



# Non-TE3: Adaptive predictor compensation with generalized residual prediction

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# Overall Summary

- To show the gains of combining adaptive predictor compensation (APC) in TE3-4.3.1 and generalized residual prediction (GRP) test-2 in TE3-4.6.2.1
  - The APC uses the reconstructed base layer (BL) texture to refine the enhancement layer (EL) sample predictors
  - The GRP uses the pseudo inter prediction residual of the collocated BL block to predict the residual of the current block
- The gains of APC and GRP are additive
  - 85-100% of GRP's gains are preserved

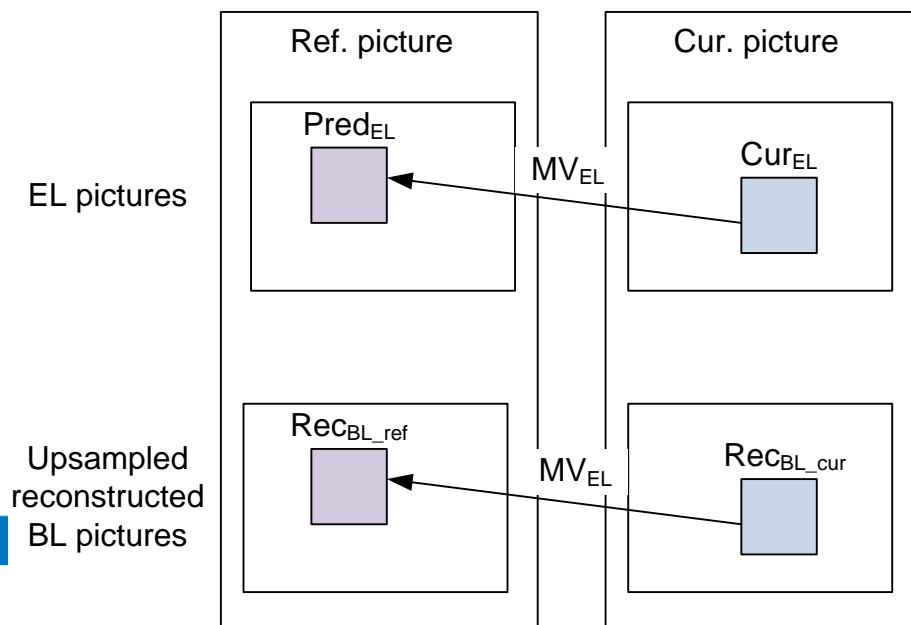
	RA- 2x	RA- 1.5x	RA- SNR	LDP- 2x	LDP- 1.5x	LDP- SNR
APC in TE3-4.3.1	-0.4%	-0.6%	-0.8%	-1.2%	-1.5%	-2.4%
GRP in TE3-4.6.2.1 test 2	-1.9%	-2.8%	-2.1%	-2.7%	-3.9%	-3.4%
APC + GRP test 2	-2.2%	-3.1%	-2.6%	-4.0%	-5.4%	-5.5%

# Adaptive Predictor Compensation (APC)

- Proposed in TE3-4.3.1, JCTVC-L0072
- Use the BL reconstructed texture to refine the EL motion compensated predictors
- Apply the APC on inter 2Nx2N CU that has at least one non-zero residue
  - Signal an APC\_enable\_flag to enable the refinement
- $\text{Pred}_{\text{EL}}' = (\text{Pred}_{\text{EL}} + \text{Rec}_{\text{BL}}) \gg 1$

# Generalized Residual Prediction (GRP)

- Proposed in TE3-4.6.2.1, JCTVC-L0078
- Use the pseudo inter prediction residual of the collocated BL block to predict the residual of the current block
  - Generates BL pseudo residual first. The weighted BL pseudo residual is used to predict the EL residual
  - $\text{Res}_{\text{BL}} = \text{Rec}_{\text{BL\_cur}} - \text{Rec}_{\text{BL\_ref}}$
  - $\text{Pred}_{\text{EL}}' = \text{Pred}_{\text{EL}} + w * (\text{Rec}_{\text{BL\_cur}} - \text{Rec}_{\text{BL\_ref}})$



# Combination of APC and GRP

- Combine the APC and GRP
- If both APC and GRP are applied, the refined EL predictor is as follow
- $\text{Pred}_{\text{EL}}' = (\text{Pred}_{\text{EL}} + w * (\text{Rec}_{\text{BL\_cur}} - \text{Rec}_{\text{BL\_ref}}) + \text{Rec}_{\text{BL\_cur}}) >> 1$

# Simulation Results

- Anchor: SMuC-0.1.1
- GRP uses the TE3-4.6.2.1 test 2
- The combined results show 2.2-5.5% gains
- The gains of APC and GRP are additive
  - 85-100% of GRP's gains are preserved

	RA- 2x	RA- 1.5x	RA- SNR	LDP- 2x	LDP- 1.5x	LDP- SNR
APC in TE3-4.3.1	-0.4%	-0.6%	-0.8%	-1.2%	-1.5%	-2.4%
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APC + GRP test 2	-2.2%	-3.1%	-2.6%	-4.0%	-5.4%	-5.5%

- Thank Qualcomm for cross-verification (JCTVC-L0196)

# Conclusions

- In this contribution, the combined results of APC and GRP are shown
- The combined results show 2.2-5.5% gains
- The gains of APC and GRP are additive
  - 85-100% of GRP's gains are preserved