

Unapproved Minutes

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

Interim Meeting  
September 11-12, 2019  
Indianapolis, IN, USA

Prepared by Shawn Nicholl and Kent Lusted

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# IEEE P802.3ck 100 Gb/s Electrical Lane Task Force – September 11, 2019

*Prepared by Shawn Nicholl*

IEEE P802.3ck 100 Gb/s, 200 Gb/s and 400 Gb/s Electrical Interfaces Task Force meeting convened at ~09:05 a.m., by Kent Lusted, IEEE 802.3ck Task Force Vice-Chair.

Kent welcomed attendees.

Chair noted that Task Force Chair Beth Kochuparambil was not in attendance at the meeting. Kent noted that he would be acting in the Chair capacity until Beth's return.

Chair noted that Shawn Nicholl has been appointed as interim Recording Secretary while he was fulfilling other leadership responsibilities.

Introductions were made.

Chair reviewed the agenda found in:

[http://www.ieee802.org/3/ck/public/19\\_09/agenda\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/agenda_3ck_01a_0919.pdf)

## **Motion #1:**

Move to approve the agenda:

- Moved by: Thananya Baldwin
- Second by: Mike Dudek
- Passed by voice without opposition

Chair noted that the July 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 July 2019 meeting minutes

- Moved by: Thananya Baldwin
- Second by: Brian Holden
- 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\\_09/agenda\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/agenda_3ck_01a_0919.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 reviewed the list of Task Force Leadership Team.

Chair announced that Beth Kochuparambil had given birth to a boy. Chair congratulated Mrs. Kochuparambil and her family. The Task Force gave a round of applause!

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

Chair noted that Draft 0.3 was posted in the private area. Chair noted that the Chief Editor requested that any comments be placed in a marked up PDF and shared with the Chief Editor.

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 presentations and discussions towards baseline proposals
- Adopt baselines where consensus exists
- Develop plan to close C2M, C2C, and Copper Cables baselines no later than November

Chair noted that no new liaison letters have been received since the July meeting.

Chair showed links for the approved project documents.

Chair reviewed the adopted timeline

[http://www.ieee802.org/3/ck/P802\\_3ck\\_Timeline\\_18july19.pdf](http://www.ieee802.org/3/ck/P802_3ck_Timeline_18july19.pdf)

Chair reviewed the presentation schedule.

Chair reviewed the future meeting dates.

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, USA

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

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

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

Introductions were made.

#### **Presentation #1:**

“Editor’s Report”, Howard Heck (on behalf of Matt Brown)

See: [http://www.ieee802.org/3/ck/public/19\\_09/brown\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/brown_3ck_01a_0919.pdf)

- Draft 0.3 posted in the Task Force private area
- Although there was currently no formal review process, the presenter welcomed feedback from the Task Force and indicated that all feedback would be considered by the editorial team.

- Chair acknowledged the work of the editorial team and Task Force responded with a round of applause

Chair noted a late presentation request from Mark Kimber. Chair asked if there were objections. No objections.

Chair noted several updated presentations from Rich Mellitz, Mike Li, Mark Gustlin, Liav Ben-Artzi, and Mau-lin Wu. Chair provided an overview of the changes. Chair asked whether there were any objections to hearing the presentations. No one responded.

#### **Presentation #2:**

“Backplane Reference Rx Tap Weight Data”, Howard Heck

See: [http://www.ieee802.org/3/ck/public/19\\_09/heck\\_3ck\\_01\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/heck_3ck_01_0919.pdf)

- Discussed whether it might be useful to limit the tap weights for the first few taps
- Discussed the Bch2\_b2p5\_7 channel

#### **Presentation #3:**

“ERL Investigations for Ethernet 106G Backplane (II)”, Mike Peng Li

See: [http://www.ieee802.org/3/ck/public/19\\_09/li\\_3ck\\_03\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/li_3ck_03_0919.pdf)

- On slide 6, it was noted that the results do not include a test fixture model.
- Clarification that these results include all the 802.3ck channels, even those that fail COM; suggestion to remove from the results those that fail COM

Break at ~10:20 a.m. Resumed at ~10:45 a.m.

Chair noted updated presentation from Rich Mellitz (mellitz\_3ck\_03a\_0919.pdf). Asked the Task Force whether there were objections to hearing the updated presentation. No objections.

#### **Presentation #4:**

“ERL KR Baseline Proposal”, Rich Mellitz

See: [http://www.ieee802.org/3/ck/public/19\\_09/mellitz\\_3ck\\_03a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/mellitz_3ck_03a_0919.pdf)

- Presenter noted that a revised 2.75 COM spreadsheet expected in mid-Sept timeframe that will contain ERL update as well as a fix that decouples Tx and Rx parameters
- It was noted that all of the channels in the analysis has less than 29dB IL.

Chair summarized the backplane presentations and discussions. He noted that a new COM version (2.75) is targeted for late September with an ERL fix and other fixes. Chair asked Rich Mellitz to provide a change log for participants.

Chair noted updated presentation from Rick Rabinovich (rabinovich\_3ck\_01a\_0919.pdf). Asked the Task Force whether there were objections to hearing the updated presentation. No objections.

**Presentation #5:**

“Examples of C2C Channels with Impairments 10dB 16dB 18dB 20dB Test Cases”, Rick Rabinovich

See: [http://www.ieee802.org/3/ck/public/19\\_09/rabinovich\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/rabinovich_3ck_01a_0919.pdf)

- Commenter indicated that NEXT is high. Speaker noted that his channels with FEXT are the ones that should be considered.

Break for lunch at ~11:55 a.m. Resumed at ~1:20 p.m.

**Presentation #6:**

“106Gbps C2C COM Investigation (II)”, Mike Peng Li

See: [http://www.ieee802.org/3/ck/public/19\\_09/li\\_3ck\\_02\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/li_3ck_02_0919.pdf)

- Discussed PTH value assumptions.
- There was discussion on the inclusion of c(-3) in the baseline. Author noted that the baseline assumed c(-3).

**Presentation #7:**

“C2C COM Simulation”, Ali Ghiasi

See: [http://www.ieee802.org/3/ck/public/19\\_09/ghiasi\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/ghiasi_3ck_01a_0919.pdf)

- On slide 14, presenter note an error: “4T FFE” should be “4T DFE”. Author to send updated version ‘01a’ with correction.
- Discussed PTH values and presence in C2C packages.
- There was a suggestion to sweep package lengths.

Chair noted updated presentation from Mike Peng Li and Ali Ghiasi (li\_3ck\_01b\_0919.pdf) containing editorial updates. Presentation was posted on the Task Force web page.

**Presentation #8:**

“Baseline Proposal for “100 Gb/s, 200 Gb/s, and 400 Gb/s Chip-to-Chip Attachment Unit Interface”, Mike Peng Li and Ali Ghiasi

See: [http://www.ieee802.org/3/ck/public/19\\_09/li\\_3ck\\_01b\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/li_3ck_01b_0919.pdf)

- Slide 8: Discussed steady state  $v_f$  values
- Slide 15: Authors noted that it should be “Differential-to-Common Mode Return Loss” instead of “Common Mode Return Loss”
- Discussed the potential of a minimum host loss

### **Straw Poll #1:**

I would support the proposed C2C informative IL target of:

- A. 20 dB
- B. 22 dB
- C. 24 dB

Choose 1.

Results: A: 42, B: 2, C: 0

Break at ~2:40 p.m. Resumed at ~3:10 p.m.

### **Presentation #8 (revised):**

“Baseline Proposal for “100 Gb/s, 200 Gb/s, and 400 Gb/s Chip-to-Chip Attachment Unit Interface”, Mike Peng Li and Ali Ghiasi

See: [http://www.ieee802.org/3/ck/public/19\\_09/li\\_3ck\\_01d\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/li_3ck_01d_0919.pdf)

- Presenters described the changes from the 01b version

### **Straw Poll #2:**

I would support the adoption of li\_3ck\_01d\_0919 slides 6-16 as a C2C baseline proposal.

Results: Yes: 43, No: 0, Abstain: 8

During the discussion of Straw Poll #2, the Chair confirmed that the baseline proposal assumed non-segmented FEC and a single C2C solution.

### **Motion #3:**

Move to adopt li\_3ck\_01d\_0919 slides 6-16 as a C2C baseline proposal.

M: Mike Peng Li

S: Ali Ghiasi

Technical ( $\geq 75\%$ )

Results: Yes: 48, No: 0. Abstain: 11

Results: Motion Passes!

### **Presentation #9:**

“100GBASE-KR1/CR1 FEC Thoughts”, Mark Gustlin

See: [http://www.ieee802.org/3/ck/public/19\\_09/gustlin\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/gustlin_3ck_01a_0919.pdf)

- On slide 8, discussed the difference in data between the non-interleaved vs. the interleaved FEC.
- There was a suggestion for an informative Annex containing details about findings through Task Force analysis.
- Discussed the impact of correlated errors; there were requests to see more data.
- There was a request to see more data from copper cable

### **Presentation #10:**

“FEC Latency and Power/Area Tradeoffs for 100G KR/CR”, Ilya Lyubomirsky

See: [http://www.ieee802.org/3/ck/public/19\\_09/lyubomirsky\\_3ck\\_01\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/lyubomirsky_3ck_01_0919.pdf)

- Comment that latency matters in storage applications which are latency sensitive ; also emerging AI applications
- Slide 5: Author confirmed that the complexity numbers were based on “area” estimates.

### **Presentation #11:**

“Summary of Error Propagation for 100GBASE-KR1/CR1”, Yan Zhuang

See: [http://www.ieee802.org/3/ck/public/19\\_09/zhuang\\_3ck\\_01\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/zhuang_3ck_01_0919.pdf)

- No questions from the audience

### **Presentation #12:**

“Auto-Negotiation for Dual mode FEC”, Yan Zhuang

See: [http://www.ieee802.org/3/ck/public/19\\_09/zhuang\\_3ck\\_02\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/zhuang_3ck_02_0919.pdf)

- Discussed how to determine whether to use Interleaved FEC in the field.
- Discussed the implications of CL 74 FEC with 10GBASE-KR

### **Straw Poll #3:**

I would support the adoption of Clause 91 as the FEC for 100GBASE-CR1 and 100GBASE-KR1

Results: Y: 26, N: 18, A: 21

During the discussion on Straw poll #3, there was a request to bring up slide 8 of ran\_3cd\_01\_0917.pdf. Chair honored the request. The slide was briefly discussed then removed from display.

### **Straw Poll #4:**

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

{Chicago Rules}

Results: A: 32, B: 3, C: 39

Room Count: 79

Chair gave summary of FEC presentations and discussion:

- Desire for more data for CR1
- Desire for more data supporting correlated errors in receivers
- Desire for more time to digest the latest FEC presentations

Chair reminded participants that a lack of clarity on the FEC direction at this meeting puts draft 1.0 (after November) at schedule risk.

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

Chair reviewed the plans for Thursday.

Chair announced a start time of 9:00 a.m on Thursday as per the posted agenda.

Break for the day at ~5:00 p.m.

# IEEE P802.3ck 100 Gb/s Electrical Lane Task Force – September 12, 2019

*Prepared by Shawn Nicholl*

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 Kent Lusted.

Chair welcomed attendees.

Chair reviewed the plans for the day.

Chair displayed the timeline and noted the need to consider and adopt baselines by the November meeting to remain on schedule.

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

Chair noted that there is a late presentation request from Mark Kimber regarding “Module on-die termination model”. He asked the attendees whether there are any objections to hearing this presentation. No one responded.

Chair noted that there is an updated presentation from Phil Sun with technical and editorial changes. Chair asked if there was objection to hearing the updated presentation. No one responded.

Chair noted that there is a late presentation request from Chris Diminico on the copper cable topic. Chair noted that he asked Chris Diminico to prepare the late presentation to facilitate discussion on the topic. Chair asked if there was objection to hearing the presentation if time permitted. No one responded.

## **Presentation #13:**

“Module on-die termination model”, Mark Kimber

See: [http://www.ieee802.org/3/ck/public/19\\_09/kimber\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/kimber_3ck_01a_0919.pdf)

- Slide 17: Author noted that the results are from looking into the CDR package.
- Discussed aspects of correlation between ERL and bandwidth
- Discussed the whole link simulations vs TP1a.
- Discussed ways to reduce ripple such as reducing Cp.

#### **Presentation #14:**

“C2M TP1a Criteria Considering Both Long and Short Host Traces”, Phil Sun

See: [http://www.ieee802.org/3/ck/public/19\\_09/sun\\_3ck\\_01b\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/sun_3ck_01b_0919.pdf)

- Slide4: It was noted that the results use  $Cd=110$ .
- Discussed VEC and VEO specifications
- Slide 5: Clarification that the channel represents a representative BGA footprint.
- Slide 4: It was noted that package values were swept and 19mm was the worst value checked. Discussion that shorter lengths (11mm or 15mm) would be worse
- Discussed the value of VEC and its dependency on the selected reference receiver

Break at ~10:30 a.m. Resumed at ~10:44 a.m.

#### **Presentation #15:**

“C2M COM Analysis on short and long channel”, Ali Ghiasi

See: [http://www.ieee802.org/3/ck/public/19\\_09/ghiasi\\_3ck\\_02a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/ghiasi_3ck_02a_0919.pdf)

- Slide 15: Typo found during presentation. Corrected in version ‘02a’.
- Discussed the VEO equation on slide 14.
- Discussed 4T DFE vs 5T FFE as reference receiver candidates listed in the summary slide.
- Discussed whether the reference equalizer should cover the span of the ISI

#### **Presentation #16:**

“Comparison of C2M performance at TP1a with whole channel performance”, Mike Dudek

See: [http://www.ieee802.org/3/ck/public/19\\_09/dudek\\_3ck\\_01\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/dudek_3ck_01_0919.pdf)

- On Slide 3, author noted that crosstalk was not included; primarily this was to reduce simulation time
- There was a request to include the lim channels in the analysis on slide 9 and 10.
- Discussed about SNDR effects
- Discussed impact of Tx vs RX noise

Break at ~12:05 p.m. Resumed at ~1:20 p.m.

#### **Presentation #17:**

“Host to Module Short Channel Issue and Possible Solutions”, Mau-Lin Wu

See: [http://www.ieee802.org/3/ck/public/19\\_09/wu\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/wu_3ck_01a_0919.pdf)

- Discussed the impact of reflections on the channel performance.
- There was a request to provide a recommended VEC and VEO on slide 12.
- Discussed power consumption of the architecture proposed on slide 16. There were concerns about module power
- Discussed the use of loss rather than host trace length

### Attendance Straw Polls

I will attend the IEEE 802.3ck meetings at the November Plenary in Waikoloa Village, HI, USA (week of November 11, 2019).

Results: Y: 38, M: 13

I will attend the IEEE 802.3ck meetings at the January interim in Geneva, Switzerland (week of January 20, 2020).

Results: Y: 32, M: 18

### Straw Poll #5:

I would support the proposed module-side Tx/Rx package parameters in kimber\_3ck\_01b\_0919 slides 11 and 25 for use in the informative whole-link C2M analysis:

- A. Case 2 (Cd=85fF, Ls=120pH)
- B. Case 4 (Cd=100fF, Ls=120pH)
- C. I do not support either case 2 or case 4

Choose one

Results: A: 11, B: 10, C: 3

From the floor, there was a suggestion to use Cd=92.5fF for the C2M whole-link analysis. Chair asked for brief feedback. Chair noted that the feedback was inconclusive.

### Straw Poll #6:

I would support the investigation of increasing VEC when VEO is large (i.e. ghiasi\_3ck\_02a\_0919) for C2M TP1a.

Results: Y: 25, N: 3, A: 21

### Straw Poll #7:

To move forward on C2M baseline, I would oppose:

- A. Choosing a performance/complexity receiver at TP1a equivalent to sun\_3ck\_01b\_0919 type A/B
- B. Choosing a higher performance/complexity receiver at TP1a (better than sun\_3ck\_01b\_0919 type A/B such as 8 to 12-tap DFE)
- C. Choosing a 5-tap DFE (3-fixed + 2 float) reference receiver at TP1a
- D. Setting a min host PCB loss
- E. Setting a min host package trace length
- F. Increasing VEC when VEO is large (i.e. ghiasi\_3ck\_02a\_0919, sun\_3ck\_01b\_0919)

{Chicago rules}

Results: A: 8, B: 14, C: 6, D: 10, E: 19, F: 5

Room Count: 64

Break at ~3:00 p.m. Resumed at ~3:20 p.m.

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

Chair noted that the late contribution from Chris Diminico will not be considered at this meeting due to a lack of presenter availability. However, the contribution would remain on the website.

Chair noted that the agenda was almost complete. Chair asked if there were participants that preferred to continue to meet on Friday. No one indicated. Chair noted that he would drive the agenda to completion on Thursday.

#### **Straw Poll #8:**

I think it is essential to identify a solution to the C2M short channel issue before adopting a reference receiver and VEC specification.

Results: Y: 25, N: 2, A: 17

Chair indicated that the C2M straw poll results show that much work and consensus building would be necessary to be ready for the November plenary meeting. He would be engaging participants to bring contributions and close action items.

#### **Presentation #18:**

“Representing imperfections for CR Host Board”, Liav Ben-Artzi

See: [http://www.ieee802.org/3/ck/public/19\\_09/benartsi\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/benartsi_3ck_01a_0919.pdf)

- Discussed the number of victims / aggressors
- Discussed accounting for NEXT in the analysis; Clarification that it was not included and discussed whether to include it in the future
- Discussed the value for SNDR

Rich Mellitz requested to swap the order of his presentations as one follows the work of benartsi\_3ck\_01a\_0919.pdf. Chair asked whether there are any objections to changing the order. No objections.

#### **Presentation #19:**

“CA COM parameters SNR\_TX and ETA\_0 Baseline Proposal”, Rich Mellitz

See: [http://www.ieee802.org/3/ck/public/19\\_09/mellitz\\_3ck\\_02a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/mellitz_3ck_02a_0919.pdf)

- Author confirmed that the analysis used the same method for SNDR and Eta\_0
- Comment that the analysis contains no NEXT and discussion about the impact on host chip

#### **Presentation #20:**

“CR Vmin and Vf Decisions”, Rich Mellitz

See: [http://www.ieee802.org/3/ck/public/19\\_09/mellitz\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/mellitz_3ck_01a_0919.pdf)

- Discussed the various values of N\_v on slide 15.
- Discussed the impact of window size on the results.

#### **Presentation #21:**

“100G CR End-to-End Channel Analysis Update (II)”, Jane Lim

See: [http://www.ieee802.org/3/ck/public/19\\_09/lim\\_3ck\\_01a\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/lim_3ck_01a_0919.pdf)

- It was noted that the cable details can be found in palkert\_3ck\_02\_0719
- There was a request to share the channels with the Task Force ; presenter would consider the request
- Discussed potential improvements in connector design can help the performance
- On slide 8, it was noted that d2d is for case 2 and includes package parasitics
- On slide 8, there was a request to see updated information about the cable COM
- There was a request to share tap weight data to help with Interleaved FEC decision

#### **Straw Poll #9:**

I support using the backplane reference receiver parameters (i.e. walker\_3ck\_01d\_0719) as the initial starting point for the CR PHYs.

Results: Y: 29, N: 8, A: 13

#### **Straw Poll #10:**

I would support the use of SNR\_TX and Eta0 values as presented in mellitz\_3ck\_02a\_0919 slide 10 and the inclusion of C0/C1 and trace parameters as in benartsi\_3ck\_01a\_0919 slide 6 for the CR COM parameters and “include PCB” representation.

Results: Y: 24, N: 0, A: 26

Chair displayed and discussed next steps for the P802.3ck Task Force. (See:

[http://www.ieee802.org/3/ck/public/19\\_09/lusted\\_3ck\\_01\\_0919.pdf](http://www.ieee802.org/3/ck/public/19_09/lusted_3ck_01_0919.pdf) )

- Chair discussed Backplane next steps for November.
- Chair discussed FEC next steps for November.
- Chair discussed C2M next steps for November.
- Chair discussed CR next steps for November.

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

Move to adjourn:

- Moved by: Mike Dudek
- Second by: Rich Mellitz
- TBD: Passed by voice without opposition

Meeting ended at ~6:00 p.m.

## Attendees

Last Name	First Name	Employer	Affiliation	Sept 11, 2019	Sept 12, 2019
Anslow	Pete	Ciena Corporation	Ciena Corporation	x	x
Baldwin	Thananya	Keysight Technologies	Keysight Technologies	x	x
Baumgartner	Steven	Avera Semiconductor	Avera Semiconductor	x	x
Ben Artsi	Liav	Marvell Semiconductor	Marvell Semiconductor	x	
Bhatt	Vipul	Finisar	Finisar		x
Bordogna	Mark	Intel	Intel	x	x
Braun	Ralf-Peter	Deutsche Telekom	Deutsche Telekom		x
Brooks	Paul	Viavi Solutions	Viavi Solutions	x	x
Bruckman	Leon	Huawei	Huawei	x	x
Butter	Adrian	Avera Semiconductor	Avera Semiconductor	x	x
Chang	Ayler	Huawei	Huawei	x	x
Chang	Frank	Source Photonics	Source Photonics	x	
Chen	C. C. David	Applied Optoelectronics	Applied Optoelectronics	x	x

Choudhury	G. Mabud	OFS	OFS	x	
D'Ambrosia	John	Futurewei	Subsidiary of Huawei		x
Dawe	Piers	Mellanox	Mellanox	x	x
DiMinico	Christopher	MC Communications/Panduit	MC Communications/Panduit	x	
Dudek	Mike	Marvell Technologies	Marvell Technologies	x	x
Estes	Dave	Spirent Communications	Spirent Communications	x	x
Ewen	John	Avera Semiconductor	Avera Semiconductor	x	x
Ghiasi	Ali	Ghiasi Quantum	Ghiasi Quantum, Inphi	x	x
Gilb	James	GA-ASI, USD, Gilb Consulting	GA-ASI, USD, Gilb Consulting	x	x
Gore	Brandon	Samtec	Samtec	x	x
Gorshe	Steve	microsemi	Microchip	x	x
Gustlin	Mark	Cisco	Cisco	x	
He	Xiang	Huawei	Huawei	x	x
Healey	Adam	Broadcom Inc	Broadcom Inc	x	x
Heck	Howard	Intel	Intel	x	x

Hegde	Raj	Broadcom	Broadcom	x	x
Hiroaki	Kukita	Yamaichi Electronics	Yamaichi Electronics	x	x
Holden	Brian	Kandou Bus	Kandou Bus	x	x
Horner	Rita	Synopsys	Synopsys	x	
Ingham	Jonathan	Foxconn Interconnect Technology	Foxconn Interconnect Technology	x	
Isono	Hideki	Fujitsu Optical Components	Fujitsu Optical Components	x	x
Issenhuth	Tom	Huawei	Huawei		x
Jackson	Ken	Sumitomo	Sumitomo		x
Kareti	Upen Reddy	Cisco	Cisco	x	x
Kasapi	Athos	Cadence	Cadence	x	x
Kim	Andrew	Spectra7 Microsystems	Spectra7 Microsystems	x	x
Kim	Inho	Marvell	Marvell	x	x
Kimber	Mark	Semtech	Semtech	x	x
Kinningham	Alan	I-Pex	I-Pex	x	
Kocsis	Sam	Amphenol	Amphenol	x	x

LeCheminant	Greg	Keysight Technologies	Keysight Technologies	x	x
Levin	Alex	Microsoft	Microsoft	x	x
Li	Mike	Intel	Intel	x	x
Lim	Jane	Cisco	Cisco	x	x
Limm	Geny	Huawei	Huawei		x
Liu	Hai-Feng	HG Genuine	HG Genuine	x	
Liu	Karen	Lightwave Logic	Lightwave Logic	x	x
Lusted	Kent	Intel	Intel	x	x
Lyubumirsky	Ilya	Inphi	Inphi	x	x
Maki	Jeffery	Juniper Networks	Juniper Networks	x	x
Malicoat	David	Malicoat Networking Solutions	Senko	x	x
Maniloff	Eric	Ciena	Ciena	x	x
Marris	Arthur	Cadence	Cadence	x	x
McSorley	Greg	Amphenol	Amphenol	x	x
Mellitz	Richard	Samtec	Samtec	x	
Miller	Will	Wilder Technologies	Wilder Technologies	x	x

Nicholl	Shawn	Xilinx	Xilinx	x	x
Nowell	Mark	Cisco	Cisco	x	x
Ofelt	David	Juniper Networks	Juniper Networks	x	
Ogawa	Daisuke	NTT Electronics	NTT Electronics	x	
Palkert	Tom	Molex - MACOM	Molex - MACOM	x	x
Parthasarathy	Vasu	Broadcom	Broadcom	x	
Pepper	Gerald	Keysight Technologies	Keysight Technologies	x	x
Pittala	Fabio	Huawei	Huawei		x
Pozzebon	Dino	Microchip	Microchip	x	
Rabinovich	Rick	Keysight Technologies	Keysight Technologies	x	x
Radhamohan	Rajesh	Maxlinear	Maxlinear	x	x
Rakanovic	Demir	U-Blox	U-Blox		x
Sayre	Edward	Samtec	North East Systems Associates	x	x
Sekel	Steve	Keysight Technologies	Keysight Technologies	x	x
Shen	Qingya	Fujitsu	Fujitsu		x

Shrikhande	Kapil	Innovium	Innovium	x	x
Shuai	Jialong	Huawei	Huawei	x	
Slavick	Jeff	Broadcom Limited	Broadcom Limited	x	x
Sommers	Scott	Molex	Molex	x	x
Sorbara	Massimo	Global Foundaries	Global Foundaries		x
Sprague	Ted	Infinera	Infinera		x
Stassar	Peter	Huawei	Huawei	x	x
Stone	Rob	Broadcom	Broadcom	x	x
Sun	Phil	Credo	Credo	x	
Swanson	Steve	Corning	Corning	x	
Tailor	Bharat	Semtech	Semtech	x	x
Takahara	Tomoo	Fujitsu	Fujitsu	x	x
Tracy	Nathan	TE Connectivity	TE Connectivity	x	x
Tran	Viet	Keysight Technologies	Keysight Technologies	x	x
Trowbridge	Steve	Nokia	Nokia	x	
Tu	Mike	Broadcom	Broadcom	x	

Twombly	Jeff	Credo	Credo	x	x
Ulrichs	Ed	Source Photonics	Source Photonics	x	x
Wang	Roy	HPE	HPE	x	
Welch	Brian	Cisco	Cisco	x	x
Wu	Mau-Lin	MediaTek	MediaTek	x	x
Zhang	Geoffrey	Xilinx	Xilinx	x	x
Zhuang	Yan	Huawei	Huawei	x	
Zivny	Pavel	Tektronix	Tektronix	x	x