3GPP TSG-RAN meeting #5 **Document RP-99945**
Korea, 6-8 October 1999

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

TS 25.302 **CR** **008** Current Version: 3.0.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG RAN#5 *list TSG meeting no. here ↑* for approval [X] for information [ ] *(only one box should be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

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

Source: Nokia **Date:** 17/08/99

Subject: Attributes of the semi-static part and coding terminology

3G Work item:

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

F	Correction	
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	X

Reason for change: Attributes of the semi-static part and coding terminology are aligned with current working assumptions and terminology in WG1.

Clauses affected: 5.1, 7.1.6, 7.1.7, 7.1.8, 7.1.9

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other 2G 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:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

5. Services and functions of the physical layer

5.1 General

The physical layer offers data transport services to higher layers. The access to these services is through the use of transport channels via the MAC sub-layer. The characteristics of a transport channel are defined by its transport format (or format set), specifying the physical layer processing to be applied to the transport channel in question, such as ~~inner~~ convolutional channel coding and interleaving, and any service-specific rate matching as needed.

The physical layer operates exactly according to the L1 radio frame timing. A transport block is defined as the data accepted by the physical layer to be jointly encoded. The transmission block timing is then tied exactly to this L1 frame timing, e.g. every transmission block is generated precisely every 10ms, or a multiple of 10 ms.

A UE can set up multiple transport channels simultaneously, each having own transport characteristics (e.g. offering different error correction capability). Each transport channel can be used for information stream transfer of one radio bearer or for layer 2 and higher layer signalling messages.

The multiplexing of these transport channels onto the same or different physical channels is carried out by L1. In addition, the Transport Format Combination Indication field (TFCI) shall uniquely identify the transport format used by each transport channel of the Coded Composite Transport Channel within the current radio frame.

7.1.6 Transport Format

This is defined as a format offered by L1 to MAC (and vice versa) for the delivery of a Transport Block Set during a Transmission Time Interval on a Transport Channel. The Transport Format constitutes of two parts – one *dynamic* part and one *semi-static* part.

Attributes of the dynamic part are:

- Transport Block Size
- Transport Block Set Size
- Transmission Time Interval (optional dynamic attribute for TDD only)

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~~C~~onvolutio~~n~~nal c~~C~~ode or no channel coding
  - ~~convolutional~~ coding rate~~e~~ ~~ratio~~
  - ~~Resulting code ratio after static~~ R~~r~~Static rate matching ratio
  - Puncturing limit for uplink
- Size of CRC

In the following example, the Transmission time Interval is seen as a semi-static part
Example:

- Dynamic part: {320 bits, 640 bits}, Semi-static part: {10ms, ~~Inner~~ convolutional coding only, ~~repeat 1/12 of the bits~~ rate matching attribute = 1}

7.1.7 Transport Format Set

This is defined as the set of Transport Formats associated to a Transport Channel.

The semi-static parts of all Transport Formats are the same within a Transport Format Set.

Effectively the first two attributes of the dynamic part form the instantaneous bit rate on the Transport Channel. Variable bit rate on a Transport Channel may, depending on the type of service which is mapped onto the transport channel, be achieved by changing between each Transmission Time Interval one of the following:

1. the Transport Block Size only
2. the Transport Block Set Size only
3. both the Transport Block Size and the Transport Block Set Size

Example 1:

- Dynamic part: {20 bits, 20 bits}; {40 bits, 40 bits}; {80 bits, 80 bits}; {160 bits, 160 bits}
- Semi-static part: {10ms, ~~Inner~~Convolutional coding only, ~~repeat 1/12 of the bits~~rate matching attribute = 1}

Example 2:

- Dynamic part: {320 bits, 320 bits}; {320 bits, 640 bits}; {320 bits, 1280 bits}
- Semi-static part: {10ms, ~~Inner~~Convolutional coding only, ~~repeat 1/12 of the bits~~rate matching attribute = 2}

The first example may correspond to a Transport Channel carrying a speech service, requiring blocks delivered on a constant time basis. In the second example, which illustrates the situation where a non-real time service is carried by the Transport Channel, the number of blocks delivered per Transmission Time Interval varies between the different Transport Formats within the Transport Format Set. Referring to **Error! Reference source not found.**, the Transport Block Size is varied on DCH1 whereas the Transport Block Set Size is fix. That is, a Transport Format Set where the dynamic part has a variable Transport Block Size has been assigned for DCH1. On DCH2 and DCH3 it is instead the Transport Block Set Sizes that are varied. That is, the dynamic parts of the corresponding Transport Format Sets include variable Transport Block Set Sizes.

7.1.8 Transport Format Combination

The layer 1 multiplexes one or several Transport Channels, and for each Transport Channel, there exists a list of transport formats (Transport Format Set) which are applicable. Nevertheless, at a given point of time, not all combinations may be submitted to layer 1 but only a subset, the Transport Format Combination. This is defined as an authorised combination of the combination of currently valid Transport Formats that can be submitted simultaneously to the layer 1 for transmission on a Coded Composite Transport Channel of a UE, i.e. containing one Transport Format from each Transport Channel.

Example:

DCH1: Dynamic part: {20 bits, 20 bits}, Semi-static part: {10ms, ~~Inner~~Convolutional coding only, ~~repeat 1/12 of the bits~~rate matching attribute = 2}
DCH2: Dynamic part: {320 bits, 1280 bits}, Semi-static part: {10ms, ~~Inner~~Convolutional coding only, ~~puncture 1/14 of the bits~~rate matching attribute = 3}
DCH3: Dynamic part: {320 bits, 320 bits}, Semi-static part: {40ms, ~~Outer~~Turbo coding, ~~repeat 1/20 of the bits~~rate matching attribute = 2}

7.1.9 Transport Format Combination Set

This is defined as a set of Transport Format Combinations on a Coded Composite Transport Channel.

Example:

Dynamic part:

Combination 1: DCH1: {20 bits, 20 bits}, DCH2: {320 bits, 1280 bits}, DCH3: {320 bits, 320 bits}
Combination 2: DCH1: {40 bits, 40 bits}, DCH2: {320 bits, 1280 bits}, DCH3: {320 bits, 320 bits}
Combination 3: DCH1: {160 bits, 160 bits}, DCH2: {320 bits, 320 bits}, DCH3: {320 bits, 320 bits}

Semi-static part:

DCH1: {10ms, ~~Inner~~Convolutional coding only, rate matching attribute = 1~~repeat 1/12 of the bits~~}
DCH2: {10ms, ~~Inner~~Convolutional coding only, rate matching attribute = 1 ~~puncture 1/14 of the bits~~}
DCH3: {40ms, ~~Outer~~Turbo coding, rate matching attribute = 2 ~~repeat 1/20 of thebits~~}

The Transport Format Combination Set is what is given to MAC for control. However, the assignment of the Transport Format Combination Set is done by L3. When mapping data onto L1, MAC chooses between the different Transport Format Combinations given in the Transport Format Combination Set. Since it is only the dynamic part that differ between the Transport format Combinations, it is in fact only the dynamic part that MAC has any control over.