

# TECHNICAL SPECIFICATION

---

**Electromagnetic compatibility (EMC) -  
Part 1-6: General - Guidelines for the evaluation of measurement uncertainty in  
EMC testing**

get full document from [standards.iteh.ai](https://standards.iteh.ai)



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2026 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 Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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](http://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 It also gives information on projects, replaced and withdrawn publications.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](http://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](http://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](mailto:sales@iec.ch).

**IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)**

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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

## CONTENTS

FOREWORD.....	5
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references .....	9
3 Terms, definitions, symbols and abbreviated terms.....	9
3.1 Terms and definitions.....	9
3.2 Symbols.....	17
3.3 Abbreviated terms.....	19
4 General .....	19
4.1 Overview .....	19
4.2 Purpose of and responsibilities in MU evaluation .....	19
4.3 Classification of measurement uncertainty contributions .....	20
4.4 Measurement uncertainty in emission test methods .....	21
4.5 Measurement uncertainty in immunity test methods .....	22
4.6 Measurement uncertainty in calibration .....	22
4.7 Methods of MU calculation .....	22
4.7.1 General .....	22
4.7.2 The GUM method .....	22
4.7.3 The GUMS1 method .....	24
4.8 Principles.....	26
5 Measurement uncertainty budget development.....	28
5.1 Basic steps - GUM method.....	28
5.2 Basic steps - GUMS1 method .....	31
5.3 Measurement model function .....	32
5.4 Probability density functions .....	32
5.4.1 Rectangular.....	32
5.4.2 Triangular .....	35
5.4.3 Normal .....	37
5.4.4 Student <i>t</i> .....	41
5.4.5 U-shaped.....	43
5.5 Concept of Type A and Type B evaluation of uncertainty .....	47
5.5.1 General considerations .....	47
5.5.2 Type A evaluation of standard uncertainty .....	48
5.5.3 Type B evaluation of standard uncertainty .....	51
5.5.4 Type A evaluation in the GUM method and in GUMS1 method.....	53
5.6 Conversion from linear quantities to decibel and vice versa .....	54
5.6.1 General considerations .....	54
5.6.2 Normally distributed fluctuations .....	54
5.6.3 Uniformly distributed fluctuations .....	57
6 Applicability of measurement uncertainty.....	58
7 Documentation of measurement uncertainty calculation.....	61
Annex A (informative) Example of MU evaluation for emission measurements .....	62
A.1 Symbols.....	62
A.1.1 General symbols.....	62
A.1.2 Symbol and definition of the measurand in the example.....	62
A.1.3 Symbols for input quantities common to all disturbance measurements .....	62

A.1.4	Symbols of input quantities specific for radiated disturbance measurements .....	62
A.2	Example of an uncertainty budget for radiated disturbance measurements from 1 GHz to 18 GHz.....	63
A.3	Rationale for the estimates of input quantities common to all disturbance measurements in Table A.1 (see cross-references in Table A.1) .....	64
A.4	Rationale for the estimates of influence quantities specific to the radiated disturbance measurement method from 1 GHz to 18 GHz (see cross-references in Table A.1).....	67
A.5	Application of GUMS1 method .....	69
Annex B (informative)	Example of MU evaluation for RF radiated immunity test level setting .....	72
B.1	General symbols.....	72
B.2	Symbol and definition of the measurand.....	72
B.3	Symbols for input quantities .....	72
B.4	Example of an uncertainty budget for RF radiated immunity test from 80 MHz to 1 GHz .....	73
B.5	Rationale for the estimates of input quantities.....	73
B.6	Application of GUMS1 method .....	74
Annex C (informative)	Application of MU to metrological confirmation in EMC.....	76
C.1	Background and definitions .....	76
C.2	Acceptance criteria for metrological confirmation .....	76
C.2.1	General .....	76
C.2.2	Acceptance criterion when standard requirements are defined.....	76
C.2.3	Acceptance criterion when standard requirements are not defined.....	78
Annex D (informative)	Sampling statistics .....	80
D.1	General considerations .....	80
D.2	Sample mean and sample standard deviation .....	80
D.3	Sample coefficient of variation .....	81
D.4	Limits of sample-statistical confidence intervals.....	81
D.5	Sampling distribution and sampling statistics of mean value .....	82
D.5.1	General .....	82
D.5.2	Complex-valued field or current .....	82
D.5.3	Power (energy density, intensity).....	83
D.5.4	Field amplitude .....	83
D.6	Sampling distribution and sampling statistics of standard deviation.....	85
D.6.1	General .....	85
D.6.2	Complex-valued field or current .....	85
D.6.3	Power (energy density, intensity).....	85
D.6.4	Field amplitude .....	86
Annex E (informative)	Robust statistics for processing interlaboratory comparison measurement data.....	87
E.1	Background .....	87
E.2	Robust statistics .....	87
E.2.1	Numerical application .....	88
E.3	Performance statistics.....	90
E.3.1	General .....	90
E.3.2	Unknown spread.....	90
E.3.3	An estimate of the maximum deviation is available .....	90
E.3.4	Measurement uncertainty is available .....	90

Annex F (informative) Example of application of MU for risk of false acceptance/rejection of an ESD generator .....	92
F.1 Background .....	92
F.2 ESD generator conformity assessment.....	92
F.3 Risk assessment approach .....	94
Annex G (informative) Estimated probability within the tolerance range .....	97
G.1 General symbols.....	97
G.2 General expression of the probability included in a specific interval as a function of tolerance to uncertainty ratio (TUR).....	97
G.3 Acceptance criteria .....	100
Bibliography.....	102
Figure 1 – Classification of uncertainty components associated with the experimental evaluation of uncertainty in EMC testing and measurement .....	21
Figure 2 – Graphical representation of the Law of Propagation of Uncertainty.....	23
Figure 3 – Graphical representation of the propagation of distributions .....	25
Figure 4 – Example of $gx'   x$ .....	26
Figure 5 – Impact of $gx'   x$ on interpretation of $x'$ .....	27
Figure 6 – Estimate returned by the measurement system .....	28
Figure 7 – Rectangular PDF.....	33
Figure 8 – Triangular PDF.....	36
Figure 9 – Normal PDF for standardized $X$ .....	39
Figure 10 – Student $t$ -PDF for various values of the degrees of freedom $\nu$ .....	43
Figure 11 – U-shaped PDF .....	45
Figure 12 – Example of a circuit.....	45
Figure 13 – PDF of $B$ for a Rayleigh distributed $A$ at selected values of $\sigma$ .....	56
Figure 14 – Measurement uncertainty budget for a quantity to be realized in the test laboratory .....	58
Figure 15 – Relationship between measurement uncertainty budgets for a quantity to be realized in the test laboratory and tolerances given for this quantity in the applicable basic standard .....	59
Figure A.1 – Deviation of the peak detector level indication from the signal level at receiver input for two cases, a sine-wave signal and an impulsive signal (PRF 100 Hz) .....	66
Figure A.2 – System consisting of measuring receiver, preamplifier and connecting cable(s) .....	66
Figure A.3 – PDF obtained through application of the GUMS1 method (histogram plot), and of the GUM method (black line, normal PDF) .....	70
Figure A.4 – PDF obtained through application of the GUMS1 method (histogram plot), and of the GUM method (black line, normal PDF) .....	71
Figure B.1 – PDF obtained through application of the GUM method (dashed line, normal distribution), and of the GUMS1 method (continuous line) .....	75
Figure C.1 – Example illustrating the risk of false acceptance as the sum of probabilities $p_1$ and $p_2$ .....	78
Figure D.1 – Limits of 95 %, 99 % and 99,5 % confidence intervals for $W$ as a function of $N$ for measurements using a rectilinear antenna or single-axis probe.....	84
Figure D.2 – Limits of 95 %, 99 % and 99,5 % confidence intervals for $A$ as a function of $N$ for measurements using a rectilinear antenna or single-axis probe.....	85

Figure D.3 – 95 % confidence intervals for $SX$ as a function of $N$ for measurements using a single-axis detector .....	86
Figure F.1 – Calibration results of an ESD generator: Rise time .....	93
Figure G.1 – Normal probability distribution of the random variable $x$ .....	97
Figure G.2 – Probability $p$ as a function of $TUR$ .....	100
Table 1 – Basic steps for evaluating MU with the GUM method .....	28
Table 2 – Expressions used to obtain standard uncertainty .....	30
Table 3 – Basic steps for evaluating MU with the GUMS1 method .....	31
Table 4 – Examples of circuit parameters .....	47
Table 5 – Values of the expansion coefficient $\eta_V$ which transforms the standard deviation to the Type A standard uncertainty .....	51
Table 6 – Situations, where and how an instrument is suitable for tests or measurements, or both, as specified in the applicable standard with tolerances .....	60
Table A.1 – Radiated disturbance measurements from 1 GHz to 18 GHz in a FAR at a distance of 3 m .....	63
Table B.1 – Example for an uncertainty budget of the radiated immunity test level (80 MHz to 1 000 MHz) .....	73
Table E.1 – Application of robust statistics and performance statistics to a numerical case .....	89
Table F.1 – Calibration results of an ESD generator: Rise time .....	92
Table F.2 – Calibration results of an ESD generator: Peak current .....	93
Table F.3 – Calibration results of an ESD generator: Current at 30 ns .....	94
Table F.4 – Calibration results of an ESD generator: Current at 60 ns .....	94
Table F.5 – Risk assessment of an ESD generator: Rise time .....	95
Table F.6 – Risk assessment of an ESD generator: Peak current .....	95
Table F.7 – Risk assessment of an ESD generator: Current at 30 ns .....	96
Table F.8 – Risk assessment of an ESD generator: Current at 60 ns .....	96
Table F.9 – Combined risk assessment of an ESD generator .....	96

INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

**Electromagnetic compatibility (EMC) -  
Part 1-6: General - Guidelines for the evaluation of measurement  
uncertainty in EMC testing**

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC TS 61000-1-6 has been prepared by IEC technical committee 77: Electromagnetic compatibility in cooperation with CISPR (International Special Committee on Radio Interference). It is a Technical Specification.

This first edition cancels and replaces the first edition of IEC TR 61000-1-6 published in 2012. This edition constitutes a technical revision.

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

- a) purpose of and responsibilities in measurement uncertainty evaluation by testing and calibration laboratories, technical committees dealing with EMC requirements have been introduced;
- b) classification of measurement uncertainty contributions (measurement uncertainty, measurement instrumentation uncertainty, intrinsic uncertainty of the measurand) has been revised;
- c) new clauses devoted to measurement uncertainty in emission test methods and measurement uncertainty in immunity test methods and in calibration have been added;
- d) methods of measurement uncertainty calculation have been enriched by introducing the GUM Supplement 1 (GUMS1) numerical approach based on Monte Carlo method;
- e) measurement uncertainty budget development has been revised to include the basic steps to follow in case of application of the GUM method or of the GUMS1 method;
- f) a clause specifically devoted to the measurement model function has been added to emphasize the importance of the measurement model and to provide guidance when the measurement model is unknown;
- g) the clause on probability density functions has been revised to include the Student-t probability density function;
- h) the clause on Type A and Type B evaluations of uncertainty has been revised to improve readability;
- i) the clause on the conversion from linear quantities to decibel and vice versa has been revised to improve readability and make some corrections;
- j) the clause on the applicability of measurement uncertainty has been modified to improve readability and to remove statements conflicting with conformity assessments standards;
- k) [Annex A](#) and [Annex B](#) have been revised by including results of GUMS1 application;
- l) new annexes have been introduced, namely [Annex C](#) (on metrological confirmation of measurement equipment), [Annex D](#) (on sampling statistics, moved from the main text to this annex to improve readability of the whole document), [Annex E](#) (on robust statistics for processing interlaboratory comparison data, with example), [Annex F](#) (including an example of application of MU for the assessment of the risk of an out of tolerance of measurement equipment) and [Annex G](#) (including an example of application of MU for the evaluation of in-tolerance probability as a function of tolerance to uncertainty ratio – TUR).

The text of this Technical Specification is based on the following documents:

Draft	Report on voting
77/637/DTS	77/640/RVDTS

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

The language used for the development of this Technical Specification is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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 [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

# Sample Document

get full document from [standards.iteh.ai](https://standards.iteh.ai)

## 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).

Further reading:

- European Telecommunications Standards Institute (ETSI) [1]
- European Accreditation (EA) [2]
- UK Accreditation Service (UKAS) [3]
- M. Kendall and A. Stuart [4]
- I. A. Harris and F. L. Warner [5]
- C.F.M. Carobbi [6]

## 1 Scope

This part of IEC 61000 provides methods and background information for the evaluation of measurement uncertainty in electromagnetic compatibility (EMC) tests and calibrations. It gives guidance to cover general measurement uncertainty considerations within the IEC 61000 series [7].

The objective of this document is to give advice to EMC technical committees dealing with EMC tests, testing laboratories and calibration laboratories on the development of measurement uncertainty budgets; to allow uniform development and comparability of these budgets between laboratories; and to align the treatment of measurement uncertainty across the technical committees of the IEC dealing with EMC tests.

Any contributing factor to measurement uncertainty that is mentioned within this document will be treated as an example: the EMC committee responsible for the preparation of a basic immunity or emission standard is responsible for identifying the factors that contribute to the measurement uncertainty of the relevant test method.

This document provides:

- methods for the evaluation of measurement uncertainty (MU),
- mathematical formulae for probability density functions and their interpretation,
- examples of MU calculations,
- examples of MU applications,
- MU reporting information.

This document is not intended to summarize all measurement uncertainty influence quantities, nor is it intended to specify how measurement uncertainty will be taken into account in determining compliance with an EMC requirement.

NOTE Some of the examples given in this document are based on IEC publications (for example CISPR 16-4 series [8]) other than the IEC 61000 series [7] that have already implemented the evaluation procedure presented here. These examples are used to illustrate the principles.

## 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 60050-161:1990, *International Electrotechnical Vocabulary (IEV) - Part 161: Electromagnetic compatibility*

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*

## 3 Terms, definitions, symbols and abbreviated terms

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-161:1990 and the following apply.

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

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

NOTE Several of the most relevant terms and definitions from IEC 60050-161:1990 are included among the terms and definitions below.

### 3.1.1

#### **combined standard measurement uncertainty**

combined standard uncertainty

standard measurement uncertainty that is obtained using the individual standard measurement uncertainties associated with the input quantities in a measurement model

Note 1 to entry: In case of correlations of input quantities in a measurement model, covariances must also be taken into account when calculating the combined standard measurement uncertainty; see also [ISO/IEC Guide 98-3:2008 \[9\]](#), 2.3.4.

[SOURCE: [ISO/IEC Guide 99:2007 \[10\]](#), 2.31, modified – The preferred term "combined standard measurement uncertainty" has been deleted.]

### 3.1.2

#### **coverage factor**

numerical factor used as a multiplier of the combined standard uncertainty in order to obtain an expanded uncertainty

[SOURCE: [ISO/IEC Guide 98-3:2008 \[9\]](#), 2.3.6, modified – The note was deleted.]

### 3.1.3

#### **coverage interval**

interval containing the set of quantity values of a measurand with a stated probability, based on the information available

[SOURCE: [ISO/IEC Guide 99:2007 \[10\]](#), 2.36, modified – In the definition, "true quantity values" was changed to "quantity values" and the notes were deleted.]

### 3.1.4

#### **coverage probability**

probability that the set of quantity values of a measurand is contained within a specified coverage interval

Note 1 to entry: The coverage probability is also termed "level of confidence" in the GUM.

[SOURCE: [ISO/IEC Guide 99:2007 \[10\]](#), 2.37, modified – In the definition, "true quantity values" was changed to "quantity values" and Note 1 was deleted.]

### 3.1.5

#### **direct (method of) measurement**

method of measurement in which the value of a measurand is obtained directly, without the necessity for supplementary calculations based on a functional relationship between the measurand and other quantities actually measured

Note 1 to entry: The value of the measurand is considered to be obtained directly even when the scale of a measuring instrument has values which are linked to corresponding values of the measurand by means of a table or a graph.

Note 2 to entry: The method of measurement remains direct even if it is necessary to make supplementary measurements to determine the values of influence quantities in order to make corrections.

[SOURCE: [IEC 60050-311:2001 \[11\]](#), 311-02-01]

**3.1.6****distribution function**

function giving, for every value  $\xi$ , the probability that the random variable  $X$  be less than or equal to  $\xi$ :  $G_X(\xi) = \Pr(X \leq \xi)$

[SOURCE: ISO/IEC Guide 98-3:2008/Suppl 1:2008 [12], 3.2]

**3.1.7****error**

measured quantity value minus a reference quantity value

[SOURCE: ISO/IEC Guide 99:2007 [10], 2.16, modified – Second admitted term became the preferred (and only) term and Note 1 and Note 2 have been deleted.]

**3.1.8****expanded uncertainty**

quantity defining an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand

[SOURCE: ISO/IEC Guide 98-3:2008 [9], 2.3.5, modified – Notes 1 to 3 have been deleted.]

**3.1.9****electromagnetic compatibility**

EMC

ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

[SOURCE: IEC 60050-161:1990/AMD8:2018 [13], 161-01-07]

**3.1.10****emission**

phenomenon by which electromagnetic energy emanates from a source

[SOURCE: IEC 60050-161:1990/AMD9:2019 [14], 161-01-08, modified – In the term, "electromagnetic" was deleted.]

**3.1.11****emission level**

emission level of a disturbing source

level of a given electromagnetic disturbance emitted from a particular device, equipment or system

[SOURCE: IEC 60050-161:1990 [15], 161-03-11, modified – In the term, "(from a disturbing source)" has been removed and "emission limit of a disturbing source" has been added as an admitted term.]

**3.1.12****emission limit**

emission limit from a disturbing source

specified maximum emission level of a source of electromagnetic disturbance

[SOURCE: IEC 60050-161:1990 [15], 161-03-12, modified – In the term, "(from a disturbing source)" has been removed and "emission limit from a disturbing source" has been added as an admitted term.]

### 3.1.13

#### **immunity**

immunity to a disturbance

ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance

[SOURCE: IEC 60050-161:1990 [15], 161-01-20, modified – In the term, "(to a disturbance)" has been removed and "immunity to a disturbance" has been added.]

### 3.1.14

#### **immunity level**

maximum level of a given electromagnetic disturbance incident on a particular device, equipment or system for which it remains capable of operating at a required degree of performance

[SOURCE: IEC 60050-161:1990 [15], 161-03-14]

### 3.1.15

#### **immunity limit**

specified minimum immunity level

[SOURCE: IEC 60050-161:1990 [15], 161-03-15]

### 3.1.16

#### **immunity test level**

level of a test signal used to simulate an electromagnetic disturbance when performing an immunity test

[SOURCE: IEC 60050-161:1990 [15], 161-04-41, modified – In the term, "severity level (deprecated)" has been removed.]

### 3.1.17

#### **indication**

quantity value provided by a measuring instrument or a measuring system

Note 1 to entry: An indication may be presented in visual or acoustic form or may be transferred to another device. An indication is often given by the position of a pointer on the display for analog outputs, a displayed or printed number for digital outputs, a code pattern for code outputs, or an assigned quantity value for material measures.

Note 2 to entry: An indication and a corresponding value of the quantity being measured are not necessarily values of quantities of the same kind.

[SOURCE: ISO/IEC Guide 99:2007 [10], 4.1.]

### 3.1.18

#### **indirect (method of) measurement**

method of measurement in which the value of a quantity is obtained from measurements made by direct methods of measurement of other quantities linked to the measurand by a known relationship

[SOURCE: IEC 60050-311:2001 [11], 311-02-02]

### 3.1.19

#### **influence quantity**

quantity that is not the measurand but that affects the result of the measurement

[SOURCE: ISO/IEC Guide 98-3:2008 [9], B.2.10, modified – Examples were deleted.]

**3.1.20****input quantity**

quantity that must be measured, or a quantity, the value of which can be otherwise obtained, in order to calculate a measured quantity value of a measurand

**EXAMPLE** When the length of a steel rod at a specified temperature is the measurand, the actual temperature, the length at that actual temperature, and the linear thermal expansion coefficient of the rod are input quantities in a measurement model.

Note 1 to entry: An input quantity in a measurement model is often an output quantity of a measuring system.

Note 2 to entry: Indications, corrections and influence quantities can be input quantities in a measurement model.

[SOURCE: [ISO/IEC Guide 99:2007 \[10\]](#), 2.50, modified – The term "input quantity in a measurement model" has been removed.]

**3.1.21****instrumentation uncertainty**

IU

measurement instrumentation uncertainty

MIU

parameter, associated with the disturbance quantity generated during an emission measurement or applied during an immunity test that characterizes the dispersion of the values that could reasonably be attributed to the measurand, induced by all relevant influence quantities that are related to the measurement instrumentation and the test facility

Note 1 to entry: This term is intended to be applicable to both emission measurements and immunity tests. The CISPR 16 series of documents also employs the term 'measurement instrumentation uncertainty' MIU.

Note 2 to entry: Based on [IEC 60359:2001 \[16\]](#), 3.1.4.

**3.1.22****intrinsic uncertainty of the measurand**

minimum uncertainty that can be assigned in the description of a measured quantity

Note 1 to entry: In theory, the intrinsic uncertainty of the measurand would be obtained if the measurand was measured using a measurement system having a negligible measurement instrumentation uncertainty.

Note 2 to entry: No quantity can be measured with continually lower uncertainty, inasmuch as any given quantity is defined or identified at a given level of detail. If one tries to measure a given quantity at an uncertainty lower than its own intrinsic uncertainty one is compelled to redefine it with higher detail, so that one is actually measuring another quantity. See also [ISO/IEC Guide 98-3:2008 \[9\]](#), D.1.1.

Note 3 to entry: The result of a measurement carried out with the intrinsic uncertainty of the measurand may be called the best measurement of the quantity in question.

[SOURCE: [IEC 60359:2001 \[16\]](#), 3.1.11, modified – An additional explanation has been added, i.e., Note 1 to entry.]

**3.1.23****level**

value of a quantity, such as a power or a field quantity, measured and/or evaluated in a specified manner during a specified time interval

[SOURCE: [IEC 60050-161:1990 \[15\]](#), 161-03-01, modified – In the term "(of a time varying quantity)" has been removed and the note has been removed.]

**3.1.24****limit of error**

extreme value of measurement error, with respect to a known reference quantity value, permitted by specifications or regulations for a given measurement, measuring instrument, or measuring system