An Extensive Study & Impact of Radiation from Mobile Towers to Living Being

Prof. (Dr.) Y.P.Singh, Director, Somany P.G. Institute of Technology and Management, Rewari, Haryana
Prof. M.L.Chandna, Director (Research & Projects ), Somany (P.G.) Institute of Technology and Management, Rewari, Haryana

ABSTRACT

With the advent of mobile communication and cell phone Technology, a revolution has been made in the information communication Technology. The development of the new hardware, software, equipments and gadgets has made the globe on a very small zone. To provide the mobile network to the country wide, many Service Providers are providing internet services provider, to customer satisfaction service. Beside they do not care much about the rules, regulations protection from the towers. Present paper is an extensive study of the harmful radiations and their impact on the human being and on nature.

Key Words:
IMC, Gadgets, SAR, WHO, ICNIRP, FCC, ISP

ORGANIZATION OF PAPER:

Present paper has been organized starting from Introduction .Topic 2 tells about the purpose of the study followed by topic 3 is literature Review and topic 4 narrates about Radiation from cell towers and power norms adopted in India, Topic 5 is all about Health effects due to radiation on human and environment, Topic 6 is conclusion of the Study, Topic 7 is all about references followed by about the author.

I. INTRODUCTION:

Cell phone technology has revolutionized the telecommunication scenario in India. Due to its several advantages, cell phone technology has grown exponentially in the last decade. The exploitation of RF range for communication can be simply understood by the fact that out of 921 million connections, 891 million are wireless. In 2014, it has been estimated that there will be almost as many mobile-cellular subscriptions as people in the world which is around 6.8 billion users (according to ITU), 55.8 crores alone in India (according to IBN Live News, India) and nearly 736K cell phone towers to meet the communication demand (according to DoT, India). The numbers of cell phones and cell towers are increasing leaps and bounds without feasibility study and its disadvantages.

A cell phone transmits 1 to 2 Watt of power in the frequency range of 824 - 849 MHz (CDMA), 890 - 915 MHz (GSM900) and 1710 – 1780 MHz (GSM1800). A cell phone has a SAR (Specific Absorption Rate) rating. Recently, in India SAR limit for cell phones is adopted as 1.6W/Kg which is actually for 6 minutes per day usage. It has a safety margin of 3 to 4, Hence, a person should not use cell phone for more than 18 to 24 minutes per day. This information is not commonly known to the people in India, so crores of people use cell phones for more than an hour per day without realizing its associated health hazards. Cell tower antennas transmit in the frequency range of 869 - 894 MHz (CDMA), 935 - 960 MHz (GSM900) and 1810 – 1880 MHz (GSM1800). Also, 3G has been deployed in a few cities, in which base station antenna transmits in the frequency range of 2110 – 2170 MHz and 4G, an evolving technology, is yet to be flourished. Mobile phone operators divide a region in large number of cells, and each cell is divided into number of sectors. A base station and its transmitting power are designed in such a way that mobile phone should be able to transmit and receive enough signal for proper communication up to a few kilo meters.

2. IDENTIFICATION OF PROBLEM & PURPOSE OF THE STUDY:

A , eight member high power committee, consisting of various Ministries (IMC) including Heath and Bio Technology has submitted his report consisting of does and do not does in report of the committee has predicted and recommended certain Rules and Regulations for avoiding the bad and harmful impact of the radiations on the human and other living being like bee, bats, goriaya, butterfly ,other birds and animals like cow, dogs etc.

3. LITERATURE REVIEW AND STUDY:

All cell phones emit a type of radiation called an electromagnetic field (EMF), composed of waves of electric and magnetic energy moving together through space. Different types of electromagnetic energy are categorized by their wavelengths and frequencies and comprise the electromagnetic “spectrum”. Different
Radiation frequencies are used by different technologies. Radio waves and microwaves emitted by transmitting antennas are a form of electromagnetic energy collectively referred to as radiofrequency (RF) energy or radiation. The RF part of the electromagnetic spectrum consists of frequencies in the range of about 3 kilohertz (3 kHz) to 300 gigahertz (300 GHz). RF energy is used in telecommunications services, including radio and television broadcasting, mobile communication, GPS devices, radio communications for police and fire departments, and satellite communications. Non-communication sources of RF energy include microwave ovens, radar, and industrial uses. The Electromagnetic spectrum given below in the figure shows the various radiation frequencies used in different technologies.

Majority of these towers are mounted near the residential and office buildings to provide good mobile phone coverage to the users. The revised radiation norms adopted by DoT for 900Mhz, 1800 Mhz and 2100Mhz band are 0.45 W/m², 0.90W/m² and 1.05W/m² active from the date 01.09.2012. These cell towers transmit radiation 24x7, so people living within 10’s of meters from the tower will receive 10,000 to 10,000,000 times stronger signal than required for mobile communication. In India, crores of people reside within these high radiation zones.

4.0 ANALYSIS PARAMETERS ABOUT THE B.T.S/CELL TOWERS:

The analytical parameters about installing the B.T.S. towers may be studied as.

4.1 Calculation of Energy absorption by a simple man in a day near a tower:
For GSM 900 the Safe Power Limit is .45 watt per meter square for 900 bands. If we model human body as a cylinder, then its area will be 1.436 square meter (average height 5’6” = 1.67 m and waist 34” = 86 cm). So, power received by human body will be power density x area =
6.75 Watts. In one hour, microwave energy absorbed will be $6.75 \times 3600 = 2.32\text{ KW-sec}$. Imagine about a child living in the range of tower for whole day and multiply $2.32\text{KW-sec}$ by a day i.e. (24 hours). The calculation is just for 900 band. Most of the towers are 3G and there are many operators.

4.2 Rules, Regulations and Factors for installing the Mobile/Cell Towers
For installing the mobile/Cell Tower followings are rules, regulations and factors for determination and need of users.

1. Permission from the local self Government is required with or without some licence fees .
2. Permission from the D.O.T. is required.
3. Rules and Regulations framed by the T.R.A.I. has to be followed and maintained.
4. Based on the need and number of the users/customers
5. TRAI ensure that Quality service is being provided to the customer/user.
6. TRAI also monitor and conduct the survey about the quality of service and also issue reservations and directions to improve the services and quality of the services.
7. Normally the Radiating frequency is 900 MHz but to cover the large and more powerful signal some B.T.S. also operating on the 1800 MHz. and also on 2100 MHz.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>ICNIRP Radiation Norms</th>
<th>Revised DoT Norms effective from 01.09.2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>900 MHz</td>
<td>4.5 Watt/Sqm</td>
<td>0.15 Watt/Sqm</td>
</tr>
<tr>
<td>1800 MHz</td>
<td>9.0 Watt/Sqm</td>
<td>0.09 Watt/Sqm</td>
</tr>
<tr>
<td>2100 MHz</td>
<td>10.5 Watt/Sqm</td>
<td>1.05 Watt/Sqm</td>
</tr>
</tbody>
</table>

4.3 Harmful Impact due to Radiations from Mobile/Cell Towers:
Study and survey conducted by the researchers have shown and listed the followings harmful Impact from the radiations from the Cell/Mobile Towers.

1. Tiredness
2. Excessive Sleeplessness
3. Lack of concentration

According to the study reveals by a Bio-Technologist [25] has shown and raised the concern for the radiations from the Towers and listed the same on the basis of the constitutions of the body structure.

1. Body Weight: More the body weight more is the harm to the body.
2. Jeans: Some living being and Plants have weak tissue, who are prone to the harmful impact of the Radiations.
3. Stage: Formation of the new cells have very bad and harmful impact of the Radiations from the Mobile and Cell Towers.
4. Dose: Impact of the Radiations from the Towers depend upon How much time one is spending in the radiation zone.

5.0 CONCLUSIONS:
The seriousness of the health hazards due to radiation from the cell phones and cell towers has not been realized among the common man. Cell operators continue to claim that there are no health issues. Even organizations like WHO, ICNIRP, FCC, etc. have not recommended stricter safe radiation guidelines, whereas several countries have adopted radiation norms, which are 1/100th to 1/1000th of these values based on their studies. Cell phone industry is becoming another cigarette industry, which kept claiming that smoking is not harmful and now there are millions of people around the world who have suffered from smoking. In fact, cell phone/tower radiation is worse than smoking; as one cannot see it or smell it, and its effect on health is noted after a long period of exposure. In addition to the continuous radiation from cell towers, there is radiation from cell phones, wireless phones, computers, laptops, TV towers, FM towers, AM towers, microwave ovens, etc. We are exposed to all these radiations which are additive in nature. Strict laws should be implemented to prevent public from such harmful radiation. Commercial benefits from the telecom industry to our government is remarkable but the real wealth of a country is its people health.

6.0 FURTHER FUTURE STUDY:
Impact study has been made in general. Researchers may carry their research work in the each impact of the radiations from B.T.S. towers.

7. REFERENCES:


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8.0 ABOUT THE AUTHORS:

Prof. (Dr.) Y.P. Singh, currently working as Director, Somany P.G. Institute of Technology and Management, Rewari, Haryana. He has also worked about 27 years as Lecturer, Dean of academics, Principal, Director in many Engineering institutions and organizations. He has also served with Training and Technical Deptt., Govt. Of Delhi, almost for 17 years. He has about 42 research papers published in National and 63 papers published in international journals in his credit. He has been selected and awarded by Govt. of Delhi as “Best Technical Teacher-2004”. Also he has been conferred “Outstanding Teachers Awards “ 2012 & 2013 respectively. He has been awarded with Outstanding Teacher Award 2012 and 2013 also. He has been awarded by Jewel of India 2014. He is also an expert and Master Trainer for the Teachers, empanelled by SCERT/NCERT. And CSTT, MHRD, Govt of India. He is also the guide of research scholar for almost dozen of Universities. His area of Research is mobile and wireless communication, digital signal
processing. Development of algorithms for the Data processing.

Prof. M.L. Chandna, Currently working as Director (Research+Projects) with Somany (P.G.) Institute of Technology and Management. He has Teaching and admin experience of about 42 Years, Beside he has worked 35 years as a faculty in Electronics and communication Engg. with Delhi College of Engg., Bawana, New-Delhi. He is One of the outstanding and eminent Professor in the field of Microwave communication Engg. He also pioneer to Design and Development of the low cost utility based Electronics Projects. His area of Research is microwave engineering, mobile and wireless communication, digital signal processing, Critical study based on Soft Computing.