

TECHNICAL REPORT



Exposure assessment methods for wireless power transfer systems



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Exposure assessment methods for wireless power transfer systems

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**EXPOSURE ASSESSMENT METHODS FOR
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IEC TR 62905, which is a Technical Report, has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

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

Enquiry draft	Report on voting
106/416/DTR	106/424A/RVDTR

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.

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

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INTRODUCTION

IEC TC 106 has the scope to prepare International Standards on measurement and calculation methods used to assess human exposure to electric, magnetic and electromagnetic fields. Wireless power transfer (WPT) systems have been developed and gradually become popular over the world. WPT basically utilize similar wireless technologies to provide power to mobile phones, tablet PCs, electric vehicles (EVs) and so on without cables; but the used frequency range, i.e., tens of kHz to tens of MHz, has not been often used and paid attention to. Both stimulation-based effects (< 10 MHz, for example) and heat-based effects (> 100 kHz, for example) should be considered in this frequency range. ITU-R published a report (ITU-R SM. 2303-1) related to WPT in June 2015 which also mentions RF exposure assessment methodologies. However, no concrete assessment method has been introduced. Only IEC TC 69 has addressed exposure assessment method of WPT for EV in IEC 61980-1:2015. There is no product standard related to WPT other than that standard. Considering that WPT products might be spread in the near future, IEC TC 106 needs to be aware of this issue and established a working group to address methods for assessment of WPT related to human exposures to electric, magnetic and electromagnetic fields.

Based on these backgrounds IEC TC 106 prepared this document consisting of an overview of WPT, basic exposure assessment methods for direct and indirect effects by WPT, case studies, and relevant research. Frequency up to 10 MHz is mainly focused on because both stimulation and heat effects need to be considered but have not been addressed so far. This document also mentions enhancement of internal fields by medical implant devices.

It is hoped that this document will be useful and helpful to develop International Standards for WPT exposure assessment.

EXPOSURE ASSESSMENT METHODS FOR WIRELESS POWER TRANSFER SYSTEMS

1 Scope

This document describes general exposure assessment methods for wireless power transfer (WPT) at frequency up to 10 MHz considering thermal and stimulus effects. Exposure assessment procedures and experimental results are shown as examples such as electric vehicles (EVs) and mobile devices.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

3.1 basic restriction BR

restriction on exposure to time-varying electric, magnetic and electromagnetic fields that is based on established biological effects

3.2 contact current

current flowing into the body resulting from contact with a conductive object in an electromagnetic field

Note 1 to entry: This is the localized current flow into the body (usually the hand, for a light brushing contact).

3.3 current density

current per unit cross-sectional area flowing inside the human body as a result of exposure to electromagnetic fields

3.4 device under test DUT

device that is tested according to the procedures specified in this document

3.5 dielectric constant

real part of the complex relative permittivity of the lossy material