



ITU Workshop on Human Exposure to Electromagnetic Fields, Turin, 9 May 2013

EMF Safety Guidelines - The ICNIRP View -

Rüdiger Matthes

International Commission on Non-Ionizing Radiation Protection



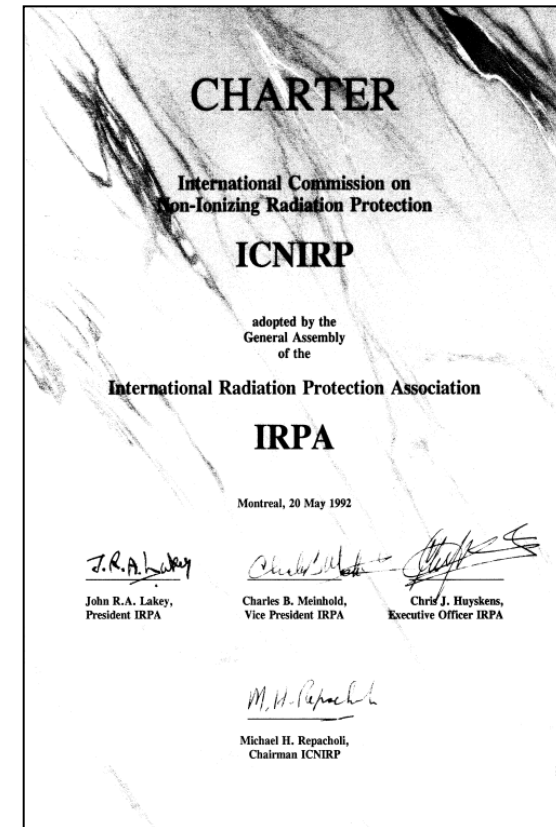
Outline

- **ICNIRP**
- **Approach to RF protection**
- **Guideline relevant topics**
- **Guideline revision - schedule**

ICNIRP

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- independent group of experts
- emanated from IRPA/INIRC in May 1992
- members are not affiliated with commercial or industrial enterprises
- multidisciplinary
- balanced in terms of geography and gender
- formally recognized cooperation with WHO, ILO, and others
- registered not-for-profit



Commission 2012-2016

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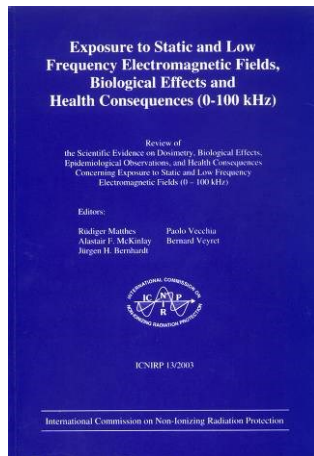
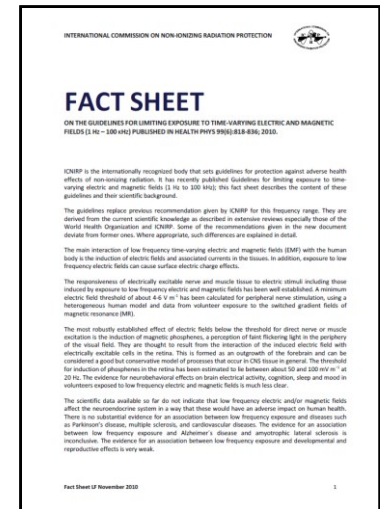
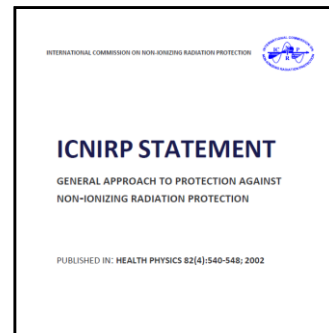
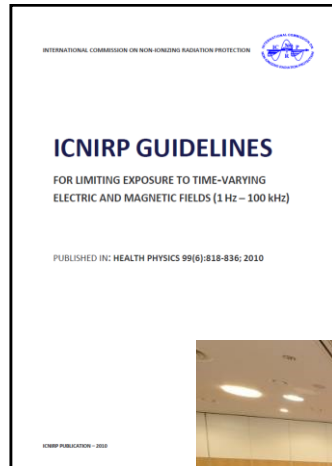


Sekretariat
Gunde Ziegelberger
Karine Chabrel



ICNIRP activities

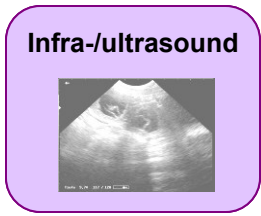
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ICNIRP objectives

- advance non-ionizing radiation protection
- provide scientific guidance and recommendations
- focus on people and the environment
 - general public, workers, patients



Outline

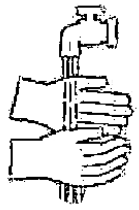
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- ICNIRP
- Approach to RF protection

ICNIRP's approach

- **protection from established health hazards**
 - detectable impairment of the health
- **result from a careful analysis of the literature**
 - rationale considers direct and indirect, acute and chronic effects
- **risk assessment based on sound scientific evidence**
 - studies that meet quality criteria
 - totality of science
- **reduction (safety) factors to consider quantitative uncertainties in the database and biological variability**
- **two tier system**
 - worker / general public



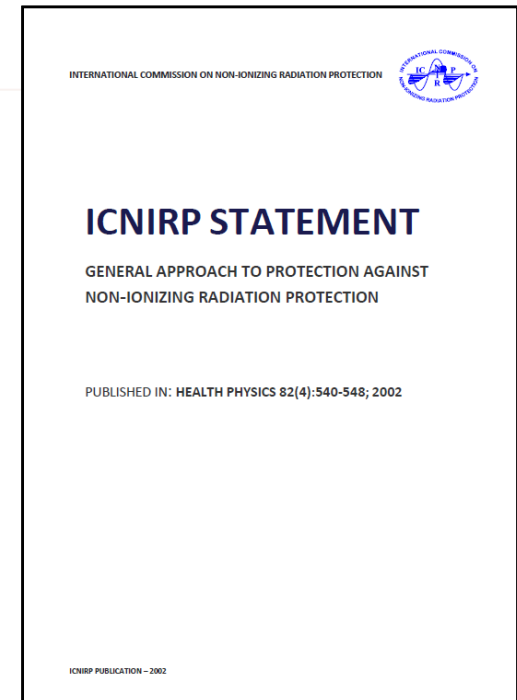


Precautionary approach

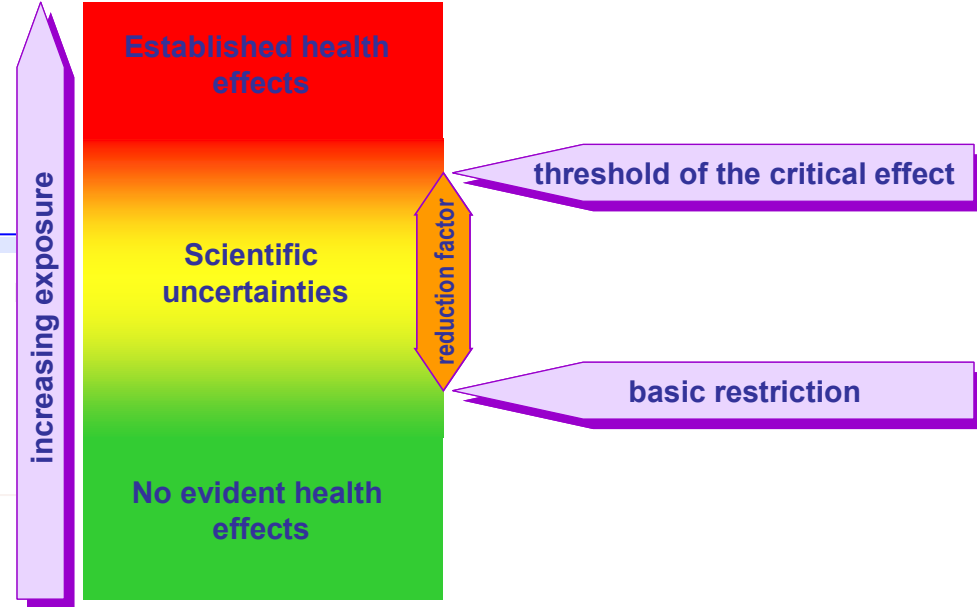
- precaution is an approach to risk management
- applied when:
 - health risks are suspected
 - sufficient scientific evidence is missing
- generally center on reducing needless exposure

ICNIRP notes:

- approach of national authorities responsible for risk management
- such approaches should not undermine evidence based guidelines
- the clarification afforded by the European Commission



Reduction factor



uncertainties in the data base

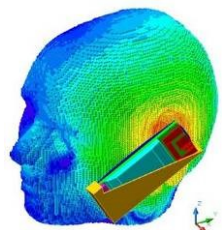
- biological variability
- uncertainties and variability in dosimetry
- threshold definition (often extrapolation)

impact of environmental conditions

- high temperature
- high activity levels

overall no rigorous scientific basis for reduction factors

- conservative expert judgement



Basic restrictions (SAR)

Workers

Whole body exposure	0.4 W/kg
Local exposure – head and trunk	10 W/kg
Local exposure – limbs	20 W/kg

General public

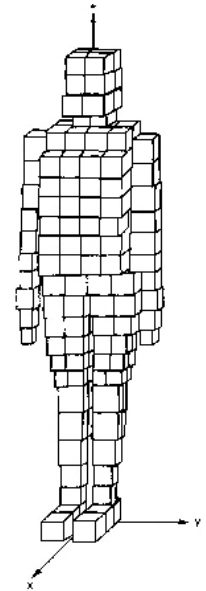
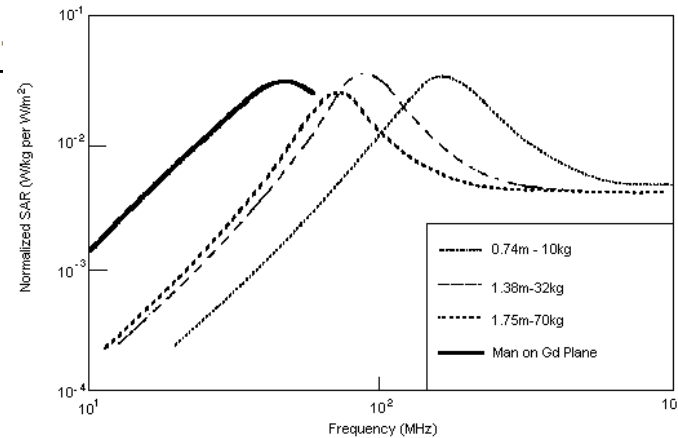
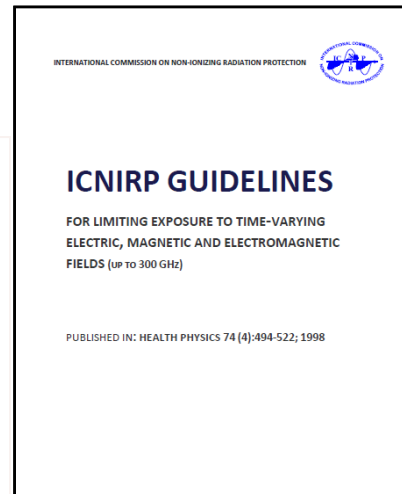
Whole body exposure	0.08 W/kg
Local exposure – head and trunk	2 W/kg
Local exposure – limbs	4 W/kg

All values averaged over 6 minutes

All local exposure is to be averaged over 10 g

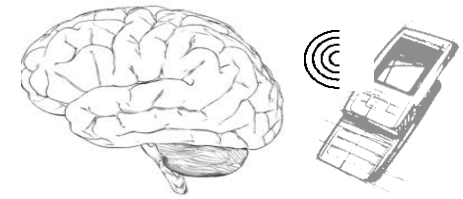
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Reference values



Outline

- **ICNIRP**
- **Approach to RF protection**
- **Guideline relevant topics**
 - **cancer and mobile phone use**
 - **delayed effects at low levels**
 - **symptoms and well-being**
 - **age related effects**
 - **intermediate and THz frequencies**



Mobile Phone use and cancer

data for longer-term use are still limited

no plausible mechanism

no convincing evidence from epidemiology

IARC 2B "possibly carcinogenic to humans"

no convincing evidence from laboratory

Nevertheless, while one cannot be certain, the trend in the accumulating evidence is increasingly against the hypothesis that mobile phone use causes brain tumors.



Delayed effects at low levels

- **no convincing evidence from epidemiology**
- **key concerns**
 - **quality of exposure assessment, missing biological mechanism, short lag periods studied**
- **research focused on brain tumors**
- **only single studies on children**
- **recent high quality animal studies consistently report lack of an effect**

- **still insufficient evidence for firm conclusions**

Symptoms and well-being

attribution of subjective symptoms to EMF (electrosensitivity)

- science does not support the attribution
- effects related to awareness of exposure (nocebo)

- short term lab studies might be less suitable

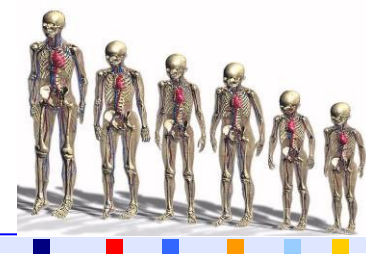


Age related effects

- **age related dosimetric variability**
- **overall no robust evidence of age related health effects**

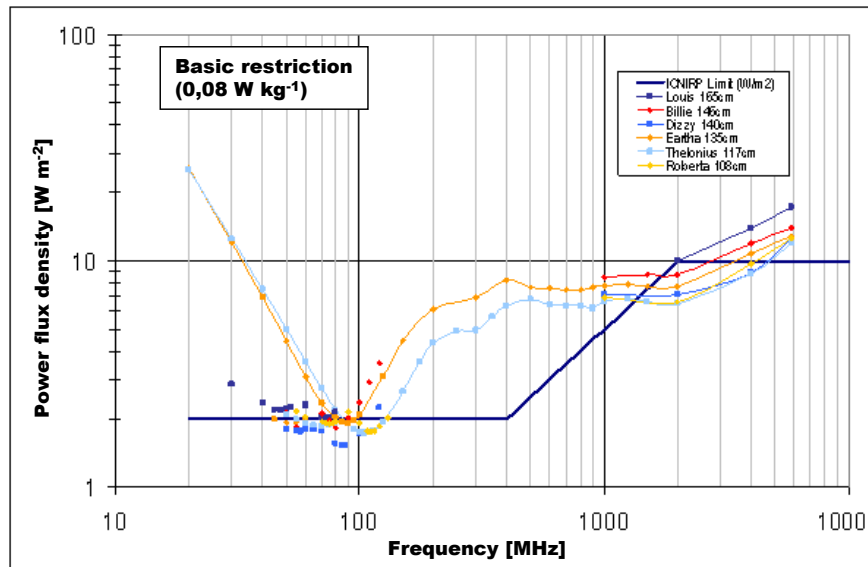
- **insufficient evidence from animal studies**
- **very young and elderly rarely included in experimental studies**

- **still insufficient evidence for firm conclusions**

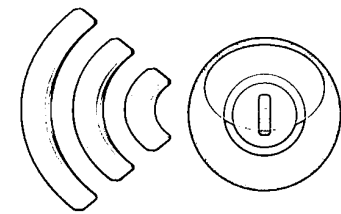


Age related dosimetry

induced SARs at recommended reference level could be up to 40% higher than the current basic restriction under worst-case conditions



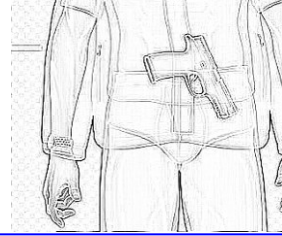
- negligible compared with the large reduction factor of 50 (5,000%)
- the few studies with adequate exposure assessment in the far-field of RF transmitters did not reveal any health-related effects
- exposure levels due to cell phone base stations are generally around one-ten-thousandth of the guideline levels



Intermediate frequencies

- **very few epidemiological data available (no recent studies)**
 - older studies, limited quality, no particular risk identified
- **biological effects have not been studied very well**

- **data are still too limited for an appropriate risk assessment**
- **guidelines are largely based on extrapolation**



THz frequencies

- numerous emerging applications (security, military, medical, ...)
 - health risks not assessed so far by ICNIRP or WHO
 - photo thermal effects well known
 - spurious reports of non-thermal effects in vitro
-
- THz not covered by guidelines so far (except for Laser radiation)



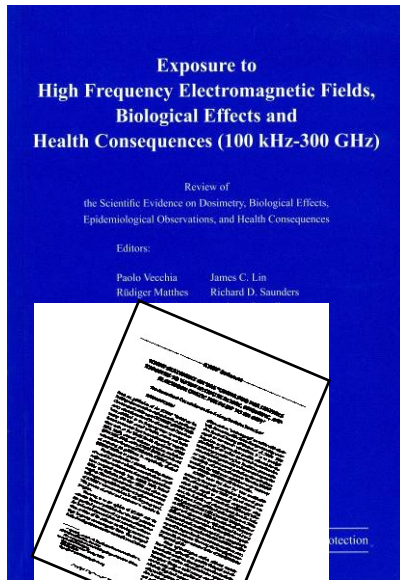
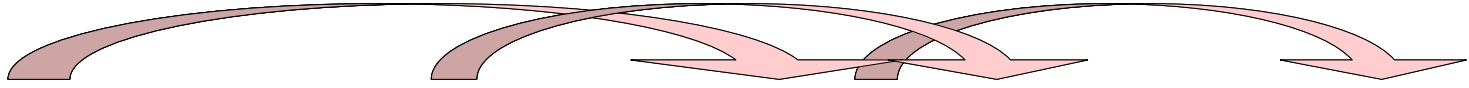
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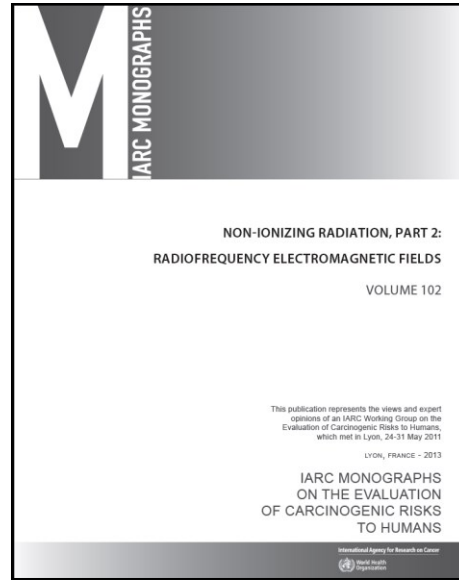
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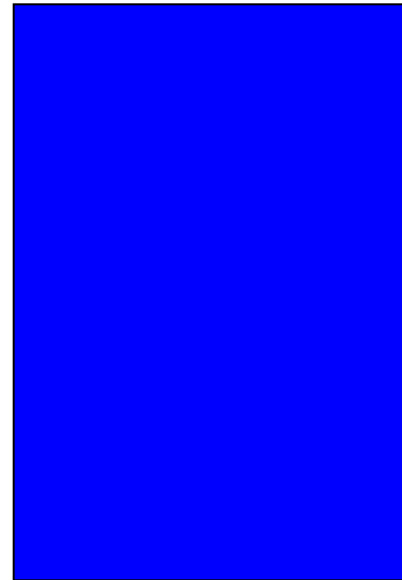
RF revision



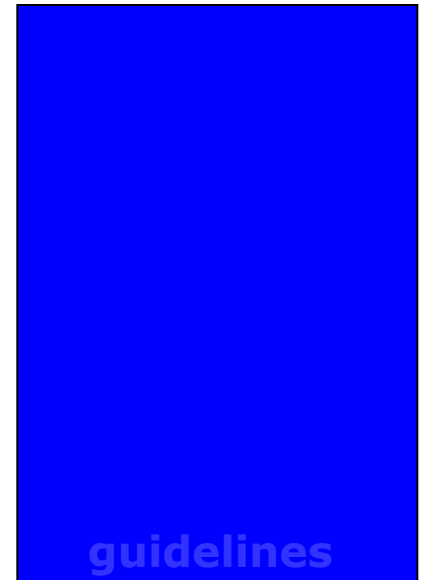
ICNIRP 2009
guidelines confirmed



IARC 2013



WHO 2014/15
(?)



ICNIRP 2015
(?)



Thank you for your attention



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