TSG-RAN Working Group 1(Radio) meeting #5 ***TSGR1#5(99)617***
Cheju, Korea, 01 – 04 June 1999

Agenda Item:

Source: **Nokia**

Title: **Text proposal to the algorithm for combining and segmentation of turbo encoder blocks (25.212)**

Document for: **Discussion**

Introduction

In e-mail discussion over the reflector it was suggested that R_{DATA}, T_{DELAY} and N_{EXTRA} would be replaced with only one parameter N_{DATA}. It is true that a turbo encoder need not know what has happened to user data before encoding. The point is to know the length of an input block, so N_{DATA} is a sufficient parameter for the algorithm.

Text proposal for 25.212

4.2.2.2.3 Encoding blocks for Turbo code

<Editor's note: 8192 is FFS.>
Input data blocks for a turbo encoder consist of the user data and possible extra data being appended to the user data before turbo encoding. The encoding segments for a turbo encoder are defined in terms of systematic bits. The segment includes the user data, a possible error detection field (CRC), possible filler bits, and the termination. The maximum encoding segment length is 8192. The Algorithm for combining and segmentation is as follows:

Inputs:

~~R_{DATA} the user data rate (bits per second)~~

~~T_{DELAY} transmission time interval (seconds)~~

~~N_{EXTRA} extra data to be appended to the user data before encoding (CRC bits etc)~~

N_{DATA} size of input data block to turbo encoder

N_{TAIL} number of tail bits to be appended to the encoding segments (termination)

Outputs:

N_S number of segments

N_{TB} number of bits in the turbo encoder input segments

N_{FILL} number of filler (zero) bits in the last turbo encoder input segment

Do:

1. Let N_S = round_up(~~(R_{DATA} * T_{DELAY} + N_{EXTRA})~~N_{DATA} / (8192 – N_{TAIL}))

2. Let N_{TB} = round_up (~~(R_{DATA} * T_{DELAY} + N_{EXTRA})~~ N_{DATA} / N_S) + N_{TAIL};

3. Let N_{REM} = remainder of ~~(R_{DATA} * T_{DELAY} + N_{EXTRA})~~ N_{DATA} / N_S;

4. If N_{REM} not equal to 0 then insert N_{FILL} = (N_S – N_{REM}) zero bits to the end of the input data else N_{FILL} = 0.

5. End.

Here round_up(x) stands for an smallest interger number being larger or equal to x.

All turbo encoder input segments are of equal size and therefore the same turbo interleaver can be used for all turbo segments. A number of systematic bits over an entire channel interleaving block at output of the encoder is

N_S * (round_up(~~(R_{DATA} * T_{DELAY} + N_{EXTRA})~~ N_{DATA} / N_S) + N_{TAIL}).

The N_{FILL} filler bits are padded to the end of the last encoding segment in order to make the last segment equal size to the precedent ones. The filler bits are encoded.

Text proposal for 25.222

The same changes apply to chapter 6.2.2.2.4 in 25.222.