Power Matters

# IEE802.3 4P Task Force

## Updating 33.3.7.10 per D1.5 requirements

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Rev7

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## D1.5 clause 33.3.7.10 page 145 lines Background:

The following comments received during D1.3 and D1.4 regarding 33.3.7.10:

1. D1.5 requires in its Editor Note in page 145 line 31 to address longer channel as well since it appears from the current text that Icon-2P_unb need to be met only at short channel while it need to be met at all operating conditions.
   On the other hand we know that if Icon-2P_unb is met when PD is tested at short channel (low resistance), it will be the worst case so at longer channel it will meet the requirement too so there is no need to measure the current at two extreme points. To fix this issue we change the text by changing the text from "PD shall meet this requirement …" to PD shall have the pair current measured…".

2. The old test looks like compliance test and some commenters said that we shouldn't do it also there are many examples that we specify test circuit and ask to meet parameters when measured with the test circuit (see 33.4.2, 33.4.3, 33.4.4 33.4.5, 33.4.6, 33.4.9.2.1 and many more in 802.3.
   Anyhow, this issue was addressed also by the fix for item 1 with a requirement to meet the Icon-2P_unb by measuring the current at specific conditions.

3. It needs to be clear that the two common mode test resistors can flip locations and still the requirement should be met. This was fixed by "……..two common mode resistances of Rsource_min=0.16 Ω ± 1% and one with Rsource_max=0.19 Ω ± 1%"

4. It was noted also that the test circuit doesn't address the fact that Rsource min/max are very low resistance and it is not clear if the connectors are part of Rsource and if it is, the connectors may affect very much the total value of Rsource etc. To fix this problem the following changes were made:
   a) The drawing of the test circuit was modified to show clear boundaries of Rsourc min/max
   b) The effect of the test circuit connector resistance on Rsource is minimized by specifying max connector resistance (plug of the test circuit, it is practical to use in test circuit side high quality connector) and subtracting it from Rsource. In addition we increase the Rsource ABS numbers by 5% and allow 5% variations with negligible effect on current measurements. The PD RJ45 Jack is not part of the test circuit.

5. Differentiating between DS and SS PD in order to ensure DS PDs meets Pclass-PD_2P over each pairset in order to meet Icon-2P=Pclass-2P/Vpse as defined in Equation 33-3c **with unbalanced PSE and channel.**

**33.3.7.10 PD PI pair-to-pair resistance and current unbalance**

1. Change according to the following text:

"All Class 5 and higher single signature PDs shall not exceed Icon-2P-unb for longer than TCUT-2P min as defined in Table 33-11 on any pair. Dual Signature PDs shall not exceed Icon-2P as defined in Equation 33-3c for longer than TCUT-2P min as defined in Table 33-11. Single-signature PDs and dual-signature PDs shall ~~meet this requirement~~ have the pair currents measured when PD PI pairs of the same polarity are connected to a common source voltage through ~~a~~ two common mode resistances of Rsource_min=~~0.16 Ω ± 1%~~ 0.168 Ω ± 5% and one with Rsource_max=~~0.19 Ω ± 1%~~ 0.2 Ω ± 5% ~~to PD PI pairs of the same polarity~~ for all PD operating conditions as shown in Figure 33-18a.

Rsource_min and Rsource_max represent the Vin source common mode effective ~~impedance~~ resistance that consists of the PSE PI components (~~RPair~~Rpse_min and ~~RPair~~Rpse_max as specified in 33.2.7.4.1~~)~~, Vport_PSE_diff as specified in table 33-11 and the channel resistance). Common mode effective ~~impedance~~ resistance is the resistance~~impedance~~ of two conductors of the same pair and their other components connected in parallel including the effect of Vport_PSE_diff. IA and IB are the pair currents of pairs with the same polarity. See Annex 33A.5 for design guide lines for meeting the above requirements.

~~RPSE_max and RPSE_min represents PSE and channel effective source impedance that includes the effect of VPort_PSE_diff as specified in Table 33-11.”~~

~~Editor Note: Longer Channel resistance need to be added~~

2. Update Figure 33-18a below:

Figure 33-18a – PD PI pair-to-pair test circuit

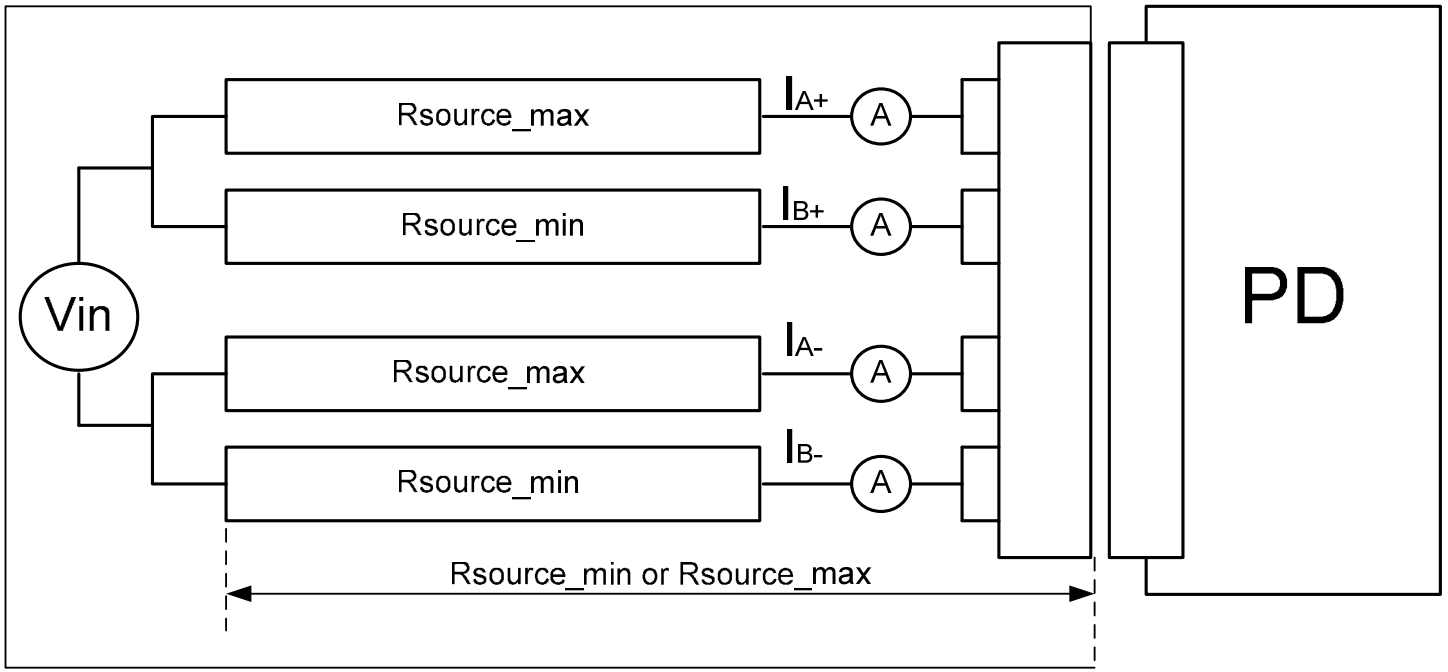


Figure 33-18a – PD PI pair-to-pair test circuit

Notes:

1. Rsource includes test setup plug resistance Rcon. The maximum recommended Rcon value is 0.02 Ω however it is test setup implementation specific choice how to meet Rsource_min and Rsource_max.
2. The test needs to be conducted when in one test the two pairs of the same polarity contain Rsource_min and Rsource_max and in the 2nd test it flips values.