USB Type-C ENGINEERING CHANGE NOTICE

Title: DFP Receptacle Vbus Max Capacitance
Applied to: USB Type-C Specification Release 1.1, April 3, 2015

Brief description of the functional changes:

Limits the maximum capacitance on an unpowered DFP receptacle VBUS pin to 10 µF. This requirement does not apply to Type-C sources with a captive cable.

Benefits as a result of the changes:

1. Be backward friendly with multi-port common-supply legacy hubs by meeting USB 2.0 requirement 7.2.4.1.
2. Improve system reliability by minimizing capacitive transfer currents between USB sources. Legacy Type-A ports do not have a capacitance limit. If Type-C sources do not employ a capacitive limit, equipment hazardous current can flow when Type-A sources are connected to Type-C sources. Furthermore, Type-C sources charged by Type-A sources are now a danger to other USB sources.
3. Avoid effectively shorting out the Table 4-2 VBUS Leakage requirement during the tCCDebounce time limits.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:

Minimum impact to the existing revision. Most existing systems probably already meet or almost meet this requirement by employing a switch to meet the cold socket requirement and having most of the VBUS capacitance before the switch. Systems that do not use a switch will probably not be compliant.

An analysis of the hardware implications:

All systems that use more than 10 µF on the VBUS pin of source receptacles will have to use an isolation element to keep the unpowered VBUS pin capacitance below the specified limit. This will be a new element for systems that otherwise did not have to use it.

An analysis of the software implications:

Systems that have to add an isolation element might also need a software change to control the isolation element.

An analysis of the compliance testing implications:

This will be a new test if compliance testing of this item is desired.

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Actual Change

(a). Section 4.4.2 VBUS , Page 106

From Text:

The DFP's USB Type-C receptacle VBUS pin shall remain unpowered until a UFP is attached.

To Text:

The DFP's USB Type-C receptacle VBUS pin shall remain unpowered and shall limit the capacitance between VBUS and GND to less than 10 µF until a UFP is attached.

(or if you prefer a table)

To Text:

The DFP's USB Type-C receptacle VBUS pin shall remain unpowered and shall limit the capacitance between VBUS and GND as specified in Table 4-x until a UFP is attached.

Table 4-x DFP Receptacle Unpowered VBUS Pin Capacitance

	Minimum	Maximum	Notes
VBUS Capacitance		10 µF	Capacitance between VBUS pins and GND pins on receptacle when VBUS is not being powered.