

## RECOMMENDATION 831

## FREQUENCY SHARING BETWEEN SERVICES IN THE BAND 4-30 MHz

(Question 56/8)

(1992)

The CCIR,

*considering*

- a) that several frequency bands between 4 and 30 MHz are allocated on a shared basis to various radio services including the mobile services;
- b) that more efficient use of the radio-frequency spectrum can be realized through inter-service sharing;
- c) that use of the radio-frequency spectrum must take into account the dimensions of frequency, time, and space;
- d) that dynamic real-time spectrum management techniques can facilitate inter-service sharing;
- e) that the fixed and mobile services are currently using many of the same frequency bands between 4 and 30 MHz;
- f) that sharing between the broadcasting, fixed and mobile services is limited by No. 503 of the Radio Regulations (RR) to the Tropical Zone in four frequency bands below 5 060 kHz;
- g) that sharing between the fixed and broadcasting services is limited by RR No. 530 to three bands wherein the fixed service is limited to not more than 24 dBW power and communicates within the boundary of the country it is located in and on the condition that harmful interference is not caused to the broadcasting service;
- h) that in order to prevent harmful interference to long distance radiocommunications in the bands between 5 MHz and 30 MHz, RR No. 955 encourages administrations to use any other possible means of communications;
- j) that the requirements of the fixed, mobile, and broadcasting services are inherently different and have diverse technical and operational characteristics,

*recommends*

that the fixed, mobile, and broadcasting services take the following into account when using the same frequency bands:

## **1. Technical and operational characteristics**

### **1.1 Power output**

**1.1.1** Stations in the broadcasting service operate with very high transmitter output power levels.

**1.1.2** Stations in the fixed service generally operate with high transmitter output power levels.

**1.1.3** Stations in the mobile service, particularly those located on mobile platforms, normally operate at low transmitter output power levels as compared to the broadcasting and fixed services.

## **1.2 Emission characteristics**

**1.2.1** The broadcasting service generally operates only with voice transmissions in the double sideband (DSB) mode but is in the process of activating voice transmissions using single sideband (SSB).

**1.2.2** Emissions and modulation schemes may be more complex (voice and data) in the fixed service.

**1.2.3** Mobile service emissions are normally simpler in nature than those of the fixed service.

## **1.3 Bandwidth**

**1.3.1** As a result of using DSB, broadcasting service bandwidths are of the order of 10 kHz and therefore wider than those of other services. Bandwidth can be reduced by using SSB.

**1.3.2** As a result of more complex modulation schemes, fixed-service bandwidths may be wider than those of the broadcasting service that use SSB and are normally wider than the mobile service.

**1.3.3** Bandwidths used by the mobile services are, in general, narrower than those used by the fixed and broadcasting services.

## **1.4 Antenna characteristics**

**1.4.1** Directional antennas are normally used in the broadcasting and fixed services.

**1.4.2** The use of omni-directional antennas is more prevalent in the mobile services.

## **1.5 Link configuration**

**1.5.1** The location of transmitting stations in the broadcasting service is fixed, however receivers are spread out in defined target areas.

**1.5.2** The location of circuit link terminals in the fixed service is correspondingly fixed in defined locations.

**1.5.3** Mobile service operation, by its nature, requires the capability to communicate with or between stations at both known and unknown locations.

## **1.6 Path length variability**

**1.6.1** The path length of the broadcasting service is determined by the target area and is coordinated within the broadcasting service.

**1.6.2** As implied in § 1.5.2, the path lengths in the fixed service are constant.

**1.6.3** In most cases, for the mobile service, path lengths vary from time-to-time and location-to-location.

## **1.7 Circuit usage**

**1.7.1** For the broadcasting service, usage is coordinated and is dependent on the time the broadcast programme is desired to be received in the target area.

**1.7.2** Full-time circuit operation is normal for the fixed service.

**1.7.3** For mobile service requirements, usage is not pre-determined, but transient and short term.

## **1.8**      *Circuit predictability*

**1.8.1**      For the broadcasting and fixed services, changes in the E and F layers of the ionosphere are highly predictable over a period of time, i.e. certain frequencies are used at one time of the day, while other frequencies may be used at another.

**1.8.2**      The ionospheric circuit behaviour in the mobile service that communicates with or between mobile platforms is more difficult to determine than for stations in the fixed service. This is attributable, in part, to the varying path lengths, which are normally not constant with respect to any certain period or time of the day.

## **2.**          **Sharing**

Satisfactory sharing between the fixed and mobile services may be achieved by the diversity of their characteristics (see § 1). For example, a channel used by a fixed station at a certain time of day may not be usable by that service at another. In this case the channel could in certain circumstances be available for mobile service use. Frequency sharing of this nature is based on the concept of maximum flexibility for the mobile station to choose or change to available frequencies which will be interference free.

Because broadcasting service transmissions are coordinated within the broadcasting service and a broadcasting schedule is published, limited sharing of the bands allocated to the broadcasting service by the fixed and mobile services may be possible taking into account ionospheric propagation conditions. One method of accomplishing this is through dynamic real-time management of frequencies to be used. Sharing can also be facilitated through the proper selection of power and antennas by the broadcasting service so that targeted service areas are adequately covered with minimum interference potential to other areas.

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