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

Welcome to the twenty-third 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 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 Physical Network Security Adhoc Meeting, Arlington, VA, USA

The ISO/IEC/JTC1/SC25 Working Group 3 (WG3) had a Physical Network Security Adhoc meeting in Arlington VA, USA, on June 17-18, 2019. The adhoc resolved comments submitted against working draft 2 and generated working draft 3 for a re-circulation ballot. Major issues resolved include:

1. Clarification of the security grades SG1, SG2, and SG3 with a recommendation that SG2 follow SG3 requirements.
2. Labels outside SG2 and SG3 shall not indicate the function, connectivity information, or contents.
3. Storage of materials during installation shall be in fenced areas that are monitored and inspected to prevent unauthorized changes.
4. Integration of security systems using automated infrastructure management (AIM) and application programming interfaces for communication is recommended for enhanced security.
5. The security system design should support future evolution, including connectivity of IoT security sensors to AI systems that will further enhance security.
6. Personnel shall be vetted and provided limited access to the physical network based on security policy for the facility.

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

IEC SC86 WG4, WG6 and WG7 meeting: April 8-12, 2019, in Delft

Visual inspection

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

- All inspections can be done with a "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 55-58 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 IEC 61300-3-35.
- Requirements are industry agreement on quality of new shipped products.
- Requirements should be logically related to the different RL grades.
- No connector should fail on visual requirements while it passes performance requirements.

Many comments, related both to method and requirements, were unresolved. In consultation with SC chair and secretariat it was decided that a 2nd committee draft 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 fibers for chromatic dispersion and numerical aperture 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.
- IEC 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, four 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 committee drafts 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, Czech Republic, Slovenia and France.
- No consensus in WG (neither based on expert basis nor on national committee 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 fibers (A1a.b).
- Unclear how to present the data obtained from modelling: use of simple graph (statistical approach) or tables with details on fiber 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 fiber 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 SC86 will be held October 14-18, 2019, Shanghai, China.

Executive summary

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

- ANSI/TIA-568.0-E Generic telecommunications cabling for customer premises.
- ANSI/TIA-568.1-E Commercial building cabling infrastructure standard.
- TIA-607-B generic Telecommunications bonding and grounding (earthing) for customer premises.

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

- ANSI/TIA-PN-5069 TSB on Optical Fiber Channel Polarity—duplex-single and double row fiber.
- ANSI/TIA-455-82C (FOTP-82C) Fluid Penetration.
- ANSI/TIA-4920000 Generic Specification for Optical Fibers.
- ANSI/TIA-492CAAC Sectional specification for class B single-mode optical fibers.
- ANSI/TIA-492AAAF Sectional specification for category A1 graded-index multimode optical fibers.
- ANSI/TIA-604-19 (FOCIS 19) Fiber Optic Connector Intermateability Standard Type SEN Connector.
- ANSI/TIA-1005-A Industrial cabling infrastructure standard (re-affirmation ballot).

The following ballot is still pending:

- ANSI/TIA-758 Customer Owned Outside plant was approved for re-circulation as a second industry ballot.

1. TR-42.1 commercial building cabling

- TR42.1 reviewed the task group recommendations to resolve terminology changes for ANSI/TIA-568.0-E generic telecommunications cabling standard and ANSI/TIA-568.1-E commercial cabling infrastructure standard. These comments were resolved and both documents will be published.
- A PAR was created to circulate TIA-TSB-162-A, Wireless Access Points, for potential revision.
- Input is being sought on the potential need to update ANSI/TIA-4966 Telecommunications infrastructure standard for educational facilities.
- The TR42.1 Single-pair Task Group is on hold awaiting more progress from TR42.7.
- There was a brief review of the work of the Edge Data Centers Task Group work, which has resulted in a working draft of ANSI/TIA-942-B-1 addendum.
- The planned ballot for TIA-758-B Customer Owned Outside plant was not circulated and this is still pending.

2. TR-42.3 pathways and spaces

- TR42.3 resolved comments on the revision of TIA-607-B Bonding and Grounding standard and approved the document for publication.
- TIA-569-E has been published since the successful closing of the default ballot, authorized at the January 2019 meeting.
- TR42.3 membership was invited to comment on the ISO/IEC 18598-1 amendment to extend AIM systems manage remote powering. The committee agreed to adopt the ISO document once it reaches the FDIS stage with minimal changes as an ANSI/TIA standard.

3. TR-42.5 telecommunications infrastructure terms and symbols

TR42.5 modified or added the following definitions:

- **MIMO:** multiple-input and multiple-output.
- **multiple-input and multiple-output:** The use of multiple inputs and outputs to improve telecommunications performance.
- **equipment outlet assembly:** A grouping in one location of several equipment outlets.
- **consolidation point connector:** A fixed connection between a distributor and an equipment outlet in a work area.
- **horizontal connection point connector:** A fixed connection between a distributor and an equipment outlet or device in a coverage area.
- **consolidation point:** An assembly of consolidation point connectors.
- **horizontal connection point:** An assembly of horizontal connection point connectors.
- **transverse conversion transfer loss:** A ratio, expressed in dB, of the measured common mode voltage on a pair relative to the differential mode voltage applied at the opposite end of the same pair.
- **connecting hardware:** A device providing cable terminations.

4. TR42.7 copper cabling systems

- TR42.7 completed some comment resolutions for the mock ballot of ANSI/TIA-568.5, single-pair cabling and components standard. There were several significant issues identified, and focused task groups will need to be formed to finish the ballot comment resolutions.
- TR42.7 agreed to start a project to write a standard for field testing of single-pair cabling systems.
- TR42.7 reviewed the draft of ANSI/TIA-568.2-D-2, which will be a normative version of TSB-184-A. There is agreement on the direction of the draft, including its three options of satisfying the bundling and cable arrangement requirements, and elevating certain recommendations to requirements. There will be two more task group meetings to refine the draft before a ballot is circulated.
- TR42.7 drafted a liaison response to CCCA on POE legislation issues and established an ad hoc (task group) to correspond with them.
- The interpretation statement regarding field-terminatable plug was accepted.

5. TIA TR42.9 industrial cabling

- TR42.9's previous attempt to re-affirm ANSI/TIA-1005-A was rejected by ANSI due to the imbalance in the voting pool. This was authorized again with the hope that TIA's outreach to the user and general interest communities will be satisfactory to ANSI.
- TR42.9 began reviewing comments to the industrial cabling addendum 2 to ANSI/TIA-1005-A-2012 for cabling supporting 1000BASE-T for E2 and E3 environments. This work was paused to await contributions on the relationship between channel and component balance.
- 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 some content of ANSI/TIA-568.5 related to industrial use cases and remains on hold until ANSI/TIA-568.5 makes further progress.

6. TR-42.11 optical fiber systems

- Resolved all ballot comments of TIA-PN-5069 Draft TSB "Optical Fiber Channel Polarity—duplex-single and double row fiber." CommScope proposals of alternative polarity-type symbols and inclusive of modules/cassettes in TSB were accepted and will be adopted in the next ballot. Motion moved to circulate draft with resolved comments for second committee ballot.
- Discussion to amend TIA-568.3-D in order to incorporate Addendum TIA-568.3-D.1 and additional material. Presented as future development for next meeting.

7. TR-42.12 optical fiber and cable

ANSI/TIA-455-3 (FOTP-3), Temperature Ramps and Precision

- Project scope: harmonization with IEC 60794-1-22, Method F1.
- PINS form was approved and submitted to TIA for project initiation.
- Reviewed the TIA/IEC dissimilarities on soak test, temperature cycle and detailed cord test specifications.
  - FOTP-3 specifies both bulk cables and connectorized cords in Annex A; however, IEC 60794-1-22 does not specify cord test. Discussed structuring option of FOTP-3 Annex A, whether or not to split as standalone document or remain unchanged to be consistent with IEC.

ANSI/TIA-455-244 (FOTP-244), Temperature Cycling of Expressed Tubes

- Approved motion incorporate sections of IEC 60794-1-22 Method F18.
- PINS form was approved and submitted to TIA for project initiation.
- Reviewed the TIA/IEC dissimilarities on buffer tube size, coil loop diameter and temperature cycling specifications.
  - OFS Pedestal Temperature Study over the course of 12 months shows that 70˚C is not a realistic high-temp threshold and it could be lowered to 60˚C. Discussed how this could affect number of cycle and soak test.

ANSI/TIA-455-82B (FOTP-82B), Fluid Penetration

- ANSI ballot closed successfully. As a result of technical changes from comment resolution, committee approved a motion to initiate another ANSI ballot.

ANSI/TIA-598-D-2014 Revision

- Reviewed contribution on mapping Munsell color targets for optical fiber to the CIELAB definitions. There is general agreement to harmonize with international standards to CIELAB method. Requested round robin data from the fiber and cable manufacturers to measure Munsell color chips using colorimeters.
- Brief discussion on marking, whether or not the end users would prefer additional colors or ring markings. The committee invites more feedback to build consensus at next meeting.

ANSI/TIA-492 Document Series Restructuring: adoption of IEC documents

- TIA-492CAAC (Adoption of IEC published 60793-2-50 SM document). PINS was approved and submitted to TIA. Approved a motion to move document to ballot, after PINS publication 30-day period is closed.
- TIA-492AAAF (Adoption of IEC 60793-2-10 Ed.7 MM document). Revised PINS form was approved and submitted to TIA based on recent IEC 60793-2-10:2019 publication. Approved a motion to move document to ballot, after PINS publication 30-day period is closed.
- TIA-4920000 (Adoption of IEC 60793-2 Generic). Document will go to ballot once IEC document is published and available.

ICEA Liaison Report

- Reviewed proposal of 200 µm ribbon fiber dimensions, using the same equations used for 250 µm fiber dimension calculation.
- Discussion of max value discrepancies between IEC and ICEA on 250 µm fiber dimension specs.

8. TR-42.13 optical passive devices and metrology

FOCIS 19—SEN (CS) Connector

- Completed comment resolution; approved to move to another committee ballot.

FOCIS Proposals—SN (Senko) and MDC (US Conec) Connector

- Both connectors were presented, and committee reached consensus to shelve projects until further MSA development and market demand.

Discussion on collaboration with TR-42.12 of upcoming FOTP-3 revision project.

9. Closing TR42 plenary

- TIA TR-42 discussed the activities of its subcommittees and acted on several motions from the sub-committees.
- TIA TR-42.11, TR-42.12 and TR-42.13 will continue to run the concurrent meeting schedule for the next meeting, with proposed improvements received at the closing plenary meeting.
- This approach in the fiber committees is also being discussed in the copper and infrastructure committees to optimize meeting schedules.
- TR42 discussed and approved a liaison response to CCCA agreeing to cooperate on legislative issues related to licensing for work related to remote powering, such as PoE.

The next meeting of TIA TR-42 will be held
September 16-20, 2019, Albuquerque, NM, USA.

INCITS Fibre Channel T11.2 meeting: June 4-6, 2019, La Jolla, CA, USA.

Relevant project and document status:

- FC-PI-7 Amendment 1 (Technical correction to FC-PI-7, equation 11)—Project proposal committee ballot closed on July 3, 2019.
- FC-PI-7P (INCITS 559), RFC ballot, August 2019 (Finisar is to bring justification to carry over the same specs of FC-PI-7).
- FC-PI-8 (INCITS 560), RFC ballot, December 2020.

FC-PI-8 ad hoc group

- 128GFC FEC architecture
  - T11.2 reviewed three 128GFC FEC architecture proposals: Single RS(544,514), Interleaved RS(544,514) and Interleaved RS(272,257+1). FEC metrics correction capability, latency and area were compared.
- 64GFC baseline wander of PRBS58
  - Further test results were presented on higher FEC uncorrectable error rate issue with all 0's payload. Ruled out baseline wander as the root cause, CDR frequency spurs and clock content, root cause is still under investigation.
- 100Gb/s PAM4 VCSEL links—feasibility and strawman link budget
  - Simulation eye diagrams at 56 Gbps and 112 Gbps PAM4 were shown using the same ~24 GHz minimum bandwidth VCSEL, at 100 m OM4 and 50 m OM5, respectively.
  - Proposal for a longer wavelength design window (930 nm to 950 nm) at 112 Gbps to improve performance. Backward compatibility would only be one generation back to 64GFC and reach would be limited to 50 m, against 100 m OM4/OM5 requirement.
- CoDi/BiDi interop discussion
  - T11.2 is developing a document outlining CoDi/BiDi impact on interoperability and backward compatibility, including module (SFP/SFP-DD) and cage compatibility, supported cabling infrastructure and speed negotiation.
- FC-PI-8 MRD
  - FCIA responses to FC-PI-8 MRD questions were reviewed, confirmed requirements as follows: signaling rate of 112.2 Gbps, reach requirement of 100 m OM4/OM5 and two generations of backward compatibility.

Note: FC-PI-7: 64GFC
FC-PI-7P: 256GFC Parallel solution (4x64GFC)
FC-PI-8: 128GFC "Serial" solution
MRD: marketing requirement document, similar to a project scope statement.

The next meeting of INCITS/T11 will be held August 13-15, 2019, in Santa Fe, NM, USA.

CENELEC TC215 WG1 meeting 71: June 3-4, 2019, Athens, Greece

The meeting was attended by 12 experts from eight countries, including France, Germany, Greece, Italy, Netherlands, Norway, Switzerland and UK.

- The livelist for the EN 50173 series was revised; no action needed.
- A revision of EN 50700 is planned to update outdated references.
- Work is starting on documents in support of single-pair cabling.

The next meeting of CENELEC TC215 WG1 will be held October 29-30, 2019, in Paris, France.

CENELEC TC215 WG2 meeting 47: June 4-5, 2019, Athens, Greece

The meeting was attended by 10 experts from seven countries, including France, Germany, Greece, Italy, Netherlands, Norway and UK.

- The development of IEC 60364-716 is delayed due to conflicting concepts between IEC 60364-4-43 (SELV) and IEC 62368-3 (ES).
- Work was done to improve text on selection of test method and limits.

The next meeting of CENELEC TC215 WG2 will be held April 22-23, 2020, location TBD.

CENELEC TC86BXA WG1 meeting: May 21-22, 2019, Brussels, Belgium

Fiber-optic connectors and passive optical components

- The following documents are published:
  - Technical report CLC/TR 50682 "Consideration on the use of OTDRs to measure return loss of single-mode optical fibre connections." The measurement error on high return loss connections is much larger than expected, especially when a mix with bend-insensitive fibers is made.
  - EN 50377-18-1 "Type 4+4x10.3125 Gb/s MPO (QFSP) transceiver mated with an MPO connector equipped with 12 fibre PPS ferrules terminated on EN 60793-2-10 category A1a.3a or A1a.3b 50/125 micron multimode fiber."
- Early revision requested of document EN 50377-14-1: "Simplex and duplex cords made from simplex plugs with cylindrical ferrules, using EN 60793-2-50 single-mode B1 or B6 fiber for Category C according to EN 61753-1."
- New documents prepared and submitted for comments from the national committees:
  - EN 50377-4-3 "Type SC/APC grade B simplex 9° terminated on IEC 60793-2-50 of types B1.3 and B6a singlemode fibre, with full zirconia ferrule category OP."
  - EN 50377-15-1 "Type MPO with 12 fibre PPS ferrules terminated on IEC 60793-2 category A1a multimode fiber for 50/125 micron multimode fiber—macrobend enhanced fibre only."

The next meeting of CENELEC TC86BXA WG1 will be held December 3-4, 2019, in Brussels, Belgium.

CENELEC TC86BXA WG2 meeting: May 21-22, Brussels, Belgium

Fiber management systems and protective housings

- Discussions on installation problems with microduct cables in existing closures and boxes. Microduct cables (IEC 60794-5 series) have reduced crush and cable load resistance compared to the "conventional" cables specified by the IEC 60794-3 series. High attenuation is observed when anchoring microduct cables. Several layers of protective tape around the microduct cable could give sufficient protection when anchoring microduct cables in protective housings, but the cable retention performance is reduced to a load (in N) of 10x cable diameter (mm) for these cables (instead of the specified 20x cable diameter). For the microduct tubes a minimum retention force of 10 N is proposed.
- The following new documents are approved for publication:
  - EN 50411-3-4 "Wall box for categories C and A" and
  - EN 50411-4-1 "Outdoor street cabinet for category A"
- Because the new edition of EN IEC 61753-1 was published in August 2018, several EN 50411 documents need maintenance. The following documents were updated and submitted to the national committees for comments.
  - EN 50411-2-4: "Sealed dome fibre splice closures for categories S and A."
  - EN 50411-3-1: "Wall mounted fibre optic closure with splices for categories G and C."
  - EN 50411-3-3: "Singlemode optical fibre fusion splice protectors category OP."
  - EN 50411-6-1: "Unprotected microduct for categories A and S."

The next meeting of CENELEC TC86BXA WG2 will be held December 3-4, 2019, in Brussels, Belgium.

ITU-T SG15: No meetings were held during Q2 of 2019

Technologies and Infrastructures for Transport, Access and Home

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

IEEE 802.3 Ethernet Meeting: Interim—Salt Lake City, UT, USA, May 20-24, 2019

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**
   - At the May 802.3 interim meeting, the 802.3ch draft was made technically complete, and entered Working Group ballot. It is currently in initial working group ballot, and is expected to be ratified in late 2020.
   - 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.

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

- This 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. The study group had its initial meeting at the 802.3 interim in May, with some initial planning. It is expected to present a proposal for a new task force by the end of 2019.

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 1310 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
- No comments were submitted by the Task Force on draft 1.6.
- Draft 2.0 advanced to Working Group ballot May 2019.

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 reviewed comments from the Working Group against draft 2.0.
- The first Working Group recirculation ballot began June 2019.

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 reviewed comments from the Working Group against draft 2.0.
- The first Working Group recirculation ballot began June 2019.

9. IEEE P802.3cp 10G, 25G, and 50G Bi-directional Access Optical PHYs Task Force

- This Task Force is developing standards for bi-directional 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 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 2.5 Gbps and 10 Gbps upstream
  - Support tunable transmitters
- Baseline proposals are being considered.

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.
- Baseline proposals are being considered.

The next meeting of IEEE 802.3 will be a plenary meeting held the week of July 15, 2019, in Vienna, Austria.

Power Supply, Bonding and related topics

EE2 documents that were progressed:

- EN 300 132-3, "400VDC power interface": a new version is available and will be sent for remote consensus approval.
- EN 300 132-4, "Single 400VDC and 230VAC interface": a new version will be available at the end of May.
- EN 302 099, "Powering the access network": version 23 was uploaded and sent for comment collection until 10 June. Conference call to be planned in June/July 2019.
- DES/EE-0260, "Progressive migration of existing Telecom/ICT sites to 400VDC" (equivalent to L.400 migration consented in March 2018 in ITU-T L.1207): The rapporteur needs to create an ETSI version for the end of June and it will be sent to remote consensus approval.
- TS 103 553-2, "Innovative energy storage technology for stationary use; Part 2: battery technology": ETSI version in preparation by rapporteur C. Bianco (17/5) sent for remote consensus for approval.
- TS 103 553-3, "Innovative energy storage technology for stationary use; Part 3: super-capacitor technology": ETSI version in preparation by rapporteur C. Bianco (17/5) sent for remote consensus for approval.
- DES/EE-0269 (ES), "Sustainable power feeding solutions for 5G network": jointly under development with ITU-T Q6/5.

Other documents discussed:

- EN 301 605, "Earthing and bonding of 400VDC ICT equipment": Ake Ericsson will check the document and report at next meeting the need to revise the document; thinking also to include power feeding and grounding requirement inside the document.
- EE2 agreed to withdraw ETR283, "Transient voltages at Interface A on telecommunications direct current (dc) power distributions" and the corrigendum as the contents are covered by TR 100 283.
- TR 102 614, "Reverse powering of access network unit by end-user equipment: A4 interface": is included in new version of EN 302 099 and it is proposed to be withdrawn.

Next meeting of ETSI EE2 will be held the week of November 4-8, 2019, in Italy.

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