

Issue 18 • Quarter 1, 2018

# Standards Quarterly Update:

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

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

64th ISO/IEC JTC1/SC25 WG3: 26 February - 2 March 2018 in Paris, France

### 1. Publication of ISO/IEC 11801 3rd Edition

The 3rd Edition of ISO/IEC 11801 was published in November 2017, including the following parts:

- ISO/IEC 11801-1 Part 1: General Requirements
- ISO/IEC 11801-2 Part 2: Office premises
- ISO/IEC 11801-3 Part 4: Industrial premises
- ISO/IEC 11801-4 Part 3: Single Tenant Homes
- ISO/IEC 11801-5 Data Centers, and ISO/IEC 11801-6 Distributed Building Services

Major 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 singlemode fiber category has been introduced for tight buffered low water peak cables
- Single row MPO (2-12 fibers) and 24-fiber MPO are specified for the Equipment Outlet in Data Centers

### 2. Development of generic single pair cabling specifications

A proposed Amendment to ISO/IEC 11801-3 was reviewed, and it was agreed to consolidate all inputs towards single pair Amendments in one internal Working Group document prior to initiating Amendments to the individual parts.

### 3. Single pair connector selection process

Based on the interest from IEEE 802.3 to define an optional MDI interface for single pair, a selection process has been initiated to choose one single pair connector each for MICE1 and MICE3

environments. The five candidates that were presented at the meeting will be included. Two of the candidates are already in progress of connector standardization in IEC SC48B, including a connector in IEC 61076-3-125 and the "LC-style" copper connector in IEC 63171-1. A selection questionnaire will be circulated to National Bodies in May, with the results expected by September 2018.

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

It was agreed to amend the scope to clarify that the Technical Report is specific to the bp, bw and cg single pair applications, and to insert text that "these specifications are not intended to replace generic 4-pair cabling". A 2nd Working Draft will be circulated for expert review.

### 5. PoE Amendment to ISO/IEC 18598 Automated Infrastructure Management

A strawman for the Draft Amendment to ISO/IEC 18598 was reviewed and it was agreed to proceed to a Working Draft for review at the next meeting. There was general agreement to include discovery and documentation of PoE capabilities and functionality, support of PoE related administration labeling, PoE usage and capacity reporting, addition of PoE related intrinsic and extrinsic benefits to the standard, and the definition of required PoE parameters for equipment and cabling.

### 6. ISO/IEC TS 29125 Remote Powering

An Amendment to Technical Specification 29125 is planned, to include single pair cabling and 4-pair 28AWG cords. Additionally, impact of remote power in cables with more than four pairs will be considered.

### 7. Extended 25GBASE-T distances over balanced cabling

A presentation with an analysis of insertion loss, latency and power consumption explored alternatives to achieve 40 m with "improved" Class I cabling, 45 m with an "improved" 25GBASE-T PHY and a small increase in power consumption, and 60 m with a further "improved" 25GBASE-T PHY and a larger increase in power consumption. Further discussions will take place at the next meeting.

## 8. Direct Attach Cabling

It was agreed to commence work towards the development of direct attach cabling specifications. A definition of direct attach cabling as "cabling assemblies with free connectors at each end, with no intermediate connecting hardware, to connect two pieces of equipment" was agreed.

## 9. Physical Network Security

A New Work Item Proposal will be circulated to support the development of a standard for physical network security considerations largely based on TIA-5017.

## 10. ISO/IEC 14763-2 Planning and Installation

All comments to the 1st CD of ISO/IEC 14763-2 Edition 2 were resolved. A DIS will be circulated.

## 11. ISO/IEC 30129 Telecommunications Bonding Networks

All comments to the Proposed Draft Amendment (PDAM) were resolved. A 2nd PDAM will be circulated.

TIA TR-42: 29 January to 2 February, 2018 in Orlando, Florida USA

### 1. TR42.1 Commercial Building Cabling

- TIA TR42.1 approved the publication of ANSI/TIA-568.1-D.1 Commercial telecommunications cabling standard
- TIA TR42.1 resolved Comments on ANSI/TIA 570-C Residential telecommunications cabling standard and approved the document for a default ballot, with approval to publish if there are no technical comments
- TIA TR42.1 Places of Assembly task group reported that it is continuing to develop a working draft focused on airports as a first step with its next meeting scheduled for March 2, 2018
- TIA TR42.1 Single Pair task group reported progress in creating a first baseline working draft amendment to ANSI/TIA-568.0-D containing changes needed to cover single pair cabling.
- The committee is planning to open up ANSI/TIA 758 Customer Owned Outside Plant cabling for revision at the next meeting in June 2018

### 2. TR-42.3 Pathways and Spaces

- TR42.3 published an errata sheet for ANSI/TIA 606-C administration standard for telecommunications cabling changing the color "white" to "gray" for second level backbone terminations
- TR42.3 completed comment resolution on TIA-569-D-2 Pathways & Spaces for Pathways in support of remote powering and approved a 45 day ANSI industry ballot

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

- TIA TR42.5 discussed and agreed to the following definitions:  
**telecommunications equipment bonding conductor:**  
A conductor that connects the primary bonding busbar, secondary bonding busbar or supplementary bonding network to equipment racks or cabinets, rack bonding busbars or rack bonding conductors.

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

- TR42.7 resolved default ballot comments on ANSI/TIA-568.2-D Balanced cabling and components standard and authorized another default ballot with the provision to publish if no technical comments are received.
- TR42.7 authorized a TIA committee ballot for TSB-184-A-1 containing guidance for 28 AWG cords used in cabling supporting

### 12. ISO/IEC TR 11801-9907: Guidelines for High-speed Applications over multimode fibre

This proposed Technical Report covers applications from 10G to 400G from IEEE and Fibre Channel, as well as market available technologies such as bidi, SWDM and eSR. Supported reaches and duplex/parallel support over OM3, OM4 and OM5 is described, along with guidelines regarding implementation and migration of duplex and parallel infrastructure. OM5 is recommended for new installations, "to support all single wavelength applications to at least the same reach of OM4 while supporting longer reach and/or providing additional performance margin for emerging multi-wavelength applications".

### 13. ISO/IEC 14763-3 Testing of Optical Fiber

All comments to the Draft Amendment were resolved, and a Final Draft Amendment will be circulated.

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

PoE. There is also interest in supporting realistic PoE installations annex to improve efficiency by organizing cables into better heat dissipating structures (e.g. vertical chimneys, spacing, etc.)  
Established an initial procedure and timeline for selecting a suitable single pair connector (or connectors) for inclusion in the TIA 568.5 single pair cabling and components draft standard

### 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 for an ANSI industry ballot
- TR42.9 agreed to expand the scope of ANSI/TIA-1005-A addendum 3 on single pair cabling in support of IEEE 802.3bp type B industrial link segments to include IEEE 802.3bw 100 BASE-T1 as well as IEEE 802.3cg 10 BASE-1, and issue a second "mock ballot"

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

- ANSI/TIA-568.3-D-1
  - Resolved comments on ballot 1 of addendum 1 to the optical fiber cabling and components standard.
    - OM5 connecting hardware color:  
Lime remains the associated color.
    - Authorized and issued second ballot, this time at the ANSI level.

### 7. TR42.12 – Fiber and Cable

- ANSI/TIA-598-D-1 colors for elements 13 to 16
  - Resolved comments on second ballot, with primary change being restructuring as addendum.
  - Authorized third ballot at ANSI level.
- ANSI/TIA-598-D-2 OM5 lime jacket color
  - Resolved comments on second ballot. Authorized publication. Document published 7 March 2018.
  - Lime, as we proposed, is now the associated color for OM5 indoor cable jacket in 598.
- A new task group was formed to investigate OM3 and OM4 bandwidth over wavelengths of interest to SWDM.
- Approved proposal to consider adoption or adaption of IEC's fiber specifications.

- The bandwidth information for SWDM can be added to the IEC documents as a regional difference while IEC works to revise their MM specs in parallel.
- Obtained editable copies of the three relevant IEC specifications for the SC to review.
- Anticipate a decision at the next meeting in June.

## 8. TR-42.13 – Connectors and Metrology

- FOTP 171-B (fiber assembly insertion loss measurement)
- Reviewed revisions to draft from incorporation of comment resolutions on third ANSI (industry) ballot. Authorized fourth ANSI ballot.
- Key resolution:  
A new test method “E”, proposed by CommScope, was added that corrects the shortcomings of existing “B” method for measuring double-terminated assemblies.
- No activity on CS FOCIS project.

INCITS T11.2 Fibre Channel: 2-6 February 2018 in Fort Worth, TX USA

- INCITS T11 Fibre Channel - FC-PI-8 MRD and Project Proposal
  - 128GFC marketing requirements were reviewed. Target technical stability date in 2021 and product availability of 2022.
  - Requirements of backward compatibility to 32G/64GFC and 100m MMF/10km SM reach.
  - Connector options were highlighted: LC and SFP+, Mini-CS and SFP-DD, and MPO and QSFP.
  - T11.2 took a vote to forward FC-PI-8 project proposal to INCITS for further processing

CENELEC TC215 WG2: no meetings were held during Q1 2018

- Revisions to FOCIS 5 (MPO) and FOCIS 18 (MPO-16)
- Resolved comments received to date.
  - 4+4 and 2+2 variants were added to FOCIS 5 to address 4-pair and 2-pair transceiver interfaces
- Authorized second ballot if no negative votes or technical comments are received

## 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 802.3 on single pair connector selection and related single pair responses to questions from IEEE 802.3

[The next TIA TR-42 meeting will be 11-15 June, 2018 in Pittsburgh, PA USA](#)

- INCITS T11 Fibre Channel - PAM4 Link Model
  - T11.2 revisited the PAM4 Link Model and agreed that further development is needed.

[The next meeting of INCITS/T11 will be on 3-5 April 2018 in Deerfield Beach, FL USA](#)

CENELEC TC215 WG1: no meetings were held during Q1 2018

[The next meeting of CENELEC TC215 WG2 will be on 11 April 2018 in Frankfurt, Germany](#)

IEEE 802.3 Ethernet Meetings:

22-26 Jan 2018, Geneva, CH (IEEE 802.3 Interim) and  
5-8 March 2018, Rosemont, IL USA (IEEE 802 Plenary)

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

- The IEEE 802.3bt 4-pair Power over Ethernet Task Force successfully resolved comments. The group is on track to complete Sponsor Balloting and be approved by the IEEE standards board at or before the September 2018 meeting.
- During sponsor balloting, the draft had been revised to include a warning against using Power over Ethernet with smaller than 26 AWG cabling; however, that warning is no longer in the draft. In place of the warning, the draft contains reference to local, national, and regional codes, including NFPA 70 – the (US) National Electric Code.
- The IEEE 802.3bt draft contains two new “Types” of PoE, Type 3 (up to 60W on 4 pairs) and Type 4 ( up to 90W at the PSE) as well as updates to the existing specifications for PoE (802.3af and 802.3at are “Type 1” and “Type 2”) to support new Ethernet rates of 2.5, 5 and 10Gbps, and currently references TIA TSB-184-A and ISO/IEC TR 29125 for cabling requirements. Additionally, the 802.3bt draft expands all Types of end-point PoE (PoE delivered from a switch) to support 10GBASE-T and the new 2.5G and 5GBASE-T speeds, and defines new midspan PSE variants for the new speeds as well.

## Single Twisted Pair Copper Standards

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

- The project objectives cover industrial, automotive, and building automation use cases, encompassing multiple different applications, one up to 15m, one of approximately 1km, and a new one is in formulation to reflect 25m multidrop applications. At the March 2018 meeting, the 802.3 working group approved new revisions to the project objectives clarifying that the project will produce 2 PHY types, and including multidrop operation on short cabling segments. The project has organized around 2 physical layer specifications, and is developing text for them:
  1. Up to 1km single-pair (aka 10BASE-T1L): The project adopted baseline specifications for the up-to 1km process control and building automation application, adopting PAM 3 signaling and various electrical specifications.
  2. Short-reach (15m+) (aka 10BASE-T1S): The project also adopted link segment specifications for 15m point-to-point links, compatible with 25m multi-drop networks as well. Short reach PHYs will optionally support multidrop.
  3. An optional improvement collision performance on multidrop networks (known as PLCA within the Task Force).

- 4. Optional single-pair powering, based on clause 104 (IEEE Std 802.3-2016, known as PoDL) with some specification changes and additional power levels.
  - The draft is currently in a Task Force review cycle focused on technical completeness as well as minor modifications necessary to address the intra-system applications resulting from the inclusion of 10Mbps Backplane Ethernet applications.
  - A technically complete draft is targeted for the July 2018 meeting, but may slip to September 2018.
- 3. IEEE 802.3 Backplane Ethernet Study Group**
- The Backplane Ethernet Study Group completed its work, recommending modifications to the IEEE P802.3cg project documentation so that the short-reach PHY work can include intra-system ‘backplane’ applications, designed to run over balanced pairs, including printed circuit boards as well as twisted-pair media. This expands the applications of 10BASE-T1S within Ethernet Switches and Servers to convert existing proprietary connections to Ethernet.
- 4. IEEE 802.3ch Multigigabit Automotive Ethernet PHY Task Force**
- This task force is focused on short-reach automotive links at rates of 2.5Gbps, 5Gbps, and 10Gbps. The objectives call for up to 15m and 4 connectors, and the project has adopted transmission characteristics for shielded cabling with bandwidths up to 6 GHz to provide headroom for PHY developers to study. Presentations on PHY specifications have begun, and these are indicating that bandwidths of 3 GHz are likely sufficient for the application. Following PHY studies, the transmission characteristics may be revised.
  - The project includes use of the 802.3bu powering, but does not expect to extend that powering specification.
- 5. IEEE 802.3bs - 400G and 200G on SM fiber**
- The Task Force is disbanded, as the amendment has been approved and published in January.
- 6. IEEE 802.3cc – 25G over Single-Mode Fiber**
- The Task Force is disbanded, as the amendment has been approved and published in January.
- 7. IEEE 802.3cd - 50G, 100G, and 200G**
- The Working Group resolved comments on two sponsor ballots (802 level) and issued a recirculation ballot. The main topics of debate are the TDECQ parameter that controls optical transmitter fidelity, and the COM parameters that control direct attach copper cabling fidelity.
- 8. IEEE 802.3 Study Group for “Beyond 10km Optical PHYs for 50G, 200G, and 400G Ethernet”**
- Three objectives were adopted by the Study Group: 50G to at least 40km, 100G to at least 80km, and 200G to at least 40km using four wavelengths. The 100G objective will likely be fulfilled using a single wavelength coherent solution.
- 9. IEEE 802.3 Study Group for “200Gb/s and 400Gb/s over fewer MM fiber pairs”**
- Objectives for two 400G PMDs were adopted, one for operation over eight pairs (400G-SR8) and another for operation over four pairs (400G-SR4.2). The first will use a single wavelength, and the second will use two wavelengths. The initiation of a Task Force awaits approval by the highest review board, but is very likely to succeed so that the first Task Force meeting will be at the next meeting in May.

The next IEEE 802.3 meeting will be held from 21 to 25 May, 2018 in Pittsburgh, PA USA.



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