

Human exposure to electromagnetic fields

ITU-T



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

The World Telecommunication Standardization Assembly (WTSA-12) held in Dubai, 20-29 November 2012, approved Resolution 72: Measurement concerns related to human exposure to electromagnetic fields.

Within the Telecommunication Standardization Sector (ITU-T) of the International Telecommunication Union (ITU), ITU-T Study Group 5 (SG5) is the lead study group on ICT environmental aspects of electromagnetic phenomena and climate change.

SG5's Working Party 2 studies EMF issues under Question 7/5: "Human exposure to electromagnetic fields (EMFs) due to radio systems and mobile equipment". The resulting international standards (ITU-T Recommendations) provide high-level frameworks for the management of human exposure to EMFs emitted by telecommunication equipment (best-practice regulatory guidelines), and also offer guidelines for the assessment of human exposure based on existing ITU-T Recommendations and standards produced by other standards development organizations (SDOs).

To achieve these goals, Question 7/5 looks at measuring techniques, procedures and numerical models for evaluating the electromagnetic fields stemming from telecommunication systems and radio terminals.



Key outcomes of SG5 EMF work include, inter alia:

EMF Handbook

A new EMF handbook or web-based 'technical information paper' including the option of an EMF information application is being developed.

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

EMF Estimator – Exposure plot overlaid on a map

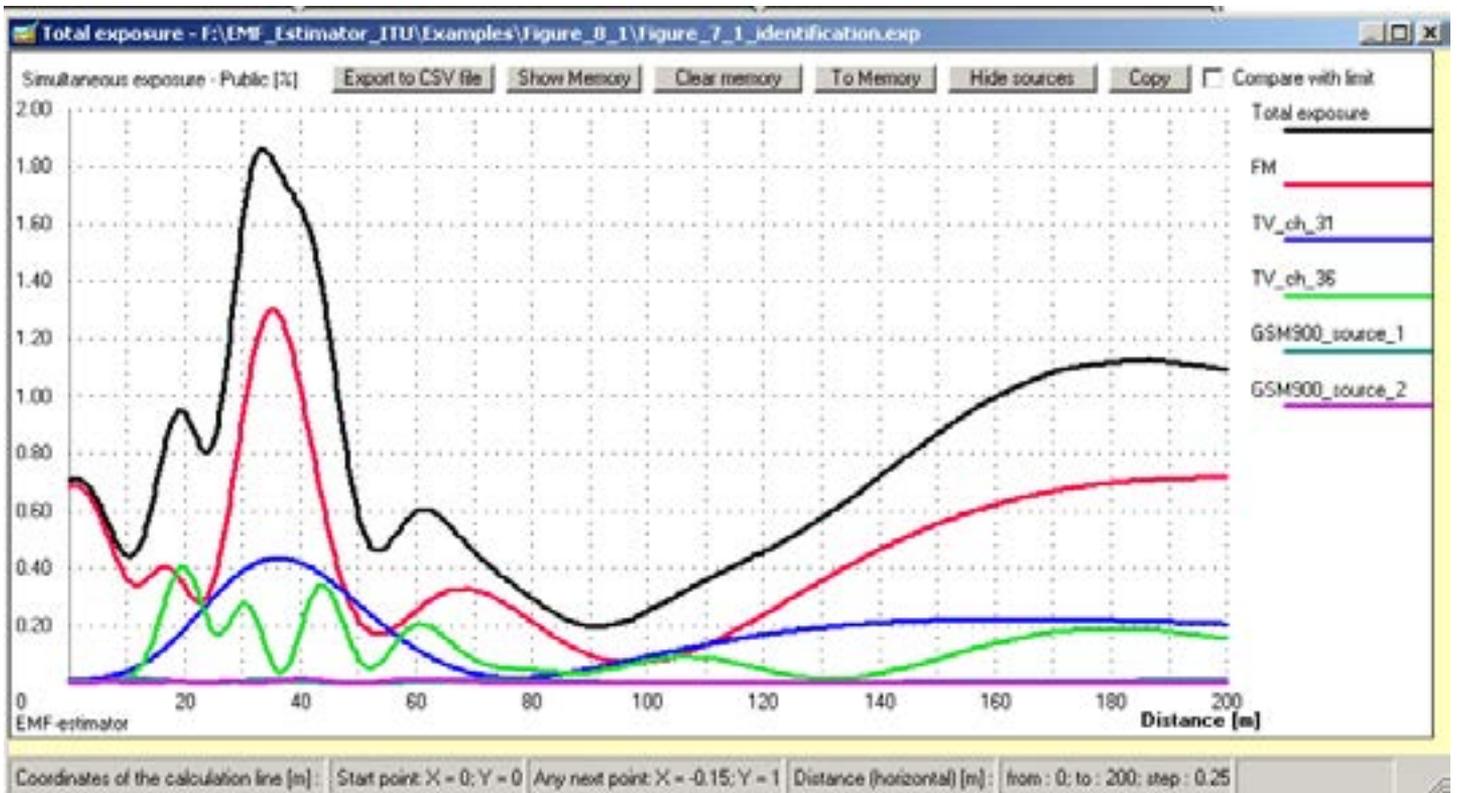
EMF Estimator is a software application that implements the methodology described in ITU-T K.70 to calculate the cumulative radio frequency exposure levels in the vicinity of transmitting antennas.

EMF Estimator also contains the library of the radiation patterns of transmitting antennas for a wide range of radio communication and broadcast services.

A typical application for EMF estimator would be the calculation of EMF levels in a local community from a cellular base station or community broadcast service.

New features of the EMF Estimator software include options to import antenna patterns directly from manufacturers' websites, as well as an option to present results of exposure level evaluations overlaid on a Google map.



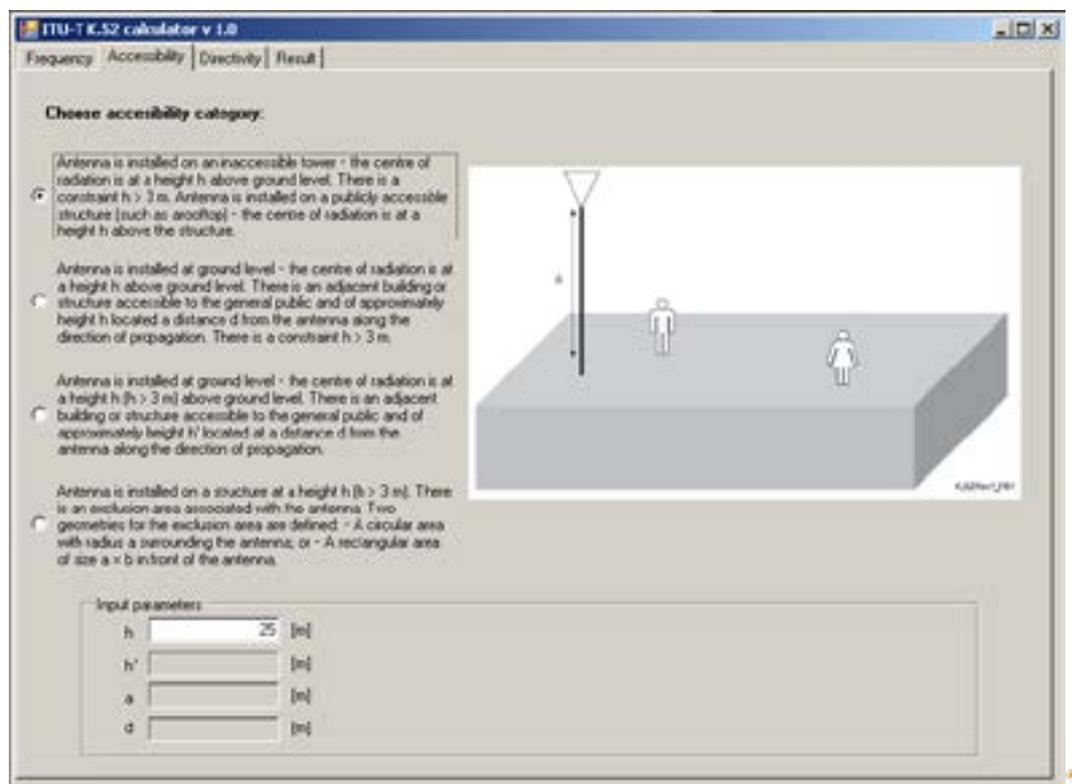


EMF Estimator – Exposure plot as a chart

K52-Calculator: Updates to Recommendation ITU-T K.52 “Guidance on complying with limits for human exposure to electromagnetic fields”

ITU-T K.52 provides guidance to compliance with safety limits for human exposure to electromagnetic fields (EMFs) as it relates to telecommunications installations, mobile handsets and other consumer devices emitting electro-magnetic radiation.

A new Appendix to ITU-T K.52 details the K52-calculator software that supports the application of the calculations presented in Appendix III, “Example of Equivalent Isotropically Radiated Power (EIRP) calculation”.



Key EMF Recommendations

Recommendation ITU-T K. 52 “Guidance on complying with limits for human exposure to electromagnetic fields”

This Recommendation aims to help with compliance of telecommunication installations and mobile handsets or other radiating devices used against one’s head with safety limits for human exposure to electro-magnetic fields (EMFs). It presents general guidance, a calculation method, and an installation assessment procedure.

Recommendation ITU-T K.61 “Guidance on measurement and numerical prediction of electromagnetic fields for compliance with human exposure limits for telecommunication installations”

This Recommendation helps telecommunication operators to verify compliance with exposure standards promulgated by local or national authorities. It gives guidance on measurement methods that can be used to achieve a compliance assessment. It also provides guidance on the selection of numerical methods suitable for exposure prediction in various situations.

Recommendation ITU-T K.62 “System level radiated emissions compliance using mathematical modelling”

This Recommendation supports telecommunication operators in demonstrating the compliance of the radiated emissions generated by telecommunication systems. The system as a whole will generally be expected to comply with a radiated emissions limit. This may be the same or different to the limit applicable to the individual constituent equipment. For each common emission frequency, the presence of many individual sources within the system means that the system emission level may be higher than that of the individual equipment. This Recommendation presents a method that allows the radiated emissions to be assessed without performing practical measurement. The method presented is particularly suited to the analysis of systems that are physically very large, for which practical testing is both prohibitively expensive and practically difficult to perform.

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

Defines techniques which may be used by telecommunication operators to evaluate the cumulative (total) exposure ratio in the vicinity of transmitting antennas and to identify the main source of radiation. It offers guidance on mitigation methods which allow reduction of radiation level in order to comply with exposure limits. It also provides guidance on procedures necessary in the environment (on site) in which there is a simultaneous exposure to multiple frequencies from many different sources. Radiating sources may belong to many operators and may represent different radiocommunication services (e.g., cellular systems, trunking systems, broadcasting, radio relays, wireless access, etc.).

Recommendation ITU-T K.83 “Monitoring of electromagnetic field levels”

Guidance on making long-term measurements in the monitoring of electromagnetic fields (EMF), with the end-purpose of providing the general public with accessible data on EMF levels.

Recommendation ITU-T K.90 “Evaluation techniques and working procedures for compliance with exposure limits of network operator personnel to power-frequency electromagnetic fields”

Evaluation techniques and guidelines for compliance with safety limits for human exposure to electromagnetic fields (EMFs) of telecommunication network personnel (e.g., outside plant craft) at power frequencies (DC, 50 Hz and 60 Hz). This Recommendation does not set safety limits; it seeks to provide techniques and procedures for determining the need for any precautions at the work site. This Recommendation includes an electronic attachment containing the EMFACDC program.

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

Guidance on how to assess and monitor human exposure to radio frequency electromagnetic fields (EMF) in the areas with surrounding radiocommunication installations, based on existing exposure and compliance standards in the frequency range of 9 kHz to 300 GHz. This Recommendation is oriented to the examination of the area accessible to people in the real environment of currently operated services with many different sources of RF EMF, but also gives references to standards on EMF compliance of products.

ITU Telecommunication Standardization Sector (ITU-T)

ITU-T Home: itu.int/ITU-T

ITU-T, Environment and Climate Change:

<http://www.itu.int/en/ITU-T/emf/Pages/default.aspx>

ITU-T Study Group 5

Lead study group on electromagnetic compatibility and electromagnetic effects

Lead study group on ICTs and climate change

SG5 Home: itu.int/en/ITU-T/studygroups/2013-2016/05/Pages/default.aspx