

## RECOMMENDATION ITU-R F.1243\*

**RADIO-FREQUENCY CHANNEL ARRANGEMENTS FOR DIGITAL  
RADIO SYSTEMS OPERATING IN THE RANGE 2 290-2 670 MHz**

(Question ITU-R 136/9)

(1997)

The ITU Radiocommunication Assembly,

*considering*

- a) that as a result of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992) (WARC-92) many administrations may wish to plan fixed services around the bands designated for new mobile and mobile-satellite services;
- b) that it is sometimes desirable to be able to interconnect low and medium capacity digital radio systems on international circuits using radio frequencies in the 2 GHz band;
- c) that many interfering effects can be substantially reduced by a carefully planned arrangement of the radio frequencies in radio systems employing several radio-frequency channels;
- d) that sharing between the fixed satellite (FS) and mobile service (MS) or mobile-satellite service (MSS) may be possible by using adequate geographical and/or frequency separation;
- e) that administrations may have different requirements for sharing spectrum with the FS, and they may not require all the spectrum allocated to MS or MSS;
- f) that the use of industrial, scientific and medical (ISM) devices in the band 2 400-2 500 MHz may cause harmful interference to systems in the FS,

*recommends*

**1** that where the introduction of MS and MSS limits the FS to the band 2 520-2 670 MHz, a radio-frequency channel arrangement with up to five go and return channels is used (carrier spacing of 14 MHz), which is derived as follows:

let  $f_0$  be the band centre frequency of 2 595 MHz,

$f_n$  be the centre frequency of a radio-frequency channel in the lower half of the band,

$f'_n$  be the centre frequency of a radio-frequency channel in the upper half of the band,

DS (Tx/Rx duplex spacing) = 74 MHz,

then the frequencies of individual channels with a carrier spacing of 14 MHz are expressed by the following relationships:

$$\text{lower half of band: } f_n = f_0 - 79 + 14 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 - 5 + 14 n \quad \text{MHz}$$

where  $n = 1, 2, 3, 4$  or  $5$ .

The frequencies of individual channels of channel arrangements with carrier spacings of 7, 3.5 and 1.75 MHz are expressed by the following relationships:

Carrier spacing of 7 MHz:

$$\text{lower half of band: } f_n = f_0 - 75.5 + 7 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 - 1.5 + 7 n \quad \text{MHz}$$

where  $n = 1, 2, 3, \dots 10$ .

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\* This Recommendation should be brought to the attention of Radiocommunication Study Groups 10 and 11 (WP 10-11S).

Carrier spacing of 3.5 MHz:

$$\text{lower half of band: } f_n = f_0 - 73.75 + 3.5 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 0.25 + 3.5 n \quad \text{MHz}$$

where  $n = 1, 2, 3, \dots 20$ .

Carrier spacing of 1.75 MHz:

$$\text{lower half of band: } f_n = f_0 - 72.875 + 1.75 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 1.125 + 1.75 n \quad \text{MHz}$$

where  $n = 1, 2, 3, \dots 40$ ;

**2** that where the introduction of MS and MSS limits the FS to the band 2 520-2 670 MHz, a radio-frequency channel arrangement, alternative to that reported in § 1 and using the same band centre frequency and duplex spacing, with carrier spacing of 2 MHz can be accommodated with up to 35 go and return channels, the frequencies of individual channels being expressed by the following relationships:

$$\text{lower half of band: } f_n = f_0 - 73 + 2 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 1 + 2 n \quad \text{MHz}$$

where  $n = 1, 2, 3, \dots 35$ .

For lower carrier spacings, the frequencies of individual channels are expressed by the following relationships:

Carrier spacing of 1 MHz:

$$\text{lower half of band: } f_n = f_0 - 72.5 + 1 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 1.5 + 1 n \quad \text{MHz}$$

where  $n = 1, 2, 3, \dots 70$ .

Carrier spacing of 0.5 MHz:

$$\text{lower half of band: } f_n = f_0 - 72.25 + 0.5 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 1.75 + 0.5 n \quad \text{MHz}$$

where  $n = 1, 2, 3, \dots 140$ .

Carrier spacing of 0.25 MHz:

$$\text{lower half of band: } f_n = f_0 - 72.125 + 0.25 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 1.875 + 0.25 n \quad \text{MHz}$$

where  $n = 1, 2, 3, \dots 280$ .

Channel arrangements with lower carrier spacings are possible by means of further channel subdivision;

**3** that where coexistence in the sub-band 2 590-2 670 MHz of different FS applications is difficult, the radio-frequency channel arrangement be based on utilizing the band 2 290-2 360 MHz paired with the band 2 520-2 590 MHz and a homogeneous pattern with a carrier spacing of 2.5 MHz defined by the following relations:

$$\text{lower half of band: } f_p = f_r - 306.25 + 2.5p$$

$$\text{upper half of band: } f'_p = f_r - 76.25 + 2.5p$$

where:

$$p = 1, 2, 3, \dots 28$$

$f_r$ : reference frequency of the homogeneous pattern

$f_r = 2\,595$  MHz.