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Title: **Report on subjective viewing test for deblocking filter proposals**

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Purpose: Report

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1 Introduction

This contribution is a report on informal subjective viewing for the deblocking filtering that was held during the Torino meeting on July 18, 2011. The subjective viewing was conducted according to the mandate of core experiment 12 on deblocking filtering E712 [1]. The goal of informal subjective viewing test was to determine how the deblocking filter proposals affect the subjective quality. In total, six proposals from CE12 and seven other proposals were evaluated in the subjective test.

2 Test procedure

There were thirteen proposals tested and the anchor, in total 14 different proposals. Both the CE and non-CE proposals have been shown in one test. The proposals in each test session were evaluated by a group of four experts. In total, three viewing sessions have been held. The identities of the proposals and the anchor were hidden (the test subjects were shown a number from 1 to 14 instead).

The following six sequences have been used in the test.

Sequence 1: BQMall, low-delay low-complexity, QP 32
Sequence 2: BQMall, random-access high-efficiency, QP 37
Sequence 3: Kimono, low-delay low-complexity, QP 32
Sequence 4: Kimono, random-access high-efficiency, QP 37
Sequence 5: Vidyo3, low-delay low-complexity, QP 32
Sequence 6: Vidyo3, low-delay high-efficiency, QP 37

The sequences were encoded according to common test conditions E700 [2].

The test subjects were given score sheets and asked to grade each proposal with a grade from 1 to 10. The test procedure was as follows. The test subjects were given instructions first. The proposals were shown in a randomized order one after another with a five-second break for voting after each test sequence. The test subjects were asked to grade the sequence with a grade from 1 to 10 with the average quality ranged in a level of 5-6. The order of the sequences was randomized for each sequence and each test. The sequences were shown in the following order.

The length of one test was about 25 minutes. In total, 12 test subjects participated in scoring. The test sessions were conducted by MPEG Test coordinator Vittorio Baroncini, who also randomized the test sequences and later processed the score sheets and counted the test results. Then the results and the identities were revealed to the participants.

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3 Test software

The test was conducted with the test program Qualiview provided by the MPEG Test coordinator.

The following proposals and combinations of proposals have been tested in the subjective test.

CE12 proposals:

1. JCTVC-F118 [A. Norkin et al (Ericsson/MediaTek)] CE12: Ericsson's and MediaTek's deblocking filter
2. JCTVC-F143 [T. Yamakage et al (Toshiba/Qualcomm)] CE12: Deblocking filter parameter adjustment in slice level
3. JCTVC-F258 [J. Yang et al, (SK Telecom/SKKU)] CE12: SK Telecom/SKKU Deblocking Filter
4. JCTVC-F262 [J. Yang et al, (SK Telecom/SKKU)] CE12: SK Telecom/SKKU Harmonized Deblocking Filter with Additional Chroma Processing
5. JCTVC-F191 [M. Narroschke et al (Panasonic)] CE12: Results for decisions for deblocking. Version 1
6. JCTVC-F198 [Microsoft] CE12, Subset 1: Report of Deblocking for Large Size Blocks

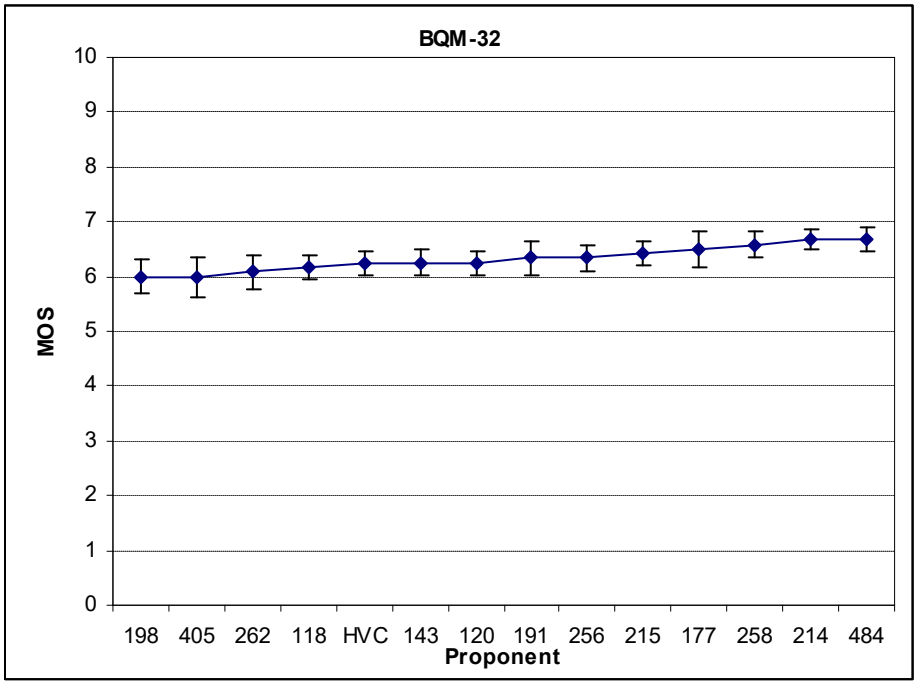
Non-CE12 proposals:

7. JCTVC-F120 [Q. Huang, et al (MediaTek)] Simplification of Chroma Deblocking Filter in F118
8. JCTVC-F175 [K. Sugimoto, et al (Mitsubishi)] Signaling of boundary filtering strength of deblocking filter for intra.
9. JCTVC-F214 [M. Ikeda et al (Sony)] Parallel deblocking improvement
10. JCTVC-F215 [M. Ikeda, T. Suzuki (Sony)] Vertical tap length reduction to reduce line memory in deblocking filter
11. JCTVC-F256 [M. Sadafale (TI)] Improving Deblock filter efficiency
12. JCTVC-F405 [M. Narroschke, A.-K. Seifert (Panasonic)] Deblocking filter using adaptive weighting factors
13. JCTVC-F484 [M. Sadafale (TI)] Improving Worst-Case performance of Deblock filter

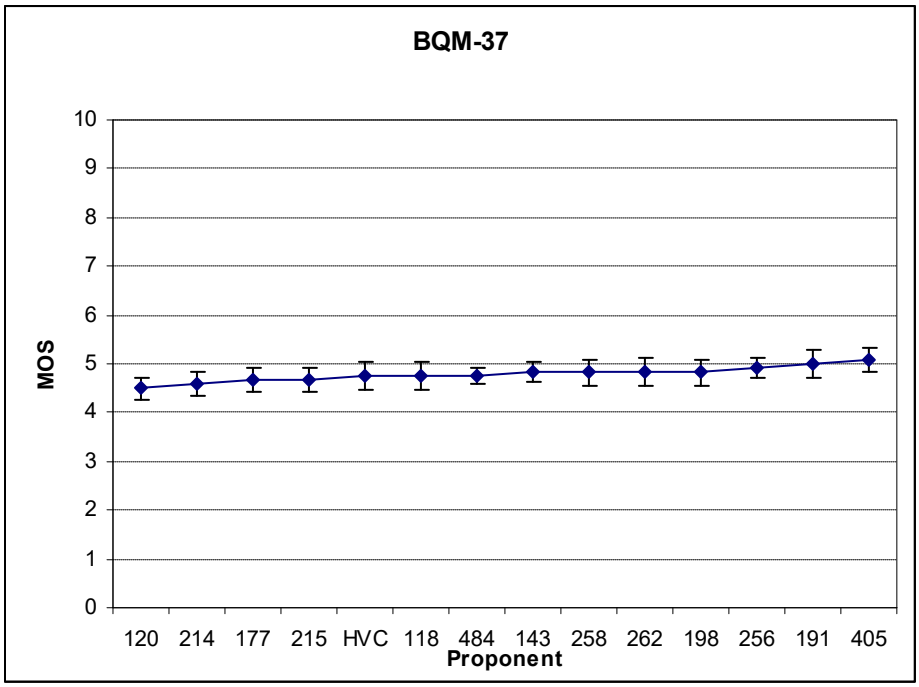
4 Test results

Tables and graph here below show the test results. MOS value with overlapping CI values cannot be rated as distinguishable (number 177 in the graphs corresponds to proposal F175).

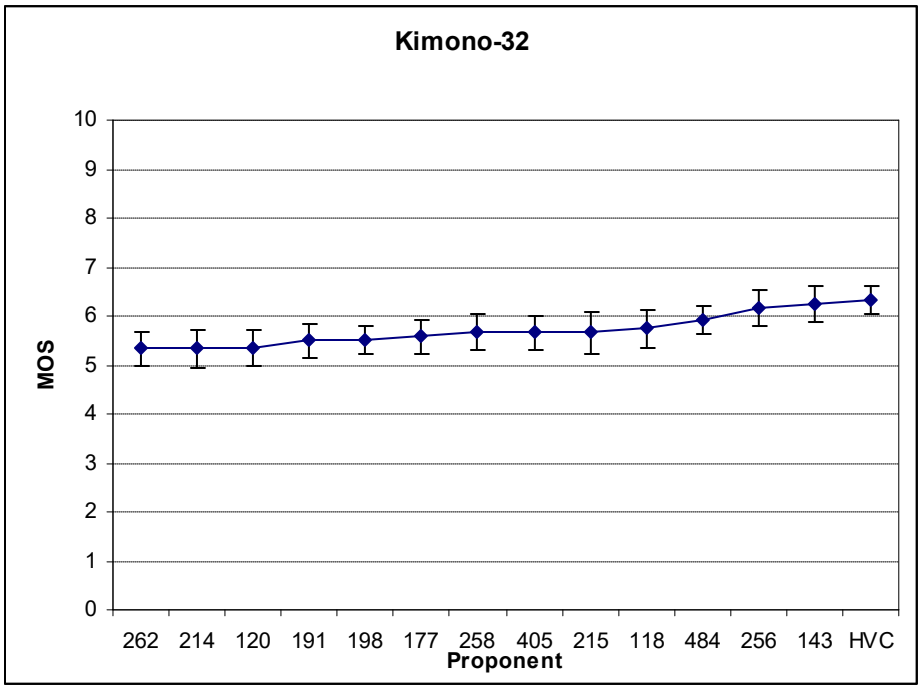
BQM-32l	MEAN	CI
198	6,00	0,32
405	6,00	0,36
262	6,08	0,31
118	6,17	0,20
HVC	6,25	0,21
143	6,25	0,24
120	6,25	0,21
191	6,33	0,30
256	6,33	0,25
215	6,42	0,22
175	6,50	0,33
258	6,58	0,22
214	6,67	0,18
484	6,67	0,22



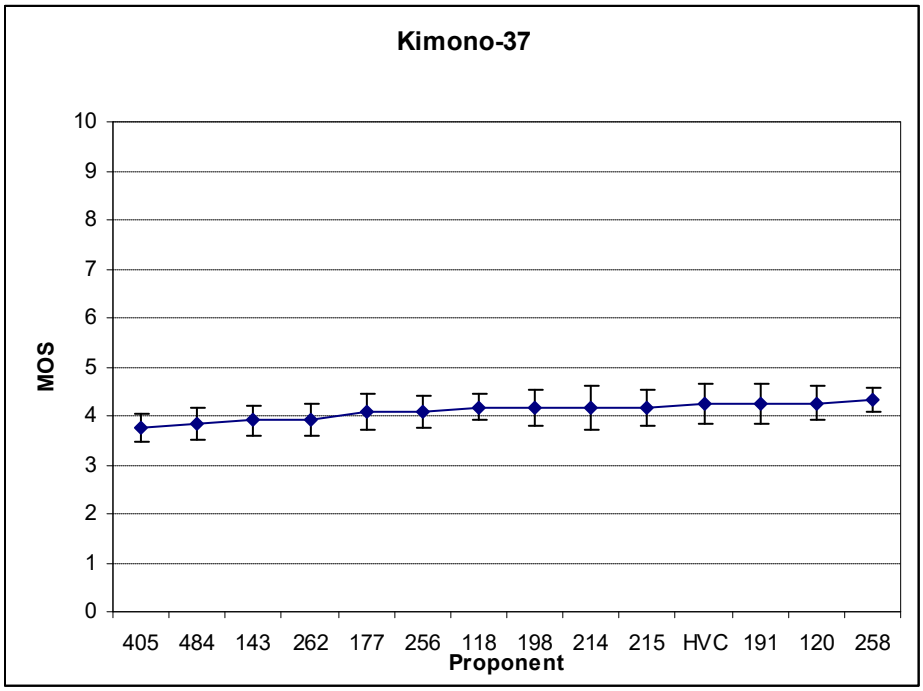
BQM-37	MEAN	CI
120	4,50	0,23
214	4,58	0,25
175	4,67	0,25
215	4,67	0,25
HVC	4,75	0,30
118	4,75	0,30
484	4,75	0,18
143	4,83	0,20
258	4,83	0,27
262	4,83	0,29
198	4,83	0,27
256	4,92	0,19
191	5,00	0,27
405	5,08	0,25



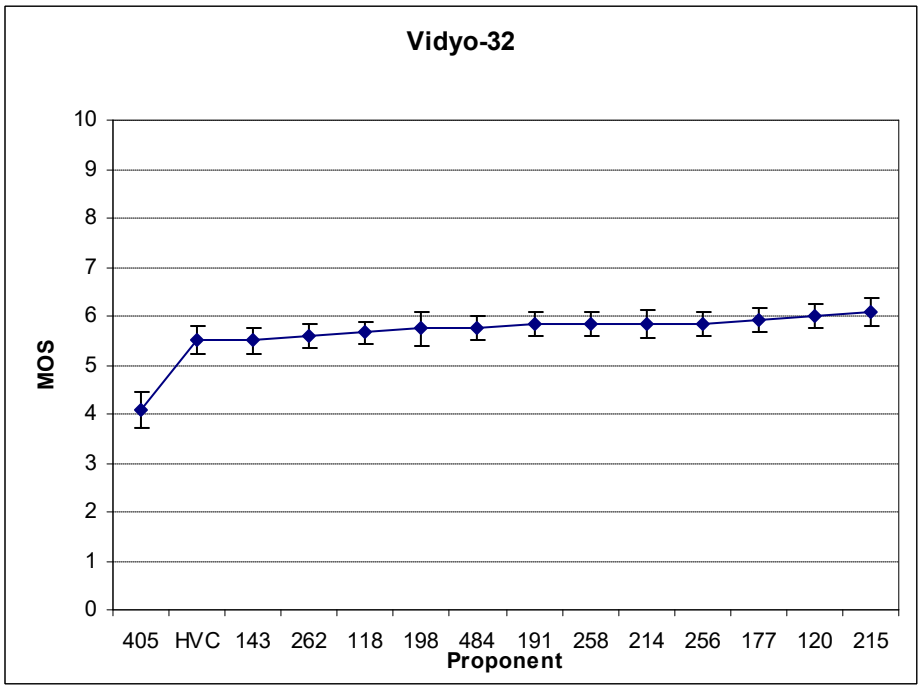
Kimono 32	MEAN	CI
262	5,33	0,35
214	5,33	0,39
120	5,33	0,37
191	5,50	0,35
198	5,50	0,28
175	5,58	0,35
258	5,67	0,37
405	5,67	0,35
215	5,67	0,42
118	5,75	0,38
484	5,92	0,28
256	6,17	0,38
143	6,25	0,36
HVC	6,33	0,28



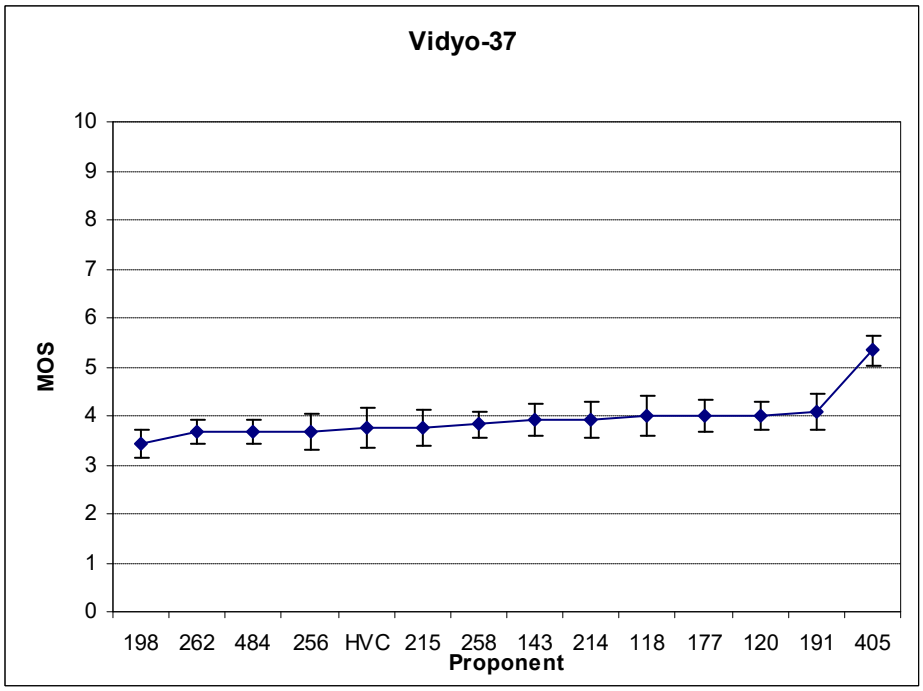
Kimono 37	MEAN	CI
405	3,75	0,27
484	3,83	0,34
143	3,92	0,31
262	3,92	0,33
175	4,08	0,37
256	4,08	0,33
118	4,17	0,27
198	4,17	0,36
214	4,17	0,45
215	4,17	0,36
HVC	4,25	0,42
191	4,25	0,42
120	4,25	0,34
258	4,33	0,25



Vidyo 32	MEAN	CI
405	4,08	0,35
HVC	5,50	0,28
143	5,50	0,26
262	5,58	0,25
118	5,67	0,22
198	5,75	0,34
484	5,75	0,24
191	5,83	0,24
258	5,83	0,24
214	5,83	0,29
256	5,83	0,24
175	5,92	0,25
120	6,00	0,24
215	6,08	0,28



Vidyo 37	MEAN	CI
198	3,42	0,28
262	3,67	0,25
484	3,67	0,25
256	3,67	0,37
HVC	3,75	0,42
215	3,75	0,36
258	3,83	0,27
143	3,92	0,33
214	3,92	0,35
118	4,00	0,40
175	4,00	0,32
120	4,00	0,27
191	4,08	0,35
405	5,33	0,30



5 Conclusions

The analysis of the results shows that for most of the cases under test the performance of the proposals was equal to that of the anchor.

There is one test condition (i.e. Kimono @ qp 32) where proponents 262, 214, 120, 191, 198, 177, 258 and 405 showed result inferior to the anchor.

For the test condition Vidyo @ qp 32, proposal 405 was clearly worse than the anchor and proposal 215 was rated better than the anchor.

For the test condition Vidyo @ qp 37, proposal 405 was rated better than all other proposals and better than the anchor.

6 References

[1] A. Norkin, X. Guo, B. Jeon, M. Narroschke, "Description of CE12: deblocking filtering," JCTVC-E712, Geneva, March 2011.

[2] A. Norkin, X. Guo, B. Jeon, M. Narroschke, "CE12: Summary report of Core Experiment on deblocking filtering," JCTVC-F032, Torino, July 2011.

[3] F. Bossen, "Common test conditions and software reference configurations," JCTVC-E700, Geneva, March 2011.

Appendix A. Bitrates for the test points

The bitrates and PSNR of test points for the proposals are shown in the table below.

Table 1 Bitrates of the test points (kbps)

Proposal	BQMall RAHE 37	BQMall LDLC 32	Kimono RAHE 37	Kimono LDLC 32	Vidyo LDHE 37	Vidyo LDLC 32
HM 3.0	451.50	977.53	535.12	1266.84	225.23	468.94
F118	450.94	972.62	534.95	1266.50	222.82	463.98
F143	451.79	978.06	535.09	1269.90	225.95	470.13
F191 v1	451.89	976.03	535.55	1267.48	225.07	468.72
F258	451.17	975.32	534.89	1268.28	223.63	466.76
F262	451.37	974.95	534.99	1268.07	223.53	467.98
F198	451.64	976.35	535.04	1266.98	225.74	468.48
F214	452.05	975.52	535.69	1267.98	225.40	469.05
F215	451.69	976.96	535.04	1266.71	225.06	468.17
F484	452.12	978.34	535.12	1269.27	226.04	469.11
F256	451.19	976.29	534.99	1266.78	225.57	467.94
F405	451.85	977.37	536.23	1267.92	225.00	468.61
F175	451.94	976.58	535.33	1267.27	225.66	469.44
F120	451.25	973.454	534.76	1264.345	222.84	464.693