33.2.6 PSE classification of PDs and mutual identification

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If the PD connected to the PSE performs Autoclass (see 33.3.5.3 and Annex 33B), the PSE may set its minimum power output based on the power drawn during Autoclass, increased by at least the margin ~~associated with the PD class as listed in Table 33–10a~~ P_{ac_margin} calculated from the measured power by equation 33-TBDa through 33-TBDd, in order to account for potential increase in channel resistance due to temperature increase, with a maximum value defined in Table 33–7 of the corresponding PD class and a minimum of 4.0 Watts. PSEs that have additional information about the actual channel DC resistance or temperature conditions may choose to use a lower Autoclass margin than those listed in Table 33–10a.

33.2.6.3 Autoclass

Type 3 and Type 4 PSEs may choose to implement an extension of Physical Layer classification known as Autoclass. The purpose of Autoclass is to allow the PSE to determine the actual maximum power draw of the connected PD. Please see Annex 33B for more information on Autoclass.

PSEs implementing Autoclass shall measure the power consumption of the connected PD throughout the period bounded by T_{AUTO_PSE1} and T_{AUTO_PSE2}, defined in Table 33–10a measured from the transition of the POWER_UP or SET_PARAMETERS state to POWER_ON state. The power consumption shall be defined as the highest average power measured throughout the period bounded by T_{AUTO_PSE1} and T_{AUTO_PSE2}. Average power is calculated using any sliding window with a width in the range of T_{AUTO_Window} as defined in Table 33-10a.

Table 33–10a—Autoclass electrical requirements

Item	Parameter	Symbol	Units	Min	Max	Additional information
1	Autoclass Power Measurement Start	T_{AUTO_PSE1}	s	1.45	1.55	Measured from transition to state POWER_ON
2	Autoclass Power Measurement End	T_{AUTO_PSE2}	s	3.1	3.2	Measured from transition to state POWER_ON
3	Autoclass average power sliding window	T_{AUTO_Window}	s	0.15	0.3	
~~4~~	~~Autoclass margin, 2 pair~~		~~%~~	~~0.14*P~~$_{Class}$		
	~~Autoclass margin, 4 pair~~			~~0.07*P~~$_{Class}$		

$$P_{ac\_margin} = \{0.0014 P_{Autoclass}^2 - 0.004 P_{Autoclass} + 0.04\} \text{ W applies to Type 3 over 2-pair}$$

$$P_{ac\_margin} = \{0.0014 P_{Autoclass}^2 - 0.007 P_{Autoclass} + 0.05\} \text{ W applies to Type 3 over 4-pair}$$

$$P_{ac\_margin} = \{0.0008 P_{Autoclass}^2 - 0.004 P_{Autoclass} + 0.04\} \text{ W applies to Type 4 over 2-pair}$$

$$P_{ac\_margin} = \{0.0014 P_{Autoclass}{}^2 - 0.004 P_{Autoclass} + 0.04\} \text{ W applies to Type 4 over 4-pair}$$

where

P_{ac_margin} is minimum margin the PSE must add to the measured power $P_{Autoclass}$

$P_{Autoclass}$ is the measured power during Autoclass window T_{AUTO_PSE2}