

Issue 27 • Quarter 2, 2020

# Standards Quarterly Update:

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

Welcome to the 27th 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 2020 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).

TIA TR-42 meeting: June 2020, Virtual meeting

### Executive Summary

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

- ANSI/TIA-PN-5069 TSB on Optical Fiber Channel Polarity – duplex-single and double row fiber
- 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-455-82C (FOTP-82C), Fluid Penetration
- ANSI/TIA-455-244 (FOTP-244), Temperature Cycling of Expressed Tubes
- ANSI/TIA-455-191 (FOTP-191), Mode Field Diameter (adopting IEC-60793-1-45)

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

- ANSI/TIA-568.5 Balanced Single Twisted-Pair Telecommunications Cabling and Components Standard
- ANSI/TIA-5071 draft standard for field testing of single pair cabling systems
- ANSI/TIA-568.2-D-2 the normative version of TSB-184-A
- ANSI/TIA-568.0-E-1 generic cabling amendment to include single pair
- TIA-TSB-162-B, Wireless Access Points cabling revision
- ANSI/TIA-862-C, intelligent buildings cabling revision
- ANSI/TIA-942-B-1, edge data centers
- ANSI/TIA-4966, education standard revision
- ANSI/TIA-4920000 Generic Specification for Optical Fibers
- ANSI/TIA-604-19 (FOCIS 19), CS Connector
- ANSI/TIA-604-10B (FOCIS 10), Fiber Optic Connector Interchangeability Standard-Type LC

### 1. TR-42.1 Commercial Building Cabling

- ANSI/TIA-568.0-E-1 amendment comments on the mock ballot to include single pair were resolved and a committee ballot authorized.
- TIA-TSB-162-B, Wireless Access Points for Ballot comments were resolved and publication authorized
- ANSI/TIA-758-C (OSP) was not addressed. The task group has not completed its work.
- ANSI/TIA-862-C, revision mock ballot comments to include single pair were resolved and a committee ballot authorized.
- There was a review of addendum 1 of ANSI/TIA-942-B-1, edge data centers. A draft of Annex F from Masood Shariff of CommScope was added. A PAR was approved and a mock ballot was authorized
- ANSI/TIA-4966, education standard revision comments were resolved and a 2nd industry ballot was authorized.
- A proposal to define and recognize hybrid cables that include both fiber elements for signal transmission and copper elements for power delivery was forwarded to the definitions subcommittee 42.5.

### 2. TR-42.3 Pathways and Spaces

- This subcommittee did not hold a meeting

### 3. TR-42.7 Copper Cabling Systems

- TR42.7 completed comment resolutions for the ballot of ANSI/TIA-568.5, single pair cabling and components standard. An industry ballot reflecting these changes was authorized.
- TR42.7 resolved comments for the ANSI/TIA 5071 draft standard for field testing of single pair cabling systems and authorized a 2nd committee ballot.
- TR42.7 reviewed the draft of ANSI/TIA-568.2-D-2, which will be a normative version of TSB-184-A. A default ANSI industry ballot was authorized covering three comments.
- A task group continues to study the far end grounding issue for TCL. The study will clarify the dependency of a single pair channel on the grounding of the far end. Round robin testing is being planned. This TG work is being delayed by the COVID-19 travel restrictions.
- Single-pair multi-drop was not addressed due to time. It will be published as ANSI/TIA-568.6.
- A public input proposal to include single pair ampacity tables in the 2023 NEC code was reviewed and received support.

### 4. TR-42.9 Industrial cabling

- TR42.9 resolved mock ballot comments on ANSI/TIA-1005-B, revision of A, and authorized a 1st committee ballot.
- A new PAR was approved for balanced single twisted-pair for industrial premises to be published as ANSI/TIA-568.7.

### 5. TR-42.11 Optical Fiber Systems

- TIA-PN-568.3-E, Revision of TIA-568.3-D, Optical Fiber Cabling Component Standard
  - General updates to uphold a 5-year cadence on maintenance of standard, incorporate content from published addendum (TIA-568.3-D-1), and update pertinent content to reflect the latest technological updates and capabilities. Approved for another committee ballot.
  - Sunny Xu (CommScope) will be the new editor.
  - With the emerging 400G-SR8 application and technical contributions within IEEE addressing the need of a new MM 16F APC connector. The Committee conducted a straw poll aiming to achieve consensus on color designation of MM MPO APC connector. Straw poll results showed that majority favors using green to define MM APC MPO connector.
- TIA-PN-526.14-D, Revision of TIA-526-14-C, Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant
  - The Committee agreed to adopt IEC 61280-4-1 Ed. 3 with the foreword to be determine, which may address the length recommendation of test leads when using BIMMF. Approved for another committee ballot.

### 6. TR-42.12 Optical Fiber and Cable

- TIA-PN-455-3-C, Revision of TIA-455-3B (FOTP-3), Procedure to Measure Temperature Cycling Effects on Optical Fiber Units, Optical Cable, and Other Passive Fiber Components
  - All comments were resolved. Temperature ranges and number of cycles information in Annex A will be updated to reflect IEC 61753-1 specifications. Approved for another committee ballot.

- TIA-PN-455-111 Adoption of IEC 60793-1-34, Measurement Methods and Test Procedures – Fibre Curl
  - IEC publication is due in August 2020. The Committee will request for published document and move to ballot after the October 2020 meeting.
- TIA-492000-C, Adaption of IEC 60793-2:2019, Optical Fibres –Part 2: Product Specifications – General
  - Approved for TIA committee ballot.
- A series of TIA-455 documents (update IEC adaption/adoption) ballot will open on June 15.
  - -78, -62, -80, -175, -176, -177, -178, -67, -74, -160, -122
- TIA-PN-598-E, Revision of TIA-598-D, Optical Fiber Cable Color Coding
  - General updates to uphold a 5-year cadence on maintenance of standard, incorporate content from published addendums (TIA-598-D-1 and TIA-598-D-2), and update pertinent content to reflect the latest technological updates and capabilities.
  - Due to COVID-19 travel restrictions, Munsell Color System bake-off session has been put on hold. Given the importance of this topic both globally and domestically (within IEC and TIA standard bodies), 42.12 committee plans to host working sessions for interested companies to continue this effort virtually. First proposal is for interested companies to produce ink drawdown samples and/or cable samples to be shipped amongst interest parties. Each company is to measure these samples with their own equipment and contribute to round-robin study.

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

- ANSI/TIA-PN-604-19 (FOCIS 19), Fiber Optic Connector Intermateability Standard - Type SEN Connector (aka. CS connector)
  - The Committee resolved all ballot comments. Document will proceed to an industry ballot.
  - An APC variant was proposed in which the left and right ferrule end face angle slopes are in opposite directions. An IP filing was disclosed for a similar design, and is currently in unpublished standing. This issue needs to be resolved before the document can go to publication.
  - A fiber tuning duplex plug design that defines opposing core locations at the right angle to the plug key was proposed. The proposal was accepted and will be included in the next draft document.
- ANSI/TIA-PN-604-10 (FOCIS 10), Fiber Optic Connector Intermateability Standard - Type LC
  - The Committee resolved all ballot comments. Document will proceed to 2nd committee ballot.
  - New inclusion to document is a quadruplex receptacle specification which defines a 6.25mm pitch.
  - A plug-adaptor intermateability matrix (similar one in IEC 61754-20) will be added to the document. This will specify that simplex connectors can mate with simplex, duplex and quadruplex receptacles, and duplex connectors can mate with duplex and quadruplex receptacles.

The next meeting of TIA TR-42 will be a webinar held October 5-9, 2020

## INCITS Fibre Channel T11.2 meeting: June 2-4, 2020, Virtual meeting

### 1. FC-PI-7P (256GFC)

- The Committee resolved all comments. Document has been forwarded to INCITS for public review (July 10 – September 8, 2020)

### 2. FC-PI-8

- June 2021 target completion date.
- Two technical contributions were reviewed by the committee aiming to define the electrical specifications. One contribution studied the crosstalk impact on BER at both data rates of 112.5Gbps and 106.25Gbps, and the BER degradation factor between the two data

- rates with (3x) and without (1.45x) crosstalk. Second contribution compared the error correcting capabilities of IEEE interleaving two FEC code RS(544/514), single RS(576,514) and single RS(560,514) FEC.
- The committee reviewed a contribution previously presented at IEEE regarding 100GbE short reach objectives, to further explore the feasibility of a 100m application.
- Optical training and overall timing remain under development.

The next meeting of INCITS Fibre Channel will be a webinar held August 11-13, 2020

## 68th ISO/IEC JTC1/SC25 WG3 meeting: No meetings were held during Q2, 2020

The next meeting of ISO/IEC JTC1/SC25 WG3 will be held September 21-24, 2020, Virtual meeting.

## CENELEC TC215 WG1 meeting: April 26, 2020, Virtual meeting

The progress and continued development of the EN 50600 series of documents is being affected by the EU Mandate on climate change adaptation. Several of the documents is already in maintenance.

- An amendment to EN 50667 Automated Infrastructure Management (AIM) is being developed.
- An amendment to EN 50700 is being developed.

- TC 215 WG1 starts the development of a document in support of 1-pair cabling.
- TC 215 WG1 is starting to develop a document on “non-structured” cabling (end to end link, Direct Attach Cabling and MPTL).
- TC 215 decided to withdraw EN 50346 on field-testing.

The next meeting of CENELEC TC215 WG1 will be held April 21-23, 2021, location TBD.

## CENELEC TC215 WG2 meeting: No meetings were held during Q2, 2020

The next meeting of CENELEC TC215 WG2 will be held end of June, 2020, Virtual meeting.

## IEEE 802.3 Ethernet meeting: Interim—May 20-24, 2020, Virtual meeting

### IEEE 802.3 Telephonic Meetings – March 1, 2020 – June 1, 2020

Due to COVID-19, the IEEE 802 March Plenary was cancelled, and the IEEE 802.3 Interim was also cancelled. These were both replaced by numerous teleconference meetings. The result was minimal business progressing the work, submitting projects to the standards association.

#### 1. IEEE 802.3cq Maintenance on 2 pair Power over Ethernet (PoE)

This Task Force is completed in Q1, and the document is currently in preparation for publication by IEEE-SA Editorial Staff

#### 2. IEEE 802.3cv Maintenance on 4 pair Power over Ethernet (PoE)

This Task Force is cleaning up minor issues found in initial testing of the 802.3bt standard for 4 pair PoE. The modifications do not change the functionality and are not expected to present interoperability or compliance issues. The Task Force requested entering initial working group ballot which will be conducted in early Q3 2020.

### Single-twisted-pair copper standards

#### 3. IEEE 802.3 Single Pair Multidrop Enhancements Study Group

- The IEEE-SA Standards Board approved the formation of Task Force IEEE 802.3da to develop the SPMD enhancements standard

- The group formed consensus and adopted objectives including:
  - To extend multidrop networks to support at least 16 nodes and 50m of reach
  - Define plug-and-play multidrop powering, select a single equipment connector, support the time synchronous interface (for determinism), and support operation in the EMC environments found in industrial and building automation, as well as transportation environments.
- 4. IEEE P802.3ch Multigigabit Automotive Ethernet PHY Task Force
  - The 802.3ch Task Force has completed balloting and submitted their draft to the IEEE-SA Review Committee (RevCom) and Standards Board for approval and publication at the end of May. Approval should occur during June 2020.
- 5. IEEE 802 Beyond 10 Gigabit Automotive Ethernet PHY Study Group
  - The 802.3 Working Group adopted the objectives proposed by the study group and submitted the PAR and CSD to become a formal Task Force at the end of May. The IEEE-SA Standards Board approved the formation of Task Force IEEE 802.3cy to begin development of a standard.

- This study group is focused on electrical automotive Ethernet PHYs at rates greater than 10 Gb/s, and is primarily driven by requirements for autonomous vehicle networking. The project adopted objectives for 25 Gbps, 50 Gbps, and 100 Gbps Ethernet links at distances up to 11m, driven by automotive networking requirements.

## Optical Fiber Standards

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

- This Task Force wrote a standard for 25G and 50G EPON.
- The previous objective supporting 100G EPON was removed from the scope.
- The wavelength plan allows backwards compatibility with networks supporting 10G EPON.
- All upstream and downstream wavelengths are in O-band (around 1310 nm).
- The standard allows coexistence of:
  - 25G EPON with GPON (reduced wavelength).
  - 25G EPON and 50G EPON with 10G-EPON, XG-PON1, and XGS-PON.
- The work of the IEEE P802.3ca 25 Gb/s and 50 Gb/s Ethernet Passive Optical Networks Task Force completed with the approval of IEEE Std 802.3ca-2020 by the IEEE-SA Standards Boards on June 4, 2020.

### 7. IEEE P802.3cp 10G, 25G, and 50G bidirectional access optical PHYs 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 single mode fiber.
- The Task Force reviewed comments against draft 1.4.
- Draft 2.0 is currently being reviewed by the Task Force.

### 8. 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 10Gb/s downstream.
  - Support the MAC data rates of 2.5Gb/s and 10Gb/s upstream.
  - Support tunable transmitters.
- A draft standard will be prepared for Task Force review.

### 9. IEEE P802.3ct 100 Gb/s and 400 Gb/s Operation over DWDM Systems Task Force

- This project was split into P802.3ct for the 100G objective and P802.3cw for the 400G objective.
- The main objective is:
  - 100 Gb/s operation on a single wavelength capable of at least 80 km over a DWDM system (100GBASE-ZR).
- DP-DQPSK coherent modulation format will be used for 100GBASE-ZR.
- Draft 2.0 is currently being reviewed by the Task Force.

### 10. IEEE P802.3cu 100 Gb/s and 400 Gb/s over SMF at 100 Gb/s per Wavelength Task Force

- This Task Force has the following objectives:
  - Define a single-wavelength 100 Gb/s 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 Gb/s PHY for operation over SMF with lengths up to at least 2 km and up to at least 6 km.
- The Task Force has reviewed comments against draft 2.1 and the Standards Association review will begin soon.

The next scheduled meeting of IEEE 802.3 will be virtual Plenary meeting the week of July 13, 2020.

## IEC SC48B meeting: Virtual meeting report Q2, 2020

IEC 63171-1 copper LC style single pair connector standard was published in April 2020. The parent IEC 63171 document is under circulation as a CDV and once this document is published as a standard, the plan is to revise IEC 63171-1 to reference the parent document for common specifications (e.g. transmission, and reliability). Other single pair connector standards in the IEC 63171-4 and IEC63171-5 have progressed

to CDV stage as well, following resolution of comments generated during the CD ballot. A corrigendum to the IEC 60512-99-02 un-mating under load test standard was approved for circulation. This corrigendum aligns the test sequence to be the same as that published in IEC 60512-99-01 while enabling testing up to 2 A per contact needed for IEEE 802.3bt 4PPoE sourcing 90 watts PoE power per channel.

## Fibre optic interconnecting devices and passive components

### Update of test procedure IEC 61300-3-30 (Polish angle and fiber position on single ferrule multifiber connectors).

- After discussion of the round robin test results the decision was made to proceed document IEC 61300-3-30 Ed2 as FDIS. The sign convention on the ferrule end face angles seems resolved, but care should be taken on the orientation of the ferrules when making measurements. The results of the core dip measurements were also checked in the round robin and found OK.

### Update of test procedure IEC 61300-3-35 (Visual inspection of fiber optic connectors and fiber-stub transceivers).

- The comments on the draft of the updated IEC 61300-3-35 Ed3 were reviewed. The "large field of view" microscopes are to be used in the factory and in-service. The flow chart of the procedure to follow will be updated. The inspection for cleanliness remains normative, but the acceptance criteria are informative as these are becoming normative in the updated IEC 61755-3 series. Decision was made to submit an updated document as 3CD and to resolve the open technical comments at the next meeting in October 2020.

### Draft Technical Report Round Robin Automated Scratch Detection

- The Technical Report will show the results of visual inspection by means of microscopes with automated scratch detection. The report will show the amount of variability in test results when the equipment is compared to the same equipment or when compared to different automated microscopes.
- All participating microscopes were claimed to be according IEC 61300-3-35 Ed2.

### New test procedure IEC 61300-2-56 Wind resistance of mounted housing

- The new test procedure for the wind resistance of street cabinets and wall/pole mounted housings was approved and will circulate as FDIS for final voting.

### Updated test procedure IEC 61300-2-10 Crush resistance

- In this update the test procedure an additional test for the distributed load on top of street cabinets and the load on the doors is added.
- Decision was made to proceed IEC 61300-2-10 as CDV.

### Technical Specification IP (Intrusion Protection) acceptance criteria for passive optical housings (based on IEC 60529)

- A draft TS was approved with new IP (Intrusion Protection) pass/fail criteria for the IEC 60529 IP 54, IP55 and IP56 classes specific for passive optical fiber housings and hardened connectors. IEC SC86B approved the draft of the new Technical Specification and it will be submitted as NP to the national committees.

## IEC 61753-111-8 Ed2 update for sealed closures category G (Ground level)

- The performance standard IEC 61753-111-8 Ed2 (category G closures) was updated to bring it in line with the recent published IEC 61753-1 Ed2 (general and guidance performance standards) document. Major changes in the updated closure document are:
  - Addition of detailed material requirements for UV-light and mould growth requirements;
  - Addition of immersion in water (1 m for 7 days);
  - Cable retention test is adapted to new generation of cables (micro-duct tubes, micro-duct cables and small drop cables):
    - 20 \* ØCable (mm) for cables with diameter > 7 mm
    - 10 \* ØCable (mm) for cables with diameter ≤ 7 mm
    - 10 N for micro-duct tubes and cables without strength member attachment
  - Cable axial compression test is adapted to the new generation of smaller diameter cables. Compression test procedure shall be according to IEC 61300-2-11. The following axial compression loads were agreed:
    - 10 N for Cable < 3mm
    - 20 N for 3 mm ≤ Ø Cable < 6 mm
    - 50 N for 6 mm ≤ Ø Cable < 10 mm
    - 100 N for 10 mm ≤ Ø Cable < 20 mm
    - 200 N for Ø Cable ≥ 20 mm
    - 10 N for micro-duct tubes and cables without strength member attachment
  - The optical test sample construction was updated to include drop cables in the distribution joint configuration.
- Decision was made to proceed as CDV. A liaison statement to ITU-T SG15 was prepared to inform ITU-T about the changes as this could affect the revision of the ITU-T L.13 document.

## IEC 61753-111-07 Ed2 and IEC 61753-111-09 Ed2 performance standards for sealed closures

- The updated drafts of the revised documents IEC 61753-111-07 Ed2 (category A) and IEC 61753-111-09 Ed2 (category S) for the sealed closures were reviewed and approved to proceed as First CD documents. The updates are based on the approved changes made in IEC 61753-111-08.

## IEC 61753-101-03 Ed2 Fiber management systems for category OP – Outdoor Protected environment

- The updated draft of the revised performance standard IEC 61753-101-03 was approved to proceed as First CD. The document was updated to bring it in line with the recent published IEC 61753-1 Ed2 (general and guidance performance standards) document.

## IEC 61753-131-03 Ed2 Single-mode mechanical fiber splice for category OP – Outdoor Protected environment

- The updated draft of the revised performance standard IEC 61753-131-03 was approved to proceed as First CD. The document was updated to bring it in line with the recent published IEC 61753-1 Ed2 (general and guidance performance standards) document.

#### IEC 62134-1 Ed3 Generic specification for protective housings

- The updated draft of the revised generic standard IEC 62134-1 was approved to proceed as First CD. The document was updated to bring it in line with the recent published IEC 61753-1 Ed2 (general and guidance performance standards) document. The scope of the document is widened to all protective housings.

#### IEC 61755-2-1 Ed 2 and IEC 617553-2-2 Ed Fiber optic connector optical interfaces level 2 documents

- The updated drafts were discussed in the meeting with some minor changes. These two documents will be submitted for Third CD circulation with the latest visual inspection criteria to be used in IEC 61300-3-35 (Visual inspection of fiber optic connectors and fiber-stub transceivers).

#### IEC 61755-3-1 Ed 2 and IEC 61755-3-2 Ed Fiber optic connector optical interfaces level 3 documents

- The updated drafts were discussed in the meeting, including a proposal to combine oriented and non-oriented interfaces within a single document. The documents will now be circulated as CDV.

#### IEC 61754-7-4 Ed 1 Type MPO connector family – One fiber row 16 fibers wide

- The decision from the previous Shanghai meeting to remove SM APC connector was overturned, and this topic will be revisited in the next meeting before submitting the document for CDV.

#### IEC 61755-6-x Optical Interface for multi-mode MPO reference connectors

- This new document will describe the details of an MPO reference connector. The draft document is based on the published single fiber reference connector interface. The tolerances for core diameter and numerical aperture are known and identical to the single fiber in order to reduce the Encircled Flux variations. The MT ferrule suppliers are to provide the details of the ferrule parameters to ensure the required true position of the fiber core.
- Approval obtained to renumber the IEC 61755-6 series into IEC 63267-2 series.

The next meeting of IEC SC86B WG2 will be held October, 2020 (Dates to be confirmed)

### CENELEC TC86BXA WG1 meeting: No meetings were held during Q2, 2020

#### Fibre optic interconnect, passive and connectorized components

The CENELEC TC86BXA meeting which was planned for May 19th and 20th, 2020 in Kessel-lo, Belgium, was cancelled.

The next meeting of CENELEC TC86BXA WG1 is scheduled for November 18-19, 2020, in Brussels, Belgium.

### ITU-T SG15 meeting: No meetings were held during Q2, 2020

The next meeting of ITU-T SG15 will be held September 7-18, 2020, in Geneva, Switzerland.

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