

**Institute of Electrical & Electronics Engineers
Broadcast Technology Society**

G-2.1 Audio Video Committee

Draft Meeting Record

G-2.1.4 Subcommittee on Video Distribution Measurements

Holiday Inn Riverwalk, San Antonio
Monday, October 30, 2000, 8:00 – 11:00 AM

- List of attendees:

Doug Lung	Telemundu
David Fibush	Tektronix
Alan Godber	Consultant
Michel Poulin	Leitch
Aidan Moore	Genum
Dan Baker	Tektronix
Dick Streeter	Consultant
Leon Stanger	Direct-TV

- Absent:

Wallace Murray	
James O'Neal	US Inform. Agency
Rick Redford	ABC
John Griggs	US West

The meeting started at 8:15AM. In the absence of the Chair, Michel Poulin acted as a co-chair. Minutes will be compiled by the co-chair using notes from meeting participants (David Fibush and Doug Lung) and himself.

Voting eligibility:

The IEEE has now decided that only IEEE Standards Association (SA) members will be allowed to vote. Membership costs \$10 in addition to IEEE membership. Without IEEE membership the cost of SA membership is about equivalent to \$10 plus IEEE membership. At this meeting it was agreed to meet the rules in order to keep the work moving.

Rick Redford will be contacted to help in resolving this SA membership issue before the next series of meetings in January.

P 205: Measurements of luminance levels.

This is a revision of the traditional level measurement standard stated in more modern terms and including the luminance filter actually used in Tektronix and other monitors. There still problems with changes made after the ballot being considered substantive by IEEE SA. In particular a “should” has been changed to a “shall” which is typically considered a substantive change. Although various short cuts are possible, a re-ballot appears to be the best path to completing this, basically legacy, document. It will be distributed with the changes indicated if this is acceptable within the IEEE rules. Due to the date of the original ballot, SA membership is not required.

Action:

- Aidan to add corrections suggested by Geoff Thompson (IEEE) and send the document for ballot to the qualified voting members.

P 1521: Jitter and wander measurements.

This draft standard is based on a document contributed by Tektronix (in 1998). It is now ready for ballot however the process of determining the voting members needs to be completed. There is some concern that potentially interested parties are not aware of this work, specifically other measurement instrument manufacturers. Information copies will be sent to a more complete group of experts in addition to the somewhat small list of eligible voters. Development of the list of experts will be completed in the near future. An electronic balloting procedure will be used.

Action:

- Rick to resolve voting issue.
- Michel to contact Rick for generating a another list of people interested in our activities (within manufacturers, standard organizations, broadcasters, consultants or individuals).

P618: Luminance S/N in VTR's.

The EBU, EIA, ARIB and SMPTE have no objection to the withdrawal of this standard. Chairman of SCTE has not answered two emails. It has been suggested and agreed that four of five is good enough, so the standard is withdrawn. A statement will be put on the web site that P618 is withdrawn. The reason for withdrawal is that it is being misused in digital environments. No action is necessary as the standard was "administratively withdrawn" in 1990.

Action:

- Statement to be published on the web site indicating that P618 is withdrawn.

P206 – Measurement of Differential gain and phase.

A revision is planned to widen the scope of the document to include hybrid analog/digital systems. The project authorization request (PAR) has been sent to the IEEE. Since no comments have been received it is assumed it will be approved. The revision will be as a modern stand-alone standard rather than referencing related documents from other groups as previously planned.

It must be confirmed that Rick has received a positive confirmation on the PAR. We can work on a project for 6 months without a PAR.

It was agreed to upgrade the current document by keeping the first part as is, description of measurement system, etc. for pure analog system. Then a second part would be added, probably taken from P746 to cover A/D and D/A measurements. With this, the document will apply to pure analog systems, hybrid and all digital systems. We need to make sure equipment is available to do these measurements. Is there a generator that has random phase? If not, we can recommend varying the phase to eliminate quantizing error. Dan Baker will look into TSG2000 to see if it can be set up asynchronously and that the frequency of the phase change can be adjusted. Dan Baker will get back to Michel to verify what can be done.

Do we want an informative annex such as in the BT1204 that shows why this is needed and the errors that can result from improper techniques. General agreement is that we should add this information. We need to keep the measurement practical, unlike the BT1204 procedure.

Action:

- Michel to generate a draft revision of P206
- Dan to verify if the subcarrier frequency on a ramp can be slightly modified to generate a variable sampling phase.
- Doug to publish it on the Website when ready from Michel.

P746 – Performance measurements of A/D and D/A

-This is a more inclusive document than Standard 206. A PAR has been drafted stating it is for System-M

only (NTSC) and the methods can be applicable to 625-line, component and HDTV systems however they will not be specifically included. Some additional types of specifications to be considered for performance measurements are, DC level, moiré level, input clamping level efficiency, and input filter frequency response.

- There are older standards where video waveforms are allowed to have large values of “non useful DC” where as SMPTE 170M (NTSC) doesn't even discuss DC levels. Large values of DC offset may not be handled by A/D converters. A measurement procedure should be included in this revised document to characterize the input capability of A/D's. Reference documents indicating such a performance specification are TIA-250C, ANSI T1.502-1988, SMPTE 253M for component, ITU-T J.61, NTC Report #7, Bellcore TR-TSV-000338-Issue 2-1993, etc. Performance specifications varies from 2.75V to 0.05V. A draft will be generated for the measurement procedure to verify it.

- The P746 Document should cover composite and component converters. This possibility will be investigated.

Action:

- Michel to find a definition of “Non-usefull DC component”.
- Michel to draft a procedure for DC offset, input clamping stability performance, and input filter frequency response.
- Michel to investigate moire (aliasing).
- Michel to consider component A/D measurement procedure.

P511 – Linear Waveform Distortions

- The PAR for revision of this document has been approved. This composite-based document will be expanded to cover component signals and conversion between the two domains. This is a major revision. Included may be a standard phase for the modulated sine-squared pulse. Various manufacturers have implemented the modulated 12.5-T pulse phase with different values. This standard is important because of the continued use of composite transmission systems.

- There are many figures in the original document that need replacement. Scanning of the original is problematic due to poor quality of the source. . Suggest we ask some manufacturers that have already published this figure if we can use them.

- Modulated sine-squared pulse: Generators have fixed phase, phase that changes by field, others offer a choice of phase (programmable test generator). Changes would be to add some of these comments. 60.84 degrees is a common, defacto phase. Dan will draft an informative annex on these issues.

Michel will identify figures needing replacement and look for replacement figures. Michel will scan the figures. If he runs into problems, Alan Godber will contact IEEE to see if they have something in their archives.

Discussion

Inclusion of component signals? Have to explain K-factor for different chroma bandwidths. It would be good to have a complete standard, but it is a lot of work. What is the issue? With 4:1:1, you have to change the T pulse duration because the bandwidth is different. If you don't the K-factor measurement is wrong. The PAR says we will include component.

Michel will see for next meeting what technical documents he can get from Tektronix that cover this. Note that application notes are now on Tek web site. At some point we should consider HDTV.

Action:

- Dan to modify Section related to modulated square pulse phase and create an informative annex..
- Michel to find neat figures to replace existing ones.

- Michel to investigate procedure for component signal tests

P948 – Chrominance S/N ratio

This document was never completed and is to be reviewed based on a scanned-in soft copy. It is necessary to make sure the specifications in this version are clear prior to approval or possible revisions. The document has been sent to several key manufacturers for their inputs regarding any changes needed before proceeding with the approval process. These include R&S, Magni, Tektronix and ShibaSoku. There have been no responses hence contact attempts shall be continued.

Tektronix is working on it. Unfortunately, the designer is no longer with Tektronix. This may be the case with other manufacturers. Tektronix will supply an answer for the next meeting.

Dan Baker suggested we contact Steve Rice for comments, as he is very familiar with this.

ShibaSoku and Rodhe and Schwarz were both on the committee, with the tolerances made wide enough to accommodate both devices, which were slightly different.

VM700 may not cover all filter suggestions. It should meet the filter specifications.

Should we send this to EIA, SCTE, EBU and ARAB? Is this a requirement from IEEE?

Alan Godber said we should definitely do this.

Action.

- Michel to continue contact with standards organizations for comments.
- Michel to contact manufacturers for comments

P xxxx - Accurate frequency response measurements.

Experiments by Leitch using Tektronix equipment (NIST traceable accurate sine wave signal source) will be performed to determine if a useful method can be developed.

Michel wants to get a test unit (module that has NIST traceable measurement, "golden" amplitude and frequency response source - 0.02 dB to 10 MHz. -70dB harmonic distortion) from Tektronix. He wants to see what can be achieved in the laboratory and then generate a first draft PAR for review at the next meeting.

Action:

- Dan to send a beta test unit to Michel
- Michel to write a PAR.
- Michel to write a draft procedure.

P xxxx - MPEG PCR jitter measurement.

-Dan Baker distributed and discussed an excerpt of ETR-290 covering this topic. The revision of ETR-290 has been completed by EBU working group. ETR-290 has a new name but the document has not been fully approved.

-PCR accuracy produced by the encoder is a separate issue (500 ns MPEG-2 specification) from PCR jitter and wander produced by a transmission system. The overall jitter includes both processes. Accuracy can be determined if the exact transport stream rate can be calculated. It can also be measured if the transport stream is recorded and reproduced with an accurate clock however transmission jitter and wander information is no longer available.

- Dan will tentatively create an informative annex to try to harmonize MPEG and DVB documents.

DVB document doesn't explain exactly how to do the measurement.

MPEG DS 13818-4 compliance document doesn't explain how to do it for a short program. It is not a practical way to plot PCR accuracy. Length of program isn't specified. Tektronix converted it to a frequency response template. .

- Items to consider in a suitable PCR jitter measurement procedure:
 - PCR jitter versus clock jitter.
 - How do we separate PCR jitter from PCR accuracy? PCR accuracy is just the soft error. PCR overall jitter is the sum of both.

Central problem is to make it difference between PCR jitter and PCR accuracy. Newtec document (was made available to the meeting attendants for discussion) confuses the two. Clock jitter is the arrive time jitter.

 - How do you separate the two - jittery arrival packets plus errors themselves?
 - If you record transport streams, you remove the arrival time jitter, you can measure PCR (in)accuracy. One way to measure PCR accuracy is to capture a stream and play it back with a clean clock. Disadvantage is you cannot measure frequency and drift rates.
 - Newtec document shows the confusion with this. It is necessary to follow ETR-290 terminology. - If ETR-290 exists, do we need our own standard? Only reason for IEEE to have a standard is to simplify what they have done and make it more concise. ETR-290 doesn't tell how to make an instrument to make the measurements. There is confusion in the marketplace in that several different instruments will give several different frequencies. Bandwidths need to be defined.
 - A PAR will be developed to define the IEEE work in this area. The general idea would to draft a more concise and informative document with reference to appropriate sections of ETR-290. An informative annex can also be created. Other interested parties (specifically manufacturers) will be invited to participate.
 - Dan Baker made a demonstration of how Tektronix has started an implementation of the new PCR jitter measurement procedure. A captured TS was played back on a PC. PCR jitter due to PCR accuracy error was demonstrated. PCR's were modified to create sinusoidal phase errors and thus demonstrate the different measurement bandwidths.
- Action:**
- Dan to write a first draft for the next meeting of an informative document
 - Michel to write a PAR.

Review on means of electronic communication

No items

New Business

Std. 208 – Measurement of camera resolution systems. No expertise in this group at the moment. In addition the workload of this sub-committee is such that we must delay the review of this document.

Next meeting?

January 29th, as scheduled on T1 web site.

SPIE starts 21st January, in San Jose

The meeting has been adjourned at 11:20AM.