

QUESTION ITU-R 207-4/3

Propagation data and prediction methods for satellite mobile and radiodetermination services above about 0.1 GHz

(1990-1993-1995-1997-2000-2009)

The ITU Radiocommunication Assembly,

considering

- a) that there is a requirement for methods to estimate the field strength or the transmission loss when planning mobile and radiodetermination services using satellites;
- b) that a number of administrations are studying satellite systems for aeronautical and maritime safety, radiodetermination, communication and control;
- c) that there is considerable interest in providing communication services to handheld and vehicular terminals with mobile-satellite systems;
- d) that for VHF, UHF and SHF systems involving satellites, both the ionosphere and troposphere may affect propagation, as well as reflections from the ground, sea and/or man-made structures;
- e) that for land mobile-satellite systems, blockage and shadowing will affect propagation;
- f) that there is a requirement for propagation data and modelling for all path elevation and azimuth angles, especially for systems employing constellations of non-geostationary satellites;
- g) that knowledge of fade-duration and non-fade-duration distributions is of particular importance to satellite mobile and radiodetermination systems;
- h) that a number of mobile-satellite systems sharing the same frequency band will be introduced;
- j) that frequency-selective fading and delay spread are important aspects of the propagation channel which must be taken into account in the design of digital wideband mobile radiocommunication and navigation systems,

decides that the following Questions should be studied

- 1** To what extent does the field strength or transmission loss depend on the nature of terrain, the effects of vegetation and man-made structures, antenna location, frequency, polarization, angle of elevation and climate; and how do these factors affect the selection of frequencies and wave polarization for such systems?
- 2** What are the effects of the local environment for handheld and vehicular terminals and personal communication systems?

- 3 What are the effects due to multipath propagation and Doppler spread changes, and how do these depend on the parameters listed in § 1?
- 4 What is the most suitable form of prediction method, for each radio service, for use in the preparation of national and international frequency plans?
- 5 What are the characteristics and effects of land- or sea-reflection and multipath fading on radiocommunication or radiodetermination signals transmitted by satellites, both geostationary and otherwise, for the use of land vehicles, aircraft and ships?
- 6 What propagation data may be collected for modelling, statistical characterization and mitigation of tropospheric and multipath-induced impairments, especially for low elevation angle slant paths, as a function of sea or land surface state (wave height or terrain irregularity), satellite elevation angle, antenna radiation pattern, local site clearance and environment, including terrain and vegetation blockage and shadowing and frequency?
- 7 What is the method for estimating signal-to-interference ratio where both wanted and unwanted signals are affected by multipath fading?
- 8 What are the advantages of physical-statistical propagation models for the characterization of the radio channel in multiple environments for land mobile satellite systems?
- 9 What are the methods to model the propagation channel and evaluate performance improvement due to diversity (satellite, polarization, antenna) and multiple-input-multiple-output (MIMO) techniques for mitigation of propagation impairment models in satellite mobile radiocommunications?

further decides

- 1 that the available information should be prepared as a new Recommendation;
- 2 that the above studies should be completed by 2013.

NOTE 1 – Priority will be given to studies relating to § 1 and 2.

Category: S2