



Recommendation ITU-R F.386-9
(02/2013)

**Radio-frequency channel arrangements for
fixed wireless systems operating in the
8 GHz (7 725 to 8 500 MHz) band**

F Series
Fixed service



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Foreword

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SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
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V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

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RECOMMENDATION ITU-R F.386-9

**Radio-frequency channel arrangements for fixed wireless systems
operating in the 8 GHz (7 725 to 8 500 MHz) band**

(Question ITU-R 247/5)

(1963-1966-1982-1986-1992-1997-1999-2007-2013)

Scope

This Recommendation provides radio-frequency channel arrangements for fixed wireless systems operating in the 8 GHz (7 725 to 8 500 MHz) band, which may be used for high, medium and low capacity systems. The preferred radio-frequency channel arrangements are based on multiples of basic slots either of 3.5 MHz or 2.5 MHz width. Examples in various segments of the 8 GHz band are presented in Annexes 1 to 5. Annex 6 presents an arrangement for high capacity digital systems used in some countries.

The ITU Radiocommunication Assembly,

considering

- a) that it may be desirable to be able to interconnect fixed wireless systems (FWSs) on international links at radio frequencies in the 8 GHz band;
- b) that the availability of frequency bands in the range from 7 725 MHz to 8 500 MHz differs in various countries;
- c) that, for some administrations, a frequency band, only 300 MHz wide or less, may be available in the 8 GHz range for such systems;
- d) that some channel arrangements have been developed in the past based on analogue system requirements only;
- e) that it is desirable to deploy in such a band digital systems of low, medium and/or high capacity. In some countries, analogue systems are still being used;
- f) that digital systems are mostly designed to accommodate radio-frequency (RF) channel arrangements based on multiples of 2.5 MHz or 3.5 MHz patterns;
- g) that, digital techniques such as cross-polar interference cancellers (XPIC) may significantly contribute to the cross-polar discrimination improvement factor (XIF, defined in Recommendation ITU-R F.746), thus counteracting multipath or rain propagation-induced depolarization;
- h) that, when very high capacity links (e.g. twice Synchronous Transfer Mode-1 (STM-1)) are required, further economy may be achieved using system bandwidths wider than the recommended channel separation, associated to high-efficient modulation formats,

recommends

- 1 that the preferred RF channel arrangements be based on multiples of basic bandwidths of either 3.5 MHz or 2.5 MHz; examples in various segments of the 8 GHz band are shown in Annexes 1 to 5;
- 2 that, in a section over which the international connection is arranged, all the go channels should be in one half of the band, and all the return channels should be in the other half of the band;

3 that, for adjacent RF channels in the same half of the band, horizontal and vertical polarization may be used alternately, as well as co-channel arrangements, provided that sufficient adjacent channel rejection is provided;

4 that when very high capacity links are required and network coordination permits, with the agreement of the administrations concerned, the use of any two adjacent 28 or 29.65 MHz channels specified in *recommends* 1 is possible, for wider bandwidth system, with centre frequency lying in the central point of the distance between the two 28 or 29.65 MHz adjacent channels;

5 that due regard be taken of the fact that, in some countries, in the 7 725 MHz to 8 275 MHz band, another RF channel arrangement for high capacity digital systems up to 140 Mbit/s or synchronous digital hierarchy bit rates is used. A description of this RF channel arrangement is given in Annex 6. Administrations currently using channel arrangements based on the 29.65 MHz raster are encouraged, in the future, to migrate to this more efficient 28 MHz and sub-multiples channel arrangement in Annex 2.

Annex 1

RF channel arrangements for the transmission of various digital signals operating in the 7 725-8 275 MHz band, with 300 MHz duplex spacing, based on multiples of 2.5 MHz bandwidth referred to in *recommends* 1

This Annex describes an RF channel arrangement for low, medium and high capacity point-to-point FWS using digital modulation and operating in the band 7 725-8 275 MHz. Channel pairs are provided with a common transmit-receive separation of 300 MHz.

1 The RF channel arrangement is shown in Fig. 1 and is derived as follows:

Let f_0 be the frequency at the centre of the band:

$$f_0 = 8\,000 \text{ MHz}$$

f_n be the centre frequency of one RF channel in the lower half of the band (MHz);

f'_n be the centre frequency of one RF channel in the upper half of the band (MHz),

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

1.1 for systems with a 30 MHz channel bandwidth:

$$\text{lower half of the band: } f_n = f_0 - 290 + 30 n \quad \text{MHz}$$

$$\text{upper half of the band: } f'_n = f_0 + 10 + 30 n \quad \text{MHz}$$

where:

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

1.2 for systems with a 20 MHz channel bandwidth:

$$\text{lower half of the band: } f_n = f_0 - 285 + 20 n \quad \text{MHz}$$

$$\text{upper half of the band: } f'_n = f_0 + 15 + 20 n \quad \text{MHz}$$

where:

$$n = 1, 2, 3, \dots 12;$$

1.3 for systems with a 10 MHz channel bandwidth:

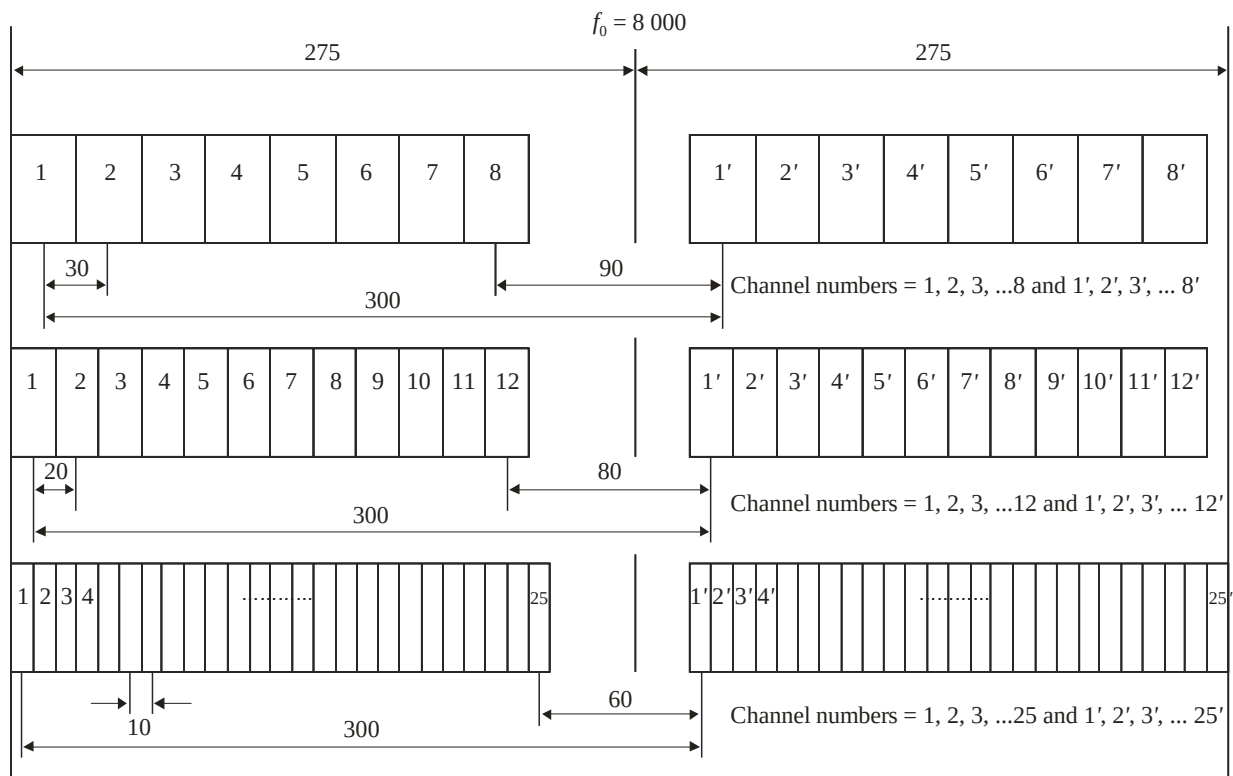
lower half of the band: $f_n = f_0 - 280 + 10 n$ MHz

upper half of the band: $f'_n = f_0 + 20 + 10 n$ MHz

where:

$$n = 1, 2, 3, \dots 25.$$

FIGURE 1
RF channel arrangements for the band 7 725-8 275 MHz
(All frequencies in MHz)



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2 Low capacity systems with RF channel bandwidths of 1.25 MHz, 2.5 MHz and 5 MHz may also be utilized by subdividing the 10 MHz RF bandwidth pattern shown in Fig. 1.

