

Unapproved Minutes

IEEE 802.3 400 Gb/s Ethernet Study Group

Plenary Meeting

Jan 20 - 21

Indian Wells, CA, USA

Prepared by Ghani Abbas

Chair called IEEE 802.3 400 Gb/s Study Group Interim meeting to order at 8.30 am, Monday, Jan 20.

Chair appointed Ghani Abbas to be a Recording Secretary for the meeting.

- Introductions – Everyone introduced themselves and stated their affiliation.

Agenda & General Information

By – John D'Ambrosia

See - http://www.ieee802.org/3/400GSG/public/14_01/agenda_400_01_0114.pdf

Chair reviewed the agenda.

Motion #1: Move to approve the agenda

Moved by: Brad Booth

Second by: Steve Trowbridge

Results: Approved by voice vote without opposition

Motion # 2: Move to approve Nov 2013 Minutes

Moved by: Dan Dove

Second by: Steve Carson

Results: Approved by voice vote without opposition

Chair asked if there were any reporters in the room. Dale Murray stated that he will be doing synopsis of the meeting using public available information. No reporters in the room. John D'Ambrosia noted he talks with press but will only disclose high level details available from published meeting minutes.

Chair continued with the introductory presentation IEEE Structure, Bylaws & Rules. Chair read the Guidelines for IEEE-SA meetings. Chair gave an overview of the 802.3 Standards Process and emphasized the need to work on project documentation – Objectives, 5 Criteria, PAR.

Goals for the meeting:

- Hear presentations related to objectives and 5 Criteria.
- Consensus on Objectives, PAR, 5 Criteria.
- Approve requesting IEEE 802.3 WG submit project documentation.
- Lay the ground work for the next meeting.

Liaisons

Assigned by IEEE 802.3 WG Chair to IEEE 802.3 400GbE SG @ Nov Plenary.

Liaison #1: ISO/IEC JTC1/SC25 WG3 – Status of the Standards for the support of parallel SMF, see

http://www.ieee802.org/3/minutes/nov13/incoming/25N2202_LiaisonRep_toIEEE_parallelOF.pdf

Alan Flatman reviewed the above liaison, which asks if IEEE802.3 have any specific requirements relating to this topic. Prior to the meeting, via the reflector, the chair appointed Alan to lead an ad hoc group to develop a response to this liaison. Alan will bring the proposed response back during closing business on Tuesday.

Presentation # 1

Title: Technical Feasibility Ad hoc

Presented By –Steve Trowbridge

See - http://www.ieee802.org/3/400GSG/public/14_01/trowbridge_400_01_0114.pdf

Discussion:

No comment

Presentation # 2

Title: Economic Feasibility Ad hoc

Presented By –Andy Moorwood

See - http://www.ieee802.org/3/400GSG/public/14_01/moorwood_400_01a_0114.pdf

Discussion:

No comment.

The chair stated that he will extend the Economic Feasibility ad hoc work till March 2014 meeting.

Presentation # 3

Title: Applications Ad hoc

Presented By –John D’Ambrosia

See - http://www.ieee802.org/3/400GSG/public/14_01/dambrosia_400_01_0114.pdf

http://www.ieee802.org/3/400GSG/public/14_01/dambrosia_400_02_0114.pdf

Discussion:

No comment

Presentation # 4

Title: Economic Feasibility of 400G Ethernet MAC/PCS/FEC/PMA

Presented By – Mike Peng Li

See - http://www.ieee802.org/3/400GSG/public/14_01/li_400_01a_0114.pdf

Discussion:

It was stated that user logic is used. Current FPGA allows for at least one 400G port but for future greater density is very likely, perhaps 10 ports.

Presentation # 5

Title: Economic Feasibility of 400G Ethernet MAC/PCS/FEC

Presented BY – Mark Gustlin

See - http://www.ieee802.org/3/400GSG/public/14_01/gustlin_400_01a_0114.pdf

Discussion:

It was stated that the interface to the optics is 16X25G.

Presentation # 6

Title: Maximizing the cost advantage of Ethernet by considering future generations of 400GE

Presented BY – Yoshiaki Sone

See - http://www.ieee802.org/3/400GSG/public/14_01/sone_400_01_0114.pdf

Discussion:

It was stated that it is not the intention to add 40km to the objective to the project. This is for future work.

Presentation # 7

Title: Technical Feasibility of Bit multiplexing in 400GbE PMA

Presented BY – Tongong Wang

See - http://www.ieee802.org/3/400GSG/public/14_01/wang_400_01a_0114.pdf

Discussion:

Questions raised on slides 5, 8 and 9. Further investigation work is needed. On slide 12, clarification sought for what meant by different DFE architecture.

Break at 10.35

Reconvened at 10.58

Presentation # 8

Title: Considering 2 km and 10 km Architectural Alternatives

Presented By – Dan Dove

See - http://www.ieee802.org/3/400GSG/public/14_01/dove_400_01a_0114.pdf

Discussion:

Questions were raised regarding the cost comparison on slide 18.

Break for Lunch 11.45
Reconvened at 13.15

Presentation # 9

Title: Feasibility for 10km SMF PMD

Presented By: Xu Yu

See - http://www.ieee802.org/3/400GSG/public/14_01/xu_400_01a_0114.pdf

Discussion:

A question was raised on slide 10 regarding 1E-13 BER. The author was requested to check bj FEC and update the slide

Presentation # 10

Title: 400Gb/s SMF PMD Technical Feasibility

Presented By: Chris Cole

See - http://www.ieee802.org/3/400GSG/public/14_01/cole_400_01_0114.pdf

Discussion:

Test results were sought to back up the 50G NRZ. Questions raised on slide 6 addressing the alternative comparison.

Presentation # 11

Title: Economic feasibility of Multi-Fiber PMDs

Presented By – Tom Palkert

See - http://www.ieee802.org/3/400GSG/public/14_01/palkert_400_02_0114.pdf

Discussion:

Presentation # 12

Title: Economic Feasibility of multi-fiber lane connectors

Presented By – Tom Palkert

See - http://www.ieee802.org/3/400GSG/public/14_01/palkert_400_03_0114.pdf

Discussion:

Presentation # 13

Title: Passive Copper Cable Objective for 400 GbE

Presented By – Tom Palkert

See - http://www.ieee802.org/3/400GSG/public/14_01/palkert_400_04_0114.pdf

Discussion:

Slide 6, which shows an application in Ethernet core switch with 100G ports, was clarified.

Presentation # 14

Title: Need for 400GbE breakout

Presented By – Tom Palkert

See - http://www.ieee802.org/3/400GSG/public/14_01/palkert_400_01_0114.pdf

Discussion:

Questions were raised on slide 11 as whether BMP can be achieved without breakout applications.

Break at 15.15

Reconvened at 15.43

Presentation # 15

Title: Proposed CSD

Presented By – John D'Ambrosia

See - http://www.ieee802.org/3/400GSG/public/14_01/dambrosia_400_03_0114.pdf

Discussion:

The chair reviewed the above document and highlighted the changes and the required input to complete the document. Edits were done on the BMP slide. (File saved as

http://www.ieee802.org/3/400GSG/public/14_01/dambrosia_400_03a_0114.pdf

Straw Poll # 1

I support the BMP response in dambrosia_400_03a_0114.

Y- 76 N- 0 A- 7

The meeting broke at 16.50

Tuesday, Jan 21, 2014

The chair reconvened the meeting at 8:40

The Chair read the Guidelines for IEEE-SA meetings again and introduced the work plan for the day.

Presentation # 16

Title: Evolution of 400 GbE PMD and Signaling

Presented By – Ali Ghiasi

See - http://www.ieee802.org/3/400GSG/public/14_01/ghiasi_400_01_0114.pdf

Discussion:

The author was requested to send an update for his slides, based on corrections made during presentation.

Presentation # 17

Title: Opportunities for PAM-4 Modulation

Presented By – Xiaolu Song

See - http://www.ieee802.org/3/400GSG/public/14_01/song_400_01_0114.pdf

Discussion:

No comment

Presentation # 18

Title: Technical feasibility of DMT for 400GbE SMF transmission

Presented By – Tomoo Takahara

See - http://www.ieee802.org/3/400GSG/public/14_01/takahara_400_01_0114.pdf

Discussion:

A question was raised on latency values which were not available. Questions on a multi-vendor interworking and power budget were also raised.

Presentation # 19

Title: 4x100GE through 2 and 10km SMF Using DMT and 1.3um LAN-WDM EMLs

Presented By – Winston Way

See - http://www.ieee802.org/3/400GSG/public/14_01/way_400_01a_0114.pdf

Discussion:

It was stated that the modulation index is 3-4% optimized.

Break at 10.00 am

Reconvened at 10.27 am

Presentation # 20

Title: Technical feasibility of CMOS DMT transceiver for 400GbE SMF transmission

Presented By – Ian Dedic

See - http://www.ieee802.org/3/400GSG/public/14_01/bower_400_01a_0114.pdf

Discussion:

A question raised on slide 4 regarding the dye size. It was stated for 28nm, it is about 100sq. nm.

Presentation # 21

Title: Proposal of new 400GbE Signaling Formats with 4λ x 100G Configuration

Presented By – Riu Hirai

See - http://www.ieee802.org/3/400GSG/public/14_01/bower_400_01a_0114.pdf

Discussion:

Question raised on slide 5 regarding the proposed modulation scheme.

Presentation #22

Title: Optical Module Power Estimates for 400GbE

Presented By – Scott Kipp

See - http://www.ieee802.org/3/400GSG/public/14_01/kipp_400_01_0114.pdf

Discussion:

The author was requested to provide the reference to the 4.5 W module on slide 3 and address the comments made on the reflector.

Presentation # 23

Title: Technical feasibility of 400G copper interconnects

Presented By – Mark Bugg

See - http://www.ieee802.org/3/400GSG/public/14_01/bugg_400_01a_0114.pdf

Discussion:

New data on the cable was provided on the slides after they have been uploaded. The chair asked the meeting if it is acceptable to present the new data, there was no objection. An update to the slides will be uploaded

Presentation # 24

Title: 56Gbps/ch Connector Capability on CFP2 Connector

Presented By – Takeshi Nishimura

See - http://www.ieee802.org/3/400GSG/public/14_01/nishimura_400_01_0114.pdf

Discussion:

A comment was made that the measurement should be taken up to 75-8- GHz to capture the 3rd harmonic. Also it would be useful to show time measurements too.

Lunch Break at 11.58

Reconvened at 13.40

Tom Palkert gave a short presentation of the updated presentation No. 13 titled “Passive Copper Cable Objective for 400 GbE” where new supporters were added.

See - http://www.ieee802.org/3/400GSG/public/14_01/palkert_400_04a_0114.pdf

Straw Poll # 2

I support the objective “Define a 400Gb/s PHY for operation over links consistent with copper twin-axial cables with a total channel insertion loss of $\leq 35\text{dB}$ at 12.9GHz”

Y 23 N 24 A 36

Motion # 3 Time : 14.35

Move to adopt the responses to the PAR as shown in dambrosia_400_04_0114.pdf

- M: Peter Anslow
- S: Steve Trowbridge
- Technical ($\geq 75\%$)
- All in room (y/n/a): 67/0/3
- Result: Pass

Break at 15.00

Reconvened at 15.23

Andy Moorwood will upload an updated version of the "Economic Feasibility" file (moorwood_400_01b_0114.pdf). The updated file is based on the discussion and presentations made during this meeting. Based on this review, it was felt that supporting material was adequate for responses to economic feasibility criteria. There will be no additional economic feasibility ad hoc meetings.

Motion # 4 Time : 16.13

Move to adopt the CSD ("Managed Objects" & "5 Criteria") as shown in dambrosia_400_03b_0114.pdf.

- M: Steve Trowbridge
- S: Peter Stassar
- Technical ($\geq 75\%$)
- All in room (y/n/a): 56/0/0
- Result: Pass

Motion # 5 Time : 16.45

Move that IEEE 802.3 400 Gb/s Ethernet Study Group approve the text in flatman_400_01_0114.pdf with an editorial license granted to the Chair (or his appointed agent) as an informal communication by the Chair to ISO/IEC JTC1/SC 25 WG3.

- M: Alan Flatman
- S: Peter Anslow
- Procedural ($> 50\%$)
- Result: Motion approved by voice vote without opposition.

The chair expressed his thanks to Andy Moorwood, Steve Trowbridge and Alan Flatman for leading the various ad hoc groups.

Straw Poll # 3

Plenary meeting 16th., March 2014 Beijing

- I will attend: 31
- I will probably attend: 7
- I will probably not attend: 14
- I will not attend: 8

Interim Meeting 12th., May, 2014 – Norfolk, VA, USA

- I will attend: 48
- I will probably attend: 13
- I will probably not attend: 1
- I will not attend: 0

Motion # 6 Time: 16.45

Move to: adjourn

- M: Ghani Abbas
- S: Scott Kipp
- Procedural (>50%)
- Result: Passed by voice vote without opposition.

The meeting was adjourned at 16.45

IEEE 802.3 400GbE Study Group			1/20/2014	1/21/2014
Last Name	First Name	Employer / Affiliation	Mon	Tues
Abbas	Ghani	Ericsson, UK	x	x
Abbott	John	Corning	x	x
Anslow	Pete	Ciena Corporation	x	x
Baldwin	Thananya	Ixia	x	x
Bhoja	Sudeep	Inphi		x
Bliss	Will	Broadcom	x	
Booth	Brad	Microsoft	x	x
Bower	Patricia	Fujitsu	x	x
Brown	David	Semtech	x	x
Brown	Matt	Applied Micro	x	
Bugg	Mark	Molex		x
Carlson	Steve	HSD	x	
Carroll	Martin	Verizon	x	
Chang	Xin	Huawei	x	x
Chen	Henry	Broadcom	x	x
Cheng	Wheling	Juniper Networks	x	x
Cole	Chris	Finisar	x	x
D'Ambrosia	John	Dell	x	x
Dawe	Piers	Mellanox	x	x
Dedic	Ian	Fujitsu Semiconductors	x	x
Donahue	Curtis	UNH-IOL	x	
Dove	Dan	Dove Networking Solutions (DNS)	x	x
Dudek	Mike	QLogic	x	
Farhoodfar	Arash	Cortina Systems	x	x
Flatman	Alan	LAN Technologies	x	x
Folkens	Norbert	JDSU	x	x
Furlong	Michael	Clariphy Communications	x	x
Ghiasi	Ali	Ghiasi Quantum		x
Grow	Bob	RMG Consulting	x	x
Gustlin	Mark	Xilinx	x	x
Healey	Adam	LSI	x	
Hirai	Riu	Hitachi	x	x
Holden	Brian	Kandou Bus	x	x
Isono	Hideki	Fujitsu Optical Components	x	x
Issenhuth	Tom	Microsoft	x	x
Jackson	Kenneth	Sumitomo	x	x
Jewell	Jack	Independent	x	x
Jiang	Wenbin	Cosemi	x	x
Kaku	Shineyo	Allied Telesis	x	x
Kelsen	Michael	Time Warner Cable	x	
Kimmitt	Myles	Emulex		x
Kipp	Scott	Brocade		x
Kojima	Keisuke	Mitsubishi Electric Res. Lab	x	x

Kolesar	Paul	CommScope	x	x
Lane	Brett	Panduit Corp.	x	x
Langhammer	Martin	Altera	x	x
Latchman	Ryan	MACOM	X	X
Laubach	Mark	Broadcom	X	
Law	David	HP	X	X
Lewis	Dave	JDSU	X	X
Li	Mike	Altera	X	X
Little	Paul	Fujitsu Semiconductors	x	
Liu	Zhenyu	Marvell Semiconductor	x	
Maki	Jeffery	Juniper Networks	X	X
Marlett	Markus	Inphi	x	x
McDermott	Tom	Fujitsu	X	X
McDonough	John	NEC America	X	X
Mei	Richard	Commscope	X	X
MohaJen	Hessam	Ensphere	X	X
Mooney	Paul	Spirent Communications	X	X
Moorwood	Andy	Infinera Corp	X	X
Muir	Ron	JAE		X
Murray	Dale	Light Counting	X	X
Nakamoto	Edward	Spirent Communications	X	X
Nicholl	Gary	Cisco		X
Nishimura	Takeshi	Yamaichi Electronics	X	X
Ofelt	David	Juniper Networks	X	X
Ogura	Ichiro	Petra	X	X
Palkert	Tom	Luxtera	X	X
Park	Moon	OE Solutions	x	x
Parthasarathay	Vasudevan	Broadcom	X	X
Pepper	Gerald	Ixia	X	X
Petrilla	John	Avago Technologies	X	X
Rabinovich	Rick	Alcatel-Lucent	X	X
Rao	Ram	Oclaro	X	X
Sambasivan	Sam	AT&T	X	X
Shanbhag	Megha	TE Connectivity	X	X
Shang	Song	Semtech	X	
Shrikhande	Kapil	Dell		X
Smith	Brad	MO	X	
Sommers	Scott	Molex	X	X
Sone	Yoshiaki	NTT	X	X
Song	Haoyu	Huawei	X	X
Song	Xiaolu	Huawei	X	X
Sparrowhawk	Bryan	Leviton		X
Stassar	Peter	Huawei	X	X
Szeto	William	Xtera	X	X
Tajima	Akio	NEC Corporation	X	

Takahara	Tomoo	Fujitsu Laboratories	X	X
Takahata	Kiyoto	NTT	X	X
Timmins	Ian	Optical Cable Corp.		X
Tooyserkani	Pirooz	Cisco	X	X
Toyoda	Hidehiro	Hitachi	X	X
Tracy	Nathan	TE Connectivity	X	X
Trowbridge	Steve	Alcatel-Lucent	X	X
Ulrichs	Ed	Source Photonics	X	X
Vallance	Ryan	Nano Precision Prod	X	X
Vanderlaan	Paul	Nexans		X
Vareljian	Albert	Independent	x	x
Wang	Robert	Intel	x	x
Wang	Tongtong	Huawei	x	x
Wang	Xinyuan	Huawei	x	x
Wang	Zhongfeng	Broadcom	x	x
Way	Winston	NeoPhotonics	x	x
Welch	Brian	Luxtera	x	x
Wong	Henry	Huawei		x
Wu	Peter	Marvell Semiconductor	x	
Xu	Yu	Huawei	x	x
Zambell	Andrew	FCI	x	x