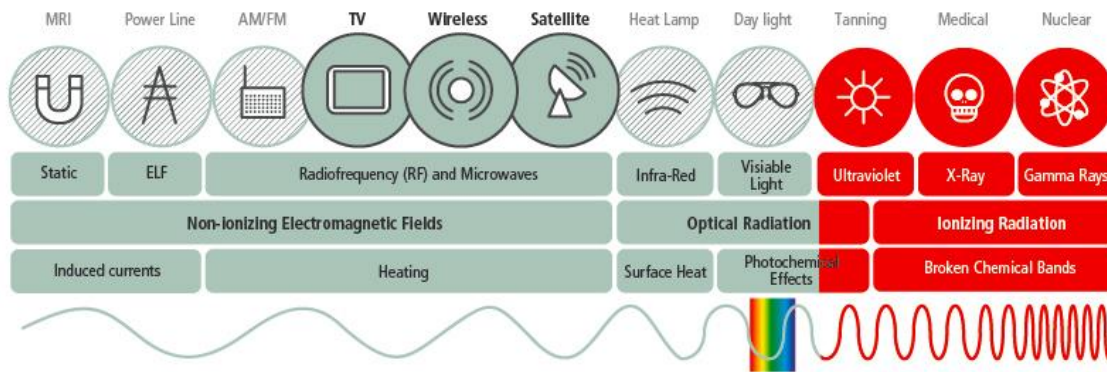


## EMF Overview

### 1. What is EMF?

EMF stands for electromagnetic field. Electromagnetic fields are present everywhere in our environment – the earth, sun and ionosphere are all natural sources of EMF.



Electromagnetic fields (EMFs) are created by electric power charges. There are two types of fields – electric fields which result from the strength (voltage) of the charge and magnetic fields which result from the motion (amperage) of the charge. A stationary charge will produce only an electric field in the surrounding space. If the charge is moving, a magnetic field is also produced. The mutual interaction of electric and magnetic fields produces an electromagnetic field.

EMFs are also created whenever an electrical appliance is connected to the mains supply, including many in daily use such as refrigerators, hairdryers and computers.

Many electrical appliances don't just create EM fields – they rely on EMF to work. Television and radio, mobile and cordless phones, remote control handsets, baby monitors and the communication systems used by emergency services all communicate using Radio Frequency EM fields. So do wireless technologies such as WiFi, which is increasingly used by computer networks, to connect to the Internet.

Radio communications are a part of everyday life in today's society. All radio communication systems utilise EMF in the radiofrequency (RF) part of the electromagnetic spectrum. Typical background EMF levels from radio communications systems are very low and well below safety guidelines.

A cellphone handset contains a radio transmitter and receiver, for sending and receiving radio signals from other phones. The radio transmitter and receiver are low-powered, which means cellphones cannot send signals very far. This is a deliberate feature of their design, since all that a cellphone has to do is communicate with its nearest mast and base station (BTS) often also called a "cell". The base station has to pick up faint signals from many cellphones and route them onward to their destination, which is why the masts have antennas (often mounted on a tower or tall building). A cellphone automatically communicates with the nearest cell and calls can be transferred from one base station to another. A mobile phone needs to have 'sight' of a mobile phone base station. In other words, the radio signal from the phone to the base station needs to be of adequate quality and should be uninterrupted to enable making calls.

### 2. International Research on Health Aspects of EMF

World Health Organisation (WHO) has referred to approximately 25,000 articles published around the world over past 30 years, and based on an in-depth review of scientific literature, has concluded: **"current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic field"**. Since the effects on human beings are to be studied over a long period of time, further studies are going on around the world.

With reference to Electromagnetic Radiation emanating from cellular mobile towers, World Health Organization (WHO) in its Fact Sheet No. 304, May 2006 on Electromagnetic Fields and Public Health (Base Stations and Wireless Technologies) has concluded that:

**"considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak Radio Frequency (RF) Signals from base stations and wireless networks caused adverse health effects.**

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

In September 2013, WHO in online question and answers, have mentioned that **"Studies to date provide no indication that environmental exposure to RF fields, such as from base stations, increases the risk of cancer or any other disease."**

### **3. Steps taken by Department of Telecommunications**

Department of Telecommunication (DoT), since 2008, has been monitoring global developments and has already taken necessary steps and adopted stricter norms for safety from EMF radiation that are emitted from mobile towers and mobile handsets. Government of India has been taking due precautions and necessary actions in respect of EMF radiation emitted from mobile towers and mobile handsets by issuing various guidelines and norms taking into account the international standards/norms prescribed by International Commission on Non Ionizing Radiation Protection (ICNIRP) as recommended by World Health Organisation.

### **4. Ensuring compliance to various safe limit standards**

- a) All Base Transceiver Stations (BTSs) are to be safe-limits compliant and certification to this effect is submitted to respective Telecom Enforcement Resource and Monitoring (TERM) Cells of DoT on launch, whenever a change occurs and also on a biennial basis.
- b) All new BTS sites start radiating commercially only after such certification is submitted to relevant TERM Cells. Format for Certification of BTS for compliance of EMF levels are provided by DoT/TEC in line with international norms of (International Telecommunication Union) ITU-K.52 and ITU- K.100 providing details of site data, photographs, technical parameters, frequency, power density etc.
- c) Extensive Audit of Compliance of Self-Certificates being submitted by Telecom service Providers is regularly being carried out by TERM field units. Further, every year upto 10% of the total BTSs are also tested by TERM Cells where physical measurements are conducted.
- d) Additionally, BTSs against which there are public complaints are also tested by TERM Cells.
- e) The testing is done as per detailed test procedure published by Telecom Engineering Centre (TEC).
- f) In case, any BTS site is found to violate the prescribed EMF norms, actions are taken to put a penalty of 10 lakh per BTS per incidence including closing of BTS if violation persists.

The present EMF emissions limits/levels for BTSs for general public exposure are as below (These are 1/10<sup>th</sup> of limits prescribed by ICNIRP and recommended by WHO for general public exposure) –

Frequency Range	E-Field Strength (Volt/Meter (V/m))	H-Field Strength (Amp/Meter (A/m))	Power Density (Watt/Sq.Meter (W/Sq.m))
400MHz to 2000MHz	$0.434f^{1/2}$	$0.0011f^{1/2}$	$f/2000$
2GHz to 300GHz	19.29	0.05	1

(f is frequency in MHz)

These Limits are cumulative exposure from all antennas installed in the vicinity.

Keeping the precautionary EMF safe exposure limits for the Radio Frequency Field (Base Station Emissions) as 1/10th of the safe limits prescribed by ICNIRP for all areas in India, eliminates the need for fixing lower limits for specific areas like schools, hospitals, residential premises, children playgrounds and other such areas; a segregation of which is impractical in densely populated localities.

For more details and pamphlets please see :-

DoT website a Journey for EMF at <http://www.dot.gov.in/journey-emf>  
and Tarang Sanchar Learn Section at <http://tarangsanchar.gov.in/EMFPortal/Learn>

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