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HELLENIC TELECOMMUNICATIONS & POST COMMISSION

# 5G deployment and EMF issues

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# 5G Networks

- A paradigm shift on how to plan and how to deploy radio networks - prioritizing quality in planning and deploying infrastructure
- Some features such as the use of millimetre wave (mmWave) spectrum and small cells have resulted in raising concern in the public and the media as well as in misinformation



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# 5G Network Architecture Requirements

- 5G requirements impose significant pressure on network architecture especially in the access part
- To overcome these challenges there is a need for:
  - ➔ Increase in the total amount of spectrum used, larger continuous channels, use of new frequency bands above 6GHz
  - ➔ Use of active MIMO antennas
  - ➔ Vast increase in the number of access points.
  - ➔ Agile architecture so users can seamless handover between various types of access points (macro, small, pico cells etc).
  - ➔ Flexible use of spectrum between different base stations - larger variation of transmissions per site

# 5G Implications on EMF

- Main implications of 5G on EMF:
  - ➔ Increase in bandwidth can increase the total amount of EMF energy transmitted (for constant dBm/MHz)
  - ➔ Usage of massive MIMO antennas in macro stations makes the evaluation of EMF limits a difficult task as the notion of effective radiated power is no more valid
  - ➔ The use of millimeter wave bands means that higher power is required to overcome the higher absorption in these frequencies
  - ➔ Restrictions on mobile phone's transmission levels will increase the need for more dense network
- The use of multiple bands can challenge the operation within EMF limits and denser networks can increase public's concerns

# Radio Wave Exposure from 5G

- 5G uses radio waves (RF EMF) for communication like previous generations of mobile networks, radio broadcast and television
- 5G frequency bands (< 1 GHz, 1-6 GHz, > 6 GHz) are covered by current EMF safety standards and limits
- 5G devices and base stations need to meet the same EMF safety requirements as current equipment
- 5G uses advanced antennas and beamforming to improve performance while keeping average EMF levels similar to those of current networks , i.e. well below international standards

# Regulatory Interventions in Greece

- Flexible legal framework to accommodate different types of access points (macro, small cells etc)
- Motivation for low emission antennas
- Established mechanism for EMF measurements and publication of the results
- Transparency for licensing procedure and connection with the measuring campaigns

# EMF Regulation

- Emission limits set at 70% of ICNIRP's 1998 guidelines
- In situ measurements for 20% of all antenna installations in Greece are performed every year
- The results are presented through an interactive web portal, in which data are constantly updated with the latest station measurements
- The EMF emissions from base stations currently observed in Greece are well below the recommended limits

# Antenna Licensing

- Since 2012, an online system is used to handle antenna licensing applications promoting efficiency as well as transparency in the licensing process
- Part of the requirements for licensing is the compliance with EMF limits
- Public authorities involved in the licensing process are connected to the system and have access to all studies / permits etc. related to each application
- For antennas with EIRP lower than 164W (higher than a typical small cell eirp level) only a notification 10 days prior to installation is required



# Antenna Licensing and EMF - Transparency

- After Antenna license is granted, all information related to the antenna, including EMF studies and permissions granted, are becoming publicly available over the internet
- An online GIS system facilitates the citizens to find where the licensed antennas are located, allowing also to query for any licensed antennas in their neighborhood
- The system is connected to the GIS system of the competent authority, so all measurements that have been performed for specific antenna installations can be easily retrieved

# Conclusions

- ICNIRP 2020 limits and guidelines contribute to confidence that the EMF issue is appropriately addressed
- New EMF measurement methods are welcomed
- Ensure that measures are in place for the necessary monitoring of whether installed equipment is operating in compliance with the set limits
- Transparent, factual and neutral information on EMF issues is a must
- Exchange information and best practices to contribute to a better understanding by the general public and to promote transparency with regard to the new 5G technology

**Thank you for your attention!**