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Standards Quarterly Update:

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

Welcome to the sixteenth 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 third quarter of 2017 and reports on activities from all aspects of the cabling industry. These activities range from the applications standards (IEEE 802.3 and 802.11 and T11—Fibre Channel) to the cabling standards (ANSI/TIA, ISO/IEC, CENELEC) and, finally, cover new developments in the world of multisource agreements (MSAs).

63rd ISO/IEC JTC1/SC25 WG3: 11-15 September 2017 in Bruges, Belgium

1. Approval of the 3rd Edition of ISO/IEC 11801 Parts 1 to 6

The Final Draft International Standard (FDIS) circulation of Parts 1 to 6 of the 3rd Edition of ISO/IEC

11801 was approved with no negative votes. Minor editorial comments were resolved and publication is expected before the end of November 2017. The new ISO/IEC 11801 series (Information technology - Generic cabling for customer premises) 3rd Edition will be comprised of the following Parts:

- ISO/IEC 11801-1 Part 1: General Requirements (in support of the other Parts in the series)
- ISO/IEC 11801-2 Part 2: Office premises (together with Part 1, supersedes ISO/IEC 11801)
- ISO/IEC 11801-3 Part 4: Industrial premises (together with Part 1, supersedes ISO/IEC 24702)
- ISO/IEC 11801-4 Part 3: Single Tenant Homes (together with Part 1, supersedes ISO/IEC 15018)
- ISO/IEC 11801-5 Data Centers (together with Part 1, supersedes ISO/IEC 24764)
- ISO/IEC 11801-6 Distributed Building Services (new Standard, applicable to all premises)

Major cabling updates in the 3rd Edition include:

- The minimum requirement for horizontal cabling in Part 2: Office premises is now Class E (Cat 6)
- Class EA (Cat 6A) is recommended for Office premises in support of applications above 1 Gbit/s
- Class EA is the minimum requirement for Part 5: Data Centers and Part 6: Distributed Building Services
- Class I (Cat 8.1) and Class II (Cat 8.2) have been introduced for 2 GHz, 30 m, two connector channels
- OM1, OM2 and OS1 cabled optical fiber categories are grandfathered (not supported for new installations)
- OM5 multimode Fiber has been introduced to support Short Wave Division Multiplexing applications
- OS1a cabled single mode fiber category has been introduced for tight buffered low water peak cables
- Single row MPO (2 to 12 fibers) and 24-fiber MPO are specified for the Equipment Outlet in Data Centers

2. Amendments to ISO/IEC 11801 3rd Edition for single pair cabling

Given the recent developments in support of single pair applications in IEEE 802.3, WG3 discussed a high level roadmap for single pair cabling and decided to circulate a New Work Item Proposal (NWIP) to initiate amendments to the 3rd Edition to include generic single pair cabling specifications in Part 1, as well as amendments to the other Parts, as appropriate. The NWIPs will be circulated once the 3rd Edition is published.

3. Amendment to 11801-6 Distributed Building Services to add an Annex for single pair cabling

The first single pair Amendment is already in progress, since a proposal for an Amendment to be developed as soon as Part 6 is published had been pre-approved. A Working Draft is in development and will be reviewed at the next meeting.

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

A new application-specific Technical Report with guidelines for the support of single pair applications for industrial environments (ISO/IEC TR 11801-9906) is being developed in support of IEEE 802.3bp, IEEE 802.3bw and IEEE 802.3cg. A Working Draft will be reviewed at the next WG3 meeting before circulation as a Committee Draft (CD) for vote.

5. Amendment to ISO/IEC 18598 to include bundle identifiers for PoE management

WG3 agreed to circulate a NWIP for an Amendment to ISO/IEC 18598 (AIM) to add information including bundle identifiers for PoE, to enable management of PoE by bundle, cable, and location.

6. 25 Gbit/s, 50 Gbit/s and 100 Gbit/s over balanced cabling

A contribution entitled "25GBASE-T to 50 m" claimed that channels constructed with Category 8.1 or Category 8.2 components have sufficient margin to support at least 50 m reach. It was agreed to set up an interim ad hoc to investigate the feasibility of 25 Gbit/s to at least 50 m, for review at the next meeting.

7. ISO/IEC 14763-2 Planning and Installation

All comments to the 1st Committee Draft were resolved. The remote power chapter was updated, removing the majority of ffs. Several safety clauses were deleted, since safety is considered to be outside the scope of ISO/IEC JTC1/SC25 WG3 standards. It was proposed to initiate a NWIP for security of physical layer infrastructure. To accommodate comments related to 1300 nm multimode testing, text was updated to state that testing of multimode optical fiber may be limited to 850 nm, unless otherwise specified. It was agreed to add an Extended Test Group of parameters for OTDR testing.

8. ISO/IEC 30129 Telecommunications Bonding Networks

The comments from previous meetings were resolved, and a Proposed Draft Amendment (PDAM) will be circulated. The main change is to move the enclosed mesh bonding network for the building to the beginning of the document, emphasizing on it as the preferred option.

9. Liaison from IEC SC86B

The IEC working group on fiber optic test and measurement methods forwarded an early revision of IEC 61300-3-35 "methods for visual inspection of polished end faces". Significant technical improvements to the current definitions and minimum requirements are required in order to address the large variability in inspection results observed in the field.

10. Liaison to ISO/IEC JTC1/SC39

ISO/IEC JTC1/SC39 is developing a series of Technical Specifications covering Data Centre Facilities and Infrastructures (based on CENELEC EN 50600 series) that refers to ISO/IEC 11801 Part 1 and Part 5 for generic cabling. A liaison officer was appointed to promote collaboration with WG3 on this subject.

[The 64th ISO/IEC JTC1/SC25 WG3 meeting will be held 26 February to 2 March 2018 in Paris, France](#)

TIA TR-42: 18-22 September 2017 in Las Vegas, NV USA

1. TR42.1 Commercial Building Cabling

- ANSI/TIA-568.1-D-1 commercial cabling addendum comments were resolved and the document re-circulated as a default ballot
- ANSI/TIA-4966-1 education premises addendum ballot comments were resolved and the document was approved for publication
- ANSI/TIA-570-D residential cabling standard comments were resolved and the document re-circulated for a 3rd industry ballot
- PAR was approved for revision of ANSI/TIA 758-B OSP cabling standard and editor is preparing a first draft of the "C" revision
- The places of assembly task group has developed a scope and initial content for the first draft of the document with focus on airports as the first use case
- The two single pair task groups working on use cases and topologies for single pair cabling in ANSI/TIA-568.0-D and ANSI/TIA-862-B were merged into one task group

2. TR-42.3 Pathways and Spaces

- TIA-569-D Addendum 2: Additional requirements for pathways used to support cabling for remote powering ballot comments were resolved and the document approved for re-circulation a first ANSI industry ballot
- The sub-committee is taking over TIA TR42.6 administration as well as TIA TR42.16 bonding and grounding. Accordingly, the name was changed to:
 - TR-42.3 Telecommunications Administration, Pathways, Spaces, Bonding and Grounding
- The scope was changed to:
 - The TR-42.3 Subcommittee develops and maintains standards for telecommunications administration, pathways, spaces, bonding and grounding.

3. TR-42.5 Telecommunications Infrastructure Terms and Symbols

- The following definitions and acronyms were added or modified: Application-specific Technical Report for IEEE 802.3bp, IEEE 802.3bw and IEEE 802.3cg
 - **External network interface:** Interface between the computer room cabling and external cabling.
 - **ENI:** external network interface
 - **DAS:** distributed antenna system
 - **Auxiliary disconnect outlet:** A device, usually located within the

tenant or living unit, that provides a means for connection to or disconnection from an access provider.

- **Auxiliary disconnect outlet cable:** The cable from the auxiliary disconnect outlet to a distribution device or demarcation point.

4. TR42.7 Copper cabling systems and components

- Resolved comments and approved recirculation of ANSI/TIA-568.2-D as a default ballot that includes the following major topics:
 - Technical changes and rejected technical comments
 - The complete annex on 28 AWG cords
 - TIA-TSB-184-A-1, guidance for the use of 28 AWG patch cords to support power, was authorized for a TIA ballot
 - ANSI/TIA-568.5, single-pair balanced copper cabling: Work continues in task group and subcommittee to edit the working draft
 - Work continues in task group to elevate TSB-184-A, guidelines for supporting power, to a normative document

5. TIA TR42.9 Industrial cabling

- TR42.9 resolved comments on the 1G industrial cabling addendum 2 to ANSI/TIA-1005-A-2012 for cabling supporting 1000BASE-T for E2 and E3 environments and approved re-circulation
- TR42.9 agreed to expand the scope of addendum 3 on single pair cabling in support of IEEE 802.3bp to include IEEE 802.3bw 100 BASE-T1 and IEEE 802.3cg 10 BASE-1

6. TIA TR-42.11 - Optical Fiber Systems

- ANSI/TIA-568.3-D-1
 - Addendum 1 to the optical fiber cabling and components standard was authorized for first ballot. The following agreements were reached on the first draft content:
 1. OM5 name added in harmony with ISO 11801-1
 2. OS1a name added in harmony with ISO 11801-1
 3. Lime color for connecting hardware on OM5 cables to match jacket color
 4. Connecting hardware colors should meet ANSI/TIA 598 definitions
 5. Reference-grade to standard-grade loss allocation increased from 0.3 to 0.5 dB
 6. IEC 61282-15-TR referenced for testing MPO-terminated installed cabling
 7. Connector qualification references new FOTP-171-B methods that specify encircled flux launch

7. TR42.12 – Fiber and Cable

- ANSI/TIA-598-D-1 colors for fibers 13 to 16
 - Resolved comments on second ballot. Authorized third ballot at ANSI level.
- ANSI/TIA-598-D-2 OM5 lime jacket color
 - Resolved comments on first ballot. Authorized second ballot at ANSI level.
- It is anticipated that both addendum 1 and 2 will be approved for publication following comment resolution at the beginning of February 2018.

8. TR-42.13 – Connectors and Metrology

- FOTP 171-B (fiber assembly insertion loss measurement)
 - Resolved comments on second ANSI (industry) ballot. Authorized third ANSI ballot. Key resolution: A new test method will be added that corrects the shortcomings of existing “B” methods for measuring double-terminated assemblies.
- Agreed to initiate project to define a FOCIS for CS connector
 - The CS connector is sufficiently small to allow two duplex plugs to fit into a QSFP transceiver. This allows for dual duplex transceiver implementations within QSFP or QSFP-DD form factors.

9. Closing TR42 Plenary

- TIA TR42 discussed the activities of its subcommittees and acted on several motions from the sub-committees.
- TR42 discussed and approved the following liaison letters:
 - Letters to IEEE 802.24.2, IEEE 802.3, CABA, ODVA, and IOT Consortium on input for single pair connector selection
 - Response to IEC SC65C regarding their liaison letter on collaborating on 1-pair cabling projects
 - Letter to ICEA requesting references for mechanical specifications for 1-pair cabling

The next meeting of TIA TR42 committees is scheduled for 29 January to 2 February, 2018 in Orlando, Florida USA

INCITS T11.2 Fibre Channel: Providence, RI USA, 7-11 August 2017

- Previous FC-PI-7 project which included both 64GFC and 256GFC variants has been separated into two projects: FC-PI-7 and FC-PI-7P. FC-PI-7 will now be focused on 64GFC and FC-PI-7P focuses on 256GFC. Target LB date for FC-PI-7 is December 2017 meeting cycle. FC-PI-7P LB target date will be in 2018, exact date TBD.
- 64GFC MMF variant strawman specs including transmitter, receiver characteristics and link budget proposals were updated and reviewed reflecting the recent IEEE TDECQ definition changes.
- Current electrical channel loss budget of 17dB requires different electronics and board designs than 50GbE. Reduction in channel budget to 13dB was proposed, reducing host loss to 12.25dB and module loss to 0.75dB. The 4dB reduction in channel loss would enable 50GbE-like receiver.
- T11.2 reviewed the 64GFC to 256GFC scaling study - using reach reduction to compensate for crosstalk in the 256GFC multi-lane variant. Analysis and simulations were generated based on 128GFC NRZ link model given no existing PAM4 link model. Further analysis will be conducted to determine exactly impairments and reduced reach in 256GFC.
- 64GFC-PSM and 256GFC-PSM4 variants will not be in FC-PI-7 and FC-PI-7P due to insufficient contribution.

The next meeting of INCITS/T11 will be held in Coeur d'Alene, ID USA on 2 to 6 October 2017

CENELEC TC215 WG1 meeting 68: 3 July 2017 London, UK

- Comments received to Secretaries Enquiry draft of the design documents in the EN 50173 series were resolved in line with the developments in the ISO/IEC 11801 series.
- The test document EN 50346 will be withdrawn.

The next meeting of CENELEC TC215 WG1 will be held in TBD, 12 April 2018.

CENELEC TC215 WG2: no meetings were held during Q3 2017.

The next meeting of CENELEC TC215 WG2 will be held in Athens, Greece on 9-10 November 2017.

1. IEEE 802.3bt 4 pair Power over Ethernet

- The IEEE 802.3bt 4-pair power over Ethernet Task Force completed working group balloting, and entered the final stage of balloting – Sponsor ballot. The document is technically complete and no new features are being added, but is still being revised to correct technical issues and improve editorial clarity. It contains two new “Types” of PoE, Type 3 (up to 60W on 4 pairs) and Type 4 (up to 90W at the PSE) as well as updates to the existing specifications for PoE (802.3af and 802.3at are “Type 1” and “Type 2”) to support new Ethernet rates of 2.5, 5 and 10Gbps.
- The IEEE 802.3bt draft currently references TIA TSB-184-A and ISO/IEC TR 29125 for cabling requirements. Additionally, the 802.3bt draft expands all Types of end-point PoE (PoE delivered from a switch) to support 10GBASE-T and the new 2.5G and 5GBASE-T speeds, and defines new midspan PSE variants for the new speeds as well.
- The group expects to complete Sponsor Balloting near the end of the first quarter of 2018 and be approved by the IEEE standards board around June 2018.

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

- The project objectives cover industrial, automotive, and building automation use cases, with two dominant, but different application reaches, one up to 15m, and one of approximately 1km.
- The project scope includes both the potential for multiple PHY transceiver types and associated powering for the target applications.
- The scope of the applications discussed has expanded to a variety of in-building applications, including a variety of sensors and even data-center connectivity for sensors and housekeeping functions in disaggregated servers. These tend to focus on link segments between 15m and 200m in length. These may result in modifications to the project documentation to represent the evolving scope, or, less likely, could result in spawning additional standards projects in the next year.
- The project has organized around 2 physical layer specifications, and is developing text for them:
 - Up to 1km single-pair: The project adopted baseline specifications for the up-to 1km process control and building automation application, adopting PAM 3 signaling and various electrical specifications.
 - Short-reach (15m+): The project also adopted link segment specifications for 15m point-to-point links, compatible with multi-drop networks as well. The project adopted a proposal to address optional multi-drop PHYs, and is expected to adopt a PHY specification (different from the 1km PHY) for the shorter-reach applications in the next quarter.
- The project also adopted text to extend single-pair powering from that in PoDL (802.3bu), including four new powering profiles for plug-and-play systems for 20V and 50V powering

on loops up to 59 ohms loop resistance and power levels to 13.4W, and engineered systems at 50 V with high power (up to 60W) and ultra-high power (up to 120 W) for process control applications.

- The project is not expected to have a technically complete draft before Q2 2018.

3. IEEE 802.3ch Multigigabit Automotive Ethernet PHY Task Force

- The 802.3ch Task Force has pursued objectives for 2.5Gbps, 5Gbps, and 10Gbps PHYs in automotive applications up to 15m and 4 connectors, and is focusing first on the 10Gbps problem. The specifics of the media types are not yet determined, but are focused on shielded balanced cabling specified to at least 3GHz.
- The project includes use of the 802.3bu powering, but does not expect to extend that powering specification.

4. IEEE 802.3bs - 400G and 200G on SM fiber

- The project advanced through two Sponsor Ballot (final stage) re-circulations during the July and September meetings. Comments were resolved and a fourth re-circulation was authorized with comments to be addressed at an interim teleconference scheduled for October 9. Substantive changes would result in a fifth re-circulation ballot in time to close before the next meeting in early November. Should another re-circulation ballot be required, the publication approval date would slip until April 2018.

5. IEEE 802.3cd - 50G, 100G, and 200G

- The project advanced through two Working Group (mid stage) Ballots during the July and September meetings. Comments were resolved and a second re-circulation ballot has been issued to close for comment resolution at the next meeting in early November.

6. IEEE 802.3cc – 25G over Single-Mode Fiber

- The project advanced through two Sponsor Ballot (final stage) re-circulations during the July and September meetings. Comments were resolved and a third re-circulation was authorized with comments to be addressed at an interim teleconference scheduled for October 5. Substantive changes would result in a fourth re-circulation ballot in time to close before the next meeting in early November.

7. IEEE 802.3 Study Group for “Beyond 10km Optical PHYs for 50G, 200G, and 400G Ethernet”

- A new Study group was chartered at the July meeting to develop a project authorization request, criteria for standards development, and objectives. The SG held its first fact-to-face meeting in September. There is activity to add 100G to the scope of this SG or start a separate SG to address 100G.

The next IEEE 802.3 meeting will be in Orlando, FL USA from 6-9 November 2017 (IEEE 802 Plenary)



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