

QUESTION ITU-R 206-3/3

Propagation data and prediction methods for fixed- and broadcasting-satellite services

(1990-1993-1995-1997-2000)

The ITU Radiocommunication Assembly,

considering

- a) that, in the design of fixed- and broadcasting-satellite services, an accurate knowledge of the distributions in time and space of radiowave propagation phenomena in the lower atmosphere, and of their dependence on various factors, is important to the determination of system performance and of interference to and from space stations;
- b) that radiowave propagation data for the fixed- and broadcasting-satellite services are restricted to certain areas and link parameters (e.g. frequency, polarization, elevation angle) and that further data are needed,

decides that the following Question should be studied

- 1 What is the long-term statistical distribution in time and space, including consideration of diurnal aspects and the worst month, of:
 - co-polar attenuation (CPA), tropospheric scintillation, and cross-polar discrimination (XPD) induced by constituents in the lower atmosphere;
 - refraction, beam divergence, and incoherence of radiowaves passing through the lower atmosphere?
- 2 What is the dependence of these distributions on the antenna size, frequency, polarization, angle of elevation, geographic latitude, rain climate, and atmospheric composition, as well as the effects of terrain, vegetation, and man-made structures, on these distributions?
- 3 What method should be used for the prediction of these distributions, and their dependence on the above parameters, in particular low elevation angle effects?
- 4 What precipitation parameters, in addition to rainfall intensity, can be applied to precipitation-related prediction methods to take account of different climates?
- 5 What are the statistical characteristics of building and vehicle signal entry loss, and how does the loss depend on frequency, path elevation angle, and the location within the structure or vehicle?
- 6 What refractivity parameters, in addition to, or instead of, refractivity gradient statistics in the first 100 m of the atmosphere, can be applied to clear-air prediction methods to take account of different climates?
- 7 What methods should be used to take account of both the simultaneous and the long-term cumulative effects of radiowave propagation mechanisms occurring at the same time along the same path (e.g. tropospheric scintillation and rain attenuations)?
- 8 What is:
 - the frequency of occurrence and duration of fades exceeding specified values and the rate of change of received signals in these fades;

- the proportion of fades occurring during the available time as defined in Recommendation ITU-R F.557?

9 What information is required on the dynamics of the propagation medium to enable impairment countermeasure techniques (e.g. up-link power control, site diversity, depolarization, pre-compensation and resource sharing) to be designed?

10 How is link performance affected in the case of a varying elevation angle?

NOTE 1 – Priority is to be given to studies relating to § 3, 4 and 5.
