Autoclass power margin II v100

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Recap Autoclass

Autoclass is a classification mechanism that allows a PD to communicate its effective maximum power consumption to the PSE. This happens in such a way that the PSE will be able to set the power budget to the maximum PD power plus the actual channel losses.

Goal: $P_{PSE\_BUDGET} = P_{PD}$+ actual channel loss + minimal margin

This will allow more efficient use of the PSU since only the effectively used power needs to be budgeted. This feature is not offered by the current classification scheme or by LLDP.

Previous presentations: ➠yseboodt_1_0913.pdf, ➠yseboodt_3_1114.pdf ➠yseboodt_1_0615_v101.pdf

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Margin calculation

The current (Draft 1.2) margin calculation is:

$P_{Class} = P_{Autoclass} \cdot (1 + 0.7x10^{-3} \cdot P_{Class\_L1})$ for 2P operation, and

$P_{Class} = P_{Autoclass} \cdot (1 + 1.4x10^{-3} \cdot P_{Class\_L1})$ for 4P operation

P_{Class}	Allocated power by the PSE
$P_{Autoclass}$	Power consumption measured by the PSE during Autoclass
P_{Class_L1}	Physical layer class the PSE allocated the PD to

The determination of margin is made by the requested PD class. This will result in overly large margins if the PD perform Autoclass at lower power level than the L1 requested class.

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New margin calculation

A new margin calculation is proposed which is based on $P_{Autoclass}$:

$P_{Class} = P_{Autoclass} + f(P_{Autoclass})$

Type 3	2P	$f(P) = 0.0014\ P^2 - 0.004\ P + 0.04$
Type 3	4P	$f(P) = 0.0014\ P^2 - 0.007\ P + 0.05$
Type 4	2P	$f(P) = 0.0008\ P^2 - 0.008\ P + 0.13$
Type 4	4P	$f(P) = 0.0008\ P^2 - 0.01\ P + 0.3$

Note on figures on next slides: the black lines are the calculated required margin, based on PSE measured power during Autoclass, needed to sustain a channel that transitions from 15°C to 60°C. The red line is a plot of the proposed curve fit.

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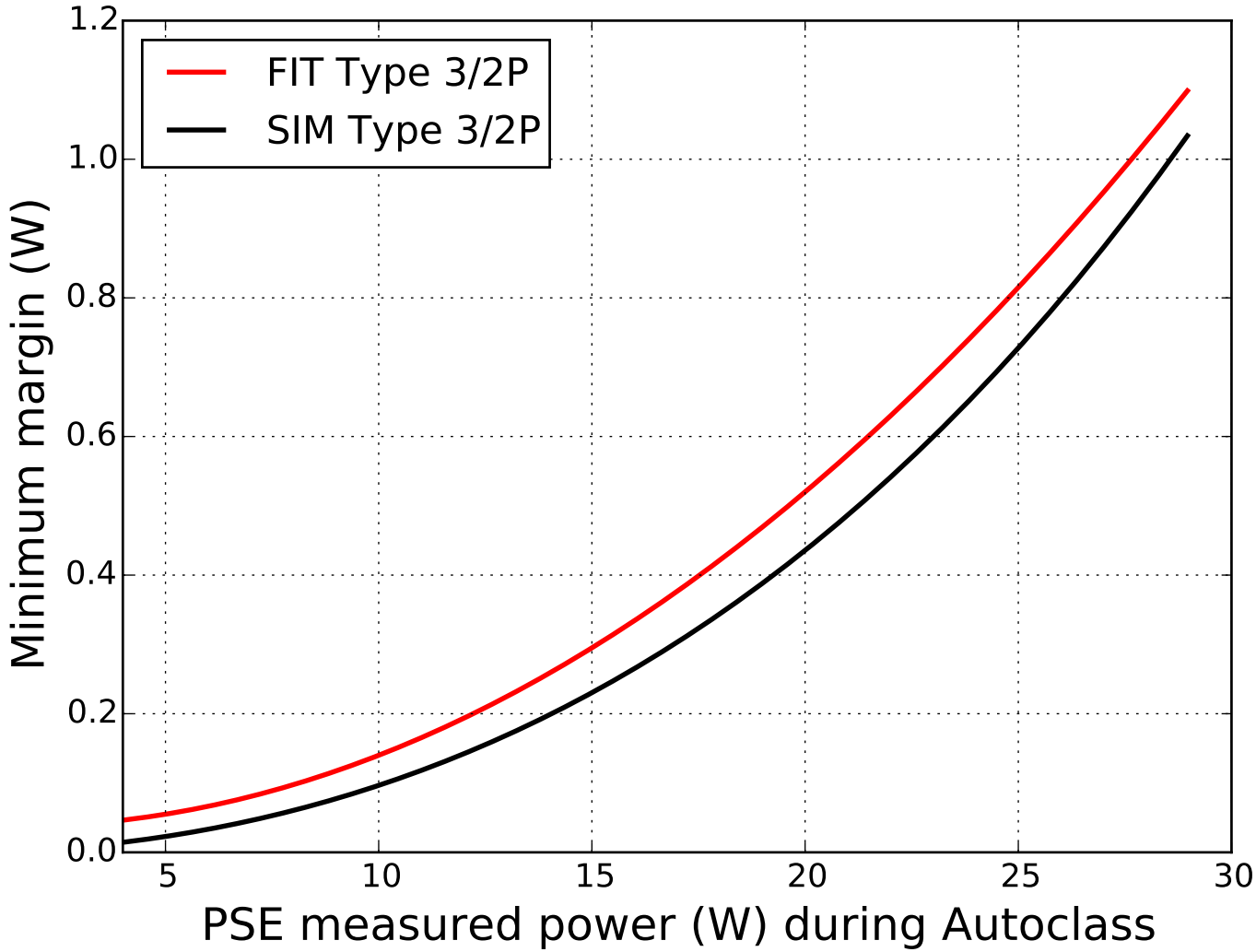
Type 3 / 2P



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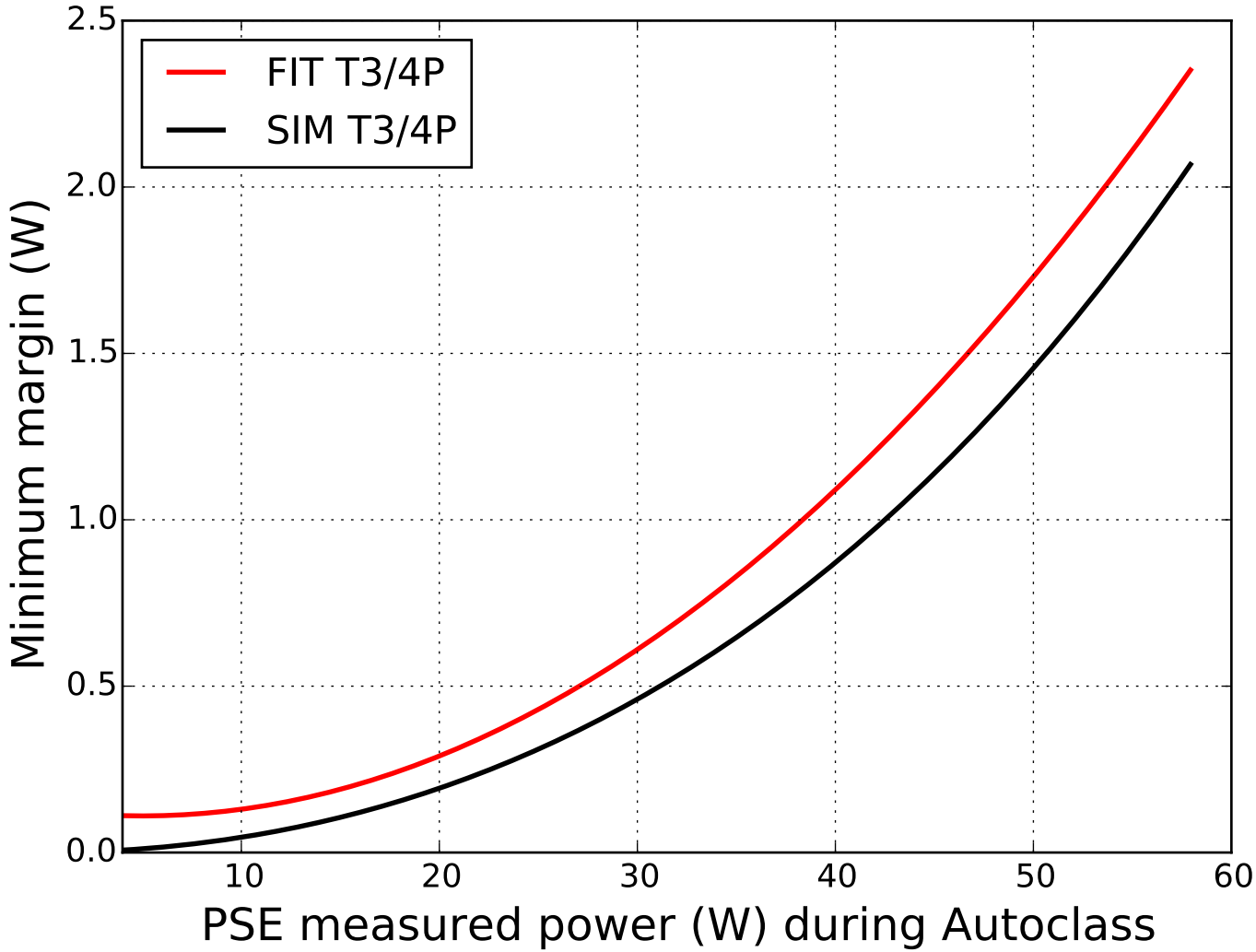
Type 3 / 4P



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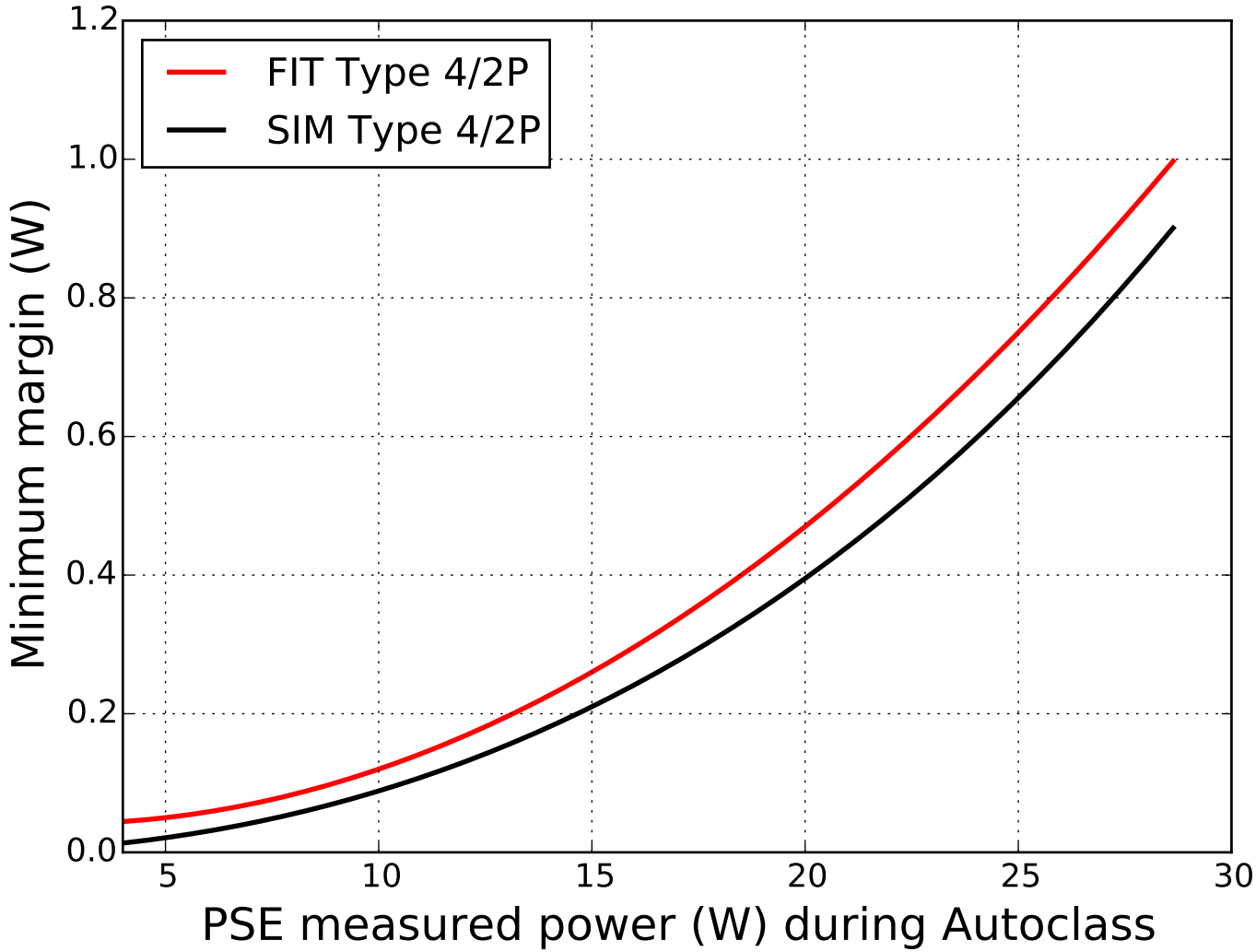
Type 4 / 2P



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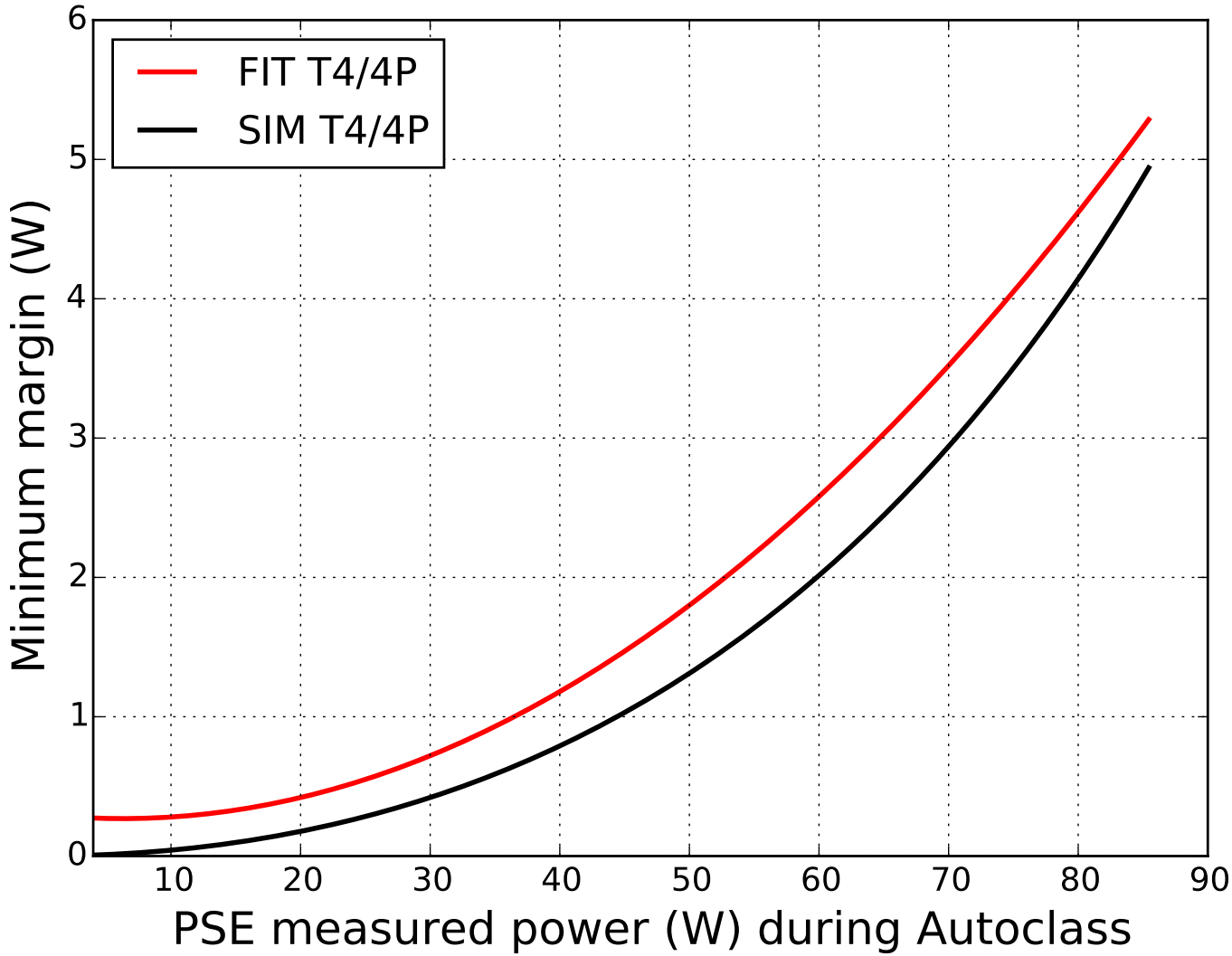
Type 4 / 4P



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Conclusion

- Curve-fit functions are proposed to set the minimum Autoclass margin
- These track closely with the actual margin needed to allow a worst case channel to heat from 15°C to 65°C
- The formulas calculate the margin based on $P_{Autoclass}$ rather than P_{Class} resulting in much tighter tracking and less ambiguity
- PSEs can use simplified derivations, these curve fits set the **minimum** margin

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