Minutes of SAS PHY Working Group conference call May 31, 2007 T10/07-265r0

Attendance:

Mr. Kevin Witt	Dallas Semiconductor
Mr. Kevin Marks	Dell, Inc.
Mr. Mickey Felton	EMC
Mr. Ramez Rizk	Emulex
Mr. Barry Olawsky	Hewlett Packard Co.
Mr. Dan Colegrove	HGST
Mr. Harvey Newman	Infineon Technologies
Mr. Pankaj Kumar	Intel Corp.
Mr. Michael Jenkins	LSI Logic Corp.
Mr. Paul Wassenberg	Marvell Semiconductor, Inc.
Mr. Galen Fromm	Molex Inc.
Mr. Hock Seow	NEC Electronics America, Inc.
Mr. Rick Hernandez	PMC-Sierra
Mr. Guillaume Fortin	PMC-Sierra
Mr. Alvin Cox	Seagate Technology
Mr. Allen Kramer	Seagate Technology
Mr. Daniel Smith	Seagate Technology
Mr. Bent Hessen-Schmidt	Synthesys Research, Inc.
Mr. Mahbubul Bari	Vitesse Semiconductor
Mr. Larry McMillan	WDC
Mr. Ramya Dissanayake	WDC
Mr. William Harmon	

22 in attendance

Agenda:

1. 6G SAS RX Tolerance, Reference RX & Reference TX [Jenkins]
http://www.t10.org/ftp/t10/document.07/07-259r1.pdf
Continued discussion. Mike provided an update which expanded the presentation. The terminology issues are understood. We had a rather lengthy discussion on the validity of the simulation results. Although we have seen a few examples of actual hardware transferring data through a 10-meter cable, the simulation results are pessimistic and do not indicate that the BER expectations can be achieved. One concern is that the StatEye version currently available uses a PRBS32 data pattern in its statistical analysis rather than 8b10b. Mike showed how the data pattern can significantly impact the eye diagram. Although the link below provides support for the validity of the StatEye results, there appear to be enough changes of significant impact related to the SAS system that the results of the existing StatEye version do not provide an accurate simulation. There is a general concern among the working group members that the simulation results need to be verified prior to accepting the methodology in the SAS specification. Those that can provide hardware measurements have been encouraged to do so that realistic values can be included in the specification and simulations can be verified.

http://www.stateye.org/downloads/stateye_ext_30apr04.pdf

Mike will post termination files to 20G for simulation purposes.

2. SAS-2: Improving a Jitter Definition (07-205)
http://www.t10.org/ftp/t10/document.07/07-205r0.pdf
Bent was not present at the time we were ready to discuss this topic. Feedback is needed from other measurement equipment suppliers regarding the comments below.

Comments from Bent Hessen-Schmidt, SyntheSys Research, Inc.:

I suggest that we use text equivalent to:

The Reference Clock characteristics are controlled by the resulting JTF (Jitter Transfer Function) characteristics obtained by taking the time difference between the PLL output (the Reference Clock) and the data stream sourced to the PLL. The PLL CLTF -3 dB corner frequency, and other adjustable CLTF parameters such a peaking, are determined by the value required to meet the requirements of the JTF.
The JTF shall have the following characteristics for an encoded D24.3 pattern (1100110011 0011001100). This is the MFTP which is a test pattern that has clock-like characteristics and a transition density of 0.5.
1) The -3 dB corner frequency of the JTF shall be 3 MHz +/-1 MHz.
2) The magnitude peaking of the JTF shall be 3.5 dB maximum.
3) The attenuation at 30 KHz +/-1% shall be 75 dB +/-3 dB.
The JTF -3dB corner frequency and the magnitude peaking requirements shall be measured with sinusoidal PJ applied, with a peak-to-peak amplitude of 0.3 UI +/-10%. The relative attenuation at 30 KHz shall be measured with sinusoidal phase (time) modulation applied, with a peak-to-peak amplitude of 20.8 ns +/-10%.

You will see that we have changed to from 72 db to 75 dB and from 2.1 MHz to 3 MHz and added the word “relative” to the last sentence. Relative should indicate that the 75 dB are with respect to the actual magnitude of jitter on the 30 kHz stimulus. The +/-10% therefore merely sets the starting point and still allows the other vendor. All uncertainties are then included in the +/-3 dB term. Effective tightening of the tolerances can be seen on the residual of the 30 kHz being confined to less than 5.2 ps instead of (7.4 x 1.1 x 1.1 ps = 8.95 ps).

3. SAS-2 Channel StatEye Simulation Results (07-253) [Witt]
http://www.t10.org/ftp/t10/document.07/07-253r0.pdf
Status:
* Harvey now has the 10-meter Mini SAS cable but needs the adapter boards.
* Harvey will continue to forward StatEye questions to Anthony Saunders to improve the model.
* Kevin has not had the opportunity to make additional attempts of running the simulation.

4. SAS-2 6Gbps PHY Electrical Specification
http://www.t10.org/ftp/t10/document.07/07-063r7.pdf
r7: Added transmitter common mode requirements and updated physical receiver test description. Briefly discussed the physical receiver test methodology. Alvin will add additional text indicating that the SSC mode during testing varies by application and should all possible modes for the particular application of the device under test.

5. Additional items and updates.
* 10-meter cable specification (06-499r2)
Update reviewed. The H-spice simulation of skew requirement based on s-parameter data showed little value in the skew measurement as specified (midpoint of the delivered signal in SFF-8410). This misses the timing aspect that affects the received signal eye.
* zero-length test load (07-013)
Barry will put final numbers in the presentation and Alvin and Barry how to include the requirements in the SAS specification.

No call June 7.
Next call June 14.

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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