

Issue 19 • Quarter 2, 2018

# Standards Quarterly Update:

## What you need to know now for the future of your network

Welcome to the nineteenth edition of the Standards Advisor. This report is issued quarterly and provides updates on the standards relevant to the structured cabling industry, and the impact they have on your network design, planning and operations.

This summary represents standards meetings held during the second quarter of 2018 and reports on activities from all aspects of the cabling industry. These activities range from the applications standards (IEEE 802.3 and 802.11 and T11—Fibre Channel) to the cabling standards (ANSI/TIA, ISO/IEC, CENELEC) and, finally, cover new developments in the world of multisource agreements (MSAs).

ISO/IEC JTC1/SC25 WG3: no meetings were held.

The 65th ISO/IEC JTC1/SC25 WG3 meeting will be on 24-27 September in 2018 in Arlington, VA, USA

IEC SC48B: 11 May, 2018, in Frankfurt, Germany

- The copper LC New Work Item Proposal (NWIP) passing result of 84% was officially approved and the standards document assigned the number IEC 63171-1, and circulated as CD ballot. The next step is to resolve and incorporate comments received during this country review, and advance the document to Committee Draft Voting (CDV) at the next IEC SC48B meeting the week of September 17, 2018

The next meeting will be on 17-21 September 2018 in Milan, Italy.

IEC SC 46C WG7: 23 April 2018 in Lyon, France

- There was discussion regarding the specifications that may be needed to support the work in ISO/IEC for an informative Technical Report on 25GBASE-T over 30 to 50 meters
- Considerable work taking place in ISO that will relate to balanced cabling and one-pair including an ISO/IEC TS 29125 amendment for one-pair power up to 50V and 1.36 Amps per conductor.

The next meeting will be on 3-7 September 2018 in Nürnberg, Germany.

TIA TR-42: 11-15 June, 2018 in Pittsburgh, PA USA

### 1. TR42.1 Commercial Building Cabling

- TR 42.1 approved the publication of ANSI/TIA-570-D residential telecommunications cabling standard after resolving comments to the default ballot
- Work continues on the "C" version of ANSI/TIA-758 customer owned outside plant cabling standard and the latest draft of this document was approved for circulation as an industry ballot
- TR42.1 is also starting the revision of the ANSI/TIA-4966 education facilities standards and will have a PAR proposal for approval at the next meeting in October 2018
- "E" versions of the TIA-568.0-D generic cabling standard and the TIA-568.1-D commercial telecommunications cabling standard will also be started at the next meeting in October 2018

- Proposal to create a TSB on polarity management for more complicated concatenated channels with the group agreeing the right place for it is in the TIA TR42 closing plenary

### 2. TR-42.3 Pathways and Spaces

- Approved the publication of ANSI/TIA-569-D-2 Pathways & Spaces for Remote Powering
- Started work on the "E" series of telecommunications infrastructure standards by reviewing and approving a PAR along with a TIA-569-E draft document
- The Committee approved to send the TIA-569-E draft out for an industry ballot

### 3. TR-42.5 Telecommunications Infrastructure Terms and Symbols

- TIA TR42.5 discussed and agreed to the following definitions:  
tolerance zone: The zone where excavation with nondestructive tools occurs until sufficient depth is reached

### 4. TR42.7 Copper cabling systems and components

- Resolved second default ballot comments on ANSI/TIA-568.2-D balanced cabling and components standard and approved to publish the document.
- Resolved ballot comments and approved to re-circulate a second committee ballot for TIA TSB-184-A-1 guidelines for 28 AWG cords supporting remote powering
- Single pair connector updates were made by several vendors. The final selection of the single pair connector interface will take place at the next meeting in October 2018
- Created a draft PAR to an addendum to 568.2-D to specify balun requirements for category 8 testing.
- Approved to re-affirm TIA TSB-190 with guidelines for sheath sharing and running mixed applications in the same cable tray
- Drafted a liaison letter to obtain copies of the IEC SC48B draft documents containing detailed specification of single pair connector proposals

### 5. TIA TR42.9 Industrial cabling

- Resolved comments on the 1G industrial cabling addendum 2 to ANSI/TIA-1005-A-2012 for cabling supporting 1000BASE-T for E2 and E3 environments and approved re-circulation for a 3rd committee ballot
- Resolved the second mock ballot comments of ANSI/TIA-1005-A addendum 3 on single pair cabling in support of IEEE 802.3bp type B, IEEE 802.3bw 100 BASE-T1 and IEEE 802.3cg 10 BASE-1.
- The next ballot of ANSI/TIA 1005-A3 will be issued during the next TIA TR42.9 meeting in October 2018, after the committee selects a single pair connector interface

### 6. TIA TR-42.11 - Optical Fiber Systems

- ANSI/TIA-568.3-D-1
  - Resolved comments on ballot 2 of addendum 1 to the optical fiber cabling and components standard.
    - Disagreement over OM5 connecting hardware color remained.
    - A default ballot was authorized.

### 7. TR42.12 – Fiber and Cable

- ANSI/TIA-598-D-1 colors for fibers 13 to 16
  - Resolved comments on third ballot.
  - Authorized publication.
- Project authorizations for adaptation of IEC's fiber specifications were approved including:
  - IEC 60793-2 (General) to become ANSI/TIA-4920000-C
  - IEC 60793-2-10 (MMF family) to become ANSI/TIA-492AAAF, and replace TIA-492A000 sectional spec, TIA-492AA00 blank detail, and TIA-492AAAA, AAAB, AAAC, AAAD, AAAE detail specs.
  - IEC 60793-2-50 (SMF family) to become ANSI/TIA-492CAAC, and replace TIA-492C000 and E000 sectional specs, TIA-492CA00 and EA00 blank detail, and TIA-492CAAA and CAAB detail specs.
  - The OM3 and OM4 bandwidth information for SWDM will be added to the 492AAAF document as a regional difference while IEC works to revise their MM specs in parallel.
- Task group on MMF:
  - Rescoped to focus on VCSEL weight sets for EMB
  - A notification to IEEE 802.3 in July will be made via liaison report as an effort to attract transceiver maker participation

### 8. TR-42.13 - Optical Passive Devices and Metrology

- Revision to FOCIS 5 (MPO)
  - Resolved comments on second ballot.
  - Approved default ballot to vet minor technical changes including proposal to add a variant to match the dual row QSFP-DD (i.e. two rows of 4+4)
- Revision to FOCIS 18 (MPO-16)
  - Resolved comments on second ballot
  - Approved publication

### 9. Closing TR42 Plenary

- The PAR for a TSB on fiber polarity that was vetted in TR-42.1 will be brought before the Optical Systems Group of TR-42.11 at the next meeting in October for consideration to initiate a project
- TR42 discussed and approved the following liaison letters:
  - Letter to IEC SC48B requesting copies of the single pair connector detail specifications

The next TIA TR-42 meeting will be on 1-5 October, 2018 in Phoenix, AZ USA

## INCITS T11.2 Fibre Channel: 5-7 June 2018 in Santa Fe USA

- Reviewed IEEE TDECQ change progress, T11.2 will continue to monitor activity to reflect on the FC-PI-7 (64GFC) document. FC-PI-7 letter ballot is pending due to these changes.
- Reviewed the PAM4 link model proposal with recent updates using statistical eye amplitude instead of worst case.
- FC-PI-7P (256GFC) key requirements were discussed, following previous applications reach of 100m on OM4/5 and 2km on SMF. Target letter ballot by end of 2018.

- T11.2 reviewed the FC-PI-8 (128GFC Serial) proposal to leverage IEEE 100Gb/s Electrical Study Group using 50GbE PAM4, same FEC and SFP-DD module. Key challenges such as backplane loss budget reduction, eye height and width reduction and host PCB loss were studied. Simulation result shows that Host PCB insertion loss doubles from 64GFC to 128GFC.

The next meeting of INCITS/T11 will on 14-16 August 2018 in Louisville, KY USA

## CENELEC TC215 WG2 meeting 44: 11 April 2018 in Frankfurt, Germany

- Preparation work for several documents ongoing.
- Work on a CPR document showing proposals for different premises across countries is ongoing.

The next meeting of CENELEC TC215 WG2 will be 29-30 October in Paris, France.

- Administrative work after the final voting of the EN 50173 series of documents.
- WG1 monitors the development of 1pair cabling in ISO/IEC and will decide on actions at a later state.

The next meeting of CENELEC TC215 WG1 will be on 31 October 2018 in Paris, France.

## IEEE 802.3 Ethernet Meetings: 21 to 25 May, 2018 in Pittsburgh, PA USA

### 1. IEEE 802.3bt 4 pair Power over Ethernet

- The IEEE 802.3bt 4-pair Power over Ethernet Task Force completed another recirculation and resolved comments. The group is on track to complete Sponsor Balloting and be approved by the IEEE standards board at the September 2018 meeting.
- The IEEE 802.3bt draft contains two new "Types" of PoE, Type 3 (up to 60W on 4 pairs) and Type 4 (up to 90W at the PSE) as well as updates to the existing specifications for PoE (802.3af and 802.3at are "Type 1" and "Type 2") to support new Ethernet rates of 2.5, 5 and 10Gbps, and currently references TIA TSB-184-A and ISO/IEC TR 29125 for cabling requirements. Additionally, the 802.3bt draft expands all Types of end-point PoE (PoE delivered from a switch) to support 10GBASE-T and the new 2.5G and 5GBASE-T speeds, and defines new midspan PSE variants for the new speeds as well.

### Single Twisted Pair Copper Standards

#### 2. IEEE P802.3cg 10 Mbps Single-Twisted-Pair Ethernet

- The Task Force resolved comments on the draft and is nearing a technically complete draft, expected out of the July meeting. Final areas relate to the definition of registers for status and control, as well as the preamble of Ethernet packets. When these are resolved, expected in July, the group expects to initiate the formal balloting process.
- The timeline for the project is expected to conclude in the 2nd half of 2019.
- The project objectives cover industrial, automotive, and building automation use cases, encompassing multiple different applications, one up to 15m, one of approximately 1km, and a new one is in formulation to reflect 25m multidrop applications. The project has organized around 2 physical layer PHYs:
  1. Up to 1km single-pair (aka 10BASE-T1L): The project adopted baseline specifications for the up-to 1km process control and building automation application, adopting PAM 3 signaling and various electrical specifications.
  2. Short-reach (15m+) (aka 10BASE-T1S): The project also adopted link segment specifications for 15m point-to-point links, compatible with 25m multi-drop networks as well. Short reach PHYs will optionally support multidrop.
  3. An optional improvement collision performance on multidrop networks (known as PLCA within the Task Force).
  4. Optional single-pair powering, based on clause 104 (IEEE Std 802.3-2016, known as PoDL) with some specification changes and additional power levels.
- A technically complete draft is targeted for the July 2018 meeting, at which point it will enter working group ballot.

#### 3. IEEE P802.3ch Multigigabit Automotive Ethernet PHY Task Force

- This task force is focused on short-reach automotive links at rates of 2.5Gbps, 5Gbps, and 10Gbps. The objectives call for up to 15m and 4 connectors, and the project has adopted transmission characteristics for shielded cabling with bandwidths up to 6 GHz to provide headroom for PHY developers to study. At the interim,

the group narrowed its focus to consider PHY proposals between 2 and 2.5 bits/PAM symbol, along with Reed-Solomon forward error correction coding to deal with impulse noise. corresponding to Nyquist bandwidths of between 2.25 and 2.8 GHz,

- The project includes use of the 802.3bu powering, but does not expect to extend that powering specification.
- The group is expected to select PHY modulations for all three speeds at the July meeting.

#### 4. IEEE P802.3ca 25G and 50G EPON Task Force

- This project has recast its plan after removing its 100G objective to have two main objectives:
  - 1) a solution for 25G downstream with 10G or 25G upstream
  - 2) a solution for 50G downstream with 10G, 25G, or 50G upstream.
- The group resolved comments against draft 1.0 and will recirculate the draft for further review.

#### 5. IEEE P802.3cd 50G, 100G, 200G Ethernet PHYs Task Force

- The Working Group resolved comments on their third recirculation Sponsor ballot. Most notably, the primary transmitter and receiver metrics, TDECQ and SECQ, continue to be honed.
- A fourth re-circulation ballot will be issued.

#### 6. IEEE P802.3cm Next-gen MMF PHYs (i.e. 400Gb/s over fewer pairs of MMF) Task Force

- This newly instituted task force had its first meeting in May. It has two PHY objectives.
  - 1) Define a physical layer specification that supports 400 Gb/s operation over 8 pairs of MMF with lengths up to at least 100m
  - 2) Define a physical layer specification that supports 400 Gb/s operation over 4 pairs of MMF with lengths up to at least 100m
- Baseline content for the first objective was adopted. Operating at 850 nm, it will deliver an 8-pair solution that will operate to 70 m on OM3 and 100 m on OM4 and OM5. It will follow the transmit and receive specifications of draft 802.3cd for 50G-SR, 100G-SR2, and 200G-SR4 to define 800G-SR8. As such it will be capable of supporting breakout to any of these lower rate PHYs. The fiber interface will have two variants. One uses 2x12 fiber MPO lanes arranged as 2 rows of 4+4 (4 Tx, 4 blank, 4 Rx). The second uses MPO-16 with a block of 8 transmitters next to 8 receivers. Both are within the QSFP-DD and OSFP MSAs.
- Two competing proposals for the second objective were vetted. Both are based on the use of two wavelengths - 850 nm and a longer wavelength. One uses bi-directional transmission (wavelengths traveling in both directions in the same fiber) and the second uses co-directional transmission. A compromise on the wavelength plan was reached, and the wavelengths will nominally be 850 nm and 910 nm.

At the 10 July 2018 meeting the P802.3cm Task Force adopted a baseline for their 4-pair objective by accepting a proposal for a bi-directional transmission solution that is essentially a parallel fiber version of Cisco's 100G-BiDi. This comes one day after the announcement of the 400G-BD MSA

[https://www.400gbidi-msa.org/files/400G\\_BiDi\\_MSA\\_FAQ.pdf](https://www.400gbidi-msa.org/files/400G_BiDi_MSA_FAQ.pdf)

The solution will support 70/100/150m over OM3/4/5 and be the first standard to leverage the WDM support capabilities of OM5. The MSA is anticipated to track the standard, ensuring harmonization. As a solution that uses multiple short wavelengths, it joins the existing stable of MSA-based solutions that include 40G-BiDi, 40G-SWDM4, 100G-BiDi, and 100G-SWDM4, all of which enjoy superior support over OM5.

## 7. IEEE 802.3 Beyond 10km Study Group

- Continued to develop project initiation documentation to become a Task Force.
- The main objectives are delineated by data rate and reach as follows:
  - 50 Gb/s operation over at least 40 km of SMF
  - 100 Gb/s operation on a single wavelength capable of at least 80 km over a DWDM system.
  - 200 Gb/s operation over four wavelengths capable of at least 40 km of SMF
  - 400 Gb/s operation over eight wavelengths capable of at least 40 km of SMF
  - 400 Gb/s operation on a single wavelength capable of at least 80 km over a DWDM system.

- It is anticipated that the 40 km objectives will be satisfied by conventional intensity modulation and direct detection methods, while the 80 km objectives will employ, for the first time in Ethernet, coherent modulation and detection methods.

**BREAKING NEWS: At the July 2018 meeting the Study Group submitted their project initiation documentation to become a Task Force.**

The next IEEE 802.3 plenary meeting will be on 9-12 July, 2018 in San Diego CA USA, followed by an IEEE 802.3 Interim meeting in Spokane, WA USA, the week of September 10, 2018.

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