Minutes

IEEE P802.3ck 100 Gb/s, 200 Gb/s and 400 Gb/s Electrical Interfaces Task Force

Plenary Meeting
July 16-18, 2019
Vienna, Austria

Prepared by Kent Lusted

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IEEE P802.3ck 100 Gb/s Electrical Lane Task Force – July 16, 2019

Prepared by Kent Lusted

IEEE P802.3ck 100 Gb/s, 200 Gb/s and 400 Gb/s Electrical Interfaces Task Force meeting convened at ~9:05 a.m., by Beth Kochuparambil, IEEE 802.3ck Task Force Chair.

Beth welcomed attendees.

Introductions were made.

Chair reviewed agenda in http://www.ieee802.org/3/ck/public/19_07/agenda_3ck_01_0719.pdf

Motion #1:
Move to approve the agenda:

- Moved by: Mark Gustlin
- Second by: Brian Holden
- Passed by voice without opposition

Chair noted that the May 2019 minutes were posted shortly after the meeting. Chair asked if there were any other corrections or modifications to be noted. No one responded.

Motion #2:
Move to approve the May 2019 meeting minutes

- Moved by: Mark Gustlin
- Second by: Mike Takefman
- Passed by voice without opposition

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

Chair reviewed the ground rules for the meeting.

Chair reviewed the IEEE structure.

Chair reviewed the Bylaws and Rules slides in
http://www.ieee802.org/3/ck/public/19_07/agenda_3ck_01_0719.pdf

Chair asked if there was anyone unfamiliar with the Bylaws or Rules. No one responded.

IEEE Patent Policy: Chair reviewed the 4 Patent-related slides contained in the agenda. Chair called 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 slide with a statement on the participation requirements for IEEE 802 Meetings. Chair noted that by participating in the IEEE 802 meeting, that participants accept these requirements. Chair asked if there were questions about the participation requirements. No one responded.

Chair reviewed the IEEE 802.3 Standards Process.

Chair showed links for the approved project documents.

Reviewed the email reflector and web information for the Task Force in the agenda deck.

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

Goals for the meeting:

- Technical discussions towards baseline consensus
- Adopt baselines where consensus is close
- Understand direction towards September

Chair reviewed the adopted timeline and the impact of unresolved baselines. Chair observes that the Task Force was doing great work but trending behind schedule. Reference receiver decisions were dependent on each other and holding back progress. Chair noted that a lack of

progress at the meeting would likely result in a timeline change, potentially to have a draft 1.0 as late as January 2020.

Chair noted that she would not be in attendance in September or November. The Task Force leadership would transition to the Vice-Chair, Kent Lusted, in coming weeks. Please include both Beth and Kent in emails for the next 3 weeks.

Chair noted a potential need for an interim Chief Editor. Participants interested should contact Kent and Beth. Chair reviewed the current editorial team and their affiliations.

Chair noted that a liaison letter and attachment from OIF was received in May. A new liaison was received from the OIF with an attachment. See http://www.ieee802.org/3/minutes/jul19/incoming/OIF_to_IEEE_802d3_CEI_112G_Jul_2019.pdf and http://www.ieee802.org/3/private/liaison_docs/OIF/OIF_to_IEEE_802d3_CEI_112G_Jul_2019_att1.pdf Mike Dudek and Tom Palkert agreed to prepare a response for consideration on Thursday.
Chair also reminded participants of the Informal Communication from IEEE 370 received in May. See: https://standards.ieee.org/project/370.html

Chair reviewed the presentation schedule.

Chair reviewed the future meeting dates.

Future Meetings:

- September 2019 Interim
    - Week of September 9, 2019 – Indianapolis, Indiana
- November 2019 Plenary
    - Week of November 11, 2019 -- Waikoloa Village, HI, USA
- January 2020 interim
    - Week of January 20, 2020 -- Geneva, Switzerland.

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

Chair reviewed the proposed ad hoc meeting schedule. Chair will announce ad hoc dates over the email reflector.

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

Presentation #1:
"Editor's Report", Howard Heck on behalf of Matt Brown
See: http://www.ieee802.org/3/ck/public/19_07/brown_3ck_01a_0719.pdf

- Chair noted that the draft was posted in the private area and provided the Task Force with login details.

Presentation #2:
"C2M Simulations with T-Coil model", Ali Ghiasi
See: http://www.ieee802.org/3/ck/public/19_07/ghiasi_3ck_02a_0719.pdf

- It was noted for nomenclature in the presentation that "ASIC" device means the host and "CDR" term means the module device.
- There was a typo on slide 7-8 that will be corrected in version '02a'.
- Discussed some ways to reuse the TDECQ algorithm for the measurement.
- Discussed the difference in results between a smaller Cd vs. the proposed inductor termination model change.

Break at ~10:20 a.m. Resumed at ~10:40 a.m.

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

Presentation #3:
"C2M simulation updates", Phil Sun
See: http://www.ieee802.org/3/ck/public/19_07/sun_3ck_01a_0719.pdf

- Updated version '01a' with typo fix
- Discussed the module-to-host results on slide 24 and the differences in the reference receiver optimization process.
- Discussed the module package parameter assumptions on slide 22. There was interest in investigating and proposing values for module-side package.
- Discussed the correlation between the whole link COM and the TP1a VEC. There was concern with the strength of the correlation.

Presentation #4:
"100G C2M TP1a Channel/System Analysis", Ed Frlan
See: http://www.ieee802.org/3/ck/public/19_07/frlan_3ck_01_0719.pdf

- There was a request for system vendor feedback on the feasibility of improving the channel quality.

Chair reviewed the plans for the rest of the day. There were a few C2M straw polls planned. The FEC topic was planned for the afternoon.

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

Break at ~12:05 p.m. Resumed at ~1:05 p.m.

Presentation #5:
"RX FFE Reference Receiver", Tom Palkert
See: http://www.ieee802.org/3/ck/public/19_07/palkert_3ck_01_0719.pdf

- Discussed Cd, Cp, VEO, and VEC values used
- Discussed power impact of reference RX on actual design
- Concern expressed from the floor on changing parameters of inductor termination
- Clarified FIR optimization statements

Presentation #6:
"The effect of host trace length on 100G chip to module performance – Updated", Mike Dudek
See: http://www.ieee802.org/3/ck/public/19_07/dudek_3ck_01_0719.pdf

- It was noted that the short channels studied do not have via breakout or multiple crosstalk aggressors. The breakout and other impairments would change the results.
- Discussed the common system configurations with short channels that supports copper cables and optical modules. It was noted that not all of the lower host length was realistic in design.

Presentation #7:
"C2M TP1a/TP4 Methodology", Phil Sun
See: http://www.ieee802.org/3/ck/public/19_07/sun_3ck_02_0719.pdf

- Discussed the two proposed methodologies from a test and measurement perspective.
- It was noted these proposed methodologies were intended to measure a transmitter compliance at TP1a or TP4, not receiver.
- It was noted that the waveform amplitude would be approximately 600mV for the waveform and only 20-30mV VEO.

Presentation #8:
"100G C2M Channel Model Update (Module-to-Host)", Jane Lim
See: http://www.ieee802.org/3/ck/public/19_07/lim_3ck_02a_0719.pdf

- Updated version '02a' with a link to the channels on the website.
- It was noted that the shallow via goes to layer 10 and the long via goes to layer 23.
- It was noted that the COM results on slide 17 does not include the host package; it stops at TP5.
- There was a request to check the data on slide 17 for the cases when the reference receiver C had better performance than reference receiver B.

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

Break at ~3:15 p.m. Resumed at ~3:40 p.m.

Presentation #9:
"P802.3ck C2M AUI Small Group Update", Kent Lusted
See: http://www.ieee802.org/3/ck/public/19_07/lusted_3ck_01_0719.pdf

- No questions or comments

Vice Chair gave summary of C2M presentations and subsequent discussion:

- Good Progress on Host-to-Module
- There was some support for the inductor termination
- A potential path forward (common theme) was the 5-tap RXFFE Ref RX
- Short channels were of concern, more analysis was wanted
- Possible schedule impact if baseline was not adopted at the meeting

Straw Poll #1:
I would support the use of the healey-proposed termination package model (host-side and module-side) for the C2M interface analysis.

- Host-side aligns with healey proposal per healey_3ck_adhoc_01_061219 using values in proposal (but with Rd=50 ohm)
- Module-side based on healey proposal per healey_3ck_adhoc_01_061219 using with values TBD

Y: 31, N: 1 , A: 11

Chair noted that she was aware of a potential late contribution in development to address some concerns raised on short channels and the C2M topic would be revisited later in the week. There was a request to communicate schedule changes for straw polls & motions over the reflector in case attendees happen to be in another Task Force at the time.

Presentation #10:
"Towards Consensus on 100GE CR/KR PCS&FEC&PMA Baseline", Louis Lu
See: http://www.ieee802.org/3/ck/public/19_07/lu_3ck_01_0719.pdf

- Discussed auto-negotiation and training protocol impacts
- Discussed use cases, but there was opposition expressed from the floor that this was of small impact.

Presentation #11:
"Error Statistics Study for 802.3ck Channels", Xiang He
See: http://www.ieee802.org/3/ck/public/19_07/he_3ck_01a_0719.pdf

- Chair asked if there was opposition to seeing this presentation '01a' with a technical update (slide 7), no opposition was expressed.
- Discuss that the DFE error propagation was not a likely cause of the errors on slide 5.

Presentation #12:
"A Dual FEC option for 100GBASE-KR1/CR1", Mark Gustlin
See: http://www.ieee802.org/3/ck/public/19_07/gustlin_3ck_01_0719.pdf

- Discussed pause capability impact of retimers in the path.
- Discussed the default interleave mode choices

Chair noted that the FEC related straw polls were deferred until Thursday in order to facilitate further consensus building.

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

Presentation #13:
"100 Gbps Copper Cable Measurement and S-Parameter File", Nathan Tracy
See: http://www.ieee802.org/3/ck/public/19_07/tracy_3ck_01b_0719.pdf

- Updated version '01b' with technical updates and additional data.
- Channels posted at http://www.ieee802.org/3/ck/public/tools/cucable/tracy_3ck_02_0719.zip

- The results on slide 8-9 were at TP1, not end-to-end. Author expected future improvement in the results.

Chair reviewed the plans for Wednesday. The C2C topic was pushed to Thursday. The C2M topic would be revisited Wednesday afternoon.

Chair announced a start time of 8:30 a.m. for Wednesday.

Break for the day at ~6:05 p.m.

IEEE P802.3ck 100 Gb/s Electrical Lane Task Force – July 17, 2019

Prepared by Kent Lusted

IEEE P802.3ck 100 Gb/s, 200 Gb/s and 400 Gb/s Electrical Interfaces Task Force meeting convened at ~8:30 a.m., by Beth Kochuparambil.

Chair welcomed attendees.

Chair reviewed the plans for the day.

Presentation #14:
"Updated TP1-TP4 QSFP-DD 2m Reach Channel", Tom Palkert
See: http://www.ieee802.org/3/ck/public/19_07/palkert_3ck_02_0719.pdf

- Discussed the ICN parameters assumed in the COM code.

Presentation #15:
"Representing imperfections for CR Host Board", Liav Ben-Artsi
See: http://www.ieee802.org/3/ck/public/19_07/benartsi_3ck_01a_0719.pdf

- Discussed the power sum crosstalk suggestion on slide 12
- There was a request to clarify which channels were used in the analysis.

Presentation #16 :
"Closing CR Baseline Specifications with Signal to Noise Distortion Ratio (SNDR)", Rich Mellitz
See: http://www.ieee802.org/3/ck/public/19_07/mellitz_3ck_01a_0719.pdf

- Discussed the rise time use/calculation
- Discussed the use of ICN and impulse creation
- Clarified the noise calculation

Break at ~10:10 a.m. Resumed at ~10:30 a.m.

Presentation #17:
"100G CR End-to-End Channel Analysis Updates", Jane Lim
See: http://www.ieee802.org/3/ck/public/19_07/lim_3ck_01a_0719.pdf

- Discussed the number and mix of copper cable ports on a switch that would not have CDR devices.
- Reviewed the OSFP build up assumptions.

Presentation #18:
"Baseline Proposal Cable assembly, Host, MTF, and Channel Insertion Loss", Chris Diminco
See: http://www.ieee802.org/3/ck/public/19_07/diminico_3ck_01a_0719.pdf

- Discussed the cable loss assumptions and mated test fixture losses on slide 8.

Presentation #19:
"Streamlining P802.3ck MDIs", Nathan Tracy
See: http://www.ieee802.org/3/ck/public/19_07/tracy_3ck_03a_0719.pdf

- Updated version '03a' with additional content. No one responded.

Motion #3:
Move to:

- remove the microQSFP MDI from the adopted baseline based on the recommendation provided in tracy_3ck_03a_0719

M: Nathan Tracy
S: Tom Palkert
Technical (>=75%)
Y: 31, N: 0 , A: 2
Results: motion passes 11:29 a.m.

Chair noted that the copper cable PHY type is in a difficult position; she observed that there multiple groups (IL budget needed and IL budget limitation of SerDes) without much work of consensus for solutions.

Straw Poll #2:
I would support the adoption of slides 8 & 9 of diminico_3ck_01a_0719 as part of the copper cable baseline?
Yes: 16 , No: 15 , Abstain: 14

Chris Diminico asked if the Chair would consider bringing the topic back for consideration by the Task Force. Chair agreed, subject to time availability.

Straw Poll #3:
What would be acceptable way(s) to move forward on the copper cable PHY?

A: Compromise on 28.5dB IL target (TP0-TP5)
B: Decouple from backplane serdes (different ref RX)
C: Stronger FEC (stronger than proposed interleaved FEC)
D: Reduce Cable length (less than 2m)
E: Adjust host allocation
F: Remove the objective

{Chicago}
A: 16, B: 2, C: 1, D: 12, E: 23 , F: 1
It was noted that this straw poll was to measure which paths forward are worthwhile to explore to help us make progress on the copper cable objective.

Break at ~12:20 p.m. Resume ~1:20 p.m.

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

Chair noted that there was a late presentation request from Upen Kareti regarding his backplane channels (previously contributed). She asked if there was objection to hearing this presentation. No one responded.

Presentation #20:
"Backplane Reference Receiver Baseline", Howard Heck
See: http://www.ieee802.org/3/ck/public/19_07/heck_3ck_01b_0719.pdf

- Updated version '01b' with editorial changes. No objection.
- Discussed the reference RX trends on slide 16.

Presentation #21:
"106Gbps Ethernet LR COM Investigation (V)", Mike Li
See: http://www.ieee802.org/3/ck/public/19_07/li_3ck_01a_0719.pdf

- Updated version '01a' with a new line on a graph. No objection
- Discussed COM results in the detailed analysis on slide 13.

Presentation #22:

“Effects of Non-ideal Equalizer Coefficients on COM”, David Rennie
See: http://www.ieee802.org/3/ck/public/19_07/rennie_3ck_01b_0719.pdf

- “Updated ‘01b’ with a link/reference. No objection.
- On slide 9, the step size was 0.1.
- Discussed the impact to COM on a change of tap weight to an FFE tap.

Break at ~3:15 p.m. Resumed at ~3:45 p.m.

Presentation #23:
“Update to Orthogonal Channels”, Upen Reddy Kareti
See: http://www.ieee802.org/3/ck/public/19_07/kareti_3ck_01_0719.pdf

- Files are posted at http://www.ieee802.org/3/ck/public/tools/backplane/kareti_3ck_01a_1118_ortho.zip
- Chair noted that the channels replace the previous contribution. All of the thru-channels had an error. The old folder in the zipfile was removed. File names remain the same, but folder name changed.

Presentation #24:
“Baseline Proposal for 100, 200, and 400 Gb/s Backplane”, Clint Walker
See: http://www.ieee802.org/3/ck/public/19_07/walker_3ck_01d_0719.pdf

- Updated version ‘01d’ with format changes. No objection.
- Discussed some possible changes to baseline. No changes were made.

Straw poll #4:
I would support the adoption of slides 6-12 of walker_3ck_01d_0719 as additions to the backplane baseline (with the exception that Bmaxg = 0.05)
Yes: 23 , No: 5 , Abstain: 15

Motion #4:
Move to:

- Adopt slides 6-12 of walker_3ck_01d_0719 as additions to the backplane baseline (with the exception that Bmaxg = 0.05)

M: Clint Walker
S: Howard Heck
Technical (>=75%),
Y: 23 , N: 6 , A: 17
Results: passes 4:25 p.m.

Chair asked if there was objection to hearing a late presentation on the C2M topic. No one responded.

Presentation #25:
"P802.3ck C2M AUI Challenges", Kent Lusted
See: http://www.ieee802.org/3/ck/public/19_07/lusted_3ck_03_0719.pdf

- Discussed the various challenges and potential ways to progress forward.

No further straw polls to be taken on C2M this week.
Chair reminded participants to sign into the IEEE Meeting Attendance Tool and sign the attendance book.

Presentation #26:
"100G C2C-S Channel Estimate", Jane Lim
See: http://www.ieee802.org/3/ck/public/19_07/lim_3ck_04a_0719.pdf

- Discussed of tap weights/constraints
- Discussed COM analysis in presentation - started with C2M settings
- Discussed the need to build consensus on the COM parameters to use in channel analysis.
- It was noted that C2C channels for retimer to host ASIC are needed.

Presentation #27:
"How to Proceed on C2C Application", Ali Ghiasi
See: http://www.ieee802.org/3/ck/public/19_07/ghiasi_3ck_01_0719.pdf

- Discussed the perceived need for the longer reach C2C application.

Chair reviewed the plans for Wednesday. There was one C2C presentation with straw poll and liaisons. There were also 3 more late presentation requests: mated fixture channel, FEC, and copper cable. The late presentations had not been received yet. Chair asked participants to send straw polls to her.

Chair announced a start time of 8:45 a.m. on Thursday.

Break for the day at ~5:40 p.m.

IEEE P802.3ck 100 Gb/s Electrical Lane Task Force – July 18, 2019

Prepared by Kent Lusted

IEEE P802.3ck 100 Gb/s, 200 Gb/s and 400 Gb/s Electrical Interfaces Task Force meeting convened at ~9:00 a.m., by Beth Kochuparambil, IEEE 802.3ck Task Force Chair.

Beth welcomed attendees.

Chair reviewed the plans for the day. There were 3 late presentations for consideration. Chair asked if there was opposition to hearing the late presentations. No one responded.

Kent Lusted displayed the draft of the proposed liaison communication to OIF posted at http://www.ieee802.org/3/ck/public/19_07/Liaison_toOIF_July%202019DRAFT.docx . Changes were made and saved as IEEE_802d3_to_OIF_CEI_0719_draft.pdf. (See http://www.ieee802.org/3/minutes/jul19/outgoing/IEEE_802d3_to_OIF_CEI_0719_draft.pdf)

Motion #5:
Move that the IEEE P802.3ck Task Force approve IEEE_802d3_to_OIF_CEI_0719_draft.pdf with editorial license granted to the Chair (or his appointed agent) as liaison communication from the IEEE P802.3ck Task Force to OIF.
M: Mike Dudek
S: Tom Palkert
Procedural (>50%)
Results: passed by voice w/o opposition 9:08 a.m.

Presentation #28:
"100GEL MTF Measurements", Sam Kocsis
See: http://www.ieee802.org/3/ck/public/19_07/kocsis_3ck_01_0719.pdf

- Channels were posted to http://www.ieee802.org/3/ck/public/tools/index.html in the copper cable section of the webpage.
- The channels include the printed circuit boards attached.

Presentation #29:
"P802.3ck C2C AUI Small Group Update", Kent Lusted
See: http://www.ieee802.org/3/ck/public/19_07/lusted_3ck_02_0719.pdf

- There was a request to investigate the PTH values assumed on slide 10.

- Presenter noted that the topic of link training had not been discussed in the small group.

Chair reminded participants to sign the attendance book.

Straw Poll #5:
I would support the proposed C2C “no FEC termination” parameters in lusted_3ck_02_0719, slide 10 as an initial target for investigation
Y: 43 , N: 0 , A: 5

Straw Poll #6:
I would support continuing to explore another C2C case (appx 26-28 dB IL and segmented FEC) in addition to the C2C “no FEC termination” from Straw Poll #5
Y: 6 , N: 22 , A: 12

Presentation #30:
“Potential Issues and Solution of Dual FEC option for 100GBASE-KR1/CR1”, Louis Lu
See: http://www.ieee802.org/3/ck/public/19_07/lu_3ck_02_0719.pdf

- There was discussion on the auto-negotiation method and preferences.

Straw Poll #7:
For the 100GBASE-KR1/CR1 PHYs, I would support the following FEC mechanism:

A: Single FEC, non Interleaved (Clause 91)
B: Single FEC, interleaved (nicholl_3ck_01b_0519)
C: Dual FEC, gustlin_3ck_01_0719
D: Need more information

{pick one}
A: 7 , B: 1 , C: 25 , D: 14

Straw Poll #8:
I would like to see a realistic channel that has a FEC performance issue solved by "interleaved FEC" before adopting it.
Y: 11 , N: 9 , A: 33

Straw Poll #9:
For channels showing evidence of FEC performance concerns, I would prefer addressing concerns by:

A: PMD solutions e.g. Constraining DFE weights (bmax=[0.85, 0.2]) or Retimer or EoBD (Proposed in lu_3ck_01_0319 evaluated in anslow_3ck_adhoc_01_041019)

B: Interleaved FEC
{pick one}
A: 6 , B: 23

Room count: 65

Attendance straw polls:
I will attend the IEEE 802.3ck meetings at the September interim in Indianapolis, IN, USA (week of September 9, 2019)
Y: 44 , M: 16
I will attend the IEEE 802.3ck meetings at the November Plenary in Waikoloa Village, HI, USA (week of November 11, 2019)
Y: 41 , M: 18

Chair announced that she will not be attending the September and November meetings due to personal absence. Please direct correspondence to the Vice Chair, Kent Lusted.

Chair noted that draft 1.0 would not be created after this meeting due to a lack of progress by the Task Force. The editorial team may implement an updated draft, at their discretion.

Chair announced ad hocs on July 31, August 14, August 28. It will be announced over the reflector.

Presentation #31:
"Baseline Proposal Cable Assembly, Host, MTF, and Channel Insertion Loss", Chris Diminico
See: http://www.ieee802.org/3/ck/public/19_07/diminico_3ck_02a_0719.pdf

- Discussed the math on slide 5.

Straw Poll #10:
I would support the adoption of Figure XX–1—28.5 dB channel insertion loss budget at 26.56 GHz in diminico_3ck_02a_0719.pdf slide 5 and slide 6 for Annex 162A - Figure 162A–1—28.5 dB channel insertion loss budget at 26.56 GHz with the addition of an editors note: Further study is required to confirm 28.5 dB.
Yes: 24 , No: 4 , Abstain: 25

Motion #6:
Move to adopt:

Figure XX–1—28.5 dB channel insertion loss budget at 26.56 GHz in diminico_3ck_02a_0719.pdf slide 5 and slide 6 for Annex 162A - Figure 162A–1—28.5 dB channel insertion loss budget at 26.56 GHz with the addition of an editors note: Further study is required to confirm 28.5 dB. With editorial license

M: Chris Diminico
S: Adee Ran
Technical (>=75%),
Y: 24 , N: 9 , A: 17
Results: fails 11:47 a.m.

Straw Poll #11
I would support the adoption of slides 24, 26-27 of diminico_3ck_01a_0719 as part of the copper cable baseline
Yes: 24 , No: 0 , Abstain: 20

Motion #7:
Move to adopt:

- slides 24, 26-27 of diminico_3ck_01a_0719 as part of the copper cable baseline

M: Chris Diminico
S: Mike Dudek
Technical (>=75%),
Y: 33 , N: 0 , A: 11
Results: passes 11:57 a.m.

Chair discussed the timeline and the need to update it.

Presentation #32:
“Timeline”, Beth Kochuparambil
See: http://www.ieee802.org/3/ck/P802_3ck_Timeline_18july19.pdf

Beth Kochuparambil passed the chair to Kent Lusted.

Motion #8:
Move to:

- adopt the updated timeline in kochuparambil_3ck_01_0719, slide 2

M: Beth Kochuparambil
S: Mike Li
Procedural (>50%)
Y: 54, N: 0 , A: 2
Results: passes 12:04 p.m.

Kent Lusted passed the chair to Beth Kochuparambil.

Motion #9:
Move to adjourn.
M: Mike Dudek
S: Liav Ben-Artsi
Procedural (>50%)
Passed by voice without opposition.

Meeting adjourned at ~12:05 p.m.

Attendees

Last Name	First Name	Employer	Affiliation	July 16, 2019	July 17, 2019	July 18, 2019
Anslow	Pete	Ciena Corporation	Ciena Corporation	x		x
Baumgartner	Steven	Avera Semiconductor	Avera Semiconductor	x	x	x
Beecroft	Jon	Cray	Cray	x	x	x
Ben Artsi	Liav	Marvell Semiconductor	Marvell Semiconductor	x	x	x
Bouse	David	Tektronix	Tektronix	x	x	x
Braun	Ralf-Peter	Deutsche Telekom	Deutsche Telekom	x		x
Brooks	Paul	Viavi Solutions	Viavi Solutions	x	x	x
Butter	Adrian	Avera Semiconductor	Avera Semiconductor	x	x	x
Chang	Frank	Source Photonics	Source Photonics	x		
Chang	Jacky	HPE	HPE	x	x	x
Choudhury	G. Mabud	OFS	OFS	x	x	
Cole	Chris	Finisar	Finisar	x		

Dawe	Piers	Mellanox	Mellanox	x	x	x
DiMinico	Christopher	MC Communications/Panduit	MC Communications/Panduit		x	x
Dudek	Mike	Marvell Technologies	Marvell Technologies	x	x	x
Estes	Dave	Spirent Communications	Spirent Communications	x	x	x
Frlan	Ed	Semtech	Semtech	x	x	x
Ghiasi	Ali	Ghiasi Quantum	Ghiasi Quantum	x	x	x
Gilb	James	GA-ASI, USD, Gilb Consulting	GA-ASI, USD, Gilb Consulting		x	
Gorshe	Steve	microsemi	Microchip			x
Gustlin	Mark	Cisco	Cisco	x	x	x
He	Xiang	Huawei	Huawei	x	x	x
Healey	Adam	Broadcom Inc	Broadcom Inc	x	x	x
Heck	Howard	Intel	Intel	x	x	x
Hess	Dave	Corddata	Corddata		x	
Hiroaki	Kukita	Yamaichi Electronics	Yamaichi Electronics	x	x	x
Holden	Brian	Kandou Bus	Kandou Bus	x	x	x

Huang	Zhaorui	China Mobile	China Mobile	x	x	
Issenhuth	Tom	Huawei	Huawei	x		x
Jackson	Ken	Sumitomo	Sumitomo	x		x
Kabra	Lokesh	Synopsys	Synopsys			x
Kareti	Upen Reddy	Cisco	Cisco	x	x	x
Kasapi	Athos	Cadence	Cadence	x	x	x
Kawatsu	Yasuaki	Apresia Systems	Apresia Systems	x		
Kimber	Mark	Semtech	Semtech	x		x
Klempa	Mike	UNH-IOL	UNH-IOL	x	x	
Kochuparambil	Beth	Cisco	Cisco	x	x	x
Kocsis	Sam	Amphenol	Amphenol	x	x	x
Kurata	Kazuhiko	AIO Core	AIO Core	x		
Lackner	Hans	QoSCom	QoSCom			x
Lambrecht	Frank	Gigamon Inc	Gigamon Inc	x	x	x
LeCheminant	Greg	Keysight Technologies	Keysight Technologies	x		x

Lewis	Dave	Lumentum	Lumentum	x		x
Li	Mike	Intel	Intel	x	x	x
Lim	Jane	Cisco	Cisco	x	x	x
Lu	Yuchun	Huawei	Huawei	x	x	x
Lusted	Kent	Intel	Intel	x	x	x
Maki	Jeffery	Juniper Networks	Juniper Networks	x		x
Maniloff	Eric	Ciena	Ciena	x		
Marques	Flavio	Furukawa Electric	Furukawa Electric			x
Marris	Arthur	Cadence	Cadence	x	x	x
Matoglu	Erdem	Amphenol	Amphenol	x	x	x
Mellitz	Richard	Samtec	Samtec	x	x	x
Muller	Shimon	Axalume	Axalume	x	x	x
Nakamoto	Edward	Spirent Communications	Spirent Communications	x	x	x
Nicholl	Shawn	Xilinx	Xilinx	x	x	x
Nowell	Mark	Cisco	Cisco	x		x

Ofelt	David	Juniper Networks	Juniper Networks	x	x	
Palkert	Tom	Molex - MACOM	Molex - MACOM	x	x	x
Pham	Phong	US Conec	US Conec	x		
Pitwon	Richard	AIO Core	Resolute Photonics	x		
Pozzebon	Dino	microsemi	microsemi	x	x	x
Ran	Adee	Intel	Intel	x	x	x
Rechtman	Zvi	Mellanox	Mellanox	x	x	x
Rennie	David	Synopsys	Synopsys	x	x	x
Shrikhande	Kapil	Innovium	Innovium	x	x	x
Shuai	Jialong	Huawei	Huawei	x	x	
Sluyski	Mike	Acacia Communications	Acacia Communications	x		
Sommers	Scott	Molex	Molex	x	x	x
Song	Chen	ZTE	ZTE	x		
Sprague	Ted	Infinera	Infinera	x		x
Stassar	Peter	Huawei	Huawei	x		x

Sun	Liyang	Huawei	Huawei	x	x	x
Sun	Phil	Credo	Credo	x	x	x
Takefman	Mike	Inphi	Inphi	x	x	x
Tooyserkani	Pirooz	Cisco	Cisco	x	x	x
Tracy	Nathan	TE Connectivity	TE Connectivity	x	x	x
Trowbridge	Steve	Nokia	Nokia	x		x
Twombly	Jeff	Credo	Credo	x	x	x
Ulrichs	Ed	Source Photonics	Source Photonics	x	x	x
Walker	Clint	AlphaWave IP	AlphaWave IP	x	x	x
Welch	Brian	Cisco	Cisco	x		
Wu	Chengbin	ZTE	ZTE	x		
Xin	Chang	Huawei	Huawei	x		x
Yam	Julius	Semtech	Semtech	x		
Young	James	CommScope	CommScope	x	x	x
Zerna	Conrad	Frauerhofer IIS	Frauerhofer IIS		x	

Zhuang	Yan	Huawei	Huawei	x	x	x
Zivny	Pavel	Tektronix	Tektronix	x	x	x