#### Recommendation T/R 13-01 E

(Montreux 1993, Revised Rottach-Egern, February 2010, Corrected May 2024)

## PREFERRED CHANNEL ARRANGEMENTS FOR FIXED SERVICE SYSTEMS OPERATING IN THE FREQUENCY RANGE 1 - 2.3 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 there are technical and economic factors that will require continued operation of fixed services in the 1 2.3 GHz range,
- c) that there is a range of different fixed service applications (point-to-point and point-to-multipoint), requiring various channel bandwidths, which need to be accommodated in the 1 - 2.3 GHz range,
- d) that according to RR 5.340 all emissions are prohibited in the band 1400 to 1427 MHz.

#### recommends

- 1. that administrations using fixed service in the band 1350 1375 MHz paired with 1492 1517 MHz should consider the channel plan given in Annex A:
- 2. that administrations using fixed service in the band 1375 1400 MHz paired with 1427 1452 MHz should consider the channel plan given in Annex B;
- 3. that administrations using fixed service in the band 2025 2110 MHz paired with 2200 2290 MHz should consider the channel plan given in Annex C (Note 1).

Note 1: According ERC Report 65 a separation distance of 2 km and a carrier separation of 8.3 MHz is required between FS and MS stations operating in adjacent bands. Therefore a carefully deployment and coordination between MS and FS with channel spacing below 14 MHz is needed.

Note:

Please check the Office web site (https://docdb.cept.org/) for the up to date position on the implementation of this and other ECC and ERC Recommendations.

# Annex A

# Frequency band 1350 - 1375 MHz paired with 1492 - 1517 MHz

Due to the fact that this band only offers 25 MHz of spectrum for each direction of transmission it will be limited to low capacity digital systems for point-to-point and point-to-multipoint systems. The channel arrangement is based on Recommendations ITU-R F.701 and ITU-R F.1242 which offers the maximum amount of possible channels.

The following detailed channel arrangement is proposed:

Let

fo	be the centre frequence	y of <b>1</b> 4	33.5 MHz
fn	be the centre frequence	y of th	e radio-frequency channel in the lower half of the band
fn'	be the centre frequence	y of th	e radio-frequency channel in the upper half of the band
TX/I	RX separation	=	142 MHz
Sepa	ration band	=	117 MHz

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

a)	for systems with a carrier space	ing of 2 MHz				
	lower half of the band: upper half of the band:	fn = fo - 84 + 2n fn' = fo + 58 + 2n	MHz MHz	where $n = 1, 12$		
b)	for systems with a carrier spac	ing of 1 MHz				
	lower half of the band: upper half of the band:	$\begin{array}{rl} fn &=& fo - 83.5 + 1n \\ fn' &=& fo + 58.5 + 1n \end{array}$	MHz MHz	where $n = 1, 24$		
c)	for systems with a carrier space	ing of 0.5 MHz				
	lower half of the band: upper half of the band:	$\begin{array}{l} fn = \ fo - 83.25 + 0.5n \\ fn' = fo + 58.75 + 0.5n \end{array}$	MHz MHz	where $n = 1, 48$		
d)	for systems with a carrier space	cing of 0.25 MHz				
	lower half of the band: upper half of the band:	fn = fo - 83.125 + 0.25n fn' = fo + 58.875 + 0.25n	MHz MHz	where $n = 1, 96$		
e)	for systems with a carrier space	ing of 0.025 MHz				
	lower half of the band: upper half of the band:	$\begin{array}{ll} fn = & fo - 83.0125 + 0.025n \\ fn' = & fo + 58.9875 + 0.025n \end{array}$	MHz MHz	where $n = 1, 960$		
	For 75 kHz channel spacing us	se the 0.025 MHz formula restr	icted to $n = 2, 5, 8$	· ·····		
f)	for systems with a carrier spac 2 MHz guard bands	ing of 3.5 MHz derived from th	e 0.5 MHz channe	els by multiplication and with		

lower half of the band:	fn = fo - 83.25 + 3.5n	MHz	
upper half of the band:	fn' = fo + 58.75 + 3.5n	MHz	where $n = 1, 6$

#### a) 2 MHz channels

Guar 0.5	d Band MHz		Guard Band 0.5 MHz	Centre Gap 117 MHz	Guard Band 0.5 MHz		Guard Ban 0.5 MHz	ıd
	1	2 x 2 MHz channels			1:	2 x 2 MHz channels		
			1375	MHz 14	  92 MHz			

#### b) 1 MHz channels

24 x 1 MHz channels		24 x 1 MHz channels	
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#### c) 0.5 MHz channels

48 x 0.5 MHz channels		48 x 0.5 MHz channels	
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#### d) 0.25 MHz channels

96 x 0.25 MHz channels		96 x 0.25 MHz channels	
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# e) 0.025 MHz channels

		960 x 0.025 MHz	z channels		960 x 0.025 N	/IHz channels		
	1	350.5 MHz	1374.5	MHz 1	492.5 MHz	1516.5 MHz	2	
13	350 MHz 1517 MHz							

# f) 3.5 MHz channels

Guard Bar 2 MHz	nd	Guard Band 2 MHz	Centre Gap 27 MHz	Guard Band 2 MHz		Guard Band 2 MHz
	6 x 3.5 MHz channels	5			6 x 3.5 MHz channel	s
1350 MHz		1375	MHz 14	92 MHz		1517 MHz

Figure 1: Occupied spectrum 1350 - 1517 MHz

#### Annex B

# Frequency band 1375 - 1400 MHz paired with 1427 - 1452 MHz

This band is comparable to band 1350-1375 MHz/1492-1517 MHz and therefore is used for the same kind of applications. Thus the channel arrangement, also based on Recommendation ITU-R F.701 and F.1242, has been developed on a similar basis.

The following detailed channel plan is proposed:

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Let	fobe the centre frequency of1413.5 MHzfnbe the centre frequency of the radio-frequency channel in the lower half of the bandfn'be the centre frequency of the radio-frequency channel in the upper half of the bandTX/RX separation=52 MHzSeparation band=27 MHz						
then th	he frequencies of individual cha	nnels are expressed by the follo	wing relationships	3:			
a)	for systems with a carrier space	ing of 2 MHz					
	lower half of the band: upper half of the band:	fn = fo - 39 + 2n fn' = fo + 13 + 2n	MHz MHz	where $n = 1, 12$			
b)	for systems with a carrier space	ing of 1 MHz					
	lower half of the band: upper half of the band:	$\begin{array}{rl} fn &=& fo &-& 38.5 + 1n \\ fn' &=& fo + & 13.5 + 1n \end{array}$	MHz MHz	where $n = 1, 24$			
c)	for systems with a carrier space	ing of 0.5 MHz					
	lower half of the band: upper half of the band:	$\begin{array}{l} fn = \ fo \ - \ 38.25 + 0.5n \\ fn' = \ fo \ + \ 13.75 + 0.5n \end{array}$	MHz MHz	where $n = 1, 48$			
d)	for systems with a carrier space	cing of 0.25 MHz					
	lower half of the band: upper half of the band:	$\begin{array}{l} fn &= fo - 38.125 + 0.25n \\ fn' &= fo + 13.875 + 0.25n \end{array}$	MHz MHz	where $n = 1, 96$			
e)	for systems with a carrier space	ing of 0.025 MHz					
	lower half of the band: upper half of the band:	$\begin{array}{l} fn = fo - \ 38.0125 + 0.025n \\ fn' = fo + 13.9875 + 0.025n \end{array}$	MHz MHz	where n = 1, 960			
	For 75 kHz channel spacing us	se the 0.025 MHz formula restric	cted to $n = 2, 5, 8$	,			
f)	for systems with a carrier spac 2 MHz guard bands	ing of 3.5 MHz derived from th	e 0.5 MHz channe	els by multiplication and with			

lower half of the band:	fn = fo - 38.25 + 3.5n	MHz	
upper half of the band:	fn' = fo + 13.75 + 3.5n	MHz	where $n = 1, 6$

#### a) 2 MHz channels

Guar 0.5	d Band MHz	Guard Band 0.5 MHz	Centre Gap 27 MHz	Guard Band 0.5 MHz		Guard Band 0.5 MHz
	12 x 2 MHz channe	ls		12	2 x 2 MHz channels	
		1400 I	MHz 14	27 MHz		

# b) 1 MHz channels

24 x 1 MHz channels		24 x 1 MHz channels	
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#### c) 0.5 MHz channels

48 x 0.5 MHz channels 48 x 0.5 MHz channels	
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#### d) 0.25 MHz channels

96 x 0.25 MHz channels		96 x 0.25 MHz channels	
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# e) 0.025 MHz channels

960 x 0.025 MHz channe	ls	960 x 0.025 M	/IHz channels	
1375.5 MHz	1399.5 MHz	 1427.5 MHz	1451.5 MHz	

#### f) 3.5 MHz channels

Guard Ba 2 MHz	nd	Guard Band 2 MHz	Centre Gap 27 MHz	Guard Ban 2 MHz	d	Guard Band 2 MHz
	6 x 3.5 MHz channels	5			6 x 3.5 MHz channels	5
1375 MHz		1400	MHz 14	27 MHz		1452 MHz

# Figure 2: Occupied spectrum 1375 - 1452 MHz

#### Annex C

#### Frequency band 2025 - 2110 MHz paired with 2200 - 2290 MHz

Future use of this band will be for some traditional multi-channel, multi-hop radio relay systems and also for modern access radio applications. It is therefore essential that the new channel plans, based on Recommendation ITU-R F.1098, allow sufficient flexibility to support a range of equipment capacities, modulation schemes and transmission techniques.

The following detailed channel plan is proposed:

#### Let

fo	be the centre frequen	cy of	2155 MHz
fn	be the centre frequen	cy of the	he radio-frequency channel in the lower half of the band
fn'	be the centre frequen	cy of t	he radio-frequency channel in the upper half of the band
TX/	RX separation	=	175 MHz
Sepa	aration band	=	<b>90</b> MHz

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

a)	for systems with a carrier spacing of 14 MHz					
	lower half of the band: upper half of the band:	$\begin{array}{rl} fn &=& fo - 130.5 \ + 14n \\ fn' &=& fo + \ 44.5 \ + 14n \end{array}$	MHz MHz	where $n = 1, 5$		
b)	for systems with a carrier sp	acing of 7 MHz				
	lower half of the band: upper half of the band:	$\begin{array}{rll} fn &=& fo - & 127.0 + 7n \\ fn' &=& fo + & 48.0 + 7n \end{array}$	MHz MHz	where n = 1,11		
c)	for systems with a carrier sp	acing of 3.5 MHz				
	lower half of the band: upper half of the band:	$\begin{array}{l} fn = \ fo - 128.75 + 3.5n \\ fn' = fo + \ 46.25 + 3.5n \end{array}$	MHz MHz	where n = 1, 23		
d)	for systems with a carrier sp	pacing of 1.75 MHz				
	lower half of the band: upper half of the band:	$\begin{array}{l} fn = fo - 130.500 + 1.75n \\ fn' = fo + 44.500 + 1.75n \end{array}$	MHz MHz	where $n = 1,, 47$		

#### a) 14 MH z channels

Guard B and 6.5 MHz	Guard Band Ce 8.5 MHz S	entre Gap Guard Ba 80 MHz 6.5 MHz	nd	Guard Band 13.5 MHz
5 x 14 MHz channels			5 x 14 MHz channels	
b) 7 MHz channels	2110 MHz	2200 MHz		
6.5 MHz	1.5 MHz	6.5 MHz		6.5 MHz
11 x 7 MHz channels			11 x 7 MHz channels	5

#### c) 3.5 MHz channels

3 MHz	1.5 MHz	3 MHz	6.5 MHz
23 x 3.5 MHz channels		23 x 3.	5 MHz channels

### d) 1.75 MHz channels

0.375 MHz	l	2.375 MHz		0.375 MHz	l	7.375 MHz	
	47 x 1.75 MHz channels				47 x 1.75 MHz channels		
 2025 MHz		2110 M	 Hz 2	200 MHz		2290	MHz

