

MEETING RECORD

Video Compression Measurements Subcommittee G-2.1.6

Audio Video Techniques Committee G-2.1

Broadcast Technology Society

Institute of Electrical and Electronics Engineers

Twenty-Second Meeting

Hyatt Regency, Savannah, GA

2 West Bay Street

Savannah, GA 31401

January 7, 2002

Item 1 - Welcome and Introduction by Interim Chairman, of IEEE G-2.1.6

Interim Chairman Alan Godber called the meeting to order at 11:10 AM, January 7. Attendees introduced themselves. See Appendix B for a list of attendees.

Item 2 - Approval of Draft Agenda

A letter from Vittorio Baroncini, chairman of Working Party 6Q, document 6Q/58-E, with condolences on the September 11 attack was acknowledged.

Item 3 - Review and Approval of Minutes of the Previous Meeting #21, July 9th, 2001.

The minutes from meeting #21 were accepted as prepared.

Item 4 - Review and Approval of Minutes of the Ad Hoc Meeting #21SA, July 23rd, 2001.

The minutes from ad-hoc meeting #21SA were accepted as prepared.

Item 5 - Review and Approval of Minutes of the Telephone Conference #21TC, August 17th, 2001.

The minutes from telephone conference #21TC were accepted as prepared.

Item 6 - Matters Arising from the Minutes

The P1486 working document could not be delivered to ITU Working Party 6Q because of IEEE restrictions on the copyright and distribution. A letter from Judy Hass at IEEE dated September 5 stated permission must be obtained from the IEEE manager of the standards, licensing and contract department before the draft standard could be distributed. Normally, documents submitted to T1A1 are posted on their public FTP site. It was reported IEEE had a problem with this.

Leon Stanger reported he sent letters via email to Vittorio Baroncini for Working Party 6Q, John Grigg for T1A1 and Arthur Webster for VQEG announcing this committee's work on the draft standard. The letters stated the draft standard was on the IEEE G-2.1.6 private web site and that they could request a password to access it.

There was discussion concerning the best way to get the IEEE document to 6Q. There was a suggestion that IEEE make an official liaison request to 6Q, send a letter to 6Q discussing the document and direct people interested in the document to Alan Godber to arrange for access to it. It was agreed that the ideal solution was for 6Q to have access to the complete document.

Action Items: David Fibush said he would make the draft standard an official contribution from the U.S. national committee. Alan Godber agreed to contact the IEEE to find out what can be done to make the document available to other standards organizations.

Item 7 - Update Report of ITU Video Quality Experts Group (VQEG) re ongoing testing plans and results of July meeting in Orlando, FL, at Teranex - Arthur Webster, Phil Corriveau, Ann Marie Rohaly, & other participants.

Vittorio Baroncini reported VQEG and was trying to boost activity for the phase 2 Full Reference (FR) and Reduced Reference (RR) tests. They will try to produce at least 25 percent new material for the phase 2 subjective tests. Expert viewers, similar to those that participated in the ATTC Grand Alliance HDTV subjective tests, will be used for at least some of these tests. The goal is to reduce the variance in the subjective quality assessments. VQEG discussed correlating the MOS and objective quality values on a sequence-by-sequence basis, similar to what Andrew Watson is doing in the P1486 standard. Under this plan, the same sequence would be encoded at multiple bit rates and viewed by experts. Vittorio Baroncini said that they hoped to define a set of coding conditions and a set of test materials at the next 6Q meeting.

Other labs have agreed to participate in the subjective tests, but expect to be paid for it. Proponents will have to pay a fee for the testing. This, it was noted, provides a way for proponents to be guaranteed honest and technically correct behavior. All known test material, currently about 60 GB, will be submitted to the proponents.

7.1 Further Discussion and Recommendations from the Subcommittee to the next meeting of VQEG

Vittorio Baroncini was asked how much the fee would be and whether it would be the same for all proponents. He did not know the amount of the fee, but said they will try to apply the same policy used for the MPEG tests. The fee may be different for a small university or laboratory. The fees will be used to cover expenses for CRC, FUB and the other laboratories. He added that laboratories would be qualified using a quick and simple dry run to avoid surprises after the test.

The expert viewing method was discussed in Boulder. It will be explained in an annex to the test plan and will become part of the official test plan.

Vittorio Baroncini said work stopped after September 11, but VQEG is ready to go ahead now.

Item 8 – Draft Standard for the Measurement of Visual Impairments in Digital Video Using a JND Scale, P1486 – Ad Hoc Committee Chair, Leon Stanger

The subcommittee thanked Dr. Watson for his work on the standard.

Andrew Watson distributed the latest version of the standard, electronically on the IEEE web site and by paper copies at the meeting. (XXXXXX, Doc...) This version contains the changes discussed at the previous G-2.1.6 meeting and in the telephone conference.

8.1 Review of Subjective Tests at NASA Ames, July 23rd – Dr. Andrew B Watson

Dr. Watson reported that the age of the observer had no effect once the data was filtered to remove people who did not have 20-20 vision. The requirement for 20-20 vision affected 20 to 26 percent of the observers. There was a comment that if a person has 20-20 vision, there is a good chance they have no ocular problems. However, if vision is worse, there could be other problems with ocular health, requiring more detailed examination of by an ophthalmologist. It was agreed we should retain the 20-20 vision requirement. While crude, it works better than age.

Dr. Watson described the problem with “null conditions”. When the difference in sequences is close to one JND, it becomes difficult to come up with an estimate. His recommendation is that when two observers return null results, that condition should be eliminated. The requirement for two observers to return null results should

eliminate a single observer effect. If you get one null results, you continue until you get four observers unless you get a second null result.

8.2 Review of the revised Draft of Standard, prepared by Dr. Andrew B. Watson

Changes made in this version of the draft standard were described and discussed.

A section was added on data recording, null distribution and age.

An informative annex describing the accuracy of the data was added. For four observers, the error is 15 percent of the mean. Results of the tests using the standard should report how many observers were used. From that, it is possible to calculate the standard deviation of the results.

A copyright notice needs to be added to the standard and it was suggested a version number would be helpful. It was noted the version number is contained in the file name.

The question on whether brand names can be used in the standard needs to be resolved. Alan Godber will check on this.

The reference: to code has to be in the informative annex, not normative.

The reference in paragraph 8.3.3 to a C15 light was removed. There was some concern, however, that vision acuity is different a high luminance than at low luminance, particularly as age increases. It was suggested that one way to reduce the variation in acuity would be to restrict the standard to young, healthy observers with no ocular disease. The argument against this is that while it would keep the variation down, it wouldn't match the viewing audience. After discussion, it was agreed to leave this section as-is.

There was a concern that the display requirements in 8.2.3 are not specific enough. It was pointed out that there is no current SMPTE standard for displays. The next paragraph references ITU-R BT.500 and that includes resolution and contrast specifications. Andrew Watson will reference display characteristics of Rec. 500 in 8.2.3. It was also recommended that the reference to ITU specifications be removed and replaced with a number, BT.500-10, for example.

Some typographical and formatting corrections were noted. There is typo in the title in 8.4.4 (Presentation...), in the caption of Figure 6 (Apparatus...), and on Page 5 in 8.1 the reference number [5] is too large.

In the Appendix, the section numbers should be changed to letters, particularly where informative. It was recommended that Section 9 be left as is, but Section 10 should be changed to Appendix A and 11 should be changed to Appendix B. It was also suggested the word "Informative" be added in the title or in parenthesis to informative sections.

Because the definition for JND references the Thurstone Model, definition 7.3 should be placed ahead of 7.2.

8.3 Plans for Other Test Labs to confirm first lab test results

It was recommended we support Vittorio Baroncini in his tests at FUB. CRC is interested in the standard, but is busy on VQEG work now. CRC may be able to find time to do this later.

The need for other labs to verify the standard was discussed. It was noted that the questions raised at NASA have been resolved. There was agreement that we should continue with the ballot process, since it could take over a year to get data from other labs. If these tests indicated the standard had to be revised, that could be done. The number of revisions to BT.500 was cited as an example of this.

8.4 Liaison with Other Standards bodies

Before P1486 can become a standard, liaison work is required. This can proceed in parallel with the ballot process. Interested groups have been notified.

8.5 Further Discussion and Action

Alan Godber described the ballot process. First we have to inform the IEEE that we want to send the standard to ballot. We also need to send them a letter stating who is eligible to vote on the ballot. The subcommittee chairman may send a letter requesting people who are not IEEE-SA members be allowed to vote.

This is followed by the vote. IEEE will send out the ballot. Voters have 30 days to respond. This could be as few as a dozen people. It is important to choose the right people. “No” votes have to be responded to. Seventy percent of the ballots have to be returned. Seventy-five percent must vote “Yes”.

The final form of the standard will come after the ballot. Andrew Watson said he is willing to consider editing it to conform to the IEEE Style Manual.

Since the Word document version of the standard on the web site does not show figures when it is viewed with a PC, it will be removed.

Action Items:

Andrew Watson will add a copyright notice to the standard, reference BT.500 in 8.2.3, change the numbers to letters for the informative annexes, add “informative” in the title of informative sections, correct typos, and move the definition for Thurstone Model ahead of JND. In 8.5, JND needs to be spelled out as “Just Noticeable Difference”.

Alan Godber will check on whether brand names can be used in the standard, work with IEEE to determine who can vote, and notify IEEE we intend to go to ballot. Leon Stanger will assist with this.

Alan Godber will try to get permission to send the whole document to other standards bodies after determining what level of protection is required.

Item 9 - Discussion of Other Compression Measurement Methodologies

9.1 – Discussion of Future Work, Additional Assignments

Leon Stanger is starting to make a list of applications and further work related to the standard. These include: 1) Develop tapes with calibrated material that can be used as a calibration reference for manufacturers and other uses; and 2) Define a method for measuring less than one JND.

We were reminded that we need an objective method for picture quality measurement. What do we want to do in regard to ITU recommended methods for objective measurements? It was suggested the group make comments on the test plans and documents being presented to ITU for other picture methods. We haven’t gotten too far in coming up with a number to describe picture quality or a way to calibrate measurements of impairments in digital video material.

One potential measure would be “threshold of visibility”. We could use a process similar to that used by T1A1, perhaps working in coordination with them, which used JND data rather than the DSCQS data described in the T1A1 technical reports. The T1A1 method of specifying accuracy should be able to be applied to this data.

There was interest in moving ahead with the generation of tapes of degraded digital video calibrated using the JND method described in the standard.

The method of distributed the calibrated sequences was discussed. The most common equipment for digital video playback of sufficient quality is either D1 or D5 videotape machines. There was concern, however, that even D1 tapes can look different on different videotape machines due to error concealment. The material could be distributed as data files on CD or DVD. The sequences used in the NASA tests are 200 MB each. 20 sequences would require 4 GB of storage. While these could not be played back from the CD or DVD uncompressed, the files could be moved to a hard drive for playback. It was suggested the data could be put inside a QuickTime wrapper to make it easier to people to play back.

There was a discussion about the JND range to be included on the calibrated sequences. While the original thought was to include the reference and the fully degraded sequence with a JND rating, there was significant interest in having the intermediate JND points available as well. Andrew Watson explained that each condition has a scale function ranging from the reference to fully compressed. The problem is that the scale is not always the same for different observers. It may be possible to take an average, but a simple linear combination will not work. Because we have a set of sequences that cover a wide range of JND, he questioned why it was necessary to have sequences with intermediate steps of JND.

Andrew Watson said NASA was willing to create the masters. If SMPTE or another organization wants to sell the data, all we need to do is determine what format people want.

It was agreed that the results from the draft standard should be specified as "IEEE JND".

Action Items:

Leon Stanger will research whether people would be able to use the video sequences in data format with the QuickTime wrapper.

David Fibush will poll Tektronix to see what their thoughts are on the calibrated sequence issues discussed here.

Alan Godber will add an item for discussion about measurements of degradation of less than one JND to the next meeting's agenda.

Item 10 - Any Other Business.

Alan Godber announced the meeting at NAB Tuesday, April 9, from 7:30A to 9 AM. The agenda for the NAB meeting will include a simple explanation of the G-2.1.6 work, but most of the meeting will be devoted to G-2.1.4 topics.

There was also a discussion about the IEEE booth at NAB and the possibility of setting up a hands-on demonstration of the JND method. Andrew Watson said he could do a presentation on the standard that would run on a loop on a PC.

The subcommittee thanked John Grigg and T1A1 for supplying facilities for this meeting.

Item 11 - Date(s) of Future Meeting(s).

The next meeting was tentatively scheduled for July 8 in conjunction with the T1A1 meetings that week.

The meeting was adjourned at 5:17 PM, January 7.

Submitted by:
H. Douglas Lung
Secretary

APPENDIX "A"

List of Documents Distributed

9-10 July 2001

Draft Agenda - IEEE Compression and Processing Subcommittee G-2.1.6, Twenty-Second Meeting, Monday, January 7, 2002, Alan Godber, Chairman, ([216m22an.pdf](#))

Draft Meeting Record, G-2.1.6, Compression and Processing Subcommittee, Twenty-First Meeting, July 9-10, 2001, Bloomington, MN, Doug Lung, Secretary, [IEEE Doc. G-2.1.6/127](#), December 17, 2001.

Draft Meeting Record, G-2.1.6, Compression and Processing Subcommittee, Ad-Hoc Meeting, July 23, 2001, NASA – Ames Research Center, Sunnyvale, CA, Doug Lung, Secretary, [IEEE Doc. G-2.1.6/128](#), January 3, 2002.

Draft Meeting Record, G-2.1.6, Compression and Processing Subcommittee, Conference Call, August 17, 2001, Doug Lung, Secretary, [IEEE Doc. G-2.1.6/129](#), January 6, 2001

Draft Standard for the Subjective Measurement of Visual Impairments in Digital Video using a JND Scale - P1486, Dr. Andrew Watson, January 5, 2002, IEEE Doc. G-2.1.6/130, January 7, 2002.

APPENDIX "B"
ATTENDANCE RECORD
January 7, 2002

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