ITU-T Study Group 5
Environment, climate action, circular economy and electromagnetic fields

Updates from ITU-T SG5

2025

International Telecommunication Union (ITU)

The International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies (ICTs)

194 Member States

+700 Companies/organizations

+160 Academia members

Moscow
Geneva
New York
Cairo
New Delhi
Tegucigalpa
Bridgetown
Dakar
Bangkok
Addis Ababa
Yaounde
Jakarta
Brasilia
Harare
Santiago

Universal Connectivity

ITU Strategic Plan 2024-2027

Sustainable Digital Transformation

ITU Resolutions on Environment, EMF, Climate Change and Circular Economy

ITU Resolution 182 – "Role of telecommunications/information and communication technologies in regard to climate change and the protection of the environment"

ITU Resolution 176 – "Measurement and assessment concerns related to human exposure to electromagnetic fields"

ITU-T Resolution 79 – "Role of telecommunications/information and communication technologies in handling and controlling e-waste from telecommunication and information technology equipment and methods of treating it"

ITU-T Resolution 72 – "Measurement and assessment concerns related to human exposure to electromagnetic fields"

ITU-T Resolution 73 – "Information and communication technologies, environment, climate change and circular economy"

Resolution 72 on "Measurement and assessment concerns related to human exposure to electromagnetic fields" (Rev. New Delhi, 2024)
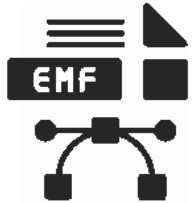
Urgent need on standardized measurements on human exposure to EMF

AI and other emerging technologies as a facilitator on EMF modeling and assessment

Key highlights

Considering:

- that the considerable increase in the use of telecommunications/ICT equipment has resulted in an increase in the sources of EMF emission, including simultaneous exposure from multiple sources, with a potential impact on exposure levels;

- that there is a need to inform the public of the levels of EMF from different radio-frequency (RF) sources in a scientific and objective manner through measurements and other standardized methodologies, as well as of the potential effects of EMF exposure;

- that AI and other emerging technologies can facilitate modelling and assessment of human exposure to EMF.

Resolves:

- to develop, publish and disseminate technical reports and Recommendations to **support countries in formulating guidelines regarding EMF exposure**;

- to encourage **collaboration with SDOs in field of simplifying the testing process for measuring and assessing exposure to EMF to make it more accessible and cost-effective for developing countries**.

How ITU supports Environment, EMF and Circular Economy

ITU-T Study Group 5 lead roles: EMF, environment, climate action, sustainable digitalization and circular economy, develops standards on:

- Electromagnetic compatibility (EMC), resistibility and lightning protection

- Soft error caused by particle radiations

- Human exposure to electromagnetic fields (EMF)

- Circular economy and e-waste management

- ICTs related to the environment, energy efficiency, clean energy and sustainable digitalization for climate actions

ITU-T Study Group 5

SG5 Structure (Study Period 2025-2028)

WP1/5

1/5 — Electrical protection, reliability, safety, and security of telecommunication/ICT systems

2/5 — Equipment specification and component/device for protection against lightning and other phenomena

3/5 — Assessment of human exposure to electromagnetic fields (EMFs)

4/5 — Electromagnetic compatibility (EMC) aspects in telecommunications/ICTs

WP2/5

6/5 — Environmental efficiency of telecommunications/ICTs

7/5 — E-waste, circular economy, and sustainable supply chain management

PLEN

8/5 — Guidance and terminology on environment

WP3/5

9/5 — Assessing the impact of telecommunications/ICTs on climate change, biodiversity and the environment - including the influence on other sectors

11/5 — Climate change mitigation and smart energy solutions

12/5 — Climate actions and adaptation to climate change through sustainable and resilient telecommunications/ICTs (including new and emerging)

Study Group 5 Key Topics

EMF

ITU-T K.91, "Guidance for assessment, evaluation and monitoring of human exposure to radio frequency electromagnetic fields"

ITU-T K.83, "Monitoring of electromagnetic field levels"

ITU-T K.145, "Assessment and management of compliance with RF EMF exposure limits for workers at radiocommunication sites and facilities"

ITU-T K.Suppl.1 to K.91, "Guide on electromagnetic fields and health

ITU-T K.Suppl.32, "K Suppl. 32: Case studies of radio frequency-electromagnetic field (RF-EMF) assessment"

Updates on the EMF Guide and mobile app to include 5G references and updates on WHO and other guidelines.

Under Study

K.AI&EMF:

EMF evaluation method using artificial intelligence in vicinity of 5G NR (IMT-2020) base station

K.calibr:

Calibration for equipment for the EMF assessment

K.devices:

RF-EMF exposure assessment of wireless communication devices operating close to the human body

K.reflection:

Impact of the metallic structures for the EMF exposure level

K.Suppl.MethDataEMF:
Guidance on Methodologies for RF-EMF Assessments and Responding to Public Concerns regarding human exposure to RF-EMF from Telecommunication Installations

EMC, lightning protection, EMF

Classification of the K.series Recommendation

New work item

K.actual_max

Guidance on implementation of Actual Maximum Approach for assessment, evaluation, compliance and monitoring of RF EMF

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Recommendation ITU-T K.devices

RF EMF exposure assessment of the wireless radiocommunication devices operating close to the human body.

The purpose of this Recommendation is to obtain proper information about RF EMF exposure limits in close proximity to the human body.
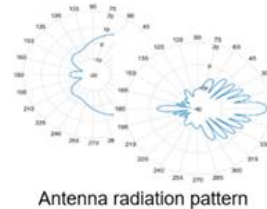
Recommendation ITU-T K.AI&EMF

EMF evaluation method using artificial intelligence in the vicinity of a 5G NR (IMT-2020) base station.

The purpose of this Recommendation is to use the advantages of Artificial Intelligence in the assessment of the human exposure to RF EMF in the vicinity of radio base stations.
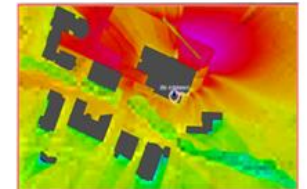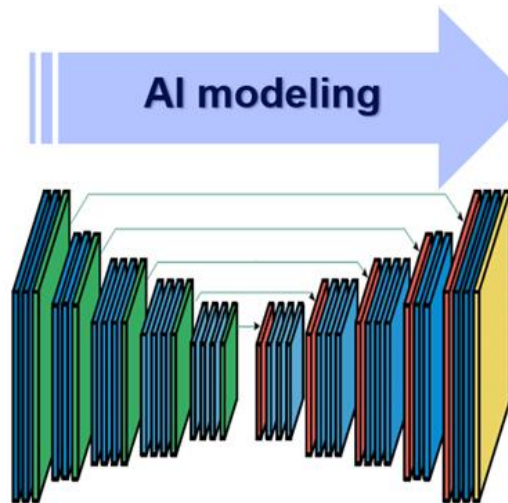

GIS data

Antenna radiation pattern

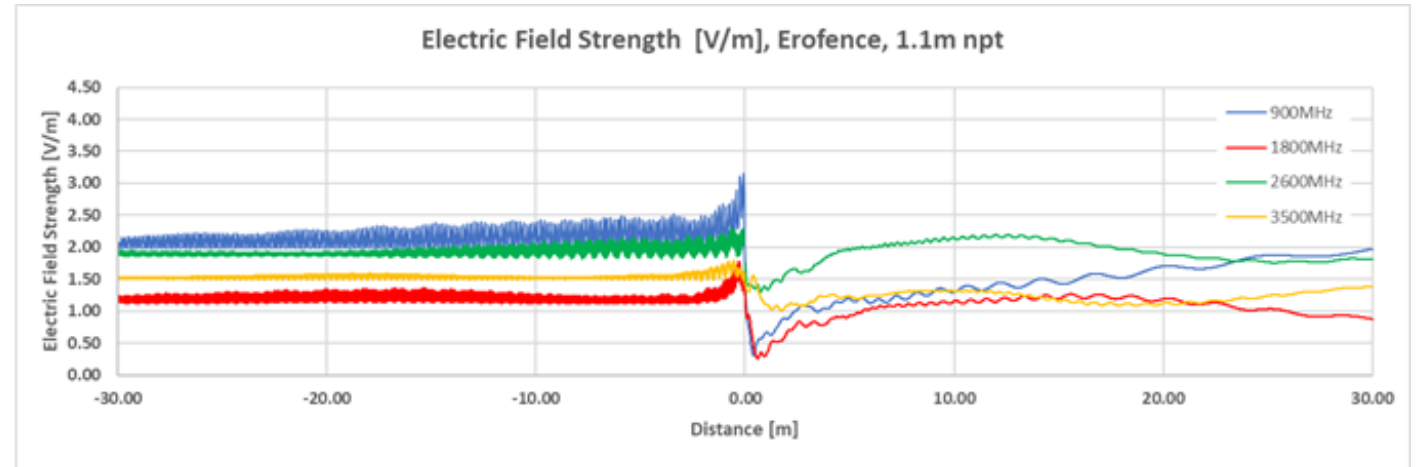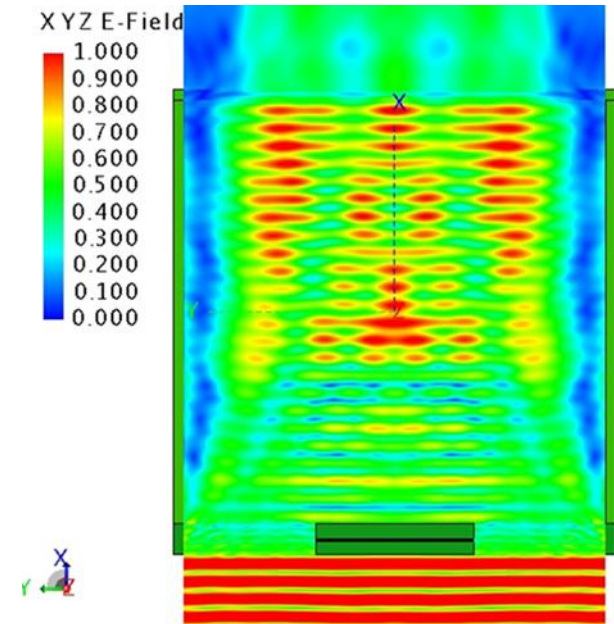| Longitude	Latitude
Altitude	PCI
Distance	

Numeric data

AI modeling

Field strength

Recommendation ITU-T K.reflections

Impact of the metallic structures for the EMF exposure level.

The purpose of this Recommendation is to deliver proper information concerning the influence of the metallic object for the results of RF-EMF measurements.

Recommendation ITU-T K.Suppl. MethDataEMF

Guidance on Methodologies for RF-EMF Assessments and Responding to Public Concerns regarding human exposure to RF-EMF from Telecommunication Installations.

- It will provide comprehensive guidance to ITU Member States seeking to conduct RF-EMF assessments with the use of ITU-T Recommendations or Supplements and other international technical standards (e.g., IEC).

- Development of a framework for harmonized RF-EMF assessment methodologies to EMF measurement and assessments of telecommunication installations (such as cellular and broadcasting).

- Propose development of a format for data collection and sharing the results of RF-EMF assessments to allow comparability between countries and analysis.

- Furthermore, it will develop guidance on addressing public concerns and misconceptions related to RF-EMF exposure from telecom installations.

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	2024
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	2024
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	2024
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
K.153	Guidance on determining the compliance boundaries (exclusion zones) of radio transmitter installations	2023
K.156	Time and spatial averaging in RF-EMF exposure assessment	2024

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	2023

ITU-T documents under development

ITU-T Rec. Number	Title	Year
K.devices	RF EMF exposure assessment of the wireless radiocommunication devices operating close to the human body	2026
K.Actual Max	Guidance on implementation of Actual Maximum Approach for assessment, evaluation, compliance and monitoring of RF EMF	2027
K.reflection	Impact of the metallic structures for the EMF exposure level	2025
K.Small	Small base stations - impact on the overall exposure level	2025
K.AI&EMF	EMF evaluation method using artificial intelligence in vicinity of 5G NR (IMT-2020) base station	2026
K.Suppl. MethDataEMF	Guidance on Methodologies for RF-EMF Assessments and Responding to Public Concerns regarding human exposure to RF-EMF from Telecommunication Installations	2026

Thank you!

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SG5 - Environment, EMF, climate

action & circular economy

ITU