

JEM1.0 Encoding Results of Chimera Test Sequence

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Introduction

❑ Report the JEM1.0 encoding results of Chimera test sequence

- ❖ The performance comparison with HM 16.6 under HM common test condition are provided as well

❑ Tools added in JEM 1.0

- Block structure
 - Larger Coding Tree Unit (up to 256x256) and transforms (up to 64x64)
- Intra prediction improvements
 - 65 intra prediction directions
 - 4-tap interpolation filter for intra prediction
 - Boundary filter applied to other directions in addition to horizontal and vertical ones
 - Cross-component linear model (CCLM) prediction
 - Position dependent intra prediction combination (PDPC)
 - Adaptive reference sample smoothing
- Inter prediction improvements
 - Sub-PU level motion vector prediction
 - Locally adaptive motion vector resolution (AMVR)
 - Overlapped block motion compensation (OBMC)
 - Local illumination compensation (LIC)
 - Affine motion prediction
 - Pattern matched motion vector derivation
 - Bi-directional optical flow (BIO)
- Transform
 - Explicit multiple core transform
 - Mode dependent non-separable secondary transforms
- Adaptive loop filter (ALF)
- Enhanced CABAC design
- Context model selection for transform coefficient levels
 - Multi-hypothesis probability estimation
 - Initialization for context models

Test Configuration

❑ Encoding condition

❖ Prediction structure

- [1] Random access Main 10 (RA-Main10)
 - Intra period is set to 64 since the frame rate of Chimera sequence is 60p
- [2] Low-delay B Main 10 (LDB-Main10)

❖ QP: 22, 27, 32, 37, 42

❑ Especially for the JEM1.0:

- ❖ *LoopFilterTcOffset_div2* is set to -2
- ❖ Both *CbQpOffset* and *CrQpOffset* are set to 1 for the RA-Main10 configuration

Experimental Results

❑ Coding performance improvement of JEM 1.0 over HM 16.6

	Random Access Main 10				Low delay B Main10		
	Bits saving over HM-16.6				Bits saving over HM-16.6		
	Y	U	V		Y	U	V
Aerial	-25.89%	-4.58%	-8.14%	Aerial	-27.25%	-23.97%	-25.74%
BarScene	-28.76%	-27.02%	-23.68%	BarScene	-29.35%	-54.78%	-47.99%
Dancers	-32.64%	-49.54%	-26.49%	Dancers	-24.19%	-51.20%	-52.30%
DinnerScene	-33.10%	-62.15%	-38.22%	DinnerScene	-30.49%	-59.51%	-49.32%
DrivingPOV	-24.44%	-12.53%	-7.59%	DrivingPOV	-15.36%	-24.97%	-17.52%
PierSeaside	-23.10%	-15.81%	-14.08%	PierSeaside	-18.16%	-30.46%	-25.17%
RollerCoaster	-31.29%	-21.84%	-18.70%	RollerCoaster	-23.56%	-28.53%	-26.07%
ToddlerFountain	-12.66%	2.96%	5.21%	ToddlerFountain	-12.24%	-12.46%	-8.94%
WindAndNature	-19.36%	-13.97%	-9.73%	WindAndNature	-15.86%	-19.51%	-18.31%
Overall	-25.69%	-22.72%	-15.71%	Overall	-21.83%	-33.93%	-30.15%

- ❖ On luma average, **25.69%** and **21.83%** bits saving for RA-Main10 and LDB-Main10, respectively
- ❖ However, *DrivingPOV*, *PierSeaside*, *ToddlerFountain* and *WindAndNature* sequences show relatively small gain compared to other sequences

❑ Conclusion:

- ❖ Coding performance of JEM1.0 should be further improved for those sequences in order to increase the compression capability of future video coding technology

Thank you

**Special thanks to Netflix for providing
the valuable test sequences**