

Unapproved Minutes

**IEEE P802.3cu 100 Gb/s and 400 Gb/s over  
SMF at 100 Gb/s per Wavelength Task Force**

Plenary Meeting

September 9, 2019

Indianapolis, IN

Prepared by Kenneth Jackson and Mark Nowell

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# IEEE P802.3cu 100 Gb/s and 400 Gb/s over SMF at 100 Gb/s per Wavelength Task Force – September 9, 2019

Prepared by Kenneth Jackson

Meeting convened at 9AM

Chaired by Mark Nowell.

Acknowledgement of contributions by and a moment of silence for Jonathan King

Room introductions made

Chair reviewed agenda in [http://www.ieee802.org/3/cu/public/Sept19/agenda\\_3cu\\_01\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/agenda_3cu_01_0919.pdf)

## **Motion#1**

Move to approve the agenda for the IEEE P802.3cu 100 Gb/s and 400 Gb/s Operation over Single-Mode Fiber at 100 Gb/s per Wavelength Task Force

- Moved by: Brian Welch
- Second by: Steve Trowbridge

Passed by voice without opposition

Minutes from previous meeting (Vienna) were posted shortly after the May 2019 Task Force Group meeting. Group discussed the meeting minutes philosophy motivated by an objection to the Vienna minutes.

## **Motion #2**

Move to approve the July 2019 v3 minutes with corrected spelling of an individual's name and removal of detail from all the presentations from the IEEE P802.3cu 100 Gb/s and 400 Gb/s Operation over Single-Mode Fiber at 100 Gb/s per Wavelength Task Force

- Moved by: Brian Welch
- Seconded by: John Johnson

Approved by voice without opposition

Chair reviewed Task Force Organization

Chair reminded participants to observe meeting decorum.

Chair reviewed the reflector and web information.

Chair reviewed the ground rules for the meeting.

Photography and recording are not permitted.

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/cu/public/Sept19/agenda\\_3cu\\_01\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/agenda_3cu_01_0919.pdf)

Chair read the Guidelines for IEEE-SA Working Group meetings and Patent Policy.

Chair requested a call for patents (9:49AM). *None were raised.*

Chair reviewed participation in IEEE 802 Meetings.

Chair reviewed the IEEE 802.3 Standards Process---Task Force phase.

No liaisons or communications

Chair mentioned the possibility of Ad Hocs.

Task Force documentation, PAR CSD & objectives

Draft timeline presented (*not adopted/approved*)

Chair reviewed Goals for This Meeting

- Review technical contributions
- Adopt remaining baseline if consensus exists
- Depending on progress, initiate working document (D1.0) for task force review
- Changes to objectives if necessary

Chair presented a slide on potential modifications to the objectives (based on preview of meeting presentations)

Room discussion on “loss” vs. “reach” based objective.

Chair reviewed meeting logistics and meeting schedule for the day.

[http://www.ieee802.org/3/cu/public/Sept19/agenda\\_3cu\\_01\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/agenda_3cu_01_0919.pdf)

Future Meetings:

- November 2019 Plenary
  - Week of November 11, 2019 – Waikoloa Village, HI USA
- January 2020 Interim
  - Week of January 20, 2020 -- Geneva, Switzerland
- March 2020, Plenary
  - Week of March 16, 2020. Atlanta, Ga.
- May 2020, Interim
  - Week of May 18, 2020. Pasadena, Ca

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

**Presentation #1: “Editorial Update”. Gary Nicholl, Cisco**

See [http://www.ieee802.org/3/cu/public/Sept19/nicholl\\_3cu\\_01a\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/nicholl_3cu_01a_0919.pdf)

- Team: Gary Nicholl (Chief Editor), David Lewis (Editor for optical clauses), Mark Kimber (Advisor and reviewer for optical clauses)
- D0.4 has been posted and received no extra comments. Presenter thanked Pete Anslow for his thorough review and feedback on the previous D0.3.

**Presentation #2:** “Further test results for 400GBASE-LR4”, Yu Xu, Huawei

See [http://www.ieee802.org/3/cu/public/Sept19/3cu\\_01a\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/3cu_01a_0919.pdf)

- Presented updated transmission results with an uncooled transmitter over different amounts of dispersion and compared against lewis\_3cu\_adhoc\_061919\_v2 presentation
- Presenter showed high TDECQ values are further exacerbated when tested at high temperature
- Presented some observations about mazzini\_3cu\_adhoc\_070319 and mazzini\_3cu\_adhoc\_082119 (slides were updated to correct some inaccuracies identified by Marco Mazzini via email reflector)
- Presenter raised concerns about lack of margin or link budget associated with a 10km link and observed reducing reach or switching to LAN-WDM were possible alternatives

**Presentation #3:** “400GBASE-LR4 Dispersion Testing”, Brian Welch, Cisco

See [http://www.ieee802.org/3/cu/public/Sept19/welch\\_3cu\\_01a\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/welch_3cu_01a_0919.pdf)

- Presenter showed updated experimental data (plot of TDECQ vs. Dispersion) that included positive and negative dispersion testing
- Presenter analyzed results to show TDECQ margin versus various scenarios of specification

**Presentation #4:** “Feasibility Of 400GBASE-LR4 Using EML Transmitters On CWDM Grid Over 10 km (6.3 dB Channel Loss) of Single Mode Fiber”, Kohichi Tamura, CIG {Presented by David Lewis, Lumentum}

See [http://www.ieee802.org/3/cu/public/Sept19/tamura\\_3cu\\_01a\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/tamura_3cu_01a_0919.pdf)

- Presented EML transmission experiments using a specific 10km fiber with slightly greater than worst case dispersion.
- Presented optical eyes and BER before/after max positive dispersion for 3 cases which included the effect of pre-equalization to compensate for dispersion.

**Presentation #5:** “400GBASE-LR4 Link Budget Proposal”, Chris Cole, Finisar

See [http://www.ieee802.org/3/cu/public/Sept19/cole\\_3cu\\_01b\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/cole_3cu_01b_0919.pdf)

- Presenter observed that based on feedback from end users (many listed and quotes provided) the main usage of 10 km reaches was driven by the need for the extra link budget that those interfaces supported. An actual 10km reach wasn't the primary feature
- Presenter proposed a reduced (6km) reach with a 10.5dB overall link budget
- Presenter showed a history of IEEE nomenclatures and proposed maintaining the LR4 nomenclature due to the consistent link budget.
- Presenter clarified that the supporters listed on Pg 3 did not cover the information in the appendix

**Presentation #6:** “Maximum distance for 400GBASE-LR4”, Peter Stassar, Huawei

See [http://www.ieee802.org/3/cu/public/Sept19/stassar\\_3cu\\_01\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/stassar_3cu_01_0919.pdf)

- Presenter reviewed data from previous presentations including TDECQ vs. dispersion, TDECQ-SECQ vs. dispersion. Suggested a CWDM reach of ~ 7 km seemed appropriate.
- Presenter proposed the choice was between using an 800 GHz wavelength chanbased configuration with distances up to 10 km or an option using a CWDM based configuration with distances up to 7 km.

- Presenter also proposed introducing an additional parameter TDECQ – SECQ, with a straw man limit of 2.5 dB.

**Presentation #7:** “400GBASE-LR4 (7 km) Baseline Proposal”, David Lewis, Lumentum

See [http://www.ieee802.org/3/cu/public/Sept19/lewis\\_3cu\\_01\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/lewis_3cu_01_0919.pdf)

- Presenter reviewed updated proposal that included CWDM based 7 km reach with 11 dB power budget having 6.3 dB insertion loss and 4.7 dB for penalties. Penalties include 3.9 dB TDECQ, 0.5 dB MPI, 0.3 dB DGD
- It was noted that if adopted, this would require a change in the objective

**Straw Poll #1:**

I support adopting a baseline proposal that would define a CWDM-based, four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least 6 km, with 10.5dB link budget.

Y: 44 N: 0 A: 8

**Straw Poll #2:**

I support modifying the objective “Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least 10 km” to be consistent in line with a shorter reach with a form similar to:

1. Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least x km.
2. Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least x km with a total channel insertion loss of  $\geq 6.3$  dB.

A: 38 B: 3

**Straw Poll #3:**

I support modifying the objective to “Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least x km” where x is:

1. 5
2. 6

A: 0 B : 46 Abstain: 9

David Lewis, Gary Nicholl and Chris Cole were asked to work-offline to develop a follow up presentation that incorporated the consensus direction indicated by the Task Force.

**Follow-up Presentation #8:** “400GBASE-LR4 (6 km) Baseline Proposal”, David Lewis

(Lumentum)

See [http://www.ieee802.org/3/cu/public/Sept19/lewis\\_3cu\\_02a\\_0919.pdf](http://www.ieee802.org/3/cu/public/Sept19/lewis_3cu_02a_0919.pdf)

- Presenter made a follow-up baseline proposal with changes to tables (from presentation #7) to reflect a 6km reach objective
- Discussion about whether nomenclature needs to be changed from 400GBASE-LR4.

**Motion #3:**

Move to modify the objective “Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least 10 km” to be:

- Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least 6 km

And

- adopt the baseline proposal on pages 3-5 of lewis\_3cu\_02a\_0919.pdf for this objective with the addition of an editor's note indicating that the 400GBASE-LR4 naming is provisional

- Moved by: Dave Lewis
- Seconded by: Chris Cole
- Technical ( $\geq 75\%$ )
- Y: 44 N: 1 Abstain: 12

Motion Passes

#### **Motion #4:**

Motion to divide Motion #3

- Moved by Ayla Chang
- Seconded by Paul Kolesar
- Procedural  $\geq 50\%$

Y: 17 N: 22 Abstain: 15

Motion Fails

#### **Attendance Straw Polls**

- I will be attending in November in Hawaii -- 31
- I may be attending in November in Hawaii -- 16
- I will not be attending in November in Hawaii - 2
- I will be attending in January in Geneva -- 27
- I may be attending in January in Geneva -- 17
- I will not be attending in January in Geneva -- 8

#### **Motion #5:**

Move to adjourn:

- Moved by: Brian Welch
- Second by: David Ofelt

Passed by voice without opposition

*Meeting adjourned ~ 4:30pm*

## Attendees

P802.3cu Task Force				9-Sep-19
Last Name	First Name	Employer	Affiliation	Monday
Anslow	Pete	Ciena Corporation	Ciena Corporation	x
Baldwin	Thananya	Keysight Technologies	Keysight Technologies	x
Bernstein	Gary	Leviton	Leviton	x
Bhatt	Vipul	Finisar	Finisar	x
Braun	Ralf-Peter	Deutsche Telekom	Deutsche Telekom	x
Brooks	Paul	Viavi Solutions	Viavi Solutions	x
Brown	Blake	UNH-IOL	UNH-IOL	x
Bruckman	Lee	Toga Networks	Huawei	x
Butter	Adrian	Avera Semi	Avera Semi	x
Chang	Frank	Source Photonics	Source Photonics	x
Chang	Xin	Huawei	Huawei	x
Chen	C. C. David	Applied Optoelectronics	Applied Optoelectronics	x
Cole	Chris	Finisar	Finisar	x
D'Ambrosia	John	FutureWei, US Subsidiary of Huawei	FutureWei, US Subsidiary of Huawei	x
Estes	Dave	Spirent Communications	Spirent Communications	x
Ferretti	Vince	Corning	Corning	x
Ghiasi	Ali	Ghiasi Quantum	Ghiasi Quantum, Inphi	x
He	Xiang	Huawei	Huawei	x
Isono	Hideki	Fujitsu Optical Components	Fujitsu Optical Components	x

Issenhuth	Tom	Huawei	Huawei	x
Jackson	Kenneth	Sumitomo	Sumitomo	x
Johnson	John	Broadcom	Broadcom	x
Kareti	Upen Reddy	Cisco	Cisco	x
Kim	Inho	Marvell Semiconductor	Marvell Semiconductor	x
Kimber	Mark	Semtech	Semtech	x
Kolesar	Paul	CME Consulting	CommScope	x
LeCheminant	Greg	Keysight Technologies	Keysight Technologies	x
Lee	Sylvanas	Leviton Network Solutions	Leviton Network Solutions	x
Lewis	Dave	Lumentum	Lumentum	x
Lingle, Jr.	Robert	OFS	OFS	x
Liu	Hai-Feng	HG_Genuine	HG_Genuine	x
Liu	Karen	Lightwave Logic	Lightwave Logic	x
Maki	Jeffery	Juniper Networks	Juniper Networks	x
Malicoat	David	Senko	Senko	x
Maniloff	Eric	Ciena	Ciena	x
Muller	Shimon	Axalume	Axalume	x
Nicholl	Gary	Cisco	Cisco	x
Nicholl	Shawn	Xilinx	Xilinx	x
Nowell	Mark	Cisco	Cisco	x
Ofelt	David	Juniper Networks	Juniper Networks	x
Ogawa	Daisuke	NTT Electronics	NTT Electronics	x
Palkert	Tom	Molex - MACOM	Molex - MACOM	x
Pepper	Gerald	Keysight Technologies	Keysight Technologies	x

Pham	Phong	US Conec	US Conec	x
Piehler	David	Dell EMC	Dell EMC	x
Pittala	Fabio	Huawei	Huawei	x
Pozzebon	Dino	microsemi	microsemi	x
Radhamohan	Rajesh	MaxLinear	MaxLinear	x
Sambasivan	Sam	AT&T	AT&T	x
She	Qingya	Fujitsu Network Communications	Fujitsu Network Communications	x
Shuai	Jia Long	Huawei	Huawei	x
Sommers	Scott	Molex	Molex	x
Sorbara	Massimo	Global Foundries	Global Foundries	x
Stassar	Peter	Huawei	Huawei	x
Takahara	Tomoo	Fujitsu	Fujitsu	x
Terada	Masaru	OFS	OFS	x
Trowbridge	Steve	Nokia	Nokia	x
Ulrichs	Ed	Source Photonics	Source Photonics	x
Wang	Roy	HPE	HPE	x
Welch	Brian	Cisco	Cisco	x
Xu	Yu	Huawei	Huawei	x
Yamamoto	Shuto	NTT	NTT	x
Young	James	Commscope	Commscope	x
Zhuang	Yan	Huawei	Huawei	x