

BTA workshop
“human exposure to electromagnetic field (EMF) from wireless technologies”

The Role and Activities of ICNIRP and ICNIRP Exposure Limits and Guidelines

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What is ICNIRP?

ICNIRP is an independent scientific organization that:

- ☺ Provides **guidance and advice** on the health hazards of non-ionizing radiation (NIR)
- ☺ Develops **international guidelines** on limiting exposure to NIR that are independent and science-based
- ☺ Provide **science-based** guidance and recommendations on protection from NIR exposure

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A multi-disciplinary approach

Individual expertise

- ☺ Medicine
- ☺ Biology
- ☺ Toxicology
- ☺ Epidemiology
- ☺ Physics
- ☺ Engineering

Collective evaluation

Standing Committees

- SC I –Epidemiology
- SC II –Biology and Medicine
- SC III –Physics and Engineering
- SC IV –Optical radiation

Where to learn about ICNIRP's methodology?

ICNIRP Statement

GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING RADIATION

Health Physics 82:540-548 (2002)

www.icnirp.org

Fundamentals of ICNIRP Guidelines

- Procedures and criteria are defined *a priori*
- Restrictions are based on science.
- No consideration for economic or social issues
- Only established effects are considered

Review of the literature

All published studies are taken into consideration

The evidence is **weighted** based upon:

- Scientific quality
- Replicability
- Consistency

Development of guidelines

- Critical review of the literature
- Identification of health effects and biological effects relevant for health
- Identification of the critical effect
- Establishment of basic restrictions
- Derivation of reference levels

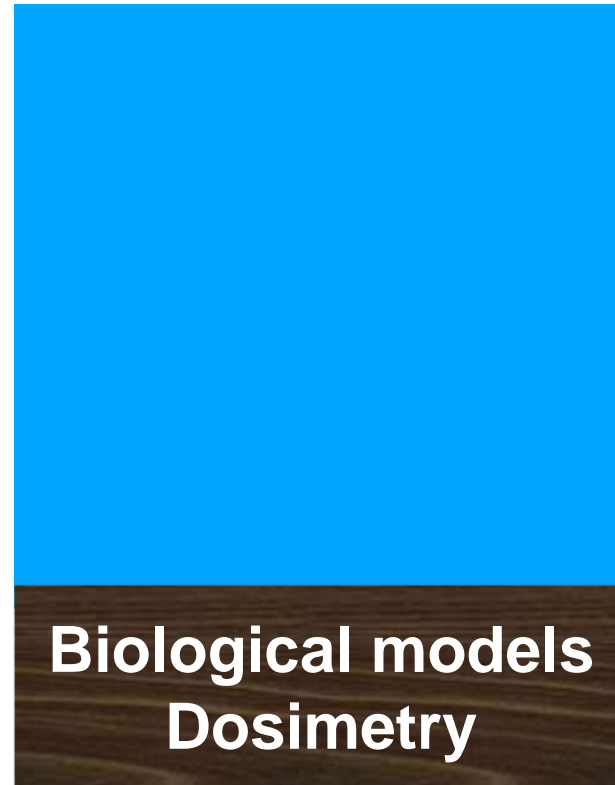
Hierarchy of data

epidemiology

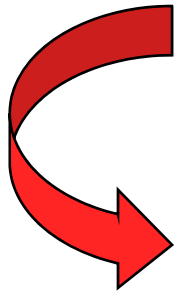
humans

animals

cells



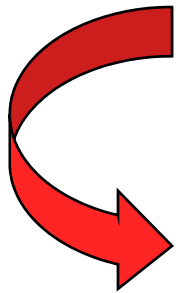
Established effects of RF fields



Absorption of electromagnetic energy

Increase of body temperature

(whole-body or local)



Thermal effects

(with threshold)

Biologically effective quantity

SAR = absorbed RF power / mass of tissues



one kilogramme

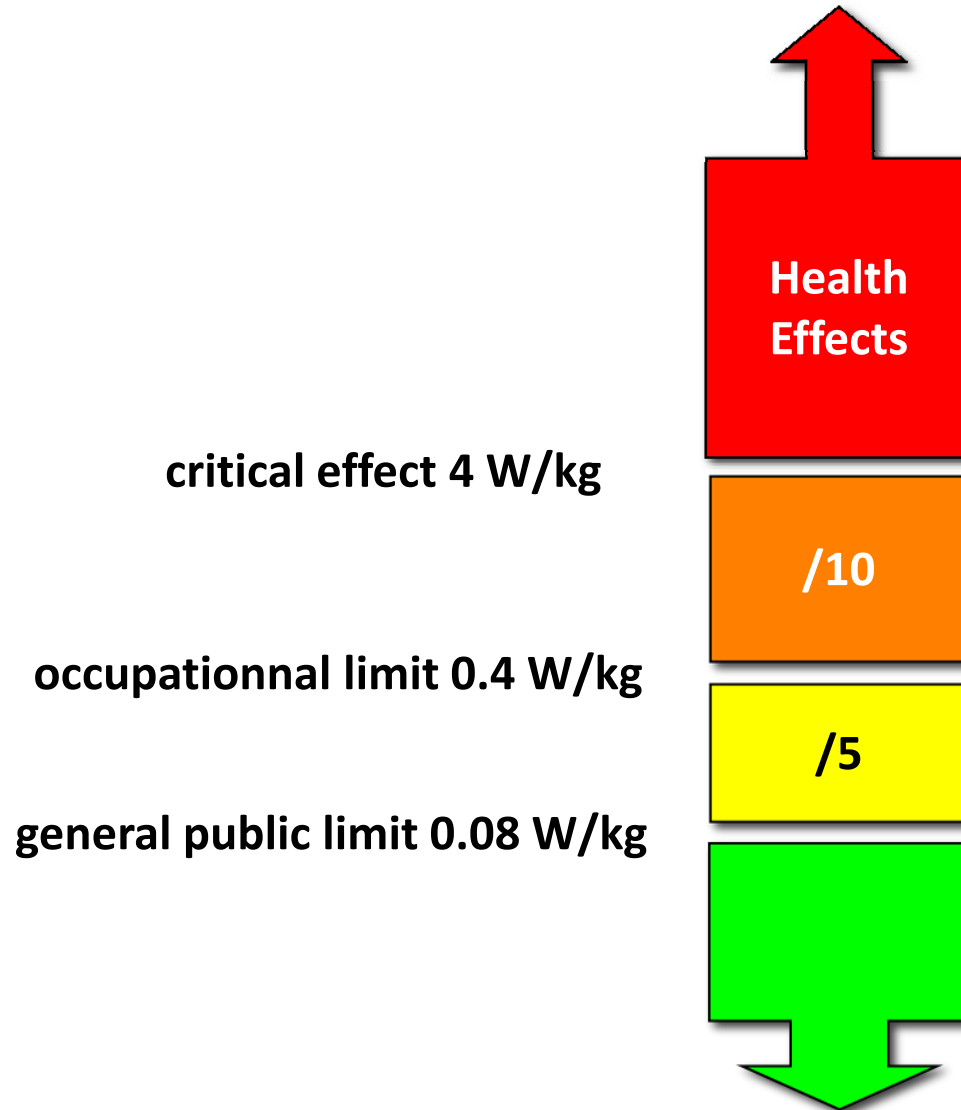


SAR=
1000 W/kg



1000 watts

Threshold-based approach



Present ICNIRP Standard

ICNIRP Guidelines

Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz)

Health Physics 74:494-522 (1998)

www.icnirp.org

Crucial questions

- Are guidelines for RF fields outdated?
- When will the guidelines be revised?
- Will the protection system change in the future?
- Will exposure limits change in the future?

Evolution of ICNIRP Guidelines

- RF (interim) 1984
- RF 1988
- 50/60 Hz fields (interim) 1990
- Static magnetic fields 1994
- Time-varying EMF >0 Hz-300 GHz 1998

Basic features of guidelines have not changed
overtime

Are the RF Guidelines outdated?

- Guidelines for time-varying fields were last updated in 1998
- “Old” does not necessarily mean “not valid any longer”!
- Long duration is in general a proof of good quality
- A balance between **stability** and **updating** is needed

Revision of standards

- Why?
- How?
- When?

Why revise a standard?

- New scientific evidence (new effects, changes in thresholds, refinement of dosimetry)
- New technologies (revision of safety factors, possibility of relaxation)
- Outdated research database

Bad reasons for revising a science-based standard

- Social pressure
- Different regulation issued by national or local authorities
- Time passed from last revision

How to revise a standard?

Depending on the evaluation of the literature, the guidelines may be subject to:

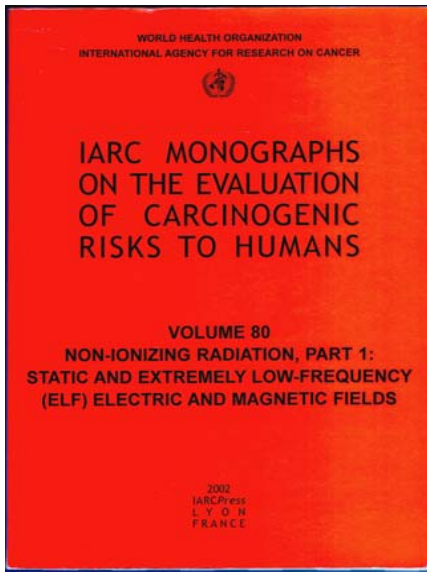
- Global revision
- Refinement/clarification
- Confirmation

When to revise a standard?

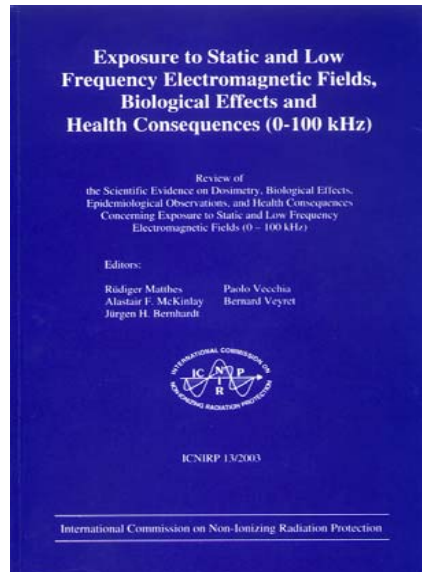
The revision of a standard is a long process that involves different bodies:

- Review of science **ICNIRP**
- Evaluation of carcinogenicity **IARC**
- Global risk evaluation **WHO-ICNIRP**
- Update of standards **ICNIRP**

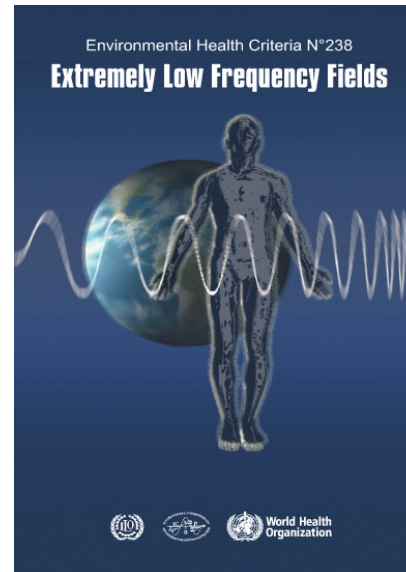
WHO and ICNIRP ELF



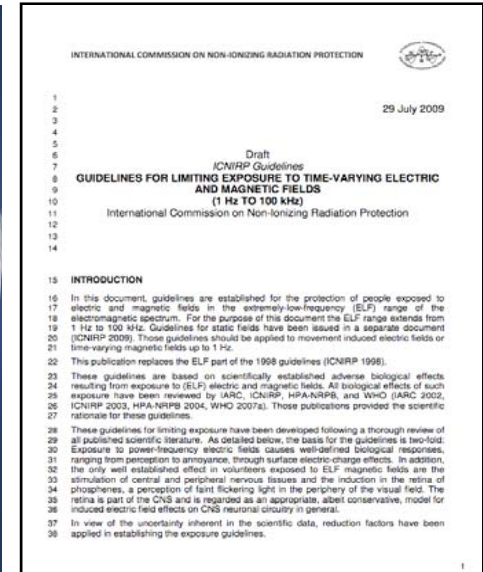
IARC 2002



ICNIRP 2003

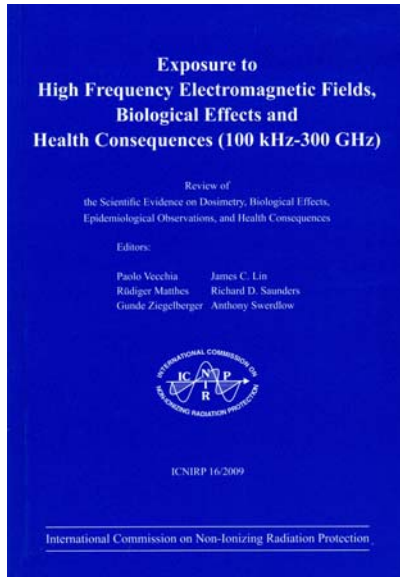


WHO 2007



ICNIRP 2010
(November)

WHO and ICNIRP RF



ICNIRP 2009

IARC 2011
(Evaluation
May 2011)

WHO 2012

ICNIRP 2012
(Confirmation
statement 2009)

Confirmation of the RF standard

ICNIRP STATEMENT ON THE “GUIDELINES FOR LIMITING EXPOSURE TO TIME-VARYING ELECTRIC, MAGNETIC, AND ELECTROMAGNETIC FIELDS (UP TO 300 GHz)”

The International Commission on Non-Ionizing Radiation Protection*

INTRODUCTION

SINCE THE publication of the ICNIRP “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz)” (ICNIRP 1998) many scientific studies of the effects of such fields have been published. In the frequency range up to approximately 100 kHz several scientific reviews and health hazard assessments have been undertaken by organizations such as the World Health Organization (WHO

effects such as “work stoppage” caused by mild whole-body heat stress and/or tissue damage caused by excessive localized heating (D’Andrea et al. 2007). With regard to non-thermal interactions, it is in principle impossible to disprove their possible existence but the plausibility of the various non-thermal mechanisms that have been proposed is very low. In addition, the recent in vitro and animal genotoxicity and carcinogenicity studies are rather consistent overall and indicate that such effects are unlikely at low levels of exposure. Therefore, ICNIRP

Health Physics 97:257-259 (2009)
www.icnirp.org

Confirmation of established effects

“It is the opinion of ICNIRP, that the scientific literature published since the 1998 guidelines has provided **no evidence of any adverse effects below the basic restrictions** and does not necessitate an immediate revision of its guidance on limiting exposure to high frequency electromagnetic fields.”

Evaluation of long-term effects

“ICNIRP recently published a review of the scientific evidence on the health effects of radiofrequency exposure from mobile phones. We found **the existing evidence did not support an increased risk of brain tumours** in mobile phone users within the duration of use yet investigated.”

ICNIRP on the Interphone Study

“The subsequent publication of the Interphone study has added greatly to the volume of evidence available. ICNIRP believes on preliminary review of the results, however, that they **do not change the overall conclusions.**

ICNIRP therefore considers that the results of the Interphone study give **no reason for alteration of the current guidelines.**“

Conclusions (Personal views)

- A balance is needed between updating and stability of the standards
- The scientific evidence has been consolidated and risk evaluation is unlikely to change in its conclusions
- Most probably, the next revision of RF guidelines will not compromise the adequateness of present limits
- Relevant modifications of basic restrictions and reference levels are unlikely to occur in the future