Local Authority Toolkit

5G & Health

Mobile UK

Introduction

Many people are unaware of the benefits of 5G or misunderstand what it is.

This is often because the information publicly available about 5G uses technical jargon, which makes it difficult to understand and explain to others. As a result, people can sometimes be swayed by false theories and unsubstantiated claims that 5G presents a danger to our health. This document has been created to help overcome some of the barriers to understanding this exciting technology. Over the following pages, we cover:

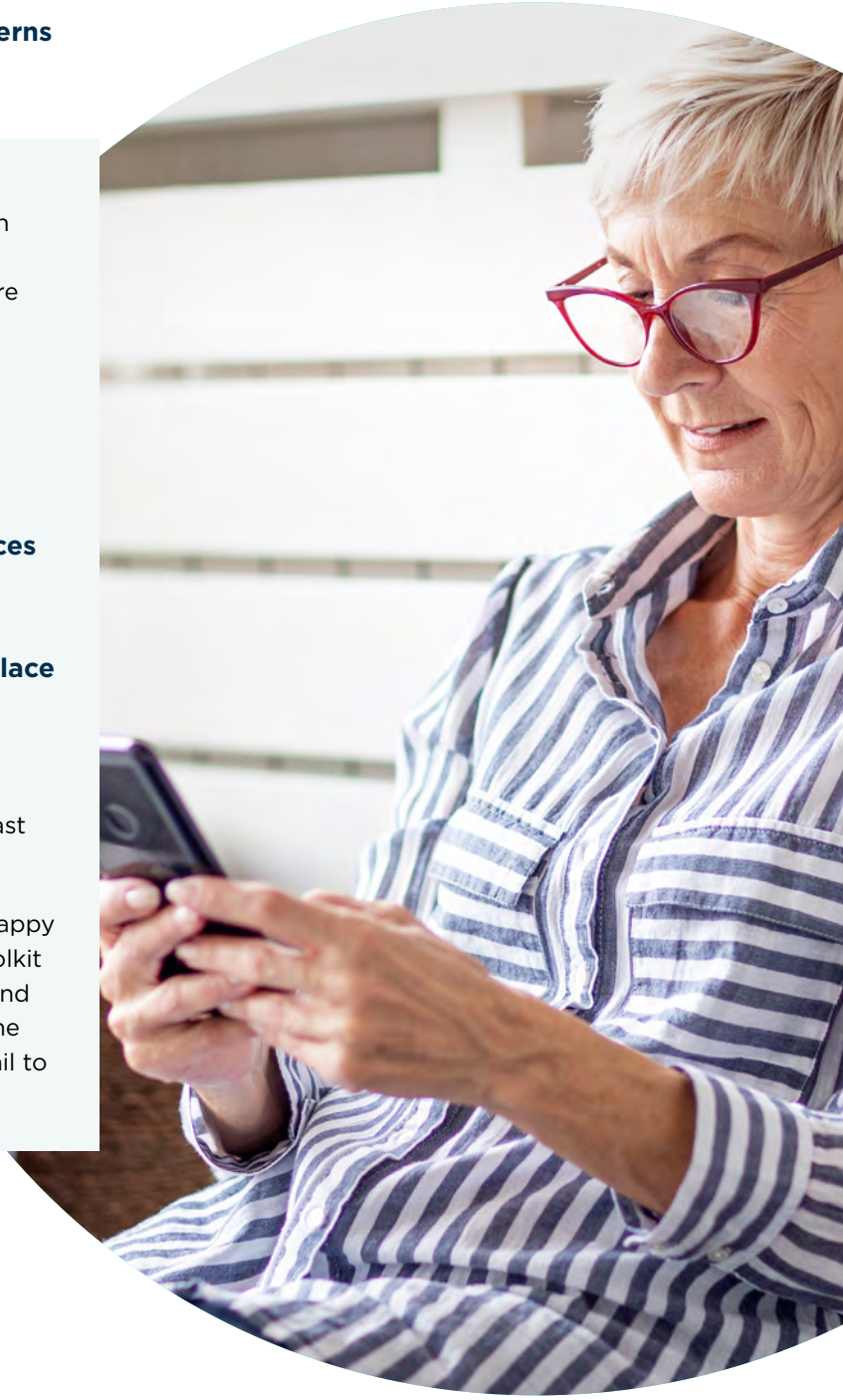
- **What is 5G?**
- **What difference will 5G make to our lives?**
- **Myth-busting facts to address common concerns**

Also available to accompany this toolkit is a series of information packs outlining the benefits of 5G in specific settings and sectors, brought to life with case studies and relevant statistics. These packs are available on the Mobile UK website and cover the following topics:

- **How 5G will help healthcare**
- **How 5G will increase rural opportunities**
- **How 5G will support the emergency services**
- **How 5G will help councils**
- **How 5G will improve the home and workplace**
- **How 5G will help the environment**

On the website you will also find an additional information document which may be useful for mast planning applications, as and when necessary.

If you would find it useful we are also more than happy for you to publish any of the documents in this toolkit on your own channels and share with colleagues and constituents. If you wish to do so and would like the documents to be co-branded please send an e-mail to info@mobileuk.org.



What is 5G?

In a nutshell, 5G is the fifth generation of mobile internet connectivity, succeeding 4G, 3G and before that 2G.

It will offer much faster data download and upload speeds and will allow more devices to simultaneously access the mobile internet.

As the world depends more and more on mobile connectivity and we are consuming more data, existing networks are becoming congested. This is particularly the case when there are lots of people in the same place, at the same time, trying to access online services.

5G has the capacity to handle this demand and has the unique ability to 'splice' the network. This gives councils, businesses and the emergency services the ability to have their own dedicated, reliable part of the 5G network.

Due to its speed, ability to connect multiple devices at the same time and the significant drop in the time it will take to send information from one point to another, 5G has the power to transform and save lives.

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What difference will 5G make?

Now, we know that on paper 5G sounds like an improvement, but what difference will it really make. How will it improve our lives on a day-to-day basis?

High speed mobile internet

Everyone will have access to fast and uninterrupted sharing, streaming, and browsing via their mobile phone network. It will mean accessible near gigabit capable speeds when you are out and about and could, in the future, work alongside or provide an alternative to fibre and wires in the home.

Multiple connected devices

Countless devices will be able to access mobile online services at the same time. It will mean you can always stay connected. For example, if you are at a football stadium or a crowded festival with everyone trying to simultaneously upload and share their experiences to social media without loss of connection.

Reducing latency to a minimum

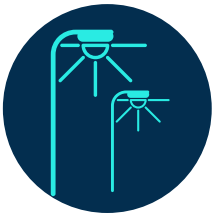
Delays between information sent and received will become virtually impossible to perceive. Real-time content sharing and data will become a reality. This will effectively make buffering and loading delays a thing of the past, with data only taking 1 millisecond to be received by a device after it has been requested – it currently it takes up to 60 milliseconds.

How will 5G make a difference to the environment?

5G will help make towns and cities more sustainable, reducing energy consumption

5G will not just improve our day-to-day connectivity, it will help reduce the environmental impact of our towns and cities, and ultimately, help save lives.

5G will be crucial in further enhancing smart cities, connecting multiple devices and sensors that will make our societies more sustainable and increase resource efficiency. For example:



5G-connected streetlights will detect when streets are empty and dim lighting to save energy, emit less CO_2 and reduce local council carbon tax contributions

5G connections between appliances and services providers and your home can reduce your household energy use and costs

Smart transport systems will help us reduce emissions when we travel

Home solar power and small-scale wind farms will integrate instantly with the national grid to share excess renewable energy

We will be able to download data in a more efficient way, using less energy

CASE STUDY

In partnership with Telefonica, the Spanish city of Malaga has converted its street lights to be 5G-connected. This allows for lighting to be adjusted according to conditions and for faulty street lights to be immediately identified. Malaga has cut its energy bill to the tune of millions as a result.

Source: O2

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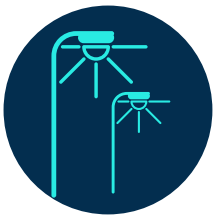
How will 5G make a difference to towns and cities?

5G will help make the roads in our towns and cities safer and minimise congestion

5G will not just improve our day-to-day connectivity, it will help make our towns and cities safer, and ultimately, help save lives.

Connected cars will communicate with each other, vastly reducing the number of accidents and resulting traffic jams and allowing cars to travel close together to keep traffic moving steadily

Connected devices will be able to alert drivers of upcoming hazards, detecting accidents before they happen and protecting vulnerable road users



Smart streetlights can include sensors to detect noise and disturbances that may relate to citizen safety concerns

CASE STUDY

Glasgow is trialling a smart street system lighting which also detects noise and disturbances that may relate to citizen safety concerns.

Source: Future City Glasgow Website

How will 5G make a difference to the emergency services?

5G will not just improve our day-to-day connectivity, it will ultimately help save lives.

5G will help save lives by revolutionising the way emergency services operate

5G will further enhance the capabilities of existing 4G-enabled connected ambulances which means doctors and surgeons, in hospital, can virtually assist paramedics at the scene of an incident, saving vital minutes treating the patients

With 5G-enhanced video links at the scene of an emergency, the control room will be able to see what is happening in real time and with more clarity than 4G - including the precise positions of all emergency personnel

4G and 5G enabled drones will be able to act like police helicopters, observing large areas, providing live footage to help keep crowds safe and monitoring emergency situations such as a large fire or major incident, at a fraction of the current cost

Smart traffic light systems will allow an ambulance to change traffic lights to clear congestion along their route, improving vital response and arrival times in an emergency

CASE STUDY

In Bristol, thermal cameras specifically designed to alert the authorities when people fall into the water, were installed in the harbour. The technology was put in place after ten people tragically died drowning in one year alone. The council control centre is notified via 5G when a person breaks the virtual barrier at the harbour edge and fire and rescue are subsequently alerted. The lives of two people have already been saved using the technology.

Source: BristolLive

How will 5G make a difference to public health?

5G will help tackle public health crises

5G will not just improve our day-to-day connectivity, it will improve our health, tackle loneliness and isolation and ultimately, help save lives.

5G-connected drones will be able to deliver essential medicines to patients in remote areas, or those with accessibility issues

5G-connected wearables, such as fitness wristbands and body monitors, can provide critical health updates to GPs and other medical professionals, alerting them to potentially life-threatening issues, such as falls, premature heart attacks and strokes

5G-connected health devices could help doctors and GPs remotely diagnose and support treatment plans, meaning patients will have quicker access to healthcare and doctors will be able to see more patients

5G will allow council's to improve health and social care provision, while saving money. 5G-connected devices will help care for people in their homes and within care settings, such as using telehealth to monitor vital signs remotely, reduce loneliness and observe medicine administration using 4K video. The 5G networks will enable councils to be at the forefront of the latest technology to support their citizens

CASE STUDY

5G trials in Liverpool have focussed on the use of the technology in social care settings. Sensors detect accidents and concerning behaviour patterns of vulnerable people while in their own home. A push-of-the-button device was created so that isolated residents could instantly talk to somebody when they are feeling lonely. These innovations - that help residents live in their own home for longer - can only be reliably rolled-out with 5G.

Source: Liverpool 5G

Your questions answered

5G & cancer

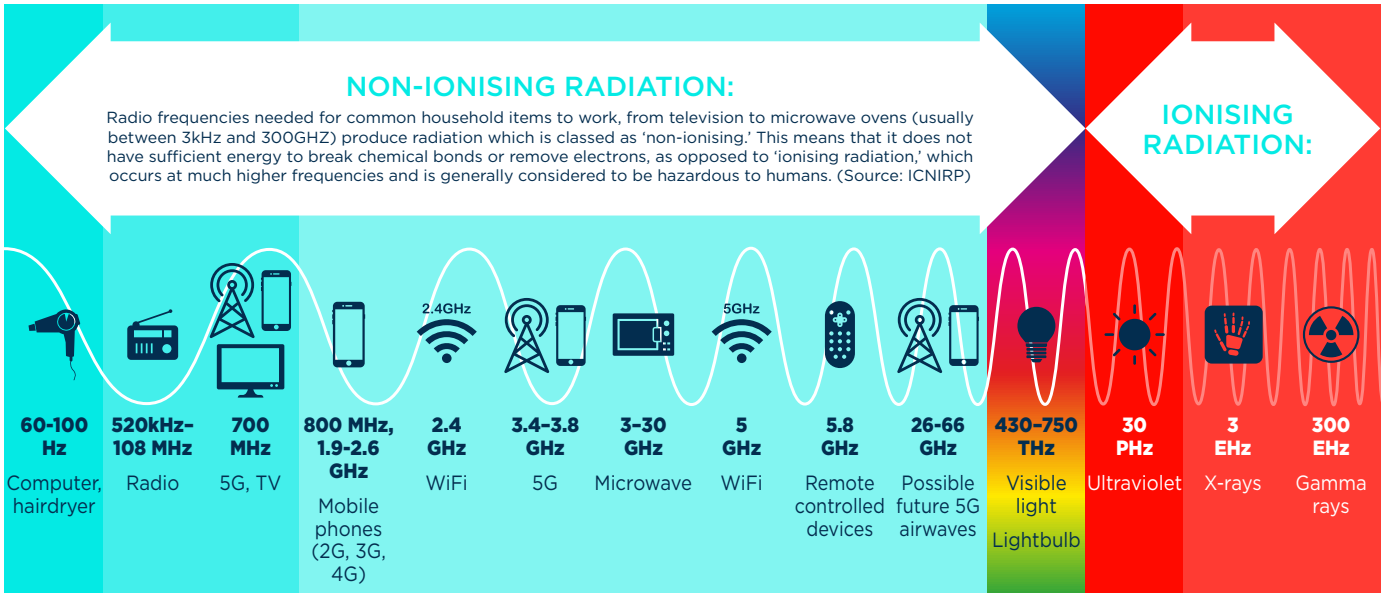
We are aware that some people are concerned that 5G could cause cancer. Importantly, this type of radiation is classed as mainly harmless when used within guidelines.

There is currently no scientific evidence to show that using mobile phones, or 5G within guidelines increases the risk of cancer.

Mobile phones and mobile masts transmit and receive radio waves, which are a type of electromagnetic radiation. Importantly, this type of radiation is classed as mainly harmless, or in scientific terms, non-ionising, just like our TVs, remote controls, home WiFi and so on. The strength of the signals is extremely weak and therefore does not have enough energy to damage DNA or directly cause cancer.

Many people who are concerned about 5G and cancer cite that the International Agency for Research on Cancer classified mobile phones as 'possibly carcinogenic.' This dates back to 2011, following a series of studies that were not considered conclusive, nor did they take into account factors that could distort the data. Mobile signals were therefore added to this category as a precautionary measure. To put this in context, talcum powder and eating pickled vegetables are also classed as 'possibly carcinogenic.'

It is widely recognised that non-ionising radiation is not capable of directly causing cancer when used within guidelines. As you can see from the graph below, 5G still falls way short of the ionising (harmful) part of the spectrum.



Your questions answered

Masts and radiation

What type of radiation does 5G use?

Sometimes the word 'radiation' scares people, because it is an invisible thing and something many people do not understand, or easily confuse with 'radioactivity.'

Radiation is simply the release of energy, just like the light from the sun, or heat from our bodies. Most radiation is harmless, or in scientific terms non-ionising. It is part of our everyday lives, without us even realising it. Many household items such as our TVs, radios, lightbulbs, remote-controlled toys and WiFi, even our own bodies, emit a level of radiation. But importantly, the levels we are exposed are so low they are not powerful enough to cause adverse health effects. 5G, mobile phones and masts all safely fall into the same category.

Are 5G masts dangerous?

The strong consensus of scientific opinion and public health agencies, such as the World Health Organisation, is that no health risks have been established from exposure to the low-level radio signals used for mobile communications, including 5G.

While masts (or base stations) transmit and receive radio waves to connect the users of mobile phones and other devices to the internet, the strength of those radio waves is very low, in publicly accessible areas.

The UK's telecoms regulator, OFCOM carried out tests at 5G-enabled mobile masts across the country. The highest emission levels (e.g. radiation) recorded at mobile phone masts were consistently well within the strict safety guidelines that monitor radiation levels.

These strict guidelines are governed by the International Commission on Non-Ionising Radiation Protection (ICNIRP) a universally acknowledged non-governmental organisation recognised by the World Health Organisation (WHO). The guidelines apply to frequencies up to 300GHz, well within the frequencies that could be used for 5G. Anything below this threshold is considered to not cause adverse health effects and is therefore safe for the public.

What type of radiation is 5G?

5G uses a specific frequency of radio waves to deliver the internet to mobile devices, just like 4G and 3G before that.

This type of radiation, and for that matter much stronger radiation, is commonly part of our daily lives as explained above. In the UK, existing 4G signals sit between 800MHz and 2.6GHz. Whereas 5G will operate at 700MHz and 3.4GHz to 3.6GHz – the TV remote you use several times a day operates at 5.8GHz.

Visible light is also a type of radiation, for example the light from your TV or a lightbulb. This is much higher than these everyday items but is still classed as non-ionising, and therefore not associated with any adverse health effects. Visible light operates at a frequency 100,000 times higher than 5G.

Dangerous radiation, that can cause harm from prolonged exposure, like UV rays from the sun, X-rays and gamma rays are even higher up the spectrum – at frequencies a quadrillion times higher than 5G.

Ofcom, the telecoms regulator, states:

"All frequencies that are currently and will in future be used for 5G fall within the part of the electromagnetic spectrum that includes radiation which is classed as 'non-ionising'. This means that these radio waves do not carry enough energy to directly damage cells. This is different from 'ionising' radiation, which is generally considered to be hazardous to humans and includes gamma (nuclear) radiation as well as x-rays, which occur at the higher frequency end of the electromagnetic spectrum."

Further Information

For further information, below we have listed additional external sources that you may find helpful in regard to 5G and health.

Ofcom and HM Government 5G health guide:
https://uploads-ssl.webflow.com/5b7ab54b285deca6a63ee27b/5f3fbf86c97b38101210ae5a_5G%20EMF%20Guide.pdf

Public Health England - 5G technologies: radio waves and health:
https://www.gov.uk/government/publications/5g-technologies-radio-waves-and-health/5g-technologies-radio-waves-and-health

World Health Organization (WHO) - Radiation: 5G mobile networks and health:
https://www.who.int/news-room/q-a-detail/radiation-5g-mobile-networks-and-health

Which? - Is 5G safe?:
https://www.which.co.uk/news/2020/06/is-5g-safe-everything-you-need-to-know-on-the-5g-powered-future/

BBC - Does 5G post health risks?:
https://www.bbc.co.uk/news/world-europe-48616174

BBC Click - Testing the safety of 5G:
https://www.youtube.com/watch?v=k2t1dUCyE0I&feature=youtu.be

Cancer Research UK - Do mobile phones cause cancer?:
https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/cancer-myths/do-mobile-phones-cause-cancer

#5G CHECK THE FACTS

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