

Agenda Item: AH21
Source: CWTS/CATT
To: TSG RAN WG1
Title: Channel coding for 1.28Mcps TDD
Document for: Decision

1. Summary

In 1.28Mcps TDD, the coding scheme and coding rate of most type of transport channels are common with that of 3.84Mcps TDD. Only the coding rate of the BCH and PCH differs from that of the 3.84 Mcps TDD.

2. Introduction and comparison with 3.84Mcps TDD

The coding rate for the BCH and PCH differs from that of the 3.84 Mcps TDD. The reason in case of the BCH is, that the BCH in 1.28Mcps TDD is mapped onto two physical channels, which provides enough capacity to use 1/3 rate coding. If using 1/2 convolutional coding as in 3.84Mcps TDD, repeating as rate matching would be applied and this might not lead to any considerable performance improvement. So 1/3 convolutional coding is considered as the coding scheme for the BCH to get better performance. Regarding the PCH there may be the situation, that only one paging message is mapped onto the S-CCPCH. In this case the capacity of the S-CCPCH would allow 1/3 rate coding, in all other cases, 1/2 rate coding is used, as in the 3.84Mcps TDD.

3. Proposal

We propose to add following paragraphs in the working CR for TS25.222 as the description of some channel coding features of the 1.28Mcps TDD.

4.2.3 Channel coding

Code blocks are delivered to the channel coding block. They are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \dots, o_{irK_i}$, where i is the TrCH number, r is the code block number, and K_i is the number of bits in each code block. The number of code blocks on TrCH i is denoted by C_i . After encoding the bits are denoted by $y_{ir1}, y_{ir2}, y_{ir3}, \dots, y_{irY_i}$, where Y_i is the number of encoded bits. The relation between o_{irk} and y_{irk} and between K_i and Y_i is dependent on the channel coding scheme.

The following channel coding schemes can be applied to transport channels:

- convolutional coding;
- turbo coding;
- no coding.

Usage of coding scheme and coding rate for the different types of TrCH is shown in table 1. The values of Y_i in connection with each coding scheme:

- convolutional coding with rate 1/2: $Y_i = 2 * K_i + 16$; rate 1/3: $Y_i = 3 * K_i + 24$;
- turbo coding with rate 1/3: $Y_i = 3 * K_i + 12$;
- no coding: $Y_i = K_i$.

Table 1: Usage of channel coding scheme and coding rate

| Type of TrCH | Coding scheme | Coding rate |
|-----------------------|----------------------|--|
| BCH | Convolutional coding | $\frac{1}{3}$ $\frac{1}{2}$ for 1.28 Mcps TDD for 3.84 Mcps TDD |
| PCH | | $\frac{1}{3}$, $\frac{1}{2}$ for 1.28 Mcps TDD $\frac{1}{2}$ for 3.84 Mcps TDD |
| RACH | | $\frac{1}{2}$ |
| DCH, DSCH, FACH, USCH | Turbo coding | $\frac{1}{3}, \frac{1}{2}$ $\frac{1}{3}$ |
| | No coding | |