



Subjective Quality Comparison between MCS Coding and YUV420 Coding Using YUV444 Screen Content Test Sequences

JCTVC-I0336

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Peijun Zhang, Tao Lin, Shuhui Wang, Kailun Zhou



What are compared?

- **HEVC YUV420 Hybrid Coding**
versus
- **Mixed Chroma Sampling-rate Coding**
 - ❖ **Full-chroma dictionary-entropy coder**
 - ❖ **HEVC YUV420 hybrid coder with 444 prediction**

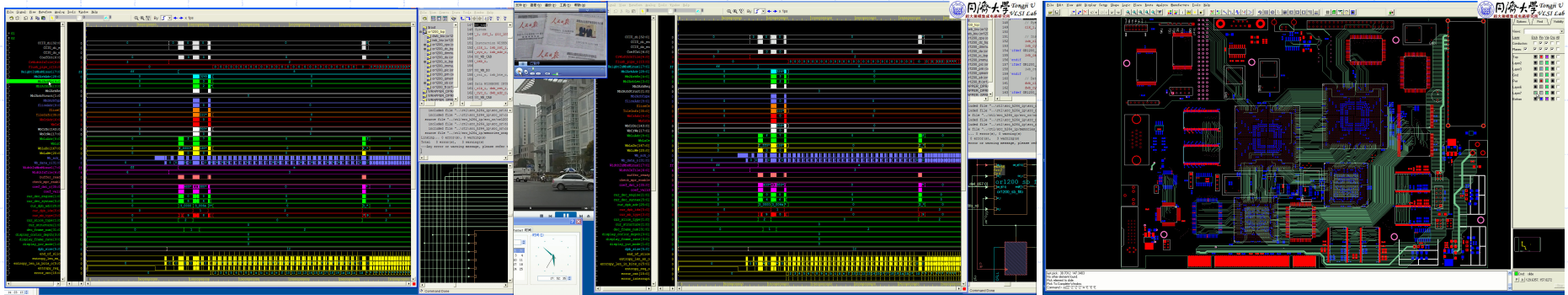
Observation

- **Obvious improvement of subjective picture quality at the same bitrate**



◆ Five test sequences: 335 frames, 1080p, 20fps

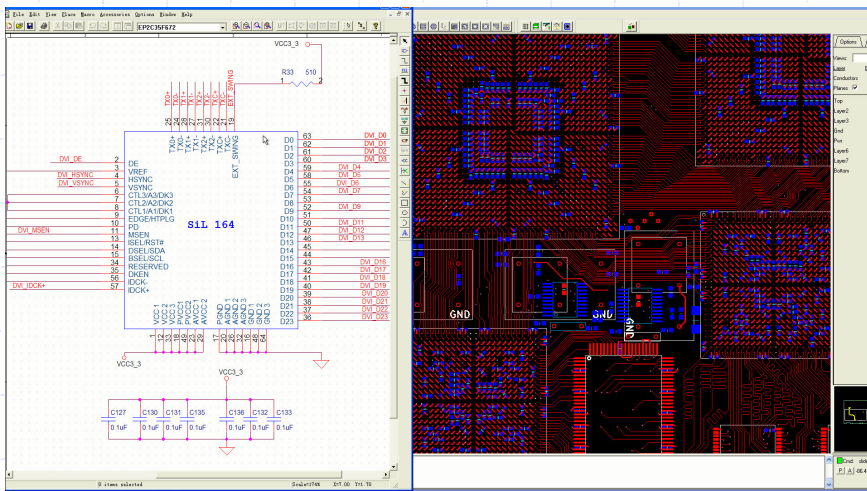
◆ See JCTVC-H0294 for details of the test sequences



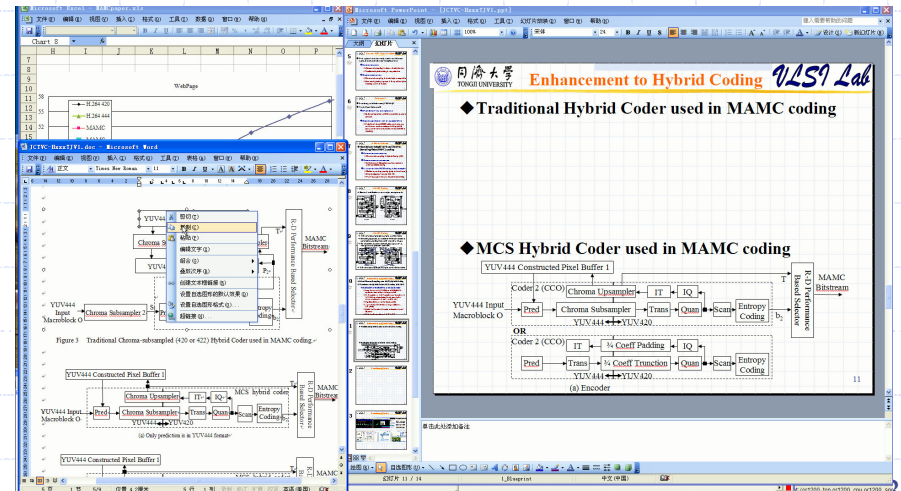
TJU_CAD_waveform.yuv

TJU_CAD_waveform_Street_Campus.yuv

TJU_PCB_layout.yuv



TJU_PCB_schematic.yuv



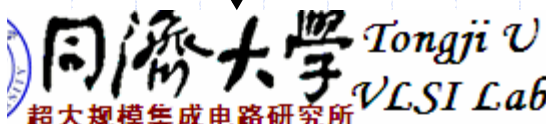
TJU_ppt_doc_xls.yuv



Original picture

420 coded/constructed
picture: 25.4dB PSNR
@237.6kbps


MCS coded/constructed
picture: 50.4dB PSNR
@227.8kbps



```

147 000_cog(
148 System
149 _i, rst_i, pic_int
150
151 Instruction WISHBONE
152 _clk_i, iwb_rst_i,
153 _cyc_o, iwb_adr_o,
154 000_WB_CAB
155 _cab_o,
156
157 000_WB_B3
158 _cti_o, iwb_bte_o,
159
160 Data WISHBONE INTE
161 _clk_i, dwb_rst_i,
162 _cyc_o, dwb_adr_o,
163 000_WB_CAB
  
```

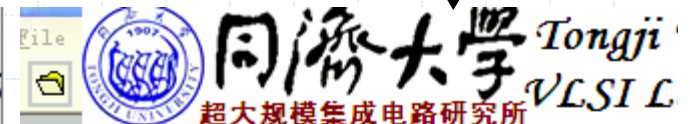
included file "../rtl/src_h264_ip/src_or/ti
included file "../rtl/src_h264_ip/src_or/or
source file "../rtl/src_h264_ip/src_or/or1200



```

147 000_cog(
148 System
149 _i, rst_i, pic_int
150
151 Instruction WISHBONE
152 _clk_i, iwb_rst_i,
153 _cyc_o, iwb_adr_o,
154 000_WB_CAB
155 _cab_o,
156
157 000_WB_B3
158 _cti_o, iwb_bte_o,
159
160 Data WISHBONE INTE
161 _clk_i, dwb_rst_i,
162 _cyc_o, dwb_adr_o,
163 000_WB_CAB
  
```

included file "../rtl/src_h264_ip/src_or/ti
included file "../rtl/src_h264_ip/src_or/or
source file "../rtl/src_h264_ip/src_or/or1200



```

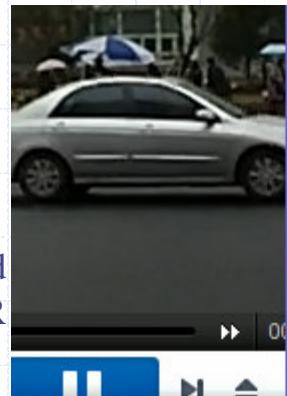
147 000_cog(
148 System
149 _i, rst_i, pic_int
150
151 Instruction WISHBONE
152 _clk_i, iwb_rst_i,
153 _cyc_o, iwb_adr_o,
154 000_WB_CAB
155 _cab_o,
156
157 000_WB_B3
158 _cti_o, iwb_bte_o,
159
160 Data WISHBONE INTE
161 _clk_i, dwb_rst_i,
162 _cyc_o, dwb_adr_o,
163 000_WB_CAB
  
```

included file "../rtl/src_h264_ip/src_or/ti
included file "../rtl/src_h264_ip/src_or/or
source file "../rtl/src_h264_ip/src_or/or1200

There are quite a lot very obvious coding artifacts on the middle picture but none on the right picture.



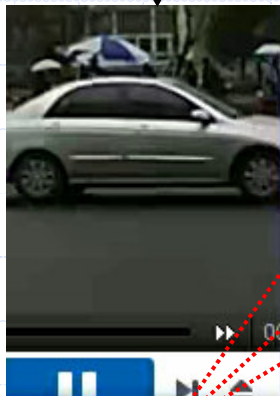
420 coded/constructed
picture: 26.4dB PSNR
@667.6kbps



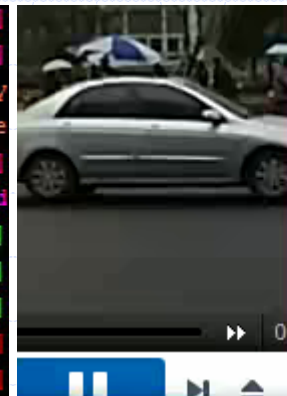
```
WidthInMbsMinus1[7:0]
WidthInTile[6:0]
  buffer_ready
  check_mpr_enable
  coef_dat_o[35:0]
  coef_valid
  cur_dec_engine[1:0]
  cur_dec_syntax[5:0]
  cur_dpb_adr[25:0]
  cur_dpb_idx[5:0]
  cur_mb_type[3:0]
```

← The original picture

MCS coded/constructed
picture: 44.8dB PSNR
@666.7kbps

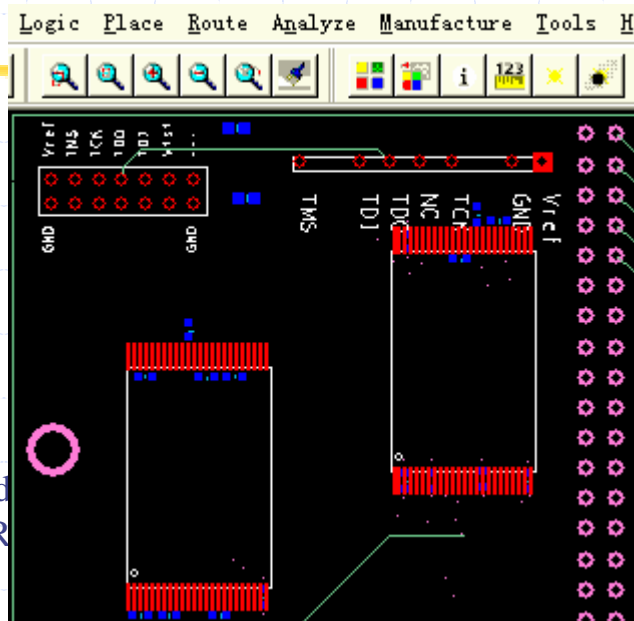


```
WidthInMbsMinus1[7:0]
WidthInTile[6:0]
  buffer_ready
  check_mpr_enable
  coef_dat_o[35:0]
  coef_valid
  cur_dec_engine[1:0]
  cur_dec_syntax[5:0]
  cur_dpb_adr[25:0]
  cur_dpb_idx[5:0]
  cur_mb_type[3:0]
```



```
WidthInMbsMinus1[7:0]
WidthInTile[6:0]
  buffer_ready
  check_mpr_enable
  coef_dat_o[35:0]
  coef_valid
  cur_dec_engine[1:0]
  cur_dec_syntax[5:0]
  cur_dpb_adr[25:0]
  cur_dpb_idx[5:0]
  cur_mb_type[3:0]
```

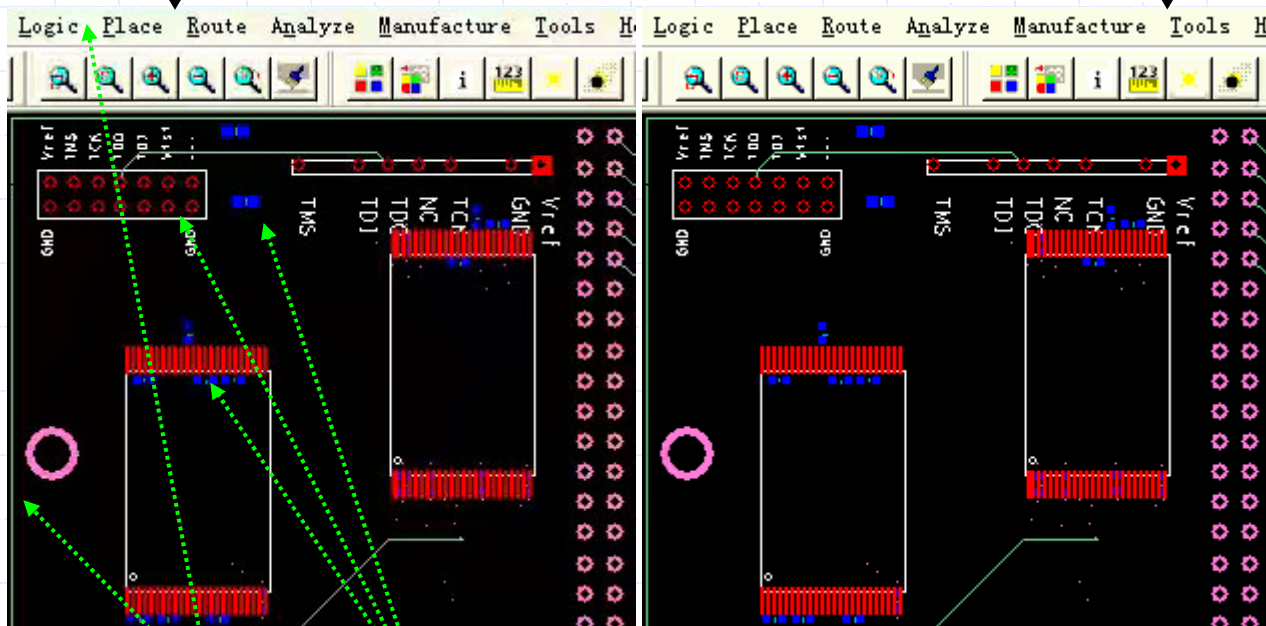
Texts are blurred and have color distortion on the left picture but none on the right picture.



←The original picture

420 coded/constructed
picture: 27.3dB PSNR
@824.5kbps

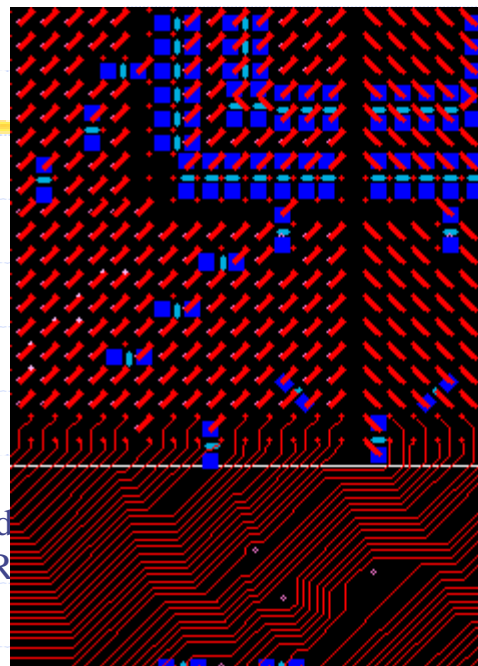
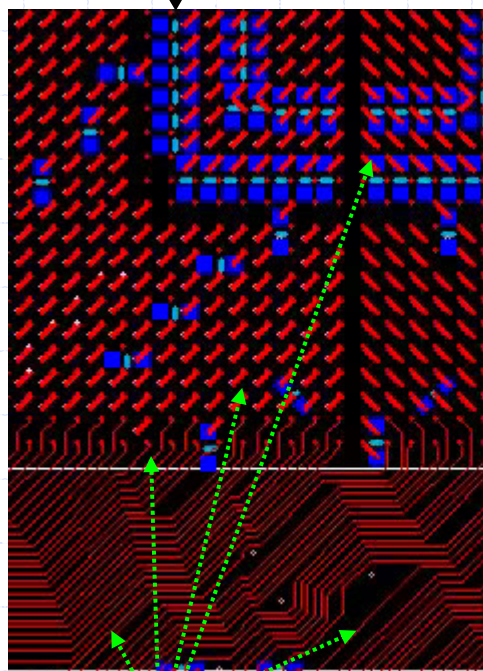
MCS coded/constructed
picture: 44.8dB PSNR
@832.7kbps



Whited/greenish color artifacts, blurred lines/circles/squares/icons etc. on the left picture



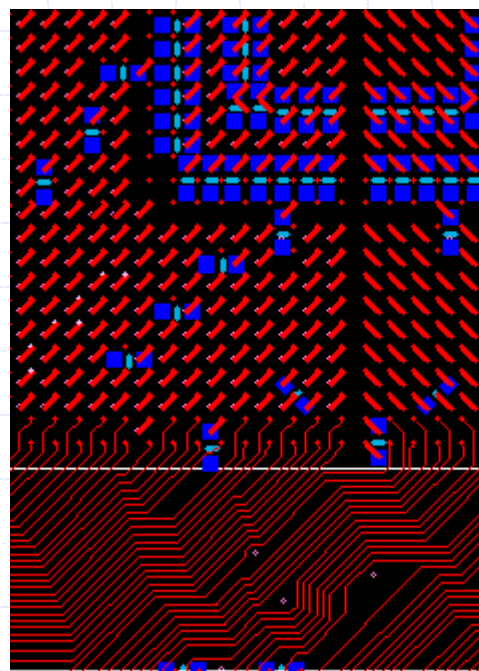
420 coded/constructed
picture: 25.9dB PSNR
@368.4kbps



Layer	Etch
Conductors	<input type="checkbox"/>
Planes	<input checked="" type="checkbox"/>
Top	<input checked="" type="checkbox"/>
Layer2	<input type="checkbox"/>
Layer3	<input type="checkbox"/>
Gnd	<input type="checkbox"/>
Pwr	<input type="checkbox"/>
Layer6	<input type="checkbox"/>
Layer7	<input type="checkbox"/>
Bottom	<input type="checkbox"/>

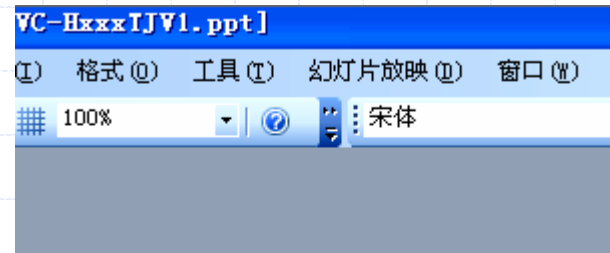
← The original picture

MCS coded/constructed
picture: 46.6dB PSNR
@377.0kbps



Layer	Etch
Conductors	<input type="checkbox"/>
Planes	<input checked="" type="checkbox"/>
Top	<input checked="" type="checkbox"/>
Layer2	<input type="checkbox"/>
Layer3	<input type="checkbox"/>
Gnd	<input type="checkbox"/>
Pwr	<input type="checkbox"/>
Layer6	<input type="checkbox"/>
Layer7	<input type="checkbox"/>
Bottom	<input type="checkbox"/>

Broken thin lines, blurred shapes, missed pixels and color distortion on the left picture



← The original picture

420 coded/constructed
picture: 31.9dB PSNR
@176kbps

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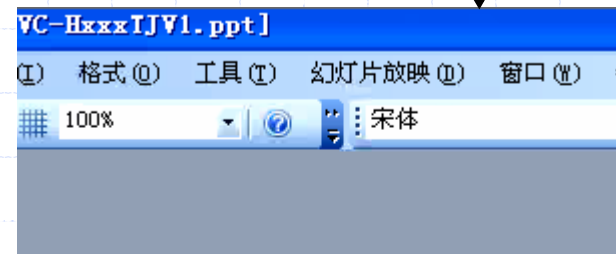
Enhance

MCS coded/constructed
picture: 41.0dB PSNR
@177kbps



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Enhance



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Enhance

Reddish artifacts, salt noise, and black pixels in text edges are obvious on the left picture



THANK YOU