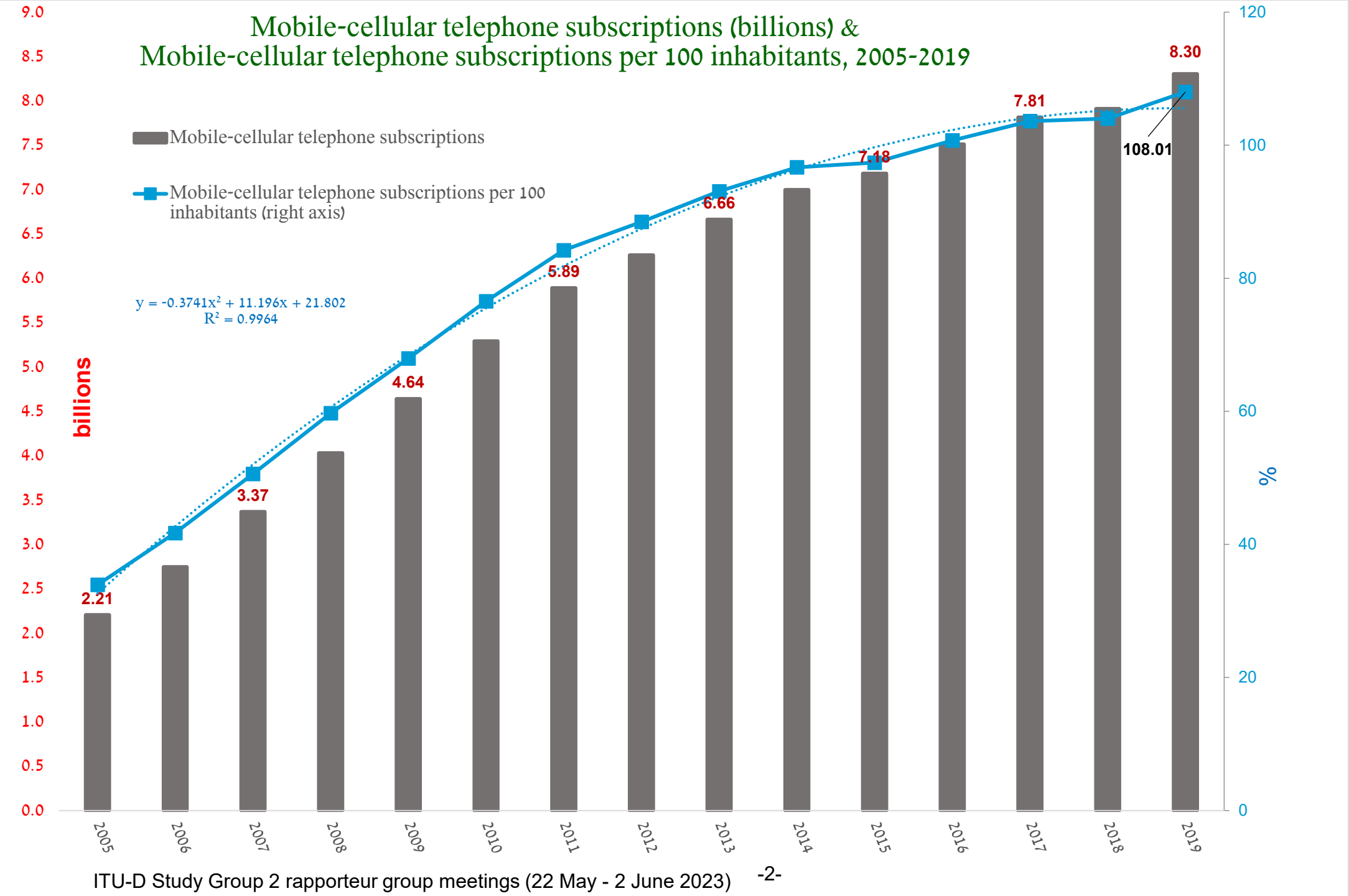
Session 1: International, regional and national policies concerning human exposure to electromagnetic fields

ITU recent activities (including the 2021 Q7/2 report) on EMF

Speaker: Dr. Haim Mazar (Madjar), ITU inter-sector coordinator on RF-EMF and co-rapporteur for ITU-D Question 7/2

ITU-D Study Group 2 rapporteur group meetings (22 May - 2 June 2023)


Mobile-cellular telephone subscriptions (billions) &
Mobile-cellular telephone subscriptions per 100 inhabitants, 2005-2019
Mobile-cellular telephone subscriptions
Mobile-cellular telephone subscriptions per 100 inhabitants (right axis)
y = -0.3741x² + 11.196x + 21.802
R² = 0.9964
billions
%
2.21
3.37
4.64
5.89
6.66
7.18
7.81
8.30
108.01
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
120
100
80
60
40
20
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

ITU Intersector Activities: Implementing ITU Resolutions

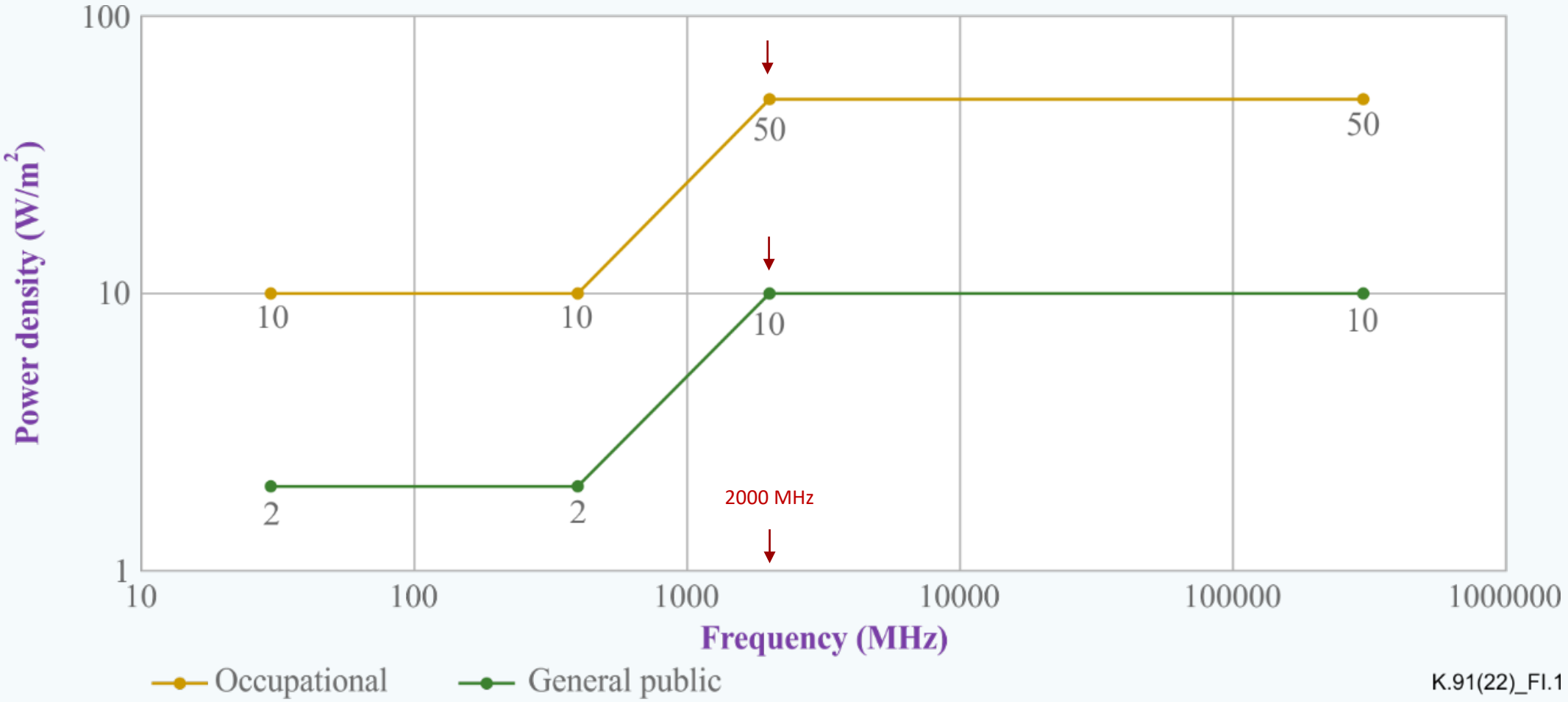
- Plenipotentiary Conference Resolution 176 (Rev. Bucharest, 2022) 'Measurement and assessment concerns related to human exposure to electromagnetic fields'
- ITU-T Resolution 72 (Rev. Geneva, 2022) 'Measurement and assessment concerns related to human exposure to electromagnetic fields'
- ITU-D Resolution 62 (Rev. Kigali, 2022) 'Assessment and measurement of human exposure to electromagnetic fields'

ITU Intersector Activities: Externally and Internally

Workshop on international, regional and national policies concerning human exposure to electromagnetic fields

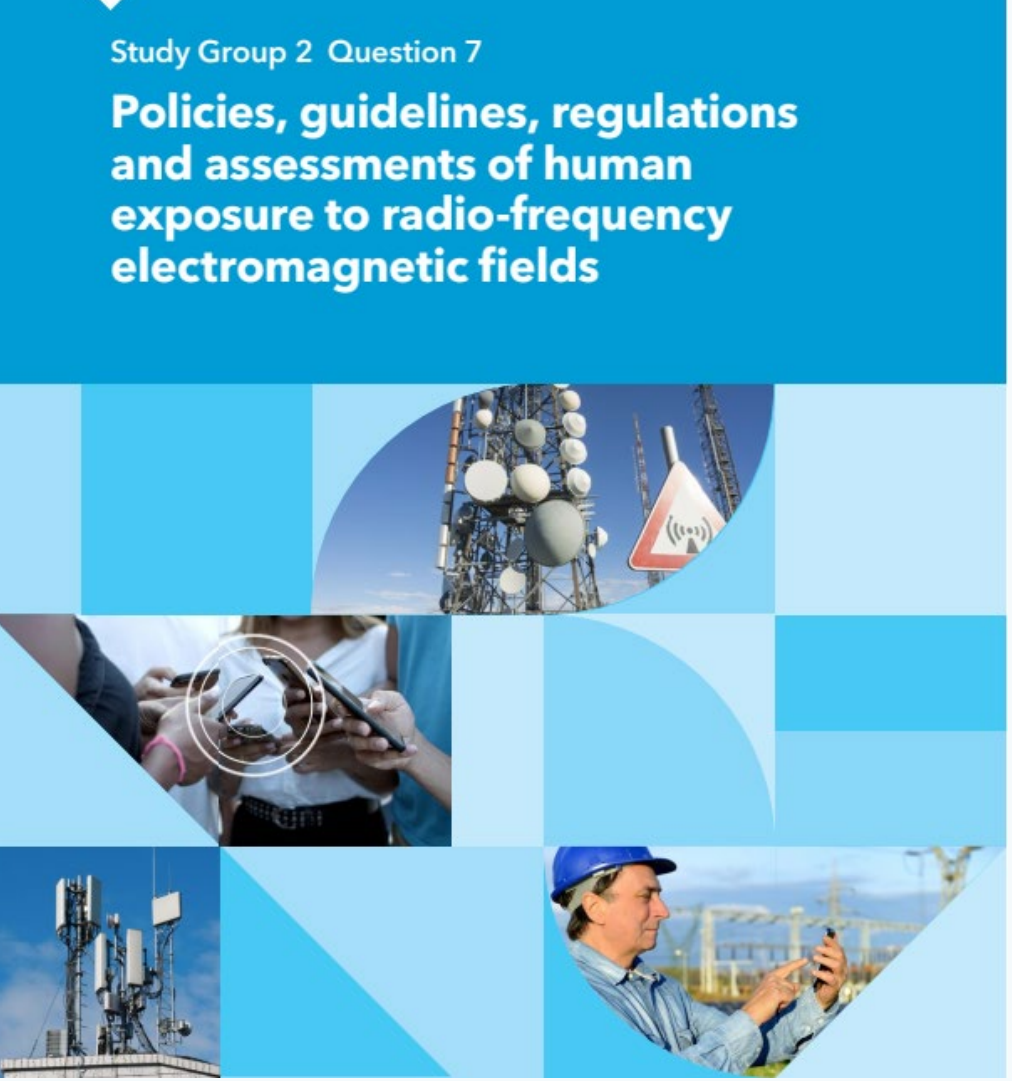
- Incorporating the ICNIRP 2020 in cooperation with ITU-D, R and T experts, in ITU Deliveries
- The Inter-Sector Coordination Group (ISCG) relates the ITU inter-sector activities, to map ITU-D Questions with ITU-R Working Parties and ITU-D and ITU-T Questions (including ITU-T Topics interesting ITU-D Questions)
- A useful matrix to avoid overlap and to indicate to which ITU group, to avoid overlap among ITU-D/R/T EMF activities, and to properly liaise the recent meeting-reports
- This is the present separation among ITU-D/R/T on EMF activities:
  - D: **Strategies** & **Policies** concerning human exposure to EMF
  - R: EMF **measurements** from **base stations** to assess human exposure
  - T: **Simulation**, assessment and **5G (IMT).**

The 3 ITU Sectors use this Figure, retrieved from ICNIRP (2020) Table 5 'power density for occupational versus general public exposures 30 MHz–300 GHz'



Recommendations ITU-T Rec. K.91 (2022) Fig. I.1; ITU-R BS.1698 (approved by R-SG6 on 17 March 2023) Fig. 35 and Q 7/2 Report (2021) Fig. 6 are based on Mazar, Wiley book Spectrum Management Fig 9.6, Chapter 9 (revised 2021)

The figure depicts differences between the ICNIRP (2020) **power-density** levels of **occupational** and **general-public** exposure, averaged over **30 minutes** and the **whole body**. The power-density ratio of 5 in ICNIRP (2020) Table 5: e.g., above 2000 MHz (see brown arrows), ratio 50/10



Final Report of Q7/2

Policies, guidelines, regulations and assessments of human exposure to radio-frequency electromagnetic fields Study period 2018-2021

The report focuses on science-based policies, guidelines, regulations and assessments in respect to human exposure to RF-EMF, based on updated international RF-EMF exposure limits defined by the ICNIRP Guidelines 2020 and the IEEE C95.1-2019

'The best practice for administrations that choose to use international RF-EMF exposure limits is to limit the exposure levels to the thresholds specified in ICNIRP (2020) Guidelines.'

The ICNIRP and IEEE limits are largely harmonized, and the power-density limits for whole-body exposure to continuous fields are identical above 30 MHz

Video Report

See also Background Paper - Implementing 5G for good: Does EMF matter? ITU Regional Forum for Europe: 5G strategies, policies, and implementation, 22-23 October 2020

ITU-D activities: WTDC-22 (precisely WTDC Resolution 62) instructs Question 7/2 to study these Tasks during 2022-2025 study period

T1	Conduct a periodic review concerning the performance of the operators and mobile equipment manufacturers in this field to verify that they are following the national specifications or ITU Recommendations, in order to ensure the safe use of EMF
T2	Conduct public awareness campaigns on the adverse impact of EMF, and deploy successful solutions, including regulations
T3	Continue to cooperate through the exchange of experts and the organization of seminars, specialized workshops and meetings
T4	Invite member states to adopt international standards for measuring and assessing EMF levels, and use effective methods for verifying compliance
T5	To collaborate with ITU-T Study Group 5 in particular to update the ITU EMF guide and mobile application relating to human exposure to EMF and the guidance on its implementation, as a matter of high priority
T6	To contribute to the organization of seminars, workshops or training on the subject of EMF
T7	To ensure wide dissemination of ITU publications and literature on EMF issues in cooperation with ITU-R and ITU-T
T8	To continue to cooperate with WHO, ICNIRP, the Institute of Electrical and Electronics Engineers (IEEE) and other relevant international organizations on guidelines and limits of human exposure to EMF, and to raise awareness and disseminate information to the membership and the public with regard to human exposure to EMF,

Draft Output Report on ITU-D Question 7/2 ; Table of contents

ITU-T Study Group 5: Environment, climate change and circular economy

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

ITU-T Study Group 5 develops standards on:

- 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

Focus Group on Environmental Efficiency for AI and other Emerging Technologies (FG-AI4EE)

Setting the Environmental Standards of 5G

Strengthening the achievements of the Connect 2030 Agenda

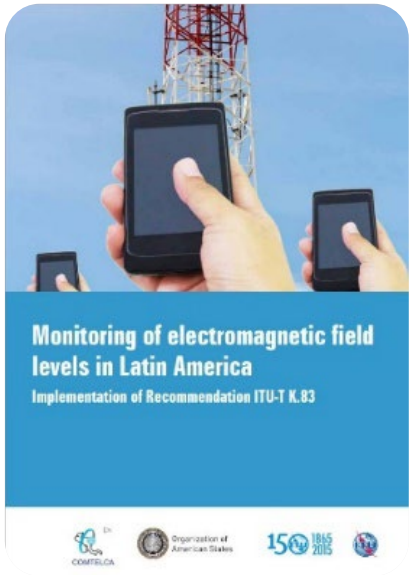
ITU-T Raising awareness on EMF

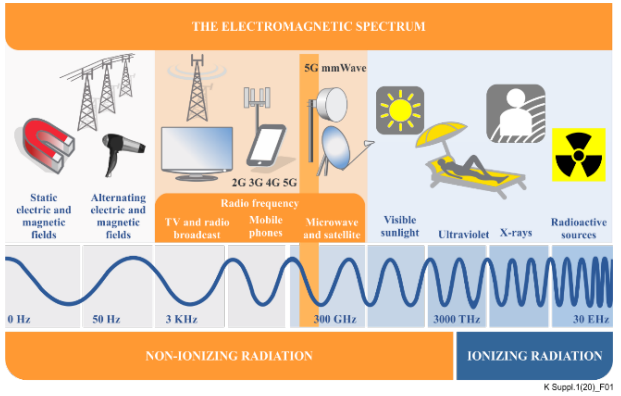
Key elements for successful public communications

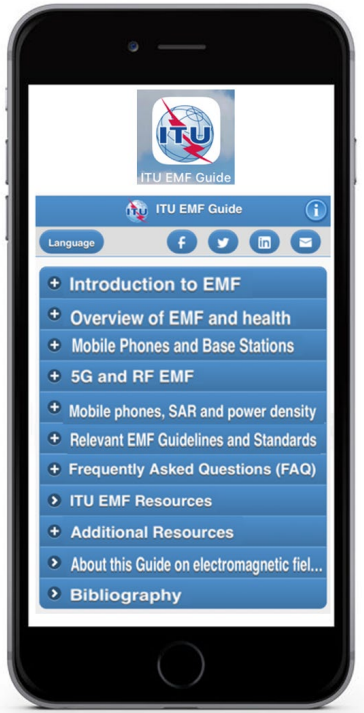
- Information easy to understand
- Open and transparent dialogues
- Providing stakeholders with trusted sources of information

ITU's Public information on EMF:

- ITU EMF Guide – key information source
- EMF Website
- Report on "Monitoring of electromagnetic field levels in Latin America"
- Best practices to reduce exposure from mobile devices







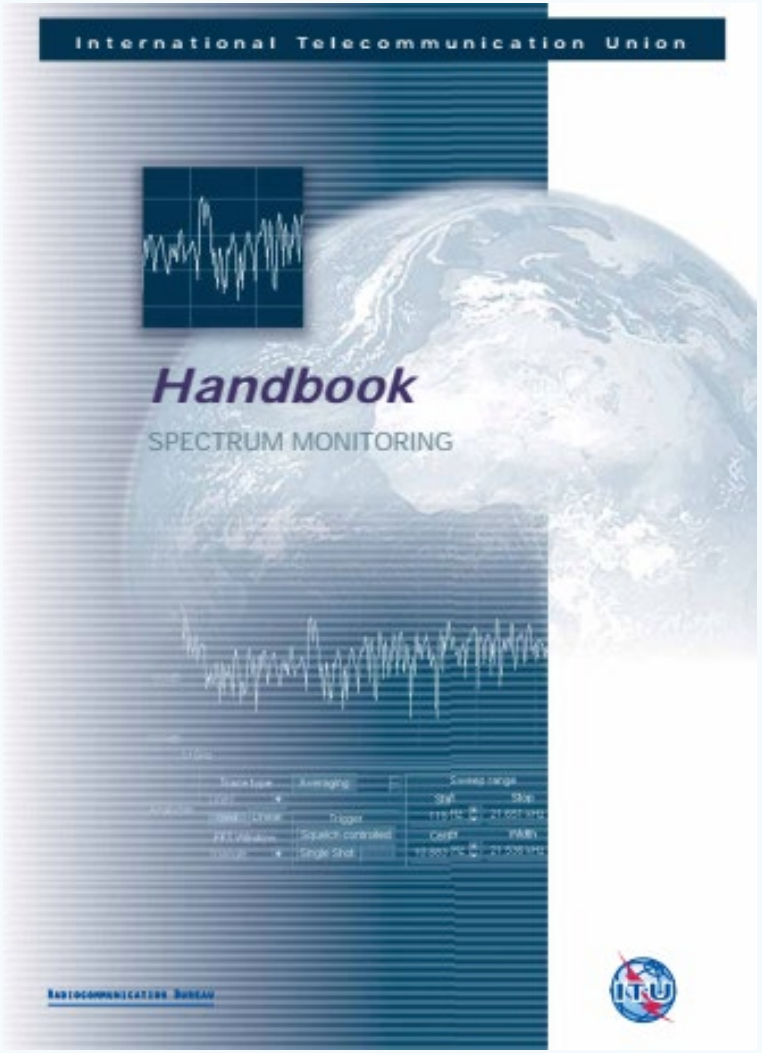
The EMF Guide mobile app was updated in 2021. It is available in the 6 UN official languages at http://emfguide.itu.int. The updated version includes information related to the EMF aspects of 5G.

ITU-T Recommendations on EMF assessment

- **K.52** (2021) - Guidance on complying with limits for human exposure to electromagnetic fields – **includes K.52calculator software"**
- **K.61** (2018) - Guidance on measurement and numerical prediction of electromagnetic fields for compliance with human exposure limits for telecommunication installations
- **K.70** (2020) - Mitigation techniques to limit human exposure to EMFs in the vicinity of radiocommunication stations – **includes "EMF Estimator software"**
- **K.83** (2022) - Monitoring of electromagnetic field levels

- **K.90** (2018) - Evaluation techniques and working procedures for compliance with exposure limits of network operator personnel to power-frequency electromagnetic fields– includes "EMFACDC" software
- **K.91** (2022) - Guidance for assessment, evaluation and monitoring of human exposure to radio frequency electromagnetic fields – includes "Uncertainty calculator" and "Watt_Guard" software, Supplement and mobile App "EMF-guide", mobile App
  " EMF Exposure"
- **K.100** (2021) - Measurement of RF EMF to determine compliance with human exposure limits when a base station is put into service
- **K.113** (2015) - Generation of RF EMF level maps
- **K.121** (2016) - Guidance on the environmental management for compliance with radio frequency EMF limits for radiocommunication base stations
- **K.122** (2016)- Exposure levels in close proximity of radiocommunication antennas
- K.145 (2020)- Assessment and management of compliance with radio frequency electromagnetic field exposure limits for workers at radiocommunication sites and facilities

K supplements- Eight Supplements to ITU-T K-series Recommendations



ITU’s worldwide recognized reference on Spectrum Monitoring and related issues

ITU-R Activities

- Chapter 5.6 on **Non-Ionizing Radiation (NIR) measurements**
  - Explains **NIR limits & exposure quotient**
  - **Instruments for NIR measurements**
    - Broadband isotropic probes and meters
    - Tri-axis antennas and field strength meters
    - Transportable station
    - standard field strength measurement equipment
  - **Measurement procedures** for different radio services (incl. mobile, broadcasting, etc.)
  - **Reporting methods**

Source: ITU-R Handbook on Spectrum Monitoring (2011) www.itu.int/pub/R-HDB-23

On-going ITU-R Studies on EMF measurements to assess human exposure

1. Work initiated by the ITU Experts Group on Spectrum Monitoring (i.e. ITU-R WP 1C) in response to Question ITU-R 239/1 (2016): What are the measurements techniques to assess the human exposure from wireless installations of all types? How can measurement results be presented?
2. Report ITU-R SM.2452 (2022) - Electromagnetic field measurements to assess human exposure

Workshop on international, regional and national policies concerning human exposure to electromagnetic fields

Geneva, ITU 2018 EMF Workshop 10 Oct. 2018 presentation is found at https://www.itu.int/oth/D0716000001

Click here to download the April 2021 Chapter 9 on EMF exposure of Mazar Wiley book on Spectrum Management

Any Questions?