Electronic Communications Committee (ECC)
within the European Conference of Postal and Telecommunications Administrations (CEPT)

ECC RECOMMENDATION (02)06 (revised June 2007)

PREFERRED CHANNEL ARRANGEMENTS FOR DIGITAL FIXED SERVICE SYSTEMS OPERATING IN THE FREQUENCY RANGE 7125-8500 MHz

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

"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 to benefit from technical and economic advantages;

b) that the preferred channel arrangements are one of the important factors in achieving the most effective and efficient use of spectrum by the Fixed Service (FS) systems;

c) that in accordance with the Joint NATO Frequency Agreement (NJFA), parts of the frequency range 7125-8500 MHz are used for military satellite communications and fixed service links;

d) that the military requirements leave sufficient freedom for CEPT administrations to find on a national basis sharing arrangements for the introduction of civil FS systems in the frequency range 7125-8500 MHz;

e) that a wide variety of digital FS applications with data rates up to 155 Mb/s, including Synchronous Digital Hierarchy (SDH), may operate in the frequency range 7125-8500 MHz;

f) that sometimes it may be desirable to interleave additional radio-frequency channels between those of the main pattern;

g) that frequency reuse techniques, supported also by modern techniques such as Cross-polar Interference Cancellers (XPIC) may significantly improve the spectrum usage in dense networks;

h) that, when very high capacity links are required, further economy may be achieved using wider channel bandwidth associated to high efficient modulation formats;

noting

a) that not all CEPT countries, currently using different arrangements than those recommended below, will be able to implement this Recommendation, but will continue to maintain the channel arrangements that they have currently implemented;

recommends

1) that CEPT administrations, considering the introduction of new channel arrangements in the frequency ranges 7125-7725 MHz and 7900-8500 MHz, or planning to re-structure their existing channel arrangements in these frequency ranges, should consider the channel arrangements in Annexes 1 and 2 respectively;
2) that CEPT administrations may consider merging any of two adjacent 28 MHz channels specified in Annexes 1 and 2 to create one 56 MHz channel, with centre frequency lying in the central point of the distance between the merged channels. This decision may be subject to minimum bit rate obligations. To assist international co-ordination, administrations may refer to the channel identifiers described in Annex 3. "

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

Annex 1

PREFERRED CHANNEL ARRANGEMENTS IN THE FREQUENCY RANGE 7125-7725 MHz

Let:

f_0 – be the centre frequency of the band of frequencies occupied (MHz),
f_n – be the centre frequency of a *n*-th radio-frequency channel in the lower half of the band (MHz),
f_n' – be the centre frequency of a *n*-th radio-frequency channel in the upper half of the band (MHz).

The whole of the frequency range 7125-7725 MHz is being divided into 2 frequency bands with the centre frequencies:

f_0 = 7275 MHz, for the band 7125-7425 MHz;
f_0 = 7575 MHz, for the band 7425-7725 MHz.

Then the centre frequencies (MHz) of individual channels are expressed by the following relationships:

a) for channel spacing of 28 MHz:
lower half of the band: $f_n = f_0 - 161 + 28 \cdot n$,
upper half of the band: $f_n' = f_0 - 7 + 28 \cdot n$, where n = 1,2,…, 5;

b) for channel spacing of 14 MHz:
lower half of the band: $f_n = f_0 - 154 + 14 \cdot n$,
upper half of the band: $f_n' = f_0 + 14 \cdot n$, where n = 1,2,…, 10;

c) for channel spacing of 7 MHz:
lower half of the band: $f_n = f_0 - 150.5 + 7 \cdot n$,
upper half of the band: $f_n' = f_0 + 3.5 + 7 \cdot n$, where n = 1,2,…, 20;

d) for channel spacing of 3.5 MHz:
lower half of the band: $f_n = f_0 - 148.75 + 3.5 \cdot n$,
upper half of the band: $f_n' = f_0 + 5.25 + 3.5 \cdot n$, where n = 1,2,…, 40;

e) for channel spacing of 1.75 MHz:
lower half of the band: $f_n = f_0 - 147.875 + 1.75 \cdot n$,
upper half of the band: $f_n' = f_0 + 6.125 + 1.75 \cdot n$, where n = 1,2,…, 80.

Spectrum occupancy boundaries are shown in Figure A1.1.The duplex separation between Tx/Rx is 154 MHz, other parameters are given in Tables A1.1 and A1.2.

Figure A1.1
Occupied spectrum: 7125-7425 MHz and 7425-7725 MHz
(all frequencies in MHz)

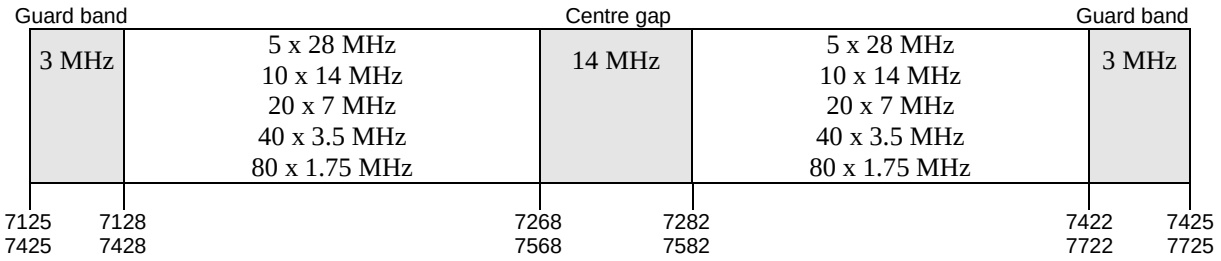

Table A1.1. Parameters of the channel arrangement in the band 7125-7425 MHz

XS, MHz	n	f1, MHz	fn, MHz	f1′, MHz	fn′, MHz	Z1S, MHz	Z2S, MHz	YS, MHz	DS, MHz
28	1...5	7142	7254	7296	7408	17	17	42	154
14	1…10	7135	7261	7289	7415	10	10	28	154
7	1…20	7131.5	7264.5	7285.5	7418.5	6.5	6.5	21	154
3.5	1…40	7129.75	7266.25	7283.75	7420.25	4.75	4.75	17.5	154
1.75	1…80	7128.875	7267.125	7282.875	7421.125	3.875	3.875	15.75	154

Table A1.2. Parameters of the channel arrangement in the band 7425-7725 MHz

XS, MHz	n	f1, MHz	fn, MHz	f1′, MHz	fn′, MHz	Z1S, MHz	Z2S, MHz	YS, MHz	DS, MHz
28	1...5	7442	7554	7596	7708	17	17	42	154
14	1…10	7435	7561	7589	7715	10	10	28	154
7	1…20	7431.5	7564.5	7585.5	7718.5	6.5	6.5	21	154
3.5	1…40	7429.75	7566.25	7583.75	7720.25	4.75	4.75	17.5	154
1.75	1…80	7428.875	7567.125	7582.875	7721.125	3.875	3.875	15.75	154

Terms used in Tables A1.1, A1.2 and A2.1:

XS - Separation between centre frequencies of adjacent channels;
n - Number of duplex channels in the band;
f1 - Centre frequency of the first channel in the lower part of the band;
fn - Centre frequency of the final channel in the lower part of the band;
f1′ - Centre frequency of the first channel in the upper part of the band;
fn′ - Centre frequency of the final channel in the upper part of the band;
Z1S - Separation between the lower band edge and the centre frequency of the first channel;
Z2S - Separation between centre frequency of the final channel and the upper band edge;
YS - Separation between centre frequencies of the closest “go” and “return” channels;
DS - Duplex spacing (fn′ – fn).

Annex 2

PREFERRED CHANNEL ARRANGEMENT IN THE FREQUENCY BAND 7900-8500 MHz

Let:

f_0 = 8200 MHz – be the centre frequency of the band 7900-8500 MHz,
f_n – be the centre frequency of a *n*-th radio-frequency channel in the lower half of the band (MHz),
f_n' – be the centre frequency of a *n*-th radio-frequency channel in the upper half of the band (MHz).

Then the centre frequencies (MHz) of individual channels are expressed by the following relationships:

a) for channel spacing of 28 MHz:

lower half of the band: $f_n = f_0 - 309 + 28 \cdot n$,
upper half of the band: $f_n' = f_0 + 1 + 28 \cdot n$, where n = 1,2,…, 10;

b) for channel spacing of 14 MHz:

lower half of the band: $f_n = f_0 - 302 + 14 \cdot n$,
upper half of the band: $f_n' = f_0 + 8 + 14 \cdot n$, where n = 1,2,…, 20;

c) for channel spacing of 7 MHz:

lower half of the band: $f_n = f_0 - 298.5 + 7 \cdot n$,
upper half of the band: $f_n' = f_0 + 11.5 + 7 \cdot n$, where n = 1,2,…, 40;

d) for channel spacing of 3.5 MHz:

lower half of the band: $f_n = f_0 - 296.75 + 3.5 \cdot n$,
upper half of the band: $f_n' = f_0 + 13.25 + 3.5 \cdot n$, where n = 1,2,…, 80;

e) for channel spacing of 1.75 MHz:

lower half of the band: $f_n = f_0 - 295.875 + 1.75 \cdot n$,
upper half of the band: $f_n' = f_0 + 14.125 + 1.75 \cdot n$, where n = 1,2,…, 160.

Spectrum occupancy boundaries are shown in Fig. A2.1. The duplex separation between Tx/Rx is 310 MHz, other parameters are given in Table A2.1.

Figure A2.1. Occupied spectrum: 7900-8500 MHz
(frequencies in MHz)

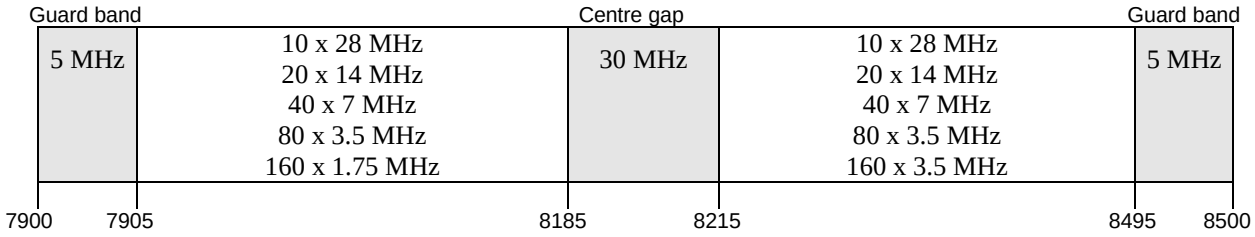

Table A2.1. Parameters of the channel arrangement in the band 7900-8500 MHz

XS, MHz	n	f1, MHz	fn, MHz	f1′, MHz	fn′, MHz	Z1S, MHz	Z2S, MHz	YS, MHz	DS, MHz
28	1...10	7919	8171	8229	8481	19	19	58	310
14	1…20	7912	8178	8222	8488	12	12	44	310
7	1…40	7908.5	8181.5	8218.5	8491.5	8.5	8.5	37	310
3.5	1…80	7906.75	8183.25	8216.75	8493.25	6.75	6.75	33.5	310
1.75	1…160	7905.875	8184.125	8215.875	8494.125	5.875	5.875	31.75	310

Annex 3

CHANNEL IDENTIFIERS FOR DERIVATIVE 56 MHz CHANNELS

The derivative 56 MHz channels (ref. Recommends 2) can be identified by using the following numbering:

1) For the band 7125 MHz – 7425 MHz:

$f_n = (f_0 – 147 + 28 \cdot n)$, MHz
$f_n' = (f_0 + 7 + 28 \cdot n)$, MHz
$n = 1, 2, \ldots 4$
$f_0 = 7275$ MHz

2) For the band 7425 MHz – 7725 MHz:

$f_n = (f_0 – 147 + 28 \cdot n)$, MHz
$f_n' = (f_0 + 7 + 28 \cdot n)$, MHz
$n = 1, 2, \ldots 4$
$f_0 = 7575$ MHz

3) For the band 7900 MHz – 8500 MHz:

fn = $(f_0 – 295 + 28 \cdot n)$, MHz
fn` = $(f_0 + 15 + 28 \cdot n)$, MHz
$n = 1, 2, \ldots 9$
$f_0 = 8200$ 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 diagram below for channel arrangement example.