



AHG15: FIX FOR AN UNHANDLED LONG-TERM PICTURE CASE

JCTVC-10234

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PROBLEM STATEMENT

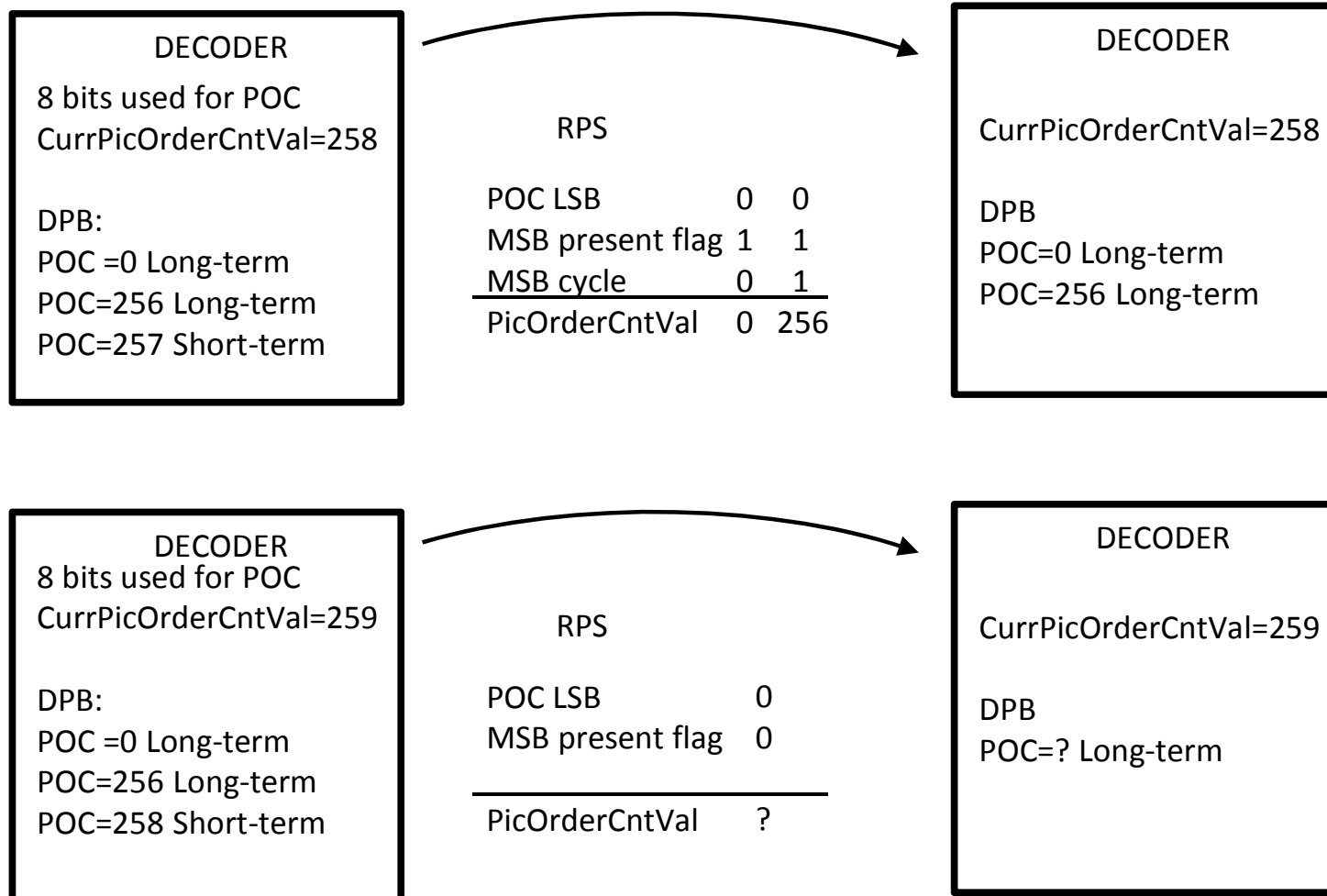
- › The current long-term picture syntax allows for multiple long-term pictures with the same POC lsb
- › In order to distinguish between them, the standard mandates that `delta_poc_msb_present_flag` shall be equal to 1 for every long-term picture in the RPS that has identical POC lsb to another long-term picture in the RPS:

“`delta_poc_msb_present_flag[i]` shall be equal to 1 when `DeltaPocLt[i]` is equal to `DeltaPocLt[j]` for any value of `j` in the range of 0 to `num_long_term_pics – 1`, inclusive, and not being equal to `i`.”

`DeltaPocLt` is a list that holds all POC lsb of the long-term pictures in the RPS

slice_header() {	Descriptor
...	
if(long_term_ref_pics_present_flag) {	
num_long_term_pics	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)
}	
}	
}	
...	

EXAMPLE



PROBLEM STATEMENT

- › The CD does not define what a decoder should do when there are two or more reference pictures in the DPB with the same POC lsb but only one of them is in the RPS, signalled using `delta_poc_msb_present_flag` equal to 0. Nor does it prohibit this signaling.
- › The HEVC specification must not contain undefined processes for a conforming bitstream!!

POSSIBLE SOLUTIONS

- › One option would be to formulate a restriction for the `delta_poc_msb_present_flag` so that it must be set equal to 1 when there are two or more long term pictures in the DPB with the same POC lsb.
- › However this imposes a restriction on a syntax element (on which the presence of another syntax element depends) to added to the semantics section which relies on the marking that is performed in the decoding process which is not very elegant.
- › Another option is to define how a decoder should react when the situation occurs (e.g. keep the long-term picture with highest POC).
- › Both of these options have error resilience issues (the result will be ambiguous if you lose the picture that selected which long-term picture to be kept in the DPB).
- › We prefer the second option as it is a more elegant and straight-forward solution. A process may also be easier to test than a restriction.
- › We further propose to add a note recommending the use of `delta_poc_msb_present_flag` equal to 1 for long-term pictures with POC lsb that is equal to the POC lsb of other (previous) long-term pictures to improve error resilience.

PROPOSAL

- › Keep the long-term picture with the highest PicOrderCntVal if there are more than one long-term picture with the same POC lsb

```
for( i = 0; i < NumPocLtCurr; i++ ) {  
    if( !delta_poc_msb_present_flag[ i ] ) {  
        if( there are one or more long-term reference pictures in the DPB  
            with pic_order_cnt_lsb equal to PocLtCurr[ i ] )  
            RefPicSetLtCurr[ i ] = the reference picture with the highest value of PicOrderCntVal among the  
                                long-term reference pictures in the DPB with pic_order_cnt_lsb equal to PocLtCurr[ i ]  
        else if( there is a short-term reference picture picY in the DPB  
                with pic_order_cnt_lsb equal to PocLtCurr[ i ] )  
            RefPicSetLtCurr[ i ] = picY  
        else  
            RefPicSetLtCurr[ i ] = "no reference picture"  
    }  
}
```

```
for( i = 0; i < NumPocLtFoll; i++ ) {  
    if( !delta_poc_msb_present_flag[ i ] ) {  
        if( there are one or more long-term reference pictures in the DPB  
            with pic_order_cnt_lsb equal to PocLtFoll[ i ] )  
            RefPicSetLtFoll[ i ] = the reference picture with the highest value of PicOrderCntVal among the  
                                long-term reference pictures in the DPB with pic_order_cnt_lsb equal to PocLtFoll[ i ]  
        else if( there is a short-term reference picture picY in the DPB  
                with pic_order_cnt_lsb equal to PocLtFoll[ i ] )  
            RefPicSetLtFoll[ i ] = picY  
        else  
            RefPicSetLtFoll[ i ] = "no reference picture"  
    }  
}
```



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POSSIBLE RESTRICTION

It is a requirement of bitstream conformance that the value of `delta_poc_msb_present_flag[i]` shall be equal to 1 **when there are at least two reference pictures in the DPB** with `pic_order_cnt_lsb` equal to `DeltaPocLt[i]`.