AS/NZS 61786.1:2021

Australian/New Zealand Standard™

Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings

Part 1: Requirements for measuring instruments (IEC 61786-1:2013 (ED.1.0) MOD)

AS/NZS 61786.1:2021

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The following are represented on Committee TE-007:

Australian Centre for Radiofrequency Bioeffects Research
Australian Industry Group
Australian Mobile Telecommunications Association
Australian Radiation Protection and Nuclear Safety Agency
Commercial Radio Australia
Communications, Electrical and Plumbing Union — Electrical Division
Department of Defence (Australian Government)
Electrical Engineers Association of NZ
Engineers Australia
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National Measurement Institute
National Radiation Laboratory New Zealand
Victoria University of Wellington NZ

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First published as AS/NZS 61786.1:2021.

Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE-007, Human Exposure to Electromagnetic Fields.

The objective of this document is to provide guidance for measuring instruments used to measure the field strength of quasi-static magnetic and electric fields that have a frequency content in the range 1 Hz to 100 kHz and with DC magnetic fields to evaluate the exposure levels of the human body to these fields.

Sources of fields include devices that operate at power frequencies and produce power frequency and power frequency harmonic fields, as well as devices that produce fields within the frequency range of this document, including devices that produce static fields, and the earth's static magnetic field. The magnitude ranges covered by this document are 0,1 μT to 200 mT in AC (1 μT to 10 T in DC) and 1 V/m to 50 kV/m for magnetic fields and electric fields, respectively.

When measurements outside this range are performed, most of the provisions of this document will still apply, but special attention should be paid to specified uncertainty and calibration procedures.

Specifically, this document—

(a) defines terminology;

(b) identifies requirements on field meter specifications;

(c) indicates methods of calibration;

(d) defines requirements on instrumentation uncertainty;

(e) describes general characteristics of fields;

(f) describes operational principles of instrumentation; and

(g) identifies sources of uncertainty during calibration.

NOTE Measurement methods that achieve defined goals pertaining to assessment of human exposure are described in AS/NZS 61786-2.

In regard to electric field measurements, this document considers only the measurement of the unperturbed electric field strength at a point in free space (i.e. the electric field prior to the introduction of the field meter and operator) or above conducting surfaces.

This document an adoption with national modifications, and has been reproduced from, IEC 61786-1:2013, *Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings — Part 1: Requirements for measuring instruments*. The modifications are additional requirements and are set out in Appendix ZZ, which has been added at the end of the source text.

Appendix ZZ lists the variations to IEC 61786-1:2013 for the application of this document in Australia and New Zealand.

As this document has been reproduced from an International Standard the following applies:

(i) In the source text "part of 61786" should read "this document".

(ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASUREMENT OF DC MAGNETIC, AC MAGNETIC AND AC ELECTRIC FIELDS FROM 1 Hz TO 100 kHz WITH REGARD TO EXPOSURE OF HUMAN BEINGS –

Part 1: Requirements for measuring instruments

FOREWORD

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International Standard IEC 61786-1 has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

The first editions of IEC 61786-1 and IEC 61786-2 replace IEC 61786:1998. Part 1 deals with measuring instruments, and Part 2 deals with measurement procedures. The content of the standard was revised in order to give up-to-date and practical information to the user.

It has the status of a horizontal standard in accordance with IEC Guide 108.

The text of this standard is based on the following documents:

FDIS	Report on voting
106/292/FDIS	106/298/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

A list of all parts of the IEC 61786 series, published under the general title *Measurement of DC magnetic fields and AC magnetic and electric fields from 1 Hz to 100 kHz with regard to exposure of human beings,* can be found on the IEC website.

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

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

MEASUREMENT OF DC MAGNETIC, AC MAGNETIC AND AC ELECTRIC FIELDS FROM 1 Hz TO 100 kHz WITH REGARD TO EXPOSURE OF HUMAN BEINGS –

Part 1: Requirements for measuring instruments

1 Scope

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– describes general characteristics of fields;
– describes operational principles of instrumentation.

NOTE Measurement methods that achieve defined goals pertaining to assessment of human exposure are described in IEC 61786-2

Sources of uncertainty during calibration are also identified. In regard to electric field measurements, this standard considers only the measurement of the unperturbed electric field strength at a point in free space (i.e. the electric field prior to the introduction of the field meter and operator) or above conducting surfaces.

This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108.

One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications. The contents of this horizontal standard will not apply unless specifically referred to or included in the relevant publications.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For