



5G, Electromagnetic Field (EMF) Exposure and Health

A Guide for GSMA Members



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Summary

The debate on health concerns related to EMF exposure has been ongoing through every generation of mobile technology. With the adoption of 5G and new features such as the use of millimetre wave (mmWave) spectrum and small cells the industry and, in particular, us as leaders can expect heightened media discussion.

This document highlights critical facts related to 5G, EMF and health. Referencing these facts, should you choose to engage in any public debate, will help ground the discussion in scientific evidence and the existing international studies and safety guidelines.

Several myths around the safety of 5G technology have gained some media traction. This document provides answers to some common questions that have surfaced in print, broadcast and social media concerning 5G, public health and the environment.

An overview of GSMA social media engagement together with a list of key reference materials is also provided.

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5G, EMF and Health

GSMA Reactive Statement to Media Queries

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The GSMA recognises that public concerns have arisen in some markets about the safety of mobile communications. The radio signals used by mobile technologies are extensively researched, have been for decades and will continue to be. International guidelines cover all frequencies under consideration for 5G. Public health agencies and expert groups consistently conclude that the guidelines protect all persons (including children) against all established health risks. The GSMA and its members welcome and encourage regular independent research and believe that regulations should be evidence-based.

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EMF and Health

- Expert groups and public health agencies such as the World Health Organization (WHO) broadly agree that no health risks have been established from exposure to the low-level radio signals used for mobile communications¹.
- In addition, statements from public health agencies confirm that no health risks are expected from 5G².

International Exposure Guidelines

- Wireless technologies operate in compliance with international exposure guidelines, developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)³. The WHO formally recognises this independent non-governmental organisation, and the guidelines are technology neutral and are subject to periodic review.
- The consensus of reviews by independent public health authorities, expert groups and the WHO is that these guidelines provide protection for all people (including children) against all established health hazards.

5G and EMF

- New applications, such as 5G, wireless IoT and wearable devices, will comply with existing exposure limits.
- The strict and safe exposure limits recommended for electromagnetic fields also apply for all frequency bands currently envisaged for 5G.
- Based on experience with 3G and 4G networks and the results from 5G trials and commercial networks, the overall exposure levels will remain well below the international safety guidelines.
- Maximum exposure levels for 5G are expected to be similar to existing mobile services.

Compliance with Guidelines

- Mobile operators encourage national regulatory authorities to adopt international recommendations on EMF exposure levels for mobile communications to protect industry workers, mobile consumers and the public.
- The mobile industry welcomes and encourages regular independent research and believes that regulation in this space should be evidence-based.

1. <https://www.gsma.com/publicpolicy/consumer-affairs/emf-and-health/expert-reports>

2. https://www.gsma.com/publicpolicy/wp-content/uploads/2019/06/GSMA_Safety-of-5G-Mobile-Networks_July-2019.pdf

3. <https://www.icnirp.org/>

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Frequently Asked Questions

Is 5G carcinogenic?

The International Agency for Research on Cancer (IARC), which reviews evidence for cancer hazards, classifies radio frequency signals in the same group as eating pickled vegetables (i.e. that there was limited

evidence that they could cause cancer in humans). Eating processed meat falls in a higher classification than radio signals (i.e. there is stronger evidence that they might cause cancer in humans).

Do we need more research on 5G before we can claim that it is safe for consumers?

Over the past two decades, extensive studies on radio signals used by mobile technologies have been undertaken and research continues. The WHO states that:

“A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use.”

Based on strong scientific evidence, international safety guidelines include all the frequencies under consideration for 5G. The GSMA and its members welcome and encourage ongoing and regular independent research.

I’ve heard children could be at greater risk. How can they be protected?

Many independent scientific reviews have consistently concluded that international guidelines protect all persons, including children. The international exposure

guidelines are based on conservative assumptions to be protective of all persons.

Is 5G dangerous for the environment?

The same exposure limits that protect people also protect the environment. The responsible German government agency (Bundesamt für Strahlenschutz), for example, says there is no scientifically reliable evidence of a risk to animals and plants exposed to

radio signals at or below the limits in the international guidelines. In addition, the Antenna Bureau in the Netherlands (Antennebureau) has also refuted conspiracy-theorist claims that 5G tests harmed birds.

There have been reports that link 5G with interference with weather forecasting and its potential consequences. How would you respond?

Research tells us that there are no established health or environmental effects from 5G and 5G measurements demonstrate that the overall levels of radio signals in the community remain low and well below international safety guidelines. Technical studies conducted by the ITU also confirm that 5G will not cause any harm to

existing services, including weather forecasting. With the separation between weather forecasting spectrum and potential 5G spectrum, as well as reasonable power limits supported by most governments globally and the mobile industry, 5G presents no risk to weather forecasting.

Will 5G increase my exposure to EMF?

With 5G, total exposure levels will remain below - and very low relative to - the international exposure limits. Advanced base station designs and new technology features that are part of 5G provide higher capacity to meet consumer demand. As such, additional

antennas will be required, and the number of small cell installations will increase. All mobile communication systems are designed, however, to minimise power to reduce systems interference.

Will large numbers of small cells for 5G mean an increase in exposure?

One of the goals of 5G deployments is to provide much higher data rates and the use of small cells will provide this enhanced capacity. Based on the results from current 5G trials and commercial networks, expected

maximum exposure levels will be similar to existing mobile services and a small fraction of the international exposure guidelines.

Are testing standards in place for 5G devices and networks?

Many initial 5G deployments will be at frequencies similar to existing 3G/4G mobile networks, and the same mobile device compliance rate and limit value will also apply to 5G devices.

An international standard for assessment of mobile networks exists for all planned 5G frequencies.

For 5G devices operating in frequency bands higher than those used by current mobile phones, new test procedures are in development and standardisation activities have been initiated. The International Electrotechnical Commission has published a Technical Report providing guidance on current test methods. A final international technical standard will be completed by 2021.

Why do calls exist for a delay in 5G rollout?

In evaluating these claims, independent expert groups have consistently concluded that international RF-EMF exposure guidelines protect all members of the public and the environment.

In response, the European Commission has emphasised that:

"The strict and safe exposure limits for electromagnetic fields recommended at EU level apply for all frequency bands currently envisaged for 5G".

"The recourse to the EU's Precautionary Principle to stop the distribution of 5G products appears too drastic a measure. We first need to see how this new technology will be applied and how the scientific evidence will evolve".

The frequencies used for 5G have been 'weaponised' by the US military, does that mean they are dangerous for the public?

No. The use of higher frequencies (mmWaves) in 5G mobile networks does not mean higher exposure. Military technologies have been developed that use very high-powered millimetre waves to cause intense heating of the skin to disperse crowds. The EMF from these waves exceeds international safety standards.

The mmWaves used by the mobile industry for 5G are NOT the same power level or frequency as those used by the US military and are well within the agreed international safety guidelines.

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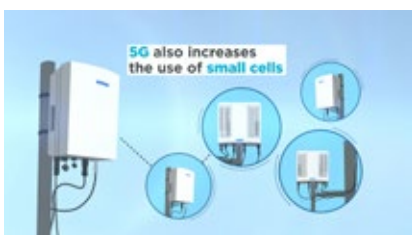
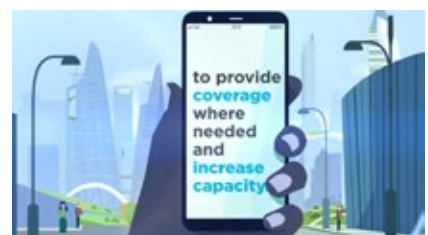
Social Media Video

From October 2019, the GSMA will launch a series of animated videos focusing on key policy issues in the digital space. As part of this series, one video addresses the safety aspects of 5G mobile networks in respect to the deployment of antennas and small cells. The video highlights how adherence to international safety guidelines will support the rollout of new networks and ensure access to 5G services.

The GSMA policy videos will launch over a number of social media platforms in from October 2019 and play at external conferences and events.

View the videos here:

<https://gsma.at/safety-of-5g-networks-animated-video>



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Useful Reference Documents

GSMA

Safety of 5G Networks Fact sheet: <https://www.gsma.com/publicpolicy/resources/safety-of-5g-mobile-networks>

5G, the Internet of Things (IOT) and Wearable Devices: <https://www.gsma.com/publicpolicy/resources/5g-internet-things-iot-wearable-devices>

Electromagnetic Fields and Health / Mobile Industry Position:

<https://www.gsma.com/publicpolicy/mobilepolicyhandbook/consumer-protection#electromagnetic-fields-and-health>

Safety of 5G Networks social media video: <https://gsma.at/safety-of-5g-networks-animated-video>

Mobile Phones and Health: <https://www.gsma.com/publicpolicy/mobilepolicyhandbook/consumer-protection#electromagnetic-fields-and-health>

International Organisations / External

World Health Organization: EMF Standards and Guidelines: <https://www.who.int/peh-emf/standards/en/>

World Health Organisation: Electromagnetic fields and public health and mobile phones:

<https://www.who.int/news-room/fact-sheets/detail/electromagnetic-fields-and-public-health-mobile-phones>

International Commission on Non-Ionizing Radiation Protection, International Exposure Guidelines: <https://www.icnirp.org/>

European Commission Scientific Committee: https://ec.europa.eu/health/scientific_committees/emerging/docs/scenih_r_o_041.pdf

International Telecommunications Union EMF Guide: <http://emfguide.itu.int/>



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