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# Electromagnetic compatibility (EMC) —

**Part 3-6: Limits — Assessment of  
emission limits for the connection of  
distorting installations to MV, HV and  
EHV power systems**

ICS 33.100.10

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# TECHNICAL REPORT

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**Electromagnetic compatibility (EMC) –  
Part 3-6: Limits – Assessment of emission limits for the connection of distorting  
installations to MV, HV and EHV power systems**



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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 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).

## ACKNOWLEDGMENT

In 2002, the IEC subcommittee 77A made a request to CIGRE Study Committee C4 and CIRED Study Committee S2, to organize an appropriate technical forum (joint working group) whose main scope was to prepare, among other tasks, the revision of the technical report IEC 61000-3-6 concerning emission limits for harmonics for the connection of distorting installations to public supply systems at MV, HV and EHV.

To this effect, joint working group CIGRE C4.103/ CIRED entitled "*Emission Limits for Disturbing Installations*" was appointed in 2003. Some previous work produced by CIGRE JWG C4.07-Cired has been used as an input to the revision, in particular the planning levels and associated indices. In addition, using experience since the technical report IEC 61000-3-6 was initially published in 1996, WG C4.103 reviewed the procedure used to determine emission limits and the assessment methods used to evaluate emission levels for installations.

Subsequent endorsement of the document by IEC was the responsibility of SC 77A.

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

### **Part 3-6: Limits – Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems**

#### **1 Scope**

This Technical Report, which is informative in its nature, provides guidance on principles which can be used as the basis for determining the requirements for the connection of distorting installations to MV, HV and EHV public power systems (LV installations are covered in other IEC documents). For the purposes of this report, a distorting installation means an installation (which may be a load or a generator) that produces harmonics and/or interharmonics. The primary objective is to provide guidance to system operators or owners on engineering practices, which will facilitate the provision of adequate service quality for all connected customers. In addressing installations, this document is not intended to replace equipment standards for emission limits.

The report addresses the allocation of the capacity of the system to absorb disturbances. It does not address how to mitigate disturbances, nor does it address how the capacity of the system can be increased.

Since the guidelines outlined in this report are necessarily based on certain simplifying assumptions, there is no guarantee that this approach will always provide the optimum solution for all harmonic situations. The recommended approach should be used with flexibility and judgment as far as engineering is concerned, when applying the given assessment procedures in full or in part.

The system operator or owner is responsible for specifying requirements for the connection of distorting installations to the system. The distorting installation is to be understood as the customer's complete installation (i.e. including distorting and non-distorting parts).

Problems related to harmonics fall into two basic categories.

- Harmonic currents that are injected into the supply system by converters and harmonic sources, giving rise to harmonic voltages in the system. Both harmonic currents and resulting voltages can be considered as conducted phenomena.
- Harmonic currents that induce interference into communication systems. This phenomenon is more pronounced at higher order harmonic frequencies because of increased coupling between the circuits and because of the higher sensitivity of the communication circuits in the audible range.

This report gives guidance for the co-ordination of the harmonic voltages between different voltage levels in order to meet the compatibility levels at the point of utilisation. The recommendations in this report do not address harmonic interference phenomena in communication circuits (i.e. only the first of the above categories is addressed). These disturbances need to be addressed in terms of international directives concerning the Protection of Telecommunication Lines against Harmful Effects from Electric Power and Electrified Railway Lines, International Telecommunication Union, ITU-T Directives [1]<sup>2</sup> or in terms of locally applicable standards such as [2], [3] or [4].

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<sup>2</sup> Figures in square brackets refer to the bibliography.