

Telecommunication Standardization Sector
Study Group 15
Experts Group for ATM Video Coding
(Rapporteur's Group on Part of Q.2/15)

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TITLE : Comments on vbv_delay description in variable bitrate operation

PURPOSE: Discussion

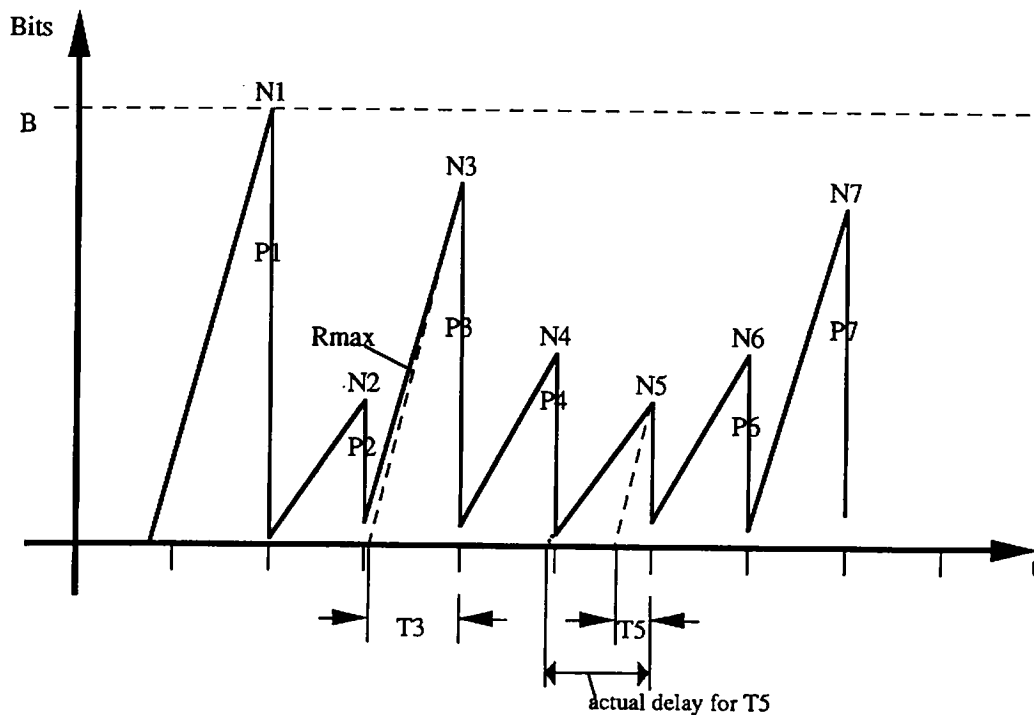
1.Introduction

Variable bit rate (VBR) operation is one of the most important feature in the video coding via ATM network, and VBR has already been adopted in WD4 (93.9,Brussels) and WD delta (MPEG93/842). This document gives some comments on the description in the WD, especially on vbv_delay under the VBR operation.

2.vbv_delay

In VBR operation, 'vbv_delay' described in picture header is defined as the time to fill the VBV buffer if the bits were supplied at the maximum average rate (constant rate). However actual average rate over the picture period is less than the maximum rate. It means that vbv_delay in VBR operation does not correspond to actual delay. Therefore, it is likely that the following sentences and figure are added to Annex C of the WD.

- In case of variable bit rate operation, vbv_delay does not correspond to actual delay.
- In case of variable bit rate operation, vbv_delay should be converted into initial buffer occupancy using bit_rate field. The decoding is started when the buffer occupancy corresponds to the initial occupancy derived from vbv_delay.



3.bit rate

In the current syntax and semantics, constant bit rate (CBR) operation and VBR operation could not be distinguished without systems layer assistance. Therefore, it is impossible for a decoder to find out whether the vbv_delay corresponds to actual delay or not. In order to solve this problem, following alternatives would be given:

- (a) Not change anything. Such information is not needed to decode. Systems layer may give the information.
- (b) Change the definition of vbv_delay as follows : The vbv_delay measures the initial buffer occupancy and is represented as time needed to fill the buffer at the target bit rate. 'Vbv_occupancy' might be a suitable name for that purpose.
- (c) Define a new field which indicates CBR or VBR. For example, following modification would be needed to WD.

```
sequence_extension() {  
    ....  
    vertical_size_extension          2    uimsbf  
    | variable_bit_rate_flag        1    uimsbf |  
    bit_rate_extension              11   uimsbf  
    ....  
}
```

variable_bit_rate_flag -- This is a one-bit flag which is set to "1" in variable bit rate operation.

4. Conclusion

Some comments on the description of vbv_delay in VBR operation are mentioned. Especially, some discussion is needed on the indication of CBR/VBR.