Mobile UK Briefing Note: 5G and Health

What is 5G?

5G is short for 'fifth-generation mobile networks.' It is a truly transformational technology that will provide the underlying wireless infrastructure to support a host of new applications such as connected cars, virtual and augmented reality and the foundations for emerging smart city and Internet of Things (IoT) technologies.

What are the features of 5G?

- **Faster download speeds**: 5G will provide much faster speeds than are achievable with today's 4G networks. 5G is expected to provide speeds between 1GBps and 10GBps. This would mean a full HD movie could be downloaded in 10 seconds as opposed to 10 minutes today.
- **Lower Latency:** 5G will also have significantly lower latency meaning very little lag (or buffering). This will enable applications that aren't possible today on mobile, such as multiplayer gaming, factory automation, and other tasks that demand quick responses.
- **Greater Capacity:** 5G will also have vastly greater capacity so that networks can better cope with not only the rapidly increasing data demands of customers today but the growth of high-demand applications being planned in the future.

Are 5G and mobile signals-safe?

Exposure guidelines govern mobile signals in the UK, and the consensus of reviews by independent public health authorities, including Public Health England, expert groups and the World Health Organization (WHO) is that these guidelines provide protection for all people (including children) against all established health hazards.

Exposure Limits and Guidelines

UK and international guidelines for exposure limits

The exposure guidelines in the UK have been developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), following a comprehensive assessment of all the peer-reviewed scientific literature, including thermal and non-thermal effects. The guidelines are based on evaluations of biological effects that have been established to have health consequences. The WHO recommends that countries adopt the ICNIRP guidelines.

Do current guidelines cover 5G?

Yes, current UK and international guidelines cover all frequencies used for mobile telephony, including those allocated to 5G.

The ICNIRP exposure guidelines for frequencies up to 300 GHz, published in 1998, are being revised and replaced and are expected to be published this year. It remains the opinion of ICNIRP, and other bodies such as the WHO, that there is no convincing evidence of adverse health effects at exposure below the guideline levels.

Ofcom recently (February 2020) extended its programme measuring EMF emissions from equipment used to transmit mobile signals and other wireless services to cover the frequencies being used for 5G. It measured 16 5G sites in towns and cities across the UK, focusing on areas where mobile use is likely to be highest. At every site, emissions were a small fraction of the levels included in international guidelines, as set by ICNIRP. And the maximum measured at any site was 1.5% of those levels.

What kind of research exists on the possible health risks from exposure to 5G?

Information on new research and details of individual studies can be found in the EMF-Portal web database maintained by the RWTH Aachen University, Germany: https://www.emf-portal.org/en

The radio signal exposure characteristics of 5G are similar to those of existing mobile technologies. In particular, the new applications use similar transmitting powers and operate in similar frequency ranges. A European Commission expert committee concluded that current knowledge about how EMF interacts with the human body can be used to set exposure limits for the whole frequency range up to 300 GHz. Therefore, existing health risk assessments are valid independently of the wireless technology for the whole frequency range.

Are RF signals a possible human carcinogen, and what does that mean?

In May 2011 a working group of the International Agency for Research on Cancer (IARC) classified RF electromagnetic fields as possibly carcinogenic to humans (Group 2B). The WHO explains that this is a category used when a causal association is

considered credible, but when chance, bias or confounding cannot be ruled out with reasonable confidence.

It is important to note that following the classification, the WHO has not recommended any changes to the exposure limits applicable to wireless networks and devices.

What is the advice from Public Health England?

Public Health England's main advice, updated in May 2019, about radio waves from base stations is that:

"The guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) should be adopted for limiting exposures. After reviewing the evidence, ICNIRP set guidelines to avoid excessive heating of the body and established the impact of exposure which can have detrimental effects. The ICNIRP guidelines apply to frequencies up to 300 GHz and cover exposures arising from new 5G base stations as well as from older technologies."[1]

What is the advice from the WHO on the mobile devices we use and health?

The position of the WHO regarding health effects from mobile phones is 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."

Are children at greater risk?

There have been many independent scientific reviews, and these have consistently concluded that the international guidelines are protective of all persons, including children.

"Although a substantial amount of research has been conducted in this area, there is no convincing evidence that RF field exposure below guideline levels causes effects in adults or children." (United Kingdom Health Protection Agency (2012)).[2]

5G Networks

5G is broadcast at a higher frequency, so does that mean higher exposure?

No, higher frequency does not mean higher exposure. Higher frequencies generally mean shorter ranges, lower power and, due to the increase of the available bandwidth, provides for the possibility of higher data rates. Current and future deployment will use frequencies already covered by existing exposure standards.

Does higher data rates mean higher network exposure?

One of the goals of 5G deployments is to provide much higher data rates. This is needed to meet the high expectations and demands customers place on mobile communication applications and services both in their professional and private life. Based on the results from current 5G test networks, it is expected that the maximum exposure levels in areas around base stations will be similar to existing mobile services that use similar transmitter powers.

With the introduction of new technologies, there may be a small increase in the overall radio signal exposure level since new transmitters are active. Based on the transition from previous wireless technologies, we can expect that the overall exposure levels will remain relatively constant and well within the international exposure guidelines.

Will 5G replace earlier mobile network technologies?

Early 5G deployments will be in locations where it is needed to supplement the capacity of current networks. Further rollouts will occur as demand dictates. It is expected that 5G will work alongside other technologies, i.e. 2G, 3G and 4G, to provide a continuity of service for customers who can continue to use their devices on existing networks.

Does 5G mean an antenna on every street corner and inside all buildings?

Wherever possible, an operator will place these antennas at an existing site, potentially replacing one of the existing antennas on the site. Only where additional capacity and/or coverage is needed will additional sites be built.

Contact Details

For further information, please contact Mobile UK on info@mobileuk.org

[1] Public Health England, 2019

[2] Health Effects from Radiofrequency Electromagnetic Fields – RCE 20, Advisory Group on Non-ionising Radiation (AGNIR), Health Protection Agency, April 2012