Unapproved Minutes

IEEE P802.3cm 400 Gb/s over Multimode Fiber Task Force

During IEEE 802.3 Plenary Meeting Week
July 10, 2018
San Diego, CA, US
Prepared by Mabud Choudhury

Group Name: IEEE P802.3cm 400 Gb/s over Multimode Fiber Task Force
Date/Location: Tuesday, July 10, 2018. San Diego, CA, US
Chair: Robert Lingle, Jr.
SR8 & Chief Editor: Jonathan King
SR4.2 clause Editor: Jonathan Ingham
Recording Secretary: Mabud Choudhury
Meeting Participants: Attendance is listed in Appendix A (74 participants)

Call to order:
IEEE P802.3cm 400 Gb/s over Multimode Fiber (400G over MMF) Task Force (TF) meeting was convened at 1:22 pm Pacific Daylight Time/PDT (UTC -7), Tuesday, July 10, 2018 by Robert Lingle, Jr., 802.3cm Task Force Chair.

Mr. Lingle welcomed attendees to the IEEE P802.3cm 400G over MMF TF meeting.

The Chair called for introductions and affiliations, the participants introduced themselves, and the Chair then proceeded with the agenda.

Presentation #1:
Title: "IEEE P802.3cm 400G over MMF Task Force Agenda and General Information"
Presenter: Robert Lingle, Jr., Chair
http://www.ieee802.org/3/cm/public/July18/agenda_802.3cm_01_0718.pdf
Chair reviewed Agenda.

Motion #1:
Move to approve the Agenda, Slide 2 of
http://www.ieee802.org/3/cm/public/July18/agenda_802.3cm_01_0718.pdf
- Moved by Mike Dudek
- Seconded by James Young

Motion approved by voice vote without objection. (Procedural > 50%)

Motion #2:
Move to approve meeting minutes, previously posted, from May 21-22 Pittsburgh March Interim IEEE P802.3cm Task Force meeting: http://www.ieee802.org/3/cm/public/May18/unapproved_meeting_minutes_3cm_01_0518.pdf
- Moved by Paul Neveux
- Seconded by Paul Kolesar

Motion approved by voice vote without objection. (Procedural > 50%)

Chair read aloud and reviewed IEEE-SA Meeting Guidelines, including patent policy, and IEEE 802 Participation Policy. There were no questions from group based on guidelines and policy review.

Mr. Lingle provided Task Force information, access to the home page and reflector.
Chair noted Task Force Editors: Jonathan King, affiliated with Finisar - SR8 & Chief Editor and Jonathan Ingham, affiliated with FIT – SR4.2 clause, and Recording Secretary: Mabud Choudhury, affiliated with OFS.

Mr. Lingle reminded everyone to sign-in via IMAT on-line attendance and to sign-in on Attendance Book.

Chair reviewed ground rules, role of the Chair, overall IEEE structure, important bylaws, rules, and associated references links, overall IEEE 802.3 standards process focusing in on Task Force phase.
Mr. Lingle reviewed the timeline goals, estimated during PAR development process, of completing D1.0 by November 2018, D3.0 by November 2019 and completing standard by June 2020. Chair emphasized the need for timeline to move as expeditiously as possible to meet market window for standard, while ensuring that the standard is technically complete and correct.

Mr. Lingle reviewed approved PAR for the "400G over MMF Task Force" and the key Objectives approved by the 802.3 Working Group.

Mr. Lingle provided Ad Hoc report, summarizing 2 teleconference meetings since May Interim.

Chair reviewed goals for the week:

- Adopt a baseline for 4-pair objective if possible
- Discuss next steps for generating D1.0 by November Plenary

Big Ticket items:

- 400GBASE-SR4.2 PMD type
    - Consider baseline proposals
    - Wavelengths – is this resolved?
    - Discuss optical mux/demux architecture

Schedule for Tuesday, July 10 and Wednesday, July 11, 2018 was reviewed. Chair indicated that if all agenda items are completed on Tuesday, July 10, then there would be no TF meeting on Wednesday, July 11.

Future meeting dates and locations were reviewed.

Presentation #2:
Title: "Baseline proposal for a 400 Gb/s optical PMD supporting four MMF pairs"
Presenter: Jonathan Ingham
http://www.ieee802.org/3/cm/public/July18/ingham_3cm_01b_0718.pdf
A baseline proposal for "400GBASE-SR4.2" based on RS(544,514) FEC-supported 26.5625 GBd PAM4 modulation was presented. Transmit and receive center wavelengths of 844 to 863nm and 900 to 918nm were proposed. Bi-directional WDM transmission with required operating range of 0.5 m to 70m OM3, 0.5 m to 100 m OM4 and 0.5 m to 150 m OM5 was presented.
The technical feasibility and broad market potential of a four-fiber-pair MMF PMD at 400 Gb/s and bi-directional approach were reviewed. Presentation had broad industry supporters list.

Discussions on: IC package for bi-directional approach; the shifted wavelength range for the shorter-wavelength VCSEL relative to VCSEL speed, modal dispersion and modal bandwidth; illustrative power budgets, particularly the use of an 850 nm attenuation value throughout being conservative; and wavelength ranges and the associated EMBs in the illustrative power budgets being the only changes since May Interim baseline proposal.

Presentation #3:
Title: "400G-SWDM4.2"
Presenter: Jonathan King
http://www.ieee802.org/3/cm/public/July18/king_3cm_01a_0718.pdf
A 400GBASE-SR4.2 baseline proposal was described for 4 fibers, 2 wavelengths/fiber x 50 Gb/s PAM4 per wavelength, with 850 nm and 910 nm wavelengths – for source availability, and co-directional propagation (4 transmit fibers and 4 receive fibers) – for lowest cost, lowest technical risk, broad market potential, with widest base of suppliers for critical sub-components.
Presentation covered 400G-SWDM4.2 status quo (prior to July TF meeting). Presentation addressed questions raised at P802.3cm May Interim.
Discussion on proposed wavelength ranges, 840 to 863nm and 900 to 918nm vs. nominal wavelengths of 850nm and 910nm. Manufacturability of both bi-directional and co-directional was discussed. Market data for bi-directional was discussed.
A motion was made to adopt portions of
http://www.ieee802.org/3/cm/public/July18/ingham_3cm_01b_0718.pdf as baseline for the 4-pair objective. Discussion on Motion #3 below followed. Discussion about breakout capability of proposed bi-directional 400G-SR4.2 baseline proposal. General discussion followed.

Motion #3:
Move to adopt content of Slides 9 to 14 of
http://www.ieee802.org/3/cm/public/July18/ingham_3cm_01b_0718.pdf as baseline for the 4-pair PHY objective

- Moved by: Jonathan Ingham
- 2nd: James Young
- Y: 38 N: 2 A: 28 (Technical, >= 75%)
- Motion Passes!
- Room Count: 74

It was noted that the just adopted baseline proposal (slides 9-14 of
http://www.ieee802.org/3/cm/public/July18/ingham_3cm_01b_0718.pdf) did not adequately reference PCS, PMA and AUI baselines. This observation led to Motion #4.
Motion #4:
Move to adopt the same PCS, PMA and AUI baselines for the 4-pair PHY objective as already adopted for the 8-pair PHY objective

- Moved by: Mark Nowell
- 2nd: Paul Kolesar
- Y: 41 N: 0 A: 7 (Technical, >= 75%)
- Motion Passes!

Break at 2:29 pm PDT (UTC -7). Resumed meeting at 3:33 pm PDT.

Presentation #4:
Title: "Should the IEEE P802.3cm TF adopt a timeline?"
Presenters: Mabud Choudhury, Robert Lingle, Jr.
http://www.ieee802.org/3/cm/public/July18/choudhury_3cm_01_0718.pdf
Presented example of adopted timeline for IEEE P802.3cg TF as possible template for P802.3cm timeline. Reviewed and discussed key timeline dates from PAR and 802.3cm Chair's presentations. Discussion and valuable input from present and past TF Chairs for other projects/standards and from IEEE/industry experts. General view that completion on P802.3cm standard is possible by end of 2019. Timeline not adopted for this meeting, but will be developed by September TF meeting and 0.x drafts will be reviewed during ad hoc meetings and at September TF meeting.

Special Request: Paul Kolesar made request to the multimode transceiver vendors and VCSEL makers in the room on behalf of new TIA TR-42.12 task group to participate in planned teleconferences which will discuss the EMBc weights that are specified in laser-optimized fiber specifications (e.g. OM3, OM4, OM5). The intent is to validate/verify or change/update these weighting functions, which were set 15 years ago. Requested that transceiver vendors contact the task group leader Bulent Kose affiliated with Panduit, or Paul Kolesar affiliated with CommScope.

Straw Poll on Attendance:

- Attend September 2018 interim, Dell EMC, Spokane, WA, USA:
  – Y: 32 N: 10 M: 11

- Attend November 2018 802 Bangkok, Thailand plenary:
  – Y: 31 N: 8 M: 15

Motion #5:
Move to Adjourn:

- Moved by: Paul Kolesar
- Seconded by: Paul Neveux
- Approved by voice vote without objection. (Procedural > 50%)

The Meeting was adjourned at 4:34 am, PDT (UTC -7), Tuesday, July 10, 2018. Since all agenda items were completed on Tuesday, July 10, the meeting for Wednesday, July 11 was cancelled.

Next Meeting:
Next in-person IEEE 802.3cm Task Force meeting is scheduled for week of September 10th, 2018 for IEEE 802.3 Interim, Spokane, WA, US.

Appendix A: Attendees at the IEEE 802.3 400 Gb/s over Multimode Fiber Task Force, 10 July, 2018.

74 individuals signed in.

	Last Name	First Name	Employer	Affiliation	10-July-2018
1	Abbott	John	Corning	Corning	x
2	Baca	Rich	Microsoft	Microsoft	x
3	Bhatt	Vipul	Finisar	Finisar	x
4	Booth	Brad	Microsoft	Microsoft	x
5	Bouda	Martin	Fujitsu	Fujitsu	x
6	Braun	Ralf-Peter	Deutsche Telekom	Deutsche Telekom	x
7	Cady	Ed	Luxshare-ICT	Luxshare-ICT	x
8	Calvin	John	VTM	VTM, Wilder	x
9	Chang	Ayla	Huawei	Huawei	x
10	Chang	Jacky	HPE	HPE	x
11	Chen	David	AOI	AOI	x
12	Choudhury	Mabud	OFS	OFS	x
13	Chuang	Keng Hua	HPE	HPE	x
14	Coenen	Robert	InterOptic	InterOptic	x
15	Cole	Chris	Finisar	Finisar	x
16	DeAndrea	John	Finisar	Finisar	x
17	Dudek	Mike	Marvell Technologies	Marvell Technologies	x
18	Estes	David	Spirent	Spirent	x
19	Ghiasi	Ali	Ghiasi Quantum	Ghiasi Quantum / Huawei	x
20	Gong	Zhigang	O-Net	O-Net	x
21	Gopalakrishnan	Karthik	Inphi	Inphi	x
22	Gustlin	Mark	Xilinx	Xilinx	x
23	Hasharoni	Kobi	DustPhotonics	DustPhotonics	x
24	Ingham	Jonathan	Foxconn Interconnect Technology	Foxconn Interconnect Technology	x
25	Ishibe	Kazuhiko	Anritsu	Anritsu	x
26	Issenhuth	Tom	Huawei	Huawei	x
27	Jackson	Ken	Sumitomo	Sumitomo	x
28	Jiminez	Andy	Anixter	Anixter	x
29	Kagami	Manabu	Toyota CRDL	Toyota CRDL	x
30	King	Jonathan	Finisar	Finisar	x
31	Kolesar	Paul	CommScope	CommScope	x
32	Lackner	Hans	QoSCom GmbH	QoSCom GmbH	x
33	Lewis	Dave	Lumentum	Lumentum	x
34	Li	David	Hisense	Hisense	x
35	Liang	Edward	AOI	AOI	x
36	Lingle Jr	Robert	OFS	OFS	x
37	Lyubomirsky	Ilya	Inphi	Inphi	x

	Last Name	First Name	Employer	Affiliation	10-July-2018
38	Maki	Jeff	Juniper Networks	Juniper Networks	x
39	Malicoat	David	Malicoat Networking Solutions	SENKO/Aquantia	x
40	Marques	Flavio	Furukawa Electric LatAm	Furukawa Electric LatAm	x
41	Martin	Arlon	Samtec	Samtec	x
42	Masuda	Takeo	OITDA/PETRA	OITDA/PETRA	x
43	Mazzini	Marco	Cisco	Cisco	x
44	McSorley	Greg	Amphenol	Amphenol	x
45	Mein	John	DustPhotonics	DustPhotonics	x
46	Melton	Stuart	US Conec	US Conec	x
47	Murty	Ramana	Broadcom	Broadcom	x
48	Neveux	Paul	Superior Essex	Superior Essex	x
49	Nicholl	Gary	Cisco	Cisco	x
50	Nolan	John	Cavium	Cavium	x
51	Nowell	Mark	Cisco	Cisco	x
52	Parsons	Earl	CommScope	CommScope	x
53	Pimpinella	Rick	Panduit	Panduit	x
54	Pozzebon	Dino	Microsemi	Microchip	x
55	Ruibo	Han	CMCC	CMCC	x
56	Sayre	Ed	Samtec	Samtec	x
57	Sprague	Ted	Infinera	Infinera	x
58	Sun	Phil	Credo	Credo	x
59	Swanson	Steve	Corning	Corning	x
60	Tamura	Kohichi	Oclaro	Oclaro	x
61	Terada	Masaru	OFS	OFS	x
62	Tooyserkani	Pirooz	Cisco	Cisco	x
63	Tracy	Nathan	TE Connectivity	TE Connnectivity	x
64	Trowbridge	Steve	Nokia	Nokia	x
65	Ulrichs	Ed	Source Photonics	Source Photonics	x
66	Wang	Haifei	Huawei	Huawei	x
67	Welch	Brian	Luxtera	Luxtera	x
68	Withey	James	Fluke Networks	Fluke Networks	x
69	Xu	Yu	Huawei	Huawei	x
70	Yang	Mengna	AOI	AOI	x
71	Young	Adrian	Leviton	Leviton	x
72	Young	Jim	CommScope	CommScope	x
73	Zhuang	Yan	Huawei	Huawei	x
74	Zivny	Pavel	Tektronix	Tektronix	x