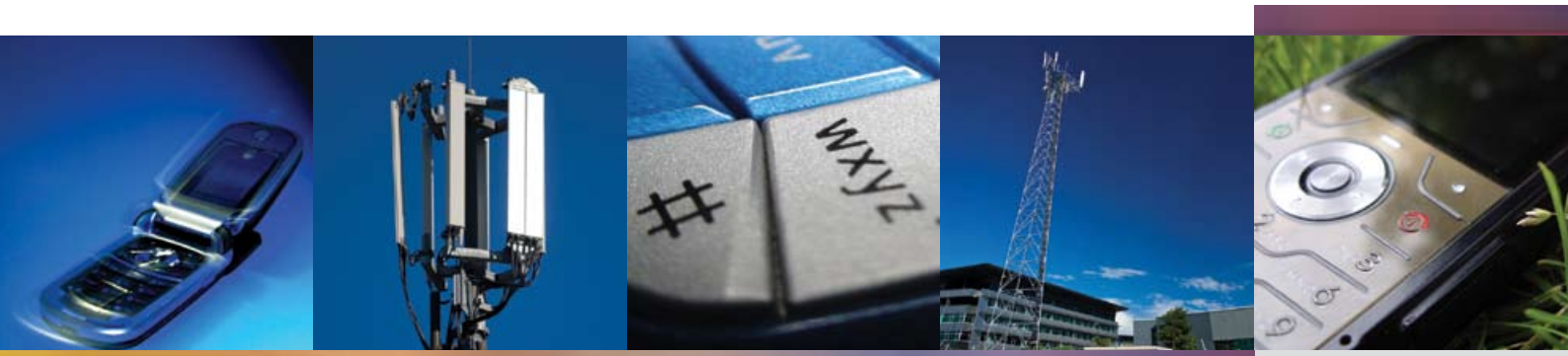
Mobile Manufacturers Forum

Mobile Networks and Health



Mobile or wireless communications have brought about a profound change in the way we communicate, work and do business.

Allowing all of this to take place is an interlinked group of base stations that together make up a major part of a mobile network. When you make a call on your mobile phone, it emits signals using radio waves (also known as radiofrequency or RF energy). These signals are received by the antenna of the nearest base station, which then transmits them to other phones in the mobile network or to the fixed-line phone network.

Base stations are an essential element in allowing us to enjoy today's wireless communications revolution. However, the presence of base stations has raised questions about possible health effects of the emitted RF energy, and this brochure has been designed to help answer those questions.

What is a base station?

A base station is comprised of an antenna (or several antennas), a mast or other supporting equipment to hold the antenna and equipment to transmit, receive and process the radio signals.

A base station can vary in size from a small box attached to a light pole providing mobile phone coverage in a street to a tower providing a combination of wireless services over a large geographical area.

Why are base stations needed?

Without a network of base stations, mobile communications as we enjoy today simply could not be provided.

When you make a call on your mobile phone, or use any wireless device to access your email or surf the web, the phone or device emits signals in the form of RF energy that are sent to the antenna of the nearest base station. The received signals are processed and forwarded through the network to the final destination. As calls are two-way, base stations both send and receive RF signals.

Why are base stations located where they are?

Base stations need to be located close to where people are using their mobile or wireless devices, because the devices themselves only have limited range within which they can communicate.

Therefore each base station is designed to serve a particular area known as a 'cell' within the network. When positioned correctly, they allow the available radio frequencies to be reused in other cells without interference and which then increases the overall number of calls that the network can handle at any one time.

Why do we need so many base stations?

Base stations have two limiting factors – one is the capacity of calls that they can handle, and the other is the geographical area that they can cover.

In areas with fewer users, base stations can be quite far apart, but in areas where there are many users, the base stations need to be located much closer to each other. This is because each base station can only manage up to about 100 calls at the same time. Where there are not so many simultaneous users, the capacity is not an issue, so the base stations are placed to maximize their geographical coverage. In areas where there are many users, more base stations will be needed to handle the call traffic, and as such, are located much closer to each other to increase overall capacity. Where base stations are located closer to each other, their output power must be lower to avoid interference with other base stations in the area.

Are there safety limits for exposure to radio waves from base stations?

There are a number of national and international guidelines, recommendations and standards for exposure to RF energy. They are very similar because most countries have adopted the guidelines from the International Commission on Non-Ionizing Radiation Protection (ICNIRP) which are recommended by the World Health Organization. Base stations are designed and installed to ensure they meet these safety limits.

If there is a base station near my home or work, should I be worried?

The safety limits provide a wide safety margin from any known adverse health effects, and also have been developed taking into account the safety of children and other members of the community. Surveys have shown that exposures in areas accessible to the public, including exposures at residential areas and offices, are usually hundreds or thousands of times below the limits.

Independent surveys have also confirmed this by measuring the RF levels in the community from base stations. The World Health Organization has also reviewed the background RF levels from wireless systems and says:

> *'Recent surveys have shown that the RF exposures from base stations range from 0.002% to 2% of the levels of international exposure guidelines, depending on a variety of factors such as the proximity to the antenna and the surrounding environment. This is lower or comparable to RF exposures from radio or television broadcast transmitters.'*

Can a base station be built on a school or hospital?

There is no health or technical reason why a base station cannot be built on a school or hospital. Any area that the public can access around a base station will be well within the safety guidelines, and there is no evidence that a base station can cause interference with medical equipment (many hospitals actually have in-building wireless communication systems to ensure

that all medical personnel can be easily contacted). Since antennas are designed to broadcast horizontally and not to beam down like a street light, having antennas on the school or hospital does not mean the area below it has the highest exposure.

There is also a benefit in having a base station nearby. Base stations can control the power of handsets and can instruct nearby handsets to power down to only that level needed to make and receive a call. This is similar to people talking more quietly when they are closer to each other.

Do I need to be concerned about how close I can get to a base station?

In practice, any area that is accessible to the public around a base station is well below the safety limits.

How strong are the emissions from a base station?

Base stations operate at low power. Typically transmitted power from an outdoor base station may range from a few watts to about 100 watts; while the output power of an indoor base station is even lower. For comparison purposes, 100 watts is similar to the power consumed by a commonly used light bulb in homes.

Is there a difference between the emissions from a 2G base station from those of a 3G base station?

The radio waves from base stations are similar to those emitted by TV transmitters and used by emergency services or taxis. The difference is how the various signals are transmitted with different frequencies. Research has not confirmed any adverse health effects due to the low-power RF fields emitted by base stations whether the signals were 2G or 3G. Furthermore, the transmitted power from 2G and 3G base stations are very similar.

Will additional base stations increase the overall exposure?

According to international safety guidelines, the exposure level at any location accessible to the public must meet the limit regardless of the number of base stations in the surrounding area. All base stations, irrespective of the technology they support, are designed and installed to comply with the international safety guidelines. Additional base stations will not change the fact that the public exposure to radio waves is typically hundreds or thousands times below the international guidelines.

What do the experts say about potential health effects from base stations?

Research into potential health effects connected with the use of RF energy has been conducted over many decades and continues even today. The World Health Organization (WHO) has recently published a fact

sheet that reviews the most recent studies and reports related to base stations. The WHO concluded:

'Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.'

Where do I go to get more information?

There are a number of sources of information directed towards answering questions on the safety of mobile networks and base stations.

The World Health Organization
www.who.int/emf

The International Commission on Non-Ionizing Radiation Protection (ICNIRP)
www.icnirp.de

EMF Explained
www.emfexplained.info

What is the MMF?

The Mobile Manufacturers Forum (MMF) is an international association of telecommunications equipment manufacturers with an interest in mobile or wireless communications. The MMF was formed to facilitate joint funding of key research projects and cooperation on standards, regulatory issues and communications concerning the safety of wireless technology.

MMF
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