

CEPT/ERC/RECOMMENDATION 12-02 E (Bonn 1994, revised June 2007)

HARMONISED RADIO FREQUENCY CHANNEL ARRANGEMENTS FOR ANALOGUE AND DIGITAL TERRESTRIAL FIXED SYSTEMS OPERATING IN THE BAND 12.75 GHz TO 13.25 GHz

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

"The European Conference of Postal and Telecommunications Administrations,

considering

1. that CEPT should develop radio frequency channel arrangements in consultation with organisations developing standards for radio systems, in order to make the most effective use of the spectrum available,
2. that the propagation characteristics of the band 12.75 GHz to 13.25 GHz are ideally suited to medium-range high grade digital fixed systems,
3. that the anticipated developments in telecommunications networks will require large numbers of medium-range links in the supporting infrastructure,
4. that a number of new or existing systems could operate successfully in the band 12.75 GHz to 13.25 GHz thus relieving congestion and reducing the demand for spectrum in the lower frequency bands,
5. that any radio frequency channel arrangement should incorporate a provision for the future introduction of improved equipment standards,
6. 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,
7. 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 Article 8 of the Radio Regulations allocates the band 12.75 GHz to 13.25 GHz on an equal primary basis to the Fixed, Fixed Satellite and Mobile services. Sharing criteria between Fixed and Mobile, and Fixed and Fixed Satellite services may be required,
- b) that in some CEPT countries there are existing fixed systems in the band 12.75 GHz to 13.25 GHz which are not operating in accordance with the channel arrangement given in Annex A, in particular the 3.5 MHz raster is used with a 1.75 MHz shift with respect to that shown in Annex A,
- c) that in some CEPT countries the band 12.75 GHz to 13.25 GHz is currently unavailable for the Fixed Service,
- d) that current equipment standards support a 1.75 MHz raster,

recommends

1. that CEPT administrations which have the band 12.75 GHz to 13.25 GHz available for the Fixed Service should follow the recommended radio frequency channel arrangements for the band 12.75 GHz to 13.25 GHz given in Annex A,
2. that in order to obtain maximum spectrum utilisation, the centre gap and guard bands may be used for a variety of low capacity systems, provided that the limits for out-of band emissions are met,
3. that administrations may choose to allow existing systems to remain in the band 12.75 GHz to 13.25 GHz until the year 2008, and may determine, on a national basis, the degree of protection given. International coordination between existing and new systems shall be in accordance with Article 12 of the Radio Regulations,
4. that one or more 28 MHz channels can be sub-divided for low capacity digital systems according to Annex A,
5. that CEPT administrations may consider merging any of two adjacent 28 MHz channels specified in Annex A 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 coordination, administrations may refer to the channel identifiers described in Annex B.”

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 A

DERIVATION OF PROPOSED FREQUENCY CHANNELS

Let

f_0 be the frequency of 12996 MHz as given in ITU-R Recommendation 497, Recommends 9,

f_n be the centre frequency in MHz of a radio-frequency channel in the lower half of the band,

f_n' be the centre frequency in MHz of a radio-frequency channel in the upper half of the band,

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

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

$$\begin{array}{ll} \text{lower half of the band:} & f_n = f_0 - 259 + 28 n \\ \text{upper half of the band:} & f_n' = f_0 + 7 + 28 n \end{array} \quad \text{where } n = 1, 2, \dots 8$$

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

$$\begin{array}{ll} \text{lower half of the band:} & f_n = f_0 - 252 + 14 n \\ \text{upper half of the band:} & f_n' = f_0 + 14 + 14 n \end{array} \quad \text{where } n = 1, 2, \dots 16$$

c) for systems with a carrier spacing of 7 MHz:

$$\begin{array}{ll} \text{lower half of the band:} & f_n = f_0 - 248.5 + 7 n \\ \text{upper half of the band:} & f_n' = f_0 + 17.5 + 7 n \end{array} \quad \text{where } n = 1, 2, \dots 32$$

d) for systems with a carrier spacing of 3.5 MHz:

$$\begin{array}{ll} \text{lower half of the band:} & f_n = f_0 - 246.75 + 3.5 n \\ \text{upper half of the band:} & f_n' = f_0 + 19.25 + 3.5 n \end{array} \quad \text{where } n = 1, 2, \dots 64$$

e) for systems with a carrier spacing of 1.75 MHz:

$$\begin{array}{ll} \text{lower half of the band:} & f_n = f_0 - 245.875 + 1.75 n \\ \text{upper half of the band:} & f_n' = f_0 + 20.125 + 1.75 n \end{array} \quad \text{where } n = 1, 2, \dots 128$$

Figure 1: Radio-frequency channel arrangement using 28 MHz channel spacing

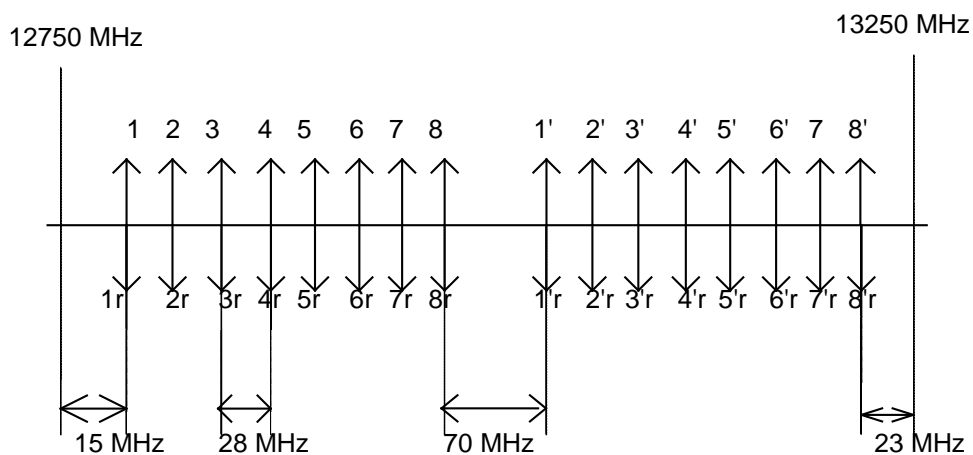
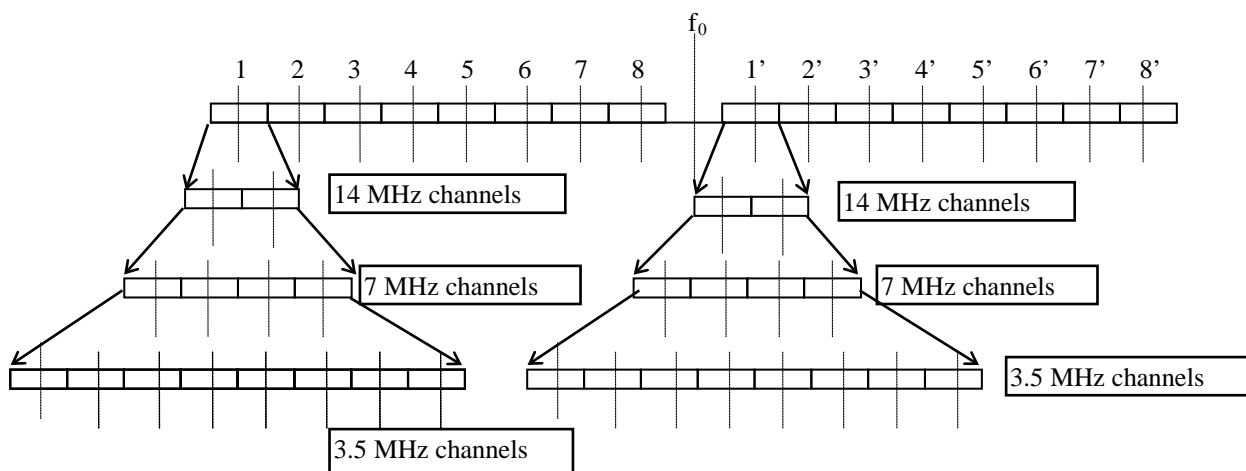
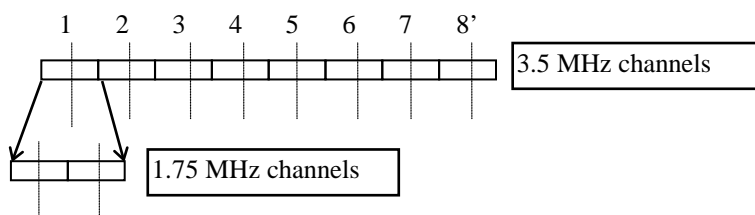


Figure 2: Examples of radio-frequency channel arrangements sub-divided for smaller capacity digital systems

(a) Sub-division of 28 MHz channels to 14 MHz, 7 MHz and 3.5 MHz channels



(b) Further sub-division to 1.75 MHz channels



Annex B
CHANNEL IDENTIFIERS FOR DERIVATIVE 56 MHz CHANNELS

The derivative 56 MHz channels (ref. Recommends 5) can be identified by using the following numbering:

$$f_n = (f_0 - 245 + 28 n) \text{ MHz}$$

$$f_{n'} = (f_0 + 21 + 28 n) \text{ MHz}$$

$$n = 1, 2, \dots, 7$$

$$f_0 = 12996 \text{ MHz}$$

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.

