

# TED ANTALYA MODEL UNITED NATIONS 2019



**Forum:** Health and Environment

**Issue:** Decreasing the biological effects of electromagnetic radiation

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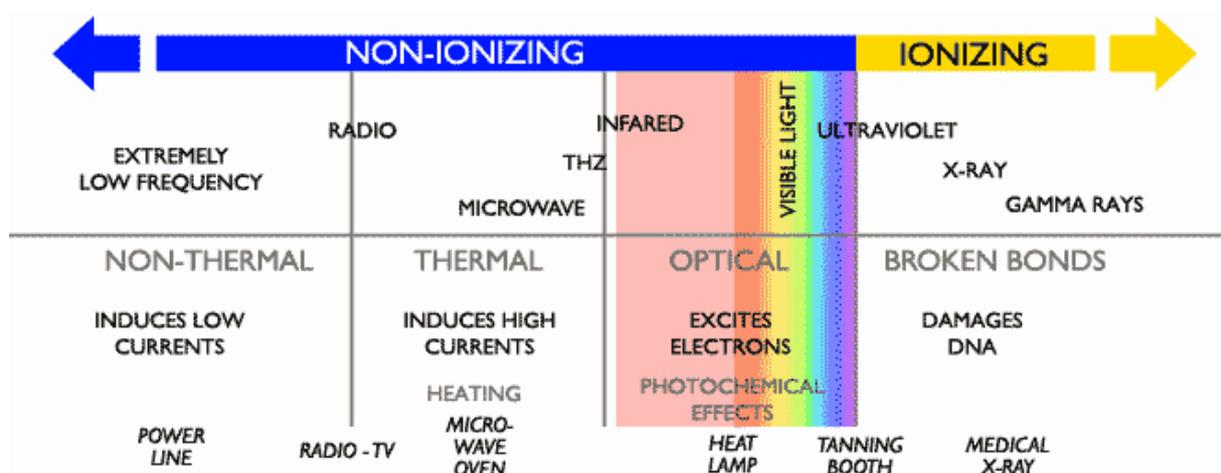
**Position:** Deputy Chair

## INTRODUCTION

A scientific source defines electromagnetic radiation (EMR) as “the energy that can travel through a vacuum and through space. Whenever an electric charge oscillates or is accelerated, an electric and magnetic field propagates outward from it.”

The very low frequency of electromagnetic fields surrounding power lines and electrical devices have potential health effects. They are the subject of ongoing research and a significant amount of unresolved public debate. There are many reports suggesting possible emerging problems. But there is not enough evidence because the epidemiological studies are not able to detect small effects. And also there is a lack of consistency in results in different laboratories on the same experiment.

Even though in certain frequency bands EMR has positive effects which are used in medicine, other non-ionising frequencies that are sourced from extremely low frequencies, power lines or certain high frequency waves that are used in the fields of radar, telecommunications and mobile phones, seem to have more or less harmful, non-thermal, biological effects on plants, insects and animals, as well as the human body even exposed to levels that are below the official threshold values. National and international decision makers must respect the precautionary principle and revise the current threshold values. Whereas waiting for high levels of scientific and clinical proof can give way to very high health and economic costs, as was the case in the past.(cases of asbestos, leaded petrol and tobacco)

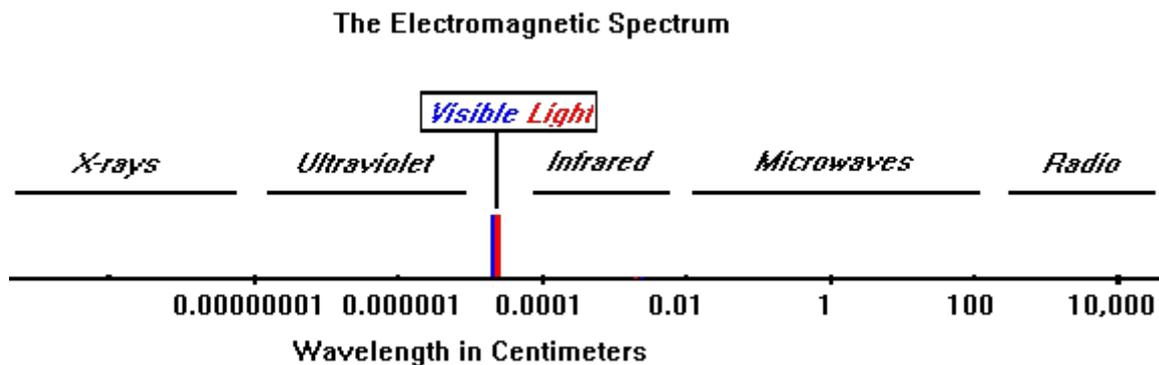


Ionizing radiation has the most harmful effect as it can ionize molecules or break chemical bonds. Radiation can cause somatic or genetic hazards. Nonionizing radiation is relatively low in energy. Unlike ionizing radiation, EMF (non-ionizing radiations) are too weak to break the bonds that hold molecules together. Prolonged exposure to lower levels can also be associated with increased risk of illnesses.

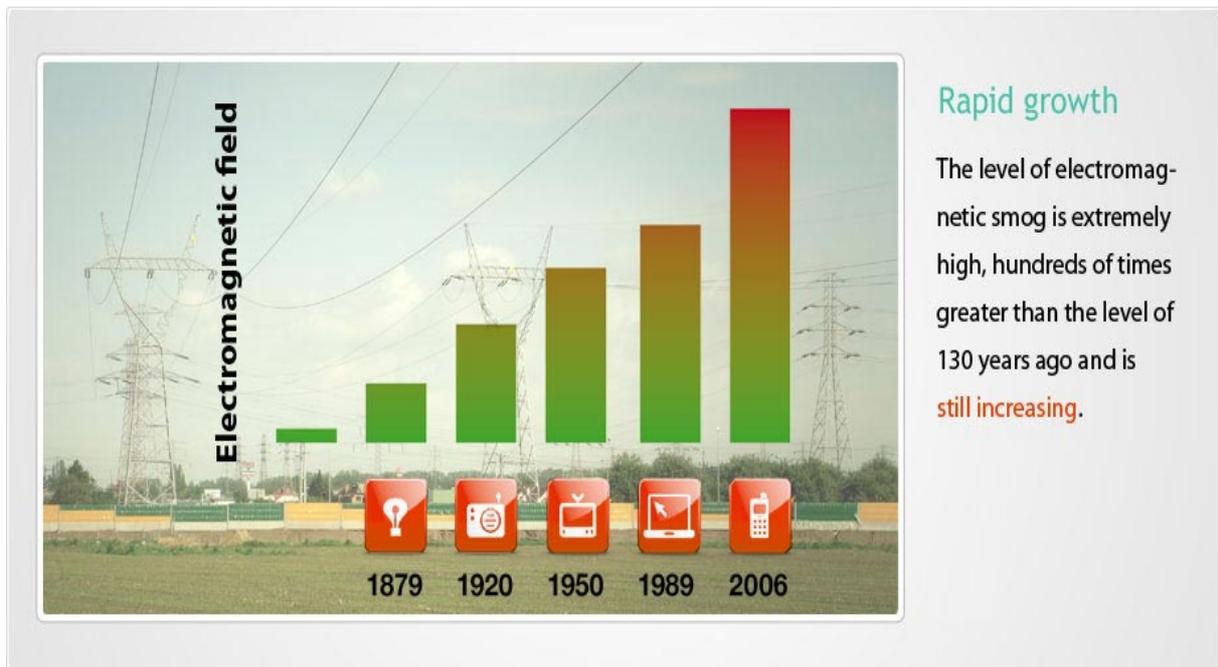
Simply, EMR is a form of energy. Whereas the light that we see is a type of electromagnetic radiation, it is only a very small part of the entire electromagnetic spectrum. Electromagnetic radiation is different from the sound since it can travel in space and does not need a medium like air or water to travel through. When an atom absorbs energy, EMR occurs causing one or more electrons to change their positions within the atom. Then the electron returns to its original position by producing an electromagnetic wave. This EMR can take the form of heat, light, ultraviolet, or other electromagnetic waves.

The generation of electromagnetic radiation may be classified into two categories:

- 1- Systems or processes that produce radiation covering a broad continuous spectrum of frequencies (the Sun with a continuous spectrum)
- 2- Ones that release and absorb radiation of separate frequencies (a radio transmitter tuned to one frequency)



Approximately 0.01 % of the mass and energy ratio of the entire universe occurs in the form of EMR. It surrounds all human living and modern communications technology and medical services are mostly dependent on one or another of its forms. Actually, all creatures on Earth depend on the EMR received from the Sun and on the transformation of solar energy into plant life or into zooplankton, which is the basic step in the food chain in oceans.



## DEFINITION OF KEY TERMS

**ELF:** extremely low frequencies

**Biological effect:** is used to refer to a “physiological, biochemical or behavioural change brought about in a tissue or a cell in response to an external stimulus. Not every biological effect necessarily poses a serious threat to health; it may simply show the normal response of the cell, tissue or organism to that stimulus. A medical or pathological biological effect, on the other hand, is an effect that may imperil the organism’s normal functioning by causing more or less severe symptoms or pathologies. “

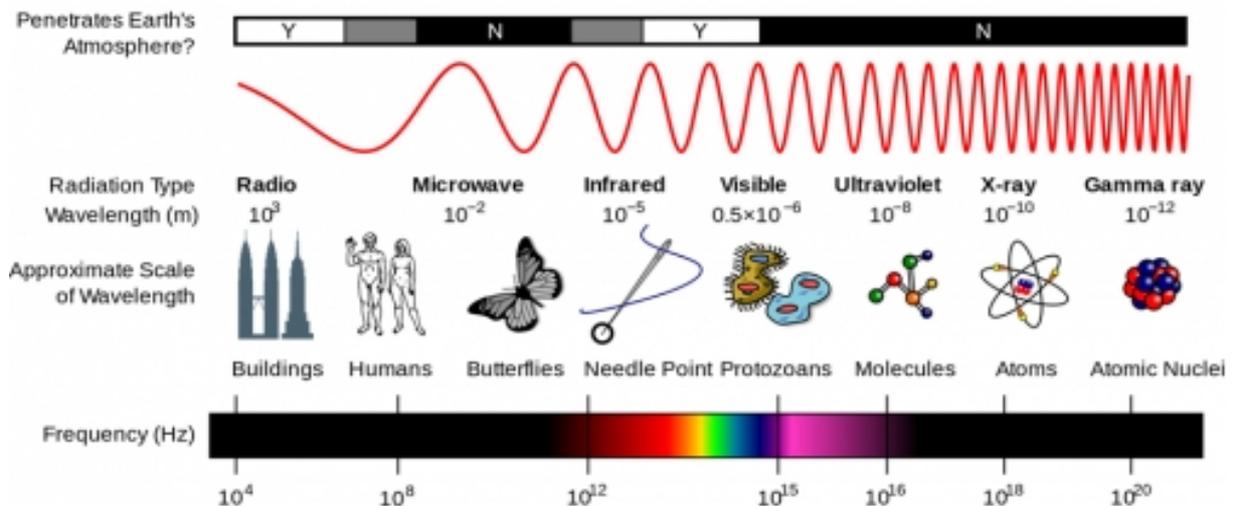
**Oscillate:** to swing backward and forward like a pendulum

**Electromagnetic wave:** one of the waves that are propagated by simultaneous periodic variations of electric and magnetic field intensity and that include radio waves, infrared, visible light, ultraviolet, X-rays, and gamma rays

**Electromagnetic spectrum:** the entire range of wavelengths or frequencies of electromagnetic radiation extending from gamma rays to the longest radio waves and including visible light

**Wave length:** the distance from one wave of energy to another as it is traveling from one point to another point

**Frequency:** the number of waves of sound or energy that pass by a point every second



**Epidemiology:** a branch of medical science that deals with the incidence, distribution, and control of disease in a population

**Immune system:** the system that protects your body from diseases and infections

**Metal toxicity or metal poisoning:** the toxic effect of certain metals in certain forms and doses on life. Some metals are toxic when they form poisonous soluble compounds.

**EMF:** (electromagnetic field) a field that is made up of associated electric and magnetic components, that results from the motion of an electric charge, and that possesses a definite amount of electromagnetic energy.

**Geomagnetic field:** is Earth's magnetic field extends from the Earth's interior out into space.

**Distortion:** is the changing of something into another that is not true or not acceptable.

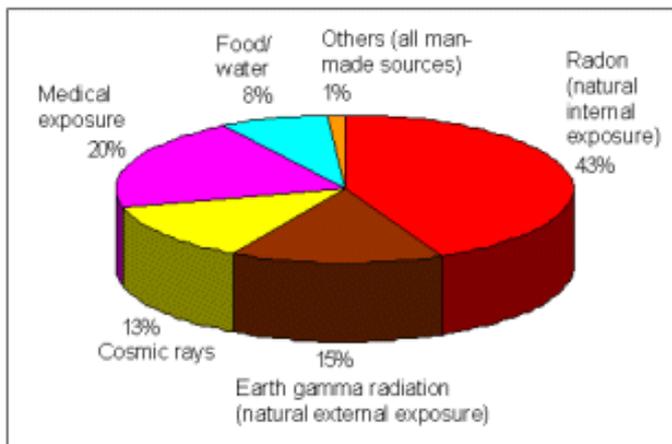
**The Precautionary Principle:** usually applied when there is a high degree of scientific uncertainty and there is a need to take action for a potentially serious risk without awaiting the results of more scientific research. It was defined in the Treaty of Maastricht as "taking prudent action when there is sufficient scientific evidence (but not necessarily absolute proof) that inaction could lead to harm and where action can be justified on reasonable judgements of cost-effectiveness". It has mainly been used to prohibit the importation of genetically modified organisms and food.

## GENERAL OVERVIEW

There are natural and human-made sources of electromagnetic fields. The first one is present everywhere in our environment but it is invisible to the human eye. The second one includes fields generated by human-made sources.

Modern society uses fuels such as gas, oil, and coal that are stored forms of energy. They are received from the Sun as electromagnetic radiation millions of years ago. Only the energy from nuclear reactors does not originate from the Sun.

Where does radiation come from?

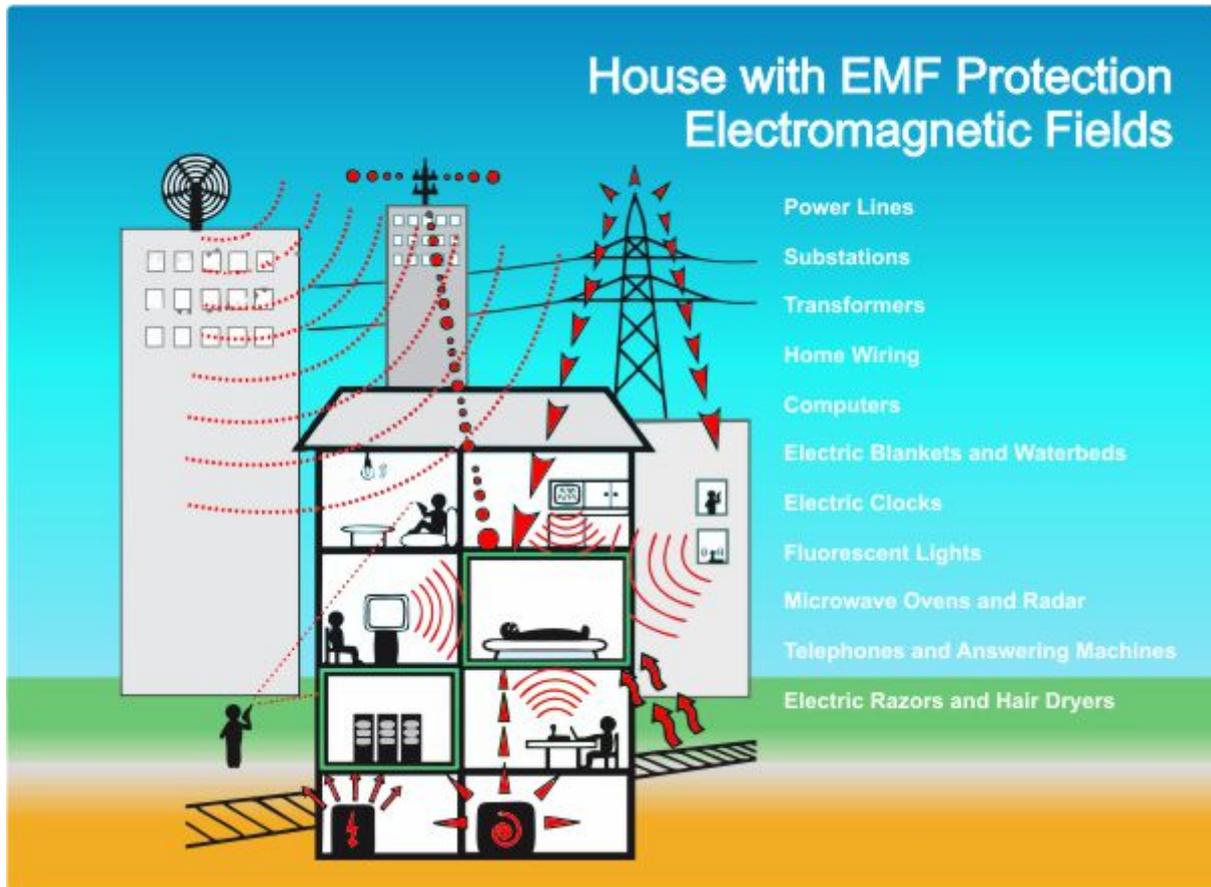


Artificially made electromagnetic radiation is perceived in every phase of life. Food is heated in microwave ovens, airplanes are guided by radar waves, television sets receive electromagnetic waves transmitted by broadcasting stations, and infrared waves from heaters provide warmth, Ultraviolet light represents a kind of electromagnetic radiation that can be harmful to life. X- Rays allow physicians to observe the inner parts of the body but its exposure should be kept to a minimum.

On the other hand, the use of radiation in medicine, industry, agriculture, energy and other scientific and technological fields has brought some utilities to society. The ones in medicine for diagnosis and treatment in terms of human lives saved are incredible.

Scientific studies related to the effects of certain microwave frequencies on plants, insects and wildlife or farm animals are causing anxiety because they reveal potentially pathogenic biological effects on the human body.

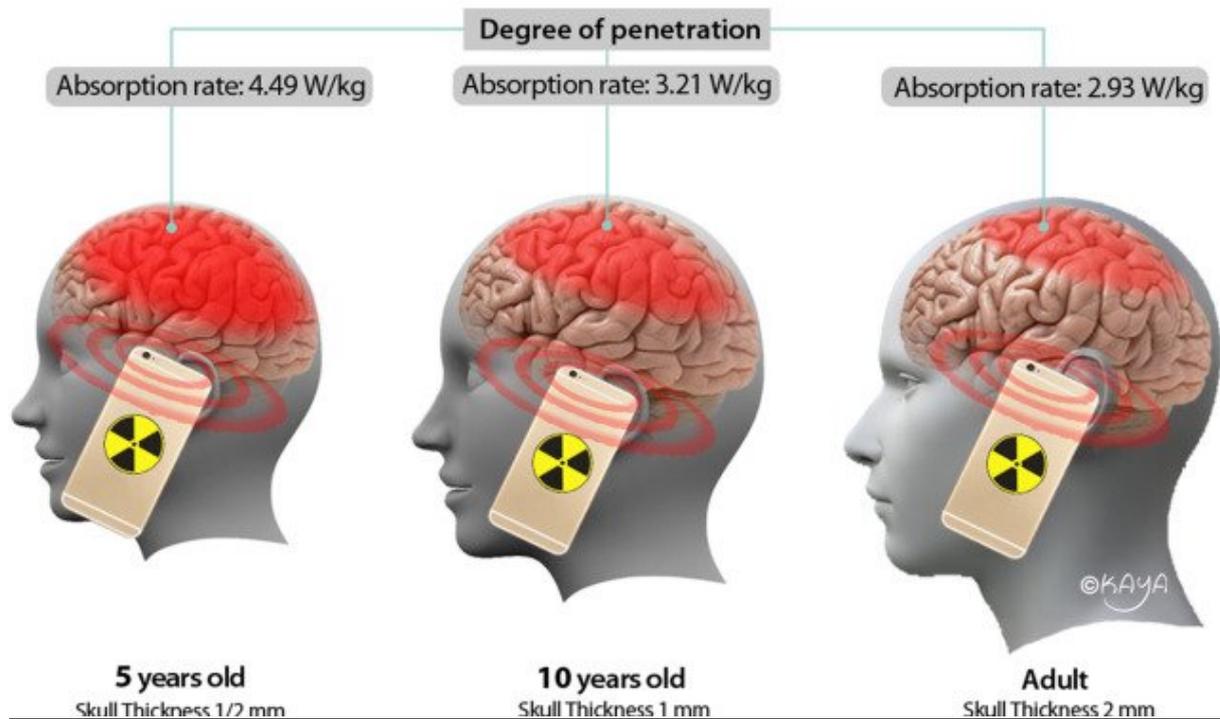
The least understood types of radiations are electromagnetic ejections from cell phones, high voltage current in power transmission lines, and from a number of household and industrial electrical equipment. Many biological studies which have been carried out with ELF electromagnetic fields on biological cells and in living animals, as well as in humans, have ended by conflicting results. Cell phone ELF electromagnetic radiation has been in the public spotlight over the past few years. The type of phone, the distance between the phone's antenna and the user, the extent and type of use, and the user's distance from cell phone towers all determine the amount of EMR one is exposed to.



Distortions of the geomagnetic field because of the use of iron and steel for the ceiling construction or natural (geopathic) fault zones and technical interferences, are detected inside buildings. When a human being spends a longtime in a distorted earth magnetic field permanent biological stress arises. It has a negative effect on cell communication in the human body weakening the immune system.

Young people may be more sensitive to radioactive field exposure than adults. Children of today will also experience a much higher cumulative exposure than previous generations.

## How the diffusion of radiation among different ages in the brain



Martin Blank, PhD, of Columbia University, says, 'International exposure guidelines for electromagnetic fields must be strengthened to reflect the reality of their impact on our bodies, especially on our DNA. The time to deal with the harmful biological and health effects is long overdue. We must reduce exposure by establishing more protective guidelines.'

Each person and their cells are different and affected by electromagnetic radiation but in a different 'speed'. There are some factors that cause a faster or stronger reaction to EMF exposures:

- High stress levels
- Low iodine levels
- Heavy metal toxicity
- Having Lyme disease
- Weakened immune system
- High total EMF exposure
- One or more single incident of very strong exposure
- Having other pre-existing health problems

The most significant effects of electromagnetic radiation can be classified as:

- Protein Changes in Skin,
- Sperm Abnormalities,
- Excited Brain Cells,
- DNA Damage,
- Brain Cell Damage,
- Aggressive Growth in Leukemia Cells,
- Increased Blood Pressure.

#### **MAJOR PARTIES INVOLVED**

**IEMFA:** The International Electromagnetic Field Alliance

**WHO:** World Health Organisation

**UNHRC:** United Nations Human Rights Council

**PACE:** Planetary Association for Clean Energy

**EPA:** US Environmental Protection Agency

**ICNIRP:** The International Commission on Non-Ionizing Radiation Protection

**GUARDS:** Global Union Against Radiation Deployment from Space

**ICEMS:** International Commission for Electromagnetic Safety

**IACRNE:** Inter-Agency Committee on Radiological and Nuclear Emergencies

#### **TIMELINE OF EVENTS**

<b>TIME</b>	<b>EVENT</b>
1972	The Declaration of the United Nations Conference on the Human Environment
1989	The United Nations Convention on the Rights of the Child

1998	The International Commission on Non-Ionizing Radiation Protection (ICNIRP) established
2008	The Mid-term review of the European Environment and Health Action Plan 2004-2010
2012	Measurement concerns related to human exposure to electromagnetic fields of the International Telecommunications Union
2015	the International EMF Scientist Appeal submitted to the United Nations
2017	Revised African Convention on the Conservation of Nature and Natural Resources
2018	The United Nations Guidelines for The Long-Term Sustainability of Outer Space Activities

## **PREVIOUS ATTEMPTS TO RESOLVE THE ISSUE**

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) that is established in 1998 clarified the “Guidelines For Limiting Exposure To Time-Varying Electric, Magnetic, and Electromagnetic Fields”. These guidelines are accepted by the World Health Organisation and many countries around the world.

The International Health Regulations in 2005 include in its’ field of activity radio-nuclear hazards. All of the countries should fulfill the essential national necessities for repling to radiation emergencies.

ICEMS, “International Commission for Electromagnetic Safety” was founded by very important scientists and researchers aiming to implement independent research and propose that the precautionary principle should be applied. In 2006 (Benevento Resolution) and 2008 (Venice Resolution), these scientists published instructive resolutions calling for the adoption of far tougher new safety standards and rules.

The International Electromagnetic Field Alliance (IEMFA) has received a statement of support for the International EMF Scientist Appeal. The Appeal was submitted to the United Nations in 2015 including from 105 NGOs in 25 nations. They have published researches on biological or health effects of non-ionizing radiation, comprising extremely low frequency fields (ELF) used for electricity and radio frequency radiation (RFR) used for wireless communications.

In 2016, International EMF Scientist Appeal recognized that current international EMF exposure guidelines do not protect against long-term exposure and they are not enough to protect the health of human and also do not care the risks for all other biological organisms. The scientists emphasized that this was an urgent matter. It must be recognized that EMF

exposure is an emerging health and environmental crisis, the current international EMF exposure guidelines must be reviewed and revised, precautionary measures must be taken to reduce EMF exposure conditions.

## **RELEVANT UN DOCUMENTS AND TREATIES**

\*The Outer Space Treaty (1967) Which requires that the use of outer space be conducted “so as to avoid [its] harmful contamination and also adverse changes in the environment of the Earth.

\* The Declaration of the United Nations Conference on the Human Environment (1972): “The discharge of toxic substances... in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems”

\* The World Charter for Nature (1982): “Activities which are likely to cause irreversible damage to nature shall be avoided.”

\* The United Nations Convention on the Rights of the Child (1989). ‘ To combat disease and malnutrition, including within the framework of primary health care, through, inter alia, the application of readily available technology and through the provision of adequate nutritious foods and clean drinking-water, taking into consideration the dangers and risks of environmental pollution’

\*The Rio Declaration on Environment and Development (1992): In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

\*the World Health Organization (WHO) launched the International EMF Project in 1996

\*Resolution 1815 (Council of Europe, 2011). The potential dangers of electromagnetic fields and their effect on the environment: “Take all reasonable measures to reduce exposure to electromagnetic fields, especially to radio frequencies from mobile phones, and particularly the exposure to children and young people”

\* Resolution 72 – Measurement concerns related to human exposure to electromagnetic fields of the International Telecommunications Union (2012). It stated that “There is a need to inform the public of the potential effects of exposure to electromagnetic fields (EMFs)” and invited Member States “to adopt suitable measures in order to ensure compliance with relevant international recommendations to protect health against the adverse effect of EMF”.

\*The United Nations World Summit on Sustainable Development (2002): “There is an urgent need to... create more effective national and regional policy responses to environmental threats to human health”

\* The Mid-term review of the European Environment and Health Action Plan 2004- 2010: “The European Parliament notes that the limits on exposure to electromagnetic fields which have been set for the general public are obsolete”(out of date)

\* The United Nations Global Strategy for Women’s, Children’s and Adolescents’ Health (2016-2030) [...] has as objectives and targets to “transform”, by expanding enabling

environments; to “survive”, by reducing maternal and newborn mortality; and to “thrive” by ensuring health and well-being and reducing pollution-related deaths and illnesses.

\*Revised African Convention on the Conservation of Nature and Natural Resources (2017): “The Parties shall... take all appropriate measures to prevent, mitigate and eliminate to the maximum extent possible, detrimental effects on the environment, in particular from radioactive, toxic, and other hazardous substances and wastes”

\*The United Nations Guidelines for The Long-Term Sustainability of Outer Space Activities (2018)

## **POSSIBLE SOLUTIONS**

The key factors in all economic, technological and social development of society are the precautionary principle and the right for a healthy environment especially for the sake of future generations.

According to the scientific studies of experts within the context of the Committee on the Environment, Agriculture and Local and Regional Affairs, there is enough evidence of harmful effects of electromagnetic fields on fauna, flora and human health.

Possible risks of EMF hazards from facilities such as power lines or mobile phone base stations present a huge set of challenges for decision-makers. In order to respond to these challenges, the involvement of individuals or organizations with the right set of capabilities, combining proper scientific expertise, strong communication skills and good judgement in the management and regulatory areas is necessary. This will be true in local, regional or even national or global situation.

Electromagnetic radiation is strongly assimilated by water at specific wavelengths. Therefore, plant water status can be assessed by measuring absorption of these wavelengths.

In everyday life, some potential hazards are minimised by an automatic process. But with radiation we are limited in what we can see, so we need instruments, knowledge and awareness to navigate. Knowledge and instrumentation can form the basis for awareness in the invisible world of ionizing radiation.

Precautions to reduce the biological effects of electromagnetic radiation can be classified shortly as the following;

Children and pregnant women must be protected; guidelines and regulatory standards about the limits must be strengthened; manufacturers must be encouraged to develop safer technology; the society must be fully educated about the potential health hazards from electromagnetic energy; professionals of medical sciences must be educated about the biological effects of electromagnetic radiation and must be provided training on the cure of patients; governments must fund training and research on electromagnetic fields; media must reveal experts' financial relationships with industry (if any) when mentioning their opinions about EMF-emitting technologies; white-zones (radiation-free areas) must be established; utilities people use (that are thought to be responsible for the generation, transmission, distribution, and monitoring of electricity) must be qualitative.

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