This brochure has been developed as part of the **Consumer Education Programme** of the **Communications Commission of Kenya.** It was compiled as a result of a review of material from various sources and presents the current perception of the information available on the effects of electromagnetic energy on human health.

Introduction

Mobile-phone use in Kenya has increased substantially, the number of subscribers having reached 11.5 million by January 2008. As a result, there has been a corresponding rise in the public interest expressed with regard to health issues associated with the exposure of humans to Electro-magnetic Fields (EMF).

What is radiofrequency electromagnetic energy (RF/EME)?

Both mobile phones and their Base Transceiver Stations (BTS – commonly known as 'base stations') emit radiofrequency (RF)/electromagnetic energy (RF/EME), which is a form of radiation technically referred to as non-ionizing radiation (NIR) - due to the fact that it is incapable of changing molecular structure of any material. Ionizing radiation (such as X-rays and Gamma Rays), on the other hand, is capable of causing ionization (radioactivity) and producing molecular changes, some of which can damage biological tissue.

Man-made sources of RF/EME include:

- Mobile-phones and Base Transceiver Stations (BTS)
- Remote control devices
- Broadcast Transmitters
- Electric and electronic devices

The amount of exposure to RF energy to which a cell-phone user is exposed depends on: the number and duration of calls made, the amount of cellular telephone traffic at any given time, the distance of the user from the nearest BTS, the quality of the transmission, how far the antenna is extended, and the size of the handset. The main source of RF energy in a cell-phone is its antenna, which is contained within the handset. Since the handset is typically held to the side of the head while the phone is in use, the closer the antenna is to the head, the greater the exposure to RF/EME.

Extensive research is currently being conducted with the intention of assessing the potential risks inherent in human exposure to RF/EME. Studies conducted by the scientific community so far have, however, revealed that while prolonged exposure to RF/EME can, under certain circumstances, cause high tissue temperature, shocks and burns from conductive objects and nerve and muscle stimulation, the levels of exposure to which the general public is currently exposed to are far below the levels required to produce adverse health effects (approximately 100 times lower).

Which body regulates RF/EME?

Emissions of ionizing radiation are regulated in Kenya by the Radiation Protection Board (RPB). At the present time, the Board has no mandate to similarly regulate the emissions of RF/EME. However, a parliamentary bill is now underway, which will grant such mandates.

What standards are in place to protect consumers against the known effects of RF/EME?

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has developed a set of guidelines, which define the standards, restrictions and reference levels that are required to ensure the protection of the general public against the possible ill-effects of non-ionizing radiation (Kenya is also currently finalizing her own guidelines).

What radiation levels are associated with mobile phones and what is SAR?

The rate at which the electromagnetic radiation emitted by a cell-phone is absorbed by the body is measured in terms of its Specific Energy Absorption Rate, or SAR value. An average cell-phone has a SAR value of 1.6w/kg, but some have a value as high as 2.0 W/kg, which is the recommended maximum SAR value for a cell-phone.

The maximum exposure levels permitted as defined by the ICNIRP are:

- 0.4 W/Kg for occupational use, for adults whose exposure is defined under known conditions and controlled by appropriate precautionary measures
- 0.08 W/Kg for the general public (dependent upon age and health status and not subject to the same constraints as above)

What radiation levels are associated with BTS?

Due to the ever-increasing mobile-phone usage in Kenya, increasing numbers of BTS are being erected to support the growing network coverage. Other wireless networks, such as those that facilitate high-speed Internet access (such as WLANs) are also on the increase. A recent survey by the World Health Organization (WHO) has shown that the RF exposure occasioned by BTSs ranges from 0.002% to 0.2% in relation to the maximum levels of exposure permitted internationally. Such exposure, which is also dependent upon the proximity of the human being to the BTS and other such relevant environmental factors, is comparable to the RF exposure caused by radio or Television-broadcast transmitters and is, therefore so low (approximately 1000 times lower than maximum exposure levels permitted) to pose a threat to human health. Note: the strength of the RF field is at its greatest in the immediate vicinity of the source and diminishes quickly in relation to distance from the source. Network access in the immediate vicinity of a BTS is also often restricted due to the fact that the RF signal may exceed the permitted exposure limits.

Are mobile phones safe?

Current scientific research has not revealed any substantial evidence to suggest that the use of a mobile-phone (within the limits set by international standards) can have an adverse effect on human health – even in the event of long-term exposure.

More information on SAR levels

Users wishing to obtain specific information on the SAR levels of the existing range of mobile-phones should contact the Mobile Manufactures Forum (MMF): www.mmfai.org. An international non-profit organization founded in 1998 by a number of leading manufacturers of mobile radio equipment (including Alcatel, Ericsson, Mitsubishi Electric, Motorola, Nokia, Panasonic, Philips, Sagem, Samsung, Siemens, Sony Ericsson and TCL & Alcatel), the Forum offers funding for research into mobile-phone use and human health, cooperation/coordination on standards and regulatory issues (specifically with the WHO Electromagnetic Fields Project), and acts as a forum for communication with the general public.

Is living within close proximity to a BTS safe?

No adverse health affects have been observed to afflict persons living close to a BTS.

And, while some individuals have reported the manifestation of non-specific symptoms as a result of exposure to the RF fields emanating from BTSs – the existence of EMF have not been proven to be the cause of such symptoms. BTS antennae (typically mounted on buildings or towers at a height of 15 to 50 metres above ground) emit a fan-shaped transmission beam, which is typically vertically narrow and horizontally broad, and whose intensity decreases rapidly in relation to the distance from the BTS. The point at which the beam comes into contact with the ground is also sufficiently low as to render its strength significantly lower than the recommended maximum radiation limits.

What regulations cover the installation of radio communication equipment?

The Communications Commission of Kenya, working in cooperation with all other relevant parties, is currently in the process of establishing a 'Code of Practice for the Setting-up of Base Transceiver Stations', which will address any specific concerns raised by those living in close proximity to a BTS. Although scientific research has revealed that all such radiation is emitted within safe limits, this code will address such issues as; the balance of coverage by the various networks and the need for sensitivity in the location of BTSs.

For more information about RF/EME and human health, see the following:

1. The World Health Organization website: www.who.int
2. The ICNIRP Guidelines: www.icnirp.de/documents/emfgdl.pdf
3. 'Mobile Phones Your Health and Regulation of Radiofrequency Electromagnetic Energy'. Available on the ACMA website: www.acma.gov.au
4. Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields available from the Federal Communications Commission (Bulletin No. 65): www.fcc.gov/oet/rfsafety/

Need to know more?

For further information on the above topic or any other aspect of health and safety with regard to communicational equipment, please contact:

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CONSUMER AFFAIRS DIVISION,
COMMUNICATIONS COMMISSION OF KENYA
P.O. BOX 14448, NAIROBI, 00800
Email: chukuahatua@cck.go.ke
TEL - 020 - 44 55 555, 0714 - 444 555, 0737 - 44 55 55

Electromagnetic energy and human health

Communications Commission of Kenya

CHUKUA HATUA

Pata huduma ya mawasiliano unayostahili