

JCTVC-I0340: Signaling of long-term reference pictures in the SPS

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Background

- Current RPS signaling
 - STRPs: either inherited from PPS or directly signaled in the slice header
 - LTRPs: only directly signaled in the slice header
- Thus, each LTRP's POC information must be included in all slice headers since the LTRP is identified as a LTRP until it becomes no longer needed for prediction reference
- However, a LTRP may stay in the DPB for a long period, thus the current LTRP signaling requires the POC information of the LTRP to be repeated in all slice headers of pictures within the long period
- In scenarios wherein LTRPs are pre-selected or the bitstream is multi-pass encoded, which reference pictures would be used for LTRPs and would stay in the DPB for long periods are known at the beginning of the bitstream
- In these scenarios, signaling of candidate LTRPs in the SPS can save a lot of bits to be transmitted, because in this case, instead of transmitting directly and repeatedly the POC information of the LTRPs in the slice header, only the indices to the candidate LTRPs included in the SPS needs to be transmitted
 - Similarly as currently for STRPs

Proposal

- To enable the inclusion of candidate LTRPs in the
- SPS syntax

seq_parameter_set_rbsp() {	
...	
num_short_term_ref_pic_sets	ue(v)
for(i = 0; i < num_short_term_ref_pic_sets; i++)	
short_term_ref_pic_set(i)	
long_term_ref_pics_present_flag	u(1)
if(long_term_ref_pics_present_flag) {	
long_term_ref_pic_poc_len_delta	ue(v)
num_long_term_ref_pics_sps	ue(v)
for(i = 0; i < num_long_term_ref_pics_sps; i++) {	
long_term_ref_pic_poc_pps[i]	i(v)
used_by_curr_pic_lt_sps_flag[i]	u(1)
}	
...	
rbp_trailing_bits()	
}	

Slice header syntax

slice_header() {	Descriptor
...	
if(IdrPicFlag) {	
idr_pic_id	ue(v)
no_output_of_prior_pics_flag	u(1)
} else {	
pic_order_cnt_lsb	u(v)
short_term_ref_pic_set_sps_flag	u(1)
if(!short_term_ref_pic_set_sps_flag)	
short_term_ref_pic_set(num_short_term_ref_pic_sets)	
else	
short_term_ref_pic_set_idx	u(v)
if(long_term_ref_pics_present_flag) {	
num_long_term_sps	ue(v)
num_long_term_pics	ue(v)
for(i = 0; i < num_long_term_sps; i++)	
long_term_idx_sps[i]	ue(v)
for(i = 0; i < num_long_term_pics; i++) {	
delta_poc_lsb_lt[i]	ue(v)
delta_poc_msb_present_flag[i]	u(1)
if(delta_poc_msb_present_flag[i])	
delta_poc_msb_cycle_lt_minus1[i]	ue(v)
used_by_curr_pic_lt_flag[i]	u(1)
}	
}	
...	
}	

Bit counting results

- Only the bits used to represent LTRPs in RPS signaling, in both SPS and slice header
- Test 2.7 in JCTVC-H0725
- On average 65% reduction in bit counts
- Cross-check by LG in JCTVC-I0510