

# **CE6.H related: Simplification of SDC signalling**

**Xiaozhen Zheng**

# Summary

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- Motivation

- ◆ Unify SDC signaling and conventional intra mode signaling
- ◆ Reduce the contexts for SDC
- ◆ Encoder bug-fixed

- Experimental results

- ◆ CTC: 0.00%, -0.02% and -0.01% for video only, synthesized only and coded & synthesized
- ◆ All-intra: 0.00%, 0.39% and 0.30% for video only, synthesized only and coded & synthesized

- Cross-check: JCT3V-C0089 by LG

# SDC signaling in current design

- Four selected intra modes are used for SDC
  - ◆ DC, Planar, DMM1 and DMM2
- Syntax for SDC signaling is independent to intra modes signaling
  - ◆ sdc\_flag used to indicate the enable of SDC
  - ◆ sdc\_pred\_mode used to specify the intra mode for SDC
- Four SDC modes come from conventional intra modes that are not need to signaled independently

→ → if( PredMode == MODE_INTRA &&DepthFlag) ↵	↵
→ → → sdc_flag[x0][y0] ↵	ae(v) ↵
→ → → if( sdc_flag[x0][y0] ) { ↵	↵
→ → → → sdc_pred_mode ↵	ae(v) ↵
→ → → → if( sdc_pred_mode == 1) ↵	↵
→ → → → wedge_full_tab_idx[x0][y0] ↵	ae(v) ↵
→ → → → if( sdc_pred_mode == 2) { ↵	↵
→ → → → → dmm_delta_end_flag[x0][y0] ↵	ae(v) ↵
→ → → → → if( dmm_delta_end_flag[x0][y0] ) { ↵	↵
→ → → → → dmm_delta_end_abs_minus1[x0][y0] ↵	ae(v) ↵
→ → → → → dmm_delta_end_sign[x0][y0] ↵	ae(v) ↵
→ → → → → } ↵	↵
→ → → → } ↵	↵
→ → → } else { ↵	↵
→ → → → if( ( PredMode[x0][y0] != MODE_INTRA ···   ··· log2CbSize ··· == ··· Log2MinCbSize ) ··· && ↓ → → → → !predPartModeFlag) ↵	↵
→ → → → ······ ↵	↵

# Proposed signaling method

- Move SDC signaling flag (sdc\_flag) behind the intra modes
  - ◆ Remove sdc\_pred\_mode and related contexts
  - ◆ Only one flag is necessary for SDC
  - ◆ Reduce “if...else...” clause, and reduce decoder parsing burden
  - ◆ The length of syntax description can also be reduced

→ → → if( PredMode == MODE_INTRA && DepthFlag )	↵
→ → → → sdc_flag[ x0 ][ y0 ]	ae(v) ↵
→ → → → sdc_pred_mode	ae(v) ↵
→ → → → if( sdc_pred_mode == 1 )	↵
→ → → → → wedge_full_tab_idx[ x0 ][ y0 ]	ae(v) ↵
→ → → → if( sdc_pred_mode == 2 ) {	↵
→ → → → → dmm_delta_end_flag[ x0 ][ y0 ]	ae(v) ↵
→ → → → → if( dmm_delta_end_flag[ x0 ][ y0 ] ) {	↵
→ → → → → → dmm_delta_end_abs_minus1[ x0 ][ y0 ]	ae(v) ↵
→ → → → → → dmm_delta_end_sign[ x0 ][ y0 ]	ae(v) ↵
→ → → → → }	↵
→ → → → }	↵
→ → → } else {	↵
→ → → → if( ( PredMode[ x0 ][ y0 ] != MODE_INTRA ·   q · log2CbSize · == · Log2MinCbSize ) · && !predPartModeFlag )	↵
→ → → → → part_mode	ae(v) ↵

→ → → → → if( PredMode == MODE_INTRA && DepthFlag && ( IntraPredMode[ xB ][ yB ] == 0    IntraPredMode[ xB ][ yB ] == 1    IntraPredMode[ xB ][ yB ] == 35    IntraPredMode[ xB ][ yB ] == 41 ) )	↵
→ → → → → sdc_flag[ x0 ][ y0 ]	ae(v) ↵
→ → → → → if( sdc_flag[ x0 ][ y0 ] == 0 )	↵
→ → → → → → intra_chroma_pred_mode[ x0 ][ y0 ]	ae(v) ↵

# Proposed signaling method (2)

- Change of context derivation for sdc\_flag
  - ◆ Change the derivation method based on the left and above sdc\_flag to the intra modes  
$$\text{UInt uiCtxSDCFlag} = (\text{intraPredMode} == \text{DC\_IDX} \parallel \text{intraPredMode} == \text{PLANAR\_IDX}) ? 0 : 1$$
  - ◆ The number of context can be reduced from 3 to 2

# Encoder bug-fixed

- Redundant search for SDC DC offset for the conventional intra mode
  - ◆ Suggest to add the condition to skip the search for the convention intra mode

```
for( UInt uiSDC=0; uiSDC<=uiUseSDC; uiSDC++ )
{
    for( UInt uiRes = 0; uiRes<=uiUseSDC; uiRes++ )
    {
        If ( uiSDC == 0 && uiRes == 1 )
        {
            continue;
        }
    }
}
```

.....

- No impact on the test results for SDC in HTM5.0.1, 20% encoding run time reduction for All-intra case

# Experimental results

## CTC

	video 0	video 1	video 2	video only	synthesized only	coded & synthesized	enc time	dec time	ren time
Balloons	0.0%	0.0%	0.0%	0.00%	0.06%	0.06%	97.8%	97.3%	98.0%
Kendo	0.0%	0.0%	0.0%	0.00%	-0.03%	-0.02%	98.2%	100.5%	100.7%
Newspapercc	0.0%	0.0%	0.0%	0.00%	0.09%	0.06%	97.8%	104.0%	99.7%
GhostTownFly	0.0%	0.0%	0.0%	0.00%	-0.06%	-0.03%	98.1%	100.7%	99.8%
PoznanHall2	0.0%	0.0%	0.0%	0.00%	-0.05%	-0.04%	99.0%	99.6%	101.0%
PoznanStreet	0.0%	0.0%	0.0%	0.00%	0.02%	0.02%	93.6%	101.9%	103.8%
UndoDancer	0.0%	0.0%	0.0%	0.00%	-0.17%	-0.12%	93.5%	98.4%	98.8%
1024x768	0.0%	0.0%	0.0%	0.00%	0.04%	0.04%	97.9%	100.6%	99.4%
1920x1088	0.0%	0.0%	0.0%	0.00%	-0.06%	-0.04%	96.0%	100.1%	100.8%
average	0.0%	0.0%	0.0%	0.00%	-0.02%	-0.01%	96.8%	100.3%	100.2%

# Experimental results (2)

## All-intra

	video 0	video 1	video 2	video only	synthesized only	coded & synthesized	enc time	dec time	ren time
Balloons	0.0%	0.0%	0.0%	0.00%	0.55%	0.42%	81.3%	97.3%	102.0%
Kendo	0.0%	0.0%	0.0%	0.00%	0.68%	0.52%	82.3%	95.7%	101.8%
Newspapercc	0.0%	0.0%	0.0%	0.00%	0.50%	0.37%	79.0%	99.9%	101.2%
GhostTownFly	0.0%	0.0%	0.0%	0.00%	0.26%	0.21%	80.2%	95.0%	102.0%
PoznanHall2	0.0%	0.0%	0.0%	0.00%	0.42%	0.35%	81.2%	98.6%	102.3%
PoznanStreet	0.0%	0.0%	0.0%	0.00%	0.23%	0.17%	78.0%	96.5%	104.8%
UndoDancer	0.0%	0.0%	0.0%	0.00%	0.11%	0.08%	78.8%	101.6%	103.8%
1024x768	0.0%	0.0%	0.0%	0.00%	0.58%	0.44%	80.9%	97.6%	101.6%
1920x1088	0.0%	0.0%	0.0%	0.00%	0.25%	0.20%	79.6%	97.9%	103.2%
average	0.0%	0.0%	0.0%	0.00%	0.39%	0.30%	80.1%	97.8%	102.6%



# Conclusions

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- The contribution proposes to move `sdc_flag` behind intra mode that can simplify the bitstream structure and syntax
- Contexts for SDC can also be reduced
- No impact on coding performance for CTC
- Slight coding gain loss for All-intra condition
- Suggest to adopt the proposed SDC signaling method



# Thank you!

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