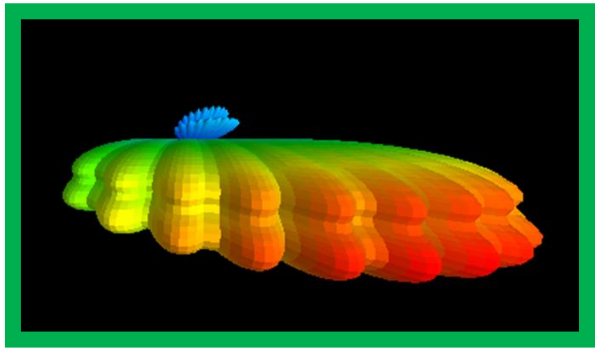
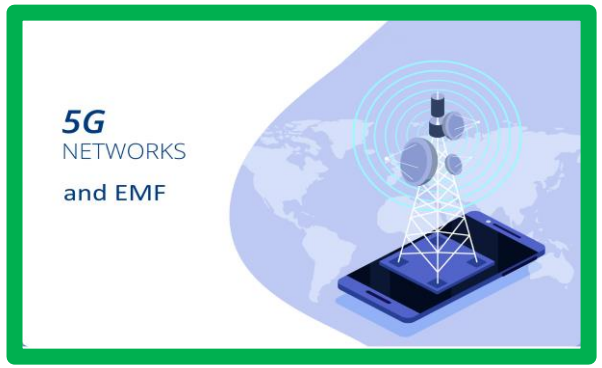
ITU-T activities on Human exposure to electromagnetic fields (EMFs) due to radio systems and mobile equipment





Dr. Fryderyk Lewicki
Chairman of Working Party 1 of ITU-T Study Group 5
Orange Polska S.A.

orange™

Orange Expert Energy & Environment

ITU

ITU's Mandate on EMF

ITU PP Resolution 176 - "Measurement and assessment concerns related to human exposure to electromagnetic fields" (Dubai, 2018)

3 SECTORS

STANDARDIZATION

WTSA Resolution 72 - "Measurement concerns related to human exposure to electromagnetic fields" (Rev. Hammamet, 2016)

ITU-T SG5, Question 3/5
Human exposure to RF EMF

DEVELOPMENT

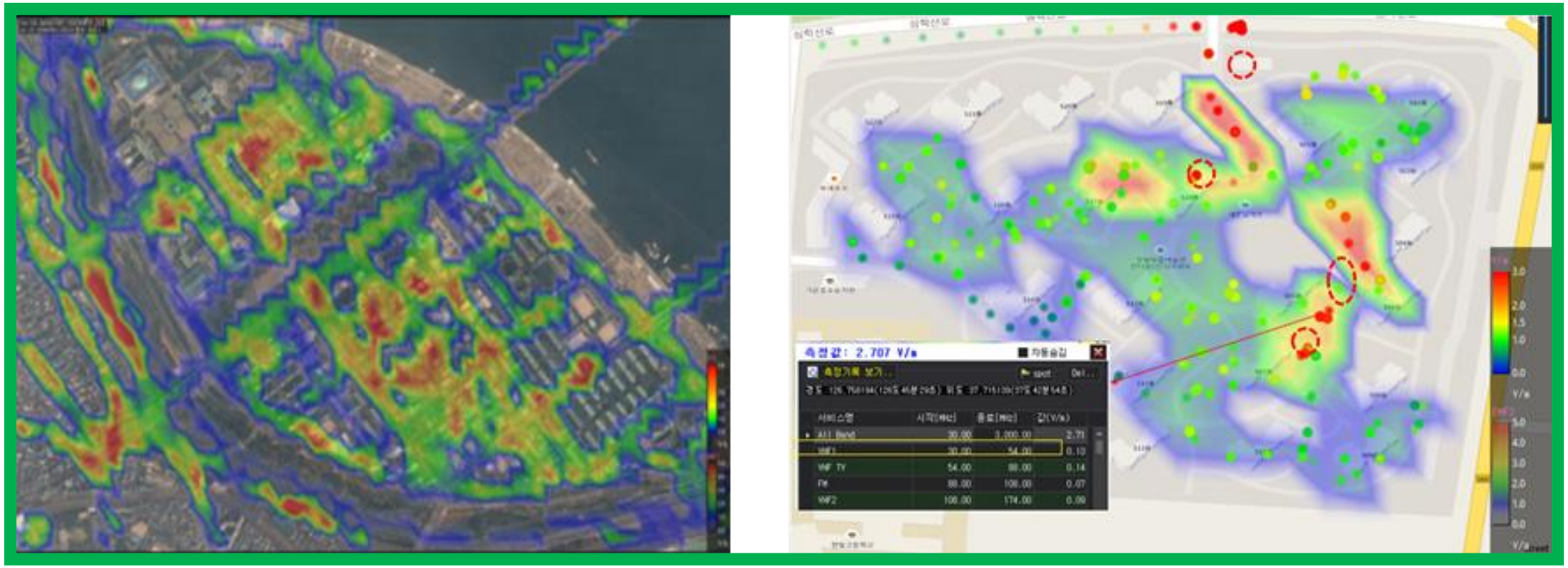
WTDC Resolution 62 - "Assessment and measurement of human exposure to electromagnetic fields" (Rev. Buenos Aires, 2017)

RADIOCOMMUNICATION

ITU-R Question 1/239 (Electromagnetic field measurements to assess human exposure).

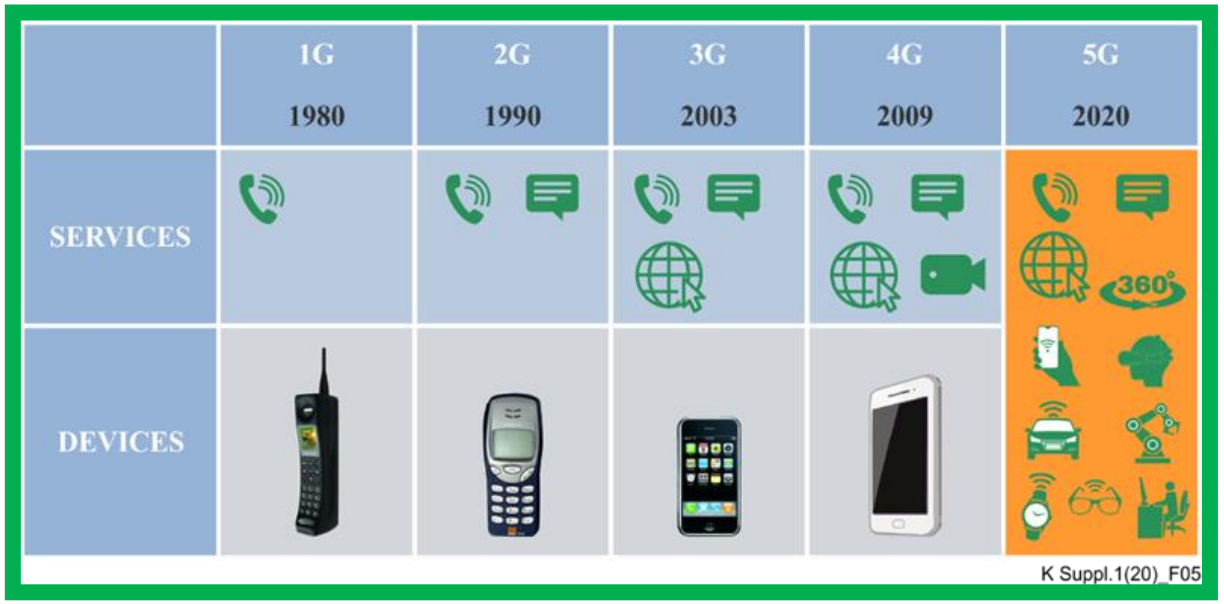
Updated Recommendation ITU-T K.91: Guidance for assessment, evaluation & monitoring of human exposure to radio frequency EMF

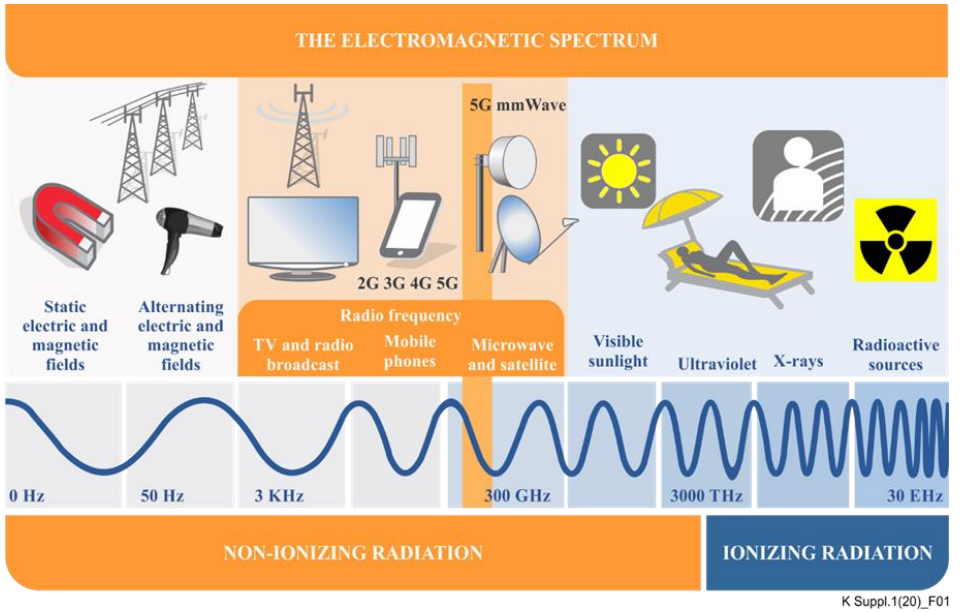
Basic Recommendation with reference to all subjects concerning RF EMF



Updated K.Suppl 1 to Rec. ITU-T K.91: Guide on EMF and health

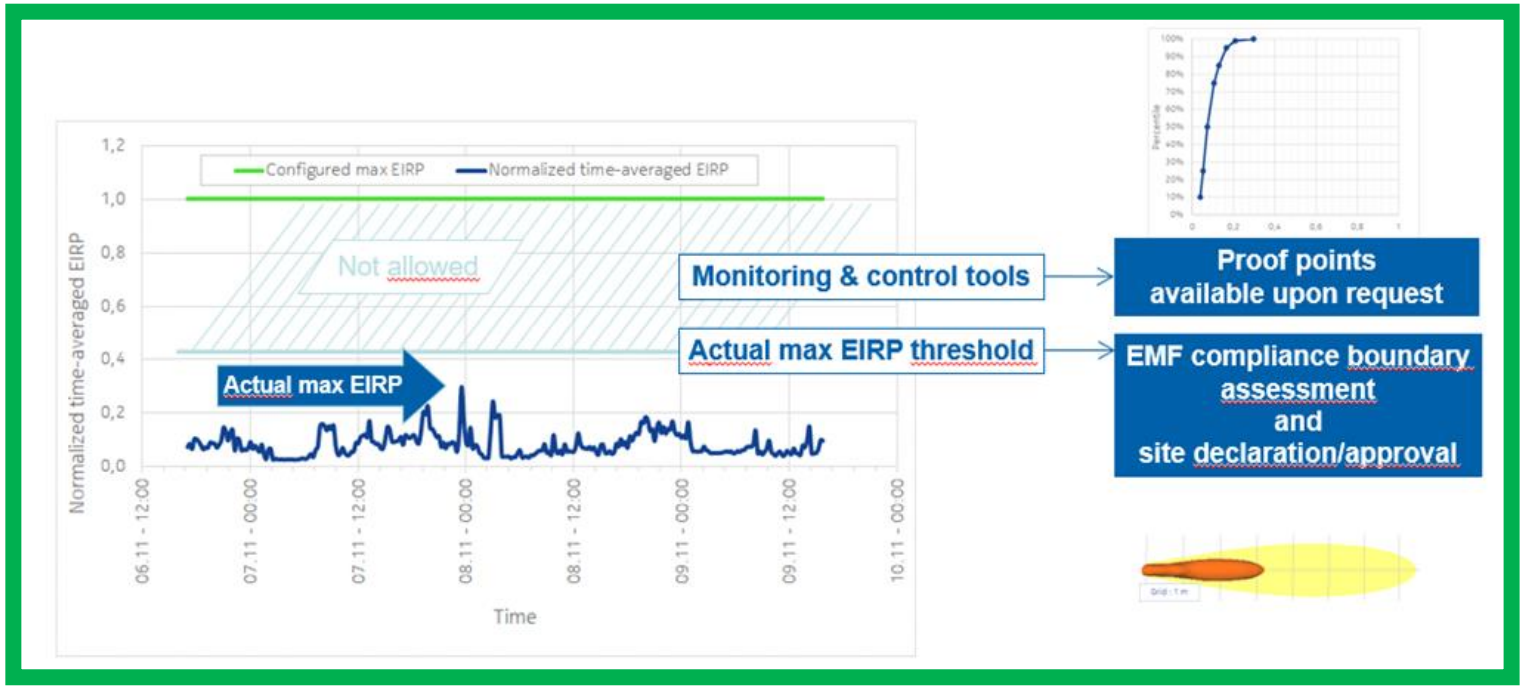
Guide and Mobile App, addressed to general public





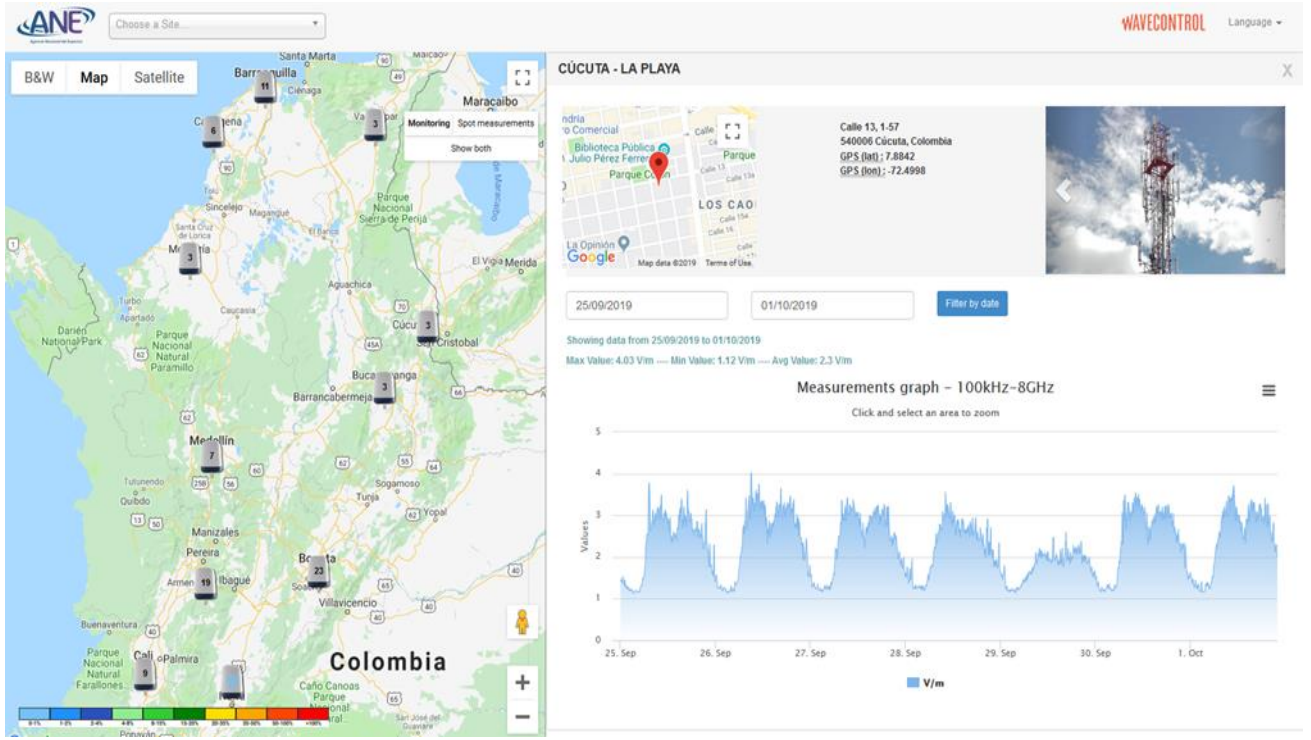
Recommendation ITU-T K.100: Measurement of radio frequency electromagnetic fields to determine compliance with human exposure limits when a base station is put into service

Compliance assessment of 5G systems requires statistical approach



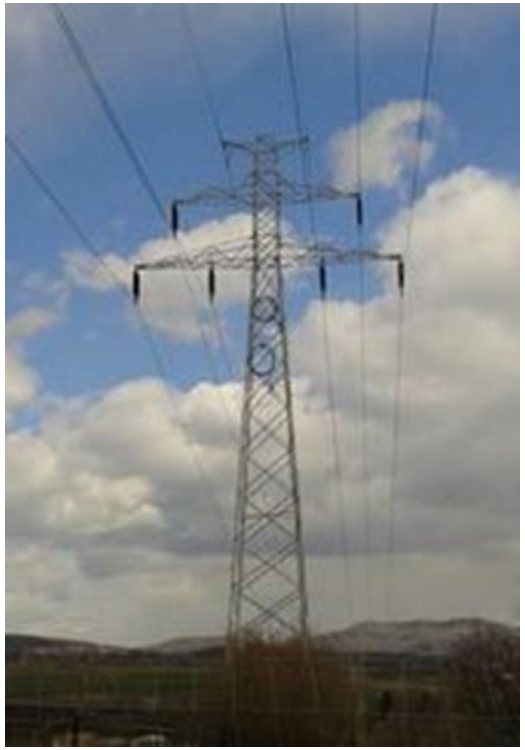
Recommendation ITU-T K.83: Monitoring of EMF levels

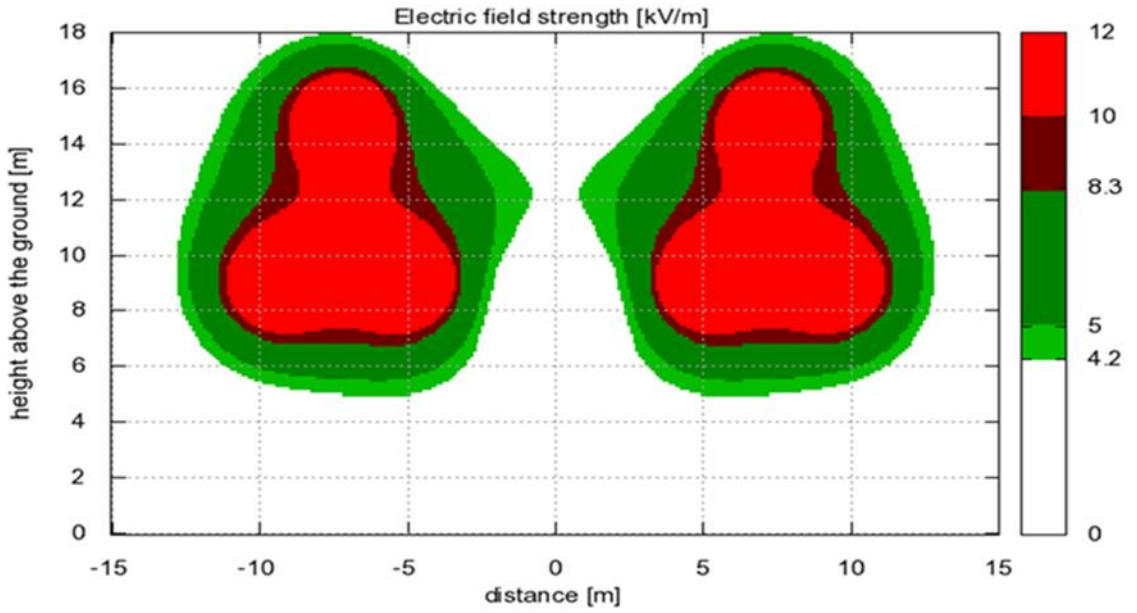
Very important for communication with general public



Recommendation ITU-T K.90: Monitoring of EMF levels

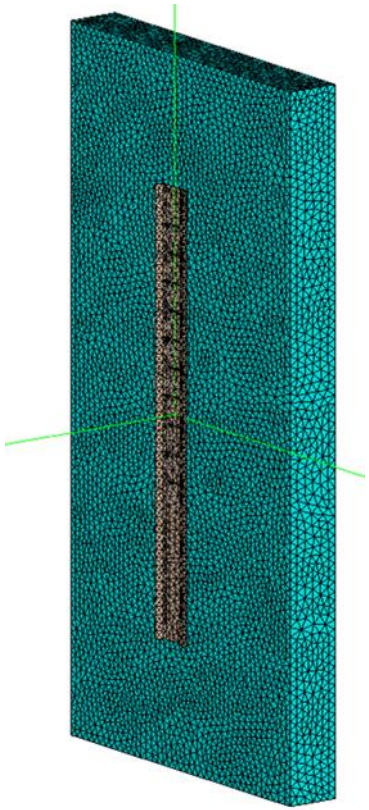
Power supply lines are also present in the vicinity of telecommunication infrastructure

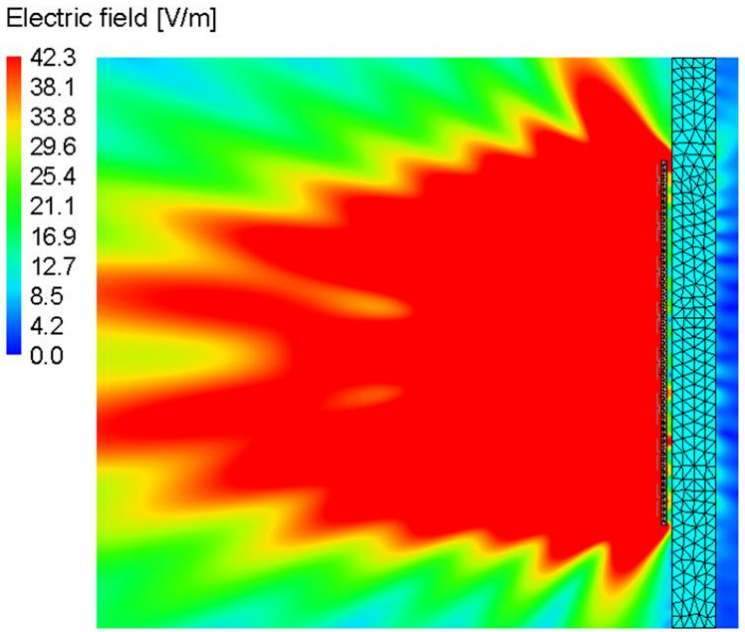


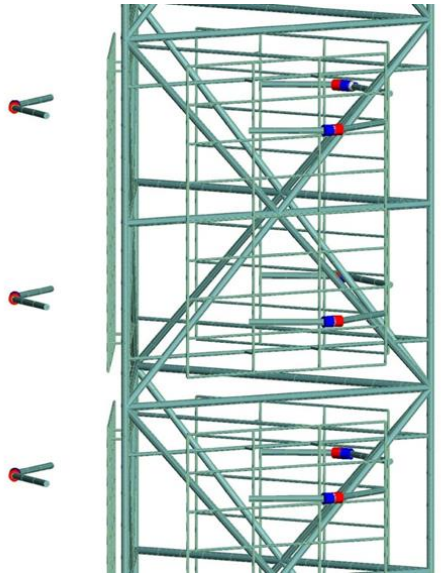


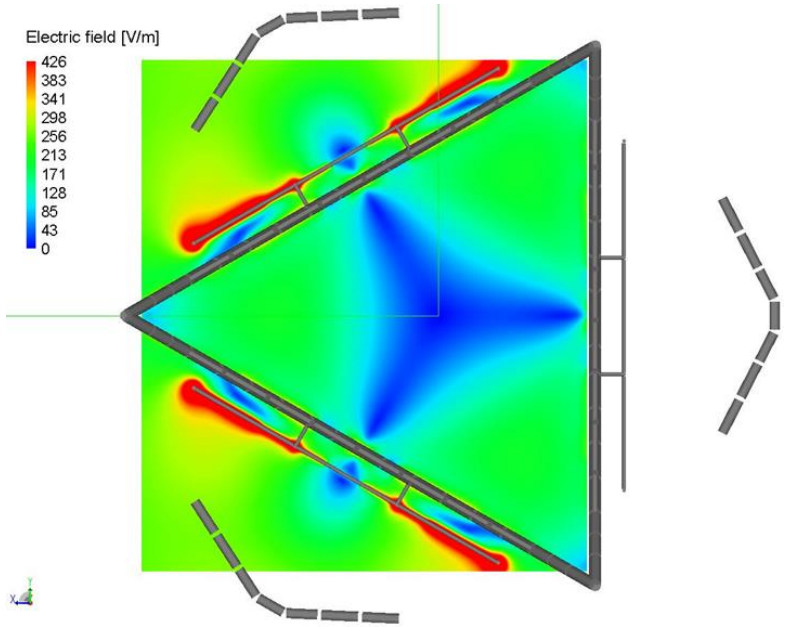
Recommendation ITU-T K.122: Exposure levels in close proximity of radiocommunication antennas

Addressed to RF EMF staff



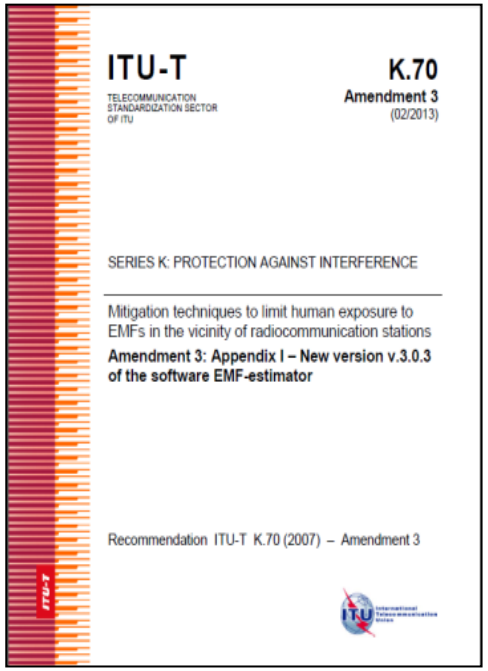


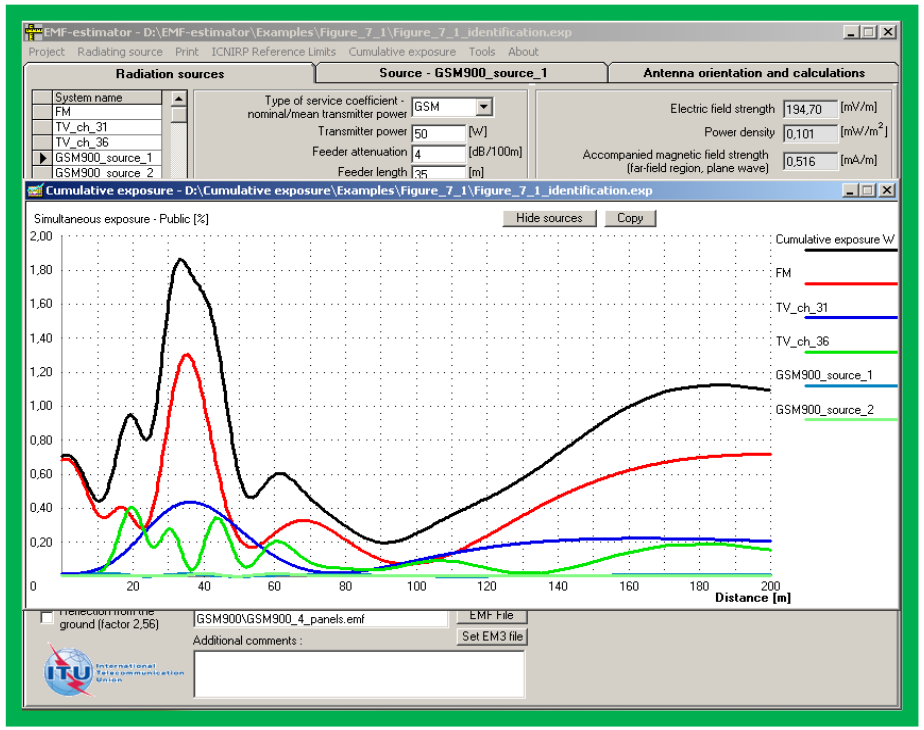


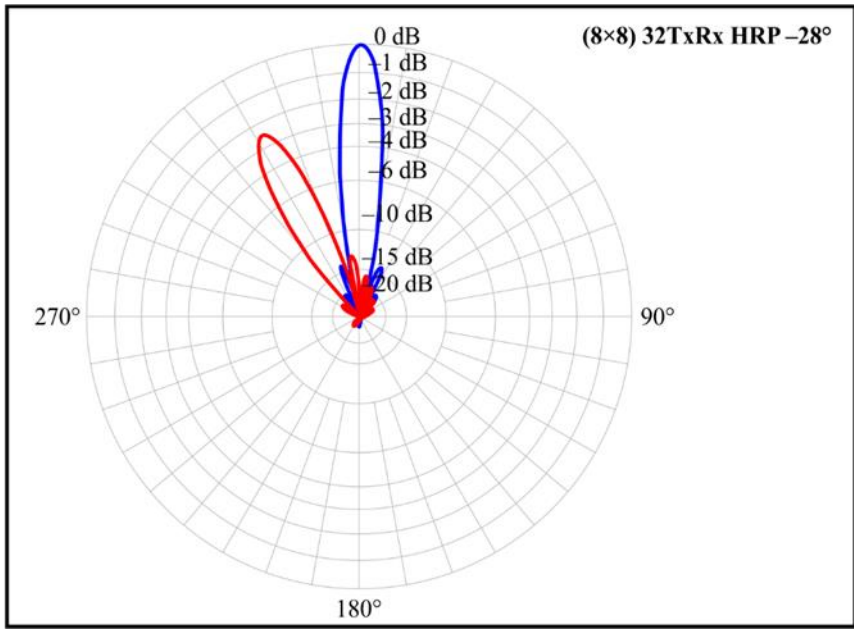


Recommendation ITU-T K.70: Mitigation techniques to limit human exposure to EMFs in the vicinity of radiocommunication stations

With the software EMF-estimator included





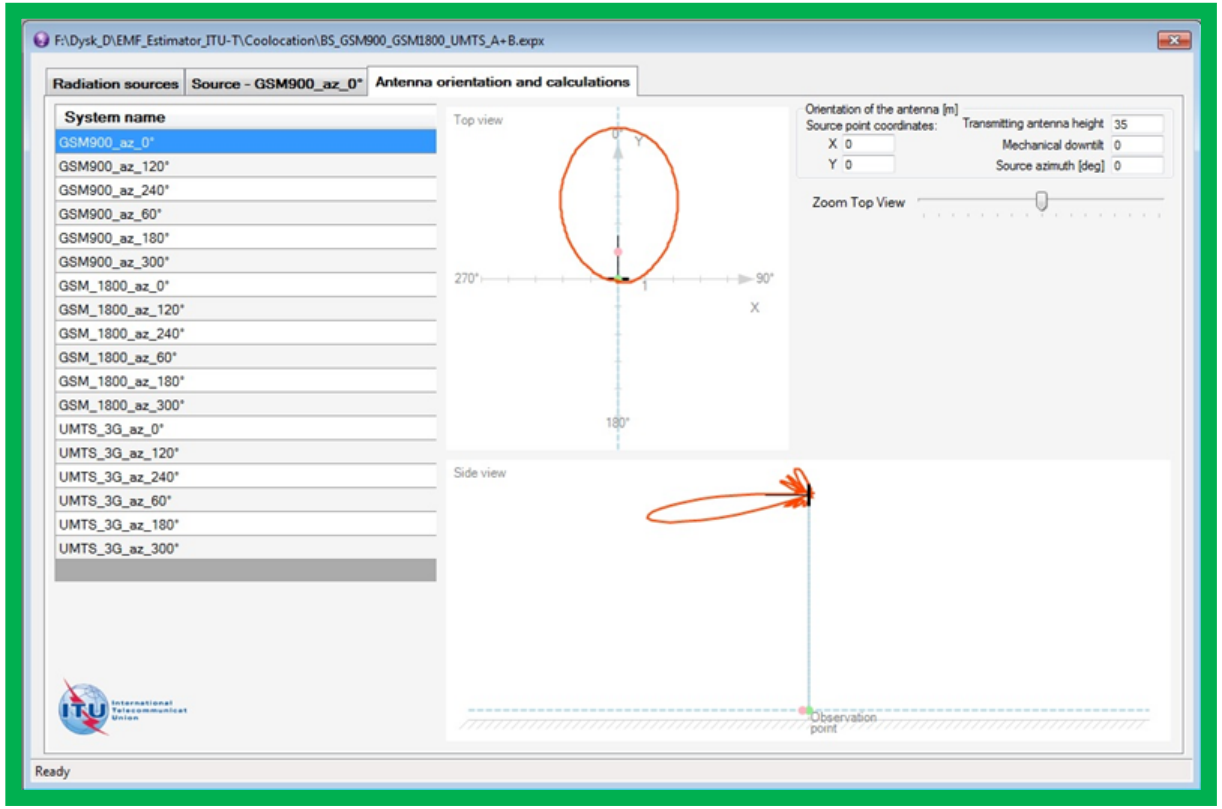


EMF-estimator software

Software tool that is Annex I to Recommendation ITU-T K.70

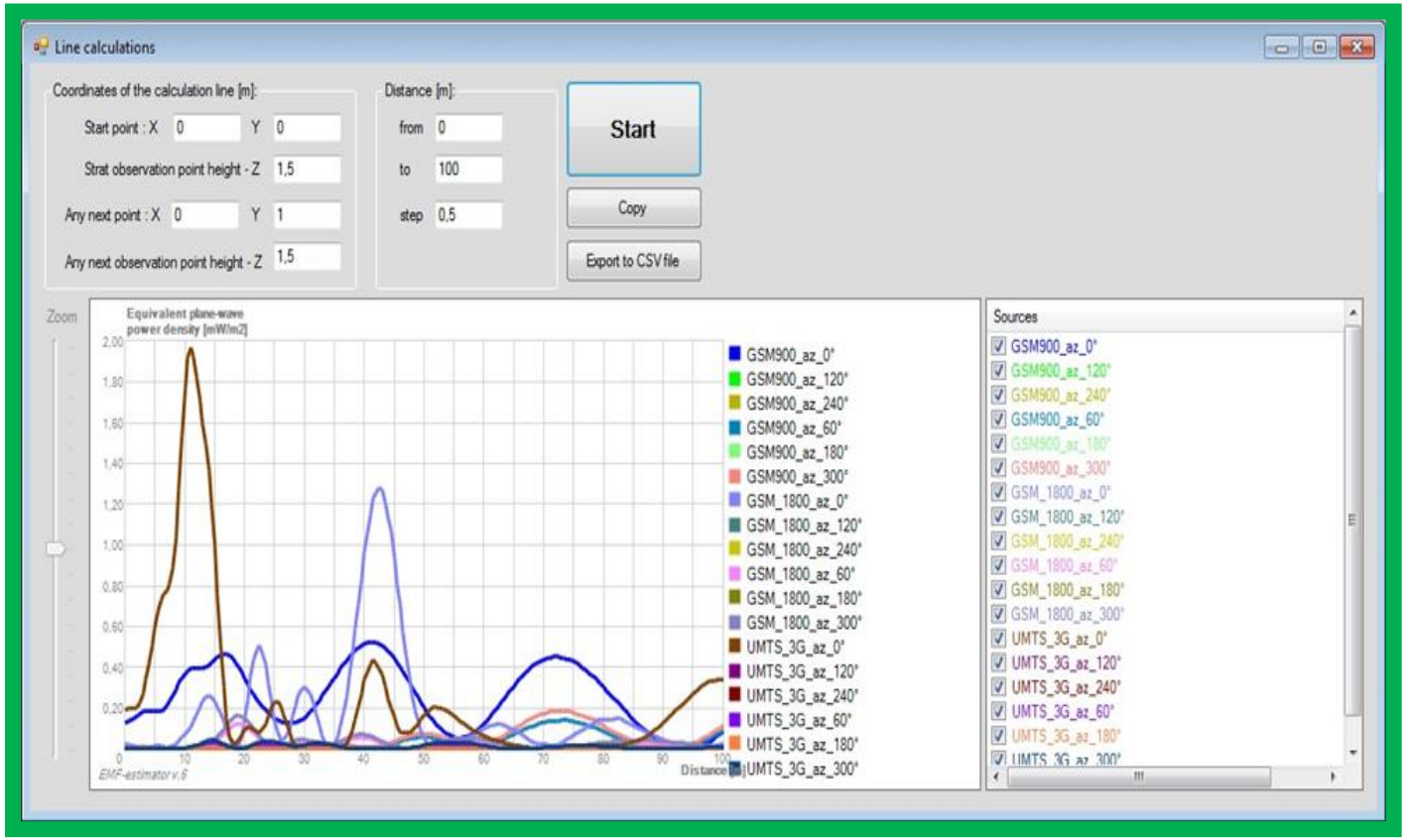
The last version (v8.32 and v.1.64 - depending on the 32- or 64-bit Microsoft Access) may be down?loaded from:

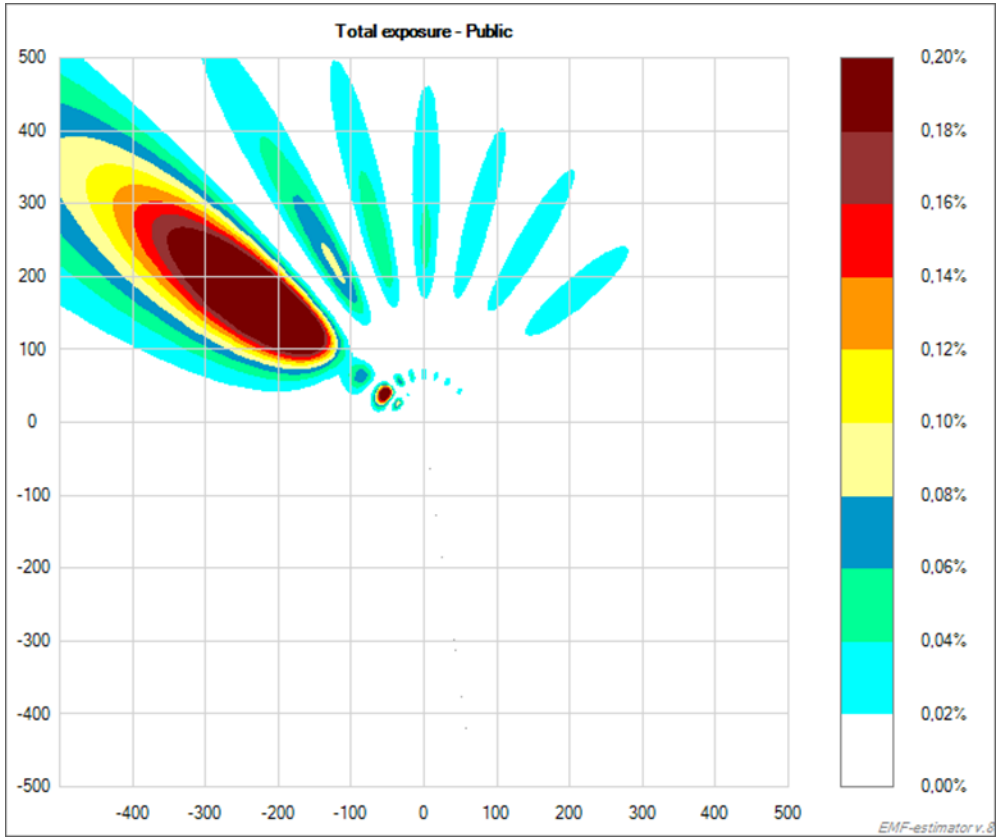
- https://www.itu.int/rec/T-REC-K.70-201801-P
- https://www.itu.int/rec/T-REC-K.70-201809-I!Amd2



EMF-estimator software

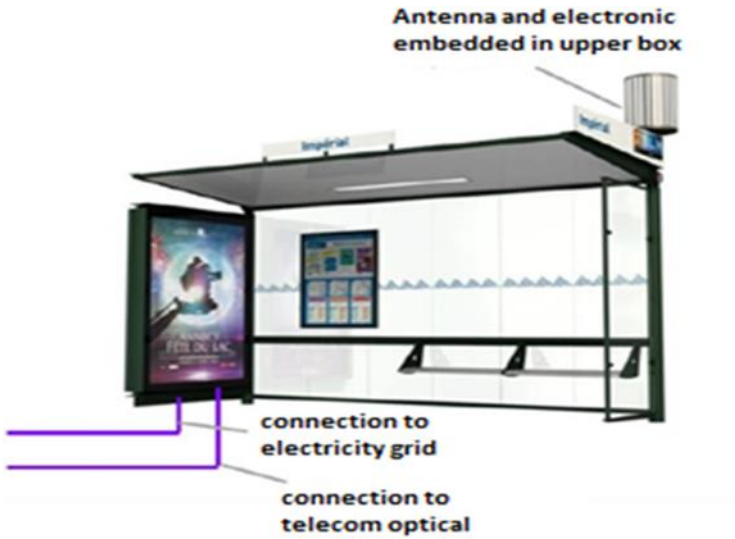
Gives possibility to assess exposure from many different systems





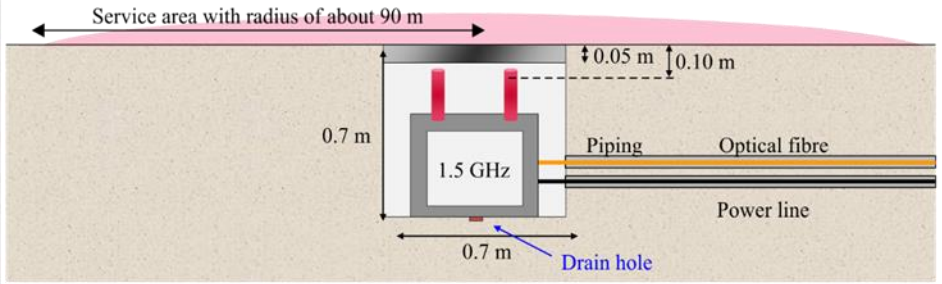
ITU-T Supplements

Informative documents covering many EMF aspects



K Suppl.19(19)_F01

a) Photo

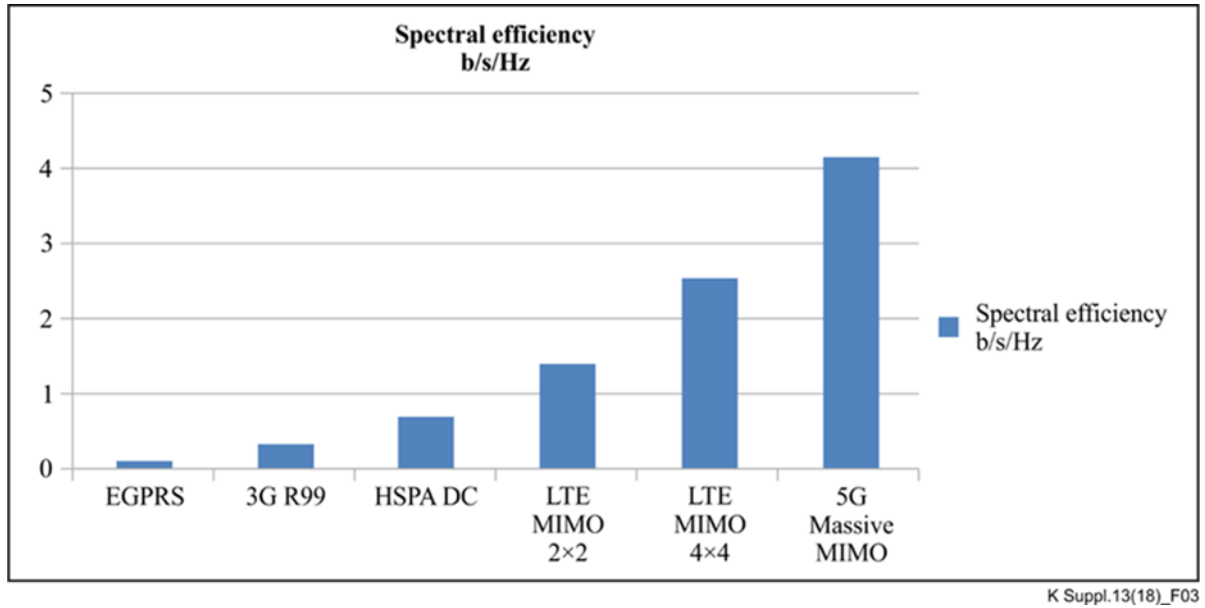


b) Structure and service area

K Suppl.20(20)_F01

ITU-T Supplements

New possible applications achievable in 5G networks & EMF impact



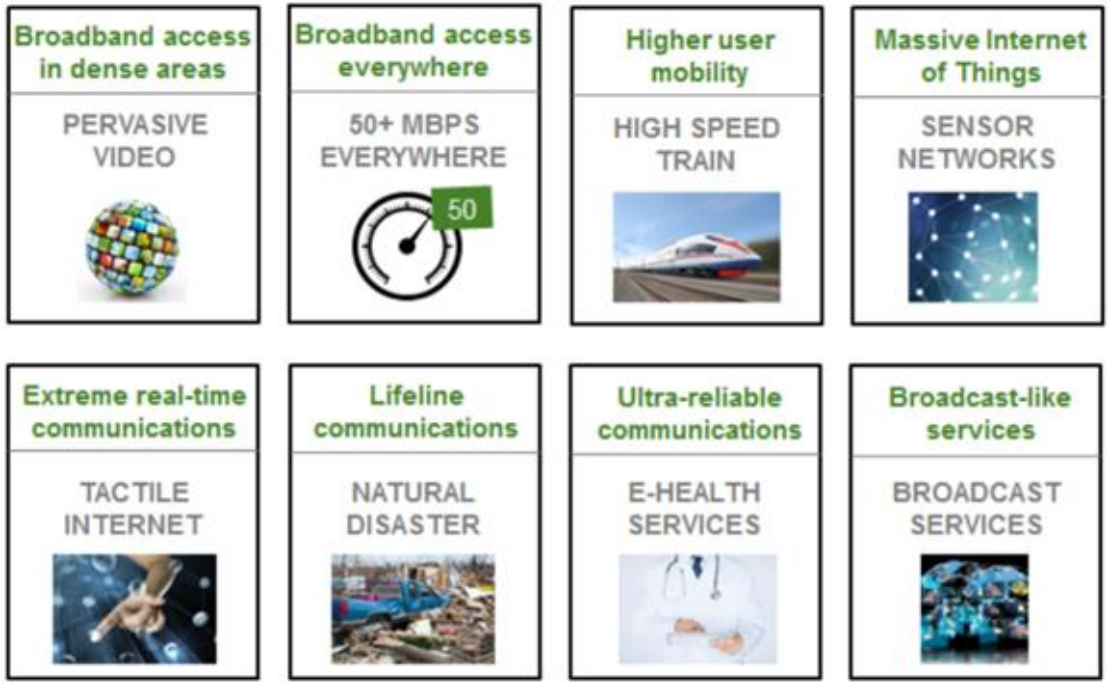
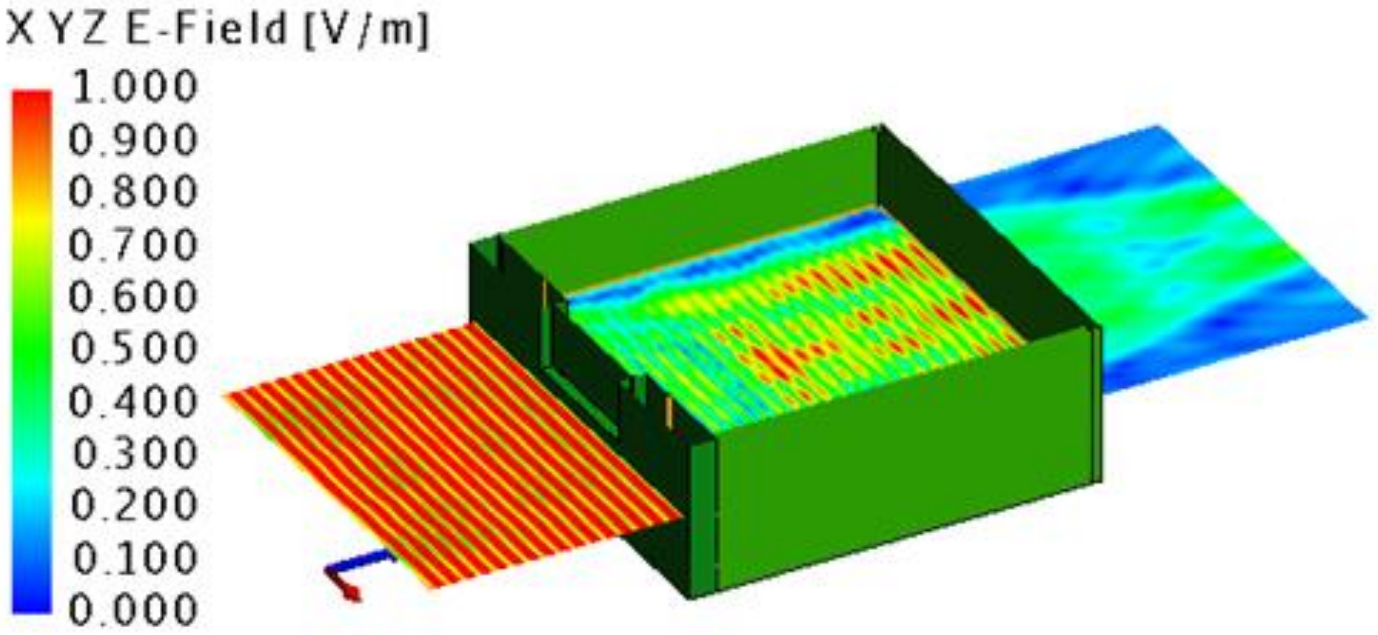
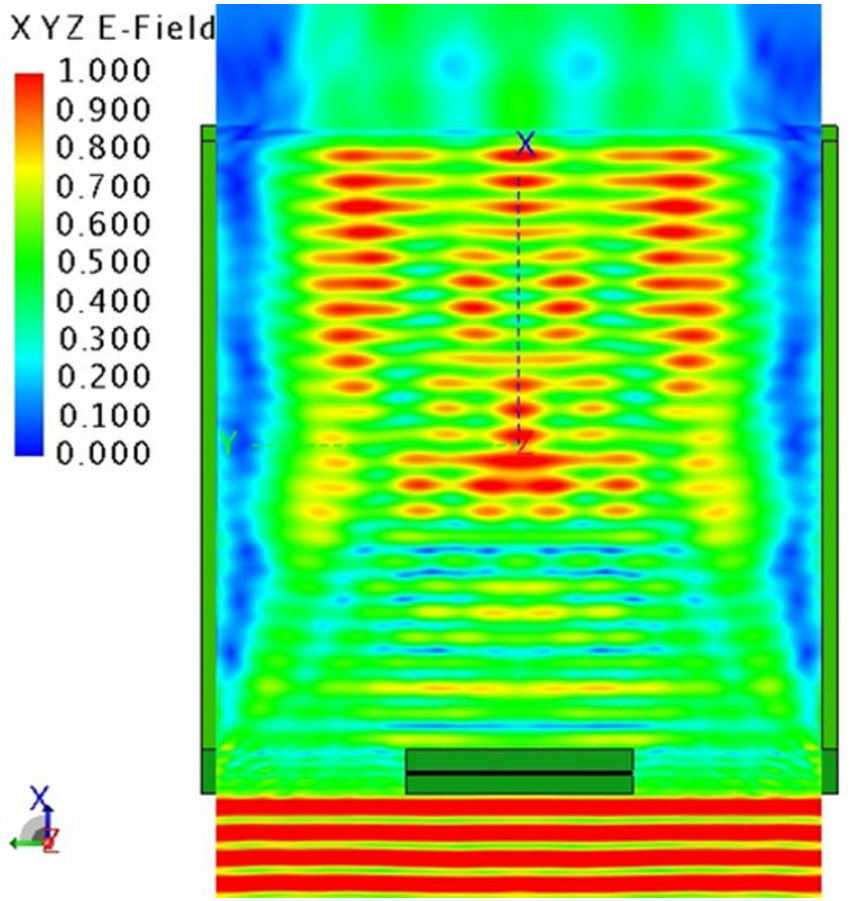


Figure 1 – Main usage for 5G networks
(Source: [b-NGMN 5G WP])

ITU-T ongoing work

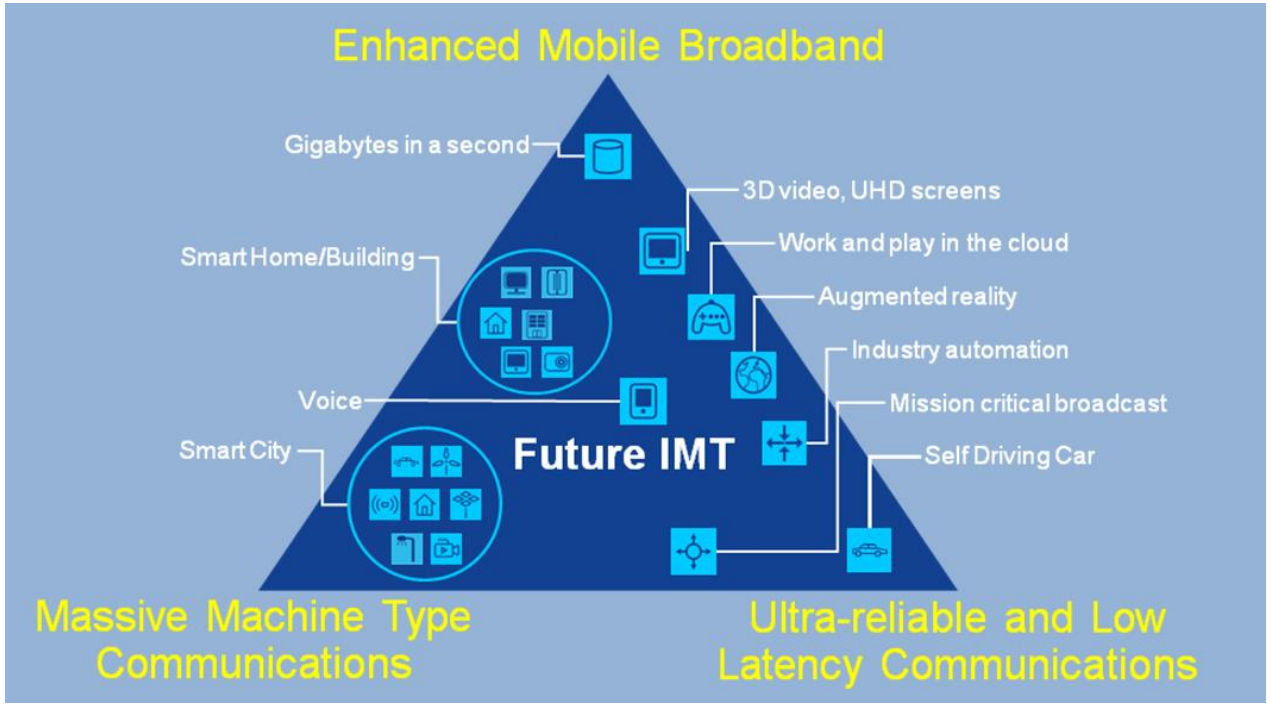
Indoor exposure

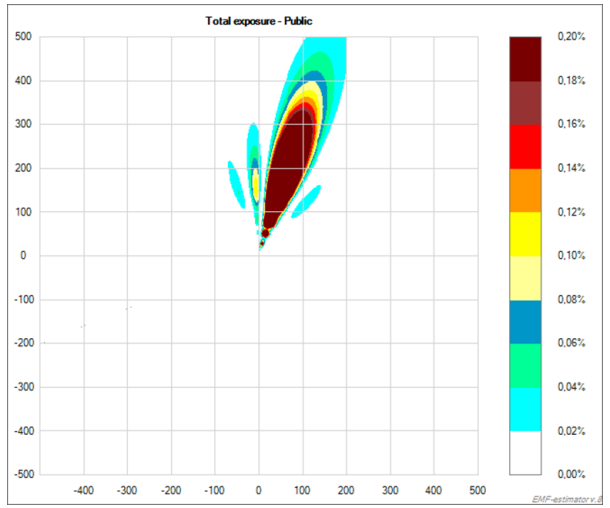


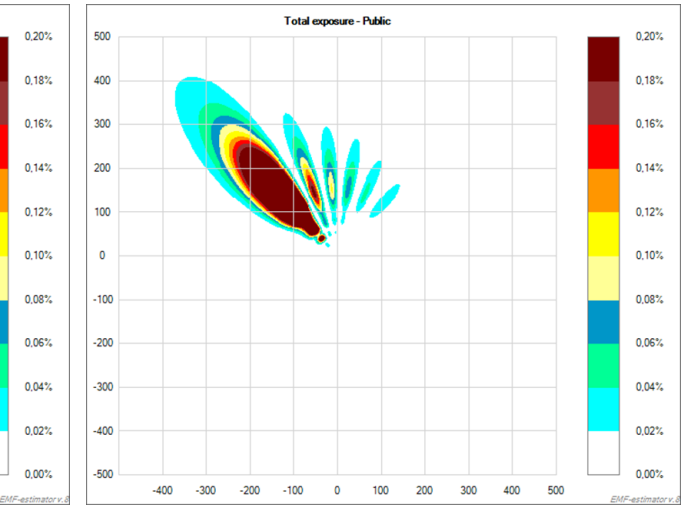


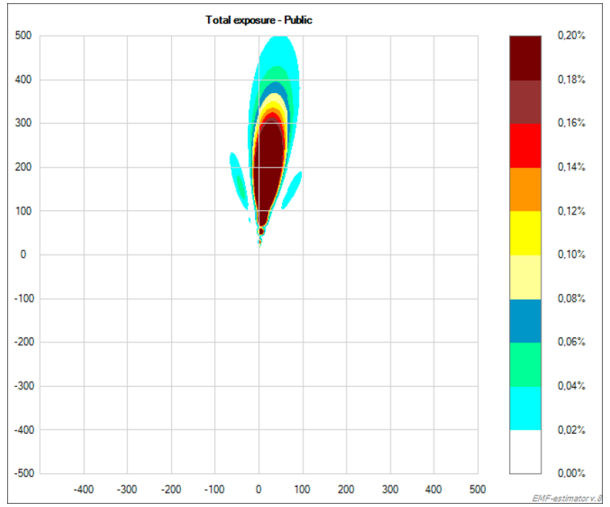
RF EMF & 5G exposure

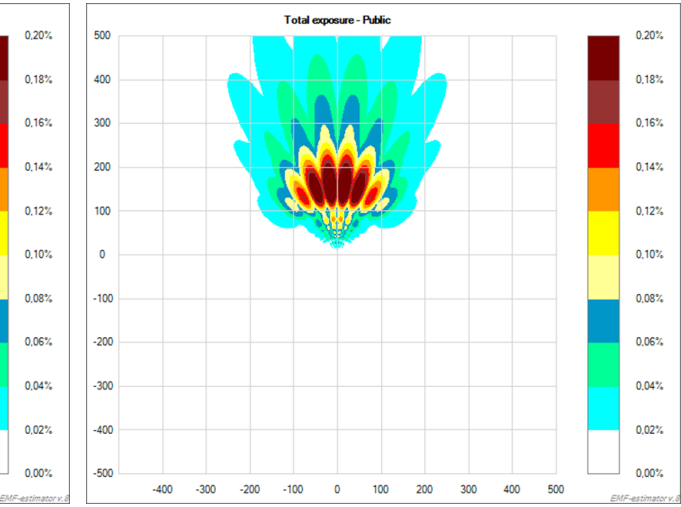
Services & AAS antennas





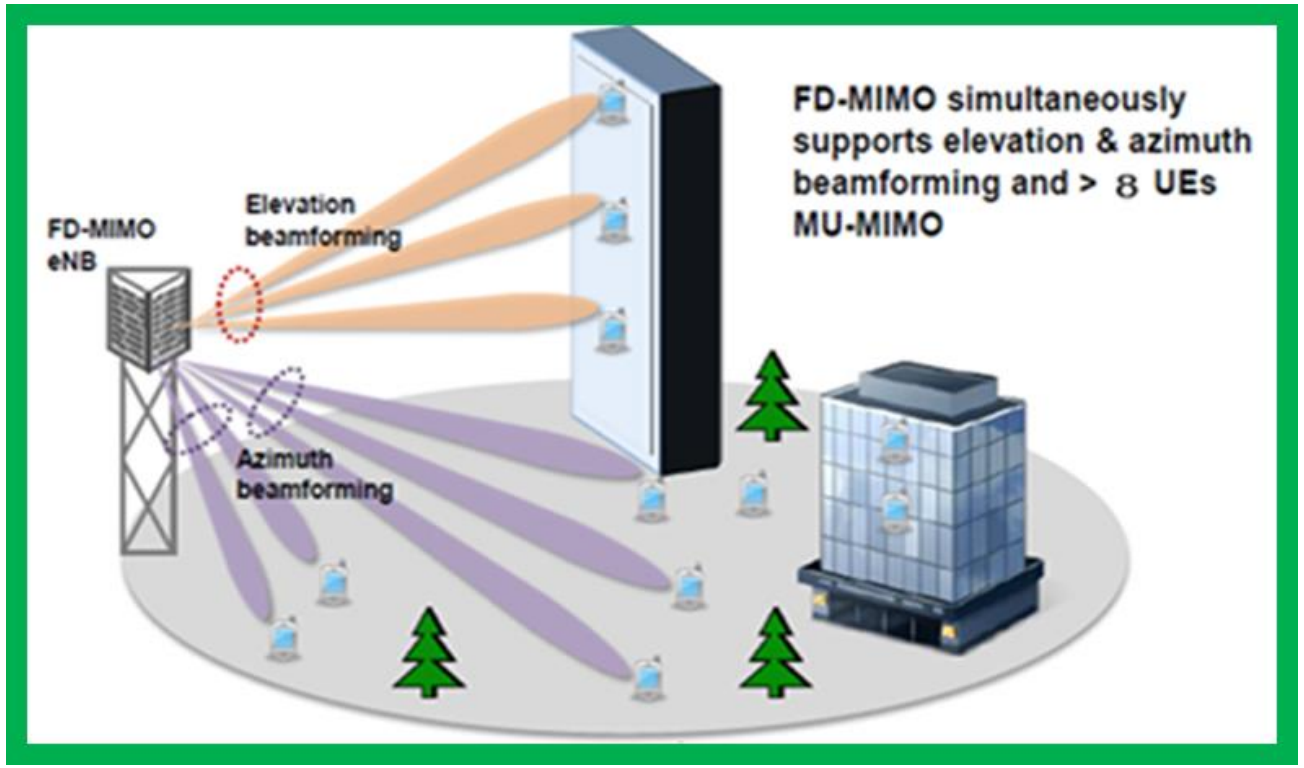


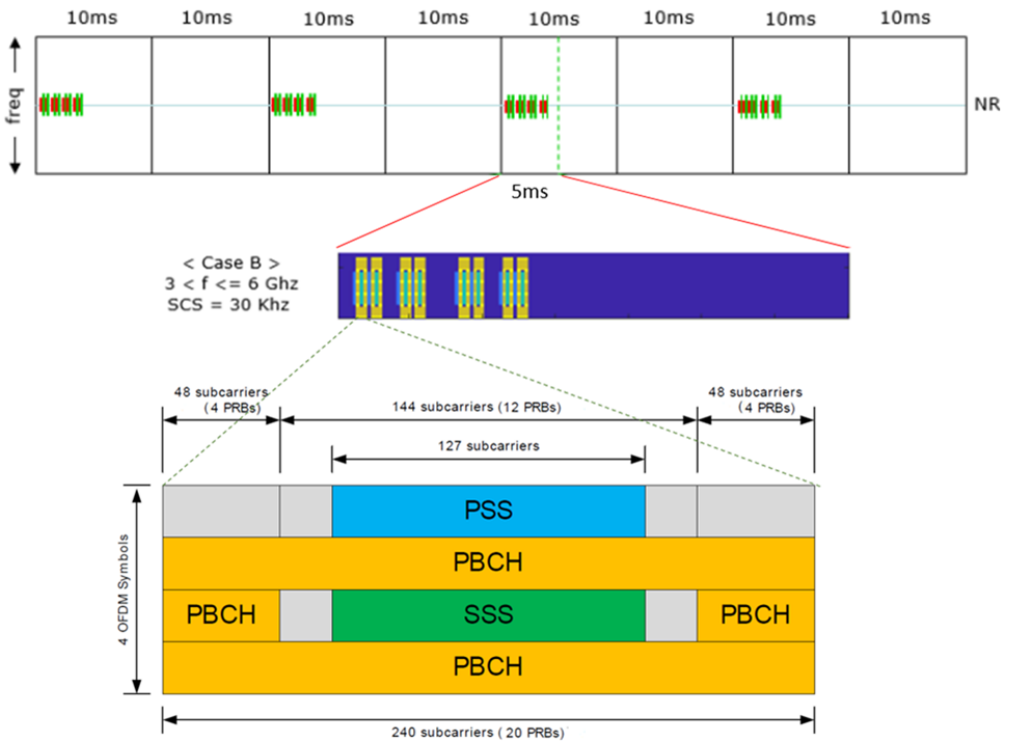




RF EMF around 5G systems shows a big variation in space and time

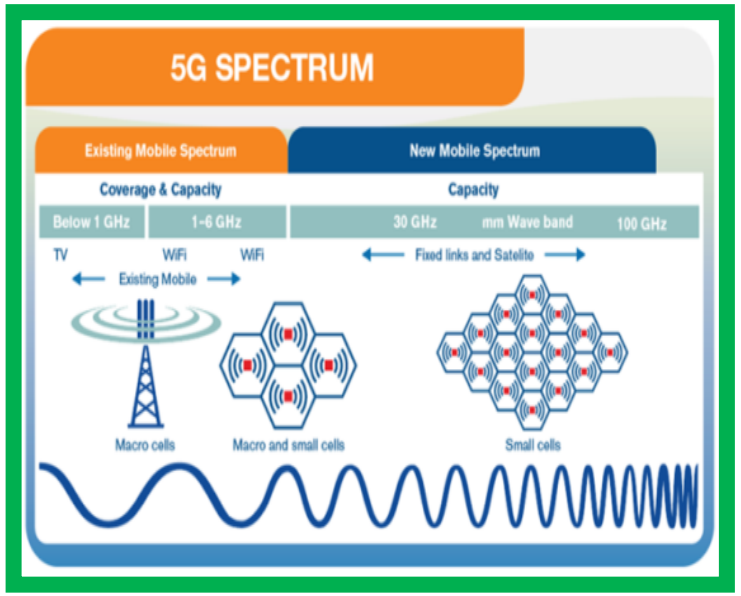
Difficulties in compliance assessment

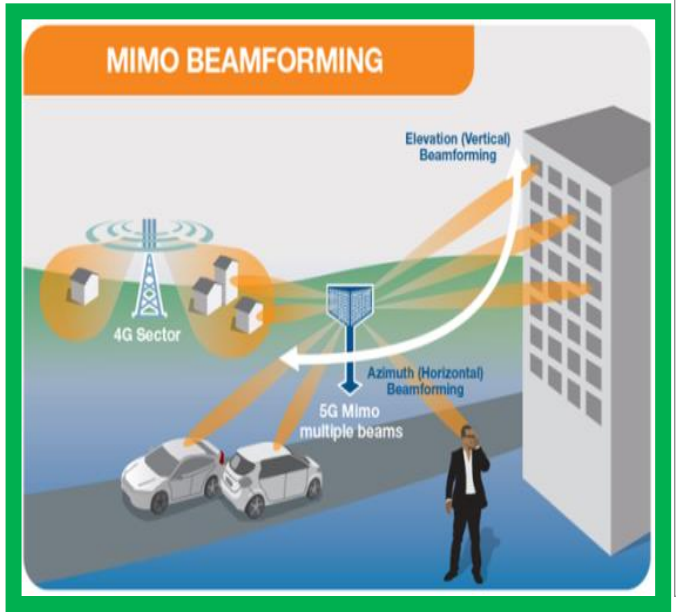


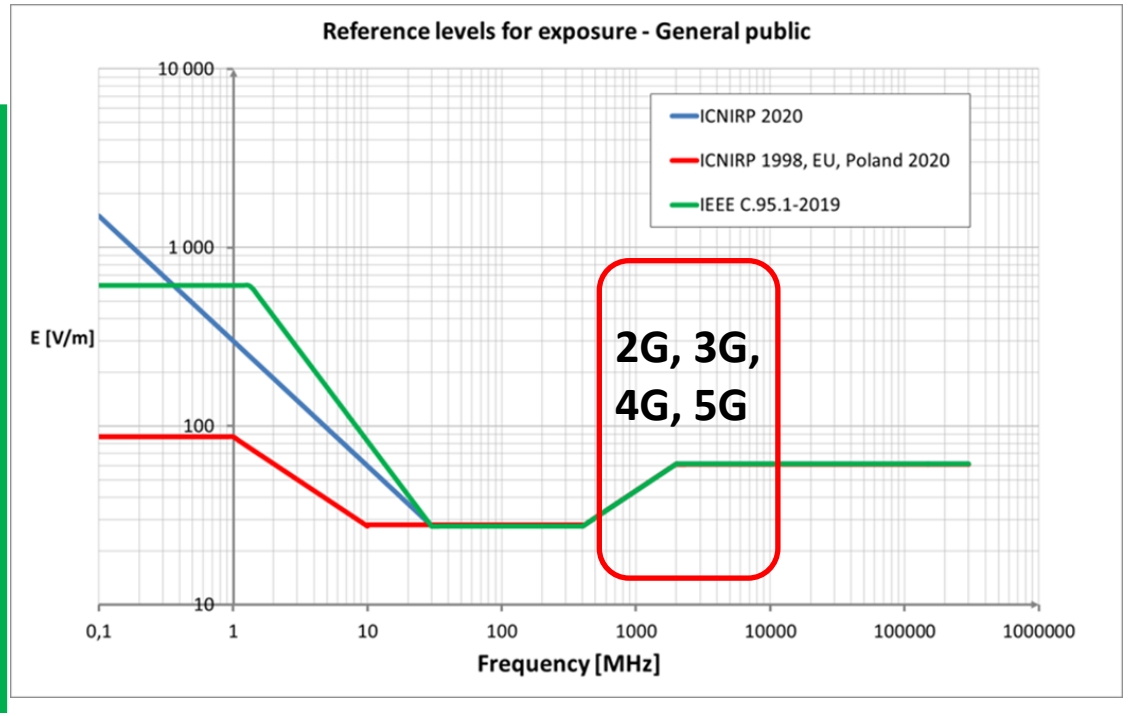


5G and Permissible Levels of Electromagnetic Fields in the Environment – RF EMF exposure limits

2G, 3G, 4G or 5G may be used in all possible frequency bands







Conclusions

- **ITU is very active in sharing knowledge and tools concerning assessment of human exposure to RF EMF**
- **Good communication with public is a very important task**
- **Efficient deployment of wireless infrastructure reduces the RF EMF exposure from networks and devices**

Thank you!

Website

SG5: Environment, climate change and circular economy

Appendix

ITU-T Recommendations in force

ITU-T Rec. Number	Title	Year
K.52	Guidance on complying with limits for human exposure to electromagnetic fields	2017
K.61	Guidance to measurement and numerical prediction of electromagnetic fields for compliance with human exposure limits for telecommunication installation	2017
K.70	Mitigation techniques to limit human exposure to EMF's within vicinity of radiocommunication stations	2020
K.83	Monitoring of the electromagnetic field levels	2020
K.90	Evaluation techniques and working procedures for compliance with exposure limits of network operator personnel to power-frequency electromagnetic fields	2018
K.91	Guidance for assessment, evaluation and monitoring of the human exposure to radio frequency electromagnetic fields	2020
K.100	Measurement of human exposure levels when a wireless installation is put into service	2017
K.113	Generation of radiofrequency electromagnetic fields (RF-EMF) level maps	2015
K.121	Guidance on the Environmental Management for Electromagnetic Radiation from Radiocommunication Base Stations	2018
K.122	Exposure levels in the close proximity of the radiocommunication antennas	2016
K.145	Assessment and management of compliance with RF EMF exposure limits for workers at radiocommunication sites and facilities	2020

ITU-T Supplements in force

Work item	Title	Year
K Suppl. 1 to K.91	Guide on electromagnetic fields and health	2020
K. Suppl. 4 to K.91	Electromagnetic field considerations in smart sustainable cities	2018
K Suppl. 9	5G technology and human exposure to RF EMF	2019
K Suppl. 13	Radiofrequency electromagnetic field (RF-EMF) exposure levels from mobile and portable devices during different conditions of use	2018
K Suppl. 14	The impact of RF-EMF exposure limits stricter than the ICNIRP or IEEE guidelines on 4G and 5G mobile network deployment	2019
K Suppl. 16	Electromagnetic field (EMF) compliance assessments for 5G wireless networks.	2019
K Suppl. 19	Electromagnetic field (EMF) strength inside underground railway trains	2019
K Suppl. 20	RF Exposure evaluation around base station installed underground	2020

Revised and new ITU-T Appendixes (2017-2020)

Work item	Title	Year
Appendix I to ITU-T K.70	Mitigation techniques to limit human exposure to EMF's within vicinity of radiocommunication stations	2018
Appendix II of ITU-T K.121	Guidance on the Environmental Management for Electromagnetic Radiation from Radiocommunication Base Stations	2018
Appendix V of ITU-T K.52	Calculator for equivalent isotropic radiated power as described in Recommendation ITU-T K.52	2018
Appendix VIII to Rec. ITU-T K.91	Guidance for assessment, evaluation and monitoring of the human exposure to radio frequency electromagnetic fields. Manhole type base station.	2018
Appendix IX to Rec. ITU-T K.91	Guidance for assessment, evaluation and monitoring of the human exposure to radio frequency electromagnetic fields. EMF monitoring and information platform.	2018/2019
Appendix II of ITU-T K.90	Evaluation techniques and working procedures for compliance with exposure limits of network operator personnel to power-frequency electromagnetic fields. Description of the program EMFACDC.	2019