

IEEE802.3bt

Concerns about Channel Pair to Pair Resistance Unbalance Ad Hoc

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Channel Resistance Model Accuracy is Important

- Maximum pair current drives
 - Magnetics cost
 - MOSFET cost
 - I_{cut} and I_{limit} values
 - Can drive delivered power and stability
- Yair's current proposal will over report current resistance imbalance by 40% for long channels
 - Best value for cable/cordage value is 5%
Long channels approach 5%
 - Error is $(7\% - 5\%) / 5\% = 2/5 = 40\%$

Arriving at a channel resistance imbalance

- If there is a specification (e.g. TIA) site the specification – the simple case
 - Empirical data may also be needed if the parameter is not completely specified (e.g. there is a maximum but no minimum)
- If there is a pending specification, wait for it?
- If there is no spec, nor one pending empirical measurements can be taken
 - Data (not just conclusions) should be presented to the task force for approval including attribution

Channel Imbalance

- Suggested imbalance compromise (Wayne has a better Idea)
 - 5% + 0.1 ohms for a 4 connector channel
 - (PI has two more connectors and will add 0.05 Ohms)
- 5% comes from cable experts, there is no spec
 - One of them is Wayne
 - Who are the others?
 - *Need to list them and the Task Force is ok with the measured data.*
- 0.1 ohms comes from TIA specification
 - See next page

Origin of 0.1 ohms for 4 connectors

- TIA connector specification is 50 mOhm conductor to conductor
- Divide by 2 for a pair => 25 mOhm pair to pair
- 4 connectors worst case is $4 \times 25 \text{ mOhm} = 100 \text{ mOhms} = 0.1 \text{ Ohms}$

ANSI/TIA-568-C.2

6.8.2 DC resistance unbalance

DC resistance unbalance shall be calculated as the maximum difference in DC resistance between any two conductors of a connector pair measured in accordance with IEC 60512, Test 2a.

Category 3 connecting hardware DC resistance unbalance should not exceed 50 mΩ. Category 5e, 6 and 6A connecting hardware DC resistance unbalance shall not exceed 50 mΩ.

Example: no consensus, out of scope topic

- This covers technical details that are out of scope of the channel
- This conclusion appeared without discussion and rebuttals were disregarded

Where we are and where we are going -1

Ad-hoc response, June 24, 2014. TBD

- | | |
|---------------------------------------|---------------------------------------|
| -Single maximum number max. | -Single maximum number MAX. |
| -Voltage and resistance unbalance. | -Voltage and resistance unbalance. |
| -Test setup TBD. 25% -50% range (TBD) | -Test setup TBD. 5% - 20% range (TBD) |

- PD PI need to be better than PSE PI due to its higher effectiveness on end to end unbalance.
- PSE PI needs larger unbalance range to allow different implementations

- Variable Channel Length
- Worst Case Runb
- 7 to 9% (TBD) max. or 0.2Ω max which ever is greater.
- We may need minimum channel resistance definition.
function of # of connectors and cable length

Maximum End to End Channel P2P unbalance
e.g. a single number max, in the 15% to 30% range (TBD).

- Channel capable of regulating/reducing of end to end unbalance as function of channel length.
- PD PI need to be better than PSE PI due to its higher effectiveness on end to end unbalance.
- PSE PI needs larger unbalance range to allow different implementations

Reference material



End to End Current Model including PSE PI, PD PI, and Channel

