

# AHG14: Evaluation of SDR quality from backward compatible HDR video technologies

JCTVC-Z0024



January 2017



- Report visual assessments made in Technicolor labs on SDR quality from different technologies considered in the Draft TR on Signalling, Backward Compatibility and Display Adaptation for HDR/WCG Video Coding (TR2)
- Aim: assessing the potential benefit of using dynamic metadata, compared to using a fixed transfer function
- 4 SDR bwd compatible solutions from TR2 considered
  - Without dynamic metadata: HLG
  - With dynamic metadata: CRI, TMI, ETSI TS 103 433 (aka SL-HDR1)

# Test content

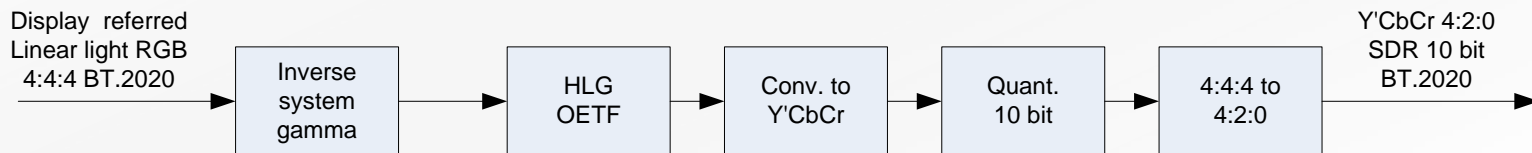
Sequence	Peak Luminance (cd/m <sup>2</sup> )	Content gamut	Container gamut	Native resolution
Tch_Balloon	1000	709	2020	UHD
Tch_Zombie1	1000	P3D65	2020	UHD
Tch_Kayak	1250	P3D65	2020	UHD
Hurdles	3000	709	2020	HD
Starting	3000	709	2020	HD
Market	4000	709	2020	HD
Netflix Chimera2	4000	P3D65	2020	UHD
BalloonFestival	5000	709	2020	HD



# Evaluated technologies

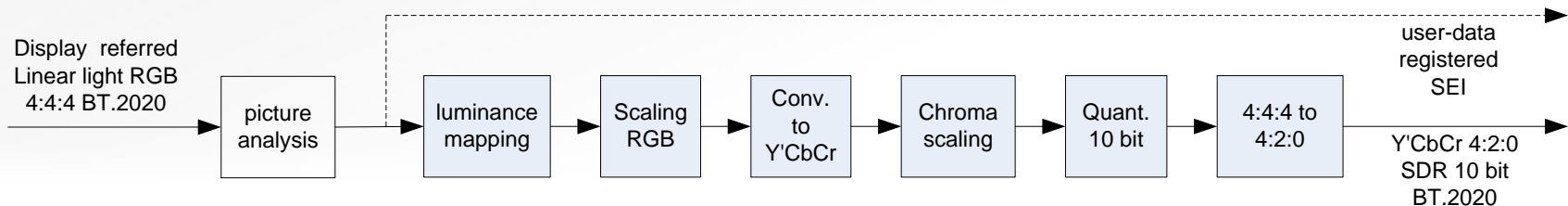
## ■ HLG

- As described in TR2 - using HDRTools v0.13 implementation
- System gamma -  $g = 1.2 + 0.42 * \text{Log}_{10}(\text{PeakLum} \div 1000)$



## ■ SL-HDR1

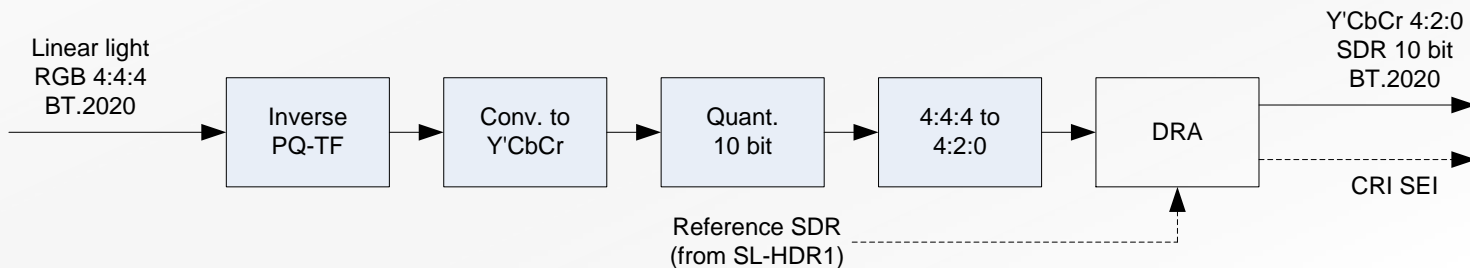
- Mapping applied in 4:4:4 linear-light
- Content dependent mapping - automatic tuning algo



# Evaluated technologies

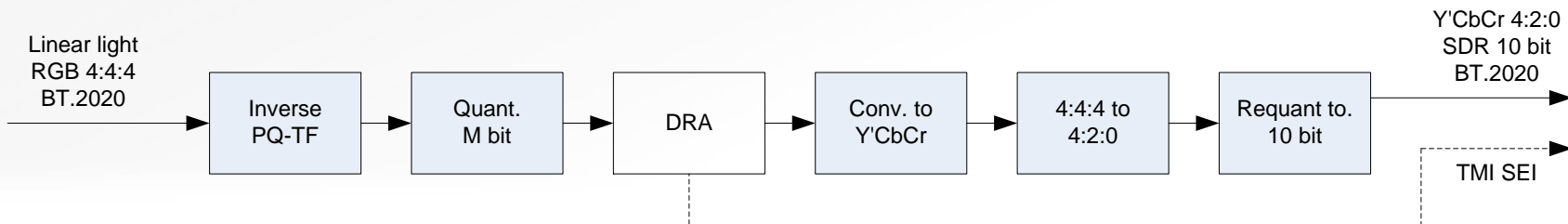
## ■ CRI

- Mapping in 4:2:0 PQ 10b, using three Pre-LUTs / SL-HDR1 SDR used as guide to derive the LUTs



## ■ TMI

- Mapping in 4:2:0 PQ 14b, using FastVDO implementation of JCTVC-Y0042
- Tested on 4 sequences (the ones from the JCTVC set)



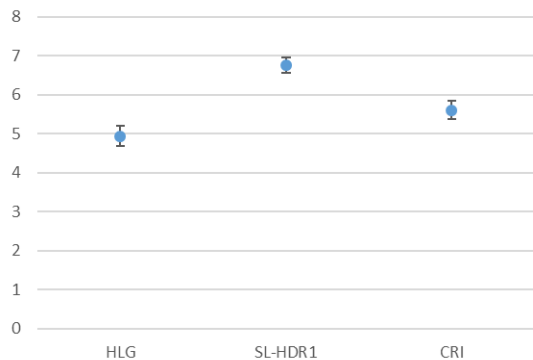
# Test set-up and protocol

- Derived from protocol defined in MPEG contribution m37407
- For each test case (sequence/techno)
  - HDR video (8 to 10 sec)
  - Grey picture (0,5 sec)
  - SDR video (8 to 10 sec.)
  - message “Vote N” (5 sec.)
  - Grey picture (0,5 sec)
- Using Sim2
  - UHD content downsampled to HD resolution
  - P3D65 content clipped to BT.709 primaries
- 26 viewers (incl. 1 outlier)

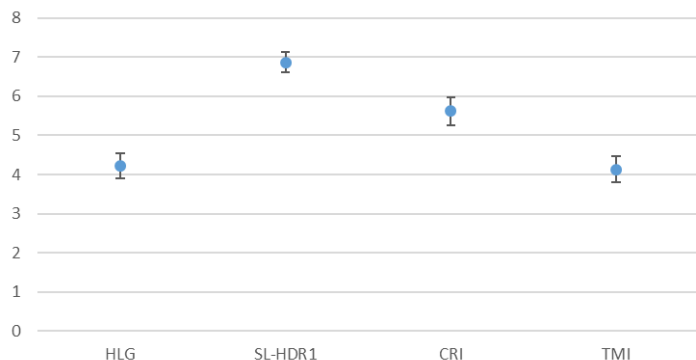
MOS	Interpretation
10	denotes a quality of reproduction that is perfectly faithful to the original. No further improvement is possible.
9	Excellent
8	
7	Good
6	
5	Fair
4	
3	Poor
2	
1	Bad
0	denotes a quality of reproduction that has no similarity to the original. A worse quality cannot be imagined.

# Results

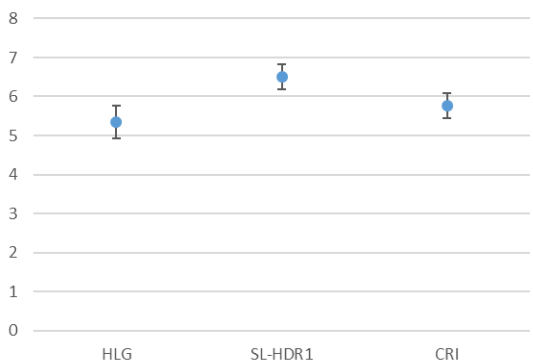
All Seqs



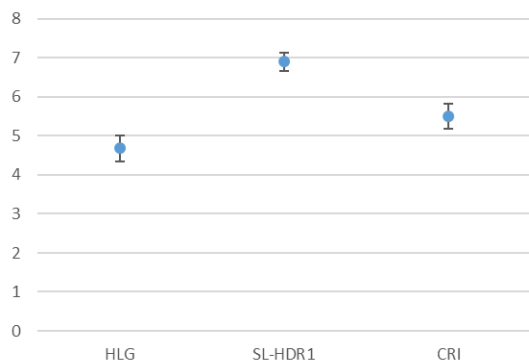
TMI Seqs



$\leq 1250$ nits



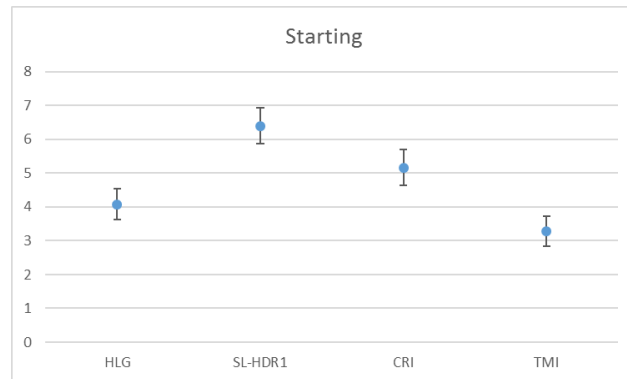
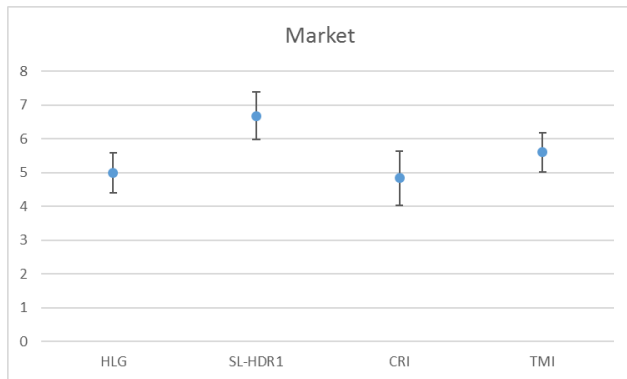
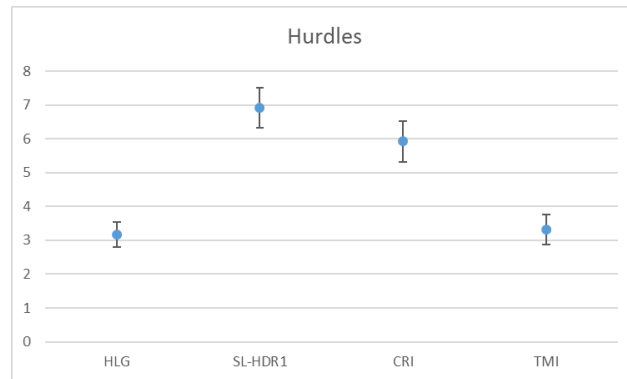
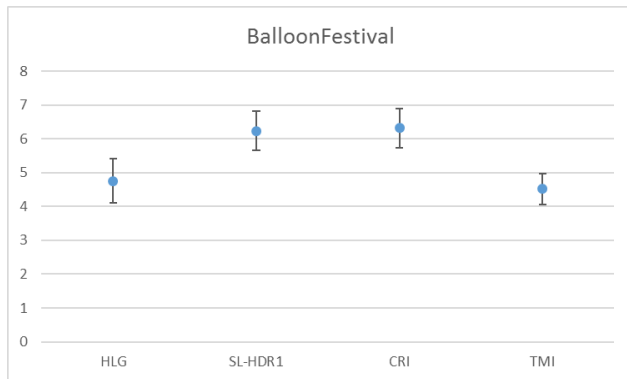
$> 1250$ nits



	HLG	SL-HDR1	CRI	TMI
all seqs	4.9	6.8	5.6	
$\leq 1250$ cd/m2	5.3	6.5	5.8	
$> 1250$ cd/m2	4.7	6.9	5.5	
TMI seqs	4.2	6.9	5.6	4.1



# Results on JCT-VC sequences



# Results on non-JCT-VC sequences

