

# **FAQ ON RF SAFETY AND WiMAX**

## **Addressing concerns about perceived health effects**

**April 2008**



## Scope

Speculation about health issues in relation to mobile phones, mobile base stations and now any new wireless products is still very much in the public eye. The following document answers some commonly asked questions in relation to WiMAX™ technology and perceived health concerns.

## WiMAX Forum® Position

Our position is based on the following:

Health and safety is taken very seriously by the WiMAX Forum® and our members. We are very conscious of our responsibility to the public and other stakeholders.

There has been an enormous amount of research carried out regarding wireless systems and health. Many independent expert committees have reviewed this research and have found no scientific evidence of adverse health effects at the low levels of public exposure that these radio systems are designed to operate at.

Recently the World Health Organisation (WHO) issued a Fact Sheet<sup>1</sup> regarding base stations and wireless networks. The fact sheet stated:

*“From all evidence accumulated so far, no adverse short - or long-term health effects have been shown to occur from the RF signals produced by base stations.”*

The conclusions of the fact sheet were:

*“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.”*

The WiMAX Forum recommends that its members abide by the relevant national guidelines where systems are deployed and strive to work to independent international exposure guidelines based on comprehensive scientific reviews such as the IEEE and ICNIRP guidelines (links are provided at the end of this document).

Despite current scientific opinion that there is no convincing evidence of a risk, the WiMAX Forum will continue to monitor the current state of science which is evaluated by national and international scientific bodies, such as WHO, to ensure our members are kept up-to-date and informed about this issue.

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<sup>1</sup> See - <http://www.who.int/mediacentre/factsheets/fs304/en/index.html>

## Questions and Answers

### 1. What is WiMAX™?

WiMAX™ is a wireless broadband technology, based upon the IEEE 802.16 standard, which provides high data rate services. WiMAX systems operate using radio waves on radio-frequencies (RF) similar to the radio waves emitted by TV and radio broadcasts, mobile phone systems and two-way radios used by taxis and the police, ambulance and fire services.

More general details about WiMAX technology can be found here:

<http://www.wimaxforum.org/about/faq/>.

### 2. What are radio frequency / radio wave emissions

RF is part of the electromagnetic spectrum, as are television, AM and FM radio signals and visible light. RF signals are known as “non-ionizing” electromagnetic waves. Scientists describe electromagnetic waves as “non-ionizing” if they are not capable of breaking the chemical structure of matter. Non-ionizing electromagnetic waves should not be confused with a different harmful type of electromagnetic wave called “ionizing radiation.” Ionizing radiation, such as X-rays and gamma rays, are different because they can break the chemical structure of matter.

### 3. Do WiMAX networks cause adverse health effects?

WiMAX is another wireless technology that uses radio waves. Radio waves have been in widespread use for broadcasting for nearly a century and there has been an enormous amount of scientific research into the health effects of radio waves over many decades. Many independent expert committees have examined this research, none have found health hazards at the low levels of public exposure from these systems; for example, the World Health Organization (WHO) issued a Fact Sheet<sup>2</sup> in May 2006 entitled “Base stations and wireless technologies.” Its conclusions are:

*“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.”*

Please see the following questions and answers for more information.

### 4. Who sets the guidelines for safety for RF emissions such as those emitted by WiMAX systems?

There are two main bodies that produce exposure limits

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<sup>2</sup> See - <http://www.who.int/mediacentre/factsheets/fs304/en/index.html>

- the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a body of independent scientific experts that monitors and analyzes all research into this area; and
- the IEEE International Committee on Electromagnetic Safety that first developed RF safety recommendations 40 years ago.

Both have examined the large volume of research on Radio Frequencies, such as those emitted by WiMAX, before deciding their exposure limits. Both the ICNIRP and the IEEE limits are aligned on the major RF safety issues including a large safety margin. The ICNIRP guidelines, recognized as the standard for safety by the World Health Organization, have been adopted by more than 35 countries including the European Community, and have also been adopted by the wireless industry.

The RF power levels transmitted from WiMAX systems and from communication cards in personal computers are very low. This low power results in exposure levels that are usually thousands of times below ICNIRP and IEEE exposure limits.

## **5. Are adults and children in danger if they go into an area with WiMAX emissions and what about vulnerable people such as pregnant women or the elderly?**

International safety standards such as the ICNIRP and IEEE limits with which WiMAX must comply are designed to protect everyone – this includes pregnant women, the elderly and children.

The WHO issued a Fact Sheet<sup>3</sup> in May 2006 which said that there is no convincing scientific evidence that the very low exposure levels from wireless networks cause adverse health effects.

## **6. Are you sure there is no effect from this low level of radio frequency over a prolonged period, say 20-30 years?**

The 2006 WHO website<sup>4</sup> states that:

*“In the area of biological effects and medical applications of non-ionizing radiation approximately 25,000 articles have been published over the past 30 years. Despite the feeling of some people that more research needs to be done, scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. However, some gaps in knowledge about biological effects exist and need further research.”*

In the past decade alone, hundreds of scientific studies have been conducted. Numerous government health agencies and independent scientific panels have

<sup>3</sup> See <http://www.who.int/mediacentre/factsheets/fs296/en/index.html>

<sup>4</sup> See <http://www.who.int/peh-emf/about/WhatIsEMF/en/index1.html>

reviewed these studies. The general scientific consensus is that low-level RF emissions do not pose a risk to health in the short or long term.

## **7. Is there any credibility to the reports of people suffering such things as headaches and short-term memory loss due to mobile phone base stations, and will WiMAX cause anything like this?**

Some people claim to be sensitive to the electromagnetic fields generated by radio networks but in a fact sheet about Electrical Hypersensitivity, the WHO states that “Well controlled and conducted double-blind studies have shown that symptoms were not correlated with EMF exposure.” This was supported by the WHO factsheet in 2006 about mobile phone base-stations and wireless technologies which said that no adverse health effects were expected from wireless networks. The RF emissions of WiMAX systems are comparable to the RF emissions covered by these studies.

## **8. Where can I find independent expert information?**

Additional information can be obtained from the web-sites of the following independent organizations, the World Health Organization, the International Commission on Non-Ionizing Radiation Protection and the IEEE:

WHO Fact sheet 304

<http://www.who.int/mediacentre/factsheets/fs304/en/index.html>

WHO Fact sheet 296 Electromagnetic Hypersensitivity

<http://www.who.int/mediacentre/factsheets/fs296/en/index.html>

ICNIRP

<http://www.icnirp.net/what.htm>

IEEE

<http://grouper.ieee.org/groups/scc28/index.html>

## About the WiMAX Forum®

The WiMAX Forum is an industry-led, non-profit corporation formed to promote and certify the compatibility and interoperability of broadband wireless products using the IEEE 802.16 and ETSI HiperMAN wireless MAN specifications. The Forum's goal is to accelerate the introduction of these devices into the marketplace. WiMAX Forum Certified™ products are designed to be interoperable and to support Metropolitan Broadband Fixed, Nomadic and Mobile Applications.

For more information about the WiMAX Forum and its activities, please visit [www.wimaxforum.org](http://www.wimaxforum.org).

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