

# USB Type-C ENGINEERING CHANGE NOTICE

## Title: Contact Current Rating Clarification

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

### Brief description of the functional changes proposed:

Section 3.7.8.4 defines the current rating testing requirement for USB Type-C and as part of that, it is implied that the contact current rating is 1.25A per contact, but it is only implied as opposed to explicitly specified. This ECN is to make the 1.25A per VBUS contact, 0.5A per VCONN contact, and 1.375A per GND contact an explicit requirement and clarify that due to the interoperability requirements for USB, use of the USB Type-C connectors for continuously supplying greater than 5A on VBUS is not allowed. Increasing the GND pin ratings considers that VCONN can add 0.5A to the return path. Also updated is the test procedure to correctly account for VCONN power – it should be 0.5A, not 1.25A applied on the VCONN pin.

### Benefits as a result of the proposed changes:

Clarifies the spec to provide a definitive basis for answering those developers that believe that USB Type-C contacts can be used with higher levels of current – The USB Type-C connector is *not designed for use* above 5A (4 x 1.25A) on VBUS.

### 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:

The existing certification testing for contact current rating is effectively overstressing the ground-related pins in that it requires the VCONN pin to carry 1.25A which results in the four ground pins carrying 6.25A (as opposed to the real world value of 5.5A – this ECN changes the VCONN current in the test to 0.5A.

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## Actual Change Requested

### (a). Section 3.7.8.4, Page 128

#### To Text:

#### 3.7.8.4 Contact Current Rating

The contact current rating for the USB Type-C connector (plug and receptacle) contacts used for VBUS (A4, A9, B4, and B9) **shall** be a minimum of 1.25 A per contact. The contact current rating for VCONN (A5 and B5) **shall** be a minimum of 0.5 A per contact. The contact current rating for GND (A1, A12, B1, and B12) contacts **shall** be a minimum of 1.375 A per contact. The contact current rating for the remaining contacts **shall** be a minimum of 0.25 A per contact.

To assure the safe interoperability of USB Type-C connectors from different manufacturers used in Sources, Sinks, and cables; USB Type-C connectors **shall** be only used for supplying up to 5 A on VBUS as defined by the power rules of **USB PD**.

The current rating testing for the USB Type-C connector (plug and receptacle) **shall** be conducted per the following set up and procedures:

- A current of 5 A **shall** be applied collectively to VBUS pins (i.e., pins A4, A9, B4, and B9) and 1.250.5 A **shall** be applied to the VCONN pin (i.e., B5) as applicable, terminated through the corresponding GND pins (i.e., pins A1, A12, B1, and B12). A minimum current of 0.25 A **shall** also be applied individually to all the other contacts, as applicable. When current is applied to the contacts, the temperature of the connector pair **shall** be allowed to stabilize. The temperature rise of the outside shell surface of the mated pair above the VBUS and GND contacts **shall not** exceed 30 °C above the ambient temperature. Figure 3-67 provides an illustration of the measurement location.
- The measurement **shall** be done in still air.
- The connectors **shall** be oriented such that the accessible outer shell surface is on top and horizontal to the ground.
- The plug and receptacle **may** require modification to access solder tails or cable attachment points.
- Either thermocouple or thermo-imaging (preferred) method **may** be used for temperature measurement
- For certification, the connector manufacturer **shall** provide the receptacle and plug samples under test mounted on a current rating test PCB with no copper planes. A cable plug **may** use short wires to attach the cable attachment points together rather than using a current rating test PCB.