

EMF regulations for Electronic Communications Networks & Services

**Parliament of Malta
Health Committee Mtg 13**

10th November 2020

Matters being discussed today

Background to EMF

Electronic Communications Networks

EMF exposure standards

Regulatory framework

Ensuring Compliance

Background - What is EMF

Electromagnetic Radiation consists of waves of electric and magnetic energy moving together through space.

Electromagnetic fields (EMFs) are generated by a multitude of sources, sunlight being the most familiar form of electromagnetic radiation.

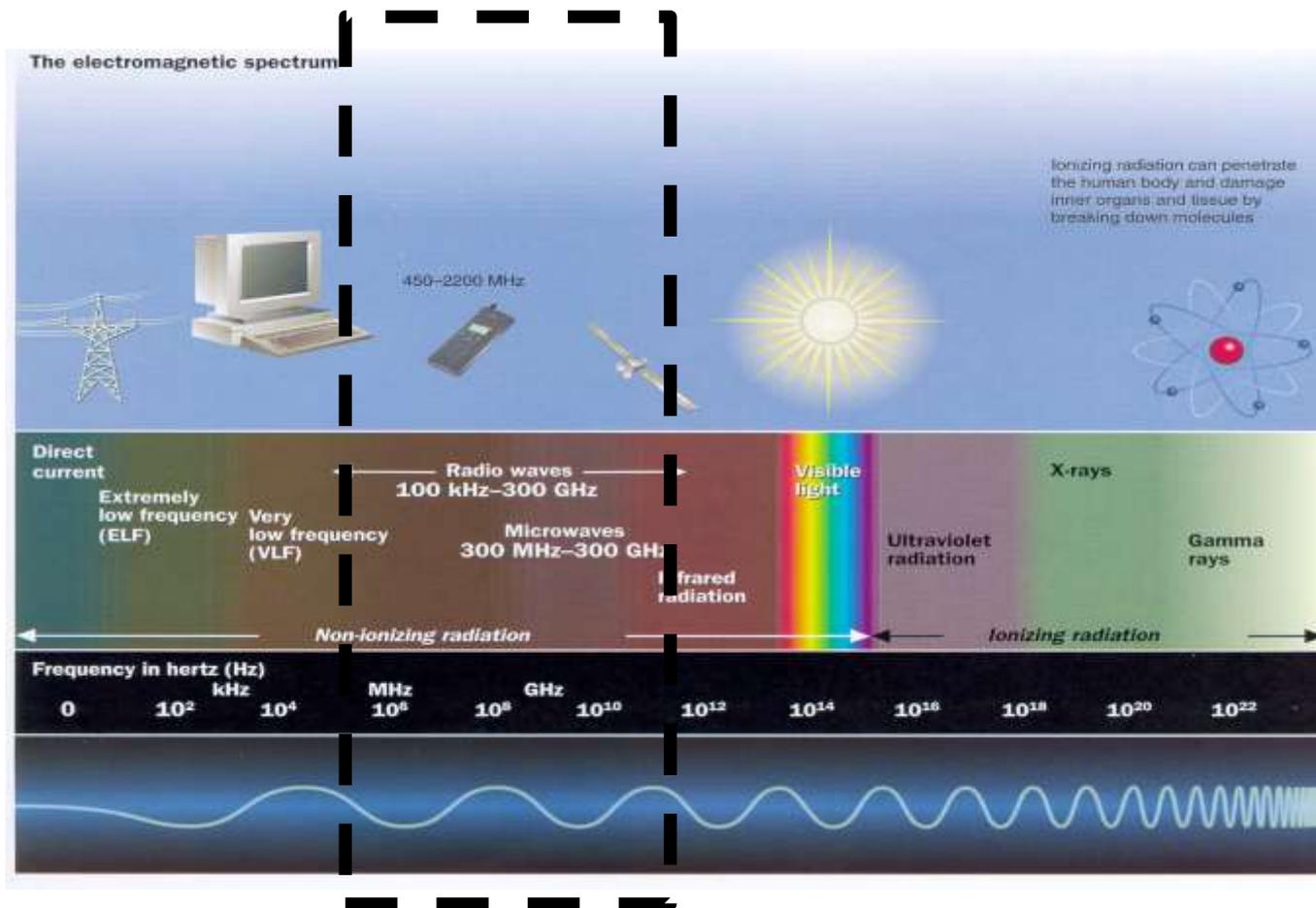
EMF is also produced by all electrical devices such as light bulbs, power lines, telephone lines, all electrical appliances, mobile phones and their base stations, TV and radio sets and their transmitters.

Exposure to common EMF sources



Electromagnetic radiation from radiocommunications equipment

Generally classified as “Non-Ionizing Radiation” because it typically lacks the energy to effect changes in atomic structure



Electronic communications networks and services

Electronic Communications Networks

Utilise radio spectrum to provide services

Fixed and wireless networks are an essential infrastructure in Europe;
Even more so in times of crises (EU bodies: RSPG and BEREC)



Antenna sites or base stations typically consist of a mast on a building to support the antennas and associated transmission and network equipment

- Frequency spectrum falls within the 100kHz to 300GHz non-ionising range
- Spectrum for ECN is harmonised at EU level through relevant EU decisions
- Current use ranges from 800 MHz to 3.6 GHz

EMF exposure standards

The international bodies

- World Health Organisation
- International Commission on Non-Ionizing Radiation Protection (ICNIRP)
- European Union



World Health Organisation



- As part of its Charter to protect public health and in response to public concern, the World Health Organization (WHO) established the [International EMF Project](#), which since 1996 has been assessing the scientific evidence of possible health effects of EMF in the frequency range from 0 to 300 GHz.

<http://www.who.int/peh-emf/en/>

- The International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines have been formally recognised by WHO.

“The standards are based on evaluations of biological effects that have been established to have health consequences. The main conclusion from the WHO reviews is that EMF exposures below the limits recommended in the ICNIRP international guidelines do not appear to have any known consequence on health.”

<http://www.who.int/peh-emf/standards/en/>

European Commission and the EU



Scientific Committee on Emerging and Newly Identified Health Risks

- As part of its mandate, the SCENIHR is asked to continuously monitor new scientific evidence that may influence the assessment of risks to human health in the area of electromagnetic fields (EMF) and to provide regular updates to the Commission.
- The results of current scientific research show that there are no evident adverse health effects if exposure remains below the levels recommended by the EU legislation:
 - Council Recommendation of 12 July 1991 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) which fixes basic restrictions and reference levels for the exposure of the general public to electromagnetic fields (EMFs)
 - Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

ICNIRP (Part 1)



- **What is ICNIRP?**

An independent group of experts established to evaluate the state of knowledge about the effects of EMF on human health and well-being and to provide science-based advice on protection against harmful effects of EMF.

- **What are ICNIRP's aims?**

- To disseminate information and science-based advice on the potential health hazards of exposure to EMF to everyone.
- To develop international guidelines and recommendations on limiting exposure to NIR that are independent and science-based.
- To continuously monitor and periodically carry out critical reviews of the scientific literature concerned with the physical characteristics and sources of EMF and possible biological and adverse health effects.
- Most of this information is published in the form of scientific reviews and reports and the proceedings of scientific meetings. The results of these reviews combined with risk assessments carried out in collaboration with WHO, result in the publication by ICNIRP of Exposure Guidelines.

ICNIRP (Part 2)

- **Who are ICNIRP's members?**

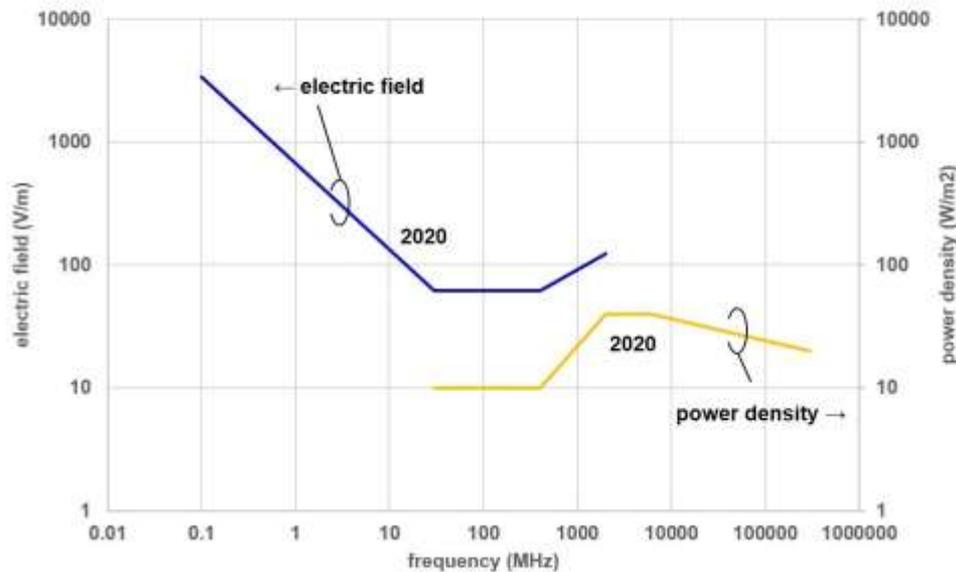
As independent experts, ICNIRP Commission members do not represent either their countries of origin or their institutes nor can they be employed by industry.

- **Internationally Recognised Organisation**

- The formally recognized non-governmental organization in EMF for WHO and the EU.
- It maintains a close liaison and working relationship with other scientific/technical bodies.

International EMF exposure limits

Same limits for 2G, 3G, 4G and 5G: 61V/m



Reference levels for the general public applying to local exposures ≥ 6 min for the ICNIRP (2020) guidelines, for the 100 kHz to 300 GHz frequency range.

Other standardization activities

Measurement methodologies: IEC; ITU



- Technical Report IEC TR 62669:2019:
 - Principles for the use of actual power including massive MIMO statistical methods
 - Case studies on EMF compliance assessments of 5G sites
- IEC 62232:2017
 - Determination of RF field strength, power density and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure
 - Update on-going to include 5G NR mMIMO compliance procedures (available in 2022)
- ITU-T has published a report on 5G network EMF compliance including the use of actual maximum power (Supplement 16 to K-series of recommendations)

Regulatory framework

The European Union



General Public Council Recommendation

- COUNCIL RECOMMENDATION of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)

EU Directive

- Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code

The EU bodies

Body of European Regulators for Electronic Communications (BEREC)
Radio Spectrum Policy Group (RSPG)

BEREC and RSPG adopted a joint position paper on spectrum-related EMF issues on the 09 October 2020

- Fixed and wireless networks are an essential infrastructure in Europe, even more so in times of crises. As part of addressing misinformation about EMF and 5G, which may act as a barrier to the timely rollout of 5G networks, RSPG and BEREC hold the following positions:
- The applicable limits and guidelines provided by ICNIRP in 2020 contribute to our confidence that the EMF issue is addressed in a transparent and scientific manner and human protection is ensured;
- The developments in new EMF measurement methods applicable to new mobile systems, including 5G, are welcomed to always safely make use of the most advanced technologies;
- That Member States are invited to ensure that measures are in place for the necessary monitoring of whether the operator's installed equipment is operating in compliance with the set limits with the objective of, among others, ensuring trust in radio technologies including 5G;
- That transparent, factual and neutral information on EMF issues is highlighted by Member States and the European Commission;
- That Member States are invited to take into consideration citizens' concerns and exchange information and best practices in Europe in order to contribute to a better understanding by the general public of these issues and to promote transparency with regard to the new 5G technology.

The national regulatory framework under MCA's remit

General Authorisation

- An undertaking operating a public electronic communications network **and/or** offering publicly available electronic communications services requires a General Authorisation from the MCA.
- *“The authorised undertaking shall comply with any radiation emission standards adopted and published by the International Commission for Non-Ionising Radiation Protection (ICNIRP) or any other appropriate standards as may be specified by law or by the competent public health authorities...”*

Ninth Schedule of the Electronic Communications Networks and Services (General) Regulations (S.L. 399.28)

The national regulatory framework

Spectrum License

Exposure to Electromagnetic Fields

The Licensee shall comply with any radiation emission standards adopted and published by the International Commission for Non-Ionising Radiation Protection (ICNIRP) and any other appropriate standards as may be specified by law or by the Authority.

The Licensee shall comply with any decisions howsoever so described issued by the Authority in relation to electromagnetic radiation and ensure that its terrestrial mobile system at all times complies with the technical and performance standards generally accepted by the industry, or as may be prescribed by the Authority in line with national and EU Law or accepted by the Authority as being adequate to ensure the limitation of exposure of the general public to electromagnetic fields.

The Licensee shall ensure that its terrestrial mobile system is not installed or operated at a location and in a manner such as to be the cause of the aggregate non-ionising radiation emissions exceeding the limits published by the ICNIRP or any other appropriate standards as may be specified by law or by the Authority.

Ensuring compliance

Ensuring Compliance

- Compliance with EMF provisions is a legal requirement for any entity operating radiocommunications equipment.
- MCA maintains a team of experts with access to state-of-the-art tools who undertake audits in line with best-practice processes.
- MCA carries out ongoing field audits to ensure that radiocommunications stations are operating as per legislation.
- Audits are performed at pre-established test points distributed nationally.
- Measurements are compared to the maximum permissible radiation levels established at law (ICNIRP)

Measurement Methodology

- **Measurement Methodology according to international accepted standards and best practice including:**
 - ECC Recommendation (02)04 – Measuring Non-Ionising Electromagnetic Radiation (9 kHz – 300 GHz)
 - ICNIRP - Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)
 - Relevant IEC and ITU procedures
- **EMF audits are performed from**
 1. Places accessible to the general public, and
 2. On request and as a service to the general public from private premises
- **Extrapolation of results to simulate full transmission capacity / capability**

Transparency

Publication of Results

- Results of site audits concerning publicly accessible locations are made available and kept current on MCA's website.
- Audit reports for measurements undertaken on request are additionally made available to the requestor as well as to the relevant public health directorate.

What about 5G?

Basic facts about EMF from 5G

- 5G uses radio waves (RF EMF) for communication like previous generations of mobile networks
- These 5G frequency bands are covered by current EMF safety standards and limits
- 5G devices and base stations need to meet the same RF EMF safety requirements as current equipment
- 5G uses advanced antennas for beamforming to improve performance while keeping average EMF levels similar to those of current networks i.e. well below the international standards

EMF assessment challenges for 5G

Massive MIMO beam forming and steering

- More complex EMF compliance assessments due to large variability of transmitted signals in time and space
- Higher instantaneous power than for current antennas but similar EMF exclusion zones if considering actual time-averaged power
- Site design is now of increasing importance, particularly in Malta where the urban environment is constantly in development
- Updated procedures for EMF compliance evaluations by mobile operators to cater for these new dynamics will soon be available from international standardization organisations (IEC and ITU) as well as nationally

EMF assessment challenges for 5G

What can't be measured can't be controlled

MCA maintains that the continued access to experts, state-of-the-art tools, and up-to-date international standards defining the relevant measurement procedures is of utmost importance for the fulfilment of its compliance functions.

The Authority is addressing novel assessment challenges through the upcoming publication of EMF measurement guidelines to further guide the compliance assessments undertaken by industry. The MCA is also including provisions in new spectrum licenses to further address such challenges:

- Prior to employing active antenna systems, the Licensee shall provide the Authority with a detailed report on the methodology or procedure, however so described, to be used in ensuring compliance with Article (Exposure to Electromagnetic fields) and shall seek approval from the Authority thereof:
- Provided that the Authority may refuse the use of active antenna systems (AAS) at any of the sites described in the Annex of this Licence if it considers that the methodology or procedure, however so described, proposed by the Licensee is not adequate in ensuring compliance with exposure to electromagnetic fields.

Thank you