

HUAWEI ENTERPRISE **A BETTER WAY**

Consideration on classes for Autoclass

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Motivation

- Discuss new classes in bt for Autoclass;
- Discuss P_{class} and $P_{\text{class_PD}}$ for Autoclass;

History

1. What and Why Autoclass (yseboodt_3_1114.pdf)

Goal of 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 effective maximum PD power including the effective channel losses.

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.

2. The group's feedback in last meeting (motions and straw polls 1114.pdf)

Straw Poll 1

- The .bt project should support Autoclass. Do you agree with this statement ?
- Yes: 24 No: 0



802.3bt should provide new classes for Autoclass.

3. Definition of Class in IEEE802.3-2013 Table 33-7 & Table 33-18

Table 33-7—Physical Layer power classifications (P_{Class})

Class	Minimum power levels at output of PSE (P_{Class})
0	15.4 Watts
1	4.00 Watts
2	7.00 Watts
3	15.4 Watts
4	P_{Type} as defined in Table 33-11

NOTE 1—This is the minimum power at the PSE PI. For maximum power available to PDs, see Table 33-18.

NOTE 2—Data Link Layer classification takes precedence over Physical Layer classification.

Table 33-18—PD power supply limits

Item	Parameter	Symbol	Unit	Min	Max	PD Type	Additional information
4	Input average power, Class 0 and Class 3	P_{Class_PD}	W		13.0	1	See 33.3.7.2, Table 33-1
	Input average power, Class 1				3.84	1	
	Input average power, Class 2				6.49	1	
	Input average power, Class 4				25.5	2	



What is the P_{class} and P_{class_PD} for the new class(es)?

- The group agrees to support Autoclass in bt standard for more efficient classification.
- **What are the new classes for Autoclass and what are the P_{class} and P_{class_PD} for Autoclass classes?**

Granularity of new classes for Autoclass

How many new classes for Autoclass and what are they?

→ It depends how much we can benefit.

PD power		PSE budget power In AT standard	PSE Budget in Auto mode with mismatch between PSE budget allocation and PD power requirements below 4% ^{note1}		Saved budget	
Min	Max		Min	Max	Max	Min
/	3.84	4	/	3.99	< 4	0.01
3.84	6.49	7	3.99	6.74	3.01	0.25
6.49	13	15.4	6.74	13.52	8.66	1.88
13	25.5	30	13.52	26.52	16.48	3.48
25.5	39.9 ^{note2}	45 ^{note2}	26.52	41.50	18.48	3.50
39.9 ^{note2}	51 ^{note2}	60 ^{note2}	41.50	53.04	18.5	6.96
51 ^{note3}	TBD ^{note3}	100 ^{note3}	53.04	TBD ^{note3}	TBD ^{note3}	TBD ^{note3}

*Narrow
limited value*

*Board
More value*

Notes:

- note1#: it refers to proposed mismatch between PSE budget allocation and PD power requirements which is 2%-4% in ysebootd_3_1114.pdf.
- note2#: Type 3 has the same R_{ch} , but I_{cable} might be impacted by pair to pair system resistance unbalance. (802.3bt-33_D0p2.pdf)
- note3#: The System parameters of I_{cable} and R_{ch} are not discussed yet.

Two Principles of Autoclass granularity:

- At any power level, **without resorting to large numbers of power classes.**
- Use autoclass for PD to communicate its effective maximum power consumption to the PSE during classification.

Hence, we suggest providing 5 new classes for 15.4W/30W/45W/60W/100W Autoclass.

P_{class} P_{class_PD} for Autoclass

Assume bt provides 5 new classes for Autoclass, P_{class} is as below:

Class	Minimum power levels at output of PSE (Pclass)
Auto0	15.4
Auto1	30W or P_{Type} as defined in Table 33–11, whichever is less
Auto2	45W or P_{Type} as defined in Table 33–11, whichever is less
Auto3	60W or P_{Type} as defined in Table 33–11, whichever is less
Auto4	P_{Type} as defined in Table 33–11

Assume bt provides 5 new classes for Autoclass, P_{class_PD} is as below:

Item	Parameter	Symbol	Unit	Min	Max	PD Type	Additional Information
	Input average power, Auto 0			/	13	3	
	Input average power, Auto 1			/	25.5	3	
4	Input average power, Auto 2	P_{class_PD}	W	/	TBD	3	
	Input average power, Auto 3			/	TBD	3	
	Input average power, Auto 4			/	TBD	4	
	Peak operating power, Auto 0			/	14.4	3	
	Peak operating power, Auto 1			/	$1.1 \times P_{class_PD}$	3	
7	Peak operating power, Auto 2	P_{peak_PD}	W	/	TBD	3	
	Peak operating power, Auto 3			/	TBD	3	
	Peak operating power, Auto 4			/	TBD	4	
	Input average power, Auto 4			/	TBD	4	

Summary

- In order to support Autoclass, bt should provide new classes for Autoclass.
- Propose 5 new classes for Auto15.4W/30W/45W/60W/100W.
- Propose P_{class} and P_{class_PD} for Autoclass.

Thank you!