Radiation Measurement Report

For

[Client Name]

Address:
[Location 1]

By

NESA
Dreams Mall
L-115, Lower Ground Floor,
LBS Road, Bhandup (West)
Mumbai – 400078
Mobile: 9619378318
Email- nesaglobal@gmail.com
Website - www.nesaglobal.com

Radiation measurements have been carried out from various cell towers at [Location 1] on 14/01/2013. The measurements were done by using Hand held Spectrum Analyzer and radiation monitor in the frequency range of 800 MHz to 2500 MHz, which covers CDMA, GSM900, GSM1800 and Wi-Fi/WLAN/Bluetooth frequency bands. The combined measured radiation levels from these sources are given in the attached file
[File name – [Client Name]_eport_Observations].

The measured readings are summarized in Table 1.

Table 1 - Summary of readings measured [Location]

Sl. No.	Location	Maximum radiation measured in different rooms (dBm)	Suggested Solution
1.	Living Room	**-10**	Shielding Film And Curtain On Window, Wallpaper on Wall 1
2.	Bathroom Near Living Room	**-12**	Shielding Film on Window
5.	Kitchen	**-28**	Shielding Film Or Curtain on Window(Optional)
6.	Master Bedroom	**-16**	Shielding Film Or Curtain On Window
7.	Master Bedroom Bathroom	**-16**	Shielding Film on Window
8.	Children Bedroom	**-30**	NIL
9.	Children Bathroom	**-33**	NIL

The combined measured radiation levels are high in Living Room, Bathroom Near Living Room, Master Bedroom and Master Bedroom Bathroom especially near the windows as several cell towers are installed in the neighbouring buildings. Radiation levels less than -30 dBm are indicated by green color implying safe level of radiation. Radiation levels between -15 and -30 dBm are indicated by yellow/amber color implying caution level of radiation. Radiation levels equal to or greater than -15 dBm are indicated by red color implying danger level of radiation. For example, a mobile phone shows full signal strength at -69 dBm and works properly even at -100 dBm power level. In comparison with -80 dBm level (taken in-between value), the measured power levels at some of the places are 60 to 70 dB higher, which translates to 10,00,000 to 100,00,000 times stronger signal than a mobile phone requires.

These measured power levels are in dBm whereas international standards are in terms of power density. In Table 2, conversion from measured power in dBm using a monopole antenna of gain = 2 dB (radiation monitor consists of this antenna) to power density is given.

Table 2 - Conversion from Power received from a monopole antenna of gain = 2 dB to Power Density at different frequencies.

Power received	**Power density for different frequencies (Micro Watt/sq. meter)**		
	f = 900 MHz	**f = 1800 MHz**	**f = 2450 MHz**
10 dBm = 10 mW	706,860	2,827,440	5,238,180
5 dBm = 3.16 mW	223,529	894,115	1,263,793
0 dBm = 1.0 mW	70,686	282,744	523,818
-5 dBm = 316µW	22,352	89,411	126,379
-10 dBm = 100µW	7,068.6	28,274	52,382
-15 dBm = 31.6 µW	2,235	8,941	12,638
-20 dBm = 10 µW	706.9	2,827	5,238
-25 dBm = 3.1 µW	223	894	1,264
-30 dBm = 1 µW	70.7	282.7	523.8
-35 dBm = 0.3 µW	22	89	126
-40 dBm = 0.1µW	7.1	28.3	52.4

where,
f = 900 MHz is approximately the center frequency of CDMA tower transmit frequency band (869 to 890 MHz) and GSM900 tower transmit frequency band (935 to 960 MHz)

f = 1800 MHz represents GSM1800 cell tower transmit frequency band (1810 to 1880 MHz).

f = 2450 MHz is approximately the center frequency of WiFi, WLAN, Bluetooth and Microwave oven frequency bands

The combined radiation level is from all the cell tower frequencies starting from 820 MHz to 2170 MHz. At f = 900 MHz (in-between frequency bands of CDMA and GSM900), for measured power = -15 dBm = 31.6 µW, power density is 2,235 µW/ m^2 and for power = -30 dBm = 1.0 µW, power density is 70.7 µW/ m^2. These radiation density values will be higher corresponding to the higher frequency as indicated in Table 2. These measured values are much below the safety limits adopted by Indian Govt., so all the telecom operators claim that they are within the safe limits. However, the researchers around the world feel that these safe limits are not appropriate. Based on the growing health hazards due to cell tower radiation, various countries have adopted much stricter radiation norms. In Table 3, EMF Exposure standards for RF fields at 900MHz are given.

Country	Watt / m²
INDIA (had adopted ICNIRP)	4.5 (f/200)
INDIA (1/10th of ICNIRP) in effect from Sep 1, 2012	0.45 (f/2000)
AUSTRALIA (New South Wales proposed)	0.00001
AUSTRIA (Salzburg city)	0.001
BELGIUM	0.045 to 1.125

BELGIUM (Luxembourg)	0.024
BIO-INITIATIVE REPORT (Outdoor)	0.001
BIO-INITIATIVE REPORT (Indoor)	0.0001
CANADA (Toronto Board of Health - proposed)	0.1
CHINA	0.4
FRANCE (Paris)	0.1
GERMANY (ECOLOG 1998 - Precautionary Recommendation)	0.09
GERMANY (BUND 2007 - Precautionary Recommendation)	0.0001
ITALY	0.1
NEW ZELAND (Aukland)	0.5
POLAND	0.1
RUSSIA	0.1
SWITZERLAND (Apartments, Schools, Hospitals, Offices & Playgrounds)	0.042
USA (Implementation is strict)*	3 (f/300)
Final Recommendations	
Indoor - include apartments, schools, hospitals, offices & playgrounds.	0.0001
Outdoor - where people spend few minutes a day.	0.01

India had adopted radiation norms specified by ICNIRP Guidelines for cell tower radiation, which states that safe Power density = f / 200, where f is in MHz.
For f = 900 MHz, Safe Power density = 4.5 W/ m^2 = 4,500,000 µW/ m^2
For f = 1800 MHz, Safe Power density = 9.0 W/ m^2 = 9,000,000 µW/ m^2

However, ICNIRP is only intended to protect the public against short term gross heating effects and NOT against 'biological' effects such as cancer and genetic damage from long term microwave exposure from mobile phones, masts and many other wireless devices. http://www.icnirp.de/documents/emfgdl.pdf

There are several reports and papers, which specify following limits.

- BioInitiative Report 2007 - **1000 µW/m^2** for outdoor, cumulative RF exposure and **100 µW/m^2** for indoor, cumulative RF exposure.
- Building Biology Institute, Germany, provided following guidelines for exposure:
  a. <0.1 µW/ m^2 - no concern
  b. 0.1 - 10 µW/ m^2 - slight concern
  c. 10 - 1000 µW/m^2 - severe concern
  d. > 1000 µW/m^2 - extreme concern
- H Thomas et al, Germany; power densities should not exceed **100 µW/m^2**

It may be noted from Table 3 that several European countries have adopted much stricter radiation norms. Austria (Salzburg City) has adopted 0.001 W/m^2 = 1,000 µW/ m^2 as safe norm. Recently, New South Wales, Australia has proposed most stringent norm in the world of 0.00001 W/m^2 = 10 µW/ m^2.

If a human body of waist 34" and height of 5'6" is modeled as a cylinder, then its surface area = 1.43 m^2. For power density of 4.7 W/m^2 (ICNIRP guidelines for safe radiation at GSM900), the microwave power absorbed in one second will be 6.75 W. In one day,

microwave energy absorbed will be 6.75 W x 60 x 60 x 24 = 583.2 KW-sec. In comparison, a microwave oven has 500W microwave output power. This implies that human body can be safely kept in a microwave oven for 583.2 KW-sec / 500 W = 1166 seconds = 19 minutes per day! I am sure nobody in the world will like to be exposed to this kind of radiation and yet Indian Govt. has adopted this radiation level.

Figure 1 shows guidelines adopted by various countries in the top right corner and health effects of radio frequency radiation at various power densities at much lower level. The sleep disorder occurs at levels even at $0.001\mu W/cm^2 = 10\mu W/m^2$, human sensation at $0.01\mu W/cm^2 = 100\mu W/m^2$, and severe health problems occur around $1\mu W/cm^2 = 10{,}000\mu W/m^2$. All these harmful radiation levels are much below the ICNIRP guidelines adopted in India.

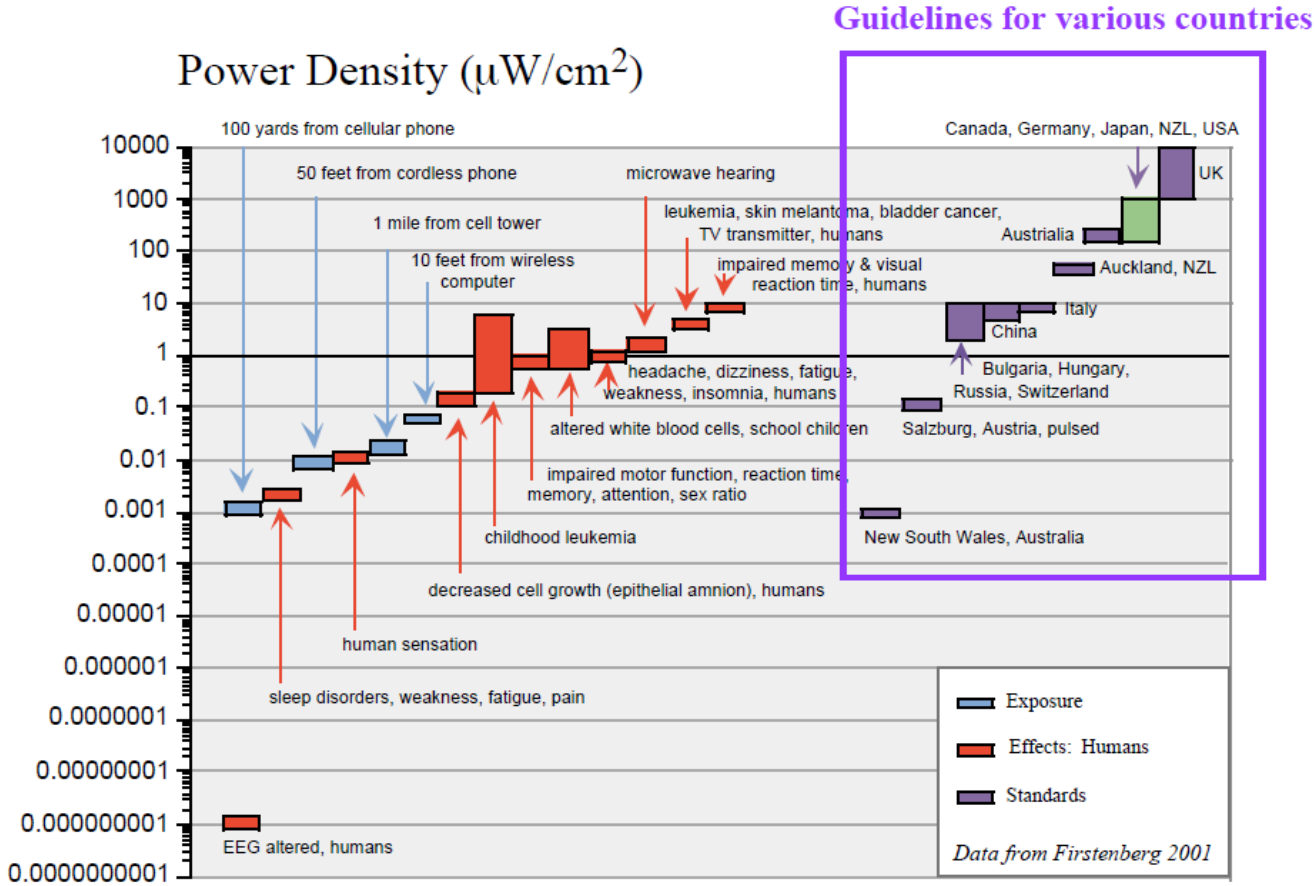

Figure 1: Guidelines, exposures and effects of radio frequency radiation at various power densities. Data from Firstenberg 2001.

According to my experience and research, the current radiation standards specified by various agencies, such as, ICNIRP, WHO, FCC, etc. around the world are not adequate to safeguard public health. I gave a presentation on Cell tower radiation at KEM Hospital on Sep. 20, 2010 to several doctors. Presentation has been uploaded at the following site: http://www.scribd.com/doc/37796846/Radiation-Hazards-from-Cell-Phones-and-Cell-Towers-Presentation-at-KEM-Hospital

I have submitted a report to Secretary, DOT in Dec. 2010, which contains 30 pages of report and nearly 200 scientific/technical references. It has been uploaded at the following site: http://www.scribd.com/doc/44736879/Cell-Tower-Radiation-Report-sent-to-DOT-Department-of-Telecommunications

On 24th June, 2011, I gave a talk on Mobile phone and Mobile tower radiation hazard at CFBP (Council for Fair Business Practices), Churchgate. Presentation has been uploaded at the following site: http://www.scribd.com/doc/58797743 At the event, Dr. Mohan Jagade, ENT specialist from JJ Hospital clearly mentioned that cell phone radiation can cause hearing loss and tumor in the ear.

You can also see Neha Kumar's blog and twitter sites, where she has uploaded several reports and videos showing health hazards due to cell tower radiation:
Blog: http://neha-wilcom.blogspot.com
Twitter: https://twitter.com/wilcom_neha

In the last two years, people from different housing societies have told me that the residents are facing several health problems like insomnia, headache, concentration problems, memory loss, joint pains, miscarriages, etc. and even some cancer cases in their buildings/societies, which did not have any cancer history in their families. At all these places, cell towers have been installed in the nearby buildings and measured radiation levels were found to be high.

At several places in your house, cumulative radiation density from various sources of radiation is more than 100μW/m^2 and in Living Room; it is even **-10dBm = 7,068 μW/m^2**

It is recommended that you should do radiation shielding in all the rooms/places indicated by red and amber color readings to protect yourself and your family members from harmful effects of high microwave radiation.

The international body and Indian Govt. may take long time to come out with new standards but it may be too late and large population may suffer by then.

Prof. Girish Kumar
IIT Bombay