Minutes of SAS PHY Working Group conference call April 26, 2007 T10/07-207r0

Attendance:

Mr. Greg McSorley	Amphenol
Mr. Kevin Witt	Dallas Semiconductor
Mr. Mickey Felton	EMC
Mr. Ramez Rizk	Emulex
Mr. Douglas Wagner	FCI
Mr. Barry Olawsky	Hewlett Packard Co.
Mr. Rob Elliott	Hewlett Packard Co.
Mr. Harvey Newman	Infineon Technologies
Dr. Mark Seidel	Intel Corp.
Mr. Pankaj Kumar	Intel Corp.
Mr. Michael Jenkins	LSI Logic Corp.
Mr. Gabriel Romero	LSI Logic Corp.
Mr. John Lohmeyer	LSI Logic Corp.
Mr. Paul Wassenberg	Marvell Semiconductor, Inc.
Mr. John Sawdy	Merritec
Mr. Galen Fromm	Molex Inc.
Mr. Tim Symons	PMC-Sierra
Mr. Rick Hernandez	PMC-Sierra
Mr. Guillaume Fortin	PMC-Sierra
Mr. Alvin Cox	Seagate Technology
Mr. Allen Kramer	Seagate Technology
Mr. Benoit Mercier	STMicroelectonics
Mr. Kees Propstra	Tektronix, Inc.
Mr. Mahbubul Bari	Vitesse Semiconductor
Mr. Larry McMillan	WDC
Mr. Ramya Dissanayake	WDC

26 in attendance

Agenda:

Status on Face-to-face tasks:

Kevin Witt to provide an initial draft of the reference receiver description. Items include The reference receiver has a 2 tap DFE with infinite precision taps and unit interval tap spacing. The reference coefficient adaptation algorithm is the Least Mean Squared (LMS).
The receiver's return loss is illustrated in Figure xyx.
Equalized inner eye mask. (100mV vertical and .6 UI horizontal after equalization)
Bounds on tap weights (magnitude, time, sign)
Status: In process

Harvey was asked to provide access to a SAS-loaded example in version 4 of StatEye that has the reference transmitter, reference receiver, and reference channel parameters already loaded to aid users in faster simulations by allowing them to just change parameters as required for their particular set of objects rather than having to load the details of every item.
Status: Should be available by the May T10 meeting.

Channel specification (reference transmitter and reference receiver plus simulation). Need to complete the reference receiver and transmitter specifications and then make a description of how to evaluate the channel based on the reference receiver, reference transmitter, and s-parameter measurement of a channel plugged into a generic analysis tool such as StatEye.

Harvey may provide a short draft of this methodology. Also reference the update to 5.3.3 in 07-063r5.
Status: In process

Mike Jenkins to provide values for the reference transmitter return loss table.
Status: After discussing Mikes initial draft, Harvey and Mike will work together on the requirements for the reference transmitter. The return loss table may not be the proper method since it has a double counting of the connectors. May need to move to a location prior to the mated connector and be specified as such.

Physical TCTF [Bari] Mabubal to update the proposal started be Adrian. This proposal needs an update to include statistical confidence levels of test results.
Status: In process

Update on the zero-length proposal (07-013r5) [Olawsky]
http://www.t10.org/ftp/t10/document.07/07-013r5.pdf
Reviewed latest updates. Harvey warned that the measurements were the fixture only and did not include the equipment characteristics, which he has seen as worse than the values that Barry measured on the test loads.

Continue discussion of 07-063. Revision 5 has been posted. It includes added text to 5.3.3 and updates of Table 52 and Table 60. Table 60 needs particular attention as the jitter tolerance notes are based on TJ and DJ while the new electrical table has TJ and RJ. Need to continue the jitter discussion.
6G edits to 5.3.3: Reference is made to a 10e-15 BER for 6G simulation results. Although a 10e-12 target is testable and likely to be specified for the hardware numbers, is it reasonable to have the simulation targeted at 10e-15 (informative) since there are some assumptions that represent perfect performance of the reference elements?

General transmitter device requirements: Is RJ and TJ the correct way to specify transmitter jitter? Previously the jitter was specified with DJ and TJ. One issue with the new method is if RJ is very low, it allows DJ to increase to a level that may be too high. Also, RJ has been based on the BER in the past through the equation TJ = DJ + 14*RJ where RJ is a 1 sigma number. The value expressed in the table probably needs to have the multiplier referenced in a note, but this still leaves a large variation for DJ if RJ is low. Is that what we want to do? How does measurement equipment deal with this? Does this depart from MSJQ? What type is the jitter? If SATA is looking at 0.15UI for RJ, should we allow 0.18UI? Does this break expander compatibility with SATA?

Table 60 for receiver jitter tolerance was updated to include 6G. There were several issues with this. The first issue is where the numbers apply. The table heading states it is at the compliance point. The total jitter number for 6G should actually apply after the equalization within the receiver device. Rob asked about consolidation of the frequency sweep of the sinusoidal jitter across all data rates rather than having a separate range for each in SAS-2. Opinions? SAS-2 r9a has the wrong note referenced for CR 3Gbps DJ. Table 60 has DJ instead of RJ referenced. If RJ is in the transmitter specification rather than DJ, does this table even work? How should the jitter tolerance be specified for the receiver device at 6G? There are significant differences between 6G and 1.5/3.

Agenda for next week (5/3):

SAS-2: Improving a Jitter Definition (07-205) [Hill]
http://www.t10.org/ftp/t10/document.07/07-205r0.pdf
Please review prior to the call.

Continued jitter specification discussion.

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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