AS/NZS 61786.2:2021

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 2: Basic standard for measurements (IEC 61786-2:2014 (ED. 1.0) MOD)

AS/NZS 61786.2:2021

This Joint Australian/New Zealand Standard™ was prepared by Joint Technical Committee TE-007, Human Exposure to Electromagnetic Fields. It was approved on behalf of the Council of Standards Australia on 16 April 2021 and by the New Zealand Standards Approval Board on 4 May 2021.

This Standard was published on 21 May 2021.

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
Ministry of Health (NZ)
National Measurement Institute
National Radiation Laboratory New Zealand
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This Standard was issued in draft form for comment as DR AS/NZS 61786.2:2021.

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ISBN 978 1 76113 322 0

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First published as AS/NZS 61786.2:2021.

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 specify requirements for the measurement of quasi-static magnetic and electric fields that have a frequency content in the range 1 Hz to 100 kHz, and DC magnetic fields, to evaluate the exposure levels of the human body to these fields.

This document specifies requirements for establishing measurement procedures that achieve defined goals pertaining to human exposure.

Because of differences in the characteristics of the fields from sources in the various environments, e.g. frequency content, temporal and spatial variations, polarization, and magnitude, and differences in the goals of the measurements, the specific measurement procedures will be different in the various environments.

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 independent of the power frequency, and DC power transmission, and the geomagnetic field.

The magnitude ranges covered by this document are 0.1 μT to 200 mT for AC (1 μT to 10 T for DC) for magnetic fields, and 1 V/m to 50 kV/m for electric fields.

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

Examples of sources of fields that can be measured with this document include:

(a) devices that operate at power frequencies (50/60 Hz) and produce power frequency and power-frequency harmonic fields (e.g. power lines, electric appliances);

(b) devices that produce fields that are independent of the power frequency (e.g. electric railway (DC to 20 kHz), commercial aeroplanes (400 Hz), induction heaters (up to 100 kHz), and electric vehicles);

(c) devices that produce static magnetic fields: MRI, DC power lines, DC welding, electrolysis, magnets, electric furnaces, etc. DC currents are often generated by converters, which also create AC components (power frequency harmonics), which should be assessed.

When EMF products standards are available, these products standards should be used.

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

Sources of uncertainty during measurements are also identified and guidance is provided on how they should be combined to determine total measurement uncertainty.

This document is an adoption with national modifications, and has been reproduced from, IEC 61786-2:2014 (ED. 1.0), *Measurement of DC magnetic, AC magnetic and AC electric fields from 1 Hz to 100 kHz with regard to exposure of human beings — Part 2: Basic standard for measurements*. 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 61786-2:2014 (ED. 1.0) for the application of this document in Australia and New Zealand.

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

(a) In the source text “this part of 61786” should read “this document”.

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2: Basic standard for measurements

FOREWORD

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International Standard IEC 61786-2 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 standard is based on the following documents:

FDIS	Report on voting
106/322/FDIS	106/326/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.

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.

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

Part 2: Basic standard for measurements

1 Scope

This part of IEC 61786 provides requirements for the measurement of quasi-static magnetic and electric fields that have a frequency content in the range 1 Hz to 100 kHz, and DC magnetic fields, to evaluate the exposure levels of the human body to these fields.

Specifically, this standard gives requirements for establishing measurement procedures that achieve defined goals pertaining to human exposure.

NOTE Requirements on field meters and calibration are described in IEC 61786-1

Because of differences in the characteristics of the fields from sources in the various environments, e.g. frequency content, temporal and spatial variations, polarization, and magnitude, and differences in the goals of the measurements, the specific measurement procedures will be different in the various environments.

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 independent of the power frequency, and DC power transmission, and the geomagnetic field. The magnitude ranges covered by this standard are 0,1 μT to 200 mT for AC (1 μT to 10 T for DC) for magnetic fields, and 1 V/m to 50 kV/m for electric fields.

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- devices that produce fields that are independent of the power frequency. (Examples: electric railway (DC to 20 kHz), commercial aeroplanes (400 Hz), induction heaters (up to 100 kHz), and electric vehicles.)
- devices that produces static magnetic fields: MRI, DC power lines, DC welding, electrolysis, magnets, electric furnaces, etc. DC currents are often generated by converters, which also create AC components (power frequency harmonics), which should be assessed.

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