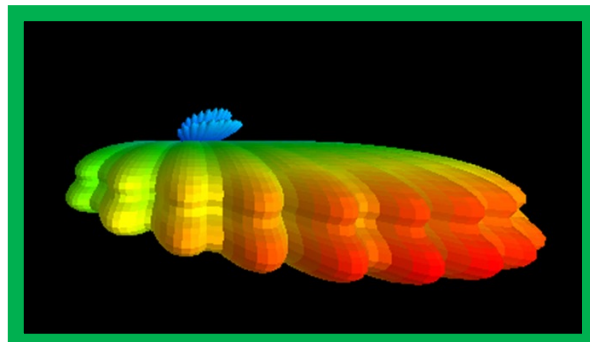


Human exposure to electromagnetic fields (EMFs)

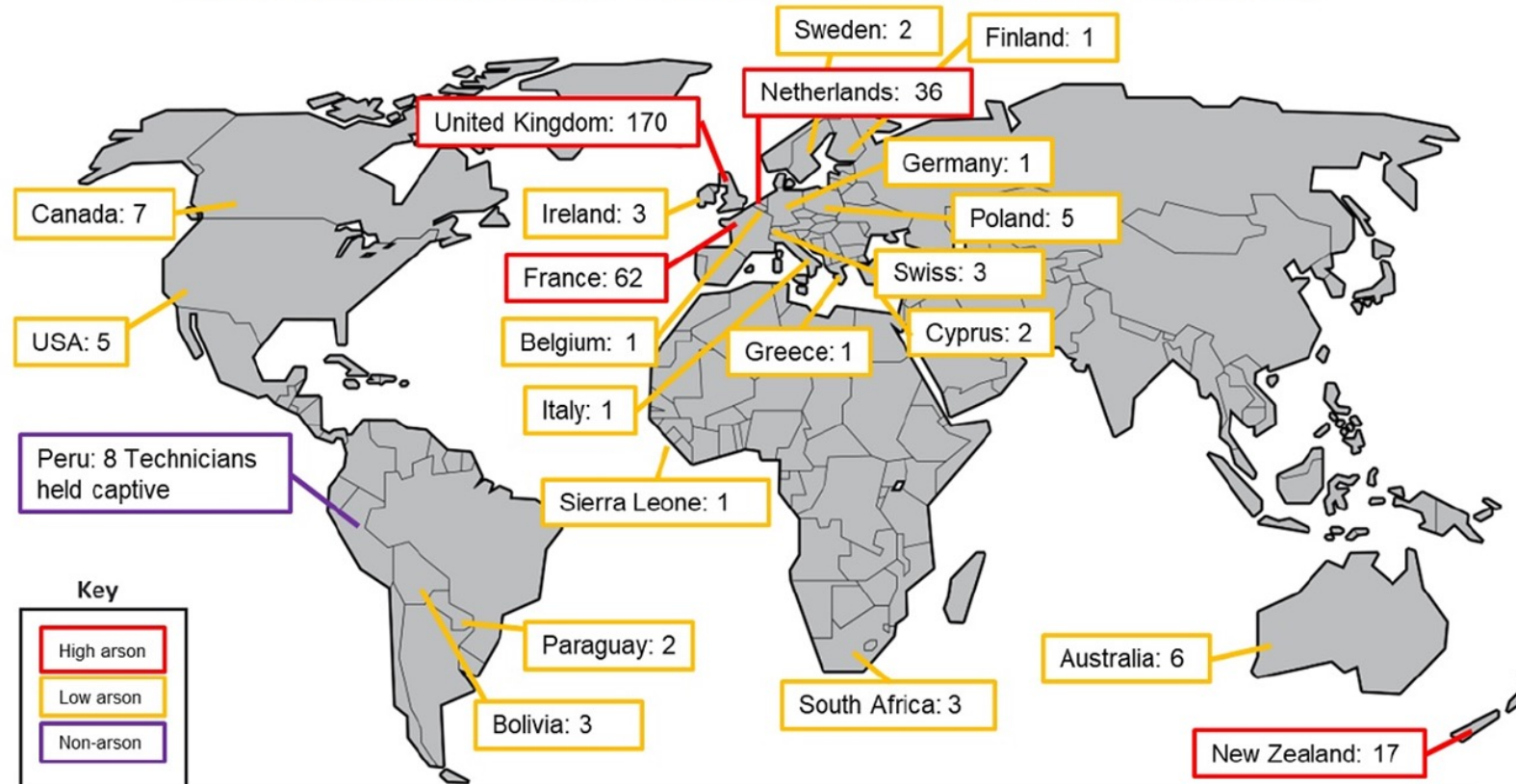
Sustainable Digital Transformation Week for Africa Region 18 May 2023
Workshop on Electromagnetic Compatibility (EMC) and Human Exposure to
Electromagnetic Fields (EMF)



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

Introduction – Problems with fake news

332 arson attacks across 21 countries (March 2020 to March 2021)



Key

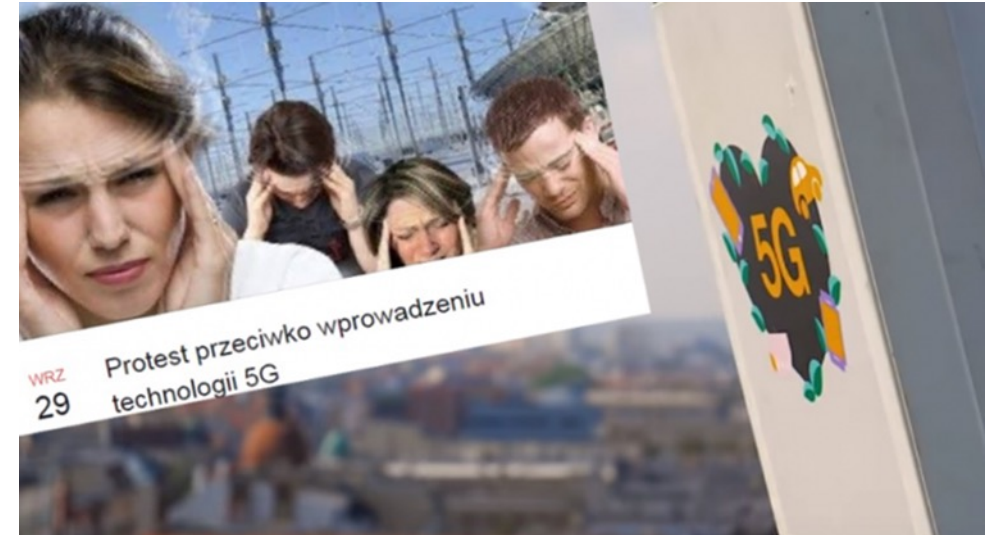
- High arson
- Low arson
- Non-arson

Source: The 10th GSMA EMF Forum 2021, Sarah Wylie, Vodafone



Introduction – Problems with fake news

- General public is very interested in the potential impact of Electromagnetic Fields (EMF) on health
- A large amount of fake news is widespread
- Proper information is required and ITU is deeply involved in this



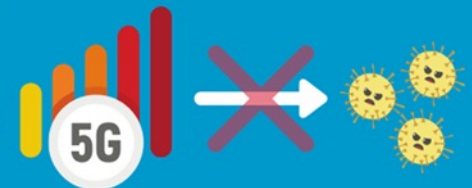
Viruses cannot travel on radio waves/mobile networks.

COVID-19 is spreading in many countries that do not have 5G mobile networks.

COVID-19 is spread through respiratory droplets when an infected person coughs, sneezes or speaks.

People can also be infected by touching a contaminated surface and then their eyes, mouth or nose.

FACT:
5G mobile networks
DO NOT spread COVID-19

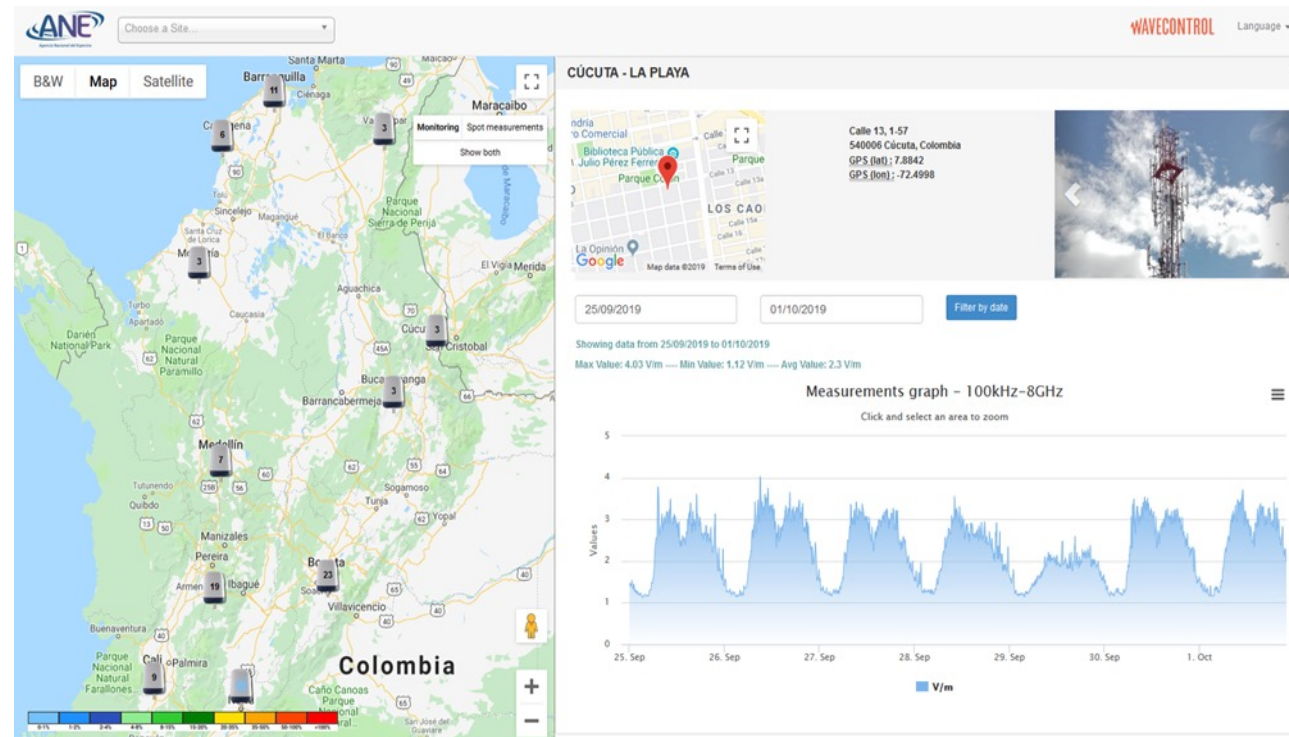


#Coronavirus #COVID19

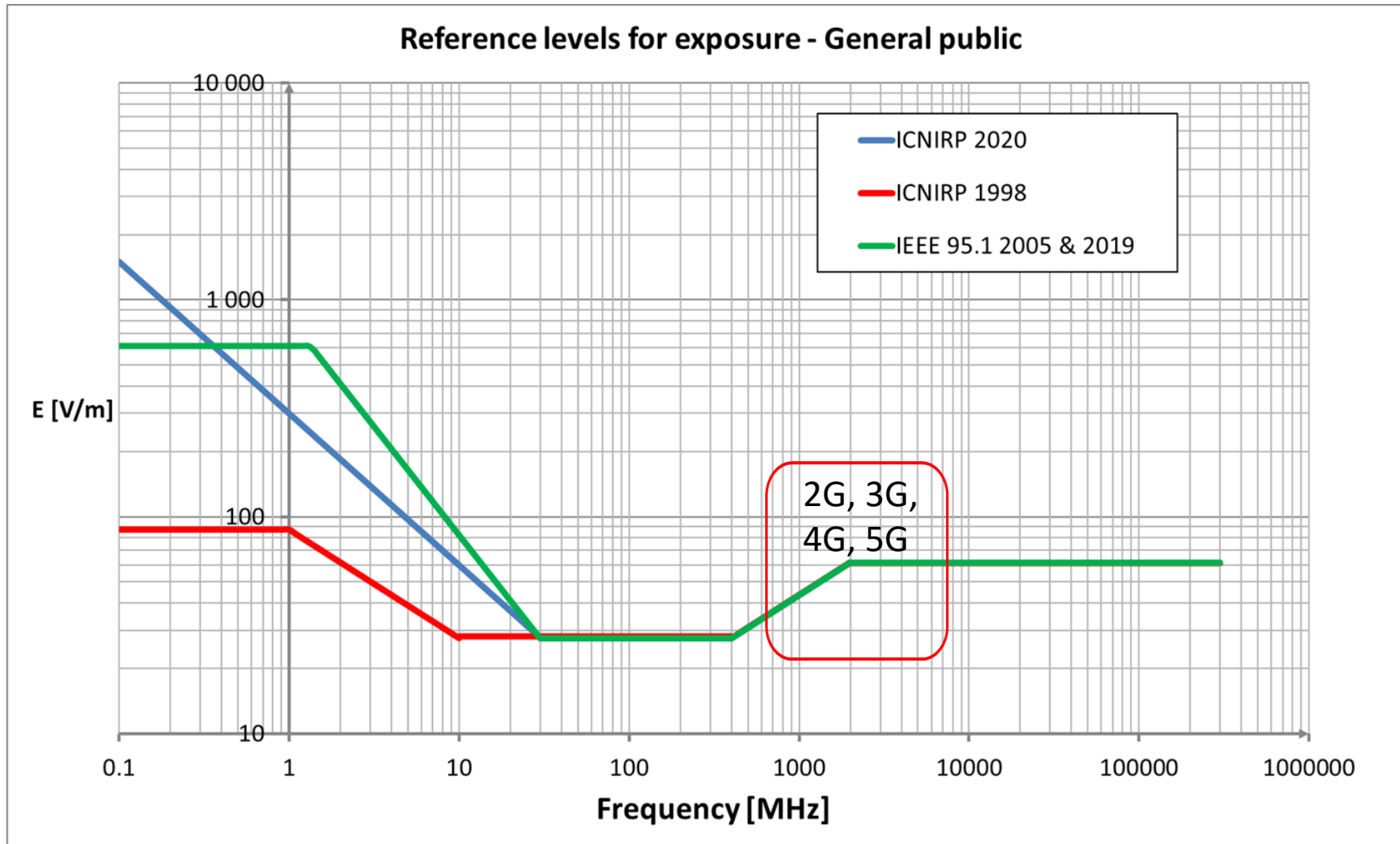
8 April 2020

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

Very important for communication with general public



Introduction - Evolution of the international exposure limits



ITU's Mandate on EMF

ITU PP Resolution 176 - "Measurement and assessment concerns related to human exposure to electromagnetic fields" (Bucharest, 2022)

3 SECTORS



STANDARDIZATION

WTSA Resolution 72 - "Measurement concerns related to human exposure to electromagnetic fields" (Rev. Geneva, 2022)

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. Kigali, 2022)



RADIOCOMMUNICATION

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

ITU-T Study Group 5: EMF, environment, climate action, sustainable digitalization, and circular economy



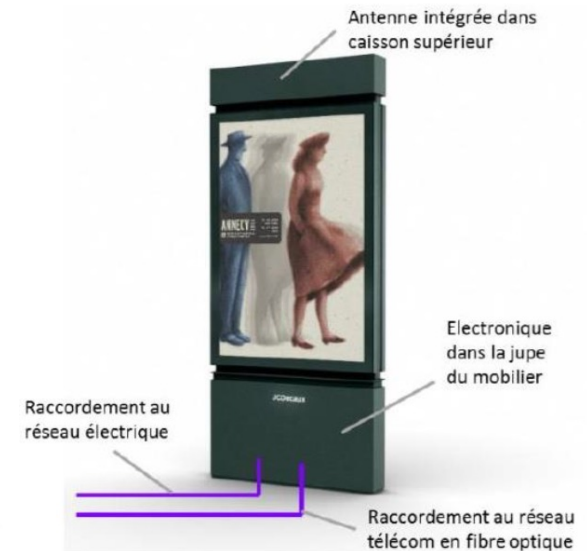
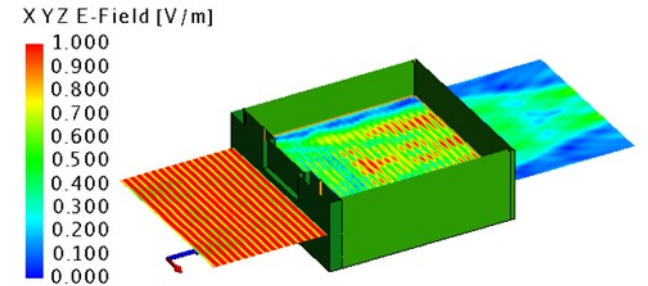
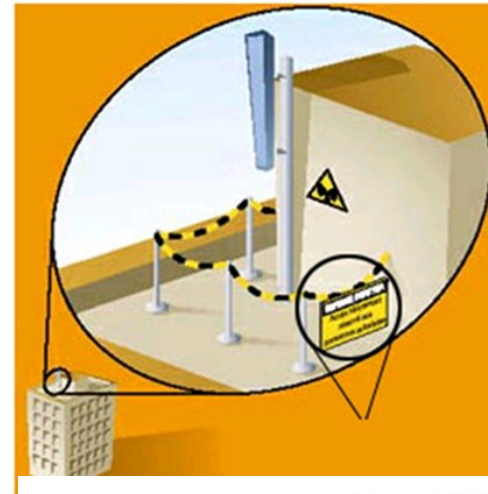
○ Lead Study Group 5 Roles:

- electromagnetic compatibility, resistibility and lightning protection
- soft error caused by particle radiations
- human exposure to electromagnetic fields
- circular economy and e-waste management
- ICTs related to the environment, energy efficiency, clean energy and sustainable digitalization for climate actions

- Q1/5 Electrical protection, reliability, safety, and security of ICT systems
- Q2/5 Protecting equipment and devices against lightning and other electrical events
- Q3/5 Human exposure to electromagnetic fields (EMFs) due to digital technologies
- Q4/5 Electromagnetic compatibility (EMC) aspects in ICT environment
- Q6/5 Environmental efficiency of digital technologies
- Q7/5 E-waste, circular economy, and sustainable supply chain management
- Q13/5 Building circular and sustainable cities and communities
- Q8/5 Guides and terminology on environment and climate change
- Q9/5 Climate change and assessment of digital technologies in the framework of the Sustainable Development Goals (SDGs) and the Paris Agreement
- Q11/5 Climate change mitigation and smart energy solutions
- Q12/5 Adaptation to climate change through sustainable and resilient digital technologies

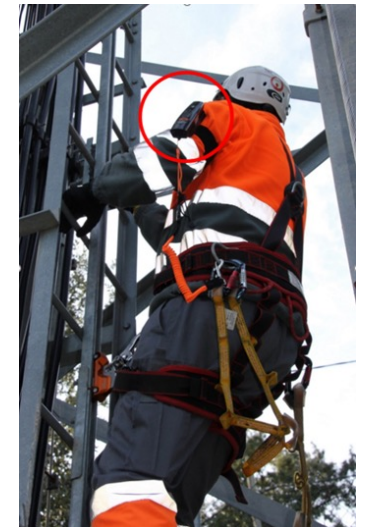
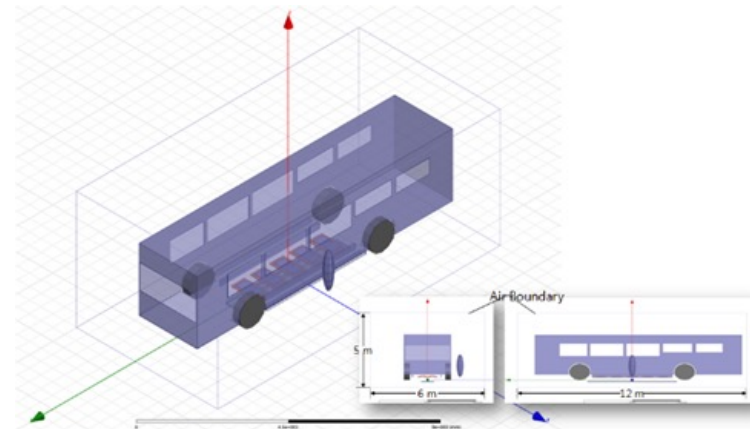
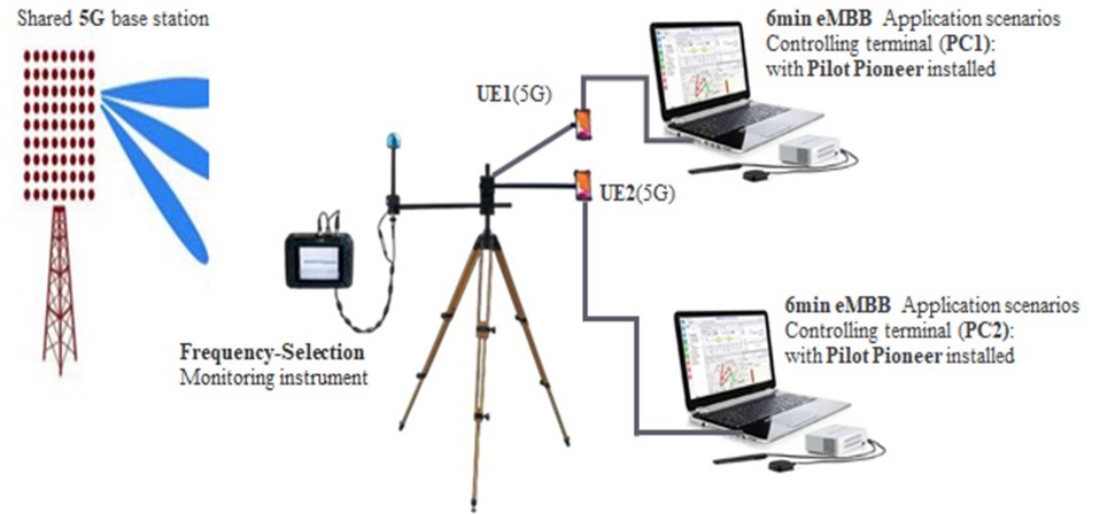
Current studies in ITU-T SG5

- **ITU-T K.peak:** Comparison between peak and real exposure in the long-term considerations
- **ITU-T K.reflection:** Impact of the metallic structures for the EMF exposure level
- **ITU-T K.Small:** Small base stations - impact on the overall exposure level
- **ITU-T K.Zones:** Guidance on Determining the Compliance Boundaries (the exclusion zone) of a Live Antenna
- **ITU-T K.devices:** RF EMF exposure assessment of the wireless radiocommunication devices operating close to the human body



The last outcomes in ITU-T SG5

- **Rec. ITU-T K.145:** Assessment and management of compliance with radio frequency electromagnetic field exposure limits for workers at radiocommunication sites and facilities
- **K Suppl. 19:** Electromagnetic field (EMF) strength inside underground railway trains
- **K Suppl. 20:** Supplement on radiofrequency, exposure evaluation around underground base stations
- **K Suppl. 29:** Electromagnetic field strength inside and outside of electric vehicles using wireless power transfer technology
- **K Suppl. 32:** Case studies of radio frequency- electromagnetic field (RF-EMF) assessment



Participation in ITU-T SG5 activities in RF EMF

- All entities are encouraged to participate in ITU-T SG5 meeting
- Active participation through contributions is welcomed
- Contributions may have different forms:
 - Results of RF EMF measurements
 - Results of RF EMF compliance assessment
 - Evaluation methods
 - Questions and problems
- All ITU-T outcomes are based on received contributions
- All ITU-T Recommendations and Supplements are freely available

+

INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION STANDARDIZATION SECTOR
STUDY PERIOD 2017-2020

SG5-Cn
STUDY GROUP 5
Original: English

Question(s): Q nos separated by commas (e.g 3/13, 5/16) or N/A (TSAG) Place, dd-dd mmm yyyy

CONTRIBUTION

Source: Insert source(s)
Title: Insert title (always in ENGLISH)
Purpose: [Purpose]

Contact: Insert contact name Tel: +xx
Insert organization Fax: +xx
Insert country E-mail: a@b.com

Contact: Insert contact name Tel: +xx
Insert organization Fax: +xx
Insert country E-mail: a@b.com

Keywords: Insert keywords separated by semicolon (;)
Abstract: Insert an abstract under 200 words that describes the content of the contribution in a form suitable for inclusion in the meeting report as a summary of the content of the document, including a clear description of any proposals it may contain. See also Rec A.2, clause I.1.2 for guidance

[[Your text starts here

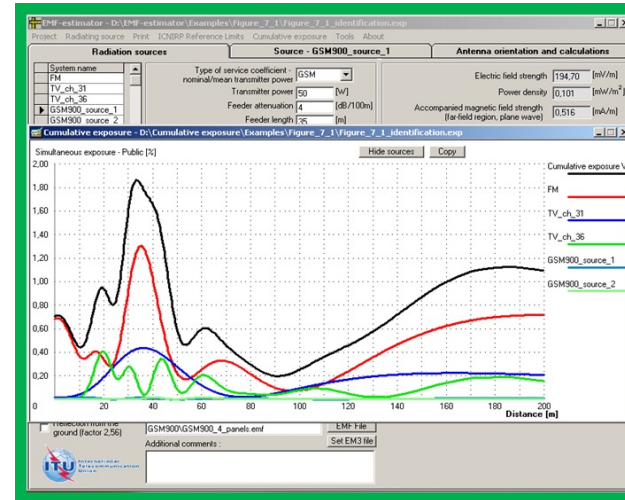
Before submitting this document:

- Update the information highlighted in yellow above: document number (n), Question(s), source, title, and contact information.
- If you need more contact information rows, please insert by copy-and-pasting an existing one (to preserve the associated WinWord fields).
- Make sure that "Track Changes" is turned off.
- Remove any remaining yellow highlighting.

]]

Additional tools: software and mobile Applications

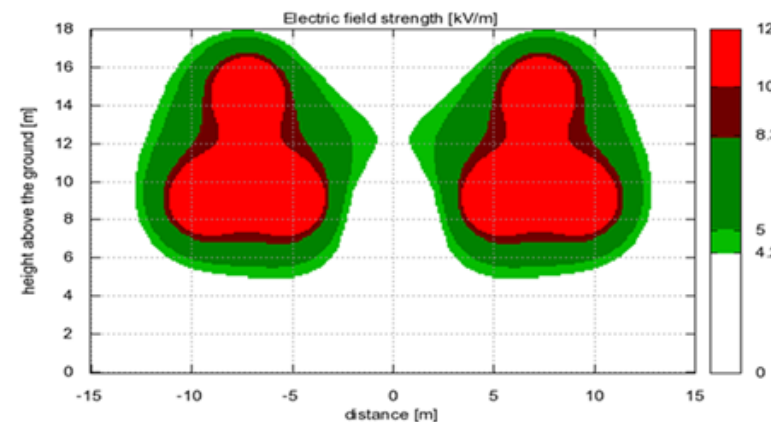
- 11 ITU-T Recommendations and 10 ITU-T Supplements (see Appendix)
- The use of the ITU-T documents is supported by additional tools
- Software:
 - EMF-estimator (K.70)
 - EMFACDC (K.90)
 - Uncertainty calculator and Watt_Guard (K.91)
- Mobile Applications
 - EMF-guide (Suppl. 1)
 - EMF Exposure (on website)



The screenshot shows the BNetzA Watt Guard software interface. It features a title bar 'BNetzA Watt Guard' and a large graphic with the text 'Watt Wächter'. Below the graphic, it identifies the 'Federal Network Agency Section 414' and provides version information: 'V 0.95 (public beta 3) released 04.04.2011'. A welcome message reads 'Welcome to Watt Guard.' Below this, a table lists features and their status in 'Assistant' and 'Extended mode' modes.

Feature	Assist...	Extended mode
Display of the safety zone	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Display of the el. and mag. field strengths	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Safety distance in user-defined planes (additional)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rotation about the antenna longitudinal axis	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Adjustable factor for ground reflection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Simultaneous operation of multiple antennas	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Create and edit additional antennas	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

At the bottom, it states: 'The choice of the mode has no influence on the calculations of the protection area!' and provides buttons for 'assistant' and 'extended mode'.



The screenshot shows the ITU EMF Guide mobile application interface. It features a title bar 'ITU EMF Guide' and a 'SHARE' button with social media icons. Below the title bar is a list of menu items:

- + Introduction to EMF
- + EMF and Health Overview
- + Mobile Phones and Base Stations
- + Mobile Phones and SAR
- + EMF Guidelines and Standards
- + Frequently Asked Questions (FAQ)
- > ITU EMF Resources
- + Additional Resources
- > About
- > Bibliography

At the bottom, it indicates 'ITU EMF Guide - Version 1.0'.

Conclusions

- ITU is very active in sharing knowledge and tools concerning **the** 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	2021
K.61	Guidance to measurement and numerical prediction of electromagnetic fields for compliance with human exposure limits for telecommunication installation	2018
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	2022
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	2022
K.100	Measurement of human exposure levels when a wireless installation is put into service	2021
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	2021
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	2021
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.	2022
K Suppl. 19	Electromagnetic field (EMF) strength inside underground railway trains	2019
K Suppl. 20	RF Exposure evaluation around base station installed underground	2021
K Suppl. 29	EMF strength inside and outside of electric vehicle using wireless power transfer (WPT) technology	2022
K Suppl. 32	Case studies of radio frequency- electromagnetic field (RF-EMF) assessment	2022