TSG-RAN Working Group1 meeting #7bis
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Agenda Item:

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Title: Harmonization of notation for 3.2, 4.2.2.2, and 4.2.3 of TS25.212 v2.2.0

Document for: AH04 (and AH05)

Due to harmonization of notation some improvements are suggested for sec 3.2, sec 4.2.2.2, and sec 4.2.3 in TS25.212 v2.2.0 to clarify text. Symbols x, X, z, Z, y, and Y are defined to be temporay variables, in order words, their meaning changes on a section-by-section basis. Moreover, the maximum block sizes for convolutional coding and turbo coding are defined without tail bits, so the values are 504 and 5114, respectively.

Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the [following] terms and definitions [given in ... and the following] apply.

<defined term>: <definition>.

example: text used to clarify abstract rules by applying them literally.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

éxù round towards ¥, i.e. integer such that *x* £ *éxù* < *x*+1
ëxû round towards -¥, i.e. integer such that *x*-1 < *ëxû* £ *x*
çxç absolute value of *x*

Unless otherwise is explicitly stated when the symbol is used, the meaning of the following symbols is:
i TrCH number
j TFC number
k Bit number
l TF number
m Transport block number
n_i Radio frame number of TrCH i.
p PhCH number
r Code block number
I Number of TrCHs in a CCTrCH.
C_i Number of code blocks in one TTI of TrCH i.
F_i Number of radio frames in one TTI of TrCH i.
M_i Number of transport blocks in one TTI of TrCH i.
P Number of PhCHs used for one CCTrCH.
PL Puncturing Limit for the uplink. Signalled from higher layers
RM_i Rate Matching attribute for TrCH i. Signalled from higher layers.

Temporary variables, i.e. variables used in several (sub)sections with different meaning.
x, X
y, Y
z, Z

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

<ACRONYM> <Explanation>

4.2.2.2 Code block segmentation

Segmentation of the bit sequence from transport block concatenation is performed if $X_i>Z$. The code blocks after segmentation are of the same size. The number of code blocks on TrCH i is denoted by C_i. If the number of bits input to the segmentation, X_i, is not a multiple of C_i, filler bits are added to the last block. The filler bits are transmitted and they are always set to 0. The maximum code block sizes are:

convolutional coding: Z = 504 ~~512 - K_{tail}~~
turbo coding: Z = 5114 ~~5120 - K_{tail}~~

no channel coding: Z = *unlimited*

4.2.3 Channel coding

Code blocks are delivered to the channel coding block. They are denoted by $o_{ir1}, o_{ir2}, o_{ir3}, \ldots, o_{irK_i}$, 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 ~~$x_{ir1}, x_{ir2}, x_{ir3}, \ldots, x_{irX_i}$~~ $y_{ir1}, y_{ir2}, y_{ir3}, \ldots, y_{irY_i}$ .The encoded blocks are serially multiplexed so that the block with lowest index r is output first from the channel coding block. The bits output are denoted by $c_{i1}, c_{i2}, c_{i3}, \ldots, c_{iE_i}$, where i is the TrCH number and $E_i = C_i$~~X~~Y_i. The output bits are defined by the following relations:

~~$c_{ik} = x_{i1k}$~~ $c_{ik} = y_{i1k}$ $k = 1, 2, \ldots,$ ~~X~~Y_i

~~$c_{ik} = x_{i,2,(k-X_i)}$~~ $c_{ik} = y_{i,2,(k-Y_i)}$ $k =$ ~~X~~$Y_i + 1,$ ~~X~~$Y_i + 2, \ldots, 2$~~X~~Y_i

~~$c_{ik} = x_{i,3,(k-2X_i)}$~~ $c_{ik} = y_{i,3,(k-2Y_i)}$ $k = 2$~~X~~$Y_i + 1, 2$~~X~~$Y_i + 2, \ldots, 3$~~X~~Y_i

$\ldots$

~~$c_{ik} = x_{i,C_i,(k-(C_i-1)X_i)}$~~ $c_{ik} = y_{i,C_i,(k-(C_i-1)Y_i)}$ $k = (C_i - 1)$~~X~~$Y_i + 1, (C_i - 1)$~~X~~$Y_i + 2, \ldots, C_i$~~X~~Y_i

The relation between o_{irk} and ~~x~~y_{irk} and between K_i and ~~X~~Y_i is dependent on the channel coding scheme.

The following channel coding schemes can be applied to TrCHs:

- Convolutional coding
- Turbo coding
- No channel coding

The values of Y_i in connection with each coding scheme:

- Convolutional coding, ½ rate: $Y_i = 2*K_i + 16$; 1/3 rate: $Y_i = 3*K_i + 24$
- Turbo coding, 1/3 rate: $Y_i = 3*K_i + 12$
- No channel coding, $Y_i = K_i$