

# USB Power Delivery ENGINEERING CHANGE NOTICE

## Title: No Load transition overshoot settling time in PDO 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) and overshoot of 0.1V over vSrcNew.

The PDO settling time for standby load would be  $3000\mu\text{F} * (0.1\text{V})/2\text{mA} = 150\text{mS}$ . 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  $3000\mu\text{F} * (0.1\text{V})/5\text{mS} = 60\text{mA}$ . 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:

Minimum load of 60mA should apply during the load test

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## Actual Change Requested

Based on USB\_PD\_R3\_0 V1.220180621.pdf

Page 300, 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>tSrcTransient</i> | The maximum time for the Source output voltage to be between <i>vSrcNew</i> and <i>vSrcValid</i> in response to a load transient. |     |     | 5   | ms    | Section 7.1.8 |

To Text:

Table 7-22 Source Electrical Parameters

| Parameter            | Description  | MIN | TYP | MAX | UNITS | Reference     |
|----------------------|--|-----|-----|-----|-------|---------------|
| <i>tSrcTransient</i> | The maximum time for the Source output voltage to be between <i>vSrcNew</i> and <i>vSrcValid</i> in response to a load transient <b>when target load is greater or equal to than 60mA.</b> |     |     | 5   | ms    | Section 7.1.8 |
|                      | The maximum time for the Source output voltage to be between <i>vSrcNew</i> and <i>vSrcValid</i> in response to a load transient <b>when target load is less than 60mA.</b>                |     |     | 150 | ms    | Section 7.1.8 |