# FOREWORD

Electrical and Electronic gadgets rule our lives and on use, each of them generates an ***'electro-magnetic (EM) field'***, the intensity and impact however depends largely on the gadget type and duration of use. They all operate on electricity. The high tension power transmission towers that constitute the power grid supplying electricity are seen across the country. Unlike the Mobile Tower Installation(s) which can be installed on buildings these transmission towers need a 'dedicated piece of land' for two reasons -one, the steel structure is enormously heavy and secondly they are high tension power lines running approx. 50 m to 150 m above ground level depending on the geographical terrain. The mobile phone base in India is expanding approximately 17 percent per annum, accordingly, the requirement for mobile towers will also grow with the increasing tele-density. The main reason that power transmission towers have not drawn public annoyance compared to mobile tower installations is because the latter have 'visibly encroached' into the urban landscape.

The reason for publishing this Newsletter are several; however the main reason being the unabated public complaints & RTIs queries on Mobile Tower Installations and the associated health problems. The present Newsletter embodies pertinent informations on the guidelines laid down by institutions both in India and abroad. Most of the regulatory bodies have addressed the subject in their consent regime wherein there are norms stipulated for installation of diesel generator (DG) sets as a power source. Shifting to gas operated gen-sets may be an enviro-friendly option that needs to be explored in the near future.

Most countries and organizations like World Health Organization (WHO) and the International Tele-communications Union (ITU) recognize RF exposure limits based on guidelines laid down by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). There is yet no conclusive scientific evidence which pinpoints that mobile tower installations are harmful or cause health problems. However, extensive use of mobile phones may cause health problems like loss of hearing, annoyance and sometimes mental fatigue too.

Foreseeing the demand for information on the subject of 'Mobile Tower Installations & its impact on Environment' it is being placed in the website www.cpcb.nic.in to share it with the general public and also to seek any further suggestions too.

Wishing our readers a **Happy New Year 2011.**

**Prof. S P Gautam**
**Chairman**

December, 2010

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IV Department of Telecommunications Ministry of Communication & IT

V Municipal Corporation of Delhi

VI Department of Health & Family Welfare, Govt. of NCT, Delhi

VII Maharashtra Pollution Control Board

VIII Department of IT, Himachal Pradesh

IX Department of Environment, West Bengal

X Karnataka Pollution Control Board

XI Tripura Pollution Control Board

XII Assam Pollution Control Board

XIII Kerala Pollution Control Board


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**a clean parivesh for all is our goal**

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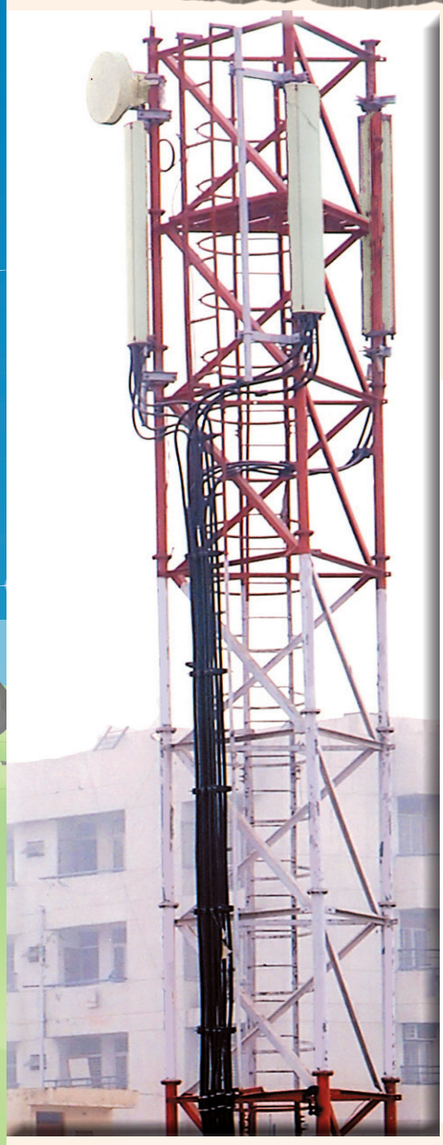
# PARIVESH

## NEWSLETTER

*DECEMBER, 2010*



# MOBILE TOWER INSTALLATIONS IN INDIA & ITS IMPACT ON ENVIRONMENT

...inside


- Introduction
- Principle of Mobile Technology
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**Central Pollution Control Board**

**Ministry of Environment & Forests**

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## 1. INTRODUCTION

The tremendous increase in number of mobile phone subscribers in the last decade has raised concern over increase in mobile tower installations across the country & its possible health impacts on the environment. According to a survey report of 30th September 2010 conducted by Telecom Regulatory Authority of India (TRAI), there are approximately 68.771 crores of wireless subscribers across our nation. The number of mobile towers in India was 3.75 lakhs in 2009 and is projected to rise to 4.25 lakhs in 2010 [1]. (Figure 1).

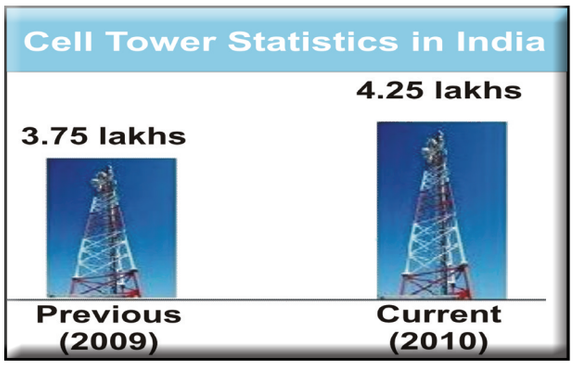
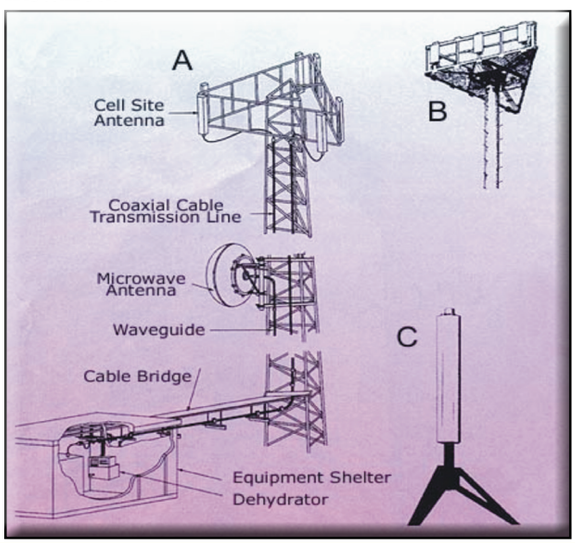



*Figure 1. Mobile Tower Statistics in India*

A typical mobile tower structure is made of iron and steel, which is very heavy and may be dangerous.

A Mobile Tower base station 'antenna' is typically about 20-30 cm in width and a metre in length, mounted on buildings or towers at a height of 15 to 50 metres above ground [2]. However, there are many different designs of mobile towers antennas that vary widely in their power, their characteristics and their potential for exposing people to Radio Frequency (RF) radiation. It is critical to be aware that the antennas of the base stations are the objects that produce RF radiation, and not the towers or masts which are the structures on which the antennas are installed.




***Box No. 1 - 65 ft-high cell tower snaps in squall in Yamuna Sports Complex – a venue in the recent Commonwealth Games 2010.***

TOWERING CONCERN: Yamuna Sports Complex was a venue during the recently-held Games

A sudden squall 23rd October 2010 evening caused a 65-feet cellular tower inside Yamuna Sports Complex in East Delhi to snap into two just like a frail matchstick. The incident, which could have had tragic consequences, left locals stunned. The complex had hosted table tennis and archery events in the recently-concluded Commonwealth Games 2010. The cellular tower, located near Gate number 3 of the sports complex broke halfway from the base around 6 pm. Fortunately there was no tragedy (Source: Times of India, dated 24.10.2010).

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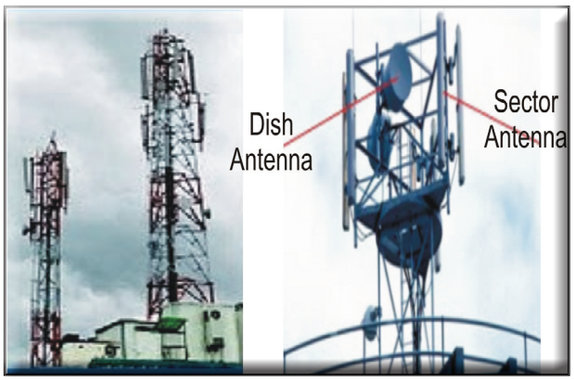


*Figure 2. A Typical site configuration of cell-based wireless systems.*

***A) A typical space diversity base station antenna site with duplexed transmit antenna. B) A typical space diversity antenna configuration with separate transmit and receive uses three antennas. This platform is installed on a monopole tower, which is often more acceptable to planners in densely populated areas than the standard tower. C) Newer configuration that uses polarization diversity antennas mounted on a tripod rooftop pedestal. These antennas can also be mounted on monopoles as shown in B. The units shown in B and C can also have a microwave point-to-point antenna as illustrated on the tower in A.***

An outdoor base station typically transmits power in the range of a few watt (W) to 100 W or more. However, when compared with the output from a FM radio transmitter (2000 W) or TV transmitter (40000 W), the base station power outputs are significantly lower. The output power of indoor base stations is even lower and similar to that of a mobile phone.

## 2. PRINCIPLE OF MOBILE TECHNOLOGY

The 'Mobile Technology' works on the principle of a two way radio bases on the radio wave technology.

Both the mobile phone handsets as well as the mobile tower antennas emit radio frequency (RF) radiation. Mobile phones communicate by radio signals passing to and from an antenna mounted on the phone and antennas connected to the base station. The radio link from the phone to the base station is known as the 'uplink' and carries the speech from the mobile phone user. A separate radio link from the base station to the phone is known as the 'downlink' and this carries the speech from the person to whom the mobile phone user is listening[3]. This principle is illustrated in Figure 3.

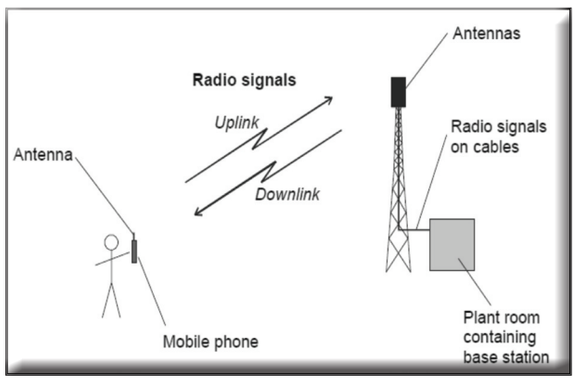


**Figure 3: Illustration of Mobile Technology**

## 3. TYPES OF MOBILE TOWER ANTENNAS

There are primarily two types of mobile tower antennas:-

i). One, that is popularly known as the 'stick/pencil antenna', and

ii). A larger antenna, commonly known as a 'Base station antenna or hub antenna'.

The stick or pencil antennas cover a limited range whereas the hub or base station antennas receive and send frequency waves to and from all the stick/pencil antennas in a given area, i.e. a given geographical area will





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be covered by one hub/base station antenna, which serves several stick/pencil antennas.

The radio frequency signal emitted by a cellular phone is picked up by the nearest stick/pencil antenna, which in turn transmits that signal to the nearest hub or another stick antenna and from that Hub to another stick antenna closest to the receiving cellular mobile phone handset.

## Box No. 2 - ELECTRO-MAGNETIC RADIATION

Most Electro Magnetic Field (EMF) exposures come from increased use of electronic equipments, electricity, and new found communication technologies. The radio-frequency waves emanating from an electro-magnetic source constitute 'electro-magnetic (EM)' or 'radio-frequency (RF)' radiation. X-rays, RF radiation and "EMF" from power lines are all part of the electromagnetic spectrum, and the parts of the spectrum are characterized by their frequency measured in Hertz (Hz). At extremely high frequencies such as that of X-rays, electromagnetic particles have sufficient energy to break chemical bonds (ionization). At lower frequencies, such as RF radiation, the energy of the particles is much too low to break chemical bonds. Thus, RF radiation is "non-ionizing". Common sources of RF fields include: monitors and video display units (3 - 30 kHz), AM radio (30 kHz - 3 MHz), industrial induction heaters (0.3 - 3 MHz), RF heat sealers, medical diathermy (3 - 30 MHz), FM radio (30 - 300 MHz), mobile telephones, television broadcast, microwave ovens, medical diathermy (0.3 - 3 GHz), radar, satellite links, microwave communications (3 -30 GHz) and the sun (3 -300 GHz). Different forms of electromagnetic energy in the entire spectrum of EM radiation with the range of frequencies, their energies, effects and sources are shown in Figure 4a & 4b.

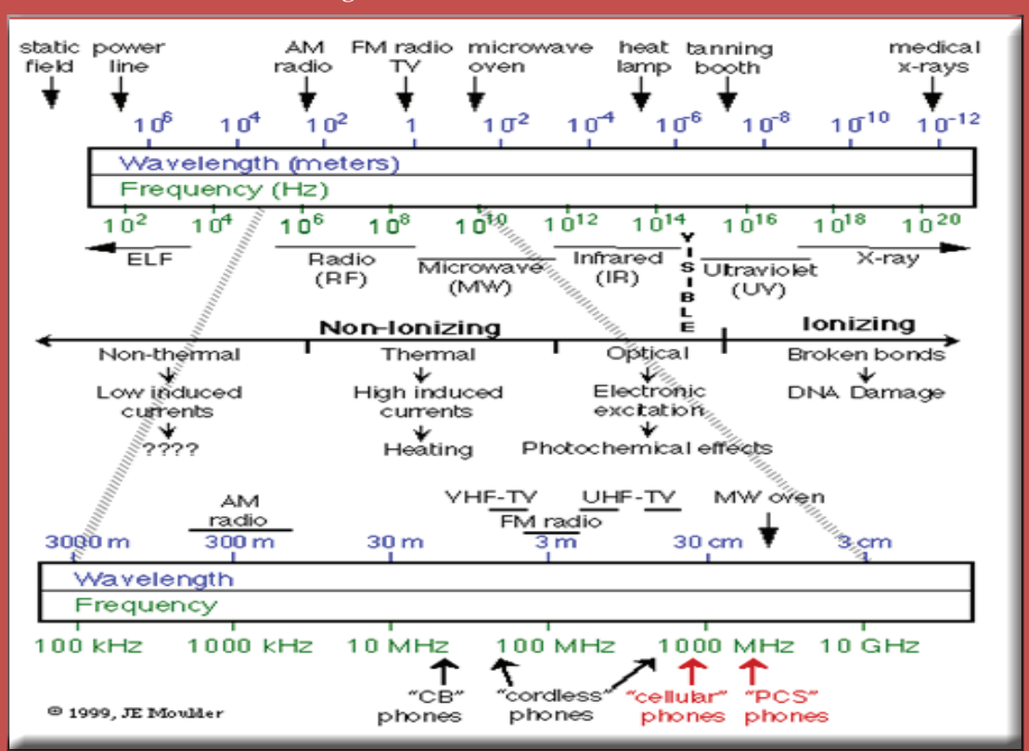


*Figure 4a. Electromagnetic Radiation – Frequency Range, Energies, Sources & Effects*

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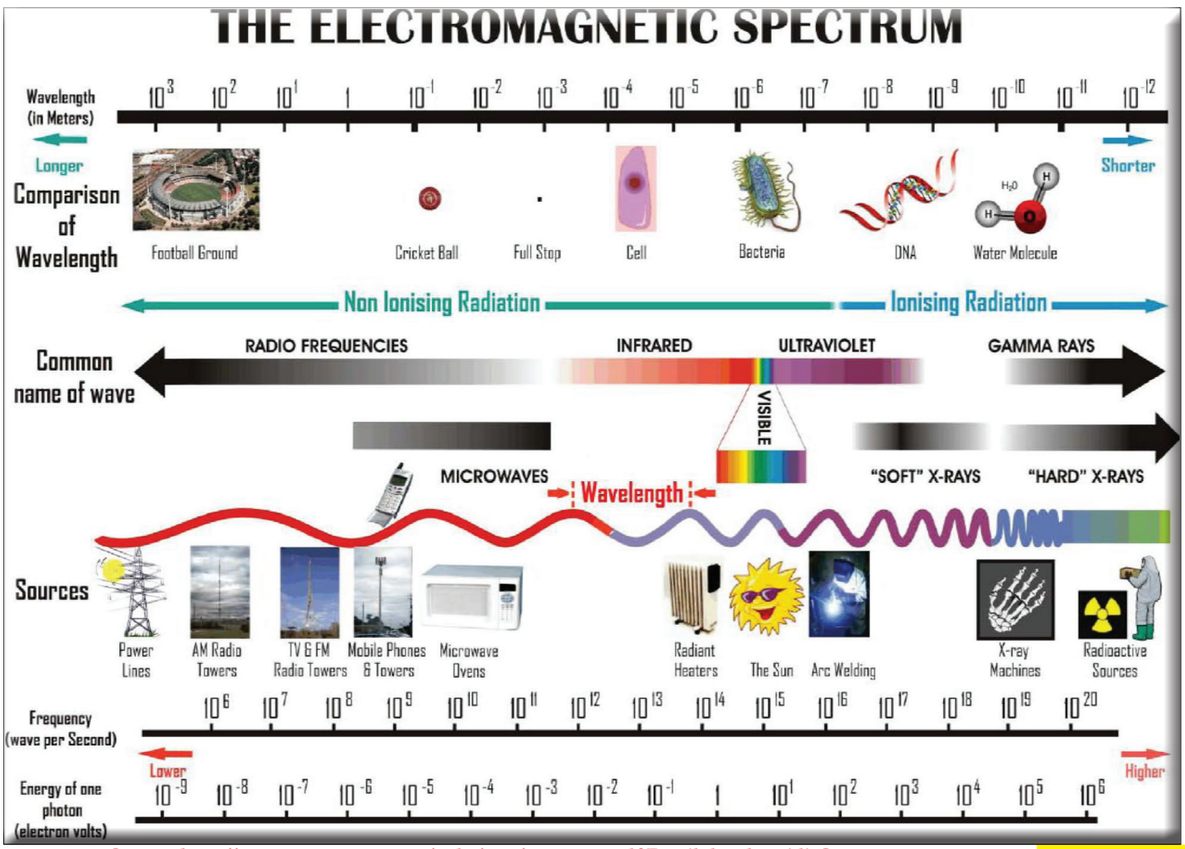
In a practical sense, several types of antennas are used for mobile phone communications; e.g., panel-shaped sector antenna or pole-shaped omni-directional antenna, dish antenna etc.

## 4. MACRO, MICRO & PICO CELLS

Mobile tower base stations communicate with mobile phones within a defined area or 'cell'. There can be three types of cells: have higher level of EM (electro-magnetic) radiation comparatively.

- Micro cells are used to infill and improve the main network, especially where the volume of traffic (calls) is high. These are good for public places such as airports, railway stations and shopping malls. Their number is rapidly increasing in line with the growth in demand for mobile phones. Micro




*Source: http://www.arpansa.gov.au/pubs/emr/spectrum.pdf Email: ken.karpidis@arpansa.gov.au*

***Figure 4b. Electromagnetic Radiation Spectrum***

Macro, micro and pico cells - depending upon their size and the radiation power from the antenna.

- Macro cells provide the main structure for the base stations network with power outputs of tens of watts to communicate with cell phones upto about 35 km. These would cell base stations emit less power (typically 5 W) and their range is a few hundred metres (typically 300 metres). The EM radiation levels are expected to be much lower than the specified threshold.





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- Pico cells provide more localized coverage than micro cells. These are normally found inside buildings where coverage is poor or where there are a large number of users, such as airport terminals, train stations or shopping centres. They have lower power output than micro cells (typically 2 watts). The EM radiation levels are supposed to be even lower than in micro cells.

## 5. BEAM SHAPES AND DIRECTIONS

The beams from the antennas spread out with distance and tend to reach ground level

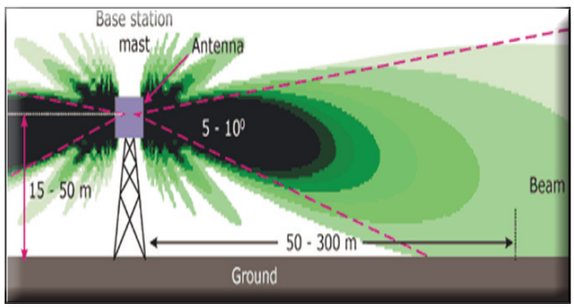
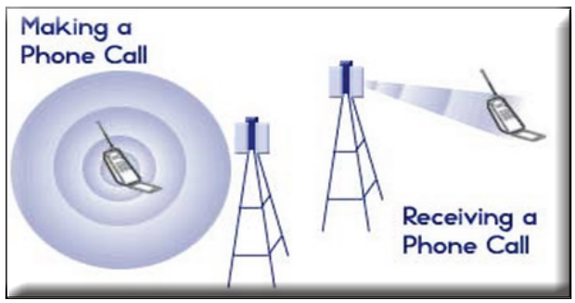


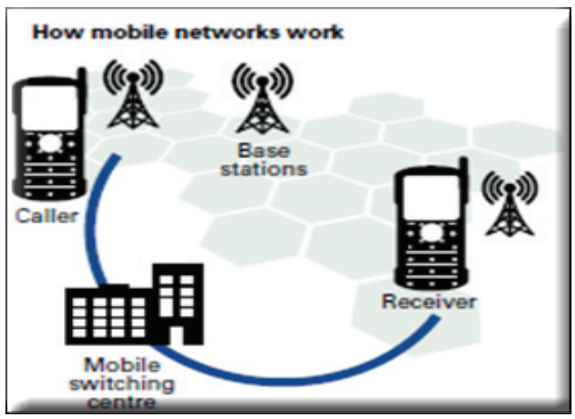

*Figure : 5 Typical Mobile Tower antenna beam structure*

at distances in the range 50-300 m from the antennas. These antennas emit RF beams that are typically very narrow in the vertical direction but quite broad in the horizontal direction. Because of the narrow vertical spread of the beam, the RF field intensity at the ground directly below the antenna is low. The RF field intensity increases slightly as one moves away from the base station and then decreases at greater distances from the antenna.

Typically within 2-5 metres of the antenna mounted on rooftops, fences keep people away from places where the RF fields exceed exposure limits. The structure of a typical mobile tower antenna beam is shown in Figure 5.

Since most antennas direct their power outwards (example sector antenna) and do not radiate significant amounts of energy from their back surfaces or towards the top or bottom of the antenna, the levels of RF energy inside or to the sides of the building




are normally very low. Whereas mobile phones on the other hand have antennas that are almost equally effective in all directions to ensure signal reception, regardless of the phone's position. Therefore, when antennas are mounted on buildings, the exposures in rooms directly below the antennas are lower than in the areas in front of the antenna.

In general, the power levels at distance D can be calculated easily using equation below;

$$P_D = PG_i/4\Pi D^2 \qquad Watt/m^2$$



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Whereas; $P_D$ is Power Density at a distance D; P is Power; $G_i$ is absolute antenna gain, if power fed into the antenna and antenna gain are known. The power from antenna of a micro-cellular base station is radiated in conical fan-shaped beams directed towards the horizon with a slight downward tilt The maximum power radiated from a sector antenna in any direction usually does not exceed 50 Watts [4]. General information on the Electro-magnetic radiation is given in Box No 2 and also depicted in Figure 4a & 4b.

## 6. HEALTH IMPACTS

In specific reference to biologic radiation exposures, Electro Magnetic radiation (range : 300 Hz-300 GHz) is divided into two types:- Ionizing and Non-ionizing (Refer Figure 4a). Because, the human body is composed of about 60 percent water, ionizing and non-ionizing radiations refer to whether the RF

energy is high enough to break chemical bonds of water (ionizing) or not (non-ionizing). Technically, ionizing radiation is the amount of energy that can remove an electron from a water molecule (1.216 kilojoules/mol), and non-ionising radiation is anything less than that amount. Ionizing radiation includes alpha particle radiation, beta particle radiation, neutrons, gamma rays and X-rays.

Examples of non-ionising radiation are sound waves, visible light, Radio Frequency and microwaves. The Radio Frequency spectrum covers the range of about 3 kHz to 300 GHz [4], note that mobile phone frequencies are in the range of 300 MHz to 3000 MHz of RF spectrum. Non-ionizing radiation is considered to be harmless below the levels that cause heating. Higher levels of non-ionising radiation are dangerous in direct exposure, although the degree of danger is uncertain (Refer Fig. 4a & 4b). Non-ionizing radiation effects could be :

- **Thermal Effect** - Thermal effect refers to the heat that is generated due to absorption of microwave radiation which causes cellular and physiological changes. Non-ionizing radiation be responsible for genetic defects, effects on reproduction and development, central nervous system behavior, endocrine systems and can lead to diseases such as Cancer, Alzheimer's, etc.

- **Non-Thermal Effect** – Non-thermal effects are caused by radio frequency fields at levels too low to produce significant heating and are due to a movement of calcium and other ions across cell membranes. They have been shown to be responsible for fatigue, irritability, headaches, nausea, loss of appetite, sleep disturbance/ disruption and other psychological disorders, memory loss, difficulties in concentration and chronic exposure is associated with dermatological problems (skin allergies, eczema, psoriasis) changes in blood chemistry, disruption of electroencephalograms and reproduction, effects on sense organs and tumors-malignant or otherwise.

Research is going on to study the non-





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thermal effects of radiation, and it has been associated with affecting the cell membrane permeability. The current exposure safety standards are purely based on the thermal effect while ignoring the non-thermal effects of radiation [1]. 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 can cause adverse health effects. Exposure standards are actually based on the level of exposure of human i.e Specific Absorption Rate (SAR) causing biological/ health effects. The rate at which RF energy is actually absorbed in the human body is called the specific absorption rate (SAR) – the fundamental dosimetric unit of RF power deposition. It is usually expressed in units of Watts per kilogram (W/kg) or milli-watts per gram (mW/gm).

The average SAR (for whole body) is defined as total energy transferred to the whole body per unit time divided by total body mass in MKS units as :

$$SAR = \sigma E_{in}^{2} / \rho \quad Watt/kg$$

Where 'σ' is the tissue conductivity (Siemens/m), '$E_{in}$' is root mean square (RMS) value of the internal electric field intensity (V/m) and 'ρ' is the tissue density ($kg/m^3$).

In a biological body, SAR depends on several exposure parameters vis-à-vis, frequency, intensity and polarization of EM radiation and also on shape, size and electrical properties of the body. It is not readily measurable in living people. Usually, only research laboratories make SAR measurements because these are relatively difficult and require specialized equipment and conditions [5].

## 7. NATIONAL SAFETY NORMS FOR AIR/NOISE POLLUTION

Some Pollution Control Boards, Department of Health & Family Welfare and Department of Environment of some states example West Bengal, Tripura, Assam, Delhi, Himachal Pradesh, Maharashtra, and Kerala have prescribed guidelines for safe installation of Mobile Phone Towers and safety exposure limits for Electromagnetic (EM) Radiation from the mobile tower antenna (refer annexure IV-XIII). CPCB has prescribed air pollution norms and noise limits for diesel generator (DG) sets which are also used as power source in mobile towers, refer to Annexure III (A-E).

All the mobile tower installations need to be covered under the purview of consent mechanism based on the reasoning that all activities involved in any industrial or trade purposes and emitting any pollutants into the air, cannot be established or operated without the prior consent of the State Pollution Control Board / Committee – as per Section 21(1) of Air Act, 1981. Mobile Tower is governed as a trade activity due to power generator sets that emit air pollutants and noise.

**Box No. 3**

During 54th Conference of Chairmen & Member Secretaries of Pollution Control Boards/Committees held in 2008, it was discussed that mobile tower operators shall make efforts to replace the existing Diesel Generator sets with the cleaner technologies i.e power generators operated be either gas based or solar operated or be .invertors

Noise from DG set is controlled by providing an acoustic enclosure at the users end. The



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acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB(A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side. The DG sets to be provided with proper exhaust muffler. These limits shall be regulated by the State Pollution Control Boards (SPCBs) and the State Pollution Control Committees (PCCs).

## 8. INTERNATIONAL EXPOSURE SAFETY STANDARDS – AN OVERVIEW

Based on the scientific consensus, different agencies and countries took different approaches to set up safety standards. The most widely accepted standards are those developed by the Institute of Electrical and Electronics Engineers and American National Standards Institute (IEEE/ANSI), the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the U.S. National Council on Radiation Protection and Measurements (NCRP).

A typical approach was used by ANSI/ IEEE and the FCC (Federal Communication Commission) of USA. The following is a brief summary of the wireless safety standards as exposure limits;

***1966:*** The American National Standards Institute (ANSI) C95.1, adopted the standard of 10mW/cm$^2$ (10,000 µW/cm$^2$) based on thermal effects.
***1982:*** The Institute of Electrical and Electronics Engineers (IEEE) recommended further lowering this limit to 1mW/cm$^2$ (1,000 µW/cm$^2$) for certain frequencies in 1982, which became a standard ten years later in 1992.
***1986:*** The U.S. National Council on Radiation Protection and Measurements (NCRP) recommended the exposure limit of 580 µW/cm$^2$.
***1992:*** The ANSI/IEEE C95.1-1992 standard based on thermal effects used 1mW/ cm$^2$ (1,000 µW/cm$^2$) safety limit. The US Environmental Protection Agency (EPA) called for the FCC to adopt the 1986 NCRP standard which was five times stricter.

***1996:*** The US Federal Communication Commission (FCC) updated to the standard of 580 µW/cm$^2$ over any 30-minute period for the 869 MHz, while still using 1mW/cm$^2$ (1,000µW/cm$^2$) for Personal Communications Service (PCS) frequencies (1850-1990 MHz).
***1998:*** The ICNIRP standard uses the limit of 450 µW/cm$^2$.

## 9. EXISTING INTERNATIONAL STANDARDS FOR ASSURING COMPLIANCE

There are two types of standards that are applicable to base stations: the first is the *exposure standards* that specify the RF exposure limits for the general public and occupational users or workers. The second types of standards are the *compliance assessment standards*, which are used to assess and demonstrate that a particular piece of base station equipment, or a base station site, is compliant with the exposure standards.

**Exposure Standards** set safety limits for the public and workers that are intended to provide protection against all established health hazards. They usually provide basic restrictions, the maximum allowable RF energy deposited in the body, and reference levels, external field levels that are more easily measured for compliance purposes. The measure of absorbed radio frequency energy is Specific Absorption Rate (SAR) in units of watts per kilogram (W/ kg).

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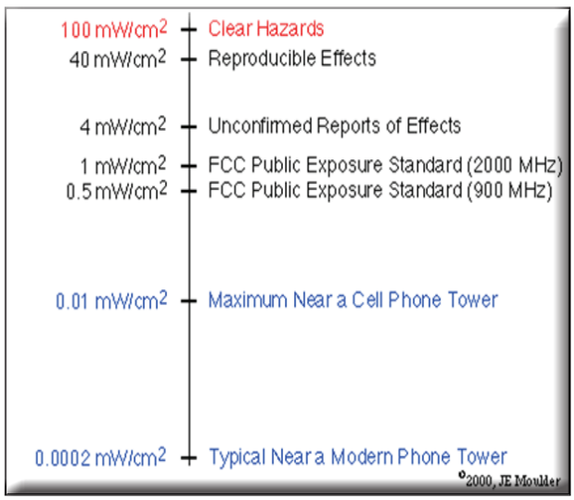
**Compliance assessment Standards** describe the procedures used to ensure that mobile phones and networks comply with the exposure standards.

In order to verify that the RF exposure from radio base stations is below prescribed limits standardized test protocols are used. Such standards have been developed or are under development by the International Electro technical Commission (IEC), the International Telecommunications Union (ITU), European Committee for Electro technical Standardization (CENELEC) and the Institute of Electrical and Electronics Engineers (IEEE).




**Note: mW/m² – milli Watt/metre²*

**Figure 6: Comparision of RF Levels and FCC Standards of USA**

• In Figure 6, a comparison of the RF levels hazardous to human health, Exposure levels specified in the FCC safety guidelines, and the RF levels found around mobile phone base stations is shown.

• The limits for maximum permissible exposure as specified by Federal Communications Commission (FCC), US [6] is as below in Table 1;

*Table 1: Limits for Maximum Permissible Exposure*

(A) Limits for Occupational/Controlled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) mW/cm² | Averaging Time \|E\|², \|H\|² or S (Minutes) |
|---|---|---|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | (900/f²)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | - | - | f/300 | 6 |
| 1500-100,000 | - | - | 5 | 6 |

(B) Limits for General Population/ Unicontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm²) | Averaging Time (\|E\|², \|H\|² or S (Minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f²)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | - | - | f/1500 | 30 |
| 1500-100,000 | - | - | 1.0 | 30 |

*f= frequency in MHz *Plane-wave equivalent power density.*
***Source:*** *Federal Communications Commission FCC,US 2007*

• The exposure characteristics for occupational and general public have been specified as per International Council for Non-ionizing Radiation Protection (ICNIRP) Guidelines [7] in Table 2;



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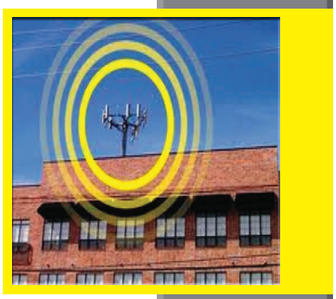
*Table 2: Basic Restrictions for time varying electric and magnetic fields for frequencies upto 10 GHz*

| Exposure Characteristic | Frequency Range | Current Density head or trunk (mA $m^{-2}$) (rms) | Whole body average SAR (W $kg^{-1}$) | Localized SAR (head and trunk) (W $kg^{-1}$) | Localized SAR (limbs W $kg^{-1}$) |
|---|---|---|---|---|---|
| Occupational Exposure | up to 1 Hz | 40 | - | - | - |
| | 1-4 Hz | 40/f | - | - | - |
| | 4Hz – 1 Khz | 10 | - | - | - |
| | 1-100 kHz | f/100 | - | - | - |
| | 100 kHz–10 MHz | f/100 | 0.4 | 10 | 20 |
| | 10 MHz-10 GHz | - | 0.4 | 10 | 20 |
| General Public exposure | up to 1 Hz | 8 | - | - | - |
| | 1-4 Hz | 8/f | - | - | - |
| | 4Hz – 1 Khz | 2 | - | - | - |
| | 1-100 kHz | f/500 | - | - | - |
| | 100 kHz–10 MHz | f/500 | 0.08 | 2 | 4 |
| | 10 MHz-10 GHz | - | 0.08 | 2 | 4 |

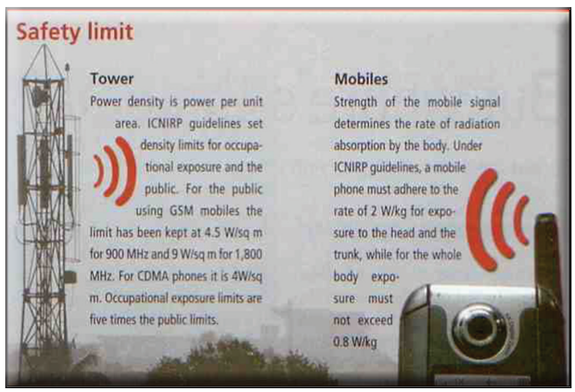
*Source: International Council for Non-Ionizing Radiation Protection (ICNIRP), 1998 Guidelines*

Wheras;

- f is the frequency in hertz
- Because of electrical inhomogenity of the body current densities should be averaged over a cross section of 1 $cm^2$ perpendicular to the current direction.
- For frequencies upto 100 kHz peak current density values can be obtained by multiplying the rms value by (~1.414). For pulses of duration $f^2$ the equivalent frequency to apply in the basic restrictions should be calculated as $f=1/(2t_p)$.
- For frequencies up to 100 kHz and for pulse magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.



- All SAR values are to be averaged over any 6-min period.




*Exposure Limit/Safety Limit for Mobile Tower and Mobile Handsets Source: Down to Earth, 2009[8]*

- Localized SAR averaging mass is any 10 g of contiguous tissue, the maximum SAR so obtained should be the value used for the estimation of exposure.

- For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated by $f=1/(2t_p)$. Additionally for pulsed exposures in the frequency range 0.3 to 10 GHz and for localized exposure of the head in order to limit or avoid auditory effects caused by thermo elastic





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expansion an additional basic restriction is recommended. This is that the SA should not exceed 10 mJ $kg^{-1}$ for workers and 2mJ $kg^{-1}$ for the general public averaged over 10 g tissues.

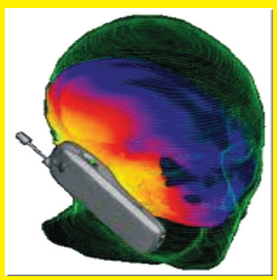
- Similar norms prescribed by IEEE is given at Table No. 3

*Table 3: Maximum Permissible Exposures (MPEs) for controlled RF Environments*

| Frequency range (MHz) | RMS electric field strength (Ea)[a] (V/m) | RMS magnetic field strength (H)[a] (A/m) | RMS power density (S) E-field, H-field ($W/m^2$) | Averaging time $\|E\|^2$ $\|H\|^2$ or S (min) |
|---|---|---|---|---|
| 0.1-1.0 | 1842 | $16.3/f_M$ | $(9000, 100000/f_M^2)^b$ | 6 |
| 1.0-30 | $1842/f_M$ | $16.3/f_M$ | $(9000/f_M^2, 100000/f_M^2)^b$ | 6 |
| 30-100 | 61.4 | $16.3/f_M$ | $(10, 100000/f_M^2)^b$ | 6 |
| 100-300 | 61.4 | 0.163 | 10 | 6 |
| 300-3000 | - | - | $f_M/30$ | 6 |
| 3000-30000 | - | - | 100 | $19.63/f_G^{1.079}$ |
| 30000-300000 | - | - | 100 | $2.524/f_G^{0.476}$ |

**Note- $f_M$ is the frequency in MHz $f_G$ is the frequency in GHz. The above table is numbered the same as the originals in Section 4 of IEEE std C95. 1 – 2005. Source: IEEE Standards*

a. For exposures that are uniform over the dimensions of the body such as certain far-field plane wave exposures, the exposure field strengths and power densities are compared with the MPEs in the Table. For non-uniform exposures the mean value of the exposure fields as obtained by spatially averaging the squares of the fields strengths or averaging the power densities over an area equivalent to the vertical cross section of the human body (projected area) or a smaller area depending on the frequency (see 'Notes to table below), are compared with the MPEs in the table.



b. These plane-wave equivalent power density values are commonly used as a convenient comparison with MPEs at higher frequencies and are displayed on some instruments in use.

- A consolidated list of safe public exposure standards prescribed for RF radiation from cellular phone base station antennas by various countries are presented in Table 4.

*Table 4. International Standards by various countries for public exposure to RF radiation*

| Country | Standards (in $mW/cm^2$) |
|---|---|
| India | 0.45 at 900 MHz<br>0.9 at 1800 MHz<br>1 at f> 2000 MHz<br>(as per ICNIRP recommendation 1998) |
| Austria | 0.0001 at 900MHz & 1800 MHz |
| Australia | 0.20 |
| Poland | 0.01 at 900 MHz & 1800 MHz |
| Germany | 0.45 at 900 MHz as per ICNIRP recommendation 1998 |
| Canada, Greece | 1.20 – for base station antennas<br>0.57 – for analog cellular phones<br>0.3 at 900 MHz & 1800 MHz (Safety Code 6, 1997) |
| Italy | 0.10 – for exposure less than 4 hrs/day<br>0.01 – for exposure more than 4 hrs/day<br>0.016 at 900 MHz & 1800 MHz |
| Belgium | 0.016 at 900 MHz & 1800 MHz |
| New Zealand | 0.2 at 900 MHz & 1800 MHz |
| Switzerland | 0.0042 – for transmitters above 6W, 900 MHz<br>0.00045 at 900 MHz<br>0.009 at 1800 MHz<br>(ECOLOG recommendation 1998 (Germany)<br>0.0095 – for transmitters above 6W, 1800 MHz |
| United Kingdom | 0.40 at 800 MHz<br>0.90 at 2000 MHz |
| USA | 0.57 at 900 MHz<br>1.00 at 1800-2000 MHz |
| Russia | at 300 MHz – 300 GHz<br>0.002 at 900 MHz & 1800 MHz |
| CSSR | 0.024 at 900 MHz & 1800 MHz |



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**Note- Not all standards throughout the world have the same recommended exposure limits; some are more stringent than others. The variation between recommended limits may be attributed to differences in the philosophy, the methodology and the interpretation of scientific data used for standard development. *f – Frequency in Hertz (Hz)*

Most countries around the world require or recognize RF exposure limits based on guidelines established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Both the World Health Organization (WHO) and the International Telecommunications Union (ITU) [9] recommend the adoption of ICNIRP guidelines as national exposure standards.

## 10. ELECTRO MAGNETIC RADIATION COMPLIANCE LEVELS

Regulatory agencies of several countries have undertaken programs to measure a sample of operating base stations to confirm compliance with the exposure limits. Results from these measurement campaigns consistently show that typical RF exposure levels from base stations, in public areas, are hundreds to thousands of times below the ICNIRP limits.

According to the World Health Organization (WHO): 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 [2].

The National Council on Radiation Protection and Measurements (NCRP), USA, the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection (ICNIRP) have adopted a whole-body SAR value of 4 watts per kilogram (4W/kg) as a threshold level of exposure. Exposure threshold limits in terms of field strength and power density are then derived from this value. Under the circumstances, it is more practical and convenient to measure related radiated power density or E field or H field (averaged over a stipulated period for workers and general public) in the far-field region of interest at a cell site to ensure compliance with stipulated levels (rather than measuring SAR). Here ' workers ' refer to maintenance and installation staff.

The reference levels recommended by ICNIRP have been adopted by India and several other countries. Guidelines based on ICNIRP-specified levels have been issued by the Ministry of Communications & IT for compliance by service providers based on the recommendations of Telecom regulatory Authority of India (TRAI). Relevant test and measurement procedures of EMR have been issued by the Telecommunications Engineering Centre (TEC) [10].

## 11. TYPICAL COMPLIANCE DISTANCES FOR DIFFERENT BASE STATION ANTENNA TYPES

Table 5 below shows types of antennas commonly found at base station or antenna sites. A photo is given of each antenna as well as a sketch indicating the shape of the compliance boundary. The typical compliance boundaries given are valid for ICNIRP exposure limits.

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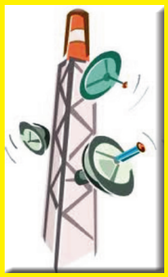

*Table 5. Base Station Antenna Types and its Compliance distances*

| | | |
|---|---|---|
| A. | **Omni-directional antenna**<br>Radiates RF energy equally in all horizontal direction. Output power is typically 10-80 watts, and the typical compliance boundary for the public is 0.5 – 2 meters from the antenna. | |
| B. | **Sector antenna**<br>Restricts most of its radiated RF energy to a narrow angular sector in the forward direction. Antenna output power is typically 10 – 80 watts, and the compliance boundary for the public may then extend 1-8 meters from the front face of the antenna. | |
| C. | **Antenna farms (or clusters)**<br>Antennas are often grouped together on masts. The combination illustrated here is that of an omni-directional antenna mounted above a cluster of three sector antennas. The compliance distance may be larger than for the individual antennas. | |
| D. | **Radio relay antenna (or fixed point-to-point link)**<br>Concentrates its RF energy into a narrow beam in the forward direction. Power levels are typically low, less than 1 watt, and safety distances a couple of centimeters. The parabolic dish antenna is one example. | |
| E. | **Micro cell antenna**<br>Typically a small sector antenna with output power of a few watts for providing coverage over short distances (typically 300-1000 meters). It is often mounted on an existing building, where it can be disguised as building features. The compliance boundary has the same shape as for a sector antenna. | |
| F | **Indoor antenna**<br>Also sometimes termed picocells and provide localized coverage inside buildings where coverage is poor or where there are a high number of users such as airport terminals, train stations or shopping centres. The power level is similar to that of a mobile phone. The compliance boundary is located within a few centimeters of the antenna. | |

*Source: Mobile Manufacturers Forum, Belgium, MMF 2010*

*Surface area in blue : Compliance boundry

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## 12. MOBILE TOWER RELATED ISSUES IN DAILY NEWSPAPERS

### BUSINESS LINE 3rd Aug 2010

# Ban coming on imported mobiles with high radiation levels

**Arun S.**
**Thomas K. Thomas**
*New Delhi, Aug. 2*

In a blow to unbranded mobile handsets being sold in the market, the Directorate-General of Foreign Trade (DGFT) will shortly issue new rules in effect banning import of phones that emit radiation higher than what is permitted under the Specific Absorption Rates (SAR) standards.

SAR shows the amount of radio waves absorbed by the body while using a mobile phone.

The Department of Telecommunication (DoT) has finalised radiation protection norms for mobile handsets and sent them to the Commerce Ministry for notification, official sources said. Currently, a large number of unbranded handsets from China and Taiwan, which do not conform to these radiation standards, are flooding the market in the absence of import norms.

The SAR adopted by the Government is based on the guidelines set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). SAR is measured in watts per kilogram (W/kg) and the higher the SAR rating, the more the radiation absorbed.

ICNIRP has stipulated that manufacturers must ensure that the SAR level of a cell phone does not exceed 2W/kg. These guidelines are followed globally by a number of countries including the US, France and the UK in a bid to limit radiation exposure to consumers.

All branded mobile handset makers, including Nokia and Samsung, adhere to the global norms but there is no check on handsets sold in the grey market. Once the DGFT issues the notice, the Customs authorities will ensure that all mobile handsets being imported into India have certification from manufacturers that they meet these standards.

This is the second major setback for handsets sold in the grey market after the Government earlier banned devices without proper International Mobile Equipment Identity (IMEI) number.

### HINDUSTAN 6th Aug 2010

# टावरों की रेडिएशन सीमा तय होगी

दस अगस्त को संचार मंत्रालय ने विभिन्न महकमों की उच्च स्तरीय बैठक बुलाई

चंदन जौड़ा
नई दिल्ली

केंद्र सरकार ने मोबाइल टावरों द्वारा फैलाए जा रहे रेडिएशन पर शिकंजा कसने की तैयारी शुरू कर दी है। टावरों से उत्सर्जित होने वाले रेडिएशन की सीमा तय करने तथा टावरों की स्थापना के नियम-कायदे बनाने के लिए 10 अगस्त को संचार मंत्रालय ने विभिन्न महकमों की उच्च स्तरीय बैठक बुलाई है। संचार राज्यमंत्री सचिन पायलट ने कहा, चूंकि देश में मोबाइल ऑपरेटरों की संख्या ज्यादा है, इसलिए टावरों से ज्यादा रेडिएशन हो रहा है। इसलिए सभी टावरों द्वारा पैदा होने वाले रेडिएशन को ध्यान में रखकर नियम-कायदे तय किए जाएंगे। मंत्रालय के अनुसार, देश में चार लाख से अधिक मोबाइल टावर हैं।

देश में सेलफोन ऑपरेटरों की संख्या ज्यादा है, इसलिए सभी कंपनियों के टावरों से उत्सर्जित होने वाले रेडिएशन को जोड़कर तय होगी रेडिएशन सीमा।

सचिन पायलट (संचार राज्य मंत्री)

जिस प्रकार मोबाइल सेवाओं का विस्तार हो रहा है, इनकी संख्या बढ़ती जा रही है। एक क्षेत्र में आठ-नौ तक मोबाइल ऑपरेटर हैं।

हालांकि कंपनियां अब टावरों में हिस्सेदारी करने लगी हैं, लेकिन अभी भी टावरों की संख्या तेजी से बढ़ रही है। कोई व्यक्ति भले ही एक फोन इस्तेमाल करता हो, लेकिन वह सभी टावरों के रेडिएशन की जद में होता है।

**कितना रेडिएशन**

अन्तरराष्ट्रीय मानकों के अनुसार मानव स्वास्थ्य के लिए सामान्य 100 मिलीवॉट से ज्यादा रेडिएशन खतरनाक हो सकता है। भारत समेत कई देशों में डिफिकल एक्सपोजर 200-300 मिलीवॉट है।

### THE HINDU 10th Aug 2010

# Mobile service providers to pay fine for violations

Aarti Dhar

**Have to get base trans-receiver stations self-certified to meet rules**

**NEW DELHI:** Mobile service providers will have to pay a fine of Rs.5 lakh per mobile phone tower from November if it does not conform to internationally accepted limits of radiation, the government told the Lok Sabha on Monday.

"To avoid health hazard from radiation of mobile towers, the Department of Telecom (DoT) has issued instructions to all Access Service Providers to conform to the limits of radiation as prescribed by the International Commission on Non-ionising Radiation Protection from time to time," Minister of State for Communications Sachin Pilot told during question hour.

A meeting of officials of the Health and Environment Ministries and the Indian Council of Medical Research (ICMR) was held last week, nd another one with service viders had been planned to ensure implementation of acceptable norms.

The Health Ministry and the World Health Organisation were constantly monitoring the studies going on globally in this respect.

The Minister said the government had asked the service providers to have all the base trans-receiver stations (BTS) self-certified to meet the norms. The self-certification details had to be submitted to the respective Telecom Enforcement Resource and Monitoring (TERM) Cells of DoT by November 15.

"If a site fails to meet the Electro Magnetic Radiation criterion, a penalty of Rs.5 lakh shall be levied per BTS per service provider."

Mr. Pilot said the service providers had been instructed that all new BTS sites should start functioning only after the self-certificate was submitted to the TERM Cells.

Manish Tewari (Congress) wanted a scientific study conducted by the ICMR on the health hazards of radiation from mobile towers.

"There is a study by the World Health Organisation and it has established a clear linkage between malignant tumour and radiation. This would be the biggest public health issue in the next two decades," he said.

Mr. Pilot asked the members not to be alarmist over the matter as the government was well aware of the issue of radiation from towers and mobile handsets.

On installation of the towers, the Minister said they could be put up only after getting permission from the local bodies.

### HINDUSTAN 12th Aug 2010

# ज्यादा रेडिएशन हुआ तो जुर्माना

मोबाइल फोन टावरों के लिए उल्व्यूएचओ मानकों का पालन करना होगा जरूरी

विशेष संवाददाता
नई दिल्ली

केंद्रीय संचार मंत्रालय ने मोबाइल फोन टावरों के लिए रेडिएशन की सीमा तय कर दी है। मोबाइल टावरों से होने वाले रेडिएशन का आम लोगों में एक्सपोजर विश्व स्वास्थ्य संगठन (डब्ल्यूएचओ) के मानकों से ज्यादा नहीं होना चाहिए। इसके तहत मोबाइल टावरों के जरिये लोगों को एक वक्त में अधिकतम 300 गीगा हर्ट्ज से ज्यादा फ्रीक्वेंसी का एक्सपोजर नहीं होना चाहिए। यह सीमा क्षेत्र के सभी टावरों से उत्पन्न रेडिएशन को मिलाकर गिनी जाएगी।

संचार राज्यमंत्री सचिन पायलट के नेतृत्व में मंगलवार को एक उच्च स्तरीय बैठक में यह फैसला हुआ। मोबाइल कंपनियों से कहा गया है कि 15 नवंबर तक रेडिएशन उत्सर्जन की उपरोक्त सीमा को लागू करने के इंतजाम कर लें। इसके बाद शिकायत मिलने पर संचार मंत्रालय जांच करेगा और किसी क्षेत्र में रेडिएशन सीमा से ज्यादा है तो वहां रेडिएशन फैला रहे टावरों पर पांच लाख तक का जुर्माना ठोका जा सकता है तथा उन्हें सील भी किया जा सकता है।

संचार राज्यमंत्री सचिन पायलट ने हिन्दुस्तान से बातचीत में कहा कि सभी कंपनियों को दिशा निर्देश जारी कर दिए गए हैं। उन्हें स्वतः रेडिएशन कम करने का मौका दिया जा रहा है।

उधर, टेलीकॉम सर्विस प्रोवाइडर ऑफ इंडिया के महासचिव एससी खन्ना ने कहा कि मोबाइल ऑपरेटर मोटे तौर पर इस पर तैयार हैं, पर उनकी भी कुछ चिंताएं हैं। उन्होंने टेलीकॉम रेगुलेटरी अथॉरिटी ऑफ इंडिया (ट्राई) और टेलीकम्युनिकेशन इंजीनियरिंग सेंटर (टीईसी) से विचार-विमर्श के लिए बैठक बुलाने का आग्रह किया है।

**सख्ती**

- 15 नवंबर के बाद ज्यादा उत्सर्जन करने पर होगा पांच लाख का जुर्माना
- रेडिएशन 300 गीगाहर्ट्ज से ज्यादा नहीं होना चाहिए

### THE HINDU, 9th Aug 2010

# Stricter guidelines soon for mobile radiation

Sandeep Joshi

- High level of radiation from towers can affect lives of people living around it
- "Strict monitoring mechanism for both mobile towers and phones needed"

**NEW DELHI:** The Union government finally seems to have woken up to the health hazards related to radiation from mobile towers and handsets. The Ministry of Communications and IT is considering a high-level study to find out the level of electromagnetic frequency (EMF) radiation from towers and handsets in order to frame stricter regulations to rein in erring operators and handset manufacturers.

"It is high time we addressed the issue of radiation, as strong objections have been raised by experts and civil society over the uncontrolled spread of mobile towers and import of cheap handsets that could have serious impact on the health of people. I will soon be meeting health and telecom experts to evolve a strong monitoring mechanism for the same," Minister of State for Communications and IT Sachin Pilot told *The Hindu*.

The government was considering commissioning a detailed study on the issue by the Indian Council of Medical Research (ICMR). Indian conditions were not similar to those in the West.

Mr. Pilot said:

"We need to look at things in different perspective. While European nations have just three to five operators, in India the number of operators now stands at 15.

"Consider the massive growth of towers...we already have around 4.5-lakh towers and many more are being added to meet the demand of almost 65-crore mobile subscribers, which is growing at 1.5-crore every month, the highest in the world.

"While European nations and the U.S. have very strict monitoring mechanism for both mobile towers and phones, we are still to come out with proper regulations on the issue."

Experts say a continuous 20-minute contact between the human ear and mobile phone increases temperature of blood flowing through a user's brain, which could be dangerous, while high levels of radiation from towers can affect lives of people living around it.

Mr. Pilot said though mobile operators, their associations and mobile phone manufactures have been claiming that radiation levels in the country were under prescribed limited, independent agencies have reported gross violation of the set standards. "As prolonged exposure to electromagnetic radiation can cause serious health problems, we need to address the issue now before it becomes a menace...and it is all the more necessary keeping in mind the growth of Indian telecom industry."

Though India has so far not set any radiation exposure standards, the proposed standards by various government agencies is still many times higher than that in the U.S. and many European countries.

In the case of handsets, the West has set up strict standards for 'specific absorption rate' (SAR) -- the amount of radiation absorbed by the body while using a mobile phone. Companies manufacturing mobile phones have to disclose the SAR.

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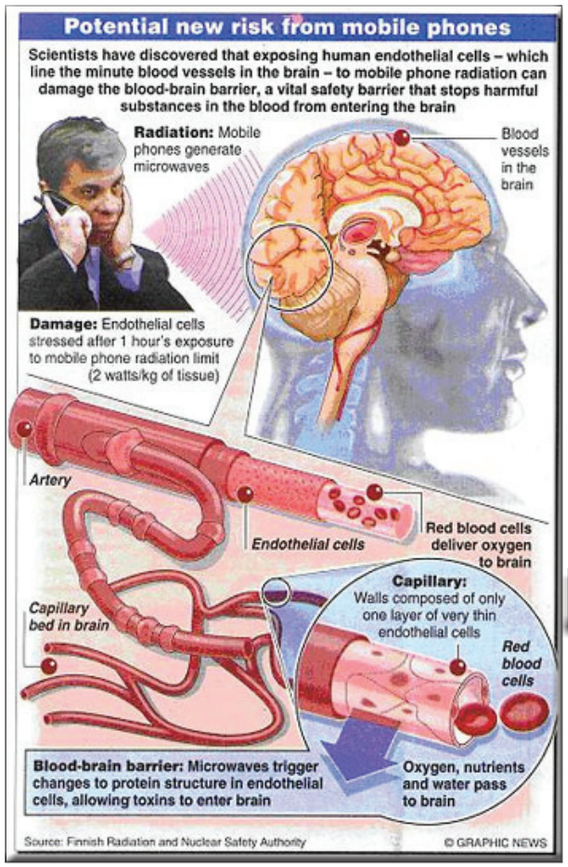
## 13. CONCLUSIONS

These reviews have finalised that for exposures to radio frequency energy up to levels below the safety limits prescribed by International Commission on Non Ionizing Radiation Protection (ICNIRP) and endorsed by WHO, there is no substantive or convincing evidence of biological effects that could harm a person's health. The results of many epidemiological studies assessing health effects due to exposure to RF radiation from base antennas of mobile tower have largely remained inconclusive.[11] It is evident that this concern on health hazards needs further research studies both nationally as well as internationally. To conclude there is yet no conclusive scientific evidence which pinpoints that mobile tower installations are harmful or cause health problems though extensive use of mobile phones do cause health problems like loss of hearing, annoyance and sometimes mental fatigue too.

Cell phone operators will soon have to seek sanction from the Wildlife Division under the Ministry of Environment & Forests before installing their communication towers. This will be in addition to the permission from the Defence and Aviation Ministries. An Expert Committee has been set up by the Hon'ble Environment Minister Shri Jairam Ramesh to study the possible impacts of communication towers on birds and bees. The Expert Committee headed the Bombay Natural History Society, has entrusted the Coimbatore-based Salim Ali Centre for Ornithology and Natural History with the task of preparing a report focusing on frequency band effects, biological disturbances, navigation and seasonal migration of birds, bees and other wild animals (Also refer Annexure II).




This newsletter was initiated due to several public complaints being received by most regulatory agencies (Refer Annexure-1A, B).

## 14. REFERENCES

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## 15. GLOSSARY

1. RADIOFREQUENCY (RF) FIELDS are part of the electromagnetic spectrum. Such fields are defined as those within the frequency range 300 Hz (or 0.3 kHz) and 300 GHz. Natural and human-made sources generate RF fields of different frequency.
2. POWER DENSITY In radio wave





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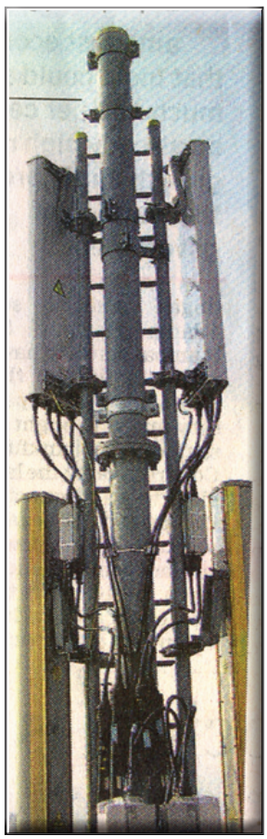
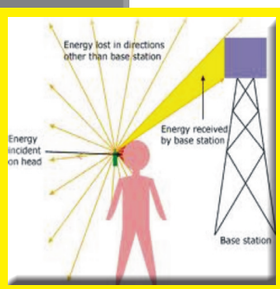
propagation, the power crossing a unit area normal to the direction of wave propagation; expressed in watt per square meter (W $m^2$). They are the basic dosimetric quantity for RF fields above 10 GHz. It is the intensity of the field measured as power density in watts per square metre (W/$m^2$) or for weak fields in milliwatts per square metre (mW/$m^2$) or microwatts per square metre (W/$m^2$). (*For adverse health effects, such as eye cataracts and skin burns, to occur from exposure to RF fields above 10 GHz, power densities above 1000 W/$m^2$ are needed. Such densities are not found in everyday life. They do exist in very close proximity to powerful radars. Current exposure standards preclude human presence in these areas.)



3. SPECIFIC ABSOPRTION RATE 'SAR' is the rate at which energy is absorbed in body tissues, in watt per kilogram (W $kg^{-1}$). It is the basic dosimetric quantity for RF fields between about 1 MHz and 10 GHz. Energy absorption from RF fields in tissues is measured as a specific absorption rate (SAR) within a given tissue mass. The unit of SAR is watts per kilogram (W/kg). (*An SAR of at least 4 W/kg is needed to produce adverse health effects in people exposed to RF fields in this frequency range. Such energies are found tens of meters away from powerful FM antennas at the top of high towers, which makes these areas inaccessible.)




4. Frequency is the number of sinusoidal cycles completed by electromagnetic waves in 1 s; usually expressed in hertz (Hz).
5. Wavelength is the distance in metres between any two 'similar' points on a radio wave. This portion of the wave is referred to as one complete cycle. The lower the frequency of a wave the longer the wavelength.
6. The World Health Organization (WHO) is the 'United Nations' specialized agency for health and as such, the leading international authority on health matters. WHO was founded in 1948.
7. International Commission on Non-Ionizing Radiation Protection (ICNIRP)–an European non-governmental organization formally recognised by WHO. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) is an independent scientific body which has produced an international set of guidelines for public exposure to radio frequency waves. These guidelines were recommended in the Stewart Report and adopted by the UK Government, replacing the National Radiological Protection Board (NRPB) guidelines.
8. FCC Federal Communications Commission (USA).
9. IEC International Electrotechnical Commission.
10. IEEE Institute of Electrical and Electronics Engineers.
11. Radio Base Station is a macrocell, microcell or picocell Station site and consists of transmitters and receivers in a cabin or cabinet connected to antennas by feeder cable.

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ANNEXURE –IA

## SAMPLE PUBLIC COMPLIANT

Recd. On 06.10.2010

To

**The Chairman**
**Central Pollution Control Board**
**Parivesh Bhawan, C.B.D. Cum**
**Office Complex**
**East Arjun Nagar, Delhi – 110032**

Sir,

I Want to draw your kind attention to the fact that different companies are leasing in land @ 50X50 Sq. ft. area for a single unit) for installing tower to increase their service network area and paying Rs. 8000 (Eight Thousand) to 11500 (Eleven Thousand and Five Hundred) as rent per month.

From the sometime past it have been noticed that several number of a family are taking the benefits of such high rent by installing tower (3 to 6) No of tower per family in the same area or in the different parts of the blocks/district). This type of work has been done in the district of Medinipur and it is being done in the district of Bankwra & Pwenlia with the help of local agents of the companies and they are taking Rs. 2.5 Lakh to 3,5 Lakh as commision money on the basis of rent rates offered by the companies.

For their personal gain the local agents are not taking into account the danger of environment pollution (2 to 3 TOWERS side by side) not only that these type of tendency is creating economic disparities in the locality. To stop this type of actions following suggestions may be consisted before essence of N.O.C.

a) Wide publicity regarding installation of tower in a particular area as well as rent to be paid per month to bring the transparency in the matter and also to find out suitable places.
b) To reduce extent of pollution in a particular locality at least one thousands meter (1000 m) distance should be maintained in between Two Towers.
c) A person/faimly should not be allowed to get the benefit of leasing of land for more than one TOWER.

If the above noted suggestions are strictly followed by framing a rule then more No of families will have a scope to be involved in the process and they will also be able to uplift their economic condition because of Rs. 8000/- or more per month is Sufficient to cater the needs of a family.

Hope, you will take appropriate action as prayed for.

Yours faithfully
**sd/-**
**H.Pal**
**Bishnupur**

**ANNEXURE – IB**

## PUBLIC COMPLAINT FORWARDED TO CPCB BY GOVT. OF KERALA

Government of Kerala
Environment Management Agency Kerala

No. EMAK/T3/256/2010 19/04/2010

From

The Director

To

The Chairman
Central Pollution Control Board
Parivesh Bhavan, CBD cum Office Complex
East Arjun Nagar, Delhi- 110032

Sir,

**Sub: Health hazards due to establishment of telecommunication antenna towers in residential areas – reg:**
**Ref: State Government letter No: 353/A1/10/Envt dated 01-03-2010**

The State Government is in receipt of a few complaints regarding the setting up of telecommunication towers in residential areas with fears of health hazard due to its operation. One copy of such a complaint is enclosed herewith for your perusal.

As the concern on this issue has been raised by several individuals and organizations in this regard, it may please by informed whether any norms/standards have been decided or are being contemplated in this respect, especially of height and distance of antenna with respect to the strength of the signals.

It is felt that specific studies at the National level would be ideal to allay the fears of the public and to bring out a well considered policy advice on the subject.

Yours faithfully
**sd/-**
**Dr. S.K. Khanduri IFS**
**Director**

**ACC:** Copy of the complaint from Smt. K.K. Kamalam
Most Urgent:



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**BY SPEED POST WITH A.D**

12.01.2010

From:-

K. Kamalam, aged 75years
Widow of Late K.N. Sreedharan Pillai
Kannakeriyil House
Chittethukara, Kakkanad C.S.E.Z. P.O.
Kochi-682037

To ,

1. Secretary to Government of India,
Ministry of Health and Family Welfare,
Nirman Bhawan, New Delhi – 110001.

2. Secretary to Government of India,
Ministry of Environment,
Lodhi Road, New Delhi – 110001.

3. Secretary to Government of India,
Department of Telecommunication,
New Delhi – 110001.

4. Secretary, Central Pollution Control Board,
Parivesh Bhawan,
CBD-cum-Office Complex,
East Arjun Nagar, Delhi – 110032

5. Director,
Centre for Science and Environment
41, Tughlakabad Institutional Area,
New Delhi – 110062

6. Principal Secretary to Government of Kerala,
Department of Health, Government Secretariat,
Thiruvanathapuram.

7. Secretary, Kerala State pollution Control Board,
Plamood, Pattom P.O., Thiruvananthapuram – 695004.

8. Secretary, Thrikkakkara Grama Panchayath,
Thrikkakkara.





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**Respected Sirs:**

**What is My Grievance?**

I am a 75-year old widow residing in House No. XIV/386 situated in Survey No. 193/2B (Re: Sy. No. 498/10) of Thrikkakkara Grama Panchayath and I am residing with my children and grandchildren. I am aggrieved by the setting up of a telecommunication/mobile antenna by M/s. Wireless TT Info Services Limited which is having its registered office at 5-9-62, 5th floor, Khan Lateef Khan Estate, Fateh Maidan Road, Hyderabad – 500 001 through its Circle office: J&Co Chambers, Manimala Road, Edappally, Cochin 682024 within 43 meters from my house i.e, in my immediate neighborhood property in Re. Sy. No.498/12 which is owned by one Mr. K.R. Ramachandran H.No. XIV/388, Chittethukara, Kakkanad Grama Panchayath. There are about 8 dwelling houses within 50 meters and within 100 meters there is a Harijan Colony having 100 houses belonging Scheduled Caste Community. Within 400 to 500 meters radius of the proposed antenna, there is Pappakkudam Harijan colony having 500 dwelling houses, N.L.P. School, having 1500 students, Bhavans Adarsh Vidyalaya having 2500 students apart from mosque, madrassa, and special schools for mentally challenged children run by nuns. Majority of people in our locality do not have even primary medial or life insurance coverage to protect their life. I am not against development or technological progress. I am protesting against the setting up of a telecommunication antenna in our locality because telecommunication antennas emit electromagnetic radiation and the long-term exposure of that could potentially affect generations to come and continuous exposure can cause cancer, genetic deformities in children, DNA changes, leukemia, etc. if a new drug has to be introduced in the market by the manufacturer, it has to go through a series of tests so as to make sure that the same is not injurious to human health and usage of it does not create any side effects. It is the duty of the manufacturer. But when it comes to mobile phone antennas, the Government is shying itself from introducing any legislative mechanism to put onus on the Cellular companies from proving that the electromagnetic radiation emitted from the antennas erected by them does not affect the human health adversely through frequent or continuous exposure for a long time. Why?

**What is Electro Magnetic Radiation?**

Radiation is an energy that comes from a source and travels through a material or space. Radiation can be classified as ionizing or non- ionizing. Ionizing radiation has sufficient energy to remove electrons from atoms or molecules. The loss of an electron results in the formation of a charged atom called an ion. The damaging effects of ionizing radiation results from this ability to change the chemical combination of matter with which it interacts. The radiation that has enough energy to move ore vibrate atoms but not enough to remove electrons is called non-ionizing radiations. Electromagnetic radiation energy is radiated in the form of a wave as a result of the motion of electric charges. A moving charge gives rise to a magnetic field, and if the motion is changing (accelerated), then the magnetic field varies and in turn produces an electric field. These interacting electric and magnetic fields are at right angles to one another and also to the direction of propagation of the energy. Thus, an electromagnetic wave is a transverse wave. If the direction of the electric field is constant, the wave is said to be polarized. Electromagnetic radiation does not require a material medium and can travel through a vacuum. The theory of electromagnetic radiation was developed



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by James Clerk Maxwell and published in 1865. He showed that the speed of propagation of electromagnetic radiation should be identical with that of light, about 186,000 mi (300,000 km) per sec. subsequent experiments by Heinrich Hertz verified Maxwell's prediction through the discovery of radio waves, also known as hertzian waves. Light is a type of electromagnetic radiation, occupying only a small portion of the possible spectrum of this energy. The various types of electromagnetic radiation differ only in wavelength and frequency; they are alike in all other respects. The possible sources of electromagnetic radiation are directly related to wavelength: long radio waves are produced by large antennas such as those used by broadcasting stations; much shorter visible light waves are produced by the motions of charges within atoms; the shortest waves, those of gamma radiation, result from changes within the nucleus of the atom. In order of decreasing wavelength and increasing frequency, various types of electromagnetic radiation include: electric waves, radio waves (including AM, FM, TV and shortwave), microwaves, infrared, visible light, ultraviolet radiation, X rays, and gamma radiation. According to the quantum theory, light and other forms of electromagnetic radiation may at times exhibit properties like those of particles in their interaction with matter. (Conversely, particles sometimes exhibit wavelike properties.) The individual quantum of electromagnetic radiation is known as the photon and is symbolized by the Greek letter gamma. Quantum effects are most pronounced for the higher frequencies, such as gamma rays, and are usually negligible for radio waves at the long-wavelength, low-frequency end of the spectrum.

**How to Measure Electro Magnetic Radiation?**

A Gauss is a common unit of measurement of magnetic field strength. A gauss meter is an instrument which measures the strength of magnetic field. Inside a Gauss meter there is a coil of thin wire, typically with hundreds of turns. As a magnetic field radiates through the coil, it induces a current, which is amplified by the circuitry inside the Gauss meter. Gauss meters may vary in the strength of the magnetic field they are capable of measuring. A meter used for measuring EMFs from power lines, transformers, substations and appliances around the home, for example, should be able to measure as low as. 1mg. gauss meter vary widely in price and accuracy. Meters have either a single axis coil or a triple axis coil. Single axis meters are much simpler than triple axis meters to manufacture and thus, are less expensive. To use a single axis meter you must point the meter's one sensor in three directions --- the x, y and z axis. Then, you combine the three readings in a mathematical equation to calculate the combined field strength. Obviously, it's far easier and more accurate to use a 3-axis meter. Triple axis Gauss meters are quite accurate, but they are also more expensive. In the present case, the Gram Panchayat does not have any such equipment to measure the possible emissions of electromagnetic radiation!

**Why Electro Magnetic Radiation is Dangerous and Unsafe?**

There's a heated debate as to what electromagnetic field (EMF) level is considered safe. Many government and utility documents report the usual ambient level of 60-Hz magnetic field to be 0.5 mG. Thus, any reading higher than 0.5 mG is above the "usual" ambient exposure. Many experts and public officials, as well as government that have made an effort to offer public protection, have adopted the 3 mG cutoff point. The EPA has proposed a safety standard of 1 mG. Sweden has set a maximum safety limit of 1 mG. Dr. Robert Becker, an MD

who has been studying the effects of EMFs for 20 years, states an lmG safety limit in his book Cross Currents. When electricians try to solve a magnetic field problem they do their best to drop the level to 1 mG or below. Dr. Nancy Wertheirmer, a Ph.S. Epidemiologist who has been studying EMFs for 20 years, has been looking at the epidemiological data in a different way – she is trying to associate EMF levels with health rather than disease. The level she is coming up with is a cut off of 1 mG. Russian researchers claim that 1/1000ths of a mG should be the standard. The Bio Electric Body believes that there are several stages of health between 'optimum wellness', "degenerative disease" and "Cancer". Thus, I maintain our own living and sleeping quarters at 0.5 mG and below.

Exposure to RF radiation can occur from the base station and its fatal effects on human health would be visible after several years. A base station has tower mounted on a building at heights between 15 and 30 meters. The tower carries three-directional antennae separated by 120 degrees to cover the phones in a given geographical area (cell) managed by a particular service providers. At the base of the tower is the instrument room housing low power radio transmitters and receivers. Generally, a base station will have over one transmitter, depending upon the number of phones in the cell. The outputs from these transmitters are combined and fed to the antennae. Most base stations radiate about 20 to 40 watts of RF power. The intensity of the radiation decreases beyond a few meters from the antenna. Because base stations are located in populated areas, those living in the path of the beam are exposed to radiation.

What are the possible effects of RF radiation exposure? Experts say that the ICNIRP version is that the only established effects of RF energy absorption by the human body are the rise in tissue temperature. In fact, this is the mechanism of microwave cooking. The RF energy absorbed is expressed in terms of "specific absorption rate" (SAR), measured in units of watts per kg (W/kg) of tissue. If the heat generated is small, the body's thermoregulatory mechanism can dissipate it without causing adverse effects. If the temperature exceeds this capacity, (about 1 to 2 degree Celsius), tissue damage may occur. Penetration of the blood-brain barrier, disturbed neuromuscular functions, lens opacity and reduced sperm production are effects observed in animal experiments and human volunteers exposed to high RF radiation levels, known as 'thermal effects'.

On the basis of information gathered from world scientific community so far, we are convinced that continued and consistent exposure to electromagnetic radiation exposure that emanates from telecommunication antennas can cause the following health hazards:

1) Increased cell growth of brain cancer cells.
2) A doubling of the rate of the lymphoma in mice.
3) Changes in tumor growth in rats
4) Increased brakes in double and single standard DNA, our genetic material.
5) 2 or 4 times as many cancers in Polish solders exposed to RF.
6) More childhood leukemia in children expose to RF/
7) Changes in sleep pattern and REM type sleep
8) Headaches caused by RF exposures.
9) Neurological changes including changes in blood-brain barrier.
10) Changes in cellular morphology.
11) Changes in neural electrophysiology (EEG)



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12) Changes in neurotransmitters (that affect motivation and pain perception)
13) Metabolic changes (calcium loss, for instance)
14) Cytogenesis effects (which can affect cancer, Alzheimer's neurodegenerative diseases).
15) Decreased memory, attention, and slower reaction time to school children.
16) Increased blood pressure in healthy men.

To substantiate the above threats and health hazards, we refer to the informative scientific research paper presented at the IBC-UK Conference: "Mobile Phones: Is there a a health Risk?" September 16-17, 1977 in Brussels, Belgium or Neurological Effects of Radiofrequency Electromagnetic Radiation Relating to Wireless communication Technology by Dr. Henry Lai, Bio-electromagnetic Research Laboratory, Department Bioengineering University of Washington, Seattle, Washington, USA. A further reading of the submissions made by Roger Santini, Doctor of Science at the Parliamentary office for Evaluation of Scientific and Technological Alternatives, during the Hearings of 6 March 2002 at the request of Senators Jean Louis Lorrain and Daniel Raoul underscore the damaging ill effect of the electromagnetic emissions from the base stations. Please do f\refer to the Research paper on the Exposure of T-Lymphoblastoid Leukaemaia CCRF-EM Cells to 900 MHZ Electromagnetic field Modulates gene expressions affecting cell proliferation, apoptosis, and cell cycle control by Marinelli F., La Sala D., Cattinil., Tomassett G, Cicciotti C, and Cinti G. Institute of Cytomorphology N.P. CHR. C/o. I.O.R. via di Barbiano 1/10 40136 Bologna Italy, Institute of Immunology and Genetics, IOR, Bologna, Italy, Institute of Radio astronomy, Bologna, Italy. The first World Breast Cancer conference held at the Queen's University, Kingston, Ontario, Canada exploded the myth that certain the so-called scientists were made others think that exposure to RF radiation has nothing to do with breast cancer.
Where a base station is installed on top of a building where people live or work, those occupants may be quite unaware that they are in very close proximity to equipment which produces substantial electromagnetic radiation. Over 100 scientists and physicians at Boston and Harvard University's Schools of Public Health have called cell phone towers a radiation hazard.

**Our Concerns are Substantiated by Scientific Studies/Research Findings**

In a major research study by an Indian scientist, Gulsatej Gandhi, Reader and Head of the Department of Human Genetics, Guru Nanak Dev University, Amritsar, it has been found that exposure to radio frequency (RF) signals generated by the use f cellular telephones have increased dramatically and reported to affect physiological, neurological, cognitive, and behavioral changes and to induce, initiate, and promote carcinogenesis. Genotoxicity of RFR has also been reported in various test systems after in vitro and/or in vivio exposure but none in the mobile phone users. The study has concluded that these results highlighted a correlation between mobile phone use (exposure to RFR) and genetic damage. The study has recommended interim public health action in the wake of widespread use of mobile telephony.

I would like to refer to the following Scientific Investigations/Research References about III-Effects to EM Radiation:





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**The list is not exhaustive.**

## The Game-Plays of the Industry & Officials

Lack of public awareness about the serious health hazards of electro-magnetic radiation from telecommunication antennas has been a boon to the Mobile industrialists. Though the Government of India tried to bring out certain guidelines for setting up the telecommunication towers regarding minimum distance from schools and hospitals, the powerful lobbying from the industry thwarted it from becoming effective. The Association of the Mobile Companies succeeded in preventing the Government to introduce adequate and effective legislative measures to control the menace affecting public health. The pollution control Laws do not envisage any specific provision for prevention of contamination of the environment as a result of electro-magnetic radiation. The Municipal laws too are not effectively used to control proliferation of mobile antennas in thickly populated places. Taking advantage of the fluid situation, the telecom company now uses a common Modus Operandi by entrusting

the tower constructing to a person or company who in turn makes an application to the Panchayath or Municipality concerned with prescribed fees for "construction of the tower-building". Once the application is received, as a matter routine, the Panchayath or Municipality will approve the same as the inspection of the site and verification of the plan are done as empty formalities. Once the construction is started on the basis of the said approval, the local people comes to know that the construction is for setting up telecommunication antenna, which when activated, would have long term adverse health hazards on their lives. The local public will then approach the panchayath and Municipal authorities for revocation of the approval. The Panchayath and Municipal authorities immediately will cancel the license without hearing the affected party to whom already the license was given. Naturally, the industry people will challenge the order or revocation of license on the ground of violation of principles of natural justice and get the order stayed. In some cases, police protection is sought from Courts against the general public for erection of antennas. In such cases brought before the courts, it is interesting to note that only the telecom company and the local self government body alone would be the parties. The really aggrieved local publics are usually not imp leaded even in representative capacity. We do not blame all but in our State, some unscrupulous officials of the local self government department hand in glove with the private telecom establishments do play such dirty tricks for petty gains at the cost of public health. At the international level, there was wide criticism over a clever but subtle strategy successfully used by the financially powerful corporate bigwigs controlling telecom business to sponsor some research on electromagnetic radiation to offbeat any public outcry against them or probable government guidelines or controls which reduce their profit margins. In India too, the experience is no different. The Government of India did not think the necessity of a research study on this particular subject until recently and it is awaiting the results of the research for taking precautionary measures. Because of these unethical and dishonest hide and seek games resorted by responsible government authorities hand in glove with private mobile phone companies the true facts pertaining to the problem are not presented before the tribunals and courts of law in time. In some cases, the courts were even misled on factual and legal matrix of the situation and attempts were made to obtain police protection for erection of telecom antenna by mobile companies. Our ever vigilant judiciary only in such times saved the fate of the poor people from such sinister games. Generations owe a high degree of gratitude to the Indian Judiciary for laying down the precautionary principle, and the principle that the polluter must pay for contaminating the environment. Thanks to the ever growing judicial scrutiny and concern for the public good, the right to life guaranteed in the Constitution is no more a dead-letter word. It is therefore most humbly urged that your good offices be pleased to grant the following reliefs.

**The Reliefs Urgently Needed**

There are no specific and cogent distant rules in the Panchayath or Municipality Acts for establishing telecommunication towers. In the Pollution Control legislation too there is no mention about electromagnetic radiation contamination. It may be worthwhile to note that in India import and export of radioactive wastes are banned. There is also no rule or regulation as to what will be done with the radio-active waste of the old antennas after they become obsolete after a few years.

The Industry should grow but at the same time it should not be at the opportunity cost of reducing a large majority of the population victims of fatal diseases. Profit is precious to





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every industry. Revenue is precious to every government. Similarly, health is precious to every citizen. There must be a proper balance and harmony with each other then only the society can reap benefits of any development. Keeping in mind this larger public interest in mind, we approach you, Sirs, seeking your benevolence and urgent intervention, for the following reliefs:

1. The Government of India should expeditiously constitute a Higher Power Committee under the Chairmanship of a retired Chief Justice of Supreme Court of India with members drawn from eminent scientists of Indian Space Research Organization, Indian Institute of Science Bangalore, Indian institutes of Technology, All India institutes of Medical Science, New Delhi, Human Genetics Departments of reputed Universities, and Centre for Science and Environment, New Delhi to study the magnitude of the problem of Electro-magnetic radiation from the mushrooming mobile Towers, its ill effects on human beings, and social costs involved therein and recommend solutions.
2. Until effective legislative/executive mechanisms are evolved for controlling the menace, applying pre-cautionary principles, the government of India through the Department of Telecommunication may prohibit by order putting up of mobile antennas in the thickly populated areas where within 300 to 500 meters radius there are dwelling houses, markets, schools and hospitals.
3. With reference to our particular issues, at the micro level, we most humbly pray that all further works are being carried out by the respondent agency for erection and commissioning of the Telecommunication antenna within breathing distance from our dwelling house be ordered to be stopped forthwith.

I am sure, Sir, your esteemed good offices will be kind enough to show mercy on us and take urgent steps to save our lives. Expecting expeditious intervention.

Yours faithfully,

**Sd/-**
**K.Kamalam**



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ANNEXURE – II

**MINISTRY OF ENVIRONMENT & FORESTS**
**WILDLIFE DIVISION**
**GOVERNMENT OF INDIA**

F.No.15-11/2010 Wl-I

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi – 110003
Dated: 30th August, 2010.
Office Memorandum

**Sub: Constitution of Expert Group to study the possible impacts of communication towers on Birds and bees.**

The Ministry of Environment & Forests had decided to constitute an Expert Group to assess the level possible impacts of growth of mobile towers in urban, sub-urban and even rural/ forest areas on the population of birds & bees and to suggest appropriate mitigative measures to address to the problem. The composition and Terms of Reference of the Expert Group it as given below:

| | | |
|---|---|---|
| 1. | Dr. Asad Rahmani, Director, Bombay Natural History Society, Mumbai | Chairman |
| | | |
| 2. | Representative of Wildlife Institute of India, Dehradun | Member |
| 3. | Representative of Ministry of Telecommunication | Member |
| 4. | Representative of WWF-India | Member |
| 5. | Representative of the Centre for Environment & Vocational Studies, Punjab University | Member |
| 6. | Dr. Sainuddin Pakattazhy, Kerala University | Member |
| 7. | Representative of Indian Institute of Science, Bangalore, | Member |
| 8. | Representative of Indian Institute of Technology, New Delhi. | Member |
| 9. | Representative of Salim Ali Centre for Omithology & Natural history, Coimbatore | Member |
| 10. | Deputy Inspector General of Forests (WL) | Member-Secretary |



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**Terms of Reference:**

1. To assess the likely impacts of the growth in the number of mobile towers in the country.
2. To review all the studies done so far in India and abroad on aspect of ill effects of mobile towers on animals, birds & insects.
3. To suggest possible mitigatory measures.
4. To formulate guidelines for regulating the large scale installation of mobile towers in the country.
5. To identify the gap areas for conducting further detailed research.

The other Terms of References with respect to the said Expert Group would be as under:

i) The term of the Expert Group would be for a period of six months from the date of its constitution.

ii) The non official members of the Committee would be entitled for TA/DA and sitting fee @ Rs. 1000/- each as applicable to the non-official members as per Rule in Vogue.

1. These issues with the approval of competent authority.

2. The IFD has concurred to the above vide their Dy. No. 1398/AS& FA Dated 20th August 2010.

Sd/-
**Prakriti Srivastava)**
**Deputy Inspector General (WL)**
**Telefax: 24361795**

**Distribution:**

1. PS to Hon'ble MOS (I/C)E & F
2. PPS to Secretary, E&F.
3. PPS to DGF & SS.
4. PPS to Addl. DGF (WF).
5. PS to IGF (WL).
6. The Chairman and all Members of the Expert Group.
7. NIC Cell - with a request to kinly upload the above order on the official website of the Ministry.



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ANNEXURE –III-A

## CENTRAL POLLUTION CONTROL BOARD
## (Ministry of Environment and Forests, Govt. of India)

## NOISE LIMIT FOR GENERATOR SETS RUN WITH PETROL OR KEROSENE

(The Noise Limit for Generator Sets run with Petrol or Kerosene were notified by Environment (Protection) Amendment Rules, 2000, vide G.S.R. 742 (E), dated 25th September, 2000, at serial no. 91, and its amendment vide G.S.R. 628 (E), dated 30th August, 2001, under the Environment (Protection) Act, 1986.)

Noise Limit for Generator sets run with Petrol or Kerosene

**1. Noise limit**

Noise limit for new generator sets run with petrol or kerosene shall be as given below:

| | Noise Limit from | |
|---|---|---|
| | September 1, 2002 | September 1, 2003 |
| Sound Power Level LWA | 90 dBA | 86 dBA |

**2. Applicability**

These rules shall apply to all new generator sets using petrol or kerosene as fuel, manufactured in or imported into India:

Provided that these rules shall not apply to:

a) Any genset manufactured or imported for the purpose of exports outside India, or
b) The genset is intended for the purpose of sample only and not for sale in India.

**3. Requirement of certification**

Every manufacturer or importer (hereinafter referred to as "supplier") of genset (hereinafter referred to as "product") to which these rules apply must have a valid certificate of type approval for all the product models being manufactured or imported after the specified dates.

**4. Verification of conformity of production (COP)**

Every supplier shall subject its products to the verification for conformity of production, by certification body specified in clause 8, every year.

**5. Sale of generator sets not complying with these rules**

The sale of a product model, not having valid type approval certificate, or not complying with the noise limits, as determined by the verification for Conformity of Production, shall





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be prohibited, in India.

**6. Requirement of conformance labelling**

6 (1) The supplier of the 'product' must affix a conformance label on the product meeting the following requirements:

a). the label shall be durable and legible,
b). the label shall be affixed on a part necessary for normal operation of the 'product' and not normally requiring replacement during the 'product' life.

6(2) The conformance label must contain the following information:

a). name & address of the supplier (if the address is described in the owner's manual, it may not be included in the label).
b). statement that "this product conforms to the Environment (Protection) Rules, 1986."
c). type approval certificate number and time phase (i.e. September 2001 or September 2002).

**7. Nodal agency**

1) The Central Pollution Control Board shall be the nodal agency for implementation of these rules.
2) In case of any dispute or difficulty in implementation of these rules the matter shall be referred to the nodal agency.
3) The nodal agency shall constitute a Standing Committee to advise it on all matters; including the disputed matters, related to the implementation of these rules.

**8. Certification body**

The following agencies are authorised for type approval and for verification of conformity of production.

1) Automotive Research Association of India, Pune;
2) National Physical Laboratory, New Delhi;
3) Naval Science & Technology Laboratory, Visakhapatnam;
4) Fluid Control Research Institute, Palghat; and
5) National Aerospace Laboratory, Bangalore.

**9. Compliance and testing procedure**

The compliance and testing procedure shall be prepared and published by Central Pollution Control Board, with the help of the certification agencies.



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ANNEXURE-III-B

## CENTRAL POLLUTION CONTROL BOARD
## (Ministry of Environment and Forests, Govt. of India)

## NOISE LIMIT FOR GENERATOR SETS RUN WITH DIESEL

**(Noise Limit for Generator Sets run with Diesel were notified by Environment (Protection) Amendment rules 2002 vide GSR 371(E), dated 17th May 2002 at serial no.94 and its amendments vide GSR No 520(E) dated 1st July 2003; GSR 448(E), dated 17th July 2004; GSR 520(E), dated 12th August 2004, GSR 315(E) dated 16th May 2005; GSR 464(E) dated 7th August 2006; GSR 566(E) dated 29th August 2007 and GSR 752(E) dated 24th October under the Environment (Protection) Act, 1986)**

**Noise Limit for Generator sets run with Diesel**

**1. Noise limit for diesel generator sets (upto 1000 KVA) manufactured on or after the 1st January, 2005**

The maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity upto 1000 KVA, manufactured on or after the 1st January, 2005 shall be 75 dB(A) at 1 metre from the enclosure surface.

The diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage itself.

The implementation of noise limit for these diesel generator sets shall be regulated as given in paragraph 3 below.

**2. Noise limit for DG sets not covered by paragraph 1.**

Noise limits for diesel generator sets not covered by paragraph 1, shall be as follows:-

2.1. Noise from DG set shall be controlled by providing an acoustic enclosure or by treating the room acoustically, at the users end.

2.2. The acoustic enclosure or acoustic treatment of the room shall be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on the higher side ( if the actual ambient noise is on the higher side, it may not be possible to check the performance of acoustic enclosure/ acoustic treatment. Under such circumstances the performance may be checked for noise reduction upto actual ambient noise level, preferably, in the night time). The measurement for Insertion Loss may be done at different points at 0.5 m from the acoustic enclosure/ room, then averaged.

2.3. The DGset shall be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A).

2.4. These limits shall be regulated by the State Pollution Control Boards and the State Pollution Control Committees.

2.5. Guidelines for the manufacturers/ users of Diesel Generator sets shall be as under:-

1. The manufacturer shall offer to the user a standard acoustic enclosure of 25 dB (A) insertion loss and also a suitable exhaust muffler with insertion loss of 25 dB (A).
2. The user shall make efforts to bring down the noise levels due to the DG set, outside his premises, within the ambient noise requirement by proper sitting and control measures.
3. Installation of DG set must be strictly in compliance with the recommendations of a DG set manufacturer.
4. A proper routine and preventive maintenance procedure for the DG set should be set and followed in consultation with the DG set manufacturer which would help prevent noise levels of the DG set from deteriorating with use.

## 3.0 LIMITS OF NOISE FOR DG SETS (UPTO 1000 KVA) MANUFACTURED ON OR AFTER THE 1ST JANUARY, 2005

### 3.1 Applicability

1. These rules apply to DG sets upto 1000 KVA rated output, manufactured or imported in India, on or after 1st January, 2005.
2. These rules shall not apply to –

a) DG sets manufactured or imported for the purpose of exports outside India; and
b) DG sets intended for the purpose of sample and not for sale in India.

### 3.2 Requirement of Certification

Every manufacturer or assembler or importer (hereinafter referred to as "manufacturer") of DG set (hereinafter referred to as "product") to which these regulations apply must have valid certificates of Type Approval and also valid certificates of Conformity of Production for each year, for all the product models being manufactured or assembled or imported from 1st January, 2005 with the noise limit specified in paragraph 1.

### 3.3 Sale, import or use of DG sets not complying with the rules prohibited

No person shall sell, import or use of a product model, which is not having a valid Type Approval certificate and Conformity of Production certificate.

### 3.4 Requirement of Conformance Labelling

The manufacturer of the 'product' must affix a conformance label on the product meeting the following requirements:

(a). The label shall be durable and legible,
(b). the label shall be affixed on a part necessary for normal operation of the 'product' and not normally requiring replacement during the 'product' life.

ii). the conformance label must contain the following information:



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(a) Name & address of the manufacturer (if the address is described in the owner's manual, it may not be included in the label),
(b) Statement "this product conforms to the Environment (Protection) Rules, 1986",
(c) Noise limit viz. 75 dB (A) at 1 m
(d) Type approval certificate number
(e) Date of manufacture of the product

**3.5 Nodal Agency**

i). The Central Pollution Control Board shall be the nodal agency for implementation of these regulations.
ii). In case of any dispute or difficulty in implementation of these regulations, the matter shall be referred to the nodal agency.
iii). The nodal agency shall constitute a Committee to advise it on all matters; including the disputed matters, related to the implementation of these regulations.

**3.6 Authorised agencies for certification**

The following agencies are authorized to carry out such tests as they deem necessary for giving certificates for Type Approval and Conformity of Production testings of DG sets and to give such certificates:-

i. Automotive Research Association of India, Pune
ii. National Physical Laboratory, New Delhi
iii. Naval Science & Technology Laboratory, Visakhapatanam
iv. Fluid Control Research Institute, Palghat
v. National Aerospace Laboratory, Bangalore

**3.7 Compliance and Testing Procedure**

The compliance and testing procedure shall be prepared and published by the Central Pollution Control Board, with the help of the Certification agencies."

**4.0 Exemption from the provisions of paragraph 1 and 3, for the products (diesel generator sets upto 30 KVA) purchased by the Ministry of Defence, Government of India.**

The products manufactured in or imported into India till 30th April, 2007 for the purpose of supplying to the Ministry of Defence, shall be exempted from the regulations given in paragraphs 1 to 3 above, subject to the following conditions, namely:-

i. The manufacturer shall manufacture or import the products only after getting purchase order from the Ministry of Defence and shall maintain the record of receipts, production / import, dispatch, etc., for inspection by the Central Pollution Control Board.
ii. The special dispensation for noise norms shall be only for the mobile Defence vehicles which, with the present design / configuration, cannot carry the gensets with acoustic





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enclosures.

iii. Director, Ministry of Defence shall ensure and maintain the serial number of all gensets for the Army and he shall also direct the manufacturers of these gensets to emboss on the engine and the main body of the gensets, the words "For the use of Army only'.

iv. The genset serial number shall be specially assigned by the Ministry of Defence with the request for proposal and contract purchase order and this information shall be forwarded to the Central Pollution Control Board for inspection as and when required.

v. Registers shall be maintained at the manufacturer's premises and in the Ministry of Defence to ensure that the number of gensets manufactured under special dispensation is not misused.

vi. The gensets procured under this dispensation shall be operated in the remote areas and not in the cities.

vii. This shall be a one-time exemption during which the Army shall remodel its vehicles to contain the new gensets and also obtain the necessary Type Approval of the gensets".

**5.0 Exemption from the provisions of paragraph 1 and 3 for sixteen Diesel Generator sets of 45 KVA purchased by the Ministry of Defence, Government of India."**

The 45 KVA DG sets manufactured in India for the purpose of their use in Mobile Documentation System for use by the Ministry of Defence shall be exempted from the regulation given in paragraph 1 to 3 above subject to the following condition, namely:-

i. The special dispensation for the noise norms shall be only for the DG sets to be used in mobile decontamination system (MDS) by army which, with the present design/ configuration cannot carry the gensets with acoustic enclosures.

ii. The Director, Ministry of Defence, shall ensure and maintain the serial numbers for sixteen gensets and he shall also direct the manufacturers of these generator sets to emboss on the engine and main body of the gensets, the words "For the use of Army only in Mobile Decontamination System (MDS)"

iii. A register shall be maintained at the manufacturer's premises and in the Ministry of Defence to ensure that only sixteen numbers of 45 KVA gensets are manufactured under special dispensation and are not misused elsewhere.

**6.0 Transportation of Diesel Generator Sets (above 250 KVA)**

i) Diesel Generator set shall be transported after fulfilling the requirement of certification specified in paragraph 3.2 as a complete unit with acoustic enclosure, or dismantled with relevant genset number specified on acoustic enclosure and silencer for reassembling at the site of its operation.

ii) Compliance with the noise norms shall be monitored after reassembling the DG set at the location of the installation by the concerned State Pollution Control Board or, as the case may be, the Union Territory Pollution Control Committee.



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ANNEXURE-III-C

## CENTRAL POLLUTION CONTROL BOARD
## (Ministry of Environment and Forests, Govt. of India)

## EMISSION STANDARDS FOR NEW GENERATOR SETS (UPTO 19 KILOWATTS) RUN ON PETROL AND KEROSENE

*(The Emission Standards for New Generator Sets (upto 19 Kilo Watt) run on Petrol and Kerosene were notified by the Environment (Protection) (Second Amendment) Rules, 1999, vide G.S.R. 682 (E), dated 5th, October, 1999 at serial no. 88, and as amended by GSR 280(E) dated 11th April 2008 under the Environment (Protection) Act, 1986.)*

**Emission standards for new generator sets (upto 19 kilowatt) run on petrol and kerosene with implementation schedule.**

The emission standards for portable generator sets run on petrol and kerosene shall be as follows:-

A. **From June 1, 2000**

| Class | Displacement (CC) | CO (g/kw-hr) | | HC+NOx(g/kw-hr) | |
|---|---|---|---|---|---|
| | | 2- Stroke engine | 4-Stroke engine | 2- Stroke engine | 4-Stroke engine |
| 1 | ≤ 65 | 603 | 623 | 166 | 65 |
| 2 | > 65 ≤ 99 | - | 623 | - | 36 |
| 3 | >99 ≤ 225 | - | 623 | - | 19.3 |
| 4 | > 225 | - | 623 | - | 16.1 |

B. **From June 1, 2001**

| Class | Displacement (CC) | CO (g/kw-hr) | HC+NOx(g/kw-hr) |
|---|---|---|---|
| 1 | ≤ 65 | 519 | 54 |
| 2 | > 65 ≤ 99 | 519 | 30 |
| 3 | >99 ≤ 225 | 519 | 16.1 |
| 4 | > 225 | 519 | 13.4 |

**C. Test method shall be as specified in SAE J 1088. Measurement mode shall be D1 Cycle specified under ISO 8178 (Weighting Factor of 0.3 for 100% load, 0.5 for 75% load and 0.2 for 50% load)**

Following organizations shall test and certify the generator sets:-

i. Automotive Research Association of India, Pune
ii. Indian Institute of Petroleum, Dehradun
iii. Indian Oil Corporation (R & D Centre), Faridabad
iv. Vehicle Research Development Establishment, Ahmednagar
v. International Centre for Automotive Technology, Manesar (Haryana)

These organizations shall submit the testing and certification details to the Central Pollution Control Board, annually. The Central Pollution Control Board may send the experts in the field to oversee the testing.



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ANNEXURE-III-D

**CENTRAL POLLUTION CONTROL BOARD**
**(Ministry of Environment and Forests, Govt. of India)**

## EMISSION LIMITS FOR NEW DIESEL ENGINES (UPTO 800 KW) FOR GENERATOR SETS (GENSETS) APPLICATIONS

**(The Emission Limits for new diesel engines (upto 800 KW) for Generator Sets (GENSETS) were notified by the Environment (Protection) Amendment Rules 2002 vide GSR 371(E), dated 17th May 2002 at Sl. No. 95 and as amended vide GSR 520(E), dated 1st July 2003, GSR 448 (E) dated 12th July, 2004, GSR 520(E) dated 12th August 2004 and GSR 280(E) dated 11th April, 2008 under Environment (Protection) Act, 1986)**

**Emission Limits for New Diesel Engines (Upto 800 KW) for Generator Sets (Gensets) Applications.**

### 1. Emission Limits

The emission limits for new diesel engines up to 800 KW, for gensets applications shall be as given in the Table below:

| Capacity of diesel engines | Date of implementation | Emission Limits (g/kw-hr) for | | | | Smoke Limit (light absorption coefficient, m-1) (at full load) | Test Cycle | |
|---|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | | | | 4. | 5. | |
| | | $NO_x$ | HC | CO | PM | | Torque % | Weight-ing factors |
| Upto 19 KW | 1.7.2005 | 9.2 | 1.3 | 3.5 | 0.3 | 0.7 | 100 | |
| 75 | 0.05 | | | | | | | |
| 0.25 | | | | | | | | |
| > 19 KW | 1.1.2004 | 9.2 | 1.3 | 5.0 | 0.5 | 0.7 | 50 | 0.30 |
| upto 176 KW | 1.7.2004 | 9.2 | 1.3 | 3.5 | 0.3 | 0.7 | 25 | 0.30 |
| > 176 KW upto 800 KW | 1.11.2004 | 9.2 | 1.3 | 3.5 | 0.3 | 0.7 | 10 | 0.10 |

**Explanation:** This extension for engines upto 19 KW shall be applicable only to those suppliers:



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(I). who have obtained Type Approval Certificate for atleast one of their engine models in this range upto 30th June, 2004.

Or

(II). who have submitted the bank guarantee and also contributed towards the study being carried out by the Indian Institute of Science, Bangalore, for development of genset diesel engines to comply with emission limits.

**2. Applicability**

(Hereinafter referred to as 'engine') manufactured in India and all diesel engines for genset applications and diesel gensets (hereinafter referred to as 'product'), imported into India, after the effective date:

Provided that these rules shall not apply to:-

a) Any engine manufactured or engine or product imported for the purpose of export outside India, or;
b) Any engine or product intended for the purpose of sample only and not for sale in India.

**3. Requirement of certification**

Every manufacturer of engine or every importer of engine or product must have valid certificates of Type Approval and certificates of Conformity of Production for each year, for all engine models being manufactured or for all engine or product models being imported, after the effective date with the emission limit as specified in paragraph 1.

**4. Sale, import or use of engine or product not complying with these rules**

No person shall sell, import or use of an engine or a product which is not having a valid Type Approval certificate and Conformity of Production certificate as per paragraph 3.

**5. Requirement of conformance labelling**

I. All the engines (individually or as part of the product) shall be clearly engraved 'Genset Engine' on the cylinder block.
II. The engine or the product must be affixed with a conformance label meeting the following requirements:-

a). The label shall be durable and legible;
b). The label shall be affixed on a part necessary for normal operation of the engine or the product and not normally requiring replacement during the life of the engine or the product.

III. The conformance label must contain the following information;





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a) name and address of the engine manufacturer or the engine or product importer (if the address is given in the owner's manual, it may not be included in the label);
b) statement that 'this engine or product conforms to the Environment (Protection) Rules, 1986';
c) type approval certificate number;
d) date of manufacture of engine or in case of import, the date of import of the engine or the product.

**6. Compliance with BIS specifications**

All engines up to 19 kW (individually or as part of the product) shall carry ISI mark and meet relevant BIS specifications (IS 10001).

**7. Nodal agency**

i). The Central Pollution Control Board shall be the nodal agency for implementation of these rules.
ii). In case of any dispute or difficulty in implementation of these rules the matter shall be referred to the nodal agency.
iii). The nodal agency shall constitute a Committee to advise it on all matters, including the disputed matters, related to the implementation of these rules.

**8. Authorised agencies for certification**

The following agencies are authorized to carry out such tests as they deem necessary for giving certificates of Type Approval and Conformity of Production tests for Diesel engines and to give such certificates:-

i). Automotive Research Association of India, Pune.
ii). Vehicle Research and Development Establishment, Ahmednagar.
iii). International Centre for Automotive Technology, Manesar (Haryana)

**9. Compliance and testing procedure**

The compliance and testing procedure shall be prepared and published by the Central Pollution Control Board with the help of the Certification Agencies.

**10. Fuel Specification**

The specification of commercial fuel applicable for diesel gensets shall be the same as applicable for commercial HSD (High Speed Diesel) applicable for diesel vehicles in the area, from time to time.



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ANNEXURE –III-E

O/C

F.No. MSCB/CC/09/2008-09 5292-to 5326 Date: 25.08.08

To
The Member Secretary
All SPCBs (As per list enclosed)

**Sub: Installation of Mobile Phone Base Stations**

Sir

Central Pollution Control Board (CPCB) has recently received some public complaints and queries from SPCBs/PCCs, regarding harmful effects of radiation emitted from such stations and development of norms and guidelines for siting of Mobile Phone Base Stations (MPBSs).

CPCB has reviewed the matter closely in the light of available international literature and feedback from the concerned agencies at national level. It has been found that, overall there is no enough evidence to show direct health hazards of RF (Radio Frequency – in which MPBSs operate) exposures from MPBSs. However, the matter of direct concern to PCBs is the noise/air emissions from the power generator sets attached to such MPBSs.

In view of the above, CPCB is interacting with the Department of Telecommunications for consideration on prescription of necessary measures that are required for the protection of the public health and also for the environment, including that required for control of noise/air emissions from power generator sets, while issuing permission for installation of such facilities. A request is also being made to Department of Telecommunications (DoT), Ministry of Communications and Information Technology for the preparation of the detailed Guidelines for control of radiation exposure and siting of such installations while considering all such environmental aspects.

Any further development, in this regard, shall be communicated to you.

Yours Sincerely

BL

(B. Sengupta)
Member Secretary

Copy to: 1. Joint Secretary (CP), MoEF
2. Ms. Nalini Bhatt, Advisor, MoEF
] For kind information please.

BL

(B. Sengupta)

Mobile

Sh Keyur Singh Pl. O/C





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ANNEXURE - IV

**WIRELESS PLANNING & COORDINATION WING**
**DEPARTMENT OF TELECOMMUNICATIONS**
**MINISTRY OF COMMUNICATION AND INFORMATION TECHNOLOGY**
**GOVERNMENT OF INDIA**

DO No. C.30011/6/2006-MR Dated : 09.06.2006

Dear Sir,

Please refer to this Ministry's letter even no. Dt. 03.03.06 regarding setting up of the Committee under the Chairmanship of Director General, ICMR for preliminary study in the wake of the directions of the Hon'ble High court of Mumbai in WP No. 2112 of 2004 on health hazards due to mobile towers and other issues.

The Committee had extensive discussions and deliberations in its meeting held on 29.05.2006 at ICMR Hors. And has opined that, overall there is not enough evidence to show direct health hazard of RF exposures from Mobiles Base Stations. A copy of the minutes of the meeting containing the deliberations and recommendations of the committee is enclosed for taking further necessary action in the matter in the light of the directions of the Hon'ble High Court of Mumbai including making necessary submissions before the Hon'ble court.

With Regards,

Yours sincerely,
**Sd/-**
**(Bhawani Thyagarajan)**

*Minutes of the Committee on Health Hazards due to Mobile Phone Towers meeting held on 29th May, 2006 at ICMR Hors. Office*

Member Present

| | |
|---|---|
| Dr. N.K. Ganguly | DG, ICMR |
| Dr. A.K. Mahapatra | Prof. & HOD Dept. Of Neurosurgery AIIMS |
| Dr. S.K. Jindal | Representing Director, PGIMER |
| Dr. P.H. Apauthanprayan | Representing DGIIS |
| Mr. R.N. | Representing Department of Telecommunication |
| | Special Invitee |
| Ms. Maya Saxena | DDG (R) Department of Telecommunication ICMR Secretariat |
| Dr. Bela Shah | Sr. DDG & Chief Division of NCD |
| Dr. R.S. Dhaliwal | ADG |
| Dr. Tripti Khanna | ADG |

This Committee was constituted with reference to a PIL filed at Mumbai on health hazards due to mobile phone base stations. The Mumbai High Court had ordered the Ministry of



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Health and Family Welfare Govt. of India, to examine the issue subsequently; the Ministry of Health and Family Welfare had constituted a Committee under the Chairmanship of Dr. N.K. Ganguly, DG, ICMR to evaluate.

1. Whether it is advisable to frame and/or adopt the existing international guidelines pertaining to installation of Base stations by mobile telephone service providers, so as to avoid any potential risk to health and safety to public at large.
2. Explore the possibility for studying the course of action and framing a research project

Dr. N.K. Ganguly, D.G. ICMR welcomed all the members of the meeting. Background papers related to Guidelines and Publications on Health effects of Base Stations were circulated to all the members prior to the meeting. He then requested Dr. Dhaliwal, APG, Division of Non-communicable diseases to make a brief presentation (copy enclosed) based on the available material.

The Committee have extensive discussion and deliberations for two hours and observed the following:

- There are multiple sources of exposures to Electromagnetic fields including radio, FM radio, Television and other household gadgets. There is a need to acknowledge the confounding effects of these sources of RF.
- There are different types of mobile Base stations depending on the requirements of particular system (GSM or CDMA) prevalent in India, however GSM system outnumbers CDMA.
- RF exposures from Mobile Base Stations are much less than from radio, FM radio and television transmissions.
- The height of Mobile Base Stations antenna is nominally 36 meters and the effect of radio waves depends on the distance from the base stations since the antennas are directed horizontally with a 5 degree downwards tilt. The strength of Radio frequency fields in front of the antenna varies with the distance. Persons standing directly in front of the antenna in these high density zones will get higher exposures.
- There are two main types of effects of electromagnetic waves: thermal and non-thermal, which includes electrophysiological behavioral effects. These can be sleep disorders, cognitive disorders, memory disturbance, hearing disorders, etc.
- Factors like urbanization, siting of base stations, distance from the towers, existence of multiple towers & multiple providers, etc. All may have confounding effects which could be difficult to quantify.
- Subjective symptoms such as sleep disorders, cognitive disorders, memory disturbances, hearing disorders, etc have been reported. However, the three completed human studies pertaining to base stations conducted by Santini R et.al. (2002), Borlkiewiez et. al. (2004) & Hutter & Kundi et. al. (2006) do not report any quantitative parameters related to health hazards.
- ICNIRP Guidelines in respect of restriction on Specific Absorption Rare (SAR) are available internationally and have been adopted by various European countries, such as UK, Australia, Malaysia and Korea. But China has adopted more stringent criteria.
- Various studies conducted across the world on RF from Mobile Base Stations have shown that the exposures are of a much lower magnitude than the internationally





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accepted levels.

- At the moment there is no concrete evidence of any health hazard and WHO has the same opinion as mentioned in the latest fact sheet modified in May 2006. The Committee felt that more objective research is needed in the above disorders to quantity the effect on human health.
- WHO in its fact sheet no. 304 regarding EMF in relation to Base stations and wireless technology which has been updated in May 2006 recommends "National Authorities should adopt international standards to protect their citizens against adverse level of RF fields"

Taking the above mentioned into account, the Committee opined that overall there is not enough evidence to show direct health hazards of RF exposures from Mobile Base Stations.

Based on the above observations and the discussions, the Committee recommends that:

- A precautionary approach should be adopted till further research data is available. It will not be amiss to adopt the ICNIRP guidelines for limiting EMF exposure.
- The protocols to be followed and necessary guidelines for siting of mobile phone base stations may need to be developed as per its applicability for India.
- Periodic review of the status of knowledge in this area should be done and the recommendations may be revised accordingly.
- Recognizing that there is not enough evidence, data be generated through appropriate epidemiological studies (covering urban/rural population & varied exposure levels). Appropriate funds should be made available to the institutions conducting these studies.

***Enclosure A***

**ELECTROMAGNETIC FIELD AND PUBLIC HEALTH**

**Introduction:**

Electromagnetic fields (EMF) occur in nature and thus have always been present on earth. However, environmental exposure to man-made sources of EMF steadily increased due to electricity demand, ever-advancing work practices and social behavior. Each one of us is exposed to a complex mix of electric and magnetic fields at many different frequencies at home and work.

Unlike ionizing radiations (such as gamma rays given off by radioactive materials cosmic rays and X-rays) found in the upper part of the electromagnetic spectrum, EMF is much too weak to break the bonds that hold molecules in the cells together and therefore, cannot produce ionization.
Current Issues:

To date, studies undertaken by researchers of the highest integrity have not demonstrated any substantive link between human health risks and the use of digital mobile phones or living near a base stations, GSM Association the international body of all the GSM Operators worldwide



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is supporting the work of independent institutions such as the World Health Organization to review identify and conduct scientific research into mobile telecommunications health and safety.

The key findings/summary of key conclusions on possible hazards from exposure to radio frequency fields are provided below:

Research reviews have been conducted by national and international organizations including:

World Health Organization (WHO), on Risks from EMF, 2003 "Base Stations are continuously transmitting signals, although the levels to which the public are exposed are extremely small, even if they live nearby"

**Radiation from Mobile Telecommunications base stations – Swedish Radiation Protection Institute August 2001**

During the last few years, the SSI has carried out several investigations of radiation around mobile telecommunication masts. The results of the SSI's measurements and calculations can be summonsed as follows:

When an antenna is placed on a mast or the wall of a building, it is unlikely that individuals can be exposed to levels exceeding those permitted. If the antenna is placed on the roof of a building in such a way that maintenance personnel or others could be exposed when working on the roof the applicable safety precautions must be taken in accordance with the regulations determined by the Swedish Work Environment Authority.
At an approximate distance of 10 meters from the antennas, the radiation intensity is very low. When an antenna is placed in a high position, the maximum radiation intensity at the ground level may be less than a tenth of the permitted level. In many cases where the general public has shown concern, radiation intensity has proved to be less than a thousandth of the permitted level.

Antennas emit low levels of radiation in all but the forward direction. When an antenna is placed on the wall of a building, the radiation in the area behind the antenna is well below the permitted levels, particularly since the wall has a certain attenuating effect on the radiation. However, it is also known that radiation, with field strength of one or two V/m, can occur in these areas. This does not necessarily cause any radiation protection problems, but there is a risk that sensitive electronic equipment might be affected. If required, the operator should be able to present radio wave intensity levels in areas available to the general public.

The technical equipment at base stations and antenna cables do not emit any significant levels of radiation. In certain cases, it is possible for sensitive measuring equipment to detect very low field strength near the surface of the antenna cables, although these levels are well below those permitted.

To summarize, mobile telecommunication base stations do not constitute a risk regarding radiation protection.



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ANNEXURE V

**MUNICIPAL CORPORATION OF DELHI (MCD)**
**Office Order**

**Office Order No. TP/G/6901/10** **Dated 08.04.2010**

**SUBJECT : Permission for Installation of Temporary Structures for Cellular Mobile Phone Services on Roof Top/Ground Level or various Premises falling in the Area under Jurisdiction of Municipal Corporation of Delhi.**

In supersession of all earlier orders on the subject mentioned above, Permission / License for installation of temporary structures on Roof Tops / Ground Level of various premises for Cellular / Basic Mobile Phone Services shall be accorded as per the policy approved by the Corporation vide Item No. U.B. No. 392 dated 16th March 2010, earlier approved by the Standing Committee vide Resolution No. 722 dated 09.02.2010 and para 25 modified vide approval from Chairman Standing Committee dated 29.03.2010 and Hon'ble Mayor (for Corporation) on dated 06.04.2010, subject to the following conditions:

1. For installation of Base Station Antennas, clearances are required from Airport Authorities of India, DUAC, Chief Fire Officer (DFS), and ASI & DMRC (wherever applicable)

2. Structural stability certificate from any one of the following five institutions are required to be obtained by the Cellular and Basic Cellular Operators:-

a) Indian Institute of Technology (IIT), Delhi.
b) Central Building Research Institute (CBRI), Roorkee.
c) Rail India Technical & Economic Services Ltd. (RITES), Gurgaon.
d) National Council for Cement & Building Material, (NCCBM), Faridabad.
e) Indian Institute of Technology (IIT), Roorkee.

3. In case of building which were unauthorized or which may be so declared at a later point of time, permission for installation of tower shall be granted on fulfillment of all the conditions.

However, that shall not imply any change whatsoever in the status of the unauthorized building and shall be without prejudice to the right of MCD to demolish the said building through the due process of law. While undertaking such a demolition, MCD will not be under any obligation to send prior intimation to the owner of the tower, nor will it be liable for loss of the tower as a consequence of demolition of the unauthorized building. The operators shall indemnify MCD to this effect.

4. The licenses shall share the towers for fixing their respective antennas provided that the prescribed conditions are duly fulfilled so as to ensure curtailing of multiple towers and optimizing the use of the existing ones.



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**5. Priority of Selection of site shall be as under:**

a) All Municipal Buildings including Community Centres, except schools, hospitals & dispensaries.
b) Other Government Building,
c) Other Non-Residential buildings i.e. industrial, commercial & institutional buildings,
d) Along the right of way of major drains after clearance from DEMS of MCD.
e) Vacant land after clearance from the concerned authority.
i) Residential vacant plot leaving 3M setback all round
ii) Residential buildings.

*(Note: Erection of Cell Tower on residential buildings shall only be allowed in those cases where no alternative is available).*

iii) Group Housing.

6. Fees: Rs. 5 lacs per tower plus Rs. 1 lac per service provider in case of sharing.

7. For Municipal Building Rs. 25/- per sq. ft. per month shall be charged towards license fee for the space to be used for erecting the temporary structure subject to a minimum of Rs. 25,000/- per month. License fee shall be payable for three months in advance and thereafter by 10th day of each month.

Any Cell Operator desirous to erect tower on any Municipal Building or land will make an application to the land owning agency i.e. to the office of ADC (L & E) for Municipal Buildings and to the Estate Department of Slum & JJ for their buildings and also execute an agreement for license fee as mentioned above.

The license fee shall be deposited in the office of ADC (L & E) and Estate Department of Slum & JJ, as the case may be.

i) "No Objection" from the concerned department having its administrative control on the building /and where erection of Cell Tower is proposed.

ii) "No Objection" from Engineering Department from structural safety point of view. In case, the Engineering Department is not in a position to certify the structural safety aspect, the same could be got examined by Cell Operators from the Institutes already identified and approved for private building.

Once the agreement for license is entered into, Cell Operator can apply for permission to the EE (Bldg.) of concerned Zone, who will process the case for grant of permission in accordance with the guidelines issued.

8. That Cell Operator shall be solely responsible for any damage to the building and for public safety.

9. That Cell Operator shall take special precautions for fire safety, lightening etc.





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10. That Cell Operator shall furnish to Assessor & Collector (MCD) a copy of the agreement executed between the Cellular or Basic Telecom Operator and the owner of the building.

11. Generator sets installed at the tower site to cater to the power requirements of the antenna should confirm to the noise and emission norms and other requirements prescribed by DPCC.

12. That Cellular & basic Telecom Operators shall produce a certificate from the Manufacturer of D.G. set to the effect that set installed meets the following Standards and Guidelines as laid down in the Noise Pollution (Regulation and Control) Rules, 2000 as notified by Ministry of Environment and Forest vide its notification dated 14th February, 2000.

NOISE STANDARDS FOR DG SETS (15-500 KVA) The total sound power level, Lw of a DG set should be less than 94+10 log10 (KVA), dB(A), at the manufacturing stage, where KVA is the nominal power rating of a DG Set. This level should fall by 5 dB (A) every five year, till 2007 i.e. in 2002 and then in 2007.

13. MANDATORY ACOUSTIC ENCLOSURE (ACOUSTIC TREATMENT OF ROOM FOR STATIONARY DG SETS 95 KVA & ABOVE)

Noise from the DG Set should be controlled by providing an acoustic enclosure or by treating the room acoustically. The acoustic enclosure / acoustic treatment of the room should be designed for minimum 25 (dB(A) Insertion loss or for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side), it may not be possible to check the performance of the acoustic enclosure / acoustic treatment. Under such circumstances the performance may be checked for noise reduction upto actual ambient noise level, preferably, in the right time. The measurement for insertion loss may be done at different points at 0.5m from the acoustic enclosure/room, and then averaged. The DG set should also be provided with proper exhaust muffler with insertion loss of minimum 25 dB (A). To ensure the compliance of Guidelines at user end, Cell Operators will furnish noise – monitoring report from DPCC.

14. The Operator shall ensure to prohibit the access to base station antenna sites for general public by suitable means such as wire fencing, locking of the door to the roof etc., access to tower site even for maintenance personnel should be for a minimum period as far as possible.

15. Installation of Base Station Antennas shall be allowed only on:-

a) The buildings which abuts on minimum 9.00 M wide road in order to reduce the risks caused by any earthquake or wind related disaster.
b) The existing sites of the Cell Towers abutting on roads having ROW less than 9.00 M could only be regularized after the specific clearance from the Fire Department regarding the width of the road.



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16. The Base Station Antennas should be at least 3 m away from the nearby building and antennas should not directly face the building. Further, the lower end of the antenna should be at least 3.00 meter above the ground or roof.

17. In case of multiple transmitter sites at a specific locality sharing of a common tower infrastructure should be explored, as far as possible which can be coordinated through a nodal agency.

18. Sign boards / Warning signs are to be provided at Base Station Antenna sites which should be clearly visible and identifiable. A warning sign should be placed at the entrance of such zone.

19. The 'Warning Sign' should discourage longer stay in the zone, even for the maintenance personnel. The sign board may contain the following text:

i) Danger ! RF radiations, Do not enter.
ii) Restricted Area.

21. The operators and maintenance personnel, who are dealing with radio frequency devices, specially with Base Station Antenna installed on towers and at any other outdoor sites, should be protected from electromagnetic radiations. The operator and maintenance personnel dealing with the radio frequency devices should be properly educated for possible hazards and for taking measures for protection from electromagnetic radiations when & where required.

22. Submission of an undertaking from the Operator that installation of Cell Tower does not cause any adverse effect to the health of human being of the area and MCD shall be kept harmless out of this.

23. The operator shall display on board (minimum size 24" x 48") at conspicuous space of the building at Ground Floor, the following details:

i). Operators name and address
ii). Contact person's name, address and Telephone number
iii). Address of Complaint Redressing Authorities with Telephone Numbers.
iv). Police Control Room : 100
v). Fire Control Room : 101
vi). Ambulance : 102
vii). Any other important information, if any
viii). Details of Insurance policy.

24. In case of any complaints against such tower construction, the same shall be referred to the office of Director / General Cellular Operators Association of India and Secretary General, Association of Basic Telecom Services, to investigate the complaints and to take remedial measures wherever necessary.

25. The operators, who have erected cell towers without permission, shall apply to MCD for regularization within 30 days, as per earlier policy in force, prior to implementation of this new policy after obtaining NOC from ASI & AAI wherever applicable. NOC from R.W.As shall not be insisted upon and the fee shall be paid as per the new policy. In case of noncompliance, action for removal of Cell towers shall be initiated as per Law. The existing towers abutting on roads having ROW less than 9 mtrs shall be regularized after clearance of the FireDepartment.





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26. Identification of the sites: For issuing of any NOC, a recommendation is to be given by TRAI to the fact that the proposed tower is essentially required at the site / vicinity as the nearest tower of this company is existing at a distance of "x" metre and no sharing of tower with other company is available. In case of residential buildings, it shall also be certified that no other alternative is available with the service provider.

27. NOCs:

i) In case of group housing, residential building, NOC from all the occupants of the housing block along with the NOC of the society is required.
a) In case of the plotted residential building owned by different floor owners, NOC from all the floor owners is required.
b) In case of leasehold property, NOC of lessor is required.

iii) In case, building abuts on road having less than 9 M ROW, NOC from Fire Department is required.

28. APPLICATION:

a). Before erection of Cell Tower, application shall be filed jointly by the owner(s) of the building & the Mobile Service Provider Co. Copy of agreement between the service provider company and the owner shall also be submitted alongwith the application.

b). In case of the Municipal building, NOC of the Head of the Department / Land & Estate Dept. under whose jurisdiction building or land is situated is required.

c). The application shall be filed under the signature of Architect, registered with the Council of Architecture, who will certify that the proposed tower is safe in all respect along with the structural design and calculation on the basis of which certificate is being issued for record purpose.

d). Erection of tower shall only be permitted only on regularized buildings.

e). A certificate / affidavit shall be submitted by the service provider company that erection of the proposed tower is not harmful to the health of the nearby residents.

f). Permission shall only be granted to the service provider who have license from Telecommunication Department, Govt. of India.

g). The service provider company shall provide 3rd party insurance and details of the insurance policy shall be depicted on the display board.

i) The NOC shall be renewed on payment of requisite fee every 5 years.

ii) The Towers existing more than 5 years are also required to be renewed within one month on payment of requisite fee.

iii) MCD reserves its right to withdraw permission at any time without assigning any reason.

iv) The erection of the tower shall be completed within 3 months from grant of NOC and report of erection be made to the Building Dept. of the concerned Zone.

29. Revised guidelines shall be prepared time to time keeping in mind the international standards & technology.



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ANNEXURE VI

**DEPARTMENT OF HEALTH & FAMILY WELFARE**
**GOVT. OF NCT OF DELHI**
**DELHI SACHIVALYA**
**9TH LEVEL 'A' WING**
**NEW DELHI-2**

**Dtd:10.01.08**

**Vivek Rae**
**(Principal Secretary (Health & FW**
**New Delhi**

Dear,

The existing guidelines for granting permission for installation of towers on ground/ roof tops for Cellular Mobile Phone Services finalized pursuant to a meeting held at Raj Niwas on 26.07.2002 have been reviewed on the basis of certain representations from the public and it has been decided that henceforth such towers in residential areas should be permitted only in consultation with the concerned Resident Welfare Associations and not left to bilateral negotiations between Telecom companies and individual residents/house owners. In this regard the following additional precautionary measures are also recommended for adoption by the local authorities:

- Installation of Base Station Antennas within the premises of schools and hospitals may be avoided because children and patients are more susceptible to Electro Magnetic Field.
- Installation of Base Station Antennas in narrow lanes should be avoided in order to reduce the risks caused by any earth quake or wind related disaster.
- The base Station Antennas should be at least 3 m away from the nearby building and antennas should not directly face the building. Further, the lower end of the antenna should be at least 3 meter above the ground or roof.
- In case of multiple transmitter sites at a specific locality sharing of a common tower infrastructure, should be explored, as far as possible, which can be coordinated through a nodal agency.
- Access to Base Station Antenna sites should be prohibited for general public by suitable means such as wire fencing, locking the door to the roof etc. Access to tower site, even for the maintenance personnel, should be for a minimum period as far as possible.
- Sign boards/Warning Signs are to be provided at Base Station Antenna sites which should be clearly visible and identifiable. A warning sign should be placed at entrance of such zone.
- The "Warning Sign" should discourage longer stay in the zone, even for the maintenance personnel. The sign board may contain the following text:





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i. Danger! RF radiations, Do not enter!
ii. Restricted Area

• The operators and maintenance personnel, who are dealing with radio frequency devices, specially with Base Station Antennas installed on towers and at any other outdoor sites, should be protected from electromagnetic radiations. It is required that operators and maintenance personnel should be educated for possible hazards from these devices.

The issues with the approval of LG.

**With regards,**

**Yours sincerely,**
**Sd/-**
**(Vivek Rae)**

**To**

1. Shri Ashok Nigam, Commissioner, MCD, Delhi
2. Shri Dinesh Rai, VC, DDA, Delhi
3. Shri Parimal Rai, Chairperson, NDMC, New Delhi

**Copy to the following:**

1. Principal Secretary to LG, Raj Niwas, Delhi
2. Principal Secretary to CM, Delhi
3. Pr. Secretary (Urban Development), GNCT of Delhi
4. Secretary (Environment), Govt. of NCT of Delhi, Delhi
5. Shri T.V. Ramachandran, Director General, Cellular Operators Association of India, 14, Bhai Veer Singh Marg, New Delhi-01
6. Shri S.C. Khanna, Secretary General, Association of Unified Telecom Service Providers of India, B-601, Gauri Sadan, 5 Hailey Road, New Delhi-01

**Sd/-**
**(Vivek Rae)**





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ANNEXURE - VII

## MAHARSHTRA POLLUTION CONTROL BOARD

## MAHARASHTRA MOBILE TOWER REGULATION ACT

1. Mobile towers must not be installed on the roof tops of Schools, Colleges & Hospitals. Mobile towers must not be installed on top of residential buildings automatically preventing their commercial use. Commercial use of residential buildings is prohibited as per Section 170 & 171 of Co. op Soc. rules. Any attempt to justify mobile towers on roof tops of residential building under the pretext of "majority of votes" should not be considered. In addition, top three floor residents should have the right to execute their VETO power.

2. Mobile towers may be erected on Hilltops, Railway tracks, bridges, beaches, water tank reservoirs, mangrove areas, forest areas, where radiation exposure to human beings would be minimum.

3. They can be also installed on buildings meant for commercial purpose such as Malls, Theatres, office buildings, where exposure of human being to radiation will be for short duration.

4. The distance of the antenna from "human habitation" must not be less than 100 meters as per internationally accepted "PRECAUTIONARY PRINCIPAL". ( In China this distance is 500 m, which is still stricter).

5. Mobile towers must not be installed in 100 m peripheral distance from Schools & hospitals.

6. "No Objection" must be obtained from residents of surrounding buildings, which come in periphery of 1.5 times the height of the mobile tower. (Reference: Pune municipal corporation GR no. 6/307 dated 27/11/2007)

7. Structural audit of the building on which mobile tower is to be installed, must be done by competent & independent organizations approved by Municipal authorities.

8. The sites of mobile towers must be "EASILY" approachable to fire brigade engines to prevent any safety hazards.

9. Radiation emitted by the mobile tower antenna must not be "Self certified" by the mobile tower company (as is the prevailing practice). The radiation levels emitted from the mobile tower antenna must be measured by Government agencies like "Pollution Control Board" or "Telecom Regulatory Authority of India" or "IITs" or "RITES".

10. Radiation levels must be below allowable limits as prescribed by "Telecom Regulatory Authority of India" (Ref: letter no. 842-998/2008-AS-IV/13 dated 4/11/2008). They have recommended the Input radiation level to mobile tower antenna to be below 9.2 Watt/meter$^2$; and the radiation emitted by the antenna to be below 600 milliWatt/meter$^2$.

11. If radiation levels are exceeded, there should be a provision of heavy penalty to the service provider.

12. Mobile towers must not be installed without "PRIOR" permissions from competent authorities such as Municipality, Pollution Control Board, fire brigade, nearby police station, Electrical Inspection Dept (B & C).

13. Present practice of regularizing the illegal installation of mobile towers by way of levying fine of Rs. 5000/- must be discontinued. Towers already installed without prior permission must not be regularized. Such service providers should be aptly penalized & such towers should be demolished at service provider's cost.

14. Charges levied by the government on these mobile towers should be uniform throughout the STATE.

15. Tower companies should be advised to code sharing system so as to avoid multiple towers & clustering of towers.

16. There must be a provision to include a clause assuring compensation from the service provider, for any Hazards physical or structural, to the aggrieved persons or property owner by way of "comprehensive insurance policy"/ "Indemnity Bond" assured by the service provider, when an agreement is made.

17. Mobile phone manufacturers must mention Specific absorption rate (SAR) value on mobile phone sets.

| **Suresh Ghadge** | **Milind Bembalkar** | **Manoj S. Londhe** |
|---|---|---|
| President (9322386847) | Secretary (9422656058) | Member (09435715494) |

**Enclosed documents:**

1. State rules (Delhi, Chandigarh, Andhra Pradesh, Haryana, Punjab, Himachal Pradesh)
2. Article written by Prof. Girish Kumar, IIT, Mumbai,
3. Article written by Shri A. M. Joshi, retired wireless advisor, Govt of India.
4. Copy presentation given to local MP, MLA & MLC by members of mobile tower affected people's grievance forum.
5. Article by Shri Manoj Londhe & Shri Milind Bembalkar.
6. J.J. Hospital letter by Dean Dr. R. S. Inamdar, denying installation of mobile tower in their 44 acre premise.
7. Tehelka reports about mobile tower radiation levels in Delhi & Mumbai.
8. Mumbai Express News line report about Usha Kiran building.
9. Copy of research papers by eminent European scientists.



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**DEPARTMENT OF INFORMATION TECHNOLOGY**
**GOVT. OF HIMACHAL PRADESH**
**Government of Himachal Pradesh**
**Department of Information Technology**

No. DIT. Dev-(IT)2005(Misc) Dated: the August 22, 2006

From

Secretary (IT) to the
Government of Himachal Pradesh

To

Pr. Secretary (MPP & Power and Pollution Control/
UD/Tribal Development/TCP) to the Government of H.P.
Secretary (Housing/Finance/RD and PR/) to the
Government of H.P. Shimla-2,

**Sub: Policy for Setting up Mobile Communication Towers.**

Sir,

There has been an exponential growth in the field of mobile communication. The mobile subscriber base in Himachal Pradesh, which was almost negligible in 2001, has now crossed 7 lacs. In order to further accelerate growth of this important telecommunication tool, to improve quality of service and to have a suitable regulatory mechanism to prevent haphazard approach there is an urgent need of having policy for setting up mobile communication towers.

Permission for erecting mobile communication towers is to be accorded by the concerned Urban Local Body or SADA or Panchayat, as the case may be, for which a pre-determined fee can be levied.

In order to arrive at a policy frame-work in this regard, a meeting of all telecom service providers in Himachal Pradesh and concerned departments was held on 28.02.2006. Based on decisions taken in the meeting and subsequent suggestions received from various departments, the matter was taken to the Council of Ministers in its meeting held on 18.08.2006. "Policy for Setting up Mobile Communication Towers" enclosed in Appendix-A to this letter has been approved by the Government.

It is requested that further necessary action may be taken at the level of your Department by issuing instruction and/or notifications or by amending the bye-laws in keeping with Acts & Rules of relevant local bodies in this regard. For instance, Gram Panchayats may need





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to take follow up action under Section 100 (1)(d) of the Himachal Pradesh Panchayati Raj Act, 1994. Similarly, the town and Country Planning Department will have to prescribe fees under Section 30 of the Himachal Pradesh Town and Country Planning Act 1977 in accordance with the Cabinet decision. A copy of action taken in the matter may kindly be supplied to this Department for reporting compliance of decision taken by the Council of Minister.

Yours Faithfully,
**Sd/-**
**Secretary (IT) to the**
**Government of Himachal Pradesh**
**Shimla-2**
Dated: the August 22, 2006

**Copy forwarded to the following for favour of information and necessary action:**

1. The Chairman, HPSEB, Shimla-4
2. The Commissioner, Tribal Development, Shimla-2
3. The Director, Rural Development and Panchayati Raj, Shimla-9.
4. The Director, Urban Development, Shimla-2
5. The Director, Town and Country Planning, Shimla-9
6. All the Deputy Commissioner in Himachal Pradesh.
7. The Commissioner, Municipal Corporation, Shimla-1.
8. The CEO. Housing Board, Shimla-2.
9. The Chief General Manager, BSNL. SDA Complex, Shimla-9.
10. The Chief Operating Officer, Airtel, Shimla.
11. The Business Head, Reliance, Khalini, Shimla.
12. The Circle Head, Tata Indicom, Kasumpti, Shimla.
13. The Circle Head, Idea, Kainthla Niwas, Khalini, Shimla.
14. The Chief Operating Officer, Hutch, Kasumpti, Shimla.

**Appendix - A**

**Policy for Setting up Mobile Communication Towers in Himachal Pradesh**

1. **State Government Assistance:** The concerned Sub Divisional Magistrate Shall assist the Telecom Service Providers in getting various clearances in different departments and any case requiring higher level intervention shall be brought to the notice of the Deputy Commissioner/Director IT (in that order), so that all approvals are obtained in a time bound manner.

2. **Fee Structure:** (a) Prior permission of the Local Body/SADA/ (as the case may be) will be obtained [after receiving dues as per (b) below] for raising any construction, including tower. (b) One time and renewal fee to be charged at the following rates shall be paid:

i. **Municipal Corporation, Shimla:** Installation Fee @ Rs. 20,000/- per tower Annual Renewal Fee @ Rs. 10,000/- per annum per tower. Fee in following Special Areas



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falling within Shimla Planning Area namely, Dhalli, New Shimla (Kasumpti) and Totu will also be levied at the same rates.

ii. **Others Urban/SADA Areas: Installation Fee** @ Rs. 10,000/- per tower and Annual Renewal Fee @ Rs. 5,000/- per annum per tower.

iii. **Rural Areas and Urban/SADA locations in Tribal/Difficult Area:** Installation Fee @ Rs. 4,000/- per tower and Annual Renewal Fee @ Rs. 2,000/- per annum per tower.

**Note**

- An option for lump sum payment of renewal fee may also be given in blocks of 5 years (with 40% discount for upfront payment of the entire amount including renewal fees for 5 years). There will be periodic increase in renewal fee by 25 % after every 5 years.
- An additional amount @ 60 % shall be levied for every additional antenna which shares the same tower.

(c) It is clarified that this Fee shall be charged for granting requisite approval for the erecting the immovable structure viz. communication tower on top of an existing building or on the ground. This fee shall be in addition to the rent charged by the owner of land, which he negotiates with the Telecom Service Provider.

3. **Prohibition on Subletting:** These structures will not be sublet without the permission of the Local Body/SADA, which has granted the original permission.

4. **Other Clearances:** Requisite clearances from Defense, Prasar Bharti and Civil Aviation by the telecom companies all by themselves as per the requirements of these authorities. However, the other clearances shall be obtained by the Telecom Service Provider independently on his own and it shall not be a pre-requisite for granting permission based on documentation in point no. 5 below:

5. **Documentation:** Application to a Local Body/SADA shall be made along with the following documents:

i. Affidavit from the owner of the land/building containing his consent along with proof of ownership.

ii. Copy of sanctioned roof plan. If the tower is to be erected on an existing building. As far as possible, sufficient open space should be left on all sides of the tower to ensure that damage is not caused, if the tower falls down. If due to any specific site related limitations, sufficient space cannot be left, and if permission is to be granted, third party insurance of such amount shall be done, as may be decided by the sanctioning authority.

iii. Design parameters and foundations details. Drawing of tower with complete details in shape of ferro-prints. Height of the tower and HT lines in the vicinity should be clearly indicated.

iv. Structural safety certificate of tower from a graduate structural engineer who should be a member of IEEE.





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v. Indemnity Bond to take care of any loss or injury due to accident caused by the tower (including a declaration to the effect that the applicant shall take special precautions for fire safety and lightning.
vi. Requisite Fee by way of a Demand Draft.
vii. Revenue documents i.e. tatima and jamabandi in original.
viii. Site plan in scale of 1:200 and location plan in 1:1000.
ix. Copy of completion plan of the building if tower is to be erected on top of an existing building.

**Note:** In case of Gram Panchayats, roof plan at Sr. No. (ii) and completion plan as per Sr. No. (ix) shall not be needed shall not be required.

6. **Deemed Approval:** A final decision shall be taken within 30 days from the date of submission of all the documents. If the documents submitted for permission are complete in all respects and a decision is not taken within 30 days, deemed permission shall be assumed. Local Body/SADA/MC shall also have online application form for installation of Mobile Communication Towers. Monitoring of applications through REFNIC or any other online interface on the lines of website of TCP shall be provided.

7. **Location:** Location of communication towers is governed by radio frequency system and as far as possible, cellular operators should try to avoid residential areas. The location shall be decided as follows:

i. First preference should be given to the location of tower in the commercial areas or other public areas.
ii. Where it is not possible to avoid the location of this tower in residential area, possibility should be explored to locate these in open spaces or on community buildings in these areas.
iii. Where it is not possible to find such suitable space mentioned at Sr. No. (ii) above, tower should be permitted on the roof top of residential buildings.
iv. Erection of towers on heritage buildings shall not be allowed.
v. Such towers can be permitted only on top of buildings already approved or regularized under the law in force.

8. **Compounding of Minor Deviations:** At certain places the Telecommunication Operators are forced by technical feasibility to install Antennae on the particular building which may have minor violations, which are compoundable as per Law. In such cases, building owner can get compounding done in advance for which an outer time of 30 days for taking a final decision shall be applicable.

9. **Noise Pollution:** Generator sets installed at the tower site to cater to the power requirements of the antenna should conform to the noise and emission norms prescribed under the Environment Protection Rules. However, in view of time frames set out for electricity connection, need for generators should be minimized. Acknowledgement of a duly filled application form to the concerned Local Body/SADA shall be deemed to be sufficient for making an application to HPSEP&PCB (Himachal Pradesh State Environment Protection & Pollution Control Board). Consent to operate shall be



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normally granted seeing manufacturers specification sheet, unless there is a felt need of carrying out noise test. However, antenna shall be made operational only after obtaining permission of Local Body/SADA,HPSEB & PCB (if applicable) and other clearances as per S.No. 4 above.

10. **Sharing of Sites:** The Telecom Operators should share the towers for fixing their respective antennas provided that the prescribed technical requirements are duly fulfilled, so as to curtail multiplicity of towers and to optimize the use of the existing ones.

**Electrical Connections:** HPSEB shall provide electrical connections for energizing a tower within 30 days, if the location of tower is within 250 meters of HPSEB system. If the mobile communication towers are located on isolated ridges of the hills and the extension of HT network, installation of step down distribution transformers and extension of L.T. line are required for providing power connection at such places, the connection shall be made available within three months from the date of duly completed application and deposit of requisite amount. Considering low power requirement, the operator should not be normally asked to pay for the entire capital cost of creating necessary infrastructure. Acknowledgement of a duly filled application form to the concerned Local Body/SADA shall be deemed to be sufficient for making an application to HPSEB.

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ANNEXURE - IX

**DEPARTMENT OF ENVIRONMENT, GOVERNMENT OF WEST BENGAL**
**Writers' Buildings, "G" Block, (2nd. Floor),**
**Kolkata-700 001.**
**Phone : 2254-4585 2711-4007**

No. EN/939/T-IV-1/001/2006 Dated: April 24th, 2008

**O R D E R**

**WHEREAS,** the Department of Environment, Government of West Bengal, is entrusted to protect environment which consists of water, air, land and the inter-relationship which exists amongst water, air, land, and human beings, other living creatures, plants, micro-organism and property within the territorial jurisdiction of West Bengal .

**AND WHEREAS** the Department of Environment, Government of West Bengal, is empowered under Environment (Protection) Act, 1986 and Rules made there under for imposing restrictions upon the industries, operation or process for maintaining safeguard of the environment and also entrusted for laying down procedure for the prevention of environmental hazards.

**AND WHEREAS** the Department of Environment has received number of complaints regarding indiscriminate installation of mobile towers in residential and school building and after necessary technical scrutiny and after considering different technical papers, it is observed that overwhelming increase in the number of installation of mobile towers even on residential buildings, schools, hostels and hospitals and such installations have a harmful electromagnetic radiations;

**AND WHEREAS** it is observed that in New Delhi, Principal Secretary, Health and Family Welfare had already issued a circular in respect of guideline for installation of the mobile towers;

**HENCE,** in exercise of the powers conferred under Environment (Protection) Act, 1986 and rules made there under, all mobile phone service providers are hereby directed to follow the following guidelines strictly at the time of installation of the mobile towers.

- Installation of Base Station Antennas within the premises of schools and hospitals may be avoided because children and patients are more susceptible to Electro Magnetic Field.
- Installation of Base Station Antennas in narrow lanes should be avoided in order to reduce the risks caused by any earth quake or wind related disaster.
- The Base Station Antennas should be at least 3 m away from the nearby building and antennas should not directly face the building. Further, the lower end of the antenna should be at least 3 m above the ground or roof.
- In case of multiple transmitter sites at a specific locality sharing of a common tower infrastructure, should be explored, as far as possible, which can be coordinated through a nodal agency.
- Access to Base Station Antenna sites should be prohibited for general public by suitable means such as wire fencing, locking of the door to the roof etc. Access to tower site, even for the maintenance personnel, should be for a minimum period as far as possible.
- Sign boards/Warning Signs are to be provided at Base Station Antenna sites which



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should be clearly visible and identifiable. A warning sign should be placed at the entrance of such zone.

- The "Warning Sign" should discourage longer stay in the zone, even for the maintenance personnel. The sign board may contain the following text
  i. Danger ! RF radiations, Do not enter !
  ii. Restricted Area.

The operators and maintenance personnel, who are dealing with radio frequency devices, especially with Base Station Antennas installed on towers and at any other outdoor sites, should be protected from electromagnetic radiations. It is required that operators and maintenance personnel should be educated for possible hazards from these devices.

All local authorities are also requested that before giving any permission for installation of the mobile towers aforementioned guidelines should be consider.

In case of non-compliance of the aforementioned directions, regulatory order will be issued in accordance with law.

By Order,
Sd/-
( M. L. Meena ) Principal Secretary,
Department of Environment

**Copy forwarded to :-**

1. The Incharge, M/s. Bharti Mobitel Limited (Airtel), Infinity Building, 5th. Floor, Salt Lake Electronics Complex, Bidhannagar, Block G.P. Sector-V, Kolkata-700091.
2. The Incharge, Vodafone Essar East Limited (Vodafone), Constantia Office Complex, 4th. Floor, 11, Dr. U.N. Brahmachari Road, Kolkata-700017.
3. The Incharge, Aircel Business Solutions (Aircel), Benfish Bhavan, No. 31, GN Block, 5th. Floor, Sector-V, Salt Lake, Kolkata-700 091.
4. The Incharge, Tata Teleservices Limited (Tata Indicom), C/o. Videsh Sanchar Bhawan, Camp Office- 1/18, C.I.T. Scheme, VII M, Ultandaga, Kolkata-700054.
5. The Incharge, Bharat Sanchar Nigam Limited (BSNL Mobile), Telephone Kendra, P-10, New CIT Road, Kolkata-700073.
6. The Chairman, West Bengal Pollution Control Board.
7. The Member-Secretary, Central Pollution Control Board, Paribesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
8. The Chief Environment Officer, Department of Environment, Govt. of West Bengal.
9. The Member-Secretary, West Bengal Pollution Control Board, `Paribesh Bhawan', Salt Lake City, Kolkata-700098.
10. The Commissioner, Kolkata Municipal Corporation, 5, S.N. Banerjee Road, Kolkata-700013.
11. The Commissioner, Howrah Municipal Corporation, Howrah.
12. The Chief Executive Officer, _____
13. The Executive Officer, _____
14. The Secretary, ……Zilla Parishad.
    with a request to circulate this memo to the Panchayats for information and necessary action.
15. The District Magistrate_____

Sd/-
**Chief Law Officer,**
**Department of Environment**





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ANNEXURE X

**KARNATAKA STATE POLLUTION CONTROL BOARD**
**Consent Form-SCHEDULE**
**TERMS AND CONDITIONS**
**KSPCB/RO-BNG(S-II) EO/DEO/AEO-2APC/2009-10/**

**A). DISCHARGE OF EMISSIONS UNDER THE AIR ACT**

1. The discharge of emissions from the premises of the applicant shall pass through the stack/chimney/outlet mentioned in this consent order where from the Board shall be free to collect the samples at any time in accordance with the Act or Rules made there under.

**C). GENERAL CONDITIONS**

1. The applicant shall provide water meters for every source of water and shall submit the cess returns regularly as required under Water Cess Act before the 5th of every month in the prescribed form.
2. The applicant shall display the consent granted in a prominent place for perusal of the inspecting officers of the Board.
3. The applicant shall provide alternate power supply sufficient to operate all Pollution Control equipments utilized by the applicant to maintain compliance with the terms and conditions of this consent.
4. The applicant shall provide port holes for sampling the emissions, access platforms for carrying out stack sampling, electrical points and all other necessary arrangements including ladder.
5. The applicant shall furnish Environmental Statement for every financial year ending with 31st March in Form – V as per Environment (Protection) rules – 1986. The Statement shall be furnished before the end of September.
6. The applicant shall not change the manufacturing products & installed capacity without prior approval of the Board.
7. Noise Pollution Control:

a) The applicant shall take steps to control noise levels so as to maintain ambient air quality standard in respect of noise as laid down under the Air Act 1981.

b) The applicant shall provide necessary acoustic enclosures or measures to control noise levels generated from the DG Sets as per Environment Protection Rules, 1986.

8. The applicant is heirs, legal representatives or assigns shall have no claims what so ever to the continuation or renewal of this consent after expiry of the period of consent.
9. The applicant shall forth with keep the Board informed of any accident of unforeseen act or event of any poisonous, noxious or polluting matter or emissions are being discharged into stream or well or air as a result of such discharge, water or air is being polluted.
10. The Board reserves the right to review, impose additional conditions, revoke, change or alter terms and conditions of this consent.
11. The applicant shall make an application for consent at least 120 days before expiry of this consent.

sd-
Dtd:28.01.10
**For and on behalf of the KSPCB**
**ENVIRONMENTAL OFFICER**



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| | | | |
|---|---|---|---|
| 1. | Chimney | : | 1 |
| 2. | Chimney Attached to | : | 15 KVA DG Set |
| 3. | Minimum Chimney Height to be Provided Above ground level | : | 3 mtrs ARL |
| 4. | Rate of emission NM3/Hr | : | |
| 5. | Constituents to be Controlled in the emission | : | SO2 |
| 6. | Tolerance limits Mg/NM3 | : | |
| 7. | Air Pollution Control equipment to be installed, in addition to Chimney height as per Col (3) | : | As per Col. (3) with acoustic enclosure. |
| 8. | Date of which air pollution Control equipments shall be provided to achieve the stipulated tolerance limits and chimney heights conforming to stipulated heights. | : | At all times |
| 9. | Remarks | : | 1). The emission rate of all chimneys shall be reported within 30 days.<br>2). Details of D.G. Sets if any like KVA rating fuel consumption in kg/Hr., Chimney height above roof level and dia to be furnished within 30 days. D.G. Sets and other noise generating machinery to be provided with silencers/ Mufflers to reduce the noise pollution.<br>3). There shall be no smell or odour nuisance from the industry.<br>4). There shall be no other sources of air pollution. |

**Note:**

1. The unit shall take adequate measures to ensure that the noise levels within the industry premises does not exceed 65 db (A) leq during day time & 55 db (A) leq during night time.
2. There shall not be any other Air Pollution sources.
3. There shall not be any complaint from the public regarding noise Pollution.
4. Waste oil generated from servicing of D.G. Set and from process shall dispose off scientifically as per the provision of Hazardous Waste (Management, Handling & Tran boundary Movement) Rules, 2008.

**ENVIRONMENTAL OFFICER**
**BANGALORE (SOUTH) REGION-II**





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ANNEXURE - XI

## TRIPURA POLLUTION CONTROL BOARD

### A NOTE ON MOBILE TELEPHONE TOWER

1. There is a wide spread apprehension that the Electro-Magnetic Radiation (EMR) originating from the antennas of Mobile Telephone Towers (also called Mobile Phone Base Stations i.e. MPBSs) poses a serious health hazard.
2. Tripura State Pollution Control Board (TSPCB) received a complaint in this line in 2005. The issue was referred to IIT, Guwahati through the Principal, Tripura Engineering College (now NIT) who was a member of the Board at that time. After consultation with IIT, Guwahati he informed that Mobile Tower Radiation does not pose any health hazard.
3. On 10.01.2008 Principal Secretary, Health and Family Welfare, Government of NCT, Delhi issued a revised guideline for setting up Mobile Telephone Towers.
4. On 24.04.2008 the Environment Secretary, Government of West Bengal also issued a similar guideline.
5. Various newspapers as well as electronic media carried stories about these guidelines with highlights on the health hazard posed by the Mobile Telephone Towers.
6. Soon thereafter we started receiving large number of complaints along with requests to take action for removal of the Towers from their respective areas.
7. As the matter is not covered by any of the existing Environment/Pollution Control Acts and Rules, TSPCB referred the matter to the Central Pollution Control Board for advice.
8. In their reply dated 24.07.2008, the Central Pollution Control Board has said:

i. Overall there is not enough evidence to show direct health hazard of RF(radio frequency in which MPBSs operate).

ii. "However, the matter of direct concern to PCBs (Pollution Control Boards) is the noise/air emission from the power generator sets attached to such MPBSs.

9. In this connection it may further be added that in pursuance of a direction issued by Hon'ble High Court of Mumbai in WP No. 2112, the Ministry of Health and Family Welfare, Government of India got the matter examined by a committee headed by Dr. N.K. Ganguly, Director General, Indian Council of Medical Research. Some of the observations made by the committee are:

i. RF exposures from Mobile Base Stations are much less than from Radio, FM Radio and Television transmissions.

ii. Various studies conducted across the world on RF from Mobile Base Stations have shown that the exposures are of a much lower magnitude than the internationally accepted level.

iii. At the moment there is no concrete evidence of any health hazard and WHO has the same opinion as mentioned in the latest fact sheet modified in May, 2006.



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ANNEXURE - XII

## ASSAM STATE POLLUTION CONTROL BOARD

## GUIDELINES FOR INSTALLATION OF MOBILE TOWER ANTENNAS

Guidelines of Pollution Control Board, Assam for the installation of Base Station Antennas and Associated D.G. Sets

Whereas, Pollution Control Board, Assam under the Department of Environment & Forests, Govt. of Assam is entrusted to protect environment which consists water, air and land and the inter-relationship amongst water, air, land and human beings, other living creatures, plants, micro-organism and property within the territorial jurisdiction of Assam.

And Whereas, Pollution Control Board, Assam under the Department of Environment & Forests, Govt. of Assam is empowered under the Air (Prevention & Control of Pollution) Act, 1981 and Rules made there under for imposing restrictions upon the industries, operation or process for maintaining safeguard of the environment and also entrusted for laying down procedure for the prevention of environmental hazards.

And Whereas, Pollution Control Board, Assam under the Department of Environment & Forests, Govt. of Assam has received number of complaints regarding indiscriminate installation of mobile towers in residential and school building and after necessary technical scrutiny and after considering different technical papers, it is observed that overwhelming increase in the number of installation of mobile towers even on residential buildings, schools, hostels and hospitals and such installations have a harmful electromagnetic radiations;

And whereas, it is observed that in New Delhi, Principal Secretary, Health and Family Welfare had already issued a circular on 10.01.08 in respect of guidelines for installation of the mobile towers:

HENCE, in exercise of the powers conferred under Air (Prevention & Control of Pollution) Act, 1981 and rules made there under, all mobile phone service providers are hereby directed to follow the following guidelines strictly at the time of installation of the mobile towers:

- Installation of Towers in residential areas will be allowed only in consultation with the concerned Resident Welfare Associations and not left to bilateral negotiations between Telecom Companies and individual residents / house owners.

- Installation of Base Station Antennas within the premises of schools and hospitals may be avoided because children and patients are more susceptible to Electromagnetic Field.





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- Installation of Base Station Antennas in narrow lanes should be avoided in order to reduce the risks caused by any earthquake or wind related disaster.

- The Base Station Antennas should be at least 3m away from the nearby building and antennas should not directly face the building. Further, the lower end of the antenna should be at least 3m above the ground or roof.

- UPS/Inverter instead of D.G. set should be installed specially in urban areas.

- In case of multiple transmitter sites at a specific locality sharing of a common tower infrastructure, should be explored, as far as possible, which can be coordinated through a nodal agency.

- Access to Base Station Antenna sites should be prohibited for general public by suitable means such as wire fencing, locking of the door to the roof etc. access to tower site, even for the maintenance personnel, should be for a minimum period as far as possible.

- Sign Boards/Warning signs are to be provided at Base Station Antenna sites which should be clearly visible and identifiable. A warning sign should be placed at the entrance of such zone.

- The "Warning sign" should discourage longer stay in the zone, even for the maintenance personnel.

The signboard may contain the following text.

i. Danger! R F radiations, do not enter
ii. Restricted Area.

The operators and maintenance personnel, who are dealing with radio frequency devices, specially with Base Station Antennas installed on towns and at any other outdoor sites, should be protected from electromagnetic radiations. It is required that operators and maintenance personnel should be educated for possible hazards from these devices.

All local authorities are also requested that before giving any permission for installation of the mobile towers aforementioned guidelines should be considered.
In case of non-compliance of the above-mentioned directions, regulatory order will be issued in accordance with law.

Guidelines for the installation of DG set is given in the Appendix-'A'

Sd/-
**Member-Secretary**
**Pollution Control Board, Assam**
**Guwahti, Bamunimaidam-21**



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## STANDARDS AND GUIDELINES FOR CONTROL OF NOISE POLLUTION FROM STATIONARY DIESEL GENERATOR DG SETS (15-500KVA)

**(A) Notes standard for DG sets (15-500KVA)**

The total sound power level LW of DG set should less than 94 + 10 log 10 (KVA), dB (A), at the manufacturing stage, weather, KVA is the nominal power rating of a DG set.

This level should fell by 5 dB (A) every five years, till 2007, i.e. in 2002 and then in 2007.

**(B) Mandatary Acoustic enclosure/ Acoustic treatment of room for stationary DG sets (5 KVA and above).**

Noise from the DG sets should be controlled by providing on acoustic enclosure on by treating the room acoustically.

The acoustic enclosure / acoustic treatment of the room should be designed for minimum 25 dB (A). Insertion loss for meeting the ambient noise standards, whichever is on the higher side (if the actual ambient noise is on the higher side, it may not be possible to check the performance of the acoustic enclosure / acoustic treatment. Under circumstances the performance may be checked for noise reduction upto actual ambient noise level, preferably in the night time). The measurement for Insertion Loss may be done at different points at 0.5 m from the acoustic enclosure/ room, and then averaged. (See the Schematic Diagram).

The DG set should also be provided with proper exhaust muffler with Insertion Doss of minimum 25 dB (A).

**Guidelines for the manufacturers/Users of DG sets (5 KVA and above).**

- The manufacture should offer to the user a standard acoustic enclosure of 25 dB (A). Insertion Loss and also a suitable exhaust muffler with Insertion Loss of 25 dB (A).
- The users should make efforts to bring down the noise levels due to DG set, outside his premises, within the ambient noise requirements by proper siting and control measures.
- The manufacture should furnish noise power levels of the unsilenced DG sets as per standard prescribed under (A).
- The total sound power level of a DG set at the user's end, shall be within to 2 dB(A) of the total sound power level of the DG Set, at the manufacturing stage, as described under (A).
- Installation of DG set must be strictly in compliance with the recommendations of the DG set manufacturers.
- A proper routine and maintenance procedure for the DG set should be set and followed with consultation with the DG set manufacturer which would help prevent





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noise levels of the DG set from deteriorating with use.

2.44.0 NOISE: (AMBIENT STANDARDS) Source: EPA, 1956(GSR7, dated: 22.12.1998)

| Area Code | Category of Area | Day Time | Limit in dB (A) Leq Night Time |
|---|---|---|---|
| A. | Industrial Area | 75 | 70 |
| B. | Commercial Area | 65 | 35 |
| C. | Residential Area | 55 | 45 |
| D. | Silence Zone | 50 | 40 |

Note – 1 Day Time is reckoned in Between 6:00 A.M. and 9:00 P.M.
Note – 1 Night Time is reckoned in Between 9:00 P.M. and 6:00 A.M.
Note – 1 Silence Zone is defined as areas upto 100 meters around such premises as Hospitals, Educational Institutions and Courts. The silence zones are to be declared by the Competent Authority.

Note – 1 Mixed categories of area should be declared as one of the four above mentioned categories by the Competent Authority and the corresponding standard shall apply.

Source: EPA Notification [G.S.R. 1063 (E), Dt. 26th Dec 1989-]

3.22.0 DIESEL GENERATOR SETS: STACK HEIGHT.

The minimum height of stack to be provided with each generator sets can be worked out using the following formula:

$H = h+0.2x\sqrt{KVA}$
H = Total height of stack in metre
h = Height of the building in meters where the generator set is Installed
KVA = Total generator capacityof the set in KVA.

Based on the above formula the minimum stack height to be provided with different range of generators sets may be categorised as follows:

| | |
|---|---|
| 50 KVA | Ht. of the building+ 1.5 metre. |
| 50 KVA – 100 KVA | Ht. of the building + 2 metre. |
| 100 KVA – 150 KVA | Ht. of the building + 2.5 metre. |
| 150 KVA – 200 KVA | Ht. of the building + 3 metre. |
| 200 KVA – 250 KVA | Ht. of the building + 3.5 metre. |
| 250 KVA – 300 KVA | Ht. of the building + 3.5 metre. |

Similarly for the higher KVA rating a stack height can be worked out using the above formula.

Source: Evolved by CPCB (Emission Regulation Part IV: COINDS/26/1986-87)

**PART –C SI. No. 1 STACK GAS: PM-150/ug/Nm3**





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**B. AMBIENT AIR STANDARDS:**

| Residential Area | Industrial Area | Sensitive Area |
|---|---|---|
| SO2 80*/ug/m3 | 120*/ug/m3 | 30* /ug/m3 |
| NO2 80*/ug/m3 | 120*/ug/m3 | 30* /ug/m3 |
| CO 2.0**/ug/m3 | 5.0** /ug/m3 | 1.0** /ug/m3 |

*24 hourly
**8 hourly

5. Schematic Diagram of D.G. set in on Acoustic Enclosure No. PROBES/71/1998-99

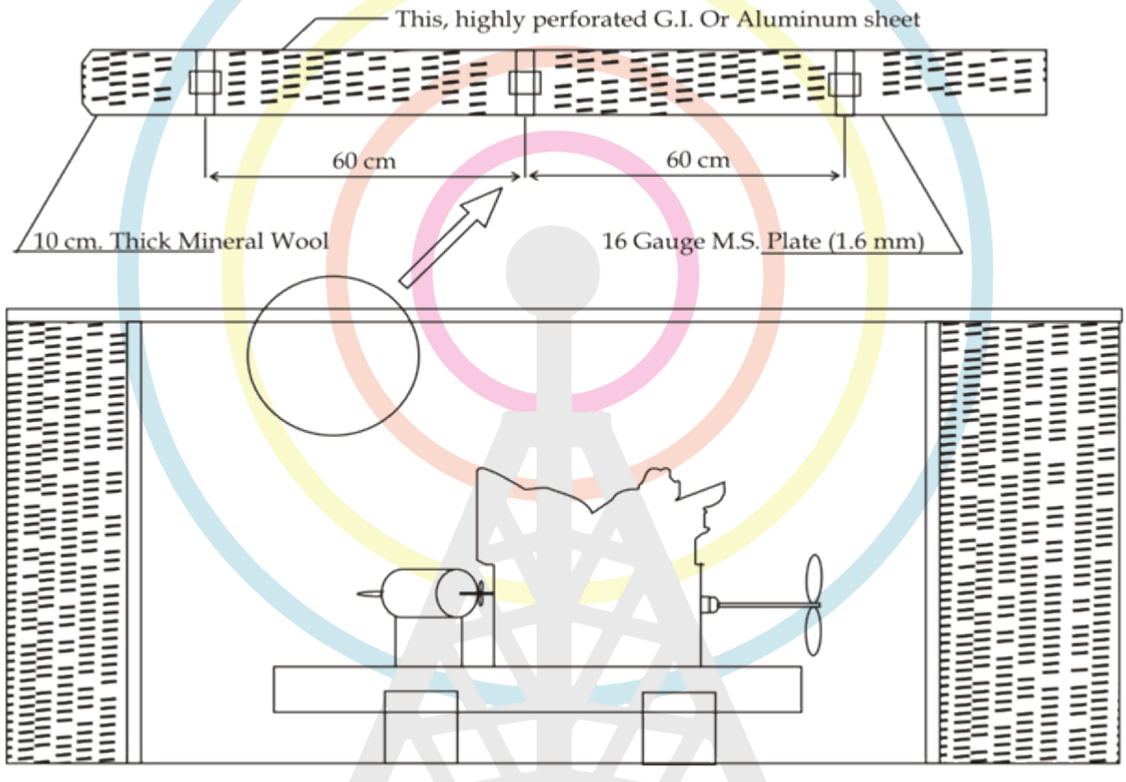


*Figure 4. Schematic Diagram of the DG Set in on Acoustic Enclosure.*

Air required for the ventilation and breathing of the engine will have to be provided by means of intake louvers and exhaust louvers (called parallel baffie pufflers) projecting out of the enclosure.

Sd/-
**Member Secretary**





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ANNEXURE XIII

**KERALA POLLUTION CONTROL BOARD**
**Pottom. P.O. Thiruvanathapuram-695004**

**Circular No. PCP/HO/GEN/CON/1/06** **Dated 19.01.2007**

**Sub : Consent for telecommunication installations**

The board in its 154th meeting noted the introduction of centralized consent granting system for telecommunication installations. Major operators like BSNL, Aircel, Idea, Tata Tele Communications, Reliance, Hutch etc have been addressed for applying for the consent per district. The first issue will be from the Head Office. Complaint enquiry and related issues, consent compliance monitoring and subsequent renewal/refusal shall be from the concerned district offices.

The following procedure is followed for processing such consent applications.

1. One single application for each district mentioning all sites of the telecommunication installations shall be submitted by the applicant consent fee based on the capital investment of tower cost, DG set cost and 20 times annual lease amount ( in case of leased plot ) or the actual land cost. An affidavit showing the total investment and other relevant details are to be submitted along with the application. A specimen copy of the affidavit is attached.

2. Applications received are to be scrutinized in the Head office of the Board and decision of application to be taken within 30 days from receipt of application. The affidavit submitted by the applicant in stamp paper worth Rs. 50/- may be relied upon for granting/refusing the consent after inspection, verification of application and necessary action may be done by the District Offices subsequently once the consent is granted.

3. Once a single consent for towers in the district is granted from HO, further issue of consent for additional towers and renewal of consent in that district shall be carried out in concerned District Offices.

Encl : As above MEMBER SECRETARY

To,

All Heads of Offices of ROs/Dos/Surveillance Centre

Copy to :

All technical staff in the Head office



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**Affidavit Form**
**(to be submitted in stamp paper worth atleast: Rs,.50/-)**

We hereby submit the following additional information for further processing of the application for consent to establish/operate under the Air (prevention & control of Pollution) Act, 1981.

1. …… ……district :……..
2. Copy of each site location plan is attached.
3. Minimum set back of 3m from the boundary to tower is proposed/ provided at all sites.
4. Minimum set back of 3m from the boundary to D.G. Set cabin is proposed/provided at all sites.
5. Acoustic enclosures are proposed/provided all the sites.
6. Sufficient height (0.2 KVA) for D.G. Set exhaust from the D.G. Set cabins is provided.
7. Particulars of complaint/legal proceeding, if any, against the operation of the tower are attached.
8. Capital investment for each tower is reported.
9. Total Capital Investment for ……..nos. of towers

Rs……

10. Consent fee remitted

Rs……

I/We hereby declare that the information furnished above are correct to the best of my/our knowledge. I understand that the consent being issued is based on the information provided by me. I further understand that in case any mistake or variation is observed by the Board subsequently, the consent is liable to be revoked and I/we am/are liable to be proceeded against.

Signature
**Name of applicant**
**Designation**
**Address of applicant**

**Place :**
**Date :**





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| Sl. No. | CAPITAL INVESTMENT (C.I.) Rs. | ANNUAL RATE OF CONSENT FEE (Rs.) CATEGORY | | |
|---|---|---|---|---|
| | | RED | ORANGE | GREEN |
| 1 | UPTO : LAKH | 540 | 490 | 440 |
| 2 | 1 to less than 2 lakh | 640 | 590 | 540 |
| 3 | 2 to less than 3 lakh | 740 | 690 | 640 |
| 4 | 3 to less than 4 lakh | 840 | 790 | 740 |
| 5 | 4 to less than 5 lakh | 940 | 890 | 840 |
| 6 | 5 lakh | 1140 | 1040 | 940 |
| 7 | Above 5 to less than 6 lakh | 1470 | 1370 | 1270 |
| 8 | 6 to less than 7 lakh | 1570 | 1470 | 1370 |
| 9 | 7 to less than 8 lakh | 1670 | 1570 | 1470 |
| 10 | 8 to less than 9 lakh | 1770 | 1670 | 1570 |
| 11 | 9 to less than 10 lakh | 1870 | 1770 | 1670 |
| 12 | 10 lakh | 2370 | 2120 | 1920 |
| 13 | Above 10 to less than 15 lakh | 3370 | 3120 | 2920 |
| 14 | 15 to less than 20 lakh | 3670 | 3420 | 3170 |
| 15 | 20 to less than 25 lakh | 3970 | 3670 | 3420 |
| 16 | 25 to less than 30 lakh | 4420 | 4020 | 3670 |
| 17 | 30 to less than 35 lakh | 5440 | 4640 | 3670 |
| 18 | 35 to less than 40 lakh | 5440 | 4640 | 4170 |
| 19 | 40 to less than 50 lakh | 6560 | 5600 | 4800 |
| 20 | 50 to less than 75 lakh | 12000 | 10000 | 5000 |
| 21 | 75 to less than 100 lakh | 15000 | 12000 | 10000 |
| 22 | 1 to less than 5 Crore | 20000 | 17000 | 14000 |
| 23 | 5 to less than 10 Crore | 35000 | 25000 | 20000 |
| 24 | 10 to less than 25 Crore | 70000 | 60000 | 50000 |
| 25 | 25 to less than 50 Crore | 100000 | 80000 | 70000 |
| 26 | 50 to less than 100 Crore | 120000 | 100000 | 80000 |
| 27 | 100 to less than 150 Crore | 140000 | 110000 | 90000 |
| 28 | 150 to less than 200 Crore | 200000 | 160000 | 120000 |
| 29 | 200 to less than 250 Crore | 250000 | 200000 | 150000 |
| 30 | 250 to less than 300 Crore | 300000 | 240000 | 180000 |
| 31 | 300 to less than 400 Crore | 400000 | 320000 | 240000 |
| 32 | 400 to less than 500 Crore | 500000 | 400000 | 300000 |
| 33 | 500 to less than 600 Crore | 600000 | 480000 | 360000 |
| 34 | 600 to less than 700 Crore | 700000 | 560000 | 420000 |
| 35 | 700 to less than 800 Crore | 800000 | 640000 | 480000 |
| 36 | 800 to less than 900 Crore | 900000 | 720000 | 540000 |
| 37 | 900 to less than 1000 Crore | 1000000 | 800000 | 600000 |
| 38 | 1000 Crore & above | 0.01% of C.I. | 0.008% of C.I. | 0.006% of C.I. |



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## REPORT OF THE TECHNICAL COMMITTEE

**August 2008**

To study the various issues with reference to eruction of Mobile communication in Kerala and Recommend Solutions to Government

### 1. Background

The Government vide GO (Rt) No: 2557/07/LSGD dt. 19.09.2007 constituted a Technical committee with the following experts to study the various issues with reference to eruction of mobile communication towers in Kerala, and to recommend the solution to Government.

1. Sri. G.S. Bhuvaneshwar, Head, Biomedical Technology Wing, Sree Chitra Tirunal Institute for Medical Science and Technology, Thiruvanathapuram.
2. Prof. A.R. Velayudhan Pillai, Structural consultant (Quality Control) SRRDA
3. Sri Eapen Varughese, Chief Town Planner
4. Sri. S.S. Thampi ITS, General Manager, BSNL

The committee at its first meeting on 19.10.2007 had discussed in general about the issue and presents the statutory provision. As decided in the said meeting, Mobile phone operators and service providers were invited for a hearing on 03.11.2007. Altogether 14 representatives turned up and they submitted their views in writing and briefed the same to the committee. Objections and suggestions received from the public and other were forwarded to the committee members for information and perusal. After studying them, the committee again met on 29.04.2008, discussed about various items to be considered for recommendation and all the members visited three sites where mobile tower were located to note the emission levels. It was also decided to conduct a hearing on 24.05.2008 to hear persons representing any organisation or firm, who had requested for hearing. Hearing was held on 24.05.2008 and the objection and suggestions were heard by the committee. In the subsequent meeting on 21.06.2008, the committee reviewed the details collected and started drafting the report. At the meeting held on 21.08.2008, the committee finalized the report and recommendations.

### 2. Meeting with Mobile Operators and Infrastructure Providers

A meeting of the mobile operators and Infrastructure providers (IP) were held on 03.11.2007. All the operators and IP providers present in Kerala attended the meeting and presented their arguments in the following lines.

I. The Ministry of Health and Family Welfare under the Chairmanship of Mr. Ganguly, DG, ICMR, conducted a study on this issue on the directions of the Hon'ble Mumbai High Court. In the report, apart from other recommendations it was pointed out that "there is no enough evidence to show any direct health hazard of RF exposure from Mobile Base Station"[1].

II. The Atomic Energy Regulatory Body also produced a report before the Mumbai High Court which states that the radio frequency waves used for mobile phone are not





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covered under the definition of "Radiation" as given in the Atomic Energy Act 1962.[2]

III. Yet another study conducted by the Radiation Protection Division (NRPB) of UK Health Protection Agency has reported, in the year 2000, that the balance of evidence indicated that there is no general risk to the health of people living near the base station on the basis that exposure are expected to be small fractions of the maximum safety level.[3]

IV. It has also been scientifically proved that the use of mobile phones, AM Radio, FM Radio etc. are more harmful to the human beings compared to the power emission from the Base Transceiving Station.

V. WHO study on the subject also concludes that there is no effect on humans.

VI. Copies of the approval received from the Forest Department for installation of Telecommunication towers even in ecologically fragile zones.[4]

VII. Taking into account all the above studies and reports, Hon'ble High Court of Kerala in WP(C) 18242/065 has dealt with the question whether the Panchayat has got the power to cancel the license issued for installation of communication towers. The division bench has clearly stated that Panchayat does not have power to cancel a license issued merely based on an apprehension that radiation may cause health hazards to the people of the locality, provided the tower has been built after complying all the formalities under the relevant statues which clearly shows that the present check measure are conclusive.

**In view of above they requested that**

1. The mobile tower and its operations may be removed from the ambit of zoning and sub-division regulations.
2. To order that the existing parameters as per Kerala Municipality Building Rules, 1999 is conclusive as far as mobile tower operation are concerned or in the alternative.
3. To order construction of mobile tower and other connected operations may be included in all the zones as permitted operations.

The counsel for the operators present in the meeting opined that the State Government has no power to make regulations in the subject of Telecommunications as it is central subject. It was pointed out by the committee members that State Government is concerned about Health and Safety of the people and the subject health is coming under the concurrent list outlined in the constitution.

### 3. Public Hearing by the Committee

Several objections and suggestions were received from the public, as there were lots of letters on the subject. After going through these representations, the committee decided to conduct a hearing from the public on 24-05-2008. Persons representing any organization or firm, who had requested for hearing were invited and heard. The General observations and suggestions are as follows:

1. The radiation from the mobile towers may retard mental and physical growth.
2. Continuous emission in small quantity (even in small quantity) from the mobile towers may lead to sleeplessness, eye diseases, skin diseases and sleeplessness.



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3. Mobile Tower shall not be installed in thickly populated areas.
4. Mobile towers shall not be installed within 100m-200m from the schools.
5. Proper lightening protection measures are not provided in many towers and those have lead to damage in nearby buildings and electrical appliances.
6. The structural stability of mobile towers is to be ensured by the municipal authorities.
7. There must be sharing of towers.
8. Awareness among public on the use of mobile must be made. Children below 10 years must be strictly restricted from using mobile phones.

## 4. Field Visit by the Committee

The committee had measured the power levels in the important locations in the Thiruvananthapuram city with the help of BSNL mobile team using drive test tool. The findings are given below.

1. The power level measured at the bottom of a tower was found to be -40 dBm (i.e. 0 0.1 microwatt)
2. The Power level measured 35 m away from the tower was found to be -46 dBm (i.e. 0.025 Microwatt)
3. The Power level measured 75 m from the tower was found to be -60 dBm (i.e. 0.001 Microwatt)
4. The power level measured at Vazhuthacaud and Bakery Junctions were all in the sub microwatt levels which was far less than the level specified by the international commission for Non Ionization Radiation Protection (ICNIRP).

## 5. Observations by the committee

The Committee had gone through the websites of the world bodies dealing with the subject. The committee has noted that considerable research had been undertaken by the various countries on the subject. Opinions expressed by some of the reputed organizations are as follows.

- World Health Organization (WHO) recommends adoption of the International Commission on Non-Ionization Radiation Protection (ICNIRP) 1998 guidelines6 and states that these guidelines "…. offer protection against all identified hazards of RF energy with large safely margins"[7].
- "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[8].
- "To date, all expert reviews on the health effects of exposure to RF fields have reached the same conclusion: "…no adverse health consequence established from exposure to RF fields …" WHO[9].
- The WHO states that "Current scientific evidence indicates that exposure to RF fields, such as those emitted by mobile phones and their base stations, is unlikely to induce or promote cancer" [10].
- Overall, the existing scientific literature provides no convincing evidence that the use of radiotelephones or other radio systems, whether analogue or digital poses a long-term public health hazard –European Commission Expert Group.[11]





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- "In many cases where the general public has shown concern, radiation intensity has proved to be less than a thousand of the permitted level"[12]. To summarize, mobile telecommunications base stations do not constitute a risk regarding radiation protection –Swedish Radiation Protection Institute[13].
- "The Nordic Authorities[14] agrees that there is no specific evidence for any adverse health effects from mobile telecommunication system neither from the base stations nor from the handsets. There are a number of published reports suggesting that biological effects may occur at exposure levels below the ICNIRP guidelines. …. important to note that biological effects do not necessarily imply health hazard". Nordic Countries: Denmark, Finland, Iceland, Norway, Sweden.
- "The AFSEE notes that the general analysis of current scientific data on exposure to base station waves show no health risk linked to mobile phone base stations [15]….. " French Environment Health and Safety Agency (AFSEE)
- There is no substantive evidence that adverse health effects, including cancer, can occur in people exposed to levels at or below the limits on whole body average SAR recommended by INIRC (IRPA/INIRC 1988) or at or below the ICNIRP limits for localized SAR .[16]
- No adverse health effects are expected from continuous exposure to the RF radiation emitted by the antennas on mobile telephone base stations towers- Australian Radiation Protection and Nuclear Safety Agency[17].
- "The weight of national and International scientific opinion is that there is no substantiated evidence that exposure to low level RF EME cause adverse health effects. The view is backed by every major review panel on the subject including the Royal Society of Canada (1999), the International Expert Group on Mobile Phones (2000), the French Health General directorate (2001) and ARPANSA's RF standard Working Group (2002)"- Australia : Committee on Electromagnetic Energy Public Health Issues. [18]
- "Regarding Health Hazards: As per the information available with TRAI there is no definite conclusive study, which confirms that health is adversely affected by radiations emitted by mobile phones" –Telecom Regulatory Authority of India. [19]
- The Atomic Energy Regulatory Body also produced a report before the Mumbai High Court which states that the radio frequency waves used for mobile phones are not covered under the definition of "Radiation" as given in the Atomic Energy Act 1962. [20]

The International Commission in Non-Ionizing Protection (ICNIRP) specifies Specific Absorption Rate (SAR) for various Frequencies. For 10 MHz to 10 GHz range, it imposes a basic restriction as described below for an averaging time of 6 minutes.

| | Whole body SAR (Watts/kg) | Localized SAR in 10g(Watts/kg) Head and Trunk | Arms and legs |
|---|---|---|---|
| General Public Exposure | 0.08 | 2 | 4 |
| Occupational Exposure | 0.4 | 10 | 20 |

The Institute of Electrical and Electronic Engineers (IEEE) specifications are similar to the ICNIRP levels

| | Whole body SAR (Watts/kg) | Localized SAR in 10g(Watts/kg) Head and Trunk | Arms and legs |
|---|---|---|---|
| Uncontrolled Exposure | 0.08 | 1.6 (1g) | 4(10g) |
| Controlled Exposure | 0.4 | 8 (1g) | 20 (10g) |



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The Transmission from the mobile Tower is classified as Non-Ionizing, which is different from Ionizing radiations such as X-rays, Gamma rays and atomic radiations. In non-ionizing radiations, thermal effects predominated when it comes to injury to human being – like in the case of radiations from microwave ovens. Non-ionizing radiation from mobile towers is of low power levels and hence not produces heating effects that can damage body tissues.

There is an immediate minimum reduction of more than 2 billion times as the microwave energy enters the atmosphere. The signal power level reduces in a logarithmic manner as we move away from the tower.

The Mobile antennae are fed 5 watts to 20 watts of power in the normal course. The Standing advisory Committee on Frequency Allocation (SACFA) under the Wireless Planning Wing of DOT does not give permission to operate above 20 Watts in India. On the other hand, Mobile set transmit from 0.25 Watt to 2 Watt depending the distance from the mobile tower. As the handset moves away it increases the power to a maximum of 2 watts.

As the frequency spectrum (Number of radio channels) is limited, there is a need for mobile operators to establish more and more BTSs to accommodate the ever increasing customer base. As BTS count is increasing, they have to reduce the power for facilitating the frequency reuse.

It is now established that the mobile handsets are to be treated with caution than the mobile towers. Many studies cautions that a handset is kept near the brain or heart could affect these parts in the long run if the usage is continuous, especially in children less than 18 years. They suggest the use of hand free devices or speaker rather than direct use of handset near the ear.

## 6. Need for caution

Through thermal effects from mobile radiation is ruled out, it is the non-thermal effects which are under research currently by various countries in the world. International bodies still suspect that there could some effect from microwave transmission even at the very low power level and continuously in search of conclusive proof since past many years.

As the administrations world over take a cautious approach, the committee feels that we also should take a few precautions which will not hinder the mobile growth at the same time the general population is not subjected to higher power levels from the mobile tower transmissions.

The safety of the structures holding Roof Top Towers (RTTs) is a matter of concern for the general public in Kerala. Since towers over the buildings are becoming common in the densely populated urban area, there is a need to tighten the safety provisions provided in the Kerala Municipal Building Rules, 1999.

## 7. Recommendations

The committee, having gone through subject matter in detail, recommends the following:

1. The Antenna should be mounted on or above 30 m from the ground where the power at antenna port is 10 Watts or above. Micro and Pico Cell antennae mounted inside the building should not exceed 5 watts.
2. Towers (Both ground based and roof based) should be avoided within 50 m from school or hospitals. New towers should be located 50 m away from schools and hospital buildings. Existing tower should be relocated within a year if they are located within 30 m from the schools or Operation room /Intensive care unit in hospitals.



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3. Kerala State shall request Central Government to ask Department of Telecommunication (DOT) to ensure that the operators are not exceeding the levels stipulated by TEC through its field units or Wireless monitoring units under the Wireless Planning and Co-ordination Wing (WPC).
4. Central Government may be urged to undertake campaigns to alleviate fears among the public about the radiation from mobile towers. Central Government may be urged to appoint Ombudsman for Telecom related complaints.
5. Prolonged users should be encouraged to use earphones instead of keeping mobile handsets near the ears.
6. Operators should be asked to refrain from advertisements depicting children using mobile phones.
7. For improving the accountability of certificates issuing agencies, stability certificate for tower should be submitted from Structural Engineers with PG qualification from the State or Central Government or PSUs under the State or Central Government. Such Engineers should be personally accountable for the safety of the structure for a period of 5 years from the date of certification.
8. DOT may be urged to advise its field units to entertain complaints on radiation, improper earthing of tower and facilitate its measurements to the General Public. DOT units shall measures the power levels and earth values on specific complaints against the mobile towers.
9. Central Government may be urged to adopt the safety levels recommended by ICNIRP guidelines in India.
10. Mobile Towers may be permitted across all developable zones in the Zoning regulation of the Town Planning schemes subject to the conditions specified in the chapter 19 Kerala Municipality Building Rules, 1999. The following suggested modifications along with points (1) and (2) above may be considered to be included in the said chapter-19:

i. 3 metres setback specified in rule 131(1) of Kerala Municipality Building Rules, 1999 shall be increased to 5 metres
ii. 1.20 m specified for the distance from the boundary of the plot in rule 131(3) shall be increased to 3 metres.

sd/-
**Sri.G. S. Bhuvaneshwar**
**Head, Biomedical Technology Wing,**
**Sree Chitra Tirunal Institute for**
**Medical Science and Technology**
**Thiruvanathapuram**

sd/-
**Sri Eapen Varughese**
**Chief Tower Planner**

Sd/-
**Sri. S.S. Thampai. ITS,**
**General Manager Telecom**
**Bharat Sanchar Nigam Limited**



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## References


1 Judgement dt. 12.06.2006 in WP(C ) 18242 & 16724 of 2006 of the Hon'ble High Court, Kerala
2 Letter No. CH/AERB/RSD/2004/7010 DATED 06th October, 2004
3 As in reference(1) above
4 As cited by the mobile operators
5 As in reference in (1) above
6 http://www.icnirp.de/documents/emfgdl.pdf
7 http://www.who.int/mediacentre/factsheets/fs193/en/print.html
8 http://www.who.int/pen-emf/about/WhatisEMF.en/print.html
9 http://www.who.int/peh-emf/meeting/ottawa_june05/en/print.html
10 http://www.who.int/mediacentre/factsheets/fs193/en/pring.html
11 http://rpd.oxfordjournals.org/cgi/content/abstract/72/3-4/313
12 http://www.ssi.se/english/Mobi_eng.pdf
13 http://www.fcps.edu/fts/safety-security/publications/RFEESurvey/Safetyhealthbackgound.html
14 http://www.mmfai.org/public/healthoverview.cfm
15 http://www.afsse.fr/upload/bibliotheque/994597576240248663335826568793/statement_mobile_phones_2003.pdf
16 http://rdp.oxfordjournals.org/cgi/content/abstract/72/3-4/167
17 http://www.arpansa.gov.au/mobilephones/index.cfm
18 http://www.arpansa.gov.av/pubs/eme/fact1.pdf
19 new paper report_Tribune news 27 September, 2007
20 Reference in the decision rendered by the Division Bench of the Hon'ble High Court of Kerala in WPC No: 118242 & 16724 of 2006 of Reliance Infocom Ltd. V. Chemancherry Grama Panchayat reported in 2006(4) KLT 695.


## Abbreviations:

| | |
|---|---|
| ARPANSA | Australian Radiation Protection and Nuclear Safety Agency |
| AFSEE | Agence Francaise de Securite Sanitaire Environmentale (The French agency for environmental health safety) |
| AM | Amplitude Modulation |
| BSNL | Bharat Sanchar Nigam Limited |
| BTS | Base Transceiving Station |
| dBm | Decible ( 1 Milliwatt as reference level) |
| DG | Director General |
| DOT | Department of Telecommunications, India |
| EME | Electro Magnetic Emissions |
| FM | Frequency Modulation |
| GHz | Giga Hertz |
| ICMR | Indian Council for Medical Research |
| ICNIRP | International Commission on Non-Ionizing Radiation Protection |
| IEEE | Institute of Electrical and Electronic Engineers |
| INIRC | International Non-Ionizing Radiation Committee |

| | |
|---|---|
| IRPA | International Radiation Protection Association |
| ITS | Indian Telecommunication Service |
| Kg | Kilogram |
| m | Metres |
| MHz | Mega Hertz |
| NRPB | National Radiation Protection Board |
| PSU | Public Sector Undertaking |
| RF | Radio Frequency |
| RTT | Roof Top Tower |
| SACRA | Standing Advisory Committee on Frequency Allocation |
| SAR | Specific Absorption Rate |
| TEC | Telecommunication Engineering Centre |
| TRAI | Telecom Regulatory Authority |
| UK | United Kingdom |
| WHO | World Health Organization |
| WP(C) | Writ Petition (Civil) |
| WPC | Wireless Planning and Co-ordination Wing |

Minutes of the meeting of the Technical Committee to study the various issues with reference to eruction of mobile communication towers in Kerala, and the recommend solutions to Government

**Venue:** Chamber of the Chief Town Planner
Office of the Chief Town Planner
Palayam, Thiruvananthapuram

**Time:** 05.30 PM on 21-08-08

**Attendance**

| | | |
|---|---|---|
| 1. | Sri. G. S. Bhuvaneshwar,<br>Head, Biomedical Technology Wing<br>Sree Chithra Tirunal Institute for<br>Medical Science and Technology, Thiruvananthapuram | Member |
| 2. | Sri. S. S. Thampi, ITS<br>General Manager, BSNL | Member |
| 3. | Sri Eapen Varughese,<br>Chief Town Planner | Member<br>(Convener) |

The convener of the committee read out the draft report. After detailed discussion, the committee approved the report. It was decided to forward the report to Government.

The meeting concluded at 06.30 PM

**CHIEF TOWN PLANNER**



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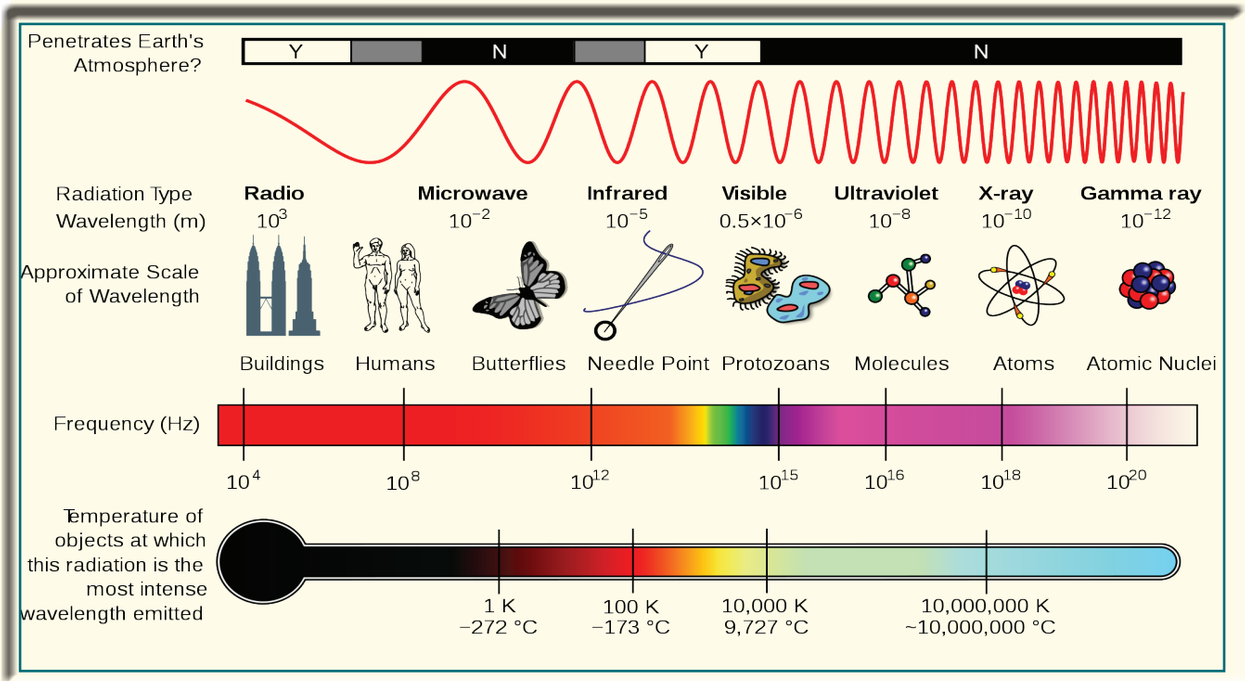
## Electromagnetic Spectrum Properties

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| 49. | Highlights – 2004 |
| 50. | Bio-mapping of Rivers Case Study Assam State |
| 51. | Highlight – 2005 |
| 52. | Activated Sludge Process |
| 53. | Highlight – 2006 |
| 54. | Cadmium |
| 55. | Highlight – 2007 |
| 56. | ENVIS Newsletter "Water Quality Management in India" |
| 57. | Hazardous Air Pollutants (HAPs) |
| 58. | Parivesh Highlight 2008 |
| 59. | Mercury - Environmental Implication & Toxicity |
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***Print & Published by:*** PR Division, Central Pollution Control Board on behalf of Sh. J.S. Kamyotra, Member Secretary, CPCB.

***Compiled by:*** Ms. P. K. Selvi and Ms. Mita Sharma, Coordination Cell, CPCB.



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