

# Proposed Remedy to i-209

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# Problem

- In going from Category 5e to Category 6 (including 6a), connector insertion loss specifications in TIA-568 went from  $0.04 \cdot \text{SQRT}(f)$  to  $0.02 \cdot \text{SQRT}(f)$ .
- A Midspan PSE replaces 1 connector with 2 connectors and contains magnetics, and needs to create margin to meet the slim insertion loss limits on connectors.
- The principle of having a midspan replace a connector in the channel worked well for Category 5e connectors where the connector insertion loss allowed some margin. Implementors could meet this spec by using higher quality Cat 6 connectors on their midspans.
- 10GBASE-T link segments are based on Cat 6 connector insertion loss, reducing the opportunities to create the margin needed for midspans.

# Figure 145-37 Midspan Insertion Configuration

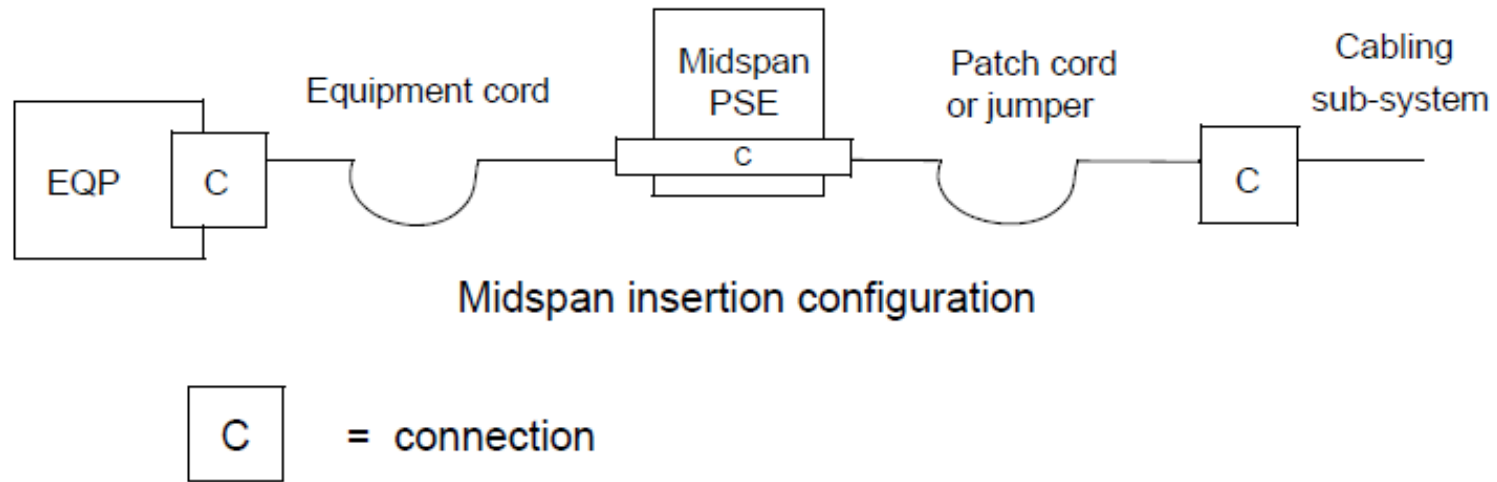
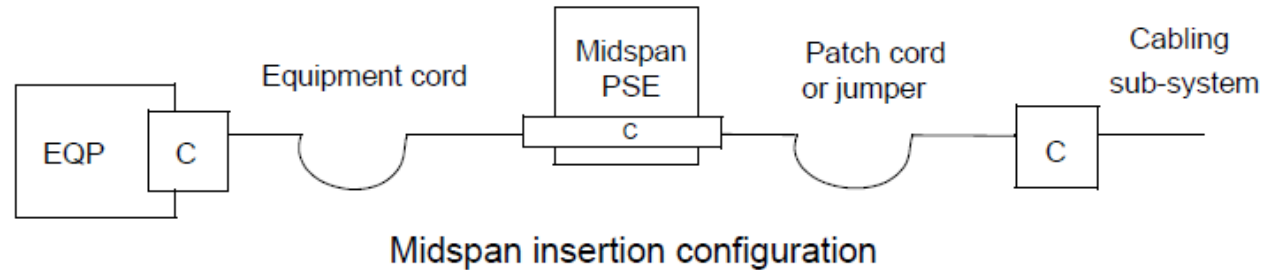


Figure 145-37—Interconnect model, cross-connect model, and midspan insertion configuration

# Proposed 10GBASE-T Midspan Insertion Configuration: May replace up to 2 connectors, not one




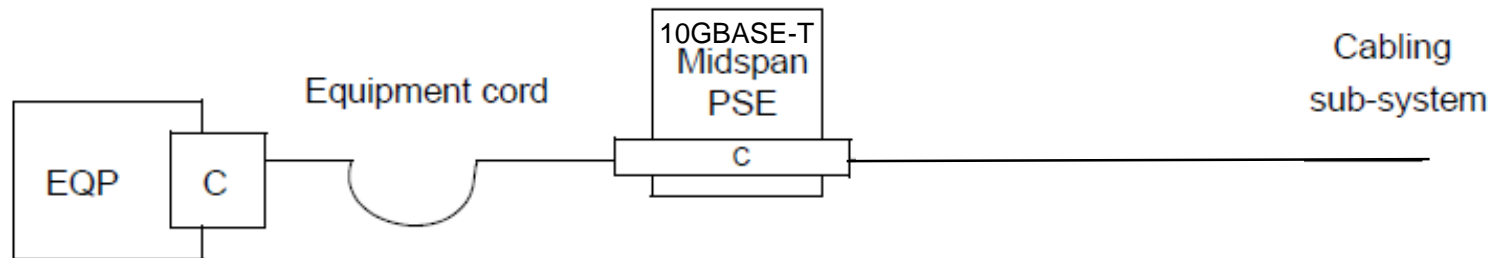
 = connection

Figure 145-37—Interconnect model, cross-connect model, and midspan insertion configuration



10GBASE-T Midspan insertion configuration (when needed to meet 100m “channel” insertion loss specified in TIA)

# Clause 33 changes – remedy to i-209

- Add missing 10GBASE-T insertion loss specification, equal to other Midspan insertion losses

***Insert the following sentence at the end of the 1st paragraph in 33.4.9.1.2 (p. 66, line 11):***

For 10GBASE-T operation, insertion loss for Midspan PSE devices shall meet the values determined by Equation (33-19) when measured from the transmit and receive pairs from 1 MHz to 500 MHz.

- Change text of 33.4.9 to allow for cable margin to be used for 10GBASE-T midspan loss, and to allow 10GBASE-T midspans to replace up to 2 connectors if needed to meet the cabling channel insertion loss.

***Change items a & b after 3<sup>rd</sup> paragraph in 33.4.9 and insert item c as shown:***

The insertion of a Midspan PSE at the Floor Distributor (FD) shall comply with the following guidelines:

- a) If the existing FD configuration is of the “Interconnect model” type, the Midspan PSE ~~needs to~~ can be added, provided it does not increase the ~~length~~ insertion loss of the resulting “channel” to more than that specified for the same Class or category 100 m channel as defined in ISO/IEC 11801-1 or ANSI/TIA-568.0-D.
- b) If the existing FD configuration is of the “Cross-connect model” type, the Midspan PSE can ~~needs to~~ be installed instead of one of the connection pairs in the FD. In addition, the installation of the Midspan PSE shall not increase the ~~length~~ insertion loss of the resulting “channel” to more than that specified for the same Class or category 100 m channel as defined in ISO/IEC 11801-1 or ANSI/TIA-568.0-D.
- c) For a 10GBASE-T midspan PSDs, in meeting either of the above requirements, the Midspan PSE may be substituted for up to two connection pairs in the FD.

# Clause 145.4.9.1.2 changes to 10GBASE-T midspan insertion loss

- Make 10GBASE-T Insertion loss equation the same as other rates, except over a wider frequency range.

***Change the first paragraph of 145.4.9.1.2 (P. 209, lines 2-26), inserting new 4<sup>th</sup> sentence as shown:***

Insertion loss is a measure of the signal loss between the transmitter and receiver, expressed in dB relative to the received signal level. For other than 5GBASE-T or 10GBASE-T operation, insertion loss for Midspan PSE devices shall meet the values determined by Equation (145–34) when measured for the transmit and receive pairs from 1 MHz to 100 MHz. For 5GBASE-T capable midspans, insertion loss for Midspan PSE devices shall meet the values determined by Equation (145–34) when measured for the transmit and receive pairs from 1 MHz to 250 MHz. For 10GBASE-T operation, insertion loss for Midspan PSE devices shall meet the values determined by Equation (145–35) when measured from the transmit and receive pairs from 1 MHz to 500 MHz. For frequencies that correspond to calculated values less than 0.1 dB, the requirement reverts to the maximum requirement of 0.1 dB.

***Delete second paragraph of 145.4.9.1.2 (P. 209, lines 18-26), including equation 145-35, as shown:***

~~“For 10GBASE-T operation, insertion loss for Midspan PSE devices shall meet the values determined by Equation (145–35) when measured from the transmit and receive pairs from 1 MHz to 500 MHz.~~

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$$\{Il_{conn}\}dB \leq 0.02 \sqrt{f} \qquad (145-35)$$

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~~where  $Il_{conn}$  is the insertion loss in dB~~

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~~$f$  is the frequency expressed in MHz.~~

# Changes to 145.4.9 configurations

- Change text of 145.4.9 to allow for cable margin to be used for 10GBASE-T midspan loss, and 10GBASE-T to replace up to 2 connectors if needed to meet channel insertion loss.

***Change items a & b after 3<sup>rd</sup> paragraph in 145.4.9 and insert item c to on p. 207 lines 41-50 as shown:***

The insertion of a Midspan PSE at the Floor Distributor (FD) shall comply with the following guidelines:

- a) If the existing FD configuration is of the “Interconnect model” type, the Midspan PSE ~~needs to~~ can be added, provided it does not increase the ~~length~~ insertion loss of the resulting “channel” to more than that specified for the same Class or category 100 m channel as defined in ISO/IEC 11801-1 or ANSI/TIA-568.0-D.
- b) If the existing FD configuration is of the “Cross-connect model” type, the Midspan PSE ~~can needs to~~ be installed instead of one of the connection pairs in the FD. In addition, the installation of the Midspan PSE shall not increase the ~~length~~ insertion loss of the resulting “channel” to more than that specified for the same Class or category 100 m channel as defined in ISO/IEC 11801-1 or ANSI/TIA-568.0-D.
- c) For a 10GBASE-T midspan PSDs, in meeting either of the above requirements, the Midspan PSE may be substituted for up to two connection pairs in the FD.

# Alternative (not preferred) – always require 2 connectors for 10GBASE-T midspans

- P. 207, L 41-50 – now apply to midspans compatible with speeds below 10Gb/s.
- Insert after line 50 (text similar to L41-50, modified for the new configuration)

The insertion of a 10GBASE-T-capable Midspan PSE at the Floor Distributor (FD) shall comply with the following guidelines:

- a) If the existing FD configuration is of the “Interconnect model” type, the 10GBASE-T Midspan PSE needs to be installed instead of one of the connections in the FD, provided it does not increase the length of the resulting “channel” to more than specified 100 m as defined in ISO/IEC 11801-1 or ANSI/TIA-568.0-D.
- b) If the existing FD configuration is of the “Cross-connect model” type, the 10GBASE-T Midspan PSE needs to be installed instead of two of the connection pairs in the FD. In addition, the installation of the Midspan PSE shall not increase the length of the resulting “channel” to more than specified 100 m as defined in ISO/IEC 11801-1 or ANSI/TIA-568.0-D.