IEEE802.3at Task Force

Technical Review of
Multiple Classification Attempts/Ping Pong

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Background

- The concept is based on repeating the classification cycles done by the PSE.
- Requires reasonable changes in PSE and PD compared to IEEE802.3af.
- The Time Based concept and the Ping-Pong are currently two different concepts that are both considered as good candidates.
- A Requirements Analysis[1] done for the time based in November 2005 and the discussions during the add-hoc meetings were used to focus on a list of requirements that may help us to extract the differences and form some “compliance table”

List of requirements tested

- Number of available 802.3at classes within 75ms time frame
  - Time required for 802.3af cycle + 3 fingers
  - Number of “illegal” codes
    - Codes with consecutive 4,4,4 that can not be used due to legacy non compliant PDs that are using class 4
    - Codes with class-0 that cant be used as 802.3at code since they are 802.3af codes or errors

- 802.3at PSE connected to 802.3af PD may cause PD current to turn OFF whenever Vclass is above or below 802.3af range hence generating class-0 error codes.
  - On the other hand, 802.3at PSE that using voltage change within 802.3af range may look like 802.3af PSE with poor load regulation during Vclass operation which was addressed by the ping-pong by using the voltage steps at >20.5V or <15.5V levels which is a valid solution in similar way to the Time Based concept.

Time required for 802.3af cycle + 3 fingers

- 802.3af cycle:
  - 10ms minimum (according to 802.3af)
  - 10ms for testing (TBD)
  - Total for 802.3af cycle=20ms
- 802.3at tests
  - N fingers takes N*5ms pulse width
  - Current steady state time at the PD: 2 to 5ms (TBD)
  - PSE start testing 4 to 10ms (TBD)
  - PSE test time 10ms (TBD)
  - Total for 802.3at cycles: N*(5ms+4ms+10ms)=N*19ms min
    N*(5ms+10ms+10ms)=N*25ms max
- Total classification time: 20ms+N*19ms=75ms ➔ Nmax=55ms/19ms=2.89 cycles
- Total classification time: 20ms+N*25ms=75ms ➔ Nmin=55ms/25ms=2.2 cycles
- Hence 3 fingers is marginal and 2 finger max may be used which reduced the number of available classes.
- To further check if optimizing TBDs may increase back to 3 fingers?
- Or if 2 fingers are enough.

Number of “illegal” codes

- Codes with consecutive 4,4,4 that can not be used due to legacy non compliant PDs that are using class 4.
- Codes with class-0 that can’t be used as 802.3at code since they are 802.3af codes or errors
- Findings:
- In addition to:
- {0,x,x,x}, {x,0,x,x}, {x,x,0,x}, {x,x,x,0}
- There are more:
- {0-4,0-4, 0-4, 0-4} with all the permutations.
- The total sum of non 802.3at codes are higher and need to be investigated
- There are some solutions for this problem however we should address it after we set the minimum number of classes that we wish to support.

Current interruptions due to Vclass N.E 802.af range

- If 802.3af PD connected to 802.3at PSE with Vclass N.E to 802.3af range, current is not defined.
- Hence class-0 error can be generated or other I_class levels.
- Solution: Like in time based concept we need to include current signature which is already inherent in the concept and cost nothing.
- Need further work to define this signature.

Summary

- Ping Pong meets most of the requirements.
- In order to complete it we should carefully count the total number of non 802.3at codes and find the real number of usable 802.3at codes.
- In addition, for reliable operation, current signature need to be considered here as in the time based concept.
- After re checking the ping-pong with the suggested action items we can compare it to the time based concept which currently has no problems with the above issues.

References

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2. An Extended Classification Proposal – Proposal #1, Yair Darshan, November 2005.
3. Time based concept updaes . Yair Darshan, March 2006.
4. Recommended guidelines for enhanced classification concepts. Yair Darshan Nashua, NH September 2005
5. IEEE802.3at list of objectives:
   http://www.ieee802.org/3/poep_study/802_3_poep_objectives.pdf
6. Classification Worst case Analysis, Yair Darshan, March 2006.