

**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

NTIA/ITS, US Department of Commerce, Boulder, CO
Monday April 24, 2000

- List of attendees:

Doug Lung	Telemundu
David Fibush	Tektronix
Dan Baker	Tektronix
Aidan Moore	Genum
Alan Godber	Consultant
Michel Poulin	Leitch

The meeting started at 11:15AM. In the absence of the Chair, Michel Poulin acted as a vice-chair. Minutes will be compiled using notes from meeting participants.

P 205: Measurements of luminance levels.

Package of documents are re-submitted to the IEEE Review Committee, which will meet in June. The mentor will also receive this package. There is a need to locate the PAR hard copy. IEEE is working on it. It appears the draft standard will be ready for the revision committee of the standards board. Dave Ringle is the contact at IEEE Standards.

P 1521: Jitter and wander measurements.

No answer from EBU/ITU standard organizations. Two letters were sent to them. Alan Godber will contact David Wood at EBU. Two letters and one follow-up phone call (possibly e-mail) are needed to show due diligence in coordination. It was agreed that two months is a reasonable time to wait for a reply.

Question on whether a letter should be sent to SMPTE giving them one last chance to make comments. David Fibush suggested sending it to the committee chair, assuming N26, Hans Hoffman. Aidan will contact Hans Hoffman at the SMPTE meetings in Toronto, in May.

There was a question whether this should go to REVCOM or the Standards Board. Most felt it should go to the Standards Board. Note by Dan Baker that there is now a NESCOM, New Standards Committee, which is handling some revisions as well as new standards. Alan will investigate balloting changes, recently introduced by IEEE management. Aidan Moore suggested contacting IEEE mentor. Dave Ringle should also be able to help on this.

Doug Lung suggested sending out a message to the email reflector alerting members that the ballots have been mailed and reminders before the ballots deadline. Aidan agreed to do this.

Action:

- Alan to investigate balloting changes

- Aidan will contact Hans Hoffman
- Aidan to send a ballot reminder.

P618: Luminance S/N in VTR's.

A coordination letter was sent to EBU, no response from chairman of VTR committee. Mr. Chambers of EBU said EBU has a similar document that covers 625, P618 covers 525 only. The filter is different for 625. Chambers said it would be a pity to lose the document, but they don't use it. Still waiting for an answer from EBU VTR subcommittee.

The withdrawal of this document has been discussed in two SMPTE meetings. VTR subcommittee V16 and I23. Bill Miller, Engineering Vice-President, sent a letter saying SMPTE has no objection to the withdrawal of P618.

At the last meeting coordination was suggested with SCTE, EIA, ATSC, ARIB. A letter still needs to be sent. Information on contacts at SCTE, EIA requested. Suggestion to use Aidan Moore's contact at EIA. Contacts should be listed in original PAR. George Hanover suggested by Alan Godber as a contact at EIA. It was noticed that we need to coordinate with T1A1 via John Grigg.

Dan Baker - there is no PAR on this? Agreed. Do we need to vote on the withdrawal? Agreed there should be a process, minimally we need to poll everyone to see what the response is. IEEE-618 can cause problems if not used appropriately and there are very few applications at the present time. It is superseded by BT.1204 and IEEE-746. Alan Godber will check to see if there is a special procedure for withdrawing a standard and obtain details.

Action:

- Michel to send a letter to ARIB, EIA, ATSC, SCTE.
- Michel to contact John Grigg and TIA
- Alan to check procedure for withdrawing a standard

P206 – Measurement of Differential gain and phase.

Dan Baker is getting a PAR out on it. It outlines a new scope that has been widened to include hybrid analog/digital systems. The purpose of revision is to refer to other standards such as IEEE 746 on A/D and D/A converters, and ITU-R BT-1204.

Need to decide if we need to make revisions to text describing measurements in P746. We have to decide what we are going to do with 746 before we reference it. Alternatively, we could move portions from P746 into P206. Discussion on whether a reference to BT.1204 needs to be included.

Should we move differential gain and phase out measurements out of 746 and into P206? Suggestion we kill 746, pick up documents in P206.

Need to compare 206, 746 and BT.1204 to see what is needed from each document. Suggested that a note on this be placed on the email reflector / web site. Dan Baker suggested submitting P206 and P746 PAR at the same time. We will look at BT.1204 to see what can be referenced. No resolution of the question. Suggest we hold PAR on 206 until we consider 746 later in the meeting.

Action:

- A draft revision of 206 will be generated.
- Dan will send copy of the P206 PAR to Michel to be used as a model for a PAR 746

P746 – A/D and D/A

This document (1984) describes a set of procedures aimed at measuring the performance of A/D and D/A converters used in video applications. This document refers to P206 and P511 for general principles of the measurement of the Differential Gain and Phase, and the Linear Waveform Distortion. But the P746 describes quite different measurement procedures. Definitions and discussions about basic A/D and D/A principles, and measurements of other parameters are also described.

The ITU-R BT.1204 document describes "Measuring methods for digital video equipment with analog input/output". This document has an identical purpose to that of the P746 and is more recent (1995).

Several alternatives to update the P746 document have been discussed during the meeting. It has been decided that the P746 document will be revised taking into considerations the content of the BT.1204, the revisions made to P511 and P206, and the fact that P205 is being withdrawn. A PAR will be generated based on these considerations.

Action:

- Michel to prepare a PAR.

P511 – Linear Waveform Distortions

The standard is a composite-based document and its scope will be extended to include component and hybrid systems. Several issues have been identified and will be defined:

- Specification of a defacto standard phase of 60.84 degrees (magenta) for modulated pulse.
- Use of conversion from digital component to analog composite requires modification of standard.
- Investigation of the use of Ghost Cancelling Reference (GCR) as a test signal for use of short time distortion measurements. It can give more measurement resolution. However, adding a new signal would require a lot of extra work.
- The 13.5 MHz sample rate does not allow generated sine squared pulse (T-pulse) without ringing. Digital output is correct, but band limited analog output has to be modified to avoid ringing. Other pulse available is a "Blackman" pulse adds third term, which adds another sine function of 4x omega to make the bottom of the pulse come down more gradually.

All these issues will be considered in more detail at the next meeting.

Action:

- Michel will attempt to scan the Standard 511 for the web site.
- Alan Godber will check to see if IEEE can assist with generating electronic copies of standards.
- Dan Baker will submit a PAR for the revision of this document.

A tentative date (January 2001) has been set for submission to REVCOM.

P948 – Chrominance S/N ratio

The old proposed document has been formatted in an IEEE standard document format. It should be reviewed by all participants to verify its content. Also we need to look at it to see what, if anything, should be changed. This measurement standard is presently used to measure chroma AM and PM S/N in current VTR's, and low frequency chroma jitter in digital to composite encoders.

Alan Godber mentioned the 0.25 dB tolerance on filter - where is the zero? On one side or in the middle? Filter tolerance drawing must be checked. This was a problem before. In section 2.3, formula, denominator should include " / square root of 2" instead of "//2"? Need to check on this.

A letter will be sent to equipment manufacturers asking for comments on this work. A copy of the document should be sent to test equipment manufacturers requesting comments on it. Alan will verify if an old PAR is still in effect and will let me know. Dan Baker will give the document to Tek sustaining engineering people to see how it matches the VM700 implementation.

Action.

- Michel to send a letter to equipment manufacturers
- Michel to verify formula in Section 2.3
- Alan to verify if an old PAR is still in effect
- Dan to give the document to Tek sustaining engineering people

P xxxx - Accurate frequency response measurements.

Dan B. indicated that a Tektronix plug-in for the TG-2000 will be available summer time generating a very accurate amplitude of a sweep or discrete frequencies. This module will go to 5 and to 10 MHz and be precise within approx. 0.25 dB or better, down to 0.02 percent (at 5 MHz) (specifications are still being determined). Calibrate out DAC and filter characteristics in manufacture.

A new standard document must be started. It should limits up to 10 MHz (good for SDTV D/A converter having a maximum limit of 6 MHz) and 30 MHz for HDTV D/A converters. 30 MHz is more difficult to achieve and do traceability to a NIST reference.

A PAR must be written by Michel Poulin. It has been suggested to look at other documents about frequency measurement and compare. A comment was made that in writing a standard we can either document what someone has done or lay out a standard others can build to. In addition we should check before the next meeting to see if there are better ideas for writing a standard on this. David Fibush suggested looking at templates in the various standards. Dan Baker mentioned ITU-R BT.601 templates.

Action:

- Michel to write a PAR.

P xxxx - MPEG PCR jitter measurement.

The revision of the DVB ETR-290 is about to be completed. DVB is working on the definition of PCR accuracy and PCR drift rate. Bit rate measurement is currently being worked on. Measuring bit rate of a transport stream accurately is not trivial. The document will be balloted in August. This document completion should be done within another year.

Dan Baker provided more copies of his November contribution "Recommendations for the measurement of MPEG program clock jitter, drift-rate, and frequency offset from the PCR values and their arrival time". Charts from a Tektronix presentation by Juan Navalpotro for DVB were also distributed and discussed to provide an idea of the DVB activities. Dan Baker will send electronic copy of his proposal to Doug Lung for posting on private area of the web site.

Should we adopt the whole thing as an ANSI document?. Can we write an IEEE standard from this? Dan Baker felt it can be easily done. It would not be too hard to put together a proposed document, but it may be a bit redundant based on ETR-290. There should be a measurement standard for this in our country. ETR-290 is an ETSI report, not a standard. But users may want to have a formal PCR jitter measurement

procedure. ETR-290 has a lot of other items not related for PCR jitter. Dan will get a copy of ETR-290 revision as soon as possible.

A comment was made that interest was growing in this area both from manufacturers and customers. Tests made with four different manufacturers gave four different results ranging from very good to very bad. Since there is no standard, it is difficult to pin manufacturers down. Dan Baker said it is impossible to demonstrate compliance with ISO/IEC 13818-9. Now, when transmitting MPEG data, to comply with MPEG standard we have specs on the 27 MHz clock. The ISO13818-9 document ignores drift rate. If manufacturers comply with the standard we should get the same results. Some manufacturers reference ETR-290, but don't reference the revision. Dan Baker was asked to submit simulation examples of how Tek does it.

It has been suggested we wait until ETR-290 revision is available before asking for comments on IEEE work in this area (poll interested parties, and see if manufacturers are interested in it).

Action plan:

- When the revision of ETR-290 is complete, this subcommittee will survey interested parties to determine if an equivalent IEEE standard is needed. Then a PAR will be submitted if necessary.

Review on means of electronic communication

No items

New Business

Alan Godber - report on IEEE BTS ADCOM meeting. Need to get 2.2 on RF measurement techniques started again. Looking for people in organizations that would be interested in this. Working on peak to average power ratios, transmitter performance measurements. Tek has RFA300, showed new features at NAB.

Next meeting?

August 07, 2000 in Schaumburg, IL (near Chicago)

Adjourned at 14:59