

RECOMMENDATION ITU-R F.748-4

**Radio-frequency arrangements for systems of the fixed service
operating in the 25, 26 and 28 GHz bands**

(Questions ITU-R 108/9 and ITU-R 229/9)

(1992-1994-1995-1999-2001)

The ITU Radiocommunication Assembly,

considering

- a) that the bands 24.25-25.25 GHz, 25.25-27.5 GHz and 27.5-29.5 GHz are allocated to fixed and other services;
- b) that some administrations use digital systems for point-to-point (P-P) and/or point-to-multipoint (P-MP) applications;
- c) that the bands are used for differing applications by various administrations and that these applications require different frequency plans;
- d) that the bands may also be used for fixed wireless access (FWA) systems;
- e) that several types of service with various capacities may be in simultaneous use in these frequency bands;
- f) that the band allocated to each service or even to each administration may vary from one country to another;
- g) that the applications in these frequency bands may require differing channel bandwidths;
- h) that a high degree of compatibility between different systems and between radio-frequency (RF) channels of different arrangements can be achieved by selecting all channel centre frequencies from a homogeneous basic pattern;
- j) that allocation of frequency blocks to FWA systems allows flexible deployment of various technologies including provision for inter-system/services operation and overall spectrum efficiency,

recommends

- 1 that the preferred RF channel arrangement for the 24.25-25.25 GHz, 25.25-27.5 GHz and 27.5-29.5 GHz bands should be based on homogeneous patterns;
- 2 that the homogeneous pattern with a preferred 3.5 MHz interval be defined by the relation:

$$f_p = f_r + 3.5 p$$

where:

$$\begin{array}{ll}
 1 \leq p \leq 285 & \text{for the band 24.25-25.25 GHz} \\
 287 \leq p \leq 928 & \text{for the band 25.25-27.5 GHz} \\
 930 \leq p \leq 1\,500 & \text{for the band 27.5-29.5 GHz} \\
 f_r: & \text{reference frequency of the homogeneous pattern;}
 \end{array}$$

- 3 that the homogeneous pattern with a preferred 2.5 MHz interval be defined by the relation:

$$f_p = f_r + 2 + 2.5 p$$

where:

$$\begin{aligned} 1 \leq p \leq 399 & \quad \text{for the band 24.25-25.25 GHz} \\ 401 \leq p \leq 1299 & \quad \text{for the band 25.25-27.5 GHz} \\ 1301 \leq p \leq 2099 & \quad \text{for the band 27.5-29.5 GHz} \end{aligned}$$

f_r : reference frequency of the homogeneous pattern;

- 4 that the reference frequency of the homogeneous pattern for international connections should be:

$$f_r = 24\,248 \quad \text{MHz}$$

- 5 that all go channels should be in one half of any bidirectional band, and all return channels in the other;

- 6 that the channel spacings, XS , centre gap, YS , and the lower and upper band limits, Z_1S , Z_2S , should be agreed by the administrations concerned, dependent on the application and the channel capacity envisaged (see Recommendation ITU-R F.746 for definitions of XS , YS and ZS);

- 7 that allocated blocks should result from aggregation of contiguous channels in accordance with the homogeneous pattern.

NOTE 1 – Due regard has to be taken that, in certain countries, a 3.5 MHz homogeneous pattern, interleaved by 1.75 MHz from that referred in *recommends* 2, is used in conjunction with the main pattern.

NOTE 2 – Examples of channel arrangements based on this Recommendation are described in Annexes 1 and 2.

NOTE 3 – Examples of FWA system block (sub-band) arrangements are described in Annex 3.

ANNEX 1

Radio-frequency channel arrangements for some CEPT administrations in the band 24.5-26.5 GHz in accordance with *recommends* 2

An example of the RF channel arrangement based on this Recommendation for carrier spacings of 112 MHz, 56 MHz, 28 MHz, 14 MHz, 7 MHz and 3.5 MHz is derived as follows (see Fig. 1):

- Let f_0 be the reference frequency of 25 501 MHz = $f_r + (358 \times 3.5)$ MHz,
 f_n be the centre frequency of a RF channel in the lower half of the band,
 f'_n be the centre frequency of a RF channel in the upper half of the band.



then the centre frequencies of individual channels are expressed by the following relationships:

a) for systems with a carrier spacing of 112 MHz:

$$\text{lower half of band: } f_n = f_0 - 1\,008 + 112 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 112 n \quad \text{MHz}$$

where:

$$n = 1, 2, 3, \dots 8$$

b) for systems with a carrier spacing of 56 MHz:

$$\text{lower half of band: } f_n = f_0 - 980 + 56 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 28 + 56 n \quad \text{MHz}$$

where:

$$n = 1, 2, 3, \dots 16$$

c) for systems with a carrier spacing of 28 MHz:

$$\text{lower half of band: } f_n = f_0 - 966 + 28 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 42 + 28 n \quad \text{MHz}$$

where:

$$n = 1, 2, 3, \dots 32$$

d) for systems with a carrier spacing of 14 MHz:

$$\text{lower half of band: } f_n = f_0 - 959 + 14 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 49 + 14 n \quad \text{MHz}$$

where:

$$n = 1, 2, 3, \dots 64$$

(See Note 1)

e) for systems with a carrier spacing of 7 MHz:

$$\text{lower half of band: } f_n = f_0 - 955.5 + 7 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 52.5 + 7 n \quad \text{MHz}$$

where:

$$n = 1, 2, 3, \dots 128$$

f) for systems with a carrier spacing of 3.5 MHz:

$$\text{lower half of band: } f_n = f_0 - 953.75 + 3.5 n \quad \text{MHz}$$

$$\text{upper half of band: } f'_n = f_0 + 54.25 + 3.5 n \quad \text{MHz}$$

where:

$$n = 1, 2, 3, \dots 256.$$