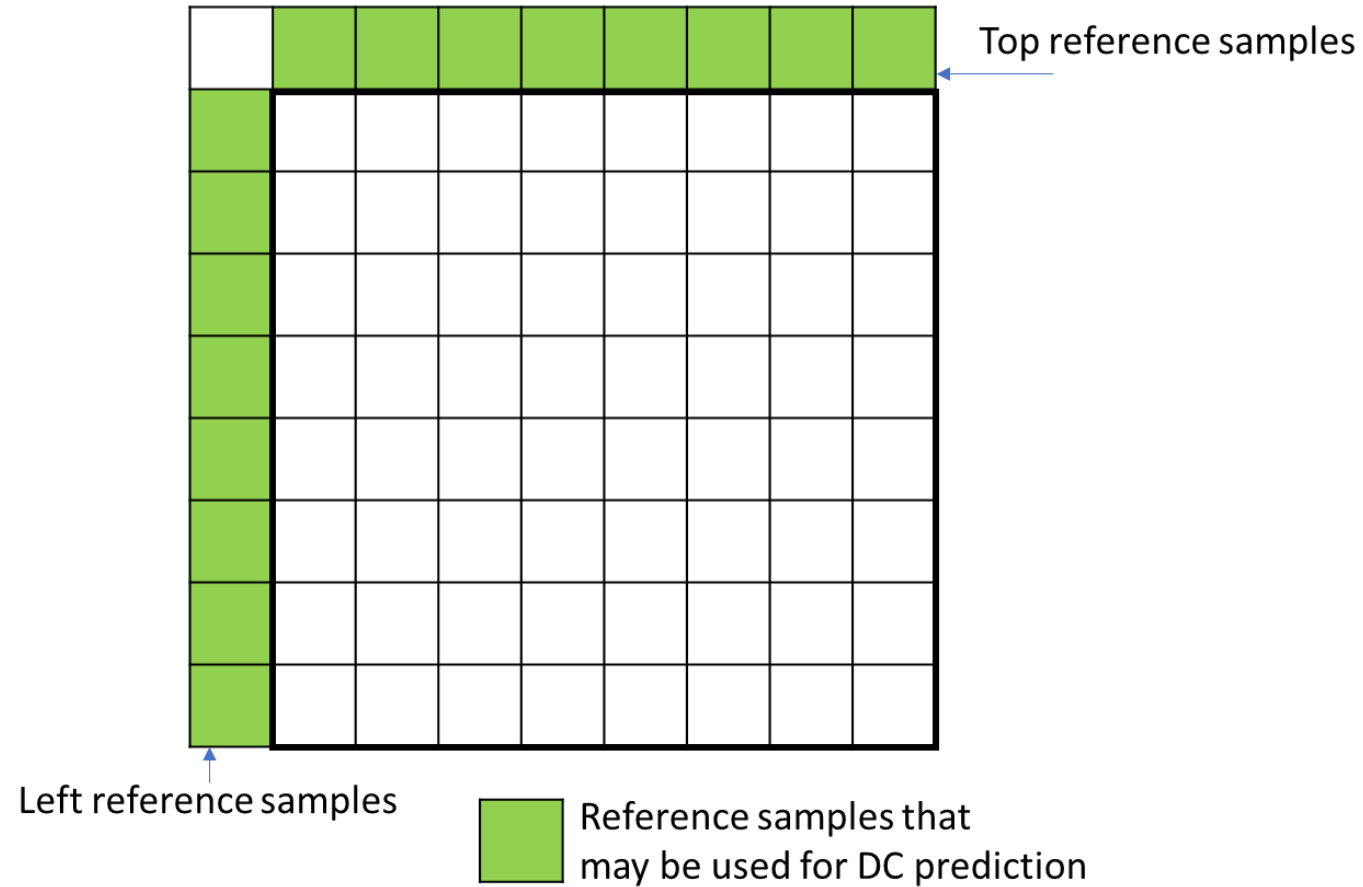


JVET-00426: DC intra prediction mode alignment

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Qualcomm

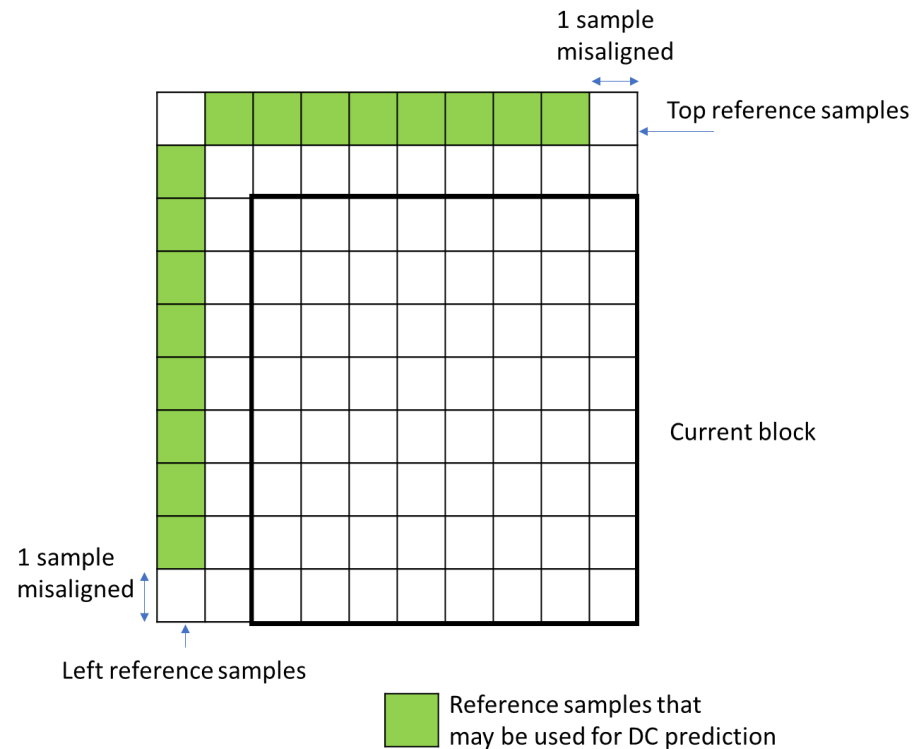
DC intra prediction mode for ref line 0



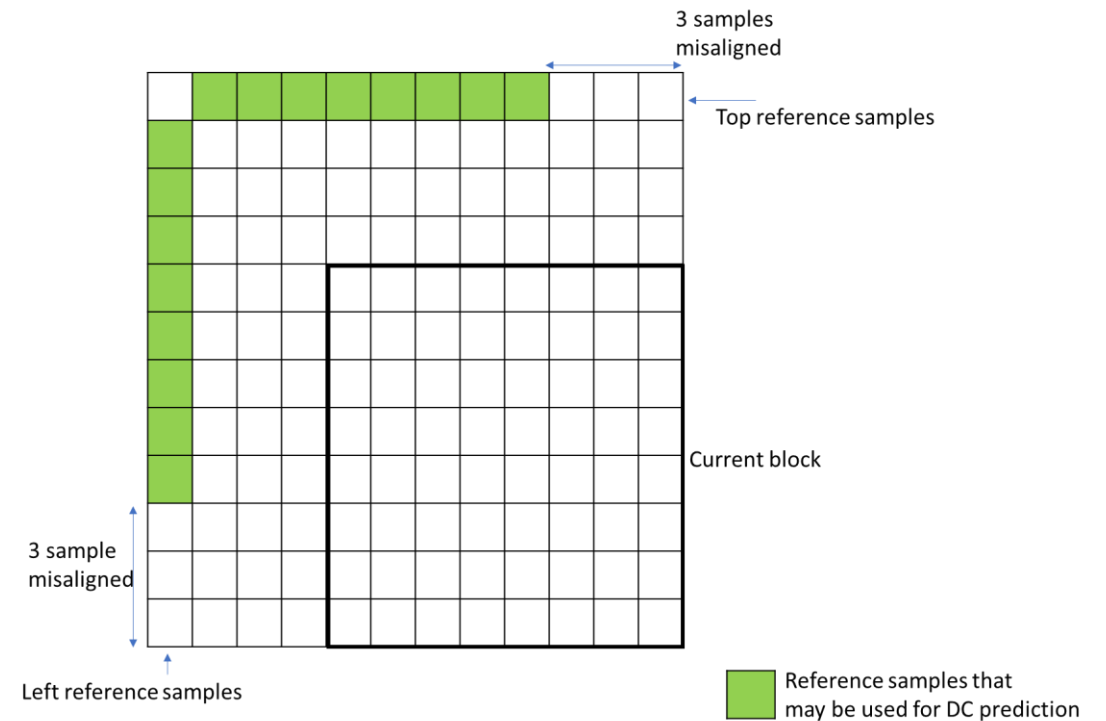
DC mode for ref. lines 1 and 3

Reference samples are mis-aligned with the block boundaries

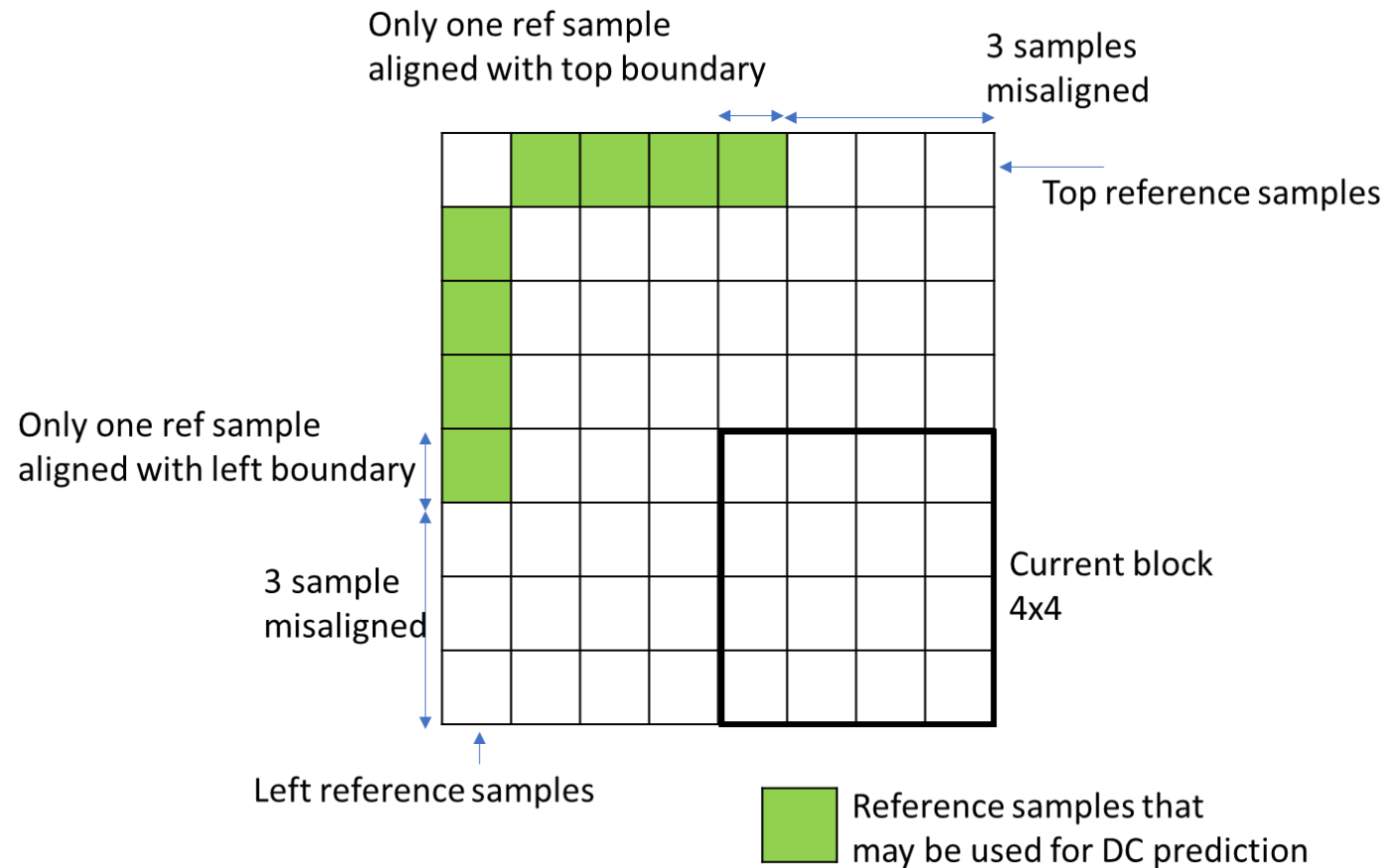
Reference line 1



Reference line 3



Worst-case – 1-sample alignment with block boundary

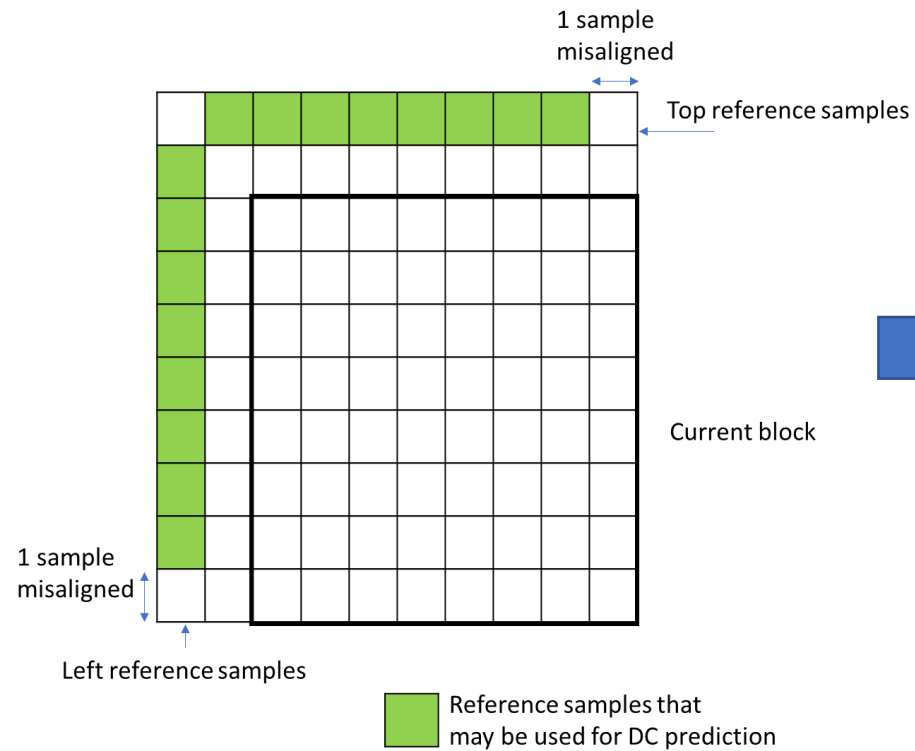


Proposal

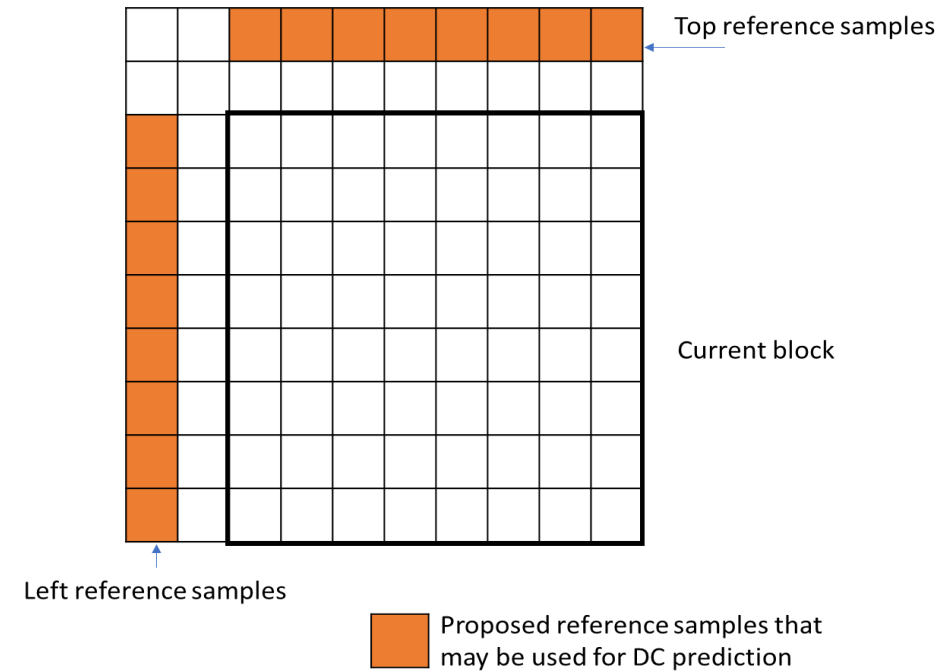
- Set DC reference samples to be aligned to the block boundaries
- Aligned with the definition of DC mode for reference line 0
- Simplifies text

Proposal: reference line 1

VTM-5.0

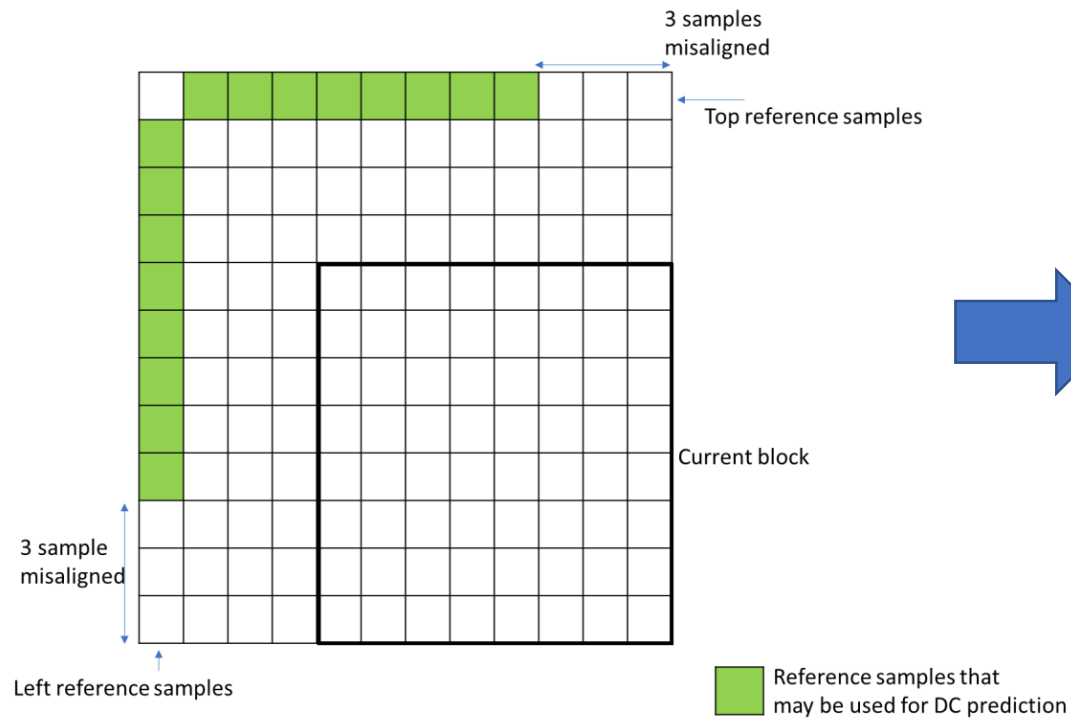


Proposal

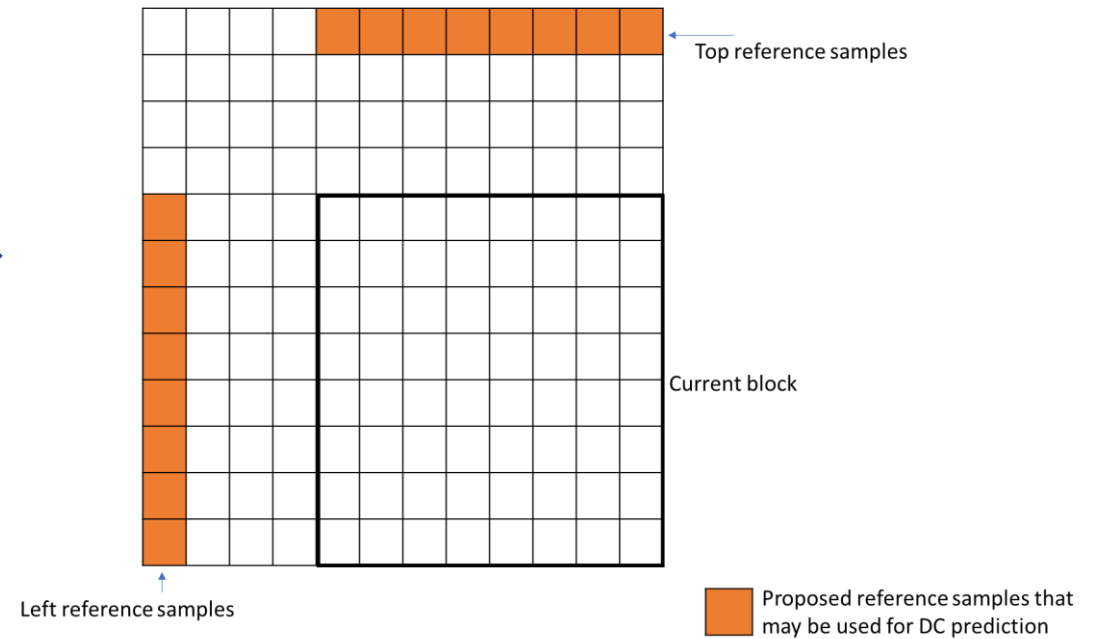


Proposal: reference line 3

VTM-5.0



Proposal



Changes to spec text

8.4.5.2.12 Specification of INTRA_DC intra prediction mode

- Inputs to this process are:
 - a variable nTbW specifying the transform block width,
 - a variable nTbH specifying the transform block height,
 - a variable refIdx specifying the intra prediction reference line index,
 - the neighbouring samples $p[x][y]$, with $x = -1 - \text{refIdx}$, $y = -1 - \text{refIdx}..n\text{TbH} - 1$ and $x = -\text{refIdx}..n\text{TbW} - 1$, $y = -1 - \text{refIdx}$.
- Outputs of this process are the predicted samples $\text{predSamples}[x][y]$, with $x = 0..n\text{TbW} - 1$, $y = 0..n\text{TbH} - 1$.
- The values of the prediction samples $\text{predSamples}[x][y]$, with $x = 0..n\text{TbW} - 1$, $y = 0..n\text{TbH} - 1$, are derived by the following ordered steps:

1. A variable dcVal is derived as follows:
 - When nTbW is equal to nTbH:
 - $$\text{dcVal} = \left(\sum_{x'=-1-\text{refIdx}}^{n\text{TbW}-1} p[x' - \text{refIdx}][-1 - \text{refIdx}] + \sum_{y'=-1-\text{refIdx}}^{n\text{TbH}-1} p[-1 - \text{refIdx}][y' - \text{refIdx}] + n\text{TbW} \right) \gg (\text{Log2}(n\text{TbW}) + 1)$$
 - When nTbW is greater than nTbH:
 - $$\text{dcVal} = \left(\sum_{x'=-1-\text{refIdx}}^{n\text{TbW}-1} p[x' - \text{refIdx}][-1 - \text{refIdx}] + (n\text{TbW} \gg 1) \right) \gg \text{Log2}(n\text{TbW}) \quad (8-115)$$
 - When nTbW is less than nTbH:
 - $$\text{dcVal} = \left(\sum_{y'=-1-\text{refIdx}}^{n\text{TbH}-1} p[-1 - \text{refIdx}][y' - \text{refIdx}] + (n\text{TbH} \gg 1) \right) \gg \text{Log2}(n\text{TbH}) \quad (8-116)$$
2. The prediction samples $\text{predSamples}[x][y]$ are derived as follows:
 - $$\text{predSamples}[x][y] = \text{dcVal}, \text{ with } x = 0..n\text{TbW} - 1, y = 0..n\text{TbH} - 1 \quad (8-117)$$

Simulation results

Negligible BD-rate difference

All Intra Main10					
Over VTM-5.0					
	Y	U	V	EncT	DecT
Class A1	0.00%	-0.07%	0.05%	102%	100%
Class A2	0.00%	-0.09%	-0.03%	100%	101%
Class B	0.00%	-0.02%	0.04%	100%	103%
Class C	0.00%	-0.02%	0.05%	99%	98%
Class E	-0.01%	-0.08%	0.03%	99%	99%
Overall	0.00%	-0.05%	0.03%	100%	100%
Class D	-0.01%	0.23%	-0.06%	94%	93%
Class F	-0.01%	0.13%	0.09%	100%	103%

Random Access Main 10					
Over VTM-5.0					
	Y	U	V	EncT	DecT
Class A1	0.01%	-0.17%	0.19%	100%	101%
Class A2	0.02%	0.03%	-0.10%	100%	101%
Class B	0.03%	-0.06%	-0.19%	99%	100%
Class C	0.00%	-0.08%	0.04%	100%	105%
Class E					
Overall	0.02%	-0.07%	-0.03%	100%	102%
Class D	0.00%	0.14%	0.42%	96%	94%
Class F	-0.03%	0.08%	0.23%	99%	98%

Thank Kwai for the cross-check.