USB Power Delivery ENGINEERING CHANGE NOTICE

Title: Applicability of Messages
Applied to: USB Power Delivery Specification Revision 2.0 V1.2

Brief description of the functional changes:
Clarify the response to unsupported messages.

Benefits as a result of the changes:
Should prevent compliance failures caused simply by an incomplete Specification.

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:
As above - prevents unnecessary failures.

Actual Change

(a). Section 6.4.4.2.5, Page 173

From Text:

6.4.4.2.5 Command Type

This Command Type field shall be used to indicate the type of Command request/response being sent.
An Initiator shall set the field to "Initiator" to indicate that this is a Command request from an Initiator.
"Responder ACK" is the normal return and shall be sent to indicate that the Command request was received and handled normally.
"Responder NAK" shall be returned when the Command request:

- has an ***Invalid*** parameter (e.g. ***Invalid*** SVID or Mode)
- cannot not be acted upon because the configuration is not correct (e.g. a Mode which has a dependency on another Mode or a request to exit a Mode which is not Active)
- is not recognized

The handling of "Responder NAK" is left up to the Initiator.
"Responder BUSY" shall be sent in the response to a VDM when the Responder is unable to respond to the Command request immediately, but the Command request may be retried. The Initiator shall wait ***tVDMBusy*** after a "Responder BUSY" response is received before retrying the Command request.

To Text:

6.4.4.2.5 Command Type

6.4.4.2.5.1 Commands other than Attention

This Command Type field shall be used to indicate the type of Command request/response being sent.
An Initiator shall set the field to "Initiator" to indicate that this is a Command request from an Initiator.
If Structured VDMs are supported, the responses are as follows:

- "Responder ACK" is the normal return and shall be sent to indicate that the Command request was received and handled normally.
- "Responder NAK" shall be returned when the Command request:
    - has an ***Invalid*** parameter (e.g. ***Invalid*** SVID or Mode)
    - cannot not be acted upon because the configuration is not correct (e.g. a Mode which has a dependency on another Mode or a request to exit a Mode which is not Active)
    - is not recognized

The handling of "Responder NAK" is left up to the Initiator.
"Responder BUSY" shall be sent in the response to a VDM when the Responder is unable to respond to the Command request immediately, but the Command request may be retried. The Initiator shall wait ***tVDMBusy*** after a "Responder BUSY" response is received before retrying the Command request.

6.4.4.2.5.2 Attention Command

This Command Type field shall be used to indicate the type of Command request being sent.
An Initiator shall set the field to "Initiator" to indicate that this is a Command request from an Initiator.
No response shall be made to an Attention Command.

(b). Section 6.4.4.2.6, Page 173

From Text:

6.4.4.2.6 Command

This field contains the value for the VDM Command being sent. The Commands explicitly listed in this field are used to identify devices and manage their operational Modes. There is a further range of Command values left for the vendor to use to manage additional extensions.
A Structured VDM Command consists of a Command request and a Command response (ACK, NAK or BUSY). A Structured VDM Command is deemed to be completed (and if applicable, the transition to the requested functionality is made) when the ***GoodCRC*** Message has been successfully sent by the Initiator in reply to the Responder's Command response.
If the Structured VDM Command request is not recognized it shall be NAKed.

To Text:

6.4.4.2.6 Command

6.4.4.2.6.1 Commands other than Attention

This field contains the value for the VDM Command being sent. The Commands explicitly listed in this field are used to identify devices and manage their operational Modes. There is a further range of Command values left for the vendor to use to manage additional extensions.
A Structured VDM Command consists of a Command request and a Command response (ACK, NAK or BUSY). A Structured VDM Command is deemed to be completed (and if applicable, the transition to the requested functionality is made) when the ***GoodCRC*** Message has been successfully received by the Responder in reply to its Command response.
If Structured VDMs are supported but the Structured VDM Command request is not recognized, it shall be NAKed (see Table 6-22).

6.4.4.2.6.2 Attention Command

This field contains the value for the VDM Command being sent (***Attention***). The ***Attention*** Command may be used by the Initiator to notify the Responder that it requires service.
A Structured VDM ***Attention*** Command consists of a Command request but no Command response. A Structured VDM ***Attention*** Command is deemed to be completed when the ***GoodCRC*** Message has been successfully received by the Initiator in reply to its ***Attention*** Command request.
If Structured VDMs are supported, but the Structured VDM ***Attention*** Command request is not recognized it shall be Ignored (see Table 6-22).

(c). Section 6.10, Page 222

From Text:

The following abbreviations are used:

- N – ***Normative***; shall be supported by this Port/Cable Plug
- CN – ***Conditional Normative*** ; shall be supported by a given Port/Cable Plug based on features
- R – Recommended; should be supported by this Port/Cable Plug
- O – ***Optional***; may be supported by this Port/Cable Plug
- RJ - Reject; this Port/Cable Plug shall return a ***Reject*** Message when received.
- I – Ignore; shall be ***Ignored*** by this Port/Cable Plug when received.
- NK – NAK; this Port/Cable Plug shall return Responder NAK to this Command when NA.
- NA – Not allowed; shall not be transmitted by this Port/Cable Plug.

To Text:

The following abbreviations are used:

- N – ***Normative***; shall be supported by this Port/Cable Plug
- CN – ***Conditional Normative*** ; shall be supported by a given Port/Cable Plug based on features
- R – Recommended; should be supported by this Port/Cable Plug
- O – ***Optional***; may be supported by this Port/Cable Plug
- RJ - Reject; this Port/Cable Plug shall return a ***Reject*** Message when received.
- I – Ignore; shall be ***Ignored*** by this Port/Cable Plug when received.
- NK – NAK; this Port/Cable Plug shall return Responder NAK to this Command when NA.
- NA – Not allowed; shall not be transmitted by this Port/Cable Plug.
- DR - Don't Recognize; there shall no response at all (i.e. not even a GoodCRC Message) from this Port/Cable Plug when received.

(d). Section 6.10.2, Page 223, Table 6-38

From Text:

Table 6-38 Applicability of Control Messages

Message Type	Source	Sink	Dual-Role Power	Dual-Role Data	Cable Plug
Transmitted Message					
Accept	N	N			N
DR_Swap	O	O		N	NA
Get_Sink_Cap	R	NA	N		NA
Get_Source_Cap	NA	R	N		NA
GoodCRC	N	N			N
GotoMin	CN[1]/O	NA			NA
Ping	O	NA			NA
PR_Swap	NA	NA	N		NA
PS_RDY	N	NA	N		NA
Reject	N	NA	O	O	NA
Soft_Reset	N	N			NA
VCONN_Swap	R	R			NA
Wait	CN[2]/O	NA	O	O	NA
Received Message					
Accept	N	N	N	N	I
DR_Swap	O/RJ	O/ RJ		N	I
Get_Sink_Cap	RJ	N	N		I
Get_Source_Cap	N	RJ	N		I
GoodCRC	N	N			N
GotoMin	RJ	R[3]			I
Ping	RJ	I			I
PR_Swap	RJ	NS RJ	N		I
PS_RDY	RJ	N	N		I
Reject	RJ	N	N	N	I
Soft_Reset	N	N			N
VCONN_Swap	CN[4]/ RJ	CN[4]/ RJ			I
Wait	RJ	N	N	N	I

Note 1: Shall be supported by a Hub with multiple Downstream Ports. Should be supported by a Host with multiple Downstream Ports.
Note 2: Shall be supported when transmission of ***GotoMin*** Messages is supported.
Note 3: Should be supported by Sinks which use PD power for charging.
Note 4: Shall be supported by any Port that can operate as a VCONN Source.

To Text:

Table 6-38 Applicability of Control Messages

Message Type	Source	Sink	Dual-Role Power	Dual-Role Data	Cable Plug
Transmitted Message					
Accept	N	N			N
DR_Swap	O	O		N	NA
Get_Sink_Cap	R	NA	N		NA
Get_Source_Cap	NA	R	N		NA
GoodCRC	N	N			N
GotoMin	CN[1]/O	NA			NA
Ping	O	NA			NA
PR_Swap	NA	NA	N		NA
PS_RDY	N	NA	N		NA
Reject	N	NA	O	O	NA
Soft_Reset	N	N			NA
VCONN_Swap	R	R			NA
Wait	CN[2]/O	NA	O	O	NA
Received Message					
Accept	N	N	N	N	I
DR_Swap	O/RJ	O/ RJ		N	I
Get_Sink_Cap	RJ	N	N		I
Get_Source_Cap	N	RJ	N		I
GoodCRC	N	N			N
GotoMin	RJ	R[3]			I
Ping	RJ	I			I
PR_Swap	RJ	~~NS~~ RJ	N		I
PS_RDY	RJ	N	N		I
Reject	RJ	N	N	N	I
Soft_Reset	N	N			N
VCONN_Swap	CN[4]/ RJ	CN[4]/ RJ			I
Wait	RJ	N	N	N	I

Note 1: Shall be supported by a Hub with multiple Downstream Ports. Should be supported by a Host with multiple Downstream Ports.
Note 2: Shall be supported when transmission of ***GotoMin*** Messages is supported.
Note 3: Should be supported by Sinks which use PD power for charging.
Note 4: Shall be supported by any Port that can operate as a VCONN Source.

(e). Section 6.10.3, Page 224, Table 6-40

From Text:

Applicability of VDM Commands

Table 6-40 details VDM Commands that shall/should/shall not be transmitted and received by a DFP, UFP or Cable Plug.

Table 6-40 Applicability of VDM Commands

Command Type	DFP	UFP	Cable Plug
Transmitted Command Request			
Discover Identity	CN[1]/R	R[2]	NA
Discover SVIDs	CN[1]/ O	NA	NA
Discover Modes	CN[1]/ O	NA	NA
Enter Mode	CN[1]/NA	NA	NA
Exit Mode	CN[1]/NA	NA	NA
Attention	NA	O	NA
Received Command Request/Transmitted Command Response			
Discover Identity	NK	CN[1]/R/NK	N
Discover SVIDs	NK	CN[1]/NK	CN[1]/NK
Discover Modes	NK	CN[1]/NK	CN[1]/NK
Enter Mode	NK	CN[1]/NK	CN[1]/NK
Exit Mode	NK	CN[1]/NK	CN[1]/NK
Attention	0/NK	NK	O
Note 1: Shall be supported when Modal Operation is supported. Note 2: May be transmitted by a UFP/Source during cable discovery (see Section 6.4.4.3.1 and Section 8.3.3.10.11).			

To Text:

Applicability of Structured VDM Commands

Table 6-40 details Structured VDM Commands that shall/should/shall not be transmitted and received by a DFP, UFP or Cable Plug. If Structured VDMs are not supported, a Structured VDM Command received by a DFP or UFP shall be Ignored.

Table 6-40 Applicability of Structured VDM Commands

Command Type	DFP	UFP	Cable Plug
Transmitted Command Request			
Discover Identity	CN[1]/R	R[2]	NA
Discover SVIDs	CN[1]/ O	NA	NA
Discover Modes	CN[1]/ O	NA	NA
Enter Mode	CN[1]/NA	NA	NA
Exit Mode	CN[1]/NA	NA	NA
Attention	NA	O	NA
Received Command Request/Transmitted Command Response			
Discover Identity	NK[3]	CN[1]/R/NK[3]	N

Command Type	DFP	UFP	Cable Plug
Discover SVIDs	NK[3]	CN[1]/NK[3]	CN[1]/NK
Discover Modes	NK[3]	CN[1]/NK[3]	CN[1]/NK
Enter Mode	NK[3]	CN[1]/NK[3]	CN[1]/NK
Exit Mode	NK[3]	CN[1]/NK[3]	CN[1]/NK
Attention	O/I	O/I	I

Note 1: Shall be supported when Modal Operation is supported.

Note 2: May be transmitted by a UFP/Source during cable discovery (see Section 6.4.4.3.1 and Section 8.3.3.10.11).

Note 3: If Structured VDMs are not supported, a Structured VDM Command received by a DFP or UFP shall be Ignored.

(f). Section 6.10.4, Page 224, Table 6-41

From Text:

Table 6-41 Applicability of Reset Signaling

Signaling Type	DFP	UFP	Cable Plug
Transmitted Message/Signaling			
Soft_Reset	N	N	NA
Hard Reset	N	N	NA
Cable Reset	CN[1]	NA	NA
Received Message/Signaling			
Soft_Reset	N	N	N
Hard Reset	N	N	N
Cable Reset			N
Note 1: Shall be supported when transmission of SOP' Packets are supported.			

To Text:

Table 6-41 Applicability of Reset Signaling

Signaling Type	DFP	UFP	Cable Plug
Transmitted Message/Signaling			
Soft_Reset	N	N	NA
Hard Reset	N	N	NA
Cable Reset	CN[1]	NA	NA
Received Message/Signaling			
Soft_Reset	N	N	N
Hard Reset	N	N	N
Cable Reset	DR	DR	N
Note 1: Shall be supported when transmission of SOP' Packets are supported.			