TSG-RAN Working Group 1 meeting #7
Hannover, Germany
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TSGR1#7(99)d75

Agenda item:

Source: Ericsson

Title: Updated text proposal for restrictions on common channels

Document for: Decision

This document contains a revised version of the text proposal in TSGR1#7(99)b29.

In Ad Hoc 4 the following points were identified and agreed:

- Section 4.2 The CCTrCH definition given in [2], should be included.
- The deletion of "code multiplexing" in [2] should be included
- Section 4.2.12.6 “each” replaced by “the”. Delete point TTI=10ms.
- Section 4.2.12.7 Only one secondary CCPCH is used *per CCTrCH*, i.e. *P*=1.

The document including these changes was recommended for approval by WG1.

1 Introduction

The description of multiplexing and coding in [1] applies to all types of Coded Composite Transport Channels (CCTrCHs). For dedicated channels, all blocks in the multiplexing chain are needed but for common channels some of the blocks are not used. In [2], it is proposed that figures describing all types of CCTrCHs should be added in [1]. In this contribution an alternative way of describing the restrictions on each type of CCTrCH is given. Instead of adding figures the restrictions are given in a separate section. The same notation as in [3] is used. The restrictions on the common channels are the same as in [2], except for the DSCH. The description of the DSCH in this paper is in line with [4], while some modifications are proposed in [2]. If the modifications in [2] are accepted, the text proposal in Section 3 should of course be updated.

It is natural to list the restrictions on the different types of CCTrCH in [1] since the restrictions become very clear if the [1]-internal notation is used. Currently, the restrictions on the allowed CCTrCH combinations are given in [5]. It seems logical to describe the restriction on allowed CCTrCH combinations in the same document as the restrictions on each individual CCTrCH. Hence, it is proposed that Section 6.1 is moved from [5] to [1]. A text proposal is given in section 4.

2 References

[1] TSG RAN WG1, “TS 25.212 Multiplexing and channel coding (FDD)”.

[2] Nokia, “TSGR1#7(99)a83 CCTrCH definition and multiplexing”.

[3] Ericsson, “TSGR1#7(99)b29 Proposal for new notation in 25.212”.

[4] TSG RAN WG2, “TS 25.302 Services provided by the physical layer”.

[5] TSG RAN WG1, “TS 25.211Physical channels and mapping of transport channels onto physical

channels (FDD)"

3 Text proposal for 25.212 on restrictions on different types CCTrCHs

4.2 Transport-channel coding/multiplexing

Data arrives to the coding/multiplexing unit in form of transport block sets once every transmission time interval. The transmission time interval is transport-channel specific from the set {10 ms, 20 ms, 40 ms, 80 ms}.
The following coding/multiplexing steps can be identified:

- Add CRC to each transport block (see Section 4.2.1)
- Transport block concatenation and code block segmentation (see Section 4.2.2)
- Channel coding (see Section 4.2.3)
- Rate matching (see Section 4.2.6)
- Insertion of discontinuous transmission (DTX) indication bits (see Section 4.2.8~~7~~)
- Interleaving (two steps, see Section 4.2.4 and 4.2.10)
- Radio frame segmentation (see Section 4.2.5)
- Multiplexing of transport channels (~~two steps,~~ see Section 4.2.2 ~~and~~ 4.2.7~~8~~)
- Physical channel segmentation (see Section 4.2.9)
- Mapping to physical channels (see Section 4.2.11)

The coding/multiplexing steps for uplink and downlink are shown in Figure 1 and Figure 2 respectively.

-- snip --

Figure2: Transport channel multiplexing structure for downlink

The single output data stream from the TrCH multiplexing is denoted *Coded Composite Transport Channel (CCTrCH)*. A CCTrCH can be mapped to one or several physical channels.

~~*<Editor's note: Code multiplexing is not used in uplink as a working assumption in WG1..>*~~
~~Primarily, transport channels are multiplexed as described above, i.e. into one data stream mapped on one or several physical channels. However, an alternative way of multiplexing services is to use code multiplexing, which corresponds to having several parallel multiplexing chains, resulting in several data stream, each mapped to one or several physical channels. This code multiplexing is used only for downlink DSCHs. For the other transport channels including downlink DCHs, the code multiplexing shall not be used.~~
-- snip --

4.2.12 ~~DSCH transmission when associated with DCH~~ Restrictions on different types of CCTrCHs

Restrictions on the different types of CCTrCHs are described in general terms in [25.302]. In this section those restrictions are given with layer 1 notation.

- ~~The data stream on DSCH shall be transmitted continuously over the 10 ms allocation period with no DTX on slot period.~~
- ~~The spreading factor is indicated with the TFCI or with higher layer signaling on DCH.~~
- ~~Rate matching is implemented as in uplink, when there is data to transmit the 10 ms frame is fully filled with no DTX. The rates for the data as well as rate matching parameters are pre-negotiated at higher layers and are all part of the TFCI indication for particular data rate with particular spreading code.~~

4.2.12.1 Uplink Dedicated channel (DCH)

The maximum value of the number of TrCHs I in a CCTrCH, the maximum value of the number of transport blocks M_i on each transport channel, and the maximum value of the number of DPDCHs P are given from the UE capability class.

4.2.12.2 Random Access Channel (RACH)

- There can only be one TrCH in each RACH CCTrCH, i.e. I=1, $s_k = f_{1k}$ and $S = V_1$.
- The maximum value of the number of transport blocks M_1 on the transport channel is given from the UE capability class.
- The transmission time interval is always 10 ms, i.e. $e_{1k} = c_{1k}$ and $N_1 = E_1$.
- At initial RACH transmission the rate matching attribute has a predefined value.
- Only one PRACH is used, i.e. P=1, $u_{1k} = s_k$, and $U = S$.

4.2.12.3 Common Packet Channel (CPCH)

- The maximum value of the number of TrCHs I in a CCTrCH, the maximum value of the number of transport blocks M_i on each transport channel, and the maximum value of the number of DPDCHs P are given from the UE capability class.
- Note 1: The need to multiplex several CPCH transport channels is FFS (this note is taken from 25.302).
- Note 2: Only the data part of the CPCH can be mapped on multiple physical channels (this note is taken from 25.302).

4.2.12.4 Downlink Dedicated Channel (DCH)

The maximum value of the number of TrCHs I in a CCTrCH, the maximum value of the number of transport blocks M_i on each transport channel, and the maximum value of the number of DPDCHs P are given from the UE capability class.

4.2.12.5 Downlink Shared Channel (DSCH) associated with a DCH

- The spreading factor is indicated with the TFCI or with higher layer signalling on DCH.
- There can only be one TrCH in each DSCH CCTrCH, i.e. I=1, $s_k = f_{1k}$ and $S = V_1$.
- The maximum value of the number of transport blocks M_1 on the transport channel and the maximum value of the number of PDSCHs P are given from the UE capability class.

4.2.12.6 Broadcast channel (BCH)

- There can only be one TrCH in the BCH CCTrCH, i.e. I=1, $s_k = f_{1k}$, and $S = V_1$.
- There can only be one transport block in each transmission time interval, i.e. $M_1 = 1$.
- All transport format attributes have predefined values.
- Only one primary CCPCH is used, i.e. P=1.

4.2.12.7 Forward access and paging channels (FACH and PCH)

- The maximum value of the number of TrCHs I in a CCTrCH and the maximum value of the number of transport blocks M_i on each transport channel are given from the UE capability class.
- The transmission time interval for TrCHs of PCH type is always 10 ms.
- Only one secondary CCPCH is used per CCTrCH, i.e. P=1.

4 Text proposal for 25.212 on allowed CCTrCH combinations

4.2.13 Multiplexing of different transport channels ~~o~~into one CCTrCH, and mapping of one CCTrCH onto physical channels

~~Different transport channels can be encoded and multiplexed together into one Coded Composite Transport Channel (CCTrCH) as described in [4].~~ The following rules shall apply to the different transport channels which are part of the same CCTrCH:

1) Transport channels multiplexed into one CCTrCh should have co-ordinated timings in the sense that transport blocks arriving from higher layers on different transport channels of potentially different transmission time intervals shall have aligned transmission time instants as shown in ~~Figure 29~~Figure 7.

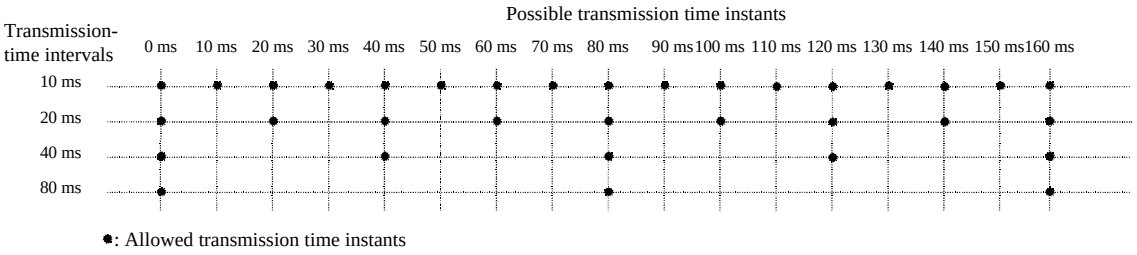

Figure ~~2~~7: Possible transmission time instants regarding CCTrCH

2) Only transport channels with the same active set can be mapped onto the same CCTrCH.
3) Different CCTrCHs cannot be mapped onto the same ~~DPDCH~~PhCH.
4) One CCTrCH shall be mapped onto one or several ~~DPDCH~~PhCHs. These physical channels ~~within one CCTrCH~~ shall all have the same SF.
5) Dedicated Transport channels and common transport channels cannot be multiplexed into the same CCTrCH
6) For the common transport channels, only the FACH and PCH may belong to the same CCTrCH

There are hence two types of CCTrCH

1) CCTrCH of dedicated type, corresponding to the result of coding and multiplexing of one or several DCHs.
2) CCTrCH of common type, corresponding to the result of the coding and multiplexing of a common channel, RACH in the uplink, DSCH ,BCH, or FACH/ ~~or~~ PCH for the downlink.

4.2.13.1 Allowed CCTrCH combinations for one UE

4.2.13.1.1 Allowed CCTrCH combinations on the uplink

The following CCTrCH combinations for one UE are allowed, where those are mutually exclusive:

1) one CCTrCH of dedicated type
2) one CCTrCH of common type

4.2.13.1.2 Allowed CCTrCH combinations on the downlink

The following CCTrCH combinations for one UE are allowed :

1) x CCTrCH of dedicated type + y CCTrCH of common type

The allowed combination of CCTrCHs of dedicated and common type are FFS.

Note 1 : There is only one DPCCH in the uplink, hence one TPC bits flow on the uplink to control possibly the different DPDCHs on the downlink, part of the same or several CCTrCHs.
Note 2 : There is only one DPCCH in the downlink, even with multiple CCTrCHs. With multiple CCTrCHs, the DPCCH is transmitted on one of the physical channels of that CCTrCH which has the smallest SF among the multiple CCTrCHs. Thus there is only one TPC command flow and only one TFCI word in downlink even with multiple CCTrCHs.