

## 5G Deployments and the Protection of Public Health

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- Protection of public health is of paramount importance for the Commission and the safety of citizens is put first. Any risks posed by new technologies to the health and safety of citizens need to be properly assessed, and appropriate mitigating steps taken. This **precautionary approach** is already being taken into account in all European Commission initiatives, including those on 5G.
- The **Council Recommendation 1999/519/EC**<sup>1</sup> sets out those strict limits for exposure of the public to electromagnetic fields in line with the 1998 International Commission on Non-Ionising Radiation Protection (ICNIRP)<sup>2</sup> guidelines. This means: EU exposure limits for the general public are always at least **50 times lower than what international scientific evidence suggests as having any effect on health**. These limits are not binding for the EU Member States. However, the European Electronic Communications Code<sup>3</sup> refers to them and calls on Member States to ensure consistent application.
- ICNIRP released new Guidelines<sup>4</sup> in March 2020. After 20 years and based on a vast review of the scientific knowledge and public consultation, **the new ICNIRP guidelines confirm the appropriateness of**

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<sup>1</sup> OJ L 199 of 30.7.1999, p.59:

(<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999H0519&from=EN>)

<sup>2</sup> ICNIRP is an independent non profit scientific organisation based in Germany founded in 1992 by the [International Radiation Protection Association](#) (IRPA), specialising in [non-ionizing radiation](#) protection. The group is recognised and supported by the World Health Organisation (WHO). As presented by ICNIRP, ICNIRP's resources consist in subsidies from national and international public institutions such as the German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety ([BMU](#)), the European Union Programme for Employment and Social Innovation ("EaSI") 2014-2020 and [IRPA](#), in support received to organize meetings or workshops from national ministries or radiation protection agencies, and in private donations from private individuals or from businesses not related in any way to the field of non-ionizing radiations, which are listed in the ICNIRP donors' report. ICNIRP insists that it is free of vested interests as its members cannot be employed by industry, must comply with the ICNIRP's policy of independence and must publicly [declare their personal interests](#). ICNIRP's [annual financial report](#) is published online. <https://www.icnirp.org/en/about-icnirp/funding-governance/index.html>

The Commission is not aware of any conflicts of interests of members of international bodies such as ICNIRP or the members of SCENIHR. This was confirmed by the Ombudsman responding to a specific complaint regarding SCENIHR in case 208/2015/PD. <https://www.ombudsman.europa.eu/en/cases/decision.faces/en/78175/html.bookmark>

<sup>3</sup> <https://ec.europa.eu/digital-single-market/en/news/european-electronic-communications-code-updating-eu-telecom-rules>

<sup>4</sup> <https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf>

**existing limits** for the exposure to electromagnetic fields with slight adaptations to the measurement methods and to protection limits in relation to higher 5G frequencies.

- The European Commission is now looking carefully into ICNIRP's findings, and will re-examine the situation in relation to the 1999 Council Recommendation based on a **review by its relevant scientific committees** (Scientific Committee on Health, Environmental and Emerging Risks - SCHEER)<sup>5</sup> - or the Scientific Advice Mechanism - SAM<sup>6</sup>).
- 5G networks are expected to use **smaller cells with lower power levels** and therefore lower exposure levels than existing (large) cells in 4G networks. The overall exposure with the roll-out of 5G networks should be comparable to existing levels and remain well below the safe health limits for public exposure defined at international level and recommended at EU level.
- Exposure to EMF at the limits currently recommended at international and EU level has been classified by the WHO [International Agency for Research on Cancer \(IARC\)](#)<sup>7</sup>, in a 2011 report, as "possibly carcinogenic". To put this in perspective, it places such exposure in the **same 'possibly carcinogenic' category as pickled vegetables, and considers it less risky than eating red meat, night shift work or drinking hot coffee** which are considered by the IARC as being "probably carcinogenic", which is a higher category of risk. The report also distinguishes between different sources of EMF exposure, pointing out, for example, that typical environmental exposures to the brain from mobile-phone base stations on rooftops and from television and radio stations are several orders of magnitude lower than those from [2G] GSM handsets.
- Some sources in social media<sup>8</sup> have linked 5G networks with the outbreak of coronavirus **exploiting the current coronavirus crisis to**

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<sup>5</sup> SCHEER is the successor of the Scientific Committee on Emerging and Newly identified Health Risks (SCENIHR) - [https://ec.europa.eu/health/scientific\\_committees/scheer\\_en](https://ec.europa.eu/health/scientific_committees/scheer_en). The above scientific body is appointed and renewed as appropriate following an open and objective selection process.

<sup>6</sup> [https://ec.europa.eu/info/research-and-innovation/strategy/support-policy-making/scientific-support-eu-policies/group-chief-scientific-advisors\\_en](https://ec.europa.eu/info/research-and-innovation/strategy/support-policy-making/scientific-support-eu-policies/group-chief-scientific-advisors_en)

<sup>7</sup> <http://publications.iarc.fr/126>

<sup>8</sup> <https://www.youtube.com/watch?v=P9dAN9VZdNQ>

**create confusion among citizens**<sup>9</sup>. Such stories have been identified as **disinformation** and platforms (e.g. YouTube, Facebook) have promptly removed problematic content as soon as notified, while giving prominence to authoritative sources.

- There is no connection between 5G and coronavirus<sup>10</sup>. According to a recent announcement<sup>11</sup> of the World Health Organisation (WHO):

*“Viruses cannot travel on radio waves/mobile networks. COVID-19 is spreading in many countries that do not have 5G mobile networks. COVID-19 is spread through respiratory droplets when an infected person coughs, sneezes or speaks. People can also be infected when touching a contaminated surface and then their eyes, mouth or nose.”*

- 5G is the new generation of mobile network technology that is transmitted over non-ionising radio waves therefore it is impossible that it has any impact on the spread of the virus.
- The Commission is already supporting substantial **research efforts** on exposure to electromagnetic fields, and every new technological development goes hand in hand with an analysis of its potential effects on human health and the environment.

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<sup>9</sup> Such disinformation has in some cases provoked people attacking and damaging mobile installations. Therefore spread of disinformation is particularly irresponsible during the coronavirus crisis when ensuring connectivity is more important than ever in enabling people to telework, home-school or otherwise participate in economic and societal life.

<sup>10</sup> [Fact-check on Coronavirus and 5G by FullFact](#)

<sup>11</sup> <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters>

## **Background**

### *EMF protection limits at EU level*

- The [Council Recommendation 1999/519/EC](#) sets out strict limits for exposure of the public to EMF, which apply to all frequency bands, including those envisaged for 5G. These limits already incorporate a precautionary approach whereby the actual maximum emission levels recommended are 10 to 50 times lower than the emission levels where health effects may start<sup>12</sup>. The Council Recommendation reflects the EMF limits recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The recommendation is, however, not binding for the EU Member States.
- The Scientific Committee on Emerging and Newly identified Health Risks (SCENIHR) – the predecessor of today’s committee SCHEER - issued an opinion in January 2015 on all sources of exposure to EMF (i.e. not just mobile communications systems taken in isolation, but also other sources such as terrestrial broadcasting, electrical installations, etc) and a wide variety of possible health effects (cancers, reproductive, cognitive and sleep effects, etc.). The opinion was in favour of maintaining the current guidelines limiting exposure to EMF in the entire frequency range from static fields to 300GHz. It should be noted, however, that at that period the Committee was not aware of new advanced 5G technologies, such as the Multiple Input, Multiple Output (MIMO) and beamforming systems (now covered in the new ICNIRP guidelines).
- In December 2018, the European Parliament and the Council adopted the [European Electronic Communications Code \(EECC\)](#)<sup>13</sup>. Article 45 of the EECC calls for consistency and predictability throughout the Union regarding the way the use of radio spectrum is authorised in protecting public health on the basis of the Council Recommendation and ensuring more consistent deployment conditions for 5G across the Union.

### *Further background information regarding potential effects of 5G on health:*

- With 5G the general trend is to lower-power cells. There is the potential for lower exposure in areas served by these smaller cells. One example are indoor cells: if most users are connected to low-power antennas that are indoors, antennas outside the buildings need to use less power as they do not need to penetrate the buildings.
- Overall, a recent Commission study<sup>14</sup> showed that combined with 4G, only a modest cumulative increase of the overall exposure can be expected in urban areas where 5G is deployed and where 4G antennas are still used. In the future, 4G with larger cells will be used less in the 5G areas and hence these areas will be exposed to less power coming from the larger cells and smart phones. As an example<sup>15</sup>, first relevant

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<sup>12</sup> See lines 54 to 68 in draft 2018 ICNIRP guidelines:

[https://www.icnirp.org/cms/upload/consultation\\_upload/ICNIRP\\_RF\\_Guidelines\\_PCD\\_2018\\_07\\_11.pdf](https://www.icnirp.org/cms/upload/consultation_upload/ICNIRP_RF_Guidelines_PCD_2018_07_11.pdf)

<sup>13</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN>

<sup>14</sup> SMART 2017/0015 "Study on using millimetre wave bands for the deployment of the 5G ecosystem in the Union"

<sup>15</sup> Ofcom has carried out the first UK safety tests of 5G base stations, finding that radiation levels are at "tiny fractions" of safe limits, the BBC reported. Whilst the rollout of 5G has sparked fears that the technology could be dangerous to humans, Ofcom found no identifiable risks in its tests, with the highest result they found for 5G at 0.039% of the recommended exposure limit. The tests covered 16 locations in 10 cities across the UK where 5G-enabled base stations had been set up. <https://www.ofcom.org.uk/spectrum/information/mobile-operational-enquiries/mobile-base-station->

measurements in the UK on the cumulative EMF effect (involving mm-waves but also frequencies below 6 GHz) indicate radiation levels much lower than the existing safety limits in line with the 1999 Council Recommendation.

- Additionally, the number of sources as such does not determine the electromagnetic fields exposure at a given location. Most 5G networks are expected to use smaller cells than previous generations with lower electromagnetic fields exposure levels. This is confirmed by experience. The introduction of 3G and 4G has not increased exposure from environmental fields and this result has been published also in peer-reviewed journals. In particular, the introduction of 3G has lowered exposure of mobile phone users for calls, compared to 2G.
- EU regulation aims to ensure consistency and predictability throughout the Union regarding the way the use of radio spectrum is authorised in protecting public health against harmful electromagnetic fields (0 Hz- 300 GHz), having particular regard to the precautionary approach taken in Council Recommendation No 1999/519/EC.
- The Commission agrees that there is a need for constant updates of scientific knowledge, which must also be taken into account in the development of the 5G technology. Such knowledge will contribute to the aim of balancing exposure of the general public to EMF with benefits brought by 5G (including eHealth) to the quality of life.
- In the context of 5G, the Commission is engaged in discussion with the Member States in the Communications Committee (COCOM) to establish an overview of national approaches for the protection against non-ionizing radiation which include calculation methods and measurement tools, information for the General Public/Awareness campaigns (in cooperation with various authorities: health, environmental, ICTs, local city councils), and general cost/benefit analysis for different EMF limits (national/local). In the same context, it is worth noting that the forthcoming European Electronic Communications Code (EECC) in article 45 calls for consistency and predictability throughout the Union regarding the way the use of radio spectrum is authorised in protecting public health on the basis of Council Recommendation 1999/519/EC and ensuring more consistent deployment conditions for 5G across the Union.
- Further information on the health effects of exposure to electromagnetic fields, can be found in the following factsheet:  
[https://ec.europa.eu/health/scientific\\_committees/docs/citizens\\_emf\\_en.pdf](https://ec.europa.eu/health/scientific_committees/docs/citizens_emf_en.pdf)  
More details on exposure limits can be found here:  
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999H0519&from=EN>

*Concerning potential non-thermal (e.g. general health, biological, cancer) effects on human health from exposure to 5G EMF*

- Current scientific knowledge (as notably reported publicly by the WHO<sup>16</sup> and considered by ICNIRP in the process of updating their guidelines) does not show a

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[audits/2020?utm\\_medium=email&utm\\_campaign=Ofcom%20publishes%20latest%20spectrum%20measurement%20results&utm\\_content=Ofcom%20publishes%20latest%20spectrum%20measurement%20results+CID\\_376f7d6ac510c926db5681373dfa3a9c&utm\\_source=updates&utm\\_term=latest%20results%20from%20our%20spectrum%20measurement%20programme](https://www.ofcom.gov.uk/consult/condocs/audits/2020?utm_medium=email&utm_campaign=Ofcom%20publishes%20latest%20spectrum%20measurement%20results&utm_content=Ofcom%20publishes%20latest%20spectrum%20measurement%20results+CID_376f7d6ac510c926db5681373dfa3a9c&utm_source=updates&utm_term=latest%20results%20from%20our%20spectrum%20measurement%20programme)

<sup>16</sup> <https://www.who.int/peh-emf/about/WhatisEMF/en/index1.html>

causal link between non-thermal effects on human health and exposure to electromagnetic waves, in general, while research continues in some areas.

- On general health effects, the WHO reports that some members of the public have attributed a diffuse collection of symptoms (headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido) to low levels of exposure to electromagnetic fields at home. To date, scientific evidence does not support a link between these symptoms and exposure to electromagnetic fields. The French Agence nationale de sécurité sanitaire (ANSES – national agency for health protection) has assessed over several years general health effects (such as headaches, sleep and attention disorders) and exposure to the EMF. Its most recent study from 2018, based on the work of 40 experts mobilised over a period of four years, concluded that such pain and suffering indeed “require and justify appropriate management by health and social actors” but at the same time found no causal link between health and exposure to EMF.
- In the area of biological effects and medical applications of non-ionizing radiation approximately 25,000 articles have been published over the past 30 years. Scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low-level electromagnetic fields.
- In the area of cancer, exposure to EMF at the limits currently recommended at international and EU level has been classified by the WHO International Agency for Research on Cancer (IARC) at the third level in a scale of five levels of risk as “possibly carcinogenic”. It puts such exposure in the same ‘possibly carcinogenic’ category as pickled vegetables, and considers it less risky than eating red meat, night shift work or drinking hot coffee, which are assessed as “probably carcinogenic”. The WHO further notes that despite many studies, the evidence for any effect remains highly controversial. However, it is clear that if electromagnetic fields do have an effect on cancer, then any increase in risk would be extremely small. The results to date contain many inconsistencies, but no large increases in risk have been found for any cancer in children or adults. Again, it must be stressed that the overall exposure for current cellular technologies as well as 5G will be far below recommended limits.
- Regarding any link between the deployment of 5G and the spread of the Coronavirus an announcement on 08 April 2020, among others, by the WHO<sup>17</sup> made clear that no such link exists.

#### *Sources of concerns raised*

- Concerns from scientists: The European Commission’s Directorate-General for Health and Food Safety has responded to two scientists that sent a letter in 2018 on this topic to Commissioner Andriukaitis. This correspondence [<sup>18</sup>, <sup>19</sup>] is in the public domain. They pointed to potential health problems that could be caused by 5G, requested a moratorium for biomedical research of health risks and pointed to warnings that circulate in parts of the scientific community. SANTE DG replied that based on the advice of independent scientific committees the recourse to a precautionary principle by the EU to stop the distribution of 5G products appears unjustifiable as a measure.

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<sup>17</sup> <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters>

<sup>18</sup> [http://www.5gappeal.eu/wp-content/uploads/2018/06/reply\\_vinciunas.pdf](http://www.5gappeal.eu/wp-content/uploads/2018/06/reply_vinciunas.pdf)

<sup>19</sup> <https://www.environmentandcancer.com/wp-content/uploads/2018/04/letter.pdf>

- Concerns from operators: Some operators in some MS were confronted with difficulties when trying to install base stations because of citizens' concerns on the health due to EMF. It has led to an increase in court cases to block the installation of base stations. Recent disinformation linking the deployment of 5G to the spread of Coronavirus have further led activists attacking base-stations in places, among others, such the UK, Germany, India and Africa.

*The Commission's position on the European Parliament research service report on the effects of 5G wireless communication on human health of February 2020<sup>20</sup>*:

- Regarding the main concerns raised in the report, the focus is on potential negative biological and general effects to human health.
- Some of the studies that the report is referring to (such as the NTP and Ramazzini studies) have already been commented upon by the International Commission on Non-Ionising Radiation Protection. ICNIRP has concluded that they do not provide a reliable basis for revising the existing radiofrequency exposure guidelines. Following the publication of the new ICNIRP guidelines, the Commission aims to review them and to re-examine the situation in relation to the 1999 Council Recommendation, eventually in collaboration with competent groups such as the Scientific Committee on Health, Environmental and Emerging Risks.
- The Commission relies on the position and scientific evidence brought forward by the WHO and ICNIRP.
- Regarding the scientific bodies mandated by the Commission, these are appointed and renewed as appropriate following an open and objective selection process.
- Regarding the call for further research, the Commission is already supporting substantial research efforts on exposure to electromagnetic fields, and every new technological development goes hand in hand with an analysis of its potential effects on human health and the environment.

*Disinformation:*

Part of the publicly available information on 5G has been linked to disinformation. Examples in the international press:

<https://www.nytimes.com/2019/05/12/science/5g-phone-safety-health-russia.html>,  
<https://euvsdisinfo.eu/figure-of-the-week-5g/>  
<https://www.youtube.com/watch?v=P9dAN9VZdNQ>

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<sup>20</sup> [https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/646172/EPRS\\_BRI\(2020\)646172\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/646172/EPRS_BRI(2020)646172_EN.pdf)