

QUESTION ITU-R 229-1/3

Prediction of sky-wave propagation conditions, signal intensity, circuit performance and reliability at frequencies between about 1.6 and 30 MHz, in particular for systems using digital modulation techniques

(2002-2009)

The ITU Radiocommunication Assembly,

considering

- a) that accurate, quantitative predictions of ionospheric propagation are important for planning optimum spectrum utilization;
- b) that the methods for prediction of basic and operational MUFs and ray paths (see Recommendation ITU-R P.1240) are required for predicting HF sky-wave propagation characteristics and merit further improvement;
- c) that a method for predicting HF sky-wave propagation characteristics is given in Recommendation ITU-R P.533, and that this now includes procedures for digital systems in the Equatorial region;
- d) that Recommendation ITU-R P.842 provides a method for the computation of reliability and compatibility of HF radio systems;
- e) that radio system performance is influenced by variations of the amplitude and dispersion of the wanted signals, and of the background noise and interference, and this influence varies with the type of emission, particularly between analogue and digital;
- f) that the available prediction methods are intended primarily for use for narrow-band or analogue systems;
- g) that many HF systems use digital modulation techniques, including those which utilize fast signalling speeds or which require phase or frequency stability;
- h) that a method needs to be developed for other parts of the world, particularly at high latitudes, to estimate the performance of digital broadcasting,

decides that the following Questions should be studied

- 1** What improvement may be made to the methods given in Recommendation ITU-R P.1240 for the long-term prediction of basic and operational MUFs and ray paths, and their variability, from predicted ionospheric characteristics?

- 2 What improvements may be made to the method for the long-term estimation of sky-wave propagation conditions, signal intensity, circuit performance and reliability using predicted ionospheric characteristics?
- 3 What are the characteristics of time delay spread, frequency spread (multipath and Doppler shifts) and frequency correlation of HF sky-wave signals, including fading characteristics?
- 4 What values of a time-delay and frequency power profiles are characteristic of the ionosphere at different locations and times, and how may the prediction of these characteristics be included within a comprehensive method?

further decides

- 1 that the available information should be prepared as new Recommendations, or as revisions to existing Recommendations;
- 2 that the methods described in the Recommendations should be available as a software package for use within the Radiocommunication Bureau and by those concerned with the planning and operation of HF systems and networks;
- 3 that the above studies should be completed by 2011.

Category: S1

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