

RECOMMENDATION ITU-R M.1227-2

**Technical and operational characteristics of wind profiler radars
in bands in the vicinity of 1 000 MHz**

(1997-2000-2001)

The ITU Radiocommunication Assembly,

considering

- a) Recommendation 621 of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992) (WARC-1992);
- b) that wind profiler radars (WPRs) are important meteorological systems used to measure wind direction and speed as a function of altitude;
- c) that many administrations plan to deploy WPRs in operational networks in order to improve meteorological predictions and warnings, and support studies of the climate and increase the safety of navigation;
- d) the need for frequency bands in the vicinity of 50 MHz, 400 MHz and 1 000 MHz to permit the full performance capability of WPR operations, as requested by the World Meteorological Organization (WMO);
- e) that wind profilers operating near 1 000 MHz may be installed at fixed locations or may be transportable, to support a variety of requirements including environmental emergencies, pollution monitoring, etc.;
- f) that Resolution 217 (WRC-97) identified the frequency bands 904-928 MHz (Region 2), 1 270-1 295 MHz and 1 300-1 375 MHz for WPRs having due regard to the potential for incompatibility with other services;
- g) that selection of a proper frequency band for a WPR depends upon height coverage user needs, local climate and interference conditions, but performance of WPRs decreases as frequency increases;
- h) that, once designed and built, the WPRs could operate on centre frequencies over a range of $\pm 1\%$;
- j) that WPRs may have to share spectrum with other systems both current and future;
- k) that it would be desirable to have a limited number of frequencies authorized worldwide, in order to minimize research and development investment in the design of components;
- l) that technical standards would enhance compatibility with other systems within the same band,

recommends

- 1** that minimum requirements on system performance, as in Annex 1, should be adopted by administrations desiring to construct or operate WPRs in the bands near 1 000 MHz;

2 that the transmitter power should be limited to that necessary to obtain data at the maximum altitude for which the profiler was designed;

3 that the occupied bandwidth (see Note 1) should be as close to the necessary bandwidth (see Note 2) as is technically and economically feasible to provide the required range resolution, noting that reduced values of resolution are generally acceptable at higher altitudes. Values are given in Annex 1.

NOTE 1 – Occupied bandwidth: the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the total mean power of the given emission.

NOTE 2 – Necessary bandwidth: for a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specific conditions;

4 that the unwanted emissions from WPRs should be reduced as much as technically and economically feasible. Values are given in Annex 1;

5 that the antenna radiation pattern should minimize the levels of the side lobes, especially those at or near the horizon. Representative values which have been achieved in one case of side-lobe gain and field strength are given in Annex 1;

6 that administrations may develop appropriate sharing criteria, such as frequency-distance (FD) separations in accordance with Recommendation ITU-R SM.337, for specific WPR designs sharing with other systems;

7 that the selection of WPR locations should take advantage of terrain and siting configuration to minimize the possibility of interaction with other systems; additional enhancements (e.g. fences, barns) and antenna orientation may improve compatibility;

8 that the frequency bands 904-928 MHz (Region 2), 1 270-1 295 MHz and 1 300-1 375 MHz should be chosen when compatibility is possible taking due account of the frequency dependence of performance over this frequency range.

ANNEX 1

Representative values and minimum requirements on system performance for WPRs in bands near 1 000 MHz

1 Introduction

The values given below are based on current knowledge and field measurements on pulse modulated systems.