

JVET-P0466
AHG18 : Residual coding for lossless video coding

**Jungah Choi, Hyeongmun Jang, Jin Heo, Sunmi Yoo,
Jaehyun Lim, Seung Hwan Kim**

LG Electronics Inc.

Proposed Methods

- Proposal
 - Transform skip (TS) residual coding for lossless coding is investigated
 - TS residual coding for intra/IBC modes, IBC mode, and entire coding

	Intra		IBC	Inter
	BDPCM	Non-BDPCM		
VTM6-Lossless	TS residual	Regular residual	Regular residual	Regular residual
Test #3	TS residual	TS residual	TS residual	Regular residual
Test #4	TS residual	Regular residual	TS residual	Regular residual
Test #5	TS residual	TS residual	TS residual	TS residual

* on top of CE7-1.2d-alternative in JVET-P0079

Test Results (Test #3)

- Anchor: VTM6.0-Lossless
- Test: Proposed method + BDPCM = 1 (for all test sequences) + BDPCM-bugfix
- Overall: -1.51% for AI, -0.35% for RA
- Overall including Class F and TGM: -2.56% for AI, -0.95% for RA

	All Intra			Random Access			Low delay B		
	ratio		bit-rate savings	ratio		bit-rate savings	ratio		bit-rate savings
	VTM6	0		VTM6	0		VTM6	0	
Class A1	2.2	2.2	-0.46%	2.3	2.3	-0.21%			
Class A2	1.7	1.8	-0.71%	1.9	1.9	-0.34%			
Class B	2.1	2.1	-1.71%	2.3	2.3	-0.37%	0.0	0.0	0.00%
Class C	2.1	2.1	-1.91%	2.6	2.6	-0.44%	2.6	2.6	-0.37%
Class D	1.9	2.0	-3.52%	2.8	2.8	-0.73%	2.7	2.8	-0.54%
Class E	2.9	3.0	-2.53%				3.3	0.0	-300.00%
Class F	5.5	5.8	-4.53%	39.4	40.7	-2.06%	78.9	80.5	-1.74%
TGM	12.3	12.8	-4.36%	112.6	115.3	-2.32%	142.4	145.8	-2.19%
Overall	2.2	2.2	-1.51%	2.3	2.3	-0.35%	1.7	0.9	-25.12%
Enc Time[%]	100%			102%			67%		
Dec Time[%]	101%			104%			62%		

Test Results (Test #4)

- Anchor: VTM6.0-Lossless
- Test: Proposed method + BDPCM = 1 (for all test sequences) + BDPCM-bugfix
- Overall: -1.60% for AI, -0.33% for RA
- Overall including Class F and TGM: -2.46% for AI, -0.87% for RA

	All Intra			Random Access			Low delay B		
	ratio		bit-rate savings	ratio		bit-rate savings	ratio		bit-rate savings
	VTM6	0		VTM6	0		VTM6	0	
Class A1	2.2	2.2	-0.78%	2.3	2.3	-0.30%			
Class A2	1.7	1.8	-1.62%	1.9	1.9	-0.44%			
Class B	2.1	2.1	-1.43%	2.3	2.3	-0.27%	0.0	0.0	0.00%
Class C	2.1	2.1	-1.70%	2.6	2.6	-0.36%	2.6	2.6	-0.37%
Class D	1.9	2.0	-2.99%	2.8	2.8	-0.59%	2.7	2.8	-0.49%
Class E	2.9	3.0	-2.51%				3.3	0.0	-300.00%
Class F	5.5	5.8	-4.17%	39.4	40.6	-1.87%	78.9	80.5	-1.69%
TGM	12.3	12.8	-4.11%	112.6	115.1	-2.17%	142.4	145.8	-2.15%
Overall	2.2	2.2	-1.60%	2.3	2.3	-0.33%	1.7	0.9	-25.12%
Enc Time[%]	95%			99%			67%		
Dec Time[%]	96%			101%			62%		

Test Results (Test #5)

- Anchor: VTM6.0-Lossless
- Test: Proposed method + BDPCM = 1 (for all test sequences) + BDPCM-bugfix
- Overall: -1.51% for AI
- Overall including Class F and TGM: -2.56% for AI

	All Intra			Random Access			Low delay B		
	ratio		bit-rate savings	ratio		bit-rate savings	ratio		bit-rate savings
	VTM6	0		VTM6	0		VTM6	0	
Class A1	2.2	2.2	-0.46%	2.3	0.0	-300.00%			
Class A2	1.7	1.8	-0.71%	1.9	0.0	-300.00%			
Class B	2.1	2.1	-1.71%	2.3	0.0	-500.00%	0.0	0.0	0.00%
Class C	2.1	2.1	-1.91%	2.6	2.6	0.90%	0.0	0.0	0.00%
Class D	1.9	2.0	-3.52%	2.8	2.7	0.49%	0.0	0.0	0.00%
Class E	2.9	3.0	-2.53%				0.0	0.0	0.00%
Class F	5.5	5.8	-4.53%	39.4	0.0	-400.00%	0.0	0.0	0.00%
TGM	12.3	12.8	-4.36%	112.6	116.9	-3.62%	0.0	0.0	0.00%
Overall	2.2	2.2	-1.51%	2.3	0.7	-73.09%	0.0	0.0	0.00%
Enc Time[%]	100%			29%			#NUM!		
Dec Time[%]	101%			31%			#NUM!		

Thank you