

The following are continuation of darshan\_03\_0117PartA.pdf regarding extended power text in 33.3.8.2.1 from **TDL #44 D2.1** and addressing two issues in **comment #93 and #382 in D2.2**.

## Two issues in comment #93 D2.2:

### Issue #1 addressed by comment #382 and #93 as shown below:

**Page 162 lines 50-52 clause 33.3.8.2.1 says:**

#### **33.3.8.2.1 Input average power exceptions**

For Class 6 and Class 8 single-signature PDs, when additional information is available to the PD regarding actual channel DC resistance between the PSE PI and the PD PI, the PD may consume greater than PClass\_PD but shall not consume greater than PClass at the PSE PI and shall not draw current in excess of ~~ICable~~ 2xIcable as defined in Table 33–1.

For Class 5 dual-signature PDs, when additional information is available to the PD regarding actual channel DC resistance between the PSE PI and the PD PI, the PD may consume greater than PClass\_PD-2P but shall not consume greater than PClass-2P at the PSE PI and shall not draw current in excess of ICable as defined in Table 33–1.

**Issue #2 that is not addressed by comment #382 or by #93 and I have used my comment #93 to address this issue as well:**

In class 6 for example,  $I_{cable}$  is 600mA however  $I_{con-2P\_unb}=682mA$  which is normal.

$I_{con-2P\_unb}$  should be  $> I_{cable}=600mA$  and the total current stays  $2 \times I_{cable}=1200mA$ .

*In class 8 however, the  $I_{con-2P\_unb}$  for class 8 is 925mA which is lower than  $I_{cable}=960mA$  for class 8.*

*The 960mA came from  $99.9W/52V/2=960mA$ . This was done to cover the max 100W LPS limits.*

*$I_{con-2P\_unb}$  was designed and specified for the  $P_{class}=90W$  (and  $P_{class\_PD}=89.7W$  at short cable).*

*Now that  $I_{con-2P\_unb} < I_{cable}$  for class 8, there is no possibility to utilize the range of 90W to 99.9W (e.g. during permitted overload conditions) i.e. total current will be always  $\leq P_{class}/V_{pse-2P}=90W/52V=1.731A$  and not  $2 \times 960mA=1.923A$  while the objective was to allow up to  $2 \times 960mA$ .*

## Discussion:

### Possible solutions - Option 1:

PDs are required not to consume power that will cause more than 90W at the PSE PI. It doesn't prevent PSE to have power capacity up to 99.9W. As a result,  $I_{con-2P\_unb} = 925mA > 90W/52V/2 = 0.865$  which follows the rule of  $I_{con-2P\_unb} > I_{cable}$ . As a result we need to change the text to:

“For Class 6 and Class 8 single-signature PDs, when additional information is available to the PD regarding actual channel DC resistance between the PSE PI and the PD PI, the PD may consume greater than  $P_{Class\_PD}$  but shall not consume greater than  $P_{Class}$  at the PSE PI and shall not draw current in excess of  $I_{Cable} \frac{P_{Class}}{V_{Port\_PSE-2P\_min}}$  as defined in Table 33–1.

For Class 5 dual-signature PDs, when additional information is available to the PD regarding actual channel DC resistance between the PSE PI and the PD PI, the PD may consume greater than  $P_{Class\_PD-2P}$  but shall not consume greater than  $P_{Class-2P}$  at the PSE PI and shall not draw current in excess of  $\frac{P_{Class-2P}}{V_{Port\_PSE-2P\_min}} I_{Cable}$  as defined in Table 33–1.”

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In this solution, the current for class 8 may reach to  $2 \times I_{cable}$  for single signature PD however  $I_{con-2P\_unb}$  still can't be met if we will not increase it.

We will need to increase  $I_{con\_2P\_unb}$  to be  $> I_{cable}$  to keep the current spec correct and accurate.

## Possible solutions - Option 2:

To calculate  $I_{con-2P\_unb}$  when at extended power conditions at class 8 is brought to the total current of  $2xI_{cable}$  this means theoretical PD of 99.9W max.

As a result, we need to change two things:

(1) Change the text to:

“For Class 6 and Class 8 single-signature PDs, when additional information is available to the PD regarding actual channel DC resistance between the PSE PI and the PD PI, the PD may consume greater than  $P_{Class\_PD}$  but shall not consume greater than  $P_{Class}$  at the PSE PI and shall not draw current in excess of  $I_{cable}2xI_{cable}$  as defined in Table 33–1.

For Class 5 dual-signature PDs, when additional information is available to the PD regarding actual channel DC resistance between the PSE PI and the PD PI, the PD may consume greater than  $P_{Class\_PD-2P}$  but shall not consume greater than  $P_{Class-2P}$  at the PSE PI and shall not draw current in excess of  $I_{cable}$  as defined in Table 33–1.”

(2) Add new row for  $I_{con-2P\_unb}$  in Table 33-18 item 5 with: “Class 8 per 33.3.8.2.1”, “A”, “1.036”, “4”, “See 33.2.8.5 and 33.2.8.5.1”.

## Recommendations:

1. Group to discuss the options above.
2. If not resolved at the meeting to Add to TDL:  
“To address class 8 extended power in 33.3.8.2.1 that allows to work in power levels that generate  $I_{cable}$  over 2-pair and  $2 \times I_{cable}$  over 4-pairs but it is never possible to be utilized by the PSE (to support 90W to 99.9W) due to  $I_{con-2P\_unb} < I_{cable}$  in the current spec while it should be  $I_{con-2P\_unb} > I_{cable}$  as normally need to be as in all other classes.

Annex A: The following is the current rules in D2.2 to support extended power class 6 and 8 to meet unbalance requirements.

✓	No increase in I <sub>con-2P_unb</sub> min capacity
✓	Total current over 4-pairs is kept = $P_{class}/V_{port\_PSE-2P}$
✓	No change in magnetic components for PSE and PD that supports extended power compare to PDs that doesn't support extended power
✓	No changes in I <sub>peak</sub> and I <sub>peak-2P_unb</sub> requirements
❖	Requires PSE and PDs to meet tighter R <sub>pse_min</sub> , R <sub>pse_max</sub> , R <sub>pair_PD_min</sub> and R <sub>pair_PD_max</sub> requirements. <a href="#">See Annex A.</a>

❖ Annex B: What if we loosen PD P2P<sub>Runb</sub> requirements in the extended power case by allowing higher I<sub>con-2P\_unb</sub>?

❖	Increase I <sub>con-2P_unb</sub> min capacity for extended power case
✓	Total current over 4-pairs is kept = $P_{class}/V_{port\_PSE-2P}$
❖	Magnetics components for PSE and PD that supports extended power will have to be bigger by 10%.
❖	I <sub>peak</sub> and I <sub>peak-2P_unb</sub> will be higher. <i>Class 8 will have smaller margin from 100W and from 1A maximum current wire target.</i>
✓	Same R <sub>pse_min</sub> , R <sub>pse_max</sub> , R <sub>pair_PD_min</sub> and R <sub>pair_PD_max</sub> requirements as in the non-extended power case

-Most of the applications will not use extended power therefore no need to add burden on PSE.

-PDs job is to ensure that their implementation specifics of their design will ensure that PD meets I<sub>con-2P\_unb</sub> as is in the current standard.