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The Standards Advisor

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Standards Quarterly Update:
What you need to know now for the future of your network

Welcome to the twenty-second 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 first quarter of 2019 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—Fiber Channel) to the cabling standards (ANSI/TIA, ISO/IEC, CENELEC). It also covers new developments in the world of multi-source agreements (MSAs).

ISO/IEC JTC1/SC25 WG3 meeting 66: March 4-8, 2019, in Vienna, Austria

The 66th ISO/IEC/ JTC1/SC25 Working Group 3 (WG3) meeting was attended by 47 experts and observers from 16 countries, including Belgium, Canada, China, Denmark, France, Germany, Great Britain, Ireland, Israel, Japan, Mexico, The Netherlands, Spain, Sweden, Switzerland, and the United States.

WG3 discussed the single-pair cabling specifications for the Amendments to the ISO/IEC 11801 series. The intent is to specify at least two generic single-pair Classes: a Class T1-A up to 20 MHz with lengths of 100, 250, 500, and 1000 m, and a 100 m Class T1-B up to 600 MHz. The ISO/IEC 18598 AIM Amendment with updates related to Power over Ethernet (PoE) is progressing to PDAM. The ISO/IEC 11801-9908 Technical Report with guidelines for duplex and parallel multimode applications will cover applications that are standardized, in progress of standardization, or covered by multi-source agreements (MSA). Several other projects were progressed as detailed below.

1. Development of generic single-pair cabling specifications

The 1st Working Draft (WD) of the Amendment to ISO/IEC 11801-1, including single-pair cabling specifications, was reviewed by the Working Group. Following much discussion, the Working Group identified a number of issues and agreed to include the following channel specifications:

- Class T1-A-1000, T1-A-500, T1-A-250, and T1-A-100, specified up to 20 MHz (1000 m, 500 m, 250 m, 100 m, respectively, with definition based on IL requirements)
- Class T1-B, specified up to 600 MHz, 100 m
- and, for further study, a Class T1-C, potentially specified up to 2,5 GHz, and up to 50 m

2. Sheath sharing and single-pair applications

A presentation identified challenges regarding sheath sharing, including the need for complex interference analysis, potential issues with remote powering, bonding and grounding, auto negotiation, and others. An informative section will state that the use of multiple single-pair applications within a common sheath is not assured, with guidelines for an engineered approach intended to minimize sheath sharing incompatibilities.

3. Alien crosstalk and generic single-pair cabling

There was no consensus regarding whether the alien crosstalk specifications in the 1st WD of the ISO/IEC 11801-1 Amendment are sufficient to support 1 Gbps. The 2nd WD will include the existing specifications for E1/E2 environments and more stringent specifications for E3, both marked ffs (for future study).

4. Single-pair connector specifications

A liaison letter to IEC SC48B was prepared with a request to consider updating the current carrying capacity of the IEC 63171-1 (LC-style) and IEC 63171-6 (industrial-style) connectors to 2A per contact, highlighting the need to support 1,02 mm (18 AWG) conductors, and emphasizing that no new connector project should be initiated for Class T1-C (ffs) up to 2,500 MHz (ffs) until WG3 completes a formal study in this area.

5. Unscreened single-pair generic cabling

A liaison letter to IEC SC46C was prepared, stating that WG3 is considering implementing unscreened solutions where possible, and requesting guidance on unscreened cable specifications to supplement draft IEC 61156-x standards for screened single-pair cables.

6. **Application-specific Technical Report for IEEE 802.3bp, IEEE 802.3bw and IEEE 802.3cg**

   The applications-specific technical report supporting IEEE 802.3 single-pair applications resolved all comments and will be circulated as a Draft Technical Report (DTR), including the sheath sharing guidelines from the ISO 11801-1 draft amendment for generic single-pair cabling.

7. **ISO/IEC TS 29125 Remote Powering and single-pair cabling**

   The ad hoc reviewed single-pair heating data in air and in conduit, as well as single-pair bundle heating constants for different conductor diameters. The document will be circulated as a Draft Technical Specification (DTS).

8. **PoE Amendment to ISO/IEC 18598 Automated Infrastructure Management**

   Comments to the second WD of the Amendment to add PoE functionality were reviewed and resolved. The document will be circulated as a Proposed Draft Amendment (PDAM).

9. **25 Gbps over balanced cabling to distances up to 50 m**

   WG3 agreed to change the title of TR 11801-9909 to "Evaluation of balanced cabling in support of 25 Gbps, with reach up to 50 m and higher." Comments were resolved and a new WD will be circulated. It was noted that a straw poll at the IEEE 802.3 New Ethernet Applications meeting asking for support to develop a CFI for 25 Gbps over balanced cabling up to 50 m received only 9 yes votes, with 23 no votes and 47 abstentions.

10. **Direct Attach Cabling**

    The DTR of ISO/IEC TR 11801-9907 was approved by National Bodies. Editorial comments will be forwarded to the Central Office for implementation prior to publication as a Technical Report.

11. **Modular Plug Terminated Links (MPTL)**

    Comments to the Working Draft were resolved, and a new Working Draft will be circulated.

12. **Network Physical Security**

    The WD was reviewed, resulting in several changes, including: 1) target harmonization between the Security Levels of ANSI/TIA-5017 and the Security Grades of the Network Physical Security document, and 2) move the AIM security content to the operations section in the main body of the document. A new WD will be reviewed at an interim face-to-face meeting.

13. **ISO/IEC 30129 Telecommunications Bonding Networks**

    All comments to the Proposed Draft Amendment (PDAM) were resolved. A DAM will be circulated.

14. **ISO/IEC TR 11801-9908: Guidelines for High-speed Applications over multimode fiber**

    The comments to the first WD were resolved. There was discussion regarding the list of non-standardized applications to be covered, and there was agreement to include applications in progress of standardization as well as applications with published MSAs. A new working draft will be circulated.

15. **ISO/IEC 14763-2 Planning and Installation**

    The comments to the Draft International Standard (DIS) were resolved and a Final Draft International Standard (FDIS) will be circulated.

16. **ISO/IEC 14763-3 Testing of Optical Fiber**

    The WD for the revision was reviewed and the ad hoc agreed to simplify the structure of the document and write it in a language more suited to the target audience, with additional detail for improved understanding.

17. **ISO/IEC 11801-6 Amendment 1 inclusion of single-pair cabling**

    The next WD of the Amendment will need to take the sheath sharing input into account.

18. **ISO/IEC 11801-3 Amendment 1 inclusion of single-pair cabling**

    The comments to the WD were resolved and a Committee Draft (CD) will be circulated.

The next ISO/IEC JTC1/SC25 WG3 meeting will be held 23-26 September, 2019 in Nagasaki, Japan.

IEC SC48B meeting: April 18 - 21, 2019, in London, United Kingdom

IEC SC48B and its working groups met in London, UK, from March 18 to March 21, 2019. Working Group 3 reviewed and resolved comments on several connector specifications, including the IEC 63171 parent document for single-pair connectors. This document contains common requirements for the family of six single-pair connectors that are in various stages of balloting in IEC SC48B. A proposal to combine the mechanical operations testing with the un-mating underload test needed for PoDL (Power over Data Lines) did not reach consensus since companies had not checked this out in their own laboratories. The advantage of combining the two tests is less time and less effort, resulting in improved efficiency. Working group 3 decided to re-circulate the IEC 63171 as a working draft (WD) to continue to refine this parent document.

The IEC 63171-1 copper LC connector developed by CommScope for enterprise environments together with the IEC 63171-6 industrial-style connector have advanced to the CDV (Committee Draft Voting) ballot. These two connectors have been recognized by ISO, TIA, and IEEE 802.3 as standardized interfaces for cabling and equipment. The other single-pair connector specifications are also being circulated as CD (Committee Draft) or WD (Working Draft) ballots and may be used as non-interface connectors for single-pair networks (i.e., in the middle of the channel).

The advanced technology group continued to develop ontology models for the connectors to improve their representation in data bases and automated systems. The goal is that IEC SC48B

specifications will eventually become accessible to software programs that can answer queries, create drawing renderings, and establish correlations with other related connector specifications. It is expected that this will also speed up the standards development process, improve consistency and accuracy, and avoid redundancy. This is a long-term project run directly by the chair of IEC SC48B and will have a big impact on standards development, if successful.

Working group 5 on testing reviewed the FDIS draft IEC 60512-99-02 specification for qualifying connectors used for 4PPoE (Four Pair Power over Ethernet). The group reviewed the section describing the test procedure and confirmed it can be used with all four pairs energized simultaneously without causing any harm to the contacts since the 2 amps per contact are turned on for only a short duration during un-mating.

The next meeting of IEC SC48B is during the week of September 3 in Arlington, Virginia, USA.

IEC SC86 WG4, WG6 and WG7 meeting in Delft

Technical Report scratch recognition of microscopes with automated scratch detection:

- Draft is circulating and has been updated several times
- Variability in test results observed when scratches are < 3 um wide
- Smallest scratch specified by 61300-3-35 is 3 um

Visual inspection

WG4 and WG6 had long discussions on the content and requirements of 61300-3-35 Ed3 and made the following decisions:

- All inspections can be done with "low-resolution microscope"
- Requirements will be investigated in WG6 Task Force; intent is not to tighten requirements
- For 45 dB requirements accepted to assume a 55 dB-58 dB polish process as input and establish criteria that will reduce RL from 58 to 47 dB (1 month time frame)
- This will lead to definition of certification artifact for minimum detectable defects and detectable scratches and thus for the definition of the microscope for 61300-3-35
- Requirements are industry agreement on quality of new shipped products
- Requirements should be logical related to the different RL grades
- No connector should fail on visual requirements while it passes performance requirements

Many comments, both method and requirements related, were un-resolved. In consultation with SC chair and secretariat it was decided that a 2nd CD will be circulated, to be handled at the next meeting in Shanghai.

MPO matters

- 16F mechanical interface on hold pending work on spring force; no agreement yet between Japanese and U.S. suppliers.
- MM reference connector draft presented; experts to determine the dimensions of pitch, guide bore and guide pin.
- Tight tolerances of fibres for CD and NA are known from published standard of the optical interface for reference connectors for cylindrical ferrules.
- Round Robin on core dip to be completed in Shanghai.
- Round Robin on sign convention for Y angle to be completed for Shanghai.
- 61300-3-30 measurement standard ready for publication pending positive outcome of Round Robins. (hopefully added measurement uncertainty guidance)
- Task Force created for measurement of guidepin bore parallelism, 4 methods used, differences between pinned and unpinned connectors.

Singlemode optical connector interface

- Attempt to combine tuned and untuned connectors intermateable in same performance grade.
- Comments on CDs based on Busan proposal were discussed.
- Busan proposal consumes some margin from the current tuned connectors to achieve intermateability with untuned connectors.
- Negative position, to that fact, from Swiss National Committee was presented. In WG this was supported by Germany, CZ, SV and France.
- No consensus in WG (neither based on expert basis nor on NC basis).
- Swiss should prepare a technical proposal within a month.

Multimode optical connector interface. Level 1 and 2 (3 for future)

- Based on modelling by MM reference connector interface.
- Encircled Flux on target at connection zero (against reference in factory) and resulting disturbed at connection one (random mated in field).
- Only for BIMM fibres (A1a.b).
- Unclear how to present the data obtained from modelling, use of simple graph (statistical approach) or look up tables with details on fibre parameters that can be selected.
- At this moment two attenuation grades and one RL grade.
- Proposed to tighten the attenuation performance; proposal was rejected: this cannot be done without restricting the fibre parameters.

IEC 61756-1 Ed2: general and guidance fibre management systems (or organisers)

- New edition contains interface dimensions of mechanical splices and splice protectors.
- Minimum bending radius of stored and installed fibers (including the bend-insensitive fibers).
- Document proceeds for last voting round (FDIS).

IEC 61753-111-08: performance standards for sealed closures for category G

- Urgent maintenance started due to changes in IEC 61753-1 Ed2.
- The problem is that previous category G closures are not suitable for immersion in water as specified by the new edition of IEC 61753-1 Ed2 category G.
- Cable retention forces reduced for microduct tubes and cables (10 N).
- Draft will circulate for comments.

IEC 61753-022-07: performance standards multimode hardened connector category A

- Chinese delegates prepared document for multimode hardened connector category A (aerial antenna applications).
- Document based on new IEC 61753-1 Ed2 requirements.

The next meeting of IEC SC86B is during the week of September 3 in Arlington, Virginia, USA.

IEC TC46 meeting: April 1, 2019, in Arlington, VA, USA

SC46C WG7

- Three "New Work Proposals" submitted by the Chinese NC to support 50-ohm cable designs; SC25 WG3 has submitted a liaison letter asking that SC46C work on one-pair UTP cable. SC46C is going to start an informal process of working on a draft that includes one-pair UTP. It is still not clear if this will form a separate standard or a corrigendum to the existing IEC 61156-11 RTPGE (one pair for 1Gbps over 40 m, for horizontal cabling) standard.
  - 61196-11-2. Detail specification for 50-5 (1/4 in, F-type) corrugated tube outer conductor semi-rigid cables with foamed polyethylene (PE) dielectric.
  - 61196-11-3. Detail specification for 50-9 (1/2 in, F-type) corrugated tube outer conductor semi-rigid cables with foamed polyethylene (PE) dielectric.
  - 61196-11-4. Detail specification for 50-12 (1/2 in, F-type) corrugated tube outer conductor semi-rigid cables with foamed polyethylene (PE) dielectric.
  - 61196-11-5. Detail specification for 50-22 (7/8 in, F-type) corrugated tube outer conductor semi-rigid cables with foamed polyethylene (PE) dielectric.
- IEC 61196-6-2, 61196-6-3, 61196-6-4 will move to CDV stage. These are specifications for 75-ohm coaxial cables with an operating band of 5 MHz to 3,000 MHz.
- Submitted a New Work Proposal for hanging bracket hardware for the wireless cable installations (46-604e NP).

The next meeting of IEC SC86 will be held In October 2019, Shanghai, China.

TIA TR-42 meeting: January 28 - February 1, 2019, in Orlando, FL, USA

Executive Summary

The following standards were approved or re-affirmed for publication:

- ANSI/TIA 568.2-D-1 balun requirements for Category 8 testing
- TIA TSB-184-A-1 guidelines for 28 AWG cords supporting remote powering
- TIA-1197 on modelling of alien crosstalk coupling mechanisms was re-affirmed
- TIA-TSB-5008 guidelines for mitigation of ESD during testing and operations was re-affirmed

The following standards were approved for ballot, re-ballot, or default ballot:

- TIA-607-B revision was approved to be circulated as a second industry ballot
- TIA-569-E approved for re-circulation as a default ballot with approval to publish if there are no technical comments or negative votes
- ANSI/TIA-758 Customer Owned Outside Plant was approved for re-circulation as a second industry ballot
- The following ballot is still pending: ANSI/TIA-1005-A addendum 2 cabling supporting 1000BASE-T for E2 and E3 environments (ANSI ballot)

1. TR-42.1 Commercial Building Cabling

- TR42.1 discussed ballot comments on ANSI/TIA-568.0-E generic standards and ANSI/TIA-568.1-E commercial cabling standard. Some ballot comments proposed significant changes to terminology and were deferred to the June 2019 meeting. A task group was formed to review these comments and develop recommended resolutions
- The committee resolved TIA-758-B Customer Owned Outside Plant ballot comments and approved the document be re-circulated as a second industry ballot
- The committee reviewed the report from the edge data center task group and agreed with their recommendations to publish edge data center requirements as an addendum to TIA 942-B. Additionally, a TSB may be created to capture those use cases that do not align with ANSI/TIA-942-B.
- Joe Cody was elected chair and Diane Forbes elected vice chair

2. TR-42.3 pathways and spaces

- TR42.3 resolved comments on the revision of TIA-607-B and approved the draft document to be circulated as a second industry ballot
- The Committee resolved all comments to TIA-569-E industry ballot and agreed to re-circulate only the technical changes as a default ballot with approval to publish if there are no technical comments or negative votes
- TR42.3 reviewed ISO I8598 AIM amendment to incorporate remote powering functionality and requested comments be submitted by end of February 2019 before the next ISO WG3 meeting
- TR42.3 reviewed ISO 14763-2 planning and installation requirements and requested comments be submitted by end of February 2019 before the next ISO WG3 meeting
- Cindy Montstream was elected chair and Jonathan Jew vice chair

3. TR-42.5 Telecommunications Infrastructure Terms and Symbols

TR42.5 modified or added the following definitions:

- **secondary bonding conductor:** Bonding conductor from the secondary bonding busbar to the telecommunications bonding backbone. (607)
- **firestop system:** A specific construction consisting of the material(s) that fill the opening where any items penetrate the wall or floor (e.g., cables, cable trays, conduit, ducts, pipes, termination devices, outlet boxes) along with their means of support. (569)
- **secondary bonding conductor:** Bonding conductor from the secondary bonding busbar to the telecommunications bonding backbone. (607)
- **optical fiber cable:** A cable containing one or more optical fibers. (568.x)
- **alien crosstalk:** The unwanted signal coupling from a disturbing pair of a channel, permanent link, or component to a disturbed pair of another channel, permanent link, or component. (568.x)
- **protector:** A device intended to limit abnormal voltages or currents on metallic telecommunication circuits. (568.x)
- Ron Tellas was elected chair and Diane Forbes elected vice chair

4. TR42.7 Copper Cabling Systems

- TR42.7 resolved ballot comments and approved publication of TIA TSB-184-A-1 guidelines for 28 AWG cords supporting remote powering
- TR42.7 resolved ballot comments on ANSI/TIA-568.2-D-1 specifying balun requirements for category 8 testing and approved publication of this addendum
- The task group developing requirements for testing field-terminated plugs proposed an interpretation statement of the existing requirements in ANSI/TIA-568.2-D instead; TR42.7 accepted this proposal and forwarded to TIA TR42 for further action
- TIA-TSB-155-A guidelines for supporting IEEE 10GBASE-T using category 6 cabling was discussed and left as is without any action
- TIA-TSB-5008 guidelines for mitigation of ESD during testing and operations was re-affirmed
- TIA-1197 with models for coupling of alien cross-talk was re-affirmed
- ANSI/TIA-568.5 with requirements for single-pair cabling and components was approved to be sent for a "mock ballot" within TIA TR42.7
- Sterling Vaden was elected vice chair and Wayne Larsen was elected chair

5. TIA TR42.9 industrial cabling

- TR42.9 could not discuss the industrial cabling addendum 2 to ANSI/TIA-1005-A-2012 for cabling supporting 1000BASE-T for E2 and E3 environments since the ballot closed on February 18, 2019.
- TR42.9 discussed the draft 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. This draft incorporates the contents of ANSI/TIA-568.5 and needs more work to highlight the industrial use cases.
- A contribution from Panduit with measured results of a 1,000-meter-long, 10-connection channel showed good channel performance and highlighted the fact that the copper LC connector can accommodate 18 AWG conductors.
- Brad Woodman was elected chair and Brian Shuman was elected vice chair.

6. TR-42.11 Optical Fiber Systems

- ANSI/TIA-568.3-D-1 Optical Fiber Cabling Component Standard-Addendum 1 General Updates
  - Document has been published
- New Projects and Proposal
  - TR42.11 moved TIA-PN-5069 (TSB on Optical Fiber Channel Polarity) draft to 60-day committee ballot

7. TR-42.12 Optical Fiber and Cable

- TR42.12 resolved comments on ANSI/TIA-455-95B (FOTP-95B) Absolute Optical Power Test. Document has been moved to publication.
- Final draft of ANSI/TIA-455-82B (FOTP-82B) Fluid Penetration has been moved to ANSI ballot.
- TR42.12 initiated a project to revise FOTP-244 Temperature Cycling of Expressed Tubes and incorporate sections of IEC 60794-1-22 Method F18.

- TR42.12 initiated a project to harmonize FOTP-3 Temperature Ramps and Precision and IEC 60794-1-22 Method F1.
- TR42.12 has broadened the scope of ANSI/TIA-598-D-2014 revision project to include 1) evaluation of other methods of determining colors (LAB vs. Munsell, color permanence testing); review and update marking, identifications and guidance (ring marking spacing, tracer color for black, color differences between PVC, LSHF and other materials).
- TIA 492 document series restructuring: adaptation of IEC documents
  - IEC published 60793-2-50 SM document. TR42.12 is developing an adaptation document for June 2019 vote submission.
  - IEC 60793-2-10 Ed.7 CDV ballot was completed in Oct. 2018. Ed. 7 will contain minimum wide band EMB specifications for OM3 and OM4. TR42.12 will incorporate the changes upon publication of Ed. 7.
  - IEC 60793-2 Generic – TR42.12 reviewed the draft document with editorial changes.
- "VCSEL Weighting Function" Task Group
  - Recent contributions have shown that the TIA 10 VCSEL weighting functions are still representative.
  - TR42.12 approved to close the task group.

8. TR-42.13 Optical Passive Devices and Metrology

- TR42.13 reviewed comment resolution for FOTP 171B. Document is ready for publication.
- TR42.13 reviewed the ballot summary and comment resolution for FOCIS 5. Document is ready for publication.
- FOCIS 19 (SEN-01 connector) draft document was reviewed. Editorial edits will be incorporated and committee ballot approved.
- TR42.13 reviewed IEC SC86B standardization update and document structure of mechanical and optical interfaces. Proposal for TIA to consider adoption of the IEC SC86B standards.

9. Closing TR42 plenary

- TIA TR42 discussed the activities of its subcommittees and acted on several motions from the sub committees
- A proposal to run TIA TR42.11, TR42.12, TR42.13 concurrently so that one meeting could follow the other without any gaps was received positively and will be tried out at the June meeting
- This approach in the fiber committees is also being discussed in the copper and infrastructure committees to optimize meeting schedules
- TR42 discussed and did not approve an interpretation statement from TIA TR42.7 regarding testing of field-terminatable plugs

The next meeting of TIA TR-42 will be held June 10-14, Vancouver, Canada.

INCITS Fibre Channel T11.2 meeting: February 4-8, 2019, in Fort Worth, TX, USA
April 9-11, 2019, in Boca Raton, FL, USA

Relevant project and document status:

- FC-PI-7 (INCITS/543-2019), Publication, June 2019
- FC-PI-7P, RFC ballot, June 2019
- FC-PI-8, RFC ballot, December 2020

FC-PI-8 Ad Hoc Group

- 128GFC Electrical variants contribution
  - Chip to chip channel IL ranged from 26.8dB (worst) to 13.2dB (best).Estimated IL of 23dB with newer material.
  - Reviewed trade-off between using stronger FEC codes (for closing higher data rates of 128GFC) comparing to using 100GEL FEC. Initial proposal to keep the same RS(544,514) FEC as in IEEE
  - Clock Content and Baseline Wander in PAM4 datastreams were presented. Proposal to remove symbol bit mux for additional 0.5dB coding gain.
- 128GFC Optical variants contribution
  - Due to low attendance from previous (2/2019) meeting, T11.2 chair requested CommScope and OFS to present the joint presentation again to discuss potential 128GFC MM solutions. T11. 2 committee is in general agreement to three viable solutions: 1)128GFC True serial based on 100G VCSEL, 2) 56 Gbps BiDi, or 3) 56 Gbps CoDi.
  - There is no 100G VCSEL project or discussion in IEEE or publicly for the 100G-SR variant.
  - FCIA is to consider an interim solution of 56 Gbps BiDi or CoDi and wait for the 100G VCSELs to mature.
  - Finisar plans to bring 100G VCSEL studies and simulation results to the June meeting.
- T11.2 reviewed most recent FC-PI-8 MRD and provided comments to FCIA for response. Comments include viable MMF solutions such as true serial 128GFC, 56 Gbps BiDi or 56 Gbps CoDi and associated cabling infrastructures. FCIA is to schedule Roadmap conference calls to review the MRD.

The next meeting of INCITS/T11 will be held June 3-7, 2019 La Jolla, CA, USA.

CENELEC TC215 WG1 meeting: No meetings were held during Q1 of 2019

The next meeting of CENELEC TC215 WG1 will be held June 3-4, 2019, in Athens, Greece.

CENELEC TC215 WG2 meeting: No meetings were held during Q1 of 2019

The next meeting of CENELEC TC215 WG2 will be held April 3, 2019, in Milan, Italy.

CENELEC TC86BXA WG1 meeting: No meetings were held during Q1 of 2019

The next meeting of CENELEC TC86BXA WG1 will be held May 21-22, 2019, in Brussels, Belgium.

CENELEC TC86BXA WG2 meeting: No meetings were held during Q1 of 2019

The next meeting of CENELEC TC86BXA WG2 will be held May 21-22, 2019, in Brussels, Belgium.

ITU-T SG15: No meetings were held during Q1 of 2019

The next meeting of ITU-T SG15 will be held July 1-12, 2019, in Geneva, Switzerland.

1. IEEE 802.3cq maintenance on two-pair power over Ethernet (PoE)

   · This is a new task force cleaning up discrepancies in the existing two-pair PoE standard (commonly known as 802.3af and 802.3at, or PoE and PoE+) found during the development of 802.3bt. This work is expected to be completed by the end of 2019, and is not expected to change the functionality in two-pair PoE systems.

Single Twisted Pair Copper Standards

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

   · The 10 Mbps/Single Pair Ethernet project concluded the Working Group ballot process, and entered the final phase of balloting, Standards Association ballot (formerly known as "Sponsor Ballot"). The initial Standards Association ballot is expected to close in May 2019, and the project is still on track to conclude in late 2019.
   · The draft specifically references the LC-style copper connector for use as an equipment interface (called an MDI) for both 10BASE-T1L and 10BASE-T1S applications in E1 and E2 environments (similar to those found in in-building environments). Because of the varied environmental and electromagnetic conditions found in the industrial and automotive use cases envisioned for this standard, the standard allows the use of other connectors, but the LC-style connector is directly referenced in the standard for commercial building environments.
   · The project objectives cover industrial, automotive, and building automation use cases, encompassing multiple different applications, one up to 15 m, one of approximately 1 km, and a new one is in formulation to reflect 25 m multidrop applications. The project has organized around two physical layer PHYs:
     – 1. Up to 1 km single-pair (aka 10BASE-T1L): The project adopted baseline specifications for the up to 1 km process control and building automation application, adopting PAM 3 signaling and various electrical specifications.
     – 2. Short-reach (15 m+, aka 10BASE-T1S): The project also adopted link segment specifications for 15 m point-to-point links, compatible with 25 m multidrop networks as well. Short reach PHYs will optionally support multidrop.
     – 3. An optional improvement collision performance on multidrop networks (known as PLCA in the draft).
     – 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.

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

   · This task force is focused on short-reach automotive links at rates of 2.5 Gbps, 5 Gbps, and 10 Gbps. The objectives call for up to 15 m and four 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 adopted PAM 4 PHY proposals for all rates, along with Reed-Solomon forward error correction coding to deal with impulse noise, and link segment (cabling) specifications using shielded cabling specified to 1 GHz, 2 GHz, and 4 GHz for 2.5 Gbps, 5 Gbps and 10 Gbps rates, respectively.
   · The project includes use of the 802.3bu powering, but does not expect to extend that powering specification.
   · The group continued Task Force review, with the major features in place, but still needs some details to be technically complete. It is expecting to have a technically complete draft to enter working group ballot in May 2019.

4. IEEE 802 Beyond 10 Gigabit Automotive Ethernet PHY Study Group

   · The IEEE 802.3 working group approved the formation of a new study group to develop a project authorization request, criteria for standards development, and objectives for a new Task Force focused on electrical automotive Ethernet PHYs at rates greater than 10 Gbps. This new project is primarily driven by requirements for autonomous vehicle networking.

Optical Fiber Standards

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

   · This Task Force is writing a standard for 25G and 50G EPON
   · The previous objective supporting 100G EPON was removed from the scope
   · The wavelength plan will allow backwards compatibility with networks supporting 10G EPON
   · All upstream and downstream wavelengths will be in O-band (around 1,310 nm)
   · The standard will allow coexistence of:
     – 25G EPON with GPON (reduced wavelength)
     – 25G EPON and 50G EPON with 10G-EPON, XG-PON1, and XGS-PON
   · The Working Group submitted comments on draft 1.6

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

   · Task Force has written a standard for 50G, 100G, and 200G
   · Standard has been submitted to RevCom and the Task Force work is complete.

7. IEEE P802.3cm Next-gen MMF PHYs (i.e. 400 Gbps over fewer pairs of MMF) Task Force

   · This Task Force has two main objectives:
     – Define a physical layer specification that supports 400 Gbps operation over eight pairs of MMF with lengths up to at least 100 m
     – Define a physical layer specification that supports 400 Gbps operation over four pairs of MMF with lengths up to at least 100 m
   · The first objective is being met by a specification creating 400GBASE-SR8 following the precedents set by P802.3cd for 50GBASE-SR, 100GBASE-SR2 and 200GBASE-SR4 and will support 70/100/100 m over OM3/OM4/OM5.
   · The second objective is being met by a specification creating 400GBASE-SR4.2 (four fiber pairs with two wavelengths), a bi-directional transmission solution that is essentially a parallel fiber version of Cisco's 100G-BiDi. The specification supports 70/100/150 m over OM3/OM4/OM5 and is the first standard to leverage the WDM support capabilities of OM5.
   · The Task Force submitted draft 2.0 for first Working Group ballot to be resolved at the May 2019 meeting.

8. **IEEE P802.3cn 50 Gbps, 200 Gbps, and 400 Gbps Operation Over Single-Mode Fiber (formerly called Beyond 10 km Study Group)**
   - This work was split into two projects. P802.3cn will address the 40 km objectives. P802.3ct will address the 80 km objectives.
   - The main objectives are:
     - 50 Gbps operation over at least 40 km of SMF (50GBASE-ER)
     - 200 Gbps operation over four wavelengths capable of at least 40 km of SMF (200GBASE-ER4)
     - 400 Gbps operation over eight wavelengths capable of at least 40 km of SMF (400GBASE-ER8)
   - The Task Force submitted draft 2.0 draft for first Working Group ballot to be resolved at the May 2019 meeting.

9. **IEEE P802.3cp 10G, 25G, and 50G Bidirectional Access Optical PHYs Task Force**
   - The Study Group successfully transitioned to a Task Force
   - This Task Force is developing standards for bidirectional 10G, 25G, and 50G over 10, 20, and 40 km over a single strand of singlemode fiber.
   - Baseline proposals are being considered.

10. **IEEE P802.3cs Central Office Consolidation (super PON) Task Force**
    - The Study Group successfully transitioned to a Task Force
    - The main objectives of this Study Group are:
      - Support a passive point-to-multipoint ODN with a reach of at least 50 km with at least 1:64 split ratio per wavelength pair
      - Support at least 16 wavelength pairs for point-to-multipoint PON operation
      - Support the MAC data rate of 10 Gbps downstream
      - Support the MAC data rates of 2.5Gbps and 10Gbps upstream
      - Support tunable transmitters

11. **IEEE P802.3ct 100 Gbps and 400 Gbps Operation over DWDM Systems Task Force**
    - This project was split off from P802.3cn and will focus on the 80 km objectives.
    - The main objectives are delineated by data rate and reach as follows:
      - 100 Gbps operation on a single wavelength capable of at least 80 km over a DWDM system (100GBASE-ZR).
      - 400 Gbps operation on a single wavelength capable of at least 80 km over a DWDM system (400GBASE-ZR).
    - DP-DQPSK coherent modulation format will be used for 100GBASE-ZR.
    - DP-16QAM coherent modulation format will be used for 400GBASE-ZR.
    - The Task Force has adopted baseline proposals for PCS and FEC functions, and is debating baseline proposals for PMD functions.

12. **IEEE P802.3cu 100 Gbps and 400 Gbps over SMF at 100 Gbps per Wavelength Task Force**
    - The Study Group successfully transitioned to a Task Force
    - This Task Force has the following objectives:
      - Define a single-wavelength 100 Gbps PHY for operation over SMF with lengths up to at least 2 km and up to at least 10 km
      - Define a four-wavelength 400 Gbps PHY for operation over SMF with lengths up to at least 2 km and up to at least 10 km

The next meeting of IEEE 802.3 will be an interim meeting held the week of May 20, 2019, in Salt Lake City, Utah, USA.

Other Standards, Codes and MSAs

Automated Infrastructure Management (AIM) systems have been recognized by BICSI and included on the list of recommended management tools in the recently published new standard - BICSI 009-2019, Data Center Operations and Maintenance Best Practices.

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