1. Attendance:

Mr. Bernhard Laschinsky	Agere Systems
Mr. Paul von Stamwitz	AMCC
Mr. Gregory McSorley	Amphenol Interconnect
Mr. Kevin Witt	Dallas Semiconductor
Mr. Kevin Marks	Dell, Inc.
Mr. Mickey Felton	EMC Corp.
Mr. Ramez Rizk	Emulex
Mr. Douglas Wagner	FCI
Mr. David Freeman	Finisar
Mr. Paul Gentieu	Finisar
Mr. Mike Fitzpatrick	Fujitsu
Mr. Rob Elliott	Hewlett Packard Co.
Mr. Barry Olawsky	Hewlett Packard Co.
Mr. Dan Colegrove	Hitachi Global Storage Tech.
Mr. George O. Penokie	IBM Corp.
Mr. Harvey Newman	Infineon Technologies
Dr. Mark Seidel	Intel Corp.
Mr. Pak Seto	Intel Corp.
Mr. Robert Sheffield	Intel Corp.
Mr. Joel Silverman	Kawasaki Microelectronics Am
Mr. Mark Marlett	LSI Logic
Mr. Gabriel Romero	LSI Logic
Mr. John Lohmeyer	LSI Logic Corp.
Mr. Steven Schauer	LSI Logic Corp.
Mr. David Geddes	Marvell Semiconductor, Inc.
Mr. John Sawdy	Meritec
Mr. Greg Rice	Mindspeed Technologies
Mr. Galen Fromm	Molex Inc.
Mr. Hock Seow	NEC Electronics America, Inc
Mr. Michael Hopgood	Nvidia Corp.
Mr. Rick Hernandez	PMC-Sierra
Mr. Tim Symons	PMC-Sierra
Mr. Alvin Cox	Seagate Technology
Mr. Benoit MERCIER	STMicroelectonics
Mr. Stephen Finch	STMicroelectronics, Inc.
Mr. Doug Loree	Toshiba
Ms. Ashlie Fan	TycoElectronics
Mr. Mahbubul Bari	Vitesse Semiconductor
Mr. Adrian Robinson	Vitesse Semiconductor
Mr. Mark Evans	Western Digital
Mr. Larry McMillan	Western Digital

41 People Present

2. Review of documents and proposals

2.1   SAS-2 OOB and SSC [Finch]
http://www.t10.org/ftp/t10/document.07/07-058r3.pdf

Recommend for inclusion is SAS-2 (16 Y - 0 N - 7 A)

2.2   SAS-2 SMP function support for SNW-3 phy capabilities [Elliott]
http://www.t10.org/ftp/t10/document.07/07-091r0.pdf

Proposal will be updated. Goes beyond just SMP function to control PHY parameters on end devices regarding supported speeds/SSC.

2.3   SAS-2 Mini SAS 4i to SAS 4i cable assemblies with SGPIO [Olawsky and Elliott]
http://www.t10.org/ftp/t10/document.07/07-083r0.pdf

Recommend for inclusion is SAS-2 (6 Y – 0 N – 20 A)

2.4   Zero-Length Test Load Characterization [Olawsky]
http://www.t10.org/ftp/t10/document.07/07-013r4.pdf

Fixture de-embedding by estimation from Nyquist may be sufficient. Need to determine if return loss effects allow this assumption to be true.

3. New Business

3.1   SAS-2 10-meter miniSAS cable specification [Fromm, Olawsky]
No update yet.

3.2   Type 1 Vs. 2 [Newman]
http://www.t10.org/ftp/t10/document.07/07-045r0.pdf

Review conducted. Previously presented on conference call.
"Hershey kiss" SSC profile would theoretically require a type 3, however, the error using a type 2 does not amount to enough to warrant a type 3.
Maybe need a specification for instantaneous SSC frequency variation.
SATA makes an average of measurements made over 10 cycles of the SSC profile to determine jitter.
ST Microelectronics has done some work in this area that will be presented to T10 in the near future.
Additional information needed to finish the transmitter jitter specification.

3.3 StatEye Tap Defined [Newman]
http://www.t10.org/ftp/t10/document.07/07-135r0.pdf

Basically, it is an infinitely adjustable, bounded tap.
Discussed what does the performance requirement actually mean so that the reference receiver performance can be used for receiver design as well as channel compliance testing.
Kevin Witt agreed to post a proposal with a description of the reference receiver tap characteristics.

3.4   Return loss measurement methodology discussion [Bari]
http://www.t10.org/ftp/t10/document.07/07-071r2.pdf

Updated version reviewed. A maximum reflected energy into the transmitter was defined based on the maximum transmit voltage swing and the return loss requirement. Alvin will incorporate into 07-063. This proposal also updates information in Annex B regarding S parameters.

3.5   SAS-2 Far-end loopback phy test functions [Elliott]
http://www.t10.org/ftp/t10/document.07/07-119r0.pdf

Analog loopback mode will be deleted. It makes no sense to send a closed eye back through the channel plus the circuitry would increase jitter and power.
Many questions as to the value of a common handle for a test set that is only for lab use with other test modes already available.
Steve Finch argued that the plug/unplug/plug mode is not a valid concept due to training to the transmitter originally trained to although SATA I using this test and trying to swap cables while in the mode to perform interop testing.
Since analog loopback is being deleted, this proposal will go to the protocol group.
The full path needs to be specified as to what happens to the signal going in and what processing is expected prior to coming out as transmitted data. Discussion also lead to clarification that the data would be valid 8b/10b characters.

3.6   SAS-2 Receiver Compliance Proposal [Robinson]
http://www.t10.org/ftp/t10/document.07/07-134r0.pdf

Questioned whether or not the .5 m miniSAS cable is worth including as a testing vehicle.
General indication was that the higher loss loads were sufficient.

3.7   SAS-2 Test Methodology [Newman]
http://www.t10.org/ftp/t10/document.07/07-112r0.pdf

Need to identify measured and simulated traces.
Need BERT contours in eye simulations.
Need to look at line-by-line of transmitter zero length tests to see which ones might be eliminated as covered in the TCTF simulation test.
Simulations based on S parameter data look very promising to be included in testing.

3.8   SAS-2 6Gbps PHY specification [Cox]
http://www.t10.org/ftp/t10/document.07/07-063r2.pdf

Transmitter emphasis measurement: Not practical to use mode for the Vpk-pk for some equipment. Need to base the value on a peak voltage obtained while getting the 1000 – 2000 hits for the Vvma mode value.
Some concern voiced over bi-modal readings during some test conditions. Alvin will update the proposal based on concern voiced

Alvin also indicated that the receiver transmitter and channel specification should probably be dealt with on separate proposals.

3.9 SAS-2 Transmitter De-Emphasis Measurement [Johnson, Bari]
http://www.t10.org/ftp/t10/document.07/07-120r0.pdf

Reviewed as input to the transmitter equalization text in 07-063.

3.10 Mark Marlett presented a T11 document dealing with jitter. Reference:
http://www.t11.org/ftp/t11/pub/fc/pi-4/07-084v0.pdf

4. Review of Recommendations

4.1 SAS-2 OOB and SSC ([07-058r3](#)) [Finch]
Recommend for inclusion is SAS-2 (16 Y – 0 N – 7 A)

4.2 SAS-2 Mini SAS 4i to SAS 4i cable assemblies with SGPIO ([07-083r0](#)) [Olawsky and Elliott]
Recommend for inclusion is SAS-2 (6 Y – 0 N – 20 A)

5. Meeting Schedule

5.1 Weekly teleconferences scheduled for Thursdays at 10 am CDT:
There will not be calls on 4/12 or 4/19.

PARTICIPANT INFORMATION:

Toll Free Dial in Number: (866) 279-4742
International Access/Caller Paid Dial In Number: (309) 229-0118

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

5.2 Interim face-to-face meeting planned for Houston on 4/17 (all day) and 4/18 (morning).
Possible joint meeting with protocol working group early afternoon on 4/18, depending on need.

6. Adjournment
The meeting was adjourned at 5:25 pm