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Standards Quarterly Update:

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

Welcome to the 28th 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 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: No meetings were held during Q3, 2020

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

69th ISO/IEC JTC1/SC25 WG3 Meeting, September 21-24, 2020, Virtual Meeting

Working Group 3 Meeting Highlights

The 69th ISO/IEC JTC1/SC25 Working Group 3 (WG3) meeting was attended by 63 experts and observers from 19 countries including Australia, Belgium, Canada, China, Denmark, France, Germany, Great Britain, Ireland, Israel, Japan, Mexico, Netherlands, Singapore, Spain, Sweden, Switzerland, and United States. The meeting had been scheduled to take place in Reutlingen, Germany, but was held virtually due to the current Covid-19 travel restrictions.

Working Group 3 resolved a large number of comments to the single pair content in the draft Amendments to ISO/IEC 11801-1 and ISO/IEC 11801-6. The first Working Draft of the ISO/IEC 14763-5 standard for Sustainability was reviewed. Comments to the 2nd Committee Draft (CD) of the ISO/IEC 24383 Physical Network Security standard were resolved. There was much discussion and progress in the ISO 14763-3 optical fiber testing revision, and it was agreed to circulate a CD for comments from national committees. Other items were also progressed as detailed below.

1. Development of generic single pair cabling specifications

Comments to the second CD of the Amendment to ISO/IEC 11801-1 were resolved and the document was approved for circulation as a third CD.

- The single pair cabling Classes include:
 - Class T1-A-100, T1-A-250, T1-A-400 and T1-A-1000, specified up to 20 MHz
 - Class T1-B, specified up to 600 MHz
 - Class T1-C, specified up to 1,250 GHz

Single pair Classes T1-A-100, T1-B and T1-C are specified to 100 m, and single pair Classes T1-A-250, T1-A-400 and T1-A-1000 are specified to 250 m, 400 m and 1000 m, respectively. The recognized single pair connectors are the IEC 63171-1 copper LC style connector and the IEC 63171-6 industrial connector.

2. Single pair cable insertion loss

It was agreed to align the cable insertion loss specifications for Class T1-A-100 with the insertion loss of Category 6A cable, in order to support T1-A-100 single pair channels that may be deployed by extending the architecture in ISO/IEC 11801-6, which specifies a minimum of Class EA performance to the Service Consolidation Point (SCP). It was also agreed to adopt Category 6A cable insertion loss for single pair Classes T1-A-250, T1-A-400 and T1-B.

3. **ISO/IEC 11801-6 Amendment 1, to include single pair cabling**
Comments to the first CD were resolved, and the document will be circulated as a 2nd CD. Single pair cabling specifications from the Service Consolidation Point will be aligned with the specifications in the ISO/IEC 11801-1 Amendment.
4. **ISO/IEC 14763-3 Testing of Optical Fiber**
There was much detailed discussion and development of the ISO/IEC 14763-3 revision. The 3rd Edition will have a new structure, to align the sequence of topics in the document with a typical installation testing schedule. The document contains descriptions of the reference connectors used for measurement of channels and links, and it contains simple tables that define the measurement uncertainty for each method. Testing of cabling with MPO connectors is introduced.
5. **Single pair multi-drop cabling**
A Draft New Work Item Proposal (NWIP) for single pair multi-drop cabling was reviewed. It included support of up to 16 nodes, with reach up to 50m, and frequency up to 40MHz, as well as the supply of power with total current capacity of up to 2A and current consumption of up to 0.1A per node. It was agreed to defer further discussion of this topic to the next meeting.
6. **PoE Amendment to ISO/IEC 18598 Automated Infrastructure Management**
Minor editorial comments to the Draft Amendment (DAM) ballot adding PoE management features were resolved, and the document will be forwarded to publication.

7. **Network Physical Security (NPS)**
All comments to the 2nd CD were resolved, and the document will be re-circulated as a 3rd CD. The ad hoc reviewed a position paper recommending alignment with other ISO/IEC and ITU-T cybersecurity standards, such as ITU-T X.805 and ISO/IEC 27000-27050. Comments based on this position paper are expected to the CD that may result in a significant restructure and changes to the content of the document.
8. **New Standard on Sustainability of Cabling Installations**
The ad hoc reviewed the first Working Draft of the NWIP. The scope of this document includes requirements and recommendations to maximize the sustainability of cabling systems by addressing the cabling design, selection, packaging and transportation of components and related materials, operation and maintenance of the installation, management of waste, and related skillsets necessary for designers, installers and users. It was agreed to send the Working Draft for national expert comments with the intent to circulate the 1st CD after the next meeting.

The next meeting of ISO/IEC JTC1/SC25 WG3 will be held February 22–26, 2021, Virtual meeting.

CENELEC TC215 WG1 meeting: September 8th, 2020, Virtual meeting

The revision of EN 50700 Information technology - Premises distribution access network (PDAN) cabling to support deployment of optical broadband networks, is ongoing as planned. The document allows customers pre-cable for FTTH networks, preventing repeated installations so supply services.

Work is starting on a separate document for "Cabling for Single Pair Ethernet"

Work has started on document EN 50173-20 - Information technology - Generic cabling systems - Part 20: Alternative cabling configurations, covering MPTL, end to end link and direct attach cords.

The next meeting of CENELEC TC215 WG1 will be held November 24, 2020, Virtual meeting.

CENELEC TC215 WG2 meeting: No meetings were held during Q3, 2020

The next meeting of CENELEC TC215 WG2 is TBD.

IEEE 802.3 Interim Task Force Meetings from June 2, 2020 – September 30, 2020

Due to COVID-19, the IEEE 802 July Plenary was held virtually, and the scheduled IEEE 802.3 Interim meeting was held as a series of virtual meetings. Task Forces are now meeting by teleconference and most occur on a weekly or biweekly basis. This is expected to continue until at least January 2021.

1. 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 completed initial Working Group ballot, and an initial recirculation. Comments were resolved to further refine tests.
- The Task Force requested conditional approval to proceed to Standards Association balloting, the final stage, which should initiate before the end of the year.
- Minor changes are still being made, but the expectation is that the specification is stable and the work will be completed in Q2 2021.

Single-twisted-pair copper standards

2. IEEE P802.3da Single Pair Multidrop Segments Enhancement Task Force (formerly Single Pair Multidrop Enhancements Study Group)

- The IEEE-SA Standards Board approved the new project, IEEE P802.3da, and the task force began initial meetings.
- This project is developing extensions to the Clause 147 10BASE-T1S multidrop (10 Mbps shared media) PHY defined in 802.3cg, interoperable with the PHY in 802.3cg. The major objectives the project is working on include the following (for more objectives, see objectives on the IEEE 802.3da site)
 - 1. Adding interoperable multidrop power over Ethernet and reach extensions for multidrop to better accommodate building automation
 - 2. Extending multidrop networks to support at least 16 nodes and 50m of reach (32 nodes and 70m are desired, but the objective is only 15 nodes and 50m)
 - 3. Defining plug-and-play multidrop powering, and
 - 4. Selecting a single equipment connector.
- Initial work has been focused on powering protocols and methods to assure plug and play startup.
- The Task Force has yet to begin work on a draft. The Task force is expected to focus on baseline proposals to meet the objectives through the end of the year and has yet to adopt a formal timeline.
- The Task Force has indicated it intends to be communicating its work with TIA TR42.7 so that the two can produce aligned specifications for multidrop single-pair use in commercial building.

3. IEEE 802.3ch Multigigabit Automotive Ethernet PHY Task Force

- IEEE Std 802.3ch-2020 was approved at the June 2020 standards board series and was published by IEEE SA on 30 June 2020. The standard is currently available for purchase and will be available for free by 1 January 2021 through the [IEEE GET program](#).

- This standard specifies full-duplex PHYs for 2.5Gbps, 5Gbps, and 10Gbps Ethernet on a single balanced pair of conductors at up to 15 m reach, suitable for automotive applications.
- The standard also supports power over data line (PoDL) per IEEE Std 802.3 clause 104. While motivated by automotive applications, the standard does not limit the application of the PHY and may find use in short-range multigigabit applications.
- The standard is generally designed for shielded cabling but does not preclude the use of unshielded cabling, which may be practical for the 2.5 Gbps rate in environments less strenuous than the automotive use case.

4. IEEE P802.3cy Greater than 10 Gb/s Electrical Automotive Ethernet Task Force (formerly Beyond 10 Gigabit Automotive Ethernet PHY Study Group)

- The IEEE-SA Standards Board approved the new project, IEEE 802.3cy, and the task force began initial meetings.
- This project is developing new electrical (as opposed to optical) PHY specifications for 25Gb/s, 50Gb/s, and 100Gb/s Ethernet, at distances of up to 11m, suitable for automotive use. It is primarily driven by requirements for autonomous vehicle networking, and the project scope includes both symmetric and asymmetric transmission (where one of the directions is at a much lower speed).
- The project will likely specify the use of shielded cabling and has already decided to go beyond a single pair, at least for the 50 Gb/s and 100Gb/s rates. In August 2020, the Task Force adopted a baseline to base its PHY specifications on a 25 Gb/s PHY, which was “laned” to operate by 2x and 4x in parallel to support the 50 Gb/s and 100 Gb/s rates respectively.
- While motivated by automotive applications, the standard does not limit the application of the PHY and may find use in short-range high-speed applications on shielded balanced pair cabling which could be used as an alternative to direct-attach twinaxial cables.
- The project is currently adopting baseline proposals and evaluating channel characteristics before beginning work on PHY specifications. The Task force is expected to focus on baseline proposals to meet the objectives through the end of the year and has yet to adopt a formal timeline.

Optical Fiber Standards

5. 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 from the Working Group against draft 2.1.
- Draft 2.2 will be generated and reviewed by the Working Group.

6. 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
- Draft 1.1 was prepared and reviewed by the Task Force.

7. **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
 - The Task Force resolved comments from the Working Group on Draft 2.2.
 - Draft 3.0 will be generated for Standards Association Ballot.
8. **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 3.0.
9. **IEEE P802.3cw 400 Gb/s Operation over DWDM Systems Task Force**
 - This project was split from P802.3ct for the 400G objective.
 - The main objective is:
 - 400 Gb/s operation on a single wavelength capable of at least 80 km over a DWDM system (400GBASE-ZR).
 - DP-16QAM coherent modulation format will be used for 400GBASE-ZR
 - Baseline proposals are being considered.
10. **IEEE P802.3cz Multi-Gigabit Optical Automotive Ethernet Task Force**
 - This project will define the performance characteristics of an automotive link segment and an optical PHY to support 2.5, 5, 10, 25, and 50 Gb/s over 40 m of automotive cabling.
 - Baseline proposals are being considered.
11. **IEEE P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force**
 - This project will define standards for 100, 200, and 400 Gb/s over 50 m multimode fiber.
 - This will allow for Top-of-Rack switch elimination by connecting Middle-of-Row switches directly to servers.
 - Technical feasibility of 100 m reaches to support the installed base of multimode fiber has been demonstrated.
 - Baseline proposals are being considered.

The next scheduled meeting of IEEE 802.3 will be a virtual Plenary meeting November 9–19, 2020.

INCITS Fibre Channel T11.2 meeting: October, 2020, Virtual meeting

1. **FC-PI-7P 256GFC**
 - The document is completed and is currently in public review.
 2. **FC-PI-8 128GFC**
 - June 2021 Target Completion Date
 - Overview on Transmission Code
 - Committee agreed to the inclusion of Bit MUX and Symbol MUX options to text and drawings. Required changes to Lane Speed Negotiation (LSN) identified and is also to be included as text to be referenced in FC-FS-6.
 - Discussion on FEC, whether it should be interleaved or non-interleaved.
- Discussion on 100m reach for MMF (T11-2020-240-v0)
 - FCIA monitoring activity of IEEE 802.3db Task Force on 100G Short Reach
 - IEEE Task Force considering moving the objective of 50m reach to 100m. Feasibility of 100G using 9 tap equalizer was presented.
 - Straw poll taken but voting was inconclusive.

The next meeting of INCITS Fibre Channel will be held December 9-11, 2020, Virtual meeting.

IEC SC86B meeting: No meetings were held during Q3, 2020

The next meeting of IEC SC86B will be a series of virtual meetings held in October, 2020.

CENELEC TC86BXA meeting: No meetings were held during Q3, 2020

The next meeting of CENELEC TC86BXA is scheduled for November 18-19, 2020, Virtual meeting.

Technologies and Infrastructures for Transport, Access and Home

This was the last meeting of the Study Period 2017-2020. Each Question proposed the new Terms of Reference for the Study Period 2021-2024. In order to provide a better work balance, WP2 proposed a new structure with the reallocation of activities in the studies groups. The activities from SG15Q7 are split over SG15Q6 (active systems) and SG15Q16 (passive network elements) making the number of documents very large for the 2.5 days that are foreseen in the meeting agenda. The cable related parts of SG15Q16 will be moved to SG15Q5.

SG15Q5: Characteristics and test methods of optical fibres and cables

- Consented recommendation:
 - G.650.1 “Definitions and test methods for linear, deterministic attributes of single-mode fibre and cable” In this version, the applicability of fewer predictor wavelengths for the spectral attenuation modelling is considered. Appendix III “Example of a matrix model” is modified to provide illustrative example matrix for G.652.D and G.654.E fibres.
 - Various contributions related to the new technical report on Space Division Multiplexing (SDM) technology were discussed. This proposed report will be a baseline not only for sharing the vision of SDM technology among the experts in various fields, but also for clarifying the remaining objectives which should be solved for realizing future deployment and/or standardization of SDM technology.

SG15Q5: Characteristics and test methods of optical

- Consented recommendations:
 - G.672 “Characteristics of multi-degree reconfigurable optical add/drop multiplexers”;
 - G.694.1 “Spectral grids for WDM applications: DWDM frequency grid”.
- Agreed a new item G.owdm for the study of the standardization of 25 Gbit/s optical interface specifications in the O-band (1260-1360 nm), to increase the availability of channels for 5G mobile access applications.
- Review of revised ITU-T Recommendation G.698.2 “Amplified multichannel dense wavelength division multiplexing applications with single channel optical interfaces”, to define 200 and 400 Gbit/s application codes.
- Discussion to add 25 Gbit/s optical interface specifications operating in the C-band over 20 km distances and a maximum of 20 channels to ITU-T Recommendations G.698.1, G.698.2 and G.698.4. The objective is to address the need for 5G mobile access applications.
- The discussion started on a proposal to create multi-vendor interoperable specifications for free space optical (FSO) communication systems (also called “Atmospheric optical communication”). The possible applications are in the last mile access nodes in hostile environment, where it is not convenient to deploy fiber optical access network (islands miles away from coast, single or several villages in or on mountains, dense populated buildings separated in metro distance, etc.).

SG15Q5: Characteristics and test methods of optical fibres and cables

- Consented ITU-T recommendations:
 - L.111 “Optical fiber cables for in-home applications”;
 - L.151 (ex L.34) “Installation of optical fibre ground wire (OPGW cable)”.
- Agreement on a new Supplement L Suppl.crg “Optical fibre cable recommendations and standardization guideline”.
- Documents in progress:
 - Revised ITU-T Recommendation L.100/L.10 “Optical fibre cables for duct and tunnel application”;
 - New ITU-T Recommendation L.font “Requirements for Fibre Optic Network Terminal Box”;
 - Revised ITU-T Recommendation L.201/L.13 “Performance requirements for passive optical nodes: Sealed closures for outdoor environments” was reviewed. The document is fully harmonized with the equivalent IEC 61753-111 performance standards for sealed closures. One open topic is the reliability of the closure when exposed to high humidity in aerial applications. This concern was raised by Chinese experts in the previous meeting. There are small companies using materials for the outer closure that are not suited for use in outside plant. Despite the addition of detailed UV resistance and Fungus (or mould growth) resistance tests for the polymer materials, the concern of cracks in the outer closure remained. A new correspondence period will be started and the outcome will be discussed again in an interim SG15/Q16 meeting planned on Feb 5th, 2021.
- The following documents in progress could not be reviewed during the meeting due to a lack of time. They will be discussed in several interim meetings scheduled in the timeframe December 2020 to March 2021:
 - New ITU-T Recommendation L. oehfc “Optical/electrical hybrid fibre cable and related application scenarios”;
 - New ITU-T Recommendation L.ncip “Requirements for Passive Optical Nodes: nodes for customer indoor premises”;
 - Revised ITU-T Recommendation L.400/L.12 “Optical fibre splices”. This document contains the effects of mode field diameter mismatch when splicing two different fibers together.

SG15Q17: Maintenance and operation of optical fibre cable networks

- Consented ITU-T recommendation:
 - L.330 “Telecommunication infrastructure facility management”.
- Progress made on the new ITU-T Recommendation L.cid “Cable identification for the construction and maintenance of optical fibre cable networks with optical sensing technique”. Two new Appendices were proposed, dealing respectively with Japanese and Chinese experiences.

The next general meeting of ITU-T SG15 is planned for June 7th through July 18th, 2021, Geneva Switzerland.

A series of interim meetings of SG15Q16 are scheduled in the timeframe December 2020 to March 2021.



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