Lab tests: Type 3 system End to End Channel pair to Pair Current Unbalance with CAT5e channel

- E2ECP2PRUNB: Test report for 5m and 100m channel
- Results with <5m channel/cable and with low load current will be shown in separate report.

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Yanai Yosef and Yair Darshan, Microsemi.

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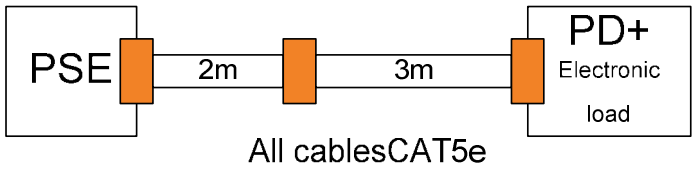
Notes: The results presented in this report is based on systems with components with lower Rmax-Rmin then in table G1 and/or have higher resistance than the worst case component minimum value as presented in Table G1 updated to September 2014. As a result, lower current unbalance values are obtained in addition to the effect of field results that are not a worst case analysis results.

Setup: Short channel, 5m, 1 connector.

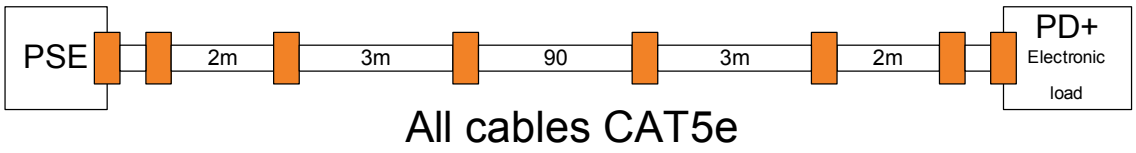


PSE current measure results:

PSE 1		
Powered Device	PD1	
Electronic Load	30W	60W
A+ [mA]	279.3	509.5
A- [mA]	295.4	537.7
B+[mA]	277.9	505.1
B- [mA]	291.9	534.1

PSE 2		
Powered Device	PD1	
Electronic Load	30W	60W
A+ [mA]	271.6	494.5
A- [mA]	295.5	543.1
B+[mA]	282.6	508.8
B- [mA]	291.8	534.1

Setup: long channel, 100m, 4 connector



PSE current measure results:

PSE 1		
Powered Device	PD1	
Electronic Load	30W	60W
A+ [mA]	309.5	558.1
A- [mA]	311.0	569.8
B+[mA]	310.4	568.3
B- [mA]	305.5	558.0

PSE 2		
Powered Device	PD1	
Electronic Load	30W	60W
A+ [mA]	301.7	562.6
A- [mA]	310.0	567.0
B+[mA]	303.1	563.4
B- [mA]	304.7	558.8

***All results are averaged over many units of each PD1 with the same PSE (PSE 1 and PSE 2)**

Results Analysis

Summary:

Note: The results presented in this report is based on systems with components with lower Rmax-Rmin then in table G1 and/or have higher resistance than the worst case component minimum value as presented in Table G1 updated to September 2014. As a result, lower current unbalance values are obtained in addition to the effect of field results that are not a worst case analysis results.

1. Low resistance/current unbalance from 5m to 100m in real systems with CAT5e cables when worst case scenario are rarely happen and when it does, it is mainly a result of bad connectors/cables (aged, dirt, faulty increasing high balance)
2. For <5m channel e.g. 0.5m, resistance unbalance will increase at high current and expected to be even higher at low currents e.g. 10mA.
3. Main contributors for unbalance are PSE and PD components. We can see that for the same cabling system, different results received with different PSE when same PD is used. Other test (not shown with PD2) done with changing PD and using the same PSE resulting with the same conclusions.
4. *Definitely Type 2 magnetics can work with Type 3 systems when worst case analysis numbers are not used.*
5. *The above results are done with one PSE vendor and different PD vendors PD1 and PD2 (PD2 was not shown).*

6. ***The next steps would be:***

6.1 Checking with <5m to represent the real area where we expect higher unbalance.
6.2 Repeat tests with CAT6A/CAT8 cables.
6.3 Repeat test with low current 5-10mA, 100-200uA.

5m Channel

	PSE 1 and PD1			
	30W		60W	
	Runb	Idiff	Runb	Idiff
A pairs	0.25%	1.4	0.43%	4.4
B pairs	0.60%	3.5	0.34%	3.6

	PSE 2 and PD1			
	30W		60W	
	Runb	Idiff	Runb	Idiff
A pairs	-4.21%	-23.9	**-4.68%**	-48.6
B pairs	-1.60%	-9.2	-2.43%	-25.3

100m Channel

	PSE 1 and PD1			
	30W		60W	
	Runb	Idiff	Runb	Idiff
A pairs	-0.24%	-1.5	-1.04%	-11.7
B pairs	0.80%	4.9	0.91%	10.3

	PSE 2 and PD1			
	30W		60W	
	Runb	Idiff	Runb	Idiff
A pairs	-1.36%	-8.3	-0.39%	-4.4
B pairs	-0.26%	-1.6	0.41%	4.6