CEPT/ERC/RECOMMENDATION 12-06 E (Rome 1996, revised Rottach Egern, February 2010)

PREFERRED CHANNEL ARRANGEMENTS FOR FIXED SERVICE SYSTEMS OPERATING IN THE FREQUENCY BAND 10.7 - 11.7 GHz

Recommendation adopted by the Working Group "Spectrum Engineering" (SE)

"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 co-primarily allocated to the fixed service and to the fixed-satellite service (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 ITU-R Recommendation 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 Footnote 5.340 states that all emissions in the band 10.68 - 10.7 GHz are prohibited except for those provided for by Radio Regulation Footnote 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 A,

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 B,

3. that CEPT administrations may consider merging any of two adjacent 40 MHz channels recommended in Annex A.1 or Annex B.1 to create one 80 MHz channel, with centre frequency lying in the central point of the distance between the merged channels. The same spectral efficiency should be maintained. To assist international co-ordination, administrations may refer to the channel identifiers described in Annex C,

4. that CEPT administrations may consider merging any of two adjacent 28 MHz channels recommended in Annex A.2 or Annex B.2 to create one 56 MHz channel, with centre frequency lying in the central point of the distance between the merged channels. The same spectral efficiency should be maintained. To assist international co-ordination, administrations may refer to the channel identifiers described in Annex C."

Note:
Please check the ECO web site (http//:www.ero.dk) for the up to date position on the implementation of this and other ECC and ERC Recommendations.

Annex A

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); and
f_n be the centre frequency of a radio frequency channel in the lower half of the band (MHz); and
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, … 9, 10, or 11

The channel arrangement is shown in Figure 1. (all frequencies in MHz)

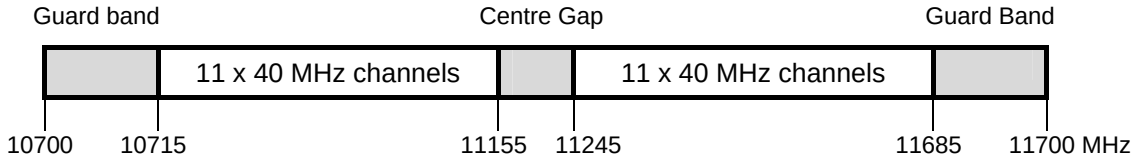


Figure 1: Channel Arrangement for 40 MHz channel separation with duplex frequency 530 MHz

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	$fn = (f_0 - 505 + 28n)$	MHz	
Upper half of the band	$f'n = (f_0 + 25 + 28n)$	MHz	where n = 1, 2, 3, ……. 15, or 16

The channel arrangement is shown in Figure 2. (all frequencies in MHz)

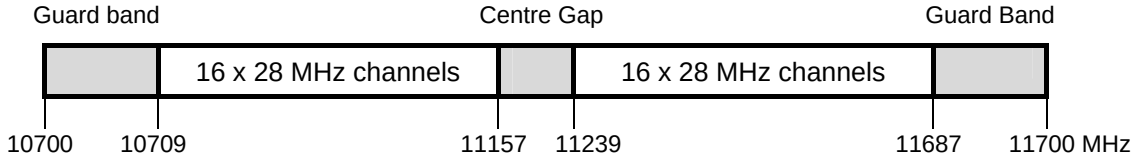


Figure 2: Channel Arrangement for 28 MHz channel separation with duplex frequency 530 MHz

Parameter	*Annex A.1*	*Annex A.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_1S / MHz	35	23
Z_2S / MHz	35	27
YS / MHz	130	110
DS / MHz	530	530

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

XS Separation between centre frequencies of adjacent channels
YS Separation between centre frequencies of the closest go and 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 B

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); and
f_n be the centre frequency of a radio frequency channel in the lower half of the band (MHz); and
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 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, … 10, 11 or 12

The channel arrangement is shown in Figure 3. (all frequencies in MHz)

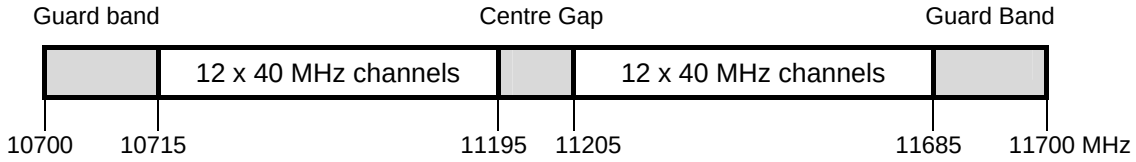


Figure 3: Channel Arrangement for 40 MHz channel separation with duplex frequency 490 MHz

2- 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, ……. 16, or 17

The channel arrangement is shown in Figure 4. (all frequencies in MHz)

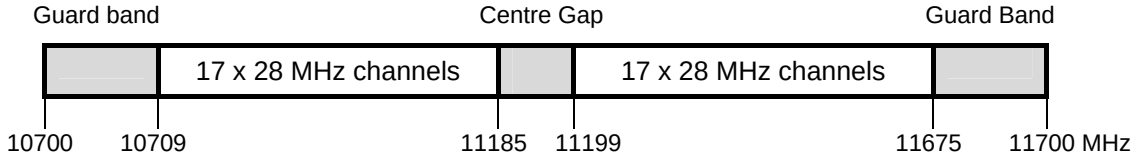


Figure 4: Channel Arrangement for 28 MHz channel separation with duplex frequency 490 MHz

Parameter	*Annex B.1*	*Annex B.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

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

XS Separation between centre frequencies of adjacent channels
YS Separation between centre frequencies of the closest go and 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 C

CHANNEL IDENTIFIERS FOR DERIVATIVE 80 MHz AND 56 MHz CHANNELS

The derivative 80 MHz channels (ref. *recommends in Annex A.1* and *Annex B.1*) can be identified by using the following numbering and illustrated in Figures 5 (a) and 5 (b), respectively:

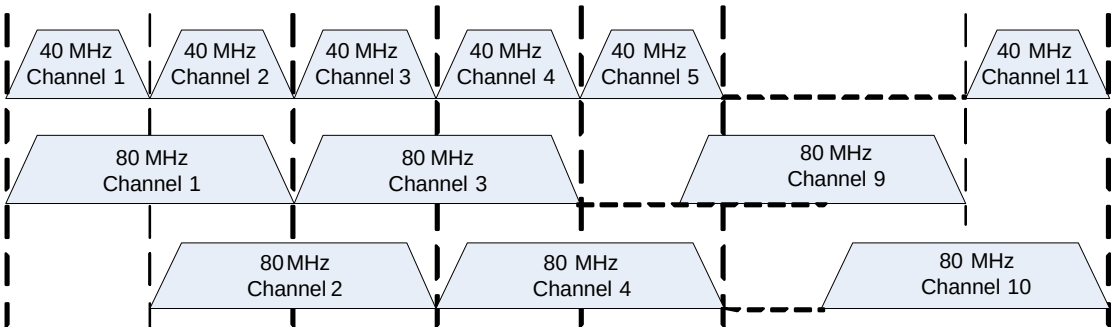
recommends in Annex A.1		
lower half of the band:	$f_n = f_0 - 485 + 40n$ MHz	
upper half of the band:	$f_n' = f_0 + 45 + 40n$ MHz	where n = 1, 2, 3, ….9, 10
recommends in Annex B.1		
lower half of the band:	$f_n = f_0 - 485 + 40n$ MHz	
upper half of the band:	$f_n' = f_0 + 5 + 40n$ MHz	where n = 1, 2, 3, ….10, 11

The derivative 56 MHz channels (ref. *recommends in Annex A.2* and *Annex B.2*) can be identified by using the following numbering and illustrated in Figures 6 (a) and 6 (b), respectively:

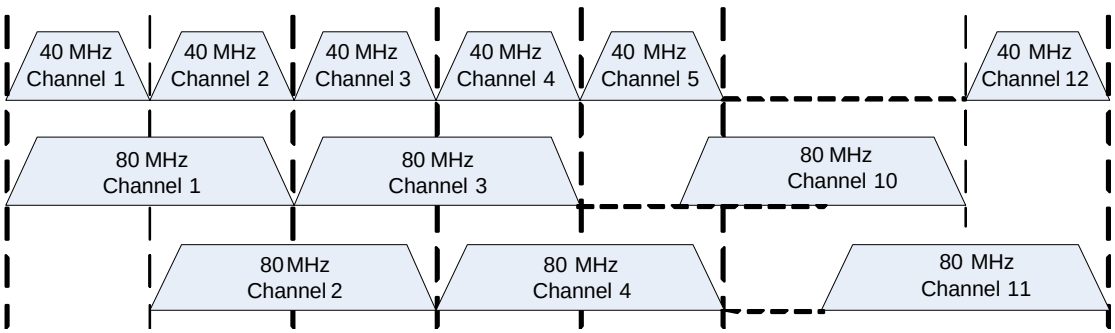
recommends in Annex A.2		
lower half of the band:	$f_n = f_0 - 491 + 28n$ MHz	
upper half of the band:	$f_n' = f_0 + 39 + 28n$ MHz	where n = 1, 2, 3, ….14, 15
recommends in Annex B.2		
lower half of the band:	$f_n = f_0 - 491 + 28n$ MHz	
upper half of the band:	$f_n' = f_0 - 1 + 28n$ MHz	where n = 1, 2, 3, ….15, 16

In all cases $f_0 = 11200$ MHz

Note: The numbering is just for identification of the channelling. It should be noted, that adjacent channel numbers can not be used on the same physical link due to channel overlap. See diagrams below for channel arrangement examples.

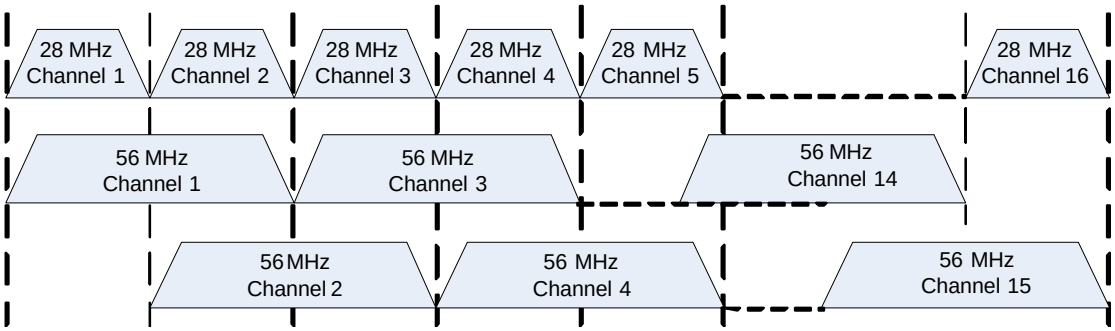


(a) duplex frequency 530 MHz

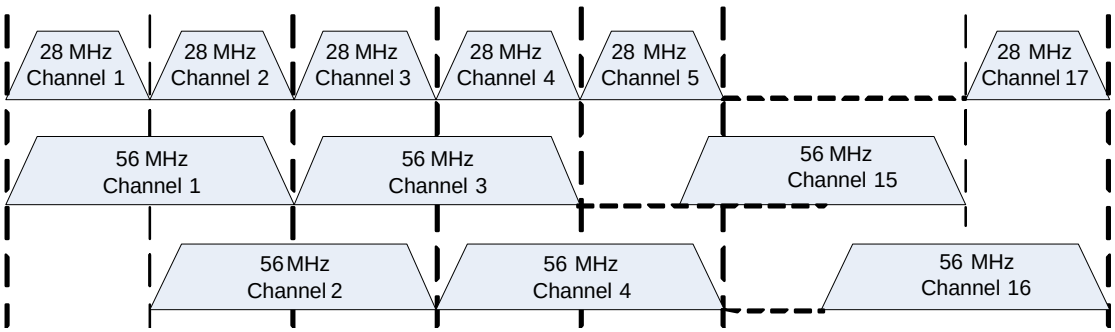


(b) duplex frequency 490 MHz

Figure 5: illustration of the channel identifiers for derivative 80 MHz channels from the channel arrangements recommended in Annex A.1 (a) and Annex B.1 (b)



(a) duplex frequency 530 MHz



(b) duplex frequency 490 MHz

Figure 6: illustration of the channel identifiers for derivative 56 MHz channels from the channel arrangements recommended in Annex A.2 (a) and Annex B.2 (b)