

Unapproved Minutes  
**IEEE 802.3 400 Gb/s Ethernet Study Group**  
Plenary Meeting  
Nov 12 - 14  
Dallas, TX, USA  
Prepared by Ghani Abbas  
Motions (Thursday) by Kent Lusted

Chair called IEEE 802.3 400 Gb/s Study Group Interim to order at 9.00 am, Tuesday, Nov 12.

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/13\\_11/agenda\\_400\\_01a\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/agenda_400_01a_1113.pdf)

Chair reviewed the agenda.

#### **Motion #1:** Move to approve the agenda

Moved by: John McDonough

Second by: Mark Gustlin

Results: Approved by voice vote without opposition

#### **Motion # 2:** Move to approve Sept 2013 Minutes

Moved by: Mark Gustlin

Second by: Thananya Baldwin

Results: Approved by voice vote without opposition

Chair asked if there were any reporters in the room. 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.

### **Liaisons**

Assigned by IEEE 802.3 WG Chair to IEEE 802.3 400GbE SG

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

As the above group is not meeting until Feb., 2014, it was agreed to respond to them in the interim meeting in Jan., 2014.

### **Presentation # 1**

Title: Applications Ad Hoc Update

Presented By – John D'Ambrosia

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/dambrosia\\_400\\_02\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/dambrosia_400_02_1113.pdf)

#### Discussion:

No comment.

### **Presentation # 2**

Title: Logic Ad Hoc Update

Presented By – Mark Gustlin

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/gustlin\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/gustlin_400_01_1113.pdf)

#### Discussion:

No comments.

### **Presentation # 3**

Title: Considerations on the Telecom Application for 400GbE

Presented By – Xiaolu Song

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/song\\_x\\_400\\_01a\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/song_x_400_01a_1113.pdf)

#### Discussion:

A comment on slide 6 regarding the breakdown of the various reaches was made. A question raised on slide 8 regarding the 4dB maximum loss. It was stated that perhaps 5 dB is needed.

Break at 09.55

Reconvened at 10.20

### **Presentation # 4**

Title: 400GbE: Perspective from China Service Provider

Presented By – Xin Chang

See (updated file)- [http://www.ieee802.org/3/400GSG/public/13\\_11/chang\\_400\\_01a\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/chang_400_01a_1113.pdf)

#### Discussion:

A question was raised about the deployment of 100G LR4 & ER4 in the Chinese carriers' networks. The author stated that some have been deployed and in 2020 40km/400G (slide 8) might be deployed.

The author was requested to update the last slide to indicate a single pair of fibre rather than a single fibre and update slide 7 to specify the actual companies intended.

A question on slide 6 regarding the bandwidth growth was raised. The author stated that such growth is likely to continue with the deployment of 4G.

### **Presentation # 5**

Title: Global Networking Services - Objectives to Support Cloud Scale Data Center Design

Presented By – Brad Booth

See (updated file) - [http://www.ieee802.org/3/400GSG/public/13\\_11/booth\\_400\\_01a\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/booth_400_01a_1113.pdf)

#### Discussion:

The author was requested to upload the updated slides with the updated list of supporters.

A question was raised on the 2km (slide 5) and 20m (slide 12) reaches which were clarified.

However, it was stated that other DCs require more loss budget (slide 12).

The author indicated that slide 11 applies to a single Data Centre (DC) and the refresh is continuous in all DCs and if technology A proves cost effective earlier it will be deployed rather than technology B.

Break at 12.00

Reconvened at 13.15

### **Presentation # 6**

Title: Passive Copper Objectives for 400GbE

Presented By – Tom Palkert

See (updated file)- [http://www.ieee802.org/3/400GSG/public/13\\_11/palkert\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/palkert_400_01_1113.pdf)

#### Discussion:

The author was requested to upload updated slides correcting slide 4 to indicate 16-lane 400Gb/s PHY.

A question was raised regarding the number of lanes. Some thought that the number of lanes should not be part of the objectives.

Slide 5 regarding defining two PHYs was questioned.

### **Presentation # 7**

Title: MMF Objective for 400GbE

Presented By – Jack Jewell

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/jewell\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/jewell_400_01_1113.pdf)

#### Discussion:

It was stated that linear extrapolation as indicated in slide 18 is risky. Slide 22, 400GE MMF objectives, the statement highest volume and lowest cost was questioned. Having 16 pair mmf fibres were questioned and effort should be made to reduce the fibre count.

## **Presentation # 8**

Title: 500m Single Mode Objective for 400GbE

Presented By – Tom Palkert

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/palkert\\_400\\_02\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/palkert_400_02_1113.pdf)

### Discussion:

Questions raised on the 5C and Compatibility slides. Since the 802.3bm group could not reach consensus on the 500m SMF objective, perhaps more data is needed to accept this as an objective for 400GE.

## **Presentation # 9**

Title: Applications and PMD Objectives for this 400GbE project

Presented By – Gary Nicholl

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/nicholl\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/nicholl_400_01_1113.pdf)

Break at 15.07

Reconvened at 15.26

### Discussion:

Questions were raised on slide 11 regarding 100G LR4 deployment and 100G-SR10 deployment slide 12. The author clarified that slide 10 indicated what Cisco shipped over the last three years. However CR10 may have been used during testing.

## **Presentation # 10**

Title: Early Market PMD Types for: Core Router to Transport interconnect and Router to Router interconnect

Presented By – Andy Moorwood

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/moorwood\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/moorwood_400_01_1113.pdf)

### Discussion:

Questions were raised on slide 6.

## **Presentation # 11**

Title: 400Gb/s PMD Objectives Considerations

Presented By – Chris Cole

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/cole\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/cole_400_01_1113.pdf)

### Discussion:

The author was requested to correct slides 6 and 7 and upload updated slides. Questions were raised on slides 7 regarding 50G signaling.

Mark Gustlin took over as chair while John D'Ambrosia presented.

### **Presentation # 12**

Title: Breakout Functionality

Presented By – John D'Ambrosia

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/dambrosia\\_400\\_01a\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/dambrosia_400_01a_1113.pdf)

#### Discussion:

It was stated that if a breakout functionality objective is agreed we should specify the breakout rates. However, some concern was expressed that such an objective could be restrictive and may constrain some solutions.

John D'Ambrosia took the chair again.

### **Presentation # 13**

Title: SMF PMD Objective Modulation Alternatives Technical Feasibility

Presented By – Ilya Lyubomirsky

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/lyubomirsky\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/lyubomirsky_400_01_1113.pdf)

#### Discussion:

The 16GHz bandwidth on slide 4 and the assumptions used in the analysis were questioned. Due to shortage of time the chair requested that discussion should be taken offline to build consensus.

The meeting broke at 18.00

### **Wednesday 13<sup>th</sup>, Nov., 2013.**

The chair reconvened the meeting at 9.05

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

### **Presentation # 14**

Title: Meeting Objectives

Presented By – Adam Healey

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/healey\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/healey_400_01_1113.pdf)

#### Discussion:

Adam gave a presentation for developing objectives and showed an example of the HSSG (10GE) Objectives.

### **Presentation # 15**

Title: Objective format for the 400G project

Presented By – Peter Anslow

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/anslow\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/anslow_400_01_1113.pdf)

### Discussion:

Questions were raised regarding including loss as well as reach in the objectives. It was stated that including loss identifies applications. Although loss and applications can be included during presentations rather than in the objectives.

Break at 09.55  
Reconvened at 10.15

### **Presentation # 16**

Title: Error performance objective for 400GbE

Presented By – Peter Anslow

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/anslow\\_400\\_02\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/anslow_400_02_1113.pdf)

### Discussion:

Questions raised on slide 8 regarding whether there is a preference to BER or FLR for inclusion in the objectives. It was stated it would be clearer to include both in the objectives.

### **Straw Poll # 1**

The format for the 400G error performance objective I support is:

- a) Support a BER of better than or equal to  $10^{-x}$  at the MAC/PLS service interface (or the frame loss ratio equivalent of better than  $6.2 \times 10^{-y}$  for 64-octet frames)
- b) Support a BER of better than or equal to  $10^{-x}$  at the MAC/PLS service interface (or the frame loss ratio equivalent)
- c) Support a BER of better than or equal to  $10^{-x}$  (or equivalent) at the MAC/PLS service interface
- d) None of the above

Results: a- 46 b- 43 c- 15 d- 3  
Room count : 129

### **Straw Poll # 2**

The format for the 400G error performance objective I support is:

- a) Support a BER of better than or equal to  $10^{-x}$  at the MAC/PLS service interface (or the frame loss ratio equivalent of better than  $6.2 \times 10^{-y}$  for 64-octet frames)
- b) Support a BER of better than or equal to  $10^{-x}$  at the MAC/PLS service interface (or the frame loss ratio equivalent)

Results: a- 45 b- 53

### Straw Poll # 3

I support an error performance objective for 400G PHYs that is equivalent to a BER of (Chicago rules):

- a) 1E-12
- b) 1E-13
- c) 1E-14
- d) 1E-15
- e) 1E-17
- f) Undecided

Results: a- 32 b- 54 c- 10 d- 30 e- 5 f- 11

Those who voted for option (d) only.

Are you targeting telecom Ethernet applications? Yes 11

### Straw Poll # 4

I support an error performance objective for 400G PHYs that is equivalent to a BER of:

- a) 1E-12
- b) 1E-13
- c) 1E-14
- d) 1E-15
- e) 1E-17
- f) Undecided

Results: a- 24 b- 51 c- 0 d- 26 e- 0 f- 4

### Presentation # 17

Title: Bandwidth Growth Vehicular Ethernet

Presented By – Steve Carlson

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/carlson\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/carlson_400_01_1113.pdf)

#### Discussion:

It was noted that no response to the July 13 Informal Communication to IEEE802.11 had been received yet.

### Presentation # 18

Title: A 400GbE PCS Option

Presented By – Mark Gustlin

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/gustlin\\_400\\_02\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/gustlin_400_02_1113.pdf)

#### Discussion:

A question raised of what does this mean to OTN.

Break at: 12.00  
Recovered: 13.15

### **Presentation # 19**

Title: 400GbE PCS Direct Coding Analysis

Presented By – Haoyu Song

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/song\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/song_400_01_1113.pdf)

#### Discussion:

No comment.

### **Presentation # 20**

Title: Technical Feasibility of 400GE Architecture with Stronger FEC

Presented By – *Tongtong Wang*

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/wang\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/wang_400_01_1113.pdf)

#### Discussion:

No comment.

### **Presentation # 21**

Title: 400G Optical Transceivers - Economic Comparisons in Silicon Photonics

Presented By – Brian Welch

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/welch\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/welch_400_01_1113.pdf)

#### Discussion:

Questions raised on slides 8 and 5 regarding PSM16 and PSM8 cost comparison, form factors and power.

### **Presentation # 22**

Title: Considerations on Optical 400GbE DMT

Presented By – Toshiki Tanaka

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/tanaka\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/tanaka_400_01_1113.pdf)

#### Discussion:

The author indicated that the current power consumption is 24 watts and the target is 14 watts

### **Presentation # 23**

Title: Advance Modulation of 400GE (4x100)

Optical Transport

Presented By – Charlie Chen

See - [http://www.ieee802.org/3/400GSG/public/13\\_11/chen\\_400\\_01\\_1113.pdf](http://www.ieee802.org/3/400GSG/public/13_11/chen_400_01_1113.pdf)



### Discussion:

A question raised on slide 4 regarding the use of SR trade mark. Also a question was raised on the tag line on slide 1. On slide 5 the channels are 25GHz each.

Room count: 122

### **Straw Poll # 5**

Interim Meeting Jan., 2014 – Indian Wells, CA

I will attend : 63

I will probably attend: 33

I will probably not attend: 11

I will not attend: 6

### **Plenary meeting 16<sup>th</sup>, March 2014 Beijing**

I will attend : 45

I will probably attend : 21

I will probably not attend : 30

I will not attend : 12

Break at 14.50

Recovered at 15.22

The Chair noted that the results of the strawpoll would be used to drive Thursday's agenda.

### **Straw Poll # 6**

I would support an objective targeting a reach of (Chicago Rule):

a. At least 5m over copper twin-axial cables

b. Backplane application

c. At least 100m over MMF

d. At least 500m over SMF

e. At least 2km over SMF

f. At least 10km over SMF

g. At least 40km over SMF

h. No PMDs

i. Undecided

Results: a- 25 b- 26 c- 74 d- 87 e- 94 f- 63 g- 14 h- 1 i- 0

Room Count : 130

### **Straw Poll # 7**

I would support the objective format - provide physical layer specifications which support link distances of:

- At least Y km of SMF
- At least X m of MMF

Results : Y 100 N 6 A 5

Mark Gustlin took over as chair during Straw Poll #8

### **Straw Poll # 8**

I would support the objective:

Provide appropriate support for breakout functionality

Results: Y 55 N 39 A 14

John D'Ambrosia assumed the chair again and made closing comments.

The meeting broke at 17.12

Thursday 14<sup>th</sup>, Nov., 2013

The chair reconvened the meeting at 09.12

Chair read the Guidelines for IEEE-SA meetings.

The Chair appointed Kent Lusted to record today's motions and Ghani Abbas will carry on with taking the minutes.

The results of Strawpoll #6 were reviewed.

Room count:  $55+62=117$

### **Motion # 3 Time : 922 am**

Move to:

- Adopt the objective of "Provide physical layer specifications which support link distances of:
  - At least 2 km **over** SMF"
- M: S Trowbridge
- S: B. Holden
- Technical ( $\geq 75\%$ )
- All in room: Y: 99 , N: 5 , A: 8
- 802.3 voters: Y:  $43+30=73$  , N:  $1+2=3$  , A:  $2+5=7$
- Result: Pass!

The Chair asked if there was any opposition to change "of" in Motion # 3 to "over". No opposition.

### **Motion # 4 Time: 928 am**

Move to:

- Adopt the objective of "Provide physical layer specifications which support link distances of:
  - At least 500m over SMF"
- M: B Booth
- S: T. Palkert
- Technical ( $\geq 75\%$ )
- All in room: Y:  $38+42=80$  , N:  $4+3=7$  , A:  $12+17=29$
- 802.3 voters: Y:  $24+29=53$  , N:  $4+5=9$  , A:  $12+8=20$
- Result: passes!

### **Motion # 5 Time : 934 am**

Move to:

- Adopt the objective of "Provide physical layer specifications which support link distances of:
  - At least 100m over MMF"
- M: Jack Jewell
- S: J. King
- Technical ( $\geq 75\%$ )
- All in room: Y:  $46+38=84$  , N:  $4+4=8$  , A:  $14+12=26$
- 802.3 voters: Y:  $34+29=63$  , N:  $3+4=7$  , A:  $4+6=10$
- Result: Pass

**Motion # 6      Time : 1001 am**

Move to:

- Adopt the objective of "Provide physical layer specifications which support link distances of:
  - At least 10km over SMF"
- M: S. Trowbridge
- S: T. McDermott
- Technical ( $\geq 75\%$ )
- All in room: Y:  $31+51 = 82$  , N:  $9+11 = 20$  , A:  $13+10 = 23$
- 802.3 voters: Y:  $23+37 = 60$  , N:  $6+10 = 16$  , A:  $6+12 = 18$
- Result: Pass

**Motion # 7      Time : 1042 am**

Move to:

- Adopt the objective of "Provide physical layer specifications which support link distances of:
  - At least 1m over printed circuit board and copper cable backplanes"
- M: T. Palkert
- S: M. Ressler
- Technical ( $\geq 75\%$ )
- All in room: Y:  $11+20 = 31$  , N:  $13+26 = 39$  , A:  $25+19 = 44$
- 802.3 voters: Y:  $11+15 = 26$  , N:  $13+20 = 33$  , A:  $11+17 = 28$
- Result: Fail

The chair asked if anyone wishes to make a motion for copper twin axial cables PMD or the 40km PMD. No one responded.

**Motion # 8      Time : 11.02 am**

Move that the 400 Gb/s Study Group adopt the following objective:

- Support a BER of better than or equal to  $10^{-13}$  at the MAC/PLS service interface (or the frame loss ratio equivalent)
- M: P. Anslow
- S: S. Trowbridge
- Technical ( $\geq 75\%$ )
- All in room: Y:  $23+44 = 67$  , N:  $7+3 = 10$  , A:  $22+26 = 48$
- 802.3 voters: Y:  $17+31 = 48$  , N:  $3+6 = 9$  , A: 26
- Result: Pass

The Chair presented the adopted objectives so far. He noted that he will review supporting material in relation to the 5 Criteria and will send a summary to the reflector to highlight to the Study Group what materials are needed in the development of 5C responses.

Updated objectives are at [http://www.ieee802.org/3/400GSG/project\\_docs/Objectives\\_13\\_1114.pdf](http://www.ieee802.org/3/400GSG/project_docs/Objectives_13_1114.pdf)

## Motion # 9

Move to:

- Request that the IEEE 802.3 Working Group extends the 400 Gb/s Ethernet Study Group

- M: K. Lusted
- S: P. Anslow
- Procedural (>50%)
- Result: Pass by voice vote without objection

The meeting was adjourned at 11.23

Attendees:

IEEE 802.3 400GbE Study Group			11/12/2013	11/13/2013	11/14/2013
Last Name	First Name	Employer / Affiliation	Tues	Wed	Thurs
Abbas	Ghani	Ericsson, UK	x	x	x
Al-Doori	Yaseen	SMU University / Dallas	x		
Ali	Hassan	Texas Instruments	x	x	x
Anslow	Pete	Ciena Corporation	x	x	x
Balasubramanian	Vittal	Dell Force10	x	x	x
Baldwin	Thananya	Ixia		x	x
Barrass	Hugh	Cisco	x	x	x
Bennett	Mike	LBNL		x	
Bergey	Chris	Luxtera	x	x	x
Bernstein	Gary	Leviton		x	
Bliss	Will	Broadcom		x	x
Booth	Brad	Microsoft	x	x	x
Bouda	Martin	Fujitsu	x	x	x
Bower	Patricia	Fujitsu	x	x	x
Braun	Ralf-Peter	Deutsche Telekom	x	x	x
Brown	David	Semtech	x	x	x
Brown	Matt	Applied Micro	x	x	x
Carroll	Martin	Verizon			x
Casher	Patrick	Molex	x	x	x
Chalupsky	David	Intel		x	x
Chang	Xin	Huawei	x	x	x
Chen	Charlie	Titan Photonics	x	x	
Cheng	Weiying	Tellabs	x		x
Cheng	Wheling	Juniper Networks	x	x	x
Cole	Chris	Finisar	x	x	x
Cook	Charles	Century Link	x		
D'Ambrosia	John	Dell	x	x	x
Dawe	Piers	Mellanox	x	x	x
Dove	Dan	Dove Networking Solutions (DNS)	x	x	x

Dudek	Mike	QLogic	x	x	x
Erba	Simone	STM Microelectronics	x	x	x
Estes	Dave	UNH - IOL		x	
Ewen	John	IBM	x	x	x
Farhoodfar	Arash	Cortina Systems	x	x	x
Flatman	Alan	LAN Technologies	x		
Forbes	Harry	Nexans		x	x
Fujikami	Craig	Spirent Communications	x	x	x
Fujikami	Craig	Spirent Communications	x	x	x
Gamy	Yurico	TE	x		x
Garcia	Modesto	Texas Instruments	x	x	x
Ge Hylander	Elyse	Commscope	x	x	x
Goell	James	Nano Precision Prod	x	x	x
Green	Malcolm	Bin Opticx	x	x	x
Gustlin	Mark	Xilinx	x	x	x
Hall	Eric	Aurion	x	x	
Healey	Adam	LSI	x	x	x
Herman	Todd	Commscope			x
Holden	Brian	Kandou Bus	x	x	x
Hongchun	Xu	Accelink		x	x
Horner	Rita	Synopsys	x	x	x
Ishibe	Kazuhiko	Anristu	x	x	
Isono	Hideki	Fujitsu Ltd.	x	x	x
Issenhuth	Tom	Microsoft	x	x	x
Jackson	Kenneth	Sumitomo	x	x	
Jackson	Kenneth	Sumitomo	x	x	
Jewell	Jack	Independent	x	x	x
Jiang	Wenbin	Cosemi	x	x	x
Jimenez	Andrew	Anixter Inc.		x	x
Jones	Doug	Comcast	x		
Kaku	Shineyo	Allied Telesis	x	x	x
Katz	Walter	Sisoft	x	x	x
Kawatsu	Yasuaki	Hitachi-Metals	x	x	x
Kelsen	Michael	Time Warner Cable	x	x	x
Kim	Frank	Leviton		x	
King	Jonathan	Finisar Corp.	x		x
Kipp	Scott	Brocade		x	
Kolesar	Paul	CommScope	x	x	
Kono	Masashi	Hitachi	x	x	x
Kunimitsu	Jocelyn	Spirent Communications	x	x	x
Lackner	Hans	QoSCom		x	x
Lane	Brett	Panduit Corp.	x	x	
Lane	Brett	Panduit Corp.			x
Larsen	Wayne	Commscope			x
Lewis	Dave	JDSU	x	x	

Li	Mike	Altera	x	x	x
Li	Shaohua	Brocade	x	x	x
Lingle, Jr.	Robert	OFS	x	x	x
Lusted	Kent	Intel	x	x	x
Lyubskirsky	Ilya	Finisar	x		
Maguire	Valerie	Siemon / TIA			x
Maki	Jeffery	Juniper Networks	x	x	x
Malkman	Yonaton	Mellanox	x	x	x
Marris	Arthur	Cadence	x	x	x
Martinez	Joel	Altera	x	x	
McDermott	Tom	Fujitsu	x	x	x
McDonough	John	NEC America	x	x	x
Meier	Wolfgang	Emerson Network Power EC	x	x	x
Mellitz	Richard	Intel		x	x
Misek	Brian	Avago Technologies	x	x	x
Mohaïen	Hessam	Ensphere	x	x	x
Mooney	Paul	Spirent Communications	x	x	x
Moore	Charles	Avago Technologies	x	x	x
Moorwood	Andy	Infinera Corp	x	x	x
Muir	Ron	JAE	x	x	x
Murray	Dale	Light Counting	x	x	x
Muth	Karl	Texas Instruments	x		
Nakamoto	Edward	Spirent Communications	x	x	x
Nolan	John	QLogic	x	x	x
Ofelt	David	Juniper Networks	x	x	x
Ogura	Ichiro	Petra	x	x	x
Padro	Carlos	KDPOF			x
Palkert	Tom	Luxtera	x	x	x
Patel	Pravin	IBM	x	x	x
Payne	Bob	TI		x	
Payne	Robert	TI	x	x	
Pepeljugin	Petar	IBM	x	x	x
Pepper	Gerald	Ixia		x	x
Petrilla	John	Avago Technologies	x	x	x
Pimpinella	Rick	Panduit Corp.	x	x	
Prosad	Yemigalla	Gigoptix	x	x	
Rabinovich	Rick	Alcatel-Lucent	x	x	x
Ressl	Mike	Hitachi Cable America	x	x	
Rotolo	Salvatore	STM Microelectronics	x	x	x
Rush	Brian	Maxim Integrated	x	x	x
Sambasivan	Sam	AT&T	x	x	x
Schube	Scott	NeoPhotonics		x	
Shan	Peijun	Acacia Acommunications	x	x	x
Shanbhag	Megha	TE Connectivity	x	x	x
Shang	Song	Semtech	x	x	x

Shrikhande	Kapil	Dell	x	x	x
Smith	Brad	Opsis	x		
Sommers	Scott	Molex	x	x	x
Sone	Yoshiaki	NTT	x	x	x
Song	Haoyu	Huawei	x	x	
Song	Xiaolu	Huawei	x	x	x
Sparacin	Daniel	Aurrion	x	x	
Sparrowhawk	Bryan	Leviton	x	x	x
Stassar	Peter	Huawei	x	x	x
Sun	CK	Titan Photonics	x		
Svendsen	Justin	CIT			x
Swanson	Steve	Corning	x	x	x
Szeto	William	Xtera	x	x	x
Tajima	Akio	NEC Corporation	x	x	x
Takahara	Tomoo	Fujitsu Laboratories	x	x	x
Tanaka	Toshiki	Fujitsu Laboratories	x	x	x
Teipen	Brian	ADVA Optical Networking	x	x	x
Telxeira	Antonio	NSN (Coriant)	x	x	x
Timmins	Ian	Optical Cable Corp.	x	x	
Tracy	Nathan	TE Connectivity	x	x	x
Trowbridge	Steve	Alcatel-Lucent	x	x	x
Tseng	WenCheng	MediaTek		x	x
Tseng	WenGheng	MediaTek	x	x	
Tu	Zhiney	ZTE	x	x	
Ugolini	Alan	US Conec	x	x	x
Ulrichs	Ed	Source Photonics	x	x	x
Umnov	Alexander	Fujitsu	x	x	
Vaden	Sterling	Optical Cable Corp.			x
Vallance	Ryan	Nano Precision Prod	x	x	x
Vanderlaan	Paul	Nexans		x	
Wang	Robert	Intel		x	
Wang	Tongtong	Huawei	x	x	x
Wang	Xinyuan	Huawei	x	x	x
Wang	Zhongfeng	Broadcom	x	x	x
Warren	David	HP	x	x	x
Way	Winston	NeoPhotonics	x	x	x
Welch	Brian	Luxtera	x	x	x
Wong	Henry	Huawei	x	x	
Xu	Hongchun	Accelink Technologies	x	x	x
Xu	Yu	Huawei	x	x	x
Yu	Cl	MediaTek		x	
Zambell	Andrew	FCI	x	x	x
Zivny	Pavel	Tektronix	x	x	x