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JCTVC-H0181

AHG07: A restriction of motion vector for small PU size

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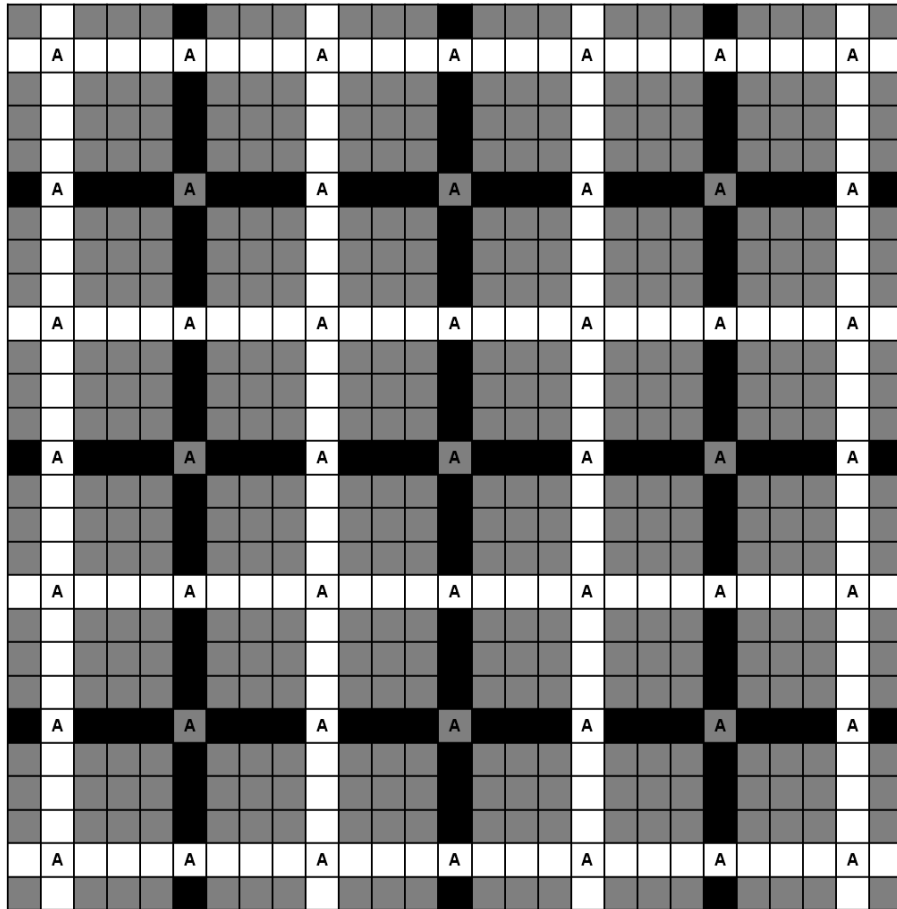
TOSHIBA CORPORATION

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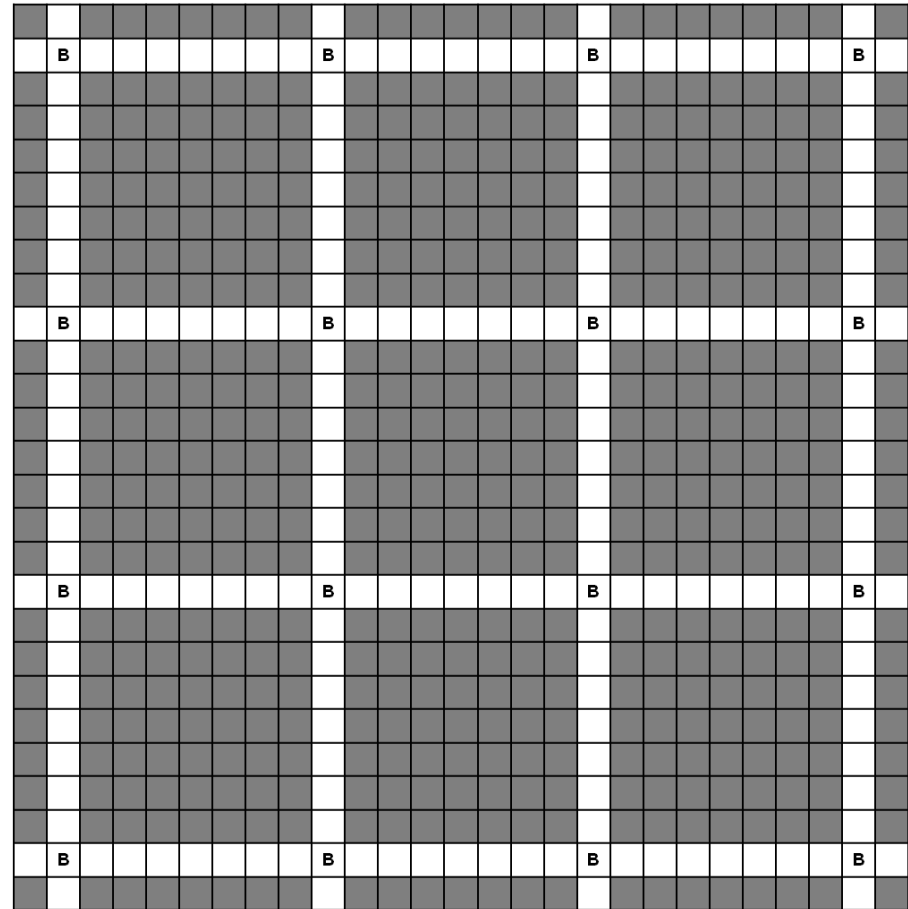
Purpose

- **A non-normative memory bandwidth reduction**
- **The worst case is bi-prediction, small PU, and 2-D interpolation for both luma and chroma, because current interpolation filters are 8 or 7-tap for luma and 4-tap for chroma**
- **How to restrict motion vectors for small PU without changes of normative specification.**

Luma and Chroma (4:2:0)



Luma



Chroma

Point

- **When motion vectors are restricted, fractional position for Chroma should be considered.**
- **An example of MV restriction**
 - 4x8 bi-prediction is prohibited.
 - One motion vector of L0 or L1 shall indicate the integer position for Chroma when PU size is 8x4 bi-prediction.

Experimental results (Summary)

	Proposal			8x4 and 4x8 bi-prediction prohibition		
	Y	U	V	Y	U	V
Gain Ave.[%]	0.45%	0.31%	0.32%	0.48%	0.40%	0.37%
Gain Best [%]	0.01%	-0.78%	-0.85%	0.01%	-0.17%	-0.81%
Gain Worst [%]	1.34%	2.26%	1.47%	1.29%	1.56%	1.65%
Gain Ave.[%] (Full)	0.23%	0.18%	0.16%	0.26%	0.21%	0.21%
Gain Best [%] (Full)	-0.54%	-0.87%	-1.74%	-0.91%	-1.07%	-2.00%
Gain Worst [%] (Full)	1.34%	2.26%	1.47%	1.34%	1.56%	1.91%
Enc Time[%]	95.80%			92.27%		
Dec Time[%]	100.76%			99.85%		
Mult Ave.[%]	-1.74%			-0.70%		
Mult Worst [%]	-22.81%			-22.81%		
Adds Ave.[%]	-1.75%			-0.70%		
Adds Worst [%]	-22.70%			-22.70%		
Access[%]	-1.98%			-1.58%		
MemBand(2D) Ave.[%]	-2.48%			-2.52%		
MemBand(2D) Worst [%]	-35.23%			-36.36%		
MemBand(1D) Ave.[%]	-2.35%			-2.39%		
MemBand(1D) Worst [%]	-31.25%			-31.25%		

Conclusion

- **When motion vectors are restricted, fractional position for Chroma should be considered.**
- **This approach is more efficient than simple PU size restriction.**
- **Cross-checked by Sharp (JCTVC-H0104)**

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