G785: Unified Pred_type coding in CABAC

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Pred_type coding in HM4.0 (CABAC)

- Pred_type: prediction mode and partition mode

- Inconsistent pred_type coding in B and P slices

- Slice B: group signaling

  - Prediction mode and partition mode is jointly decoded in partition size parsing stage
  - Low priority to intra mode

- Slice P: explicit signaling

  - Prediction mode is decoded in prediction mode parsing stage
  - Partition mode is decoded in partition size parsing state

Slice type	Value of pred_type	PredMode	PartMode	Bin string		
				cLog2CUSize > Log2MinCUSize	cLog2CUSize == Log2MinCUSize	
					cLog2CUSize == 3 && !inter_4x4_enabled_flag	cLog2CUSize > 3 || inter_4x4_enabled_flag
I	0	MODE_INTRA	PART_2Nx2N	-	1	1
	1	MODE_INTRA	PART_NxN	-	0	0
P	0	MODE_INTER	PART_2Nx2N	0 1	0 1	0 1
	1	MODE_INTER	PART_2NxN	0 011	0 01	0 01
	2	MODE_INTER	PART_Nx2N	0 001	0 00	0 001
	4	MODE_INTER	PART_2NxnU	0 0100	-	-
	5	MODE_INTER	PART_2NxnD	0 0101	-	-
	6	MODE_INTER	PART_nLx2N	0 0000	-	-
	7	MODE_INTER	PART_nRx2N	0 0001	-	-
	3	MODE_INTER	PART_NxN	-	-	0 000
	4	MODE_INTRA	PART_2Nx2N	1	11	11
	5	MODE_INTRA	PART_NxN	-	10	10
B	0	MODE_INTER	PART_2Nx2N	1	1	1
	1	MODE_INTER	PART_2NxN	011	01	01
	2	MODE_INTER	PART_Nx2N	001	001	001
	4	MODE_INTER	PART_2NxnU	0100	-	-
	5	MODE_INTER	PART_2NxnD	0101	-	-
	6	MODE_INTER	PART_nLx2N	0000	-	-
	7	MODE_INTER	PART_nRx2N	0001	-	-
	3	MODE_INTER	PART_NxN	-	-	0001
	4	MODE_INTRA	PART_2Nx2N	000	000 0	0000 0
	5	MODE_INTRA	PART_NxN	-	000 1	0000 1

Proposal

- Unify the pred_type coding in slice B with that of slice P
  - To separate the coding of prediction mode and partition size
  - To enhance the readability of specification and source code

Slice type	Value of pred_type	PredMode	PartMode	Bin string		
					cLog2CUSize = = Log2MinCUSize	
				cLog2CUSize > Log2MinCUSize	cLog2CUSize = = 3 && !inter_4x4_enabled_flag	cLog2CUSize > 3 || inter_4x4_enabled_flag
I	0	MODE_INTRA	PART_2Nx2N	-	1	1
	1	MODE_INTRA	PART_NxN	-	0	0
P / B	0	MODE_INTER	PART_2Nx2N	0 1	0 1	0 1
	1	MODE_INTER	PART_2NxN	0 011	0 01	0 01
	2	MODE_INTER	PART_Nx2N	0 001	0 00	0 001
	4	MODE_INTER	PART_2NxnU	0 0100	-	-
	5	MODE_INTER	PART_2NxnD	0 0101	-	-
	6	MODE_INTER	PART_nLx2N	0 0000	-	-
	7	MODE_INTER	PART_nRx2N	0 0001	-	-
	3	MODE_INTER	PART_NxN	-	-	0 000
	4	MODE_INTRA	PART_2Nx2N	1	11	11
	5	MODE_INTRA	PART_NxN	-	10	10

Common test configuration

	Random Access HE			Low delay B HE		
	Y	U	V	Y	U	V
Class A	0.0%	-0.1%	-0.1%			
Class B	0.0%	0.0%	0.1%	0.0%	-0.2%	-0.2%
Class C	0.0%	-0.1%	0.0%	0.0%	-0.1%	-0.1%
Class D	0.0%	0.0%	0.0%	0.0%	0.2%	-0.2%
Class E				0.0%	0.3%	0.7%
Overall	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%
Enc Time[%]	100.0%			99.8%		
Dec Time[%]	100.1%			99.9%		

Summary

Unified pred_type coding

- Unify pred_type coding of slice B with that of Slice P in CABAC

Coding performance

- 0.01%/RA_HE, 0.03%/LD_HE

Propose adoption of unified pred_type coding into next version of HM

Thank you !