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Non-RCE4: Removal of syntax redundancy in RCE4 Test2

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Overall Summary

- In RCE4 Test2 (JCTVC-P0198), run coding can represent major color indices of multiple samples in a CU.
  - Explicit signaling
    - A mode flag to indicate copy-above or send-index
    - An index (only for the send-index mode)
    - A run to describe the number of multiple samples
  - If copy-above mode, the multiple samples copy indices from the above sample row; otherwise, share the explicitly signaled index.

- Proposed to prohibit the copy-above mode and save the mode flag when the previous multiple samples select the copy-above mode

- Results

Lossy coding BD-rate	AI-MT	RA-MT	LB-MT
SC YUV 444 sequences	-0.2%	-0.4%	-0.3%

- For further study in a CE

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Color Index Run Coding in RCE4 Test2

- Two run modes: copy-above and send-index

- Explicit signaling
  - A mode flag to indicate the selected run mode
  - A major color index (only for the send-index mode)
  - A run value to describe the number of multiple samples

- Reconstruction process
  - If the copy-above mode is selected, indices of the above sample row are copied for the multiple samples
  - Otherwise, the multiple samples share the signaled index.

- Syntax redundancy exists
  - E.g., a copy-above mode of M samples followed by a copy-above mode of N samples = a copy-above mode of M+N samples

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Proposed Method

- The syntax redundancy is removed as follows.

- If a copy-above mode is chosen by previous multiple samples, the current multiple samples are forced to use the send-index mode for run coding without signaling the mode flag.

Lossy Coding Results

- Anchor: RCE4 Test2

- 0.3% / 0.4% / 0.3% BD-rate savings for SC YUV 444 sequences under AI-MT / RA-MT / LB-MT

- Thank Qualcomm for cross-verification

Y BD-rate	AI-MT	AI-HT	AI-SHT	RA-MT	RA-HT	LB-MT	LB-HT
Class F	-0.1%	-0.1%	-0.1%	0.0%	-0.1%	0.1%	0.1%
Class B	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SC RGB 444	-0.3%	-0.4%	-0.4%	-0.3%	-0.4%	-0.1%	-0.2%
Animation RGB 444	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SC YUV 444	-0.3%	-0.4%	-0.4%	-0.4%	-0.4%	-0.3%	-0.2%
Animation YUV 444	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
RangeExt	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SC(444) GBR Opt.	-2.1%	-2.1%	-2.1%	-2.2%	-2.3%	-1.3%	-2.3%
SC(444) YUV Opt.	-1.4%	-1.5%	-1.6%	-1.0%	-1.0%	-1.2%	-1.2%

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Lossless Coding Results

- Anchor: RCE4 Test2

- 0.3% / 0.3% / 0.2% bit savings for YCbCr 444 SC sequences under AI / RA / LB

	AI	RA	LB
Class F	0.0%	0.0%	0.0%
Class B	0.0%	0.0%	0.0%
RGB 4:4:4 SC	-0.3%	-0.2%	-0.3%
RGB 4:4:4 Animation	0.0%	0.0%	0.0%
YCbCr 4:4:4 SC	-0.3%	-0.3%	-0.2%
YCbCr 4:4:4 Animation	0.0%	0.0%	0.0%
RangeExt	0.0%	0.0%	0.0%
RGB 4:4:4 SC (Optional)	-2.1%	-2.6%	-3.0%
YCbCr 4:4:4 SC (Optional)	-1.4%	-1.5%	-1.4%

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Conclusions

- A method is proposed to remove the syntax redundancy in RCE4 Test2.

- Results

Lossy coding BD-rate	AI-MT	RA-MT	LB-MT
SC YUV 444 sequences	-0.2%	-0.4%	-0.3%

- For further study in a CE

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