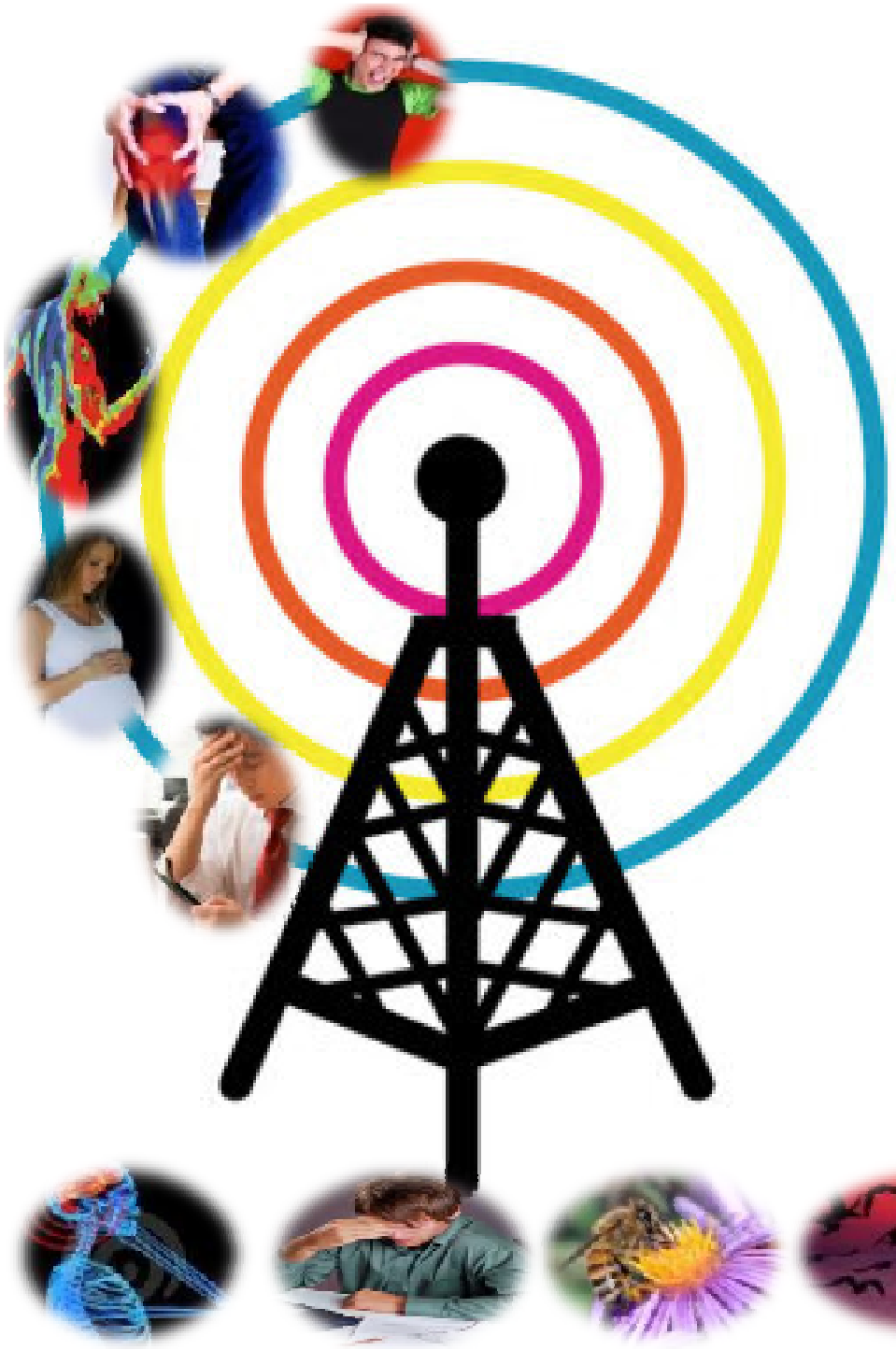


CELL TOWER RADIATION HAZARDS AND SOLUTIONS

Prof. Girish Kumar

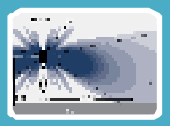
IIT Bombay

Tel:(022) 2576 7436

gkumar@ee.iitb.ac.in

OUTLINE OF PRESENTATION

RF sources



Radiation Pattern of Cell tower Antenna

EMF exposure Safety norms

Radiation measurements near cell towers

Review Biological effects

Solutions

RF Sources

RF SOURCES IN INDIA

FM TOWER (88-108MHz)	PT=10KW		503 TOWERS
TV TOWER (180-220MHz)	PT=40KW		1044 TOWERS
AM TOWER (540-1600KHz)	PT=100 KW		197 TOWER
Wi-Fi (2.4 - 2.5 GHz)	PT=10-100mW		Wi-Fi HOT SPOTS
CELL TOWER (800,900,1800 MHz)	PT=20 W		4.5 LAKH TOWERS
MOBILE PHONES	GSM-1800 - 1 W GSM-900 -2 W		800+ million

Cell Tower Radiation

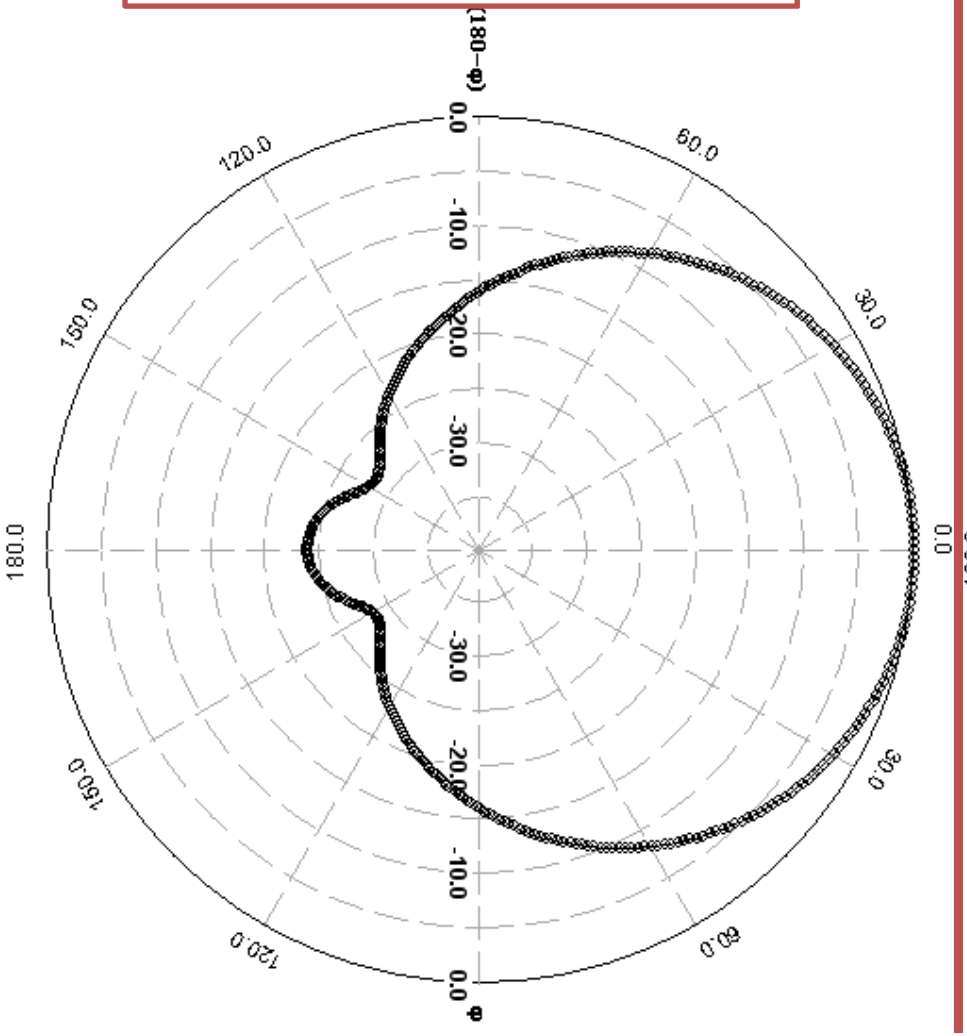
Antennas on Cell tower transmit in the frequency range of:

- 869 - 890 MHz (CDMA)
- 935 - 960 MHz (GSM900)
- 1805 – 1880 MHz (GSM1800)
- 2110 – 2170 MHz (3G)

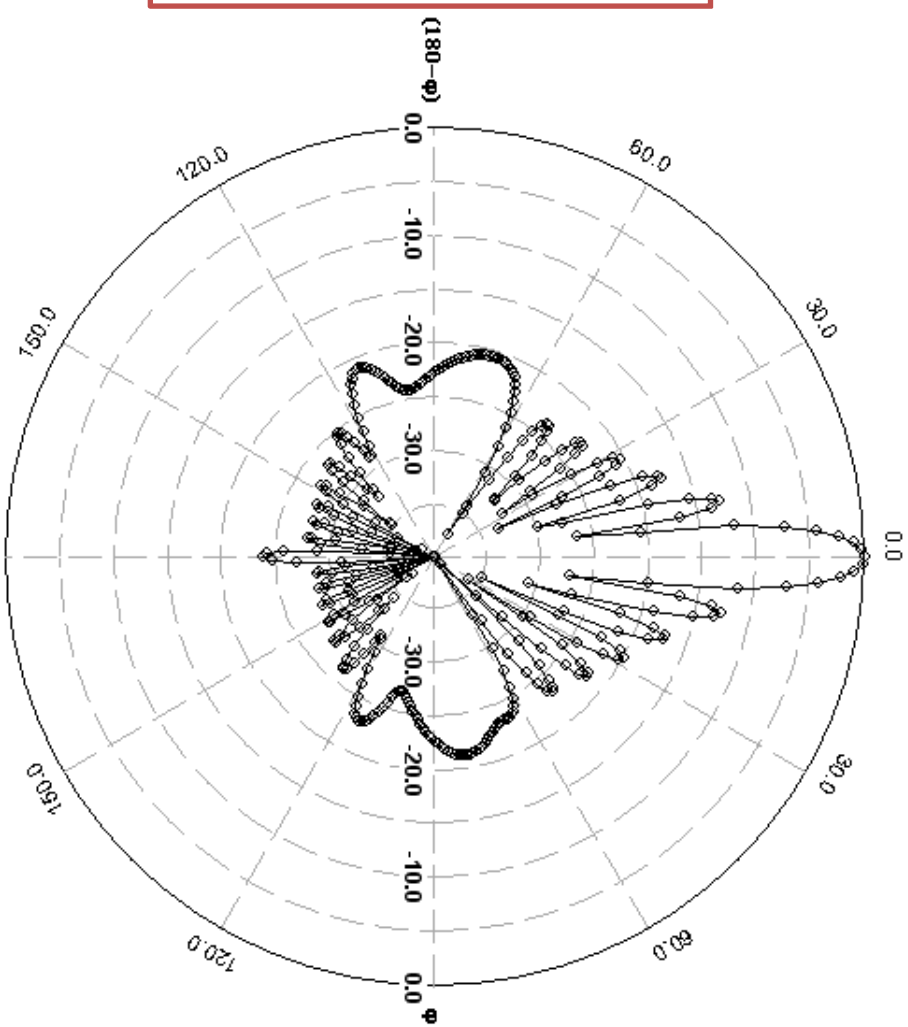
Cell Towers Installed in Mumbai

Radiation Pattern of Antenna

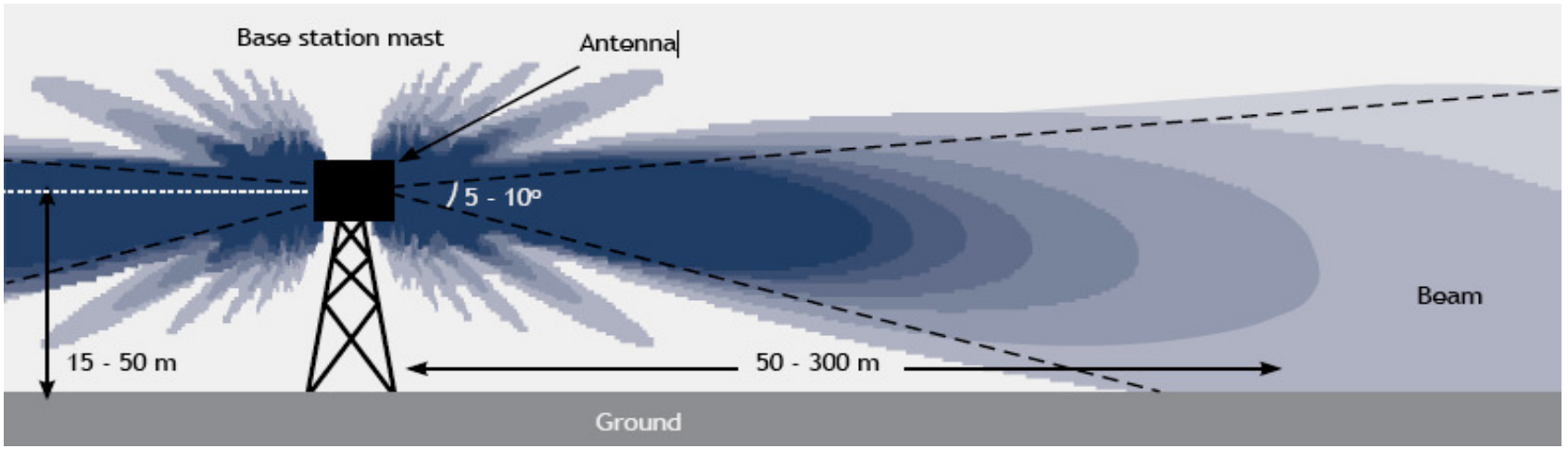
Horizontal plane



Vertical plane



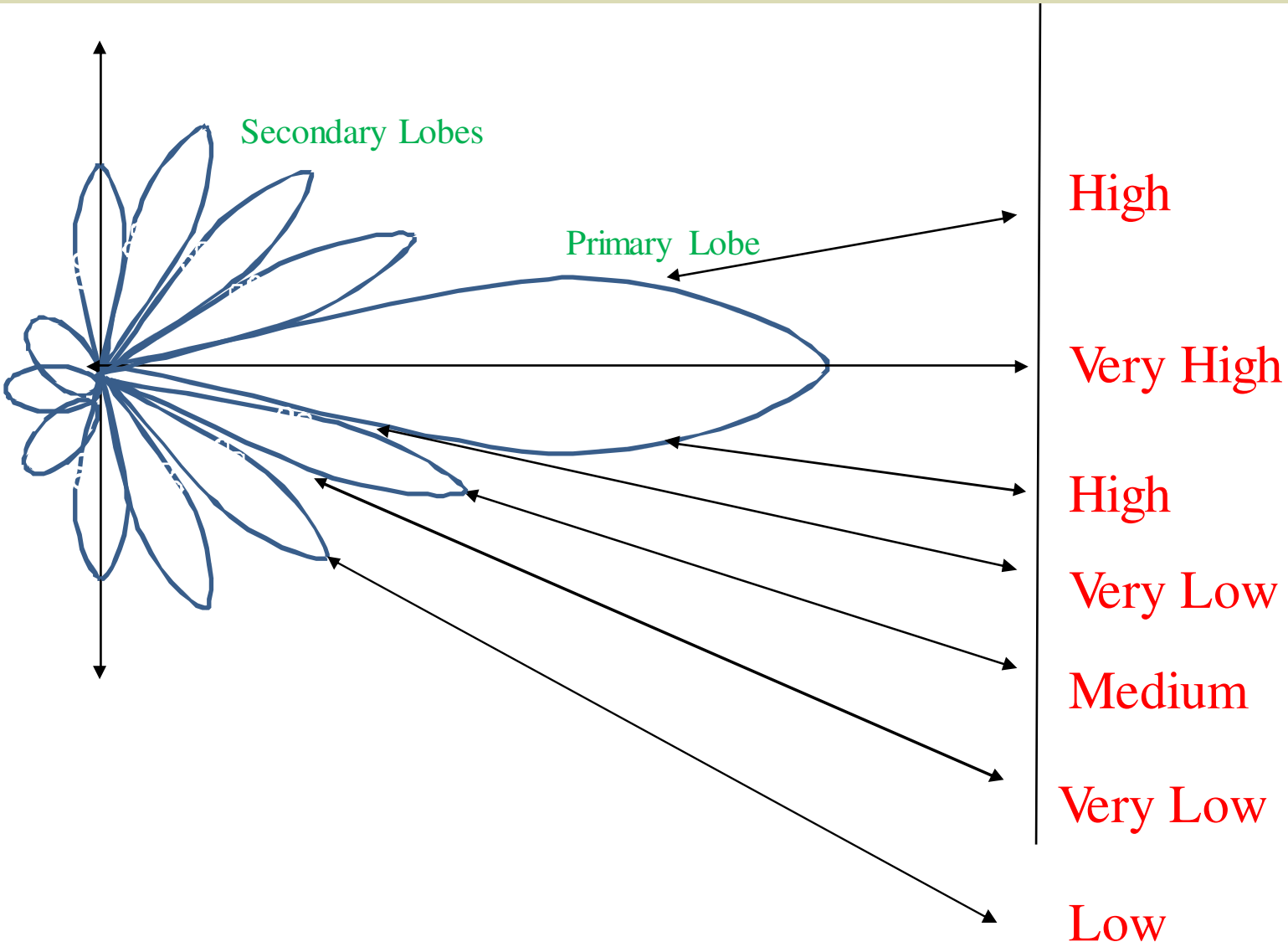
Radiation Pattern of a Cell Tower Antenna



Propagation of "main beam" from antenna mounted on a tower or roof top

People living within 50 to 300 meter radius are in the high radiation zone (dark blue) and are more prone to ill-effects of electromagnetic radiation

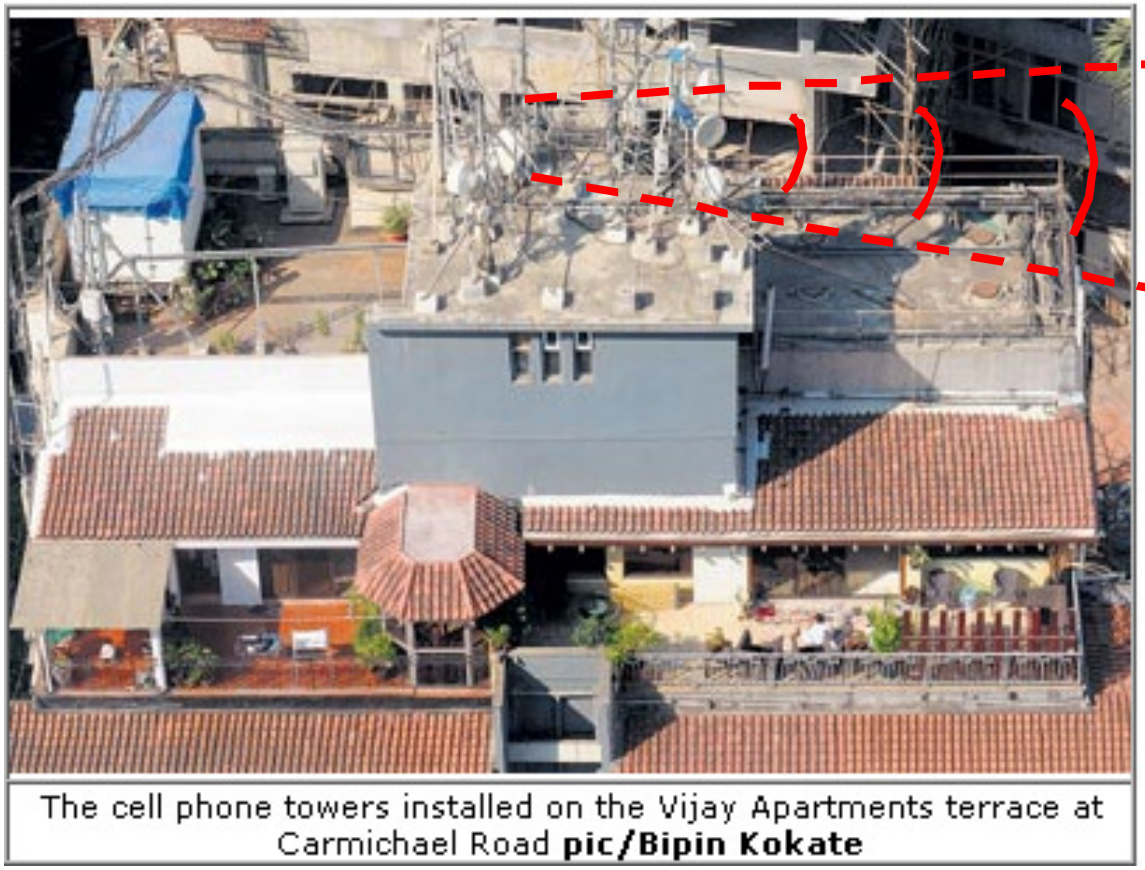
Radiation Pattern of a Cell Tower Antenna



Note: Diagram only for illustration

CASE STUDY

Usha Kiran Building, Worli, Mumbai

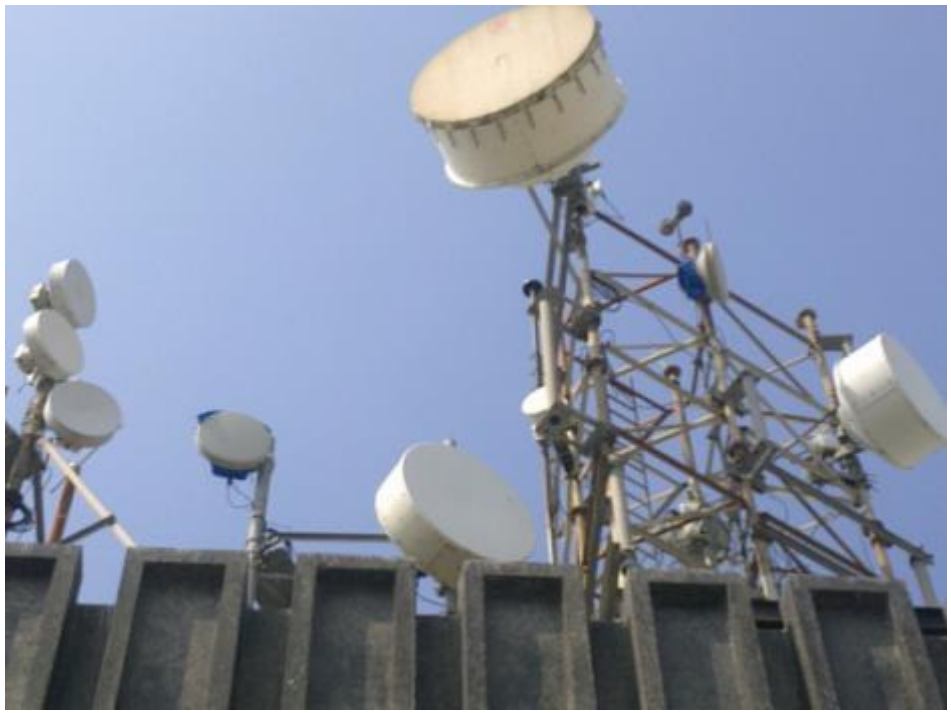


The cell phone towers installed on the Vijay Apartments terrace at Carmichael Road **pic/Bipin Kokate**

Usha Kiran Building

Six cancer cases in consecutive floors (5^{th}, 6^{th}, 7^{th}, 8^{th} and 10^{th}) directly facing and at similar height as the mobile phone towers of four telecom companies placed on the roof of opposite building.

Difference between back-haul Circular Dish antenna and cell tower antennas



Operate at higher frequency and lower power. Point-to-point. Not very harmful

Operate at lower frequency and higher power. Point to multi-point. Very harmful

Power Density Calculations

Power density P_d at a distance R is given by

$$P_d = \left(\frac{P_t \times G_t}{4\pi R^2} \right)$$ Watt/m^2

P_t = Transmitter power in Watts

G_t = Gain of transmitting antenna

R = Distance from the antenna in meters

Power Density at distance from cell tower

For P_t = 20 W, G_t = 17 dB = 50

Distance R (m)	P_d (W/m^2)	P_d ($\mu W/m^2$)
1	79.6	79,600,000
3	8.84	8,840,000
5	3.18	3,180,000
10	0.796	796,000
50	0.0318	31,800
100	0.008	7,960
500	0.000318	318

Above values are for a **single carrier and a single operator**.

Power Density for multiple carriers and operators

For P_t = 20 W, G_t = 17 dB = 50

No. of carriers = 5, No. of operators = 3

Distance R (m)	P_d (W/m²)	P_d (μW/m²)
1	1194.0	1194,000,000
3	126.0	126,000,000
5	47.7	47,700,000
10	11.94	11,940,000
50	0.477	477,000
100	0.1194	119,400
500	0.00477	4,770

For **5 carriers** and **3 operators** on the same roof top or tower, radiation level is extremely high.

International Exposure Standards and Guidelines

International Exposure limits for RF fields (1800MHz)	
9.2 W/m²	**ICNIRP and EU recommandation 1998 – Adopted in India**
2 W/m²	Exposure limit in Australia
1.2 W/m²	Belgium (except Wallonia)
0.5 W/m²	Exposure Limit in Auckland, New Zealand
0.24 W/m²	Exposure limit in CSSR, Belgium (Wallonia), Luxembourg
0.1 W/m²	Exposure limit in Poland, China, Italy , Paris, Toronto Board of Health1999
0.095 W/m²	Exposure limit in Switzerl, Italy in areas with duration > 4hours
0.09 W/m²	ECOLOG 1998 (Germany) *Precaution recommendation only*
0.025 W/m²	Exposure limit in Italy in sensitive areas
0.02 W/m²	**Exposure limit in Russia (since 1970), Bulgaria, Hungary**
0.001 W/m²	"Precautionary limit" in Austria, Salzburg City only
0.001 W/m²	Bio-Initiative Working Group 2007) *Precautionary recommendation – outdoor*
0.0001 W/m²	Bio-Initiative Working Group (2007) *Precautionary recommendation - indoor*
0.00001 W/m²	BUND 2007 (Germany) *Precaution recommendation only*
0.00001W/m²	**New South Wales, Australia (2010)**

FCC Guidelines – Human exposure to RF fields

Cellular cell site towers are typically 50-200 feet high.

Majority of cellular or PCS cell sites in urban and suburban areas operate at an ERP of 100 watts per channel or less. An ERP of 100 watts corresponds to an actual radiated power of 5-10 watts, depending on the type of antenna used.

In urban areas, cell sites commonly emit an ERP of 10 watts per channel or less.

http://www.fcc.gov/guides/human-exposure-rf-fields-guidelines-cellular-and-pcs-sites

In INDIA, cell sites transmit 100's of Watts of power with antenna gain of 50, so ERP = 5000 Watts

Other Standards and Guidelines

- **BioInitiative Report 2007 (610 pages)**

1000 $\mu W/m^2$ for outdoor, cumulative RF exposure.
100 $\mu W/m^2$ for indoor, cumulative RF exposure.

- **Building Biology Institute, Germany**

a. $<0.1\ \mu W/m^2$ - no concern

b. $0.1 - 10\ \mu W/m^2$ - slight concern

c. $10 - 1000\ \mu W/m^2$ - severe concern

d. $> 1000\ \mu W/m^2$ - extreme concern

ICNIRP Guidelines

India adopts ICNIRP guideline for Power density (P_d)
= Frequency /200, frequency is in MHz

For GSM900 (935-960 MHz), $P_d = 4.7 W/m^2$ and
GSM1800 (1810-1880 MHz), $P_d = 9.2 W/m^2$.

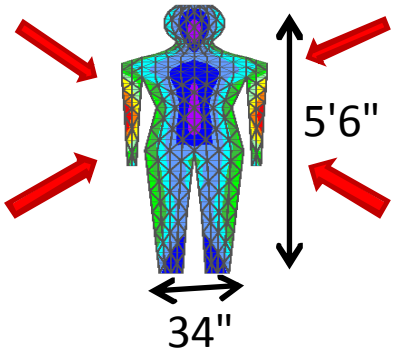
ICNIRP has given following disclosure:

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 low level microwave exposure from mobile phones, masts and many other wireless devices.

http://ww.icnirp.de/documents/emfgdl.pdf

Power Absorbed by Human Body

Microwave power absorbed by human body if exposed to so called safe radiation level adopted in India, which is f/200, where f is in MHz?



Area = 1.43 m²

X

ICNIRP Guideline – At 940 MHz, Power density (P_d) is 4.7W/m²

Power received (P_r) by human body will be [$P_r = P_d$ x Area] = 6.75 Watts in one sec.

Microwave oven: 700 to 1000 W. With say 60% efficiency, microwave power output is say <u>500 W.</u>

In one day, microwave energy absorbed will be [6.75 Watts x 60x60x24 sec] = <u>583.2 KW-sec.</u>

This implies that human body can be safely kept in a microwave oven for 1166 secs = 19 minutes per day

Power absorbed by human body near cell tower

Can one stand in front of a cell tower at 1 m distance for 4 hours continuously?

For P_t = 20 W, G_t = 17 dB = 50

At 1m, Power density = 79.6 W/m²

Power absorbed in one sec = Pd x .7 (for ½ area) = 55.7 W

Energy absorbed in 1 hour = 55.7 x 3600 = 200.5 kW-sec

For a human body of weight 60 Kg, liquid content at 70% is 42 Litres. So, temp. rise will be 2^0F.

In 4 hours, temp. rise will be 8^0F. Normal body temp will increase from 98.4 to 106.4 ^{0}F. Can one survive?

Power Received by an Antenna

Power Received P_r by an antenna at a distance R is given by:

$$P_r = \frac{P_t \times G_t \times Area}{4\pi R^2} = P_t \times G_t \times G_r \times \left(\frac{\lambda}{4\pi R}\right)^2$$

- For a transmitter power, P_t = 20 W
- Transmitting antenna gain, G_t = 17.0 dB = 50
- Receiving monopole antenna gain, G_r = 2 dB =1.6
- Received power at R = 50 m is:
- At 940 MHz, P_r = 0.413 mW = -3.8 dBm
- At 1840 MHz, P_r = 0.108 mW = -9.7 dBm

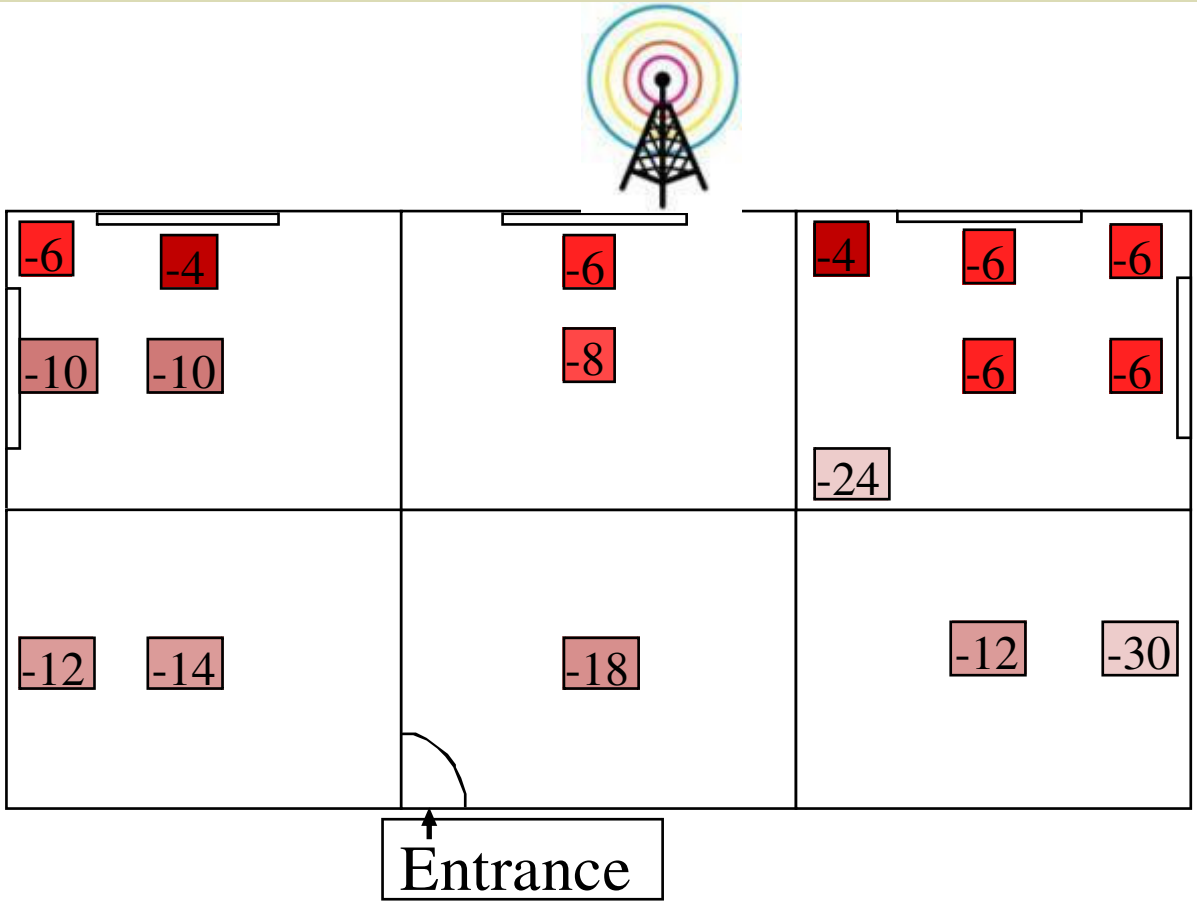
Power density is equal to 31.8 mW/m^2 = 31,800 µW/m^2.

Radiation Measurement at various locations

Cumulative Readings including CDMA, GSM 900, and GSM 1800

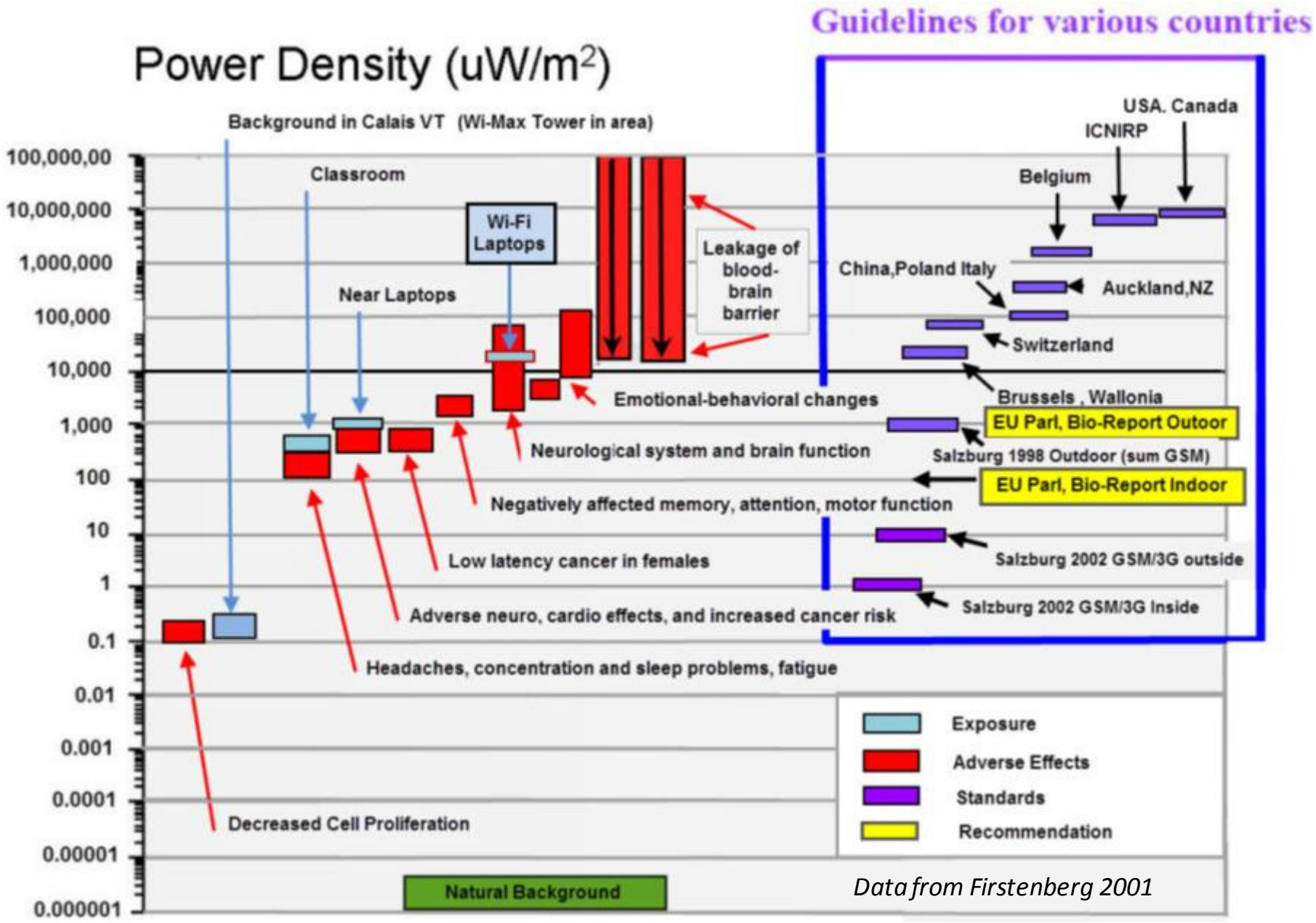
Location	Reading in dBm	Readings in W/m2	Readings in microW/m2
Delhi-Gurgaon Highway - near Toll (3 towers)	0	0.0706	70,686
Vashi Bridge - after Railway Station	-4	0.0282	28,274
Resident 1, 4th Fl: Sergean House Lady w/cancer	-6	0.0177	17,756
Resident 2, Opposite roof, Rane Society, Powai	-10	0.00706	7,069
Near Hub mall, Goregaon	-10	0.00706	7,069
Gandhi Nagar Over railway bridge-near building	-12	0.00446	4,460
Ustav Chowk, Kharghar	-12	0.00446	4,460
Vikroli - before Godrej	-14	0.002814	2,814
Govandi- Residential towers - near Indian Oil	-14	0.002814	2,814
Belapur Flyover, near RBI- CIDCO	-16	0.001776	1,776
Vashi Highway – near Turbhe	-18	0.001120	1,120
Nerul Bridge	-20	0.000707	707
Vivero pre School (opposite powai lake)	-22	0.000446	446
Powai police station	-22	0.000446	446
Rajeev Gandhi nagar	-26	0.000177	177
On road near Evita (Hiranandani Building)	-28	0.000112	112
D-Mart,Hiranandani, Powai	-34	0.0000280	28
IIT Bombay School of Management - Entrance	-46	0.00000178	1.78

Measurement inside an Apartment

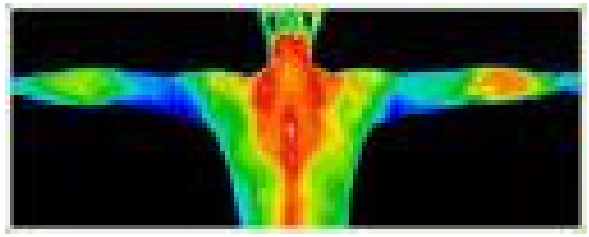


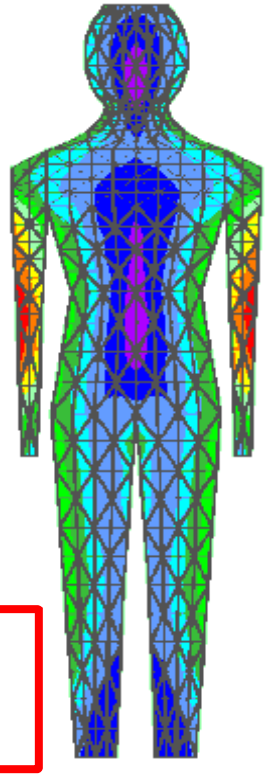
SERGEANT HOUSE Residence (4th Floor) - Lady has been diagnosed with cancer - Cell phone towers few 10 meters away close to window in main beam. Measured Power levels using Radiation Monitor are in dBm, which are very high.

Health concerns with current Safety Guidelines



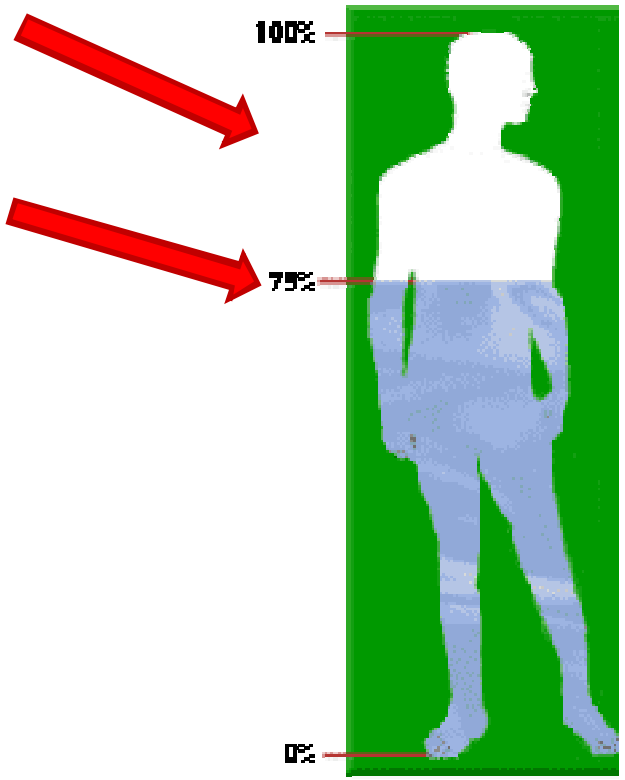
Data from Firstenberg 2001





BIOLOGICAL EFFECTS

BIOLOGICAL EFFECTS



Multiple Resonances - localized heating - results in boils, drying up the fluids around eyes, brain, joints, heart, abdomen, etc.

BIOLOGICAL EFFECTS

Most common complaints:

- Sleep disruption
- Headache
- Concentration
- Forgetful memory
- Depression
- Fatigue
- Dizziness
- Palpitations of the heart
- Visual disorders
- Cardiovascular problems
- Buzzing in the head
- Altered reflexes

Many of these are related to changes in the electrical activity of the brain



Epidemiological studies- Cell Phone Antennas

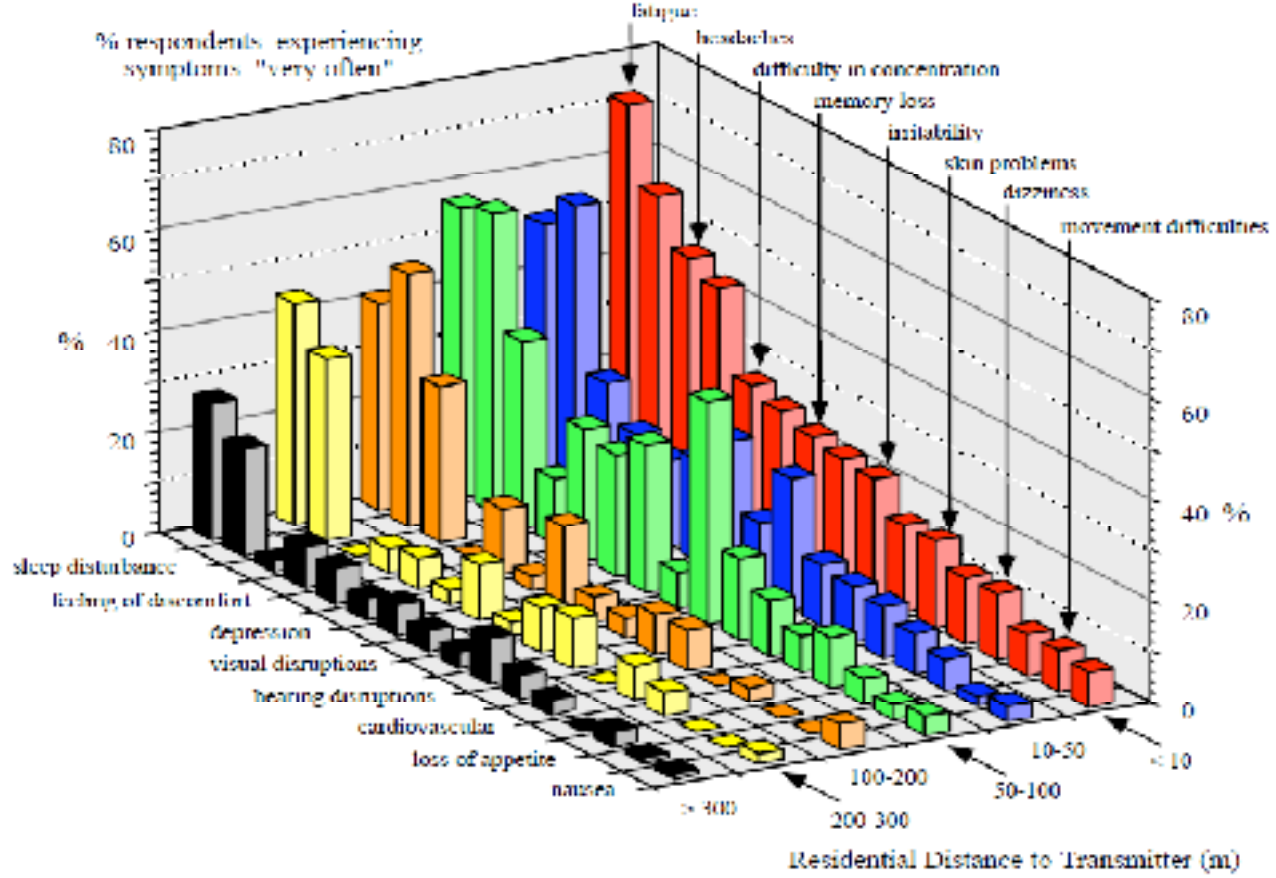
Studies in France, Israel, Germany, Spain, the Netherlands, Egypt and Austria - all document adverse health effects below the FCC guideline.




SPAIN

SPAIN

- Incidents increased with proximity to towers
- Women had more symptoms
- Based on symptoms experiences: Cellular phone base stations should not be sited closer than 300 m to populations. (*Santini R 2002*)



ISRAEL

ISRAEL

Netanya, Irus – Medical Records (Wolf R *et. al* 2004)

- **Four fold increased** incidence of cancer within 350m after long term exposure to a phone mast compared with the general population of Israel.
- **10- fold** increase specifically among women

Table 1. Cancer cases in area A

Name	Age	Sex	Origin[1]	Smoking	Cancer Type	Measured power density in $\mu w/cm^2$
Hemda	52	f	ash	No	Ovary ca stage 1	$0.3\mu w/cm^2$
Edna	42	f	sph	No	Breast ca in situ	$0.4\mu w/cm^2$
Tania	54	f	ash	No	Breast ca	$0.5\mu w/cm^2$
Neli	67	f	ash	Yes	Breast ca	$0.4\mu w/cm^2$
Galit	24	f	ash	No	Hodgkins	$0.5\mu w/cm^2$
Miriam	61	f	sph	No	Lung ca	$0.3\mu w/cm^2$
Masal	37	f	sph	No	Osteoid osteoma	$0.4\mu w/cm^2$
Max	78	m	ash	No	Hypernephroma	$0.3\mu w/cm^2$

[1] Origin: ash - Ashkenazien Jews sph - Spharadic Jews

GERMANY

GERMANY

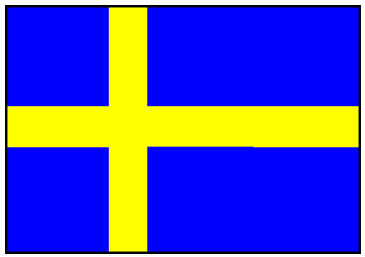
Naila: (Eger H 2004, 2009)

- **3-fold increase** in new malignancies within 400m from a mast after five years exposure
- Breast Cancer topped the list.
- Cancers of the prostate, pancreas, bowel, skin melanoma, lung and blood cancer increased.

Berlin - Head of cancer registry, 2006

- **7 fold increase** in breast cancer

SWEDEN



SWEDEN

- **250,000 Swedes are** electro hypersensitive out of a population of 9,000,000.
- One of the first countries where mobile technology was introduced (approx. 15 years ago).

BRAZIL

New study from Brazil: direct link to 4,924 cancer deaths from cellular antennas radiation

May 17, 2011

❑ Scientists found between 1996 and 2006 died in Belo Horizonte a total of 4924 victims of cancer types that may be caused by electromagnetic radiation, such as **tumors in the prostate, breast, lung, kidneys and liver.**

❑ 80% of victims lived within 500 m's away from cell phone antennas

Source: http://www.next-up.org/pdf/Brazil_New_study_direct_link_to_4924_cancer_deaths_from_cellular_antennas_radiation_28_07_2011.pdf

INDIA

❖10 Housewives in Sher-e-Punjab Colony - Andheri (E), Mumbai have been diagnosed with various forms of cancer

6 - Breast Cancer cases, 1 - Ovarian Cancer , 1 - Blood Cancer,1 - Inguinal Lymph Node Cancer, 1 - unknown – relapsed after chemotherapy

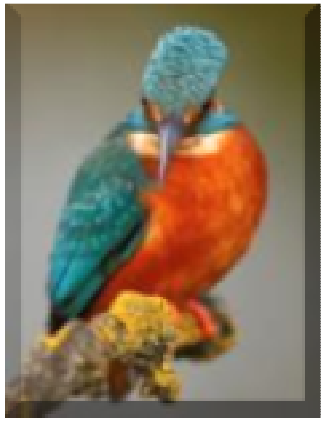
❖Increased cancer cases with proximity to Towers

Within 91 m from a mobile tower

Name of deceased	Year of death	Cause of death	Age at time of death
Radhabai Sathe	2005	Breast cancer	66
Deshpande	2006	Oesophagus cancer	48
Shubhangee Deshpande	2007	Rectum cancer	66
Pujaree	2008	Cancer	46
Gawai	2008	Breast cancer	52
Shah	2009	Cancer	48
Vidyadhar Dev	2009	Liver cancer	52
Ransube	2009	Throat cancer	73
Archana Malvadkar	2009	Spinal cord cancer	17

Source: L B Deshpande, who studied the deaths in his Solapur locality since two towers were installed four years ago

Effect on Environment

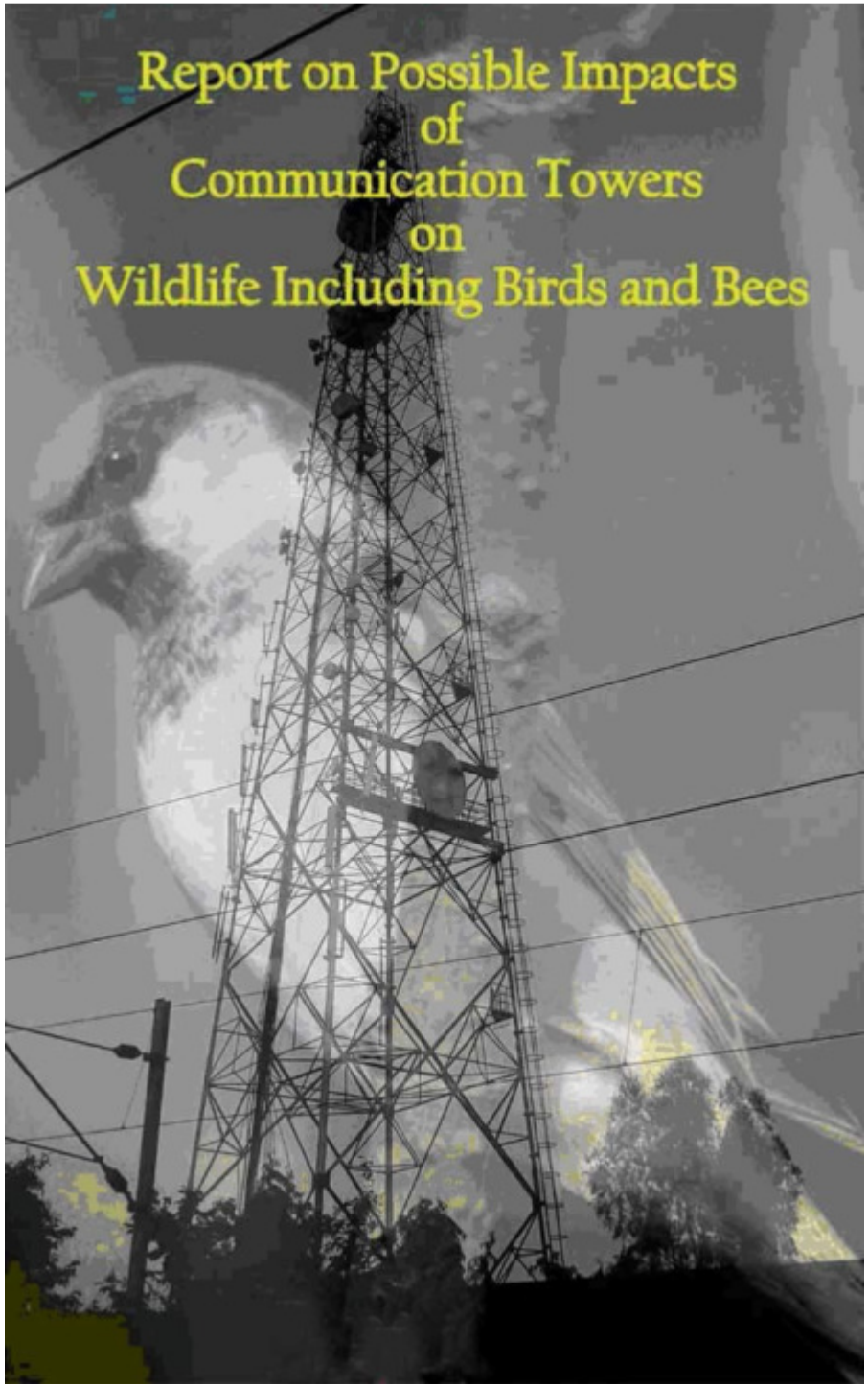


Have you ever seen any bird near cell towers?

May be not, because birds have more volume and less weight, so heating effect is very fast.

4 cell towers near Gurgaon-Delhi Toll Naka

Output of most of fruit bearing trees drastically reduced from 100% to < 5% after 2.5 years of cell tower installation.


Report on Possible Impacts
of
Communication Towers
on
Wildlife Including Birds and Bees

(Oct. 2011)

Expert Group to study the possible impacts of communication towers on Wildlife including Birds and Bees *(2011)*

Table 3. Number of research studies (collected from Open access Bibliographic databases) collected and collated based on the study subjects and results

	Impact	No Impact	Neutral/ inconclusive	Total (n)
Birds	23	3	4	30
Bees	6	1	0	7
Human	459	109	174	742
Other Animals (+Wildlife)	85(+13)	16(+1)	10(+7)	111(+21)
Plants	7	0	1	8
Total	593	130	196	**919**

Expert Group to study the possible impacts of communication towers on Wildlife including Birds and Bees *(2011)*

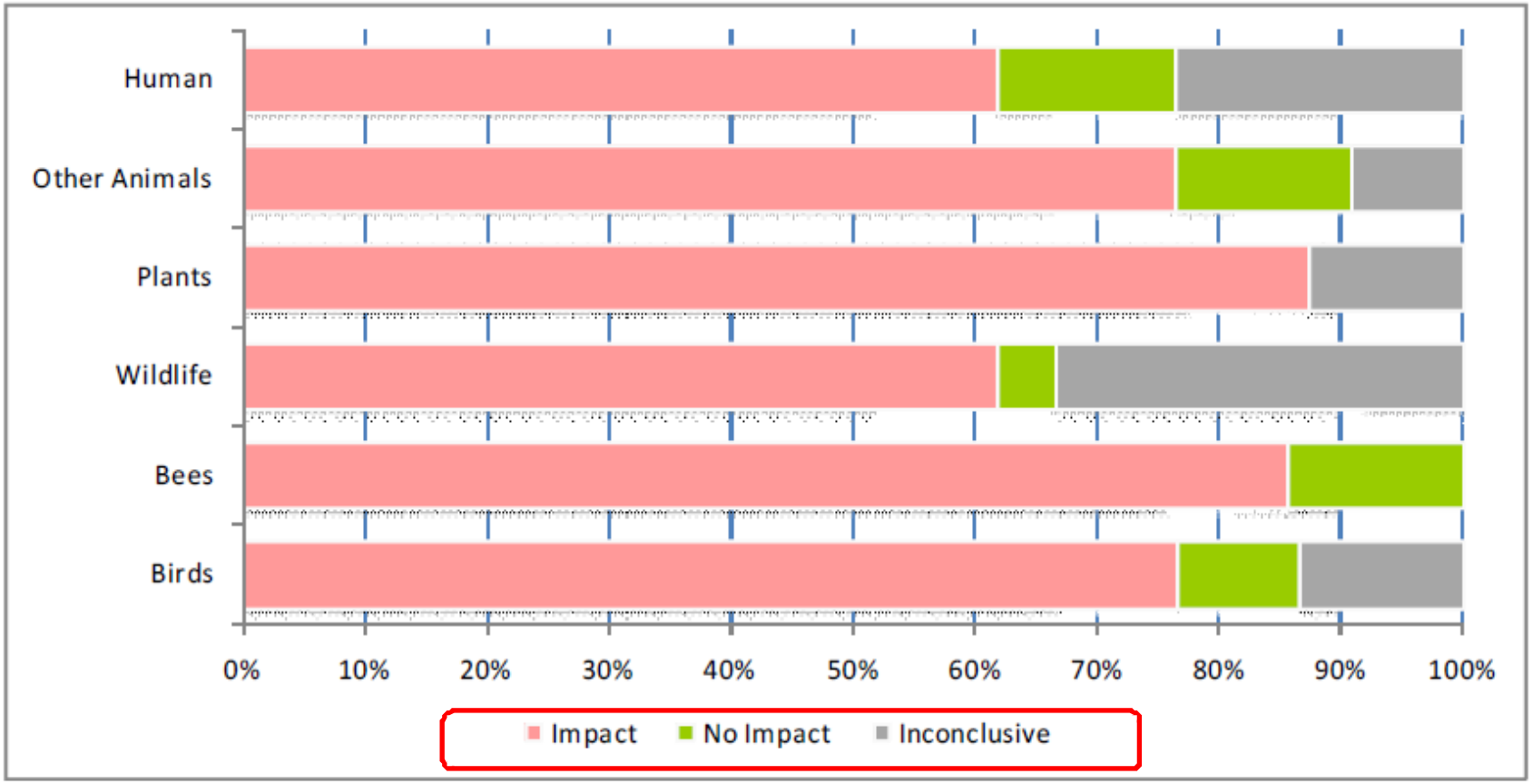
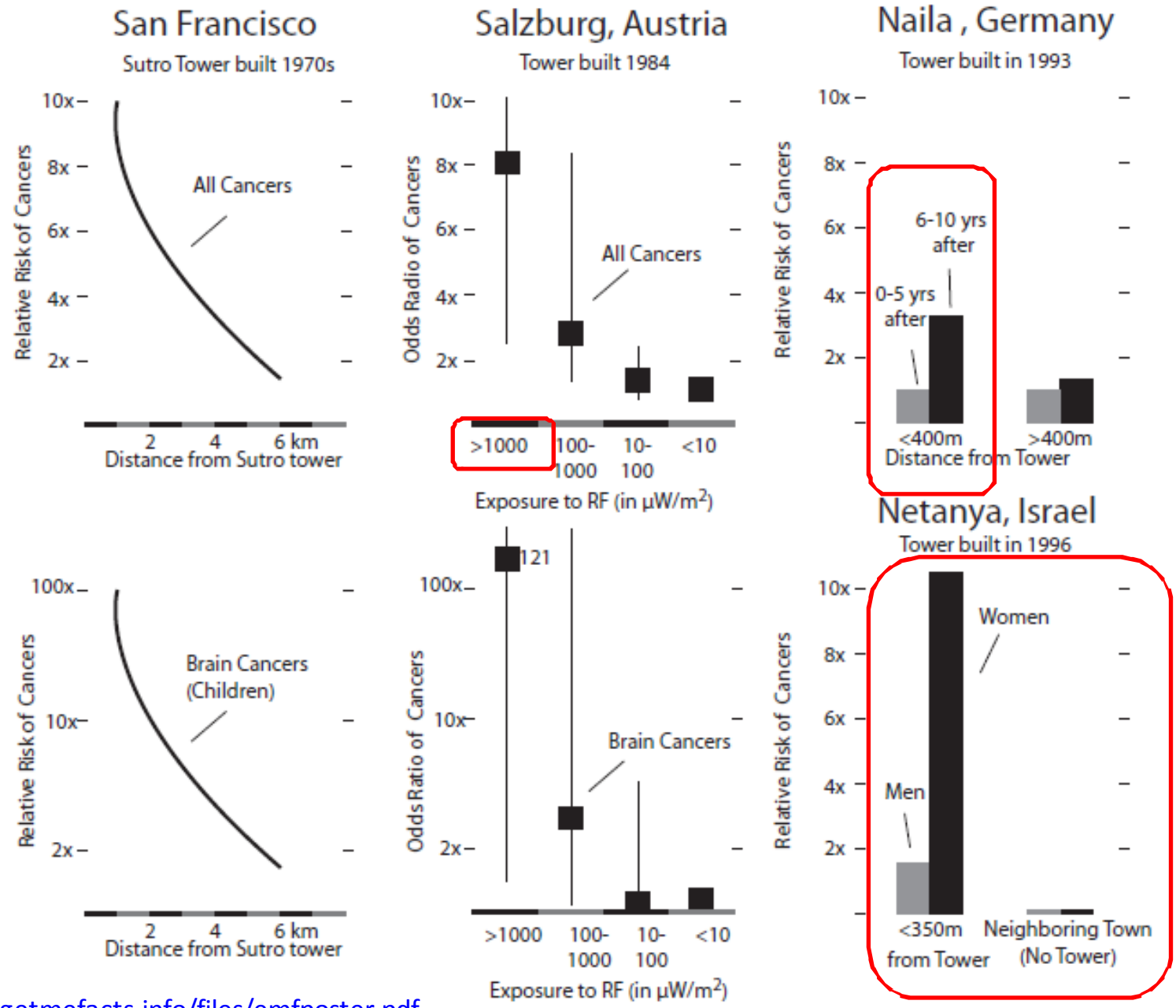


Fig 2. Proportion of study results in various groups of organisms (n=919). The 'Impact' (in red) indicates percentage of studies that reported harmful effect of EMR

EFFECT OF CELL TOWERS *updated on 11Sep'11*



http://www.getmefacts.info/files/emfposter.pdf

Automobile industry vs Mobile industry

What do they have in common?

- Both are required, integral part of lifestyle
- Automobiles create air pollution while cell phones and towers create radiation pollution

What is not common?

- Automobile industry has accepted that it creates air pollution and people found solutions, such as, unleaded petrol, catalytic converters, CNG, Hybrid vehicles, etc.
- **Mobile industry is still to accept health problems from cell tower radiations.**

Automobile industry vs Mobile industry

?

DOT Inter-Ministry Committee accepts cell phone and tower radiation hazard

INTER-MINISTERIAL COMMITTEE (IMC) Report ON EMF RADIATION was uploaded on DOT website in Jan. 2011.

Mentions several health hazards due to radiation on human health and environment (pages 12-27).

Mentioned Bio-initiative report 2007 has recommended 1000 microW/m2 for outdoor cumulative RF exposure (Page 32).

Yet recommended RF exposure limits in India may be lowered to 1/10th of the existing reference level, which will be 0.92W/m2 for GSM1800 (Page 33)

NEWS COVERAGE

THE TIMES OF INDIA

7 June 2011, Pg 1

State to nix cell towers on schools, hospitals

Prafulla Marpakwar | TNN

Mumbai: Taking a cue from the widespread concern about mobile towers installed on school and hospital buildings, the Maharashtra government is all set to amend the Development Control (DC) Rules in this regard. Of the 1,600 mobile towers in Mumbai, nearly 500 (or 30%) are atop schools and hospitals. The remaining are on private or commercial buildings.

Mobile towers in Mumbai **1,600**

On schools and hospitals **500**

6 metres Proposed distance from schools and hospitals

"Since fears have been expressed about the radiation from mobile towers, we are readying to remove them from school and hospital buildings," a senior official told TOI on Monday. "Once the DC rules are amended, it will be mandatory for the operators to remove the towers within six months."

As per the proposed amendment, the operator will have to submit a certificate stating that the emission is within the permissible level and an undertaking that the existing tower will be removed within six months. "New Delhi has already imposed stringent restrictions on mobile towers. We have proposed that they should be at least six metres away from a school or hospital and that the radar should not face the school or hospital," the official said.

The proposed measures will be implemented by the concerned civic corporation.

The Indian EXPRESS

Chandigarh - 8 June 2011, Pg 1

08-06-11
Ind. Exp.
Pg-04
Pune Edn

Inform public about health hazard of mobile towers: High Court to Govt

RAGHAV OHRI
CHANDIGARH, JUNE 7

EXPRESSING concern over the effects of radiation from mobile towers installed in residential areas, the Punjab and Haryana High Court has held that it will be the duty of the government and mobile companies to inform residents about the harmful effects. A division bench ruled the government will be duty bound to inform the public living where a mobile tower is to be erected, about the "amount of radiation it will emit" and its harmful effects thereof on the health of people. The information will have to be supplied in the shape of a public notice, the court has ruled, before the mobile tower is erected. The HC has also directed the companies in the business of installing mobile towers to do the same.

The directions were passed on an appeal by M/s Wireless IT Info Services Limited and another which had moved the HC against Haryana, challenging the validity of Haryana Municipal (erection of communication towers) by-laws, 2009. HC has upheld by-laws. The petitioner had challenged the levy of tax, terming it unreasonable.

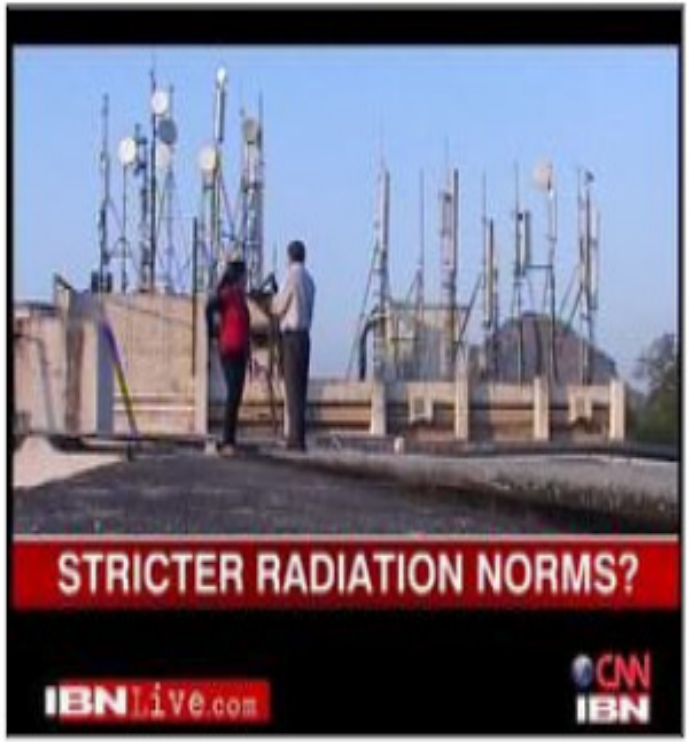
Making it clear that "there is no absolute right to carry on any business", the Bench ruled that "it (business) is always subject to reasonable restriction and regulation", and highlighted the damage being caused due to the radiation originating from the mobile towers. "It will be the duty of the local authorities to issue a public notice for information of all concerned where the permission for erection of a tower is being considered or granted to apprise the public as to what amount of radiation it will emit and the effect thereof on the health of the people living in the area," read the judgment.

The HC held that "the mobiles emit signals in the form of radio waves....It is also feared that the radio waves can cause changes to the cells in our brain. If the DNA in the brain cells get damaged, they may become cancerous and cause brain tumors... it is also feared that the radio waves can alter chemical and electrical reactions in our brain, changing, in effect, the way the brain cells communicate... Studies conducted revealed that sparrows have declined in most contaminated electromagnetic fields".

IBNlive.com

India has worst radiation norms: report

Nikita
CNN-IBN



Mumbai: An Inter Ministerial Report submitted to the Department of Telecommunications (DoT) has recommended the cutting down of mobile phone tower radiation by one-tenth of the present level.

The 5.4 lakh mobile phone towers in the country pose a huge threat to the health of the citizens. Experts say that the amount of radiation emitted from these towers in a day, is equivalent to putting one's body in an oven for 19 minutes!

India has the worst cell phone tower radiation norms in the world. The upper limit is so high that within 2 years the health of 1 crore Indians could be affected.

Actress Juhi Chawla check cell tower radiation

- Got an independent radiation check

The radiation levels were extremely high all around my house!

This is a cause for concern, not only for my family, but also for all the people living in Malabar Hill.

http://www.groundreportindia.com/2011/06/juhi-chawla-radiation-from-sahyadri.html#links

Milind Deora and A.K Mittal of TERM inspects radiation level of mobile towers at Haji Ali, Mumbai

22nd September'11

Measurement Location	Reading (in µW / m^2)
Haji Ali Juice Center	**85,000 µW / m^2**
Raj Niketan, **Opp. Sahyadri State Guest** House, Malabar Hill	Max: **42,260 µW/m^2** Min: ~178 µW/m^2

The TERM team says

"We were within WHO limits of 4,500,000 µW/ m^2".

ANALYSIS OF READINGS

Standard/ Location	Reading (in µW / m^2)	Comments
Indian Guideline - ICNIRP' 98	**4,700,000**	Equivalent to putting a person in microwave oven for 19 min/day.
IMC recommendation - Jan. 2011	4,70,000	However, the report mentions several health hazards at 1000 µW/m^2.
Haji Ali Juice Center	85,000	This level is very high but TERM says it is safe as it is within ICNIRP guideline
Opp. Sahyadri State Guest House	42,260	Cancer case in this house - "..same as above.."
Range at which health problems have been observed	>10,000 >100	**Several Cancer Cases** observed in India **Headaches, concentration problem, fatigue, miscarriage, joint pains etc** Disclaimer – Symptoms based on Individual sensitivity
Safe Radiation Density level	100	For long term continuous exposure (as per Bio-Initiative Report 2007)

Ultimately, everything is related to Energy

$$\text{Energy} = (\text{Power} \times \text{Time})$$

If we want to be safe for:

- 100 years, power density must be <100 $\mu W/m^2$
- 10 years, power density must be <1000 $\mu W/m^2$
- 1 year, power density must be <10,000 $\mu W/m^2$

Above values are for continuous exposure. If we are exposed for only a few hours per day, then we can afford to be exposed to higher radiation density.

IIT expert to help Kolkata City to tackle radiation

The Bengal Post, May 15 2011, Page 5

The Bengal Post CITY 5
Sunday May 15, 2011

IIT expert to help city tackle tower radiation

Subhankar Chowdhury

Kolkata: With fears being raised on the effects of electromagnetic radiation from mobile phone towers on the health of humans, an expert from IIT has approached the West Bengal pollution control board and offered his help in tackling the problem. According to a recent report of the PCB, the intensity of electromagnetic radiation in the city has been increasing and could pose a health hazard to residents.

In a bid to deal with the problem effectively, Girish Kumar, a professor of IIT Bombay, who is also a researcher in the field, wrote to the board on Friday, offering to share his expertise with the board in tackling the menace. The professor, who teaches in the electrical engineering department, has also written to the Kolkata Municipal Corporation (KMC) on this issue.

"I have heard that like in other metros, mobile towers are coming up in residential areas and near schools and hospitals across the city. Despite strict rules and regulations, the WBPCB gets at least 15 to 20 complaints every month. I have been working in this area for several years. I had spoken with Shri Chandrasekhar, secretary in the department of telecommunication (DoT) last December about taking concrete steps in tackling cell tower radiation. I hope to share this expertise with PCB officials," the professor said.

The professor had given a presentation on the hazards posed by mobile tower radiation at the Inter-Ministerial Committee (IMC) meeting, DoT, Delhi on October 8, last year. Subsequently, the IMC came out with a report on the same subject in January, this year.

The professor claimed that as per the International Commission of Non-Ionizing Radiation Protection (ICNRP) guidelines, installation of base station antennas within the premises of schools and hospitals must be avoided, because children and patients are more susceptible to electro-magnetic radiation. Installing them in narrow lanes increases the risk of earthquakes or wind related disasters.

The ICNRP is an international scientific advisory body monitoring cell tower radiation and issuing guidelines in combating the danger. However, these rules have been clearly ignored by mobile companies, alleged the I.I.T expert.

"The problem is that DoT officials often overlook these guidelines and submit to the interests of mobile companies. There is also a lack of public awareness about the perils of cell tower radiation. The best way is to create pressure through public awareness via bodies such as the PCB of respective states so that the DoT officials in turn compel mobile companies to adhere to the guidelines. Therefore, I want to work with WBPCB and KMC," Kumar said.

REASONS TO WORRY

- The IIT professor had given a presentation on the hazards posed by cell tower radiation at the inter-ministerial committee meeting in Delhi on October 8, last year
- Shri Chandrasekhar claimed that as per the ICNRP guidelines, installation of base station antennas within the premises of schools and hospitals must be avoided, because children and patients are more susceptible to electro-magnetic field

REPORT

ON

CELL PHONE TOWERS RADIATION HAZARDS

Submitted To

West Bengal Environment Minister

Prepared By

Technical Advisory Committee

September 2011

Measurements in the presence of West Bengal Environment Minister

20 Recommendations made

Solutions – Better Radiation Norms

- With immediate affect, we should adopt safe radiation level as 0.01 W/m^2, so power transmitted from each tower must be reduced.
- This will reduce coverage area. There may be some call drops initially.
- People must be informed about harmful effects of radiation and this is being done to protect them.
- In 1 to 2 years, the safe radiation level should be reduced to 0.001 W/m^2, this will give enough time to operators to plan the network for smooth operation.
- Requires large number of towers with reduced output power, more number of repeaters, fiber optic solutions, etc.

Solutions – Better Radiation Norms (Continue)

- 24 hours monitoring of cell tower radiation must be done at various places.

- Utmost care must be taken to ensure that main beam of the antenna is not in the direction of residential/office buildings as well as, where there is large concentration of people, animals, birds, trees, etc. Operators must be informed:

"**Reduce the Power or Remove the Tower**"

- **High cost for operators - not more than health of people**

Solutions – How to meet the increased cost?

- Low power RF output (max. 1 to 2 Watts) means less heating and power consumption, so cooling cost is reduced, low power solar solution can be adopted, carbon credit can be claimed.
- Can increase cost per minute by Rs. 0.10
- Govt. can reduce the license fee
- Can be subsidized for 1 to 2 years to recover investment cost.

Cell phones – Cigarettes of 21st century

What do they have in common?

- Produced by Multi-Billion $ Companies
- Products linked to illness
- Industries deny any health problem

Cell tower radiations are even more harmful than cigarettes because

- One can not see it
- One can not smell it
- One can not move away if his house/office is near cell towers

Children are the Future of Our Nation

Do we want future of our nation to be deaf or suffer from many health problems due to cell phone and cell tower radiations? Could have been avoided if precautionary steps were taken on time.


Thank you