Dual Signature Classification v121

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Current status

Overview of dual signature classification: ➠darshan_05_0615.pdf

Summary:

- Dual-signature PDs can request Class 0-5 on each pairset
- Total maximum power is 2*Class 5 = 90W
- Pairsets can show a different Class

Mutual identification

Type 1/2 Dual-signature PDs are not guaranteed to be capable of handling 4P power correctly. They can only be 4P powered after a confirmation over LLDP or by checking the detection signature of the unpowered pair set (when one pair set is powered).

Type 3/4 PDs must be able to handle 4P power without damage. Therefore a method is needed to distinguish Type 1/2 from Type 3/4 dual-signature PDs for all valid dual-signature classes.

Type	**Abbreviated Type**
Type 3 Single-Signature	Type 3/SS
Type 3 Dual-Signature	Type 3/DS
Type 4 Single-Signature	Type 4/SS
Type 4 Dual-Signature	Type 4/DS

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Dual-Signature Class codes

Requested pairset power[1]	Type 3+4 Class code	Type 1+2 Class code	Different?
Class 1: 4W	1,1,0	1,1,1	Yes
Class 2: 7W	2,2,0	2,2,2	Yes
Class 3: 15.4W	3,3,0	3,3,3	Yes
Class 4: 30W	4,4,0	4,4,4	Yes
Class 5: 45W	4,4,3,3	N/A	Yes

When connected to a dual signature PD, the PSE will issue 3 classification events. By the third event it can determine the Type of the PD. Type 1 or 2 dual-signature PDs must be powered over 2P until other methods determine 4P suitability.
All Type 3/4 PDs are 4P capable.

[1] All references to power in these tables refer to PSE PI power.

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<30W caveat

Requested pairset power	Type 3+4 Class code	Type 1+2 Class code	Different?
4W	1,1,0	1,1,1	Yes
7W	2,2,0	2,2,2	Yes
15.4W	3,3,0	3,3,3	Yes
30W	**4**,4,0	**4**,4,4	Yes
45W	**4**,4,3,3	N/A	N/A

A PSE with <30W power is limited to issuing a single classification event. It cannot determine the Type of the PD. Two options exist:

- Assume the PD is a Type 1/2 dual signature and do not 4P power.
- Issue 3 events to determine the Type, followed by resetting the PD classification and issuing a single classification event. PD classification can be reset by bringing PI voltage below V_{Reset} for T_{Reset} and re-issuing a classification event within T_{pon}.

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Interpretation by Type 1/2 PSEs

Requested pairset power	Type 3+4 Class code	Type 1+2 PSE result
4W	1,1,0	1 → 4W
7W	2,2,0	2 → 7W
15.4W	3,3,0	3 → 15.4W
30W	4,4,0	4,4 → 30W
45W	4,4,3,3	4,4 → 30W[1]

Type 3/4 dual signature PDs will be treated correctly by Type 1/2 PSEs on the pairset the PSE powers.

[1] Class 5 DS pairset will receive 15W/30W Type 1/2 PSE.

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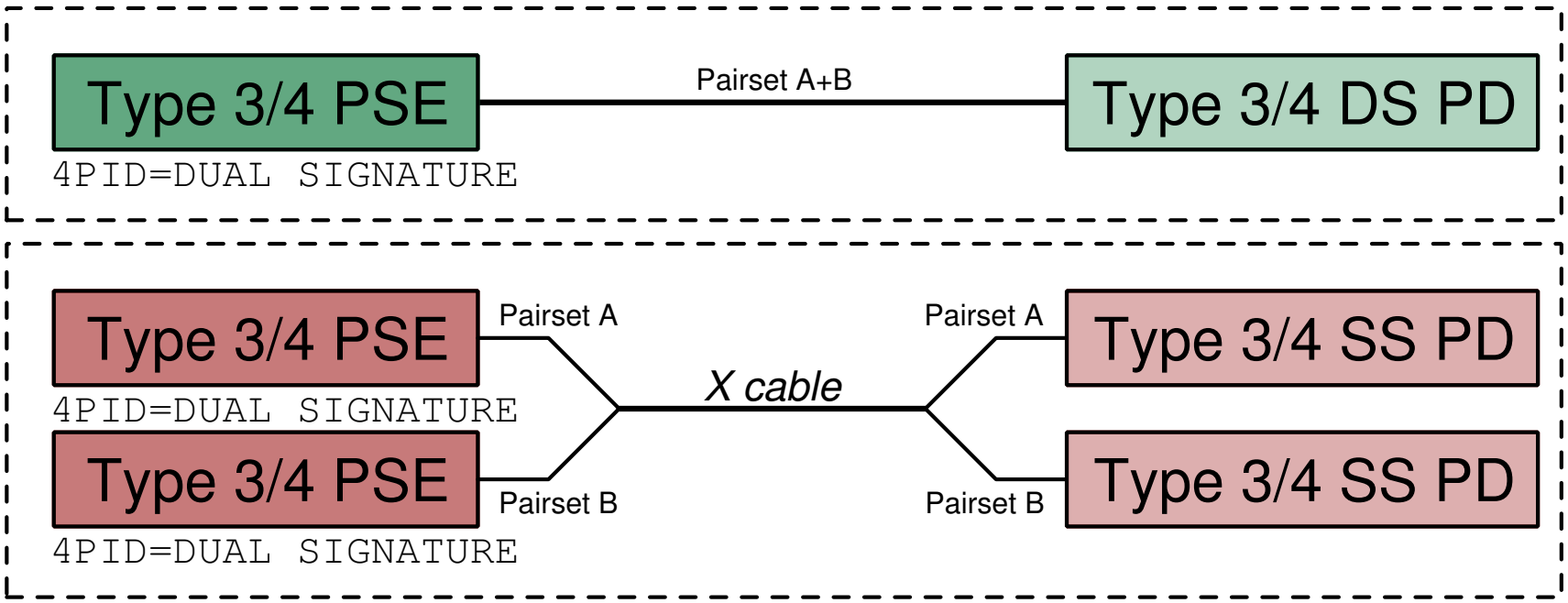
X/Y cables



A PSE cannot see the difference between a true dual signature PD and two separate single signature PDs attached via an X or Y cable. The class codes for single and dual signature have different meaning and these have been chosen to ensure correct operation also in this particular case.

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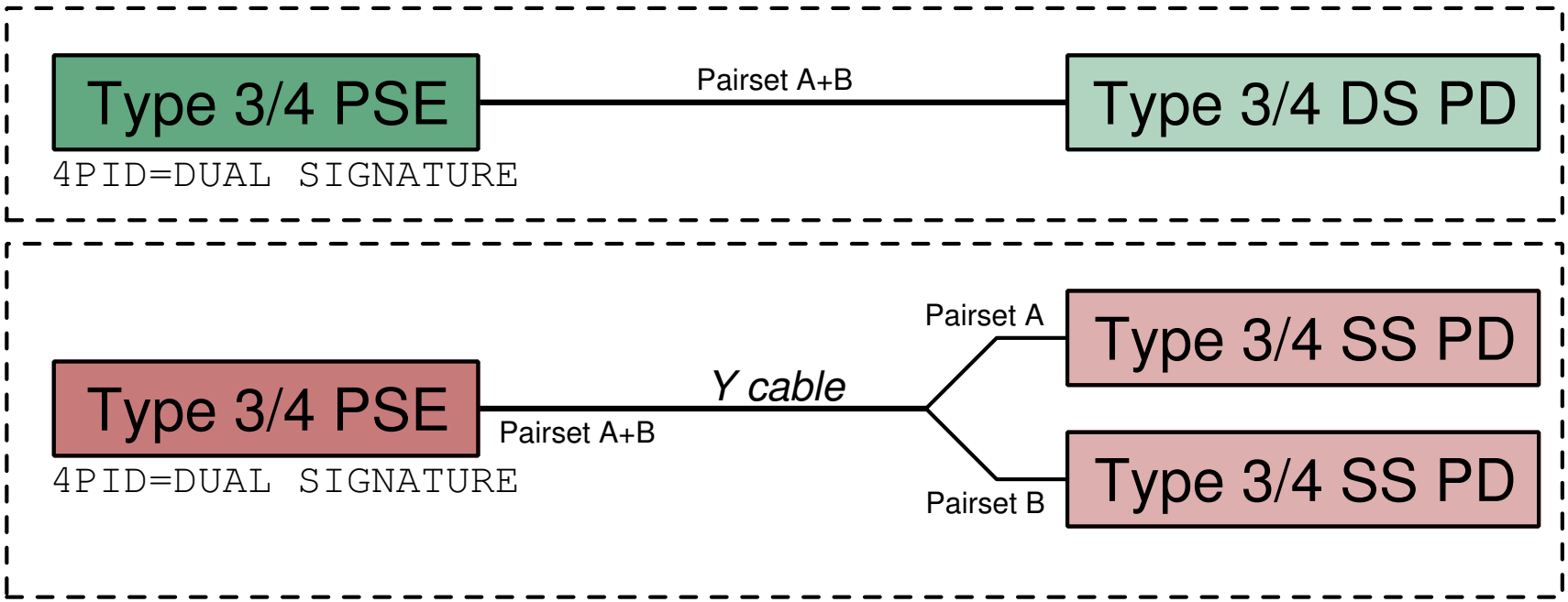
X/Y cables



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X/Y cables (SS PD connected via 2P to PSE)

Requested total power	Type 3+4 DS Class code	Type 1-4 SS Class code	Result
4W	1,1,0	1,1,1	4W
7W	2,2,0	2,2,2	7W
15.4W	3,3,0	3,3,3	15.4W
30W	4,4,0	4,4,4	30W
45W	4,4,3,3	4,4,0	30W
60W	N/A	4,4,1	OFF[1]
75W	N/A	4,4,2	OFF[1]
90W	N/A	4,4,3,3	45W/60W[2]

1. This is an invalid dual-signature code. PSE denies power.
2. See note on next page.

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Y cable, Class 8 SS PD

A Class 8, single-signature PD, connected via an X or Y cable to a Type 3/4 PSE will advertise class code 4,4,3,3.

PSE

The PSE will (mis-)interpret this as a dual signature PD requesting Class 5 power on that pairset. If such power is available, the PSE will produce 4 classification events and allocate 45W for that pairset.

PD

The PD will see 4 events and assume that 60W (it saw 4 events) is available. Power will be delivered over 2P. This is OK because the PD is Class 8 and capable of 45W per pairset, but there is significant chance of motorboating.

Conclusion

- Full mutual ID for dual signature PDs
- Full class range available (classes 0,1,2,3,4,5) for each pairset of a dual-signature PD
- Method to determine Type even with <30W budget
- Class codes chosen to prevent damage with Y cables in single signature PDs

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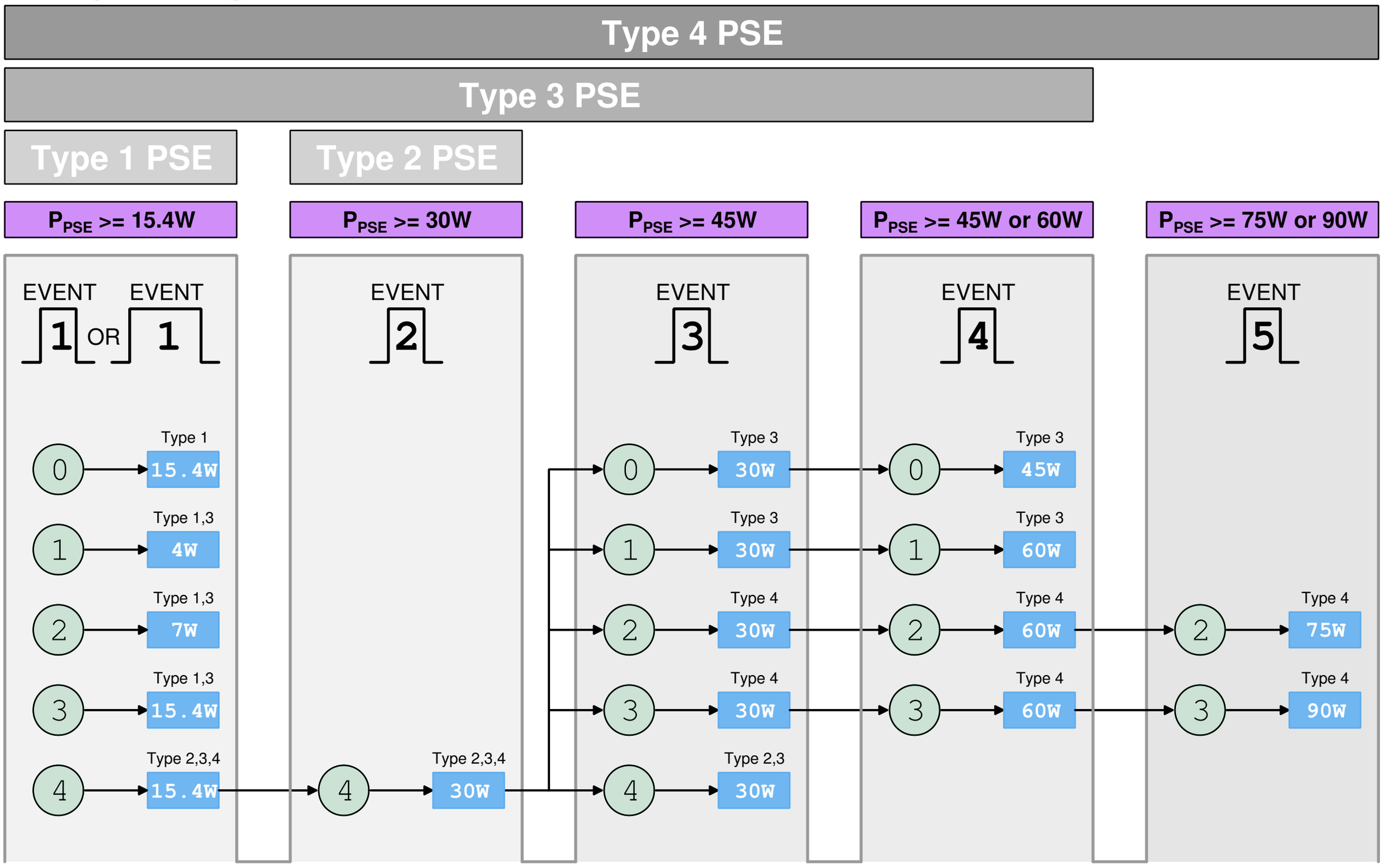
Single Signature PDs scheme



Dual Signature PDs scheme