



JVET Call for Evidence on video compression with capability beyond VVC

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ISO/IEC JTC 1/SC 29/AG 5 MPEG Visual Quality Assessment

Responses to JVET CfE on video compression with capability beyond VVC ([JVET-AM2026](#))

- **Compression efficiency test case (CP)**
 - **ECM + 4 submissions** + anchor
 - All but one submissions in all test categories
- **Runtime test case (RT)**
 - **ECM_2x + 15 submission variants** + anchor
 - All submissions responded to all test categories
 - Evaluated on subset of test sequences
- **Functionality test (FC)** (error concealment)
 - One submission with subset of test sequences
 - Broadcast and unicast scenarios

Overview

CP	Start time	duration	
Sat	09:00	137	CP1
Sat	11:30	125	CP2
Sat	14:00	129	CP3
Sat	16:30	157	CP4

RT	Start time	duration	
Sun	09:00	129	RT1
Sun	11:30	127	RT2
Sun	14:00	125	RT3
Sun	16:30	125	RT4
Mon	09:00	129	RT5
Mon	11:30	119	RT6
Mon	13:30	145	RT7

FC	Start time	duration	
Mon	16:30	129	FC1

2025-12-16

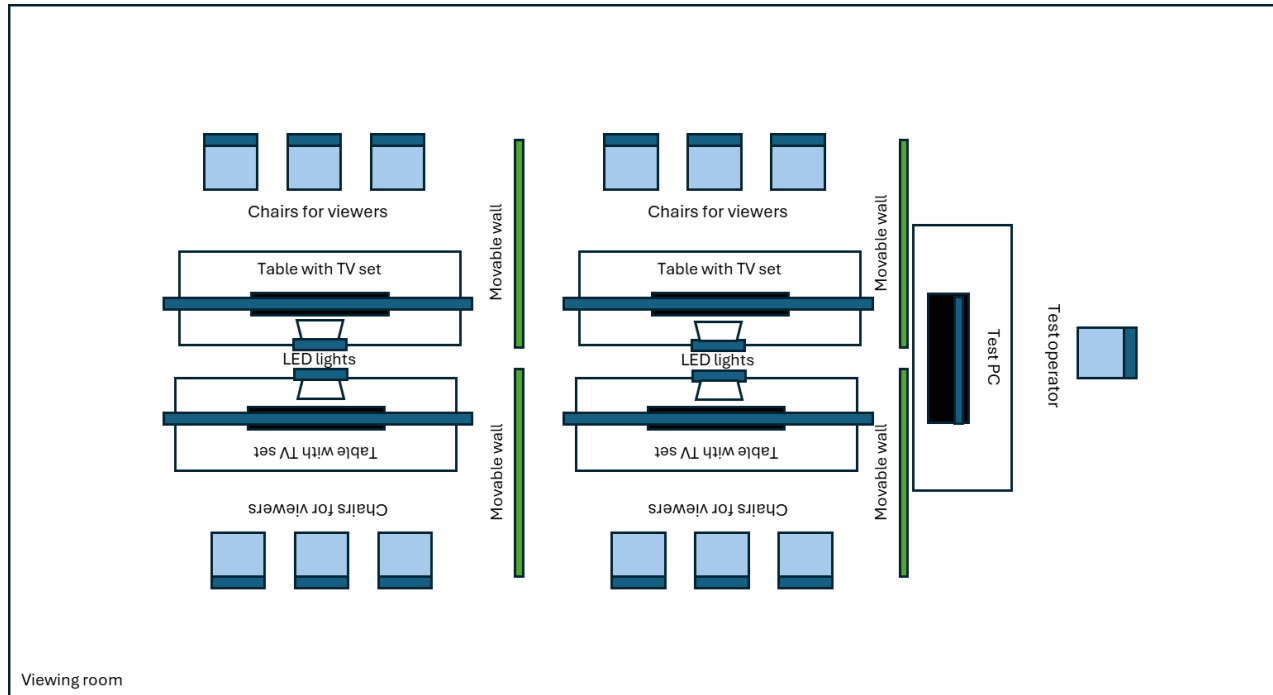
Compression efficiency Test Case		
Session allocation		741
S01	HDR_HLG	69
S02	HDR_PQ a	57
S03	HDR_PQ b	59
S04	SDR_UHD a	47
S05	SDR_UHD b	46
S06	HD50 1	71
S07	HD50 2	68
S08	HD60 1 a	51
S09	HD60 1 b	51
S10	HD60 2	77
S11	HD60 3	72
S12	HD60 4	73

Functionality test		
Session allocation		184
S34	P09_UHD	39
S35	P09_HD_a	49
S36	P09_HD_b	49
S37	P09_HD_c	47

VQEG 227 ETG | JVET CFe | online meeting

Runtime Test Case		
Session allocation		1189
S13	HDR_PQ 1 a	59
S14	HDR_PQ 1 b	58
S15	HDR_PQ 2 a	53
S16	HDR_PQ 2 b	52
S17	HDR_HLG 1 a	60
S18	HDR_HLG 1 b	57
S19	HDR_HLG 2 a	53
S20	HDR_HLG 2 b	52
S21	SDR_HD50 1 a	59
S22	SDR_HD50 1 b	58
S23	SDR_HD50 2 a	53
S24	SDR_HD50 2 b	52
S25	SDR_HD60 1 a	59
S26	SDR_HD60 1 b	58
S27	SDR_HD60 2 a	53
S28	SDR_HD60 2 b	52
S29	SDR_HD60 3 a	50
S30	SDR_HD60 3 b	50
S31	SDR_HD60 4	87
S32	SDR_HD60 5	60
S33	SDR_HD60 6	54

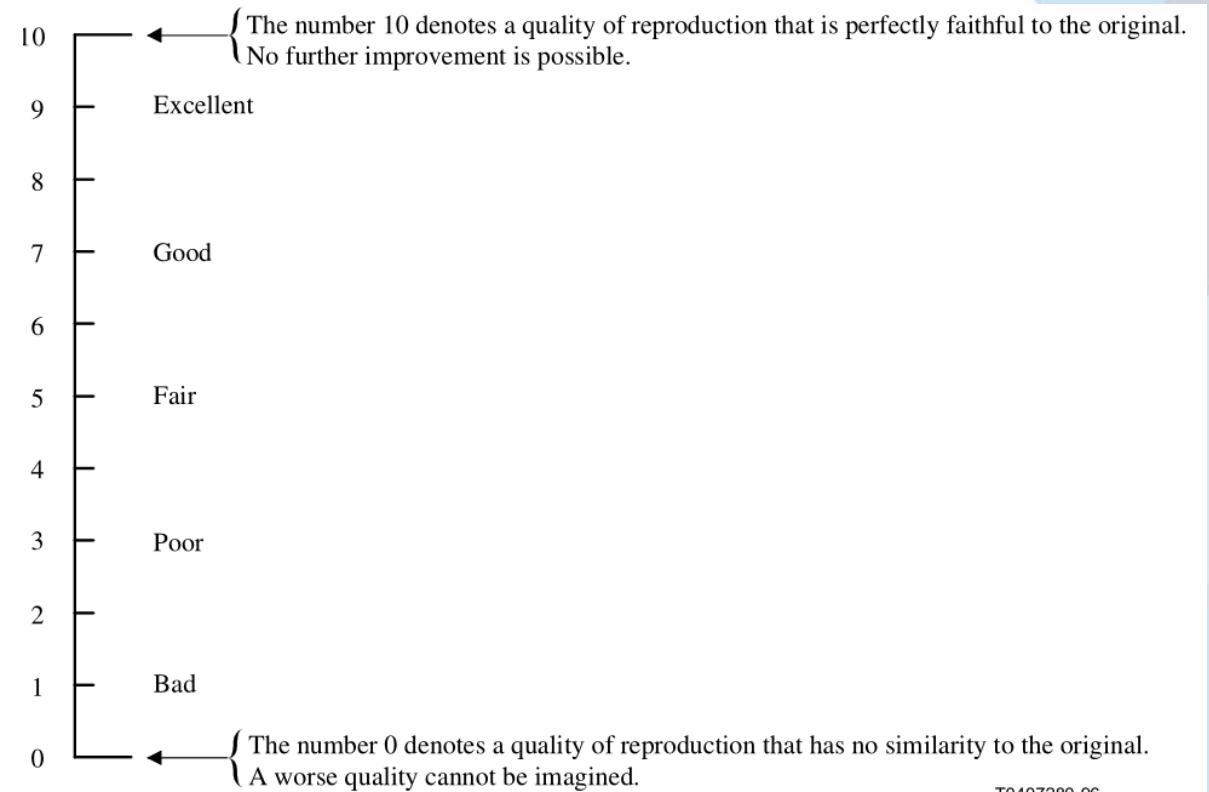
Test arrangement



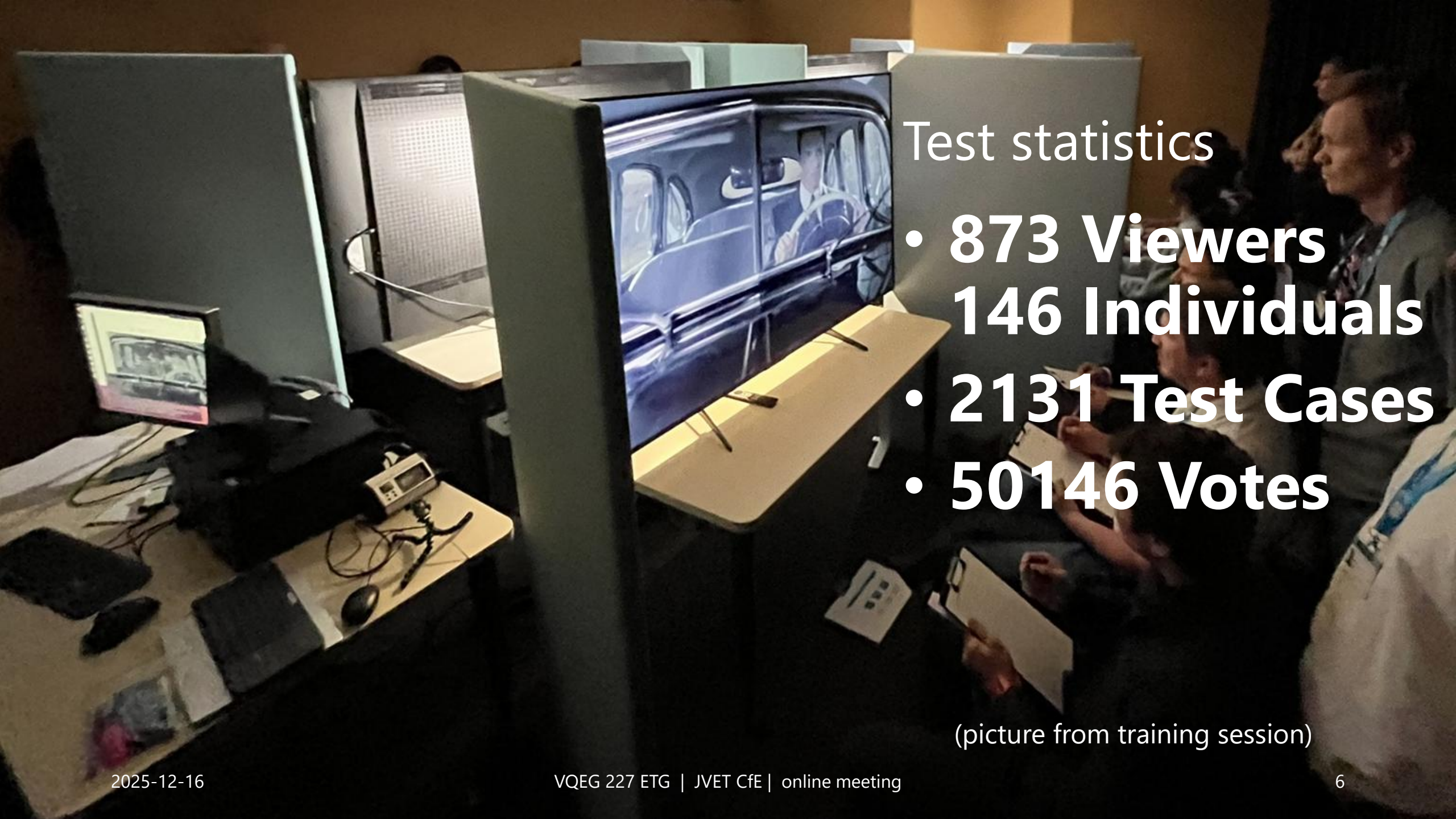
- Dark quite room with viewing PC, 4 TCL 75C6K miniLED TVs (via HDMI splitter), 12 seats, mobile walls
- Viewers organized in groups of 2×12
 - One group test
 - One group rest (enter their scores in database during break)

Overview on testing activity

- Test method:
Absolute category rating with hidden reference (ACR-HR)
 - Rate PVS on absolute quality scale
 - BTC of 16sec
"PVS" – <video> – "Vote x"
(1sec) (10 sec) (5 sec)
- **Training (AG5N118 method)**
 - Explanation of task
 - Training session with relevant sequences, show quality range
 - Participants read out scores (assess distribution of scores)
 - Replay PVS in case of wide spread



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Test statistics

- **873 Viewers**
- **146 Individuals**
- **2131 Test Cases**
- **50146 Votes**

(picture from training session)

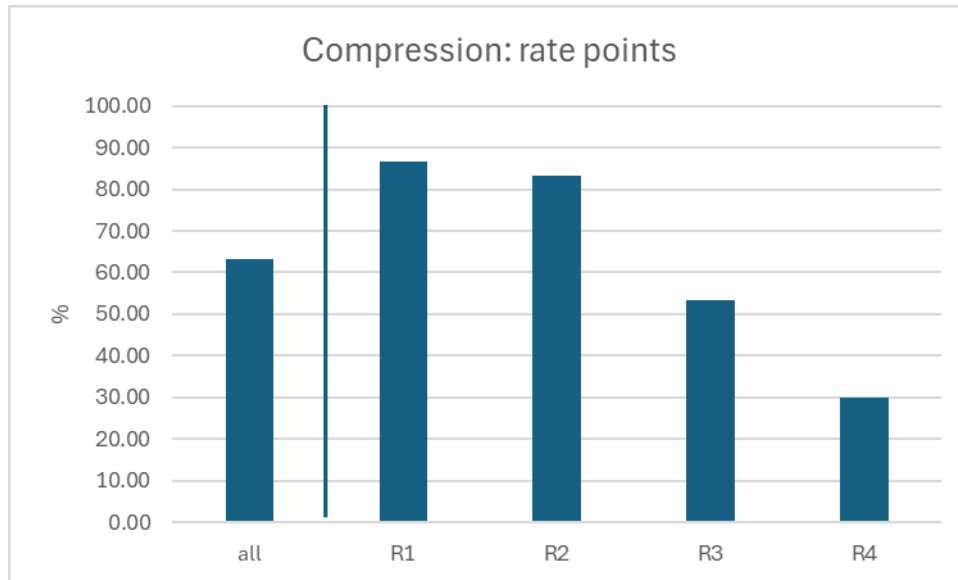
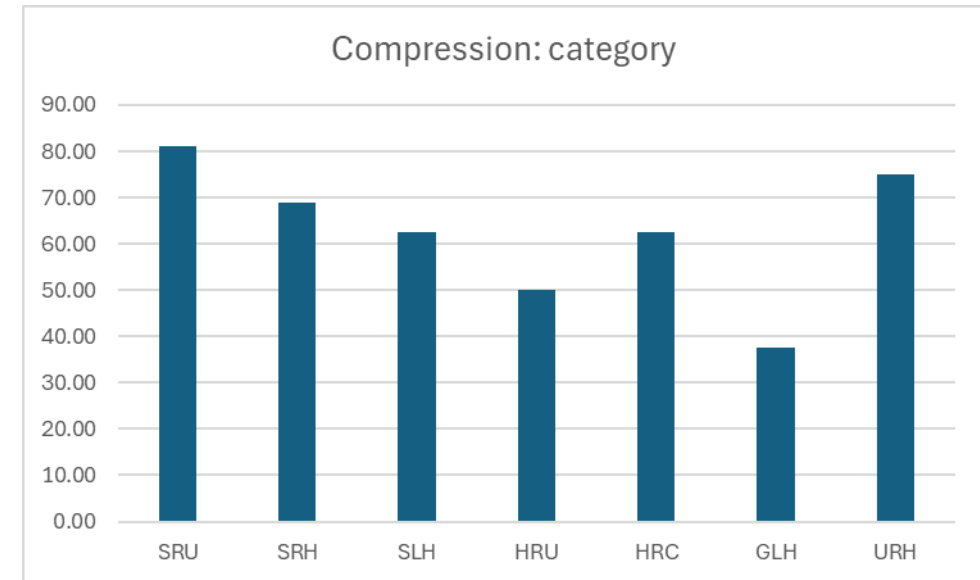
Data processing

- Application of the BT.500 method implemented in the Sural software package (<https://github.com/Netflix/sural>)
 - Outlier detection based on 'noisiness' of scores per viewer
 - No further viewer correlation check
- Additional check
 - Scan for outliers using non-normalized z-score method (threshold 2), applied to a subset of data (HD sequences)
 - Very few outliers observed

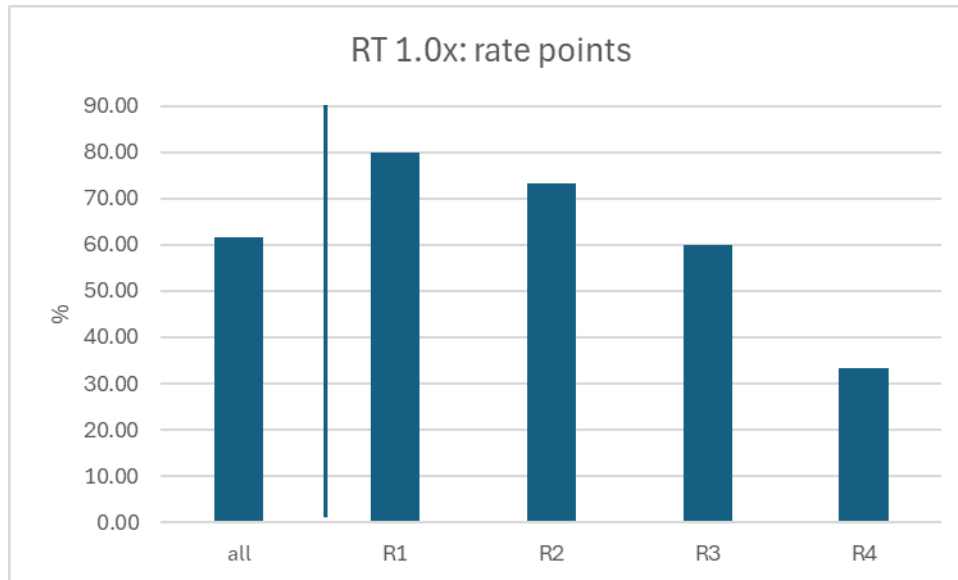
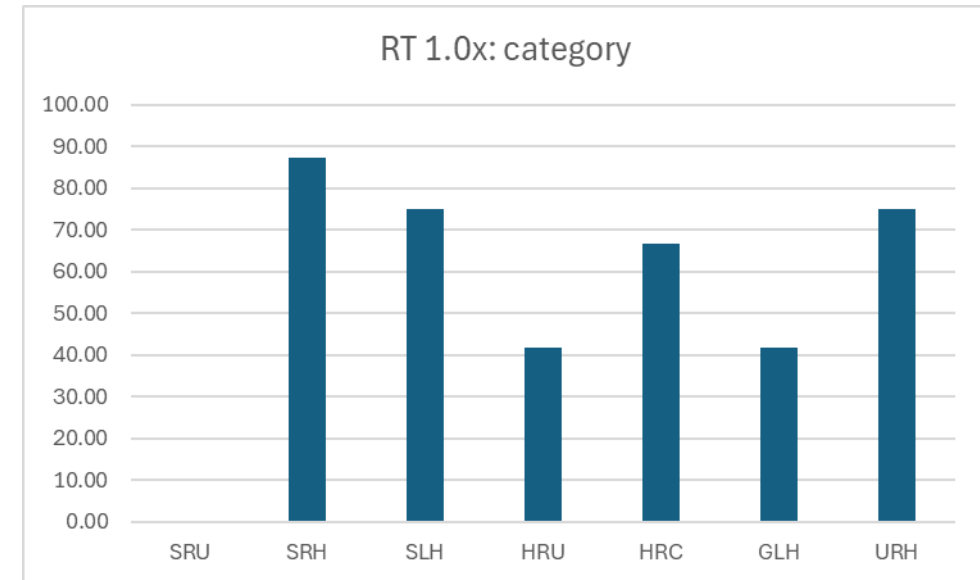
CfE Results Overview

- Presentation:
 - Overview: Percentage of rate points where with at least one proposal being better than the anchor
 - over all categories
 - over all per rate point
 - per category
 - Examples for cases with significant benefit
 - Examples for cases with less benefit

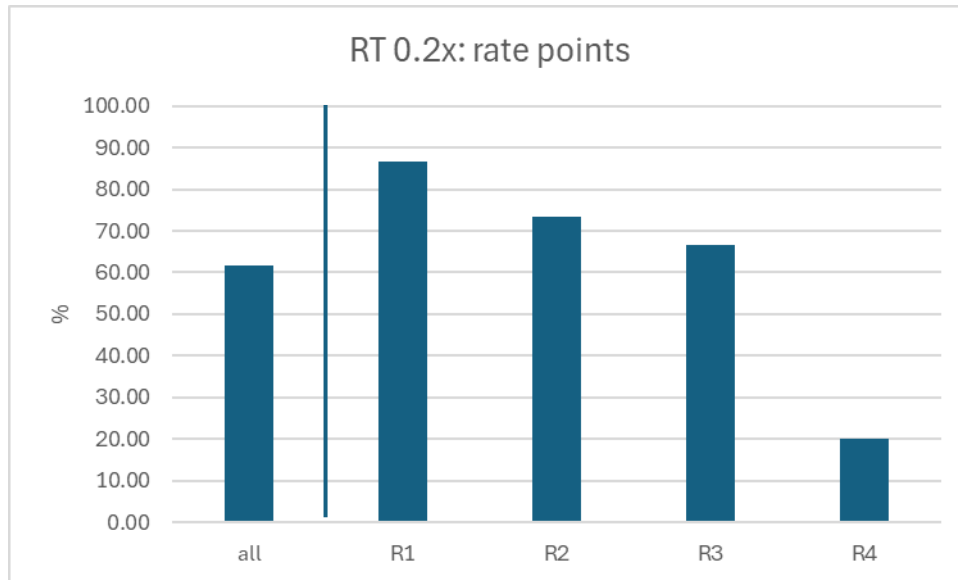
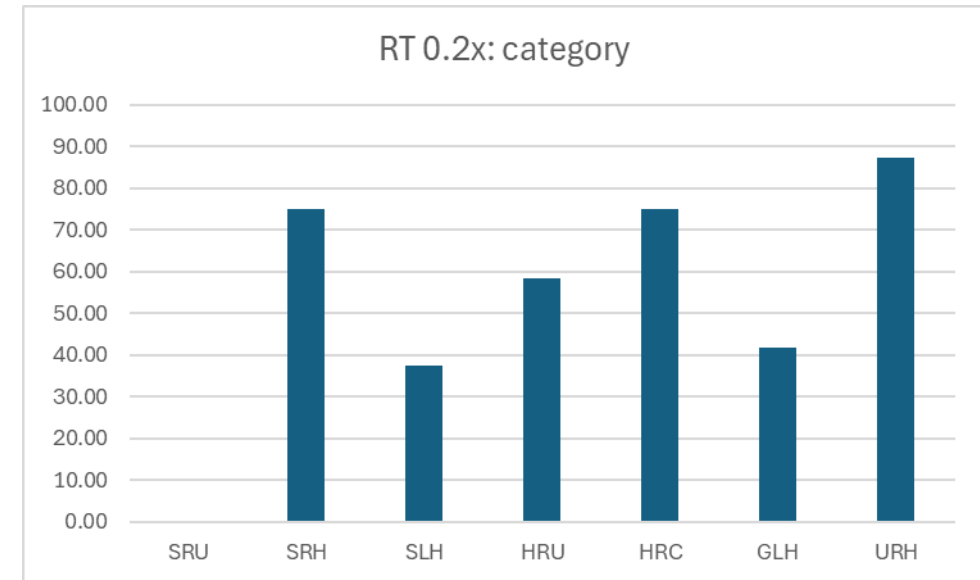
Compression efficiency test case



Runtime: 1x test case

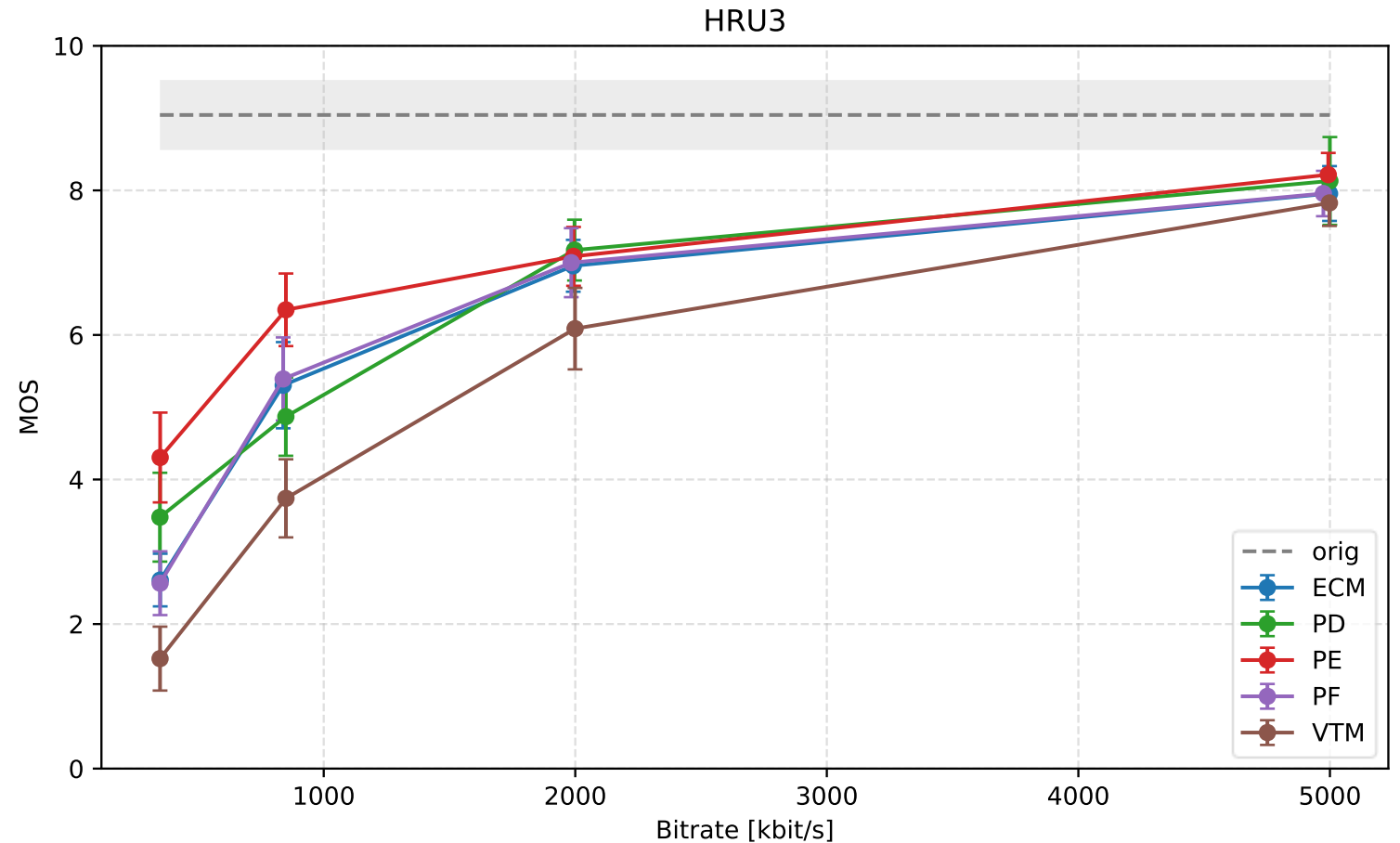


Runtime: 0.2x test case



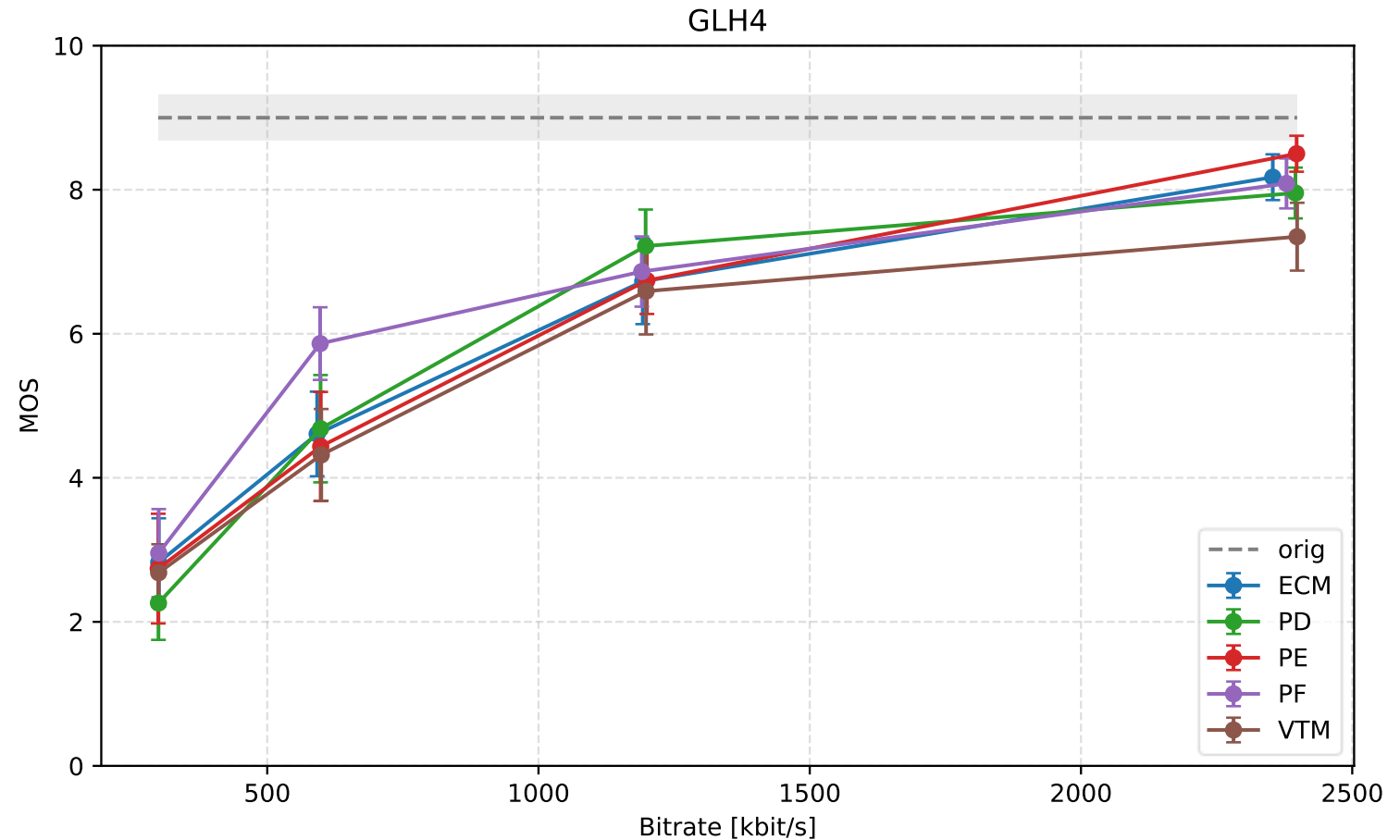
Example MOS-over-Rate plots

- HDR PQ UHD
Random access
NeptunFountain
(HRU3)



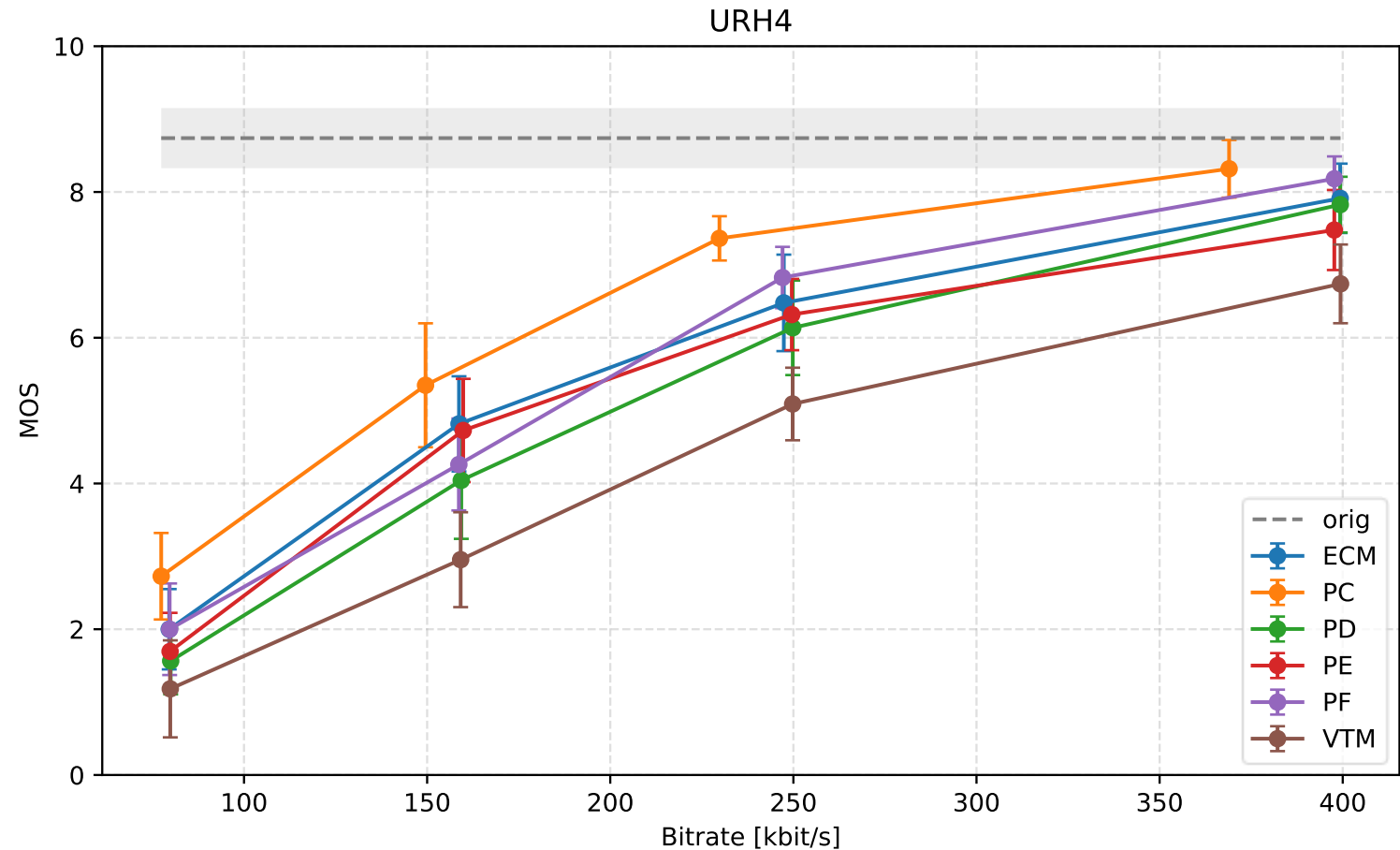
Example MOS-over-Rate plots

- Gaming HD
Low-delay
Minecraft
(GLH4)



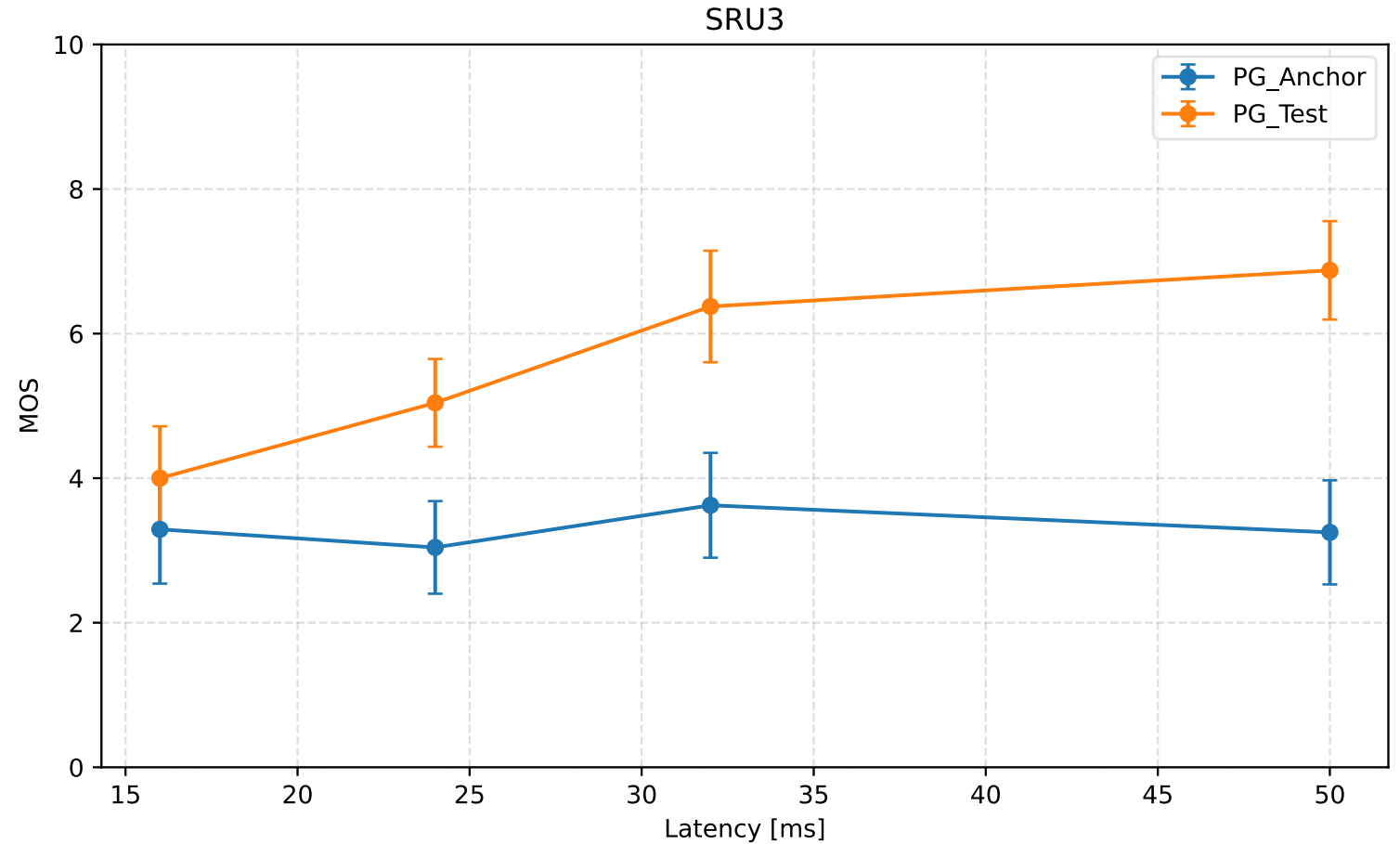
Example MOS-over-Rate plots

- UGC
Random access
Sports Iceball
(URH4)



Example MOS-over-channel-delay plots

- Functionality test
Broadcast
scenario
- SDR UHD
Random access
FireDance
(SRU3)



Conclusions

JVET Report JVET-AN2029 (release: 2025-12-19)

- Compression efficiency test case
 - In roughly 2/3 of test points, significant gain over VTM observed
 - In many test cases significant gain over ECM16.1
 - High gains in SDR UHD, HDR 8K Crop test cases, also SDR HD und UGC
 - NN-based technology shows clear visual benefit in some cases
- Run time-constraint test cases
 - Significant gains also at reduced encoder run time (1x, 0.2x VTM)
 - NN-base technology impact on decoder run time noted
- Functionality test case
 - Clear improvements demonstrated
- **CfE considered successful, preparations for CfP started**

Next steps

- Definition of conditions for Call for Proposals
 - JVET AHG17 activity, drafting document: [JVET-AO0045](#)
- Estimate of testing effort
 - 7 categories, 4-6 test sequences each, 4 rate points per test sequences for visual evaluation: ~120 test points per proposal
 - Compression efficiency test case (no defined encoder run time limits)
 - Run time constraint test case (1x, 0.2x encoder run time targets)
 - Functionality test case (tbd)
 - CfE: 7 responses, including up to 5 run time configurations
 - CfP for VVC in 2018: 46 submissions (22 SDR, 12 HDR, 12 360° video)
- Timeline: CfP submissions in October 2026, testing in November 2026, report at January 2027 JVET meeting
- Call for laboratories in January meetings of JVET and AG 5

Thanks

- to the ITU for the excellent facilities
 - to TCL for providing four calibrated 75" miniLED TVs for the tests
 - to Fraunhofer HHI for providing the playout PC(s)
 - To the viewers scoring all the PVS
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- to Christian Lehmann and Vittorio Baroncini for running most of the sessions
- + to Christian Lehmann for preparations and technical support