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Beyond the fear: EU-funded scientists test the health impacts of 5G

From street-level measurements to long-term health studies, researchers are building a clearer picture of the impact of everyday exposure to 5G signals on human health.

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As 5G antennas multiply across Europe, bringing faster downloads, better connectivity and more reliable streaming, public concern about potential health impacts has grown as well.

To address these concerns, EU-funded researchers are investigating what everyday exposure to radiofrequency electromagnetic fields (RF-EMF) from 5G actually looks like – and what it means for our health.

Their findings so far are reassuring.

Measuring exposure in real life

One of the scientists leading this work is Professor Mònica Guxens, a doctor and public health researcher at the Barcelona Institute for Global Health (ISGlobal).

“We need to understand the current exposure levels of the European population,” said Guxens, who is coordinating a five-year EU-funded international research initiative called GOLIAT that runs until June 2027.

GOLIAT is part of CLUE-H, a cluster of EU-funded projects on electromagnetic fields and health that share methods and data to strengthen the overall evidence on health effects.

Guxens’ team brings together researchers from 25 institutions in 10 European countries, with additional partners in the US, Japan and South Korea. They are examining exposure levels in different situations, possible physical and psychological health impacts, and how information about risk can be communicated clearly and effectively.

“Performing large-scale measurements across different countries will help us understand how and where people are most exposed to 5G RF-EMF now that these networks are being widely deployed,” Guxens added.

Mapping 5G exposure across Europe

One of the first tasks has been to measure how much RF-EMF people encounter in daily life.

To find out what real-world exposure looks like, researchers in Belgium and Switzerland have carried out the most detailed assessment of 5G exposure to date. They used a portable “exposimeter” to measure radio waves in the environment, alongside new sensors attached to smartphones to track emissions.

More than 800 measurements were taken across urban and rural locations in eight EU countries, plus Switzerland and the UK. The team looked at scenarios from phones in flight mode to data-intensive activities, such as sharing attachments or watching livestreamed video.

The results show that exposure to RF-EMF in everyday environments remains well below international safety limits in all settings measured.

These limits, set by independent scientific bodies, define the maximum exposure levels considered safe for the general public and include large safety margins.

Exposure levels did vary, however, depending on how and where devices were used.

In dense urban areas, signals from mobile base stations tend to be higher. In rural locations, short-lived peaks in exposure can occur when phones upload large amounts of data, as weaker coverage causes devices to transmit at higher power.

Putting health effects to the test

Measuring exposure is only part of the picture. To investigate whether 5G signals have any immediate effects on the body, researchers in France have carried out the first coordinated human laboratory studies focusing on a key 5G frequency band: 3.5 gigahertz.

At INERIS, the French National Institute for Industrial Environment and Risks near Paris, 31 healthy volunteers were exposed to 5G signals for 26 minutes under controlled conditions designed to reflect real-world environmental exposure.

“We observed no measurable impact on heart function, stress levels, skin temperature or brain activity in healthy young adults,” said Dr Brahim Selmaoui, one of the researchers involved in the study.

“While more research is still needed on long-term and repeated exposures, our results provide reassuring evidence for this new 5G band under realistic exposure conditions,” he said. “They also contribute to ongoing international safety assessments.”

Helping people check their own exposure

Beyond laboratory results, researchers see clear value in helping people better understand their own exposure and in reducing unnecessary anxiety.

Professor Martin Röösli, head of the Environmental Exposures and Health Unit at the Swiss Tropical and Public Health Institute, is leading the development of a freely accessible online “dose database” that will allow users to explore how everyday behaviours influence exposure levels.

“It is important for society that people feel informed and reassured,” said Röösli. “People often ask very practical questions: is it safe to sleep with my phone on the bedside table? Should I keep it further away?”

Expected to launch in spring 2026, the tool will allow users to input how they use their mobile phones and other devices, and where they live, to get a clearer picture of typical exposure levels.

Early findings suggest that a phone placed 30 to 40 cm away overnight, with minimal activity, results in virtually no exposure – far less than that generated during even a very brief phone call.

What may matter more, researchers suggest, is human behaviour. For example, sleep disrupted by notifications or late-night scrolling.

Behaviour and well-being

This distinction is central to the long-term health research now under way. Scientists are examining links between digital communication devices and neuropsychological outcomes in children and young adults, including cognitive function, sleep quality and mental health.

“The phone doesn’t only bring radio frequency electromagnetic fields exposure,” Guxens explained. “It also brings screen light exposure, mental arousal or device dependency. Separating the effects of the different factors related to the use of the devices is challenging.”

Unlike many earlier studies that captured only a snapshot in time, the current research follows participants over longer periods, helping scientists distinguish cause from correlation.

“If someone sleeps badly, is it because of radiation, or because they were scrolling late at night?” Guxens said. “You can’t answer that without long-term data.”

Closing the information gap

For the researchers involved, clear communication is as important as measurement and analysis. Persistent misinformation around 5G, they argue, has flourished in the gap between rapid technological change and public understanding.

Throughout their work, the scientists are engaging directly with citizens to understand concerns and misconceptions, and to tailor how findings are shared, including short, accessible social media-style videos designed to explain results simply and transparently.

“Giving people tools to understand exposure can reduce anxiety, even when the risk is low,” said Guxens.

With the EU investing heavily in digital infrastructure through initiatives such as the Connecting Europe Facility, and with 6G networks expected from around 2030, researchers say ongoing monitoring will remain essential.

“Technology is changing so quickly that exposure assessment has to keep pace,” Röösli said. “We need to understand what these developments mean for the population – now and in the future.”

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- GOLIAT (CORDIS)
- GOLIAT project website
- Connecting Europe Facility

- 5G networks in Europe
- Shaping Europe’s digital future