

AHG9: COMMENTS ON CODING AND DISPLAY FORMATS

JCTVC-K0146



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- **Several coding functionalities present in H.264/AVC and widely used in practice are prohibited in current HEVC text**
 - These concepts are well understood and provide coding efficiency advantages
 - They can be specified as SEI in similar fashion to H.264/AVC

- **Specifically, these apply to signaling a coding format different than the desired display format:**
 - Top/bottom field cadence
 - 3:2 pulldown
 - Frame doubling/tripling

- **Current signaling (in JCTVC-K0030_v4)**

field_indication(payloadSize) {	Descriptor
field_pic_flag	u(1)
progressive_source_flag	u(1)
duplicate_flag	u(1)
if(field_pic_flag)	
bottom_field_flag	u(1)
else if(!progressive_source_flag)	
top_field_first_flag	u(1)
else	
reserved_zero_1bit /* equal to 0 */	u(1)
reserved_zero_4bits /* equal to 0 */	u(4)
}	

PIC_STRUCT IN H.264/AVC



H.264/AVC		HEVC	
pic_struct	Indicated display of picture	Possible?	Comments
0	(progressive) frame	YES	field_pic_flag = 0
1	top field	YES	field_pic_flag = 1 bottom_field_flag = 0
2	bottom field	YES	field_pic_flag = 1 bottom_field_flag = 1
3	top field, bottom field, in that order	NO	Note top_field_first flag is only signalled when progressive_source = 0. The progressive_source flag indicates the nature of content and not the intended display.
4	bottom field, top field, in that order	NO	
5	top field, bottom field, top field repeated in that order	NO	See pic_struct = 3 and no ability to signal repeated (field) picture.
6	bottom field, top field, bottom field repeated in that order	NO	See pic_struct = 4 and no ability to signal repeated (field) picture.
7	frame doubling	NO	No ability to signal repeated (frame) picture.
8	frame tripling	NO	No ability to signal repeated (frame) picture.
9-15	reserved		

- **Top/bottom field cadence**
 - Not possible to encode progressive content within an interlaced stream without signaling relative ordering of the fields
 - Cannot differentiate between `pic_struct = 3` and `pic_struct = 4`
 - The `top_field_first` flag is only signaled when `progressive_source = 0`
- **3:2 pulldown in frame sequences**
 - Not possible to code 24 frames per second (film content) at 60 fields per second
 - Cannot differentiate between `pic_struct = 3` and `pic_struct = 4`
 - No mechanism analagous to `repeat_first_flag`
- **Frame doubling/tripling**
 - Not possible to facilitate display of various coded formats on different display formats (e.g. 25p on 50p, 29.97 on 59.94p and 23.98p on 59.94p) without explicitly coding repeated pictures
 - Explicit coding seems unnecessary especially when well understood and used in practice in previous video standards

- **Add following capabilities to HEVC SEI messages:**
 - Signal field cadence in frame coded pictures intended for interlaced display
 - Signal 3:2 pulldown in frame coded pictures intended for interlaced display
 - Signal frame doubling/tripling for progressive display

- **HEVC Field indication SEI has some similarities to H.264/AVC pic_struct element**
 - HEVC Field indication SEI seems intended to be used for transmitted interlaced (and mixed progressive/interlaced) sequences??
 - But information conveyed by pic_struct is more generally applicable than just for interlaced material

- **Suggest a new SEI with pic_struct functionality be defined to replace some/all of the elements of the Field indication SEI**
 - Or equivalently, add additional elements in the Field indication SEI or other SEIs



Thank you!