AS/NZS 2772.2:2011

Australian/New Zealand Standard™

Radiofrequency fields

Part 2: Principles and methods of measurement and computation—3 kHz to 300 GHz

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 2 May 2011 and on behalf of the Council of Standards New Zealand on 19 April 2011.
This Standard was published on 23 May 2011.

The following are represented on Committee TE-007:

Australian Centre for Radiofrequency Bioeffects Research
Australian Mobile Telecommunications Association
Australian Radiation protection and Nuclear Safety Agency
Department of Defence (Australia)
EMC Technologies
Engineers Australia
Kordia Solutions
Kordia (New Zealand)
Local Government New Zealand
Ministry of Economic Development (New Zealand)
National Measurement Institute
National Radiation Laboratory New Zealand
New Zealand Institute of Occupational and Environmental Medicine
Office of the Australian Safety and Compensation Council
Swinburne University of Technology
Telecom New Zealand
Telstra Corporation
Wireless Institute Australia

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS 2772.2.

Australian/New Zealand Standard™

Radiofrequency fields

Part 2: Principles and methods of measurement and computation—3 kHz to 300 GHz

Originated in Australia as AS 2772.2—1988.
Jointly revised and designated as AS/NZS 2772.2:2011.

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, Private Bag 2439, Wellington 6140

ISBN 978 0 7337 9857 3

PREFACE

This Standard was prepared by the joint Standards Australia/Standards New Zealand Committee TE-007, Human Exposure to Electromagnetic Fields, to supersede AS 2772.2—1988, *Radiofrequency radiation*, Part 2: *Principles and methods of measurement—300 kHz to 100 GHz*.

The objective of the Standard is to specify commonly accepted processes for assessing compliance with the exposure limits of RF safety standards such as ARPANSA Standard RPS3 and New Zealand Standard NZS 2772.1. It includes methodologies for reliably assessing human exposures to radiofrequency (RF) electromagnetic fields by measurement or computation, which form part of any compliance assessment.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

.

CONTENTS

Page

Page

FOREWORD

The reliable evaluation of radiofrequency (RF) electric and magnetic field exposures and the subsequent assessment of compliance with relevant RF safety exposure standards is a complex and specialised task. Users of this Standard should be aware that a full understanding of its content requires a well-developed knowledge of RF field theory and practice, and the potential hazards associated with exposure to RF fields. It also requires knowledge of the limitations of the measurement techniques, instrumentation and computational methods used. For safety compliance assessments, the assessor should be aware of the exposure limits set out in the relevant RF safety Standard such as ARPANSA Standard RPS3 or New Zealand Standard NZS 2772.1, and be in possession of appropriate skills, knowledge and understanding. Notwithstanding these requirements, this standard will also be of use to anyone wishing to better inform themselves in this area.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Radiofrequency fields

Part 2: Principles and methods of measurement and computation—3 kHz to 300 GHz

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for, and provides guidance on, assessing compliance with the exposure limits of radio frequency (RF) safety standards such as ARPANSA Standard RPS3 or New Zealand Standard NZS 2772.1. This includes methodologies for making an assessment (by measurement or computation) of human exposure to ambient RF fields and induced body currents in the frequency range of 3 kHz to 300 GHz.

This Standard also sets out processes for calculating the basic restrictions quantities (such as specific absorption rate and induced current density) in the relevant standards, but does not address their *measurement*.

This Standard may also be used as a guide for making low-level environmental exposure assessments in areas around RF sources, or for other purposes.

This Standard provides appropriate methodologies, including measurement techniques and instrumentation selection, computational techniques and the determination of assessment uncertainty and its use in assessing compliance with applicable exposure limits.

The assessment methodologies provided in this Standard may be applied for all types of RF exposure situations including exposure to—

(a) leakage fields;

(b) radiated fields; and

(c) reactive fields.

NOTE: Leakage fields generally imply unintentional leakage of energy, whereas radiated fields are considered primarily to be intentionally radiated RF fields. Reactive fields are present in the immediate vicinity of all sources or re-radiating objects.

This Standard is applicable to the compliance assessment of RF exposures from most kinds of RF sources including—

(i) broadcast installations;

(ii) cellular base stations;

(iii) radio-communications facilities;

(iv) radar installations;

(v) medical applications such as diathermy machines;

(vi) industrial applications, including RF welders, heaters and induction heaters; and

(vii) scientific applications.