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Bestämning av exponering för elektromagnetiska fält från utrustning för artikelövervakning (EAS), identifiering (RFID) och liknande

*Evaluation of human exposure to electromagnetic fields from devices used in
Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID)
and similar applications*

Som svensk standard gäller europastandarden EN 50357:2001. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50357:2001.

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Denna standard är fastställd av Svenska Elektriska Kommissionen, SEK,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
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**Evaluation of human exposure to electromagnetic fields
from devices used in Electronic Article Surveillance (EAS),
Radio Frequency Identification (RFID) and similar applications**

Evaluation de l'exposition humaine aux champs électromagnétiques (EMFs) émis par les dispositifs utilisés pour la surveillance électronique des objets (EAS), l'identification par radiofréquence (RFID) et les applications similaires

Ermittlung der Exposition von Personen gegenüber elektromagnetischen Feldern von Geräten, die in der elektronischen Artikelüberwachung (en: EAS), Hochfrequenz-Identifizierung (en: RFID) und ähnlichen Anwendungen verwendet werden

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CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 106X (former TC 211), Electromagnetic fields in the human environment.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50357 on 2001-07-03.

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) | 2002-07-01 |
| - latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2004-07-01 |

Annexes designated "informative" are given for information only.
In this standard, annexes A and B are informative.

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Introduction

This document presents procedures for the evaluation of human exposure to electromagnetic fields (EMF's) from Devices used in electronic article surveillance (EAS), radio frequency identification (RFID) and similar applications. The work has been carried out in response to:

- The ICNIRP ¹⁾ Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz) [1];
- European Council Recommendation 1999/519/EC on the limitation of exposure of the general public to electromagnetic fields 0-300 GHz (the EC Recommendation) [2];
- European Council Directive 73/23/EEC on the harmonisation of the laws of member states relating to electrical equipment designed for use within certain voltage limits (the LV Directive) [3];
- European Council Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (the R&TTE Directive) [4].

The techniques presented in this document may also be used to demonstrate compliance to other National or International requirements.

Electromagnetic fields interact with the human body and other biological systems through a number of physical mechanisms. The main mechanisms of interaction are based on nervous system effects and heating. These effects are dependent on frequency and are defined by biologically relevant quantities such as magnetic flux density, induced current density and specific absorption rate. These quantities are not directly measurable so they must be determined either, by calculation for each case, or by measuring a reference quantity which has a pre-derived relationship to them.

The examples used in this document are taken from the EC Recommendation and from the ICNIRP Guidelines. They each contain a series of Basic Restrictions for magnetic flux density, induced current density, power density and specific absorption rate as well as a series of derived Reference Levels

In any particular exposure situation, measured or calculated values can be compared to the appropriate reference level. The reference levels are generally obtained from the basic restriction by mathematical modelling and laboratory experimentation at specific frequencies. They reflect maximum coupling of the fields to the exposed human being, thereby providing maximum protection. Respect of the reference level will ensure respect of the relevant basic restriction. If the measured value exceeds the reference level, it does not necessarily follow that the basic restriction is also exceeded. Under those circumstances, more detailed evaluation techniques will be necessary which are specific to that type of equipment and exposure.

This document adopts a staged approach to compliance assessment. The first stage is a simple measurement against the appropriate derived Reference Levels. If the device meets these, there is no requirement for further assessment. Stage 2 is a more complex series of measurements, coupled with analysis techniques. Again, if the device meets the appropriate levels, there is no requirement for further assessment. Stage 3 requires detailed modelling and analysis to show compliance with the Basic Restrictions. Device compliance can be shown using any one of the stages; it is not necessary to use more than one, unless an assessment using Stages 1 or 2 fails to demonstrate compliance.

The devices covered by this document normally have non-uniform field patterns. Often these devices have a very rapid reduction of field strength with distance and operate under near-field conditions where the relationship between electric and magnetic fields is not constant. This, together with typical exposure conditions for different device types, is detailed in annex A.

Measurements and methods are derived with reference to:

1. Work carried out within CENELEC
2. Notes and explanatory text from the EC Recommendation and the ICNIRP Guidelines
3. Similar techniques proposed or adopted by IEC ²⁾, especially in the case of desktop equipment [5].
4. Other, specifically referenced techniques.

¹⁾ International Commission on Non-Ionising Radiation Protection

²⁾ International Electrotechnical Committee

[illegible]