Approved Minutes
IEEE P802.3cd 50 Gb/s, 100 Gb/s, 200 Gb/s Ethernet Task Force
Plenary Meeting
July 26-28, 2016
San Diego, CA, USA
Prepared by Kent Lusted

Table of Contents

IEEE P802.3cd 50 Gb/s, 100 Gb/s, 200 Gb/s Ethernet Task Force – July 26, 2016:

Prepared by Kent Lusted

IEEE P802.3cd 50 Gb/s, 100 Gb/s, and 200 Gb/s Ethernet Task Force meeting convened at 1:08 p.m., July 26, 2016, by Mark Nowell, IEEE P802.3cd Task Force Chair.

Mr. Nowell welcomed attendees.

Chair reviewed agenda in http://www.ieee802.org/3/cd/public/July16/agenda_3cd_01a_0716.pdf

Introductions were made.

Motion #1:
Move to approve the agenda:
- Moved by: Thananya Baldwin
- Second by: Mike Dudek
- Passed by voice without opposition

Minutes were posted shortly after the meeting. Chair asked if there were any comments on the posted minutes.   No one responded.

Motion #2:
Move to approve the May 2016 interim minutes:
- Moved by: Steve Trowbridge
- Second by: Brad Booth
- Passed by voice without opposition

Chair reminded participants to observe meeting decorum. Called for members of the press. No one responded. Photography and recording are not permitted.

Chair reviewed the reflector and web information. Chair reviewed the ground rules for the meeting.

Chair reviewed the attendance procedures. Chair reminded participants to sign into the IEEE Attendance Tool and to sign the book.

Chair reviewed the IEEE structure.

Chair reviewed the Bylaws and Rules slides in http://www.ieee802.org/3/cd/public/July16/agenda_3cd_01a_0716.pdf

IEEE Patent Policy: Chair reviewed the Patent related slides on the 4 slides contained in the agenda. Chair calls for potentially essential patents. No one responded. Chair read the Guidelines for IEEE WG meetings.   No one responded.

Chair advised the WG attendees that:
- The IEEE's patent policy is described in Clause 6 of the *IEEE-SA Standards Board Bylaws*;
- Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
- There may be Essential Patent Claims of which the IEEE is not aware. Additionally, the IEEE, the WG, nor the WG chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.

No one responded.

Chair reviewed the IEEE 802.3 Standards Process.

Chair noted that there are 2 proposed communications, a liaison letter to the ITU and an informal communication to the OIF. The responses to the letters were reviewed in the P802.3bs Task Force meeting. Chair reviewed them in the P802.3bs Task Force and found no significant issues. The Chair will review the responses for approval.

Chair reviewed the P802.3cd Ethernet Task Force approved project documentation. Chair noted that a timeline has not yet been adopted.

Chair reviewed the adopted objectives.   Chair noted that there is a potential issue with the project documentation based on the potential baselines (contributed presentations) for the 2 km 100 Gb/s SMF objective. The PAR and CSD responses may need modification, if these baselines are adopted.

Chair reviewed the potential timeline in
http://www.ieee802.org/3/cd/public/July16/agenda_3cd_01a_0716.pdf

Goals for the meeting:
- Review technical contributions
- Build, assess consensus on proposals
- Consider making some decisions:
    o Baselines
    o New Objectives
- Establish work items for Sept Meeting
- Adopt a schedule

Chair noted that he will post updated versions of presentations to the website.

Chair noted that the "Editorial Considerations" presentation will move to the end of the session.

Chair noted that there was a late contribution request from Pete Anslow with an analysis on alignment markers. (See http://www.ieee802.org/3/cd/public/July16/anslow_3cd_02_0716.pdf)
Chair asked if there was objection to hearing the presentation. No one responded.

Future Meetings:
- Sept 2016 Interim
  - Week of Sept 12th, 2016 – Fort Worth, Tx
- November 2016 Plenary
  - Week of Nov 7th, 2016 – San Antonio, Tx
- January 2017 Interim
  - Week of Jan 9, 2017 – Orange County, CA

Anyone interested in hosting a meeting should contact the Chair or Steve Carlson.

IEEE P802.3cd Task Force Ad-hoc report:
See http://www.ieee802.org/3/cd/public/July16/lusted_3cd_01_0716.pdf
- Kent Lusted noted that the joint ad hoc meetings will likely resume on August 10, 2016 and switch to a weekly cadence. Details will be announced over the reflector.

Presentation #1:
"Nomenclature Update", Kent Lusted
See: http://www.ieee802.org/3/cd/public/July16/lusted_3cd_02a_0716.pdf
- Author noted that an updated version '02a' contains additional technical content related to the AUI interfaces that will be discussed at the meeting.
- Author noted that the table on slide 6 can be used as a reference for the AUI interfaces. Additionally, the presentation does not propose the nomenclature for those interfaces at this time.

Chair displayed the liaison letters to the ITU and the OIF:
(http://www.ieee802.org/3/cd/public/July16/trowbridge_3bs_01a_0716.pdf and
http://www.ieee802.org/3/cd/public/July16/trowbridge_3bs_02a_0716.pdf)

Motion #3:
Move that the Task Force approve the text in trowbridge_3cd_01a_0716.pdf with editorial license granted to the Chair (or his appointed agent) as a liaison communication from the IEEE 802.3 Working Group to ITU-T SG15 and approve the text in trowbridge_3bs_02a_0716.pdf with editorial license granted to the Chair (or his appointed agent) as an informal communication from the IEEE 802.3 Working Group to OIF.
- Moved by: Steve Trowbridge
- Second by: Pete Anslow
- Procedural (>50%)
- Motion passes by voice vote without opposition

Presentation #2:
"Continuing discussion on "Missing objectives"", Peter Stassar
See: http://www.ieee802.org/3/cd/public/July16/stassar_3cd_01a_0716.pdf

- Author had an updated presentation '01a' that removes the proposal and makes editorial changes.

Presentation #3:
"Architectural Support for 50/100 GbE Breakout", Ali Ghiasi
See: http://www.ieee802.org/3/cd/public/July16/ghiasi_3cd_01a_0716.pdf
- Author had an updated presentation '01a'
- Clarifying questions were asked and answered.

Presentation #4:
"The need for 25G electrical lanes support", Mark Gustlin
See: http://www.ieee802.org/3/cd/public/July16/gustlin_3cd_01_0716.pdf
- Clarifying questions were asked and answered.

Break at 2:55 p.m. Resume at 3:15 p.m.

Presentation #5:
"50GE/NG100GE PCS Consideration", Tongtong Wang
See: http://www.ieee802.org/3/cd/public/July16/wang_3cd_01_0716.pdf
- Discussed that the implementation can vary from the specification as long as the logic behaves the same as required by the specification.

Presentation #6:
"50GE FEC codeword alignment with 16k AM spacing", Andre Szczepanek
See: http://www.ieee802.org/3/cd/public/July16/szczepanek_3cd_01_0716.pdf
- Author noted that he intends to use a straw poll to gauge support for 16k vs. 20k alignment markers.

Chair reminded participants to sign into the IEEE Meeting Attendance Tool and to sign the attendance book.

Presentation #7:
"RS(544,514) FEC performance including precoding", Pete Anslow
See: http://www.ieee802.org/3/cd/public/July16/anslow_3cd_01_0716.pdf
- Author noted that the presentation has not changed since the last presentation in the Task Force ad hoc.
- Author asked for a show of hands of people that did not see the presentation in the ad hoc. A few people indicated.
- Clarifying questions were asked and answered.

Presentation #8:
"100GbE Alignment Markers", Pete Anslow
See: http://www.ieee802.org/3/cd/public/July16/anslow_3cd_02_0716.pdf
- Discussed the need for the analysis to be done with the 50 Gb/s logic proposal.

Presentation #9:
"TX precoder for 802.3cd electrical links", Raj Hegde
See: http://www.ieee802.org/3/cd/public/July16/hegde_3cd_01_0716.pdf

Presentation #10:
"50GbE and NG 100GbE Logic Baseline Proposal", Gary Nicholl
See: http://www.ieee802.org/3/cd/public/July16/nicholl_3cd_01a_0716.pdf
- Discussed that the reference to 50GAUI-2b is Annex 120 B/C.
- Discussed the need to clarify what the RX does with the precoding if it does not use it.

Presentation #11:
"PreFEC BER Monitoring", David Ofelt
See: http://www.ieee802.org/3/cd/public/July16/ofelt_3cd_01_0716.pdf
- Discussed the need for the PreFEC BER monitoring for the 50G application.

Chair noted that the start time on Wednesday is 8:00 a.m. per the schedule.

Break at 5:35 p.m.

IEEE P802.3cd 50 Gb/s, 100 Gb/s, 200 Gb/s Ethernet Task Force – July 27, 2016:

Prepared by Kent Lusted

Meeting convened at ~8:05 a.m., July 27, 2016, by Mark Nowell, IEEE P802.3cd Task Force Chair.

Chair reviewed the plans for the day. Chair displayed the agenda presentation:
http://www.ieee802.org/3/cd/public/July16/agenda_3cd_01a_0716.pdf

Chair noted that the schedule will be tight for the day and asked presenters to keep to their scheduled times.

Chair reminded participants to sign into the IEEE Meeting Attendance Tool and to sign the attendance book.

Presentation #12:

"Cl73 AN baseline proposal for 802.3cd", Jeff Slavick
See: http://www.ieee802.org/3/cd/public/July16/slavick_3cd_01a_0716.pdf

- Mike Dudek offered his support to the presentation.

Presentation #13:

"EEE baseline proposal for 802.3cd", Jeff Slavick
See: http://www.ieee802.org/3/cd/public/July16/slavick_3cd_02_0716.pdf

- Clarifying questions were asked and answered.

Presentation #14:

"50GAUI-2 and 100GAUI-4 C2C and C2M Baseline Proposals for 50G and 100G Ethernets", Mike Li
See: http://www.ieee802.org/3/cd/public/July16/li_3cd_01a_0716.pdf

- There was a request to remove the 3rd bullet "100GAUI-4" on slide 7.
- Author will provide updated '01a' with the changes discussed during the Q&A portion.
- Editor-in-Chief and Chair asked participants to hold comments related to the nomenclature and focus on the technical aspects of the presentation. Kent Lusted will be working on the nomenclature consensus building.

Presentation #15:

"TIA-492AAAE wideband multimode fiber spec publication", Paul Kolesar
See: http://www.ieee802.org/3/cd/public/July16/kolesar_3cd_01_0716.pdf

- Discussed the ecosystem and multi-vendor availability for this fiber in the market.
- Discussed the reach of SWDM on the various types of fiber.

Presentation #16:
"Updated baseline proposal for the 100 Gb/s MMF objective using two-wavelength PAM4 transmission", Jonathan Ingham
See: http://www.ieee802.org/3/cd/public/July16/ingham_3cd_01a_0716.pdf

- Updated presentation '01a' with minor changes.
- Discussed the link power budget proposal. The laser is Class 1-M.

Presentation #17:
"Transmitter testing for MMF PMDs", Jonathan Ingham
See: http://www.ieee802.org/3/cd/public/July16/ingham_3cd_02_0716.pdf

- Discussed the assumptions made on the T-spaced FFE equalizer.

Presentation #18:
"Wavelength Dependence of Multimode Fiber Bandwidth & Dual Wavelength Channel Performance", Rick Pimpinella
See: http://www.ieee802.org/3/cd/public/July16/pimpinella_3cd_01a_0716.pdf

- Discussed the shift results in the minimally compliant fiber testing.
- Discussed the effect of multiple wavelength laser proposals on the fiber.

Break at ~10:20 a.m. Resume at ~10:35 a.m.

Presentation #19:
"Baseline specifications for 100G 2km and 10km SMF PMDs following 200G 2km and 10km SMF PMD specs", Chris Cole
See: http://www.ieee802.org/3/cd/public/July16/cole_3cd_01a_0716.pdf

Presentation #20:
"100GBase-DR2: A Baseline Proposal for the 100G 500m Two Lane Objective", Brian Welch
See: http://www.ieee802.org/3/cd/public/July16/welch_3cd_01a_0716.pdf

- Updated presentation '01a' with additional supporters.
- Clarifying questions were asked and answered.

Presentation #21:
"Data center applications for 100GBase-FR objective", Tom Palkert
See: http://www.ieee802.org/3/cd/public/July16/palkert_3cd_01_0716.pdf

- Clarifying questions were asked and answered.

Presentation #22:
"Experimental results on single wavelength 100Gbps PAM4 modulation", Matt Traverso
See: http://www.ieee802.org/3/cd/public/July16/traverso_3cd_01_0716.pdf

- Updated presentation '01a' with new slide 3 with additional background information.
- There was a request to increase the length of the test pattern.

- Discussed the BER vs. RX equalizer results on slide 8. The equipment in the setup limited the data to 5E-06.
- Atul Gupta noted that the TIA used in the experiment was designed for lower optical power than was tested and some saturation effects were observed.

Chair reminded participants to sign into the IEEE Meeting Attendance Tool and to sign the attendance book.

Break at 11:50 a.m. Resume ~1:10 p.m.

Chair reminded participants to sign into the IEEE Meeting Attendance Tool and to sign the attendance book.

Presentation #23:
"Baseline proposal for the 100 Gb/s SMF PHY 2 km objective using single wavelength PAM4 modulation", David Lewis
See: http://www.ieee802.org/3/cd/public/July16/lewis_3cd_01_0716.pdf
- Discussed the use cases and receiver specifications.
- Chair noted that the concern regarding the approved project CSD responses would be addressed after the question queue is finished.
- Concern was expressed about the production viability of the proposed solution.

Chair noted that there appears to be some confusion about the discussion held at the May 2016 interim around the adoption of the 100G 2km SMF objective. Chair noted that motion #8 in Whistler (May 2016) was adopted without "two-lane" verbiage. Brad Booth stated, as the mover of the motion, that the "two-lane" term was omitted explicitly in the motion and had been part of the discussion around the motion to adopt.

Chair noted that the Task Force now has an objective for 2km 100 Gb/s over SMF and needs to adopt a baseline to fill that objective. Chair noted that the CSD responses use "50G electrical and optical signaling" and was accurate when the CSD responses were adopted at the March 2016 Plenary meeting as there were no 100G SMF objectives at the time. If the Task Force chooses to adopt a baseline that uses 100 Gb/s optical signaling, then the project CSD responses will need to be updated. The two new objectives that were adopted by the Task Force in May 2016 have not yet been adopted by the Working Group. This will be addressed in the WG Plenary on Thursday. Chair noted that a 100 Gb/s single lane proposal will also need CSD changes and that supporters of that proposal will need to bring proposed changes to the CSD responses. Chair noted that there is another proposal based on 50 Gb/s optical signaling competing for the 2km baseline.

Chair asked if there were any questions or comments on this approach. No one responded.

Presentation #24:
"Ethernet Adoption: SERDES Rates & Form Factors", Jeff Maki
See: http://www.ieee802.org/3/cd/public/July16/maki_3cd_01a_0716.pdf
- Updated presentation version '01a' with clarifications.

- Clarifying questions were asked and answered.

Presentation #25:
"One meter measured backplane channel data", Nathan Tracy
See: http://www.ieee802.org/3/cd/public/July16/tracy_3cd_01a_0716.pdf
- Author noted that the data will be available on the Task Force website.
- Chair stated that he will announce the posting over the Task Force email reflector.
- Author noted that the backplane channel data was updated from the 2013 contribution due to an improved connector that is now available.
- The measurements were made at typical room temperature.
- There was concern that the backdrill stub was difficult in production boards.

Presentation #26:
"Baseline proposals for copper twinaxial cable specifications", Chris Diminico
See: http://www.ieee802.org/3/cd/public/July16/diminico_3cd_01a_0716.pdf
- Updated version '01a' with clarifications on the baseline proposal.
- Discussed the specification of the connector insertion loss.

Break at ~3:05 p.m. Resume at ~3:35 p.m.

Presentation #27:
"Die/Ball Level Parameters and Channel Characteristics Annex", Rich Mellitz
See: http://www.ieee802.org/3/cd/public/July16/mellitz_3cd_01a_0716.pdf
- Updated presentation '01a' with supporters
- Concern was expressed about the measurement of the signal at the die pads.
- Discussed the need for a full set of COM and compliance measurement specifications
- Author noted that he intends a straw poll to measure support

Presentation #28:
"Revisiting MCB/HCB requirements in support 50G/lane PAM4", Ali Ghiasi
See: http://www.ieee802.org/3/cd/public/July16/ghiasi_3cd_02_0716.pdf
- Clarifying questions were asked and answered.

Presentation #29:
"PAM4 transmitter training protocol", Adam Healey
See: http://www.ieee802.org/3/cd/public/July16/healey_3cd_01a_0716.pdf
- Updated presentation '01a' with supporters
- Discussed the use of the frame lock indication in the protocol

Presentation #30:

"Working towards baseline COM parameters for Backplane and Direct Attach Cable", Upen Reddy Kareti

See: http://www.ieee802.org/3/cd/public/July16/kareti_3cd_01a_0716.pdf

- Updated presentation '01a' with additional information
- Discussed the results for the backplane channels
- Clarifying questions were asked and answered

Straw Poll #1: 5:49 p.m.
- For the 100 Gb/s 2km SMF baseline:
    - A) I support the 1x100G proposal per lewis_3cd_01a_0716.pdf
    - B) I support the 2x50G proposal per cole_3cd_01a_0716.pdf
    - C) I want more information
- (pick one)
- A: 34 , B: 25 , C: 36

There was a request to add an option "remove the objective". Chair noted that he did not want to add it to this straw poll but would entertain additional straw polls on that topic. Chair noted that he considers this straw poll to be an informative check between the two proposals for Task Force.

Break for the day at 5:50 p.m.

IEEE P802.3cd 50 Gb/s, 100 Gb/s, 200 Gb/s Ethernet Task Force – July 28, 2016:

Prepared by Kent Lusted

Meeting convened at ~8:35 a.m., July 28, 2016, by Mark Nowell, IEEE P802.3cd Task Force Chair.

Chair reviewed the plans for the day. Chair displayed the agenda presentation:
http://www.ieee802.org/3/cd/public/July16/agenda_3cd_01a_0716.pdf

Presentation #31:
"802.3cd Editorial Consideration", Matt Brown
See: http://www.ieee802.org/3/cd/public/July16/brown_3cd_01a_0716.pdf
- Updated presentation '01a' with changes based on the meetings progress this week.
- Clarifying questions were asked and answered.

Chair thanked the editorial team for stepping up to the task.

Motion #4: 8:57 a.m.
Move to adopt li_3cd_01a_0716.pdf as the updated baseline proposal for 50 Gb/s and 100 Gb/s chip-to-chip and chip-to-module electrical interfaces
- M: Mike Li
- S: Gary Nicholl
- Technical (>=75%),
- Y: 98 , N: 0 , A: 16
- Results: passes 8:59 a.m.

Straw Poll #2: 9:01 a.m.
For 50 Gb/s Ethernet, I support
  – A) a 16k Alignment Marker spacing (per szczepanek_3cd_01_0716.pdf)
  – B) a 20k Alignment Marker spacing (per nicholl_3cd_01a_0716.pdf)
- A: 4   B: 70

Motion #5: 9:09 a.m.
Move to:
  – Adopt nicholl_3cd_01a_0716 as the baseline proposal for 50 Gb/s and 100 Gb/s RS/MII, PCS, FEC and PMA
- M: Gary Nicholl
- S: David Ofelt
- Technical (>=75%),
- Y: 100 N: 0 A: 13
- Results: passes 9:12 a.m.

Motion #6: 9:13 a.m.
Move to adopt the AN baseline proposed in slavick_3cd_01a_0716.pdf
- M: Jeff Slavick
- S: Kent Lusted
- Technical (>=75%),
- Y: 88 N: 0 A: 23
- Results: passes 9:15 a.m.

Motion #7: 9:16 a.m.
Move to adopt the EEE baseline proposed in slavick_3cd_02a_0716.pdf, slide 5
- M: Jeff Slavick
- S: Adee Ran
- Technical (>=75%),
- Y: 88 N: 0 A: 23
- Results: passes 9:18 a.m.

Motion #8: 9:19 a.m.
Move to adopt diminico_3cd_01a_0716 as the copper twin-axial cable, MDI, TX/RX PCB IL, and test fixture baseline.
- M: Chris Diminico
- S: Mike Dudek
- Technical (>=75%),
- Y: 77 N: 0 A: 35
- Results: passes 9:33 a.m.

Motion #9: 9:34 a.m.
Move to adopt the PAM4 training baseline proposed in healey_3cd_01a_0716.pdf
- M: Adam Healey
- S: Kent Lusted
- Technical (>=75%),
- Y: 94 N: 0 A: 22
- Results: passes 9:37 a.m.

Chair showed timeline in agenda (see
http://www.ieee802.org/3/cd/public/July16/agenda_3cd_01a_0716.pdf)   Timeline used to communicate progress in the task force. It was noted that there is a typo with two instances of "D3.2". Discussed the date for the "last new proposal"; it was recommended to move it to November 2016 and keep D1.0 in September 2016. Chair displayed the changed version (see http://www.ieee802.org/3/cd/public/July16/agenda_3cd_01b_0716.pdf).

Motion #10: 9:49 a.m.
Move to adopt the P802.3cd proposed timeline in agenda_3cd_01b_0716.pdf, slide 26
- M: John D'Ambrosia
- S: Matt Brown
- Technical (>=75%),
- Y: 111 N: 0 A: 7

- Results: passes 9:51 a.m.

Straw Poll #3:
I would support the feature outlined in ofelt_3cd_01_0716.pdf for inclusion in the 802.3cd specification
- Yes: 62
- No: 0

Break at 10:00 a.m. Resume at ~10:30 a.m.

Straw Poll #4:
I would support adopting welch_3cd_01a_0716 as a baseline for the 100 Gb/s 500m two lane SMF objective
- Yes: 18
- No: 3
- Need more information: 57

Chair asked for feedback from members of the Task Force who indicated that they needed more information. The feedback from the Task Force included: the market for two fiber vs. the current ecosystem, cost and power estimates vs. the alternatives.

Straw Poll #5:
I would support the adoption of ingham_3cd_01a_0716.pdf as the baseline proposal for the 100G MMF objective
- yes: 27
- no: 4
- need more information: 63

Straw Poll #6:
I would support the approach outlined in mellitz_3cd_01a_0716 to become an informative Annex in the 802.3cd specification.
- Yes: 8
- No: 29
- Need more information: 13
- Abstain: 54

Attendance Polls:
Chair noted that the September interim will have P802.3bs Monday-Wednesday and P802.3cd Wednesday-Friday. The P802.3cd will start as soon as P802.3bs ends. For the Plenary, there will be overlap
- I will attend the IEEE P802.3cd meetings at the September interim in Fort Worth, TX, USA (week of September 12, 2016)
    - Yes: 72   Maybe: 20
- I will attend the IEEE P802.3cd meetings at the November plenary in San Antonio, TX, USA (week of November 7, 2016)
    - Yes: 76, Maybe: 17

- I will attend the IEEE P802.3cd meetings at the January interim in Orange County, CA, USA (week of January 9, 2017)
  - Yes: 71 Maybe: 17

Motion #11:

Move to Adjourn:
- Moved by: Adee Ran
- Second by: Ali Ghiasi
- Passed by voice vote without any credible opposition

Meeting ended at 11:06 a.m.

Attendees

P802.3cd, July 2016			26-Jul-16	27-Jul-16	28-Jul-16
Last Name	**First Name**	**Affiliation**	**Tuesday**	**Wednesday**	**Thursday**
Abbott	Justin	Lumentum	x	x	
Anslow	Pete	Ciena Corporation	x	x	x
Baden	Eric	Broadcom	x	x	x
Bains	Amrik	Cisco	x		
Balan	Vishnu	nVidia	x	x	
Balasubramanian	Vittal	Dell Force10	x	x	x
Balasubramonian	Venugopal	Marvell	x	x	x
Baldwin	Thananya	Ixia	x		
Bar-Niv	Amir	Aquantia	x	x	x
Bhatt	Vipul	Finisar	x	x	
Bliss	Will	Broadcom	x	x	x
Booth	Brad	Microsoft	x	x	x
Bouda	Martin	Fujitsu	x	x	x
Brandt	David	Rockwell Automation		x	
Braun	Ralf-Peter	Deutsche Telekom	x	x	x
Brooks	Paul	Viavi Solutions	x	x	x
Brown	Alan	Commscope			x
Brown	Matt	Applied Micro	x	x	
Butter	Adrian	Global Foundries	x	x	x
Caggioni	Francesco	APM	x	x	x
Cantin	Pierre Luc	Google	x		
Carty	Clark	Cisco	x		
Chabot	Craig	UNH-IOL	x		
Chalupsky	David	Intel		x	x
Chang	Frank	Inphi	x	x	
Chang	Xin	Huawei	x	x	x
Chen	Charlie	IPTegra	x		
Chen	David	AOI	x	x	
Chen	Henry	Broadcom	x	x	x

16

Cheng	Weiying	Coriant	**x**		
Cheng	Wheling	Ericsson	**x**	**x**	x
Cole	Chris	Finisar	**x**	**x**	x
Conroy	Keith	Acacia	**x**	**x**	x
D'Ambrosia	John	FutureWei, Subsidiary of Huawei			x
Desai	Samir	Cosemi	x	x	
Diab	Wael	Huawei	**x**	**x**	
Dillard	John	MicroSemi	**x**	**x**	x
Dillow	Daniel	Amphenol	**x**	**x**	x
DiMinico	Christopher	MC Communications/Panduit	**x**	**x**	
Donahue	Curtis	UNH-IOL	**x**		
Dove	Dan	Dove Networking Solutions (DNS)	**x**		
Dudek	Mike	QLogic	**x**	**x**	x
Dupuis	Mark	Molex	**x**		
Estes	Dave	Spirent Communications	**x**	**x**	x
Ewen	John	Global Foundries	**x**	**x**	x
Feyh	German	Broadcom	**x**		
Fife	James	eTopus Technology	**x**	**x**	x
Filip	Jan	Maxim Integrated Products Inc.	**x**		
Flatman	Alan	LAN Technologies	**x**		
Ghiasi	Ali	Ghiasi Quantum, Huawei	**x**	**x**	x
Goldberg	Jonathan	IEEE-SA	x		
Gong	Zhigang	O-net	**x**	**x**	x
Gorshe	Steve	microsemi	**x**	**x**	x
Guckenberger	Drew	Molex	**x**	**x**	
Gupta	Atul	MACOM	**x**	**x**	x
Hashimoto	Tomohiro	Socionext	x	x	x
Healey	Adam	Broadcom Limited	**x**	**x**	x

17

Hegde	Raj	Broadcom	**x**	**x**	x
Hess	Dave	Corddata	x		x
Hidaka	Yasuo	Fujitsu Laboratories of America	**x**	**x**	x
Horner	Rita	Synopsys	**x**		
Ingham	Jonathan	Foxconn Interconnect Technology	**x**	**x**	x
Ishibe	Kazuhiko	Anristu	**x**	**x**	x
Isono	Hideki	Fujitsu Optical Components	**x**	**x**	x
Issenhuth	Tom	Microsoft	**x**	**x**	x
Jackson	Ken	Sumitomo	**x**	**x**	x
Jimenez	Andrew	Anixter Inc.	**x**	**x**	x
Jones	Peter	Cisco	**x**		
Kareti	Upen Reddy	Cisco	**x**	**x**	x
Kawatsu	Yasuaki	Hitachi-Metals	**x**	**x**	x
Kim	Yong	Broadcom	**x**		
Kipp	Scott	Brocade	**x**	**x**	x
Klempa	Mike	UNH-IOL	**x**		
Koehler	Daniel	More than IP	**x**	**x**	x
Kolesar	Paul	CommScope	**x**	**x**	x
Krishnasamy	Kumaran	Broadcom	**x**		
Lackner	Hans	QoSCom	**x**	**x**	x
Lapak	Jeff	UNH-IOL	**x**	**x**	
Law	David	HPE	**x**	**x**	
Leizerovich	Hanan	Multiphy	**x**	**x**	x
Lewis	Dave	Lumentum	**x**	**x**	
Lewis	Jon	Dell			x
Li	Mike	Intel	**x**	**x**	x
Li	Weiqi	II-VI Photonics	x		
Lim	Jane	Cisco	**x**	**x**	x
Lin	Juitse	GIUC	x	x	

Liu	Hai-Feng	Intel	**x**	**x**	x
Liu	Jackie	Cisco	x		
Liu	Jackie	Cisco		x	
Lo	William	Marvell Semiconductor	x		
Lusted	Kent	Intel	**x**	**x**	x
Maguire	Valerie	Siemon			x
Maki	Jeffery	Juniper Networks	**x**		
Malicoat	David	HP	**x**	**x**	
Marris	Arthur	Cadence	**x**	**x**	x
McCurdy	Alan	OFS-Fitel	**x**	**x**	x
McDermott	Tom	Fujitsu	**x**	**x**	x
McDonough	John	NEC America	**x**	**x**	x
McSorley	Greg	Amphenol	**x**	**x**	x
Mei	Richard	Commscope	**x**	**x**	x
Mellitz	Richard	Samtec	**x**	**x**	
Mooney	Paul	Spirent Communications	**x**	**x**	x
Moritake	Toshiyuki	JAE	**x**	**x**	
Muir	Ron	JAE	**x**	**x**	
Murray	Dale	Lightcounting	**x**	**x**	x
Nakamoto	Edward	Spirent Communications	**x**	**x**	x
Nicholl	Gary	Cisco			x
Nishimura	Kei	Hitachi	x	x	x
Nordin	Ron	Panduit Corp.	**x**		
Norimatsu	Takayasu	Hitachi	x	x	x
Nowell	Mark	Cisco	**x**	**x**	x
Ofelt	David	Juniper Networks	**x**	**x**	x
Palkert	Tom	Molex - MACOM	**x**	**x**	x
Pandey	Sujan	NXP semiconductor			x
Parsons	Earl	Commscope			x
Parthasarathay	Vasudevan	Broadcom		**x**	x
Patra	Lenin	Marvell Semiconductor	x	x	x
Pepper	Gerald	Ixia	**x**		

19

Peterson	Harry	Yanutek Inc			x
Pham	Phong	US Conec	**x**	**x**	x
Pimpinella	Rick	Panduit Corp.	**x**		
Rabinovich	Rick	IXIA	**x**	**x**	x
Rahn	Jeffrey	Infinera	x	x	x
Ran	Adee	Intel	**x**	**x**	x
Remein	Duane	Huawei			x
Ressl	Mike	Hitachi Cable America	**x**	**x**	
Sakai	Toshiaki	Socionext	**x**	**x**	x
Sambasivan	Sam	AT&T	**x**	**x**	x
Sayre	Edward	Samtech LTD	**x**	**x**	x
Sedarat	Hossein	Aquantia	**x**	**x**	x
Shariff	Masood	Commscope	**x**	**x**	x
Shigematsu	Masayuki	Sumitomo Electric	**x**	**x**	x
Shirani	Ramin	Aquantia	**x**	**x**	x
Shrikhande	Kapil	Innovium	**x**	**x**	x
Slavick	Jeff	Broadcom Limited	**x**	**x**	x
Sommers	Scott	Molex	**x**	**x**	x
Sone	Yoshiaki	NTT	**x**	**x**	x
Sparrowhawk	Bryan	Leviton			x
Srivastava	Atul	NTT Electronics	**x**	**x**	x
Stassar	Peter	Huawei	**x**	**x**	x
Stone	Rob	Broadcom	x	x	x
Sun	CK	Iptegra	x		
Sun	Phil	Marvell Semiconductor	x	x	x
Svendsen	Justin	CIT	x	x	x
Swanson	Steve	Corning	x	x	x
Szczepanek	Andre	Inphi	x	x	x
Szeto	William	Xtera	x		
Tailor	Bharat	Semtech Corp	x	x	x
Takahara	Tomoo	Fujitsu Laboratories	x	x	x
Tamura	Kohichi	Oclaro	x	x	x

Tellas	Ronald	Belden	x		x
Tooyserkani	Pirooz	Cisco	x	x	x
Tracy	Nathan	TE Connectivity	x	x	x
Traverso	Matt	Cisco	x	x	x
Trowbridge	Steve	Nokia	x	x	x
Ulrichs	Ed	Source Photonics	x	x	x
Valle	Stefano	ST Microelectronics	x	x	x
Vanderlaan	Paul	Berk-Tek LLC	x		
Wang	Chuanbtao	Huawei	x	x	x
Wang	Robert	Intel	x	x	x
Wang	Tongtong	Huawei	x	x	
Wang	Xinyuan	Huawei	x		
Welch	Brian	Luxtera	x	x	x
Wertheim	Oded	Mellanox	x	x	x
White	Martin	Cavium	x	x	
Xu	Yu	Huawei	x	x	x
Yasueda	Jim	Teledyne Lecroy	x	x	
Yuki	Hayato	Sumitomo		x	
Zhao	Wenyu	CAICT	x		
Zheng	Tie	Foxconn	x		
Zhong	Qiwen	Huawei	x	x	x
Zhuang	Yan	Huawei	x	x	x
Zinnor	Helge	Continental			x