

JVET-N0481

J. Chen, R.-L. Liao, Y. Ye (Alibaba)

Problem statement

- BCW (Gbi) was adopted in the current VVC draft to allow averaging of two predictors with different weights.
- When BCW is applied on affine merge, there are two different ways to get the BCW index for the affine merge candidate:
 - ❑ Inherited affine candidate → BCW index is inherited from neighbors
 - ❑ Constructed affine candidate → BCW index is fixed to equal weight

It creates a design discrepancy in the affine merge mode

Proposed method

- To align the BCW design of these two types of affine merge candidate, it is proposed to inherit a BCW index from control points for the constructed affine merge candidate.
- Three methods are proposed

Method 1

if (at least 2 of 3 CPs have the same BCW index)

use that BCW index for current candidate

else

use equal weight

| | Random access Main10 | | | | | Low delay B Main10 | | | | |
|----------------|----------------------|--------|--------|------|------|--------------------|--------|--------|------|------|
| | Over VTM-4.0 | | | | | Over VTM-4.0 | | | | |
| | Y | U | V | EncT | DecT | Y | U | V | EncT | DecT |
| Class A1 | -0.02% | -0.03% | -0.07% | 100% | 101% | | | | | |
| Class A2 | -0.02% | -0.07% | -0.10% | 101% | 101% | | | | | |
| Class B | -0.02% | -0.09% | 0.05% | 100% | 99% | -0.01% | 0.05% | -0.20% | 102% | 106% |
| Class C | -0.01% | -0.04% | -0.12% | 100% | 96% | -0.02% | 0.13% | -0.29% | 100% | 101% |
| Class E | | | | | | 0.05% | -0.23% | -0.41% | 100% | 103% |
| Overall | -0.02% | -0.06% | -0.05% | 100% | 99% | 0.00% | 0.01% | -0.29% | 101% | 103% |
| Class D | -0.01% | -0.05% | 0.10% | 100% | 94% | -0.03% | 0.27% | -0.60% | 100% | 96% |
| Class F | -0.03% | -0.02% | -0.07% | 99% | 97% | -0.22% | 0.30% | -0.28% | 99% | 100% |

Method 2

if ((at least 2 of 3 CPs have the same BCW index) && !(one CP BCW index ==0 && another CP BCW index ==4))

use that BCW index for current candidate

else

use equal weight

| | Random access Main10 | | | | | Low delay B Main10 | | | | |
|----------------|----------------------|--------|--------|------|------|--------------------|--------|--------|------|------|
| | Over VTM-4.0 | | | | | Over VTM-4.0 | | | | |
| | Y | U | V | EncT | DecT | Y | U | V | EncT | DecT |
| Class A1 | -0.02% | -0.03% | -0.06% | 102% | 101% | | | | | |
| Class A2 | -0.02% | -0.08% | -0.11% | 102% | 101% | | | | | |
| Class B | -0.03% | -0.07% | 0.06% | 102% | 101% | -0.02% | -0.19% | -0.22% | 101% | 103% |
| Class C | -0.01% | -0.04% | -0.12% | 101% | 102% | -0.02% | 0.23% | 0.08% | 102% | 101% |
| Class E | | | | | | -0.01% | 0.02% | -0.55% | 102% | 102% |
| Overall | -0.02% | -0.06% | -0.04% | 102% | 101% | -0.02% | 0.00% | -0.20% | 101% | 102% |
| Class D | -0.01% | -0.05% | 0.09% | 101% | 102% | -0.04% | 0.14% | -0.64% | 102% | 101% |
| Class F | -0.03% | -0.02% | -0.07% | 101% | 101% | -0.11% | 0.23% | -0.41% | 102% | 102% |

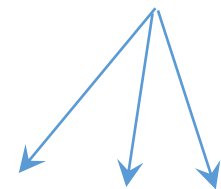
Method 3

if ((at least 2 of 3 CPs have the same BCW index) && (all CP BCW indices are from same group))

use that BCW index for current candidate

else

use equal weight



BCW index: {0,1,2,3,4} → {0}, {1,2,3}, {4}

3 groups

| | Random access Main10 | | | | | Low delay B Main10 | | | | |
|----------------|----------------------|--------|--------|------|------|--------------------|--------|--------|------|------|
| | Over VTM-4.0 | | | | | Over VTM-4.0 | | | | |
| | Y | U | V | EncT | DecT | Y | U | V | EncT | DecT |
| Class A1 | -0.03% | -0.02% | -0.09% | 102% | 101% | | | | | |
| Class A2 | -0.02% | 0.01% | -0.12% | 102% | 101% | | | | | |
| Class B | -0.02% | -0.14% | 0.13% | 102% | 101% | -0.04% | -0.02% | -0.08% | 101% | 103% |
| Class C | -0.01% | -0.01% | -0.14% | 101% | 101% | -0.05% | 0.04% | 0.05% | 101% | 100% |
| Class E | | | | | | -0.07% | -0.25% | -0.27% | 102% | 103% |
| Overall | -0.02% | -0.05% | -0.03% | 101% | 101% | -0.05% | -0.06% | -0.08% | 101% | 102% |
| Class D | -0.01% | -0.02% | 0.13% | 101% | 102% | -0.06% | 0.36% | -0.44% | 101% | 101% |
| Class F | -0.04% | -0.05% | -0.09% | 101% | 101% | -0.10% | -0.20% | -0.10% | 101% | 102% |



Conclusion

- It is proposed to harmonize the BCW design for constructed and inherited affine merge candidates: inherit BCW index from control points for constructed affine merge candidate
- Method 3 achieves 0.02% in RA and 0.05% in LD BD-rate reduction
- Suggest to adopt the proposal into VVC draft 5