

INTERNATIONAL STANDARD



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

IT'S STANDARD PREVIEW
(standards.iteh.ai)
IEC 61000-4-3:2020
<https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020>



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

[IEC 61000-4-3:2020](https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020)

[https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-](https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020)

[f6c02a3c2b26/iec-61000-4-3-2020](https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020)

INTERNATIONAL STANDARD



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

[IEC 61000-4-3:2020](https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020)

<https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.100.20

ISBN 978-2-8322-8678-4

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	6
INTRODUCTION	8
1 Scope	9
2 Normative references	9
3 Terms, definitions and abbreviated terms	9
3.1 Terms and definitions	9
3.2 Abbreviated terms	13
4 General	14
5 Test levels and frequency ranges	14
5.1 Selection of test level	14
5.2 Test frequency ranges	16
6 Test equipment	17
6.1 Test instrumentation	17
6.2 Description of the test facility	17
6.3 Uniform field area (UFA)	18
6.3.1 Characteristics of the UFA	18
6.3.2 Constant field strength level setting method	23
6.3.3 Constant power level setting method	24
7 Test setup	25
7.1 General	25
7.2 Arrangement of table-top equipment	26
7.3 Arrangement of floor-standing equipment	28
7.4 Arrangement of wiring	29
7.5 Arrangement of human body-mounted equipment	30
8 Test procedure	30
8.1 General	30
8.2 Laboratory reference conditions	30
8.2.1 General	30
8.2.2 Climatic conditions	30
8.2.3 Electromagnetic conditions	30
8.3 Execution of the test	30
8.4 Step sizes	32
9 Evaluation of test results	32
10 Test report	32
Annex A (informative) Rationale for the choice of modulation for tests related to the protection against RF emissions from digital radio services	34
A.1 Summary of available modulation methods	34
A.2 Experimental results	35
A.3 Secondary modulation effects	38
A.4 Conclusion	38
Annex B (informative) Field generating antennas	39
B.1 Biconical antenna	39
B.2 Log-periodic antenna	39
B.3 Combination antennas	39
B.4 Horn antenna and double ridge wave guide antenna	39

Annex C (informative) Use of anechoic chambers	40
C.1 General anechoic chamber information	40
C.2 Use of ferrite-lined chambers at frequencies above 1 GHz	40
C.2.1 Problems caused by the use of ferrite-lined chambers for radiated field immunity tests at frequencies above 1 GHz	40
C.2.2 Solutions to reduce reflections	41
Annex D (informative) Amplifier compression and non-linearity	42
D.1 Objective of limiting amplifier distortion	42
D.2 Possible problems caused by harmonics and saturation	42
D.3 Limiting the harmonic content in the field	42
D.4 Effect of linearity characteristic on the immunity test	43
D.4.1 General	43
D.4.2 Evaluation method of the linearity characteristic	43
Annex E (informative) Guidance for product committees on the selection of test levels	47
E.1 General	47
E.2 Test levels related to general purposes	47
E.3 Test levels related to the protection against RF emissions from digital radio telephones	48
E.4 Special measures for fixed transmitters	49
Annex F (informative) Selection of test methods	50
Annex G (informative) Cable layout details	52
G.1 Intentions of EUT setup for radiated immunity test	52
G.2 Cable in the field	52
G.3 Cables leaving the test area	52
G.4 Turning the EUT cabinets	52
Annex H (informative) Examples of test setups for large and heavy EUTs	54
H.1 EUTs with bottom fed cables	54
H.2 EUTs with overhead cables	55
H.3 EUTs with multiple cables and AEs	56
H.4 Large EUTs with side fed cables and multiple UFA windows	57
Annex I (informative) Testing with multiple signals	58
I.1 General	58
I.2 Intermodulation	58
I.3 Power requirements	59
I.4 Level setting requirements	60
I.5 Linearity and harmonics checks	60
I.6 EUT performance criteria with multiple signals	60
Annex J (informative) Measurement uncertainty due to test instrumentation	61
J.1 General	61
J.2 Uncertainty budgets for level setting	61
J.2.1 Definition of the measurand	61
J.2.2 MU contributors of the measurand	61
J.2.3 Calculation examples for expanded uncertainty	62
J.2.4 Explanation of terms	63
J.3 Application	64
J.4 Reference documents	64
Annex K (informative) Calibration method for E-field probes	65
K.1 Overview	65

K.2	Probe calibration requirements	65
K.2.1	General	65
K.2.2	Calibration frequency range	65
K.2.3	Frequency steps	65
K.2.4	Field strength	66
K.3	Requirements for calibration instrumentation	66
K.3.1	General	66
K.3.2	Harmonics and spurious signals	66
K.3.3	Linearity check for probe	67
K.3.4	Determination of the gain of the standard horn antennas	68
K.4	Field probe calibration in anechoic chambers	69
K.4.1	Calibration environments	69
K.4.2	Validation of anechoic chambers for field probe calibration	69
K.4.3	Probe calibration procedure	75
K.5	Other probe calibration environments and methods	77
K.5.1	General	77
K.5.2	Field probe calibration using TEM cells	77
K.5.3	Field probe calibration using waveguide chambers	78
K.5.4	Field probe calibration using open-ended waveguides	79
K.5.5	Calibration of field probes by gain transfer method	79
K.6	Reference documents	79
Bibliography	81

iTech STANDARD PREVIEW
(standards.iteh.ai)

Figure 1	– Definition of the 80 % amplitude modulated (AM) test signal and the waveshapes occurring	16
Figure 2	– Example of suitable test facility	18
Figure 3	– Level setting setup	19
Figure 4	– Dimensions of sixteen-point uniform field area	20
Figure 5	– Minimum UFA size having a fifth grid point in the centre	21
Figure 6	– Measuring setup	23
Figure 7	– Example of EUT setup and cable layout for table top EUT having a cable that leaves the test setup	26
Figure 8	– Example of EUT setup (top view)	28
Figure C.1	– Multiple reflections in an existing small anechoic chamber	41
Figure C.2	– Most of the reflected waves are eliminated (applies for top and side view)	41
Figure D.1	– Amplifier linearity measurement setup	44
Figure D.2	– Example of linearity curve	45
Figure D.3	– Example of gain deviation	45
Figure H.1	– Example of a test setup for EUT with bottom fed underground cables (CMADs not shown)	54
Figure H.2	– Example of a test setup for EUTs with overhead cables	55
Figure H.3	– Example of a setup of EUTs with multiple cables and AEs	56
Figure H.4	– Large EUTs with side fed cables and multiple UFAs	57
Figure I.1	– Test frequencies f_1 and f_2 and intermodulation frequencies of the second and third order	58
Figure J.1	– Example of influences upon level setting	62
Figure K.1	– Example of linearity for probe	68

Figure K.2 – Setup for measuring net power to a transmitting device	70
Figure K.3 – Test setup for chamber validation test.....	72
Figure K.4 – Detail for measurement position ΔL	72
Figure K.5 – Example of data adjustment.....	73
Figure K.6 – Example of the test layout for antenna and probe	74
Figure K.7 – Test setup for chamber validation test.....	74
Figure K.8 – Example of alternative chamber validation data	75
Figure K.9 – Field probe calibration layout.....	76
Figure K.10 – Field probe calibration layout (top view).....	76
Figure K.11 – Cross-sectional view of a waveguide chamber	78
Table 1 – Test levels.....	15
Table 2 – Amplitude modulation characteristics at output of signal generator.....	15
Table 3 – Requirements for uniform field area for application of full illumination and partial illumination.....	22
Table A.1 – Comparison of modulation methods	35
Table A.2 – Relative interference levels.....	36
Table A.3 – Relative immunity levels.....	37
Table E.1 – Examples of test levels, associated protection distances and performance criteria	48
Table J.1 – Level setting process.....	62
Table J.2 – Test process.....	63
Table K.1 – Calibration field strength level.....	66
Table K.2 – Example for the probe linearity check.....	67

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –**Part 4-3: Testing and measurement techniques –
Radiated, radio-frequency electromagnetic field immunity test**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61000-4-3 has been prepared by subcommittee 77B: High frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

It forms part 4-3 of IEC 61000. It has the status of a basic EMC publication in accordance with IEC Guide 107.

This fourth edition cancels and replaces the third edition published in 2006, Amendment 1:2007 and Amendment 2:2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) testing using multiple test signals has been described;
- b) additional information on EUT and cable layout has been added;
- c) the upper frequency limitation has been removed to take account of new services;
- d) the characterization of the field as well as the checking of power amplifier linearity of the immunity chain are specified.

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

FDIS	Report on voting
77B/830/FDIS	77B/825/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

iTeh STANDARD PREVIEW

(standards.iteh.ai)

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.

<https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020>

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

[IEC 61000-4-3:2020](#)

<https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-1005e906a600/iec-61000-4-3-2020>

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, radio-frequency, electromagnetic fields.

ELECTROMAGNETIC COMPATIBILITY (EMC) –

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

1 Scope

This part of IEC 61000 is applicable to the immunity requirements of electrical and electronic equipment to radiated electromagnetic energy. It establishes test levels and the required test procedures.

The object of this document is to establish a common reference for evaluating the immunity of electrical and electronic equipment when subjected to radiated, radio-frequency electromagnetic fields. The test method documented in this part of IEC 61000 describes a consistent method to assess the immunity of an equipment or system against RF electromagnetic fields from RF sources not in close proximity to the EUT. The test environment is specified in Clause 6.

NOTE 1 As described in IEC Guide 107, this is a basic EMC publication for use by product committees of the IEC. As also stated in Guide 107, the IEC product committees are responsible for determining whether this immunity test standard should be applied or not, and if applied, they are responsible for determining the appropriate test levels and performance criteria. TC 77 and its sub-committees are prepared to co-operate with product committees in the evaluation of the value of particular immunity tests for their products.

NOTE 2 Immunity testing against RF sources in close proximity to the EUT is defined in IEC 61000-4-39.

Particular considerations are devoted to the protection against radio-frequency emissions from digital radiotelephones and other RF emitting devices.

NOTE 3 Test methods are defined in this part for evaluating the effect that electromagnetic radiation has on the equipment concerned. The simulation and measurement of electromagnetic radiation is not adequately exact for quantitative determination of effects. The test methods defined in this basic document have the primary objective of establishing an adequate reproducibility of testing configuration and repeatability of test results at various test facilities.

This document is an independent test method. It is not possible to use other test methods as substitutes for claiming compliance with this document.

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 60050-161, *International Electrotechnical Vocabulary (IEV) – Part 161: Electromagnetic compatibility* (available at www.electropedia.org)

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-161 and the following 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>

3.1.1

amplitude modulation

AM

modulation in which the amplitude of a periodic carrier is a given function, generally linear, of the instantaneous values of the modulating signal

[SOURCE: IEC 60050-702:2016, 702-06-17]

3.1.2

anechoic chamber

shielded enclosure which is lined with radio-frequency absorbers to reduce reflections from the internal surfaces

3.1.3

fully anechoic chamber

shielded enclosure whose internal surfaces are totally lined with anechoic material

3.1.4

semi-anechoic chamber

shielded enclosure in which all surfaces except the metal floor are covered with material that absorbs electromagnetic energy (i.e. RF absorber) in the frequency range of interest

3.1.5

modified semi-anechoic chamber

semi-anechoic chamber which has additional absorbers installed on the ground plane

3.1.6

antenna

that part of a radio transmitting or receiving system which is designed to provide the required coupling between a transmitter or a receiver and the medium in which the radio wave propagates

Note 1 to entry: In practice, the terminals of the antenna or the points to be considered as the interface between the antenna and the transmitter or receiver should be specified.

Note 2 to entry: If a transmitter or receiver is connected to its antenna by a feed line, the antenna may be considered to be a transducer between the guided waves of the feed line and the radiated waves in space.

[SOURCE: IEC 60050-712:1992, 712-01-01]

3.1.7

balun

device for transforming an unbalanced voltage to a balanced voltage or vice versa

[SOURCE: IEC 60050-161:1990 161-04-34]

3.1.8

common mode absorption device

CMAD

device that may be applied on cables leaving the test area in radiated immunity tests to damp resonances on cables

3.1.9 continuous wave CW

sinusoidal electromagnetic wave, the successive oscillations of which are identical under steady-state conditions, which can be interrupted or modulated to convey information

3.1.10 electromagnetic wave

wave characterized by the propagation of a time-varying electromagnetic field

Note 1 to entry: An electromagnetic wave is produced by variations of electric charges or of electric currents

[SOURCE: IEC 60050-705:1995, 705-01-09]

3.1.11 far field

that region of the electromagnetic field of an antenna wherein the predominant components of the field are those which represent a propagation of energy and wherein the angular field distribution is essentially independent of the distance from the antenna

Note 1 to entry: In the far field region, all the components of the electromagnetic field decrease in inverse proportion to the distance from the antenna.

Note 2 to entry: For a broadside antenna having a maximum overall dimension D which is large compared to the wavelength λ , the far field region is commonly taken to exist at distances greater than $2D^2/\lambda$, from the antenna in the direction of maximum radiation.

[SOURCE: IEC 60050-712:1992, 712-02-02, modified – the word "region" has been removed from the term]

3.1.12 field strength

magnitude of the electromagnetic field at a given point

<https://standards.iteh.ai/catalog/standards/sist/638e504f-8e16-4c5a-850d-f6c02a3c2b26/iec-61000-4-3-2020>

[SOURCE: IEC 60050-705:1995, 705-08-31, modified – the rest of the definition after "given point" has been deleted.]

3.1.13 frequency band

continuous set of frequencies lying between two specified limiting frequencies

Note 1 to entry: A frequency band is characterized by two values which define its position in the frequency spectrum, for instance its lower and upper limiting frequencies.

[SOURCE: IEC 60050-702:1992, 702-01-02]

3.1.14 full illumination method

test method in which the EUT being tested fits completely within the uniform field area (UFA)

Note 1 to entry: This test method may be applied for all test frequencies.

3.1.15 human body-mounted equipment

equipment which is intended for use when attached to or held in close proximity to the human body.

Note 1 to entry: This term includes hand-held devices which are carried by people while in operation (e.g. pocket devices) as well as electronic aid devices and implants.

3.1.16**intentional RF emitting device**

device which radiates (transmits) an electromagnetic field intentionally

EXAMPLE: Digital mobile telephones and other radio devices.

3.1.17**intermodulation**

interaction in non-linear device or transmission medium between the spectral components of the input signal or signals producing new spectral components having frequencies equal to linear combination with integral coefficients of the frequencies of the input spectral components

Note 1 to entry: Intermodulation can result from a single non-sinusoidal input signal or from several sinusoidal or non-sinusoidal input signals applied to the same or to different inputs

[SOURCE: IEC 60050-161:2017, 161-06-20]

3.1.18**isotropic field probe**

field sensor, whose detection properties are independent of direction of propagation and polarization of an electromagnetic wave

[SOURCE: IEC 60050-731:1991, 731-03-08, modified – wording modified to apply to field probe.]

3.1.19**maximum RMS value**

highest short-term RMS value of a modulated RF signal during an observation time of one modulation period

Note 1 to entry: The short-term RMS is evaluated over a single carrier cycle. For example, in Figure 1 b), the maximum RMS voltage is: $U_{\text{maximum rms}} = U_{\text{p-p}} / (2 \times \sqrt{2}) = 1,8 \text{ V}$

3.1.20**modulation factor**

in linear amplitude modulation, the ratio, generally expressed as a percentage, of the difference between the maximum and minimum amplitudes of the modulated signal to the sum of these amplitudes, expressed as:

$$m = 100 \times \frac{U_{\text{p-p,max}} - U_{\text{p-p,min}}}{U_{\text{p-p,max}} + U_{\text{p-p,min}}}$$

SEE Table 2 and Figure 1.

[SOURCE: IEC 60050-702:1992, 702-06-19, modified – the formula has been added and the note removed.]

3.1.21**non-constant envelope modulation**

RF modulation scheme in which the amplitude of the carrier wave varies slowly in time compared with the period of the carrier itself

EXAMPLE Conventional amplitude modulation and time division multiple access (TDMA).

3.1.22**partial illumination method**

test method used when the EUT face cannot be illuminated at once using a single UFA

3.1.23**polarization**

orientation of the electric field vector of a radiated field

3.1.24**reference ground plane****RGP**

flat conductive surface that is at the same electric potential as the reference ground, which is used as a common reference, and which contributes to a reproducible parasitic capacitance with the surroundings of the equipment under test (EUT)

[SOURCE: IEC 60050-161:2014, 161-04-36, modified – notes have been deleted.]

3.1.25**shielded enclosure****screened room**

mesh or sheet metallic housing designed expressly for the purpose of separating electromagnetically the internal and the external environment

[SOURCE: IEC 60050-161:1990, 161-04-37]

3.1.26**time division multiple access****TDMA**

multiple access technique in which the various terminals having access to a link are allotted separate recurrent time intervals for transmission

[SOURCE: IEC 60050-725:1994, 725-14-12]

3.1.27**transceiver****transmitter-receiver**

combination in a single unit of a radio transmitter and a radio receiver employing common circuit components and usually the same antenna for both transmitting and receiving

[SOURCE: IEC 60050-713:1998, 713-08-02, modified – the note has been deleted.]

3.1.28**uniform field area****UFA**

vertical plane in which field strength variations are acceptably small

SEE: 6.3.

3.2 Abbreviated terms

AE	Auxillary equipment
AM	Amplitude modulation
CMAD	Common-mode absorption device
CW	Continuous wave
DECT	Digital enhanced cordless telecommunications
EM	Electromagnetic
ERP	Effective radiated power
EUT	Equipment under test
GSM	Groupe Special Mobile, later renamed to: Global System for Mobile Communications