
NGEAB-T Use Case ad hoc

February 6, 2015

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Agenda

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(1) Review patent policy

(2) Review contributions

- NGEAB-T Use Case Ad Hoc.pdf – Chris DiMinico, MC Communications/Panduit**
- UseCasesMoffitt.ppt – Brian Moffitt, Commsope**

(3) Action items

Participants, Patents, and Duty to Inform

All participants in this meeting have certain obligations under the IEEE-SA Patent Policy.

- Participants [Note: Quoted text excerpted from IEEE-SA Standards Board Bylaws subclause 6.2]:
 - “Shall inform the IEEE (or cause the IEEE to be informed)” of the identity of each “holder of any potential Essential Patent Claims of which they are personally aware” if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents
 - “Personal awareness” means that the participant “is personally aware that the holder may have a potential Essential Patent Claim,” even if the participant is not personally aware of the specific patents or patent claims
 - “Should inform the IEEE (or cause the IEEE to be informed)” of the identity of “any other holders of such potential Essential Patent Claims” (that is, third parties that are not affiliated with the participant, with the participant’s employer, or with anyone else that the participant is from or otherwise represents)
- The above does not apply if the patent claim is already the subject of an Accepted Letter of Assurance that applies to the proposed standard(s) under consideration by this group
- Early identification of holders of potential Essential Patent Claims is strongly encouraged
- No duty to perform a patent search

▲ ———

Call for Potentially Essential Patents

- If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance:
 - Either speak up now or
 - Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible or
 - Cause an LOA to be submitted

Patent Related Links

All participants should be familiar with their obligations under the IEEE-SA Policies & Procedures for standards development.

Patent Policy is stated in these sources:

IEEE-SA Standards Boards Bylaws

<http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6>

IEEE-SA Standards Board Operations Manual

<http://standards.ieee.org/develop/policies/opman/sect6.html#6.3>

Material about the patent policy is available at

<http://standards.ieee.org/about/sasb/patcom/materials.html>

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at patcom@ieee.org or visit <http://standards.ieee.org/about/sasb/patcom/index.html>

This slide set is available at <https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.ppt>

Background

Motion #16:

- Move that the Next Generation Enterprise Access BASE-T PHY Study Group define use cases and deployment configurations for 2.5 and 5 Gb/s PHY operation in the enterprise environment.

M: Chris DiMinico S: George Zimmerman

Y: 37 N: 0 A: 1 Technical (>= 75%)

Motion Passes

Y: 37 N: 0 A: 1 Technical (>= rma75%)

Motion Passes

Motion #17:

Move that the Next Generation Enterprise Access BASE-T PHY Study Group adopt the objectives.

- Define a 2.5 Gb/s PHY for operation over
 - Up to at least 100m on four-pair Class D (Cat5e) balanced copper cabling on defined use cases and deployment configurations
- Define a 5 Gb/s PHY for operation over
 - Up to at least 100m on Class E (Cat6) balanced copper cabling on defined use cases and deployment configurations
 - Up to 100m on Class D (Cat5e) balanced copper cabling on defined use cases and deployment configurations

M: Chris DiMinico S: Richard Mei

Y: 33 N: 1 A: 3 Technical (>= 75%)

Motion Passes

Mr. Chalupsky announced the formation of the Use Case ad hoc, with the charter of defining use cases and deployment configurations for 2.5 and 5 Gb/s PHY operation in the enterprise environment and has appointed Chris DiMinico as the ad hoc chair.

Mr. Chalupsky announced the formation of the “Impulse noise and use case analysis” ad hoc and has appointed German Feyh as the ad hoc chair. Charter of this ad hoc is to recommend electrical specifications for the project based upon 1) analysis of enterprise noise sources (such as impulse noise) and 2) evaluation of the results of the Use Case ad hoc.

Source: http://www.ieee802.org/3/NGEBASET/public/jan15/Unconfirmed_minutes_NGEAGBT_0115.pdf

NGEAB-T Use case ad hoc

Next Generation Enterprise Access BASE-T PHY Study Group

Next Generation Enterprise Access BASE-T PHY Objectives

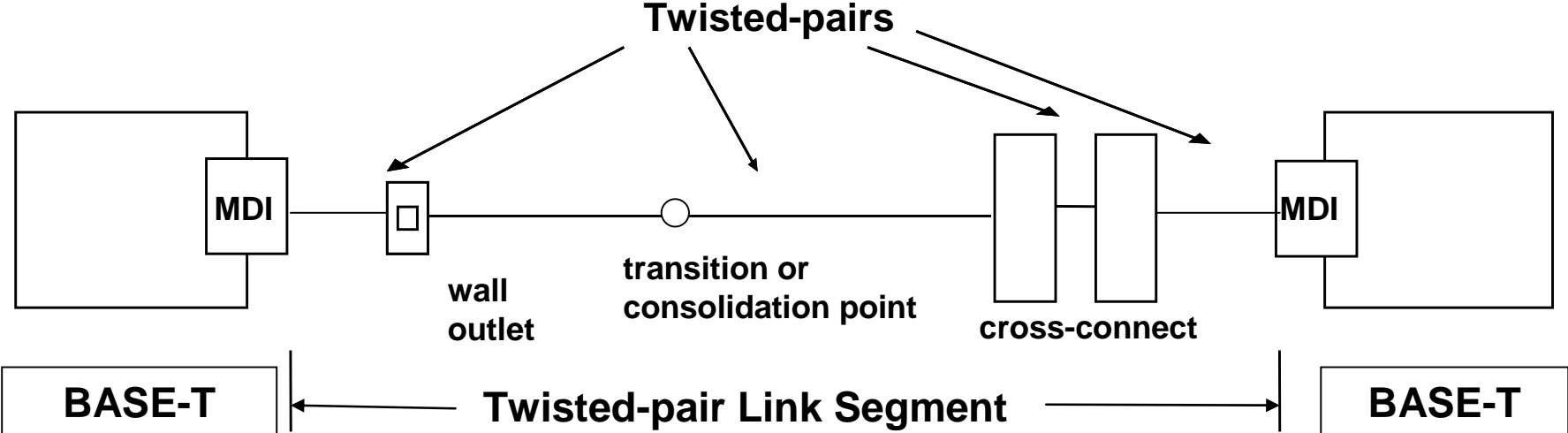
- Support full duplex operation only
- Preserve the 802.3 / Ethernet frame format utilizing the 802.3 MAC
- Preserve minimum and maximum Frame Size of current 802.3 standard
- Support Auto-Negotiation (Clause 28)
- Support optional Energy Efficient Ethernet (Clause 78)
- Support local area networks using point-to-point links over structured cabling topologies
- Do not preclude meeting FCC and CISPR EMC requirements
- Support PoE (Clause 33)
 - including amendments made by 802.3bt “DTE Power via MDI over 4-Pair Task Force”
- Support MAC data rates of 2.5 Gb/s and 5 Gb/s
- Support a BER better than or equal to 10^{-12} at the MAC/PLS service interface (or the frame loss ratio equivalent)
- Select copper media from ISO/IEC 11801:2002, with any appropriate augmentation to be developed through work of 802.3 in conjunction with SC25/WG3 and TIA TR42
- Define a 2.5 Gb/s PHY for operation over
 - Up to at least 100m on four-pair Class D (Cat5e) balanced copper cabling on defined use cases and deployment configurations
- Define a 5 Gb/s PHY for operation over
 - Up to at least 100m on Class E (Cat6) balanced copper cabling on defined use cases and deployment configurations
 - Up to 100m on Class D (Cat5e) balanced copper cabling on defined use cases and deployment configurations

Adopted by SG January 15

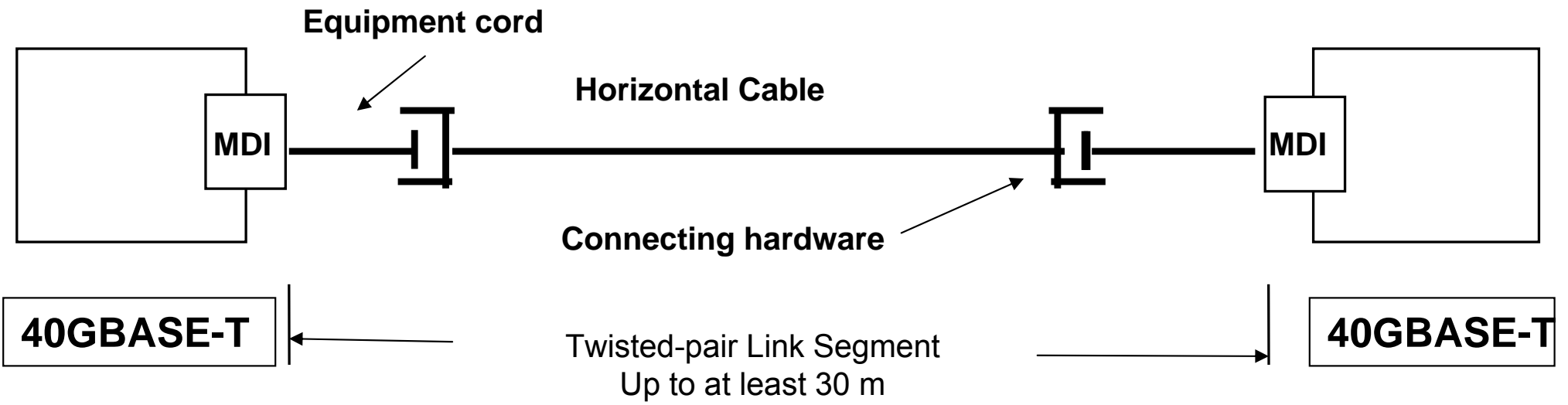
Scope

- **Use Case ad hoc chartered to define use cases and deployment configurations for 2.5 and 5 Gb/s PHY operation in the enterprise environment.**
- **Use cases defined to develop deployment configurations and characterize noise environment.**
- **Deployment configurations needed to develop link segment characteristics.**
- **Use cases and link segment characteristics for purpose of PHY modeling.**

IEEE 802.3 Twisted-Pair Link Segment

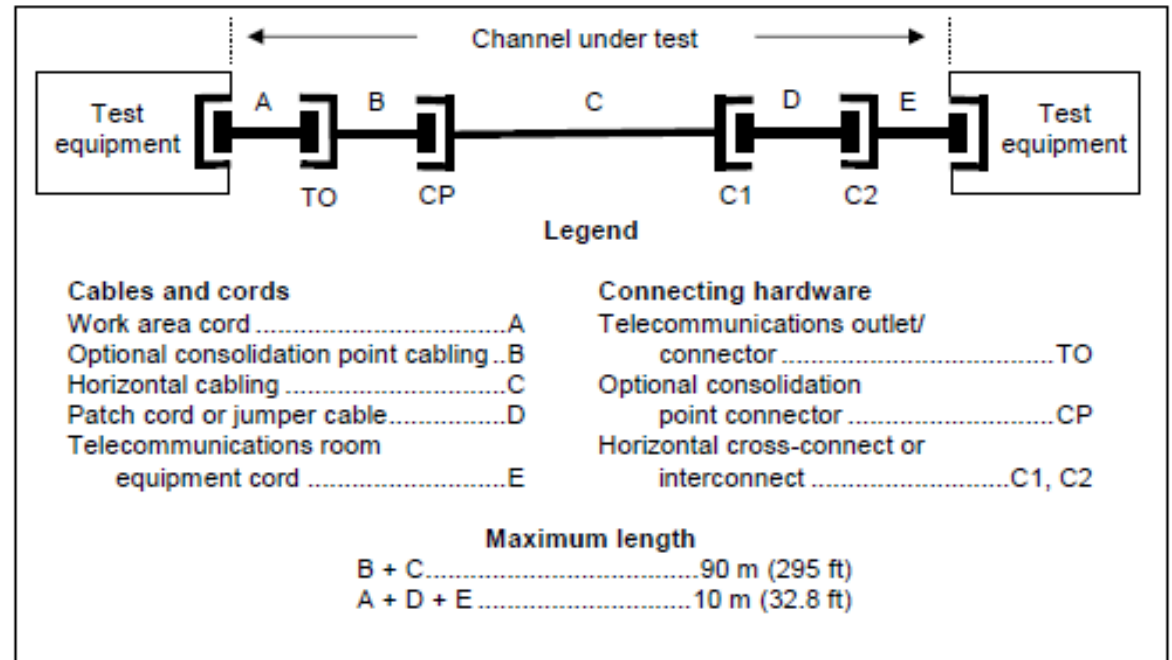


10BASE-T/100BASE-T/1000BASE-T/10GBASE-T

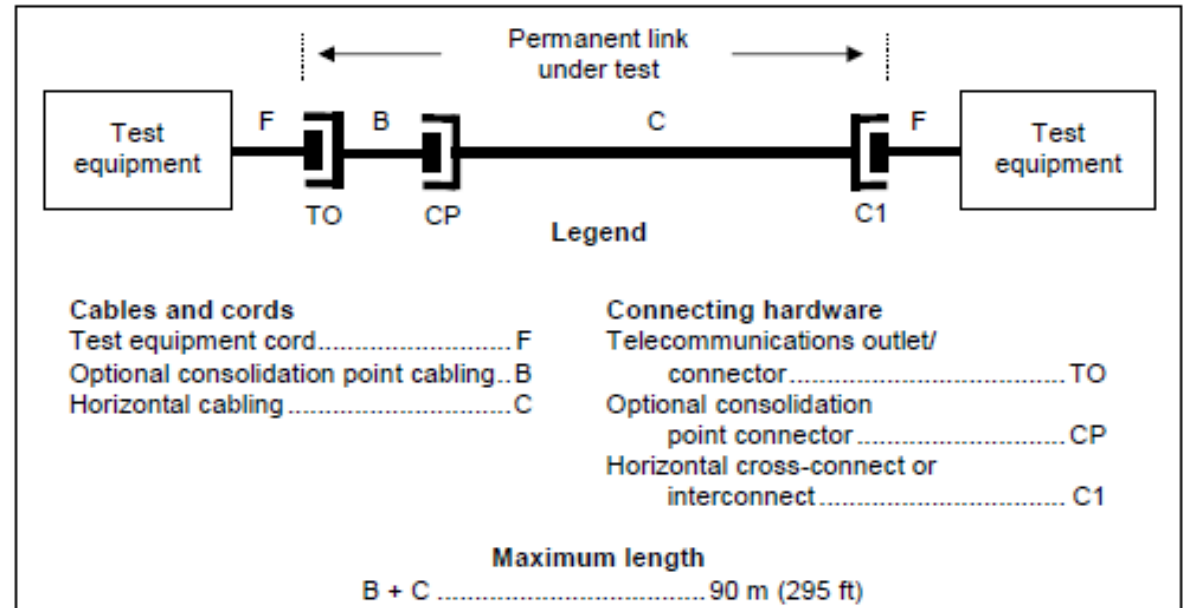


Channel and Permanent Link

- Channel test configuration to emulate IEEE link segments enabling IEEE to reference cabling standards .



- Channel and permanent link transmission requirements developed from cables, cords, and connecting hardware transmission requirements

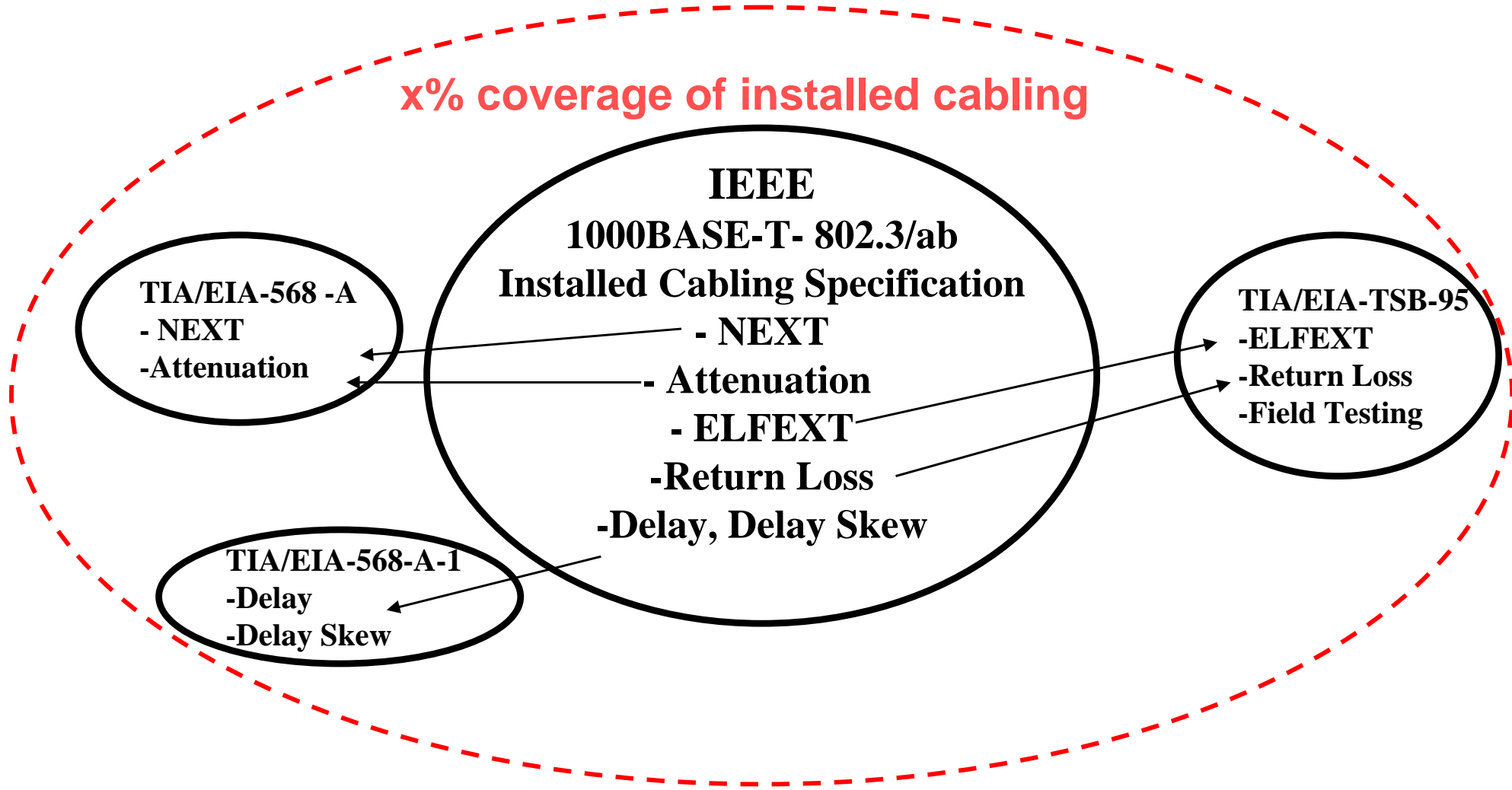


Deployment configurations

- Define a 2.5 Gb/s PHY for operation over
 - Up to at least 100m on four-pair Class D (Cat5e) balanced copper cabling on defined use cases and deployment configurations
 - Define a 5 Gb/s PHY for operation over
 - Up to at least 100m on Class E (Cat6) balanced copper cabling on defined (2) use cases and deployment configurations
 - Up to 100m on Class D (Cat5e) balanced copper cabling on defined use cases and deployment configurations
- 1) Use cases and deployment configurations for 2.5 Gb/s PHY for operation over
 - Up to at least 100m on four-pair Class D (Cat5e) balanced copper cabling
 - 2) Use cases and deployment configurations for a 5 Gb/s PHY for operation over
 - Up to at least 100m on Class E (Cat6) balanced copper cabling
 - 3) Use cases and deployment configurations for a 5 Gb/s PHY for operation over
 - Up to 100m on Class D (Cat5e) balanced copper cabling
- Use case based deployment configurations not required for PHYs demonstrating operation over “worse case” cabling configurations.

1000BASE-T Link Specifications - Minimum Requirements

Cabling Installed to TIA/EIA-568-A with additional parameters as specified in Addendum and proposed TIA/EIA-Technical System Bulletin



1000BASE-T Link Specifications

When Installing 1000BASE-T Links

100% coverage using specified cabling

TIA/EIA-568 -A
-Attenuation

IEEE
1000BASE-T- 802.3/ab
Installed Cabling Specification

- NEXT (worst pair)
- Attenuation
- ELFEXT (power sum)
- Return Loss
- Delay, Delay Skew
- ANEXT

Category 5e

TIA/EIA-TIA/EIA-568-A-5
-NEXT (worst pair, power sum)
-ELFEXT (worst pair, power sum)
-Return Loss
-Field Testing

TIA/EIA-568-A-1
-Delay
-Delay Skew

10GBASE-T coverage dependencies

- **Analysis assumptions**
 - worst case measurements
 - worst case measurements scaled
 - assumption that all worst case impairments occur simultaneously
- **Number and Category of connectors**
- **Distances**
- **ANEXT and mitigation**

10GBASE-T – 802.3an

- Deployment configurations

Table 55–12 lists the supported cabling types and distances.

Table 55–12— Cabling types and distances

Cabling	Supported link segment distances	Cabling references
Class E / Category 6	55 m to 100 m ^a	ISO/IEC TR-24750 / TIA/EIA TSB-155
Class E / Category 6: unshielded	55 m	ISO/IEC TR-24750 / TIA/EIA TSB-155
Class E / Category 6: shielded	100 m	ISO/IEC TR-24750 / TIA/EIA TSB-155
Class F	100 m	ISO/IEC TR-24750
Class E _A / Augmented Category 6	100 m	ISO/IEC 11801 Ed 2.1 / TIA/EIA-568-B.2-10

^aSupported link segments up to 100 m shall meet the alien crosstalk to insertion loss requirements specified in 55.7.3.1.2 and 55.7.3.2.2.

10GBASE-T – 802.3an – Annex 55B

- Additional cabling design guidelines for 10GBASE-T
- This annex provides additional cabling guidelines for 10GBASE-T deployment on balanced copper cabling systems as specified in 55.7. These guidelines are intended to supplement those in Clause 55.

55B.1.1 Alien crosstalk mitigation

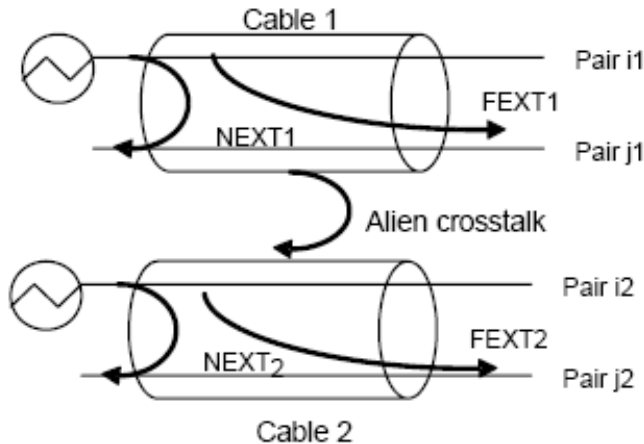


Figure 55B-1—Alien crosstalk coupling between link segments

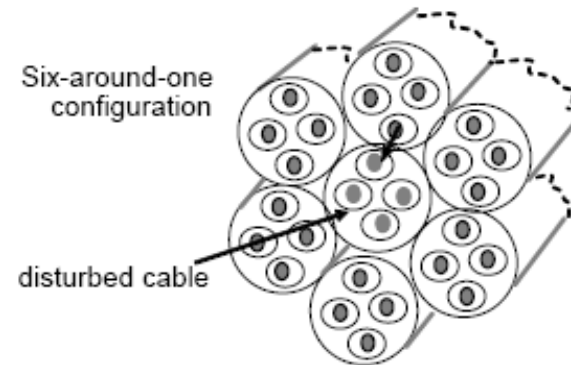


Figure 55B-2—Six-around-one cable configuration

10GBASE-T – 802.3an – Annex 55B

55B.1.2 Alien crosstalk mitigation procedure

This annex provides procedures and cabling guidelines designed to mitigate the alien crosstalk in the event that the alien crosstalk transmission parameters given in 55.7 are not met. For more information on mitigation techniques, see ANSI/TIA-TSB-155 and ISO/IEC TR24750.

The mitigation actions outlined below are based on four connector channels. In the majority of initially non-compliant cases, fewer than all corrective actions are required. Select the option(s) that is most appropriate for your situation.

- When selective deployment of 10GBASE-T is possible, non-adjacent patch panel positions in the equipment room should be used. The adjacent positions may be used for other applications.
- Reduce the number of co-located connectors by implementing an interconnect configuration to attach equipment to the horizontal cabling rather than a cross-connect. In general, connectors and cordage in the work area are not co-located.
- Reduce the alien crosstalk coupling in the first 5 m to 20 m of the horizontal cabling by separating the equipment cords and the patch cords and un-bundling the horizontal cabling: in the case of a telecommunications room un-bundle the cabling to the point it exits the telecommunications room. A significant portion of the ANEXT coupling occurs in less than the first 20 m of cabling.
- An alternative to separating equipment cords is to utilize equipment cords sufficiently specified to mitigate the alien crosstalk coupling.
- Replace connectors with Augmented Category 6/Class E_A.

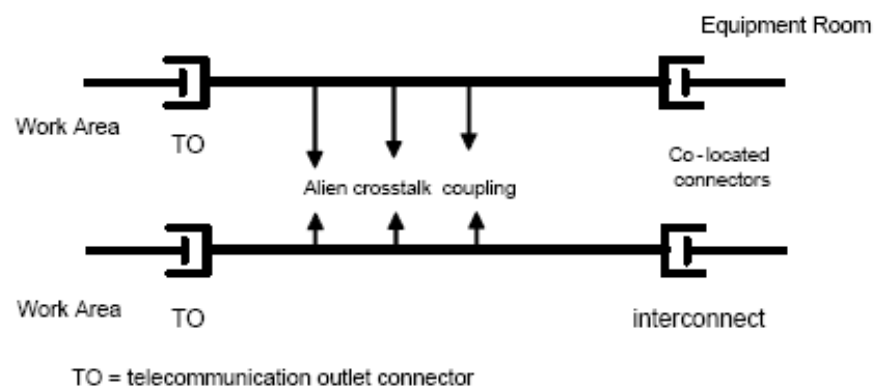


Figure 55B-4—Minimum horizontal cabling configuration

Deployment configurations

TSB-155 Distances

TSB-155 provides additional guidelines for 10GBASE-T supported distances that recognize harsh alien crosstalk environments such as the use of kellum grips in riser applications. The kellum grip provides a method of securing cable bundles in the riser space between floors as illustrated in figure 14. The cables are bound tightly by the grip. The kellum grip can increase the alien crosstalk coupling compared to other methods of binding the cables such as tie-wraps.

For cabling configurations in harsh alien crosstalk environments such as those utilizing kellum grips, TSB-155 states 10GBASE-T operational channel lengths of up to 37 meters over Category 6 cabling.

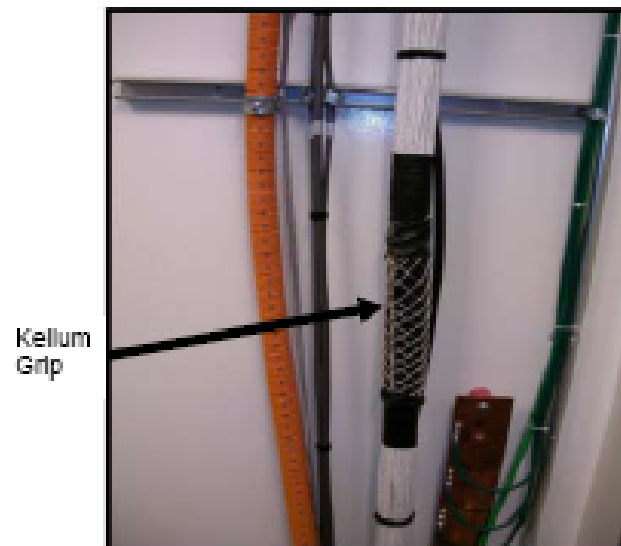


Figure 16 - Kellum Grip, Vertical Cable Bundle Support

Source: http://www.ethernetalliance.org/wp-content/uploads/2011/10/static_page_files_127_10GBASE_T2.pdf

TIA/TSB-162-A – Cabling Guidelines WAPs

- Consider cabling guidelines as basis for cabling deployment configurations for WAPs
- Review with system OEMs as framework for use cases