RECOMMENDATION ITU-R BS.702-1*

Synchronization and multiple frequency use per programme in HF broadcasting

(1990-1992)

The ITU Radiocommunication Assembly,

considering

a) that the overloading of the HF bands is well known;

b) that No. 12.29 of the Radio Regulations, states: "... their number (of frequencies) should be the minimum necessary to provide satisfactory reception of the particular programme in each of the areas for which it is intended ...";

c) that the WARC HFBC-87 recognized that the synchronization of transmitters is an accepted technique for improving the efficient use of the spectrum,

recommends

1 that, wherever possible, only one frequency should be used to radiate a particular programme to a given reception area;

2 that over certain paths, e.g. very long paths, those passing through the auroral zone, or paths over which the propagation conditions are changing rapidly, it may be found necessary to use more than one frequency per programme;

3 that in certain special circumstances, namely:

– where the depth of the required service area extending outwards from the transmitter is too great for it to be served by a single frequency;

– when highly directional antennas are used to maintain satisfactory signal-to-noise ratios, thereby limiting the geographical area covered by such antennas;

– where the required service area subtends an azimuth angle greater than can be served by a single directional antenna,

more than one frequency per programme or synchronization could be used as appropriate;

4 that synchronized transmitters:

– at the same site, driven by a common oscillator and modulated by the same programme in the correct phase;

– at separate sites, driven by separate oscillators, the frequencies of which are precisely controlled (a carrier frequency difference of 0.1 Hz or less) and modulated by the same programme,

should be considered as not introducing any appreciable deterioration in reception.

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* Radiocommunication Study Group 6 made editorial amendments to this Recommendation in 2002 in accordance with Resolution ITU-R 44.

This conclusion is valid:

– for non-overlapping coverage areas;

– for overlapping coverage areas, provided that due consideration is given to:

  – the shape and size of the reception area;

  – the availability of suitable transmitting antennas;

  – the propagation conditions over the respective transmission paths.

The use of synchronized transmitters with overlapping coverage areas can lead to an improvement in the efficiency of spectrum utilization.