

USB Power Delivery ENGINEERING CHANGE NOTICE

Title: EPRMDO and Entry Clarification

Applied to: USB Power Delivery Specification Revision 3.2 Version 1.0

Brief description of the functional changes proposed:
<p>This ECN updates the EPRMDO to clarify the intended meaning of the Enter Failed 0x04 (Source unable to enter EPR Mode at this time) reason. The condition is potentially temporary and if the Sink subsequently returns with a new request to Enter EPR, the Source may be able to do so then.</p> <p>The ECR also clarifies that EPR entry shall always be accepted by the Source when able to meet the EPR Power Rules.</p>

Benefits as a result of the proposed changes:
<p>Remove ambiguity about why a EPR Source might fail EPR Entry at a given time of request.</p>

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
<p>No intended impact.</p>

An analysis of the hardware implications:
<p>No intended implications. Might impact designs that use this Enter Failed reason for policy reasons as opposed to its intended use to address temporary abnormal operating conditions.</p>

An analysis of the software implications:
<p>No intended implications.</p>

An analysis of the compliance testing implications:
<p>Potentially some simplifications to testing procedures.</p>

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Actual Change Requested

(a). Section 6.4.10, Table 6.51

From:

Table 6.51 “EPR Mode Data Object (EPRMDO)”

Bit(s)	Field	Description		
B31...24	Action	Value	Action	Sent By
		0x00	Reserved and Shall Not be used	
		0x01	Enter	Sink only
		0x02	Enter Acknowledged	Source only
		0x03	Enter Succeeded	Source only
		0x04	Enter Failed	Source only
		0x05	Exit	Sink or Source
		0x06...0xFF	Reserved and Shall Not be used	
B23...16	Data	Action Field	Data Field Value	
		Enter	Shall be set to the EPR Sink Operational PDP	
		Enter Acknowledged	Shall be set to zero	
		Enter Succeeded	Shall be set to zero	
		Enter Failed	Shall be one of the following values: <ul style="list-style-type: none">• 0x00 - Unknown cause• 0x01 - Cable not EPR capable• 0x02 –Source failed to become VCONN source.• 0x03 – EPR Mode Capable bit not set in RDO.• 0x04 – Source unable to enter EPR Mode at this time.• 0x05 - EPR Mode Capable bit not set in PDO. All other values are Reserved and Shall Not be used	
		Exit	Shall be set to zero	
		B15...0	Reserved, Shall be set to zero.	

To:

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Table 6.51 “EPR Mode Data Object (EPRMDO)”

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B31...24	Action	Value	Action	Sent By
		0x00	Reserved and Shall Not be used	
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		0x03	Enter Succeeded	Source only
		0x04	Enter Failed	Source only
		0x05	Exit	Sink or Source
		0x06...0xFF	Reserved and Shall Not be used	
B23...16	Data	Action Field	Data Field Value	
		Enter	Shall be set to the EPR Sink Operational PDP	
		Enter Acknowledged	Shall be set to zero	
		Enter Succeeded	Shall be set to zero	
		Enter Failed	Shall be one of the following values: <ul style="list-style-type: none">0x00 - Unknown cause0x01 - Cable not EPR capable0x02 –Source failed to become VCONN source.0x03 – EPR Mode Capable bit not set in RDO.0x04 – Source unable to enter EPR Mode at this time!.0x05 - EPR Mode Capable bit not set in PDO. All other values are Reserved and Shall Not be used	
		Exit	Shall be set to zero	
		B15...0	Reserved, Shall be set to zero.	

1)

The Sink **May** retry entering EPR Mode after receiving this Enter Failed response.

(b). Section 6.4.10.1

From:

6.4.10.1 Process to enter EPR Mode

For port partners to successfully enter EPR mode, the following conditions must be met:

- The Sink **Shall** request entry into the EPR Mode.
- The Source **Shall** verify the cable is EPR capable.
- A Sink **Shall Not** be Connected to the Source through a Charge Through VPD (CT-VPD).

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- The Source and Sink **Shall** be in an SPR Explicit Contract.
- The EPR Mode capable bit **Shall** be set in the Fixed 5V PDO.
- The EPR Mode capable bit **Shall** have been set in the RDO in the last **Request** Message received by the Source.

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The entry process **Shall** follow these steps in order:

- 1) The Sink **Shall** send the **EPR_Mode** Message with the Action field set to 1 (Enter) and the Data field set to its Operational PDP. If the EPR Source receives an **EPR_Mode** message with the Action field not set to Enter it **Shall** initiate a Soft Reset.
- 2) The Source **Shall** do the following:
 - a. Verify the EPR Mode Capable bit was set in the most recent RDO. If not set, the Source **Shall** do the following:
 - i. Send an **EPR_Mode** Message with the Action field set to 4 (“Enter Failed”) and the Data field set to 3 (“EPR Mode Capable bit not set in the RDO”).
 - ii. Abort the EPR Mode entry process and remain in the existing SPR Explicit Contract.
 - b. Verify the EPR Mode Capable bit was set in the most recent 5V fixed PDO. If not set, the Source **Shall** do the following:
 - i. Send an **EPR_Mode** Message with the Action field set to 4 (“Enter Failed”) and the Data field set to 5 (“EPR Mode Capable bit not set in the fixed 5V PDO”).
 - ii. Abort the EPR Mode entry process and remain in the existing SPR Explicit Contract.
 - c. Verify the Source is still able to support EPR Mode. If not, the Source **Shall** do the following:
 - i. Send an **EPR_Mode** Message with the Action field set to 4 (“Enter Failed”) and Data field set to 4 (“Unable at this time”).
 - ii. Abort the EPR Mode entry process and remain in the existing SPR Explicit Contract
 - d. Send an **EPR_Mode** Message with the Action field set to 2 (“Enter Acknowledged”).

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To:

6.4.10.1 Process to enter EPR Mode

An EPR Source *Shall* enter EPR Mode upon request by an EPR Sink connected with an EPR cable when able to offer the Source Capabilities as defined in the Power Rules (See Table 10.12 “EPR Source Capabilities based on the Port Maximum PDP and using an EPR Capable Cable” and Table 10.13 “EPR Source Capabilities when Port Present PDP is less than Port Maximum PDP and using an EPR-capable cable”).

For port partners to successfully enter EPR mode, the following conditions must be met:

- The Sink **Shall** request entry into the EPR Mode.
- The Source **Shall** verify the cable is EPR capable.
- A Sink **Shall Not** be Connected to the Source through a Charge Through VPD (CT-VPD).
- The Source and Sink **Shall** be in an SPR Explicit Contract.
- The EPR Mode capable bit **Shall** be set in the Fixed 5V PDO.

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- The EPR Mode capable bit **Shall** have been set in the RDO in the last **Request** Message received by the Source.

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The entry process **Shall** follow these steps in order:

- 1) The Sink **Shall** send the **EPR_Mode** Message with the Action field set to 1 (Enter) and the Data field set to its Operational PDP. If the EPR Source receives an **EPR_Mode** message with the Action field not set to Enter it **Shall** initiate a Soft Reset.
- 2) The Source **Shall** do the following:
 - a. Verify the EPR Mode Capable bit was set in the most recent RDO. If not set, the Source **Shall** do the following:
 - i. Send an **EPR_Mode** Message with the Action field set to 4 (“Enter Failed”) and the Data field set to 3 (“EPR Mode Capable bit not set in the RDO”).
 - ii. Abort the EPR Mode entry process and remain in the existing SPR Explicit Contract.
 - b. Verify the EPR Mode Capable bit was set in the most recent 5V fixed PDO. If not set, the Source **Shall** do the following:
 - i. Send an **EPR_Mode** Message with the Action field set to 4 (“Enter Failed”) and the Data field set to 5 (“EPR Mode Capable bit not set in the fixed 5V PDO”).
 - ii. Abort the EPR Mode entry process and remain in the existing SPR Explicit Contract.
 - c. Verify the Source is still able to support EPR Mode. If not, the Source **Shall** do the following:
 - i. Send an **EPR_Mode** Message with the Action field set to 4 (“Enter Failed”) and Data field set to 4.
 - ii. Abort the EPR Mode entry process and remain in the existing SPR Explicit Contract. **The Sink *May* at some time in the future send another request to enter EPR Mode.**
 - d. Send an **EPR_Mode** Message with the Action field set to 2 (“Enter Acknowledged”).

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