

**JVET-AD0126**

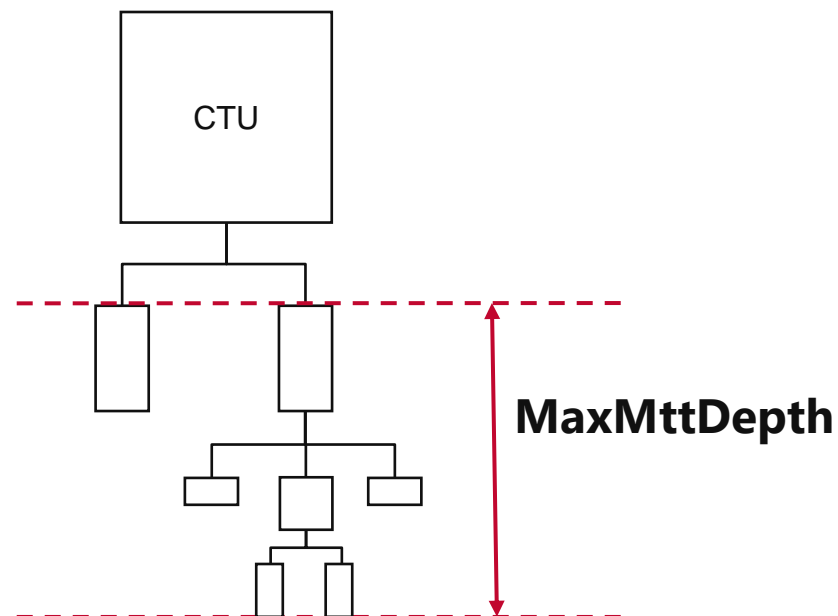
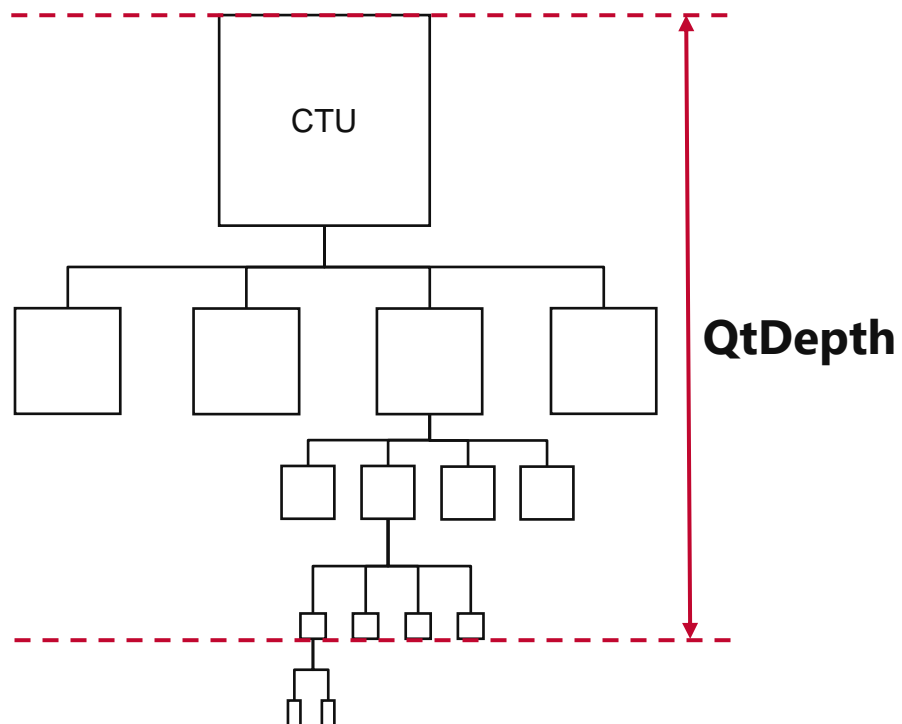
# **AhG12: On ECM temporal partitioning prediction**

Guillaume Laroche

Patrice Onno

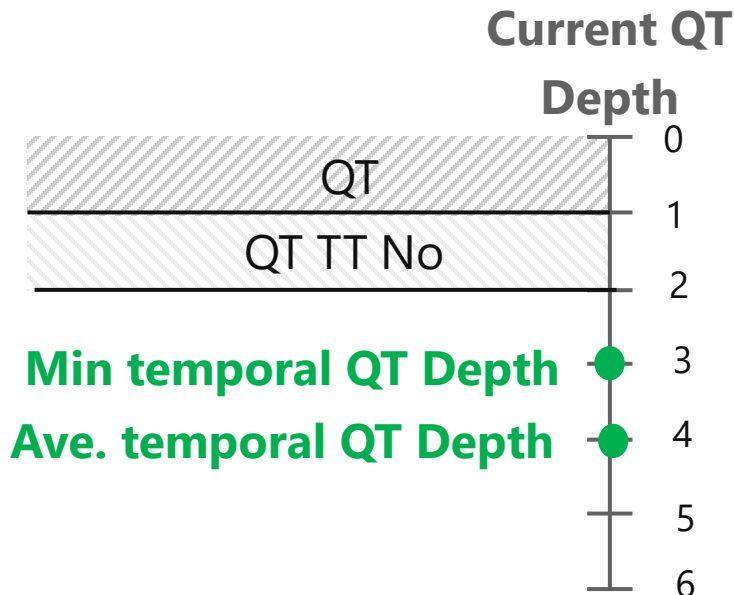
- Already presented and tested EE2 in July 2023.
  
- New in this proposal:
  - Additional conditions thanks to a new temporal parameter to increase the coding efficiency and to keep a global complexity reduction.
  - Adaptation of the coding order of the partitioning syntax elements.
  
- => Gain increase x 2.5 for RA configuration
  
- Similar encoding time reduction.

# VVC partitioning variables



# Temporal prediction of split modes

- The partitioning variables are limited based on temporal values obtained from a temporal area
  - The temporal area comes from the same reference frame as the temporal motion information.
- BT, TT or no Split are disallowed according to the current QT depth and the minimum temporal QT allowed



```
If (QTDepth < MinQTDepthTempo-1)
{
    Only QT Split allowed
}

If (QTDepth < AverageQTDepthTempo-1)
{
    if(TT was not selected)
        BT is not allowed
}
```

# Adaptation of the Maximum MTT Depth **Canon**

## ■ MaxMttDepth++

- The MaxMttDepth is incremented when rules detect that the MaxMttDepth inside the temporal area is particularly high compared to the MaxMttDepth of the current frame.

## ■ MaxMttDepth--

- The MaxMttDepth is decremented when rules detect that the MaxMttDepth inside the temporal area is particularly low compared to the MaxMttDepth of the current frame.
- The rules take into account the following parameters:
  - QT Depth: Current and average temporal QT depth
  - MTT Depth: Current, average and Maximum temporal MTT depth
  - Type of the Reference frame
  - Absolute POC difference between the current frame and the reference frame.

# Temporal prediction of split syntax elements

- The **split\_qt\_flag** is set at the 1<sup>st</sup> syntax element when the QT depth is strictly inferior to the average temporal QT depth

**QT Depth  $\geq$   
Tempo QT Depth**

split\_cu\_flag

split\_qt\_flag

mtt\_split\_cu\_vertical\_flag

mtt\_split\_cu\_binary\_flag

**QT Depth  $<$   
Tempo QT Depth**

split\_qt\_flag

split\_cu\_flag

mtt\_split\_cu\_vertical\_flag

mtt\_split\_cu\_binary\_flag



## ■ Memory requirement

### ■ 14 bits per 16x16 blocks

Memory in KB	Additional Memory needed for proposed method	MV storage VVC
Class A 3840x2160	55	1297
Class B 1920x1080	14	324
Class C 832x480	2.5	62
Class D 416x240	0.5	16

## ■ Temporal parsing dependency:

- In ECM this temporal parsing dependency already exists with the CABAC initialization from previous inter slice (JVET-Y0181).

# Experimental results

■ The encoding times are reliable

■ Average encoding time reduction by

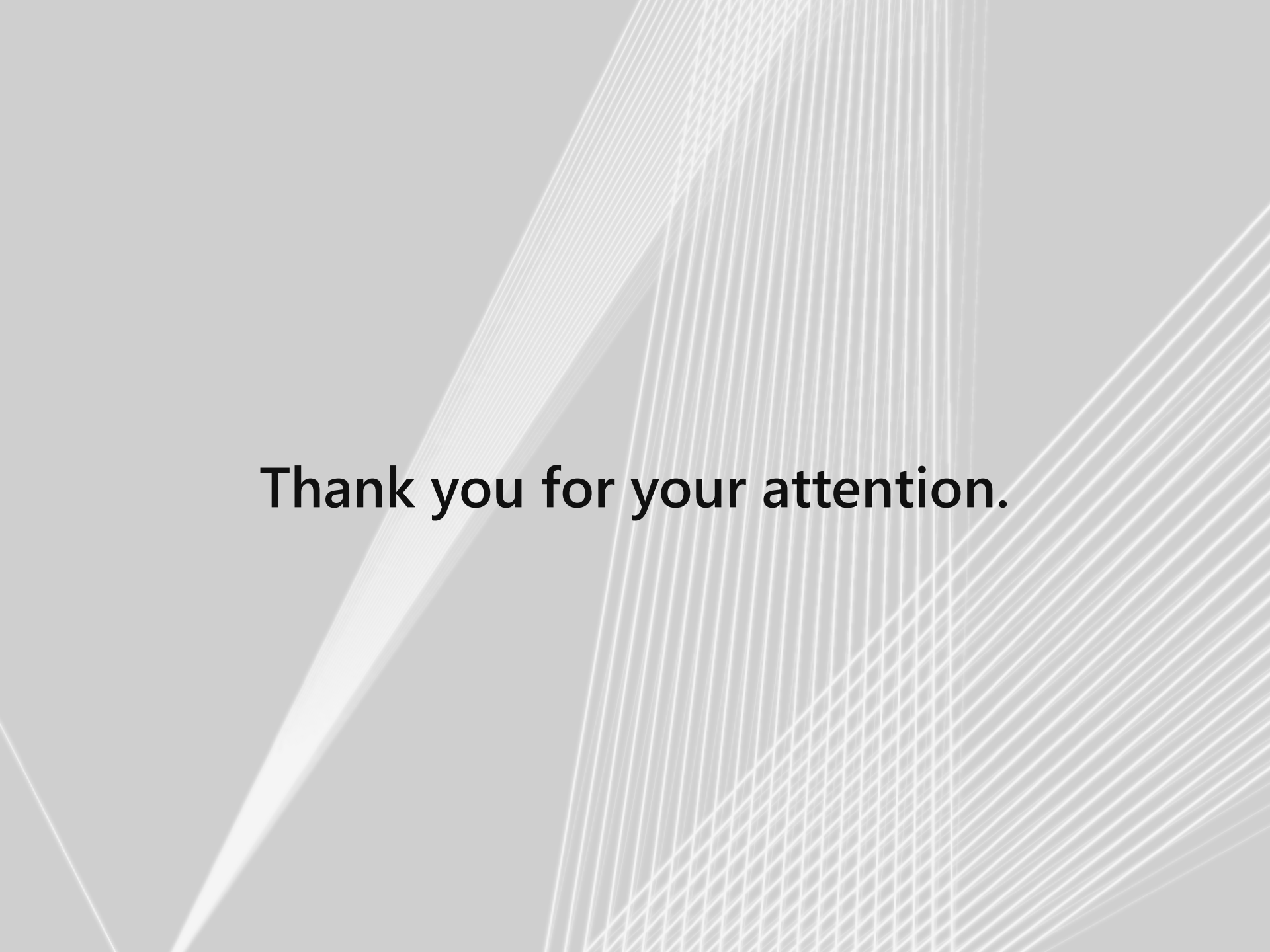
- 2% for RA and
- 4% for LDB
- 6% for LDB BQTerrace QP22

	Random Access Main 10				
	Over ECM-8.0_ANCHOR				
	Y	U	V	EncT	DecT
Class A1	-0.30%	-0.31%	-0.27%	102.0%	100.7%
Class A2	-0.25%	-0.16%	-0.29%	99.5%	100.7%
Class B	-0.24%	-0.16%	-0.05%	98.9%	100.4%
Class C	-0.05%	0.03%	0.02%	93.9%	100.0%
Class E					
<b>Overall</b>	-0.21%	-0.14%	-0.12%	98.3%	100.4%
Class D	-0.09%	0.16%	0.05%	92.4%	100.1%
Class F	0.05%	0.14%	0.16%	95.9%	100.1%

	Low delay B Main 10				
	Over ECM-8.0_ANCHOR				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.01%	0.10%	0.21%	95.6%	100.1%
Class C	0.05%	0.09%	-0.01%	96.2%	100.1%
Class E	-0.14%	-0.11%	-0.47%	96.6%	100.2%
<b>Overall</b>	-0.02%	0.04%	-0.04%	96.0%	100.2%
Class D	-0.08%	-0.55%	-0.89%	96.4%	99.9%
Class F					



- The principle of the proposed method was already tested in a previous EE2
- Further gains obtained for RA case (x 2.5) with similar complexity reduction
  - Y:-0.21% U:-0.14% V:-0.12%
- Small impact on memory
- No additional parsing constraint compared to the current ECM.
- Recommend to investigate these modifications in EE2

The background is a light gray gradient. Overlaid on this are several sets of thin, white, parallel lines. These lines are arranged in a way that they appear to be part of a larger, complex geometric pattern, possibly a stylized 'A' or a series of intersecting planes. The lines are most prominent on the right side of the image and fade out towards the left.

**Thank you for your attention.**

**Canon**