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To: TSG RAN WG2

Source: TSG RAN WG1

Title: Answer to Liaison statement on TS 25.302, 'Services provided by the Physical Layer'

WG1 thank WG2 for their Liaison statement on 25.302, 'Services provided by the Physical Layer' (TSGR1#6(99)965 & TSGR2#5(99)700) and would like to give the following comments on TS 25.302 V2.4.0:

Section 6.1

WG1 would like to inform WG2 that the L1 function corresponding to "splitting/demultiplexing" is called "physical channel segmentation", which is done in blocks. Hence, WG1 would like to ask WG2 to update the terminology and instead use the term "physical channel segmentation".

Section 7.1.5

WG1's current assumption is that all transport blocks within a transmission time interval have the same size. If that is not the case, WG1 need to slightly modify several steps in the multiplexing chain. WG1 would like to ask WG2 for guidance, if WG2 still consider the case with different sizes important (requiring changes on L1), or if WG2 could remove that possibility.

Section 7.6.1

The semi-static attributes are not completely in line WG1 assumptions and WG1 would therefore like to suggest the following changes:

Attributes of the semi-static part are:

- Transmission Time Interval (mandatory for FDD, optional for the dynamic part of TDD NRT bearers)
- Error protection scheme to apply
  - Type of error protection ~~e.g.,~~ t~~T~~urbo c~~C~~ode, ~~, C~~convolutio~~n~~nal c~~C~~ode or no channel coding
  - Coding rate~~nvolutional code ratio~~
  - ~~Resulting code ratio after static rate matching~~Rate matching
  - Puncturing limit for uplink
- Size of CRC

Note that code rates 1/2 and 1/3 can be used in conjunction with *both* convolutional codes and turbo codes.

WG1 further propose that the terms "inner coding" and "outer coding" used in several of the examples in 25.302 are replaced with either "convolutional coding" or "turbo coding". There is no longer any inner or outer coding since Reed-Solomon codes have been replaced by turbo codes.

According to WG1's current assumption, the semi-static rate matching attribute is a single value associated with each transport channel. Furthermore, WG1's current assumption is not that the amount of rate matching is obtained by

multiplying the semi-static rate matching attribute by the number of bits in a radio frame. Hence, saying repeat 1/12 bit does not correspond to what WG1 expect to be indicated to layer 1. Instead, the semi-static rate matching attribute indicates the relative amount of rate matching between the different transport channels. In the downlink, the actual level of puncturing/repetition applied does not vary from frame to frame, and transmission is interrupted if the resultant number of bits is less than the maximum. In the uplink, the actual level of puncturing/repetition may vary from frame to frame in order to match the resultant number of bits to the channel bit rate. In addition, in the uplink the physical layer selects the spreading factor on a frame by frame basis, always selecting the highest spreading factor whilst ensuring that the maximum puncturing ratio of each transport channel is not exceeded. For the exact details we would like to refer to the latest versions of 25.212 and 25.222 (generated after the WG1#6 meeting).

Section 7.1.12

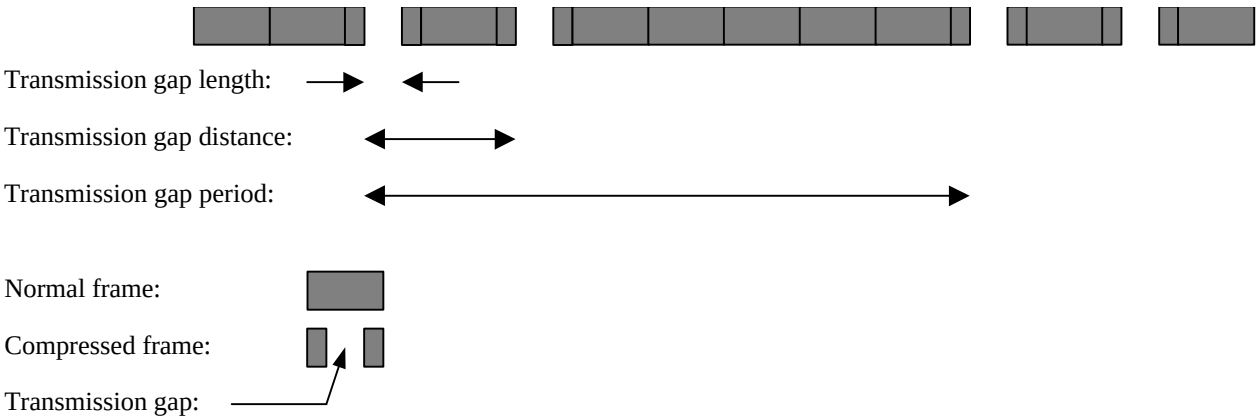
WG1 would like to inform WG2 that the current assumption in WG1 is that there is no dynamic rate matching in downlink. If dynamic rate matching without restrictions is introduced in downlink, it will require significant changes of current assumptions in WG1. The main reason that dynamic rate matching can not be supported in downlink is that it would make blind transport format detection (no TFCI field) harder. This has not been studied in detail.

Section 7.3

WG1 would like to inform WG2 that the terminology "slotted mode" is no longer used within WG1. Instead "compressed mode" is used since that describes more what is actually done, i.e. the data is compressed in time to create a measurement hole. The radio frames that are compressed should then be denoted "compressed frames".

The actual gap in the transmission created in the compressed frames, should be called "transmission gap". The length in time of this gap is then denoted "transmission gap length". In a pattern of compressed frames, the "compressed frame pattern" there may in the general case be more then one compressed frame. The distance between those frames is the "transmission gap distance". There may be, in the general case, different transmission gap distances between different compressed frames in the pattern. The distance between the patterns of compressed frames is the "transmission gap period".

The general case with patterns of compressed frames is shown in the figure below.



To summarise, WG1 would like to ask WG2 to modify the terminology used within WG2, so that there is consistency between the groups. The terminology used should then be: compressed mode, compressed frame, compressed frame pattern, transmission gap, transmission gap length, transmission gap distance, transmission gap period.

Section 8.1

There is no "DPCH" physical channel defined in uplink. Only the terms "DPCCH" and "DPDCH" should be used.

Section 8.2

Combination 3: Whether the support of simultaneous AICH and SCCPCH is part of the UE baseline implementation capabilities is still under discussion within WG1, and therefore WG1 cannot provide any additional information on this point at this stage.

Section 9

WG1 would like to inform WG2 that WG1 see the SFN as a L1 parameter, i.e. the SFN is added on the physical layer and is not included in the transport blocks from L2/3.

Regarding the measurements:

- Instead of measuring on the primary CCPCH, it is assumed in WG1 that it is the common pilot channel CPICH that should be measured.
- WG1 has not yet come to any agreement on the impact on terminal complexity if L1 should support measurements of RX primary CCPCH SIR and ISCP. Therefore, these two measurements are currently not supported by L1. However, it is too early to rule out the possibility that they will eventually be included also in the WG1 specifications. It may be beneficial to mark this current status of these measurements more clearly in 25.302.

Section 10.3.3

The need for individual TX-diversity indications for different common channels is FFS. In general, for the FDD mode the section is in line with WG1's view. However, there are some comments, found below.

Section 10.3.3.5

"Message channelisation code(Spreading factor)" should more accurately be "Spreading factor for data part". No explicit information about the channelization code is needed.

Section 10.3.3.6

In uplink, there is no "DPCH" physical channel defined, but "DPCCH" and "DPDCH" should be used instead. Moreover, the channelization codes to use on the DPCCH and DPDCH are not signalled from higher layer, but are determined within L1 only.

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Section 10.3.3.9

The PICH may have 144, 72, 36 or 18 paging indicators per frame, corresponding to repetition factors 1, 2, 4, or 8. This repetition factor needs to be known by L1 as well, and is therefore to WG1' s understanding a parameter to define.

Annex A

WG1 would like to inform WG2 that segmentation has been specified on the physical layer for both turbo and convolutional codes. This segmentation will of course be removed if the maximum block size is set below the limit for segmentation. The specified limits including tail bits and CRC bits are 5120 bits for turbo codes and 512 bits for convolutional codes. From an implementation point of view it is desirable to have a maximum size that is close to 2^x or a sum of such. For turbo codes, the number of tail bits is 6, while the number of tail bits for convolutional codes is 8. Hence, assuming a longest CRC of 24 bits, the maximum transport block size for turbo codes is 5120-6-24=5090 bits, while the maximum transport block size for convolutional codes should be 512-8-24=490 bits.

Currently WG1 has two stages of multiplexing. The first stage may be used for multiplexing the transport blocks of transport channels that have identical transport formats and transport format sets. The first multiplexing may be considered as similar to MAC multiplexing but without the overhead of a MAC header. According to the current WG1 specification, the output block from the first stage may be larger than the maximum coding block size and therefore segmentation would be required prior to coding. In order to avoid physical layer segmentation, there must be a further limitation on the first multiplexing to ensure that the resultant block is never greater than 5090 bits or 490 bits for turbo and convolutional coding respectively. WG1 would like to ask WG2 ŝ opinion on this issue.

WG1 ŝ specifications currently support code rate 1/1 (equivalent to no channel coding at all).

WG1 has not defined a CRC of length 24. However, this will be done when there exists a detailed proposal.

WG1 has not yet discussed the range of the semi-static rate-matching attribute and does therefore not have an opinion on if 0.5 to 4 is appropriate. However, WG1 would like to inform WG2 that with the current rules for converting the rate matching attribute to number of repeated or punctured bits, it is possible to always let the rate matching attribute be integers.