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# JCT3V-D0184: CE6.h related: Wedgelet modes unification

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# Introduction

- Depth intra coding
  - Conventional intra coding: DC, Planar, angular intra prediction
  - Partition-based intra coding: DMM, SDC\_DMM1, Chain coding
  
- Depth intra mode signaling
  - Different schemes make depth intra mode coding variant
    - Conventional intra modes: same as HEVC
    - DMM1, SDC\_DMM1: explicitly signaled with up to 11 bins
    - DMM2: the difference to the predicted wedgelet end position is explicitly signaled
    - DMM3: a wedgelet subset index is explicitly signaled with up to 9 bits
    - Chain coding: signaled as the final intra prediction mode
  
- Connection between wedgelets and intra mode
  - Each wedgelet is connected to an intra mode in DMM 3

# Proposal

- Unification of DMM and intra mode coding
  - Removal of DMM2
    - DMM2 has limited impact on coding performance
    - DMM2 adds additional complexity to predict wedgelet
    - The signaling of DMM is modified accordingly

dmm_mode	DMM mode	Delta DC	Binary string
0	DMM 1	not used	00
1	DMM 1	used	01
2	DMM 3	not used	100
3	DMM 3	used	101
4	DMM 4	not used	110
5	DMM 4	used	111

- Represent wedgelet index in DMM1 and SDC\_DMM1 as two parts
  - Intra mode: same as intra mode coding in HEVC
  - Wedgelet subset index: same as DMM3

# Results

## ■ Common test condition

	video 0	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
Balloons	0.0%	-0.1%	0.0%	0.0%	0.0%	0.1%
Kendo	0.0%	0.1%	0.1%	0.0%	0.1%	0.2%
Newspapercc	0.0%	-0.1%	0.1%	0.0%	0.1%	0.3%
GhostTownFly	0.0%	0.0%	0.2%	0.0%	0.0%	0.1%
PoznanHall2	0.0%	-0.5%	-0.4%	-0.2%	-0.2%	-0.1%
PoznanStreet	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%
UndoDancer	0.0%	0.1%	0.1%	0.0%	0.1%	-0.4%
1024x768	0.0%	-0.1%	0.1%	0.0%	0.1%	0.2%
1920x1088	0.0%	-0.1%	0.0%	0.0%	0.0%	-0.1%
<b>average</b>	<b>0.0%</b>	<b>-0.1%</b>	<b>0.1%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>

# Results

- All intra test condition

	video 0	video 1	video 2	video PSNR / video bitrate	video PSNR / total bitrate	synth PSNR / total bitrate
Balloons	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
Kendo	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
Newspapercc	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%
GhostTownFly	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
PoznanHall2	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
PoznanStreet	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
UndoDancer	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%
1024x768	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%
1920x1088	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
<b>average</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.3%</b>

- Thank Huawei for cross-check (JCT3V-D0288)!

# Conclusion

- Removal of DMM2
  - Reduced complexity with negligible performance difference
- Unification of wedgelet and intra mode signaling
  - Wedgelet is represented by intra mode and subset index
  - Intra mode coding in HEVC and subset index signaling in DMM3 is re-used
- Coding performance
  - CTC: average 0.0% BD rate for synthesized
  - All-intra: average 0.3% BD rate for synthesized

# Thanks!