

# TECHNICAL REPORT



BASIC EMC PUBLICATION

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**Electromagnetic compatibility (EMC) –  
Part 1-6: General – Guide to the assessment of measurement uncertainty**



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BASIC EMC PUBLICATION

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## Electromagnetic compatibility (EMC) – Part 1-6: General – Guide to the assessment of measurement uncertainty

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## **ELECTROMAGNETIC COMPATIBILITY (EMC) –**

### **Part 1-6: General – Guide to the assessment of measurement uncertainty**

#### 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.
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The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 61000-1-6, which is a technical report, has been prepared by the IEC technical committee 77: Electromagnetic compatibility in corporation with CISPR (International Special Committee on Radio Interference).

It forms Part 1-6 of IEC 61000. 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*.

The text of this technical report is based on the following documents:

|               |                  |
|---------------|------------------|
| Enquiry draft | Report on voting |
| 77/397/DTR    | 77/409/RVC       |

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

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

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

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

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- withdrawn,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

A bilingual version of this publication may be issued at a later date.

**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.**

## 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).



# ELECTROMAGNETIC COMPATIBILITY (EMC) –

## Part 1-6: General –

### Guide to the assessment of measurement uncertainty

## 1 Scope

This part of IEC 61000 provides methods and background information for the assessment of measurement uncertainty. It gives guidance to cover general measurement uncertainty considerations within the IEC 61000 series.

The objectives of this Technical Report are to give advice to technical committees, product committees and conformity assessment bodies on the development of measurement uncertainty budgets; to allow the comparison of these budgets between laboratories that have similar influence quantities; and to align the treatment of measurement uncertainty across the EMC committees of the IEC.

Any contributing factor to measurement uncertainty that is mentioned within this Technical Report shall be treated as an example: the technical committee responsible for the preparation of a basic immunity standard is responsible for identifying the factors that contribute to the measurement uncertainty of their basic test method.

It gives a description for

- a method for the assessment of measurement uncertainty (MU),
- mathematical formulas for probability density functions,
- analytical assessment of statistical evaluations,
- correction of measured data,
- documentation.

This Technical Report is not intended to summarize all measurement uncertainty influence quantities nor is it intended to define how measurement uncertainty is to be taken into account in determining compliance with an EMC requirement.

NOTE Some of the examples given in this report are taken from IEC publications other than the IEC 61000 series that have already implemented the evaluation procedure presented here. These examples are used to illustrate the principles.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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) – Chapter 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*