

USB Power Delivery ENGINEERING CHANGE NOTICE

Title: No Load transition overshoot settling time in APDO Applied to: USB Power Delivery Specification Revision 3.0 Version 1.2 with ECR

Brief description of the functional changes proposed:

The settling time of transition-to-no-load should not be bounded to 5mS (tPpsTransient). This settling time is not controlled by control loop but function of Vbus Capacitance and standby load. Based on calculation of Type-C Maximum 3000uF Vbus Capacitance and a practical 2mA standby load (10mW@5V).

The Augmented PDO settling time for standby load would be $3000\mu\text{F} * (\text{vPpsvalid}(0.1\text{V}))/2\text{mA} = 150\text{mS}$. Hence based on this assumption, any load less than 60mA will exceed the 5ms settling time. The 60mA is the minimum load that will result in a 5ms settling time based on $3000\mu\text{F} * (\text{vPpsvalid}(0.1\text{V}))/5\text{mS} = 60\text{mA}$. This ECN extends the settling time to 150ms for loads less than 60mA.

Benefits as a result of the proposed changes:

Allowing Source design to achieve lower standby power.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:

None

An analysis of the hardware implications:

None

An analysis of the software implications:

None

An analysis of the compliance testing implications:

Apply minimum of 60mA in the load test

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Actual Change Requested

Based on USB_PD_R3_0 V1.220180621.pdf

(a). Page 299, Section: 7.4.1 Source Electrical Parameters

Table 7-22 Source Electrical Parameters

tSrcTransient

From Text:

Table 7-22 Source Electrical Parameters

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
<i>tPpsTransient</i>	The maximum time for the Programmable Power Supply to be between vPpsNew and vPpsValid in response to a load transient			5	ms	Section 7.1.8.1

To Text:

Table 7-22 Source Electrical Parameters

Parameter	Description	MIN	TYP	MAX	UNITS	Reference
<i>tPpsTransient</i>	The maximum time for the Programmable Power Supply to be between vPpsNew and vPpsValid in response to a load transient when target load is greater than or equal to 60mA.			5	ms	Section 7.1.8.1
	The maximum time for the Programmable Power Supply to be between vPpsNew and vPpsValid in response to a load transient when target load is less than 60mA.			150	ms	Section 7.1.8.1