

# TECHNICAL REPORT



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**Procedures for the assessment of human exposure to electromagnetic fields  
from radiative wireless power transfer systems – Measurement and  
computational methods (frequency range of 30 MHz to 300 GHz)**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PROCEDURES FOR THE ASSESSMENT OF HUMAN EXPOSURE TO  
ELECTROMAGNETIC FIELDS FROM RADIATIVE WIRELESS POWER  
TRANSFER SYSTEMS – MEASUREMENT AND COMPUTATIONAL  
METHODS (FREQUENCY RANGE OF 30 MHz TO 300 GHz)**

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The text of this Technical Report is based on the following 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 Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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## INTRODUCTION

IEC TC 106 is tasked with preparing International Standards on measurement and simulation methods used to assess human exposure to electric fields, magnetic fields, and electromagnetic fields. Wireless power transfer (WPT) systems operating at 30 MHz to 300 GHz utilize electric fields, magnetic fields, or electromagnetic fields to provide power to equipment nearby or at distances up to several metres or more. Users or bystanders in close proximity to both the transmitting equipment and receiving equipment or in between them could be exposed to these fields. Assessment methods are needed to demonstrate compliance with applicable human exposure limits. A working group (WG9) was established by IEC TC 106 to address assessment methods of human exposure to WPT equipment.

This document consists of an overview of radiative WPT, exposure assessment methods, procedures, and case studies, to help in the development of international standards for WPT exposure assessment. This document addresses the frequency range of 30 MHz to 300 GHz. For lower frequencies, WPT equipment operating below 10 MHz is covered by IEC TR 62905:2018, and below 30 MHz is covered by IEC PAS 63184:2021, with an associated subsequent International Standard currently under consideration by IEC TC 106. The methods and procedures described in this document are based on the techniques of other exposure standards covering the same frequency range. Other methods are referenced when deviations from these assessment methods are needed.

# **PROCEDURES FOR THE ASSESSMENT OF HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS FROM RADIATIVE WIRELESS POWER TRANSFER SYSTEMS – MEASUREMENT AND COMPUTATIONAL METHODS (FREQUENCY RANGE OF 30 MHz TO 300 GHz)**

## **1 Scope**

This Technical Report describes assessment methods to evaluate the compliance of radiative wireless power transfer (WPT) systems operating in the frequency range from 30 MHz to 300 GHz with electromagnetic guidelines on human exposure (electromagnetic field strength, specific absorption rate (SAR), and power density). This document includes but is not limited to systems that focus the electromagnetic energy emitted by the transmitter to regions surrounding the receiver, for example, by narrow beam-forming systems, wide-beam systems and spatially closed systems. Implementations without transmitter, for example, applications that harvest energy from the environment, are not included in the scope of this document.

## **2 Normative references**

There are no normative references in this document.