
NGEAB-T Use Cases

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Scope

- **Next Generation Enterprise Access BASE-T PHY Study Group 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.**

Next Generation Enterprise Access BASE-T PHY Study Group

Next Generation Enterprise Access BASE-T PHY Objectives

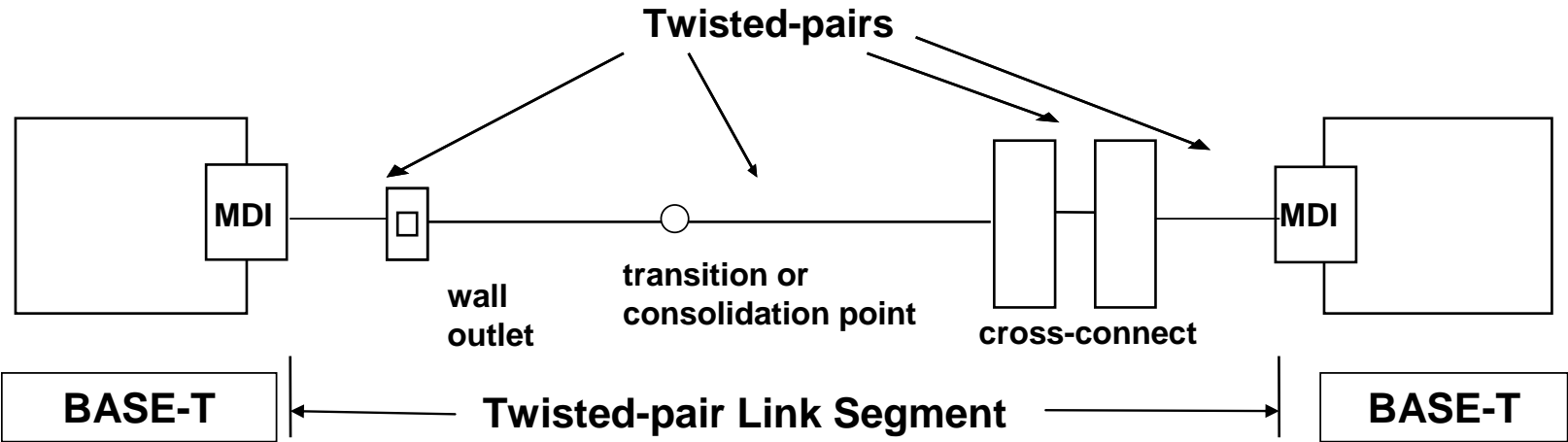
- Support full duplex operation only
 - Preserve the 802.3 / Ethernet frame format utilizing the 802.3 MAC
 - Preserve minimum and maximum Frame Size of current 802.3 standard
 - Support Auto-Negotiation (Clause 28)
 - Support optional Energy Efficient Ethernet (Clause 78)
 - Support local area networks 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

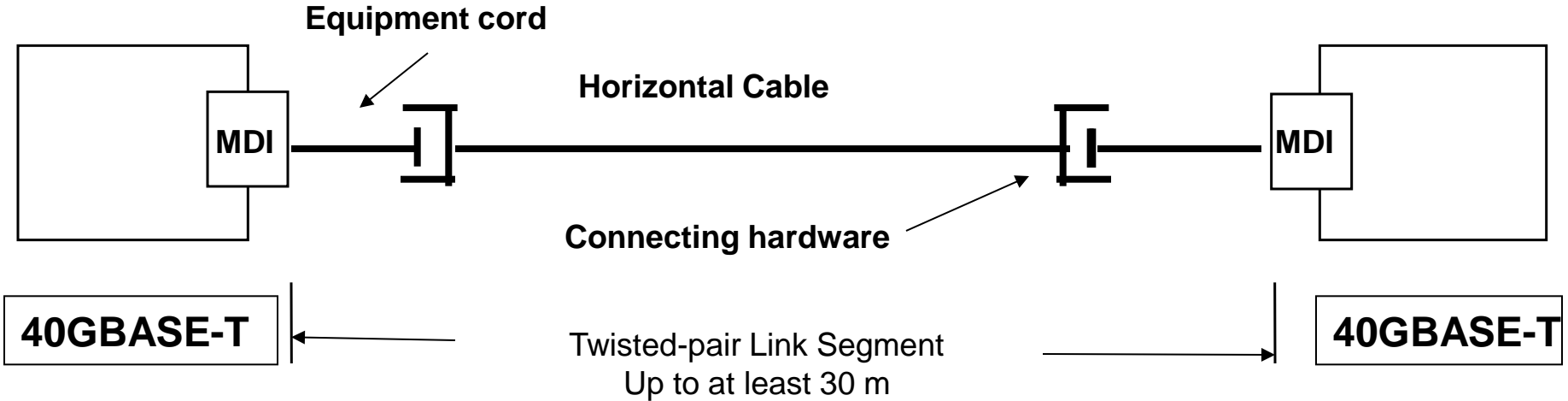
Deployment configurations

- 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 configurations¹
 - 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.

IEEE 802.3 Twisted-Pair Link Segment

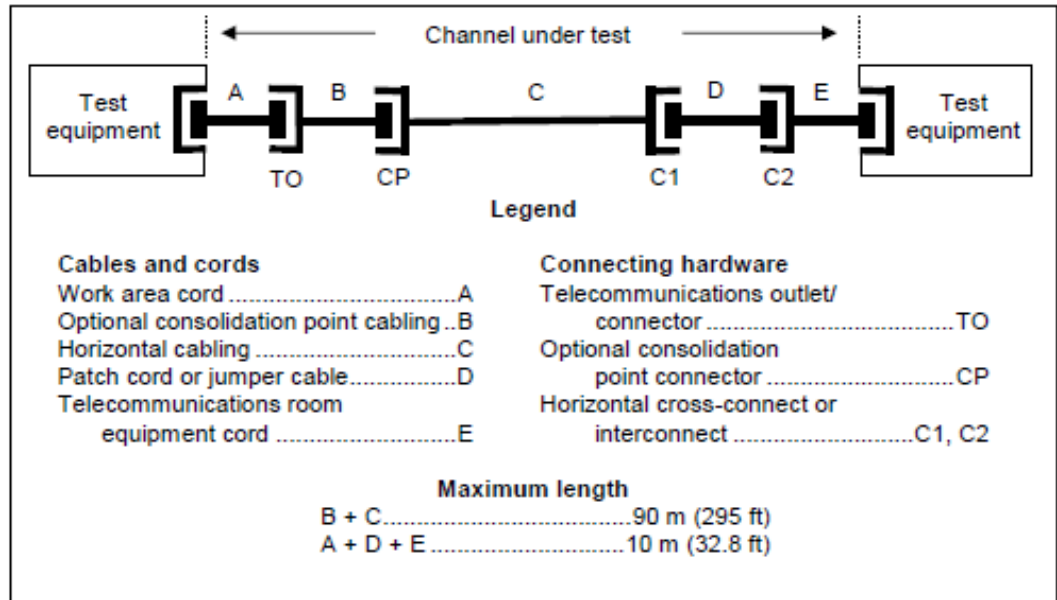


10BASE-T/100BASE-T/1000BASE-T/10GBASE-T

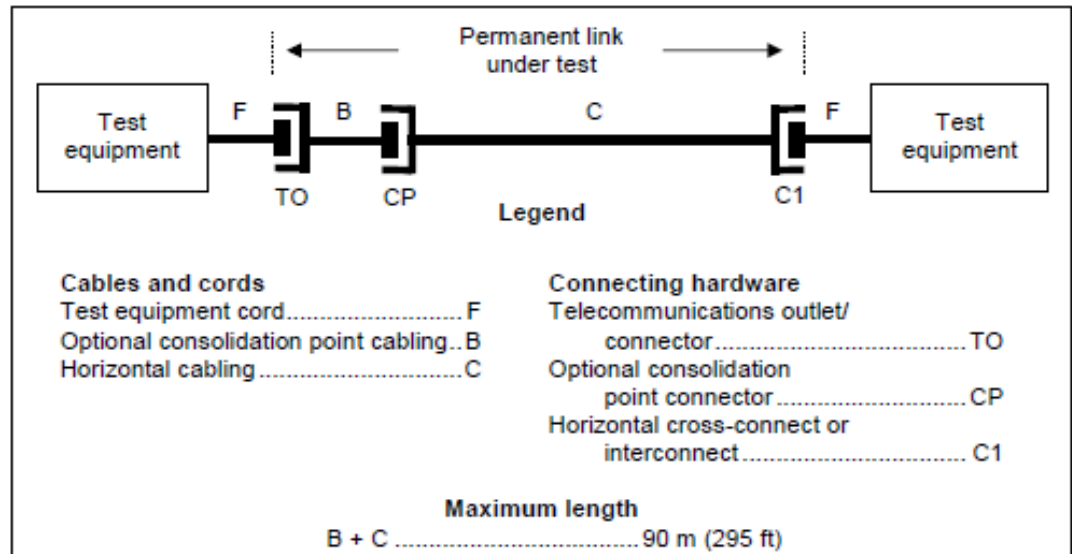


Channel and Permanent Link

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

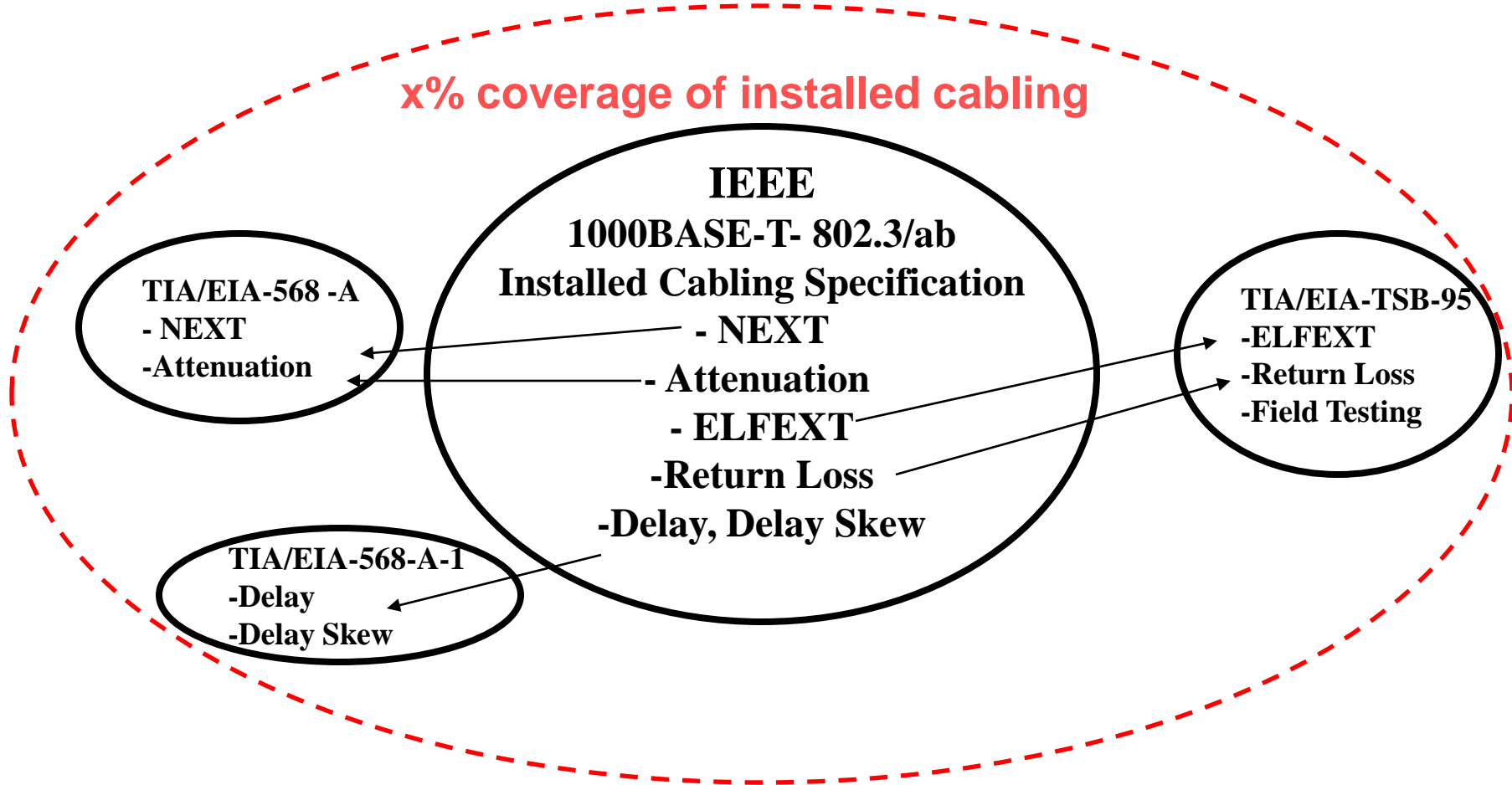


- Channel and permanent link transmission requirements developed from cables, cords, and connecting hardware transmission requirements



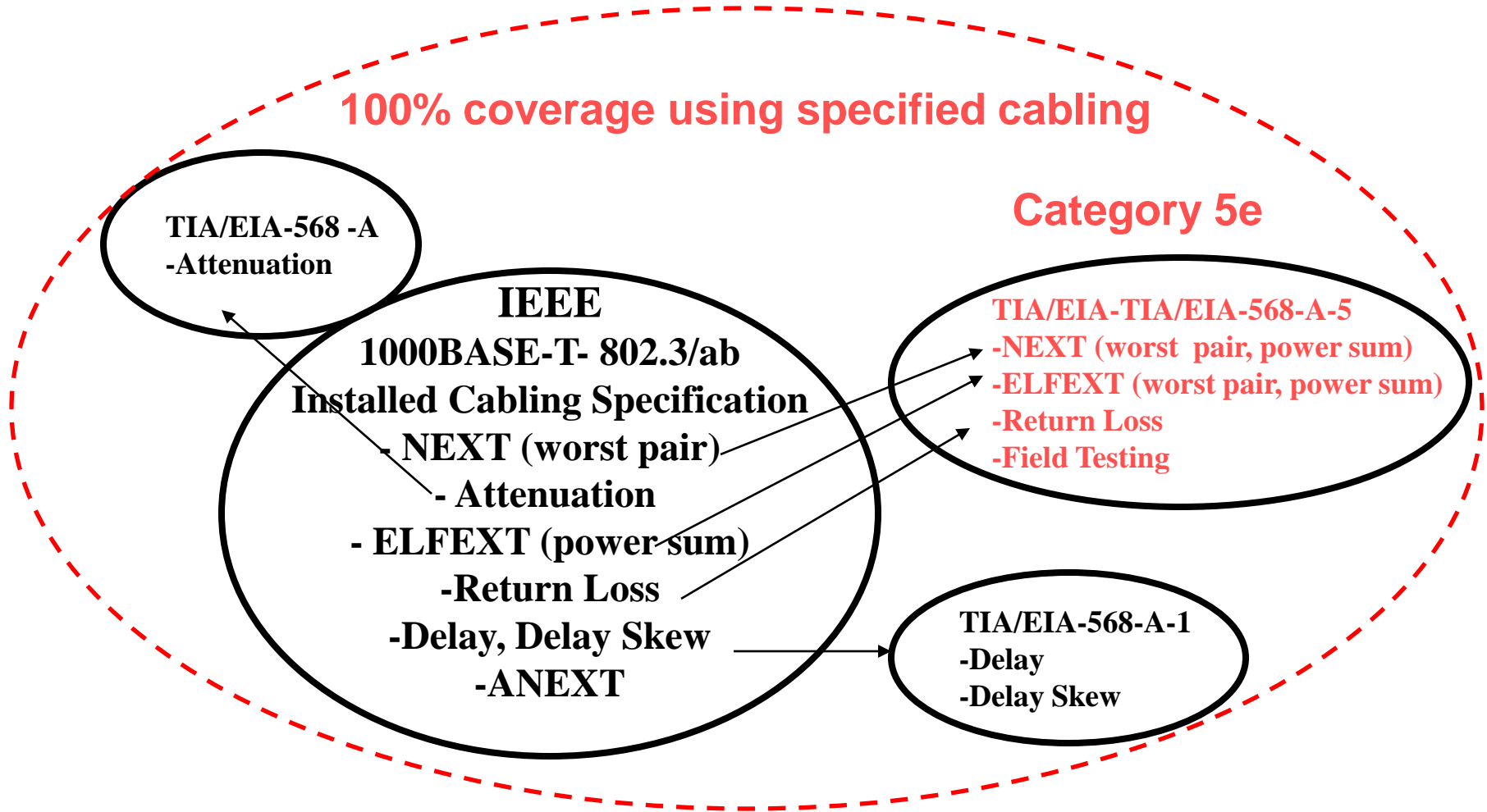
1000BASE-T Link Specifications - Minimum Requirements

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



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

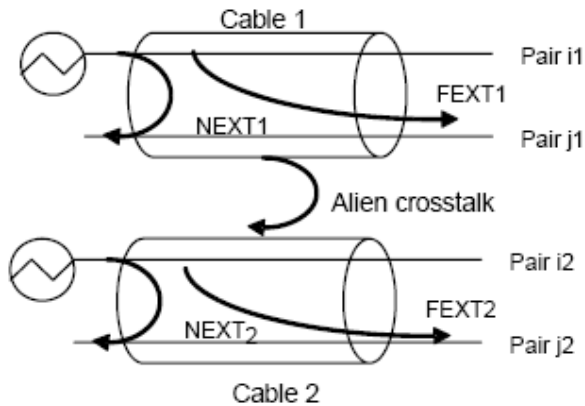


Figure 55B-1—Alien crosstalk coupling between link segments

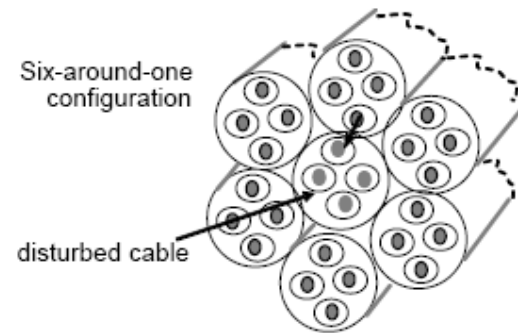


Figure 55B-2—Six-around-one cable configuration

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.

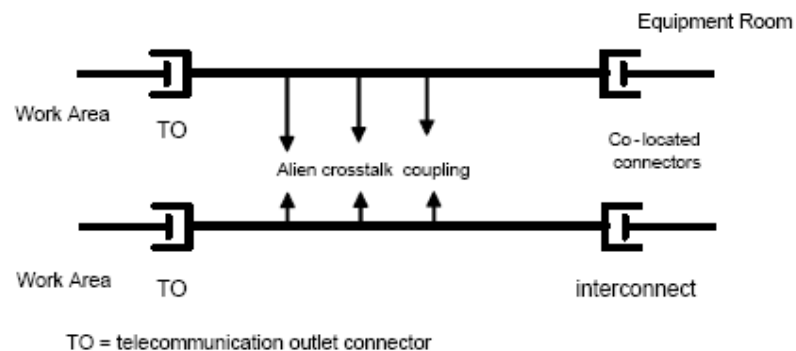


Figure 55B-4—Minimum horizontal cabling configuration

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.

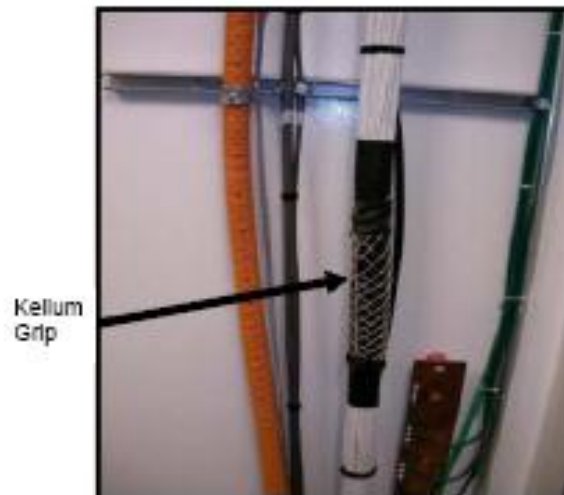


Figure 16 - Kellum Grip, Vertical Cable Bundle Support

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

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/survey

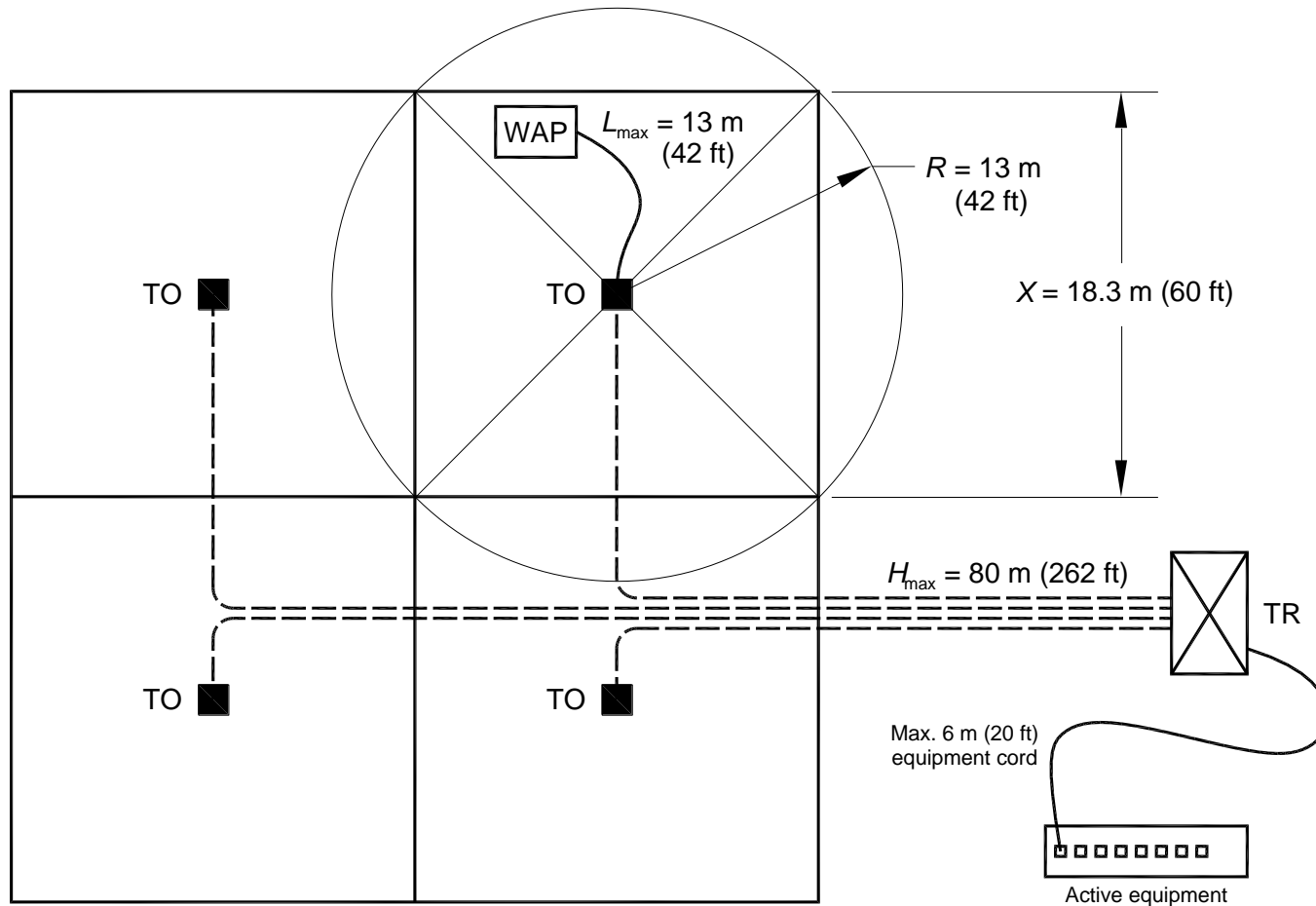
TIA/TSB-162-A – Cabling Guidelines WAPs

- Scope

- TSB to provides guidelines on the topology, design, installation, and testing of telecommunications cabling infrastructure, in compliance with ANSI/TIA-568-C.0 and ANSI/TIA 569 C, for supporting wireless local area networks (WLAN).

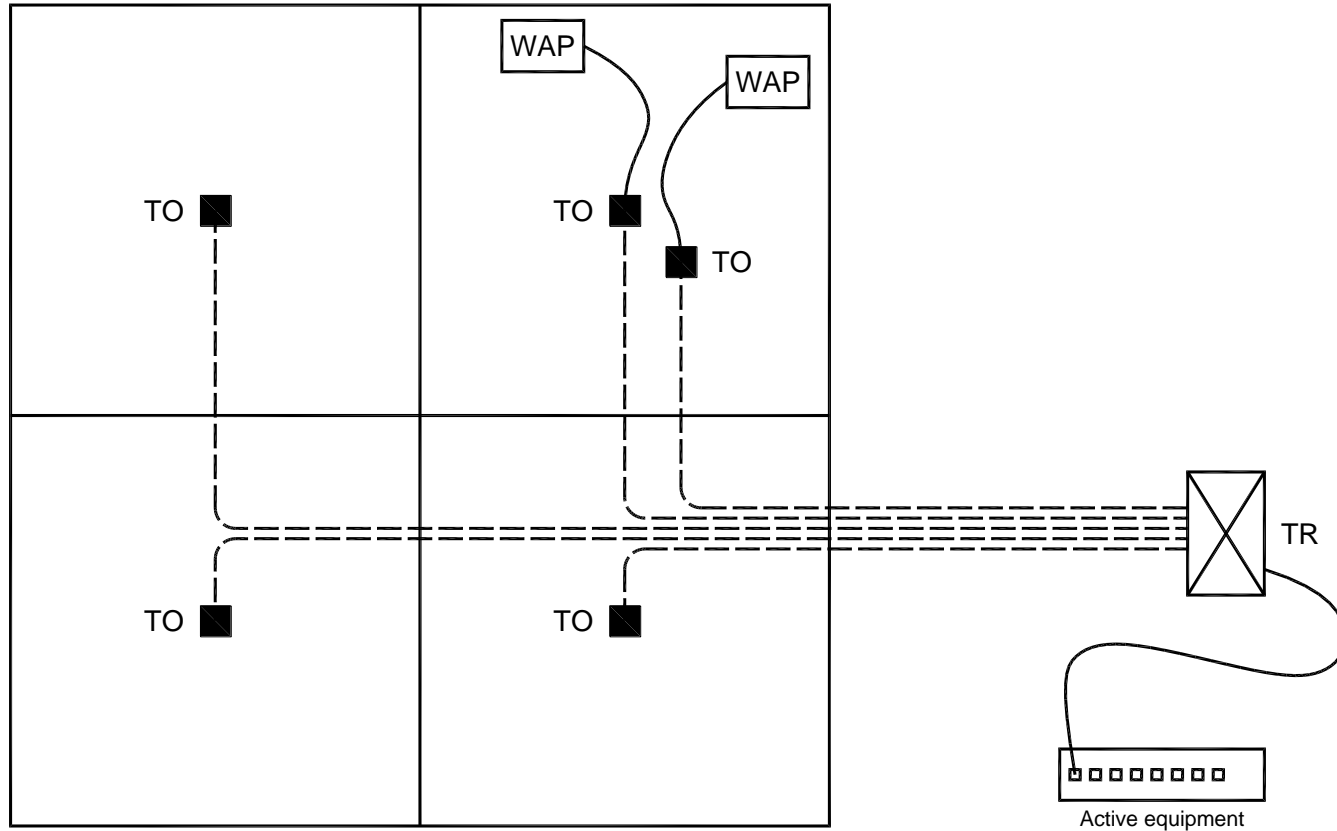
- The TSB includes the cabling between local area network (LAN) equipment and wireless access points including pathways and spaces to support the cabling and wireless access points.

TIA/TSB-162-A – Cabling Guidelines WAPs



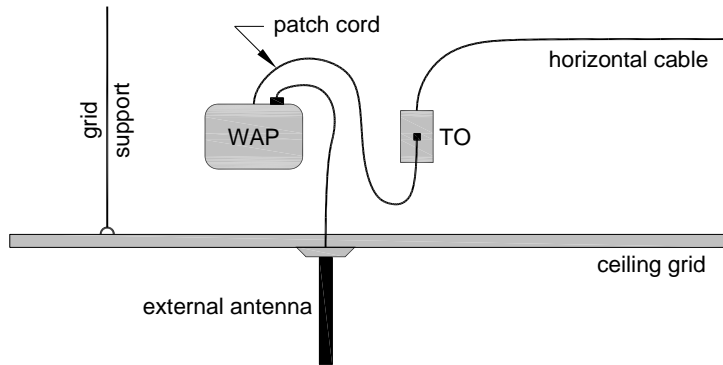
WAP cell

TIA/TSB-162-A – Cabling Guidelines WAPs

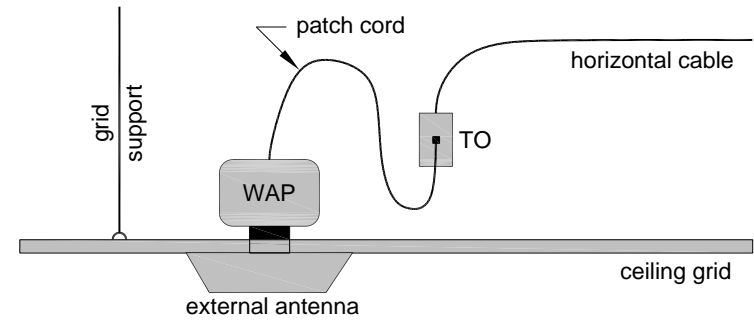


Additional TO and wireless access point in cell

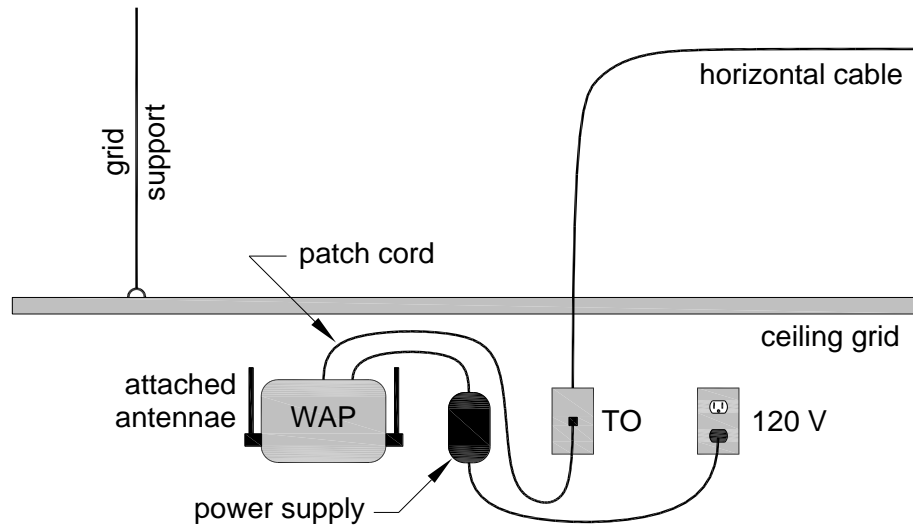
TIA/TSB-162-A – Cabling Guidelines WAPs



WAP wall-mount above drop ceiling

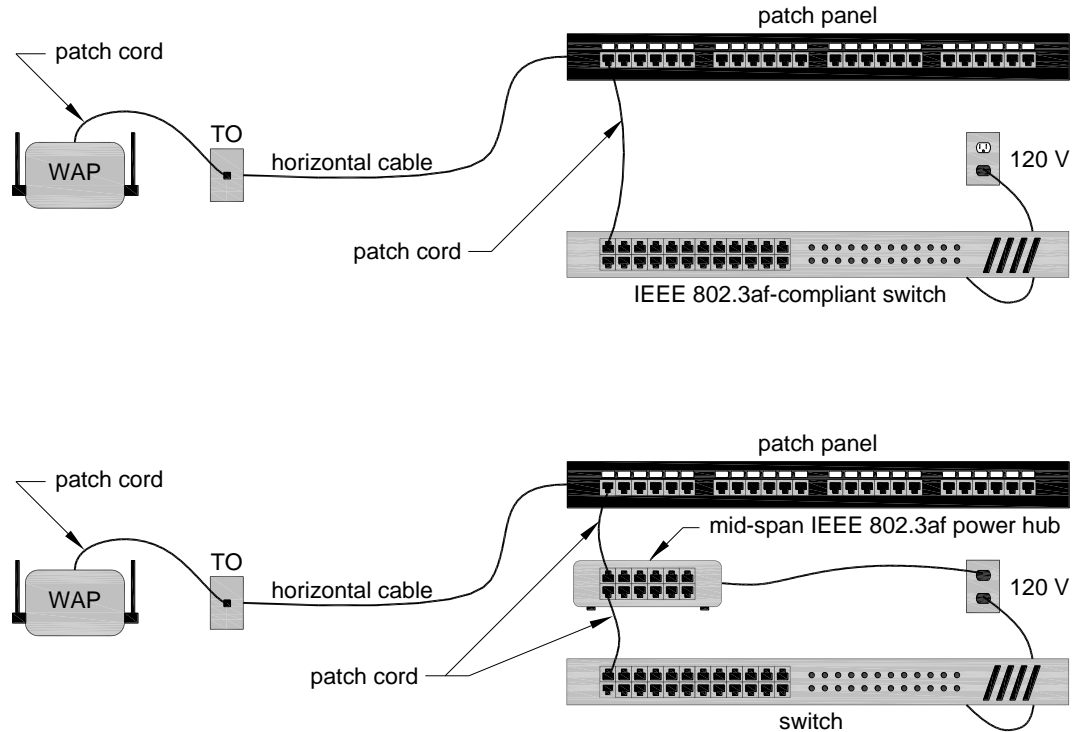


WAP in ceiling grid



WAP wall-mount below drop ceiling

TIA/TSB-162-A – Cabling Guidelines WAPs

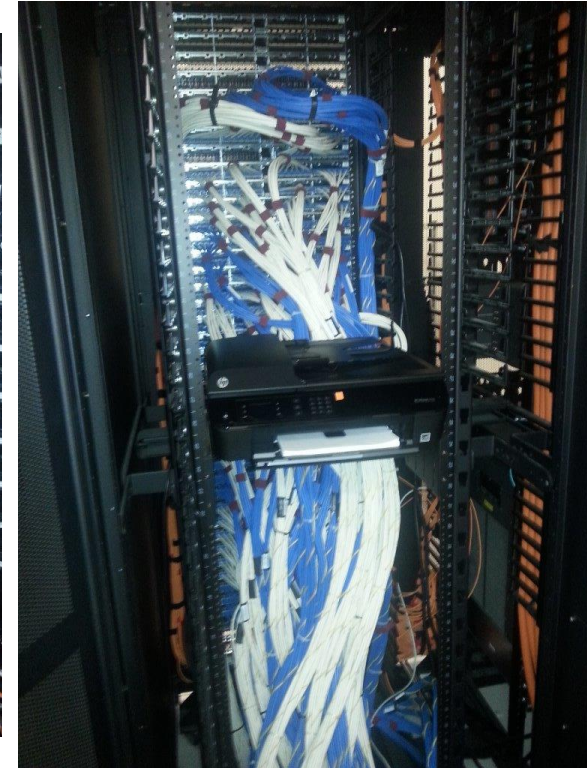
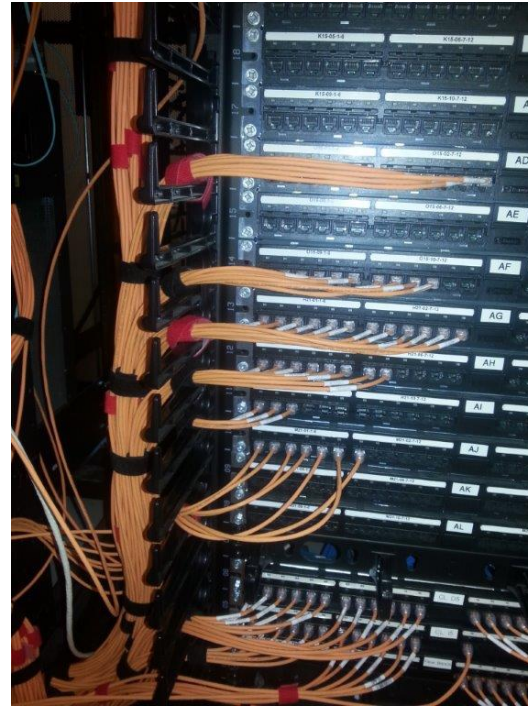
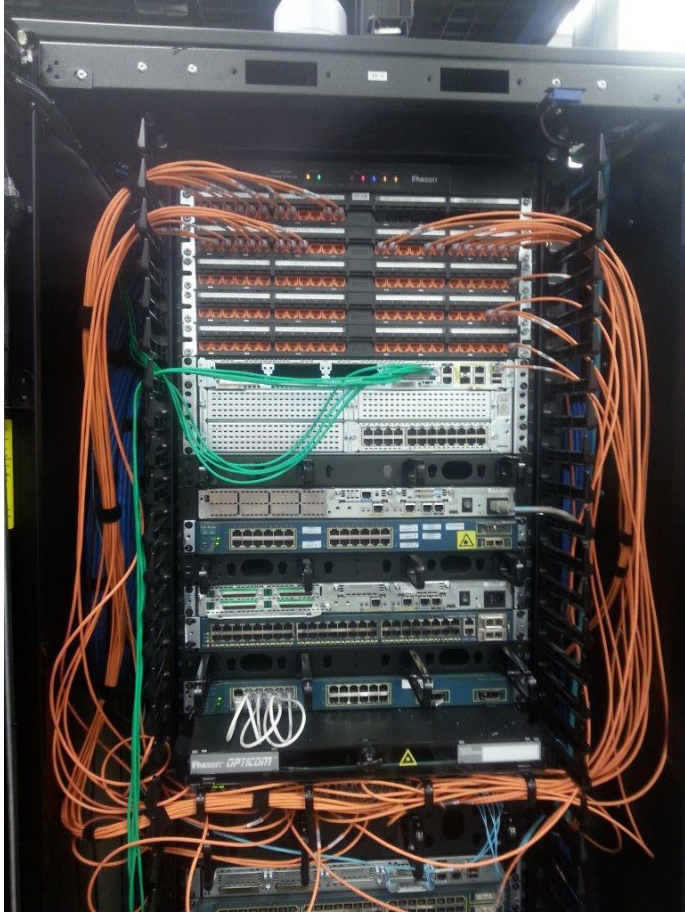


Wireless access point with remote power

Deployment configurations – WAPs



Deployment configurations



Summary

- Consider WAP cabling guidelines as basis for WAP cabling deployment configurations