

**Place** : Yokohama (Japan)  
**Date** : 19<sup>nd</sup> 20<sup>th</sup> April 1999  
**Title** : Discussion on segmentation of block between radio frame for TrCH with Transmission Time Interval longer than 10ms  
**Source** : Mitsubishi Electric  
**Paper for** : Decision

---

## 1 Introduction

This document proposes clarification about where and how is to be operated some segmentation step due to the difference of the Time Interval (TTI) of transport channels and of multiplexing frame (TTI=10ms) produced by the multiplexer of transport channels with different QoS.

## 2 References

- [1] S1.12 v1.1.0 FDD Multiplexing and channel coding
- [2] S1.22 TDD multiplexing, channel coding and interleaving description;

## 3 Proposal

### 3.1 Problem:

Each transport channel has a Transmission Time Interval (TTI) that is equal to 10, 20, 40 or 80 ms in the current assumption. At some step the transport channels with different QoS, and therefore with possibly different TTI are multiplexed together. This is done by the box with caption "Multiplexing of TrCHs with different QoS" in figure 4-1 and 4-2 of [1] S1.12. The output of this multiplexing process is a multiplexing frame that is described in section 4.2.6 of S1.12 [1]. Generally speaking the TTI of the multiplexing frame needs to be a divider of the TTI's of all the existing transport channels: in the working assumption this is simply achieved by having a TTI of 10ms for the multiplexing frame that is therefore mapped on one radio frame.

A segmentation step is needed when the TTI for some QoS is bigger than the TTI of the multiplexing frame. This segmentation is of course not existing when the TTI of one QoS is equal to the TTI of the multiplexing frame. This segmentation step does not appear on figure 4-1 and 4-2 of [1], nor is it described.

### 3.2 Multiplexing frame

Throughout this paper we use "multiplexing frame" rather than "radio frame" because in section 4.4.2.2 of [1] where slotted mode on a multiframe is proposed, there is the underlying assumption of a multiplexing frame spanning on more than 1 radio frame, contrary to the current assumption.

Our intention in this paper is not to push the possibility of having a multiplexing frame longer than 10ms. We just prefer to keep separate terminology as long as we are not completely sure that a multiplexing frame will always (including release 2000) be spanning on one unique radio frame.

If the concept of multiplexing frame proves out later to be useless, it would be quite easy to replace it everywhere by "radio frame" in the text proposal contained in this paper.

### 3.3 Text proposal 1

In section 3.3 of [1] add the following new acronym:

---

TTI    Transmission Time Interval

---

### 3.4 Text proposal 2

Add the following definition in section 3.1 of [1].

---

|                    |   |
|--------------------|---|
| multiplexing frame | the block that is produced by the “multiplexing of TrCHs with different Qos” on figures 4-1 and 4-2. Formation of the multiplexing frame is described in section 4.2.6. The transmission time interval of a multiplexing frame is 10ms in the current assumption. |
|--------------------|---|

---

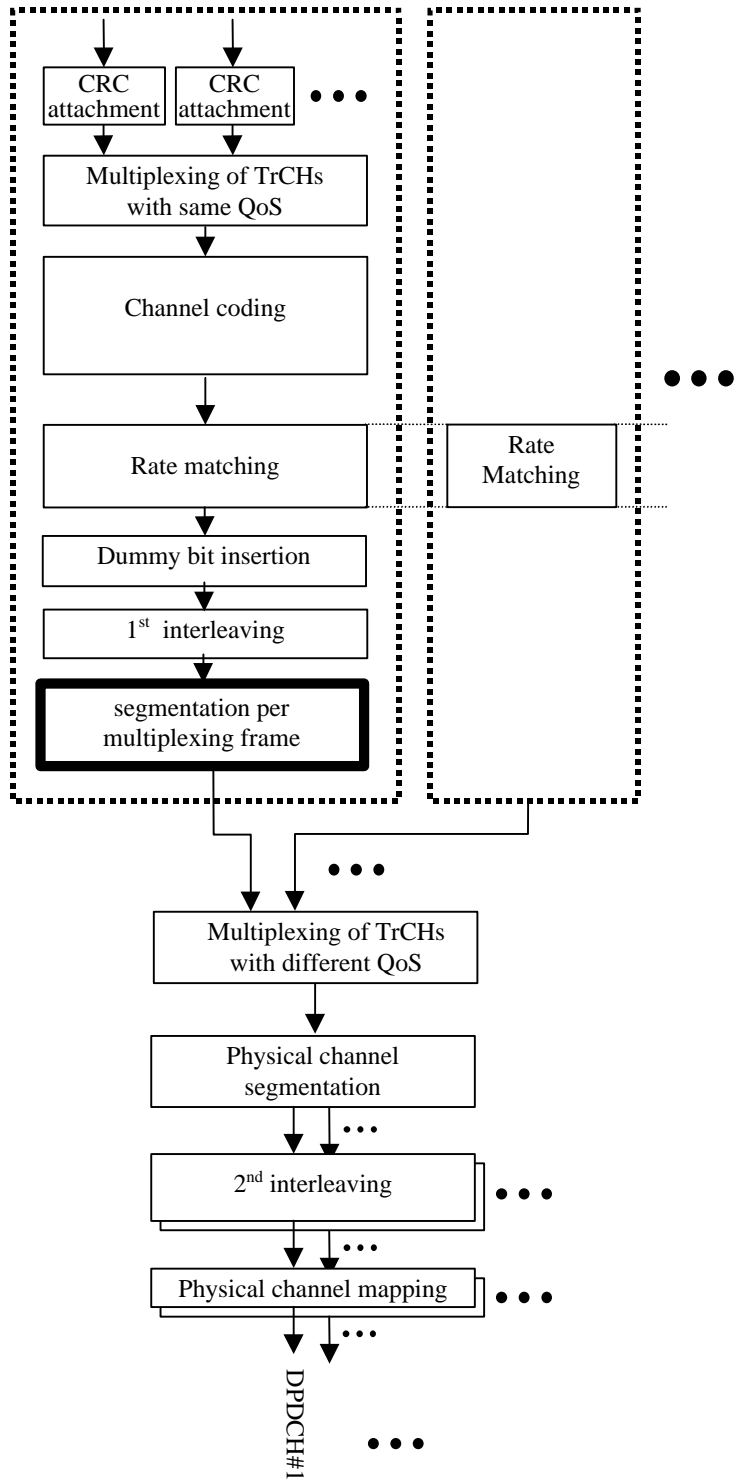
### **3.5 Text proposal 3**

Replace the figures 4-1 and 4-2 of [1], and the corresponding figure of [2] by the following figures.

Note 1: during text insertion, the new box that is in bold outline for this Tdoc needs to be converted to normal outline

Note 2: during text insertion, figure number needs to be set to the correct value.

---



**Figure 1 Transport channel multiplexing structure in FDD downlink.**

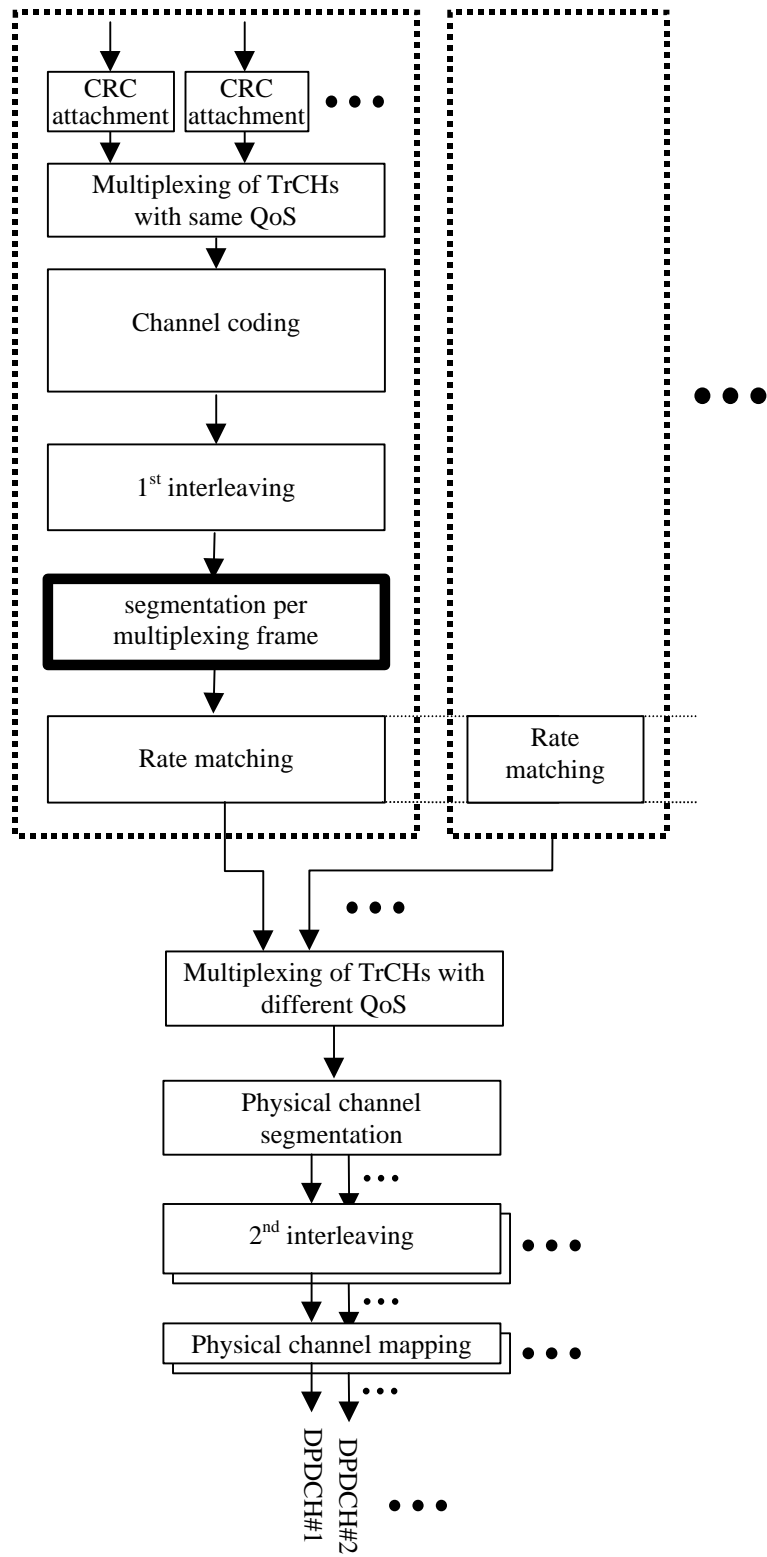


Figure 2 Transport channel multiplexing structure for FDD uplink.

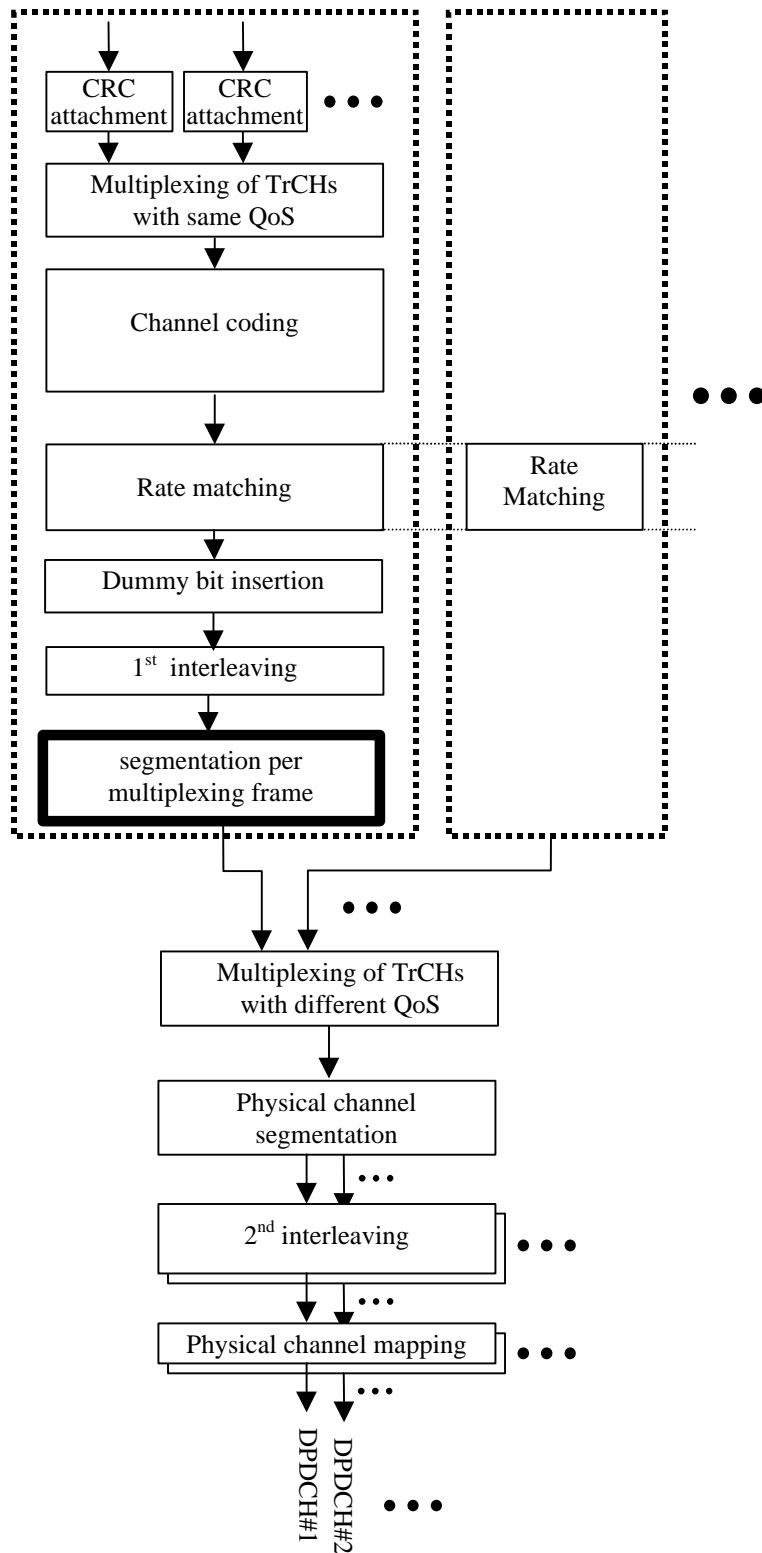


Figure 3 Transport channel multiplexing structure for TDD downlink and TDD uplink.

---

### 3.6 Text proposal 3

Add a new section between section 4.3.2.2. to define the segmentation.

Note that the text proposal does not restrict the depth of the 1<sup>st</sup> interleaver to be a multiple of F, this restriction is done in section 4.2.3.1. by assuming that the last row of the matrix is complete.

---

#### 4.3.2.2 Segmentation per multiplexing frame

*<Editor's note working assumption is that  $TTI_{MUX}$  is constant and equal to 10ms>*

The transmission time interval  $TTI_Q$  for some QoS Q is a multiple  $TTI_Q = F \cdot TTI_{MUX}$  by some constant integer factor F in {1,2,4,8} of the time span  $TTI_{MUX}$  [ $TTI_{MUX} = 10ms$ ] of the multiplexing frame.

This means that the block outputted by the first interleaver needs to be segmented into F blocks, each one being transmitted in one multiplexing frame. These blocks are the  $C_0, C_1, \dots, C_{F-1}$  blocks defined in section 4.2.3.1, and sequenced in the order of the right column of table 4-3.

---

### 3.7 Conclusion

In this paper we have introduced the concept of multiplexing frame for the sake of generality as long as it does not prove out to be useless.

We have also proposed text for definition the segmentation on the blocks outputted by the first interleaver for some QoS per each multiplexing frame.

We suggest that the proposed text should be incorporated into reference [1] and [2].