RAN WG1 meeting #1   **TSGR1#2(99)119**

Place   :   **Yokohama (Japan)**

Date   :   **22nd 25th 1999**

Title   :   **Discussion on rate matching block in relation with service specific coding**

Source   :   **Nortel Networks**

1. 1.   Introduction

In the merging process between ARIB and ETSI on the multiplexing scheme, service specific coding is mentioned and is combined with other Transport Channels <u>after</u> the rate matching step. This document discusses the pros and cons of this approach and proposes other alternatives.

2. Pros and cons of the uncoordinated rate matching for specific service

From the Figures attached in the annex, specific services, as voice, do not participate to the rate matching block. Some discussion on the pros and cons of this scheme in particular for the case of speech is provided thereafter.

2.1. Pros :

Considering the fact that speech coded bits do not have the same importance, usually, the channel coding scheme is adapted to the 'bits sensibility', and a uniform puncturing can not be applied (for example non protected bits should not be punctured). In this respect, specific services can not participate to rate matching block.

2.2 Cons :

Having uncoordinated rate matching would mean allocate permanently the resource for normal speech bit rate, without taking into account the voice low activity periods. During these low activity periods, no or low bit rate needs to be transmitted for speech. If this was known to the other rate matching blocks, they could take advantage of it to allow some redundancy to other TrChs.

3. First Alternative:

An alternative solution could be to apply a uniform coding on the whole speech frame, and then uniform puncturing. In this case, the service specific bits could participate to the general rate matching block. This would have the advantages to reduce the overall complexity by having only a limited number of channel coders, give speech not too much advantage in terms of amount of resources allocated, take into account the period of low voice activity with zero or low bit rate from speech, and use this capacity for the other TrChs.

However one disadvantage is that the specificity of the speech bits would be lost, and thus the voice quality would be degraded to some extent.

4. Second Alternative:

If we consider that the rate matching block consists of one control part and one algorithm part, then a second alternative solution would be that the control part of rate matching block would be co-ordinated between the different TrChs and would take into consideration also the service specific bits. This would allow to take advantage of the capacity not used during voice low activity period.

Meanwhile, the rate matching algorithm and channel coding parts would still be specific for the voice service.

This approach would be in line with the idea that rate matching should be done in a co-ordinated way between the rate matching blocks of different TrChs, but the rate matching algorithm would be different according to service specificity and/or TrCh encoding, as is probably also required for Turbo Codes rate matching.

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5. Conclusion

In this document, specific service combination with other TrChs was discussed, in particular the relation to the rate matching block. Some alternatives to the proposed scheme were listed. The idea is to get some feedback from WG1 regarding the combination of specific services with other TrChs.
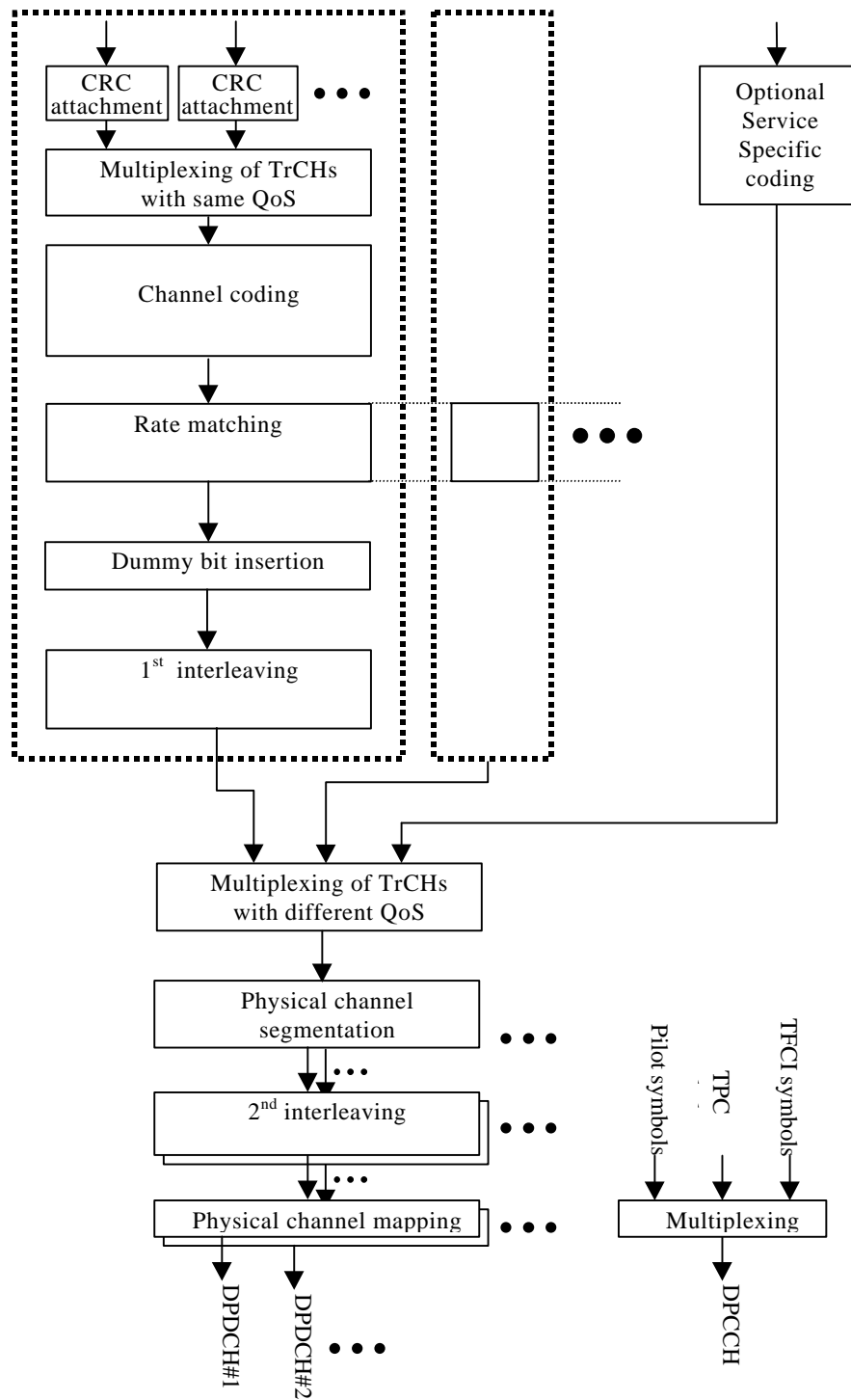

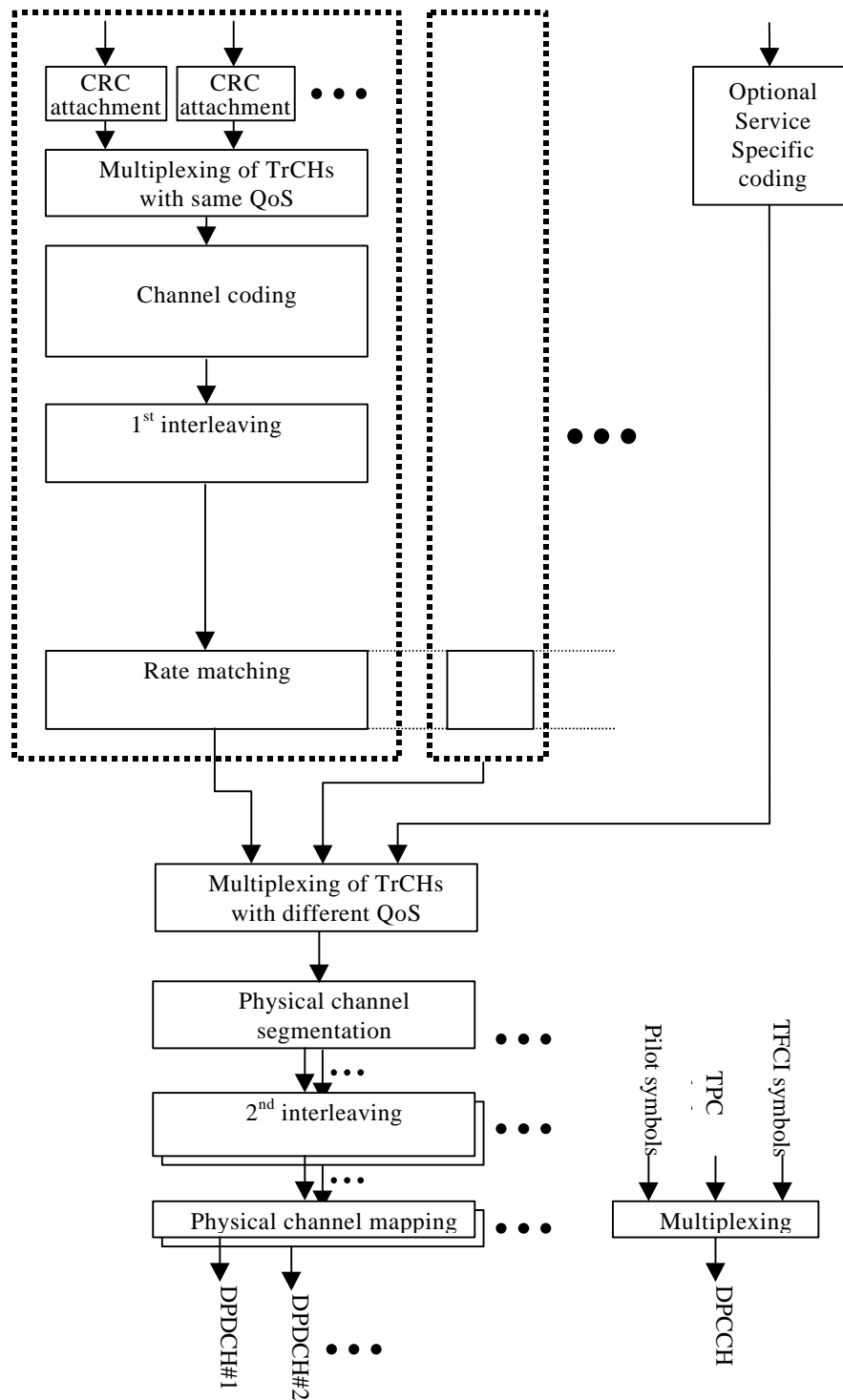Annex : Figures from ad-hoc 4 report

Figure 1 Transport channel multiplexing in downlink.

Figure 2 Transport channel multiplexing in uplink.