

Current RF Exposure Limits

Please note official exposure limits are based on scientific studies that demonstrate so-called thermal effects, which are well studied and established. Precautionary recommendations by scientific, nongovernmental, and environmental organizations also include reported nonthermal effects whose explanations of their “plausible mechanisms” are still pending. Throughout this process of scientific knowledge finding to explain the why, various adverse health effects are being observed at much lower levels.

Exposure Levels in $\mu\text{W}/\text{m}^2$	National and International Exposure Guidelines
1,000,000,000	Cataract formation, established (Steneck 1980) <i>Lens opacity may already occur from 10,000,000 $\mu\text{W}/\text{m}^2$.</i>
100,000,000	U.S. Standard C95.1-1966 (occupational exposure) <i>The first standard limiting exposure to microwaves in the Western world.</i>
Up to 10,000,000	RF radiation exposure from cell phone handset held next to head
10,000,000	ICNIRP International Guidelines (1998) (new revision expected in 2018) 1500–15 000 MHz
4,500,000	900 MHz <i>These guidelines are based on biological effects of short-term, high-level exposures only, also referred to as thermal effects: e.g. Germany (1996), USA (1997), Japan (1997), Switzerland (2000), Australia (2002), Finland (2002), Sweden (2002), UK (2004), Austria (2006)</i>
5,350,000	Canada Safety Code 6 (2015) 2400 MHz (new limit about 50% lower than the previous one from 2009)
2,740,000	900 MHz (new limit about 60% lower than the previous one from 2009)
~2,400,000	Belgium : Guidelines (2001) 1900 MHz
~1,000,000	800 MHz <i>In 2009 a ruling of the constitutional court concluded that the setting of exposure levels for cell towers lies with the regional not the federal government. See further below.</i>
1,000,000	India : Exposure limit of cell tower radiation for general public (2012) 2–300 GHz
450,000	900 MHz
Up to 1,000,000	RF radiation exposure from cell phone handset at 1 foot
Up to 400,000	DECT cordless phones at 1 foot: 100,000–400,000 $\mu\text{W}/\text{m}^2$
Up to 200,000	Wi-Fi access points/clients at 8 inches: 100,000–200,000 $\mu\text{W}/\text{m}^2$
Up to 100,000	In the vicinity of cell towers (400-m radius): 1,000–100,000 $\mu\text{W}/\text{m}^2$

~100,000 (6 V/m)	<p>China: Ministry of Health Standard (1987) Exposure limit for “first grade” living environments or sensitive areas</p> <p>Toronto Board of Health, Canada (1999) Prudent Avoidance Policy for Siting of Cell Phone Base Stations, voluntary In 2013, the Toronto Medical Officer of Health recommended to discontinue this policy. The motion did not pass; the policy is still in place.</p> <p>Russia: Ministry of Health Standard SanPin 2.1.8. (2003) Exposure limit for general public</p> <p>Italy: Council of Ministers (2003): Decree: precautionary attention level not to be exceeded in sensitive areas</p> <p>Brussels Capital Region (2014) Exposure limit for general public (increased again after lowered to 3 V/m in 2009)</p> <p>Switzerland: Ordinance on Protection against Nonionizing Radiation (NISV 1999) — precautionary cell tower exposure limit for sensitive areas</p>
~95,500	1800 MHz
~42,500	900 MHz
~24,000 (3 V/m)	<p>Ukraine Health & Safety Guideline (1996)</p> <p>Regional Ordinances in Belgium: Wallonia (2009), Flanders (2010) In Wallonia, within a radius of 200 m of a cell antenna site, neighbors can request control measures, which are free of charge.</p>
40,000	DECT cordless phone at 1 m: 2,000–40,000 $\mu\text{W}/\text{m}^2$
20,000	Wi-Fi router/access point/PC card at 50 cm: 1,000–20,000 $\mu\text{W}/\text{m}^2$
20,000	Standard RF baby monitor at 30 cm: 2,000–20,000 $\mu\text{W}/\text{m}^2$ Low-emission baby monitor (Germany) at 30 cm: only 35 $\mu\text{W}/\text{m}^2$
(2 V/m)	ECOLOG Institute in Germany (2000)
~10,000	Precautionary recommendation based on review of scientific literature
3,000	Emissions from single RF sources (e.g. cell tower) at max. 30% of precautionary limit
	Seletun Consensus Statement (2010)
1,700	Precautionary recommendation, may be lowered in the future
500–1,000	Health effects observed in populations near cell towers (Kundi 2009) Cardiac effects, headaches, sleep problems
1,000	<p>Salzburg Resolution on Mobile Telecommunication Base Stations (2000) Precautionary recommendation</p> <p>Bioinitiative Working Group (2007) (see also update from 2012 below) Precautionary recommendation</p> <p>Parliamentary Assembly of Council of Europe: Resolution 1815 (2011) Precautionary recommendation for indoor environments</p> <p>Austrian Antenna System Siting Guideline (2012, updated 2015) Precautionary target threshold level inside and outside a building</p>

- 1,000 [EUROPAEM EMF Guideline](#) for EMF-related health problems (2016)
Nighttime exposure: radio broadcasting (FM)
Daytime exposure: TETRA, DVBT

- 100 Working Group of EU [STOA Panel](#) (2001)
Precautionary recommendation
[BUND](#) (Friends of the Earth Germany) (2008)
Precautionary recommendation for hazard protection
[Parliamentary Assembly of Council of Europe](#) (2011)
Precautionary recommendation for indoor environments for medium-term
[EUROPAEM EMF Guideline](#) for EMF-related health problems (2016)
Sensitive populations: radio broadcasting (FM)
Nighttime exposure: TETRA, DVBT
Daytime exposure: GSM, DECT, UMTS, HSPA, LTE

- 10 [Health Department of the Federal State of Salzburg](#) (Austria 2002)
Precautionary recommendation for outdoor environment (GSM sum total)
[TQB Green Building Rating System](#) (Austria 2009)
Largest number of credit points for indoor environment
[EUROPAEM EMF Guideline](#) for EMF-related health problems (2016)
Sensitive populations: TETRA, DVBT
Nighttime exposure: GSM, DECT, UMTS, HSPA, LTE
Daytime exposure: Wi-Fi 2.4/5.6 GHz, DAB+, GPRS with PTCCCH

- 3–6 [Bioinitiative Working Group](#) (2012)
Precautionary recommendation

- 1 [Health Department of the Federal State of Salzburg](#) (Austria 2002)
Precautionary recommendation for indoor environment (GSM sum total)
[BUND](#) (Friends of the Earth Germany) (2008)
Precautionary recommendation for general protection
[EUROPAEM EMF Guideline](#) for EMF-related health problems (2016)
Sensitive populations: GSM, DECT, UMTS, HSPA, LTE
Nighttime exposure: Wi-Fi 2.4/5.6 GHz, DAB+, GPRS with PTCCCH

- 0.1 [Building Biology Evaluation Guidelines](#) (SBM-2015) “No Anomaly”
Specifically designed for sleeping areas associated with long-term risks
[EUROPAEM EMF Guideline](#) for EMF-related health problems (2016)
Sensitive populations: Wi-Fi 2.4/5.6 GHz, DAB+, GPRS with PTCCCH

0.000 01–0.001	Minimum power level required for cell phone communication
~0.000 001	Natural background
~0.000 01	Ambient atmospheric noise in kHz range
~0.000 01	Stormy sun (30 MHz – 30 GHz)
~0.000 000 01	Quiet sun (30 MHz – 30 GHz)

$0.1 \text{ W/m}^2 = 100 \text{ mW/m}^2 = 100,000 \text{ } \mu\text{W/m}^2 = 10 \text{ } \mu\text{W/cm}^2$

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