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mobile  
operators  
association

responsible  
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# Mobile Phones and Base Stations

## How mobiles work

Mobile phones have been around for 20 years. They are low-powered two-way radios – converting human voice and data messages into radio waves.

When making a call, these radio signals are sent from mobiles to the nearest base station which transmits them to other mobiles or fixed networks. Mobile phones and the antennas mounted on base stations produce radio frequency (RF) fields, similar to those emitted by TV transmitters and radios used by taxis, emergency services and broadcasters.

International health and safety guidelines, endorsed by the World Health Organisation (WHO), are in place to ensure radio waves stay below a certain level, limiting the public's exposure to them. All base stations in the UK produce RF fields well below the international guidelines.

## 'Talking' to a base station

Mobile phones do not work without base stations (commonly called 'masts'). Without them, a call cannot be made. They need to be where people use their phones.

In order to enable millions of people across the country to make calls, each of the five mobile phone operators divides the UK into thousands of individual geographic areas known as 'cells'. At the heart of each cell is a base station. The cells overlap at the edges to prevent holes in coverage. If the base stations are too far apart, calls cannot be handed over from one area to another and are interrupted or 'dropped' when mobile users are on the move.

Cells can be big or small and base stations are usually built about 200-500m apart in towns and 2-5km apart in rural areas. They can be on freestanding lattice towers, monopoles, rooftops, lamp posts, trees or flagpoles. Antennas are often integrated into the design of buildings around us.

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**Mobile phones cannot work without a network of base stations in places where people want to use them.**

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**No less than 30 scientific reviews worldwide in the past five years have not found adverse health effects caused by mobile phone base stations operating within the international health and safety guidelines used in the UK.**

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The size of a cell also depends on the local terrain. Radio signals can be blocked by trees, buildings, hills and valleys, so base stations may have to be closer together.

Base stations are limited in how many calls they can carry at any one time. Large outdoor masts can handle about 120 simultaneous calls, while a small base station typically inside a building carries about 30. In an area where call traffic is high, additional base stations may have to be built to provide effective customer service.

## Involving people

In 2001, the operators introduced their 'Ten Commitments to best siting practice' to ensure transparency in building mobile phone networks, to provide more information to the public and local planners and to boost the community's role in the siting of radio base stations. These can be found at: [www.mobilemastinfo.com](http://www.mobilemastinfo.com)

## Frequently asked questions

### Q How many base station sites are there?

A At present, there are about 47,000 in the UK. Two-thirds of these are on existing structures and buildings. It is possible that the number will rise to 50,000 by the end of 2007.

### Q Are the radio waves harmful to health?

A In May 2000, an independent expert group chaired by Sir William Stewart concluded that the balance of evidence to date did not suggest mobile phone technologies cause adverse health effects. However, the Stewart Report called for more research to fill gaps in scientific knowledge and for a precautionary approach to be adopted. This was reaffirmed by the National Radiological Protection Board in January 2005. The adoption of the international public exposure guidelines underpins this precautionary approach. The operators build their networks to be compliant with these guidelines.

### Q What is 3G technology?

A Third generation (3G) is a term used to describe the next generation of mobile phone systems which will transfer data as well as voice. The advanced technology offers internet access and the ability to view video footage. 2G, also known as GSM, is the current second generation technology. The first mobile phone technology, analogue, was phased out of the UK in 2001.

### Q Why do we need more base stations?

A Each base station can only carry a limited number of calls at the one time. To satisfy increasing customer demand for mobile services or to improve call quality, more base stations have to be built in busy areas. Site and mast sharing by operators is and will remain a priority. However, it is not always possible to share masts and there may be good environmental reasons for not doing so.

The Mobile Operators Association represents the interests of the UK's five mobile phone network operators - 3, O2, Orange, T-Mobile and Vodafone - on radiofrequency health and associated planning issues.

**For individual operator contact details see [www.mobilemastinfo.com](http://www.mobilemastinfo.com)**

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