USB Type-C ENGINEERING CHANGE NOTICE

Title: VBus current in Type-C to USB Legacy Cable Assemblies and Adaptors
Applied to: USB Type-C Specification Release 1.0, August 11, 2014

Brief description of the functional changes:

Increase the minimum current rating on USB Type-C to USB Legacy connector cable assemblies and adaptors from 1.5A to 3A

Benefits as a result of the changes:

This will allow support for existing proprietary means of negotiating current above 1.5A. For example, a USB Type-C power consumer can use existing proprietary means to negotiate higher current from an existing USB A power provider. It seems better to recognize that these will exist on USB Type-C, and to rate the cable accordingly.

Side benefits are to provide a simple and consistent statement across all the various USB Type-C to legacy USB cable assemblies and adaptors: “If it has a USB Type-C plug on one end and any type of USB Plug on the other end, then it carries at least 3A.” (Note, Mini B is an exception, as its current carrying capacity is only 500 mA).

It also reduces the number of bulk cable constructions needed to support the various cable assembly specifications.

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

As above, it simplifies the message and the number of different bulk cable types. Cable assemblies that are currently about to enter production and don’t meet the spec for IR drop measured at 3A and/or connector rating at 3A will need a waiver.

An analysis of the hardware implications:

The cable OD will increase. By way of examples, a USB 2.0 1m cable assembly may grow from 2.6mm to 2.9mm, and a USB 3.1 Gen 2 1m cable assembly may grown from 4.0mm to 4.1mm. Connectors will need to comply with the existing USB PD requirements for 3A connectors for contact resistance and contact current rating. Other connector requirements are unchanged.

An analysis of the software implications:

Power management software is simplified, as 3A can always be assumed.

An analysis of the compliance testing implications:

Minor changes to the test set-ups for two tests (tests run at 3A rather than at lower current).

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Actual Change

(a). Section 3.1.3, Table 3-2, Page 25

From Text:

Table 3-2 USB Type-C Legacy Cable Assemblies

Cable Ref	Plug 1	Plug 2	USB Version	Cable Length	Current Rating	USB Power Delivery (BFSK)[1]	USB Type-C Electronically Marked
AC2-1.5	A	C[2]	USB 2.0	≤ 4 m	1.5 A	Optional	N/A
AC2-5					5 A	Supported	Required
AC3G2-1.5	A	C[2]	USB 3.1 Gen2	≤ 1 m	1.5 A	Optional	N/A
AC3G2-5					5 A	Supported	Required
CB2-1.5	C[3]	B	USB 2.0	≤ 4 m	1.5 A	Optional	Optional
CB2-5					5 A	Supported	Required
CB3G2-1.5	C[3]	B	USB 3.1 Gen2	≤ 1 m	1.5 A	Optional	Required
CB3G2-5					5 A	Supported	
CmB2	C[3]	Mini-B	USB 2.0	≤ 4 m	500 mA	N/A	N/A
CμB2-1.5	C[3]	Micro-B	USB 2.0	≤ 2 m	1.5 A	Optional	Optional
CμB2-3					3 A	Supported	
CμB3G2-1.5	C[3]	Micro-B	USB 3.1 Gen2	≤ 1 m	1.5 A	Optional	Required
CμB3G2-3					3 A	Supported	

Notes:

1. This capability only functions with USB Type-C products that incorporate *USB PD* BFSK support in addition to *USB PD* BMC – support for *USB PD* BFSK will not likely be common for products based on USB Type-C. For all legacy adapter cables that will be certified for *USB PD* BFSK usage, the legacy plug is required to be the *USB PD* version of the plug and appropriate *USB PD* cable marking is required. See Section 4.6.3.
2. USB Type-C plugs associated with the "B" end of a legacy adapter cable are required to have Rp termination incorporated into the plug assembly – see Section 4.5.3.2.2.
3. USB Type-C plugs associated with the "A" end of a legacy adapter cable are required to have Rd termination incorporated into the plug assembly – see Section 4.5.3.2.1.

To Text:

Table 3-2 USB Type-C Legacy Cable Assemblies

Cable Ref	Plug 1	Plug 2	USB Version	Cable Length	Current Rating	USB Power Delivery (BFSK)[1]	USB Type-C Electronically Marked
AC2-3	A[4]	C[2]	USB 2.0	≤ 4 m	3 A	Optional	N/A
AC2-5					5 A	Supported	Required
AC3G2-3	A[4]	C[2]	USB 3.1 Gen2	≤ 1 m	3 A	Optional	N/A
AC3G2-5					5 A	Supported	Required
CB2-3	C[3]	B[4]	USB 2.0	≤ 4 m	3 A	Optional	Optional
CB2-5					5 A	Supported	Required
CB3G2-3	C[3]	B[4]	USB 3.1 Gen2	≤ 1 m	3 A	Optional	Required
CB3G2-5					5 A	Supported	
CmB2	C[3]	Mini-B	USB 2.0	≤ 4 m	500 mA	N/A	N/A
CμB2-3	C[3]	Micro-B[4]	USB 2.0	≤ 2 m	3 A	Optional	Optional
CμB3G2-3	C[3]	Micro-B[4]	USB 3.1 Gen2	≤ 1 m	3 A	Optional	Required

Notes:

1. This capability only functions with USB Type-C products that incorporate *USB PD* BFSK support in addition to *USB PD* BMC – support for *USB PD* BFSK will not likely be common for products based on USB Type-C. For all legacy adapter cables that will be certified for *USB PD* BFSK usage, the legacy plug is required to be the *USB PD* version of the plug and appropriate *USB PD* cable marking is required. See Section 4.6.3.
2. USB Type-C plugs associated with the "B" end of a legacy adapter cable are required to have Rp termination incorporated into the plug assembly – see Section 4.5.3.2.2
3. USB Type-C plugs associated with the "A" end of a legacy adapter cable are required to have Rd termination incorporated into the plug assembly – see Section 4.5.3.2.1.
4. Legacy USB plugs are required to have low level contact resistance as specified in USB-PD 3.6.1 for 3A or 5A cable as appropriate and contact current rating as specified in USB-PD 3.6.5.2, i.e. measured with a 3A current or 5A current as appropriate

(b). Section 3.1.4, Table 3-3, Page 25

From Text:

Table 3-3 USB Type-C Legacy Adapter Assemblies

Adapter Ref	Plug	Receptacle	USB Version	Cable Length	Current Rating	USB Power Delivery (BFSK)	USB Type-C Electronically Marked
CμBR2-1.5	C[1]	Micro-B	USB 2.0	≤ 0.15 m	1.5 A	N/A	N/A
CAR3G1-1.5	C[2]	A	USB 3.1 Gen1	≤ 0.15 m	1.5 A	N/A	Optional

Notes:

1. USB Type-C plugs associated with the "B" end of a legacy adapter are required to have Rp termination incorporated into the plug assembly – see Section 4.5.3.2.2
2. USB Type-C plugs associated with the "A" end of a legacy adapter are required to have Rd termination incorporated into the plug assembly – see Section 4.5.3.2.1.

To Text:

Table 3-3 USB Type-C Legacy Adapter Assemblies

Adapter Ref	Plug	Receptacle	USB Version	Cable Length	Current Rating	USB Power Delivery (BFSK)	USB Type-C Electronically Marked
CμBR2-3	C[1]	Micro-B[3]	USB 2.0	≤ 0.15 m	3 A	N/A	N/A
CAR3G1-3	C[2]	A[3]	USB 3.1 Gen1	≤ 0.15 m	3 A	N/A	Optional

Notes:

1. USB Type-C plugs associated with the "B" end of a legacy adapter are required to have Rp termination incorporated into the plug assembly – see Section 4.5.3.2.2
2. USB Type-C plugs associated with the "A" end of a legacy adapter are required to have Rd termination incorporated into the plug assembly – see Section 4.5.3.2.1.
3. Legacy USB receptacles are required to have low level contact resistance as specified in USB-PD 3.6.1 for 3A and contact current rating as specified in USB-PD 3.6.5.2, i.e. measured with a 3A current

(c). Section 4.5.3.2.2, Page 138

From Text:

The value of Rp shall indicate an advertisement of Default USB Power (See Table 4-10).

To Text:

The value of Rp shall indicate an advertisement of Default USB Power (See Table 4-10), even though the cable itself can carry 3A. This is because the cable has no knowledge of the capabilities of the power source, and any higher current is negotiated via USB BC1.2 or by proprietary means.