JCTVC-S0105

MEDIATEK

CE6-related: Syntax fixes for zero palette in palette coding

Kai Zhang, Tzu-Der (Peter) Chuang, Shan Liu,
Jungsun Kim, Jicheng An, Xianguo Zhang, Shawmin Lei

Presented by Tzu-Der (Peter) Chuang
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Overview Summary

- Propose to fix the issues when palette size is equal to 0
- When the palette size of the previous CU is zero
  - Palette sharing mode is redundant
  - The palette_sharing_flag inferred as 0
- When the palette size of the current CU is 0
  - If the CU-level escape flag is 0, the decoder behaviour is undefined
  - The palette_escape_val_present_flag is inferred as 1
  - Using PCM mode coding for current CU
- The results reportedly show negligible coding performance change

Palette Sharing Flag with Zero Palette

- The current palette CU may be coded in a sharing mode even when the palette size of the previous CU is 0
  - Such syntax redundancy should be removed
- When the palette size of last coded palette is 0, the palette_sharing_flag is proposed to be inferred as 0

palette_coding(x0, y0, nCbS) {
palette_transpose_flag
if (previousPaletteSize > 0)
palette_share_flag[x0][y0]
if(palette_share_flag[x0][y0]) {
…
}

CU-level Escape Flag with Zero Palette

- The indexMax is derived for index map coding
- If the palette size of the current CU is zero and the palette_escape_val_present_flag is 0, the indexMax is equal to -1
  - No valid palette index for decoding
  - Decoder behaviour is undefined, and the decoder may crash

```
palette_coding( x0, y0, nCbS ) {
  …
  palette_escape_val_present_flag
  if( palette_escape_val_present_flag )
    indexMax = palette_size
  else
    indexMax = palette_size − 1
 …
}
```

CU-level Escape Flag with Zero Palette

- When the palette size of current palette CU is 0, the palette_escape_val_present_flag is proposed to be inferred as 1
  - All samples are coded as escape pixels

```
palette_coding( x0, y0, nCbS ) {
  …
   if ( paletteSize > 0 )
    palette_escape_val_present_flag
  if( palette_escape_val_present_flag )
    indexMax = palette_size
  else
    indexMax = palette_size − 1
  …
}
```

Inferred PCM Mode

- Coding all samples as escape pixels is similar to PCM mode
- When the palette size of current palette CU is 0, using, using PCM mode coding

```
 …
   if( palette_size == 0 )
   {
  while( !byte_aligned( ) )
    plt_alignment_zero_bit
    pcm_sample( x0, y0, log2CbSize )
   }
  else{
    palette_escape_val_present_flag
 …
 }
```

Lossy Coding Result of Inferred Palette Sharing flag and CU-level Escape Flag

- Anchor: SCM-2.0
- Negligible coding performance change

	All Intra			Random Access			Low delay B		
	G/Y	B/U	R/V	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%
RGB, text & graphics with motion,720p	0.0%	0.0%	0.1%	0.0%	-0.1%	0.0%	-0.1%	-0.1%	0.0%
RGB, mixed content, 1440p	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.1%	-0.1%	0.0%
RGB, mixed content, 1080p	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.3%	0.2%	0.4%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.1%	0.1%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	0.1%
YUV, text & graphics with motion, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%
YUV, text & graphics with motion,720p	0.1%	0.0%	0.1%	0.1%	0.0%	0.2%	-0.2%	0.2%	-0.3%
YUV, mixed content, 1440p	0.0%	0.0%	-0.1%	-0.1%	-0.2%	-0.1%	0.0%	-0.2%	0.3%
YUV, mixed content, 1080p	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.2%	0.0%	0.3%	0.2%
YUV, Animation, 720p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.3%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	-0.1%	0.1%

Conclusion

- Propose to fix the issues when palette size is equal to 0
- When the palette size of previous CU is 0
  - The palette_sharing_flag is inferred as 0
  - Remove the syntax redundancy
- When the palette size of the current CU is 0
  - The palette_escape_val_present_flag is inferred as 1
  - Using PCM mode coding for current CU
  - Fix the problem of undefined decoder behaviour