



BSI Standards Publication

**Exposure assessment methods for
wireless power transfer systems**

National foreword

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Exposure assessment methods for wireless power transfer systems

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CONTENTS

| | |
|---|----|
| FOREWORD..... | 7 |
| INTRODUCTION..... | 9 |
| 1 Scope..... | 10 |
| 2 Normative references..... | 10 |
| 3 Terms and definitions..... | 10 |
| 4 Symbols and abbreviations..... | 12 |
| 4.1 Physical quantities..... | 12 |
| 4.2 Constants..... | 12 |
| 4.3 Abbreviations..... | 12 |
| 5 Overview of WPT systems..... | 13 |
| 5.1 General..... | 13 |
| 5.2 WPT systems whose frequency range is less than 100 kHz..... | 13 |
| 5.3 WPT systems whose frequency range is from 100 kHz to 10 MHz..... | 17 |
| 6 Basic assessment methods..... | 20 |
| 6.1 General..... | 20 |
| 6.2 Basic assessment methods considering direct effect..... | 20 |
| 6.2.1 General..... | 20 |
| 6.2.2 Evaluation based on transmit power or current..... | 21 |
| 6.2.3 Evaluation of incident fields against reference levels..... | 21 |
| 6.2.4 Evaluation of incident fields against basic restrictions..... | 21 |
| 6.2.5 Evaluation of induced E-field and SAR against basic restrictions..... | 22 |
| 6.2.6 Assessment procedure..... | 23 |
| 6.3 Basic assessment method considering indirect effect..... | 23 |
| Annex A (informative) WPT systems whose frequency range is over 10 MHz..... | 25 |
| Annex B (informative) International exposure guidelines..... | 27 |
| B.1 ICNIRP guidelines..... | 27 |
| B.2 IEEE standards..... | 30 |
| Annex C (informative) Assessment methods..... | 33 |
| C.1 Exclusion based on transmit power or current..... | 33 |
| C.2 Measurement of incident electromagnetic fields..... | 34 |
| C.2.1 Equipment for electric field measurement..... | 34 |
| C.2.2 Equipment for magnetic field measurement..... | 34 |
| C.2.3 Measurement method..... | 35 |
| C.3 Coupling factor..... | 36 |
| C.4 Generic gradient source model..... | 37 |
| C.5 Induced E-field or SAR..... | 40 |
| C.5.1 Measurement..... | 40 |
| C.5.2 Calculation..... | 41 |
| C.6 Contact current..... | 43 |
| C.6.1 Equipment..... | 43 |
| C.6.2 Measurements..... | 45 |
| Annex D (informative) Case studies..... | 46 |
| D.1 WPT system for EV..... | 46 |
| D.1.1 General..... | 46 |
| D.1.2 Assessment procedures for WPT system for EV..... | 47 |
| D.2 Experimental assessment results for EV..... | 58 |

| | | |
|-----------------------|--|----|
| D.2.1 | General | 58 |
| D.2.2 | Electromagnetic field measurement results | 58 |
| D.2.3 | Contact current measurement..... | 60 |
| D.3 | WPT system for mobile devices | 61 |
| D.3.1 | General | 61 |
| D.3.2 | Assessment procedures for WPT system for mobile..... | 62 |
| Annex E (informative) | Numerical and experimental studies | 64 |
| E.1 | Exposure evaluation of WPT for EV | 64 |
| E.1.1 | Research in Japan..... | 64 |
| E.1.2 | Research in Korea | 68 |
| E.2 | Exposure evaluation of WPT for mobile device..... | 72 |
| E.2.1 | WPT system in 140 kHz band | 72 |
| E.2.2 | WPT systems in MHz band | 74 |
| E.3 | Coupling factor | 79 |
| E.3.1 | WPT system for EV | 79 |
| E.3.2 | WPT system for mobile device..... | 82 |
| E.3.3 | Evaluation example of CF and GGSM using a cylinder model | 83 |
| E.4 | SAR measurement..... | 87 |
| E.5 | Contact current | 89 |
| E.5.1 | WPT system for EV | 89 |
| E.5.2 | WPT systems for mobile (MHz)..... | 90 |
| Annex F (informative) | Medical implants..... | 92 |
| F.1 | Background..... | 92 |
| F.2 | Medical implant enhancement factor | 92 |
| F.3 | Numerical evaluation of medical implant enhancement factor..... | 97 |
| F.3.1 | General | 97 |
| F.3.2 | Numerical setup..... | 97 |
| Bibliography | | 99 |
| Figure 1 | – Wireless power kitchen appliances [1]..... | 13 |
| | (WPT kitchen island of apartment) | 14 |
| Figure 2 | – Use cases of the LCD and semiconductor product lines and kitchen WPT systems [1] | 14 |
| Figure 3 | – Example of a WPT system for EV/PHEV [1] | 15 |
| Figure 4 | – Example of an online electric vehicle [1]..... | 16 |
| Figure 5 | – Technical characteristics of an online electric vehicle [1]..... | 16 |
| Figure 6 | – Example magnetic induction WPT system block diagram [1]..... | 18 |
| Figure 7 | – Example magnetic resonance WPT system block diagram [1] | 18 |
| Figure 8 | – Capacitive coupling WPT system block diagram [1]..... | 19 |
| Figure 9 | – Typical structure of the capacitive coupling system [1] | 19 |
| Figure 10 | – Flowchart of assessment procedure considering the direct effect | 23 |
| Figure 11 | – Two exposure situations for ungrounded and grounded metal objects | 24 |
| Figure 12 | – Flowchart of assessment procedures for indirect effects..... | 24 |
| Figure C.1 | – Frequency characteristics of impedance of adult male and IEC equivalent circuit..... | 44 |
| Figure C.2 | – IEC equivalent circuit..... | 44 |
| Figure C.3 | – Example of contact current measurement equipment | 44 |

| | |
|---|----|
| Figure D.1 – Example for areas of protection, for ground mounted systems [37] | 47 |
| Figure D.2 – Area 3 measurement position [37] | 48 |
| Figure D.3 – Area 4 measurement position [37] | 48 |
| Figure D.4 – Assessment flow of Part 1 | 51 |
| Figure D.5 – Assessment flow of Part 2 | 55 |
| Figure D.6 – Assessment flow of Part 3 | 56 |
| Figure D.7 – Example measurement layout for Area 3 surrounding area of vehicle | 59 |
| Figure D.8 – Example measurement layout for Area 4 car interior | 60 |
| Figure D.9 – Contact current meters used in the measurement | 60 |
| Figure D.10 – Measurement of contact current | 61 |
| Figure E.1 – Geometry of vehicle model | 64 |
| Figure E.2 – Measured and simulated magnetic field strength leaked from wireless power system in an electric vehicle [46] | 65 |
| Figure E.3 – Distance dependence of peak induced electric field strength in human body model | 65 |
| Figure E.4 – Analysis of induced electric field strength in the human body for different human positions relative to the vehicle [41] | 66 |
| Figure E.5 – Relationship between the maximum induced electric field in the human body and the magnetic field strength [41] | 67 |
| Figure E.6 – The induced electric field distributions in a human body model lying on the ground with his right arm stretched [48] | 68 |
| Figure E.7 – EMF human exposure condition from the power line and pickup coils of OLEV system | 69 |
| Figure E.8 – The model in the field generated by OLEV | 70 |
| Figure E.9 – The calculated magnetic field distributions at each distance from OLEV | 71 |
| Figure E.10 – Photograph of magnetic field measurement for transmitting and receiving pads of wireless charging system | 72 |
| Figure E.11 – Measurement results of magnetic field value for two cases of low voltage output (case 1) and high voltage output (case 2) | 72 |
| Figure E.12 – Transmitting and receiving coils, and magnetic sheet | 73 |
| Figure E.13 – Simulated magnetic field strength distribution (Charging (a) xy plane, (b) yz plane; Standby mode (c) xy plane, (d) yz plane) and measured value (Charging (e) xy plane, (f) yz plane; Standby mode (g) xy plane, (h) yz plane) | 73 |
| Figure E.14 – Position of human body and coil (left), exposure point in chest (right) | 74 |
| Figure E.15 – Realistic human body model and system position | 75 |
| Figure E.16 – Position of the human body model: (a) the human body is moved in the horizontal direction, (b) the coils are moved in vertical direction | 76 |
| Figure E.17 – Peak of 10 g average SAR moved in (a) horizontal direction, (b) vertical direction | 76 |
| Figure E.18 – Peaks of 10 g average SAR | 77 |
| Figure E.19 – Wireless power transfer system configurations | 78 |
| Figure E.20 – Electric field and magnetic field distributions around the coil when an input power is 1 W | 78 |
| Figure E.21 – Exposure conditions for WPT system | 78 |
| Figure E.22 – Top and bird's-eye views of (a) solenoid type and (b) circular spiral type coupling coils, and (c) geometry of electric vehicle with a wireless power transfer system [13] | 81 |
| Figure E.23 – A numerical model of dielectric cylinder used in the calculation | 83 |

| | |
|--|----|
| Figure E.24 – Distribution of induced electric field strength inside the cylinder in the vicinity of a one-turn loop with 1 A current | 85 |
| Figure E.25 – A two-line current model | 85 |
| Figure E.26 – Decay profile of incident magnetic field for each component | 86 |
| Figure E.27 – Profile of incident magnetic field for $G_n = 13$ (left) and 80 (right) | 86 |
| Figure E.28 – Distribution of induced electric field for x-, y-, and z-components of the incident magnetic field profiles generated by GGSM | 86 |
| Figure E.29 – Solenoid-type WPT system (left) and flat-spiral-type WPT system (right) used for SAR measurement | 88 |
| Figure E.30 – SAR distribution in a liquid phantom, calculated by MoM (above) and measured by the developed measurement system (below) | 88 |
| Figure E.31 – Two conditions of contact current measurement | 89 |
| Figure E.32 – Contact currents with ungrounded condition | 90 |
| Figure E.33 – Contact currents with grounded condition | 90 |
| Figure E.34 – Contact current with ungrounded metal | 91 |
| Figure E.35 – Contact current with grounded metal | 91 |
| Figure F.1 – Model of the insulated perfectly conducting wire with non-insulated bare tips used as generic implantable medical device | 94 |
| Figure F.2 – $pSAR_{0,1g}$ (W/kg) at the lead tip as a function of frequency in the range 100 kHz to 10 MHz for each lead length (100 mm, 200 mm, 500 mm and 800 mm) | 96 |
| Figure F.3 – Induced E-field tangential to the implant, embedded in the homogeneous tissue, in the absence of the implant, to reach ICNIRP2010 LRs in the frequency range 10 kHz to 10 MHz and as a function of the lead length, when the implant is present | 97 |
| Table 1 – Summary of application, technology and specification of WPT systems whose frequency range is less than 100 kHz | 17 |
| Table 2 – WPT systems whose frequency range is from 100 kHz to 10 MHz | 20 |
| Table A.1 – Classification of WPT applications | 26 |
| Table A.2 – Characteristics of beam WPT applications | 26 |
| Table B.1 – Basic restrictions up to 10 GHz of ICNIRP1998 | 27 |
| Table B.2 – Basic restrictions of ICNIRP2010 | 28 |
| Table B.3 – Reference levels for electric and magnetic fields (unperturbed rms values) of ICNIRP1998 | 29 |
| Table B.4 – Reference levels for electric and magnetic fields (unperturbed rms values) of ICNIRP2010 | 29 |
| Table B.5 – Reference levels for contact currents of ICNIRP1998 and ICNIRP2010 | 30 |
| Table B.6 – Basic restrictions up to 5 MHz of IEEE C95.6 and IEEE C95.1 | 30 |
| Table B.7 – Basic restrictions between 100 kHz and 3 GHz of IEEE C95.1 | 31 |
| Table B.8 – Magnetic field MPE up to 5 MHz of IEEE C95.1 and IEEE C95.6 | 31 |
| Table B.9 – Electric field MPE for whole-body exposure up to 100 kHz of IEEE C95.1 and IEEE C95.6 | 31 |
| Table B.10 – MPE for electric and magnetic field over 100 kHz for whole-body exposure of IEEE C95.1 and IEEE C95.6 | 32 |
| Table B.11 – Contact current MPE of IEEE C95.1 and IEEE C95.6 | 32 |
| Table C.1 – Basic restrictions regarding SAR (unit is W/kg) | 33 |
| Table C.2 – Possible exclusion power level regarding local SAR | 34 |

| | |
|--|----|
| Table C.3 – Coupling transformation matrix to estimate induced E-field for compliance with ICNIRP 2010 | 38 |
| Table C.4 – Coupling transformation matrix to estimate induced current density for compliance with ICNIRP 1998 | 38 |
| Table C.5 – Coupling transformation matrix to estimate induced E-field for compliance with IEEE 2005 | 39 |
| Table C.6 – Coupling transformation matrix to estimate SAR (pSAR _{10g} and wbSAR) for compliance with ICNIRP 1998 and IEEE 2005 | 39 |
| Table C.7 – Dielectric properties of the tissue equivalent liquid defined in IEC 62209-2 | 40 |
| Table C.8 – Dielectric properties of the tissue equivalent NaCl solution | 40 |
| Table C.9 – Human models and source models | 42 |
| Table C.10 – Computational methods | 43 |
| Table C.11 – SAR evaluation method based on numerical simulation | 43 |
| Table D.1 – Uncertainty of H-field measurements for WPT systems in Area 3 | 52 |
| Table D.2 – Numerical uncertainty of the exposure of anatomical human models to WPT systems for EV | 53 |
| Table D.3 – Uncertainty of EMF measurements for WPT systems in Area 3 | 54 |
| Table D.4 – Uncertainty of contact current measurements | 57 |
| Table D.5 – ICNIRP2010 guideline at 85 kHz | 58 |
| Table D.6 – Specification of DUT | 58 |
| Table D.7 – Measured incident H-fields and E-fields of Area 3 | 59 |
| Table D.8 – Measured incident H-fields and E-fields of Area 4 | 59 |
| Table D.9 – Measurement results of contact current [mA] | 61 |
| Table E.1 – Estimated permissible power for WPT system for EV | 68 |
| Table E.2 – Local SAR and induced electric field in a human body on the chest surface ... | 74 |
| Table E.3 – Simulated result of local SAR and whole-body average SAR by Nagoya Institute of Technology (NITech) / NITRI / JCOMO and NICT (input power is 40 W) | 79 |
| Table E.4 – Dimensions of WPT systems for electric vehicles considered by different groups [13] | 81 |
| Table E.5 – Coupling factor for internal electric field of WPT systems for EV [13] | 82 |
| Table E.6 – Coupling factor for peak 10 g SAR for WPT systems at 6,78 MHz (implemented on the desk) [13] | 83 |
| Table E.7 – Coupling factor for internal electric field for WPT systems at 6,78 MHz (implemented on the desk) [13] | 83 |
| Table E.8 – NICT and IT'IS results of induced electric field and local peak 10 g average SAR in the dielectric cylinder using GGSM | 87 |
| Table E.9 – Experimental and numerical results of spatial peak 10 g average SAR (input power = 10 W) | 88 |
| Table F.1 – Preliminary medical implant enhancement factors for nerve stimulation up to 10 MHz | 93 |
| Table F.2 – Preliminary medical implant enhancement factors for tissue heating up to 10 MHz (ΔT) | 93 |
| Table F.3 – Dielectric and thermal properties assigned to the muscle tissue and to the generic implants | 94 |
| Table F.4 – Induced E-field in the homogeneous tissue without the implant to reach J-BR of ICNIRP 1998 | 95 |
| Table F.5 – Induced E-field in the homogeneous tissue without the implant to reach SAR-BR of ICNIRP 1998 and IEEE 2005 for $f \geq 100$ kHz | 95 |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPOSURE ASSESSMENT METHODS FOR WIRELESS POWER TRANSFER SYSTEMS

FOREWORD

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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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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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