

USB Type-C ENGINEERING CHANGE NOTICE

Title: Captive Cable IR drop

Applied to: USB Type-C Specification Release 1.1, April 3, 2015

Brief description of the functional changes:

Clarify IR drop requirements for signal GND on captive cables.
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Benefits as a result of the changes:

Increased confidence in interoperability
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An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
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Clarification of spec intent. Builds on recently-approved ECR that limits the overall loss of such cables.
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An analysis of the hardware implications:
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Cable design needs to ensure the particular limit is not exceeded

An analysis of the software implications:
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None

An analysis of the compliance testing implications:
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Compliance testing for captive cables needs to validate this requirement
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Actual Change

(a). Section 4.4.1

From Text

4.4.1 IR Drop

The maximum allowable cable IR drop for ground shall be 250 mV and for VBUS shall be 500 mV through the cable to the cable's maximum rated VBUS current capacity. When VCONN is being sourced, the IR drop for the ground shall still be met considering any additional VCONN return current.

To Text

4.4.1 IR Drop

The maximum allowable cable IR drop for ground (including ground on a captive cable) shall be 250 mV and for VBUS shall be 500 mV through the cable to the cable's maximum rated VBUS current capacity. When VCONN is being sourced, the IR drop for the ground shall still be met considering any additional VCONN return current.

(b). Section 4.8.1.2

From Text (after application of recently approved ECR):

4.8.1.2 Chargers with USB Type-C Captive Cables

- A charger with a USB Type-C captive cable may supply VBUS at any time. It is recommended that such a charger only apply power to VBUS when it detects a UFP is present and remove power from VBUS when it detects the UFP is not present (vOPEN).
- A charger with a USB Type-C captive cable shall limit its current advertisement so as not to exceed the current capability of the cable (up to 5 A).
- The voltage as measured at the plug of a charger with a Type-C captive cable can be up to 0.75V lower than the standard tolerance range for the chosen voltage. For example:
 - A that charger advertises 3A Type-C Current shall output a voltage in the range of 4.0V – 5.5V at any load between 0A and 3A.
 - A PD Charger that has negotiated a contract to provide 20V at 5A shall output a voltage in the range of 18.25V - 21V at any load between 0A and the negotiated current.

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 - A PD Charger that has negotiated a contract to provide 20V at 5A shall output a voltage in the range of 18.25V - 21V at any load between 0A and the negotiated current.
- Note: The maximum allowable cable IR drop for ground is 250 mV (see 4.4.1). This is to ensure the signal integrity of the CC wire when used for connection detection and USB PD BMC signaling.

Supporting information:

See Captive Cable Charger ECR 20150625