Broadband radiated immunity tests

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTROMAGNETIC COMPATIBILITY (EMC)

Part 4-41: Testing and measurement techniques – Broadband radiated immunity tests

FOREWORD

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International Standard IEC 61000-4-41 has been prepared by subcommittee 77B: High frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

It forms Part 4-41 of IEC 61000. It has the status of a basic EMC publication in accordance with IEC Guide 107.

The text of this International Standard is based on the following documents:

Draft	Report on voting
77B/xxxx/FDIS	77B/xxxx/RVD

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

127 The language used for the development of this is English.

128 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
129 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
130 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
131 described in greater detail at http://www.iec.ch/standardsdev/publications.

132 A list of all parts in the IEC 61000 series, published under the general title *Electromagnetic*
133 *compatibility (EMC)*, can be found on the IEC website.

134 The committee has decided that the contents of this document will remain unchanged until the
135 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
136 specific document. At this date, the document will be

137 • reconfirmed,
138 • withdrawn,
139 • replaced by a revised edition, or
140 • amended.

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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.

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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 (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 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into several parts, published either as international standards or as technical specifications 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 (example: IEC 61000-6-1).

This part is an international standard which gives immunity requirements and test procedures related to radiated disturbances generated by broadband signals.

Modern digital communication signals operate on multiple frequencies such as Orthogonal Frequency Division Multiplexing (OFDM) and use bandwidths ranging from tens of MHz to hundreds of MHz, all while employing in-band time-division multiplexing (TDM) and/or Frequency Domain Division (FDD) transmission technology. Such broadband signals could cause a performance degradation and/or malfunctions of other equipment. In this document, the disturbance is not a frequency sweep of a narrowband signal but a broadband signal with coexisting multiple frequencies which is stepped through the desired frequency range.

Examples of broadband signals are LTE signals and 5G mobile communication signals.

ELECTROMAGNETIC COMPATIBILITY (EMC)

Part 4-41: Testing and measurement techniques – Broadband radiated immunity tests

1 Scope

This part of IEC 61000 relates to broadband radiated disturbances created by, for example, communication devices or services, transmitters or industrial electromagnetic sources or any other devices capable of generating such a signal.

The object of this document is to establish a common reference for evaluating the immunity of electrical and electronic equipment when subjected to broadband radiated electromagnetic fields.

This document specifies testing in frequency ranges above 80 MHz, limited only by the capabilities of the test instrumentation.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)* (available at <http://www.electropedia.org>)

IEC 61000-4-3:2020 Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
auxiliary equipment
AE
equipment necessary to provide the equipment under test (EUT) with the signals required for normal operation and equipment to verify the performance of the EUT

3.2
equivalent carrier field strength
cumulative field strength caused by the radiation of broadband signal, expressed in V/m

3.3
broadband signal
signal where the energy is distributed over several megahertz, either by a broadband nature of the signal itself or by a collection of subcarriers

Note 1 to entry in typical applications a broadband signal could be as wide as 5 MHz to 100 MHz

3.4
duty cycle
fraction of the period time where a repetitive signal is above a specified threshold

3.5
test generator
generator capable of generating the required test signal

Note 1 to entry The test generator can, for example, include a vector signal generator, modulation sources, attenuators, broadband power amplifiers and filters, etc. See Annex A for additional information on test generator.

3.6
white noise
flat random noise
random noise which has a continuous spectrum and a constant power spectral density in the frequency band considered

[SOURCE: IEC 60050-702:1992, 702-08-39]

3.7
electric field spectral density
quantity derived from the electric Power Spectral Density (PSD) of a broadband signal

Note 1 to entry Further information can be found in Annex D

4 General

The source of disturbance covered by this part of IEC 61000 is an electromagnetic field, consisting of broadband signals, generated by, for example, communication devices or services, transmitters or industrial electromagnetic sources or any other devices capable of generating such a signal.

– The frequency range covered by this document is specified in Table 3Table 3.

253

254 5 Test levels and test signal

255 5.1 Test levels

256 The test levels are given in terms of an equivalent carrier field strength consistent with the
257 level-setting process and the electric field spectral density spread out to the test signal
258 bandwidth.

259 The levels in columns 3 to 6 of Table 1 show the electric field spectral density derived from the
260 power spectral density of the broadband test signal assuming that the different spectrum
261 components are uncorrelated.

262 The test level is derived from the UFA level-setting process. The signal power to generate the
263 test levels of Table 1 should be equal to the total power of the broadband signal.

264
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Table 1 – Test levels

Test Level	Equivalent carrier field strength V/m	Electric Field Spectral Density $dB\left(\frac{\mu V}{m \cdot \sqrt{Hz}}\right)$			
		BW **= 5 MHz**	***BW*** **= 20 MHz**	***BW*** **= 40 MHz**	***BW*** **= 100 MHz**
1	1	53,0	47,0	44,0	40,0
2	3	62,5	56,5	53,5	49,5
3	10	73,0	67,0	64,0	60,0
4	30	82,5	76,5	73,5	69,5
Note 5 MHz and 40 MHz bandwidth (***BW)*** are indicated for the convenience of the product committee.					

This document does not suggest that a single test level is applicable over the entire frequency range. The product committees shall select the frequency range(s) to be tested as well as the appropriate test level(s). See Annex D giving guidance for product committees on the selection of test levels.

Product committees may use test levels other than those listed in Table 1. However, once the equivalent carrier field strength is determined, the test levels for each bandwidth follow the relationship between the test levels in this table.

5.2 Test signal

Real broadband communication signals today are largely based on OFDM. The parameters (number of carriers, modulation per carrier, etc.) are so diverse that an internationally agreed set of parameters that is representative of all conceivable broadband communication services does not seem to make sense. In accordance with the nature of the interference, a band-limited noise is therefore specified as the test signal. The signal can be generated on the one hand by a physical noise generator with a filter, on the other hand by an arbitrary waveform generator, which periodically plays a pseudo-noise code. With the latter, care must be taken that the sequence is long enough to produce a spectrum that is as continuous as possible.

An additional important parameter of the test signal is the crest factor. The crest factor is defined as the relation between peak amplitude and RMS and is usually expressed in dB. The crest factor of the signal generator output signal shall be at least 10 dB. Information on test signal characterization is given in Annex F.

Note The higher the crest factor the higher the compression demand on the power amplifier.