MOHAWK update

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December 2009

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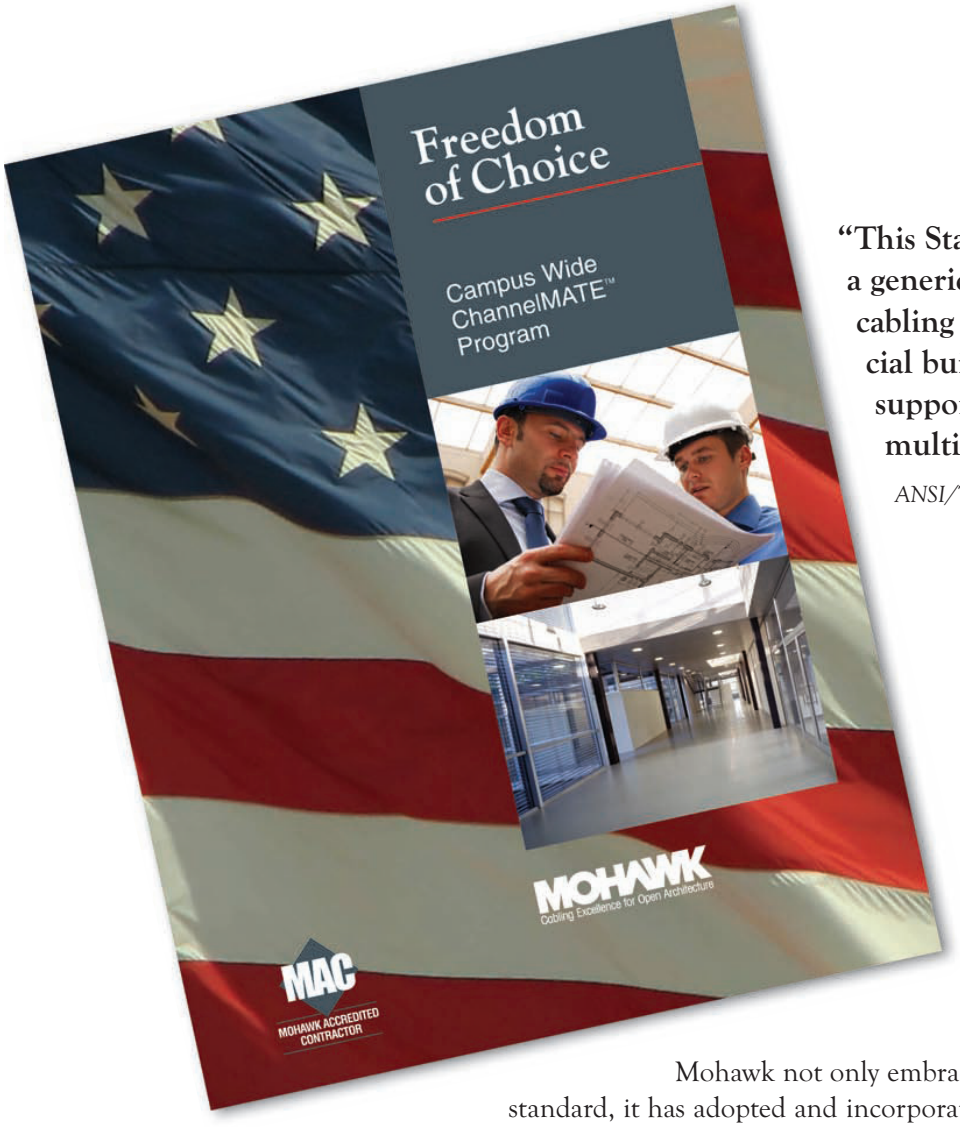

"This Standard Specifies a generic telecommunication cabling system for commercial buildings that will support a multi-product, multi-vendor environment"

ANSI/TIA-568-C.2

Mohawk not only embraces the ANSI/TIA-568-C standard, it has adopted and incorporated the Standard's Purpose into our "Open Architecture" philosophy.

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MOHAWK
Cabling Excellence for Open Architecture

TIA TR 42.1 (Commercial Building Cabling) and TIA TR 42.7 (Copper Cabling Systems) Jacksonville, FL, November 2, 3, 4, 5, 2009

The TIA TR 42.1 (Commercial Building Cabling) and TR 42.7 (Copper Cabling Systems) Subcommittees have published TIA 568-C.0 (for Generic Cabling for Customer Premises), C.1 (for Commercial Building Telecommunications Cabling), and C.2 (for Balanced Twisted-Pair Cabling Components). During this third and last group of meetings in 2009, discussion covered the mixing of Category 6A and 6 cables, the latest of the Data Center standard being developed, changes to the BAS Standard (TIA 862A), completion of the MICE tutorial (to be published as TSB 185), changes to the Healthcare Standard (TIA 1179), plus they had presentations on the Passive Optical LAN and a third method for Connectivity for parallel fiber signals. There was also a good discussion on changes still needed in TIA 568-C.0 and C.1.

Meeting Topics

1. New TSB: Guidelines on Shared Pathways and Shared Sheaths
2. Guidelines for the Assessment and Mitigation of Installed Category 6 Cabling to Support 10GBASE-T (TSB 155-A)
3. Coaxial Cabling Standard (TIA 568-C.4)
4. Data Center Cabling Standard Update (TIA 942A)
5. BAS Cabling Standard Changes (TIA 862)
6. MICE Tutorial Changes (TSB 185)
7. Healthcare Cabling Standard Changes (TIA 1179)
8. Presentation: Passive Optical LAN
9. Presentation: Connectivity Method C for Parallel Signals
10. Changes due in TIA 568-C.0 and C.1
11. Next Meeting

1. New TSB: Guidelines on Shared Pathways and Shared Sheaths

Following much discussion on mixing media (UTP) in sheaths, it was decided to create this new project and TR 42.7 planned for it to be completed in February, 2011. Testing had been done by a manufacturer who captured the results in a paper that presented the result of a controlled experiment quantifying mixed media coupling between Category 6A cables from different manufacturers, and Category 6A cables and Category 6 cables. The research suggested that mixing copper cables in pathways is acceptable when done per the standard guidelines and did not create the potential for application issues.

Scope:
This would be an applications sharing document, similar to the shared sheath annex that provided guidelines for different applications sharing the same 25-pair cable. This new TSB should satisfy some of the issues and concerns that have been raised regarding placing different category cabling in the same pathway. The document will also address the issue of alien crosstalk interference between Category 6A UTP cables manufactured by different vendors.

What You Need to Know

At this point, they will not be looking at "foiled" cable.

Testing involved:

- Using a 7-around-1 (7A1) configuration of Category 6 cables surrounding a Category 6A cable.
- Other tests were where Category 6A cables from different manufacturers were installed in the same pathways.

What You Need to Know

The conclusions arrived at after this first testing were:

1. Mixing Category 6A with Category 6 or other Category 6A cables did not present any operational issues for 10GBASE-T or performance concerns.
2. Testing performed was worst-case, with results significantly exceeding expectations.
3. 10GBASE-T operation on Category 6 cable should follow the guidelines of TIA TSB-155.
4. None of the permanent Links of Category 6 cable (regardless of length) contributed sufficient Alien Crosstalk into the Category 6A cabling to affect its Category performance or operation.
5. As far as mixing Category 6A cabling from different vendors, the evidence showed that alien crosstalk between bundles was negligible, regardless of the type of cable. This same result was expected to carry through to mixed categories as well, or that the actual coupling of installed Category 6 to Category 6A cabling should be lower than the worst-case measurement of this test.

➢ **ACTION:** This TSB project was approved and a PAR (Project Authorization Request) would be prepared. The PAR title was "Guidelines on Shared Pathways and Shared Sheaths." Estimated completion date was 2/2011. A Task Group would be formed to collect and work on data to support it, all to be discussed at the next Plenary Meeting in February 2010.

2. Guidelines for the Assessment and Mitigation of Installed Category 6 Cabling to Support 10GBASE-T (TSB 155-A)

Most of the comments were editorial, with some dispute about Annex A regarding cabling measurement procedures. All ballot comments were resolved. See the main issue below:

Issue: Cabling Measurement Procedures, Annex A, should refer people to TSB 1152 for specs.
Resolution: A revised Annex A would point people to TSB 1152 "…for information on test parameters, test equipment for alien crosstalk measurements in installed cabling, alien crosstalk measurement floor, alien crosstalk measurements, and processing measurement data…"

➢ **ACTION:** TSB 155-A was approved to go out as a PN (internal) ballot and to be debated again at the February 2010 Plenary meeting.

3. Coaxial Cabling Standard (TIA 568-C.4)

The first draft of the TIA 568-C.4 standard for Broadband Coaxial Cabling and Components was presented to this subcommittee.

Its contents included:

- The Coaxial Topology
  - Recognized cables for Cabling Subsystem 1
  - Recognized cables for Cabling Subsystems 2 and 3
- Series 6 and 11 Link Performance
- Coaxial Cable, Cords, and Connecting Hardware
- Installation Requirements
- Field Test Requirements
- Annex A (Informative) Background information for coaxial cabling requirements.
- Annex B (Informative) Bibliography and References

With Figures as follows:

Figure 1	Relationship between TIA-568-C Series and other relevant TIA standards
Figure 2	Elements of generic cabling topology
Figure 3	Coaxial equipment outlet
Figure 4	Test link for Cabling Subsystem 1
Figure 5	Test link for Cabling Subsystem 2 and Cabling Subsystem 3
Figure 6	Comparison of linear vs. discrete insertion loss values, Series 6 cable
Figure 7	Comparison of linear vs. discrete insertion loss values, Series 11 cable

With Tables as follows:

Table 1	Maximum insertion loss of coaxial cabling
Table 2	Minimum return loss of coaxial cabling
Table 3	Minimum screening attenuation of coaxial cabling
Table 4	Minimum transfer impedance of coaxial cabling
Table 5	Maximum insertion loss of coaxial cable at 20 °C (68 °F)
Table 6	Minimum return loss of coaxial cable
Table 7	Minimum screening attenuation of coaxial cable
Table 8	Minimum transfer impedance of coaxial cable
Table 9	Maximum pull tension for coaxial cable
Table 10	Maximum coaxial cable insertion loss (for information only)
Table 11	Minimum connecting hardware return loss
Table 12	Minimum connecting hardware screening attenuation

➢ **ACTION:** The Coaxial Cabling Standard would go out for a 30-day PN (internal) ballot planning to close by 1/24/09 so it could be reviewed at the February 2010 Plenary meeting.

4. Data Center Cabling Standard Update (TIA 942-A)

The update to the Data Center Cabling Standard (TIA-942-A) presented their new section on Energy Efficiency. The content was seen as extremely important and some felt it should be a section within the standard instead of an Informative Annex.

Here is some of the information that will be in the "Mock" (internal) ballot that includes recommendations for design of telecommunications cabling, pathways, and spaces that can improve energy efficiency.

What You Need to Know

Note that at this stage most of the contents are recommendations, but some are requirements. The general feeling was that this should be reviewed more and perhaps not be in an Informative Annex, but in the body of the standard where it would be Normative (required). They considered it for Data Center Design part of the Data Center Cabling System Infrastructure section.

Telecommunications Cabling:
The overhead cabling improves cooling efficiency and is a best practice where ceiling heights permit—it reduces losses due to airflow obstruction and turbulence caused by under-floor cabling and cabling pathways.

Cabling:
- Consider telecommunications cabling installed under the floor.
- Plan routing of telecommunications cabling within cabinets, racks, etc.
- Place telecommunications pathways so as to minimize disruption to airflow to and from equipment.
- Where under-floor cooling is utilized, floor tile cuts should be limited both in size and quantity to minimize loss of under-floor air pressure.
- You should employ use of brushes, grommets, or other methods to minimize loss of air through cable openings in floor tiles.

Pathways:
- Pathways should be placed so as to minimize disruption to airflow to and from equipment.
- Consider use of computational fluid dynamics (CFD) models to optimize location of pathways, air conditioning, enclosures, air return, etc.
- If floor cooling used, floor tile cuts should be limited.

Spaces:
- Consider use of enclosures that improve cooling efficiency.
- Routing of cabling and pathways should not compromise efficiency of the enclosure.
- Equipment should match the airflow design for the enclsures and computer room space in which they are placed.
- Provision cabinets and racks with power strips that permit monitoring of power levels, that will not exceed designed power and cooling levels.
- Avoid exterior windows and sky lights in computer rooms environmentally controlled.

➢ **ACTION:** The Data Center Cabling Standard Annex on Energy Efficiency to TIA 942-A, was approved to go out as a "Mock" (internal) ballot to be reviewed at the February 2010 Plenary meeting.

5. BAS Cabling Standard Changes (TIA 862)

The Building Automation Systems Cabling Standard had been out to a full industry ballot and comments were reviewed again:

Issue: So the user doesn't get confused, 1) under "Recognized Cabling Components" use the latest information and point to the latest 568-C.2 Standard, 2) reference the newly obsolete Category 6A cabling standard (ANSI/TIA-568-B.2-10), and 3) refer to 568-C.2 recognized cables that include Category 6 and 6A.
Resolution: They agreed to insert that "…recognized transmission media ***shall*** be selected from the recognized Cabling Subsystem 1 transmission media from 568-C.0 and C.2."

Issue: In the section on Distances for Cabling Channels, make it clear that BAS (Building Automation Systems) equipment is not in the Distributor, but in the TR (Telecom Room), ER (Equipment Room), or the MR (Mechanical Room) spaces.
Resolution: They cleared that up by stating that the "…maximum allowed cable length between the BAS equipment in the space containing the Distributor and any BAS device in the coverage area, is application dependent."

Issue: Is the NOTE in Table 3 (Maximum operating voltages for installed BAS cables in dry conditions) about maximum operating currents for 24 cabling channels correct?
Resolution: That note would be changed to refer to Table 2 (instead of A-1) which is shown below with information for 24 AWG cabling channels only.
(See table on next page.)

Issue: Under BAS Coverage Area Topologies, send a strong message that the star topology should be used for Cabling Subsystem 1. Now it isn't clear.
Resolution: The intro section to Coverage Area Topologies would be rewritten to say Cabling Subsystem 1 ***should*** be configured in a star topology and that other optional coverage area topologies provide deviations that support different BAS applications not compatible with structured cabling.

Issue: Zone boxes can go in the ceiling and that isn't mentioned to help the user.
Resolution: They would say that zone boxes ***shall*** be located in fully accessible, permanent locations such as building columns, floors, ceilings and permanent walls, and ***should*** be provided with appropriate security, such as key-locking, tool-814 removable covers, or other suitable means…

Issue: Make Annex C Informative instead of Normative because it covers optional coverage area topologies and does not contain any shall statements.
Resolution: They would make Annex C Informative for "Optional Coverage Area Topologies" which means it's strictly informative and not considered part of the standard.

Example of Table 2 for Maximum Operating Currents and Temperatures for 24 AWG Cabling Channels

Wire gauge (min diameter) AWG (mm)	Max operating temperature °C	Max current for a single conductor A	Total max current for a 4-pair cable A
24 (0,5)	25	1.50	3.36
24 (0,5)	55 (Note 2)	0.75	1.68

Note 1……..
Note 2 – for BAS applications, when the max operating temperature is between 55°C and 60°C, a minimum 75°C temperature rated cable is required.

Preliminary Information, Subject to Revision
Table by M. Michelson, Business Communication Services

➢ **ACTION:** The BAS Cabling Standard would go out to an SP (industry-wide) ballot and be discussed at the February 2010 Plenary Meeting.

6. MICE Tutorial Changes (TSB 185)

This TSB on the MICE classifications had been out to ballot and all the comments made on it were resolved. Its content provided information on the MICE environmental classification system including some examples.

Here are some of the changes:

Issue: There are four primary environmental elements used to classify an environment:

1. the M element, defining the mechanical characteristics of the environment;
2. the I element, defining the ingress protection characteristics of the environment;
3. the C element, defining the climatic and chemical characteristics of the environment; and
4. the E element, defining the electromagnetic characteristics of the environment.

Describe them more clearly in the section on Environmental Classifications to help the designer/user.
Resolution: The classification (MICE) of a local area is based on the immediate surroundings of the cabling component. A cable extending to an equipment outlet in an automation island area ***may*** start in a $M_1I_1C_1E_1$ environment, but terminate in a $M_3I_3C_3E_3$ environment. In this case, a conduit that extends from the $M_1I_1C_1E_1$ space to the outlet ***could*** be used as an isolation or mitigation technique to reduce the effects of the overall environment. Alternatively, cabling components suitable for use in $M_3I_3C_3E_3$ environments ***could*** be used. Designers ***should*** select components or mitigation techniques appropriate for the environment in which they are to be installed.

See next page for an example of the relationship of environmental classification elements and parameters.

Issue: Users may want to know how to determine if the components are suitable for the environment as described. Shouldn't this TSB include a test protocol, or a reference to test protocol(s) that qualify products to operate in the environments described?
Resolution: No. This idea was REJECTED because the TSB was an informational document and could not contain requirements for product qualification.

Issue: In the climate section change any statements that infer requirements because this is a TSB which includes no requirements, only guidance.
Resolution: Under the Climate section, they would explain that certain parameters were used to maintain the desired (instead of required) conditions.

Issue: Interference is potentially harmful, not frequencies. In the section on "Guidance with respect to the electromagnetic element" explain that there can be interference at the operating frequency as well as the harmonic frequency.

Example of the Relationship of Environmental Classifications to Elements and Parameters

Element — **Example of an Environmental Classification** $M_1I_2C_3E_2$ — Severity (Worst case)

Parameters	ELEMENTS			
	M	I	C	E
	Shock/bump	Particulate ingress	Ambient temperature	Electrostatic discharge
	Vibration	Immersion	Humidity	Radiated RF
	Crush		Liquid pollution	Conducted RF
	Impact		Gaseous pollution	Magnetic field

Preliminary Information, Subject to Revision
Table by M. Michelson, Business Communication Services

Resolution: They reworded this section to say that "In addition to generating potentially harmful interference at the primary operating frequency, devices also generate interference at harmonic frequencies that can impact telecommunications networks."

➢ **ACTION:** The MICE TSB was approved for publication and after it goes through an official review by TIA, it will be available from *www.global.ihs.com*.

7. Healthcare Cabling Standard Changes (TIA 1179)

This new standard has been developed internally and the most recent changes/resolutions are below:

Issue: When describing the Entrance Facilities, remember that pathways and spaces are part of it.
Resolution: Changed the description of the infrastructure to state that the entrance facility (EF) consists of the pathway(s), space(s), cables, connecting hardware, protection devices, and other equipment that connect to access provider (AP) cabling.

Issue: Remember that there are other services that can be provided to a hospital other than Access Provider (AP) services.
Resolution: In the Design section under Entrance Facilities, they reworded text to say that many healthcare facilities, particularly critical care areas, ***may*** be severely impacted by a loss of telecommunications services, rather than saying only access provider services.

Issue: This standard doesn't appropriately address size issues or whether the computer room door should swing in or out.
Resolution: Under Design of Equipment Rooms, say that "TERs ***shall*** be designed and installed in accordance with the requirements of TIA-569-B with the following exceptions: 1) door swing ***shall*** be in unless otherwise approved by the facility owner, and 2) size of the TERs ***shall*** be increased to reflect the loss of functional space due to door swing as well as to accommodate additional services (space requirements should be at least 100% greater than those in TIA-569-B).

Issue: Right up front in this standard, mention that room for expansion must be included so that space gets allocated to Telecommunications.
Resolution: They would include in the section on design of Equipment Rooms that "for existing facilities, growth for new or expanding systems ***can be*** accommodated by reclaiming space adjacent to the TER if the adjacent spaces is not critical to the facility (e.g. storage room), alternatively additional space ***should*** be located in as close proximity to the existing TER as is practical."

Issue: More guidance is necessary for what "diverse" pathways are in Equipment Rooms. As a cable practice, how should this be done? In the standard it says that "a minimum of two diverse pathways ***shall*** be provided between the ER and EF…" Are those supposed to be side by side with some measure of separation?

Resolution: They focused on the separation and wrote into the standard that "…diverse pathways ***should*** entail a route separation as great as possible."

Issue: Make it clear that the TE (Telecom Enclosure) is a box or cabinet and does not support data transmission rates and performance—tell people that it is a protection to the cabling.
Resolution: Under the Design of TEs, they clarified a TE's purpose by saying: "TEs ***should*** be selected and installed in order to protect and support the cabling components, the cabling data transmission rates and performance in these areas during operation, or the location of the TE ***should*** be selected to minimize these effects."

Issue: Make it clear that centralized or pull through fiber cabling goes a longer distance (300 meters) than copper cabling at 90 meters.
Resolution: They changed the sentence that said "The maximum allowed distance for a pull-through cable is 90 m (295 ft)" to "The maximum allowed distance for a pull through cable is 300m (964 ft .)"

Issue: Under Recognized Cabling for backbone copper cabling, bring the content up to date for cabling higher than Category 5e. Good design practice maintains that the backbone cabling should support 10x time the throughout capability of the horizontal.
Resolution: They would state that Category 6 or higher was recommended.

Issue: Under Recognized Cabling for backbone fiber cabling, bring the content up to date for OM3 and OM4 fiber.
Resolution: They would state that for multimode optical fiber cabling, there was:

- 850nm laser-optimized 50/125 um (OM3, OM4) which was recommended, and
- 62.5/125 um (OM1) and 50/125 um (OM2) (as in ANSI/TIA-568-C.3).

Issue: Bring in that "air-blown fiber" ***could*** be installed in a health facility, as well as other standard copper or fiber cabling.
Resolution: Add into the Horizontal Cabling section that air-blown fiber ***could*** be installed or used in addition to or in place of conduit. It would then be easier to reach the cable without disturbing people in the hospital rooms.

Issue: Healthcare sites have high work area density requirements. This standard needs to increase the maximum number of work areas that can be served by one MUTOA.
Resolution: Under the section on work area design and the MUTOA, they changed the high density requirement for the MUTOA so that it ***should*** be limited to serving a maximum of 24 work areas.

Below is an illustration showing which work areas are considered as low (L), medium (M), or high (H) density:

Issue: Under Cabling Installation Requirements, some of the guidance regarding cabling in a healthcare facility is very inadequate. It only says that some areas ***may*** expose the cabling to the detrimental effects of high magnetic field, radiation, etc., and that a cabling solution (e.g. shielded, armored) ***should*** be selected and installed in order to support adequate data transmission rates and performance in these areas during operation.

Examples of Recommended Work Area Outlet Densities

Patient Services							
Administration	Registration	Patient Room	Family Lounge	Waiting Room	Nurses Station	Library	Consultation
M	M	H	L	L	H	M	L

Surgery/Procedure/Operating Rooms							
Patient Prep	Patient Holding	Patient Recovery	Sterile Zone	Sub-Sterile Zone	Intensive Care Rooms	Operating Room	Anesthesia Offices
M	M	M	L	L	H	H	M

L=Low, M=Medium, H=High

Preliminary Information, Subject to Revision
Tables by M. Michelson, Business Communication Services

Resolution: They decided to rewrite that section to say that "…some areas of the healthcare facility ***may*** expose the cabling to the detrimental effects of high magnetic fields, radiation, extreme temperature, chemicals, etc. ANSI/TIA-568-C.0 Annex F contains information relative to the classification of the environment along four main specifications--Mechanical, Ingress, Climatic and Electromagnetic (MICE). Telecommunications cabling and associated pathways and spaces ***should*** be designed, selected and installed in order to ensure operation of the installed cabling in these areas during normal operation… Compatibility with the environment ***can*** be achieved with enhanced cabling components, or through protection, separation or isolation."

➢ **ACTION:** This new Healthcare Cabling standard would go out to its first full industry (SP) ballot and be debated at the February 2010 Plenary Meeting.

8. Presentation: Passive Optical LAN

This presentation was delivered in hopes of getting a TSB (Technical Services Bulletin for guidance) started that would augment centralized fiber cabling with the use of splitters in support of POL (Passive Optical LAN) and other PON (Passive Optical Network) technologies.

Discussion

A passive optical network (PON) is a point-to-multipoint fiber to the premises network architecture where splitters are used to enable a single optical fiber to serve multiple premises. This reduces the amount of fiber and central office equipment required compared with point to point architectures.

- The plusses are 1) it saves power, 2) fiber can accommodate both PON and PT-PT (point-to-point), and 3) WAN capacity is generally from 1 Gbps to 100 Gbps per chassis.
- At the February 2010 meeting they would give a presentation on bandwidth.

➢ **ACTION:** This subject would be added to the TR 42.1 meeting agenda for February 2010: Contribution on Optical Passive Networks in the Enterprise.

9. Presentation: Connectivity Method C for Parallel Signals

Connectivity Method C was a solution for parallel signals.

Discussion

- The issue was to gain recognition that this "Method" existed.
- This was no more complicated than Method A, and it involved only 2 patch cords.

➢ **ACTION:** This subject (Polarity System for Parallel Signals) would be added to the TR 42.1 meeting agenda for February 2010: Contribution on Proposed Addendum to 568-C.0 (TIA 568-C.0-1) would be presented and discussed.

10. Changes Due in TIA 568-C.0 and C.1

➢ **ACTION:** A Task Group was created to put together these changes/updates such as Addendum C.0.1 to add references to 568-C.2 and TIA 1152.

11. Next Meetings

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262

Confirm city, hotel, and schedule at www.tiaonline.org/news_events/calendar.cfm.

TIA TR 42.2
Residential Cabling
Jacksonville, FL, November 4, 2009

At this third and final Plenary meeting of 2009, the TIA TR 42.3 committee has reaffirmed the updated Residential Telecommunications Cabling standard, TIA 570-B. The first work has been done by the Copper Systems Group (TR 42.7) for the full new standard, TIA 568-C.4 for Coaxial Building Cabling. TIA has already approved Addendum 1 to 570-B for "Additional Requirements for Boradband Coaxial Cabling" in the data center. And, they also reviewed the issue of Category 6A cabling sharing a sheath with other cables.

Meeting Topics

1. TIA 570-B "Residential Telecommunications Cabling" Status
2. TIA 568-C.4 "Coaxial Cabling"
3. Liaison Letter
4. Next Meeting

1. TIA 570-B, "Residential Telecommunications Cabling," Status

➢ **ACTION:** TIA 570, "Residential Telecommunications Cabling," was reaffirmed and is now 570-B (meaning that the subcommittee reviewed the Standard and that review showed that the technical content was valid and did not need change); this is available for purchase at *www.global.ihs.com* as TIA 570.

2. TIA 568-C.4 "Coaxial Cabling"

There already is an Addendum 1 to TIA 570-B titled Additional Requirements for Broadband Coaxial Cabling. This is now a new project involving the Copper Cabling Systems subcommittee TR 42.7 who will develop a full coaxial cabling standard (TIA 568-C.4) so they could refer to that document when writing the next update to the Residential Cabling Standard (TIA 570-C).

That new project titled "75Ω Broadband Coaxial Structured Cabling and Components Standard" was discussed this meeting and a Scope was set:

Scope

- Specify requirements and recommendations for 75Ω broadband coaxial cabling, cables, cords and connecting hardware to support community antenna television (CATV, commonly referred to as cable television), satellite television and other applications supported by the telecommunications infrastructure (star topology) as defined by ANSI/TIA-568-C.0.
- Included would be transmission and mechanical requirements and requirements related to electromagnetic compatibility (EMC) for cabling, cables and connectors; cabling installation and connector termination procedures; and field testing procedures.

➢ **ACTION:** TR 42.7 would develop TIA 568-C.4 for Coaxial Cabling and a PAR was initiated this week. See Meeting Topic #3 in the TR 42.1 and 42.7 section for this standard's planned contents.

What You Need to Know

The first draft of this new coaxial cabling standard was presented at the TR 42.7 subcommittee meeting and it would be developed for the November TR 42 Plenary meeting. TR 42.2 would wait for 42.7 to report on that work.

3. Liaison Letter

Because this was a topic of interest, this subcommittee reviewed the liaison letter that TR 42.3 received from TR 42.7 indicating a potential problem with Category 6A cabling in proximity to other UTP category cables, and to those manufactured by other companies with different constructions. The letter stated that problems with Category 6A cables, in a shared sheath environment, were basically not true. They alone could handle 10GBASE-T applications. The problem arose when using the 10GBASE-T application over Category 6A cables in the same pathway with cables that were mixed, i.e., mixed with lower categories or with other Category 6A cables made by different manufacturers.

➢ **ACTION:** The liaison letter from TR 42.7 to 42.3 was reviewed and no action was taken at this time. The letter concerned the possible need for separate pathways for Category 6A cabling.

What You Need to Know

The problem with 10GBASE-T is that it puts out a lot more power, therefore generating a lot more noise (Alien Crosstalk). 1000BASE-T allows much more alien crosstalk margin versus 10GBASE-T. 1000BASE-T allows 30 dB margin and they only use about 8 dB. There is a lot less margin with Category 6A and 10GBASE-T.

4. Next Meeting

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262

Confirm city, hotel, and schedule, at www.tiaonline.org/news_events/calendar.cfm.

TIA TR 42.3
Pathways and Spaces
Jacksonville, FL, November 3, 2009

The TIA TR 42.3 subcommittee created the standard, TIA 569 for Commercial Building Telecommunications Pathways and Spaces. At this third Plenary meeting of 2009, the group covered changes made to the 4th internal ballot to the Pathways and Spaces standard and agreed to keep it internal at this time (to become 569-C), and they reviewed comments to Addendum 1 to 568-C (568-C-1.1) Commercial Building Pathways and Spaces, which was also keep internal.

Meeting Topics

1. TIA 569-C, Pathways and Spaces (next version)
2. TIA 568-C.1-1, Commercial Building Telecommunications Cabling Standard, Addendum 1 for the Commercial Building's Pathways and Spaces
3. Liaison Letter re Mixed Media
4. Next Meeting

1. TIA 569-C, Pathways and Spaces (next version)

This updated standard is still being reviewed internally before going out to the public. Below are major issues agreed to:

Issue: In the section on Requirements for Rooms, add that fiber is an option in spaces where there could be EMI interference. Now the text implies use of copper media only, and optical media is a logical choice in these areas.
Resolution: Add advice that says the telecommunications space ***should*** be located away from sources of electromagnetic interference, and that some cable assemblies in areas close to levels of high EMI ***may*** require the use of shielded twisted pair cabling or dielectric optical media.

Issue: The current generation of UPS equipment uses sealed batteries or energy cells that do not require ventilation. Change the requirements for backup batteries in the environmental section where it says adequate ventilation must be provided.
Resolution: Redo the requirement to point out if non-sealed batteries are used for backup, adequate ventilation ***shall*** be provided.

Issue: For racks and cabinets, include that there are alternative cooling mechanisms to forced airflow because alternative cooling mechanisms may be necessary to maintain the cabinet temperature within the temperature rating of the equipment and cabling.
Resolution: Without going into detail, add in that alternative cooling mechanisms ***may*** be necessary to maintain the cabinet temperature within the temperature rating of the equipment and cabling.

Issue: Should you mention that noise created by the equipment within a telecommunications enclosure could be detrimental to the productivity of nearby workers, or stay out of personnel work issues?
Resolution: Remove that statement because this standard's Scope specifies requirements for telecommunications pathways and spaces and does not include worker productivity and/or satisfaction.

Issue: Power needs to be provided if active equipment is used in a telecommunications enclosure and if it's needed, it has to be secure from tampering. Power also has to be planned for in advance, during the design phase.
Resolution: Right away, under environmental requirements for the telecommunications enclosure, use a ***shall*** statement making it mandatory that power be provided for the equipment.

Issue: Table 11 for Pull Box Sizing contains errors. Fix it.
Resolution: A volunteer will redo the table as a contribution for the next ballot cycle.

Issue: In the Informative Annex B for Access Floor Systems, the dynamic load has wrong units and values. DIN, ASCE, and AISC standards recommend a safety factor of at least 2.
Resolution: This is in an Informative annex (not mandatory) that includes all minimum requirements. A licensed structural engineer would handle this decision.

➢ **ACTION:** Send out a fourth PN (internal) ballot on TIA 569-C to be discussed at the first 2010 TR 42 meeting, February 1-5, 2010.

2. TIA 568-C.1-1, Commercial Building Telecommunications Cabling Standard, Addendum 1 for the Commercial Building's Pathways and Spaces

This Addendum to the main commercial building telecommunications standard is still being reviewed internally before going out to the public. Below are major issues agreed to:

Issue: Tell people that they may have a problem when designing a data center or equipment room and the door to that room opens inward, thus lessening the space available inside the room.
Resolution: In the section on Design, add a sentence that describes if there is a door that opens inwards (into the room), that the size of the room (floor space) ***should*** be increased accordingly.

Issue: Since it is already explained in TIA-569-C that a Telecommunications Enclosure (TE) cannot be used in lieu of a Telecommunications Room (TR), delete it from design information here.
Resolution: Delete any information on the TE in this standard. People will already know what the TE can be used for from 569-C.

Issue: Are there many locations/spaces where a MUTOA can and cannot go?
Resolution: This standard covers spaces in commercial buildings and due to the heavy racks, etc. in some of the equipment/data rooms, tell users that assemblies such as MUTOAs ***shall*** not be located under access flooring.

Issue: Since TIA 568-C.1 already tells people where to put MUTOAs, in this standard just tell them how to provide security.
Resolution: In the section on Telecom Outlet Spaces, state that Consolidation Points ***should*** be provided with appropriate security, such as key-locking, tool-removable covers, or other suitable means.

Issue: Should this standard also remind users that firestopping is required in a building?
Resolution: Add a new section at the end for Firestopping and state that it ***shall*** be in accordance with TIA 569-C.

What You Need to Know

If both 569-C and 568-C-1.1 are kept open (as internal ballots) corrections can be made on both documents, at the same time, regarding updates before going out to a full industry (SP) ballot.

➢ **ACTION:** Send out a fourth PN ballot on 568-C-1.1.

3. Liaison Letter re Mixed Media

Essentially, TR 42.7 is planning a TSB to address the concern of mixing Category 6A cables from different manufacturers within the same sheath or conduit. They are saying that they don't believe it is a problem.

➢ **ACTION:** Below is the write up TR 42.7 put together that immediately addressed the issue of shared pathways between Category 6A and lower cable categories:

"Mixing category 6A UTP and other lower category cables within the same pathway is acceptable provided that the other lower category cables are not used for 10GBASE-T operation. The lower category cable may be used to support non-10GBASE-T applications such as 1000BASE-T,100BASE-TX, 10BASE-T, ATM, DSL, baseband video, RS 485, analog original telephony. For new installations, category 6A cables should be used for all 10GBASE-T and lower speed applications and category 6 or category 5e cables should be used for 1000BASE-T or lower speed applications."

See report on TR 42.1/42.7 for more on this work.

4. Next Meeting

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262
Confirm city, hotel, and schedule, at www.tiaonline.org/news_events/calendar.cfm.

TIA TR 42.4
Outside Plant
Jacksonville, FL, November 4, 2009

The TIA TR 42.4 subcommittee created the standard, TIA 758 "Customer-Owned Outside Plant Telecommunications Cabling" and is now updating it. At this third and last Plenary meeting of 2009, the group went over the second mock ballot comments to TIA 758-B.

Meeting Topics

1. TIA 758-B Outside Plant Cabling Standard Changes
2. Next Meeting

1. TIA 758-B Outside Plant Cabling Standard Changes

Many of the agreed upon changes were editorial in nature. Here are a few technical changes:

Issue: There are three types of pathways in most reference books—aerial, buried, and underground. Fix that in this standard and be consistent. Some sections of the standard say aerial & UG, and other places say UG and aerial and direct buried.
Resolution: Do a global change throughout the document to accommodate this as aerial, direct buried, and underground.

Issue: If ILEC and CLEC are outdated terms, update them for the user.
Resolution: Remove ILEC and/or CLEC. Replace with AP (Access Provider) and/or SP (Service Provider).

Issue: Clear up what the "recognized media" are by referring people to the generic cabling standard TIA 568-C.0 and point to the new work on coax also.
Resolution: They were to simplify this section and state that the recognized media included those listed in ANSI/TIA-568-C.0 as well as the 75 Ω coaxial (proposed ANSI/TIA-568-C.4).

Issue: When telling users to meet applicable codes and if there are none, tell them to follow the most current version of the NESC (National Electrical Safety Code) to include ALL construction elements that need to be considered in the design and installation of subsurface pathways.
Resolution: They added three elements to the list to consider—Horizontal Directional Drilling (HDD), Above Ground Obstructions, and Environmental Considerations, along with Excavation, clearances and separations from other utilities, Depth of burial, Buried street crossings, Casing, Trenching, Boring (pipe pushing), Plowing, Backfill, and, Restorative landscaping.

Issue: In the section on conduits there is a paragraph stating that "Nonmetallic conduits ***shall*** be encased in concrete of minimum 17225 kPa (2500 lb/in2) compressive strength where vehicular traffic (i.e., automotive, railway) is above the pathway, or where a bend or sweep is placed. This has a big impact on the cost of a project. Define what a "bend" in a pipe is, maybe by degrees of bend? Some documents say for all bends over 10 or 15 degrees.
Resolution: They made it mandatory that nonmetallic conduits ***shall*** be encased in concrete of minimum 17225 kPa (2500 lb/in2) compressive strength where vehicular traffic (i.e., automotive, railway) was above the pathway, or where a bend or sweep in excess of 15 degrees was placed.

Issue: When describing bends in a conduit, put in the criteria for a bend radius.
Resolution: They would add that "All bends ***shall*** be sweeps with a minimum radius of six times the internal diameter for conduits up to 2 inch, and ten times the internal diameter for all conduits larger than 2 inch."

Issue: So that people aren't confused on what electronic equipment is located in a true MH (Man Hole, not a vault), give an example.
Resolution: They added environmental monitoring equipment, pumps, as an example.

Issue: Clear up how Handholes can be used for splicing instead of saying Handholes ***should*** not be used for splicing. They are commonly used for splicing cables together when issues arise.
Resolution: They would state that splicing ***may*** be accommodated in Handholes depending upon cable type and size.

Issue: When describing an Entrance Point, don't say the Entrance Point has to be from an underground conduit per the NEC. The NEC just says the point of entrance is from a conduit.
Resolution: They would correct that to say an entrance point is the point of emergence of telecommunications cabling through an exterior wall, through a floor, or from a conduit.

Issue: In the Note under Penetration and Termination, make it clear that some non-metallic innerduct commonly used for underground or outside plant construction, might be "Unlisted" versus just not having the appropriate fire safety characteristics.
Resolution: They would clear that up by saying "Some nonmetallic innerduct commonly used for underground or outside plant construction ***may be*** Unlisted (not have the appropriate fire safety characteristics) for use as a pathway within the building.

Issue: Under Aerial Cabling for OSP or BBOSP, get the point across that the support messenger doesn't have to be steel.
Resolution: They would state that the "Self-supporting cable ***shall*** incorporate an integral support messenger into the cable design" instead of saying…an integral steel support messenger…

Issue: Correct Table (3), Optical fiber cable placement recommendations, as it is wrong.
Resolution: They removed the table as a whole and any reference to it.

Issue: Under Pressurization of Air Core Cables, add the critical monitoring system as a consideration where dry air pressure systems are deployed,
Resolution: They would add "monitoring system" to the list of considerations.

➢ **ACTION:** The TIA 758-B updated draft would now change from a "Mock" ballot and go out for a PN (still internal) ballot and be discussed at the February 2010, TR 42 Plenary meeting.

2. Next Meeting

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262

Confirm city, hotel, and schedule at www.tiaonline.org/news_events/calendar.cfm.

TIA TR 42.6
Administration
Jacksonville, FL, November 4, 2009

The TIA TR 42.6 committee has created the TIA 606-A standard for "Administration (Labeling) of Telecommunications Cabling." This third and last Plenary meeting of 2009 again covered the work done in ISO/IEC on "identifiers" and the status of the work on the 606 update, TIA 606-B.

Meeting Topics

1. ISO/IEC's Identifier Scheme Status
2. TIA 606-B
3. Next Meeting

1. ISO/IEC's Identifier Scheme Status

➢ **ACTIONS:**

1. The subcommittee unanimously agreed to defer work on TIA-606-B until the further development of ISO/IEC's identifier standard, TR 14763-2-1.
2. We will forward the results of ISO/IEC's mock ballot to the USTAG for consideration for incorporation in the US comments on the ISO/IEC document 14763-2-1.

What You Need to Know

The TIA 606-A-1 standard (Administration of Equipment Rooms and Data Center Computer Rooms) still seems to be okay for adoption into the ISO/IEC document, and if not, that would not work for this subcommittee.

2. TIA 606-B

➢ **ACTION:** The work on TIA 606-B (Administration/Labeling) was still deferred until the ISO/IEC identifier standard is further developed.

3. Next Meeting

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262

Confirm city, hotel, and schedule, at www.tiaonline.org/news_events/calendar.cfm.

TIA TR 42.8
Optical Fiber Cabling
Jacksonville, FL, November 3, 2009

The TIA TR 42.8 committee for "Telecommunications Optical Fiber Cabling Systems," provides research, testing, and presentations on optical fiber being used in performance standards. This committee has now developed the TIA-568-C.3 standard, "Optical Fiber Cabling Components" which is an update to the 568-B series published in June 2008 for optical fiber cable and components. This third and final Plenary meeting of 2009 again discussed whether TR 42.12 (Optical Fibers and Cables) and TR 42.8 (Optical Fiber Cabling Components) should merge, OM4 fiber, and the work on loss budgets.

Meeting Topics

1. Loss Budgets
2. TR 42.12 and 42.8 Merge Status
3. OM4 Fiber
4. Next Meeting

1. Loss Budgets

Discussion

- TIA 568-C.0 and C.3 do not agree on fiber loss budgets.
- They wanted to lower the loss budget per connector.

➢ **ACTION:** A Task Group was established to open the definition of loss budgets. It would define what this subcommittee wanted to do. This would all be reported on at the next TR 42 Plenary Meeting, November, 2010.

2. TR 42.12 and 42.8 Merge Status

➢ **ACTION:** After reviewing the consequences of a "merge", there was no support for reorganizing.

What You Need to Know

At the next Plenary Meeting (February 2010), the pros and cons of a merge will be presented along with other options.

3. OM4 Fiber

➢ **ACTION:** TIA-492AAAD, the OM4 fiber specification, has been approved for publication and by the end of this year it should be harmonized with ISO/IEC. Actual publication should be within a year.

4. Next Meeting

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262
Confirm city, hotel, and schedule at www.tiaonlineorg/news_events/calendar.cfm.

TIA TR 42.9
Industrial Building Cabling
Jacksonville, FL, November 4, 2009

The TR 42.9 subcommittee has developed the TIA 1005 standard for the industrial telecommunications infrastructure. This brought in new effects from noise, dust, distance, vibration, EMI, etc. This standard refers to cabling for industrial manufacturing—on the factory floor. During this third and final Plenary meeting of 2009, the subcommittee was given a presentation on POF with a list of standards that recognize 1mm POF, the "shared sheath" issue, and resolution of the ballot comments on updated TIA 1005, (TIA 1005-A), titled "Telecommunications Infrastructure Standard for Industrial Premises".

Meeting Topics

1. Plastic Optical Fiber (POF)
2. "Shared Sheath" Issue
3. TIA 1005-A Industrial Cabling Standard Changes
4. Next Meeting

1. Plastic Optical Fiber (POF)

The presentation was on Plastic Optical Fiber and the standards that recognized 1mm POF. The standards mentioned were the ISO/IEC 60793 and 60794 series, 24702, and an ODVA spec. Debate ensued over the legitimacy of POF and the attendees, at this point, still did not accept POF.

➢ **ACTION:** None taken; legitimacy of POF still in question.

What You Need to Know

The attendees still wanted clear substantiation that POF had been tested at 1mm for the specs listed for attenuation, bandwidth, chromatic dispersion, numerical aperture, etc. The presenter planned to bring this proof to the next TR 42.9 meeting.

2. "Shared Sheath" Issue

Since sharing Category 6A and other cables in the same sheath was an issue for industrial cabling, TR 42.9, they reviewed a presentation on "Mixing Category 6A Cables."

Essentially, TR 42.7, Copper Cabling Systems, was planning a TSB to address the concern of mixing Category 6A cables from different manufacturers within the same sheath or conduit. They said that they didn't believe it was a problem. The new TSB would be out soon and would be mostly shared sheath information.

➢ **ACTION:** Below is the write up TR 42.7 put together that immediately addressed the issue of shared pathways between Category 6A and lower cable categories:

Mixing category 6A UTP and other lower category cables within the same pathway is acceptable provided that the other lower category cables are not used for 10GBASE-T operation. The lower category cable may be used to support non-10GBASE-T applications such as 1000BASE-T,100BASE-TX, 10BASE-T, ATM, DSL, baseband video, RS 485, analog original telephony. For new installations, category 6A cables should be used for all 10GBASE-T and lower speed applications and category 6 or category 5e cables should be used for 1000BASE-T or lower speed applications.

3. TIA 1005-A Industrial Cabling Standard Changes

The update to the Industrial Cabling Standard (TIA 1005-A) reviewed the latest comments sent in. Many of the updates were to reference the appropriate TIA 568-C standard (C.0, C.1, C.2, or C.3) versus a general 568-C statement. Here are a few of the changes made:

Issue: Include Category 6A cable as a "recognized" cable because it offers significant advantages in transmission and EMC performance and should be recognized.
Resolution: For the time being, they would refer to ANSI/TIA-568-C.2 for 100-Ohm twisted-pair cable.

Issue: Add plastic polymer optical fiber and plastic polymer clad silica optical fiber to TIA-1005.
Resolution: This comment was NOT ACCEPTED and the polymer optical fiber and polymer clad silica optical fiber would not be added as "recognized cables."

What You Need to Know

There was much discussion about including POF, even though this had been a "Mock" ballot. The attendees felt it was premature to include POF at this time. These comments would be sent to a Task Group for whatever action should be taken.

Issue: Category 6A cabling offers significant advantages in transmission and EMC performance and should be recognized in the industrial premises cabling standard, 1005-A.
Resolution: When including Balanced Twisted Pair Cabling under Cabling Performance Requirements state that the installed Category 5e, Category 6, and Category 6A channels and permanent links ***shall*** meet the applicable performance requirements as

specified in ANSI/TIA-568-C.2 and the additional requirements of this Standard.
Issue: In the Section on Industrial Cabling Performance Requirements, for the Consolidation Point, make sure the sections you point to are correct.
Resolution: That part would be written to say that the consolidation point was an interconnection point within the horizontal cabling, as defined in ANSI/TIA-568-C.1, using ANSI/TIA-568-C.2 and ANSI/TIA-568-C.3 compliant connecting hardware in accordance with the requirements of the clause in 1005-A on the Telecommunications Outlet.

➢ **ACTION:** TIA 1005-A would now go out for a PN (internal) ballot.

4. Next Meeting

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262

Confirm city, hotel, and schedule at www.tiaonline.org/news_events/calendar.cfm.

TIA TR 42.16
Bonding and Grounding
Jacksonville, FL, November 2, 2009

TIA continues working on updating the Grounding and Bonding standard that exists now, ANSI/TIA/EIA-J-STD-607-A. This third and final Plenary meeting of 2009 covered the section of EMC for the upcoming 607-B.

Meeting Topics

1. EMC Contribution for TIA 607-B
2. Next Meeting

1. EMC Contribution for TIA 607-B

The current Grounding and Bonding Standard (ANSI J-STD-607-A) is being updated to 607-B. Following is part of a contribution that reviewed some of the latest EMI content.

Examples of Useful EMC-related Standards
EMC regulations are considered living documents and ALWAYS the latest versions of existing documents or even recently new documents should be sought out for proper utilization.

- United States: FCC Part 15, Subpart B
- Canada: ICES-001, ICES-003 and CS-03
- Regulated Telecom (USA): Telcordia GR-1089 CORE, Issue 4 (NEBS)
- IEEE: IEEE Std 1100TM-2005
- CENELEC: EN 50310
- ITU: ITU-K.27, 1996
- IEC 60950 series, Information technology equipment -Safety
- IEC TR 61000-5-2. Electromagnetic compatibility (EMC) - Part 5-2: Installation and mitigation guidelines - Section 2: Earthing and cabling
- IEC 61000-6-1, Electromagnetic compatibility (EMC) - Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments
- IEC 61000-6-2, Electromagnetic compatibility (EMC) - Part 6-2: Generic standards – Immunity for industrial environments
- IEC 61000-6-3, Electromagnetic compatibility (EMC) - Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments
- IEC 61000-6-4, Electromagnetic compatibility (EMC) - Part 6-4: Generic standards – Emission standard for heavy industrial environments

A Description of EMC was also written up:
EMC encompasses almost all equipment powered by electrical supplies. Radio communications, digital systems, and fast processors have required EMC to become a mandatory discipline for modern designs. Typically, digital devices can be upset or damaged by overvoltages and overcurrents from surges, fast transients, ESD and high power RF. Immunity for a digital circuit depends upon its noise margin whereby even continuous EMI to the threshold level is ignored by the circuit and only transient events are a problem. Where the noise margin is exceeded, a variety of malfunctions can be noticed:

- Errors in data links
- Errors in communications and control links
- Malfunction of software.

➢ **ACTION:** The Editor would update 607-B (to become Draft 1.0) and send it out as a PN (internal/committee) ballot for review at the next TR 42 Plenary meeting, February 2010.

2. Next Meeting

Week of February 1-5, 2010

Hyatt Regency Palm Springs
Palm Springs, CA 92262

Confirm city, hotel, and schedule at www.tiaonline.org/news_events/calendar.cfm.

IEEE 802

IEEE, the Institute of Electrical and Electronics Engineers, Inc., is a not-for-profit association that publishes technical documents, holds conferences, and develops standards. IEEE 802 is the LAN/MAN Standards Committee for Layers 1 and 2 of the OSI (Open System Interconnection) reference model.

Layer 1 is the physical layer (hardware including cabling) that applies to the LAN (Local Area Network) defined as a campus, and MAN (Metropolitan Area Network) for intracity networking. Light or radio signals are conveyed through the network at the electrical and mechanical level. It consists of the electromagnetic and physical aspects of a device, a transmission medium (the cable), and the interface between them (connectors or NICs [network interface cards]). The PHY refers to anything relating to hardware (cables, connectors, cards) that is enabled to send and receive data.

Layer 2 is the Data Link Layer where data packets become bits and carry transmission protocol information to 1) handle errors in the physical layer; 2) provide flow control, and 3) provide frame synchronization. This data link layer is made up of two sublayers—the Media Access Control (MAC) layer and the Logical Link Control (LLC) layer. That MAC sublayer controls how we access data and gives permission for its transmission. The LLC layer controls frame synchronization, flow control and error checking.

The other five layers of the OSI model are Layer 3, the Network Layer (where switching and routing is provided and logical paths [virtual circuits] are created that send data from node to node); Layer 4, the Transport Layer (where data is transferred [transparently] between systems/hosts and end-to-end error recovery and flow control is performed); Layer 5, the Session Layer (where connections between applications are managed); Layer 6, the Presentation Layer (where data is transformed into the form that the application layer can accept when that data is different;) and, Layer 7, the Application Layer (where application and end-user processes are supported—everything at this layer is application specific).

IEEE 802.3—ETHERNET

IEEE 802.3 is referred to as the Ethernet standard (an application). This includes projects for 1 gigabit Ethernet transmission (1000 Mbps) over both fiber (802.3z-1998) and copper (802.3ab-1999). The standard for DTE (Data Terminal Equipment) power over Ethernet (802.3af-2003) has been completed and published; so has Ethernet in the First Mile (802.3ah-2004); the standard for 10 gigabit Ethernet over coaxial cable (802.3ak-2004), and the standard for 10 gigabit Ethernet over fiber (802.3ae-2003) have also been published. Just recently the Power over Ethernet Plus (802.3at), and the 10 Gigabits per second EPON (Ethernet Passive Optical Network) (802.3av) applications were approved for publication. The Energy Efficient Ethernet (802.3az) application and the work of the Higher Speed Study Group (802.3ba) are still planning a 2010 approval.

Current Phy-Related Work Items

802.3at Power via MDI Enhancements

The IEEE 802.3at is evaluating the requirements for the next generation of Ethernet technology at 40 and 100 Gbps.

Status

- The work of the P802.3at DTE Power Enhancements Task Force is now complete with the approval of IEEE Std 802.3at-2009 and IEEE Std 802.3bc-2009 (Ethernet Organizationally Specific type, length, values (TLVs).
- IEEE Std 802.3at-2009 and IEEE Std 802.3bc-2009 are available from IEEE.

802.3az Energy Efficient Ethernet

This work will define a mechanism to reduce power consumption during periods of low link utilization. This is primarily equipment related.

Goals:

- Define a mechanism to reduce power consumption during periods of low link utilization for the following PHYs
  - 100BASE-TX (Full Duplex) (Fast Ethernet)
  - 1000BASE-T (Full Duplex) (Gigabit Ethernet)
  - 10GBASE-T (10 Gigabit Ethernet)
  - 1000BASE-KX (1 Gigabit backplane, added in July 2008)
  - 10GBASE-KR (10 Gbps serial backplane connectivity)
  - 10GBASE-KX4 (10 Gbps over 4 lanes for backplane connectivity)

Current Objectives

- Define a 10 megabit PHY with a reduced transmit amplitude requirement such that it shall be fully interoperable with legacy 10BASE-T PHYs over 100 m of Class D (Category 5) or better cabling to enable reduced power implementations.
- Any new twisted-pair and/or backplane PHY for EEE (Energy Efficient Ethernet) shall include legacy compatible auto negotiation

Status

- Next Meeting the January Interim Meeting, 1/25-29/09, New Orleans, LA
- Standard expected in September, 2010.

802.3av 10Gbps EPON (Ethernet Passive Optical Networks)

This is to support subscriber access networks using point-to-multipoint topologies on optical fiber.

Status

- The work of the IEEE P802.3av 10G-EPON Task Force is now complete with the approval of IEEE Standard 802.3avTM-2009 at the September 2009 IEEE-SA Standards Board meeting.
- IEEE Standard 802.3av-2009 is available from the IEEE.

802.3ba Higher Speed Ethernet

The IEEE 802.3 working group formed the Higher Speed Ethernet Task Force to evaluate the requirements for the next generation of Ethernet technology at 40 Gbps and 100 Gbps.

Status

After the IEEE 802.3ba Task Force Plenary Meeting, Nov 17 - 19, 2009, in Atlanta, Georgia:

- After this Plenary review, the IEEE P802.3ba editorial team would generate Draft 3.0, based on Draft 2.3 and the resolution of comments against Draft 2.3.
- Most comments were rejected, withdrawn, or editorial.
- The document TIA-492AAAD (for OM4 fiber) was published by TIA as of Oct, 2009, so the Note to follow its progress was removed.
- The LMSC Executive Committee approved Draft 3.0 for a Sponsor Ballot.
- Approval of standard is still expected in June 2010.
- Original goals
  1. Provide Physical Layer specifications which support 40 Gbps operation over:
     - at least 10km on SMF
     - at least 100m on OM3 MMF
     - at least 10m over a copper cable assembly
     - at least 1m over a backplane
  2. Provide Physical Layer specifications which support 100 Gbps operation over:
     - at least 40km on SMF
     - at least 10km on SMF
     - at least 100m on OM3 MMF
     - at least 10m over a copper cable assembly
- Added goal: Copper cable assembly objective changed to 7m.

Call for Interest

At the November 2009 Plenary meeting there was a Call for Interest for "40 GBPS Ethernet single-mode."

Cabling-Related Standards Published or Approved for Publication, as of November, 2009

TIA Standards

TIA 568-C.0	Generic Telecommunications Cabling for Customer Premises (2/09)
TIA 568-C.1	Telecommunications Cabling Standard (2/09)
TIA 568-C.2	Balanced Twisted Pair Telecommunications Cabling and Components (8/09)
	Includes TIA-568-B.2 Erratum, Corrected Beginning/End of Channel, Figure 11
	Includes TIA 568-B.2, AD 1, Transmission Performance Specs for 4-pair 100 Ohm Category 6 Cabling
	Includes TIA 568-B.2, AD 2, Balanced Twisted Pair Cabling Components
	Includes TIA-568-B.2, AD 3, Additional Considerations for Insertion Loss and Return Loss Pass/Fail Determination (3 dB Rule)
	Includes TIA 568-B.2, AD 4, Solderless Connection Reliability Requirements for Copper Connecting Hardware
	Includes TIA-568-B.2, AD 5, Corrections to TIA-568-B.2
	Includes TIA 568-B.2, AD 6, Category 6 Related Test Procedures
	Includes TIA 568-B.2, AD 7, Reliability Requirements for RJ-45 Connecting Hardware
	Includes TIA 568-B.2, AD 8, Additional Component Requirements for DTE Power
	Includes TIA 568-B.2, AD 9, Additional Category 6 Balance Requirements and Measurement Procedures
	Includes TIA 568-B.2, AD 10, "Augmented" Category 6 Cabling
	Includes TIA 568-B.2, AD 11, Specification for Increased Diameter of 4-Pair UTP and ScTP Cables
TIA 568-C.3	Optical Fiber Cabling Components (6/08)
TIA 569-B	Commercial Building Telecommunications Pathways and Spaces, 2004 (TIA standard only)
TIA 569-B, AD1	Temperature and Humidity Requirements for Telecommunications Spaces
TIA 570-B	Residential Telecommunications Cabling, 2009 (Reaffirmed/approved)
TIA 570-B, AD1	Additional Requirements for Broadband Coax Cabling (in the data center)
TIA 606	Administration Standard for Commercial Telecommunications Infrastructure, 2002
ANSI/TIA/EIA-J-STD-607	Commercial Building Grounding (Earthing) & Bonding
TIA 758	Customer Owned Outside Plant Telecom Cabling (5/04)
TIA 862	Building Automation Systems Standard (reaffirmed)
TIA 942	Telecommunications Infrastructure Standard for Data Centers (4/05)
TIA 942, AD1	Data Center Coaxial Cabling Specifications & Application Distances (3/08)
TIA 942, AD2	Additional Media and Guidelines for Data Centers (8/09)
TIA 492-AAAC	Detailed Spec for OM3 Fiber
TIA 492-AAAD	Detailed Spec for OM4 Fiber
TIA 1005	Telecommunications Industrial Infrastructure Cabling
TIA 1152	Requirements for Field Test Equipment (8/09)
TIA TSB 155	Guidance for Field Testing Installed Cabling for 10GBASE-T
TIA TSB 162	Telecom Cabling Guidelines for Wireless Access Points (2006)
TIA TSB 184	Guidelines for Supporting Power Delivery over Balanced Twisted-Pair Cabling (Approved 8/09)
TIA TSB 185	MICE Tutorial (approved for publication)

IEEE 802.3 "x" Standards (Wired)

IEEE 802.3-2008	Ethernet Standard, updated

Approved/Published Applications:

IEEE 802.3at-2009	DTE Power Enhancements (for 24 watts)
IEEE 802.3av-2009	10Gbps PHY for EPON (project approved 9/09)
IEEE 802.3ap-2007	Backplane Ethernet
IEEE 802.3an-2006	10 Gbps Ethernet over Copper
IEEE 802.3aq-2006	10GBASE-LRM
IEEE 802.3as-2006	Frame Expansion
IEEE 802.3ak-2004	10GBASE-CX4, Ethernet over Twinaxial Cable
IEEE 802.3ah-2004	Ethernet in the First Mile
IEEE 802.3af-2003	DTE Power via MDI
IEEE 802.3ae-2002	10 Gbps PHY (over fiber)
IEEE 802.3z-1991	1000BASE-X Gbps Ethernet over Fiber at 1 Gbps (125 MB/s)

Cabling-Related Standards in Progress as of November 2009

TIA Standards (Under Development)

TIA 568-C-1.1, AD1	for Commercial Building Pathways and Spaces (out for an internal (PN) ballot)
TIA 568-C.4	Coaxial Cabling (out for an internal (PN) ballot)
TIA 568-C.0 and C.1	Report on possible Addendum due 2/2010
TIA 568-C.0, AD1	for Connectivity Method C Array Polarity System for Parallel Signals (PINS/PAR approved 11/09)
TIA 568-C.2, AD1	kept open for future work TBD
TIA 569-C	Pathways and Spaces (new update/revision work started) (out for an internal (PN) ballot)
TIA 570-B, AD1	Additional Requirements for Broadband Coax Cabling (still collecting input)
TIA 590-A	Outside Fiber Cable Plant Installation (to be merged into TIA 758-B)

TIA 606, AD1	Administration of Equipment Rooms and Data Center Computer Rooms (out for Mock ballot to U.S. TAG)
TIA 606-A	Update to 606-A, Administration Standard Telecommunications Infrastructure (work on this still deferred until ISO/IEC decision)
TIA 607-B	Update to Grounding & Bonding (out for an internal (PN) ballot)
TIA 758-A	Update to Outside Plant (out for an internal (PN) ballot)
TIA 862-A	Update to Building Automation Systems Cabling (out for another public (SP) ballot)
TIA 942-A	Update to Telecommunications Infrastructure Standard for Data Centers (Mock ballot going out)
TIA 1005, AD1	Industrial Pathways and Spaces (Approved by TR 42.3, Pathways and Spaces and 42.9, Industrial Building Cabling to be published as Addendum 1, later to be merged into TIA 1005-A.)
TIA 1005-A	Update to Telecommunications Industrial Infrastructure Cabling (out for an internal (PN) ballot)
TIA 1005-A-"X"	(1st Addendum to be on POF—held off until POF distance approved)
TIA 1179	Healthcare Facilities Telecommunications Cabling Standard (out for an SP (public) ballot)
TSB "X"	Balunless Test Methods and Fixtures for Network Analyzer Measurements of Four-Pair Passive Device Parameters (PAR approved 8/09)
TSB "X"	Guidelines on Shared Pathways and Shared Sheaths (PAR approved 11/09 and Task Group started)
TSB 155-A	Update to Guidelines for the Assessment and Mitigation of Installed Category 6 Cabling to Support 10GBASE-T (out for an internal (PN) ballot)

IEEE 802.3 Ongoing Standards Work (Wired)

IEEE 802.3az	Energy Efficient Ethernet Task Force
IEEE 802.3ba	Higher Speed Task Force (100 Gbps; 40 Gbps)

Glossary of Acronyms

10GBASE-T	10 Gigabit Ethernet
40GBASE-SR4	4 Transmit/ 4 Receive parallel lanes over 4 + 4 OM3 parallel fibers connected to a high density SFF
40GBASE-SR10	10 Transmit/ 4 Receive parallel lanes over 10 + 10 OM3 parallel fibers connected to a high density SFF
100GBASE-SR10	100 Gbps over 10 lanes of, short reach, multimode fiber
1000BASE-T	Full Duplex, Gigabit Ethernet
ACRF	Attenuation to Crosstalk Ratio, Far End
AD1	Addendum 1
ANSI/J-STD	American National Standards Institute/Joint-Standard
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ATM	Asynchronous Transfer Mode
BAS	Building Automation System
BBOSP	Broadband Outside Plant (cable)
BICSI	BICSI
BN	Bonding Network
C	Centigrade
CATV	Cable TV
CD	Committee Draft (in ISO/IEC)
CEA	Consumer Electronics Association
CEDIA	Custom Electronic Design & Installation Association
CER	Common Equipment Room
CLEC	Competitive Local Exchange Carrier
CITG	Cabling Implementation Task Group
CP	Connection/Consolidation Point
dB	Decibel
DSL	Digital Subscriber Line
DTE	Data Terminal Equipment
EF	Entrance Facililty
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EO	Equipment Outlet
ER	Equipment Room
F	Fahrenheit
ft	foot
ftp	File Transfer Protocol
FO	Fiber Optic
Gbps	Gigabits per second
GHz	Gigahertz
HC	Horizontal Cross-Connect
HVAC	Heating, Ventilation and Air Conditioning
IEC	Internationale Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IHS	Information Handling Services (includes Global Engineering Documents)
ILEC	Incumbent Local Exchange Carrier
IP	Internet Protocol
ISO	International Standards Organization
JSIG	Joint Special Interest Group
km	kilometer
LMSC	LAN/MAN Standards Committee
m	meter
mm	millimeter
MDI	Media Dependent Interface
MH	Manhole
MHz	Megahertz
MICE	Classifications for Mechanical, Ingress, Climatic/ Chemical, and EMI Environments
MMF	Multimode Fiber
MOST	Media Oriented Systems Transport protocol
MPO	Multi-user Fiber Push On (connector)
MUTOA	Multi-User Telecommunications Outlet Assembly
NEC	National Electrical Code
NECA	National Electrical Contractor's Assoc.
nm	nanometer
ODVA	Open DeviceNet Vendor's Association
OM3	Laser-optimized 50 micron fibers with 2000 MHz.km EMB at 850 nm
OM4	850nm Laser Optimized 50 micron multimode fiber (a higher bandwidth fiber)
OSP	Outside Plant
PAR	Project Authorization Request
PHY	Physical Layer
PN	Project Number
POF	Plastic Optical Fiber
PON	Passive Optical Network
PT-PT	Point to Point
RGB	Re Grounding or a MESH-BN
RH	Relative Humidity
SCTE	Society of Cable and Telecommunications Engineers
SC25	Subcommittee 25 (within IEC)
SC65/JWG10	Subcommittee 65/Joint Work Group 10 (within IEC)
SFF	Small Form Factor
SMF	Single-mode Fiber
SP	Special Project
TE	Telecommunications Enclosure
TEBC	Telecom Equipment Bonding Conductor
TGB	Telecommunications Grounding Busbar
TIA	Telecommunications Industry Association
TO	Telecommunications Outlet
TMGB	Telecommunications Main Grounding Busbar
TR (- xx)	Acronym for a TIA Engineering Committee/ Subcommittee
TR	Telecommunications Room
TSB	Telecommunications Services Bulletin (guidelines only)
UG cable	Underground Coax Cable
µm	micron
UPS	Uninterruptable Power Supply
UTP	Unshielded Twisted Pair
US TAG	U.S. Technical Advisory Group (to ISO/IEC)
VAC	Voltage Alternating Current
WA	Work Area
WAN	Wide Area Network
WAP	Wireless Access Point
WG3	Working Group 3