

# IEEE liaison report

T11-2020-00049-v000

Feb 6 2020

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# IEEE 802.3 Task Forces, Study Groups, CFIs

- P802.3ca 25 Gb/s and 50 Gb/s-Ethernet Passive Optical Networks Task Force
- P802.3cg 10 Mb/s Single Pair Ethernet Task Force
- P802.3ch Multi-Gig Automotive PHY Task Force
- P802.3ck 100 Gb/s per Lane Electrical Task Force
- ~~P802.3cm Next Generation 400 Gb/s Ethernet over Multimode Fiber Task Force~~
- ~~P802.3cn 50 Gb/s, 200 Gb/s, and 400 Gb/s over single mode fiber Task Force~~
- P802.3cp Bidirectional 10 Gb/s, 25 Gb/s, and 50 Gb/s Optical Access PHYs Task Force
- P802.3cq Power over Ethernet over 2 Pairs (Maintenance #13) Task Force
- P802.3cr Isolation (Maintenance #14) Task Force
- P802.3cs Ethernet Access PMDs for Central Office Consolidation Task Force
- P802.3ct 100 Gb/s Ethernet over DWDM systems Task Force
- P802.3cu 100 Gb/s per lane optical PHYs for 100 GbE and 400 GbE Task Force
- P802.3cv Power over Ethernet 4 Pairs (Maintenance #15) Task Force
- (P802.3cw 400 Gb/s Ethernet over DWDM systems Task Force)
- (P802.3cx) Improving PTP Timestamping Accuracy Study Group
- (P802.3cy) Greater than 10 Gb/s Automotive Ethernet Electrical PHYs Study Group
- (P802.3cz) Multi-Gigabit Automotive Optical PHY Study Group
- (P802.3da) 10SPE Multidrop Enhancements Study Group
- (P802.3db) 100 Gb/s Wavelength Short Reach PHYs Study Group
  
- New Ethernet Applications Ad Hoc

# P802.3ck 100 Gb/s per lane Electrical Task Force Adopted Objectives (1 of 2)

- Support a MAC data rate of 100 Gb/s, 200 Gb/s, and 400 Gb/s
- Support full-duplex operation only
- Preserve the Ethernet frame format utilizing the Ethernet MAC
- Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
- Support the existing bit error ratios (BERs) at the MAC/PLS service interface (or the frame loss ratio equivalent) for 100 Gb/s, 200 Gb/s, and 400 Gb/s Ethernet
  
- Define a single-lane 100 Gb/s Attachment Unit interface (AUI) for chip-to-module applications, compatible with PMDs based on 100 Gb/s per lane optical signaling
- Define a single-lane 100 Gb/s Attachment Unit Interface (AUI) for chip-to-chip applications
- Define a single-lane 100 Gb/s PHY for operation over electrical backplanes supporting an insertion loss  $\leq 28$  dB at 26.56 GHz.
- Define a single-lane 100 Gb/s PHY for operation over twin-axial copper cables with lengths up to at least 2m

# P802.3ck 100 Gb/s per lane Electrical Task Force

- 10<sup>th</sup> Task Force meeting 11-13 November 2019, Waikoloa, Hawaii
  - Meeting Materials: [http://ieee802.org/3/ck/public/19\\_11/index.html](http://ieee802.org/3/ck/public/19_11/index.html)
  - Meeting Minutes: [http://ieee802.org/3/ck/public/19\\_11/minutes\\_3ck\\_1119\\_unconfirmed\\_v3.pdf](http://ieee802.org/3/ck/public/19_11/minutes_3ck_1119_unconfirmed_v3.pdf)
- 11<sup>th</sup> Task Force meeting 21-23 January 2020, Geneva, Switzerland
  - Meeting Materials: [http://ieee802.org/3/ck/public/20\\_01/index.html](http://ieee802.org/3/ck/public/20_01/index.html)
  - Meeting Minutes: [http://ieee802.org/3/ck/public/20\\_01/minutes\\_3ck\\_0120\\_unapproved.pdf](http://ieee802.org/3/ck/public/20_01/minutes_3ck_0120_unapproved.pdf)
- Adopted a dual-FEC mode for 100G, allowing the option of interleaved FEC for difficult channels, with Clause 91 being the default
- Adopted additional baselines for Chip-to-Module, Copper Cable and Backplane interfaces.
- Authorized the editors in the November plenary to produce Draft 1.0 for the formal start of Task Force review.
- Resolved 244 comments against Draft 1.0 in January interim and agreed to produce Draft 1.1 for continued Task Force review

# P802.3ck 100 Gb/s per lane Electrical Task Force Adopted Objectives (2 of 2)

- Define a two-lane 200 Gb/s Attachment Unit interface (AUI) for chip-to-module applications, compatible with PMDs based on 100 Gb/s per lane optical signaling
- Define a two-lane 200 Gb/s Attachment Unit Interface (AUI) for chip-to-chip applications
- Define a two-lane 200 Gb/s PHY for operation over electrical backplanes supporting an insertion loss  $\leq 28$  dB at 26.56 GHz.
- Define a two-lane 200 Gb/s PHY for operation over twin-axial copper cables with lengths up to at least 2m
  
- Define a four-lane 400 Gb/s Attachment Unit interface (AUI) for chip-to-module applications, compatible with PMDs based on 100 Gb/s per lane optical signaling
- Define a four-lane 400 Gb/s Attachment Unit Interface (AUI) for chip-to-chip applications
- Define a four-lane 400 Gb/s PHY for operation over electrical backplanes supporting an insertion loss  $\leq 28$  dB at 26.56 GHz.
- Define a four-lane 400 Gb/s PHY for operation over twin-axial copper cables with lengths up to at least 2m

# P802.3ck 100 Gb/s per lane Electrical Task Force Actions from Jan Geneva interim

- Compliance board note added:
  - ‘Note: 2.3 dB MCB PCB IL includes the RF connector (up to the RF connector calibration plane).’
- Discussion about SNDR (Measured at TP2)
  - Proposed values of 32.2 for CR, 32.5 for KR
- Discussion that these values need to relate to SNRTx
- $\eta_0$  changed from  $8.2e-9$  to  $1e-8$ . (Note: This may reduce COM by .4 dB for passive cable and backplanes.)
- Changed measurement bandwidth to 40GHz passive copper and backplane Tx measurements
- Agreed on 45GHz for S parameter limits in informative Backplane channel

# P802.3cm – Next generation 400 Gb/s MMF PHYs Task Force

- 10<sup>th</sup> Task Force meeting 13 November 2019, Waikoloa, Hawaii
  - Meeting Materials:  
<http://www.ieee802.org/3/cm/public/November19/>
  - Meeting Minutes:  
[http://www.ieee802.org/3/cm/public/November19/unapproved\\_meeting\\_minutes\\_3cm\\_01\\_1119.pdf](http://www.ieee802.org/3/cm/public/November19/unapproved_meeting_minutes_3cm_01_1119.pdf)
- Resolved 1 comment against Draft 3.1 with no change to the draft. As this was a re-submit of a prior issue and not a new negative vote, the 802.3 Working Group agreed to forward the draft to RevCom for approval.
- Approved by the Standards Board on 31 January 2020. This project is complete!

# P802.3cu 100 Gb/s per lane Optical PHYs Task Force

- 4<sup>th</sup> Task Force meeting 11-12 November 2019, Waikoloa, Hawaii
  - Meeting Materials: <http://www.ieee802.org/3/cu/public/Nov19/>
  - Meeting Minutes: [http://www.ieee802.org/3/cu/public/Nov19/minutes\\_3cu\\_1119\\_unapproved.pdf](http://www.ieee802.org/3/cu/public/Nov19/minutes_3cu_1119_unapproved.pdf)
- 5<sup>th</sup> Task Force meeting 20 January 2020, Geneva, Switzerland
  - Meeting Materials: <http://www.ieee802.org/3/cu/public/Jan20/>
  - Meeting Minutes: [http://www.ieee802.org/3/cu/public/Jan20/minutes\\_3cu\\_0120\\_unapproved.pdf](http://www.ieee802.org/3/cu/public/Jan20/minutes_3cu_0120_unapproved.pdf)
- Resolved 22 comments against Draft 1.0 and agreed to produce Draft 1.1 for continued Task Force review in November plenary
- Resolved 18 comments against Draft 1.1 in January interim. The 802.3 Working Group agreed to the creation of Draft 2.0 and the start of Working Group ballot



# P802.3cu 100 Gb/s per lane Optical PHYs Task Force

## Adopted objectives – Page 1/2

- Support a MAC data rate of 100 Gb/s
- Support a MAC data rate of 400 Gb/s
- Support full-duplex operation only
- Preserve the Ethernet frame format utilizing the Ethernet MAC
- Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
- Provide appropriate support for OTN
- Support a BER of better than or equal to  $10^{-12}$  at the MAC/PLS service interface (or the frame loss ratio equivalent) for 100 Gb/s operation
- Support a BER of better than or equal to  $10^{-13}$  at the MAC/PLS service interface (or the frame loss ratio equivalent) for 400 Gb/s operation

# P802.3cu 100 Gb/s per lane Optical PHYs (future) Task Force Adopted objectives – Page 1/2

- Define a single-wavelength 100 Gb/s PHY for operation over SMF with lengths up to at least 2 km
- Define a single-wavelength 100 Gb/s PHY for operation over SMF with lengths up to at least 10 km
- Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least 2 km
- Define a four-wavelength 400 Gb/s PHY for operation over SMF with lengths up to at least ~~10~~6 km

# P802.3cu 100 Gb/s per lane Optical PHYs (future) Task Force activity Jan interim meeting

- The following changes were made as a result of a presentation by Chris Cole: cole\_01b\_0120
  - Remove TDECQ- $10\log_{10}(C_{eq})$  and replace with TECQ
  - Added TECQ (3.0 and 2.5)
  - Add TDECQ-TECQ to 100G-LR1, FR1 and 400G-FR4
  - RS: eliminate equation references from Tables and make RS normative
- Tom Palkert opinion: there are impacts to other parts of the spec that were not realized during the meeting votes. The editors have decided not to 'take editorial license' so the next revision will have some inconsistencies.

# (P802.3cy) Greater than 10 Gb/s Automotive Ethernet Electrical PHYs Study Group

- 3<sup>rd</sup> Study Group meeting 10-11 September 2019, Indianapolis, IN
  - Meeting Materials:  
<http://ieee802.org/3/B10GAUTO/public/sep19/index.html>
  - Meeting Minutes:  
[http://grouper.ieee.org/groups/802/3/ch/public/sep19/Unconfirmed\\_minutes\\_3ch\\_0919.pdf](http://grouper.ieee.org/groups/802/3/ch/public/sep19/Unconfirmed_minutes_3ch_0919.pdf)
- 4<sup>th</sup> Study Group meeting 22 January 2020, Geneva, Switzerland
  - Meeting Materials:  
<http://ieee802.org/3/B10GAUTO/public/jan20/index.html>
  - Meeting Minutes:  
[http://grouper.ieee.org/groups/802/3/ch/public/jan20/Unconfirmed\\_minutes\\_3ch\\_0120.pdf](http://grouper.ieee.org/groups/802/3/ch/public/jan20/Unconfirmed_minutes_3ch_0120.pdf)
- Continued drafting of [PAR](#), [CSD](#), and [Objectives](#) at November plenary. More work is needed, so these are not planned for submission to the 802.3 Working Group in November.
- Adopted P802.3cy [PAR](#) in January interim. Intend to request 802.3 to approve project documentation in March 2020 plenary

# (P802.3cz) Multi-Gigabit Automotive Optical PHY Study Group

- First Study Group meeting 9 September 2019, Indianapolis, IN
  - Meeting Materials: [http://ieee802.org/3/OMEGA/public/sep\\_2019/index.html](http://ieee802.org/3/OMEGA/public/sep_2019/index.html)
  - Meeting Minutes: [http://ieee802.org/3/OMEGA/public/sep\\_2019/minutes\\_OMEGA\\_1\\_0919.pdf](http://ieee802.org/3/OMEGA/public/sep_2019/minutes_OMEGA_1_0919.pdf)
- Second Study Group meeting 20-21 January 2020, Geneva, Switzerland
  - Meeting Materials: [http://ieee802.org/3/OMEGA/public/jan\\_2020/index.html](http://ieee802.org/3/OMEGA/public/jan_2020/index.html)
  - Meeting Minutes: [http://ieee802.org/3/OMEGA/public/jan\\_2020/Minutes\\_OMEGA\\_01\\_0120.pdf](http://ieee802.org/3/OMEGA/public/jan_2020/Minutes_OMEGA_01_0120.pdf)
- Initial discussions held in September interim – more work required to develop PAR, CSD and Objectives.
- Developed [PAR](#), [CSD](#), and [Objectives](#) in January interim. Intending to request 802.3 Working Group approval

# (P802.3cz) Multi-Gig Automotive Optical PHY Study Group Adopted Objectives (1 of 2)

1. Preserve the IEEE 802.3/Ethernet frame format at the MAC client service interface
2. Preserve minimum and maximum frame size of the current IEEE 802.3 standard
3. Support full duplex operation only
4. Define optional startup procedure which enables the time from power\_on=FALSE to a state capable of transmitting and receiving valid data to be less than 100ms
5. Support data rates of 2.5 Gb/s, 5 Gb/s, 10 Gb/s, 25 Gb/s, 50 Gb/s and 100 Gb/s at the MAC/PLS service interface
6. Support optional Energy Efficient Ethernet optimized for automotive application
7. Support operation in automotive environments (e.g., EMC, temperature)
8. Do not preclude meeting FCC and CISPR EMC requirements

# (P802.3cz) Multi-Gig Automotive Optical PHY Study Group Adopted Objectives (2 of 2)

9. Define the performance characteristics of an automotive link segment and an optical PHY to support 2.5 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling.
10. Define the performance characteristics of an automotive link segment and an optical PHY to support 5 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling.
11. Define the performance characteristics of an automotive link segment and an optical PHY to support 10 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling.
12. Define the performance characteristics of an automotive link segment and an optical PHY to support 25 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling.
13. Define the performance characteristics of an automotive link segment and an optical PHY to support 50 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling.
14. Define the performance characteristics of an automotive link segment and an optical PHY to support 100 Gb/s point-to-point operation over this link segment supporting up to 4 inline connectors for at least 40 m on at least one type of automotive optical cabling.
15. Support a Bit Error Ratio better than or equal to  $10^{-12}$  at the MAC/PLS service interface (or the frame loss ratio equivalent)

# (P802.3db) 100 Gb/s Wavelength Short Reach PHYs Study Group

- First Study Group meeting 23-24 January 2020, Geneva, Switzerland
  - Meeting Materials:  
<http://www.ieee802.org/3/100GSR/public/Jan20/>
  - Meeting Minutes: **Not yet posted**
- Adopted a [PAR](#), [CSD](#), and [Objectives](#) at January interim, intending to ask for 802.3 approval at the March plenary. When approved, this is anticipated to become the IEEE P802.3db Task Force



# (P802.3db) 100 Gb/s Wavelength Short Reach PHYs

## Adopted Objectives (1 of 2)

1. Support a MAC data rate of 100 Gb/s, 200 Gb/s and 400 Gb/s
2. Support full-duplex operation only
3. Preserve the Ethernet frame format utilizing the Ethernet MAC
4. Preserve minimum and maximum FrameSize of current IEEE 802.3 standard
5. Provide appropriate support for OTN
6. Support a BER of better than or equal to  $10^{-12}$  at the MAC/PLS service interface (or the frame loss ratio equivalent) for 100 Gb/s operation
7. Support a BER of better than or equal to  $10^{-13}$  at the MAC/PLS service interface (or the frame loss ratio equivalent) for 200 Gb/s and 400 Gb/s operation

# (P802.3db) 100 Gb/s Wavelength Short Reach PHYs

## Adopted Objectives (2 of 2)

8. Define a physical layer specification that supports 100 Gb/s operation over 1 pair of MMF with lengths up to at least 50 m  
Support full-duplex operation only
9. Define a physical layer specification that supports 200 Gb/s operation over 2 pairs of MMF with lengths up to at least 50 m
10. Define a physical layer specification that supports 400 Gb/s operation over 4 pairs of MMF with lengths up to at least 50 m

# New Ethernet Applications (NEA) Ad Hoc

- One session 11 November 2019, Waikoloa, Hawaii
  - Meeting Materials: [http://ieee802.org/3/ad\\_hoc/ngrates/public/20\\_01/index.html](http://ieee802.org/3/ad_hoc/ngrates/public/20_01/index.html)
  - Meeting Minutes: [http://ieee802.org/3/ad\\_hoc/ngrates/public/20\\_01/minutes\\_nea\\_0120\\_unapproved.pdf](http://ieee802.org/3/ad_hoc/ngrates/public/20_01/minutes_nea_0120_unapproved.pdf)
- One session 21 January 2020, Geneva, Switzerland
  - Meeting Materials: [http://ieee802.org/3/ad\\_hoc/ngrates/public/20\\_01/index.html](http://ieee802.org/3/ad_hoc/ngrates/public/20_01/index.html)
  - Meeting Minutes: [http://ieee802.org/3/ad\\_hoc/ngrates/public/20\\_01/minutes\\_nea\\_0120\\_unapproved.pdf](http://ieee802.org/3/ad_hoc/ngrates/public/20_01/minutes_nea_0120_unapproved.pdf)
- Launched first review cycle of Bandwidth Assessment (BWA) Part II report after November plenary. Began discussions of a possible “next rate” beyond 400G project.
- Resolved 119 comments against Draft 1.0 of BWA Part II report at January interim and agreed to produce Draft 1.1 for continued review. Expectation is to request publication of the report at the March 2020 plenary, and to hold an evening tutorial on the report at that meeting.
- Continued discussion of a possible “Next Rate” CFI at January interim.
  - Next rate will be 800G or 1.6Tbit or both.

# Future Meetings

Meeting	Location	Dates
IEEE 802 plenary	Atlanta, GA	15-20 March 2020
IEEE 802.3 interim	Pasadena, CA	18-22 May 2020
IEEE 802 plenary	Montreal, QC, Canada	13-16 July 2020
IEEE 802.3 interim	Kansas City	21-25 September 2020
IEEE 802 plenary	Bangkok, Thailand	9-12 November 2020
IEEE 802.3 interim	TBD	January 2021
IEEE 802 plenary	Denver, CO	14-18 March 2021
IEEE 802.3 interim	TBD	May 2021

Upcoming meeting details at:

<http://ieee802.org/3/interims/index.html>