

Wireless electronic devices and health

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For mobile phones, see Mobile phone radiation and health.

The World Health Organization has acknowledged that electromagnetic fields (EMFs) are influencing the environment (but not people), and that some people are worried about possible effects.^[1] In response to public concern, the World Health Organization established the *International EMF Project* in 1996 to assess the scientific evidence of possible health effects of EMF in the frequency range from 0 to 300 GHz. They have stated that although extensive research has been conducted into possible health effects of exposure to many parts of the frequency spectrum, all reviews conducted so far have indicated that exposures are below the limits recommended in the ICNIRP (1998) EMF guidelines, covering the full frequency range from 0–300 GHz, and do not produce any known adverse health effect.^[citation needed]

International guidelines on exposure levels to microwave frequency EMFs such as ICNIRP limit the power levels of wireless devices and it is uncommon for wireless devices to exceed the guidelines. These guidelines only take into account thermal effects, as nonthermal effects have not been conclusively demonstrated.^[2] The official stance of the Health Protection Agency is that “[T]here is no consistent evidence to date that WiFi and WLANs adversely affect the health of the general population”, but also that “...it is a sensible precautionary approach...to keep the situation under ongoing review...”.^[3]

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Exposure difference to mobile phones

Main article: Mobile phone radiation and health

Users of wireless devices are typically exposed for much longer periods than for mobile phones and the strength of wireless devices is not significantly less. Whereas a mobile phone can range from 21 dBm (125 mW) for Power Class 4 to 33 dBm (2W) for Power class 1, a wireless router can range from a typical 15 dBm (30 mW) strength to 27 dBm (500 mW) on the high end.^[4]

Wireless routers can be located significantly farther away from users' heads than a mobile phone, resulting in far less exposure overall. The Health Protection Agency (HPA) claims that if a person spends one year in a Wi-Fi hotspot, they will receive the same dose of radio waves as if they had made a 20-minute call on a mobile phone.^[5] Nevertheless, the same is not true of Wi-Fi enabled laptops, which are not as far away.

The HPA also acknowledges that due to the mobile phone's adaptive power ability, a DECT cordless phone's radiation could actually exceed the radiation of a mobile phone. The HPA explains that while the DECT cordless phone's radiation has an average output power of 10 mW, it is actually in the form of 100 bursts per second of 250 mW, a strength comparable to some mobile phones.^[6]

Wireless LAN

Most wireless LAN equipment is designed to work within predefined standards. Wireless access points are also often close to humans, but the drop off in power over distance is fast, following the inverse-square law.^[7] However, wireless laptops are typically used close to humans. WiFi has been anecdotally linked to electromagnetic hypersensitivity, e.g., in Toronto, Canada schoolchildren as well as staff workers of France National Library.^[8]

The HPA's position is that "...radio frequency (RF) exposures from WiFi are likely to be lower than those from mobile phones." It also saw "...no reason why schools and others should not use WiFi equipment."^[3] In October 2007, the HPA launched a new "systematic" study into the effects of WiFi networks on behalf of the UK government, in order to calm fears that had appeared in the media in a recent period up to that time".^[9] Dr Michael Clark, of the HPA, says published research on mobile phones and masts does not add up to an indictment of WiFi.^[10]

Bluetooth

Bluetooth also uses the microwave frequency spectrum in the range of 2.4 GHz to 2.4835 GHz. The radiated output power of Bluetooth devices varies between 1 and 100 mW, and can operate continuously or sporadically (on demand), so total exposure to EMF radiation is quite variable. Bluetooth devices have not been linked with any health issues.

Other devices

Radio frequency in the microwave and radio spectrum is used in a number of practical devices for professional and home use, such as:

- DECT and other cordless phones operating at a wide range of frequencies
- Remote control devices for opening gates, etc.
- Portable two-way radio communication devices, such as walkie-talkies
- Wireless security (alarm) systems
- Wireless security video cameras

- Radio links between buildings for data communication
- Baby monitors

In addition, electrical and electronic devices of all kinds emit EM fields around their working circuits, generated by oscillating currents. Humans are in daily contact with computers, video display monitors, TV screens, microwave ovens, fluorescent lamps, electric motors of several kinds (such as washing machines, kitchen appliances [like electric can openers, blenders, and mixers], water pumps, etc.) and many others. A study of bedroom exposure in 2009 showed the highest ELF-EF from bedside lights and the highest ELF-MF from transformer devices, while the highest RF-ELF came from DECT cordless phones and outside cellphone base stations; all exposures were well below International Commission on Non-Ionizing Radiation Protection (ICNIRP) guideline levels.^[11] The highest typical daily exposure, according to a study of 2009, came from cellphone base stations, cellphones and DECT cordless phones, with the highest exposure locations in trains, airports and buses.^[12] The typical background power of electromagnetic fields in the home can vary from zero to 5 milliwatts per meter squared.^[citation needed] Long-time effects of these electromagnetic fields on human and animal health are still unknown.

See also

- Electromagnetic radiation and health
- Electronic harassment

References

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http://www.timesonline.co.uk/tol/life_and_style/health/features/article665419.ece. Retrieved 2007-09-16. "All the expert reviews done here and abroad indicate that there is unlikely to be a health risk from wireless networks. ... When we have conducted measurements in schools, typical exposures from WiFi are around 20 millionths of the international guideline levels of exposure to radiation. As a comparison, a child on a mobile phone receives up to 50 per cent of guideline levels. So a year sitting in a classroom near a wireless network is roughly equivalent to 20 minutes on a mobile. If WiFi should be taken out of schools, then the mobile phone network should be shut down, too—and FM radio and TV, as the strength of their signals is similar to that from WiFi in classrooms...."
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External links

- WiFi information at the UK Health Protection Agency

[hide] Radiation (Physics & Health)		
Main articles	Non-ionizing radiation	Ultraviolet light • Near ultraviolet • Visible light • Infrared light • Microwave • Radio waves • Acoustic Radiation
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		Thermal radiation • Electromagnetic radiation • Earth's radiation balance
Radiation health effects		Radiation therapy • Radiation poisoning • Radioactivity in biological research • List of civilian radiation accidents Mobile phone radiation and health • Wireless electronic devices and health • Health physics • Laser safety • Lasers and aviation safety
Related articles		Radiation hardening • Half-life • Radiobiology • Nuclear physics
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