

Many thanks to Molex for hosting this meeting!

1. Attendance:

Mr. Mike Wingard	Amphenol
Mr. Jeremy Flake	ATL Technology
Mr. Mickey Felton	EMC
Mr. Ramez Rizk	Emulex
Mr. Paul Gentieu	Finisar
Mr. Mike Fitzpatrick	Fujitsu
Mr. Barry Olawsky	Hewlett Packard Co.
Mr. Harvey Newman	Infineon Technologies
Dr. Mark Seidel	Intel Corp.
Mr. Joel Silverman	Kawasaki Microelectronics
Mr. Michael Jenkins	LSI Logic Corp.
Mr. John Lohmeyer	LSI Logic Corp.
Mr. Jacky Chow	Marvell Semiconductor, Inc.
Mr. Kevin Witt	Maxim Semiconductor
Mr. Galen Fromm	Molex Inc.
Mr. Jay Neer	Molex Inc.
Mr. Rick Hernandez	PMC-Sierra
Mr. Edward Chang	Samsung
Mr. Alvin Cox	Seagate Technology
Mr. Benoit Mercier	STMicroelectronics
Mr. Bent Hessen-Schmidt	Synthesys Research, Inc.
Mr. Don Grillo	Toshiba
Mr. Sanjay Sethi	Toshiba
Mr. Dan Gorenc	TycoElectronics

24 in attendance

Agenda:

2. Newman:

StatEye v5 status update:

- Theory verified
 - www.stateye.org
 - Direct comparison between v5 and v4 theory shows exact correlation of basic analysis
- Equalisation implemented
 - n tap DFE
 - 2 tap FIR
- Coding Implemented
 - 8b10b coding
 - Scrambling
- Jitter Implemented
 - Pulse Width Shrinkage (Bi-modal)
 - Mid-band jitter (equivalent to v4)
- ~1 month behind original timescale due to unforeseen complexities in v5 handling of DFE
- Development website up and running
- Technical exchange with initial adoptors good
- Still solving bugs in implementation for DFE equalisation
- Final verification of results ongoing

- Initial results show ~10 to 20% improvement of vertical eye opening for given 10m cable between 8b10b over scrambling (assuming same symbol rate)
- Absolute values are not properly normalised

Bottom line is that StatEye is still having issues and continues to appear to be overly pessimistic.

3. New items:

3.1 07-366 Comments on SAS-2 Electrical Specification [Witt]

<http://www.t10.org/ftp/t10/document.07/07-366r0.pdf>

StatEye reference should not be the “gold standard”. **Agreed. Wording updated.**

Need to provide test patterns and examples. **See tables for patterns. Eye mask overview updated to move CJTPAT statement in the overview rather than the last sub clause.**

General: **Test methodologies need to be defined.**

Remove the jitter tolerance eye mask from 6G. Some other form of receiver tolerance needs to be implemented for 6G. Reference 06-496 or 06-053. **Covered by the receiver physical test.**

Need compliance channel paragraph for 6G. **Revised 5.3.3 to address this issue.**

Differential eye opening should be removed from the receiver / delivered signal spec. and moved to the reference receiver. **Will be added to the reference receiver.**

Physical test should be normative. **Working to define received signal at receiver compliance point.**

3.2 Jenkins:

- <http://www.t10.org/ftp/t10/document.07/07-333r1.pdf>
- <http://www.t10.org/ftp/t10/document.07/07-365r0.pdf>

The first is a presentation made at the recent T11 meeting on the Enhanced WDP methodology, and the 2nd applies this methodology to the 6G SAS environment. Sets up a jitter budget and where different amounts are located.

3.3 Newman: Receiver tolerance eye mask graph for sinusoidal jitter needs updating to reflect the filter change from single pole to JTF. **Lower frequency number revised.**

3.4 Olawsky: SCD 21 fails too many cables. He will work on how to revise.

4. Cox:

07-339r2 page turner

Reviewed the posted document and made a few editorial changes. Major issues addressed:

StatEye isn't working yet. Editorial change made so it doesn't sound like a golden standard.

Receiver tolerance eye mask graph for sinusoidal jitter needed updating to reflect the filter change from single pole to JTF. Lower frequency number revised.

The 6G channel requirement wasn't clearly identified. 5.3.3 divided into sub clauses and a figure added so it stands out as a requirement.

SSC jitter statement moved to appropriate locations rather than in the SSC section.

Common mode voltage limit was not changed to a flat line. This area needs work. Comments added under the figure.

Need vertical and horizontal opening requirements to meet BER added to the reference receiver description. Figure added for the reference receiver device.

Normative physical test for the 6G receiver device is being defined. Need to describe the delivered signal characteristics at IR.

Existing receiver device jitter tolerance and delivered jitter to apply to 1.5 and 3G while the physical test for 6G will cover that speed.

5. Actions:

Updated 07-339 per meeting input [Cox]

<http://www.t10.org/ftp/t10/document.07/07-339r3.pdf>

Test illustrations/descriptions [Cox, Felton]

Receiver test delivered signal [Newman, Hessen-Schmidt, Witt, Jenkins]

Cable specification update [Olawsky, Fromm, Jenkins]

Common mode voltage limit [Jenkins + anyone who can help]

StatEye updates [Newman]

Appendix material for JTF tuning [Cox]

6. Schedule:

Next conference call: 8/23/07

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 (GMT -05:00, Chicago)

Meeting number: 826 515 680

Meeting password: 6gbpsSAS