Base Line Text for IEEE 802.3BT

IEEE802.3bt – May 2014 Interim

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Motivation

• To define some basic terminology and text markup for the standard
The word “Type” associates with the following parameters
- Class or Category of cabling needed for operation
- Classification Details and supported/requested Power Levels

The same thought process is extended for IEEE 802.3bt with the inclusion of the “new MPS”

New Maintain Power Signature (MPS) – requirement to reduce power consumption while PD is in a mode where it is only sending MPS.
Suggested Terminology

A) Type 1,2 – 2Pair operation will be as per “AT” Already in the Standard
May operate as 4Pair with old MPS

B) Type 3– 4-Pair operation, 0-60W\(^1\), new MPS
- Can use existing Type 2 cable definitions

C) Type 4 – 4-pair operation, 0 - <100W\(^1\), new MPS
- New cable definition needed (cable type, bundle size etc.)

\(^1\) – Mentioned power levels are at the PSE PI

Within Type 3 and Type 4, ways to **identify more granular power levels** should be available. For instance a Type 3 PD and PSE should be able to agree on 15W, 30W or 60W. This is a **must** to allow 4-pair 15W or 4-pair 30W only systems in the field which will cover wider market need in a better way, rather than forcing all 4-pair PSE to be 60W or 100W capable.
Higher Level Details

This presentation covers only higher level details.

• 10GBase-T inclusion

• Per 2-pair detection, monitoring and protection on the PSE.

More in-depth parameters etc., needs to be worked out.
Section 33.1.1 - Objectives

- **Compatibility**—Clause 33 utilizes the MDIs of 10BASE-T, 100BASE-TX, 1000BASE-T, and 10GBASE-T without modification. Type 1 operation adds no significant requirements to the cabling. Type 2 and Type 3 operation requires ISO/IEC 11801:1995 Class D or better cabling and a derating of the cabling maximum ambient operating temperature. The clause does not address the operation of 10GBASE-T. For 10GBASE-T operation, the channel model specified in Clause 55 needs to be met without regard to DTE Power via MDI presence or operation.

NOTE: Once we know the cable details for Type 4 we can add that as well.
Section 33.1.4 – System Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>Type 1 value</th>
<th>Type 2, or Type 3</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal highest DC current per pair</td>
<td>I_{Cable}</td>
<td>A</td>
<td>0.350</td>
<td>0.600(^b)</td>
<td>See Section that covers inter-pair unbalance</td>
</tr>
<tr>
<td>Channel maximum DC pair loop resistance</td>
<td>R_{Ch}</td>
<td>Ω</td>
<td>20.0</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>Minimum cable type</td>
<td></td>
<td></td>
<td>UTP per 14.4 and 14.5(^a)</td>
<td>Class D</td>
<td>See 33.1.4.1, 33.1.4.2</td>
</tr>
</tbody>
</table>

\(^a\) Class D recommended

\(^b\) In Type 3, 60W operation, the current per 2-pair might be impacted by pair to pair system resistance unbalance. See details in <section that covers pair to pair unbalance>

- **For Type 1 and Type 2 systems**, Two twisted pairs are required to source ICable—one carrying (+ ICable) and one carrying (– ICable), from the perspective of the PI. **All 4 twisted pairs, connected from PSE PI to PD PI are required for Type 3 and Type 4 operation.**
Section 33.1.4.1 Cabling Requirements

• “Type 2 and Type 3 operation requires Class D, or better, cabling as specified in ISO/IEC 11801:1995 ….”

• Under worst-case conditions, Type 2 and Type 3 operation requires a 10 °C reduction in the maximum ambient operating temperature of the cable when all cable pairs are energized at ICable (see Table 33–1).

NOTE: Type 4 needs to be added once we have cable parameters for that.
Section 33.1.4.2 Channel Requirement

- **Type 1** and **Type 2, Any Type** operation requires that the channel pair resistance unbalance shall be 3 % or less. **Pair** Resistance unbalance is a measure of the difference between the two conductors of a twisted pair in the 100 Ω balanced.

- Operation over all 4 twisted pairs requires that the channel pair to pair resistance unbalance shall be x% (TBD) or less. **Pair to pair** resistance unbalance is a measure of the difference between the equivalent pair resistance of one of the pairs in the cable to any other pair’s equivalent resistance.

**NOTE:** This can be appended with more information coming out of the End to End Cable Resistance ad-hoc
Section 33.2.3 Pin Assignments

- A PSE shall implement Alternative A, Alternative B, or both. While a PSE may be capable of both Alternative A and Alternative B, PSEs shall not operate both Alternative A and Alternative B on the same link segment simultaneously.
Section 33.3.1 PD PI

• The PD shall be capable of accepting power on either or both of two sets of PI conductors.

• NOTE—PDs that implement only Mode A or Mode B are specifically not allowed by this standard. PDs that simultaneously require power from both Mode A and Mode B are specifically not allowed by this standard.
Thank You