



PD PI & 57V

Rectifying the infamous “...*PD shall withstand any voltage from 0V to 57V at the PI indefinitely...*” text.

Chris Bullock, Cisco

Dylan Walker, Cisco

IEEE 802.3bt Task Force

July 2015

Problem Statement

From 33.3.1 PD PI: *“The PD shall withstand any voltage from 0 V to 57 V at the PI indefinitely without permanent damage.”*

- This text is vague, open to misinterpretation
 - The text is wrong because no PD can withstand 57V between pins within a pair
 - We need to clarify this statement for all PDs Types
- ❖ D1.1 Comments 5, 145, & 189 all pertain to this sentence!

Key Considerations

- Must exclude the application of 57V within a twisted pair for all Types
- Cannot change the requirement as interpreted from 802.3-2012 for existing Type 1 / Type 2 PDs
- Requirements must be abundantly clear for Type 3 / Type 4 PDs, if not all

Interpreting Legacy Text in Isolation

What is meant by “...at the Pl...”?

- Can 57V be applied across ANY two pairs or only two pairs within the same mode?
- Can 57V be applied across multiple pairs simultaneously?

Interpreting Legacy Text in Context

- The term “PI” is used extensively throughout 802.3-2012, yet it is rarely in reference to **all 4** twisted pairs
- Other text provides appears to provide guidance
 - From 33.3.1: “The PD shall be capable of accepting power on either of two sets of PI conductors.”
 - From 33.3.1: “PDs that simultaneously require power from both Mode A and Mode B are specifically not allowed by this standard.”
 - From 33.2.3: “...PSEs shall not operate both Alternative A and Alternative B on the same link segment simultaneously.”

Reasonable Interpretation of Legacy Text

What is meant by “...at the Pl...”?

- Can 57V be applied across ANY two pairs or only two pairs within the same Mode? **57V is only to be applied between two twisted pairs within the same Mode**
- Can 57V be applied across multiple pairs simultaneously? **No, 57V is applied to each Mode individually**

Suggested Remedy – Option 1

- Modify the original text:
 - “~~The~~ Type 1 and Type 2 PDs shall withstand any voltage from 0 V to 57 V ~~at the PI~~ on either Mode A or Mode B, in any polarity, indefinitely without permanent damage.”
- Supplement with the following text:
 - “Type 1 and Type 2 PDs should withstand any voltage from 0 V to 57 V on any 2 sets of twisted pairs, in any polarity combination, indefinitely without permanent damage. Type 3 and Type 4 PDs shall withstand any voltage from 0 V to 57 V on any 2 sets of twisted pairs, in any polarity combination, indefinitely without permanent damage.”

Suggested Remedy – Option 2

- Modify the original text:
 - “The Type 1 and Type 2 PDs shall withstand any voltage from 0 V to 57 V between twisted pairs at the PI indefinitely without permanent damage.”
- Supplement with the following text (same as Option 1):
 - “Type 1 and Type 2 PDs **should** withstand any voltage from 0 V to 57 V **on any 2 sets of twisted pairs, in any polarity combination**, indefinitely without permanent damage. Type 3 and Type 4 PDs **shall** withstand any voltage from 0 V to 57 V **on any 2 sets of twisted pairs, in any polarity combination**, indefinitely without permanent damage.”