



International Telecommunication Union

**SG 5 Regional Group for Latin America
and Caribbean (RG - LAC)**



SG 5 Activities and Recommendations Regarding EMF Exposure

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SG 5 Activities and Recommendations Regarding EMF Exposure

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Introduction

- The proliferation of radiocommunication stations in the urban environments has raised a worldwide public concern regarding human exposure to electromagnetic fields (EMF) and possible health effects.
- Basically, EMF exposure can be handled in two approaches:
 - Health effects related to EMF
 - EMF environmental characterization
- WHO and ICNIRP handle the first approach.
- ITU, IEC, IEEE and others handle the second approach.



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Approach of Study Group 5 Regarding EMF Exposure

- ITU-T approach is to develop assessment standards, that describe how compliance with exposure may be ensured. SG 5 provides guidance on how to evaluate, that is, measure or calculate, the EMF exposure due to radiocommunication installations and mobile equipment.
- ITU-T SG 5 has been studying this issue since 1996.
- Question 3: Human exposure to electromagnetic fields (EMFs) due to radio systems and mobile equipment
- SG 5 will not develop new limits.



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WTSA Resolution 72 and new Resolution PP 10

- Resolution 72 (Johannesburg, 2008):
 - Measurement concerns related to human exposure to electromagnetic fields

- Resolution WGPL/3 (Guadalajara, 2010):
 - Human exposure to and measurement of electromagnetic fields

- Workshops/Seminars
 - Disseminate information related to EMF through organizing workshops and seminars for regulators, operators and any interested stakeholders from developing countries, in accordance with Resolution 72 and New Resolution PP10.



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The RG-LAC

- Study Group 5 created the SG5 Regional Group for Latin America and the Caribbean at its Buenos Aires meeting in April 2010. The objectives of this Regional Group include:
 - To disseminate the studies on electromagnetic environment and ICT & climate change, especially on human exposure to EMF.
 - To encourage the participation of its countries in the Study Group 5 events.
 - Establish a link to attend Latin America and Caribbean countries needs regarding the issues covered by SG 5 mandate.



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Recommendations in Force

- Recommendation K.52 (2004)
 - Guidance on complying with limits for human exposure to electromagnetic fields

- Recommendation K.61 (2008)
 - Guidance on measurement and numerical prediction of electromagnetic fields for compliance with human exposure limits for telecommunication installations

- Recommendation K.70 (2007)
 - Mitigation techniques to limit human exposure to EMFs in the vicinity of radiocommunication stations



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Recommendation K.52

- This Recommendation deals with designing and operating telecommunication installations with safety limits for human exposure to electromagnetic fields (EMFs). The assessment procedure is, based on safety limits provided by ICNIRP. It helps users determine the likelihood of installation compliance based on accessibility criteria, antenna properties and emitter power.

- It gives information about:
 - EMF exposure assessment and exposure zones;
 - installation classification and installation assessment procedure;
 - EMF evaluation techniques (calculation methods);
 - mitigation techniques.



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Recommendation K.52

- ITU-T Rec.K.52 provides a procedure for achieving a compliance with EMF safety limits. The steps needed to achieve compliance are:
 - 1) Identify appropriate compliance limits.
 - 2) Determine if EMF exposure assessment for the installation of equipment in question is needed.
 - 3) If the EMF exposure assessment is needed, it may be performed by calculations or measurement.
 - 4) If the EMF exposure assessment indicates that pertinent exposure limits may be exceeded in areas where people may be present, mitigation/avoidance measures should be applied.



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K.52 Exposure Classification

- Compliance zone
 - Potential exposure to EMF is below the applicable limits.

- Occupational zone
 - Potential exposure to EMF is below the limits for occupational exposure but exceeds the limits for general public exposure.

- Exceedance zone
 - Potential exposure to EMF exceeds the limits for both occupational and general public exposure.

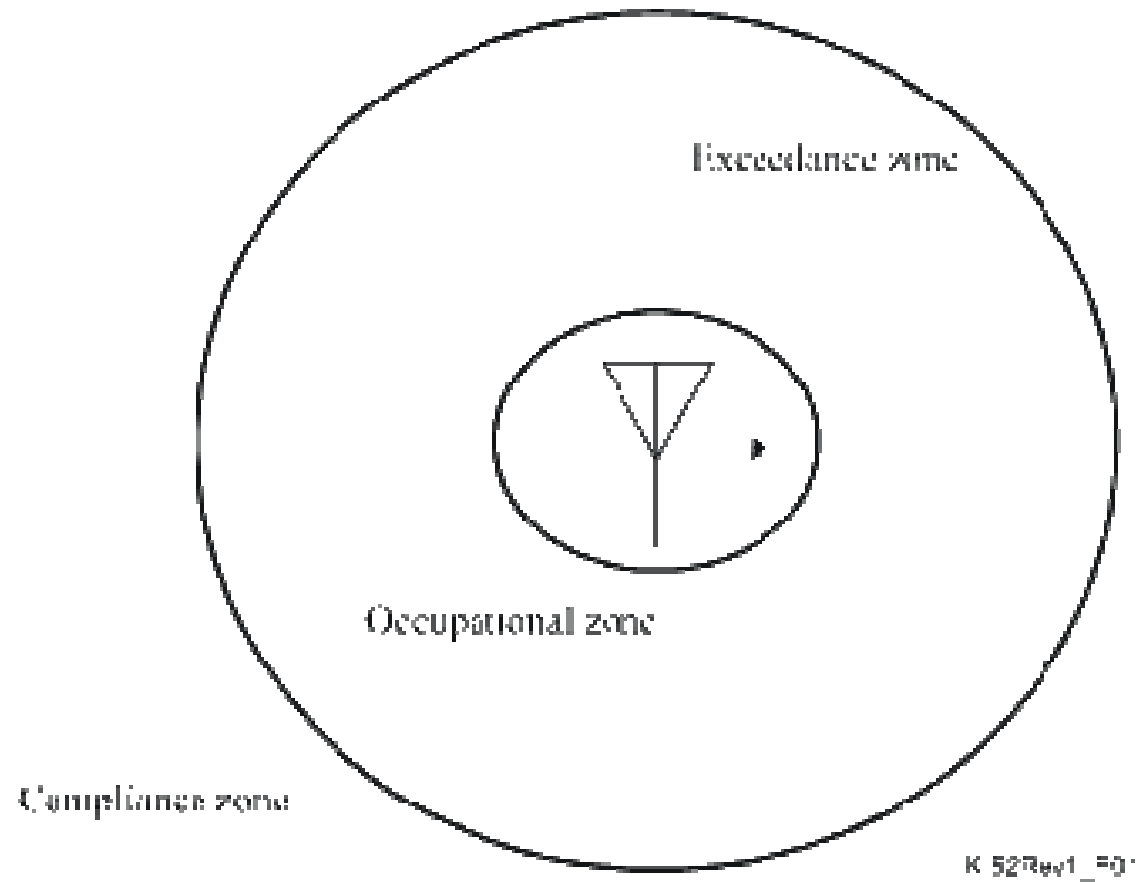


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K.52 Exposure Classification





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K.52 Exposure Classification



Compliance
Boundary



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K.52 Installation Class Scheme

- Each emitter installation should be classified into the following three classes:
 1. Inherently Compliant
 - Inherently safe sources produce fields that comply with relevant exposure limits a few centimetres away from the source. Particular precautions are not necessary.
 2. Normally Compliant
 - Sources that produce EMF that can exceed relevant exposure limits. However, the exceedance zone of these sources is not accessible to people under ordinary conditions.
 3. Provisionally Compliant
 - These installations require special measures to achieve compliance. This involves determination of the exposure zones and measures.



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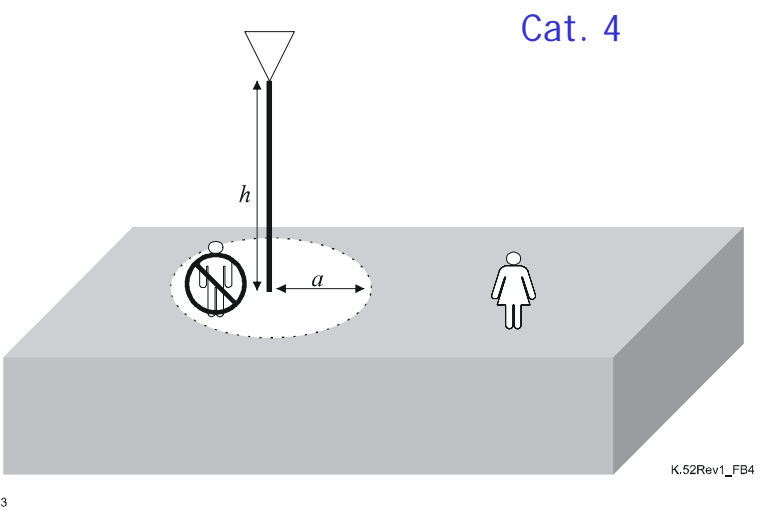
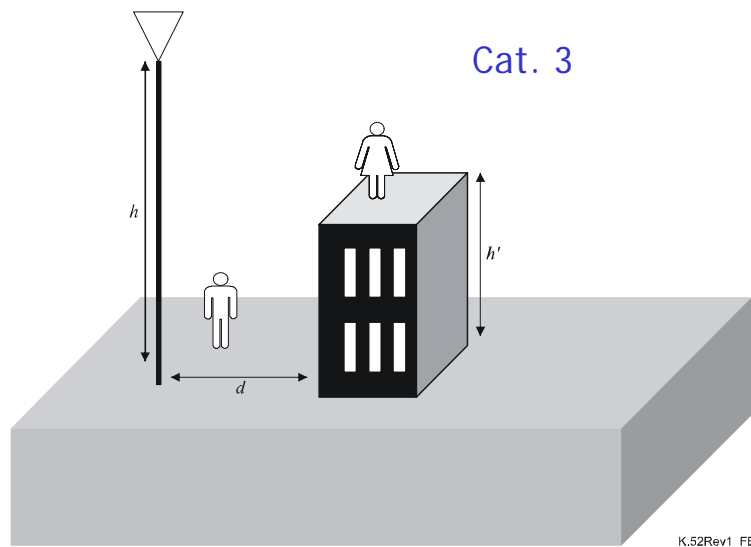
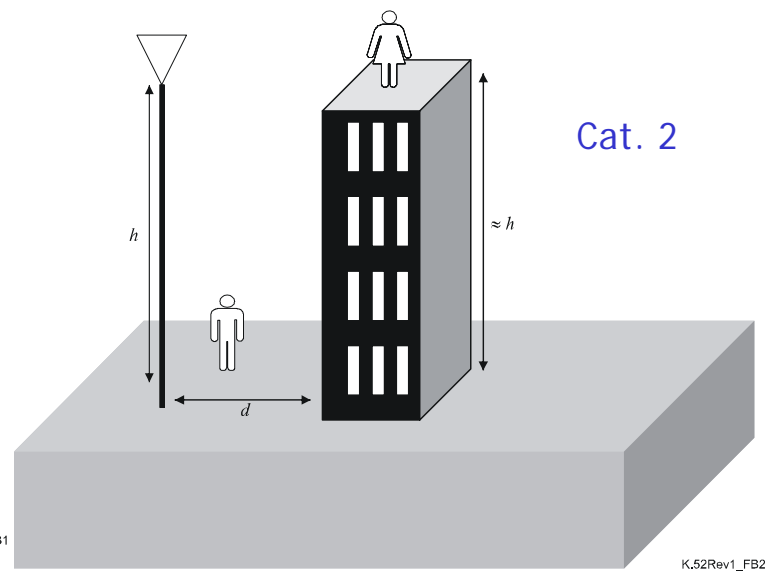
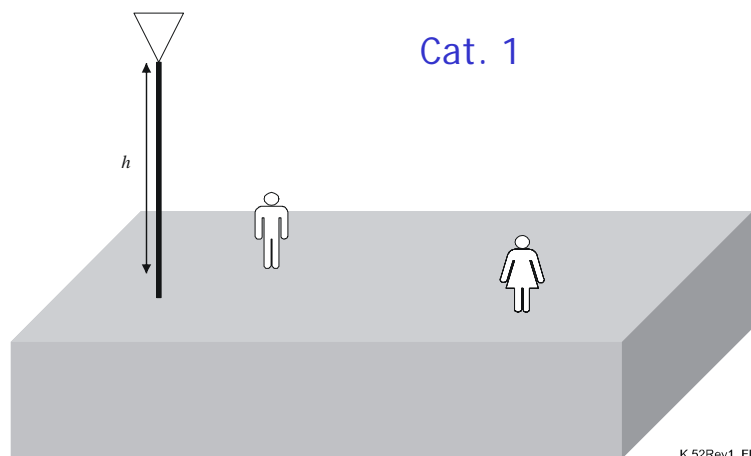
K.52 Accessibility categories

Accessibility category	Relevant installation circumstances
1	<p>Antenna is installed on an inaccessible tower - the centre of radiation is at a height h above ground level. There is a constraint $h > 3$ m.</p> <p>Antenna is installed on a publicly accessible structure (such as a rooftop) - the centre of radiation is at a height h above the structure.</p>
2	<p>Antenna is installed at ground level - the centre of radiation is at a height h above ground level. There is an adjacent building or structure accessible to the general public and of approximately height h located a distance d from the antenna along the direction of propagation. There is a constraint $h > 3$ m.</p>
3	<p>Antenna is installed at ground level - the centre of radiation is at a height h ($h > 3$ m) above ground level. There is an adjacent building or structure accessible to the general public and of approximately height h' located at a distance d from the antenna along the direction of propagation.</p>
4	<p>Antenna is installed on a structure at a height h ($h > 3$ m). There is an exclusion area associated with the antenna. Two geometries for the exclusion area are defined:</p> <ul style="list-style-type: none">- A circular area with radius a surrounding the antenna; or- A rectangular area of size $a \times b$ in front of the antenna.



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K.52 Accessibility categories



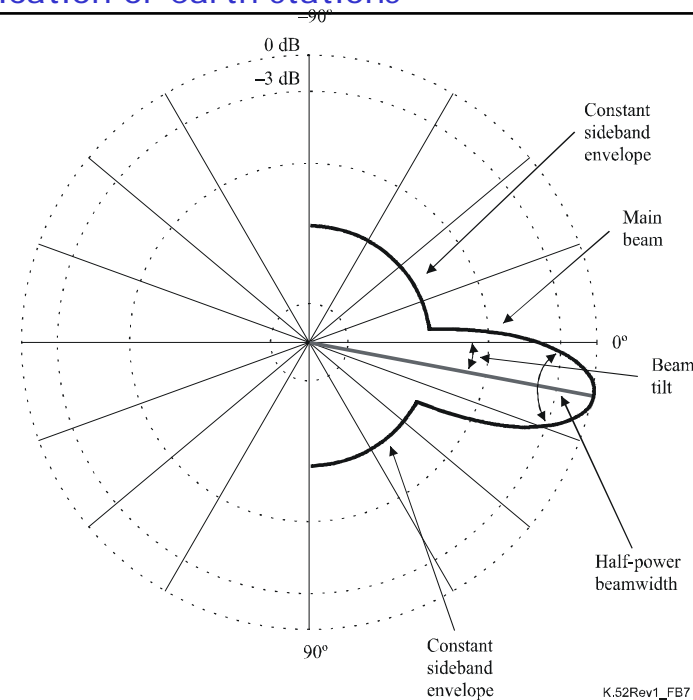
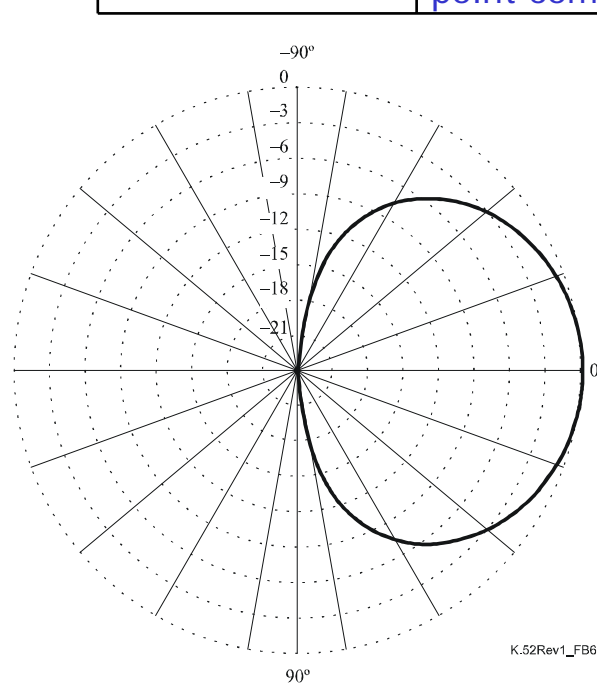


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K.52 Antenna directivity categories

Directivity category	Antenna description
1	Half-wave dipole
2	Broad coverage antenna (omnidirectional or sectional), such as those used for wireless communication or broadcasting
3	High-gain antenna producing a "pencil" (circularly symmetrical beam), such as those used for point-to-point communication or earth stations





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Evaluation Based on K.52

- K.52 provides simple analytical method using far-field expressions.
- K.52 provides general information regarding mitigation techniques.
- K.52 provides a large table with conditions for normal compliance of installations based on ICNIRP limits for frequency range 100 - 3,000 MHz.



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Recommendation K.61

- This Recommendation provides guidance on measurements and calculations of the EMF (step 3 of K.52). It also provides guidance on the selection of numerical methods suitable for exposure prediction in various situations.

- It gives information about:
 - Typical situations;
 - Technical considerations, like averaging (time and spatial), field regions, shadowing and scattering, variability of the source;
 - Measurement instrumentation;
 - Evaluation of measurement uncertainties;
 - Probe selection;
 - Safety precautions.



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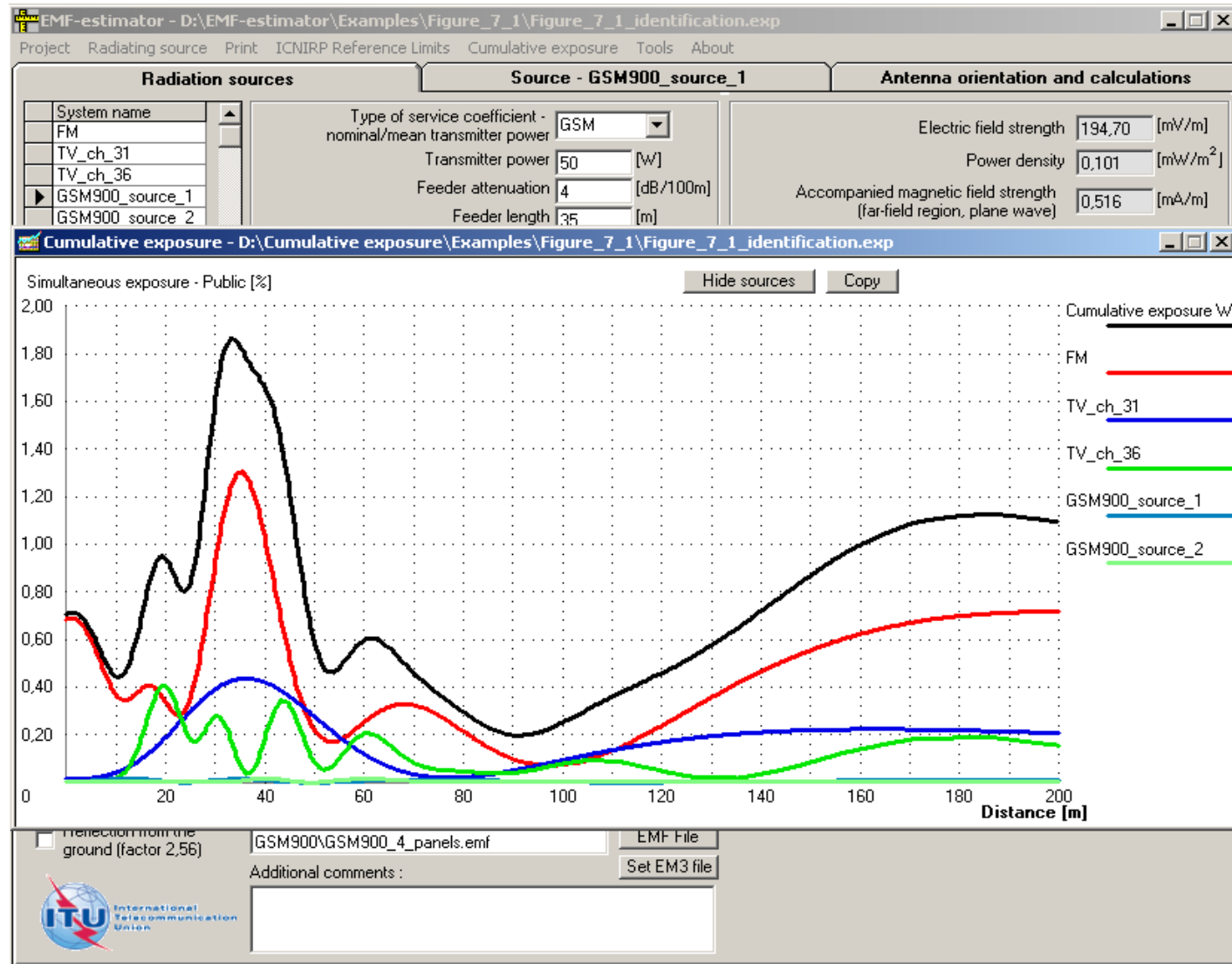
Recommendation K.70

- This Recommendation defines techniques which may be used to evaluate cumulative (total) exposure ratio in vicinity of transmitting antennas, to identify main source of radiation and it gives guidance on mitigation methods which allow reducing radiation level in order to comply with the exposure limits. Radiating sources may belong to many operators and may represent different radiocommunication services (e.g. cellular systems, trunking systems, broadcasting, radio relays).
- Presents the software EMF-Estimator with the libraries of examples of transmitting antennas.
- It gives examples of mitigations techniques considering:
 - Decrease in the transmitter power;
 - Increase in the antenna height;
 - Decrease in the VRP downtilt;
 - Increase in the antenna gain;
 - Changes in the VRP;
 - Changes in the HRP.



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Recommendation K.70





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Recommendations Under Approval Process

- Recommendation K-83 (K.Monitor) (2010)
 - Monitoring of the EMF levels

- This Recommendation gives the guidance how to make long-term measurement for monitoring of electromagnetic fields (EMF) in the selected areas that are under public concern in order to show that EMF are under control and under the limits. The purpose of this Recommendation is to provide for the general public the clear and easily available data concerning electromagnetic field levels in the form of results of continuous measurement.

- Broadband monitoring or frequency selective monitoring.



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Recommendations Being Developed

- Recommendation K.Guide
 - Guidance for management and evaluation of the human exposure to RF electromagnetic fields

- This Recommendation will give guidance containing as simple as possible and cost effective procedure for human exposure assessment by measurements and or calculation. This Recommendation will be based on existing standards, but will give clear guidance how to proceed depending on the complexity of the case that is considered. The majority of real cases are relatively simple and human exposure assessment may be done using simple methods and tools. The work on Recommendation K.guide started in February 2008 and is planned to be completed in 2011.



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Next Meetings

- Next Meetings of SG 5: 27 April-05 May 2011 and 13-21 September 2011 (Geneva).

Important Links

- <http://www.itu.int/ITU-T/studygroups/com05/index.asp>
- <http://www.itu.int/rec/T-REC-K/e>



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Thank you!
Muchas Gracias!
Obrigado!