International Telecommunication Union

ITU-R

Radiocommunication Sector of ITU

Recommendation ITU-R F.637-5

(02/2022)

Radio-frequency channel arrangements for fixed wireless systems operating in the 21.2-23.6 GHz band

F Series

Fixed service

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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
TF	Time signals and frequency standards emissions
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.637-5

Radio-frequency channel arrangements for fixed wireless systems operating in the 21.2-23.6 GHz band

(Question ITU-R 247-1/5)

(1986-1992-1994-1999-2012-2022)

Scope

This Recommendation provides radio-frequency (RF) channel arrangements for fixed wireless systems (FWS) operating in the 21.2-23.6 GHz band. The main text of this Recommendation presents RF channel arrangements based on the homogeneous patterns with channel separations of 2.5 and 3.5 MHz. Annexes 1 to 4 present example arrangements of these homogeneous patterns used in some countries.

Keywords

Fixed service, point-to-point, channel bandwidth, channel arrangement, 23 GHz

Abbreviations / Glossary

BSS	Broadcasting-satellite service
CEPT	European Conference of Postal and Telecommunications Administrations
ENG/OB	Electronic news gathering / outside broadcast
FS	Fixed service
FWS	Fixed wireless systems
IMT	International Mobile Telecommunications
SAP/SAB	Services ancillary to production / services ancillary to broadcasting
RF	Radio-frequency
WARC	World Administrative Radio Conference

Related ITU Recommendations and Reports

Recommendation ITU-R F.746 – Radio-frequency arrangements for fixed service systems

The ITU Radiocommunication Assembly,

considering

a) that the band 21.2-23.6 GHz is allocated to the fixed and other services;

b) Resolution **525** of the World Administrative Radio Conference (WARC) for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992);

c) that the band is used for differing applications by various administrations and that these applications may require different radio-frequency (RF) channel arrangements;

d) that several types of service with various capacities may be in simultaneous use in this frequency band;

e) that the band allocated to each service or even to each administration may vary from one country to another;

f) that the applications in this frequency band may require differing channel bandwidth;

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g) that a high degree of compatibility between RF channels of different arrangements can be achieved by selecting all channel centre frequencies from a homogeneous basic pattern;

h) that the continuously capacity growing request to radio links, especially as part of the mobile network evolution to IMT-2020, has been increasingly addressed in recent years,

recognizing

that Recommendation ITU-R SM.1540 provides guidelines for managing the unwanted emissions in the out-of-band domain falling into adjacent allocated bands,

recommends

1 that RF channel arrangements for the band 21.2-23.6 GHz should be based on a homogeneous pattern;

2 that the homogeneous pattern with a preferred 3.5 MHz interval be defined by the relation:

$$f_p = f_r + 3.5 + 3.5\,p$$

where:

$1 \le p \le 685$

f_r : reference frequency of the homogeneous pattern;

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

$$f_p = f_r + 4 + 2.5\,p$$

where:

$1 \le p \le 959$

f_r : reference frequency of the homogeneous pattern;

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

$$f_r = 21\,196 \quad \text{MHz}$$

other reference frequencies may be agreed by the administrations concerned;

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

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

NOTE 1 – Examples of channel arrangements based on this Recommendation are described in Annexes 1, 2, 3 and 4.

NOTE 2 – 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 § 2, is used in conjunction with the main pattern.

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Annex 1

RF channel arrangements in the band 21.2-23.6 GHz used in some countries in accordance with *recommends* 2

The use of the band 21.2-23.6 GHz is based on a homogeneous 3.5 MHz frequency pattern. Various channel spacings from 3.5 MHz to 224 MHz are accommodated as shown in Fig. 1 and interleaved patterns are also used for the various spacings. In some applications, additional channels can be added in the edge and central guardbands using the homogeneous pattern.

The duplex separation is 1 232 MHz

Let f_r be the reference frequency of the homogeneous pattern 21 196 MHz;

f_n be the centre frequency of a radio-frequency channel in the lower half of the band (MHz);

f'_n be the centre frequency of a radio-frequency channel in the upper half of the band (MHz);

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

a) for systems with carrier spacing of 224 MHz in interleaved arrangement:

lower half of the band: $f_n = f_r + 28 + 112\,n$ MHz

upper half of the band: $f'_n = f_r + 1260 + 112\,n$ MHz

where:

$n = 1, \ldots 9$

b) for systems with carrier spacing of 112 MHz:

lower half of the band: $f_n = f_r - 28 + 112\,n$ MHz

upper half of the band: $f'_n = f_r + 1204 + 112\,n$ MHz

where:

$n = 1, \ldots 10$

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

lower half of the band: $f_n = f_r + 56\,n$ MHz

upper half of the band: $f'_n = f_r + 1232 + 56\,n$ MHz

where:

$n = 1, \ldots 20$

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

lower half of the band: $f_n = f_r + 14 + 28\,n$ MHz

upper half of the band: $f'_n = f_r + 1\,246 + 28\,n$ MHz

where:

$n = 1, \ldots 40$

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

lower half of the band: $f_n = f_r + 21 + 14\,n$ MHz

upper half of the band: $f'_n = f_r + 1253 + 14\,n$ MHz

where:

$n = 1, \ldots 80$

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