

Non-CE7: Unification of CCB count method between transform residual and transform skip residual

(JVET-O0409)

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VTM5.0 specification

Trans residual coding:

residual_coding() {	
last_sig_coeff_x_prefix	
last_sig_coeff_y_prefix	
last_sig_coeff_x_suffix	
last_sig_coeff_y_suffix	
for(SubBlock loop) {	
coded_sub_block_flag	
for(coeff loop) {	
sig_coeff_flag	Count CCB
abs_level_gtx_flag[0]	
par_level_flag	
abs_level_gtx_flag[1]	
}	
for(coeff loop) {	
abs_remainder	
}	
for(coeff loop) {	
coeff_sign_flag	
}	
}	
}	

Transskip residual coding:

residual_ts_coding () {	
for(SubBlock loop) {	
coded_sub_block_flag	
for(coeff loop) {	
sig_coeff_flag	Count CCB
coeff_sign_flag	
abs_level_gtx_flag[0]	
par_level_flag	
}	
for(j=0; j<5; j++) {	
for(coeff loop) {	
abs_level_gtx_flag[j]	
}	
}	
for(coeff loop) {	
abs_remainder	
}	
}	

Proposal

Trans residual coding:

residual_coding() {	
last_sig_coeff_x_prefix	
last_sig_coeff_y_prefix	
last_sig_coeff_x_suffix	
last_sig_coeff_y_suffix	
for(SubBlock loop) {	
coded_sub_block_flag	
for(coeff loop) {	
sig_coeff_flag	 Count CCB
abs_level_gtx_flag[0]	
par_level_flag	
abs_level_gtx_flag[1]	
}	
for(coeff loop) {	
abs_remainder	
}	
for(coeff loop) {	
coeff_sign_flag	
}	
}	
}	

Transskip residual coding:

residual_ts_coding () {	
for(SubBlock loop) {	
coded_sub_block_flag	
for(coeff loop) {	
sig_coeff_flag	 Count CCB
coeff_sign_flag	
abs_level_gtx_flag[0]	
par_level_flag	
}	
for(j=0; j<5; j++) {	
for(coeff loop) {	
abs_level_gtx_flag[j]	
}	
}	
for(coeff loop) {	
abs_remainder	
}	
}	
}	

Proposal

- Align CCB count target syntaxes to Trans residual.
- Subtract # sub_block_flag from the maximum number of CCB.

Simulation results

■ standard QP

All Intra Main10					
Over VTM-5.0					
	Y	U	V	EncT	DecT
Class A1	0.00%	-0.01%	-0.04%	99%	100%
Class A2	0.00%	0.00%	0.01%	101%	100%
Class B	0.00%	0.04%	-0.03%	99%	100%
Class C	0.00%	-0.09%	0.03%	100%	101%
Class E	0.00%	0.03%	0.03%	100%	101%
Overall	0.00%	0.00%	0.00%	100%	101%
Class D	0.00%	0.16%	-0.04%	100%	99%
Class F	0.00%	0.01%	-0.07%	100%	100%
TGM	0.02%	0.00%	0.02%	99%	100%

There are no coding losses.

Random Access Main 10					
Over VTM-5.0					
	Y	U	V	EncT	DecT
Class A1	0.00%	0.01%	0.03%	101%	100%
Class A2	0.02%	-0.10%	0.04%	100%	100%
Class B	0.00%	0.06%	-0.06%	100%	100%
Class C	-0.02%	-0.29%	-0.01%	100%	101%
Class E					
Overall	0.00%	-0.08%	-0.01%	100%	100%
Class D	0.04%	-0.03%	0.05%	101%	99%
Class F	0.03%	-0.04%	0.10%	100%	100%
TGM	0.01%	-0.01%	-0.03%	100%	100%

Low delay B Main10					
Over VTM-5.0					
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.00%	0.43%	-0.05%	100%	99%
Class C	0.02%	0.44%	0.20%	100%	100%
Class E	0.06%	0.20%	-0.32%	100%	99%
Overall	0.02%	0.37%	-0.03%	100%	99%
Class D	-0.01%	-0.01%	0.71%	100%	100%
Class F	-0.02%	-0.21%	-0.12%	100%	100%
TGM	0.05%	-0.11%	-0.01%	100%	100%

Simulation results

low QP

All Intra Main10					
Over VTM-5.0(100Frm4K_LowQP)					
	Y	U	V	EncT	DecT
Class A1	0.00%	-0.01%	-0.01%	100%	98%
Class A2	0.00%	0.00%	0.01%	101%	99%
Class B	0.01%	-0.01%	0.02%	100%	99%
Class C	0.00%	0.02%	0.00%	100%	99%
Class E	0.00%	0.03%	0.01%	100%	98%
Overall	0.00%	0.00%	0.01%	100%	99%
Class D	0.00%	-0.04%	-0.02%	100%	98%
Class F	0.02%	-0.03%	-0.01%	100%	99%
TGM	0.03%	0.05%	0.05%	99%	99%

The coding loss in TGM is induced by the big loss of DeskTop sequence, which is an another issue from this proposal

Random Access Main 10					
Over VTM-5.0(100Frm4K_LowQP)					
	Y	U	V	EncT	DecT
Class A1	0.00%	-0.01%	0.00%	101%	101%
Class A2	#VALUE!	#VALUE!	#VALUE!	#NUM!	#NUM!
Class B	0.00%	0.00%	0.03%	100%	99%
Class C	-0.01%	-0.02%	-0.01%	100%	100%
Class E					
Overall	#VALUE!	#VALUE!	#VALUE!	#NUM!	#NUM!
Class D	-0.02%	0.04%	-0.01%	100%	103%
Class F	0.09%	0.01%	0.03%	99%	99%
TGM	1.49%	-0.23%	-0.21%	100%	100%

Low delay B Main10					
Over VTM-5.0(100Frm4K_LowQP)					
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.00%	0.00%	0.00%	100%	100%
Class C	-0.02%	0.01%	-0.07%	101%	100%
Class E	0.00%	0.01%	-0.09%	100%	100%
Overall	0.00%	0.00%	-0.05%	100%	100%
Class D	0.00%	-0.05%	0.00%	100%	99%
Class F	0.04%	0.03%	0.18%	99%	99%
TGM	0.25%	0.07%	0.07%	100%	101%

- **Proposed method unifies the count method of subblock flag between two residual modes with no coding losses.**

→ Propose to adopt this into the test model

Thank LGE for cross checking our proposal.