



The use of mobile phones and the siting of cell sites is fuelling a huge debate. There's a great deal of conflicting information in the public domain and this has made the task of making informed decisions difficult. We have looked at the issues and prepared this information leaflet to help you form an opinion.

How do mobile phone networks really work?

Mobile phones and their base stations transmit and receive voice and data signals using radio waves, also known as electromagnetic waves. Electromagnetic waves are emitted by many natural and man-made sources. We are warmed by electromagnetic waves from the sun, our eyes detect electromagnetic waves as visible light and man-made sources include radio and TV broadcasting, taxi and emergency services' radios and telecommunications networks.

Mobile phones work by converting voice and data calls into radio waves, like any other two-way radio. Mobile phone base stations enable these calls to be transmitted to and from mobile phones so that they can be connected to other mobile and fixed phones.

In order to provide mobile phone services to millions of customers across the country, each operator divides the UK into thousands of individual geographical areas known as cells, each requiring a radio base station.

These cells overlap at their edges so that when mobile phone users are on the move, calls are 'handed over' from one radio base station to the next so that there is no break in the calls. If radio base stations are positioned too far away from each other, calls cannot be handed over and will be interrupted or 'dropped'.

Radio base stations are located where customers require coverage and without sufficient base stations in the right locations mobile phones will not work. They are typically spaced 0.2-0.5 km apart in towns and 2-5 km apart in rural areas. The spacing and the size of each cell depends on three factors:

- Local terrain – radio signals can be blocked by trees, hills and buildings.
- Frequency – in general, higher frequencies travel shorter distances than lower frequencies.
- Capacity – the number of calls needed to be carried in an area. The size of a third generation cell can also vary with the amount of data it is carrying at any one time.



Deciding where to put mobile phone base stations

Locations for mobile phone base stations are identified by monitoring the growth in calls in each cell and also from known 'gaps' in the coverage. The process for selecting a site will typically comprise four main stages:

1. Site survey
2. Local consultation
3. Landlord negotiation
4. Planning application

A search area is identified that will vary in size depending on the capacity requirements of the network in that area. A survey will identify all potential sites, but looking specifically for existing radio towers or other structures on which the necessary antennas can be located. If no existing structures are suitable, a green field site offering a good degree of natural screening will be sought.

The aim is to identify a site that will offer the best possible coverage whilst minimising the environmental impact. During the course of this search, local communities will be consulted, following guidelines agreed by all operators.

Agreement must also be reached with the site landlord on terms and conditions on the use of the proposed site. An application is made to the appropriate planning authority. Early dialogue will be entered into with the local planning authority with the aim, wherever possible, to agree the form of development prior to any application being made. Construction can begin once landlord negotiation has been concluded and necessary planning consent has been granted.

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Why more are being built

There is a limited amount of radio spectrum, the radio wave frequencies which carry the mobile phone calls. Therefore, the space within radio frequencies made available to each mobile phone operator is limited. This means base stations can only carry a limited number of calls, typically 100-150, at any one time. In order to handle calls efficiently, mobile phone operators re-use the radio frequencies many times in a network whilst ensuring there is no interference.

This results in the 'cellular' structure where frequencies are allocated to cells and re-used elsewhere to carry different calls. To increase capacity, additional radio base stations have to be built but they will each cover a smaller area. The different frequencies and higher data capacity capabilities of third generation mean that networks require more radio base stations than current second-generation networks. However, operators will re-use existing radio base stations wherever possible.



Mobile phones play an increasingly important part in our everyday lives. New generations of mobile phones are being developed and introduced to provide an ever wider range of services. Businesses depend on them and many people are starting to build their personal lives around them. They are here to stay.

At O2, we understand that people are worried about possible risks to their health. We are all quite right to make sure that we take every possible precaution to protect our own health and that of our children.

Health and safety is at the very heart of the way O2 does business – we are very conscious of our responsibility to the public, employees, customers and all interested groups.

That's why we make sure we follow recommendations on mobile phone handsets and base stations made by Governments, regulators and health bodies throughout the world.

Many people have asked questions about the safety of mobile phones and base stations. Here are some of the most frequently asked questions. If you would like to ask other questions, please call our helpline on 01753 564306 or visit our website at www.O2.co.uk

Are mobile phones safe?

- After taking guidance from expert and regulatory bodies in this field, O2 is completely satisfied that mobile base stations operating within existing guidelines are safe and do not pose a health risk to members of the public.
- The National Radiological Protection Board (NRPB), the expert body in the UK that advises on this subject, gives a clear view that 'there is no convincing scientific evidence of a health risk to humans resulting from mobile phone use'.
- This view is supported by other international expert groups such as the World Health Organisation (WHO) and the International Commission on Non-Ionising Radiation Protection (ICNIRP).



What is the background science to this?

- Mobile phones are low power radio devices that receive and transmit radio frequency waves, a form of electromagnetic radiation.
- There are many everyday sources of electromagnetic radiation in our lives – light, televisions and radio waves for example.
- Mobile phones are not radioactive and do not emit ionising radiation, such as X-rays or gamma waves.

Why can't mobile phones be used in hospitals or planes?

- The Civil Aviation Authority has banned the use of mobile phones, games and other electronic equipment during flights as it may affect avionics systems, although the risk is small.
- In hospitals, some equipment in intensive care and operating theatres may be affected by mobile phone transmissions in close proximity to the equipment.

What are cellsites and are there concerns about them?

- A cellsite or mobile phone base station is a low power radio transmitter with an antenna to transmit radio waves to mobile phones.
- The World Health Organisation (WHO) one of the international expert bodies that monitor research in this area and advise on safety concluded, 'RF field levels around base stations are not considered a health risk'.

Are people living near cellsites in danger?

- No – Cellular transmitters operate at a low power.
- At ground level the emissions are typically hundreds of times below The National Radiological Protection Board (NRPB) and the International Commission on Non-Ionising Radiation Protection (ICNIRP) public exposure guidelines.
- The Independent Expert Group on mobile Phones (IEGMP) established by the Minister of Health concluded 'the balance of evidence indicates that there is no general risk to the health of people living near to base stations on the basis that exposures are expected to be small fractions of the guideline'.
- The World Health Organisation (WHO) one of the international expert bodies that monitor research in this area and advise on safety concluded, 'RF field levels around base stations are not considered a health risk'.



Are adults and children in danger if they go to school near a cellsite?

- The safety standards are designed to protect everyone.
- Independent audits by the Radiocommunications Agency (RA) – an executive agency of the Department of Trade and Industry (DTI) – have demonstrated that exposure levels are many hundreds of times below public exposure guidelines set by the International Commission on Non-Ionising Radiation Protection (ICNIRP).
- Up to date survey results can be found on the RA web site at www.radio.gov.uk.
- The World Health Organisation (WHO) one of the international expert bodies that monitor research in this area and advise on safety concluded, 'RF field levels around base stations are not considered a health risk'.

What is being done to look into alleged associated health risks?

- The need for good quality, ongoing independent research is recognised and is actively supported by O2, the telecommunications industry in general, and various national and international scientific and health organisations.
- The World Health Organisation (WHO) co-ordinates and interprets research, shares the results and, most importantly, recommends what further research needs to be done at a global level.
- The European Union has announced a major research and risk evaluation programme related to the safety of mobile communications.
- O2 tracks these and other relevant developments as part of our ongoing commitment to addressing any concerns.
- O2 is contributing its share, 8%, of the joint UK Industry/Government initiative launched in January 2002 to sponsor over £7 million worth of further, independent, research. The exact nature of this research is to be established by Sir William Stewart and his advisory panel.

What were the conclusions of the Independent Expert Group on mobile Phones IEGMP Enquiry?

- The Independent Expert Group on mobile Phones (IEGMP), chaired by Sir William Stewart, concluded that 'the balance of evidence to date suggests that exposure to RF radiation below NRPB and ICNIRP guidelines do not cause adverse health effects to the general population'.
- The IEGMP proposed however that 'a precautionary approach to the use of mobile phone technologies be adopted until much more detailed and scientifically robust information on any health effects becomes available'.
- The IEGMP recommended that a 'substantial research programme should operate under the aegis of a demonstrably independent panel', that 'this programme be financed by the mobile phone companies and the public sector' and that there 'should be a further review in three years time, or earlier if circumstances demand it'.



What are the elements of the precautionary approach recommended by the Independent Expert Group on mobile Phones (IEGMP)?

- The adoption of the International Commission on Non-Ionising Radiation Protection (ICNIRP) public exposure guidelines.
- A publicly accessible national database of base stations and their emissions be set up by the Government.
- Clearly defined physical exclusion zones around base station antennas, where exposure guidelines may be exceeded.
- Independent, random, ongoing audit of all base stations to confirm compliance with guidelines.
- Base stations in or near school grounds – The Stewart Report acknowledge that there was some public concern about base stations located on or near schools. O2 and other operators are able to provide information about the pattern of radio wave emissions if schools or parents are concerned.
- Continuing, relevant, high quality, independent research – jointly funded by Industry/Government.
- Specific Absorption Rate (SAR) values for mobile phones must be readily accessible to consumers.
- The widespread use of mobile phone by children should be discouraged for non-essential calls and the mobile phone industry should refrain from promoting the use by children.
- Drivers should be dissuaded from using hand held or hands free phones whilst on the move.

How does O2 ensure base stations are safe?

- National (The National Radiological Protection Board - NRPB) and International (International Commission on Non-Ionising Radiation Protection - ICNIRP) guidelines protect against established health effects.
- Guidelines are based on analysis of all relevant science and include large margins of safety.
- Guidelines are implemented through exclusion zones around antennas.
- New base stations comply with ICNIRP public exposure guidelines.
- All existing base stations comply with NRPB guidelines. O2, in co-operation with the other UK operators, has a programme to assess and ensure compliance with the tighter ICNIRP public exposure guidelines.



How is O2 addressing community concerns on base station siting?

O2 is committed, along with the other UK operators, to:

- Improve the transparency of the process of building mobile networks.
- Provide more information to the public.
- Increase the role of public consultation in the siting of base stations.

Where can further information be obtained?

- World Health Organisation
www.who.int/peh-emf/
- National Radiological Protection Board
www.nrp.org.uk/
- International Commission on Non-Ionising Radiation Protection
www.icnirp.de/index.htm
- Radiocommunications Agency
www.radio.gov.uk/
- Department of Health
www.doh.gov.uk/mobile.htm
- Independent Expert Group on Mobile Phones
www.iegmp.org.uk/