Place	**:**	**Yokohama (Japan)**
Date	**:**	**19nd 20th April 1999**
Title	**:**	**Multiplexing frame and CCTrCH definition**
Source	**:**	**Mitsubishi Electric**
Paper for	**:**	**Discussion**

1   Introduction

Currently the S1.12 [1] contains a proposal to make slotted mode on a multiframe. A editor note mentions that this seems not feasible, due to this that multiplexing is operated on a 10ms basis. In this paper we define the notion of mutliplexing frame, and by the way we give a precise definition of the CCTrCH that is for now not existing.

2   References

[1]   S1.12 v1.1.0 FDD Multiplexing and channel coding

3   Discussion

In this paper we define a multiplexing frame as the block that is periodically outputted by the "multiplexing of TrCHs with different QoS" in [1]. Currently the multiplexing frame is produced every 10ms as mentioned in section 4.2.6.

In [1] at section 4.4.2.2 we can see an optional method (method A2) to make a compressed mode on a multiframe spanning on more than 10ms. We completely agree with the editor that this is not possible due to this that multiplexing frame have a span limited to 10ms, even when all of the QoS that are multiplexed have Transmission Time Interval longer than 10ms.

We think that it might be not reasonable to specify TTI longer than 10ms for release '99 due to the very tight time schedule. However the specification should be kept open for this issue to be considered again later.

Then we propose to introduce the concept of "multiplexing frame", even if for now the time span is limited to 10ms, in order to pave the way to further enhancement of the standard.

Anyway, even if the time span of multiplexing frame was never to go beyond 10ms, the concept is interesting in itself, because it allows to give easily a definition of the composite transport channel.

4   Conclusion

In conclusion we give hereafter some text proposal for the S1.12 in typical sections that would be impacted. We have not reviewed extensively all of the draft recommendation, because at the time when this paper is written it is not clear whether it will receive support or not, and therefore, if no support, the job would have been for nothing.

5   Text proposal examples

5.1   Text proposal 1

Add the following definition in section 3.1 of [1]. Note that in the definition that we give for the CCTrCH we don't mention anything about the need in terms DPCCH, for instance whether 2 CCTrCH

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.

	Other TTI for multiplexing frame are FFS. In case of explicit rate detection, a TFCI is transmitted along with each multiplexing frame.
CCTrCH	the stream formed by the sequence of consecutive multiplexing frame. A CCTrCH can be mapped to one or several physical channels. To the same physical channel cannot be mapped two different CCTrCH.

5.2 Text proposal 2

Modify section 4.2.6 as follows:

4.2.6 Multiplexing of transport channels with different QoS

The coded transport channels are serially multiplexed ~~within~~ to form one ~~radio~~ multiplexing frame. The output after the multiplexer (before physical channel segmentation) will thus be according to Figure 4-11.

<Editor's note: Original figure will be misinterpreted that the entire data is transmitted in one physical channel of 10ms.>
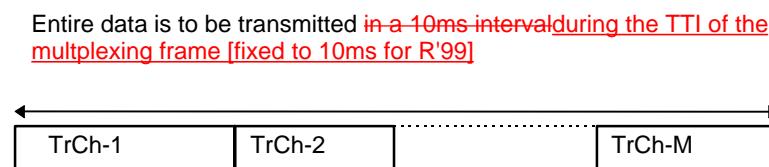
Entire data is to be transmitted ~~in a 10ms interval~~during the TTI of the multplexing frame [fixed to 10ms for R'99]

TrCh-1	TrCh-2	....	TrCh-M

Figure 4-11. Transport channel multiplexing.

<Editor's note: The followings were removed because these should be considered as WG2 matter.>

5.3 Text proposal 3

Modify section 4.4.2.2 as will follow. The motivation for replacing 50ms by 40ms is that the interleaving spans that are considered for transport channels are only 10, 20, 40 and 80ms. Then when all of the service that are in use have a QoS with TTI not less than 40ms it is possible to make multiplexing frames spanning on 40ms.

4.4.2.2 Method A2: By puncturing, for services that allow larger delay

< Editor's note: This ~~has been an option in ETSI. However, editor's opinion is that this is not possible, or at least it will be very difficult to specify it clearly, since combined rate matching for several transport channels has to be done at 10 ms intervals. This means that there can be another, maybe delay sensitive, service to be multiplexed in the slotted frame, which may require certain room for data transmission and will make the concept quite complicated. So editor's proposal is to delete this option~~ is possible only for multiplexing frame spanning on more than 10ms. Such time span are still FFS, then it is likely that this section will not be included in release '99>

Other methods of supporting slotted mode may be considered as options. For example, with services that allows for a larger delay, e.g. data services with interleaving over several frames, multiple frames might be compressed together in order to create a short measurement slot. As an example, for a 2 Mbps service, with interleaving of ~~5~~ 4 frames (~~50~~ 40 ms), a 5 ms idle slot can be created by puncturing only ~~10~~12.5% of ~~5~~ 4 radio frames, as illustrated in Figure 5-1.

This is possible by having the TTI of the multiplexing frame equal to 40ms.

Compressed transmission during one interleaver span

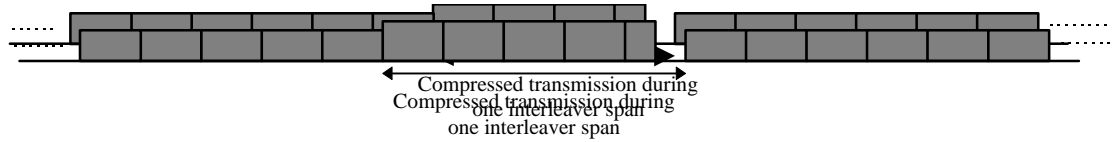Compressed transmission during one interleaver span

Figure Error! No text of specified style in document.-Error! Unknown switch argument.**. Multi-frame compressed mode for long-delay services.**