

1. Opening Remarks

The meeting opened at 9:00 am. Alvin thanked LSI for sponsoring the September meeting. Participants then made self-introductions.

2. Attendance

Mr. Mark Lettang	3M
Mr. Charles Hill	Alta Engineering
Mr. Paul von Stamwitz	AMCC
Mr. Gregory McSorley	Amphenol Interconnect
Mr. Kevin Marks	Dell, Inc.
Mr. Douglas Wagner	FCI
Mr. Elwood Parsons	Foxconn Electronics
Mr. Mike Fitzpatrick	Fujitsu
Mr. Rob Elliott	Hewlett Packard Co.
Mr. Barry Olawsky	Hewlett Packard Co.
Mr. Dan Colegrove	Hitachi Global Storage Tech.
Mr. James Rockrohr	IBM
Dr. Mark Seidel	Intel Corp.
Mr. Pak Seto	Intel Corp.
Mr. Brian Day	LSI Corp.
Mr. Michael Jenkins	LSI Corp.
Mr. George Penokie	LSI Corp.
Mr. Greg Shogan	LSI Corp.
Mr. Tom Palkert	Luxtera
Mr. Kevin Witt	Maxim Integrated Products
Mr. Galen Fromm	Molex Inc.
Mr. Jay Neer	Molex Inc.
Mr. Michael Rost	Molex Incorporated
Mr. Tim Symons	PMC-Sierra
Mr. Gourgen Oganessyan	Quellan
Mr. Alvin Cox	Seagate Technology
Mr. Benoit Mercier	STMicroelectronics, Inc.
Mr. John Hackman	TycoElectronics
Mr. Michael Fogg	TycoElectronics
Mr. Dan Gorenc	TycoElectronics
Mr. Tom Grzysiewicz	TycoElectronics
Mr. Scott Shuey	TycoElectronics
Mr. Mark Evans	Western Digital
Mr. Larry McMillan	Western Digital
Mr. Bill Pagano	Xiotech Corp.
Mr. Alan Westbury	Xyratex

36 People Present

3. Review of documents and proposals

Two groups of proposals and documents were reviewed; the first being related to SAS 2.0 and the second to SAS 2.1.

4. SAS 2.0 letter ballot resolution

4.1 SAS-2: Making [07-193r1](#) into an Annex ([08-312r3](#)) [Penokie]

This is one of two proposals to resolve letter ballot comments on how to include s-parameter files in the specification as normative information in addition to providing the background information regarding how the files were generated. Several editorial changes were made to these proposals. George updated them and the revised versions will be incorporated in the next revision of SAS 2.0.

4.2 SAS-2: Making [07-267r1](#) into an Annex ([08-313r2](#)) [Penokie]

This is the second of the two proposals mentioned above. Several editorial changes were made. There was no opposition regarding these two proposals (as updated) as the proper way to resolve the issues outlined by the letter ballot comments.

4.3 SAS 2.0 miniSAS 4x key dimensions ([08-328r0](#)) [Neer]

No additional comments were made concerning the configuration or dimensions. A question concerning the licensing was asked. The Molex position was documented in the August 28 SAS PHY conference call minutes. See [08-348r0](#) for details. Alvin will work with Jay to provide text for next week's revision of SAS 2.0.

4.4 SAS-2 RX Simulation Matlab Code (SASWDP) ([08-345r1](#)) [Jenkins]

Discussed concerns that Rob Elliott had regarding the code.

Question: For simulations of channels, we use 10^{-15} . Would that be more appropriate for this simulation too? Current software uses 10^{-12} .

Response: It's not clear what impact this would have on the measured penalty, but it is a simple thing to investigate.

Question: Should the pass band normalized to signal speed be based on the SymbolRate variable so it works properly at non-6 Gbps rates like 1.5, 3, and 12 Gbps?

Response: This could be made rate-agnostic, if the bandwidth is not expected to change with signaling speed.

Question: The assumption that the scope has a 7.5 GHz Bessel-Thomson filter seems based on the theory that the scope needs a filter at 0.75 times the rate (which for this algorithm was originally 10 Gbps Ethernet). This code seems to scale that down to $.75 \times 6$ Gbps (5.1 GHz). However, what if the filter that was present in the scope that was used to generate the .txt files was 7.5 GHz? Is it more important that the WDP code filter match the filter of the actual scope used, or that it be 0.75 times the rate? Is it important that the scope filter be 5.1 GHz rather than 7.5 GHz for SAS measurements?

Response: This is not intended to emulate the noise filter in an optical scope's front-end, which is typically a Bessel filter and not a Butterworth as used in the script. This is intended to be an anti-aliasing filter used prior to the sampling function in the reference receiver. The procedure for electrical waveform captures typically requests that scope front-end is fairly wide-open (e.g. in excess of 12 GHz). This should prevent double-counting of filter-related penalties.

4.5 Reference Receiver Solutions for SAS-2 Compliance Testing ([08-330r1](#)) [Witt]

Kevin shared the latest updates indicating this code is looking very promising. Since StatEye support has been minimal the last couple of months and issues have been exposed, this alternate software could be the solution to our simulation software deficiency. There are a few areas that need to be addressed by the group. Kevin has offered to keep a list of code improvements and Mike Jenkins will forward those to Adam, but the number of revisions should be minimized. The following items were identified:

Need to determine SAS CJTPAT differences.

Need to understand how to model RJ and DJ specs in Tx compliance test.

Need more users trying this code with real hardware. This is especially important so that Maxim is not providing the only input to specification numbers. It is in everyone's best interest to have several people working this. Not only does it provide a wider range of tested hardware, it provides additional specification review to avoid mistakes due to familiarity.

Observations:

Initial runs complete and a few issues observed.

With some work this code can serve as a Reference Rx.

With this code and some specification changes we will be able to wrap up the open technical SAS-2 compliance test Issues/comments.

Alvin will work with Kevin on the specification text.

4.6 Open letter ballot PHY comments (REFER PHYSICAL)

There were 81 remaining PHY comments to be addressed all of these except those related to SASWDP (transmitter and receiver simulation testing) were addressed.

5. SAS-2.1 topics

5.1 SAS-2 Mini SAS 8i connectors and cable assemblies ([07-449r0](#)) [Elliott]

Not discussed.

5.2 Proposal for SAS 2.1 Specification to Enable Support for Active Cables ([08-358r0](#))

[Oganessyan]

Please review this proposal along with [08-359r0](#). The SAS PHY working group will be voting on inclusion of this proposal in SAS 2.1 at the November meeting.

5.3 Validation of the Power Supply Voltage Detection Logic Circuit Proposed in [08-358r0](#) ([08-359r0](#)) [Oganessyan]

Provides data regarding the reference voltage detection circuit included in [08-358r0](#). No issues were observed from the presentation.

6. New business

None.

7. Review of Recommendations

None.

8. Meeting Schedule

Conference calls 10:00 am CDT

Tuesday Sept 23, Thursday Oct 2, 9, 16, and 23.

Toll Free Dial in Number: (877)810-9442

International Access/Caller Paid Dial In Number: (636)651-3190

PARTICIPANT CODE: 3243413

Webex information:

<https://seagate.webex.com/seagate>

Topic: SAS-2 PHY WG

Date: Thursday

Time: 10:00 am, Central Daylight Time

Meeting number: 826 515 680

Meeting password: 6gbpsSAS

9. Adjournment

The meeting was adjourned at 2:30 pm.