



THE ANSWER IS **IN YOUR HANDS**

Mobile Phones,
Masts and
Your Health

Table of content

- 1.0 Radio frequency waves
- 2.0 Guidelines for exposure
- 3.0 Base stations and health
- 4.0 Mobile phones and health
- 5.0 Children and mobile phones
- 6.0 3G and 4G base station needs
- 7.0 FAQs and facts
- 8.0 Expert opinion
- 9.0 Glossary
- 10.0 Reference materials



Commitment To Care

At Safaricom we are committed to ensuring that our activities pose no risks to the health and safety of the communities in which we operate and to our own employees. That is why this booklet is so important. Out of the over 35 million mobile phone users in Kenya, some might have questions about mobile phones and health.

We have a responsibility to remain conscious of our customers and indeed, the general public's questions and concerns. Each and every one of us should be able to answer them in plain and simple language.

To help you do this...the answers are at your fingertips.

Bob Collymore
CEO, Safaricom Limited

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Foreword

On behalf of the Communications Authority of Kenya (CA), I take this opportunity to commend Safaricom Limited for its efforts to educate and sensitize the public with balanced information on exposure to electromagnetic fields (EMFs) generated by the industry and personal communication devices.

CA is guided by the International Commission on Non-Ionizing Radiation Protection (INCIRP) guidelines when verifying that EMF exposure limits of consumer devices and telecommunications facilities to ensure they are within the safety limits. Such include mobile phones and mobile phone base stations.

As the Kenyan ICT Regulator, the Authority remains fully committed to the health and safety of ICT users in Kenya. We shall therefore maintain continued collaboration with industry stakeholders, including Government Agencies, International Standards Development Organisations and Licencees to address public concerns about potential hazards from EMFs.

Francis W. Wangusi, MBS
Director General

A handwritten signature in black ink, appearing to read 'Francis W. Wangusi', with a stylized flourish at the end.

Foreword

First and foremost, I wish to extend my heartiest congratulations to Safaricom Limited for their commendable efforts in producing this highly informative publication entitled "The Answer Is In Your Hands". This timely publication not only provides background information on the Electro-Magnetic Frequency (EMF) from base stations and the international standards that Safaricom complies with, but also the myths around the health effects of the base stations, aimed at promoting better understanding between what is known and not known about this subject.

With technology rapidly advancing, people living close to the base stations have become increasingly concerned over the potential harmful effects that EMF may have on their health. There has been a great deal of misunderstanding and misinformation about the issue of safety and radiation.

The National Environment Management Authority (NEMA) of Kenya is the principal regulator in the Government charged with the responsibility of protecting the environment, of which public health is one of its key aspects. We adopt the EMF guidelines published by the International Commission on Non-Ionizing Radiation Protection Board (ICNIRP) in 1998 and require that Safaricom undertakes Environmental Impact Assessment (EIA) for their base stations for approval and licensing by the Authority before commencement of the project. Safaricom should also undertake Environmental Audits (EA) one year after the project commences.

We appreciate that over 50 years of scientific research has already been conducted into the possible health effects from mobile phones, base stations and other wireless services. The data from this research has been analysed by many expert review groups. Weighing the whole body of facts, there is no evidence to convince experts that exposure below the guidelines set by the ICNIRP carries any health risks, for adults or children.

As the Authority we support the development of this EMF booklet as it will go a long way towards demystifying the so many misconceptions held by the general public on the effects of electromagnetic radiations from the base transceiver station on their health.



Prof. Geoffrey Wahungu
Director General, National Environment Management Authority

Radio Frequency Waves



What is Electromagnetic Fields (EMF)?

Electromagnetic fields (EMF), sometimes known as electromagnetic radiation (EMR) is a form of energy produced by equipment like televisions, radios, microwave ovens, fridges, computers, electricity, mobile phones and base station antennas among others. EMF is present everywhere in the environment we live. The earth, sun and ionosphere are all natural sources of EMF.



Radio Frequency Waves

Types of radiation emitted by radio frequency waves?

Ionizing radiation:

This is radiation with enough energy that on interaction with an atom, it's able to charge or ionize, causing a change in the original status and or characteristics. Such radiations are harmful to humans as they cause cell mutations. Sources of such radiations include X-Ray machines in hospitals and nuclear materials.

Non-ionizing radiation:

This radiation does not have enough energy to charge or ionize atoms. These include: Radiations from mobile phones, base station antennas, TVs and TV broadcasting stations, FM radio stations, microwaves, the sun and power lines, among others.

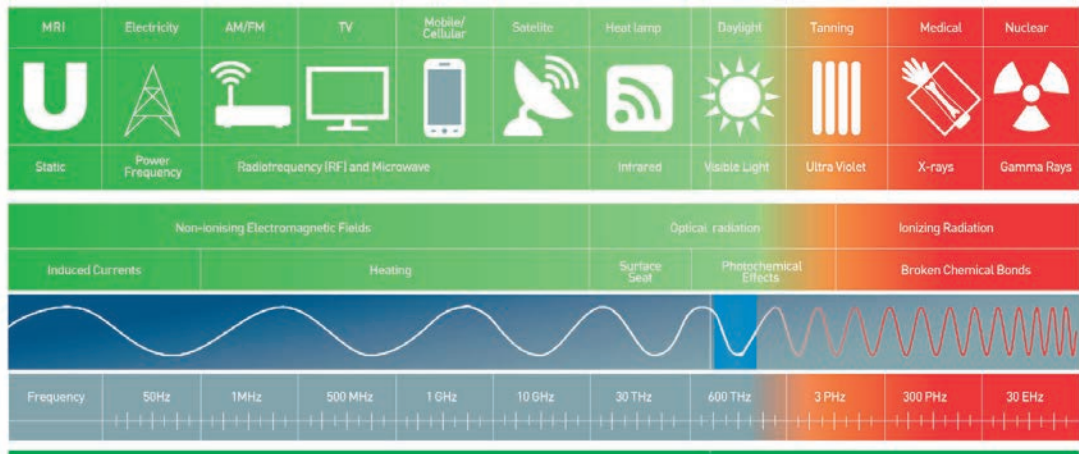


Fig.1 Electromagnetic spectrum, ionizing and non-ionizing sections, and typical sources of electromagnetic fields.

Radio Frequency Waves

Comparison of household appliances and typical base station radiofrequency emissions

Emissions from various EMF sources are very much a part of our normal daily lives. The RF emissions from these sources are several multifold times lower than the safety limits set by international EMF standards bodies, INCRIP guidelines.

Emissions from a base station are lower than the emissions from a microwave and even from our radio tuner.

Guidelines for EMF Exposure

Who monitors and reviews the research and sets international guidelines on EMF?

The World Health Organization has a special advisory group of expert scientists called International Commission on Non-Ionizing Radiation Protection (ICNIRP) who monitor and review the research and set international guidelines. The ICNIRP guidelines were published in 1998.

They form the basis of WHO and International Telecommunications Union (ITU) recommendations to governments and have been widely adopted around the world. Many countries use the ICNIRP guidelines to set national standards or guidelines for exposure to mobile phone technology. Safaricom makes sure such guidelines are followed. Radio waves have been studied for more than 60 years and therefore standards like the ICNIRP guidelines are based on a large body of knowledge.



Base Stations and Health

What is a base station and why do we need them?

Base stations are the building blocks of a mobile phone network. Connect one to another to another and you have a network for making calls anywhere in the world.

Well, whenever you make or receive a call, your phone uses low power radio frequency waves to communicate with a network of radio transmitters and receivers called base stations or cell sites.

Base transceiver stations need to be located close to mobile phone users to provide good quality reception.

Base Stations and Health

What radiation levels are associated with BTS?

A recent survey by the World Health Organization (WHO) has shown that the Radio Frequency (RF) exposure occasioned by the BTSs ranges from 0.002% to 0.2% in relation to the maximum level of exposure permitted internationally. Such exposure is comparable to the RF exposure caused by Radio or Television broadcast transmitters and is therefore too low (approximately 1000 times lower than the permitted maximum exposure levels) to pose a threat to human health.



Base Stations and Health

Is it safe for me to live near a base station?

Base stations are designed to send signals outward, like a lighthouse sends out light. Radio wave exposure levels at the foot of a base station are hundreds, even thousands of times lower than the set guideline limits. Base stations are sited with great care to ensure nobody living near or passing by them is exposed to radio waves above ICNIRP guideline limits.

Radio waves have been used as a means of communication for over 100 years now. Each base station covers a specific area or cell, hence the name 'cellular phone'. The power output of a base station is quite small. Did you know that a TV transmitter may have an output of 100,000 watts or more, while a typical base station's output is less than 150 watts?

In relation to base stations and health, the WHO fact sheet on electromagnetic fields and public health has concluded that:

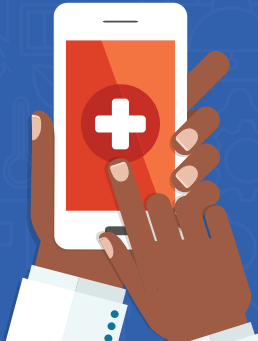
'Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.'

Mobile Phones and Health

Does use of mobile phones have any health effects on users?

WHO states that:

"A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established for mobile phone use."





Mobile Phones and Driving

Is it safe to use a mobile phone while driving?

Driving is complex and challenging activity. Use of mobile phones while driving causes distraction. Research shows that using a hand-held or hands-free mobile phone while driving may increase your chance of a crash by as much as four times. The current traffic law also prohibits use of mobile phones while driving.

It is safe to have phones switched off or put on silent mode while driving and only used while the vehicle is legally parked in a safe location.



Children and Mobile Phones

Is it safe for our children to use mobiles phones?

WHO says, "Present scientific information does not indicate the need for any special precautions for the use of mobile phones." If you are still concerned, you could work with your children to vary their mobile phone usage, for example, by limiting their calls or by teaching them to use a 'hands-free' kit which keeps the phone away from the body.

Even though the weight of evidence does not suggest there are any adverse effects, Safaricom, through Vodafone, supports independently conducted research because our technology has rapidly spread and is now used by one in six people around the world. Since 1999, Vodafone has globally committed more than 6 million pounds to an 8-year program of research projects.



3G and 4G Base Station Needs



Will 3G and 4G technology bring more base stations?

Not necessarily. Much of the need for 3G and 4G coverage will be met by existing Safaricom sites. Some new sites will be required but, where possible, these will be located on existing towers. Where additional base stations are used, these are often to provide fill-in coverage.

Safaricom also adheres to telecommunication industry code of practice for siting of BTSs and it is managed by the sector regulator, the Communication Authority of Kenya. All environmental impact assessments for the base transceiver stations (BTSs) are approved and licensed by National Environment Management Authority (NEMA).

The code can be found at www.ca.go.ke



FAQs & Facts

a) Will I be constantly exposed to RF waves if I carry my phone in my handbag or pocket?

Not always. Phones transmit RF waves when on a call or when transmitting data like photos (MMS). At all other times, RF waves are transmitted by the handset intermittently to maintain contact with the nearest base station.

The new technologies we love to use - like text messaging, picture messaging, the internet and e-mail - actually reduce our exposure to RF, as they encourage us to hold the phone away from our bodies.

b) Does your ear sometimes feel warm when you're on the phone?

It can...but the warmth you may feel does not come from the small amount of RF Waves from a compliant handset. The warmth comes from the batteries, which warm up when in use and is also the result of restricted airflow around the ear when on an extended call.

FAQs & Facts

c) Why are there so many restrictions on using mobile phones in hospitals?

At short range, the radio signal from a mobile phone may cause interference with electronic medical devices. It may also cause distraction to the medical personnel and patients. It is possible for mobile phones to be used in designated areas of hospitals.

d) Why can't I use my mobile phone when I fly?

Aircrafts contain vast arrays of complex electronic equipment and sophisticated communication systems that may be interfered with by use of mobile phones.

e) Why do some petrol stations ask me to turn off my mobile phone?

It's distracting. Mobile phones will not cause a fire or explosion, but can be distracting when filling a vehicle with highly flammable petrol. This is why some petrol stations have signs asking customers not to use their mobile phones.

Expert Opinion

SSMs Independent Expert Group on Electromagnetic Fields (Sweden), 2013

"...Recent research on exposure from transmitters has mainly focused on cancer and symptoms, using improved study designs. These new data do not indicate health risks for the general public related to exposure to radiofrequency electromagnetic fields from base stations for the mobile telephony, radio and TV transmitters, or wireless local data networks at home or in schools."

International Commission on Non-Ionizing Radiation Protection (ICNIRP), 2009

"...it is the opinion of the ICNIRP that the scientific literature published since the 1998 guidelines has provided no evidence of any adverse effects below the basic restrictions and does not necessitate an immediate revision of its guidance on limiting exposure to high frequency electromagnetic fields."

Expert Opinion

Health Council of the Netherlands, 2012

"...No evidence has been found that exposure to radiofrequency electromagnetic fields has a negative influence on the development and functioning of children's brains, not even if this exposure is frequent."

World Health Organization (WHO), 2011

"...A large number of studies has been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use."

Glossary

4G

A more efficient mobile technology with greater speed and improved quality. It allows you to do more on your mobile like send video messages, play 3D games and have real music ringtones.

Base Station

Consists of antennas fixed to a mast, building or structure and connected to radio transmission equipment, stored in a secure cabinet. Allows your mobile phone to communicate.

Mast/tower

The most visible part of the base station, for example a pole or tower. Safaricom ensures it locates/sites its masts to blend with the landscape.

WHO (The World Health Organization)

A United Nations agency that coordinates international health activities and helps governments improve health practices.

EMF (Electromagnetic Fields)

These electric and magnetic fields are produced by equipment like televisions, radios, microwave ovens, fridges, computers, electricity, mobile phones and base station antennas.

Radio waves (RF Electromagnetic Field)

Waves of electrical and magnetic energy moving together through space. When an RF current is connected to an antenna, an electromagnetic field (EMF) is created and is able to travel through space as radio waves.

Glossary

ICNIRP

The International Commission on Non-Ionizing Radiation Protection.

Non-Ionizing Radiation

Radiation that does not have enough energy to break chemical bonds (ionization). It is used in devices such as radios, microwaves and the infrared lamps used to keep food warm in restaurants. It includes the visible spectrum.

Atom

It is the defining structure of an element, which cannot be broken by any chemical means.

CA is the Communications Authority of Kenya.

NEMA is the National Environment Management Authority.

Key reference materials about RF/EMF and Human Health

- The World Health Organization: www.who.int/emf
- The ICNIRP Guidelines: www.icnirp.de/documents/emfgdl.pdf
- 'Mobile phones, your Health and regulations of Radiofrequency Electromagnetic Energy'.
Available on the ACMA website: www.acma.gov.au
- Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields available from Federal Communication Commission [Bulletin No.65]:
www.fcc.gov/oet/rfsafety
- <http://www.who.int/mediacentre/factsheets/fs193/en/index.html>
- International Telecommunication Union: www.itu.int/en/ITU-T/emf/
- European Commission: <http://ec.europa.eu/health/electromagnetic-fields>



We welcome your questions and comments.

Write to us at: emf@safaricom.co.ke

As we want to keep the environmental impact of this booklet to a minimum, we have given very careful consideration to the production process.

This paper is totally chlorine free and environmentally friendly.

Produced by the Corporate Affairs Division



