

# Update on ICNIRP's High Frequency Guidelines

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**Work in progress!!**  
**No final decisions made**  
**Numbers preliminary**

## Previous Guidelines

- ICNIRP Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz). Health Physics, 74 (4):494-522; 1998
- ICNIRP Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz – 100 kHz). Health Physics, 99 (6): 494-522; 2010
- Guidelines under development: 100 kHz – 300 GHz (High Frequency)

## Scope

- To provide protection against adverse health effects to humans due to exposure to high-frequency EMFs (100 kHz – 300 GHz)
- Considers occupational and general public exposure
- Considers direct and indirect exposure (but only contact with charged objects)
- Protection based on exposure, not device
- Not included:
  - Electromagnetic interference
  - Exposure for medical purposes
  - Compliance issues (e.g. measurement)

## Method for setting restrictions

- Identify evidence of effects of HF exposure on biological systems (and where available, mechanisms)
  - WHO Environmental Health Criterion
  - Currently only have draft; will wait for final document
  - ‘Evidence’ = scientifically substantiated; independent replication, sufficient quality, scientifically explicable generally
- Identify HF ‘health effect threshold’
  - WHO 2006 definition of ‘health’ (physical, mental and social well-being)
- Where insufficient threshold data, use knowledge of mechanisms to set ‘operational threshold’
  - e.g. use knowledge of temperature in lieu of clear RF threshold

## Method for setting restrictions

- Where relevant, apply 'reduction factors' to account for
  - Biological variability (e.g. elderly more prone to heat stress)
  - Uncertainty in science, such as
    - confidence in thresholds
    - precision of dose estimation
    - level of caution deemed appropriate
- Resultant value is used as a Basic Restriction(BR)
  - Refers to exposure within tissue
  - If below the BR, then exposure is OK
  - Conservatism is applied at many steps
    - BRs are considered conservative estimates that will remain protective unless exceeded by a substantial margin

## Progress so far

- Treat two groupings of body regions separately
  - Head and trunk (head, eye, abdomen, back, thorax, pelvis)
  - Limbs (upper arm, forearm, hand, thigh, leg, foot, epidermis, dermis and auricle)

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## Basic Restrictions

Parameter	Frequency Range	Threshold Effect	Occupational	General Public
WBA SAR	100 kHz-300 GHz	1 deg C BCT	0.4 W kg <sup>-1</sup>	?0.16 W kg <sup>-1</sup>
Local SAR (head & trunk)	100 kHz-300 GHz	2 deg C local	5 W kg <sup>-1</sup>	2 W kg <sup>-1</sup>
Local SAR (limbs)	100 kHz-300 GHz	4 deg C local	10 W kg <sup>-1</sup>	4 W kg <sup>-1</sup>
Power Density	6 -300 GHz	4 deg C local	?	?
Specific Absorption	300 MHz-10 GHz (pulsed)	Annoyance	?	?
E field Pulse (in tissue)	100 kHz-30 MHz (ampl.)	Electroporation	?	?

- Local SAR (10g; combined tissue; cube [potentially deformed]; 6 min average)
- PD (4 cm<sup>2</sup>; 6 min average; frequency dependent PD and averaging time)
- Considerable ongoing discussion



## Next steps

- Still more to do
  - A number of issues still under discussion
  - Any conclusions must be tentative until WHO EHC is complete
  - Public consultation draft likely end 2017

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**THANKS!**