



EMF Emissions from Telecom Towers

The Physics & Technical Aspects

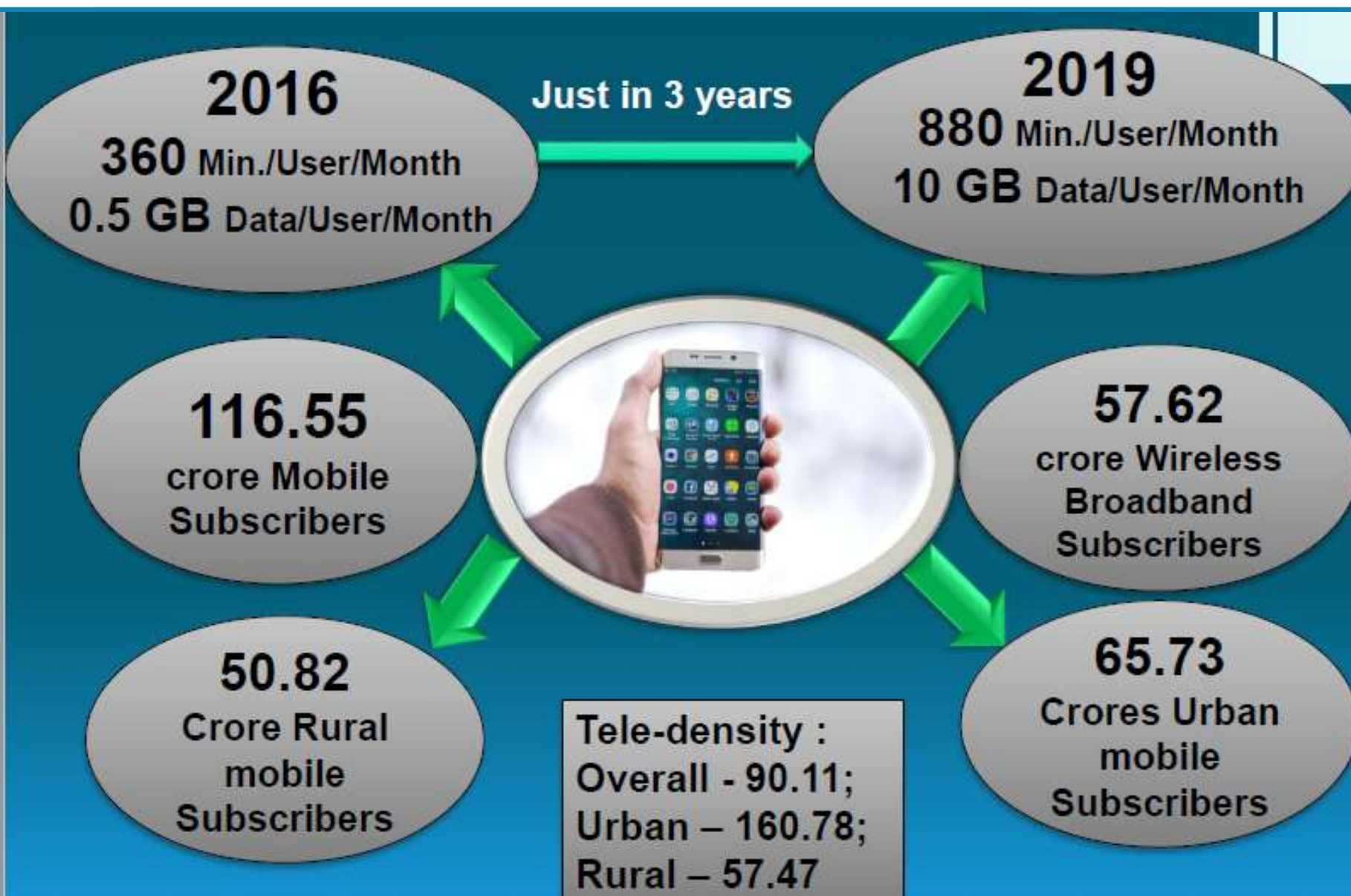
March 2, 2020

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Indian Telecom Market



Source: TRAI

Role of Mobile communication in Our Lives

Personal Productivity

- *Email*
- *Organiser & Calendar*
- *Maps*

Knowledge enhancement

- *Search engines*
- *Online courses*
- *Apps*

Entertainment & Lifestyle

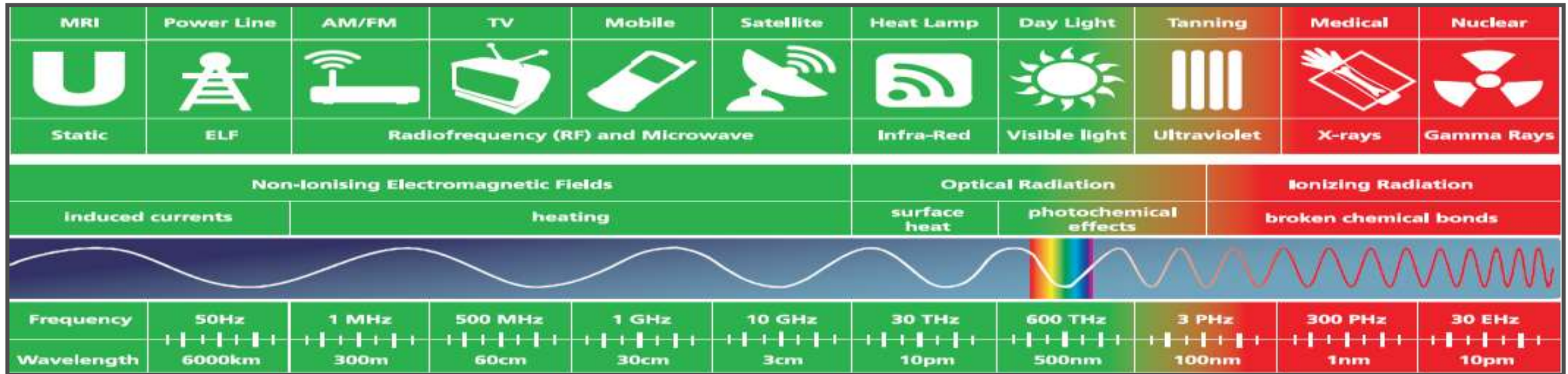
- *Shopping, e-commerce*
- *Travel, online cabs*
- *Personalised music, movies*

Public Services

- *Direct Payments & Banking*
- *Agriculture & weather information,*
- *Health services & Utilities*

What is EMF?

EMF. i.e. Electromagnetic fields are part of everyday life, emitted both by natural sources like the sun, the earth and the ionosphere, and by artificial sources such mobile phone base stations, radar facilities equipment, remote controls, etc.



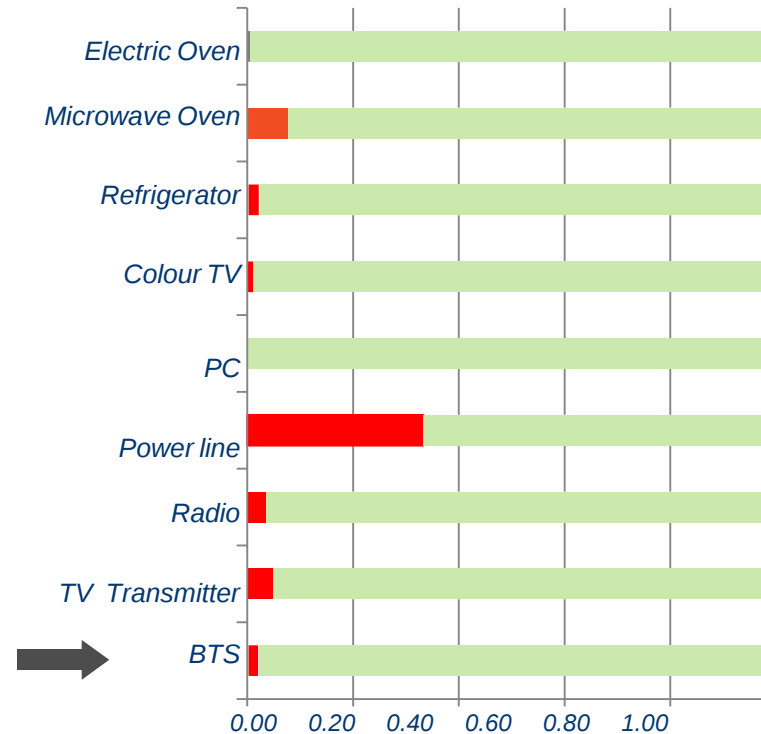
Nonionizing Emission such as Sunlight, Light, Radio, BTS on Telecom Towers, etc. (Cannot remove electrons) Radio frequency waves lie in the non-ionizing part of the spectrum which means that they cannot directly impart enough energy to a molecule to break or change chemical bonds

Cellular towers work in the **non-ionizing spectrum**
NON-IONIZING RADIATIONS CANNOT CAUSE GENETIC DAMAGE

Ionizing Emission such as Gamma Rays, X rays etc. can strip electrons from atoms and molecules, producing changes that can lead to tissue damage and possibly cancer

EMF in our Daily lives

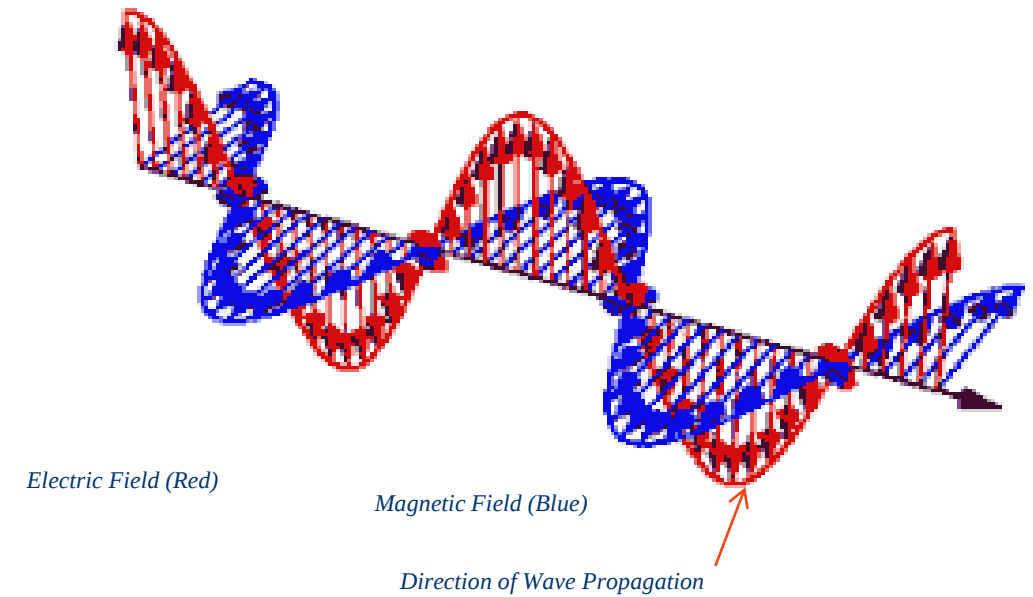
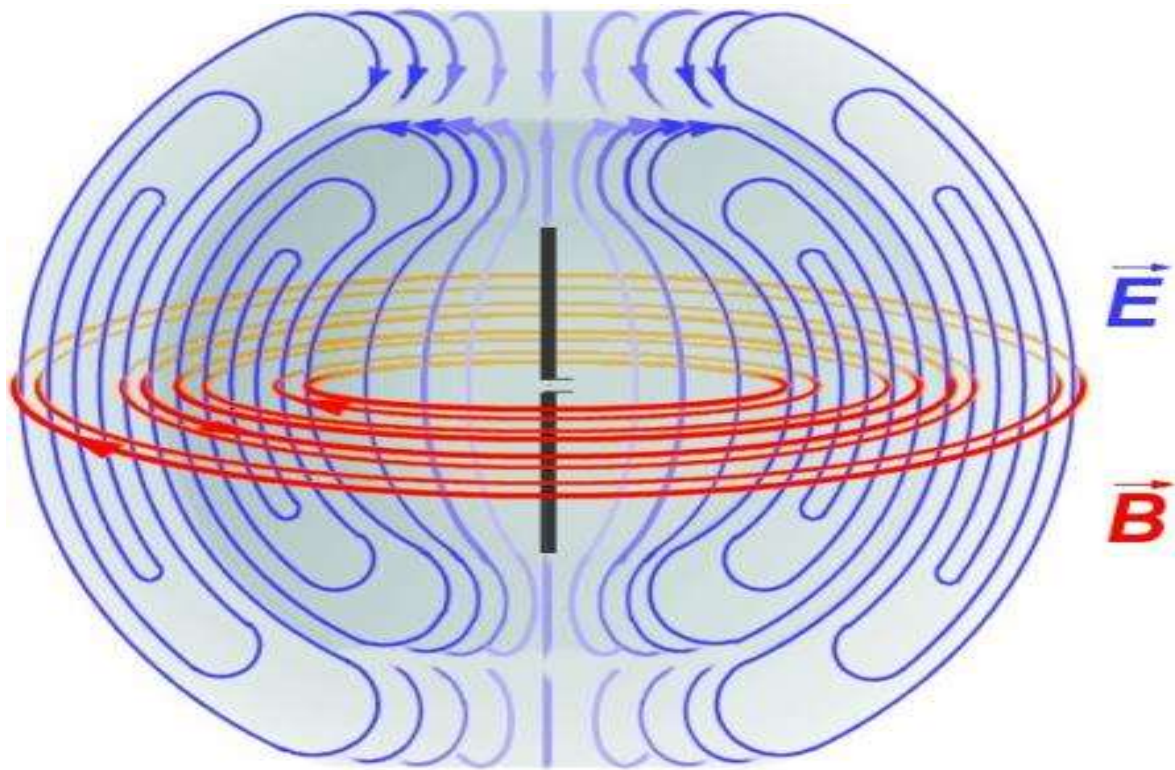
Emissions from various EMF sources are very much a part of our normal daily lives



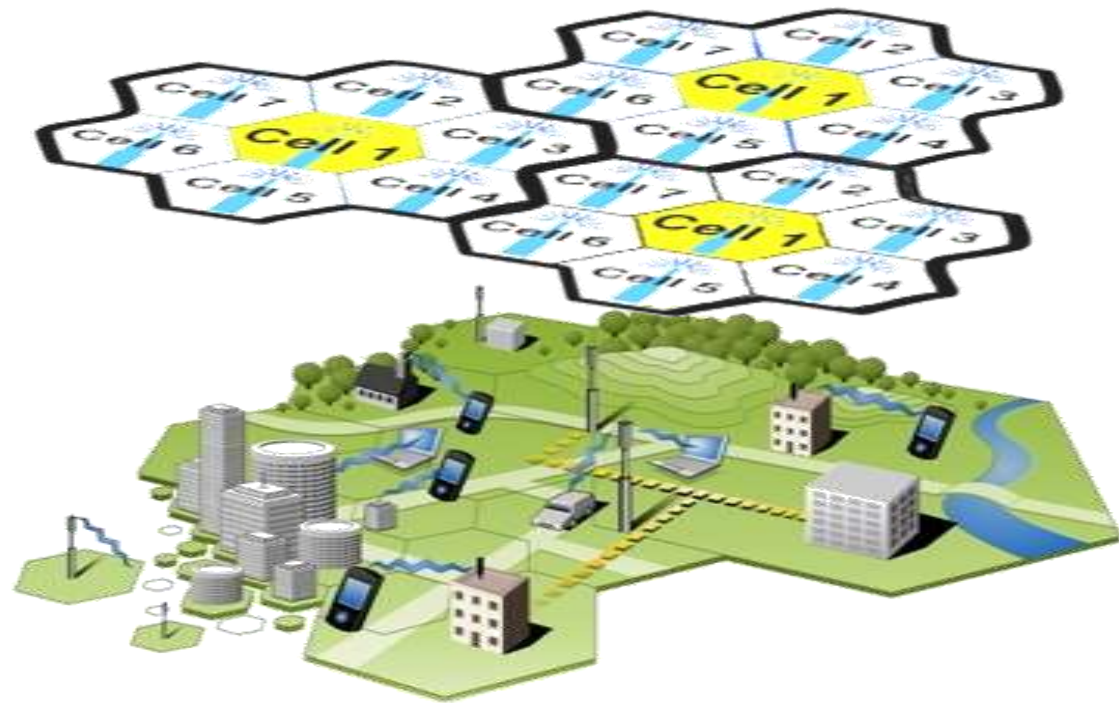
Emissions from a mobile tower are lower than the emissions from our normal radio tuner!

Electromagnetic Emission

- It can best be described as waves of electric and magnetic energy moving together (i.e., radiating) through space



How are Mobile Networks structured?



- *Telecom networks follow RF Planning according to available spectrum, power allowed for emitting, population density and other network parameters.*
- *Coverage area is divided into cells; calls are handed over base stations from tower to tower.*

Municipalities cannot designate just one corner of a city for towers!

“SAYS World Health Organization (WHO)?”

Threshold Zone	Limit when body start feeling the radiation
900 MHz	230W/m ²
1800 MHz	460W/m ²



Safe Zone	ICNIRP Limit
900 MHz	4.5W/m ²
1800 MHz	9.2 W/m ²
2000 MHz and above	10 W/m ²



Safe Zone	ICNIRP Limit
900 MHz	0.45W/m ²
1800 MHz	0.9 W/m ²
2000 MHz and above	1 W/m ²

50 times Safety Margin exists in ICNIRP

500 times Safety Margin exists in India

India has reduced emission limits by further 10 times

In India, SAR value for phones is set at a maximum of **1.6 W/kg**



21,611 publications & 5,068 studies published on EMF Portal of WHO

WHO has concluded that ‘*...current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields, including children..*

EMF Compliance Ecosystem



The Deterrents

- Do we have Deterrent ? 



In case of non-compliance, operators are penalized as per procedure

5 Lakh ➡ 10 Lakhs ➡ 20 Lakh

Site Closure **X** if Violation persists



Cumulative Effect of Multiple towers in one area should not exceed the EMF limits!

Tarang Sanchar – EMF Portal

Designed to provide a public interface for viewing the EMF compliance status of mobile towers, anywhere in India.

A map based mobile base-station search feature and facility to check EMF compliance levels is offered.

Information about EMF, FAQs, and various research reports. The Do's and Don'ts for users.

The portal can be accessed at
www.tarangsanchar.gov.in

tarang sanchar

Welcome to tarang sanchar



संचार मंत्रालय
Ministry of
Communications

Department of Telecommunications initiative with Industry
A portal for information sharing on mobile towers and EMF compliance

Locate Telecom Tower in your area

My Location
(For GPS enabled PC/Tablet/Mobile)

EMF Overview

Summary

- EMF from towers is **non-ionizing!**
- India follows **very strict emission norms!**
- Power density of the Sun Rays= 1000 times higher than BTS radiation
- WHO reviewed over 25,000 studies: **No adverse health effect!**
- More towers required for **better coverage and quality**
- Queries related to **EMF to be diverted to DoT/LSA Head in each state headquarter**

Thank You

FREQUENTLY ASKED QUESTIONS

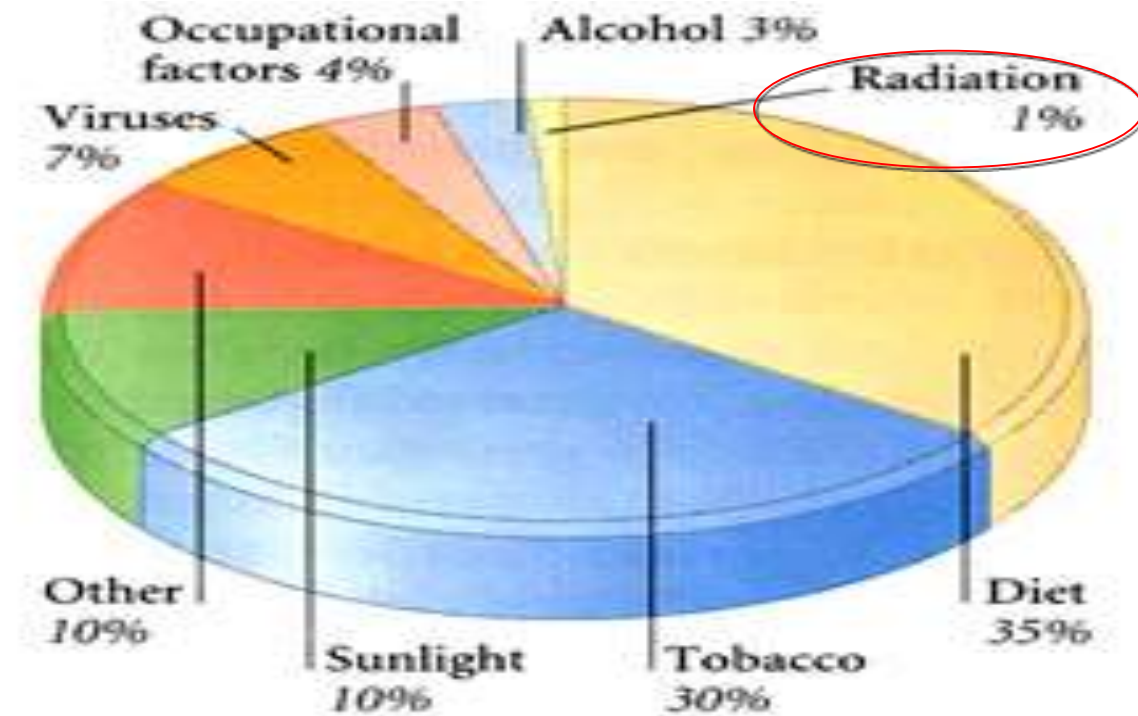
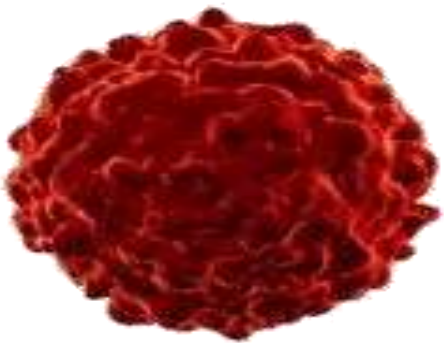


What causes cancer?

Cancer is caused by alterations or mutations in the genetic code

Can be induced in somatic cells by:

- **Carcinogens** - Alcohol, tobacco, asbestos, formaldehyde, etc.
- **Radiation**(ionizing) like X-Rays, etc.
- **Viruses**
- **Heredity** - 5%



Is it unsafe to live near a Mobile Tower?



EMF exposure from mobile tower is equal to or less than exposures from TV towers, radio etc.

a).... The levels of RF exposure from base stations and wireless networks are so low that the temperature increases are insignificant and do not affect human health.

b) The strength of RF fields is greatest at its source, and diminishes quickly with distance. Access near base station antennas is

restricted where RF signals may exceed international exposure limits. Recent surveys have indicated that RF exposures from base stations and wireless technologies in publicly accessible areas (including schools and hospitals) are normally thousands of times below international standards.

c) In fact, due to their lower frequency, at similar RF exposure levels, the body absorbs up to five times more of the signal from FM radio and television than from base stations. ... Further, radio and television broadcast stations have been in operation for the past 50 or more years without any adverse health consequence being established.

- WHO Fact sheet N° 304 dated May 2006

Are children more vulnerable to EMF?



*International safety
guidelines protect everyone
in the population with a large
safety factor*

“The scientific evidence does not show a danger to any users of cell phones from RF exposure, including children and teenagers.”

- U.S. Food & Drug Administration (2008)

“French health authorities indicate there is no evidence to demonstrate that the use of mobile phones presents a risk to health, both for adults and for children.”

French National Cancer Institute (2010)

Can a radiation shield protect us from EMF exposure ?



Scientific evidence does not indicate any need for shields on mobile phones

“The use of commercial devices for reducing radiofrequency field exposure has not been shown to be effective.”

– WHO Fact sheet, June 2011

“A mobile phone automatically operates on the lowest power necessary to maintain call quality. If an add-on device adversely affects the phone's antenna, the phone will attempt to transmit more power up to its specified maximum”

-GSMA Association Health Booklet

“Scientific evidence does not indicate any need for shields on mobile phones. They cannot be justified on health grounds and the effectiveness of many such devices in reducing exposure is unproven.”

-GSMA Association Health Booklet

Do towers cause increased incidence of cancer in their vicinity?



“Media or anecdotal reports of cancer clusters around mobile phone base stations have heightened public concern. It should be noted that geographically, cancers are unevenly distributed among any population. Given the widespread presence of base stations in the environment, it is expected that possible cancer clusters will occur near base stations merely by chance. Moreover, the reported cancers in these clusters are often a collection of different types of cancer with no common characteristics and hence unlikely to have a common cause.”

- WHO Fact sheet N° 304 dated May 2006

Why are there so many restrictions on using mobile phones in hospitals?

“Mobile phones are often prohibited in hospitals and on airplanes, as the radiofrequency signals may interfere with certain electro-medical devices and navigation systems”

- WHO Fact Sheet No. 193 June 2011



Does Cell phone usage cause cancer ?

“The largest retrospective case-control study to date on adults, Interphone, coordinated by the ... (IARC), was designed to determine whether there are links between use of mobile phones and head and neck cancers in adults. The international pooled analysis of data gathered from 13 participating countries found no increased risk of glioma or meningioma with mobile phone use of more than 10 years.

Some indications of an increased risk of glioma for those who reported the highest 10% of cumulative hours of cell phone use, although there was no consistent trend of increasing risk with greater duration of use. The researchers concluded that biases and errors limit the strength of these conclusions and prevent a causal interpretation. Based largely on these data, IARC has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B)”

- WHO Fact sheet N° 193, June 2011

Radio signals don't have sufficient intrinsic energy to affect any genetic material

Should a pregnant woman be worried about mobile phone use?

THE PREGNANT WOMEN SHOULD NOT WORRY ABOUT THE EMF RADIATION FROM MOBILE TOWERS.

“The protection system using basic restrictions and reference levels makes the ICNIRP guidelines flexible and applicable to virtually any exposure condition, and any group of population.”

- Dr. Paolo Vecchia, Chairman of ICNIRP



Does continuous exposure to mobile phones lead to irreversible infertility?

CAUSAL RELATIONSHIP BETWEEN MOBILE PHONE USAGE AND INFERTILITY HAS NOT BEEN ESTABLISHED.

Journal of Assisted Reproduction and Genetics (2012) has challenged the argument that 'Cell phone has an impact on reproduction.'



Are mobile phone signals linked to decline in bee numbers?

THERE IS NO LINK BETWEEN DECLINE IN BEE NUMBERS AND MOBILE PHONES.

Researchers in Germany suggested bees were being "confused" by mobile phone signals causing Colony Collapse Disorder (CCD) and bee deaths. But researchers from US universities have identified a virus causing the deaths. US Department of Agriculture says there is no link between mobile phones and CCD.



Are mobile phone signals linked to decline in birds?

SPARROW DECLINE LEVELS ARE LINKED TO URBAN NOISE LEVELS, NOT TO MOBILE PHONES.

A University of Sheffield study found that industrial and traffic noise in urban environments can make it difficult for adult sparrows to hear their young, impairing the chicks' growth as they are less likely to be fed.

