

Radiofrequency Fields

Part 1 – Maximum Exposure Levels – 3 kHz to 300 GHz

NZS 2772:Part 1:1999

COMMITTEE REPRESENTATION

This Standard was prepared by the Joint Australian/New Zealand Committee TE/7, Human Exposure to Electromagnetic Fields. It was subsequently published as a New Zealand Standard (see Preface).

New Zealand representation on the committee was as follows:

Adopt Radiation Control (NZ)
Broadcast Communications NZ
Local Government, New Zealand
Ministry of Commerce NZ
National Radiation Laboratory New Zealand
New Zealand Association of Radio Transmitters
New Zealand Institute of Occupational & Environmental Medicine
Telecom New Zealand

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Published by Standards New Zealand, the trading arm of the Standards Council, Private Bag 2439, Wellington 6020.

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Website: www.standards.co.nz

AMENDMENTS

No	Date of issue	Description	Entered by, and date

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE/7, Human Exposure to Electromagnetic Fields, to supersede AS/NZS 2772.1 (Int):1998.

The finalised text was subsequently balloted by committee members but did not meet the high threshold (80 % of votes cast from each country being positive) necessary for adoption as a joint Standard. Subsequently a number of further changes were discussed, and agreed to, by New Zealand members of the TE/7 Committee. The modified text was balloted by New Zealand members and exceeded the 80 % threshold. A further ballot of Australian members, using the New Zealand text, failed and the document has been published as a New Zealand only (rather than a joint Australian/New Zealand) Standard.

This Standard is based on the ICNIRP Guidelines, April 1998. The objective of this Standard is to specify basic restrictions and reference levels for human exposure to radiofrequency fields in the frequency range 3 kHz to 300 GHz.

The terms “informative” and “normative” have been used in this Standard to define the application of the Appendix to which they apply. An informative Appendix is for information and guidance only whereas a normative Appendix is an integral part of the Standard. Due to the nature of the material contained in this Standard, the Foreword should be considered and read as part of the Standard.

The Standard is consistent with currently accepted world best practice.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

Permission from the International Commission on Non-Ionizing Radiation Protection and Health Physics for the use and reproduction in this Standard of material from the 1998 ICNIRP Guidelines, is gratefully acknowledged.

FOREWORD

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) was established in 1992 as a successor to the International Radiation Protection Association (IRPA)/International Non-Ionizing Radiation Committee (INIRC). IRPA/INIRC had previously worked in cooperation with the Environmental Health Division of the World Health Organization (WHO), to produce a number of health criteria documents on non-ionizing radiation as part of the WHO's Environmental Health Criteria Programme. The present ICNIRP Guidelines are a result of this succession of work. This Standard draws extensively on the ICNIRP Guidelines.

In setting limits, ICNIRP/IRPA identified radiofrequency (RF) field values above which adverse biological effects could be confirmed by independent laboratory studies. These values were used as benchmarks. For example, for exposures in the frequency range above about 10 MHz, the benchmark was an absorption of RF power equivalent to a whole body average specific energy absorption rate (SAR) of 4 W/kg. The biological effect detected at this level is the reduced endurance to perform tasks in experimental animals, when their temperature was raised by about 1 °C as a result of the RF field exposure.

To derive exposure limits from this SAR benchmark, a safety factor of 10 was incorporated so that workers would not be exposed to more than 1/10th of this level (i.e. 0.4 W/kg). For the general public, an additional safety factor of 5 was incorporated into the exposure limits. Thus the exposure limits for the general public are set at 1/50th of the benchmark level (i.e. 0.08 W/kg). These levels provide basic restrictions for frequencies at which the SARs are limiting values.

Whilst previous Australian/New Zealand Standards incorporated the basic ICNIRP SAR restrictions, the derived reference levels did not follow the ICNIRP values at certain frequencies. This inconsistency was considered to be unsatisfactory and accordingly this Standard specifies both basic restrictions and derived reference levels which are consistent with the ICNIRP guidelines.

There is scientific research, including epidemiology, which has suggested associations between some adverse health effects and exposure to RF fields at levels lower than the basic restrictions specified in this Standard, however causation has not been shown.

In many cases, data suggesting adverse health effects of RF field exposure at levels below those prescribed in this Standard have been explained and discounted. However, there remain some unexplained findings from research which need to be clarified or repeated.

There is currently a level of concern about RF exposure, which is not fully alleviated by existing scientific data. It is acknowledged that data regarding biological effects, at levels below those determined in this Standard, are incomplete. However, as these data are neither clear

nor consistent, these have not been used in setting the levels for basic restrictions in the ICNIRP Guidelines or this Standard. It should be further noted that it is not possible to logically prove with certainty that any environmental agent will not cause an adverse health effect. This is an inherent limitation of any process, including the scientific method, that relies on inductive reasoning.

Research is continuing in many countries into possible effects on health arising from RF exposure. In recognition of this, the Committee will continue to monitor the results of this research and, where necessary, issue amendments to this document. Generally, it is therefore sensible in achieving service or process requirements to minimize unnecessary or incidental RF exposure.

It is recognized that this Standard does not operate in isolation from the legal framework within New Zealand. Occupational, health, safety, and environment laws provide obligation on employers, and the designers, manufacturers and suppliers of plant or equipment, to ensure that their activities, or their plant and equipment, do not represent a risk to the health and safety of their employees or third parties who may be affected by them. These are performance based obligations which effectively require those covered by the law to continually assess and improve the safety and health impact of their activities.

REFERENCED STANDARDS

The users of this Standard should ensure that their copies of the Standards referenced in this document are the latest revisions or include the latest amendments. Such amendments are listed in the annual Standards New Zealand *Catalogue* which is supplemented by lists contained in the monthly magazine *Standards* issued free of charge to committee and subscribing members of Standards New Zealand.

REVIEW OF STANDARDS

Suggestions for improvement of this Standard will be welcomed. They should be sent to the Chief Executive, Standards New Zealand, Private Bag 2439, Wellington 6020.

NOTES

NEW ZEALAND STANDARD

RADIOFREQUENCY FIELDS

Part 1: Maximum exposure levels – 3 kHz to 300 GHz

1 SCOPE

This Standard specifies basic restrictions and derived reference levels for exposure of all or part of the human body to radiofrequency (RF) fields in the frequency range 3 kHz to 300 GHz. This Standard also identifies the rationale for the basic restrictions and reference levels and provides guidance on compliance measures. This Standard specifies the following:

- (a) Basic restrictions for occupational exposure with corresponding derived reference levels as a function of frequency for the practical measurement of exposure levels;
- (b) Basic restrictions for general public exposure, with corresponding derived reference levels as a function of frequency for the practical measurement of exposure levels;
- (c) Equipment and usage parameters in order to readily determine compliance with this Standard.

2 APPLICATION

2.1

This Standard is applicable wherever people may be exposed to RF fields in the course of their work and wherever the public may be exposed.

2.2

This Standard is applicable to continuous wave (CW), pulsed and modulated fields.

2.3

The limits specified in this Standard are intended to be used as a basis for planning work procedures, designing protective facilities, the assessment of the efficacy of protective measures and practices, and guidance on health surveillance.

2.4

This Standard does not apply where persons are exposed to RF fields as part of a recognized medical procedure, but does apply to persons operating the radiating equipment and others who are in the vicinity during the procedure.

2.5

This Standard does not apply to other hazards of RF fields such as the ignition of explosives or flammable gases, or to interference to other electronic equipment which are the province of other Standards.

2.6

The limits specified in this Standard are such as to reduce to minimal levels any RF absorption in the body and to minimize the possibility of RF burns or shock under routine operations. Precautions against RF burns or shock may still be necessary for workers but not for members of the general public.