
JCTVC-AC0030: ON PADDING SIGNALLING IN OMNIDIRECTIONAL VIDEO

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Problem Description: Padding Signalling

1. CMP padding signalling is not fully specified in JCTVC-AB1005
 - pictureWidth and pictureHeight do not regards padding area.
 - Padding area position not specified (cp. JCTVC-AB0044)
2. Padding in CMP and ERP with different signalling mechanism
 - >360 degree azimuth range, vs explicit padding signalling
3. Padding layouts, i.e. padding sample positions, are not flexible enough to address tiling

Proposal

1. Remove detailed padding signalling from ERP and CMP SEI messages
2. Add constrained padding flags to ERP SEI message
3. Introduce guard bands to Region-wise packing SEI message in alignment with OMAF (as proposed in Section 2.4 of JCTVC-AC0023-v4)

Proposal 1 and 2 - CMP

Syntax and semantics

1. Remove detailed padding signalling from ERP and CMP SEI messages
2. Add constrained padding flags to ERP SEI message

	Descriptor
cubemap_projection(payloadSize) {	
cmp_cancel_flag	u(1)
if(!cmp_cancel_flag) {	
cmp_persistence_flag	u(1)
cmp_rotation_flag	u(1)
cmp_constrained_padding_flag	u(1)
 cmp_padding_flag	u(1)
cmp_reserved_zero_4bits	u(4)
 if(cmp_padding_flag == 1) {	
 cmp_padding_type	u(2)
 cmp_reserved_zero_6bits	u(6)
 cmp_padding_chroma_sample_range_minus1	u(8)
 }	
if(cmp_rotation_flag == 1) {	
cmp_yaw_rotation	i(32)
cmp_pitch_rotation	i(32)
cmp_roll_rotation	i(32)
}	
}	
}	

cmp_constrained_padding_flag equal to 1 indicates that any region-wise packing SEI message present in the bitstream that applies to the current picture does not use guard bands or signals two regions where one region contains the top half of the projected picture and the other region contains the bottom half of the projected picture and that the two regions are neighboured on the vertical and horizontal picture boundaries as well as on the the horizontal boundary between the two by equally sized guard band regions. **cmp_constrained_padding_flag** equal to 0 does not give any such indication.

When **cmp_constrained_padding_flag** equal to 1, the following syntax elements in any region-wise packing SEI message present in the bitstream that applies to the current picture are constraint as follows:

- **proj_region_width[i]**, **proj_region_height[i]**, **proj_region_top[i]** and **proj_region_left[i]** shall be equal to **packed_region_width[i]**, **packed_region_height[i]**, **packed_region_top[i]**, and **packed_region_left[i]** respectively.
- **transform_type[i]** shall be equal to 0.

Proposal 1 and 2 - ERP

Syntax and semantics

1. Remove detailed padding signalling from ERP and CMP SEI messages
2. Add constrained padding flags to ERP SEI message

	Descriptor
equirectangular_projection(payloadSize) {	
erp_cancel_flag	u(1)
if(!erp_cancel_flag) {	
[...]	
erp_constrained_padding_flag	u(1)
[...]	
}	
}	

erp_constrained_padding_flag equal to 1 indicates that any region-wise packing SEI message present in the bitstream that applies to the current picture does not use guard bands or signals one regions within the packed picture and that the region is neighboured on the vertical picture boundaries by equally sized guard band regions. **erp_constrained_padding_flag** equal to 0 does not give any such indication.

When **erp_constrained_padding_flag** equal to 1, the following syntax elements in any region-wise packing SEI message present in the bitstream that applies to the current picture are constraint as follows:

- **proj_region_width[i]**, **proj_region_height[i]**, **proj_region_top[i]** and **proj_region_left[i]** shall be equal to **packed_region_width[i]**, **packed_region_height[i]**, **packed_region_top[i]**, and **packed_region_left[i]** respectively.
- **transform_type[i]** shall be equal to 0.