

JVET-P0162

CE5-related: Simplified ALF syntax with removal of `alf_ctb_use_first_aps_flag`

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Overall Summary

- Simplify the inconsistent and over-complicated signalling of adaptive loop filter (ALF) coding tree block (CTB) syntax for luma component
 - Remove `alf_ctb_use_first_aps_flag`, used to indicate whether a luma CTB uses the filter set from the first adaptation parameter set (APS)
 - Simplify related parsing processes

Over VTM-6.0 (%)		Y	U	V	EncT	DecT	
1	Remove alf_ctb_use_first_aps_flag	AI	0.00	0.00	0.00	100%	100%
		RA	0.01	-0.01	0.00	100%	100%
		LB	-0.03	0.14	0.07	100%	99%

Introduction

- ALF CTB syntax for luma is unnecessarily complicated in VTM6.0
 - `alf_ctb_use_first_aps_flag` is signalled first
 - if `alf_ctb_use_first_aps_flag` is false, followed by `alf_use_aps_flag`
 - if `alf_use_aps_flag` is true, then `alf_luma_prev_filter_idx_minus1`
 - else `alf_luma_fixed_filter_idx` is signalled

alf_ctb_flag[0][xCtb >> CtbLog2SizeY][yCtb >> CtbLog2SizeY]	ae(v)
if(alf_ctb_flag[0][xCtb >> CtbLog2SizeY][yCtb >> CtbLog2SizeY]) {	
if(slice_num_alf_aps_ids_luma > 0)	
alf_ctb_use_first_aps_flag	ae(v)
if(!alf_ctb_use_first_aps_flag) {	
if(slice_num_alf_aps_ids_luma > 1)	
alf_use_aps_flag	ae(v)
if(alf_use_aps_flag) {	
if(slice_num_alf_aps_ids_luma > 2)	
alf_luma_prev_filter_idx_minus1	ae(v)
} else	
alf_luma_fixed_filter_idx	ae(v)
}	
}	
}	

Proposed Method

- Remove `alf_ctb_use_first_aps_flag`
- `alf_use_aps_flag` is signalled first
 - if `alf_use_aps_flag` is true followed by `alf_luma_prev_filter_idx`
 - else (`alf_use_aps_flag` is false) `alf_luma_fixed_filter_idx` is signalled

alf_ctb_flag [0][xCtb >> CtbLog2SizeY][yCtb >> CtbLog2SizeY]	ae(v)
if(alf_ctb_flag[0][xCtb >> CtbLog2SizeY][yCtb >> CtbLog2SizeY]) {	
if(slice_num_alf_aps_ids_luma > 0)	
alf_use_aps_flag	ae(v)
if(alf_use_aps_flag) {	
if(slice_num_alf_aps_ids_luma > 1)	
alf_luma_prev_filter_idx	ae(v)
} else	
alf_luma_fixed_filter_idx	ae(v)
}	

Simulation Results

- Remove
alf_ctb_use_first_aps_flag

	All Intra Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	0.00%	0.00%	0.00%	100%	101%
Class A2	0.00%	0.00%	0.00%	100%	100%
Class B	0.00%	0.00%	0.00%	100%	100%
Class C	0.00%	0.00%	0.00%	100%	100%
Class E	0.00%	0.01%	0.01%	101%	100%
Overall	0.00%	0.00%	0.00%	100%	100%
Class D	0.00%	0.00%	0.00%	100%	100%
Class F	0.00%	0.00%	0.00%	100%	100%

	Random access Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1	0.00%	-0.16%	-0.06%	100%	101%
Class A2	0.05%	0.08%	0.09%	100%	100%
Class B	0.00%	0.07%	0.00%	100%	100%
Class C	-0.01%	-0.06%	-0.02%	100%	100%
Class E					
Overall	0.01%	-0.01%	0.00%	100%	100%
Class D	-0.02%	0.02%	0.01%	101%	100%
Class F	0.00%	0.00%	-0.03%	100%	100%

	Low delay B Main10				
	Over VTM-6.0				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.00%	0.04%	-0.02%	100%	99%
Class C	-0.04%	0.10%	-0.14%	100%	99%
Class E	-0.09%	0.34%	0.52%	100%	98%
Overall	-0.03%	0.14%	0.07%	100%	99%
Class D	0.00%	0.50%	0.10%	101%	100%
Class F	0.00%	0.01%	0.40%	100%	99%

Conclusions

- Proposed to remove `alf_ctb_use_first_aps_flag` to simplify ALF syntax design
- Coding efficiency impact is minor
- Thanks to Ericsson for cross-checking