



ERC Recommendation

12-06

Preferred channel arrangements for Fixed Service
systems operating in the frequency band 10.7-11.7 GHz

Approved 1996

Amended 29 May 2019

ERC RECOMMENDATION 12-06 OF 1996 ON PREFERRED CHANNEL ARRANGEMENTS FOR FIXED SERVICE SYSTEMS OPERATING IN THE FREQUENCY BAND 10.7-11.7 GHz, AMENDED 05 FEBRUARY 2010 AND AMENDED 29 MAY 2019

“The European Conference of Postal and Telecommunications Administrations,

considering

- a) that CEPT has a long-term objective to harmonise the use of frequencies throughout Europe in order to make the most effective use of the spectrum available;
- b) that the band 10.7-11.7 GHz is, among other services, co-primarily allocated to the fixed service and to the fixed-satellite service (FSS) (space-to-Earth); however, ERC Decision (00)08 specify that uncoordinated Earth stations in the FSS should operate on a non-protected basis;
- c) that ERC Decision (00)08 also limits the use of the band 10.7-11.7 GHz to high capacity (i.e. 140 Mbit/s or higher) point-to-point links;
- d) that Recommendation ITU-R F.387 also gives channel arrangements for the fixed service in this band;
- e) that, when very high capacity links are required, it may be achieved by using wider channel bandwidth;
- f) that ITU Radio Regulation No. **5.340** states that all emissions in the band 10.68-10.7 GHz are prohibited except for those provided for by Radio Regulation No. **5.483**,

recommends

- 1. that in the 10.7-11.7 GHz band, CEPT administrations may consider the preferred radio frequency channel arrangement for digital point-to-point fixed wireless systems with a duplex frequency of 530 MHz as presented in ANNEX 1;
- 2. that in the 10.7-11.7 GHz band, CEPT administrations may consider the preferred radio frequency channel arrangement for digital point-to-point fixed wireless systems with a duplex frequency of 490 MHz as presented in ANNEX 2;
- 3. that CEPT administrations may consider merging any two adjacent 40 MHz channels recommended in, ANNEX 1: item 1 or ANNEX 2: item 1 to create one 80 MHz channel, on the centre frequency between the merged channels. The same spectral efficiency should be maintained. To assist cross-border co-ordination, administrations may refer to the channel identifiers described in ANNEX 3;
- 4. that CEPT administrations may consider merging any two adjacent 28 MHz channels recommended in ANNEX 1: item 2 or ANNEX 2: item 2 to create one 56 MHz channel, on the centre frequency between the merged channels. The same spectral efficiency should be maintained. To assist cross-border co-ordination, administrations may refer to the channel identifiers described in ANNEX 3;
- 5. that CEPT administrations may consider merging any four adjacent 28 MHz channels recommended in ANNEX 3 to create one 112 MHz channel, with its centre frequency in the middle of the merged channels. To assist cross-border co-ordination, administrations may refer to the channel identifiers described in ANNEX 4.”

Note:

Please check the Office documentation database <https://www.ecodocdb.dk> for the up to date position on the implementation of this and other ECC Recommendations.

ANNEX 1: RECOMMENDATION FOR CHANNEL ARRANGEMENT WITH DUPLEX FREQUENCY 530 MHz

Let

F_0 be the frequency of the centre of the band of frequencies occupied (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);

and $F_0 = 11200$ MHz

1. The radio frequency channel arrangement for digital point-to-point fixed wireless systems based on 40 MHz channel separation will contain 11 go/return channels and the individual channels should be derived as follows:

Lower half of the band $F_N = (F_0 - 505 + 40n)$ MHz

Upper half of the band $F'_N = (F_0 + 25 + 40n)$ MHz where $n = 1, 2, 3, \dots, 9, 10, \text{ or } 11$

The channel arrangement is shown in Figure 1.

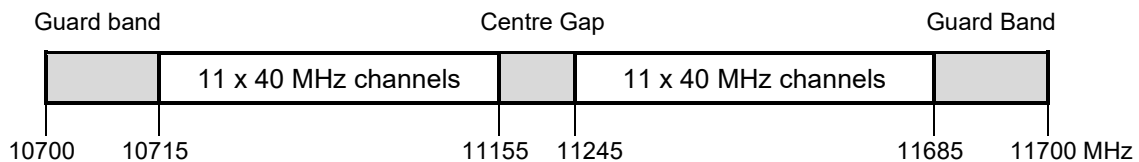


Figure 1: Channel arrangement for 40 MHz channel separation with duplex frequency 530 MHz

2. The radio frequency channel arrangement for digital point-to-point fixed wireless systems based on 28 MHz channel separation will contain 16 go/return channels and the individual channels should be derived as follows:

Lower half of the band $F_N = (F_0 - 505 + 28n)$ MHz

Upper half of the band $F'_N = (F_0 + 25 + 28n)$ MHz where $n = 1, 2, 3, \dots, 15, \text{ or } 16$

The channel arrangement is shown in Figure 2.

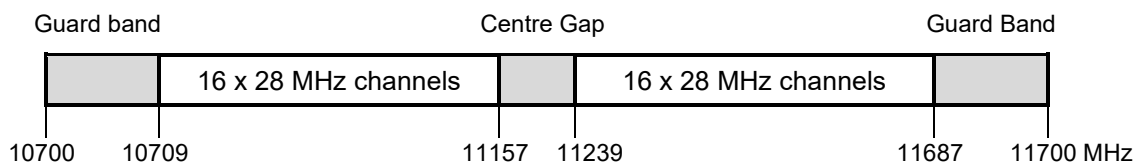


Figure 2: Channel arrangement for 28 MHz channel separation with duplex frequency 530 MHz

Table 1: Calculated parameters according to Recommendation ITU-R F.746

Parameter	ANNEX 1: item 1	ANNEX 1: item 2
XS / MHz	40	28
N	11	16
f_1 / MHz	10735	10723
f_{11} / MHz	11135	11003
f_{12} / MHz	–	11031
f_{16} / MHz	–	11143
f'_1 / MHz	11265	11253
f'_{11} / MHz	11665	11533
f'_{12} / MHz	–	11561
f'_{16} / MHz	–	11673
Z ₁ S / MHz	35	23
Z ₂ S / MHz	35	27
YS / MHz	130	110
DS / MHz	530	530

XS Separation between centre frequencies of adjacent channels

YS Separation between centre frequencies of the closest go/return channels

Z₁S Separation between the lower band edge and the centre frequency of the first channel

Z₂S Separation between centre frequencies of the final channel and the upper band edge

DS Duplex spacing ($F_N' - F_N$)

Note: On a national level, CEPT administrations not implementing ERC/DEC/(00)08, may wish to use 14 MHz, 7 MHz channel arrangement by subdividing the 28 MHz channel arrangement.

ANNEX 2: RECOMMENDATION FOR CHANNEL ARRANGEMENT WITH DUPLEX FREQUENCY 490 MHz

Let

F_0 be the frequency of the centre of the band of frequencies occupied (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).

and $F_0 = 11200$ MHz

- The radio frequency channel arrangement for digital point-to-point fixed wireless systems based on 40 MHz channel separation will contain 12 go/return channels and the individual channels should be derived as follows:

Lower half of the band $F_N = (F_0 - 505 + 40n)$ MHz

Upper half of the band $F'_N = (F_0 - 15 + 40n)$ MHz where $n = 1, 2, 3, \dots, 10, 11$ or 12

The channel arrangement is shown in Figure 3.

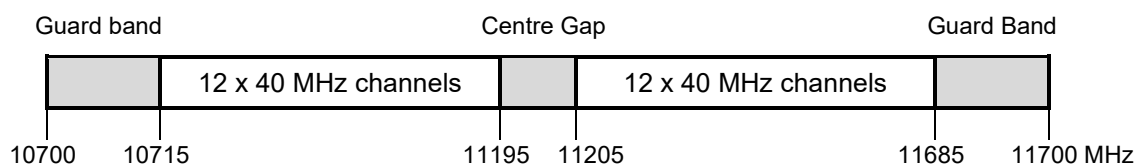


Figure 3: Channel arrangement for 40 MHz channel separation with duplex frequency 490 MHz

- The radio frequency channel arrangement for digital point-to-point fixed wireless systems based on 28 MHz channel separation will contain 17 go/return channels and the individual channels should be derived as follows:

Lower half of the band $F_N = (F_0 - 505 + 28n)$ MHz

Upper half of the band $F'_N = (F_0 - 15 + 28n)$ MHz where $n = 1, 2, 3, \dots, 16$, or 17

The channel arrangement is shown in Figure 4.

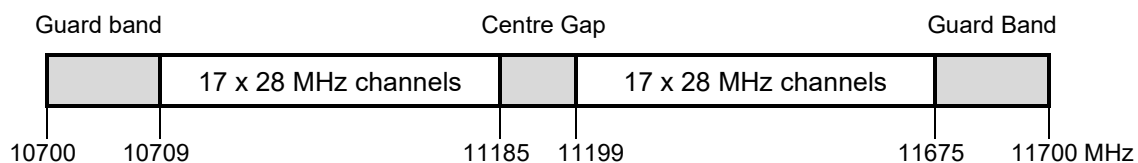


Figure 4: Channel arrangement for 28 MHz channel separation with duplex frequency 490 MHz

Table 2: Calculated parameters according to Recommendation ITU-R F.746

Parameter	ANNEX 2: item 1	ANNEX 2: item 2
XS / MHz	40	28
n	12	17
f ₁ / MHz	10735	10723
f ₁₁ / MHz	11135	11003
f ₁₂ / MHz	11175	11031
f ₁₆ / MHz	–	11143
f ₁₇ / MHz	–	11171
f' ₁ / MHz	11225	11213
f' ₁₁ / MHz	11625	11493
f' ₁₂ / MHz	11665	11521
f' ₁₆ / MHz	–	11633
f' ₁₇ / MHz	–	11661
Z _{1S} / MHz	35	23
Z _{2S} / MHz	35	39
YS / MHz	50	42
DS / MHz	490	490

- XS Separation between centre frequencies of adjacent channels
- YS Separation between centre frequencies of the closest go/return channels
- Z_{1S} Separation between the lower band edge and the centre frequency of the first channel
- Z_{2S} Separation between centre frequencies of the final channel and the upper band edge
- DS Duplex spacing ($F_N' - F_N$)

Note: On a national level, CEPT administrations not implementing ERC/DEC/(00)08, may wish to use 14 MHz, 7 MHz channel arrangement by subdividing the 28 MHz channel arrangement.

ANNEX 3: CHANNEL ARRANGEMENT AND IDENTIFIERS FOR 80 MHZ AND 56 MHZ CHANNELS BY MERGING RESPECTIVELY 40 MHZ AND 28 MHZ CHANNELS

The 80 MHz channels (ref. *recommends 3 in ANNEX 1: item 1* and *ANNEX 2: item 1*) can be identified by using the following numbering and illustrated in Figure 5 (a) and (b), respectively:

recommends 3, in ANNEX 1: item 1

lower half of the band: $F_N = F_0 - 485 + 40n$ MHz
 upper half of the band: $F_{N'} = F_0 + 45 + 40n$ MHz where $n = 1, 2, 3, \dots, 9, 10$

recommends 3, in ANNEX 2: item 1

lower half of the band: $F_N = F_0 - 485 + 40n$ MHz
 upper half of the band: $F_{N'} = F_0 + 5 + 40n$ MHz where $n = 1, 2, 3, \dots, 10, 11$

The 56 MHz channels (ref. *recommends 4 in ANNEX 1: item 2* and *ANNEX 2: item 2*) can be identified by using the following numbering and illustrated in Figure 6 (a) and (b), respectively:

recommends 4 in ANNEX 1: item 2

lower half of the band: $F_N = F_0 - 491 + 28n$ MHz
 upper half of the band: $F_{N'} = F_0 + 39 + 28n$ MHz where $n = 1, 2, 3, \dots, 14, 15$

recommends 4 in ANNEX 2: item 2

lower half of the band: $F_N = F_0 - 491 + 28n$ MHz
 upper half of the band: $F_{N'} = F_0 - 1 + 28n$ MHz where $n = 1, 2, 3, \dots, 15, 16$

In all cases $F_0 = 11200$ MHz

Note: The numbering is just for identification of the channelling. It should also be noted, that two consecutive channel numbers cannot be used on the same physical link due to channels overlap. See figures below for channel arrangement examples with identifiers.

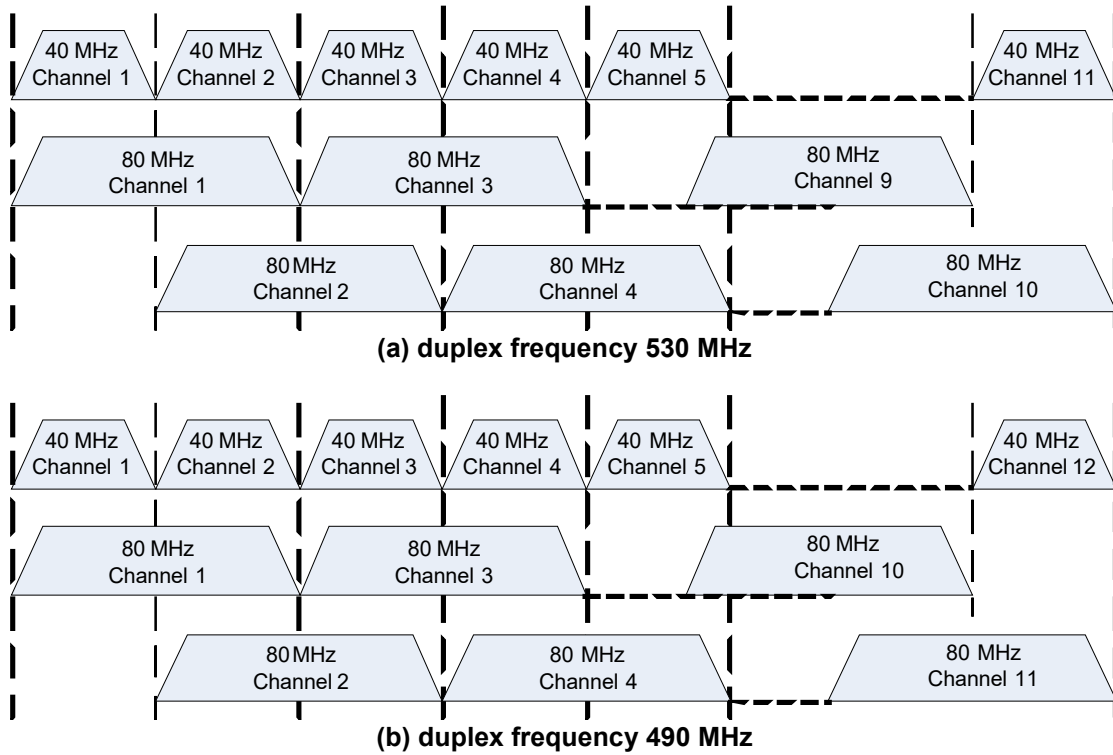


Figure 5: Illustration of the channel arrangement and identifiers for 80 MHz channels from the channel arrangements recommended in ANNEX 1: item 1 (a) and ANNEX 2: item 1 (b)

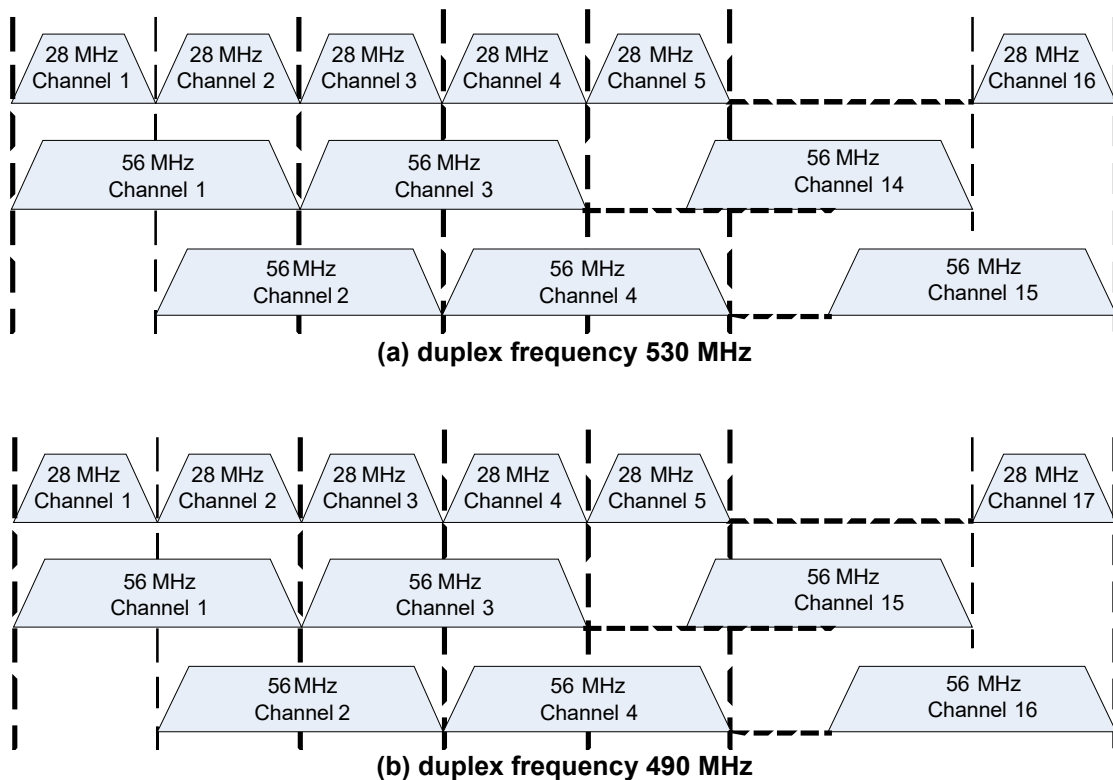


Figure 6: Illustration of the channel arrangement and identifiers for 56 MHz channels from the channel arrangements recommended in ANNEX 1: item 2 (a) and ANNEX 2: item 2 (b)

ANNEX 4: ARRANGEMENT AND IDENTIFIERS FOR 112 MHZ CHANNELS BY MERGING FOUR 28 MHZ CHANNELS

The 112 MHz channels (ref. *recommends* 5) can be identified by using the following numbering:

Let

F_0 be the reference frequency of 11200 MHz;

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

$F_{N'}$ be the centre frequency (MHz) of a radio frequency channel in the upper half of the band;

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

recommends in ANNEX 1: item 2

lower half of the band: $F_N = F_0 - 463 + 28n$ MHz

upper half of the band: $F_{N'} = F_0 + 67 + 28n$ MHz where $n = 1, 3, \dots, 13$

recommends in ANNEX 2: item 2

lower half of the band: $F_N = F_0 - 463 + 28n$ MHz

upper half of the band: $F_{N'} = F_0 + 27 + 28n$ MHz where $n = 1, 2, 3, \dots, 14$

It is to be noted that the numbering is just for identification of the channelling. It should also be noted that four consecutive channel numbers cannot be used on the same physical link due to channels overlap. See figures below for channel arrangement example with identifiers.

It is also to be noted that some of the 112 MHz channels may not be supported by the equipment due to duplex implementation.

See figures below for channel arrangement examples with identifiers.

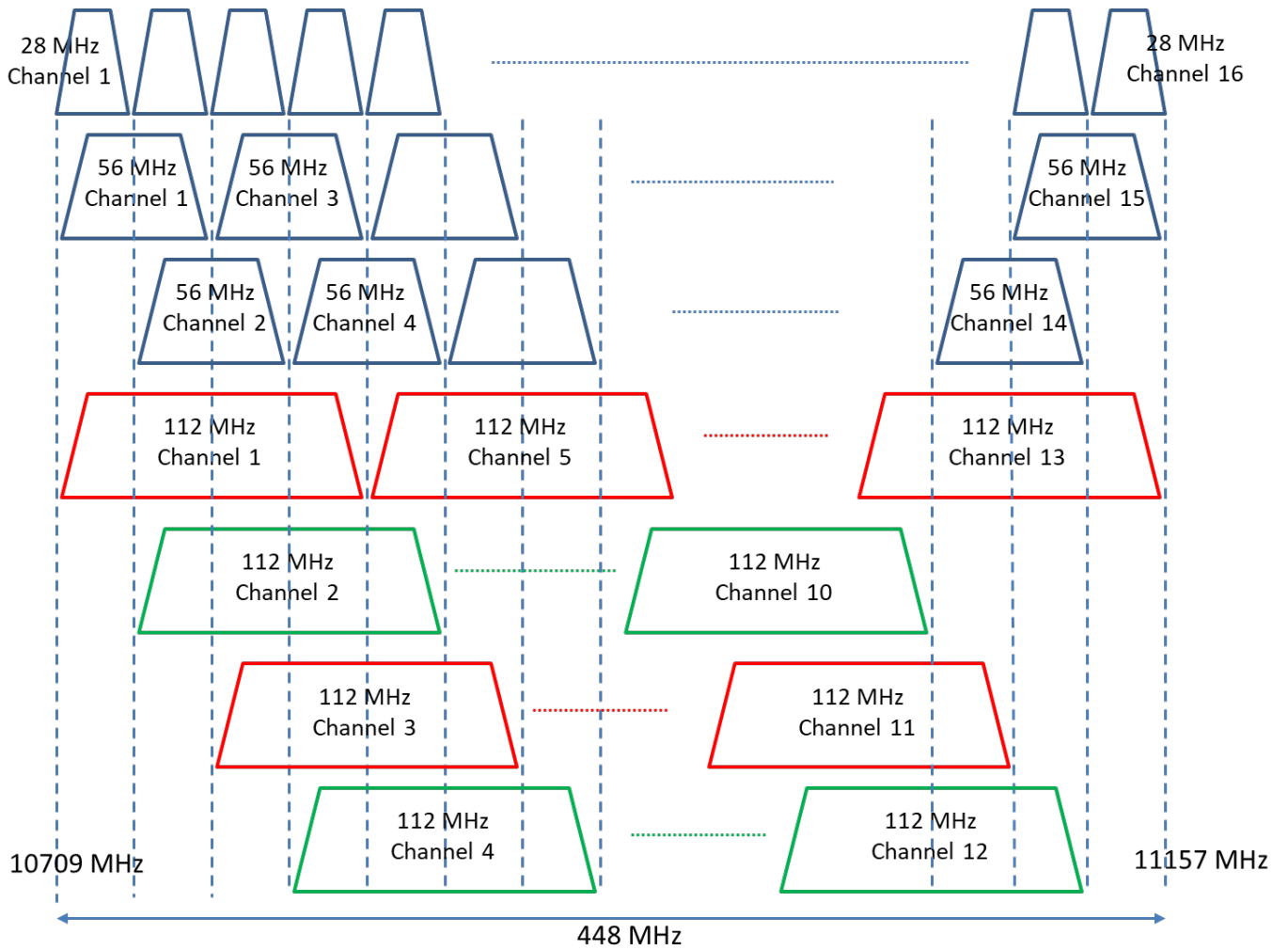


Figure 7: Channel arrangement and identifiers with channel width of 112 MHz as of ANNEX 1: item 2 – Duplex frequency 530 MHz

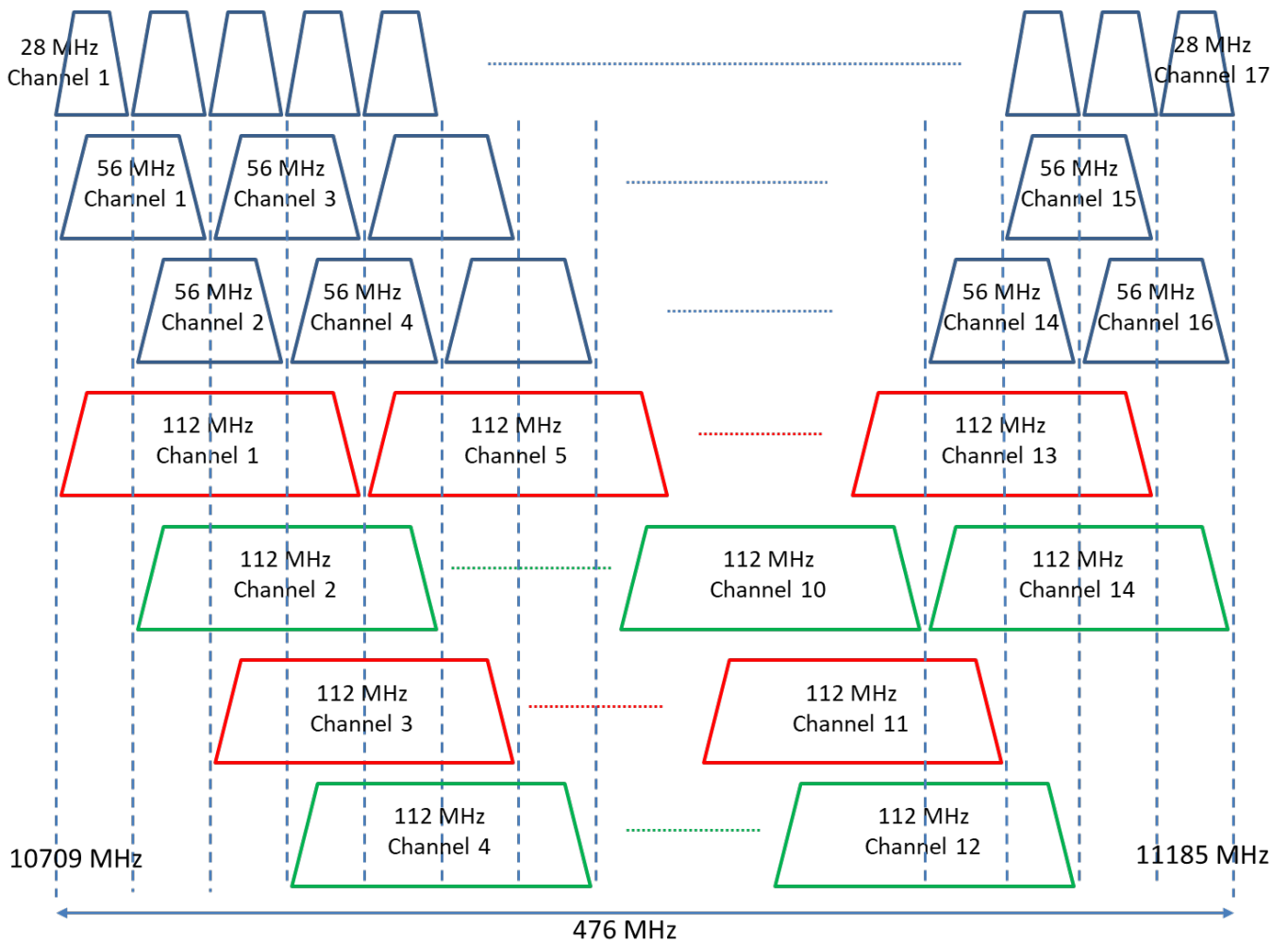


Figure 8: Channel arrangement and identifiers with channel width of 112 MHz as of ANNEX 2: item 2 - Duplex frequency 490 MHz