Latest updates on ICNIRP and its role in radiation safety

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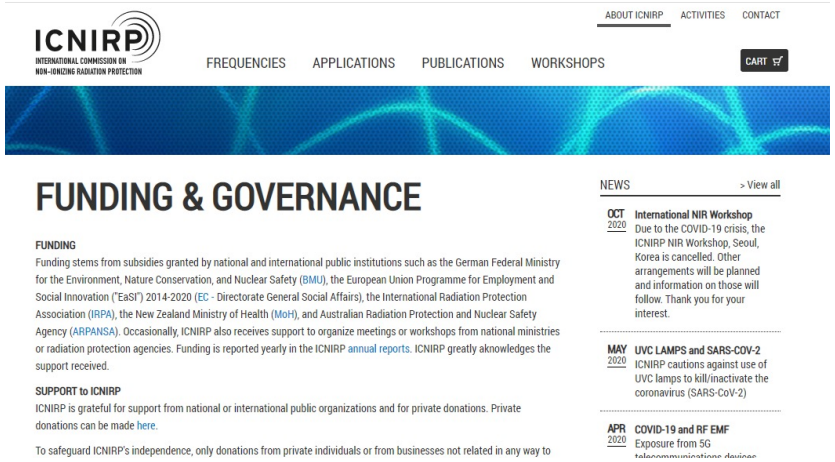
ICNIRP Background

- Chartered as an independent commission in 1993 by the International Radiation Protection Association (IRPA)
- To develop and disseminate science-based advice on limiting exposure to non-ionizing radiation (SMF, ELF, RF, IR, UV)

ICNIRP Background

- Not-For-Profit Non-Governmental Organization in official relations with World Health Organization & International Labour Organization
- Independent from industry; members declarations of interests available at www.ICNIRP.org



ICNIRP Background

- ICNIRP deals with all NIR (+ infrasound/ultrasound)
- Relevant to telecommunications is the radiofrequency electromagnetic field band (RF)
  - 100 kHz to 300 GHz
  - this is what most telecommunications devices use to enable communication

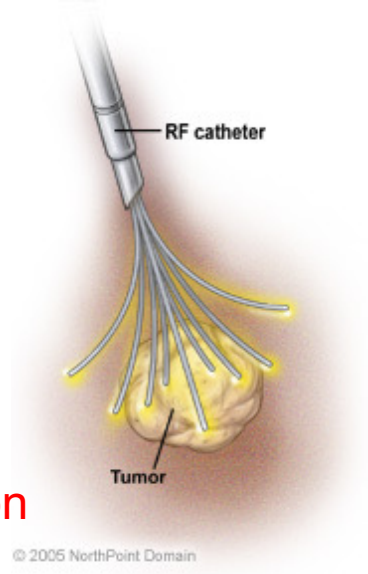
Why are *limits* important in terms of RF?

- The effect of RF on human health varies greatly depending on a range of factors
- For example
  - it has no effect at low levels
  - but can be harmful at high levels
- We need to know the difference

youtube.com/c/TannerTech

Importance of the difference between harm and safety

- There are many important benefits that RF brings
- If we stop safe-RF merely because very high levels of RF are dangerous
  - lose benefits, but do not improve health and safety
- If we can determine levels that are safe and that still allow beneficial technologies to operate
  - a win-win
- Providing guidance on safe/unsafe NIR levels is ICNIRP's main function



RF Ablation

MRI Scans

Mobile telecommunications

RF Guidelines provide a set of rules to avoid unsafe RF exposures, without unduly limiting beneficial uses of RF

ICNIRP Updates

- Governance
- RF Guidelines
- The Future

Governance

- RF, telecommunications and health is very contentious in the eyes of the public / media
- Pressure groups have become very professional, and try to exploit anything they can to push the debate away from science
- Governance must be ‘squeaky clean’, as it appears to be easier to gain traction with this than the science itself

Governance

- ICNIRP has been working through its governance structures to
  - reduce potential confusion
  - ensure it is appropriate & transparent
- Released an initial document that outlines our current practices
  - important as it deals with a range of false claims on the web
  - https://www.icnirp.org/cms/upload/publications/ICNIRProle2022.pdf
- Currently extending this work

RF Guidelines

- First update since 1998
- Published in May 2020
- https://www.icnirp.org/en/publications/article/rf-guidelines-2020.html

OPEN

Special Submission

GUIDELINES FOR LIMITING EXPOSURE TO ELECTROMAGNETIC FIELDS (100 kHz to 300 GHz)

International Commission on Non-Ionizing Radiation Protection (ICNIRP)[1]

Abstract—**Radiofrequency electromagnetic fields (EMFs) are used to enable a number of modern devices, including mobile telecommunications infrastructure and phones, Wi-Fi, and Bluetooth. As radiofrequency EMFs at sufficiently high power levels can adversely affect health, ICNIRP published Guidelines in 1998 for human exposure to time-varying EMFs up to 300 GHz, which included the radiofrequency EMF spectrum. Since that time, there has been a considerable body of science further addressing the relation between radiofrequency EMFs and adverse health outcomes, as well as significant developments in the technologies that use radiofrequency EMFs. Accordingly, ICNIRP has updated the radiofrequency EMF part of the 1998 Guidelines. This document presents these revised Guidelines, which provide protection for humans from exposure to EMFs from 100 kHz to 300 GHz.**
Health Phys. 118(5):483–524; 2020

INTRODUCTION

THE GUIDELINES described here are for the protection of humans exposed to radiofrequency electromagnetic fields (EMFs) in the range 100 kHz to 300 GHz (hereafter "radiofrequency"). This publication replaces the 100 kHz to 300 GHz part of the ICNIRP (1998) radiofrequency guidelines, as well as the 100 kHz to 10 MHz part of the ICNIRP (2010) low-frequency guidelines. Although these guidelines are based on the best science currently available, it is recognized that there may be limitations to this knowledge that could have implications for the exposure restrictions. Accordingly, the guidelines will be periodically revised and updated as advances are made in the relevant scientific knowledge. The present document describes the guidelines and their rationale, with Appendix A providing further detail concerning the relevant dosimetry and Appendix B providing further detail regarding the biological and health effects reported in the literature.

PURPOSE AND SCOPE

The main objective of this publication is to establish guidelines for limiting exposure to EMFs that will provide a high level of protection for all people against substantiated adverse health effects from exposures to both short- and long-term, continuous and discontinuous radiofrequency EMFs. However, some exposure scenarios are defined as outside the scope of these guidelines. Medical procedures may utilize EMFs, and metallic implants may alter or perturb EMFs in the body, which in turn can affect the body both directly (via direct interaction between field and tissue) and indirectly (via an intermediate conducting object). For example, radiofrequency ablation and hyperthermia are both used as medical treatments, and radiofrequency EMFs can indirectly cause harm by unintentionally interfering with active implantable medical devices (see ISO 2012) or altering EMFs due to the presence of conductive implants.

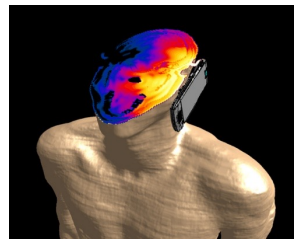
[1]ICNIRP, c/o BfS, Ingolstaedter Landstr. 1, 85764, Oberschleissheim, Germany;
The International Commission on Non-Ionizing Radiation Protection (ICNIRP) collaborators are listed in the Acknowledgement section.

RF Guidelines

- Radiofrequency EMFs (100 kHz – 300 GHz)
- Provide protection against adverse health effects to humans under realistic exposure conditions
- Does not include
  - exposure for medical purposes (patients, carers and comforters)
  - exposure of medical implants
  - electromagnetic compatibility
  - compliance issues (e.g. measurement protocols)

Basic algorithm for deriving limits

a) Determine minimum exposure level that results in harm (regardless of mechanism)
b) Derive ‘Basic Restrictions’ (RF in the body)
   - via application of reduction factors
c) Derive ‘Reference Levels’ (RF in the environment)
   - more easily applied means of providing protection
   - very conservatively derived



Overall outcomes

- Set of limits, below which harm will not occur

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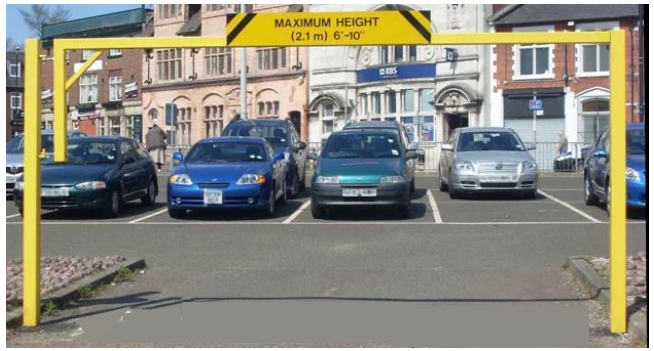
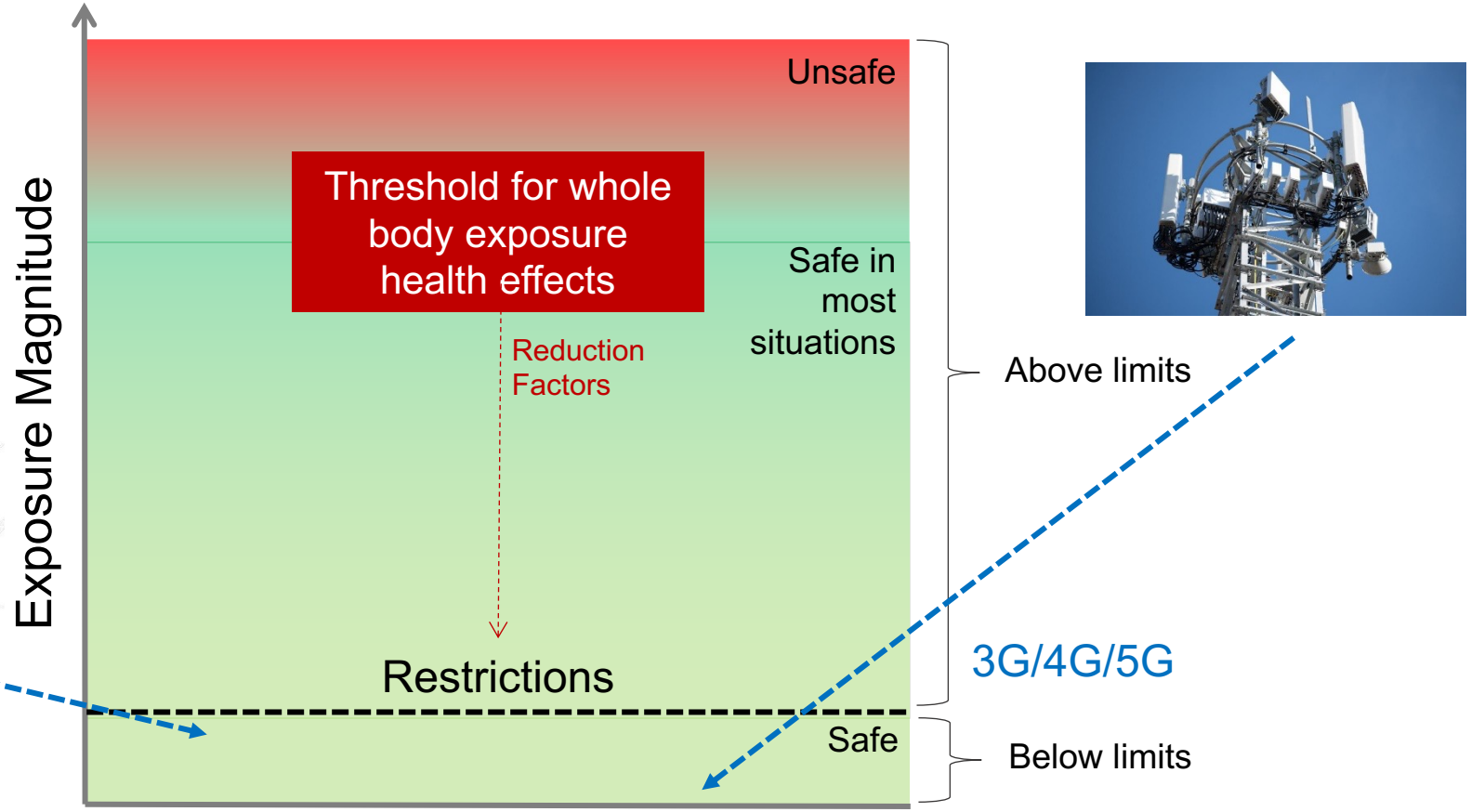
Overall outcomes

- Importantly
  - Protects against all adverse health effects, regardless of mechanism
  - Protects against all realistic types of exposure
    - long and short-term exposures
    - different signal types (e.g. pulsed, CW, 2G, 3G, 4G, 5G)
  - Protects all people within scope (e.g. children as well as adults)



Guidelines & Telecommunications



The Future

- ICNIRP has not identified any urgent RF-safety issues that need to be addressed
- Research continues, and ICNIRP will continue to search for potential RF-safety issues, and address them as needed

Thankyou for your time!

ICNIRP
INTERNATIONAL COMMISSION ON
NON-IONIZING RADIATION PROTECTION