



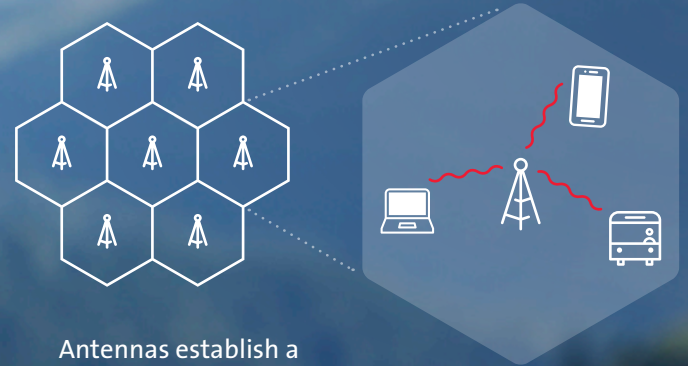
What do we need to know about 5G?

Everything you always wanted
to know about the latest mobile
generation.

swisscom

How does mobile technology work?

Mobile technology is dispersed over radio cells. Each radio cell receives signals from a base station (mobile communication mast).



Antennas establish a connection with the mobile phone. All information is transmitted over weak electromagnetic (radio) waves.

Why is 5G on the way?

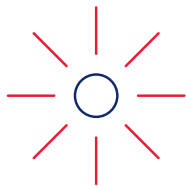
The mobile phone and smartphone have changed our lives more than any device before them. Nowadays, hardly anyone would like to do without. The networks are struggling to cope with the sharp rise in usage. The latest mobile generation is the answer as it uses better software and accompanying hardware.

But how exactly does mobile technology work?

What is radiation and what are electromagnetic fields?

In nature, there are different types of radiation. Some radiation, like visible light and infrared radiation for example, is visible or perceptible to humans or animals.

There is much less energy in radiation from radio applications (mobile phones, WLAN, radio, TV etc.). Experts therefore talk more precisely of electromagnetic fields or waves.

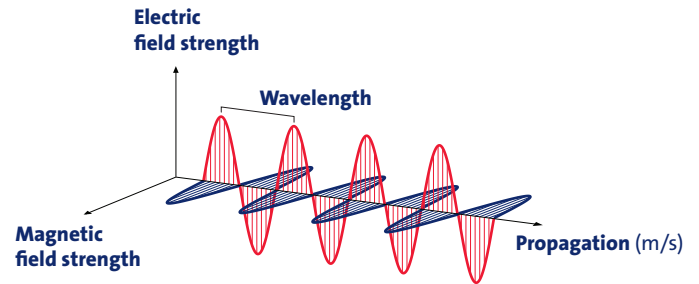
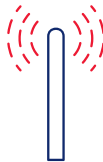


Natural fields

Solar, terrestrial or cosmic radiation.

Technically generated fields

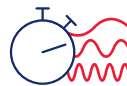
Radiation that is generated in the household, by power lines or by mobile technology.



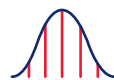
We use the term 'waves' because this is how the energy travels. **Magnetic and electric fields** are produced as part of this. The electric field transmits information, such as calls, images or video.



The **wavelength** describes how far a wave propagates as it oscillates.



The **frequency** describes the number of times a wave oscillates per second: the higher the frequency, the more information can be transmitted at the same time.



Radiation is the amount of energy transported by the wave. More energy means higher ranges and more information.

All radiation has a specific amount of energy. Different types of radiation therefore have different effects.

Ionising radiation

Depending on the strength of the fields, it can damage cells in the body. An example of this type of radiation is radioactive material or X-ray.



X-ray



Solarium

Non-ionising radiation

This type of radiation does not affect cells in the body and can only heat them. Mobile technology uses this non-harmful radiation only.



Light



Heat



Microwave



Mobile phone



TV & radio

High-frequency fields



Short wavelength

Visible waves

Our eyes are only able to see a limited range of radiation: light.

What does this mean for everyday life?

Mobile technology takes advantage of the properties of specific electromagnetic (radio) waves. Relatively weak signal strengths are used to transmit information such as calls, images or video.

Where do the radio fields that surround us come from?

The majority originate from our own mobile phone, followed by other sources such as other people's mobiles, WiFi, or cordless fixed-line telephones. Only a tenth of our exposure, on average, comes from mobile communication masts.

Radiation exposure to the head

Daily exposure



95%
from own
mobile phone

5%
from
mast

Radiation exposure to the body

Daily exposure



90%
from mobile
phones, WiFi,
radio, TV

10%
from masts

Thresholds

In addition to installation limit values, Switzerland also has precautionary limits for sensitive locations (OMEN) such as dwellings, schools, hospitals or permanent workplaces.

Typical exposure in everyday life

0.11
V/m

0.22
V/m

0.55
V/m

5
V/m

50
V/m

Home

Workplace

Train

Switzerland
(OMEN)

WHO
recommendation

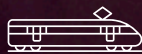
The usable amount of radiation for mobile communications is very limited. The average measured values are again far below the limit values.

Swisscom complies with the requirements at all times and is required to prove this at any time.

Low-frequency fields



Power lines



Rail

Long wavelength

How does mobile radiation affect people?

According to the German Federal Office for Radiation Protection:

« *The effect of electromagnetic radiation from mobile communications on humans has been well researched. No impact on health has been demonstrated below the limit values.* »

The US Food and Drug Administration (FDA) states:

« *To date, there is no consistent or credible scientific evidence of health problems caused by the exposure to radio frequency energy emitted by cell phones.* »

On 20 January 2020, Australia's Chief Medical Officer, Professor Brendan Murphy, made the following statement:

« *I'd like to reassure the community that 5G technology is safe. There is no evidence telecommunication technologies, such as 5G, cause adverse health impacts. This position is supported by health authorities in Australia [...] and around the world, such as the World Health Organization (WHO).* »

Tips on precautionary steps to take to reduce personal exposure

As a precautionary measure, the following tips can help reduce the impact of mobile phone use and Wi-Fi on the body.



Wear a headset when making phone calls. Every additional centimetre away from the end device reduces radiation exposure significantly.



Select a mobile phone with a low SAR (maximum radiation) limit.



Do not use 'radiation blockers'. These often have the opposite effect, causing devices to emit much more radiation.



To limit electromagnetic radiation at home as a precautionary measure, do not forget the other sources of low frequencies, such as alarm clocks, household appliances, lamps, irons and electric radiators.



Make sure you have good reception. The better the reception, the lower the exposure. The closer the antenna, the less radiation emitted by the mobile phone.



On the Swisscom Home app, set the WLAN to turn off at night – this also saves energy. The strength of the WiFi signal can also be adjusted to the size of the apartment.

What is 5G?

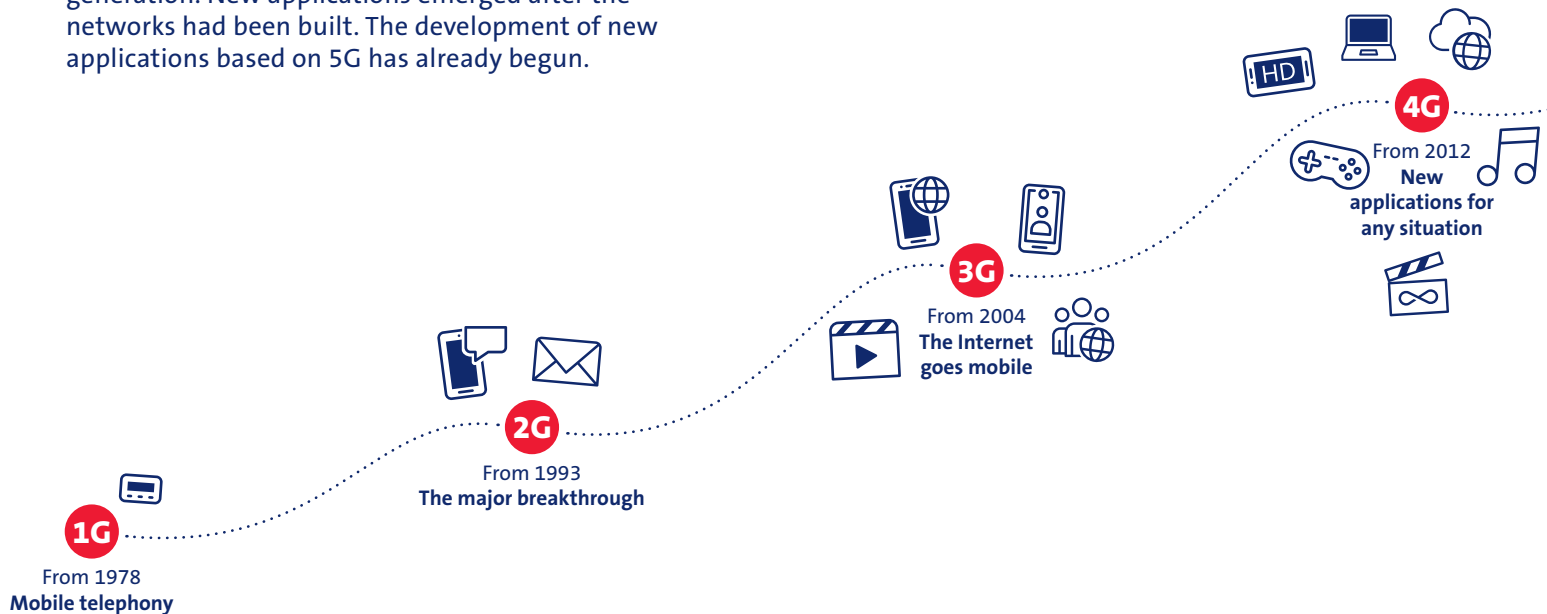
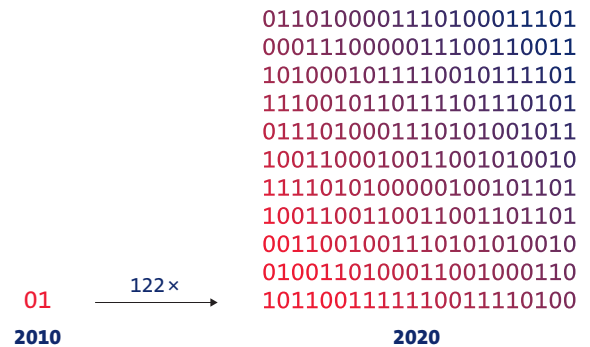


Mobile technology is constantly evolving. 5G is the fifth-generation mobile standard.

The number of applications has increased with each generation. New applications emerged after the networks had been built. The development of new applications based on 5G has already begun.

Why is the expansion important?

The general public makes intensive use of mobile communications. Today, on average, each and every one of us uses twice as much data in a single week as we did in a whole year in 2010. Mobile operators have kept pace with this growth by improving the technology with each mobile phone generation.



Why do we need 5G?

The latest generation makes mobile communications more stable, versatile, energy efficient and powerful. It also brings new features, such as shorter response times or guaranteed network availability, which are required for new applications.

How can we take advantage of 5G?

Anyone wanting to use 5G simply requires a 5G-enabled smartphone because 5G is already activated automatically with all Swisscom subscriptions.



5G is more sustainable

It uses 45,000 times less energy per unit than 2G. Even compared to 4G, 5G uses only half as much energy.





I heard that ...

... 5G phones emit significantly more radiation.

Since the third-generation mobile standard (3G), mobile phones have in fact emitted much less radiation than their predecessors.

... 5G mobile masts emit significantly more radiation.

All mobile communication masts have to comply with the same limits; it is equivalent to a sports car having to observe the same speed limits as a small car when on the road.

... more data causes more radiation.

That is incorrect. 5G can transfer much more data under the same conditions. A modern, energy-efficient car with the same tank capacity also goes further than the previous models.

... 5G masts are harmful and should not be built in the community.

The same limits apply to 5G masts as to 4G or 3G systems. Preventing the construction of new masts, however, results in poorer reception for mobile phones, which in turn results in much higher radiation exposure for the user.

... adaptive antennas expose users to high levels of radiation.

Their transmission power is limited too. They work much like beams of light compared to floodlights, illuminating only what needs to be lit.

... 5G uses millimetre waves!

These are not currently approved for mobile communications in Switzerland. They have, however, been used in everyday life for decades; in distance warning systems in cars for example.

... radiation from 5G masts cannot be measured.

5G masts are consistently evaluated for highest possible radiation, which ensures that all masts comply with the strict limit values at all times. The Swiss government provides the specific guidelines for the measurement.

... 5G was built without permission.

That is incorrect. Swisscom complies with all regulations. The Swiss government enacts the regulations, and the municipalities and cantonal department are responsible for implementation.

... according to the WHO, mobile technology could be carcinogenic.

The WHO and the International Agency for Research on Cancer (IARC) have classified the fields used by mobile technology as class 2B, 'possibly carcinogenic to humans'. However, this classification also applies to foods such as pickled vegetables or Aloe Vera. Salami and ham are classified as class 1 'carcinogenic'.

... studies in rats have associated mobile technology with the formation of tumours.

The design of these studies cannot be applied 1:1 to the use of mobile technology. In 2018, the US Food and Drug Administration (FDA), which commissioned the study, clearly distanced itself from the study.

Research and transparency

We operate a mobile phone network that is safe for people and the environment. We address fears about possible risks with research, education and tips on using mobile technology. We comply with federal, cantonal and municipal guidelines at all times.



Research

Swisscom supports the independent Swiss Research Foundation for Electricity and Mobile Communication (FSM) at ETH Zurich.

Prevention

As a precautionary measure, we offer headsets and speakers to reduce exposure.

Transparency

Please refer to swisscom.ch/radiation for transparent information on field strengths and output.

Personal responsibility

We provide info material and tips to support the careful use of mobile communications.

We will be happy to answer your questions

Read our information at
www.swisscom.ch/radiation

or write to our experts at
mobile.umwelt@swisscom.com



Sources

Please refer to the different sources listed on www.swisscom.ch/radiation and the report “Mobilfunk und Strahlung” (Mobile Technology and Radiation) by the working group “Mobilfunk und Strahlung” (Mobile Technology and Radiation) commissioned by the Federal Department of Environment, Transport, Energy and Communications (UVEK); educational material from the German Federal Office for Radiation Protection; <https://www.health.gov.au/news/safety-of-5g-technology>, <https://www.fda.gov/radiation-emitting-products/cell-phones/scientific-evidence-cell-phone-safety>; own sources; Ericsson Mobility Report.

Imprint

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Concept and content: Michael Lieberherr
Implementation: Nemuk and Konrad Mazanowski
Translation: Textraplus AG
GCR-CXC 11.2020