3GPP TSG RAN WG1 Meeting #14
Oulu, Finland, 04-07 July 2000

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e.g. for 3GPP use the format TP-99xxx
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CHANGE REQUEST

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25.222	CR	XXX	Current Version:	3.3.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	RAN#10	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

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Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [X] Core Network [ ]

Source: CWTS **Date:**

Subject: CR for TS25.222 regarding the 1.28 Mcps TDD

Work item: Low Chip Rate TDD option, Physical Layer

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature	X		Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	
				Release 00	X

Reason for change: This CR collects the principally agreed wording of the changes necessary for introducing the feature 'Low Chip Rate TDD option' in the TS25.222. In its last revision it should be editorially changed to reflect the correct changes needed for the latest approved version of this specification.

Clauses affected:

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments: In this first version, a proposed structure has been included in this CR. The structure was copied from TS25.222 vers. 3.3.0. The sections on 'physical channels' and 'mapping of TrCH to physical channels' were duplicated to distinguish between the different chip rate options. In addition to that the proposals that were agreed in principle in WG1#14 were included in this CR.


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2 References

<For clarity, this chapter will currently collect only the references that are needed in addition to the already existing abbreviations. In its last version this chapter has to be modified, so that it includes the revisions with respect to the latest versions of TS25.222.>

3 Definitions, symbols and abbreviations

<For clarity, this chapter will currently collect only the definitions, symbols and abbreviations that are needed in addition to the already existing ones. In its last version this chapter has to be modified, so that it includes the revisions with respect to the latest versions of TS25.222.>

3.1 Definitions

3.2 Symbols

3.3 Abbreviations

4 Multiplexing, channel coding and interleaving

4.1 General

Data stream from/to MAC and higher layers (Transport block / Transport block set) is encoded/decoded to offer transport services over the radio transmission link. Channel coding scheme is a combination of error detection, error correcting (including rate matching), and interleaving and transport channels mapping onto/splitting from physical channels.

In the UTRA-TDD mode, the total number of basic physical channels (a certain time slot one spreading code on a certain carrier frequency) per frame is given by the maximum number of time slots which is 15 and the maximum number of CDMA codes per time slot.

4.2 Transport channel coding/multiplexing

Figure 1 illustrates the overall concept of transport-channel coding and 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 subclause 4.2.1);
- TrBk concatenation / Code block segmentation (see subclause 4.2.2);
- channel coding (see subclause 4.2.3) ;
- radio frame size equalization (see subclause 4.2.4);
- interleaving (two steps, see subclauses 4.2.5 and 4.2.10);
- radio frame segmentation (see subclause 4.2.6);
- rate matching (see subclause 4.2.7);

- multiplexing of transport channels (see subclause 4.2.8);
- physical channel segmentation (see subclause 4.2.9);
- mapping to physical channels (see subclause 4.2.11).

The coding/multiplexing steps for uplink and downlink are shown in figure 1.

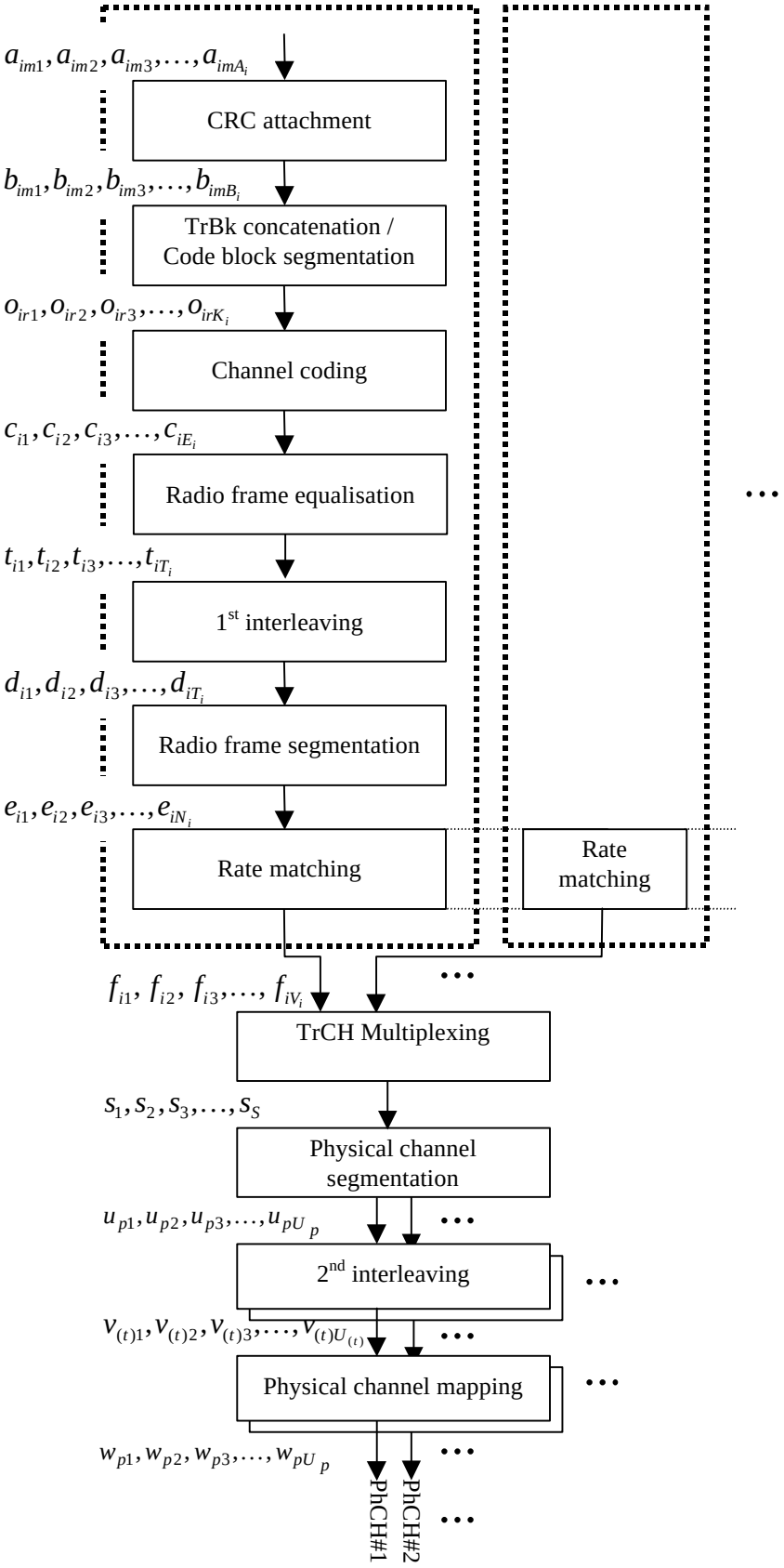

Figure 1: Transport channel multiplexing structure for uplink and downlink

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 multiple CCTrCHs (Coded Composite Transport Channels), which corresponds to having several parallel multiplexing chains as in figure 1, resulting in several data streams, each mapped to one or several physical channels.

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 $y_{ir1}, y_{ir2}, y_{ir3}, \ldots, y_{irY_i}$, 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

<table>
<tr><th>Type of TrCH</th><th>Coding scheme</th><th>Coding rate</th></tr>
<tr><td>BCH</td><td rowspan="3">Convolutional coding</td><td rowspan="2">½</td></tr>
<tr><td>PCH</td></tr>
<tr><td>RACH</td><td>1/3, ½</td></tr>
<tr><td rowspan="2">DCH, DSCH, FACH, USCH</td><td>Turbo coding</td><td>1/3</td></tr>
<tr><td colspan="2">No coding</td></tr>
</table>

4.2.11 Sub-frame segmentation for the 1.28 Mcps option

4.2.12 Physical channel mapping

4.2.12.11 Physical channel mapping for the 3.84 Mcps option

<No changes will be made in this chapter in this CR, only the title and numbering have to be changed. [former section 4.2.11]>

4.2.12.2 Physical channel mapping for the 1.28 Mcps option

4.2.1213 Multiplexing of different transport channels onto one CCTrCH, and mapping of one CCTrCH onto physical channels

<No changes will be made in this chapter in this CR, only the numbering has to be changed. >

4.2.~~13~~14 Transport format detection

<No changes will be made in this chapter in this CR, only the numbering has to be changed. >

4.3 Coding for layer 1 control for the 3.84 Mcps option

<No changes will be made in this chapter in this CR, only the numbering has to be changed. >

4.4 Coding for layer 1 control for the 1.28 Mcps option

4.4.1 Coding of transport format combination indicator (TFCI) for QPSK

4.4.1.1 Coding of long TFCI lengths

4.4.1.2 Coding of short TFCI lengths

4.4.1.2.1 Coding very short TFCIs by repetition

4.4.1.2.2 Coding short TFCIs using bi-orthogonal codes

4.4.1.3 Mapping of TFCI word

4.4.2 Coding of transport format combination indicator (TFCI) for 8PSK

4.4.2.1 Coding of long TFCI lengths

4.4.2.2 Coding of short TFCI lengths

4.4.2.2.1 Coding very short TFCIs by repetition

4.4.2.2.2 Coding short TFCIs using bi-orthogonal codes

4.4.2.3 Mapping of TFCI word

4.4.3 Coding of Paging Indicator (PI)

4.4.4 Coding of Transmit Power Control (TPC)

4.4.4.1 Coding of TPC for QPSK

4.4.4.2 Coding of TPC for 8PSK

4.4.5 Coding of Synchronisation Shift Control (SS)

4.4.5.1 Coding of SS for QPSK

4.4.5.2 Coding of SS for 8PSK