

JVET-AG0107

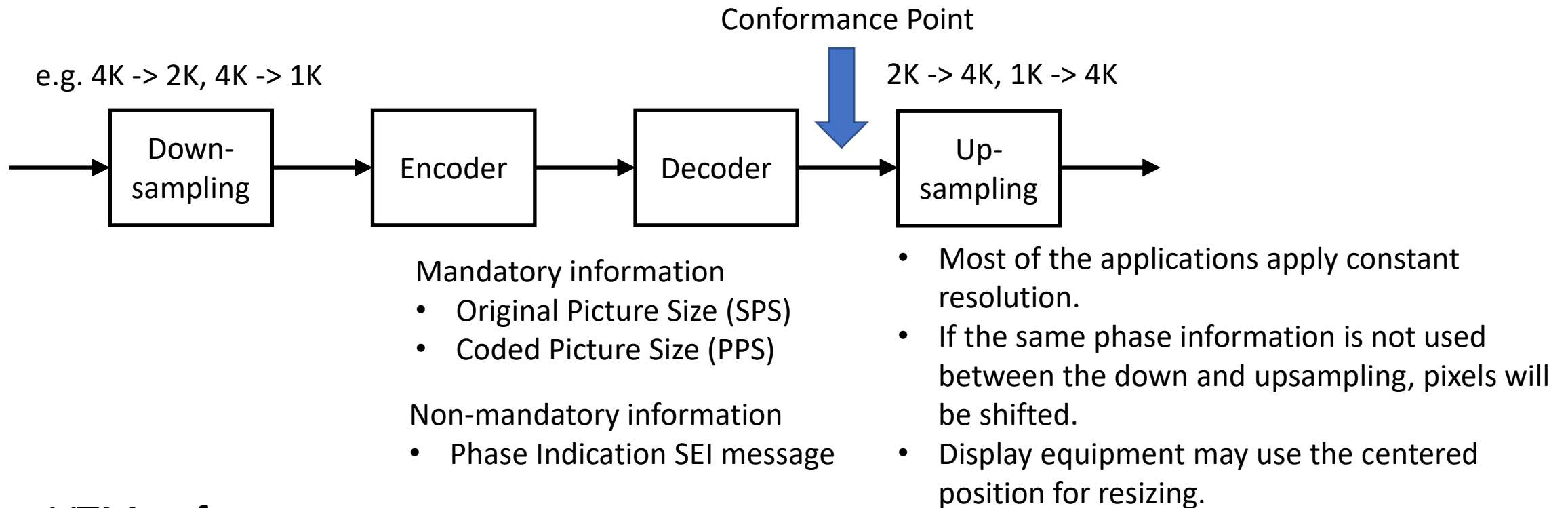
AHG9: On phase indication SEI message

Takeshi Chujoh, Tomohiro Ikai (Sharp Corporation)

Kei Kawamura (KDDI Corporation)

Problem statements

- Dynamic resolution changes by using RPR



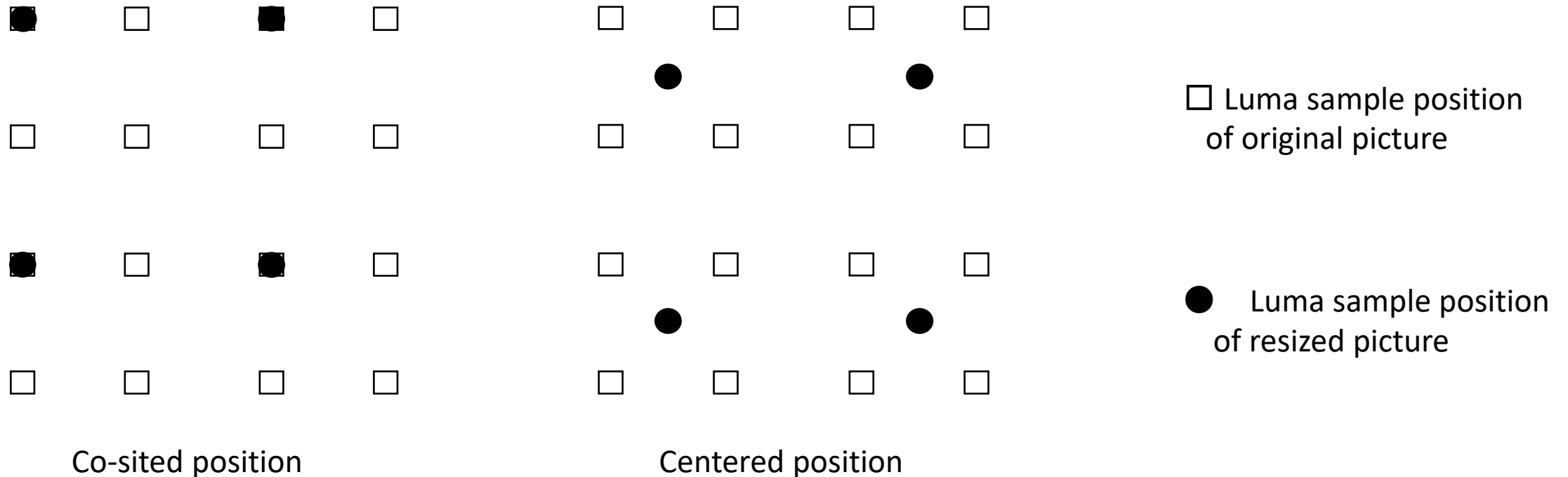
- VTM software

- The co-sited position is implicitly assumed without the SEI message.
- This implementation is not defined in the VVC specification.

Sample positions

- Video codec uses the co-sited position for resizing, but the other applications often use the centered position.

An example of half resolution horizontally and vertically.



Proposal

- Propose specification 1
 - Move the text of the phase indication SEI to the VVC text
 - The phase indication SEI message is moved to Annex D.11 of VVC.
 - Defines the inferred values of the syntax elements of the SEI.
 - The specification of the co-sited position is added in Annex D.11 of VVC.
- Propose specification 2 (if specification 1 is unacceptable)
 - Defines the inferred values of the syntax elements of the SEI.
 - The specification of the co-sited position is added in Annex D.12.12 of VVC.

These proposals only change Annex D of VVC (not mandatory specification) and do not change the conformance bitstreams and the reference software.

Co-sited position

When there is no phase indication SEI message, the syntax elements `pi_hor_phase_num`, `pi_hor_phase_den_minus1`, `pi_ver_phase_num`, and `pi_ver_phase_den_minus1` are inferred to be equal to the minimum values that satisfy the following formulas unless determined by the application by external means:

- $\text{pi_hor_phase_num} / (\text{pi_hor_phase_den_minus1} + 1) = \text{CroppedWidth} / (2 * \text{OrgCroppedWidth})$
- $\text{pi_ver_phase_num} / (\text{pi_ver_phase_den_minus1} + 1) = \text{CroppedHeight} / (2 * \text{rgCroppedHeight})$

Where variables `OrgCroppedWidth` and `OrgCroppedHeight` are specified as follows.

`OrgCroppedWidth` = `sps_pic_width_max_in_luma_samples`

– `SubWidthC * (sps_conf_win_left_offset + sps_conf_win_right_offset)`

`OrgCroppedHeight` = `sps_pic_height_max_in_luma_samples`

– `SubHeightC * (sps_conf_win_top_offset + sps_conf_win_bottom_offset)`

Experiments

- Down-sampling with co-sited position from 4K(3840x2160) to 1K(960x540) and 2K(1920x1080) by using HDRTools. Used a first picture of DayStreet2 (3840x2160) on CTC Class H2
- Experiment 1: Up-sampling them with the centred position from 1K and 2K to 4K using FFmpeg
 - Picture 1: Up-sampling it from 1K to 4K
1.5 pixels from the original picture have shifted horizontally and vertically
 - Picture 2: Up-sampling it from 2K to 4K
0.5 pixels from the original picture have shifted horizontally and vertically
 - Picture 3: The original picture (4K)
- Experiment 2: Up-sampling them with the co-sited position from 1K and 2K to 4K using HDRTools
 - Picture 4: Up-sampling it from 1K to 4K
 - Picture 5: Up-sampling it from 2K to 4K
 - Picture 6: The original picture (4K)
- The pictures are dot by dot in the case of a full screen on an HD display.



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5



Picture 6

