

JVET-AO0072

AHG17/AHG18: On ULL evaluation metrics toward CfP

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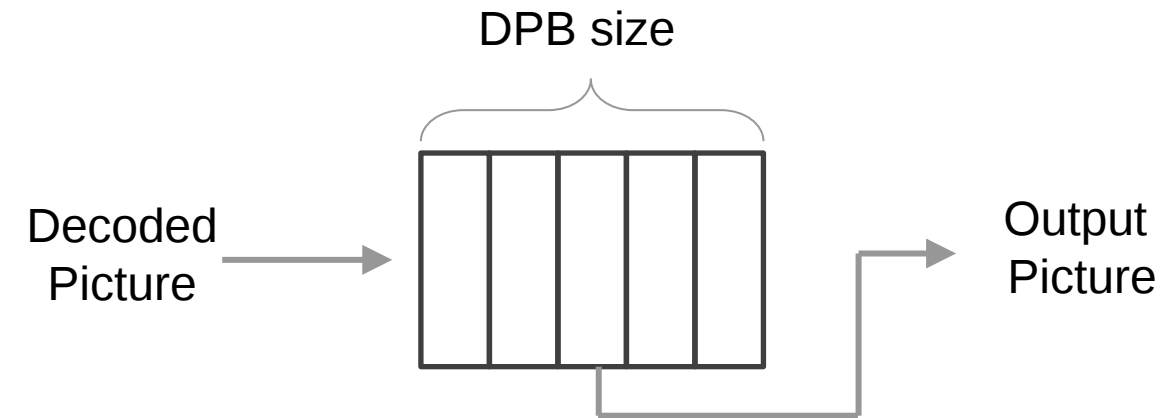
- At the previous Geneva meeting, two delays, “Coding delay” and “Buffering delay” for ULL (Ultra-Low Latency) were discussed.
- A test condition for GDR (Gradual Decoder Refresh) on ECM, which reduces two delay was suggested.
- In this meeting, more detailed metrics regarding the video coding latency in CfP should be discussed.

T. Chujoh, Y. Kidani and K. Kawamura, AHG12/AHG18: On GDR test condition for video compression beyond VVC, JVET-AO0089, Geneva, Oct. 2025.

■ DPB (Display Picture Buffer)

● Coding delay

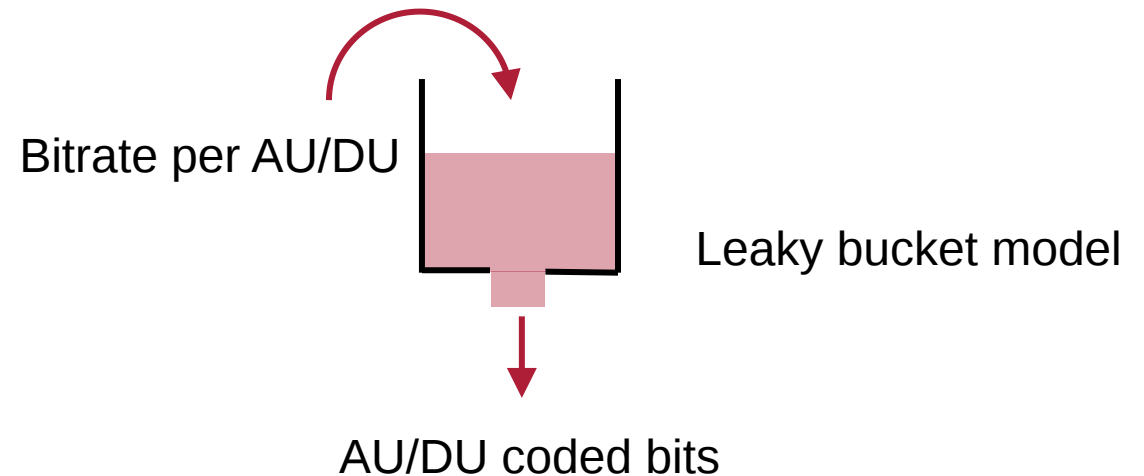
- Initial DPB output delay
 - Number of delayed picture for prediction structure
→ Low delay B/P structure (no initial DPB output delay)
- DPB size
 - Number of reference pictures



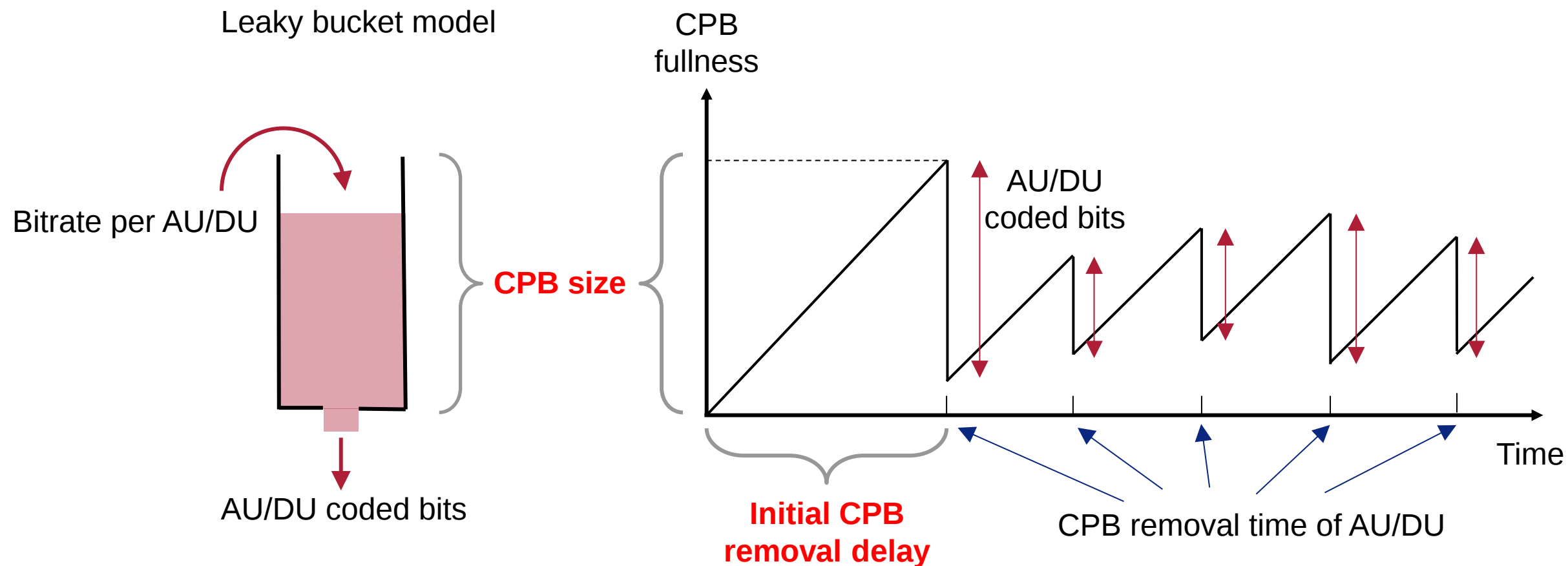
■ CPB (Coded Picture Buffer)

● Buffering delay

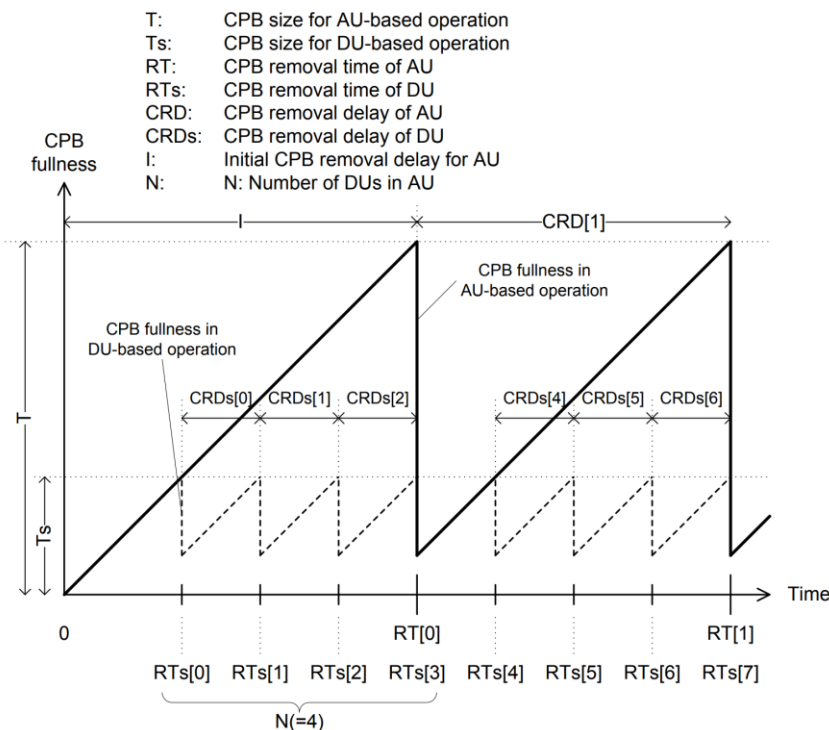
- Initial CPB removal delay
 - Initial fixed time of buffering delay
- CPB size
 - Limit maximum AU/DU size



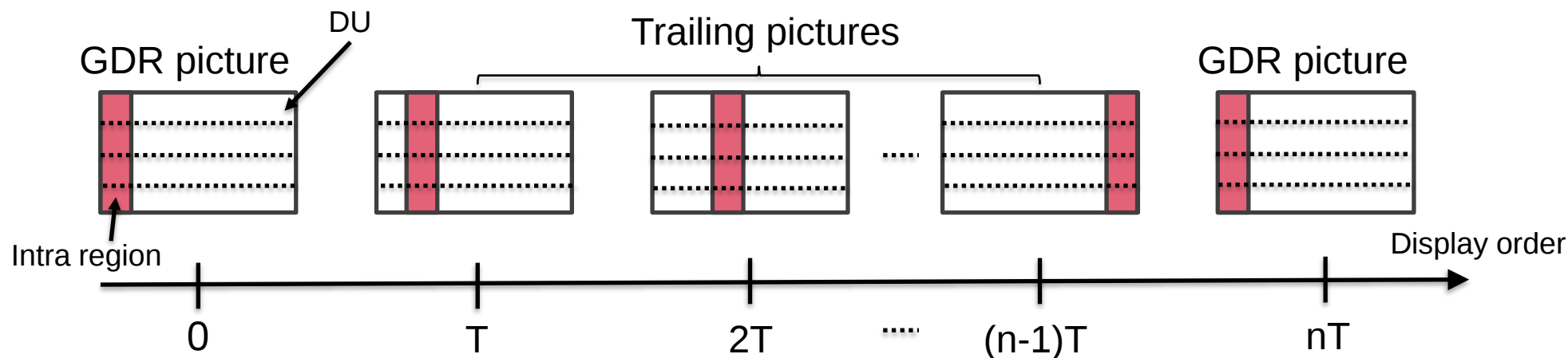
CPB (Coded Picture Buffer)



DU based on CPB (HEVC, VVC)



S. Deshpande, M. Hannuksela, K. Kazui and T. Schierl, An improved hypothetical reference decoder for HEVC, Proc. SPIE 8666, Visual Information Processing and Communication IV, 866608 (21 February 2013).



Proposed metrics for CfP

■ Basic coding results:

- Coded bits for each picture
- Maximum picture coded bits in the sequence
- Minimum picture coded bits in the sequence
- Average standard deviation on a sliding window

CE for GDR in VVC used them

■ Delay information regarding HRD:

- Initial CPB removal delay
- CPB size
- Initial DPB output delay
- DPB size

Traditional HDR parameters

Those metrics are not only helpful in measuring delay but also for assessing coding efficiency and complexity.

- Discussed evaluation metrics for video coding delay toward the CfP on video compression with capability beyond VVC.
- The proposed evaluation metrics should be included in the test condition the CfP, such as one of the items within **Annex D Data submission format**.

Annex D Data submission format

Data should be submitted in CSV format. For each sequence and each rate point, the following information should be provided, as applicable. When submitting data for runtime-constrained encoding as per section 5, a separate CSV file shall be provided for each target run time.

Column name	Description
Sequence	Sequence name, e.g., SRU1
Rate point	Rate point, e.g., R1
Bitrate	Bitrate in kbit/s
PSNR-Y	PSNR metric for Y component (See Annex A and [1])
PSNR-U	PSNR metric for U component (See Annex A and [1])
PSNR-V	PSNR metric for V component (See Annex A and [1])
SSIM-Y	MS-SSIM metric for Y component (See Annex A and [1])

