The bridge to possible

802.3da Isolation Improvements

Clarifying requirements and environments

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Comment 246 Motivation

- The current isolation requirements a mash-up of PoE and PoDL requirements
- The requirements do not properly differentiate between PHY and MPoE isolation requirements
- 802.3cg PHYs did not require isolation explicitly
- The proposal that follows leverages legacy language to improve consistency throughout 802.3

Precedents

100BASE-T Isolation Requirements

25.4.6 Replacement of 8.4.1, “UTP isolation requirements”

A PMD with a MDI that is a PI (see 33.1.3 and 145.1.3) shall meet the isolation requirements defined in 33.4.1 and 145.4.1.

A PMD with a MDI that is not a PI shall provide isolation between frame ground and all MDI leads including those not used by the 100BASE-TX PMD.

This electrical isolation shall meet the isolation requirements as specified in J.1.

NOTE—In the case of a PMD with a MDI that is not a PI, these requirements are equivalent to those found in TP-PMD.

Clause Cheat Sheet:

25. Physical Medium Dependent (PMD) sublayer and baseband medium, type 100BASE-TX
33. Power over Ethernet over 2 Pairs
145. Power over Ethernet

1000BASE-T Isolation Requirements

40.6.1.1 Electrical isolation

A PHY with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1 or 145.4.1.

A PHY with a MDI that is not a PI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation shall meet the isolation requirements as specified in J.1.

Clause Cheat Sheet:

40. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 1000BASE-T
33. Power over Ethernet over 2 Pairs
145. Power over Ethernet

10GBASE-T Isolation Requirements

55.5.1 Electrical isolation

The PHY with a MDI that is not a PI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation shall meet the isolation requirements as specified in J.1.

Clause Cheat Sheet:

55. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer and baseband medium, type 10GBASE-T

10GBASE-T Isolation Requirements

126.5.1 Electrical isolation

A PHY with a MDI that is a PI (see 33.1.3) shall meet the isolation requirements defined in 33.4.1 or 145.4.1.

A PHY with a MDI that is not a PI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all MDI leads. This electrical isolation shall meet the isolation requirements as specified in J.1.

Clause Cheat Sheet:

126. Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA) sublayer, and baseband medium, types 2.5GBASE-T and 5GBASE-T
33. Power over Ethernet over 2 Pairs
145. Power over Ethernet

10BASE-T1L / -T1S Isolation Requirements

- No requirements for data-only nodes!
- Requiring isolation for –T1M nodes would diverge from this approach and should be carefully considered

Proposal -10BASE-T1M Isolation Requirements

<Note to Editor: Please insert as 188.6.1 and renumber as needed>

188.6.1 Electrical isolation

A PHY with a TCI that is an MPI (see 189.1.2) shall meet the isolation requirements defined in 189.6.1.

A PHY with a TCI that is not an MPI shall provide electrical isolation between the port device circuits, including frame ground (if any) and all TCI leads. This electrical isolation shall meet the isolation requirements as specified in J.1.

Clause Cheat Sheet:
104. Power over Data Lines (PoDL) of Single-Pair Ethernet

Electrical Isolation Environments

189.6.1.1 Electrical isolation environments

There are three electrical power distribution environments to be considered that require different electrical isolation properties. They are as follows:

MPoE Environment A: When a LAN or LAN segment, with all its associated interconnected equipment, is entirely contained within a single low-voltage power distribution system and within a single building.

MPoE Environment B: When a LAN crosses the boundary between separate power distribution systems or the boundaries of a single building.

MPoE Environment C: When a LAN or LAN segment, with all its associated interconnected equipment, is entirely contained within a single low-voltage power distribution system contained within a single cabinet, vehicle, machine, or other power domain where ground loops are unlikely to occur.

Discussion Items

- Should PHYs require isolation even thought 802.3cg did not?
- Should these environments be defined for PHYs as well as MPoE systems?
- Should an additional MPoE Environment D be defined with no isolation requirement?
  - Might require that the MPSE disconnect both positive and negative conductors.

Questions and Discussion