Addendum
Telecommunications Systems Bulletin TSB-184 Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling

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Background

- Power delivery over BASE-T PHYS with specified operation over TIA/ISO cabling
  - 802.3af, 802.3at, 802.3bt

- Coordination with TIA/ISO cabling committees on power delivery - 802.3af and 802.3at
  - TSB-184
    Guidelines for Supporting Power Delivery Over Balanced Twisted-Pair Cabling

Telecommunications Systems Bulletin (TSB)-184-A

- Project Request – June 13, 2014
- Scope Summary:
  - Revise TIA TSB-184 to include considerations for 4-Pair PoE and higher current.
  - The update will focus on increased current levels (up to 1A per pair), specific use cases and installation condition considerations.
  - Examples of the installation conditions to be considered are delivery systems such as conduit, cable tray, and through fire stops.
  - Other areas will include expanding the recommendations on cable bundle sizes, bundling of patch cords, additional cable types and mixing of cable type bundles.

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Scope

The purpose of this document is to provide guidelines that will enable the support of a wide variety of safety extra low voltage (SELV) limited power source (LPS) applications using remote power supplied over balanced twisted pair cabling. Examples of such applications include LAN devices, wireless access points, ANSI/TIA-862-B building automation and security devices like remote cameras, IP telephone and multimedia devices, all of which may be supported by standards such as IEEE Std 802.3™-2012 Clause 33 DTE Power via MDI or IEEE Std. 1394-2008.

The guidelines in this TSB are considered to be in addition to, and not in place of, the infrastructure specified in the ANSI/TIA-568-C series of Standards. The TSB covers the transmission and electrical parameters needed to support power over category 5e or higher performance twisted-pair cabling. The guidelines address various environmental conditions related to the installed cabling, bundled cabling, cabling in conduit, different cabling categories and cable types, and how these may impact the capability of balanced twisted-pair cabling to support remote powering. This TSB provides additional guidelines with respect to:

a) parameters needed for remote powering;
b) references to safety standards;
c) different installation conditions that require special considerations;
d) application considerations;
e) mitigation considerations; and
f) cabling configurations and related field test considerations

The cabling systems detailed in this TSB are designed to support SELV LPS power, as defined in IEC 133 60950-1. Safety and electromagnetic compatibility (EMC) requirements are outside the scope of this TSB

TSB-184-A Status

- April 2015 - second committee ballot circulated
- May 28, 2015 – ballot close

Highlights of revisions based on ballot comment resolution (June 2015)

- Additional details given on installation conditions

Temperature rise is affected by:

1. Installation design including the type of pathways selected, the pathway fill factor, whether the pathway is sealed at both ends.
2. The pathway environment and whether the pathway goes through insulated areas, in which case the type of insulation will have a significant factor. For optimal thermal performance, pathway design should avoid any insulated areas.
3. Thermal aspects of the entire pathway should be taken into account

   To account for installation factors, possible high ambient temperature, the use of 26 AWG cords, and higher currents up to 1A per pair with all 4 pairs energized, the bundle size should be limited to 24 cables per bundle in typical pathway installation conditions (conduit or tray without any insulation).

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- Table with channel DC resistance nominal values will be added.
- The dc resistance unbalance (pair to pair) was changed.
  - From: shall not exceed the greater of 7% (TBD) or 200mΩ.
  - To: shall not exceed the greater of 7% or 100mΩ.
- Three failures in 4877 channels tested. These failures were examined and were determined to be installation specific, and are not due to cable or component deficiency.

- DC resistance unbalance (pair to pair) was clarified using the following equations.

$$Resistance\_Unbalance_{Between\_pairs} = \left(\frac{|R_{P1} - R_{P2}|}{R_{P1} + R_{P2}} \right) 100\%$$

Where:

R_{P1} is the DC parallel resistance of the conductors of a pair.

R_{P2} is the DC parallel resistance of the conductors of another pair.

And

$$R_{PX} = \frac{(R_{C1} R_{C2})}{(R_{C1} + R_{C2})}$$

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•Further clarification on the origin of the TSB-184 data given, “The temperature rise reported in Table A.2 is at the center of the 100-cable bundle “*installed in a conduit*”.

•For all tables and graphs given in the Appendix, the following guidelines will be followed:

- Limit it to 1000 mA
- Provide an indication that values above 15 degrees are not recommended while still providing the numbers
- Truncate tables at 30 degrees

Summary

- Review TIA-184 –A Status