Applying 4P Power to Type 1 and Type 2 PD designs

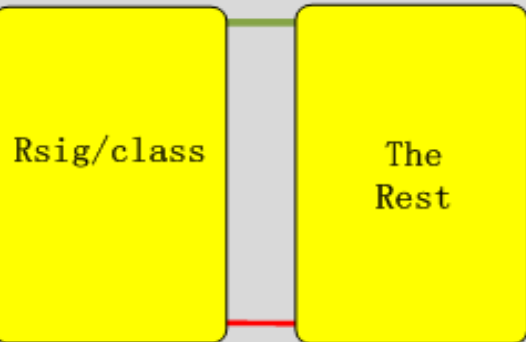Yan Zhuang, Huawei Technologies

Rui Hua, Huawei Technologies

Outlines

➢ **Potential Type 1 and Type 2 PD designs**

➢ **How these potential PD designs work with different deployments of Type 1/2 PSEs**
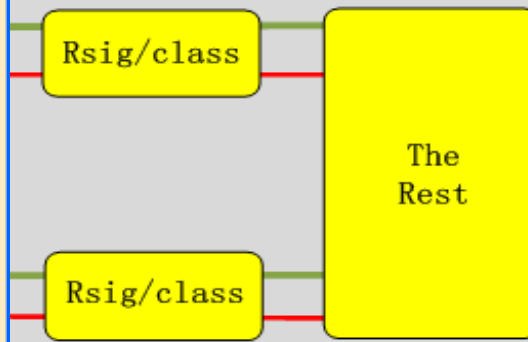
➢ **Things to be considered**
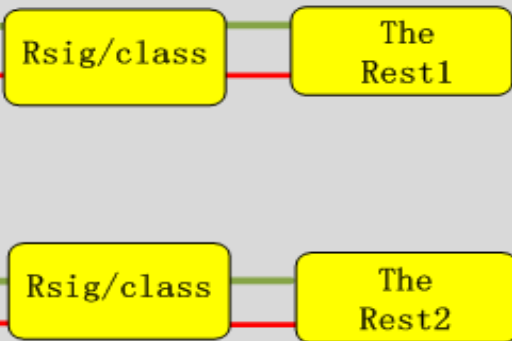
Potential PD designs

Signal signature with one load	Dual signatures with one load
➢ One set of detection signature and classification signature on PD PI.	➢ Two sets of detection signature and classification signature on one PD PI. ➢ Provide single load to equipment.

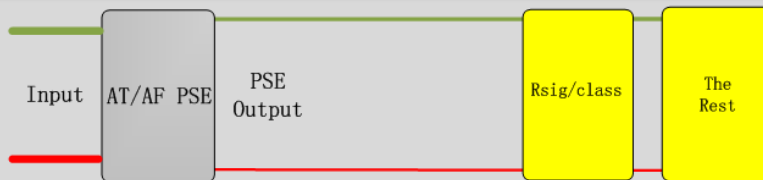| Dual signatures with two load	To be compatible with .at, PD designs Shall follow
➢ Two sets of detection signature and classification signature on one PD PI. ➢ Provide dual loads to equipment.	• 802.3at-2012 33.3.1: *The PD shall be capable of accepting power on either of two sets of PI conductors.* • 802.3at-2012 33.3.1: *The PD shall withstand any voltage from 0 V to 57 V at the PI indefinitely without permanent damage.* • 802.3at-2012 33.3.1: *PDs that simultaneously require power from both Mode A and Mode B are specifically not allowed by this standard.*

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Outlines

➢ **Potential Type 1 and Type 2 PD designs**

➢ **How these potential PD designs work with different deployments of Type 1/2 PSEs**

➢ **Things to be considered**

Single Load PD with a single signature

Normal Connection

One PSE PI on the other end of the link
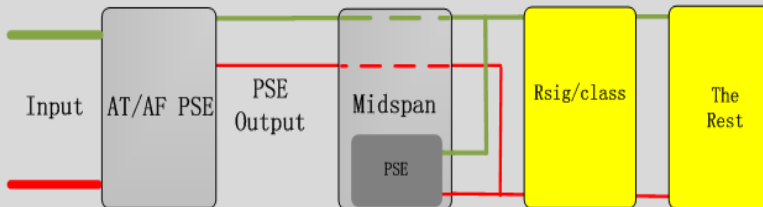
> Type 1/Type 2 PSE detects two pair and **provides power on the 2P.**

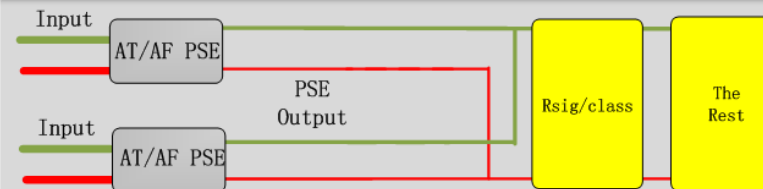**Midspan in the middle**

A midspan in the middle of a link segment.

> If detecting successively, PSEs may provide power on 4P or one of the two 2Ps.
> If detected simultaneously on both 2Ps, the detection on each 2P will interfere each other and **PSEs won't get the good signature and can not power up.**
> **PSEs may provide power on 4P or 2P or not.**

Y-Cable Connection on PSE side

Two separate PSEs are connected to PD through Y-Cable.

> The same as midspan in the middle, **PSEs may provide on 4P or 2P or not.**

- *The PD is capable of powering over either of the two 2Ps, while doesn't require power simultaneously from both Mode A and Mode B.*
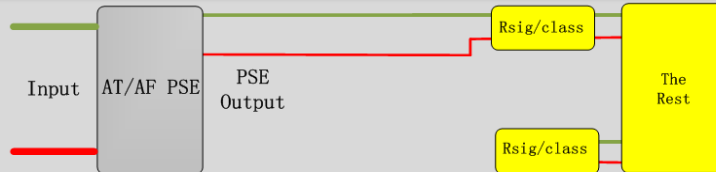- ***Type1/2 PSE(s) deployments may provide power on 4P.***

Single Load PD with Dual signatures

Normal Connection

One PSE PI on the other end of the link

Endpoint /Midspan PSE

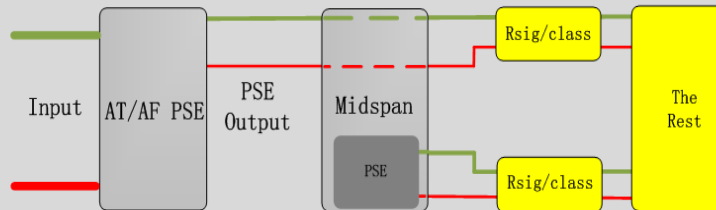Input — AT/AF PSE — PSE Output — Rsig/class — The Rest — Rsig/class

➢ Type 1/Type 2 PSE detects one of the two pair and **provides power on the 2P.**

Midspan in the middle

A midspan in the middle of a link segment.

Endpoint /Midspan PSE

Input — AT/AF PSE — PSE Output — Midspan — PSE — Rsig/class — The Rest — Rsig/class

➢There shall be interlock between two Rsig/class to remove one while the other channel is powered. (802.3at 33.3.4)
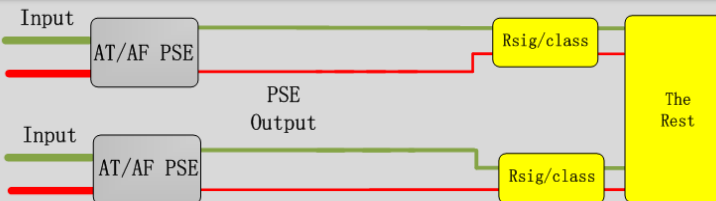➢ If detected simultaneously on both 2Ps, PD may provide **good signature resistances** on both 2Ps and PSEs will provide power on 4P.
➢ **PSEs may provide power on 4P.**

Y-Cable Connection on PSE side

Two separate PSEs are connected to PD through Y-Cable.

Endpoint /Midspan PSE

Input — AT/AF PSE — PSE Output — Rsig/class — The Rest
Input — AT/AF PSE — Rsig/class

➢There shall be interlock between two Rsig/class to remove one while the other channel is powered. (802.3at 33.3.4).
➢ The same as midspan in the middle, **PSEs may provide power on 4P.**

• *PD is capable of powering over either of the two 2Ps, while it may require power simultaneously from both Mode A and Mode B when it connects to two separate PSEs on a link while the two PSEs detect simultaneously on both 2Ps.*
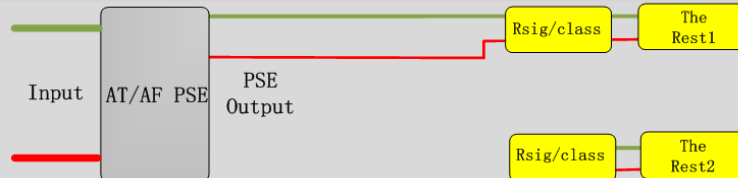
• *Type1/2 PSE(s) deployments may provide powered on 4P.*

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Two load PD with Dual signatures

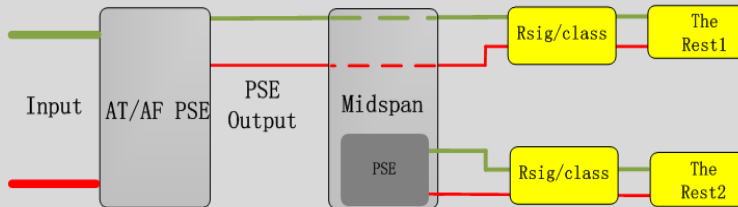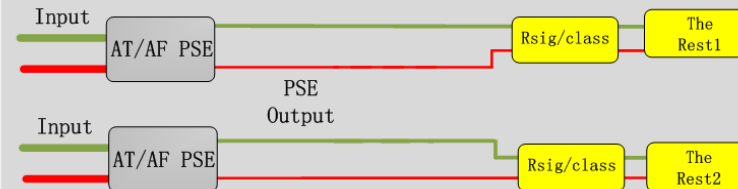| Normal Connection		
One PSE PI on the other end of the link		➢ Type 1/Type 2 PSE detects one of the two pair and **provides power on the 2P.**
Midspan in the middle		
A midspan in the middle of a link segment.		➢There shall be interlock between two Rsig/class to remove one while the other channel is powered. (802.3at 33.3.4) ➢ If detected simultaneously on both 2Ps, PD may provide **good signature resistances** on both 2Ps and PSEs provide power over 4P. ➢ **PSEs may provide power on 4P.**
Y-Cable Connection on PSE side		
Two separate PSEs are connected to PD through Y-Cable		➢There shall be interlock between two Rsig/class to remove one while the other channel is powered. (802.3at 33.3.4) ➢ The same as midspan in the middle, **PSEs may provide power on 4P.**

- *PD is capable of powering over either of the two 2Ps, while it may require power simultaneously from both Mode A and Mode B when connect to two separate PSEs on a link while the two PSEs detect simultaneously on both 2Ps.*

- *Type1/2 PSE(s) deployments may provide power on 4P.*

Outlines

➢ **Potential Type 1 and Type 2 PD designs**

➢ **How these potential PD designs work with different deployments of Type 1/2 PSEs**

➢ **Things to be considered**

Things to be considered

1. *According to previous slides, Type 1/2 PSE deployments may provide power on 4P, then does there exist any 2P only Type 1/2 PD?*
    *   *If yes, will it cause any damage when work with these Type1/2 PSE deployments?*
    *   *Or , All Type1/2 PDs are 4-pair capable.*

2. *For Y-cable case and a midspan in the middle case in which there are two different PSEs on a link segment that may detect simultaneously on both 2Ps, Type 1/2 PD with dual signatures may provide good signature resistances on both 2Ps.*
    *   *Does it result in requiring power from both Mode A and Mode B simultaneously?*

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Thank you!

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