**Comment (i-426, 145.2.8.5.1, Page 159 Line 27):**

- This comment is not about active current balancing.
- This comment is about the valid range of Rpse_min to keep Equation 145-15 accurate so when Rpse_min/max are used with the test verification model specified in Table 145-17, we will meet the values Icon-2P_unb in Table 145-16.

The main reason for the accuracy dependence on Rpse_min is:
Equation 145-15 was developed based on worst case 4-pair model components at short cable and long cable.
At short cable, we have total P2PRunb around 30%. if Rpse_min is increased, Rpse_max is increased too until the contribution of Rpse_min/max unbalance became higher that the contribution of the channel that is only 7% and the connectors that are ~25% resulting with total P2PRunb of >~30%.

The effect on the accuracy happen when Rpse_min is > 0.5 ohms at Class 7-8 and 1 ohm at class 5-6. This limitation is not relevant to active current balancing.

There are other side effects that will cause the PSE to not meet other requirements in the spec if Rpse_min max value will not be limited such as load regulation, PSE voltage range and power loss.

**Proposed Remedy:**

*Add after line 27 in page 159:*

"Equation 145-15 is valid for R_pse_min up to a value of 1 ohm for Class 5 and Class 6, and 0.5 ohm for Class7 and Class 8.

*Add after line 53 in page 195:*

"Equation 145-26 is valid for R_pd_min up to a value of 1 ohm for Class 5 to Class 8.
Class7 and Class 8.

*END OF BASE LINE*

*See detailed analysis in the next Annex for the PSE. Similar analysis done for the PD.*

# Annex A: Why the maximum possible value of Rpse_min need to be limited in the specifications?

| Rpse_min [Ω] | 0.04 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 | 1.5 | 2 | 2.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Class | Results: Difference from calculated to spec value [mA] | | | | | | | | | | | | | |
| Short Cable: 2.65m | | | | | | | | | | | | | | |
| 5 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| 6 | -1 | -1 | -2 | -2 | -2 | -2 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| 7 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 8 | -43 | -43 | -43 | -43 | -43 | -43 | -43 | -43 | -43 | -43 | -43 | -43 | -43 | -43 |
| Long Cable 100m | | | | | | | | | | | | | | |
| 5 | -65 | -63 | -60 | -58 | -55 | -53 | -50 | -48 | -46 | -44 | -42 | -33 | -25 | -18 |
| 6 | -42 | -40 | -36 | -33 | -30 | -27 | -25 | -22 | -20 | -17 | -15 | -5 | 4 | 12 |
| 7 | -14 | -12 | -9 | -6 | -2 | 1 | 4 | 6 | 9 | 12 | 14 | 25 | 35 | 43 |
| 8 | -19 | -16 | -12 | -9 | -5 | -2 | 1 | 4 | 7 | 10 | 13 | 25 | 35 | 45 |

**Icon-2P_unb when Rpse_min up to 1 Ω for class 5 and 6, and 0.5 Ω for class 7 and 8 including 5mA margin.**

| | Icon-2P_unb | | | | Difference between calculated and spec values | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Class | Actual calculated | Spec | Simulations | PASS/FAIL Calculated vs. Spec. | Delta= Calculated - Spec | Max difference up to Rpse_min= 0.5 OHM | Max difference up to Rpse_min= 1 OHM | Max difference | To set spec. with 5mA margin from the max of (Calculated, Simulated, Spec) | | To change Icon-2P_unb in D3.0 |
| | [A] | [A] | [A] | | [A] | [mA] | [mA] | [mA] | [A] | | [mA] |
| **For 2.65m** | | | | | | | | | | | |
| 5 | 0.549 | 0.550 | 0.547 | PASS | -0.001 | - | -1 | -1 | 0.554 | To change to | **554** |
| 6 | 0.680 | 0.682 | 0.679 | PASS | -0.002 | - | -1 | -1 | 0.686 | To change to | **686** |
| 7 | 0.783 | 0.781 | 0.786 | FAIL | 0.002 | 2 | - | 2 | 0.793 | To change to | **793** |
| 8 | 0.889 | 0.932 | 0.866 | PASS | -0.043 | -43 | - | -43 | 0.894 | No change | 932 |
| **For 100m.** | | | | | | | | | | | |
| 5 | 0.497 | 0.550 | 0.483 | PASS | -0.053 | - | -42 | -42 | 0.513 | No change | no change |
| 6 | 0.655 | 0.682 | 0.639 | PASS | -0.027 | - | -15 | -15 | 0.672 | No change | no change |
| 7 | 0.782 | 0.781 | 0.764 | FAIL | 0.001 | 1 | - | 1 | 0.788 | To change to | 788 |
| 8 | 0.930 | 0.932 | 0.912 | PASS | -0.002 | -2 | - | -2 | 0.935 | To change to | **935** |

**The final proposed numbers are the max of both tables.**
**See final spec numbers in darshan_03_0917.pdf for Icon-2P_unb that includes PD calculations when connected to test verification model.**