Layer 1 Method to Detect 4PPoE Capable Legacy Type 1 & 2 PD Ad Hoc

September 2014

Meeting #6: Thursday September 4, 2014
Meeting #5: Thursday August 28, 2014
Meeting #4: Thursday August 14, 2014
Meeting #3: Wednesday June 25, 2014
Meeting #2: Wednesday June 11, 2014
Meeting #1: Wednesday June 4, 2014

David Tremblay

HP

david.tremblay@hp.com

Ad Hoc Report – September 2014

Participants:

Pavlick Rimboim / Microsemi

Yair Darshan / Microsemi

Shahar Feldman / Microsemi

David Tremblay / HP

David Law / HP

Lennart Yseboodt / Phillips

David Abramson / TI

Jean Picard / TI

Gaoling Zou / Maxim Integrated

Fred Schindler / Seen Simply

Sesha Panguluri / Broadcom

Christian Beia / ST

George Zimmerman / Employer: CME Consulting, Affiliation: Commscope

Kousi Balasubramanian / Cisco

Miklos Lukacs / Silabs

Jeff Heath / Linear Technology

Dave Dwelly / Linear Technology

Yan Zhuangyan / Huawei

Geoff Thompson / GraCaSI S.A./Linear

Ken Bennett / Sifos

Ad Hoc Report – September 2014

Scope and Objectives

Review technical feasibility of a layer 1 (physical layer) method to detect 4-pair PoE capable legacy Type 1 & 2 PD devices and provide recommendation to the BT task force.

Technical Contributions

David Law – law_1_0614.pdf

Yair Darshan - darshan_6_0914_rev_05a.pdf

Dave Dwelly - dwelley_01_0914.pdf

Status

Achieved technical feasibility and propose the following motions.

Ad Hoc Report – September 2014

Motion 1

The BT project shall require a PSE to successfully complete a 4P-ID test before enabling power over all 4 pairs to Type 1 & 2 PDs.

Mover: David Tremblay

Seconder: Koussalya Balasubramanian

Y: 33   N: 0   A: 1

Ad Hoc Report – September 2014

Motion 2

The BT project will include a physical layer test to qualify Type 1 & Type 2 PDs, including those in the installed base, to receive power over all 4 pairs. This would, in turn, allow a 4-pair PSE to transmit 4-pair power to a Type 1 or 2 PD that passes such a test, which shall be a conformant mode within BT.

Mover: David Tremblay

Seconder: Lennart Yseboodt

Y: 29   N: 0   A: 5

Ad Hoc Report – September 2014

Motion 3

The BT project shall create a 4P-ID adhoc to recommend the L1 test criteria to qualify Type 1 and Type 2 PDs to receive power over all 4 pairs.

Mover: David Tremblay

Seconder: Fred Schindler

Y: 24   N: 0   A: 9

All Meeting Minutes

Please see summary of items discussed during our 6th Adhoc meeting on Thursday Sept 4, 2014.

9:00 am Meeting Start

1.   Roll call

Record attendance, attendees' names and affiliations (please email David Tremblay <david.tremblay@hp.com> a note confirming attendance)

Sept 4, 2014 Attendance List, please let me know if you attended and do not see your name below:

1. Pavlick Rimboim / Microsemi
2. Yair Darshan / Microsemi
3. David Tremblay / HP
4. David Law / HP
5. David Abramson / TI
6. George Zimmerman / Employer: CME Consulting, Affiliation: Commscope
7. Kousalya Balasubramamian / Cisco
8. Dave Dwelly / Linear
9. Geoff Thompson / GraCaSI S.A./Linear
10. Lennart Yseboodt / Phillips
11. Miklos Lukacs / SiLabs

2.   Reminder of IEEE patent policy

www.ieee802.org/3/patent.html

3.   New business for this ad hoc meeting:

A. Reviewed portions of dwelley_01_0914.pdf slides relevant to this Adhoc at: http://www.ieee802.org/3/bt/public/sep14/index.html

> Highlights single channel PSE technical feasibility using pollution test to detect Type 1 & 2 PDs
>
> Comments received:
>> Provide economic and technical feasibility
>>
>> Provide results of pollution test using a real PD
>>
>> Provide results using a MOSFET bridge PD implementation
>>
>> Will pollution test conform to existing IEEE clause 33 criteria?
>>
>> Yair will send Dave D. a list of his concerns for comments/feedback

B. Review any general opposition with Yair's option 1 & 2 PD detection methods?

Fred's comments via email:

> I did hear that the group believes legacy PDs with a single power consumption point may be powered using both Alternatives. I still disagree with this because behavior is not defined for legacy PDs that are powered using both Alternatives. I will be traveling to the Ottawa meeting next Thursday and will not attend that adhoc call. However, I attached slides that may be used to discuss my concern. I do believe PD vendors may have created proprietary 4P solutions by determining whether the PD is 2P or 4P powered. Since the IEEE did not define 4P powering, I believe the IEEE should not dictate new behavior for legacy compliant devices. I understand many legacy PDs may be powered using 4P but feel that if interoperability is the #1 goal for the IEEE then a complete L1 4P-ID solution has not been found.

Adhoc response – request Fred to provide a specific example of real PD in the market implementing such a proprietary implementation that is also Type 1 or 2 compliant. If such a PD exists, it would be good to investigate further and add to the proof of concept testing.

C. Review proposed motions for approval during IEEE Kanata meeting

Motion1

> BT project shall require a PSE to successfully complete a 4P-ID test before enabling power over all 4 pairs to Type 1 & 2 PDs.

 Motion2

> The BT project will include a physical layer test to qualify a PD in the installed base of Type 1 & Type 2 PDs to receive power over all 4 pairs. This would, in turn, allow a PD that passes such a test to receive 4-pair power, which shall be a conformant mode within BT.

D. Update proof of concept for Yair's proposed option 1 & 2 PD detection using existing Type 1 & 2 PDs in the market?

Sesha Panguluri Updates (not present)

Yair Darshan's Updates:

> See darshan_6_0914_rev_05a.pdf posted at: http://www.ieee802.org/3/bt/public/sep14/index.html

E. Review any opposition to delivering 4PPoE power to Type 1 & 2 PDs after successful completion of option 1 & 2 detection methods?

> Did not review during this adhoc meeting. Will follow up and discuss via email.

4.   Closing Discussion

Next steps/future meetings
    None
Review action items from this meeting
    AI: Send proposed motions to adhoc for review and feedback over email
        David Tremblay – done: Sept 4, 2014
    AI: Provide adhoc report to BT task force
        David Tremblay – due: Sept 9, 2014
Future presentations & contributions
    None

10:20 am meeting end

Please see summary of items discussed during our 5thAdhoc meeting on Thursday Aug 28, 2014.

9:00 am Meeting Start

1.   Roll call

·   Record attendance, attendees' names and affiliations (please email David Tremblay <david.tremblay@hp.com> a note confirming attendance)

Aug 28, 2014 Attendance List, please let me know if you attended and do not see your name below:

1.   Pavlick Rimboim / Microsemi
2.   Yair Darshan / Microsemi
3.   Shahar Feldman / Microsemi
4.   David Tremblay / HP
5.   David Abramson / TI
6.   Jean Picard / TI
7.   George Zimmerman / Employer: CME Consulting, Affiliation: Commscope
8.   Kousalya Balasubramamian / Cisco
9.   Sesha Panguluri / Broadcom
10.   Gaoling Zou / Maxim
11.   Dave Dwelly / Linear
12.   Geoff Thompson / GraCaSI S.A./Linear

2.   Reminder of IEEE patent policy

www.ieee802.org/3/patent.html

3. New business for this ad hoc meeting:

A.   Review proof of concept for Yair's proposed option 1 & 2 PD detection using existing Type 1 & 2 PDs in the market?

 Sesha Panguluri (not present)

Yair Darshan's Updates:

>We need to complete 3 checking tasks during the proof of concept test. Full report may be available after the Sept interim meeting. Testing includes Type 1 & 2 PDs but we could create damage on some legacy PDs. Identify a reference set of legacy PDs to test.

>Next steps – detection option 1 & 2 PD – done. Next, check any issue with algorithm when applying power on A or B and detect power issue. Use a two load interface PD and disconnect invalid signature option to check the algorithm flow. No need to monitor current b/c it's done today on both alternatives.

·   AI: Adhoc provide feedback on a reference list of legacy PDs for test consideration

·   AI: David T obtain update from Sesha regarding test methodology

B.   Review any general opposition with Yair's option 1 & 2 PD detection methods?

·   David T requested feedback received on Yair's rev004 presentation given at the IEEE Plenary in San Diego

·   Dave Dwelly's Feedback

  o   Page 12 – IEEE Standards require PDs to accept 57V on all pins without damage

  o   Page 14 – Choices should be power only 2pair or deny power

  o   David Law – the IEEE 57V on all pins specification could be improved moving forward

  o   Yair's presentation is a valid example of successful detection of PD designed as option 1 or 2 but this is not the only method to complete detection. Would like to see each pair validated independently but not mandated to include a separation in time between Alt A and B

  o   George Zimmerman – PHY sub-clause also includes similar 57V withstand requirements and is open to discussing cross sub-clause requirements for sub-clause 33 consideration

·   AI: Yair will provide David T the San Diego Plenary feedback received on the rev004 presentation

C.   Review any opposition to delivering 4PPoE power to Type 1 & 2 PDs after successful completion of option 1 & 2 detection methods?

  o   We acknowledge there are other methods of completing the detection which should be discussed during Task Force to move forward.

  o   Geoff Thompson will provide wording for Task Force motion to provide 4PPoE to Type 1 & 2 PDs

   AI fulfilled by motion text supplied below

  o   David Law – suggest we include energy efficiency in the wording. We accept LLDP but there is an overwhelming consensus to include physical layer detection and have at least one candidate proposal

  o   Adhoc consensus is to deliver 4PPoE power based on physical layer detection of Type 1 & 2 PDs

  o   Hold off on discuss alternative detection methods during future adhoc discussions

D.   Propose Adhoc present a motion to the task force for approval

·   Motion

  o   The BT project will support a physical layer test to qualify the installed base of Type 1 & Type 2 PDs to receive power over all 4 pairs and shall include such a test in the BT standard. This would, in turn allow them to receive 4-pair power, which shall be a conformant mode within BT.   Yair has proposed a candidate test which seems to satisfy the requirement

4.   Closing Discussion

·   Next steps/future meetings

o   Agenda Topics for Sept 4 Adhoc

§ Review Dave Dwelly's contribution

§ Review Fred Schindler's email feedback

§ Discuss approval of motion in preparation for .bt Task Force meeting in Ottawa

§ Geoff – propose we conclude this adhoc based on the motion and recommend the .bt Task Force open a new adhoc to complete the test work

·   Review action items from this meeting

o   AI: Yair will provide David T the San Diego Plenary feedback received on the rev004 presentation

§ **Yair Darshan** – due: Sept 4, 2014

o   AI: Adhoc participants provide feedback on a reference list of legacy PDs for test consideration

§ **Adhoc** – due: Sept 4, 2014

o   AI: Contact Sesha regarding test methodology planned for proof of concept testing

§ **David Tremblay** – done Aug 29, 2014

o   AI: Provide new technical contributions

§ **Dave Dwelly** – due Tue: Sept 2, 2014

·   Future presentations & contributions

o   Sept 4, 2014 @ 9am PST – Dave Dwelly's Contribution

10:26 am meeting end

Please see summary of items discussed during our 4thAdhoc meeting on Thursday Aug 14, 2014.

9:00 am Meeting Start

1.   Roll call

Record attendance, attendees' names and affiliations (please email David Tremblay <david.tremblay@hp.com> a note confirming attendance)

Aug 14, 2014 Attendance List, please let me know if you attended and do not see your name below:

1.   Pavlick Rimboim / Microsemi
2.   Yair Darshan / Microsemi
3.   Shahar Feldman / Microsemi
4.   David Tremblay / HP
5.   Lennart Yseboodt / Phillips
6.   David Abramson / TI
7.   Jean Picard / TI
8.   George Zimmerman / Employer: CME Consulting, Affiliation: Commscope
9.   Kousalya Balasubramamian / Cisco
10. Sesha Panguluri / Broadcom
11. Ken Bennett / Sifos
12. Sesha Panguluri / Broadcom
13. Miklos Lukacs / SiLabs

2.   Reminder of IEEE patent policy

www.ieee802.org/3/patent.html

3. New business for this ad hoc meeting:

Review Adhoc Scope and Objectives

Review submitted contributions – Slide 14-15 of Yair's Rev 004 Presentation

Comments & Questions:

Slide 14 clarification #1 – The box labeled "Additional information that permits 4p operation?" should include a side note clarifying the intention of this box. What does it do?

Slide 14 clarification #2 – Add text clarifying if support of non-compliant Type 1 & 2 PDs is required and why.

Can we validate slide 15 algorithm with lab experimentation?
Yes, PSE FW modifications can be implemented as a proof of concept

Who can volunteer to lead a proof of concept for the option 1 & 2 PD detection using existing Type 1 & 2 PDs in the market? Timeframe for completion is 2-3weeks.
Volunteers:
Yair Darshan
Sesha Panguluri (checking schedule availability)

Any general opposition with Yair's option 1 & 2 PD detection methods?
Adhoc Members – provide your response to this email distribution

Any opposition to delivering 4PPoE power to Type 1 & 2 PDs after successful completion of option 1 & 2 detection methods?
Adhoc Participants - provide your response to this email distribution
Recommendation to take a straw poll during the next task force meeting

Jeff Heath requested presentation time during the Aug 28 Adhoc
Granted – please provide presentation by Tue Aug 26 for Adhoc review

Presenters please note:
If you are planning to submit a contribution for this ad hoc meeting, please notify David Tremblay
Contributions are encouraged to be submitted the Tue before the scheduled Adhoc meeting

4. Closing Discussion

Review action items from this meeting

      AI: Send meeting minutes from Aug 14 Adhoc

            David Tremblay – Done: Aug 18, 2014

      AI: Respond to all concerns and questions raised during Yair's presentation

            Yair Darshan – due Tue: Aug 26, 2014

      AI: Confirm volunteer availability to lead proof of concept experimentation with Broadcom PSE

            Sesha Panguluri – due ASAP

      AI: Provide new technical contributions

            Jeff Heath – due Tue: Aug 26, 2014

Future presentations & contributions

      Aug 28, 2014 @ 9am PST – Jeff's Contribution

Next steps/future meetings

      Please provide feedback to both questions below:

            Any general opposition with Yair's option 1 & 2 PD detection methods?

            Any opposition to delivering 4PPoE power to Type 1 & 2 PDs after successful completion of option 1 & 2 detection methods?

10:10 am meeting end

Please see summary of items discussed during our 3rd Adhoc meeting on Wed June 25, 2014

9:00 am Meeting Start

1.   Roll call

Record attendance, attendees' names and affiliations (please email David Tremblay <david.tremblay@hp.com> a note confirming attendance)

June 25, 2014 Attendance List, please let me know if you attended and do not see your name below:

1.   Pavlick Rimboim / Microsemi
2.   Yair Darshan / Microsemi
3.   David Tremblay / HP
4.   David Law / HP
5.   Lennart Yseboodt / Phillips
6.   David Abramson / TI
7.   Jean Picard / TI
8.   Gaoling Zou / Maxim Integrated
9.   Fred Schindler / Seen Simply
10.   Sesha Panguluri / Broadcom
11.   Christian Beia / ST
12.   George Zimmerman / Employer: CME Consulting, Affiliation: Commscope
13.   Kousi Balasubramanian / Cisco
14.   Miklos Lukacs / Silabs
15.   Jeff Heath / Linear Technology
16.   Yan Zhuangyan / Huawei

2.   Reminder of IEEE patent policy

www.ieee802.org/3/patent.html

3. New business for this ad hoc meeting:

Review Adhoc Scope and Objectives

Review submitted contributions

Summary – see Yair's updated slides attached

Comments & Questions:

Slide 8, David T – should we consider option 2a as part of this adhoc discussion? (option 2a = non-compliant type 1 or 2 PD when arrow disconnected – disables invalid signature on unused pair)?

Response- Yair and Fred – although the example shows a non-compliant Type 1 & 2 PD implementation, it should be considered for our discussion since it could be powered via 4pair

Fred – A type 1 device configured as option 1 or option 2 could have load configured to draw power under type 1 or 2 (2pair only) power specs but then could draw more power than specified by Type 1 limits after 4pair has been applied which could lead to an interoperability problem. Our challenge is do these PDs exist and could we run into interop issues by powering these devices? Fred is working on a presentation addressing this specific condition for IEEE and will provide a preview to this adhoc.

Yair – Q1 since we want to enable type 1 & 2 PD to operate over 4p and could lead to IoP issues under higher power draw without damage, how important is it to maintain IoP requirement?

David Law – Would be wonderful if we could enable 4pair power to existing Type 1 & 2 devices existing in field while maintaining compliancy

How does IEEE determine what is and is not compliant based on interpretation with the IEEE spec, is it voting, etc?

Law – How does the Task Force proceed with a decision to move forward – 75% voting approval

Law – What products are considered standards compliant or not – we are not discussing this here.

Fred – If we check off all IEEE PICs then we should consider it compliant but if we connect this compliant device to a 4p PSE and there's an IoP issue then we will have a problem

Law – we are not voting on what is compliant or not

George – We are discussing what is compliant or not and should not be considered in voting discussions for Task Force or IEEE SG. We could discuss which devices may not be interoperable, identify the risk and recommend to IEEE how to handle these devices.

Yair – Are we agreeing that PD or PSE meets standard PICS is a compliant device?

Law – We want to grandfather existing products into the standard

Yair's notes & questions:

Fred: Type 1/2 PD, option 1 is compliant when work at 2P and stop working when get 4P because if it sees 4P power, it was designed to get more power.

Yair: Valid point and we need to address it. It means that we cannot be 100% sure that option 1 PD when get 4P.

David Law: If I have compliant PD used to work in 2P system, connected to compliant 4P PSE (we upgrade the system..), and it is not work, it is a problem.

Yair: Are we agree that a PD or PSE that meets the standard (PICs etc.) is a compliant device?

David/George: We are not in the business of deciding what is compliance or not. We define what is interoperable or not.

David: We do trying to grandfather existing products

Yair: The key issue is the focus on Fred concern. Which is how we sure that Type 1/2, option 1 PD, is 4P capable at 100% probability.

David Tremblay: Fred to send us preview of his material.

4.   Closing Discussion

Review action items from this meeting

AI: Send meeting minutes from June 25 Adhoc

David Tremblay – Done: June 25, 2014

AI: Schedule additional Adhoc meeting the week before IEEE (target July 9, 2014)

David Tremblay – due Mon: June 30, 2014

AI: Send preview of IoP issues when powering Type 1 or 2 PDs with 4pair power from Fred's IEEE presentation

Fred Schindler – due Mon: June 30, 2014

AI: Respond to all concerns and questions raised during Yair's presentation

Yair Darshan – due Mon: July 7, 2014

AI: Send additional questions, comments or concerns on Yair's solution proposal and Fred's IoP preview to the Layer 1 Adhoc distribution to gain further progress and build consensus for solution

Adhoc attendees – due Mon: July 7, 2014

AI: Provide new technical contributions

Adhoc attendees – due Wed: July 9, 2014

Future presentations & contributions

July 9, 2014 @ 9am PST – Contributions TBD

 Next steps/future meetings

Please provide contributions for Wed July 9 Adhoc meeting

10:10 am meeting end

Please see summary of items discussed during our 2nd Adhoc meeting on Wed June 11, 2014

9:00 am Meeting Start

1.   Roll call

Record attendance, attendees' names and affiliations (please email David Tremblay <david.tremblay@hp.com> a note confirming attendance)

June 11, 2014 Attendance List, please let me know if you attended and do not see your name below:

1.   Pavlick Rimboim / Microsemi
2.   Yair Darshan / Microsemi
3.   David Tremblay / HP
4.   Lennart Yseboodt / Phillips
5.   David Abramson / TI
6.   Jean Picard / TI
7.   Gaoling Zou / Maxim Integrated
8.   Fred Schindler / Seen Simply
9.   Sesha Panguluri / Broadcom
10. Yan Zhuang / Huawei

2.   Reminder of IEEE patent policy

www.ieee802.org/3/patent.html

3. New business for this ad hoc meeting:

Review Adhoc Scope and Objectives

Review submitted contributions

     Summary – see Yair's two part slides attached

        Comments & Questions:

           Jeff H: Slides 5 & 6 - It needs to be emphasized that the 2 PD one may not be deigned to simultaneously require power on both pairs.

Response: Option 2 PDs are NOT intended to draw power on both mode A & B simultaneously. The PD diagrams are intended to show real PD implementations with individual diode bridge on Mode A & B

           Jeff H: Slide 7 - Per our previous conversations a PD must withstand 57V on both pairs without damage. I would continue to invite Yair and others to bring one of these to 'bt' so we can see that it is real, and compliant.

Response: This PD is real product, intended for backup power. Only load 1 or load 2 are active but not both at same time. Line between two PD ICs shows only 1 active and disables the 2nd detection but if 4P power applied then may damage either or both PD modes b/c not intended for power to be delivered on both modes simultaneously

           Jeff H: Slide 8 - The compliant PD will not be damaged.

           David T: Slide 9 – Option 2 PD implementations are defined as a PD with separate diode bridges for Mode A & B (NOT shorted together). Variation of option 2 includes a PD with two separate loads with only 1 active load while the 2nd load is redundant only (Option 3)

           David T: Slide 10 - Option 1 PD implementations are defined as a PD with all diode bridges shorted (Mode A & B are connected together)

           Yair: Slide 11 – Key to layer 1 4P-ID, when a PD becomes powered via the PI, it shall present a non-valid detection signature on the set of pairs from which it is not drawing power

           Fred: Confused on discovering between dual PD or single PD load detection. Can someone explain it? Not clear so concerned how to do complete detection and if it will work.

Response - Needs additional thought into all possible permutations and Yair/others will present more details at future adhoc meetings

           Fred: For option 2 PD implementations, if a PD doesn't generate an invalid detection signature on the unused Mode should it be OK to power?

           Do we know of a PD in the market that can be damaged if 4P power applied?

           Gaoling: if you know the PD can't handle the extra 4pair power thermally, then PD designer may put extra protection circuitry to not allow the 4pair power draw

           Yair: Most PD solutions in the market have not thought about designing to support 4pair power so we can't just say all PD vendors are designing capable to support 4P power

Presenters please note:

> If you are planning to submit a contribution for this ad hoc meeting, please notify David Tremblay
>
> Contributions are encouraged to be submitted the Mon before the scheduled Adhoc meeting

4. Closing Discussion

Review action items from this meeting

> AI: Respond to all concerns raised during Yair's solution presentation
>
> > **Yair Darshan** – due Wed: June 18, 2014
>
> AI: Send additional questions, comments or concerns on Yair's solution proposal to the Layer 1 Adhoc distribution to gain further progress and build consensus for solution
>
> > **Adhoc attendees** – due Wed: June 18, 2014
>
> AI: Provide new technical contributions
>
> > **Adhoc attendees** – due Wed: June 18, 2014

Future presentations & contributions

> June 18, 2014 @ 9am PST – Contributions TBD
>
> June 25, 2014 @ 9am PST – Contributions TBD

Next steps/future meetings

> Please provide contributions for Wed June 18 Adhoc meeting

10:00 am meeting end

Please see summary of items discussed during our 1st Adhoc meeting on Wed June 4, 2014

9:00 am Meeting Start

1. **Roll call**

Record attendance, attendees' names and affiliations (please email David Tremblay <david.tremblay@hp.com> a note confirming attendance)

  June 4, 2014 Attendance List, please let me know if you attended and do not see your name below:

    1. Pavlick Rimboim / Microsemi
    2. Yair Darshan / Microsemi
    3. Jeff Heath / LTC
    4. David Tremblay / HP
    5. David Law / HP
    6. Christian Beia / ST
    7. Lennart Yseboodt / Phillips
    8. David Abramson / TI
    9. George Zimmerman / Employer: CME Consulting, Affiliation: Commscope

2. **Reminder of IEEE patent policy**

www.ieee802.org/3/patent.html

3. New business for this ad hoc meeting:

Review Adhoc Scope and Objectives

      Summary – see David Tremblay's slides attached (combined)

            Highlighted objectives and scope for this adhoc

            Modified IS and IS NOT text with friendly amendments

            Although new .bt PDs are out of scope for this adhoc, learnings may be considered for new .bt types

Review submitted contributions

      Summary – see David Law's slides attached (combined)

            Highlighted need to identify IEEE 802.3 (clause 33) compliant Type 1 & 2 PDs capable of receiving power on all 4 pairs

            4pair Layer 1 identification enables inclusion of IEEE compliant legacy (Type 1 & 2) PDs not capable of supporting LLDP TLV via SW upgrade

            Example of 4Pair capable Layer 1 identification could be to use PD dual diode bridge to detect resistor on both pairs and between pairs

            Discussed two possible detection method categories:

                  Detect a Type 1 & 2 PD that IS capable to be 4Pair powered

                  Detect a Type 1 & 2 PD that IS NOT capable to be 4Pair powered

            Discussed different PD configurations which may/may not be compliant with IEEE specifications

            Discussed need to maintain existing IEEE PSE/PD PI requirements

      Presenters please note:

o   If you are planning to submit a contribution for this ad hoc meeting, please notify David Tremblay

o   Contributions are encouraged to be submitted the Mon before the scheduled Adhoc meeting

4.   Closing Discussion

Review action items from this meeting

      AI: Send request to 802.3bt reflector inquiring about examples of Type 1 & 2 PDs that would NOT correctly work when powered on 4pairs

            Lennart Yseboodt – Completed on June 5, 2014

      AI: Provide technical contributions highlighting a Layer 1 method to detect a Type 1 & 2 PD that IS or IS NOT capable to be 4pair powered

            Adhoc attendees – June 11, 2014

Future presentations & contributions

      June 11, 2014 @ 9am PST – Contributions TBD

      June 18, 2014 @ 9am PST – Contributions TBD

      June 25, 2014 @ 9am PST – Contributions TBD

Next steps/future meetings

      Please provide contributions for Wed June 11 Adhoc meeting.

10:00 am meeting end