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9 June 2006

## **Response to 'Award of available spectrum 1452-1492 MHz'**

We broadly support the proposals for the award. The technology of most interest to us is DVB-H and our view is that best use of the spectrum would be realised if blocks of 4 x 1.7 MHz were made available. Such a block would accommodate the 7MHz DVB-H variant (see annex.)

If negotiation with other European countries were required for such use there would clearly be an element of risk for bidders if the auction were held before agreement was reached. Noting also the impact of the ongoing Digital Divident Review we suggest it would be better to defer the auction (for a maximum of 1 year) to allow the negotiations to reach a more stable point. Speculators will have a better knowledge of the spectrum value. This will reduce volatility in the auction prices, leading to a more economically efficient outcome.

### **Auction for upper 12.5MHz**

For each part of the spectrum to be sold at the optimum times, we believe it would be better to hold 2 auctions.

### **Spectrum Packaging**

In order to accommodate the 7MHz channel as above we prefer the first option ie auctioning 17 x 1.7MHz blocks.

### **Licence Term and Fees**

We support the proposals, except that the auction payment should be payable spread over the 15 year licence period. Requiring the full payment upfront biases the auction towards bidders with access to low interest rates or available capital. Therefore the outcome is suboptimal (ie economically inefficient in terms of securing maximum economic value of services).

### **Limits on applying for spectrum**

We see a potential risk to competition if all the channels were allowed to be sold to a single bidder, as proposed. In this event some kind of rights of access may be required. Since Ofcom argues -in part on competition grounds- against auctioning a single package of spectrum (6.36/7) it would be logical also to argue against a single licensee.

### **Power Limits**

We note that Ofcom proposes no power limit, only field strength at boundares. In that case a 'close' field strength limit of 3V/m should also apply, at the nearer point at which other users are likely to be using electronic apparatus, in accordance with EMC immunity standards. Consideration of receiver blocking parameters in current ETSI standards may also be needed.

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## **Annex**

### **Channel raster when sharing the L-Band with DVB-H and T-DMB**

#### **Background**

L-Band is currently regulated to the use of T-DAB and S-DAB. The channel raster is based on the 1.712 MHz channel spacing (DAB-blocks).

DVB-H systems have been proposed to use L-Band as well. DVB organization (DVB-H group) did some investigations how this can be done and studied among others scaling down the DVB-H directly to 1.5 MHz band with so that the DAB-Blocks could be used directly. However, the conclusion of these studies was that scaling down is not technically nor commercially feasible option and decided to stop any further work on the item. Instead it was decided to recommend that DVB-H should be used in the L-Band with some of the existing bandwidth variants 5, 6, 7 or 8MHz.

#### **Options**

Starting from the existing T-DAB block channel raster of 1.712 MHz a natural proposal is to combine some blocks together and fit the DVB-H signal in this wider channel. The possible options are:

3 x 1.712 MHz = 5.136 MHz

4 x 1.712 MHz = 6.848 MHz

5 x 1.712 MHz = 8.56 MHz

The real signal bandwidths of the DVB-H variants are:

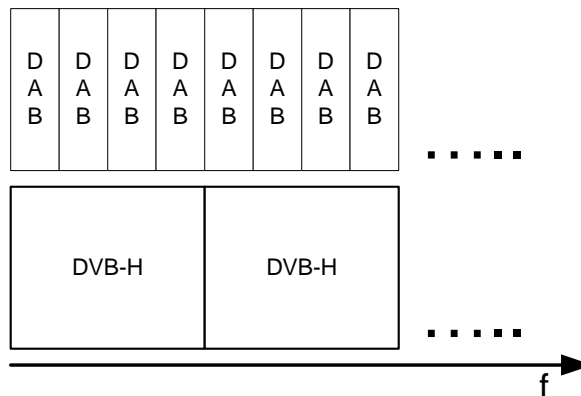
Variant	Signal bandwidth
5 MHz	4.75 MHz
6 MHz	5.71 MHz
7 MHz	6.66 MHz
8 MHz	7,61 MHz

From this we can see that the 5MHz variant would fit to 3 blocks, 6 MHz and 7 MHz variant to 4 blocks and 8 MHz variant to 5 blocks.

#### **Proposal**

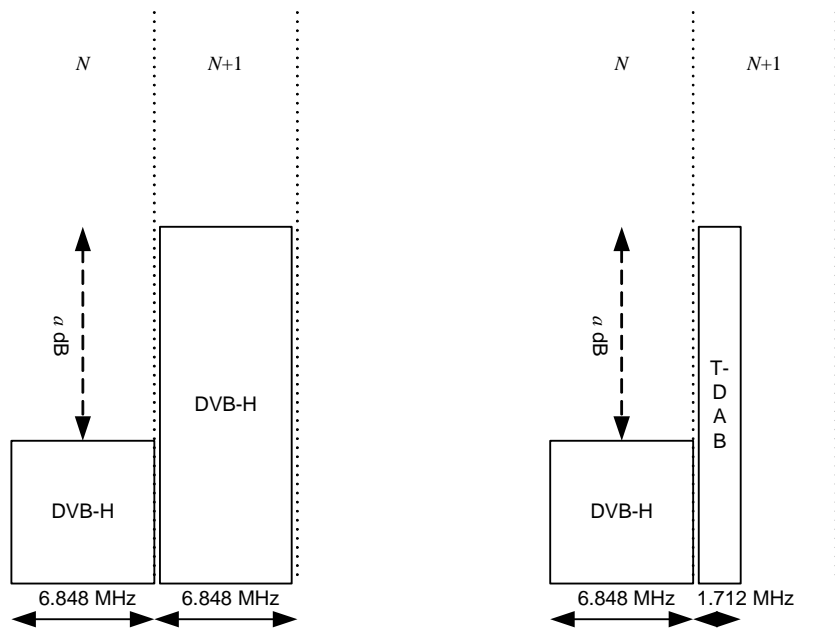
The best fit from spectrum efficiency point of view is the use of 7 MHz variant in 4 T-DAB blocks. This has also other advantages:

- Higher capacity than 5 or 6 MHz variants
- Better Doppler performance than 5 or 6 MHz variants
- Better efficiency in time slicing due the higher capacity



**Figure 1 Combining 4 T-DAB blocks to a DVB-H block**

To test whether the guard band between DVB-H signals with this 6.848 MHz raster is wide enough an adjacent channel test was done and the results were compared to the usual UHF-band performance given in IEC PT62002-1. A similar test was done by replacing the adjacent DVB-H by a T-DAB signal to see if the systems can work in the adjacent channels.



**Figure 2 Adjacent channel test scenarios**

The result of the test was that in both cases the digital ACI-requirements of the IEC PT62002-1 (following table) were met.

**Table 1 IEC PT62001-1 Digital adjacent channel performance requirements**

Mode	a [N±1]
2k/8k 16QAM CR=1/2, GI=All	29 dB
2k/8k 16QAM CR=2/3, GI=All	29 dB
2k/8k 16QAM CR=3/4, GI=All	29 dB
2k/8k 64QAM CR=2/3, GI=All	27 dB

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**Conclusion**

A combination a four T-DAB blocks to form a 6.848 MHz DVB-H block in the L-Band is proposed to make it possible to share the L-Band between services.

ENDS