Handling Autoclass in DLL classification (D3.1) v102

Info (not part of baseline)

This baseline fixes two issues related to Data Link Layer classification.

Issue 1

When a PD changes it's power allocation through DLL, and get re-assigned from a Class of 5 or higher to a Class of 4 or lower, or vica versa, the PD needs to take care of changing MPS requirements. The timing in which to react is different for the both cases.
When going DOWN in Class, the PD can only make use of the lower 10mA I_{Port_MPS} when the PSE has re-allocated the power. That means the PD must wait until PSEAllocatedPowerValue is changed by the PSE to reflect the lower allocation. Until that happens the PD must stay at the higher MPS current level.

Issue 2

There is a basic conflict between DLL power negotiation and Autoclass. In an Autoclass enabled system the PD does not necessarily know what it's PD PI power was during the Autoclass procedure. A PSE certainly does not know the amount of power at the PD PI, it only is aware of the output power at the PSE PI. Because of this, it is impossible to initialize the DLL classification system at the correct value. Per the current state diagram, the initial value is derived from the assigned Class. As soon as DLL is enabled, the Autoclass value is essentially forgotten.
We need a way to indicate at DLL level that Autoclass is being used and that the normal DLL operation is suspended. Ideally what I would want is that a PD or PSE can, at any time, switch out of this mode and go back to "normal" power allocation. Thus, I would suggest that we take a magic number for the PDRequestedPowerValue and PSEAllocatedPowerValue fields that indicates that the power allocation = the most recent Autoclass power. A logical value for this would be 0xACAC.
What would happen after a Physical Layer Autoclass is that the PD initializes with a PDRequestedPowerValue=0xACAC which indicates Autoclass. The PSE, if it supports Autoclass, would use PSEAllocatedPowerValue=0xACAC. If it doesn't, the PSE sets PSEAllocatedPowerValue to the assigned Class.

145.3.9 PD Maintain Power Signature

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For single-signature PDs the MPS shall consist of current draw equal to or above I_{Port_MPS} for a minimum duration of T_{MPS_PD} followed by an optional MPS dropout for no longer than T_{MPDO_PD}. A single-signature PD shall use the I_{Port_MPS} value associated with assigned Class 1 to 4 when pse_assigned_class is 1, 2, 3, or 4, and MirroredPSEAllocatedPowerValue and PDRequestedPowerValue are less or equal to 255. A single-signature PD shall use the I_{Port_MPS} value associated with assigned Class 5 to 8 when pse_assigned_class is 5, 6, 7, or 8, or when PDRequestedPowerValue is greater than 255.

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Change Table 145–32 as follows as follows:

Table 145–32 — PD DC Maintain Power Signature

Item	Parameter	Symbol	Units	Min	Max	Conditions
1	Total input current per the assigned Class, for single-signature PDs					
	Class 1 to 4	I_{Port_MPS}	A	0.01		See 145.3.9
	Class 5 to 8			0.016		
2	Input current on each powered pairset for dual-signature PDs					
	Class 1 to 5	I_{Port_MPS-2P}	A	0.01		—

145.5.3 Power control state diagrams

In subclauses 145.5.3.3.1, 145.5.3.3.2, 145.5.3.4.1, 145.5.3.4.2, and 145.5.3.4.4, add "0xACAC" to the valid values (such that it reads "Values: x through y, and 0xACAC") for the following variables:

- ***MirroredPDRequestedPowerValue***
- ***MirroredPSEAllocatedPowerValueEcho***
- ***PDRequestedPowerValueEcho***
- ***PSEAllocatedPowerValue***
- ***TempVar***
- ***pse_new_value***
- ***MirroredPDRequestedPowerValueEcho***
- ***MirroredPSEAllocatedPowerValue***
- ***PDMaxPowerValue***
- ***PDRequestedPowerValue***
- ***PSEAllocatedPowerValueEcho***
- ***TempVar***
- ***pd_new_value***

145.5.3.3.1 Variables

Info (not part of baseline)

Change pse_initial_value such that if the PSE supports Autoclass and it saw an Autoclass PD, that it initializes with value 0xACAC instead of a power value. Note that the erroneous values 600 and 900 are left unchanged, this is handled by a comment against D3.1.

Change pse_initial_value as follows:

pse_initial_value

The value of this variable is valid after classification and is derived from the pse_allocated_pwr and pd_autoclass variables (145.2.5.4), which is used in the PSE state diagrams in 145.2.5.7.
Values:

pd_autoclass	pse_allocated_pwr	pse_initial_value
FALSE	1	39
FALSE	2	65
FALSE	3	130
FALSE	4	255
FALSE	5	400
FALSE	6	600
FALSE	7	620
FALSE	8	900
TRUE	—	0xACAC

145.5.3.4.2 Variables

Info (not part of baseline)

If the PD had Autoclass enabled, it will initialize using the value 0xACAC.

Change pd_initial_value as follows:

pd_initial_value

The value of this variable is valid after classification and is derived from the pd_max_power and pd_autoclass_enable (145.3.3.4) variables used in the PD state diagrams; defined in Figure 145–26.
Values:

pd_autoclass_enable	pd_max_power	pd_initial_value
FALSE	1	$\leq$ 39
FALSE	2	$\leq$ 65
FALSE	3	$\leq$ 130
FALSE	4	$\leq$ 255
FALSE	5	$\leq$ 400
FALSE	6	$\leq$ 600
FALSE	7	$\leq$ 620
FALSE	8	$\leq$ 900
TRUE	1 to 8	0xACAC