

Comment (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 typical use of PSE resistive elements to form R_{pse_min} and R_{pse_max} that meet equation 145-15 and when PSE connected to the PSE load specified in Table 145-17, will meet the values I_{con-2P_unb} in Table 145-16.

In D3.0, the maximum value of R_{pse_min} is not limited. R_{pse_max} is function of R_{pse_min} . If R_{pse_min} maximum value is not limited, it will cause the following issues:

(a) The internal PSE power supply open load voltage to significantly increase in order to keep the PSE voltage at the PI 50V min or 52V min pending the PSE Type under load. This will result with working outside the PSE operating voltage range.

(b) power loss at extreme values of R_{pse_min} which doesn't make sense.

(c) Per Equation 145-15, if R_{pse_min} is increased, R_{pse_max} is increased and at higher values of R_{pse_min} (starting at 0.5 ohms at Class 7-8 and 1 ohm at class 5-6), the contribution of R_{pse} to unbalance compared to the channel and PD, resulting with the increase of system unbalance at long cable which violates I_{con-2P_unb} when tested with test verification model in Table 145-17.

(d) there is no practical benefit to increase R_{pse_min} to any value.

(e) The above is not relevant to active current balancing.

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 Class 7 and Class 8.

END OF BASE LINE

Note: R_{pd_min} need to be analyzed in the same way. Results: TBD

See detailed analysis in the next Anex.



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

Because of the above analysis, Icon-2P_unb was updated to allow Rpse_min up to 1 Ω for class 5 and 6, and 0.5 Ω for class 7 and 8.

Class	Icon-2P_unb			PASS/FAIL Calculated vs. Spec.	Difference between calculated and spec values			Max difference [mA]	To set spec. with 5mA margin from the max of (Calculated, Simulated, Spec) [A]		To change Icon-2P_unb in D3.0 [mA]
	Actual calculated [A]	Spec [A]	Simulations [A]		Delta= Calculated - Spec [A]	Max difference up to Rpse_min= 0.5 OHM [mA]	Max difference up to Rpse_min= 1 OHM [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

