

USB Power Delivery ENGINEERING CHANGE NOTICE

Title: EPR Power Rules Clarifications

Applied to: USB Power Delivery Specification Revision 3.1 Version 1.8

Brief description of the functional changes proposed:
This ECN clarifies the Extended Power Range (EPR) power rules. These clarifications are in response to some industry inquiries about the feature requirements of EPR chargers/ports.

Benefits as a result of the proposed changes:
Addresses clarification questions received since the original release of the EPR spec.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
Should have no impact to existing products.

An analysis of the hardware implications:
Should have no specific hardware implications.

An analysis of the software implications:
Should have no specific software implications.

An analysis of the compliance testing implications:
Should have no specific compliance testing implications.

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Actual Change Requested

a). Table 1.1, P.49

From Text:

Term	Description
EPR Source	A Source that supports both SPR Mode and EPR Mode and can supply more than 100W.

To Text:

Term	Description
EPR Source	A Source that supports both SPR Mode and EPR Mode and can supply more than 100W.

a). Section 10.2.3.3, P.810

From Text:

Support of EPR Mode is *Error! Reference source not found.*. An EPR-capable charger **Error! Reference source not found.** include multiple ports and these ports can be functionally implemented as Shared or Assured ports as defined in *Error! Reference source not found.*. An EPR-capable charger port **May** operate in either SPR mode or EPR mode when operating at 100W or less. Any port on an EPR charger that has a PDP rating of 100W or less **Shall** follow the **Error! Reference source not found.** requirements for SPR Source ports and **Shall** operate only in SPR mode.

Table 10-9 and Table 10-10 define the **Error! Reference source not found.** requirements for ports on EPR Source Ports.

- When an EPR Source port is capable of supplying its PDP Rating, it **Shall** adhere to the requirements defined in Table 10-9 based on its PDP Rating of x Watts.
- When a Source Port on an EPR charger is unable to provide its PDP Rating, it **Shall** adhere to the requirements defined in Table 10-10 based on an Equivalent PDP Rating of x Watts. Some examples:
 - An EPR Source port *Error! Reference source not found.* be unable to provide its rated PDP because it is thermally constrained at the time of power negotiation.
 - A Shared port on a multi-port EPR Charger that is limited by the remaining available power.
- When an EPR charger is in an Adjustable Voltage Source (AVS) contract:
 - It **Shall** Reject all Requests outside of the defined Voltage range (see Table 10-12) or for a requested Voltage and Current that results in a power level that is more than the Port's Advertised PDP.
 - In no case **Shall** a Source Advertise a Current or accept a Current requested by a Sink that exceeds the attached cable's current rating.
- The Max Voltage offered by an EPR Source **Error! Reference source not found.** exceed 48V.

To Text:

Support of EPR Mode is *Error! Reference source not found.*. **An EPR-capable port has a PDP Rating that is >100W and ≤240W.**

An EPR-capable charger port May operate in either SPR mode or EPR mode when operating at 100W or less. An EPR-capable Source port operating in SPR Mode May offer less than 100W to avoid violating safety regulations. When operating in EPR Mode, an EPR-capable Source port Shall offer 100W in Fixed 20V when not constrained by multi-port sharing limits.

An EPR-capable **chargerSource** **Error! Reference source not found.** include multiple ports and these ports can be functionally implemented as Shared or Assured ports as defined in *Error! Reference source not found.*. **An EPR-capable charger port May operate in either SPR mode or EPR mode when operating at 100W or less.** Any port on an EPR charger

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that has a PDP Rating of 100W or less **Shall** follow the **Error! Reference source not found.** requirements for SPR Source ports and **Shall** operate only in SPR mode.

Table 10-9 and Table 10-10 define the **Error! Reference source not found.** requirements for ports on EPR Source Ports. **While not included in these tables, any EPR-capable Source port that also supports SPR PPS Shall offer the SPR Fixed 20V PDO and PPS 20V Prog APDO at 100W (or the maximum available PDP when the port is operating at an Equivalent PDP <100W) when in EPR mode:**

- When an EPR Source port is capable of supplying its PDP Rating, it **Shall** adhere to the requirements defined in Table 10-9 based on its PDP Rating of x Watts.
- When a Source Port on an EPR charger is unable to provide its PDP Rating, it **Shall** adhere to the requirements defined in Table 10-10 based on an Equivalent PDP Rating of x Watts. Some examples:
 - An EPR Source port *Error! Reference source not found.* be unable to provide its rated PDP because it is thermally constrained at the time of power negotiation.
 - A Shared port on a multi-port EPR Charger that is limited by the remaining available power.
- When an EPR charger is in an Adjustable Voltage Source (AVS) contract:
 - It **Shall** Reject all Requests outside of the defined Voltage range (see Table 10-12) or for a requested Voltage and Current that results in a power level that is more than the Port's Advertised PDP.
 - In no case **Shall** a Source Advertise a Current or accept a Current requested by a Sink that exceeds the attached cable's current rating.
- The Max Voltage offered by an EPR Source **Error! Reference source not found.** exceed 48V.