

# **Current Capacity for PoE+**

**(Separately presented to ISO SC25 WG 3 & 802.3at)**

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## List of Supporters

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**Other Supporters Welcome**

# Agenda

- Recap of Developments To-Date
- Constraints and Issues
- Suggestion for Moving Forward

# Recap of Developments To-Date

- Goal is to go beyond 802.3af power level
  - Do no harm to 802.3af
  - Higher capacity over 2-Pairs
  - Target infrastructure of ISO/IEC 11801-1995 Class D or higher
- Discussions for over 1.5 years
  - Formal contributions
  - Liaison letters
  - Discussions within each group
  - Groups include IEEE 802.3at, ISO/IEC SC25 WG3, TIA TR42
- Identified new issues
  - Bundling
  - De-mating
  - Others
- Will quickly review contributions to-date

# Recap: Temperature vs current options

- Use cable temperature margin (if any)
  - This determines the current
- Derating curve
  - Flexibility – difference between ambient and cable rating determines current
- Derating temperature
  - To use IEEE 802.3at the ambient must be X below cable rating
- Any combination of above

Ref [http://www.ieee802.org/3/at/public/may06/law\\_1\\_0506.pdf](http://www.ieee802.org/3/at/public/may06/law_1_0506.pdf)

# Recap: TIA TR42 Contribution

- Worst case results for bundled cables of different categories and different current levels examined
- Temperature rise vs. current per pair curve
- Maximum DC-current per pair 45C ambient given
  - Maximum dc current is 720mA per pair (360 mA per conductor) up to 45 °C maximum ambient temperature for Category 5e, 6 and 6A UTP
- Recommendations on de-rating
  - Bundle power de-rating vs. ambient temperature
  - Current de-rating vs. ambient temperature

Ref [http://www.ieee802.org/3/at/public/jan07/0107\\_TR42\\_1.pdf](http://www.ieee802.org/3/at/public/jan07/0107_TR42_1.pdf)

Ref ISO Interim 2007

ISO/IEC SC25 WG3 & 802.3at, September 2007, Korea

# Recap: Liaison Letters

- Several liaison letters exchanged
- Areas related to
  - Addressing new constraints
  - Clarification of the contributions
  - Backward compatibility of 802.3af
- Will not attempt to summarize each liaison.  
Please refer to the individual communications
- 3N821 and 3N833 as the most recent/relevant liaisons between 802.3at and ISO

Ref ISO, IEEE Servers

# Constraints and Issues

- This attempts to capture discussion in 802.3at
- Objective is to support existing capability and compatibility with 802.3af
  - Would like to retain current capability and not make existing deployments non-compatible simply with a new standard
- Dynamic measurement of bundle size is impractical
  - Not something easily automated by Si or Sys
- 45C may be too low. Too close to Sys Op Temp
- Bundling and cabling temp are not items that most IT managers are familiar with

# Constraints and Issues Contd.

- Dynamic measurement of cable's ambient temperature is impractical
  - Not something to be easily automated by Si or Systems. Equipment often cooled and/or maybe in a different environment than cabling
  - Question of average temperature vs. worst case temperature on a link-segment
- Most PDs will have a fixed power consumption or range dependent on operating modes. It is not practical to have a PD's power consumption be dependent on the ambient temperature of the cable

# Suggestion for Moving Forward

- Looking back at our options and constraints, it seems that we are closest to 3<sup>rd</sup> option
  - Derating temperature: To use IEEE 802.3at the ambient must be TBD below cable rating
- Suggested next steps
  - ISO agrees to a Temperature vs. Current graph
    - Based on TR42, model, other or combination
  - IEEE can look to provide feedback on what TBD is.
    - Based on current info range is  $0C < TBD < 15C$
    - E.g. For a 60C rated cable the range is  $45C < TBD < 60C$
  - ISO updates their standard for capacity @ TBD
  - IEEE uses this capacity in 802.3at, ref ISO