

Agenda item:

Source: Siemens

Title: Text proposal: Physical Channel Segmentation and 2nd Interleaving for TDD

Document for: Decision

1 Introduction

In [1] a modification of the multiplexing scheme for TDD is described regarding the physical channel segmentation as well as the 2nd interleaving. These changes are reflected in the following text proposal.

2 Textproposal

The following text is proposed to replace the respective sections in [2]:

6.2.8 Physical channel segmentation

~~<Editor's note: Physical channel segmentation will depend upon the QoS parameters of the different transport channels in each CCTrCH. It will be necessary to specify what are the parameters expected from L2 for it.>~~

~~<Editor's note: for physical channel segmentation, it is assumed that the segmented physical channels use the same SF>~~

Data after multiplexing of transport channels with different QoS can get segmented into multiple physical channels which are transmitted in parallel during a 10ms interval.

Figure A-1 illustrates data flow from 1st interleaver down to 2nd interleaver in channel coding and multiplexing chain. In the figures, it is assumed that there are N different channel coding and multiplexing chains, and M physical channels. The following subsection describes input-output relationship of physical channel segmentation in bit-wise manner, referring to the notation in Figure A-1, where the notation in each data block, for examples L_j , R_j , K_j , P_j , M_j , etc., indicate number of bits of the data block.

The bits before physical channel segmentation are described as follows:

Bits from second multiplexing: d_1, d_2, \dots, d_P

~~M~~ is the number of physical channel with the respective capacity M_1, M_2, \dots, M_m

The bits after physical channel segmentation are defined by the following relationship:

The first physical channel bits after physical channel segmentation:

$$e_{1j} = d_j \quad j=1,2,\dots,P/M_1$$

The second physical channel bits after physical channel segmentation:

$$e_{2j} = d_{(j+P/M_1)} \quad j=1,2, \dots, P/M_2$$

...

The ~~M~~ th physical channel bits after physical channel segmentation:

$$e_{Mmj} = d_{(j+(M-1)P/M) \bmod (M_1 + M_2 + \dots + M_{m-1})} \quad j=1, 2, \dots, P/M_m$$

6.2.9 2nd interleaving

The 2nd interleaving can be applied jointly to all data bits transmitted during one frame, or separately within each timeslot, on which the CCTrCH is mapped. The selection of the 2nd interleaving scheme is controlled by higher layer.

The 2nd interleaving of channel interleaving consists of two stage operations. In first stage, the input sequence is written into rectangular matrix row by row. The second stage is inter-column permutation. The two-stage operations are described as follows, the input block length is assumed to be K_2 .

First Stage:

- (1) Set a column number $C_2 = 30$.
- (2) Determine a row number R_2 by finding minimum integer R_2 such that,

$$K_2 \leq R_2 \times C_2.$$

- (3) The input sequence of the 2nd interleaving is written into the $R_2 \times C_2$ rectangular matrix row by row.

Second Stage:

(1) Perform the inter-column permutation based on the pattern $\{P_2(j)\}$ ($j=0, 1, \dots, C-1$) that is shown in Table-4-yy6.2.8-1, where $P_2(j)$ is the original column position of the j -th permuted column.

(2) The output of the 2nd interleaving is the sequence read out column by column from the inter-column permuted $R_2 \times C_2$ matrix and the output is pruned by deleting the non-existence bits in the input sequence, where the deleting bits number l_2 is defined as:

$$l_2 = R_2 \times C_2 - K_2.$$

<Note: Inter-column permutation pattern in table 6.2.8-1 is a working assumption of WGI.>

Table 6.2.8-1

Column number C_2	Inter-column permutation pattern
30	{0, 20, 10, 5, 15, 25, 3, 13, 23, 8, 18, 28, 1, 11, 21, 6, 16, 26, 4, 14, 24, 19, 9, 29, 12, 2, 7, 22, 27, 17}

3 Conclusion

The text proposal given in the last section should be approved for [2].

4 References

- [1] TSG RAN WG1, (99)b67 “Physical Channel Segmentation and 2nd Interleaving for TDD”, Source: Siemens
- [2] TSG RAN WG1, TS 25.222 “Multiplexing and channel coding (TDD)”, Source: editor