

# ECN for USB Power Delivery Specification Revision 3.2 Version 1.1, 2024-10

## Title: Clarify Assured and Shared Capacity Definitions

<b>Brief description of the functional changes proposed:</b>
ECR proposes minor editorial adjustments to Assured and Shared Capacity definitions to align better with the USB Type-C spec.

<b>Benefits as a result of the proposed changes:</b>
Changes intended for easing future spec interpretation.

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

<b>An analysis of the hardware implications:</b>
No intended implications.

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

<b>An analysis of the compliance testing implications:</b>
No intended implications.

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## Actual Change Requested

### (a). Section 1.6

#### To Text:

[Update as indicated with change notations.]

## 1.6 Terms and Abbreviations

This section defines terms used throughout this document. For additional terms that pertain to the Universal Serial Bus, see Chapter 2, “Terms and Abbreviations,” in [\[USB 2.0\]](#), [\[USB 3.2\]](#), [\[USB Type-C 2.4\]](#) and [\[USBBC 1.2\]](#).

Table 1.4 Terms and Abbreviations

Term	Description
<del>Assured Capacity Charger</del>	As defined in <del>[USB Type-C 2.4]</del> . This maps to a <del>Charger</del> with one or more <del>Guaranteed Capability Ports</del> .
<del>Assured Capacity Group</del>	As defined in <del>[USB Type-C 2.4]</del> . This maps to a group of <del>Guaranteed Capability Ports</del> .
<del>Assured Capacity Port</del>	As defined in <del>[USB Type-C 2.4]</del> . <del>Assured Capacity Ports</del> can be either <del>Managed Capability Ports</del> or <del>Guaranteed Capability Ports</del> .
<del>Shared Capacity Charger</del>	As defined in <del>[USB Type-C 2.4]</del> . This maps to a <del>Charger</del> with multiple <del>Managed Capability Ports</del> .
<del>Shared Capacity Group</del>	As defined in <del>[USB Type-C 2.4]</del> . This maps to a group with <del>Managed Capability Ports</del> .
<del>Shared Capacity Port</del>	As defined in <del>[USB Type-C 2.4]</del> . <del>Shared Capacity Ports</del> can only be <del>Managed Capability Ports</del> .

### (b). Section 2.6.1.2

#### To Text:

[Update as indicated with change notations.]

## 2.6.1.2 Device Policy Manager

The *Device Policy Manager* provides mechanisms to monitor and control the USB Power Delivery system within a particular *Consumer* or *Provider*. The *Device Policy Manager* enables *Local Policy* to be enforced across the system by communication with the *System Policy Manager*. *Local Policy* is enacted on a per *Port* basis by the *Device Policy Manager*'s control of the *Source Ports*/*Sink Ports* and by communication with the *Policy Engine* and USB-C® *Port Control* for that *Port*. The *Device Policy Manager* is responsible for the sharing algorithm used ~~in~~for *Shared Capacity* ~~PortsChargers~~ (see [\[USB Type-C 2.4\]](#))

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## (c). Section 6.4.11.1

### To Text:

[Update as indicated with change notations.]

#### 6.4.11.1 Port Type Field

**Port Type** is a **Static** field that **Shall** be used to indicate whether the amount of power the *Port* can provide is fixed or can change dynamically.

For **Shared Capacity** Ports ~~that are part of a Shared Capacity Group~~, the **Port Type** field **Shall** be set to *Managed Capability Port*.

For **Assured Capacity** Ports ~~that are not part of a Shared Capacity Group~~, the **Port Type** field **May** be set to either *Managed Capability Port* or *Guaranteed Capability Port*.

## (d). Section 6.4.11.3

### To Text:

[Update as indicated with change notations.]

#### 6.4.11.3 Port Present PDP Field

The **Port Present PDP** field **Shall** indicate the integer part of the amount of power the *Port* is presently capable of supplying including limitations due to *Cable Capabilities* or abnormal operating conditions (e.g., elevated temperature, low input voltage, etc.).

A *Guaranteed Capability Port* **Shall** always set its **Port Present PDP** to be the same as its **Port Maximum PDP** or the highest possible value when limited.

A *Managed Capability Port* that is ~~part of~~ a *Shared Capacity* ~~Port Group~~ **Shall** set its **Port Present PDP** to *Shared Port Power Available* as defined in **[USB Type-C 2.4]** or to a lower value when limited.

A *Managed Capability Port* that is ~~an Assured Capacity Port part of an Assured Capacity Group~~ **Shall** set its **Port Present PDP** to the **Port Maximum PDP** or the highest value possible when limited.

## (e). Section 6.5.13.13 – 6.5.13.18

### To Text:

[Update as indicated with change notations.]

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## 6.5.13.13 SPR Sink Minimum PDP

The **SPR Sink Minimum PDP** field **Shall** contain the minimum power *Source PDP* needed by the *Sink*, rounded up to the next integer, to operate at its lowest level of functionality without requiring power from its *Battery* if present. *Battery* charging may be an opportunistic feature, however this *PDP* **Should** be designed for basic functionality, not for charging. The **SPR Sink Minimum PDP** field **Shall** be less than or equal to the **SPR Sink Operational PDP**. The value is used by the *Source* to determine whether or not it has sufficient power to minimally support the *Attached Sink*. If the *Sink* is *EPR Capable* and is unable to operate at *PDPs* less than 100W, it **Shall** set this field to the minimum power to sustain PD communication.

If the *Sink* is self-powered, such that it doesn't need power from a *Source*, then it **Shall** set this field to zero.

The **SPR Sink Minimum PDP** is used to indicate ~~to Shared Capacity Chargers~~ the power that **Should** be delivered to the *Sink* to guarantee at least basic functionality for the end user.

Possible examples of **SPR Sink Minimum PDP** could be:

- The minimum power a wireless *Charger* would require in order to detect, and deliver the minimum required amount of power to the attached device.
- The power required to have basic functionality by a *Batteryless Sink*,
- On a device with a *Battery*, it can power the minimum functionality of the device

## 6.5.13.14 SPR Sink Operational PDP

The **SPR Sink Operational PDP** field **Shall** contain the *Source PDP* that the manufacturer recommends for the normal functionality of the *Sink*, rounded up to the next integer. This corresponds to the *PDP Rating* of *Sources* that the *Sink* is designed to operate with (See [Section 10.3.2, "Normative Sink Rules"](#)). The **SPR Sink Operational PDP** field **Shall** be sufficient to operate all the *Sink's* functional modes normally AND charge the *Sink's* *Battery* if present. For *Sinks* with a *Battery(s)*, the **SPR Sink Operational PDP** field **Shall** correspond to the *PDP Rating* of the *Charger* shipped with the *Sink* or the recommended *Charger's* *PDP Rating*. If the *Sink* is *EPR Capable* and is unable to operate at *PDPs* less than 100W, it **Shall** set the **SPR Sink Minimum PDP** field to the minimum power to sustain PD communication.

If the *Sink* is self-powered, such that it doesn't need power from a *Source*, then it **Shall** set this field to zero.

The **SPR Sink Operational PDP** is used to indicate ~~to Shared Capacity Chargers~~ that at this power level the user is not expected to receive any performance warning related to the power being supplied to the *Sink*.

## 6.5.13.15 SPR Sink Maximum PDP

The **SPR Sink Maximum PDP** field **Shall** contain the highest *PDP* the *Sink* will ever request under any operating condition, rounded up to the next integer, including charging its *Battery* if present. The **SPR Sink Maximum PDP** field **Shall Not** be less than the **SPR Sink Operational PDP** field, but **May** be the same. The value is used by the *Source* to determine the maximum amount of power it has to budget for the *Attached Sink*. If the *Sink* is *EPR Capable* and is unable to operate at *PDPs* less than 100W, it **Shall** set this field to the minimum power to sustain PD communication.

If the *Sink* is self-powered, such that it doesn't need power from a *Source*, then it **Shall** set this field to zero.

## 6.5.13.16 EPR Sink Minimum PDP

The **EPR Sink Minimum PDP** field **Shall** contain the *Source PDP* needed by an *EPR Sink*, rounded up to the next integer, to operate at its lowest level of functionality without requiring power from its *Battery*, if present. *Battery*

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charging may be an opportunistic feature, however this *PDP* **Should** be designed for basic functionality, not for charging. The *EPR Sink Minimum PDP* field **Shall** be less than or equal to the *EPR Sink Operational PDP* field value. The value is used by the *Source* to determine whether or not it has sufficient power to minimally support the *Attached Sink*. If the *Sink* is not *EPR Capable*, or if the *Sink* is self-powered, such that it doesn't need power from a *Source*, this field **Shall** be set to zero.

The *EPR Sink Minimum PDP* is used to indicate ~~to Shared Capacity Chargers~~ the power that **Should** be delivered to the *Sink* to guarantee at least basic functionality for the end user.

Possible examples of *EPR Sink Minimum PDP* could be:

- The power required to have basic functionality by a *Batteryless Sink*,
- On a device with a *Battery*, it can power the minimum functionality of the device.

**Note:** *EPR Sink Minimum PDP* can be the same as its *SPR Sink Minimum PDP*.

## 6.5.13.17 EPR Sink Operational PDP

The *EPR Sink Operational PDP* field **Shall** contain the *Source PDP* that the manufacturer recommends for the normal functionality of the *Sink*, rounded up to the next integer. This corresponds to the *PDP Rating* of *EPR Sources* that the *Sink* is designed to operate with (See [Section 10.3.2, "Normative Sink Rules"](#)). The *EPR Sink Operational PDP* **Shall** be sufficient to operate all the *Sink's* functional modes normally AND charge the *Sink's Battery* if present. For *Sinks* with a *Battery(s)*, it **Shall** correspond to the *PDP Rating* of the *Charger* shipped with the *EPR Sink* or the recommended *Charger's PDP Rating*. If the *Sink* is not *EPR Capable*, or if the *Sink* is self-powered, such that it doesn't need power from a *Source*, this field **Shall** be set to zero.

The *EPR Sink Operational PDP* is used to indicate ~~to Shared Capacity Chargers~~ that at this power level the user is not expected to receive any performance warning related to the power being supplied to the *Sink*.

## 6.5.13.18 EPR Sink Maximum PDP

The *EPR Sink Maximum PDP* field **Shall** be highest *PDP* the *EPR Sink* will ever request under any operating condition, rounded up to the next integer, including charging its *Battery* if present. The *EPR Sink Maximum PDP* field **Shall Not** be less than the *EPR Sink Operational PDP*, but **May** be the same. The value is used by the *Source* to determine the maximum amount of power it has to budget for the *Attached Sink*. If the *Sink* is not *EPR Capable*, or if the *Sink* is self-powered, such that it doesn't need power from a *Source*, this field **Shall** be set to zero.

## (f). Section 10.2

### To Text:

[Update as indicated with change notations.]

## 10.2 Source Power Rules

The *Source Power Rules* defined in this section include both **Normative** and **Optional** rules. For all of the defined rules, the capabilities a *Source* exposes are based on the *Port Maximum PDP*, or if power constrained, the *Port Present PDP* of the *Port*.

For a *Guaranteed Capability Port*, the *Source* **Shall** always include in every *Source\_Capabilities* or *EPR\_Source\_Capabilities* Message sent to a *Sink* all the (A)PDOs that are defined by the **Normative** (and **Optional**

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when implemented) rules based on the *Port's Port Maximum PDP* and *Mode of operation* (i.e., *SPR Mode* or *EPR Mode*).

For a *Managed Capability Port*, except before the *First Explicit Contract* or before the *Explicit Contract* after the *Port Present PDP* changes on a *Shared Capacity Charger* Port, the *Source* **shall** always include in every *Source Capabilities* or *EPR\_Source\_Capabilities* Message sent to a *Sink* all the (A)PDOs that are defined by the *Normative* (and *Optional* when implemented) rules based on the *Port's Port Present PDP* and *Mode of operation* (i.e., *SPR Mode* or *EPR Mode*). After the *First Explicit Contract*, this requirement assures that the attached *Sink* will always know what voltages (or voltage modes) are presently available from the *Source*.

## (g). Section 10.2.3.3

### To Text:

[Update as indicated with change notations.]

### 10.2.3.3 Optional Normative Extended Power Range (EPR)

Support of *EPR Mode* is **Optional**. An *EPR Capable* port has a *PDP Rating* that is  $>100\text{W}$  and  $\leq 240\text{W}$ . An *EPR Capable Source Port* (*EPR Source Port*) **May** operate in either *SPR Mode* or *EPR Mode* when operating at  $100\text{W}$  or less.

An *EPR Source Port* operating in *SPR Mode* **May** offer less than  $100\text{W}$  to avoid violating safety regulations. When operating in *EPR Mode*, an *EPR Source Port* **shall** offer  $100\text{W}$  in Fixed  $20\text{V}$  when not constrained by multi-port sharing limits.

An *EPR Source* **May** include multiple ports and these ports can be functionally implemented ~~as Shared Capacity Charger or Assured Capacity Charger ports~~ as defined in [USB Type-C 2.4].

Any port on an *EPR Source* that has a *Port Present PDP* of  $100\text{W}$  or less **shall** follow the *Normative* requirements for *SPR Source Ports* and **shall** operate only in *SPR Mode*. Any port on an *EPR Source* that is operating with a cable that is not *EPR Capable* **shall** operate only in *SPR Mode*. An *EPR Source*, when operating in *SPR Mode* with a  $5\text{A}$  cable, **May** offer less than  $5\text{A}$  due to design tolerances in order to meet applicable safety standards. For best user experience it **should** be as close to  $100\text{W}$  as possible.

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" define the *Normative* requirements *EPR Source Ports*. While not included in these tables, any *EPR Source Port* that also supports *SPR PPS* **shall** offer the *SPR Fixed  $20\text{V}$  PDO* and *PPS  $20\text{V}$  Prog APDO* at  $100\text{W}$  (or the maximum available *PDP* when the port is operating at an Equivalent *PDP*  $<100\text{W}$ ) 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 10.12. "EPR Source Capabilities based on the Port Maximum PDP and using an EPR Capable Cable" based on its *PDP Rating* of x Watts.
- When a *Source Port* on an *EPR Charger* is unable to provide its *Port Maximum PDP*, it **shall** adhere to the requirements defined in Table 10.13. "EPR Source Capabilities when Port Present PDP is less than Port Maximum PDP and using an EPR-capable cable" based on a *Port Present PDP* of x Watts. Some examples:
  - An *EPR Source Port* **May** be unable to provide its *PDP Rating* because it is thermally constrained at the time of power *Negotiation*.

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- A Shared **Capacity Port-port** on a multi-port *EPR Charger* that is limited by the remaining available power.
- When an *EPR Charger* is in an *Adjustable Voltage Supply (AVS) Explicit Contract*:
  - It **Shall** Reject all Requests outside of the defined voltage range (see [Table 10.15, "EPR Adjustable Voltage Supply \(AVS\) Voltage Ranges"](#)) 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* **Shall Not** exceed 48V.