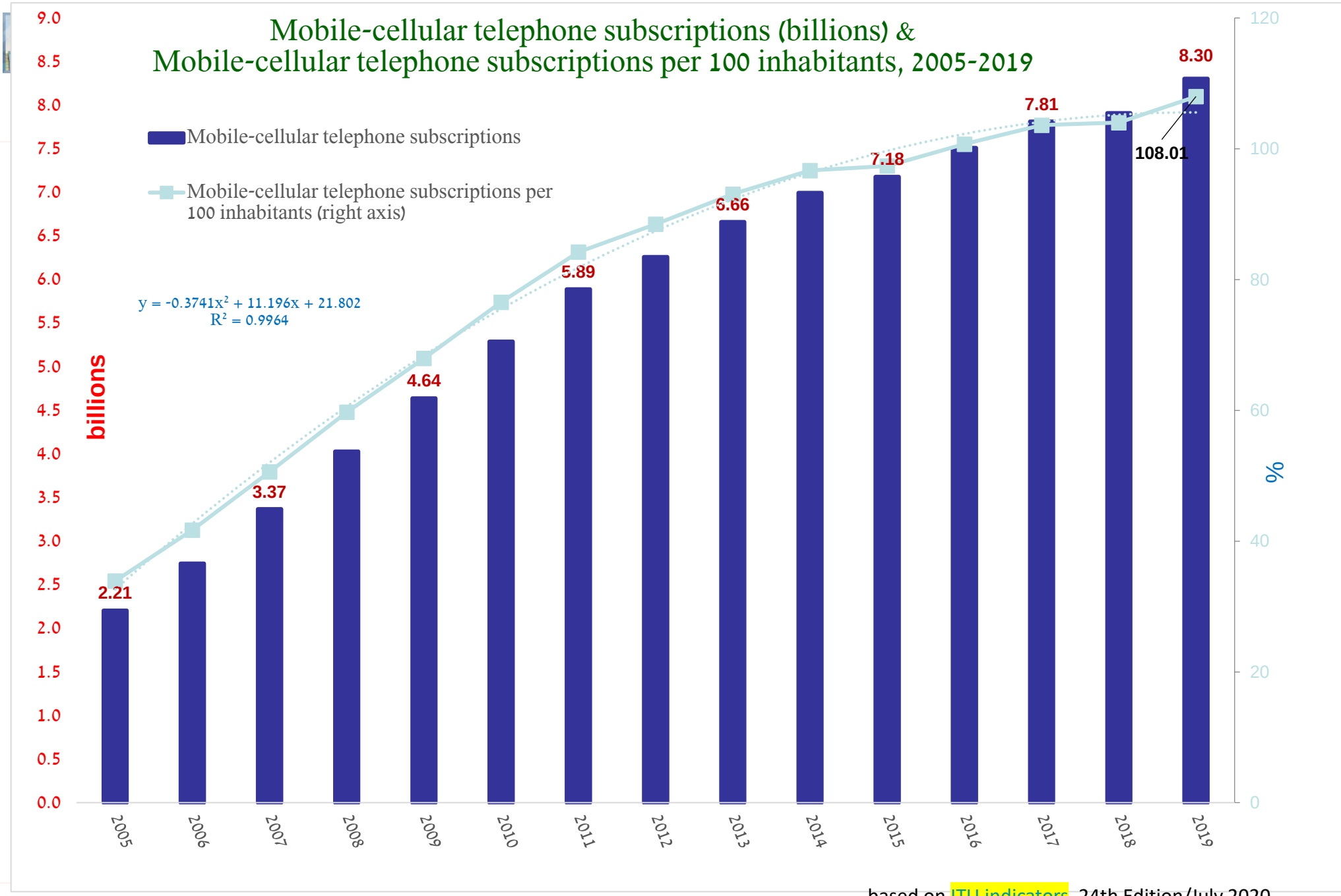
https://www.icnirp.org/en/workshops/article/mini-symposium-2022.htm

ITU's Perspective on Compliance with the new 2020 RF Guidelines

Dr. Haim Mazar

ITU intersector coordinator on RF-EMF and co-rapporteur ITU-D Question 7/2

U may download the April 2021 Chapter 9 on EMF exposure of my Wiley book on Spectrum Management



based on ITU indicators, 24th Edition/July 2020

Intersector Activities

- 32 comments have been included and sent to ICNIRP; see TD696-R1 and ICNIRP main Revisions, presentation of Dr. Rongen, Chair ICNIRP. ITU view to separate ICNIRP 1998 & 2010 was adopted
- Incorporating the ICNIRP 2020 in cooperation with ITU-D, R and T experts, in ITU Deliveries
- Mapping of ITU-D/R/T EMF activities to avoid overlap, mainly:
  - D: **Strategies** & **Policies** concerning human exposure to EMF
  - R: EMF **measurements** from **base stations** to assess human exposure
  - T: **Simulation**, assessment, **5G**

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

SG5 is responsible for:
Studying ICT environmental aspects of electromagnetic phenomena and climate change.

Studies on how to use ICTs to help countries and the ICT sector to adapt to the effects of environmental challenges, including climate change, in line with the Sustainable Development Goals (SDGs).

Lead Study Group for

- electromagnetic compatibility, lightning protection and electromagnetic effects
- ICTs related to the environment, climate change, energy efficiency and clean energy
- circular economy, including e-waste

Safe and reliable use of ICT

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

9 Questions

4 Regional Groups

Q3/5 Human exposure to electromagnetic fields (EMFs) due to digital technologies

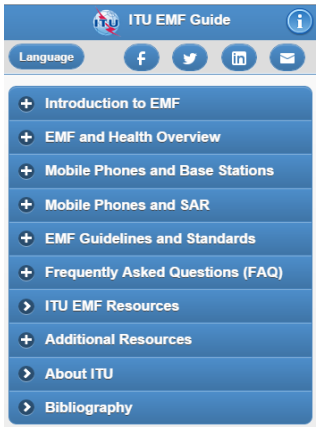
ITU-T Raising awareness on EMF

Key elements for successful public communications:

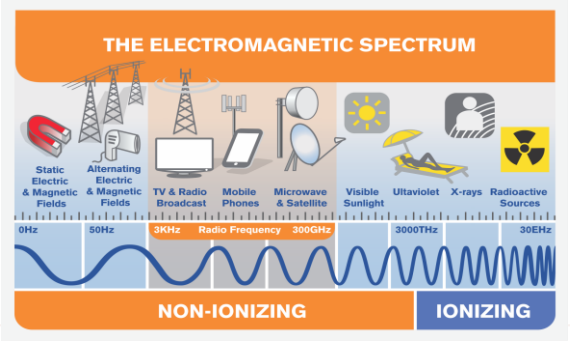
- Information easy to understand;
- Open and transparent dialogues;
- Providing stakeholders with trusted sources of information.

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



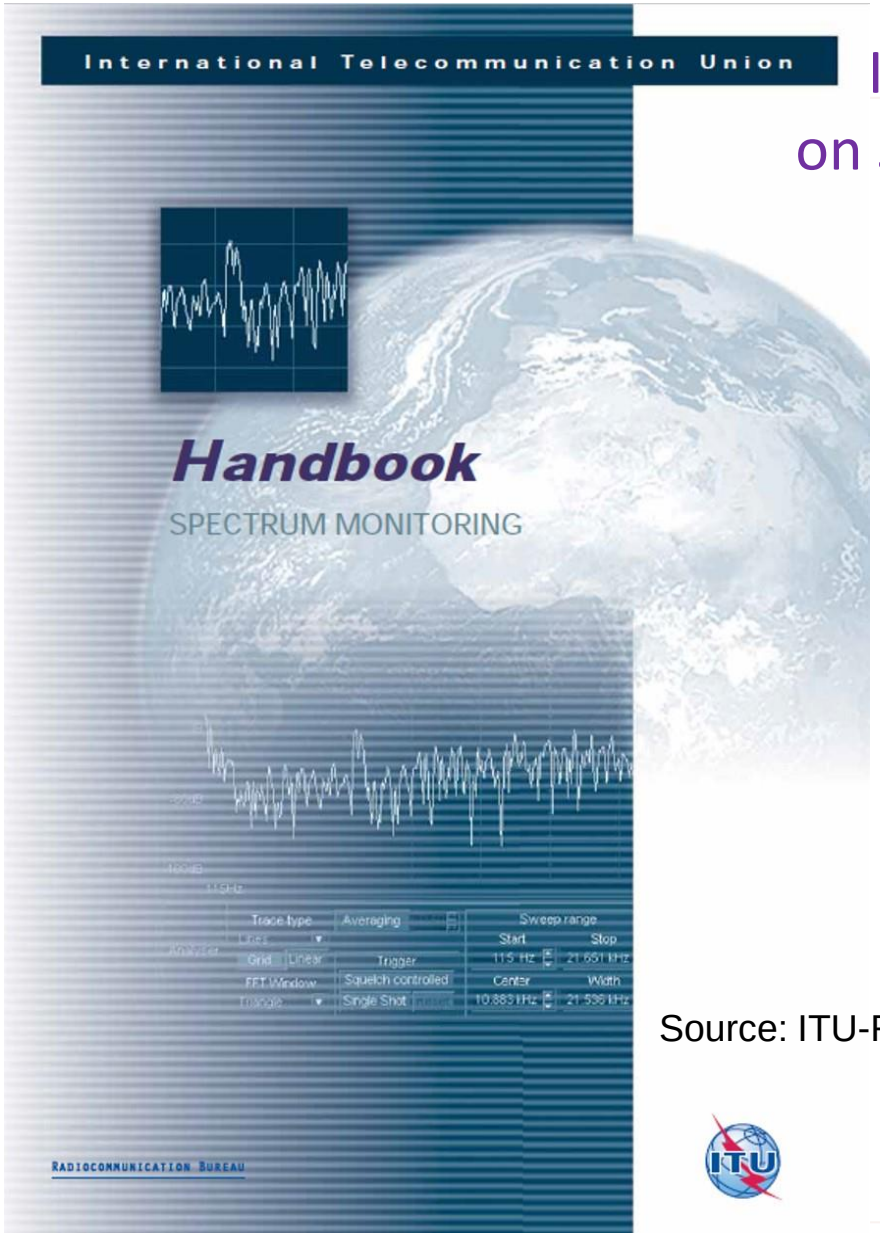
The EMF Guide mobile app in the 6 UN official languages is available online at http://emfguide.itu.int. It is also available in Malay.



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- Supplements to ITU-T K-series Recommendations



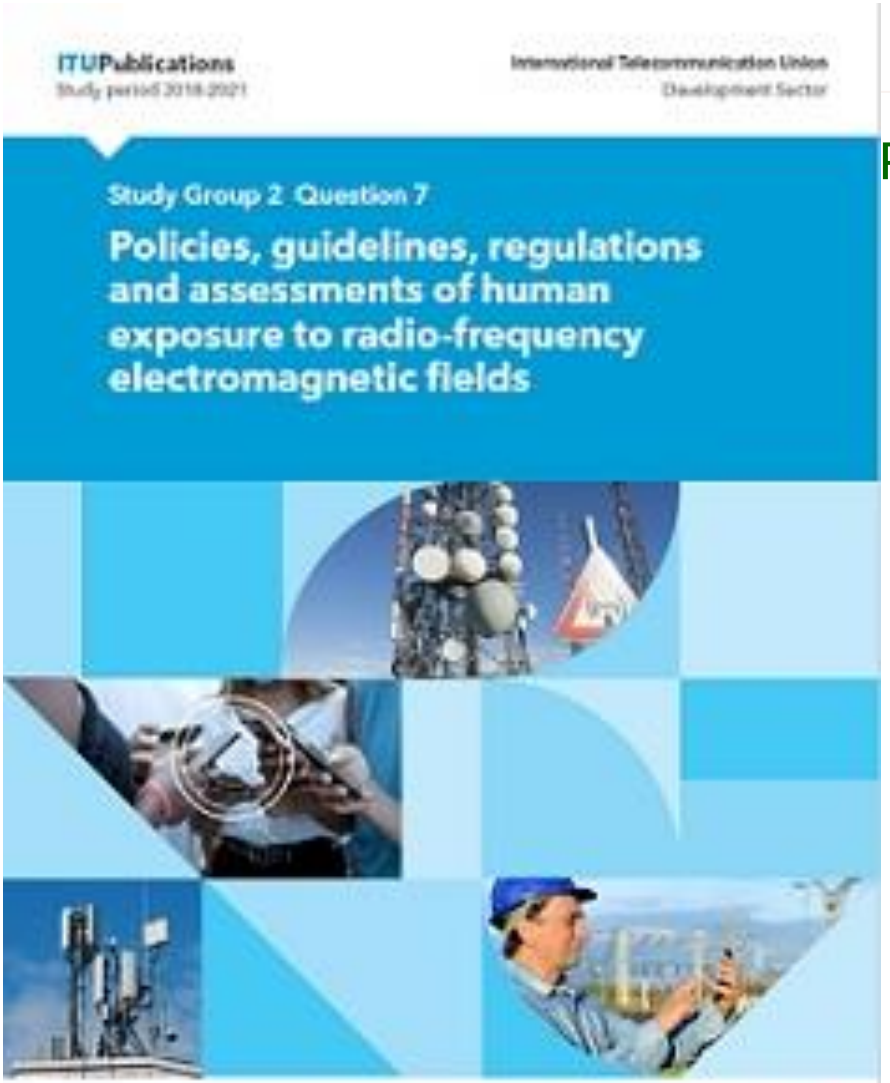
ITU's worldwide recognized reference on Spectrum Monitoring and related issues

- 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

- 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?
- Report ITU-R SM.2452 (July 2022) - Electromagnetic field measurements to assess human exposure.



Video Report

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.'

- Differing approaches to adoption of ICNIRP 2020 (above 100 kHz):
  - ICNIRP (2020), e.g., Australia
  - ICNIRP (1998) or ICNIRP (2020), e.g., UK
  - ICNIRP (1998), e.g., France
  - Other limits, e.g., ?
- European Union consulting Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) for opinions on updating public and worker EMF limits

ICNIRP (2020) changes reported to be marginal for base station compliance

- Macro sites: largely unchanged
- Indoor low power: largely unchanged >30 mW
- 6-min averaging for actual maximum assessment conservative for ICNIRP (2020) 30-min average

frontiers in Communications and Networks

ORIGINAL RESEARCH
published: 04 March 2022
doi: 10.3389/frcmn.2022.744528

https://doi.org/10.3389/frcmn.2022.744528

Implications of ICNIRP 2020 Exposure Guidelines on the RF EMF Compliance Boundary of Base Stations

Davide Colombi, Bo Xu, David Anguiano Sanjurjo, Paramananda Joshi, Fatemeh Ghasemifard, Carla Di Paola and Christer Törnevik*

Ericsson Research, Ericsson AB, Stockholm, Sweden

- ComReg (Ireland) applies ICNIRP (2020) to sites since August 2020
- Extract of results for one site:

Emission Type	Frequency (MHz)	Measured Level (V/m)	Adjusted Level (V/m)	ICNIRP Exposure Limit (V/m)	Times below Limit [adjusted Values]
GSM	1841.190	0.00468	0.00936	59.0	6300.726
LTE	1815.000	0.00950	0.03328	58.6	1760.139
LTE	1830.000	0.00450	0.01820	58.8	3231.289
LTE	1855.000	0.00820	0.03317	59.2	1785.340
LTE	1875.000	1.10000	3.85357	59.5	15.450
UMTS FDD	2142.500	0.22200	0.70203	61.0	86.891
UMTS FDD	2147.500	0.17110	0.54107	61.0	112.740
UMTS FDD	2112.500	0.01011	0.03197	61.0	1907.988
LTE	2119.238	0.00650	0.01859	61.0	3281.334
LTE	2133.048	0.77580	2.86270	61.0	21.309
LTE	2164.857	0.00950	0.03506	61.0	1740.123
LTE	3505.333	0.00211	0.02010	61.0	3034.289
5G NR	3669.381	0.00460	0.03397	61.0	1795.708
LTE	3748.619	0.00147	0.01402	61.0	4352.036


An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation

Site Survey Methodology

Programme of Measurement of Non-Ionising Radiation

Site Survey Methodology
Reference: ComReg 08/51R4
Date: 25/09/2020

An Coimisiún um Rialáil Cumarsáide
Commission for Communications Regulation
1 Lárcheantar na nDugaí, Sráid na nGildeanna, BÁC 1, Éire, D01 E4X0.
One Dockland Central, Guild Street, Dublin 1, Ireland, D01 E4X0.
Teil | Tel +353 1 804 9600 Suíomh | Web www.comreg.ie

https://www.comreg.ie/industry/radio-spectrum/site-viewer/non-ionising-radiation-information/

- ANFR (France) measurements at 1,500 sites before and after the introduction of 5G
- Overall '*exposure is comparable before and a few months after 5G roll out.*'
- Main results:
  - Low-band (700 & 2 100 MHz) level remains stable
  - Mid-band (3 500) MHz shows '*slight increase*'

RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

ANFR
AGENCE NATIONALE DES FRÉQUENCES

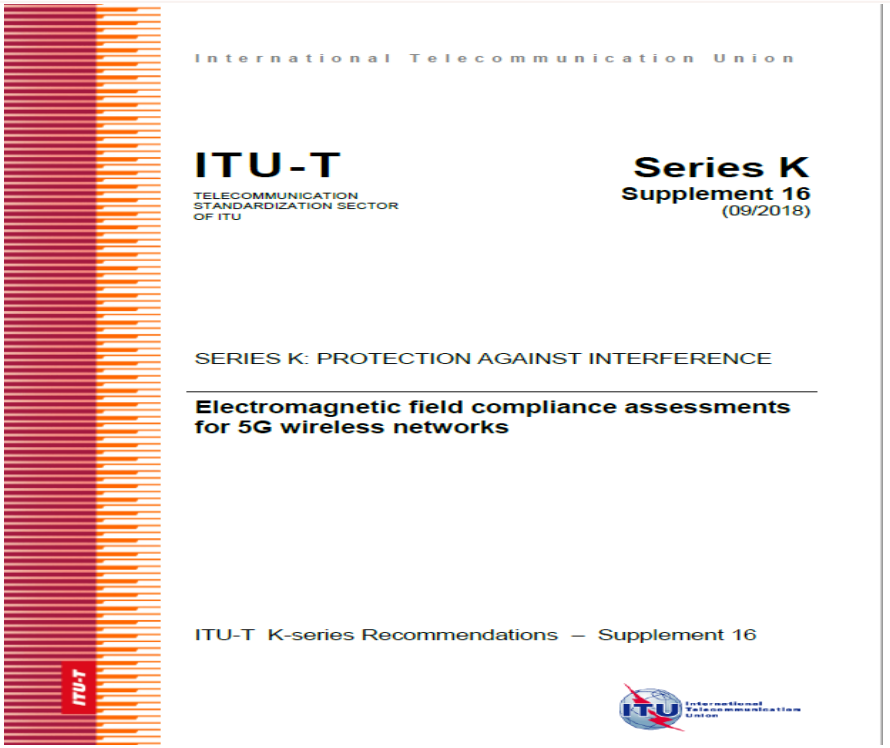
Study of the 5G contribution to exposure of the general public to electromagnetic waves

Preliminary report
(October 2020 to October 2021)

December 2021

https://www.anfr.fr/fileadmin/mediatheque/documents/expace/20211214-exposition-5G-EN.pdf

- Influence of 5G, TDD, MIMO, multiple technologies
- Evolving assessment procedures
- Realistic assessments based on IEC actual maximum approach



K Suppl. 16: EMF compliance assessments for 5G wireless networks

Proposals to update will be discussed at June 2022 meeting of ITU-T Study Group 5: Environment, EMF & circular economy

- compliance for devices:
  - ICNIRP (2020), e.g., Australia
  - ICNIRP (2020) above 6 GHz modified, e.g., Canada
  - ICNIRP (1998), e.g., France

- Assessment methods > 6 GHz:
  - IEC/IEEE 63195-1 measurement procedure
  - IEC/IEEE 63195-2 computational assessments

It remains important to address EMF misunderstanding/misinformation

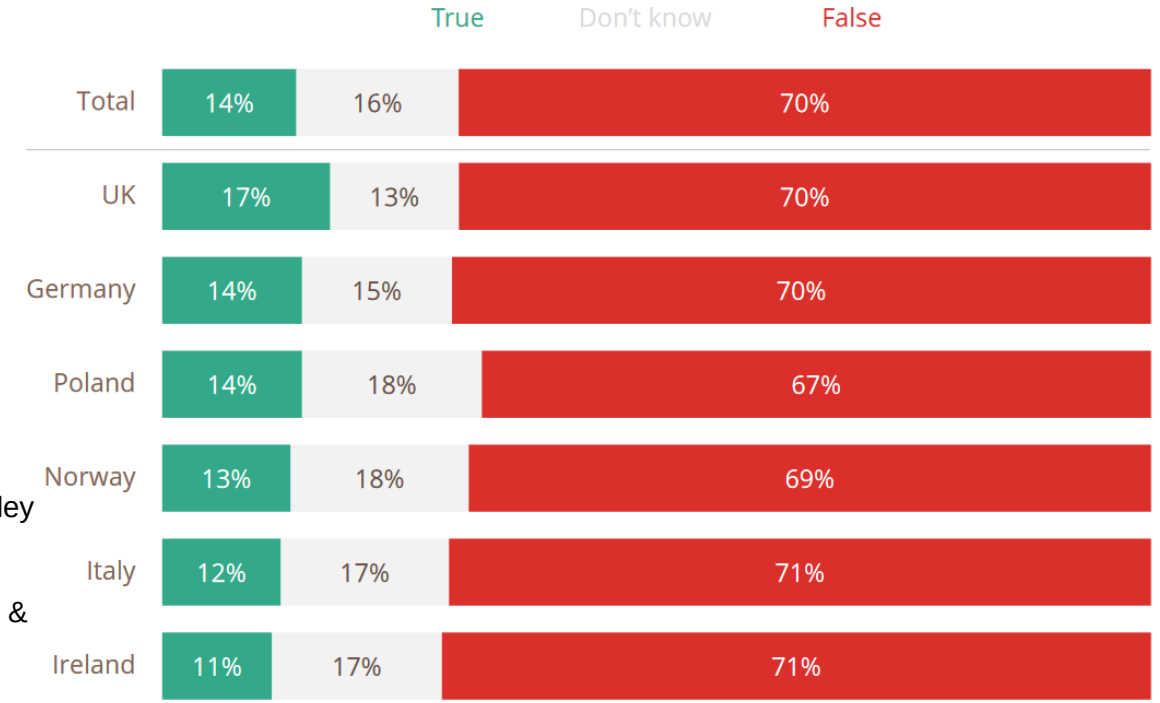
14% people think the symptoms that most people blame on coronavirus appear to be linked to 5G network radiation

PERITIA
Policy, Expertise and Trust

Please say whether you think the following statement is true or false... **The symptoms that most people blame on coronavirus appear to be linked to 5G network radiation**

14% of people in the surveyed countries think that the symptoms most people blame on coronavirus appear to be linked to 5G network radiation. Despite this, there is no evidence to link the symptoms of coronavirus to 5G network radiation.[1]

https://peritia-trust.eu/wp-content/uploads/2022/05/2-Covid-19-pandemic-Europe.pdf



See also, IEEE COMCAS 2021- Rowley & Mazar, Misunderstandings about radiofrequency electromagnetic field exposure and 5G misinformation; Ball & Mazar, Science and Politics of Base Station Electromagnetic Field Risks

[1] Uthman, M. et al. (2020) '5G Radiation and COVID-19: The Non-Existent Connection,' *International Journal of Research in Electronics and Computer Engineering*, Vol. 8, Issue 2, pp. 34-38.

Base: 12,346 adults aged 18+, interviewed 4–19th January 2022

Areas for ICNIRP clarification:

- between the years 2010 and 2020, ICNIRP did not explain how the overlapping frequencies with 1998 Guidelines should be dealt with in a way that was understood by users
- there is extensive discontinuity at 100 kHz; e.g., general public: 83 V/m (ICNIRP 2010, Table 4) versus $300/f_M^{0.7}=300/0.1^{0.7}\approx$ 1 500 V/m (ICNIRP 2020, Table 5)
- near&far fields definitions of for compliance assessment
- Application of ICNIRP 30-min averaging time versus (shorter) valid measurement time

1. **Acknowledgement**: Dr Jack Rowley: ITU-T Study Group 5 and ITU-D Study Group 2 delegate
2. This presentation is **available** at:
   1) the International Commission on Non-Ionizing Radiation Protection (ICNIRP) website ICNIRP Mini-Symposium 19 June 2022, 14.00-18.00 JST Nagoya, Japan and Online
   2) At https://mazar.atwebpages.com/Downloads/MiniSymposium2022MazarICNIRP_Nagoya2022.pdf
3. Session 1 – Health protection in EMF range: **on behalf of ITU,** ITU's Perspective on Compliance with the new 2020 RF Guidelines
   1) Streaming see minutes between 28:40 and 39:23
   2) PDF

ITU workshop on modern policies, guidelines, regulations and assessments of human exposure to RF-EMF

ITU, Geneva 10 Oct. 18

See workshop presentations at https://www.itu.int/en/ITU-D/Study-Groups/2018-2021/Pages/meetings/session-Q7-2-oct18.aspx

Any Questions?

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