Clarifying Detection for 4PPoE

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Why do we Need Clarification?

- The current text was written when only 2-pair power was allowed by the standard.
  - PSEs only detected on the two pairs that they applied power to.
  - Figures 33-4 through 33-7 show that the PSE is only connected to two pairs.

- The current text is unclear when applied to 4-pair power.
  - Section 33.2.5 states "The PSE shall turn on power only on the same pairs as those used for detection."
  - Section 33.2.5.3 states "A PSE shall accept as a valid signature a link section with both of the following characteristics between the powering pairs …"
  - Section 33.2.5.4 states "The PSE shall reject link sections as having an invalid signature, when those link sections exhibit any of the following characteristics between the powering pairs…"

- The text could be interpreted as allowing 4-pair detection in addition to the 2-pair detection currently used.
  - The detection process and criteria in the current standard were evaluated using two-pair measurements.
  - See http://www.ieee802.org/3/bt/public/jul14/abramson_01_0714.pdf for a full analysis of 4-pair parallel detection.

A Quick Reminder: Consequences of 4-Pair Detection

- Detecting both alternatives in parallel is not sufficient to apply power safely:
  - It will allow invalid loads that produce a valid signature when in parallel to be powered.
  - It will allow powering of open circuits and isolated terminations.
  - It requires the addition of a 12.5KΩ valid detection range to maintain backwards compatibility.

- We should not change the detection criteria (accept/reject ranges) for 802.3bt. Specifically, 12.5KΩ should remain an invalid detection signature. Otherwise:
  - PSEs will be powered, and most likely damaged, as they can exhibit a 12KΩ signature.
  - Mutual identification will produce the wrong results because PDs in the mark state can have signatures as high as 12KΩ.
  - Invalid loads may produce valid signatures in the new detection range and will be powered on.

Proposed Changes

- The text should be modified to make it clear that detection takes place between two pairs. Four-pair detection should not be considered the equivalent of two-pair detection without adequate data and testing.

- The proposal is designed to make the minimum changes to the current text.

- **33.2.5 PSE detection of PDs**
  - The PSE shall only turn power on using the same two pairs as those used for detection.

- **33.2.5.3 Detection criteria**
  - A PSE shall accept as a valid signature a link section with both of the following characteristics between the two powering pairs…

- **33.2.5.4 Rejection criteria**
  - The PSE shall reject link sections as having an invalid signature, when those link sections exhibit any of the following characteristics between the two powering pairs…

Motion

- Move that the changes shown on slide 3 of Abramson_02_0914.pdf be adopted as IEEE802.3bt text in their respective sections.

- Mover: David Abramson

- Seconder:

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