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TEC

टी ई सी संचारिका NEWSLETTER

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SAR (Specific Absorption Rate) Lab



Hon'ble MOC&IT Shri. Kapil Sibal Inaugurating the lab at TEC



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TELECOMMUNICATION ENGINEERING CENTRE

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1.0 TEC has commissioned two labs on 21.01.2013 namely Specific Absorption Rate (SAR) lab for mobile handsets and Next Generation Network (NGN) lab. These labs were inaugurated by Hon'ble MOC&IT Shri Kapil Sibal in a function, which was attended by senior officers of DoT.



Sr. DDG, TEC explaining SAR Robot System to Hon'ble MOC&IT Shri Kapil Sibal, in presence of the then Secretary (T) Shri R. Chandrashekhar, Member (T) and others.

2. About SAR lab

The TEC SAR Lab is the first lab in India for independent audit of SAR value, self-certified by mobile handset manufacturers and importers in India. The main equipment of the lab is supplied by M/s. Speag of Switzerland, through its Indian partner.

SAR is closely related to electric field strengths produced inside human body tissues while making communication. It is the rate at which human body absorbs electromagnetic power radiated from mobile phones. Lower the value of SAR, safer the mobile handset for the human use.

This Lab is capable of making SAR measurement for CDMA, GSM 2G and 3G mobile handsets in the frequency band of 800 MHz, 900 MHz, 1800 MHz

and 2100 MHz. The lab is also capable of making measurement of SAR value against the International Commission on non-Ionizing Radio Protection (ICNIRP) limit of 2 Watt per Kilogram measured over 10 gm. of tissue as well as the recently adopted unit in India i.e. 1.6 Watt per Kg measured over 1 gm of tissue.

Government of India has prescribed safety limits for exposure to RF energy produced by mobile devices that mainly exposes the head or a limb for the RF energy. This article presents basics of electromagnetic radiations from Mobile Phones, the standards adopted for safety limits and measures taken by Department of Telecommunications for assessment of compliance to safety limits in terms of SAR values of mobile phones.

3. Electromagnetic Radiation

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.

It has been known for many years that exposure to high levels of RF radiation can be harmful due to the ability of RF energy to heat biological tissue rapidly. This is the principle by which microwave ovens cook food, and exposure to very high RF power densities, i.e., on the order of 1000 W/m^2 or more, can clearly result in heating of biological tissue and an increase in body temperature. Biological effects that result from heating of tissue by RF energy are often referred to as "thermal" effects. Tissue damage in humans could occur during exposure to high RF levels because of the body's inability to cope with or dissipate the excessive heat that could be generated.

There are a number of medical applications of RF energy, including a technique called diathermy, that take advantage of the ability of RF energy to rapidly heat tissue below the body's surface. Tissue heating ("hyperthermia") can be beneficial in the therapeutic treatment of injured tissue and cancerous tumors.

A biological effect occurs when a change can be measured in a biological system after the introduction of some type of stimuli. However, the observation of a biological effect, in itself, does not necessarily suggest the existence of a biological hazard.

A biological effect becomes a safety hazard only when it "causes detectable impairment of the health of the individual"

4.0 Standard for limiting exposure from mobile phone handsets in India

India adopted safety limits as per the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines vide DOT OM No. 18-10/2008-IP Dated 01-09-2008 notified for seeking compliance of Mobile Handsets being manufactured in India as well as the 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.

Based on the recommendations of Inter Departmental Group comprising representatives from TEC, DoT, Indian Council on Medical Research and Ministry of Environment, DoT vide its OM no 32-7/2010-EW dated 17-11-2011 revised the permissible SAR value limits for Mobile Phones from existing 2 W/Kg measured over 10 gm tissue mass (ICNIRP guideline) to 1.6 W/Kg measured over 1 gm tissue mass (IEEE standard).

Directions have been issued to all Indigenous Mobile Manufacturers, TEMA and Indian Cellular

Association for implementation of revised SAR value, the road map will be as under:

- (a) All the new design of mobile handsets shall comply with the SAR value of 1.6 W/kg averaged over 1 gram tissue w.e.f. 1st Sept 2012. However, the mobile handsets with existing design which are compliant with 2.0 W/Kg averaged over 10 gram tissue, may continue to co-exist up to 31st August, 2013.
- (b) From 1st Sept 2013, only the mobile handsets with revised SAR value of 1.6 W/Kg would be permitted to be manufactured or imported in India for domestic market.

5.0 Radiation Effects of Mobile Phones

5.1 World Health Organization (WHO) Fact sheet N°193 May 2010 on Electromagnetic fields and public health: mobile phones:

Key facts noted by WHO are :

- Mobile phone use is ubiquitous with an estimated 4.6 billion subscriptions globally.
- Till date, no adverse health effects have been established for mobile phone use.



Hon'ble MOC&IT Shri Kapil Sibal recording his remarks in visitor book

- 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.

5.2 The International Agency for Research on Cancer (IARC), a part of World Health Organization (WHO), in its Press Release dated 31 May 2011 has classified radio frequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), i.e. there "could be some risk" of carcinogenicity (ability or tendency to produce cancer), based on an increased risk for glioma, a malignant type of brain cancer, associated with wireless phone use.

5.3 Subsequently, WHO in its fact sheet N°193 of June 2011, has stated that Epidemiological research examining potential long-term risks from radiofrequency exposure has mostly looked for an association between brain tumours and mobile phone use. However, because many cancers are not detectable until many years after the interactions that led to the tumour, and since mobile phones were not widely used until the early 1990s, epidemiological studies at present can only assess those cancers that become evident within shorter time periods. However, results of animal studies consistently show no increased cancer risk for long-term exposure to radiofrequency fields.

6.0 Monitoring of Mobile Phone Hand-Sets for compliance of SAR limit of 1.6W/Kg

1. SAR Laboratory has been set up in TEC, New Delhi w.e.f. 21-01-2013 for testing the SAR value to audit the self -certifications furnished by the manufacturers/importers.
2. For monitoring of the compliance of reference levels of SAR values for mobile

handsets product shall comply with the following:

- a) Manufacturer/ importers shall self-certify for compliance of Mobile Handsets being manufactured in India as well as the being imported in terms of latest prescribed SAR value as may be notified time to time.
- b) SAR value to be displayed on the handsets
- c) All the mobile handsets manufacturers, both indigenous and imported, shall provide a self declaration in respect of SAR value based on certificate from internationally accredited labs i.e. laboratories accredited with International Laboratory Accreditation Co-operation (ILAC) or accredited Telecommunication Engineering Centre (TEC). Self declaration of SAR value shall be subjected to TEC audit as and when required.

7.0 SAR Measurement System

The SAR Robot System: Dosimetric Assessment System (DASY) set up is used for conducting SAR measurements. The equipment consists of a 'phantom', precision robot, RF field sensors, and mobile phone holder. The phantom is filled with a liquid that represents the electrical properties of human tissue.

7.1 Components of SAR instrumentation :

Major components are :

- (1) Robot Arm Controller
- (2) Specific Anthropomorphic Mannequin (SAM) Phantom
- (3) Head Tissue Simulating Liquids
- (4) DUT Holder
- (5) Probes & Dipole Kit
- (6) Data Acquisition Electronics
- (7) Measurement Server
- (8) Computer & Software

7.2 Tissue Simulating Liquid: The liquid medium that simulates the Human Tissue is filled in the SAM phantom. The properties of liquid will be different depending upon the frequency band. Typical values of relative permittivity (relative dielectric constant) and conductivity of the medium for various frequency bands are as under:

- 900 MHz : ϵ (41.5), Ω (0.97 S/m)
- 1800 MHz : ϵ (40.0), Ω (1.40 S/m)
- n 2100 MHz : ϵ (39.8), Ω (1.49 S/m)

Different liquids for different bands

- Sugar-Water based liquids up to 1 GHz
 - DGMBE* based liquids for 1 – 3 GHz
 - OIL-Water based liquids above 3 GHz
- * (DGMBE = Diethylene Glycol Mono Butyl Ether)

7.3 Environmental Conditions for SAR Measurement:

- Ambient Temperature of 18-25 °C
- Variation of less than ± 2 °C in liquid temperature during test.
- Noise (after switch off transmitters) & reflections < 0.012 W/Kg
- DUT not to connect to local wireless networks, connection to BS simulator is acceptable.

8.0 SAR Test Procedure

The SAR measurement is to be carried out as per test procedure given in TEC TSTP No: TEC/TSTP/GR/SAR/001/01.MAR-09 which is based international standard IEC 62209-1 (2005)

9.0 Inauguration of NGN Lab

The Next Generation Network (NGN) lab in TEC is a unique test infrastructure of its kind, capable of subjecting Internet Protocol (IP) based equipment for Conformance and Interoperability testing. The



Hon'ble MOC&IT Shri. Kapil Sibal delivering the inaugural speech at the function

lab is equipped with Testing and Measurement Equipment manufactured by M/s Spirent of USA and supplied by M/s Sterlite as System Integrator.

NGN lab has the capability to test both IPv4 and IPv6, including the migration scenarios. The lab also supports the NGN based Interconnection and Voice Over Internet Protocol (VoIP). IPv6 Ready Logo Forum which is international body, has been approached for accreditation for IPv6 testing.



Audience at the inaugural function

The lab is upgradable from the present 1G/10G Electrical/Optical Interfaces to 40G/100G optical interfaces. The test facility can also be augmented to take care of testing of Cloud Computing based implementations.

Expected Users of the lab are Equipment Vendors of NGN products, Application Software Providers, Indigenous Manufacturers of EPABX/IP based equipment and Academic Institutions. IIT Kanpur has tested their IPv6 traffic tool which is installed in ALTTC, BSNL. CDOT has offered its GPON equipment for Network Management Interface testing.

10. Training of ITS 2011 batch starts at NTIPRIT

Two year training of ITS probationers 2011 batch started at NTIPRIT with successful conduction of orientation program from 4th-8th march 2013. Eleven probationers have joined the institute.



The then Secretary (T), Sr. DDG(TEC), DDG (NTI) and Director (NTI) with probationers

During orientation program these young officers interacted with Sh R. Chandrashekhar, Secretary (T), Sh R. Bhatnagar Member (T), Ms Sadhna Dixit Member (F) ,USOF Administrator Sh N Ravi Shankar, Sr DDG TEC Sh Anil Kaushal, CVO DoT

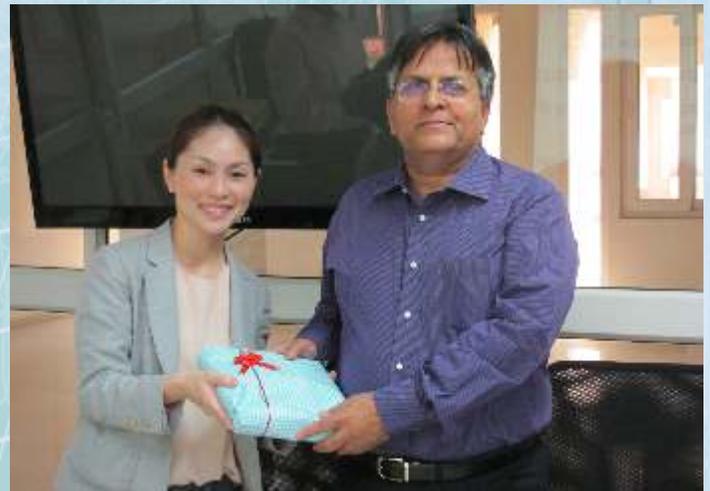
Sh Pankaj Kumar , CMD TCIL Sh Vimal Wakhlu, Sh Pradeep Nagpal CGM ALTTC, Director CDoT Sh Vipin Tyagi, and Sh U.K. Srivastava DDG TEC . Dignitaries shared their experiences with probationers ,motivated and briefed about the challenges ahead in the Department.

11. IPv6 Ready Logo Certification training

NTIPRIT and NGN division of TEC have conducted IPv6 Ready Logo Certification training –cum-evaluation of TEC officers in newly commissioned NGN lab at TEC during 18th -22nd Mar'13. The training was imparted by Akiko Hattori from Japan.



Inauguration of training program by Sr.DDG(TEC)



Sr. DDG(TEC) Shri Anil Kaushal presenting memento to Akiko Hattori

Approvals from 1st Oct. 2012 to 31st March 2013

1	M/s ITI Limited Raebareli
1.1	G-PON,CDOT GPON
2	M/s VMC SYSTEM LIMITED RANGAREDDY(DIST) HYDERABAD
2.1	G-PON,CDOT GPON
3	M/s UNITED TELECOMS LIMITED BANGALORE
3.1	G-PON,CDOT GPON
4	M/s Hewlett Packard India (Sales) Pvt Ltd Mumbai
4.1	Group-3 Fax Machine/Card,VCVRA-1212
4.2	Group-3 Fax Machine/Card,SNPRC-1103-01
4.3	Group-3 Fax Machine/Card,SNPRC-1103-01
5	M/s Sunren Technical Solutions Pvt. Ltd
5.1	V.90 MODEM (Analog),MT5600SMI
5.2	PABX For network conectivity,Mediant 3000
5.3	PABX For PSTN conectivity,Sonus SBC1000
6	M/s Team Engineers Advance Technologies India Private Limited, Hyderabad
6.1	Fast Ethernet to E1 converter,TEAMLINK 3104/08/16
7	M/s Supreme & Co.Pvt.Ltd. Howrah
7.1	Digital Multiplexer(PDH),BorderNet 2020
8	M/s Nokia India Private Limited,
8.1	Blue Tooth Headset,BH-907
9	M/s ERICSSON India Pvt. Ltd.,Gurgaon - 122002
9.1	SDH MULTIPLEX EQUIPMENT ,OMS 1664
10	M/s Himachal Futuristic Communications Limited , Solan.
10.1	G-PON,CDOT GPON
11	M/s NATELCO Infotech Pvt. Ltd.
11.1	Digital Multiplexer(PDH),IMG1010
11.2	Digital Multiplexer(SDH),BorderNet 2020
11.3	Digital Multiplexer(PDH),BorderNet 2020
11.4	Digital Multiplexer(PDH) ,I-Gate4000 Edge
11.5	Digital Multiplexer(PDH) ,I-Gate4000 pro
12	M/s Cisco Systems India (Pvt.) Ltd
12.1	IP PABX For private use,CISCO 881V
12.2	IP PABX For private use,CISCO 887 VA

13	M/s MRO TEK Limited
13.1	High Speed Line Driver,WITLITE-V.35 WL/V.35/ 2W/AC/DC
13.2	High Speed Line Driver,WITLITE-E1 WL/E1/ 2W/AC/DC
14	M/s Bharat Electronics Ltd.
14.1	G-PON,BEL GPON
15	M/s Cosmos Business Machines Pvt. Ltd
15.1	ISDN PABX for Private Use,KX-TDE200
15.2	ISDN PABX for Private Use,KX-TDA 100D
15.3	ISDN PABX for Private Use,KX-TDE100
16	M/s Team Engineers Advance Technologies Pvt.Ltd
16.1	Data Interface to G.703 Interface Converter,TEAMLINK 3002 FC
16.2	High Speed Line Driver,TEAMLINK 4064L- V.35
16.3	High Speed Line Driver, Teamlink 3002 SHDSL V.35
16.4	High Speed Line Driver, TEAMLINK 4064L- G.703
16.5	High Speed Line Driver, Teamlink 3002 SHDSL E1
17	M/sEricssonIndia Pvt Ltd.
17.1	SDH Multiplex equipment with 60 G Cross connect.,OMS 1664
18	M/s Siemens Enterprise Communications PVT Ltd
18.1	PABX For PSTN conectivity,HiPath 3550
18.2	PABX For PSTN conectivity,HiPath 3800
18.3	PABX For PSTN conectivity,HiPath 4000
19	M/s EPSON India Pvt. Ltd
19.1	Group-3 Fax Machine/Card,C471C
19.2	Group-3 Fax Machine/Card,C471B
19.3	Group-3 Fax Machine/Card,C463A
20	M/s MATRIX COMSEC PVT Ltd
20.1	ISDN PABX For PSTN conectivity,Eternity ME
20.2	PABX For PSTN conectivity,Eternity GE 12S
20.3	PABX For PSTN conectivity,Eternity GE6S



Important Activities of TEC during Oct. 12 to Mar 13

New GRs/IRs Issued on

- GR on cloud Infrastructure
- GR On XDSL MDF
- GR On OTN
- GR on Packet Microwave Radio Equipment
- GR On Diameter Signaling Controller
- GR on 10 GPON Technology
- Amendment issue on GR on Raw material for manufacturing optical fibre cable
- IR for GSM/GPRS/EGPRS Mobile/Handset
- IR for CDMA2000 Mobile Handset
- IR for WCDMA/HSPA Mobile Handset
- IR on MRT Communication Equipment
- IR on MRT Subscriber unit
- SR on time Synchronisation

GRs/IRs Revised on

- GR on Digital network Synchronisation Equipment(integrated in switch as well as Standalone)
- GR on 2048Kbps high speed line drivers
- GR on Narrow Band RAS
- GR on UTP to optical converter
- GR on Trunk Media Gateway
- GR on Softswitch (Local and transit wire line application)
- IR on high speed line driver
- IR for interchange of Digital Signals at 2,8,34,45 & 140Mb/s port
- IR on RAS
- IR on IP based Integrated media gateway for NLD/ILD application
- IR on System Employing computer telephony integration

Activities at NTIPRIT

- One batch of ITS 2010 probationers completed 16 week field training and other batch undergoing field training
- ITS-2011 batch joined on 4/3/13



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Approvals issued by TEC during the period Oct. 2012 to Mar 2013

Interface Approvals.....	34
Type Approvals	7
Certificate of Approvals.....	01

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