

ISO 9001 : 2008

TEC

टी ई सी संचारिका NEWSLETTER

VOL 14

October 2010

ISSUE 3

Electromagnetic Radiation from Mobile Services



ISO 9001:2008

TELECOMUUNICATION ENGINEERING CENTRE

IN THIS ISSUE

- ELECTROMAGNETIC RADIATION FROM MOBILE SERVICES

1.0 Introduction :

There is growing public concern about the effects of electromagnetic radiation on human health due to the proliferation of ubiquitous mobile services. This special issue of TEC Newsletter is being presented with an objective to explain the concept of electromagnetic radiation and also to present a brief on the measures taken by the DOT to control radiation from mobile services & to protect the general public.

2.0 Electromagnetic Radiation :

Electric fields are created by difference in voltages: the higher the voltage difference, the stronger will be the resultant field. Magnetic fields are created when electric current flows: the greater the current, the stronger the magnetic field. The Electromagnetic field (EMF) can be viewed as the combination of an electric field and a magnetic field.

Electromagnetic radiation is defined as the propagation of energy through space. The energy associated with an electromagnetic wave depends on its frequency. Electromagnetic waves of higher frequency carry more energy than lower frequency fields.

2.1 Ionizing Radiation

X-rays and gamma rays (which have very high electromagnetic frequencies) have a relatively

large energy content causes biological effects through the breaking of molecular bonds, which can damage genetic material such as DNA. Therefore, X-rays and gamma rays are examples of ionizing radiation.

2.2 Non-ionizing Radiation

The radio frequency electromagnetic fields emission (up to 300GHz) are found at relatively low end of electromagnetic spectrum and the energy carried by them are unable to break chemical bonds between molecules, therefore, called non-ionizing radiation.

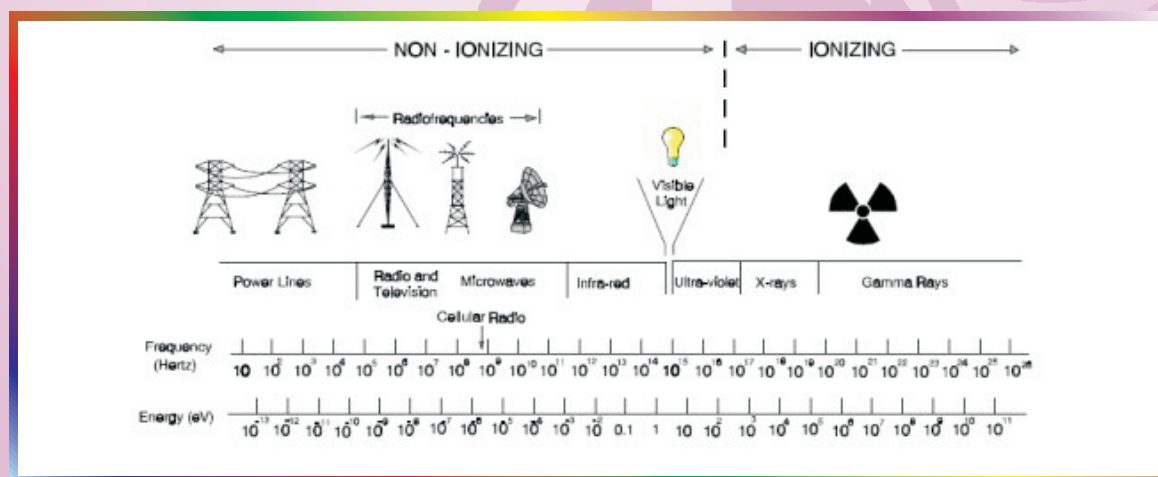
Base Transceiver Stations (BTS) of Mobile Communication Network radiate electromagnetic fields. Similarly Mobile Handsets also produce Electromagnetic radiations. The electromagnetic fields emission from mobile handsets and BTS falls in the category of non-ionizing radiation.

The following diagram depicts the frequency spectrum and its broad usage.

3.0 Electromagnetic Radiation in Telecom Sector :

Electromagnetic radiation in Telecom sector can be classified into two categories :

- (1) Radiation from Mobile Handsets and hand held devices used for mobile communication and wireless broadband access.



- (2) Radiation from Base Transceiver Stations (BTSs) of GSM, CDMA, 2G, 3G for Mobile Communication Network and from Wimax for Wireless Broadband Access.

4.0 International Standards on Electromagnetic Radiation in telecom sector :

International Commission on Non-Ionizing Radiation Protection (ICNIRP) is an international independent scientific organization that provides guidance and advice on the health hazards of non-ionizing radiation exposure.

ICNIRP has published guidelines for limiting exposure to time varying electromagnetic fields in the frequency range up to 300 GHz. Its guidelines are endorsed by the World Health Organization (WHO).

4.1 ICNIRP guidelines for limiting for exposure to Electromagnetic radiation from Base Transceiver Stations (BTSs) :

The reference levels of electromagnetic fields prescribed in ICNIRP guidelines safe for general public as given below have been adopted by Department of Telecommunication for Telecom sector in India :

Frequency range	Electric field strength (V/m)	Magnetic field Strength (A/m)	Power Density Seq (W/m ²)
400MHz to 2000 MHz	$1.375 f^{1/2}$	$0.0037 f^{1/2}$	$f/200$
2GHz to 300 GHz	61	0.16	10

Summary of reference levels / limits considered safe for general public are as below :

General Public Exposure Levels	Frequency range MHz	E field (V/m)	Power (W/m ²)
ICNIRP (Recognized by WHO)	400 MHz	28	2
	900 MHz	41	4.5
	1800 MHz	58	9
	2100 MHz	61	10

4.2 ICNIRP guidelines for limiting exposure from Mobile Phone Handsets :

Specific Absorption Rate (SAR) is a measure to know the levels of exposure to electromagnetic fields from mobile handsets. It is the rate at which human body absorbs electromagnetic power radiated from mobile phones.

India has adopted the above ICNIRP guidelines and notified for seeking compliance of Mobile Handsets being manufactured in India as well as the mobile handsets being imported in terms of SAR value limited to 2 W/kg localized for head and trunk in the frequency range of 10 MHz to 10 GHz.

5.0 WHO fact sheets on Radiation Effects of Mobile Services :

- (a) Fact sheet N°304 May 2006 on Electromagnetic fields and public health: Base stations and wireless technologies concludes as below :
- “Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects”
- (b) Fact sheet N°193 May 2010 on Electromagnetic fields and public health: mobile phones :

Following key facts were noted :

- Mobile phone use is ubiquitous with an estimated 4.6 billion subscriptions globally.
- To date, no adverse health effects have been established for mobile phone use.
- Studies are ongoing to assess potential long-term effects of mobile phone use.
- There is an increased risk of road traffic injuries when drivers use mobile phones (either handheld or “hands-free”) while driving.

6.0 Measures taken by DoT to control EMF Radiations :

1. The Telecom Commission decided to approve/ adopt ICNIRP guidelines in telecommunication sector in India regarding basic restrictions and reference levels for limiting EMF exposure.
2. Department of Telecommunication has notified for seeking compliance of Mobile Handsets being manufactured in India as well as those being imported in terms of SAR value limited to 2 W/kg localized for head and trunk in the frequency range of 10 MHz to 10 GHz. The License agreement was amended by insertion of clause 43.6A confirming limits/levels for antennae (Base Station Emissions) safe for general public as prescribed by International Commission on Non-Ionizing Radiation Protection (ICNIRP).
3. TEC has published Test Procedure for measurements of EMF from Base Transceiver Stations vide Document No: TEC/TP/EMF/001/01.SEP-2009. The procedure seeks for compliance of Electromagnetic Field exposure levels prescribed by ICNIRP. A supplement addendum to this was also issued in August 2010. This supplement has been made available on TEC website.

4. DOT has directed all CMTS/ UAS licensees for compliance of the reference limits/levels prescribed by ICNIRP by way of self certification of their BTS for meeting the EMF radiations norms.

5. Telecom Enforcement Resource & Monitoring (TERM) Cells have been entrusted with the job of conducting audit on the self certification furnished by the Service Providers.

7.0 Monitoring of Radiation from mobile services :

7.1 Monitoring of Cellular BTSs for compliance of safe limits prescribed for general public :

- (i) TERM Cell shall carry out test audit of 10% of the new BTS sites randomly and the BTS site against which there is public complaint as per procedure laid down. The cost of the test of Rs. 10,000/- per site per Service Provider is to be borne by the mobile Service Operator.
- (ii) For non-compliance of EMR criterion a penalty of Rs. 5 lakh shall be levied per BTS per Service Provider.

7.2 Monitoring of mobile phone hand-sets for compliance in terms of SAR value limited to 2 W/Kg :

- (i) SAR Laboratory would be set up in TEC, New Delhi for testing SAR value of mobile handsets.
- (ii) Manufacturer/importer shall provide 2 random samples of each model being sold in India to TEC for check of compliance in terms of SAR value, before launching mobile handset in the Indian market.
- (iii) TEC or its authorized representative will also have discretion to pick up 2 to 10 samples from market or from the factory of manufacturer/stock of the importer at latter's cost for testing, if any doubt arises w.r.t. SAR

value of any model due to complaint or by any other reason.

- (iv) The TEC will maintain list of all the models which have been submitted to it, along with self-certification, on its website with their SAR values. As soon as sample of a model is tested by TEC, model status will be changed to “tested by TEC”. Models which have not been submitted to TEC and distributed in the market, if comes to notice of TEC, will also be listed on the TEC website for public information.

Other important activities during July 2010 to September 2010.

1. Release of document “National IPv6 Deployment Roadmap”.

A function to release the IPv6 Policy Document “**National IPv6 Deployment Roadmap**” by Thiru A.Raja, Hon’ble MOC&IT, Government of India, was organized on 20th July 2010 at Electronics Niketan, CGO Complex, New Delhi. Shri Sachin Pilot, Hon’ble MOS(C&IT), Government of India also graced the occasion. The function marked the completion of one year of activities on IPv6 entrusted to TEC by the Telecom Commission. Last financial year TEC had conducted various workshops and seminars throughout the country and based upon the inputs from them the “National IPv6 Deployment Roadmap” a policy document for transition from IPv4 to IPv6 in India was prepared by TEC and approved by the Government for implementation by different stakeholders specially Central and State Government departments and Telecom Service Providers. The function was organised with the support of Department of Information Technology.



Release function of the IPv6 Policy Document :-

(From left) Shri Chandra Prakash, Member (Technology), DoT, Shri N.K. Srivastava, Sr. DDG, TEC, Thiru A. Raja, Hon'ble MOC & IT, Government of India, Shri Sachin Pilot, Hon'ble MOS(C&IT), Government of India, Shri R.Chandrashekhhar, the then Secretary, Department of Information Technology, now Chariman Telecom Commission and Secretary DoT

2. हिन्दी पखवाड़ा समारोह

दूरसंचार इंजीनियरिंग केन्द्र द्वारा 1 सितम्बर से 15 सितम्बर तक हिन्दी पखवाड़ा मनाया गया। पखवाड़े के दौरान विभिन्न प्रतियोगिताएं आयोजित की गईं, जिसमें संस्थान के कर्मचारियों व अधिकारियों ने बढ़-चढ़ कर हिस्सा लिया। हिन्दी पखवाड़े का समापन वरिष्ठ उपमहा निदेशक की अध्यक्षता में 17 सितम्बर 2010 को सम्पन्न हुआ।



हिन्दी पखवाड़े के समापन समारोह में :-

दाएं से श्री एन.के. श्रीवास्तव, वरिष्ठ उपमहानिदेशक, श्री सुनील पुरोहित, अध्यक्ष राजभाषा कार्यान्वयन समिति एवं श्री ए.एस.मीना, सचिव राजभाषा कार्यान्वयन समिति, दूरसंचार इंजीनियरिंग केन्द्र, नई दिल्ली

Important Activities of TEC during July 2010 to September 2010

New / Revised GRs / IRs :

- Lightning & Surge Protection of Telecom Site.

Amendments :

- Amendment to GR of EMF strength measuring instrument (GR/EMF-01/01 March 2009), Supplement on test procedure for measurement of EMF from base station antenna (TEC/TP/EMF-001/01. Sept.2009), Adhesive PVC Tape (G/CJM-06/03.Feb.2004), and Sealant Tape (G/CJM-08/03. Feb.2004)

DCC held for :

- GRs on STM-1, STM-4, STM-16, and STM-64 Synchronous Mux,
- GR on Splice protection Sleeves for Optical Fibre,
- GR on Splice protection Sleeves for Ribbon Fibre,
- GR on Tower Mount Amplifier,
- GR on Fibre to the Antenna,
- GR on 7GHz Waveguide,
- GR on 7GHz STM-I Microwave Equipment
- GR on Portable VSAT Terminal,
- GR on Splice Filling Compound,
- GR on Thermoshrink sleeve, closure channel and branch – off clip,
- GR on Cable Cleaning Liquid,
- GR on SMPS Power Plant,

Other Activities :

- National Telecom Academy under TEC has been approved by DoT for training/workshops /seminars etc of Telecom Officers and proposed recruited ADEsT in future.
- Conduction of two workshops on Mobile Number Portability (MNP) Implementation,
- Conduction of one workshop on Electromagnetic Field, Measurement and compliance audit.



ISO 9001 : 2008

TEC Conducts
Type Approval
Interface Approval
Certificate of Approval
on
Telecome Products

Visit

www.tec.gov.in
Contact

Eastern Region	:	033-23570003
Western Region	:	022-26610900
Northern Region	:	011-23329464
Southern Region	:	080-26642900

Approvals issued by TEC during the period July 2010 to September 2010

Interface Approvals.....27

Certificate of Approvals.....35

DISCLAIMER : TEC Newsletter provides general technical information only and it does not reflect the views of DoT, TRAI or any other organisation. TEC/Editor shall not be responsible for any errors, omissions or incompleteness.

टी ई सी संचारिका

अक्टूबर 2010

भाग 14

अंक 3

दूरसंचार इंजीनियरी केन्द्र

खुरशीद लाल भवन

जनपथ

नई दिल्ली - 110001

Editor : Sunil Purohit, DDG (S) Phone : 23329354 Fax : 23318724 Email : ddgs.tec@gov.in