

# USB Type-C ENGINEERING CHANGE NOTICE

**Title: Assured and Shared Groups Clarification**

**Applied to: USB Type-C Specification Release 2.3, Oct 2023**

<b>Brief description of the functional changes proposed:</b>
Add editorial clarifications to the definitions of Assured Capacity and Shared Capacity, including associating these definitions with port or port groups as opposed to being charger types which can be confusing when chargers include both Assured Capacity and Shared Capacity ports.

<b>Benefits as a result of the proposed changes:</b>
The clarifications will ease interpretation of requirements when a mix of Assured Capacity and Shared Capacity ports appear in the same charger.

<b>An assessment of the impact to the existing revision and systems that currently conform to the USB specification:</b>
None

<b>An analysis of the hardware implications:</b>
None

<b>An analysis of the software implications:</b>
None

<b>An analysis of the compliance testing implications:</b>
None

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## Actual Change Requested

(a). Add definitions to Section 1.5

To Text:

## 1.5 Terms and Abbreviations

Term	Description
Assured Capacity Port	A charger port that, in terms of <b>USB PD</b> , is either a Guaranteed Capability or Managed Capability port that is always capable of delivering its Port Maximum PDP.
Guaranteed Capability Port	As defined by the <b>USB PD</b> specification.
Managed Capability Port	As defined by the <b>USB PD</b> specification.
Port Maximum PDP	As defined by the <b>USB PD</b> specification.
Port Present PDP	As defined by the <b>USB PD</b> specification.
Shared Capacity Port	A charger port that, in terms of <b>USB PD</b> , is a Managed Capability port that is not always capable of delivering its Port Maximum PDP due to it being part of a group of ports that share a common source that is less than the sum of the individual port's Port Maximum PDPs.

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## (b). Section 4.8.6

### To Text:

### 4.8.6 USB Type-C Multi-Port Chargers

A USB Type-C Multi-Port Charger is a product that exposes multiple USB Type-C Source ports for the purpose of charging multiple connected devices. A compliant USB Type-C charger **may** offer on each of its ports a mix of power options as defined in Section 4.6.

Each port on a Multi-Port Chargers will **generally** fall into **one of the following** two categories **as defined by the following**.

1. **Assured Capacity PortsChargers:** a multi-port charger where the sum of the maximum capabilities of all of the exposed **Assured Capacity** ports, as indicated to the user, is equal to the total power delivery capacity of the charger. A port in a **Assured Capacity portgroup** has a fixed allocated amount of power and is either a Guaranteed Capability port or Managed Capability port as defined in the **USB PD** specification. **Assured Capacity ports are independent ports that are not grouped.**
2. **Shared Capacity PortsChargers:** a multi-port charger where the sum of the maximum capabilities of all of the exposed ports, as indicated to the user, is less than the total power delivery capacity of the charger. A port in a **Shared Capacity portgroup** does not have a fixed allocated amount of power and is a Managed Capability port as defined in the **USB PD** specification. **Shared Capacity ports only exist as a group of two or more ports where the sum of the maximum capabilities of all of the exposed ports, as indicated to the user, is greater than the total power delivery capacity of the group of ports.**

A Multi-Port Charger **may** offer in a single product separate visually identifiable **Assured Capacity ports and groupings of Shared Capacity** charging ports. **In this case, each group can independently offer either one of the two charging categories, either an Assured Capacity Charger or a Shared Capacity Charger.**

This section defines the requirements and provides guidelines for the operation and behavior of a USB Type-C Multi-Port Charger.

#### 4.8.6.1 General Requirements

Individual source ports **shall** always comply with power negotiation and rules set forth by the USB Type-C and **USB Power Delivery** specifications, adjusted as needed when available resources change as other ports take more or less power.

The minimum capability of all individual USB Type-C ports of a USB Type-C Multi-Port Charger **shall** be 5 V @ 1.5 A independent of how many of the other ports are in use.

For Shared Capacity **Chargers Ports**, the following are defined:

- **Total Shared Capacity** is the total power available for a **Shared Capacity** group of **Shared Capacity** ports. This is the overall power available when none of the ports in the group are connected to Sinks
- **Remaining Power Available** = Total Shared Capacity minus the sum of the power allocated to the attached ports. When doing this calculation, for ports in a **USB PD** power contract, the maximum power offered in the **USB PD** source capabilities is used, not the power requested in the RDO.
- **Shared Port Power Available** is either:
  - a) the port's PDP when it is less than or equal to the Remaining Power Available,

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- b) the Remaining Power Available when it is greater than 7.5 W and less than the port's PDP, or
- c) 7.5 W.

When a Shared Capacity ~~port in a group~~**Charger** reclaims power from one or more already connected ports to meet the 7.5 W minimum requirement for a newly attached device, the charger **shall** use standard **USB Type-C Current** and/or **USB PD** renegotiation methods and **shall not** use Hard Resets, **Error Recovery**, or the **Disabled** state.

## 4.8.6.2 Multi-Port Charger Behaviors

Each ~~Source port of~~ Assured Capacity ~~Chargers port~~ **shall**, by design, behave independently and be unaffected by the status and loading of the other ports. An exception to this behavior is allowed if the charger has to take any action necessary to meet an overall product operational safety requirement due to unexpected behavior on any port.

For ~~each group of~~ Shared Capacity ~~Chargers ports~~, the following behavioral rules **shall** apply:

- Each of the exposed ~~Source Pp~~ ports **shall** have the same power capabilities. ~~Each port of the charger shall be capable of the same maximum capability, minimum capability, and be able to can~~ draw from the shared power equally.
  - ~~○ Ports shall have the ability to supply the available shared capacity power up to the port's maximum power (PDP).~~
  - ~~○ When the power available to the port is not limited, a port's Port Present PDP will be to equal its Port Maximum PDP and the port shall have the ability to supply power up to the port's Port Maximum PDP.~~
  - ~~○ When the power available to the port is limited, a port's Port Present PDP will be less than its Port Maximum PDP and the port shall have the ability to supply power up to the port's Port Present PDP.~~
  - Ports ~~may offer~~ **have its Port Reported PDP** less than ~~this value its Port Present PDP~~ but **shall** increase the offer up to ~~the required value its Port Present PDP~~ when the Sink sets the Capabilities Mismatch bit in its response. This **may** be done in multiple steps, but all ports in the Shared Capacity Group **shall** reach the maximum power **or satisfy the Sink's needs** within three seconds.
  - Whenever a power contract is made or changed on any port, the Remaining Power Available and the Shared Port Power Available **shall** be re-computed, and the Source **shall** send updated Source Capability messages as needed.
  - Ports when not in a **USB PD** contract **shall** follow the rules for a shared **USB Type-C Current** source.
- All exposed **USB Type-C Current** ports **shall** have the ability to offer the same power capabilities.
  - All ports **shall** initially offer at least 1.5 A, e.g., **shall not** offer Default.
  - The total of offers across all the ports **shall** never exceed the capacity of the shared supply.
  - Ports that initially offer 1.5 A **shall** increase to 3 A after attach if they have sufficient available shared capacity within one second.

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## 4.8.6.3 Multi-Port Charger Port Labeling

Multi-port chargers **shall** have OEM-designed port labeling consistent with the following rules.

- For Assured Capacity **portsChargers**, each exposed Source port **shall** be labeled to indicate the PDP of the port. In this case, the user will be able to expect that each of the labeled ports will be able to meet power contracts consistent with the labeling independent of how many of the Source ports are in use.
- For Shared Capacity **port groupsChargers**, each Source port **shall** be labeled to indicate the same PDP. Additionally, the charger **shall** have a label that, with a minimum of equal visual prominence, indicates the Total Shared Capacity (see Section 4.8.6.1) shared across all the ports identified as a group.

~~A~~For a Multi-Port Charger that offers ~~in a single product separate groupings~~ mix of charging **Assured Capacity and Shared Capacity** ports, each **port and port** grouping **shall** be clearly identified ~~as a separate grouping~~ and each ~~grouping~~ **shall** be individually labeled consistent with ~~that group's behavior model, either as~~ an Assured Capacity **portCharger** or a Shared Capacity **port groupsCharger** ~~as defined above~~.

Refer to the USB Implementers Forum (**USB-IF**) for USB Type-C Chargers certification along with further labeling guidelines.

## 4.8.6.4 Multi-Port Charger that includes USB Data Hub Functionality

Multi-Port chargers that also incorporate USB data hub capabilities **shall** meet the same requirements as standalone chargers. These charging-capable hubs **shall** be self-powered and **shall** fully operate as a charger independent of the state of the USB data bus connections.

For hub-based Multi-Port Chargers that offer power to the upstream-facing port (to the host), this port **may** either behave as an Assured Capacity **Charging** port (e.g., be a dedicated charging port) or as a Shared Capacity **Charging** port (e.g., sharing capacity with downstream-facing ports). In either case, it **should** be clearly labeled consistent with its designed behavior, including identifying it as part of a group if it is sharing capacity with other ports.

When the upstream-facing port is sharing capacity with the downstream-facing ports, the PDP of the upstream-facing port can differ from the downstream-facing ports.