



Institut luxembourgeois de la normalisation  
de l'accréditation, de la sécurité et qualité  
des produits et services

## ILNAS-EN 55016-2-3:2010

### **Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and**

Anforderungen an Geräte und  
Einrichtungen sowie Festlegung der  
Verfahren zur Messung der  
hochfrequenten Störaussendung

Spécifications des méthodes et des  
appareils de mesure des perturbations  
radioélectriques et de l'immunité aux  
perturbations radioélectriques - Partie

## National Foreword

This European Standard EN 55016-2-3:2010 was adopted as Luxembourgish Standard ILNAS-EN 55016-2-3:2010.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

### THIS PUBLICATION IS COPYRIGHT PROTECTED

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

English version

**Specification for radio disturbance and immunity measuring apparatus  
and methods -****Part 2-3: Methods of measurement of disturbances and immunity -  
Radiated disturbance measurements  
(CISPR 16-2-3:2010)**

Spécifications des méthodes  
et des appareils de mesure  
des perturbations radioélectriques  
et de l'immunité aux perturbations  
radioélectriques -  
Partie 2-3: Méthodes de mesure  
des perturbations et de l'immunité -  
Mesures des perturbations rayonnées  
(CISPR 16-2-3:2010)

Anforderungen an Geräte  
und Einrichtungen sowie Festlegung  
der Verfahren zur Messung  
der hochfrequenten Störaussendung  
(Funkstörungen) und Störfestigkeit -  
Teil 2-3: Verfahren zur Messung  
der hochfrequenten Störaussendung  
(Funkstörungen) und Störfestigkeit -  
Messung der gestrahlten Störaussendung  
(CISPR 16-2-3:2010)

This European Standard was approved by CENELEC on 2010-06-01. 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.

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, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

# CENELEC

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document CISPR/A/886/FDIS, future edition 3 of CISPR 16-2-3, prepared by CISPR SC A, Radio-interference measurements and statistical methods, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 55016-2-3 on 2010-06-01.

This European Standard supersedes EN 55016-2-3:2006.

This EN 55016-2-3:2010 includes the following significant technical changes with respect to EN 55016-2-3:2006: addition of the measurand for radiated emissions measurements in an OATS and a SAC in the range of 30 MHz to 1 000 MHz, and addition of a new normative annex on the determination of suitability of spectrum analysers for compliance tests. Also, numerous maintenance items are addressed to make the standard current with respect to other parts of the EN 55016 series.

It has the status of a basic EMC publication in accordance with IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications*.

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

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) 2011-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2013-06-01

Annex ZA has been added by CENELEC.

---

## Endorsement notice

The text of the International Standard CISPR 16-2-3:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- |                        |  |
|------------------------|--|
| [1] CISPR 11:2009      | NOTE Harmonized as EN 55011:2009 (modified).               |
| [3] CISPR 22:2008      | NOTE Harmonized as EN 55022:200X <sup>1)</sup> (modified). |
| [4] IEC 61140:2001     | NOTE Harmonized as EN 61140:2002 (not modified).           |
| [6] ISO/IEC 17000:2004 | NOTE Harmonized as EN ISO/IEC 17000:2004 (not modified).   |
| [7] IEC 61000-4-21     | NOTE Harmonized as EN 61000-4-21.                          |
- 

<sup>1)</sup> At draft stage.

**Annex ZA**  
(normative)

**Normative references to international publications  
with their corresponding European publications**

The following referenced documents are indispensable for the application 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.

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>
CISPR 14-1	2005	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission	EN 55014-1	2006
CISPR 16-1-1	-	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	EN 55016-1-1	-
CISPR 16-1-2	2003	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Conducted disturbances	EN 55016-1-2	2004
CISPR 16-1-4	2010	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	EN 55016-1-4	2010
CISPR 16-2-1	2008	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements	EN 55016-2-1	2009
CISPR 16-4-1	-	Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-1: Uncertainties, statistics and limit modelling - Uncertainties in standardized EMC tests	-	-
CISPR 16-4-2	-	Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling - Uncertainty in EMC measurements	EN 55016-4-2	-
CISPR/TR 16-4-5	-	Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-5: Uncertainties, statistics and limit modelling - Conditions for the use of alternative test methods	-	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-161	1990	International Electrotechnical Vocabulary (IEV) - Chapter 161: Electromagnetic compatibility	-	-
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-20	-	Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides	EN 61000-4-20	-



# INTERNATIONAL STANDARD

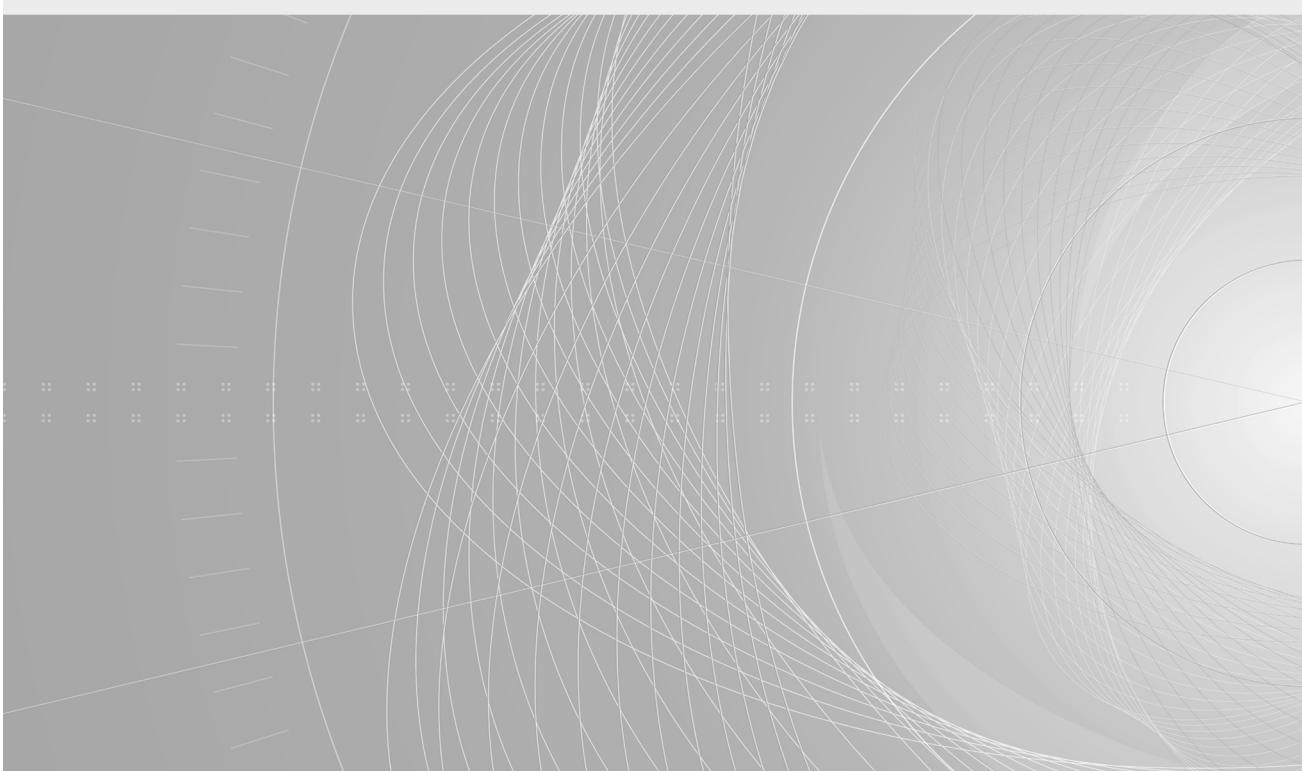
## NORME INTERNATIONALE

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

BASIC EMC PUBLICATION  
PUBLICATION FONDAMENTALE EN CEM

**Specification for radio disturbance and immunity measuring apparatus and methods –  
Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements**

**Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques –  
Partie 2-3: Méthodes de mesure des perturbations et de l'immunité – Mesures des perturbations rayonnées**



## CONTENTS

FOREWORD .....	6
1 Scope .....	8
2 Normative references .....	8
3 Terms and definitions .....	9
4 Types of disturbance to be measured .....	13
4.1 General .....	13
4.2 Types of disturbance .....	13
4.3 Detector functions .....	14
5 Connection of measuring equipment .....	14
6 General measurement requirements and conditions .....	14
6.1 General .....	14
6.2 Disturbance not produced by the equipment under test .....	14
6.2.1 General .....	14
6.2.2 Compliance (conformity assessment) testing .....	14
6.3 Measurement of continuous disturbance .....	15
6.3.1 Narrowband continuous disturbance .....	15
6.3.2 Broadband continuous disturbance .....	15
6.3.3 Use of spectrum analyzers and scanning receivers .....	15
6.4 Operating conditions of the EUT .....	15
6.4.1 Normal load conditions .....	15
6.4.2 The time of operation .....	15
6.4.3 Running-in time .....	15
6.4.4 Supply .....	16
6.4.5 Mode of operation .....	16
6.5 Interpretation of measuring results .....	16
6.5.1 Continuous disturbance .....	16
6.5.2 Discontinuous disturbance .....	16
6.6 Measurement times and scan rates for continuous disturbance .....	16
6.6.1 General .....	16
6.6.2 Minimum measurement times .....	17
6.6.3 Scan rates for scanning receivers and spectrum analyzers .....	17
6.6.4 Scan times for stepping receivers .....	18
6.6.5 Strategies for obtaining a spectrum overview using the peak detector .....	19
7 Measurement of radiated disturbances .....	22
7.1 Introductory remarks .....	22
7.2 Loop-antenna system measurements (9 kHz to 30 MHz) .....	23
7.2.1 General .....	23
7.2.2 General measurement method .....	23
7.2.3 Test environment .....	24
7.2.4 Configuration of the equipment under test .....	24
7.2.5 Measurement uncertainty for LAS .....	25
7.3 Open-area test site or semi-anechoic chamber measurements (30 MHz to 1 GHz) .....	25
7.3.1 Measurand .....	25
7.3.2 Test site requirements .....	26
7.3.3 General measurement method .....	26

7.3.4	Measurement distance.....	27
7.3.5	Antenna height variation .....	27
7.3.6	Product specification details .....	27
7.3.7	Measurement instrumentation.....	29
7.3.8	Field-strength measurements on other outdoor sites.....	29
7.3.9	Measurement uncertainty for OATS and SAC .....	29
7.4	Fully-anechoic room measurements (30 MHz to 1 GHz) .....	30
7.4.1	Test set-up and site geometry .....	30
7.4.2	EUT position .....	32
7.4.3	Cable layout and termination .....	33
7.4.4	Measurement uncertainty for FAR .....	34
7.5	Radiated emission measurement method (30 MHz to 1 GHz) and radiated immunity test method (80 MHz to 1 GHz) with common test set-up in semi-anechoic chamber .....	34
7.5.1	Applicability .....	34
7.5.2	EUT perimeter definition and antenna-to-EUT separation distance .....	34
7.5.3	Uniform test volume.....	35
7.5.4	Specifications for EUT set-up in common emissions/immunity test setup .....	36
7.5.5	Measurement uncertainty for common emission/immunity set-up and method .....	41
7.6	Fully-anechoic room and absorber-lined OATS/SAC measurements (1 GHz to 18 GHz).....	41
7.6.1	Quantity to measure .....	41
7.6.2	Measurement distance.....	41
7.6.3	Set-up and operating conditions of the equipment under test (EUT).....	41
7.6.4	Measurement site .....	42
7.6.5	Measurement instrumentation.....	42
7.6.6	Measurement procedure .....	42
7.6.7	Measurement uncertainty for FAR .....	49
7.7	<i>In situ</i> measurements (9 kHz to 18 GHz) .....	49
7.7.1	Applicability of and preparation for <i>in situ</i> measurements .....	49
7.7.2	Field-strength measurements <i>in situ</i> in the frequency range 9 kHz to 30 MHz.....	50
7.7.3	Field-strength measurements <i>in situ</i> in the frequency range above 30 MHz.....	51
7.7.4	<i>In situ</i> measurement of the disturbance effective radiated power using the substitution method .....	52
7.7.5	Documentation of the measurement results .....	56
7.7.6	Measurement uncertainty for <i>in situ</i> method .....	56
7.8	Substitution measurements (30 MHz to 18 GHz) .....	56
7.8.1	General .....	56
7.8.2	Test site .....	56
7.8.3	Test antennas.....	57
7.8.4	EUT configuration.....	57
7.8.5	Test procedure .....	57
7.8.6	Measurement uncertainty for substitution method .....	58
7.9	Reverberation chamber measurements (80 MHz to 18 GHz).....	58
7.10	TEM waveguide measurements (30 MHz to 18 GHz) .....	58
8	Automated measurement of emissions .....	58