

Challenges and Dichotomies of Misconceptions on Environmental Effects of Mobile Base Stations

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Abstract

Mobile phone base stations have become a common sight around cities and along highways. The extensive use of mobile devices has led to increased installations of base stations and high voltage overhead power lines. This has led to public environmental health concern and potential health effects of exposure to electromagnetic fields. The exponential growth in the use of mobile phone base stations has raised global concerns about the base stations and prompted researches on different aspects of environmental health issues of exposure to radiofrequency- electromagnetic fields (RF-EMF) among others. This paper determined the challenges and dichotomies of misconceptions on environmental effects of Mobile Base Stations (MBS) in the country as well as possible solutions to enable proper laws and policies that will guide subsequent installations of MBS to avoid issues of environmental health. Available literature review and SWOT analysis targeting stakeholders showed that disparities and overlaps in government functions, laws and regulations concerning the telecommunications industry brought about controversies and misconceptions as regards the activities of the industry. The setback (m) of the MBS and NIR emission levels are some factors where these disparities occur. It should be noted that there are no specific standard and regulatory bodies or agencies dedicated for the regulation and management of mobile telecoms Health, Safety and Environmental (HSE) challenges in Nigeria. This appears to be the same in many parts of the world especially the less developed countries. This is largely due to the diverse and multi-disciplinary nature of the HSE related hazards or issues. In Nigeria, telecoms HSE related issues are generally handled by appropriate Ministries and/or their designated agencies/departments. However, not one agency has come out with detailed telecoms-related occupational health and safety specific hazards or environmental aspects/management requirements or guidelines. It is recommended that all stakeholders in the sector should move towards reconciling these discrepancies, as this will go a long way in clearing the misconceptions.

Les Défis Et Les Dichotomies Des Conceptions Fautes Sur Les Effets Environnementaux Des Stations De Base Mobiles

Abstrait

Les stations de base de téléphonie mobile sont devenues une vue courante dans les villes et le long des autoroutes. L'utilisation intensive des appareils

mobiles a conduit à une augmentation des installations de stations de base et de lignes électriques aériennes à haute tension, ce qui entraîne des problèmes de santé publique et des effets potentiels sur la santé liée à l'exposition aux champs électromagnétiques. La croissance exponentielle de l'utilisation des stations de base de téléphonie mobile a soulevé des préoccupations mondiales au sujet des stations de base et a incité les chercheurs à étudier, entre autres, différents aspects des problèmes de santé environnementale liés à l'exposition aux (RF-EMF). Le but de cet article est de déterminer les défis des idées fausses sur les effets environnementaux des SBM dans le pays en vue d'apporter des solutions possibles pour permettre des lois et des politiques appropriées qui guideront les installations ultérieures de MBS pour éviter les problèmes de santé environnementale. La revue de la littérature disponible et l'analyse SWOT ciblant les parties prenantes montrent que les disparités et les chevauchements dans les fonctions gouvernementales, les lois et les réglementations concernant l'industrie des télécommunications ont suscité de nombreuses controverses et idées fausses concernant les activités de l'industrie. Le recul (m) des niveaux d'émission SBM et NIR sont certains des facteurs où ces disparités se produisent. Il convient de noter qu'il n'y a pas d'organismes ou d'agences de normalisation et de réglementation spécifiques dédiés à la réglementation et à la gestion des défis de santé, de sécurité et d'environnement des télécommunications mobiles au Nigeria et cela semble être le même dans de nombreuses régions du monde, en particulier le des pays moins développés. Cela est en grande partie dû à la nature diversifiée et multidisciplinaire des dangers ou des problèmes liés à ce discours. Au Nigéria, les questions liées à des télécommunications sont généralement traitées par les ministères compétents et / ou leurs agences / départements désignés. Cependant, aucune agence n'a publié de détails sur les risques spécifiques à la santé et la sécurité au travail liés aux télécommunications ou sur les aspects environnementaux / les exigences de gestion ou les directives. Il est recommandé que toutes les parties prenantes du secteur s'efforcent de concilier ces écarts, car cela contribuera grandement à dissiper les idées fausses.

Introduction

Mobile communication networks have operated in various forms for about five decades. However, with the introduction of cellular mobile telephone networks in Nigeria in 1999, and the availability of mobile phones, the use of mobile telephone services has expanded rapidly. Consequently, mobile phone base stations have become a common sight around cities and along highways.

The exponential growth in the use of mobile phones has led to a significant expansion of mobile phone base stations. This has raised global concerns about the safety of mobile phones and their base stations. Thus prompting scientists to investigate

different aspects of the health issues of exposure to these common sources of RF-EMF (Zhu, 2016; Sadetzki *et al.*, 2014).

Mobile phones and their base stations use electromagnetic radiation for transmitting and receiving radiofrequency (RF) signals.

Currently, the largest radiofrequency electromagnetic fields' (RF-EMF) exposures are attributed to mobile phone use (Bolte and Eikelboom, 2012). Base stations produce radiofrequency (RF) radiation that is part of the electromagnetic radiation spectrum. Most of the aerials on base stations transmit and receive RF radiation at frequencies between 870 and 960 megahertz (MHz). RF radiation in the environment is also produced in

varying amounts by radio and television towers, CB and UHF aerials, pager services, as well as cordless phones and some remote controlled devices. A 'background' of RF radiation from these devices and also a small component from natural sources such as the human body and the sun was present in the environment even before mobile telephone networks began. A commonly cited report by Gartner (2007) and Hassan *et al.*, (2013) states that two percent of the human-driven CO₂ footprints can be accredited to the information and communication technology (ICT) sector.

Telecoms Infrastructure in Nigeria

The exponential growth and development in the telecoms industry required a fast and huge deployment of related equipment and facilities such as, Base Stations, masts/towers, transmitting antennas, mobile stations, satellite dishes, microwaves, optical fiber, switching equipment and the power generating sources for both data and voice transmission across the country. However, the desire for better quality of service, wider coverage and quest for broad band for data transmission means more of these infrastructures and equipment will be deployed in no distant future (Idris, 2002).

The rapid growth in the number of mobile phone subscribers has resulted in an increased number of base stations all over the world and Nigeria is not an exception. As a result, more base stations are being installed in every part of the country. According to a report by the Nigerian Communications Commission (NCC, 2014), the estimated number of mobile base stations in the country is expected to have reached 50,000 in 2018.

The interactions among these and the Nigerian environment is further exposure (inscales and forms) to variety of Health, Safety and Environment related issues, hazards and risks. Some of these are usually associated with the modification of aquatic and terrestrial habitats, hazardous materials and waste generation, land and water pollutions, EMF emissions, gaseous emissions, electrical hazards, noise exposure/pollution, optical fibre exposures, overhead works,

alterations in visual impacts among others.

In the past, what had been the topmost issue of National Environmental Standards Regulations Enforcement Agency (NESREA) was effluent discharge from industries that have impacted negatively on climate change and water bodies' pollution. Currently, the paradigm bewildering the agency is the issue of location of mobile base stations. This makes it a top priority because of the public outcry on the various issues and externalities associated with them. It is the sole responsibility of the agency to regulate activities that are believed to have impact on the environment so as to ensure conducive environment for human habitation.

The exponential growth in the use of mobile phones has led to significant expansion of mobile phone base stations. This growth has raised global concerns about the safety of mobile phones and their base stations. Hence, it has prompted scientists like Sadetzki *et al.*, (2014), Yogesh *et al.*, (2014), Urbello *et al.*, (2014), Ikinici *et al.*, (2016), Morgan *et al.*, (2015), Yoon *et al.*, (2015), Zhu *et al.*, (2016) to investigate different aspects of health issues associated with mobile base stations.

Legal Framework in Relation to Telecom Installations

Based on the reviewed literature, it can be deduced that there is no specific standard and regulatory body or agency dedicated for the regulation and management of mobile telecoms Health, Safety and Environmental challenges (HSE) in Nigeria. This agrees with Idris, (2002) who stated that it is understandable if this is the situation in Nigeria, as obtainable in many parts of the world. The diverse and multi-disciplinary nature of the HSE related hazards or issues can be attributed to this. In Nigeria, telecoms HSE related issues are generally handled by appropriate ministries and/or their designated agencies/departments. No agency has come up with detailed telecoms-related occupational health and safety specific hazards or environmental aspects, management requirements or guidelines.

The Federal Government of Nigeria has through the Federal Ministry of Environment put in place some agencies and parastatals that are empowered to make and enforce environmental regulations to prevent and/or minimize environmental challenges posed by telecom installations across the country. Some of these laws provide in general term the protection of the environment while some provide for the regulation of specific aspects of the telecom installations. However, this is not to undermine the effort of the National Environmental Standards and Regulations Enforcement Agency (NESREA) to evolve the industry specific environmental regulatory standards in 2011: *The National Environmental (standards for telecommunications and broadcast facilities) Regulations 2011*.

In Nigeria, there are many laws and regulations which provide for the protection of the environment generally and specifically. They include the following:

1. Nigerian Communications Act, 2003
2. National Environmental Standards and Regulations Enforcement Agency (Establishment) Act (NESREA), 2007
3. Environmental Impact Assessment Act, (EIA) 1992
4. Electrical Power Reform Act, (EPR) 2005
5. Nigeria Airspace Management Agency (Establishment) Act, (NAMA) 1999
6. Nigeria Civil Aviation Authority (Establishment) Act, (NCAA) 1999
7. Factories Act, 1987
8. Nuclear Safety and Radiation Protection Act (NSRP), 1995

Provision of Laws for General Protection of the Environment

1- The National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007 (NESREA) empowers the agency hereunder to prohibit processes and use of equipment or technology that undermine environmental quality (NESREA Act, 2007). Furthermore, is Section 136 of the Nigerian Communications Act, 2003 which is produced hereunder for ease of reference:

- (1) A licensee shall, in installing its network facilities, take all reasonable steps to ensure that this causes as little detriment and inconvenience, and does as little damage, as is practicable.
- (2) The law also mandates the network operator to restore back the land through which it carried out its installations to the condition similar to the condition of the land before the installation (Nigerian Telecommunications Act, 2003).

2- Nigerian Telecommunication Act, (2003) also stated that licensees are further admonished in carrying out their installations to take reasonable steps to:

- (a) Act in accordance with good engineering practice;
- (b) Protect the safety of a person and property;
- (c) Ensure that the activities interfere as little as practicable with: the operations of a public utility; public roads and paths; the movement of traffic; and the use of land;
- (d) Protect the environment.

It is also provided that Environmental Impact Assessment of the proposed project must first be carried out before any project which is likely to have effect on the environment if embarked upon (Environmental Impact Assessment Act, 1992).

3- National Oil Spills Detection and Response Agency Act (NOSDRA Act 2006)

The National Oil Spills Detection and Response Agency (NOSDRA), another subset of the Federal Ministry of Environment, Housing and Urban Development, is mandated by the Act to legislate, regulate and manage oil spill detection, response planning and preparedness in Nigeria; Section 5 reads: 'The objective of the agency shall be to coordinate and implement the National Oil Spill Contingency Plan for Nigeria'. Section 19 (2) states that 'the agency shall act as the lead agency for all matters relating to oil spills response management and liaise with other agencies for the implementation of the plan as contained in the second schedule'.

4- Provision of Law on Specific Environmental Issues of Telecom Installations.

On the construction of towers and masts (BTS) and their possible alteration of the earth habitation, the NCC 'Guidelines on Technical Specifications for the Installation of Telecommunications Masts and Towers' (2009) provide for measures to prevent environmental challenges in the cause of masts and tower construction. These guidelines as stated in 'The Guidelines on Technical Specifications for the Installation of Telecommunications Masts and Tower, (2009) particularly in respect of siting the location of telecommunication ground stations provide that the objective should include minimizing their number, protecting and promoting public safety, and mitigating the adverse visual impacts on the community whilst promoting the provision of telecommunications service to the public. As earlier mentioned, the importance of towers in the provision of quality service in the telecom industries cannot be overemphasized. However, their proliferation no doubt poses a lot of environmental challenges ranging from distortion of the serenity of the environment to the adverse visual impacts. In an effort to minimize the proliferation of masts and towers, operators are mandated to design and construct their Base Stations in such a way that it can accommodate at least three other service providers on the same structure (GTSITMT, 2009). This practice is technically referred to as co-location. Though, the objective behind co-location is appreciable, experts have argued that the practice of co-location may also constitute some further environmental hazards (Earnest, 2005). In a co-located Base Station, the tower/mast must be reasonably high to accommodate more antennas. Thus, the height of the tower constitutes adverse visual impact especially for air navigation. Also it is believed that the increase in number of antennas will increase the amount of the electromagnetic emissions/ radiation which to some is detrimental to health. As regards the height of towers and masts and its possible environmental hazard, the law provides that the maximum height that may

be approved for a telecommunication tower in Nigeria is 150 metres (GTSITMT, 2009).

Nevertheless, a tower, more than 150 metres in height, may be approved by the Nigerian Communications Commission if the Commission is satisfied that the increased height of the tower (GTSITMT, 2009):

- i. will not be detrimental to public health, safety or general welfare;
- ii. will not have a substantial negative effect on the neighborhood.;
- iii. is in conformity with the intent and purpose of the planning of the area and the general plan of community; and
- iv. will not impair the obligation to comply with any other applicable laws or regulations.

Also, on the erection of telecom masts and towers, section 7(1) (n) of Nigerian Civil Aviation Authority (Establishment) Act, 1999 empowers the authority to prohibit and regulate the installation of any structure which by its height or position is considered to endanger the safety of air navigation. The height and closeness of tower to the airport or runways may constitute air navigation danger. Therefore, in order to prevent this possible air navigation hazard, a tower whose height exceeds 30 metres must be approved by the National Air Management Agency (NAMA) (GTSITMT, 2009). No mast or tower (irrespective of the height) may be installed within 15 kilometres of any airport without prior approval and a permit from the Nigeria Airspace Management Authority (NAMA) (GTSITMT, 2009). As a measure to further prevent air navigation-related hazard, towers are required to be marked or painted in a particular colour and its top lighted in a particular way. This is to ensure that the obstruction to air navigation remains visible and the pilot is enabled to see any towering object at a range sufficient for him to take appropriate action in order to avoid the obstruction.

Other practices which are meant to eliminate or reduce the menace of the proliferation of towers are the roof-top or high object mounting and alternative mounting (camouflage). Network providers can make use of roof-top of high

buildings or structures like skyscrapers and power line towers respectively (Olanrewaju, 2016). The alternative mounting structure is the camouflage telecom tower which is usually in form of activity trees. For the objective of the camouflage to be achieved and to avoid creation of visual uniqueness, the colour, scale and character of the camouflage tower to the adjoining structures must be similar (GTSITMT, 2009). In order to reduce or prevent the exposure of neighbours of Base Stations of radiation, a tower is to be constructed at least five metres (National Environmental Standards for Telecommunications /Broadcasting Facilities Regulations, 2010,) or 10 metres (Factories Act, 1987) away from residential area. Apart from the fact that the dichotomy created by the NCC and NESREA in this regard gives room for excuses for non-compliance, it is doubtful, considering the proximity of some telecom towers to residential houses whether service providers are actually complying with this requirement.

Network providers in the construction of Base Station and its maintenance are to provide for their workers protective clothings and appliances such as head helmet, protective jacket, fall-protection belt, gloves, goggles and other accident preventive apparatus (PPEs), like every other factory workers in order to prevent occupational or workplace hazards (GTSITMT, 2009).

On the issue of air and noise pollution mostly generated by the power generating sets which supplies backup electricity to Base Stations, it is necessary that any company including network operators with any source or potential source of air (National Environmental (Food, Beverages and Tobacco Sector) Regulations, 2009) and noise (National Environmental (Food, Beverages and Tobacco Sector) Regulations, 2009) pollutions (55Db-60Db) should take measures and develop plans to prevent and control such pollutions. The NCC regulations also stated that only sound proof and fumeless generator should be used by service providers.

Challenges of Some Regulations

The technical code and specifications concerning

siting of telecoms Base Stations include, among others, the promotion of safety of network facilities and the adoption of technical standards promulgated by international bodies. Section 136 (3) of the NCC Act, 2003 requires that in connection with the installation of respective network facilities, operators shall take all reasonable steps to protect the safety of persons, property and the environment. Pursuant to the NCC Act, the NCC issued many Guidelines and Regulations among which are the Guidelines on Technical Specifications for the Installation of Telecommunications Masts and Towers, 2009. The Guidelines provide standards to be adhered to by telecommunications services providers/operators and installers of telecommunications' towers towards ensuring environmental safety and sound engineering practices. Consequently, the NCC Guidelines 2009 provides that the distance for setback of towers shall be five metres from any demised property excluding the fence. The NCC Guidelines 2009 also provides that all generators within a base station must be sited five metres away from all demised properties excluding the fence. All towers sited within residential areas must conform to the setback stipulated in the Guidelines to mitigate the effect of heat, smoke and noise pollution arising from generating sets (Abdulkadir, 2017).

The NCC and NESREA prescribed setbacks of 5m and 10m respectively for siting telecoms mast/towers away from existing building. Understandably, the aim is to ensure minimal exposures to such environmental hazards as noise, vibrations, gaseous emission (fumes) from power generating sets and RF-EMF exposure etc. This is placing additional strain on the deployment of the required base stations especially in built-up areas. One of the options available for the operators will be to site them away from the communities as green fields (Guidance, 2013). Such locations will be built-up sooner or later anyway and the cycle will continue. More so, providing telecom coverage for such areas will require transmitting at relatively higher powers for the desired result. This brings about another challenge associated with elevated environmental RF/EMF level and service interruptions.

Interestingly, experience has (IHS, 2015) shown that a well-positioned, adequately maintained and sound-proofed 27KvA generator set not only conform to day and night noise requirements even at closer range but, that the change in the levels of these parameters at 5m or 10m is negligible (usually an average of 0.5-1.5 decibels for noise). Poorly maintained and inappropriately positioned power generating sets at 20m or more away from residence are known not to meet the requirement set by NESREA. Ironically people living 5m-150m range of base station are exposed to far lower RF-EMF than those immediately beyond and the exposed level are usually several thousand times below the ICNIRP permissible exposure limits. According to Idris (2002), in reality there is little benefit from the setback requirement.

Electromagnetic Radiation Emissions, Health, Safety and Environmental Risks Concerns and Misconceptions

The issue with the general use of the term 'radiation' for the non-ionizing Radiofrequency band of the Electromagnetic frequency (EMF RF) is usually misconstrued to be same as the ionizing X-rays, Gama-rays or even radio-active 'Radiations', and such could cause the same harmful effects (NCSHE, n.d). There is also the dimension of access to unguided or uncensored publications from individuals and groups other than the responsible bodies or agencies on the safety of mobile telecommunication installations (Idris, 2002).

More so, the recent classification of RF-EMF as possibly carcinogenic to human beings (class 2B), based on the rather none consistent indication of increased risk of cancer-related ailments by the International Agency for Research on Cancer (IARC, 2011) is surely compounding these concerns, worries and apprehensions.

There have been several researches on the association between RF-EMF exposure and potential health effects. Many studies looked at the relationship between brain tumours and mobile phone use (e.g. Hardell and Carlberg, 2009; Health Council of the Netherlands, 2013; INTERPHONE Study Group, 2010), as mobile phones cause much higher local peak exposures

than far-field sources (Lauer *et al.*, 2013). Similarly, the International Agency for Research on Cancer (IARC) classified RF radiation as possibly carcinogenic to humans (2B classification), mainly based on limited evidence of positive associations between exposure to RF-EMF from mobile phones and glioma and acoustic neuroma (Baan *et al.*, 2011; IARC, 2013). One of the major uncertainties in drawing firm conclusions on the relation between mobile phones and brain tumours is the characterization of mobile phone uplink exposure. Akeju *et al.*, (2016) conducted an assessment of exposure to electromagnetic radiation from GSM Antennas within and around two health facilities at the Obafemi Awolowo University, Ile-Ife, Nigeria using electrosmogmeter to measure indoor and outdoor microwave radiation levels. They reported that the radiation power density at most of the locations investigated was below the maximum limit of 940GHz stipulated by the Federal Ministry of Environment, based on values suggested by the non-governmental agency, the International Commission on Non-ionizing Radiation Protection (ICNIRP), and recommended by the World Health Organization. Similarly, the study of Eleine (2018), reported that there are hundreds of apparently conflicting reports in the media about the health effects of mobile phones and base-stations. He also reported that available scientific literature abound and are confusing, also apparently showing very inconsistent effects across studies. For example, he stated that many reports and reviews have been published; with most of them concluding that there is little evidence for any adverse health effect attributed to mobile phone base-stations.

The term Electromagnetic Hypersensitivity (EHS) was created (Augner *et al.*, 2009) for symptoms possibly related to EMF. Augner *et al.*, (2009) asserted that exposure to very high levels of RF radiation can be harmful due to the ability of RF energy to rapidly heat biological tissues.

Similarly, in a study conducted by Elaine (2018) on 'Health Effects of Mobile Phone Base-stations: Human Studies,' it was reported that there is a widespread public concern about the

potential adverse health effects of mobile phones, and especially their associated base-stations. The study further concluded that there is little evidence for any adverse health effect attributed to mobile phone base-stations.

There is growing and worrisome concerns and misconceptions among the public, media, healthcare and indeed legal practitioners on the safety of mobile telephone and base stations. Idris (2002) reported that at least six (6) out of every ten (10) documented complains (NESREA) received by the mobile telecoms operators in Nigeria centred on the safety, health and environment risk concerns range from the belief, to the assertion of the possibilities of such health impacts as cancers, regular abortions, infertilities, birth defects, loss of sights, hearing losses, hemorrhagic anemia, and alopecia from mobile telecoms equipment/infrastructures resulting in various spurious claims and in some cases needless litigations.

The major factor to this misconception could be the non-uniform (See Table 1) EMF RF exposure guidelines or standards (Idris, 2002; Abdulkadir, 2017). There are worrisome disparities between some national and international EMF RF exposure guidelines and standards (Idris, 2002) among others. For instance the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) standards for RF-EMF field range of 3 KHz to 300GHz (FCC Std., 1996) and that of

the International Commission on Non-ionizing Radiation Protection (ICNIRP) guidelines for EMF up to 300GHz. While the former is rather a technical standard with clearer and wider application, the latter which is endorsed by WHO is a guideline with limited application and does not provide guidelines for pulsed, non-linear, chronic or complex frequency effects of EMF RF. The Federal Ministry of Environment also has stipulated maximum limit of 940GHz, which is far higher than the 300GHz earlier mentioned.

The current regulation for operations of mast/towers in Nigeria is however still based on the 1998 recommendations of the International Commission for Non-Ionizing Radiation Protection (ICNIRP), (up to 300GHz), a non-governmental body; even though the Federal Ministry of Environment has its own EMF RF emission level (940GHz). According to Regulation 8 (2) of the National Environmental (Standards for Telecommunications and Broadcast Facilities) Regulations, 2011; "Permissible radiation level for occupational staff on-site and for the general public shall conform to all existing standards, regulations and the permissible limits approved for telecommunications and broadcasting facilities by the World Health Organisation (WHO) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and any amendments thereof" (Olorufemi, 2016).

Table 1: Dichotomies for Misconceptions

S/No	Parameter	Dichotomies for Misconceptions	Observations
1	Base station set back	NESREA Act (2010): 5-10m Factories Act (1987): 10m	When the height of a tower can be 30m-150m
2	RF-EMF exposure levels guidelines or standards	ARPANSA: 3GHz – 300GHz ICNIRP: Up to 300GHz Fed. Min. of Environment: 940GHz	940GHz minus 300GHz =640GHz

Source: Authors Compilation (2019)

However, the Precautionary Principle should not be forgotten. Examples of these studies include: Royal Society of Canada (1999) which states that “Surveys conducted in proximity to base stations operating in Canada indicate that the public is exposed to extremely low intensity RF fields in the environment”. Stewart Report, (2000) conducted by Independent Expert Group on Mobile Phones in the U.K. (IEGMP, 2000) stated that “The balance of evidence to date suggests that exposures to RF energy below NRPB and ICNIRP guidelines do not cause adverse health effects to the general population. The Institute of Electrical & Electronics Engineers (IEEE, 2001) also stated that public exposure to RF fields near wireless base stations is far below recommended safety limits.

Consequently, wireless base stations are not considered to present a risk to the general population. The Australian Radiation Protection & Nuclear Safety Agency (ARPANSA, 2002) reported that “Radiofrequency radiation (RFR) from mobile phone towers makes only a minor contribution to the total environmental RFR that arises primarily from other communication sources (generally less than 3%). Furthermore, the exposure levels from all combined radiofrequency sources adjacent to mobile phone towers are below 1% of the maximum allowable public exposure levels.” The U.K. Advisory Group on Non-Ionizing Radiation (2003) reported that “Exposure levels from living near to mobile phone base-stations are extremely low, and the overall evidence indicates that they are unlikely to pose a risk to health”. NRPB (2004) asserted that “The widespread development in the use of mobile phones world-wide has not been accompanied by associated, clearly established increases in adverse health effects”.

Conclusion

Researchers encounter some challenges that hinder finding conclusions to their long awaited researches. These challenges also serve as a hold back for the development of policy framework and criteria for controls, implementation, performance monitoring as well as compliance evaluation by

the stakeholders in mobile telecoms health safety and environment (HSE). As also observed by Idris (2002), this is increasing apprehension and concerns by some members of the public. It is revealed that no agency has come up with detailed telecoms related occupational health and safety specific hazards or environmental aspects/ management requirements or guidelines. It is recommended that all stakeholders in the sector should move towards reconciling these discrepancies, and move towards finding synergy in the sectors' policies as this will go a long way in clearing the misconceptions.

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