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NORME INTERNATIONALE

Assessment methods of the human exposure to electric and magnetic fields from wireless power transfer systems – Models, instrumentation, measurement and computational methods and procedures (frequency range of 3 kHz to 30 MHz)

Méthodes d'évaluation de l'exposition humaine aux champs électriques et magnétiques produits par les systèmes de transfert de puissance sans fil – Modèles, instrumentation, méthodes et procédures de mesure et de calcul (Plage de fréquences comprise entre 3 kHz et 30 MHz)

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ASSESSMENT METHODS OF THE HUMAN EXPOSURE TO ELECTRIC AND MAGNETIC FIELDS FROM WIRELESS POWER TRANSFER SYSTEMS – MODELS, INSTRUMENTATION, MEASUREMENT AND COMPUTATIONAL METHODS AND PROCEDURES (FREQUENCY RANGE OF 3 kHz TO 30 MHz)

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IEC/IEEE 63184 was prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure, in cooperation with International Committee on Electromagnetic Safety (ICES) of the IEEE Standards Association, under the IEC/IEEE Dual Logo Agreement between IEC and IEEE. It is an International Standard.

This document is published as an IEC/IEEE Dual Logo standard.

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

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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 International Standard is English.

This document was drafted in accordance with the rules given in the ISO/IEC Directives, Part 2, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

This first edition of IEC/IEEE 63184 cancels and replaces the first edition of IEC PAS 63184 published in 2021. This edition constitutes a technical revision.

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

a) lower frequency bound changed from 1 kHz to 3 kHz;

b) clarified contact currents as indirect effects in assessment procedures;

c) in measurement methods applied the formulas of SAR and internal electric field;

d) in computational assessment methods added specifications for averaging of current density and internal E-field;

e) updated uncertainty of computational methods;

f) introduced test reporting contents guidance.

The IEC Technical Committee and IEEE Technical Committee have decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

The wireless power transmission systems described in the scope of this document require particularly developed procedures and protocols for the assessment of human exposure. Such systems are increasingly being implemented in a wide range of applications at different frequency ranges from consumer electronics (e.g. mobile phones, tablet PCs) to automotive (electric vehicles). Human exposure to electric and magnetic fields is limited to avoid established adverse health effects, including electrostimulation of nervous tissues and thermal effects, as well as contact currents. A published ITU-R report (ITU-R SM.2303-3 [1][1]) on WPT systems specifies RF exposure assessment methodologies, yet no definitive assessment method was introduced. An exposure assessment method of WPT for EV charging systems was specified in IEC 61980-3:2022 [2]; however, there are currently no other detailed product standards related to WPT systems. Because WPT systems will continue to become ubiquitous in a multitude of applications in the future, IEC and IEEE established a joint working group to address WPT system assessment methods related to human exposures to electric, magnetic, and electromagnetic fields.

In this document, the basic methods to assess both direct and indirect effects of exposure to WPT systems, case studies, and relevant research are specified. These methods mainly focus on frequencies between 3 kHz and 30 MHz and consider both electrostimulation and thermal effects. Future editions will consider extended guidance for assessments of exposure from capacitive WPT systems.

[1] Numbers in square brackets refer to the Bibliography.