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Danish National Board of Health (Sundhedsstyrelsen)
Finnish Radiation and Nuclear Safety Authority (Säteilyturvakeskus, STUK)
Icelandic Radiation Safety Authority (Geislavarnir Rikisins)
Norwegian Radiation Protection Authority (Statens strålevern)
Swedish Radiation Safety Authority (Strålsäkerhetsmyndigheten)

EXPOSURE OF THE GENERAL PUBLIC TO RADIOFREQUENCY ELECTROMAGNETIC FIELDS

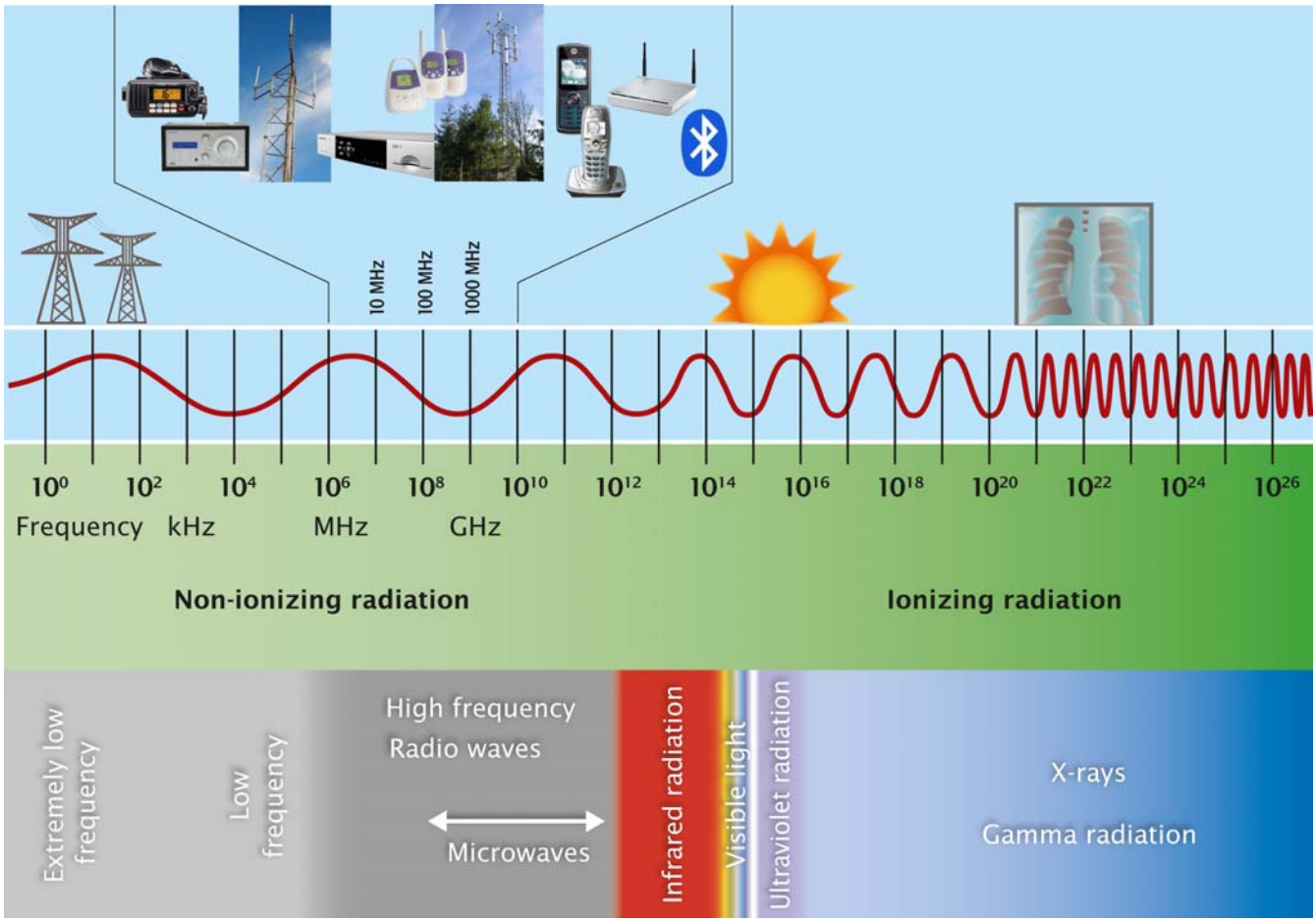
- A joint statement from the Nordic Radiation Safety Authorities -

This statement addresses the exposure of the general public to radiofrequency (RF) radiation emitted continuously by fixed transmitters located in our surroundings. The joint statement regarding mobile phones issued in 2004 is still valid (Mobile Telephony and Health – A common approach for the Nordic competent authorities).

Introduction

The introduction of new sources of electromagnetic fields is fast in the Nordic countries due to technological developments. Radio and TV transmitters have existed throughout the Nordic countries for more than 70 and 50 years, respectively. The first generation (NMT) of mobile telecommunication networks were introduced 30 years ago, the second generation (GSM) came 25 years ago and third generation (UMTS) networks started around 2000 while the public safety radio network has been (or soon will be) started up in the Nordic countries. In addition, cordless telephones have been in use for more than 25 years and wireless networks are used in the home, offices and in public areas. Wireless alarm and baby monitoring systems using radiofrequency signals are also common, as well as wireless personal identification systems. Bluetooth technology has been adopted for use in many pc applications such as the wireless mouse and keyboard, as well as in hands-free devices for mobile phones.

The above are all examples of sources emitting electromagnetic fields in the radiofrequency range from 10 MHz to 2.5 GHz. The exposure of the general public in the Nordic countries due to these sources is well below the international recommendations given by International Commission on Non-Ionizing Radiation Protection (ICNIRP).



The electromagnetic spectrum illustrating typical sources in the high frequency range.

Exposure limits

It is well documented in the global scientific community that exposure to electromagnetic fields above a certain level is harmful. ICNIRP published exposure guidelines in 1998 aimed at preventing such harmful health effects [ICNIRP, 1998]. The ICNIRP guidelines are derived by applying a safety factor of 50 (for general public exposure) to the lowest level of exposure resulting in an observed significant biological effect. All of the well-established adverse health effects from electromagnetic fields are caused by a temperature rise in affected tissues. The ICNIRP guidelines are therefore aimed to prevent adverse tissue heating; compliance with the guidelines for the general public ensures that the maximum temperature increase is a few tenths of one degree centigrade. Recently, the ICNIRP reconfirmed their 1998 guidelines in the radiofrequency area until further notice [ICNIRP, 2009].

Exposure levels

With regard to exposure, there are two different types of sources of radiofrequency radiation; hand-held (or body-worn) and fixed transmitters. The exposure level caused by hand-held sources such as mobile phones can be close to the ICNIRP exposure limits in some cases, though exposure only occurs when the device is in use (e.g. during a phone call). Contrary to this, exposure caused by fixed transmitters is continuous and present everywhere. According to measurements performed in all the Nordic countries, however, exposure of the general public to these background fields is typically far below 1/100th of the exposure limits.

For further information about exposure sources and field strengths in normal living environments, see annex 'Exposure of the general public to radio frequency fields'.

Electromagnetic hypersensitivity (EHS)

Issues regarding reported cases of electromagnetic hypersensitivity (EHS) are complex and not easily addressed. According to the World Health Organisation (WHO) there is no scientific basis to link EHS symptoms to exposure to an electromagnetic field [WHO, 2005]. Therefore, the Nordic radiation safety authorities regard EHS as a medical issue, which needs to be dealt with by health authorities, rather than as a radiation safety issue. The symptoms related to EHS can be real and severe for sufferers, however, and hence it is important to continue studies aimed at achieving a better understanding of the causes of EHS.

Conclusion

The Nordic authorities agree that there is no scientific evidence for adverse health effects caused by radiofrequency field strengths in the normal living environment at present. This conclusion concurs with the opinion of international scientific and advisory bodies listed as references below [ICNIRP, 1998 and 2009; WHO, 2005 and 2006; SCENIHR 2009; SSI`s Independent Expert Group on Electromagnetic Fields, 2007]. The Nordic authorities therefore at present see no need for a common recommendation for further actions to reduce these radiofrequency fields.

It is important to note, however, that many of the technologies which use radiofrequency electromagnetic fields have only been prevalent for less than two decades. It is therefore important to continue active research on the possible health effects of radiofrequency radiation and reappraisal of the scientific literature concerning this issue. It is also important to follow developments in exposure from different sources and the possible health consequences from such development.

The Nordic authorities wish to emphasize the fact that to reduce the total exposure received by the general public from wireless communication systems, it is necessary to carry out integrated planning that takes into account radiation emitted both from fixed antennas and hand-held devices such as mobile phones. Furthermore, in terms of overall public exposure, mobile phones are a much more significant source of radiofrequency radiation than fixed antennas. If the number of fixed antennas is reduced, mobile phones will need to use higher power to maintain their connection, thereby the exposure of the general public may increase.

For further information about this and possible actions to reduce exposure from mobile phones and other devices, see the web-pages of the national authorities listed below.

References

Mobile Telephony and Health – A common approach for the Nordic competent authorities (Available at http://www.nrpa.no/archive/Internett/div_dokument/IIS/NordicMobile.pdf)

ICNIRP. 1998. Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). Health Phys 74:494–522. (Available at http://www.icnirp.de/documents/emfgdl.pdf)

ICNIRP. 2009. ICNIRP Statement on the "Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)". Health Phys 97:257–258. (Available at http://www.icnirp.de/documents/StatementEMF.pdf)

World Health Organization (WHO). 2005. Fact sheet 296: Electromagnetic fields and public health - Electromagnetic Hypersensitivity. (Available at http://www.who.int/mediacentre/factsheets/fs296/en/index.html)

World Health Organization (WHO). 2006. Fact sheet No 304: Electromagnetic fields and public health. (Available at http://www.who.int/mediacentre/factsheets/fs304/en/index.html)

SCENHIR (The European Commission Scientific Committee on Emerging and Newly Identified Health Risks) 2009. Health effects of exposure to EMF, European commission 2009. (Available at http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf)

SSI`s independent expert group on Electromagnetic fields. 2007. (Statens strålskyddsinstitut) SSI Rapport 2008:12. Recent Research on EMF and Health Risks. Fifth Annual Report from SSI`s independent expert group on Electromagnetic fields. (Available at http://www.stralsakerhetsmyndigheten.se/Publikationer/Rapport/Stralskydd/2008/200812/)

Further reading:

www.ssm.se

www.stralevernet.no

www.sis.dk

www.gr.is

www.stuk.fi