Vendor Info File Definition

Revision 1.36, Version 1.0

Revision 1.36, Version 1.0
May 9, 2018

Revision History

Revision	Version	Issue Date	Comment
0.5	1.0	Aug 23, 2016	Initial release Revision 0.5.
0.51	1.0	Aug 24, 2016	Editorial fixes.
0.52	1.0	Aug 31, 2016	SVID/SVID Mode definitions added. SSSTX/RX_dir_support parameters marked as reserved/shall not be tested.
0.53	1.0	Sept 6, 2016	$VIF_Specification and $VIF_Producer fields added.
0.54	1.0	Sept 27, 2016	Editorial fixes.
0.90	1.0	Nov 18, 2016	Added new fields and tightened constraints among existing fields. Removed SSSTX/RX_dir_support fields.
0.91	1.0	Nov 22, 2016	Added additional constraints.
0.92	1.0	Nov 25, 2016	Editorial fixes.
0.93	1.0	Nov 30, 2016	Added new fields and tightened constraints among existing fields.
0.94	1.0	Dec 6, 2016	Editorial fixes.
0.95	1.0	Dec 7, 2016	Renamed Externally_Powered field to Unconstrained_Power.
0.96	1.0	Dec 7, 2016	Updated description of Unconstrained_Power field. Updated this Revision History.
1.00	1.0	Dec 8, 2016	Official release.
1.10	1.0	Mar 15, 2017	Renamed two fields and tightened constraints on another two.
1.11	1.0	Mar 21, 2017	Added support for PPS. Expanded support for Chunking.
1.20	1.0	June 13, 2017	Added additional support for PD 3.
1.21	1.0	June 30, 2017	Moved field to correct field group.
1.22	1.0	Sept 14, 2017	Added additional constraints to PDP fields. Set the Max Voltage to 21000 mV for all PDO Supply Types that have a Max Voltage field.
1.30	1.0	Dec 5, 2017	Added support for BC 1.2, Link Layer and Type-C Functional tests.
1.31	1.0	Jan 16, 2018	Changed lower limit to PD_Power_As_Sink to 0. Editorial fixes.

Revision	Version	Issue Date	Comment
1.32	1.0	Jan 26, 2018	Clarified requirements for Type_C_Can_Act_As_Device and Type_C_Can_Act_As_Host
1.33	1.0	Feb 7, 2018	Two new fields added to USB Host Fields.
1.34	1.0	Apr 26, 2018	Added new fields for OCP testing. Replaced Responds_To_Discov_SOP with two new fields Responds_To_Discov_SOP_UFP and Responds_To_Discov_SOP_DFP. Removed Structured_VDM_Version and Structured_VDM_Version_SOP Added new Product Power Fields section. Added new fields to USB Device section.
1.35	1.0	May 3, 2018	Clarified requirements for Product_Total_Source_Power.
1.36	1.0	May 9, 2018	Removed fields related to PD Consumer Port Capability Descriptor from section 3.2.5.

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1 INTRODUCTION

1.1 Scope of the Document

This document tests and/or checks for compliance with requirements specified in ***[PowerDelivery2.0]***, ***[PowerDelivery3.0]***, ***[USBType-C1.3***, and ***[USB3.2]***.

1.2 Intended Audience

This specification is intended for developers of Hosts, Hubs, Peripherals and Cables which have support for Power Delivery, USB Type-C™, or USB 3.2 capability.

1.3 Reference Documents

The following referenced documents can be found on the USB-IF website www.usb.org:

[BatteryCharging1.2]	*Battery Charging Specification Revision 1.2*
[OTG&EH2.0]	*On-The-Go and Embedded Host Supplement to the USB 2.0 Specification, Revision 2.0 plus errata and ECR*
[OTG&EH3.0]	*On-The-Go and Embedded Host Supplement to the USB 3.0 Specification, Revision 1.0 plus errata and ECR*
[OTG&EH3.0ComplianceChecklist]	*OTG&EH 3.0 Compliance Checklist*
[OTG&EH2.0ComplianceChecklist]	*OTG&EH 2.0 Compliance Checklist*
[PowerDelivery2.0]	*USB Power Delivery Specification Revision 2.0*
[PowerDelivery3.0]	*USB Power Delivery Specification Revision 3.0*
[Micro-USB1.01]	*Universal Serial Bus Micro-USB Cables and Connectors Supplement to the USB 2.0 Specification, revision 1.01.*
[USB2.0]	*Universal Serial Bus Revision 2.0 Specification including ECNs and errata.*
[USB3.2]	*Universal Serial Bus Revision 3.2 including ECNs and errata.*
[USBType-C1.3]	*USB Type-C™ Cable and Connector Specification Revision 1.2*
[USBSystemsChecklist]	*USB Compliance Checklist, Systems*
[USBPeripheralChecklist]	*USB Compliance Checklist, Peripheral (Excluding Hubs)*
[USBPeripheralSilicon]	*USB Compliance Checklist, Peripheral Silicon (Excluding Hub Silicon)*
[PDCommunicationsEngineMOI]	*Communications Engine PD Compliance MOI, developed by MQP Electronics Ltd.*
[PDDeterministicMOI]	*Deterministic PD Compliance MOI, developed by Ellisys*

2 ACRONYMS AND TERMS

This chapter lists and defines terms and abbreviations used throughout this specification. Other terms and abbreviations are provided in ***[PowerDelivery2.0]***, ***[PowerDelivery3.0]*** and ***[USBType-C1.3]***.

Term	Description
Attached	USB Power Delivery ports which are mechanically joined with USB cable.
BIST	Built In Self Test – Power Delivery testing mechanism for the Phy Layer.
Cold Socket	A downstream port receptacle that does not apply vSafe5V on VBUS until a plug insertion is detected.
Connected	USB Power Delivery ports which are actively communicating using the USB Power Delivery protocol.
Consumer	The capability of a PD Port (typically a Device's upstream port) to sink power from the power conductor (e.g. VBUS).
Consumer/Provider	A Consumer with the additional capability to act as a Provider.
Contract	An agreement on both power level and direction reached between a Port Pair. A contract may be explicitly negotiated between the Port Pair or may be an implicit power level defined by the current state. While operating in Power Delivery mode there will always be either an explicit or implicit contract in place. The agreement may only be altered in the case of a negotiation, Hard Reset or failure of the Source.
Dead Battery	A device has a Dead Battery when the battery in a device is unable to power its functions.
Device	When lower cased (device), it refers to any USB product, either device or host.
Device Policy Manager	Module running in a Provider or Consumer that applies Local Policy to each port in the Device via the Policy Engine.
Downstream Port	Either a port in the Host or the ports defined in ***[USB2.0]***, ***[USB3.2]*** or USB Type-C as defined in ***[USBType-C1.3]***. The default Host and Source.
Dual-Role Device	A product containing one or more Dual-Role Ports that are capable of operating as either a Source or a Sink.
Dual-Role Port	A Consumer/Provider or Provider/Consumer capable port that is a port capable of operating as either a Source or Sink.
HDD	A Hard Disk Drive.
Hard Reset	This is initiated by HardReset signaling from either Port Partner. It restores VBUS to the default condition and resets the PD communications engine to its default state.
IR Drop	The voltage drop across the cable and connectors between the Source and the Sink. It is a function of the resistance of the ground wire in the cable plus the contact resistance in the connectors times the current flowing over the path.
Local Policy	Every Device has its own Policy, called the Local Policy, that is executed by its Policy Engine to control its power delivery behavior. The Local Policy at any given time may be the default policy, hard coded or modified by changes in operating parameters or one provided by the system Host or some combination of these. The Local Policy optionally may be changed by a System Policy Manager.
Message	The packet payload consisting of a header for control messages and a header and data for data messages as defined in Sections 6.2, 6.3, and 6.4 of ***[PowerDelivery2.0]*** and ***[PowerDelivery3.0]***.
Messaging	Communication in the form of messages as defined in Sections 6.2, 6.3, and 6.4 of ***[PowerDelivery2.0]*** and ***[PowerDelivery3.0]***.

Term	Description
Negotiation	This is the PD process whereby: 1. The Source advertises its capabilities. 2. The Sink requests one of the advertised capabilities. 3. The Source acknowledges the request and alters its output to satisfy the request. The result of the negotiation is a contract for power delivery/consumption between the Port Pair.
Packet	One entire unit of PD communication including a preamble, SOP*, payload, CRC and EOP as defined in Sections 6.2 of ***[PowerDelivery2.0]*** and ***[PowerDelivery3.0]***.
PD	USB Power Delivery
PD Capable	A port that supports USB Power Delivery.
PDUSB	USB Device Port or USB Host Port that is PD capable.
PD Connection	A Port Pair with an established contract.
Phy Layer	The Physical Layer responsible for sending and receiving messages across VBUS between a Port Pair.
Policy	Policy defines the behavior of PD capable parts of the system and defines the capabilities it advertises, requests made to (re)negotiate power and the responses made to requests received.
Policy Engine	The Policy Engine interprets the Device Policy Manager's input in order to implement Policy for a given port and directs the Protocol Layer to send appropriate messages.
Port	An interface typically exposed through a receptacle, or via a plug on the end of a hard-wired captive cable. USB Power Delivery defines the interaction between a Port Pair.
Port Pair	Two attached PD Ports.
Port Partner	The USB Power Delivery contract is negotiated between a Port Pair connected by a USB cable. These ports are known as Port Partners.
Power Conductor	The wire delivering power from the Source to Sink. For example USB's VBUS.
Power Consumer	See Consumer
Power Provider	See Provider
Protocol Error	An unexpected or unknown message that cannot be handled by a given implementation.
Protocol Layer	The entity that forms the messages used to communicate information between Port Partners.
Provider	A capability of a PD Port (typically a Host, Hub, or Wall Wart DFP) to source power over the power conductor (e.g. VBUS). This corresponds to a Type-A or a Type-C Port with RP asserted on its CC Wire.
Provider/Consumer	A Provider with the additional capability to act as a Consumer. This corresponds to a Dual-Role Type-A Port or a Dual-Role Type-C Port with RP asserted on its CC Wire.
Reserve	Power which is kept back by a Provider in order to ensure that it can meet total power requirements of attached Consumers on at least one port.
Safe Operation	Sources must have the ability to tolerate 5V applied by both Port Partners.

Term	Description
Signaling	An ordered set of four K-codes used to indicate a particular line symbol e.g. Hard Reset as defined in Section 5.6.4 of ***[PowerDelivery2.0]*** and ***[PowerDelivery3.0]***.
Sink	The port consuming power from VBUS; most commonly a Device.
Soft Reset	A process that resets the PD communications engine to its default state.
Source	A role a port is currently taking to supply power over VBUS; most commonly a Host or Hub downstream port.
System Policy	Overall system policy generated by the system, broken up into the policies required by each Port Pair to affect the system policy. It is programmatically fed to the individual Devices for consumption by their Policy Engines.
System Policy Manager	Module running on the USB Host. It applies the System Policy through communication with PD capable Consumers and Providers that are also connected to the Host via USB.
Tester	The Tester is assumed to be a piece of test equipment, or an assembly of pieces of test equipment, which manage(s) the testing process of a PD UUT.
Unit Under Test (UUT)	The PD device that is being tested by the Tester and responds to the initiation of a particular BIST test sequence.
Upstream Port	Typically, a B port on a Device as defined in ***[USB2.0]***, ***[USB3.2]*** or Type-C Port as defined in ***[USBType-C1.3]***. The default Device and Sink.
USB Powered State	Synonymous with the ***[USB2.0]*** and ***[USB3.2]*** definition of the powered state.
VI	Same as power (i.e. voltage * current = power)
Wall Wart	A power supply or “power brick” that is plugged into an AC outlet. It supplies DC power to power a device or charge a battery.

3 SUBMISSION MATERIALS

3.1 Vendor Information File (VIF)

3.1.1 Introduction

In order to expedite the testing process, the Vendor is required to provide a text file which defines in detail, the UUT to be tested. One such file is required for any significantly different configuration; for example, a UUT which needs to demonstrate correct functionality with or without External Power would need two files; one with the *Unconstrained_Power* field set to YES, and one with it defined as NO. In particular, a UUT with multiple ports must submit a VIF for each port.

The full test suite should then be run for each such file.

It is the intention that the testing is as automated as possible, so that interaction by the vendor during a test is not expected, or indeed encouraged.

The reason for this is that such details as Source or Sink Capabilities of the UUT should always match the Vendor Information File (VIF) during a given test sequence, thus allowing the vendor intentions to be checked against the UUT presented for test.

3.1.2 File Format

The *Vendor Info File* is a 'text' file which shall use single byte characters from the ASCII character set. The file defines a number of *Parameter Definitions*.

- A semicolon ';' and anything which follows on that line is a comment and shall be ignored.
    - A semicolon within a string Value Token shall not initiate a comment.
- Blank lines or lines that consist entirely of whitespace are permitted and shall be ignored.
- Each Parameter Definition shall be defined on a single line of text.
- Each Parameter Definition consists of a *Parameter Name*, followed by a colon ':', followed by a single *Value Token* that represents either a 32-bit value or a text string.
- Parameter Definitions may appear in any order within the Vendor Info File.
- Parameter Names shall consist of the following:
    - For string values only, an initial '$' character.
    - One or more upper or lower case letters, digits, underscores or single-quotes.
    - Parameter Names shall be unique across the Vendor Info File.
    - Parameter Names are case-insensitive.
- Each non-string Value Token is a non-negative decimal or hexadecimal integer, or one of the strings "YES" or "NO" (meaning 1 or 0 respectively).
    - Hexadecimal values are prefixed with the strings “0x” or “0X”.

  - "YES" and "NO" are case-insensitive.

- String Value Tokens consist of an opening double-quote '"', arbitrary ASCII text, and a closing double-quote.
  - If there are more than two double-quotes in the Value Token area, then the final double-quote on the line that is not part of a comment shall close the string Value Token. Thus, `$StringVar: "This is "quoted" text"` is valid, with the Value Token equal to `This is "quoted" text`.
- Blank space is permitted and shall be ignored in the following places:
  - Prior to the Parameter Name.
  - Prior to and following the colon that separates the Parameter Name from the Value Token.
  - Following the Value Token.
- A single Parameter Definition shall be parsed as if the following steps are taken in order:
  - Comments are removed.
  - Leading and trailing whitespace is removed.
  - The Parameter Definition is validated.
  - The Parameter Name and Value Token are extracted.

3.1.3 Requirements For VIF Producers

- VIF producers shall omit inapplicable fields from the VIF upon saving.
- VIF producers shall not emit a VIF unless it conforms to this specification.

3.1.4 Requirements For VIF Consumers

In this section, "recorded as a failure" means that the VIF consumer shall inform the user in an application specific manner that the VIF is not valid. If the VIF consumer is a tester, then it will not run any tests on the device described by the VIF.

- Inappropriate parameters for the UUT in question (e.g. cable parameters for a non-cable marker) shall be ignored by VIF consumers. In particular, a VIF consumer shall not record a VIF as a failure solely because it contains unexpected Parameter Definitions.
- A VIF with inconsistent applicable parameters for the UUT in question shall be recorded as a failure by VIF consumers. The VIF may then be redirected to a VIF editor.
- A VIF with more than one definition for the same Parameter shall be recorded as a failure by VIF consumers and all instances of that definition shall be discarded. The VIF may then be redirected to a VIF editor.
- A VIF consumer shall take the VIF as the authority on how the UUT shall behave, and any inconsistency between the VIF and UUT behavior shall be recorded by the VIF consumer as a failure.

3.2 Vendor File Parameters

The following is a listing of all valid parameters, with additional explanations as required.

Some fields may appear multiple times within a Vendor Info File. These fields are distinguished by one or more index numbers interpolated into the field name. Thus the parameter name *SVID2_mode1_recog_mask* references the first listed SVID mode of the second listed SVID of the given UUT. In this document, these numbers are given in the form <X>. Thus *SVID2_mode1_recog_mask* would be referenced as *SVID<X>_mode<Y>_recog_mask*. Unless otherwise specified, index numbers shall start at 1, and be incremented by 1 for each item.

If a field is marked (Y/N), then it is a YES/NO field that can take the values YES (or 1) and NO (or 0). All other values are invalid.

3.2.1 Intro Fields

The fields in this section are required for all UUTs unless otherwise specified.

$VIF_Specification

The Vendor Info File specification to which the VIF is compliant. This field is generated automatically by the VIF producer. This field may be displayed to the user, but it shall not be modifiable by the user within the VIF producer. If the VIF producer is editing an existing VIF then it shall update this field to the version of the Vendor Info File specification that it currently supports when it saves the VIF.

The format of this field shall be "Revision <Num>, Version <Num>", where the <Num>s are version numbers in the form ***X.Y[..]***.

When generating a new VIF, VIF producers shall populate this field with the most recent version of the specification that it supports.

$VIF_Producer

Information regarding the VIF producer used to generate the VIF. This field is generated automatically by the VIF producer. This field may be displayed to the user, but it shall not be modifiable by the user within the VIF producer. If the VIF producer is editing an existing VIF then it shall update this field to the version of the current VIF producer when it saves the VIF.

This field is an unrestricted text string defined by the VIF producer vendor. However, vendors are encouraged to include vendor name, app name and app version.

When generating a new VIF, VIF producers shall populate this field.

This field may be ignored by VIF consumers.

$Vendor_Name

To be provided by the Vendor. This is an unrestricted ASCII text string.

$Model_Part_Number
$Product_Revision

ASCII text strings to be provided by the Vendor. These fields should match what appears in the USB-IF Product Registration form.

The USB-IF uses these fields to generate the product name in the USB Integrator's List.

$TID

A text string, provided by USB-IF.

3.2.2 VIF Product Fields

The fields in this section are required for all UUTs unless otherwise specified.

VIF_Product_Type

The highest-level category into which the Item being tested falls. Valid options are:

0 - Port
1 - Cable
2 - Re-timer

$Port_Label

To be provided by the Vendor. This field must correspond with the port label given on the device picture submitted to USB-IF by the Vendor along with the VIF.

If *VIF_Product_Type* is not set to 0 (Port) this field shall be ignored by testers.

Connector_Type

The connector type of a Port. Valid options are:

0 - Type-A (includes mini-A and micro-A)
1 - Type-B (includes mini-B and micro-B)
2 - Type-C

If *VIF_Product_Type* is not set to 0 (Port), then this field shall be ignored by testers.

USB_PD_Support (Y/N)

Does this product support USB Power Delivery?

If *VIF_Product_Type* is set to 0 (Port) and *Connector_Type* is not set to 2 (Type-C), then this field shall be set to NO.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be set to YES.

If *VIF_Product_Type* is set to 2 (Re-timer) then this field shall be ignored by testers.

PD_Port_Type

The PD capabilities of the UUT.

Valid options are:

0 - Consumer Only (asserts Rd all the time)
1 - Consumer/Provider (asserts Rd at startup and can be directed to assert Rp)
2 - Provider/Consumer (asserts Rp at startup and can be directed to assert Rd)
3 - Provider Only (asserts Rp)
4 - DRP (toggles between asserting Rp and Rd)

If *VIF_Product_Type* is not set to 0 (Port)), then this field shall be ignored by testers.

If *USB_PD_Support* is not set to YES), then this field shall be ignored by testers.

If *Connector_Type* is not set to 2 (Type-C), then this field shall be ignored by testers.

Type_C_State_Machine

Indicates which Type-C connection state machine is implemented on the DUT. If *Connector_Type* is not set to 2 (Type-C) then this field shall be ignored by testers.

If *USB_PD_Support* is set to YES and *PD_Port_Type* is equal to 0 (Consumer Only), then valid options are:

1 - SNK

If *USB_PD_Support* is set to YES and *PD_Port_Type* is equal to 1 (Consumer/Provider), then valid options are:

1 - SNK
2 - DRP

If *USB_PD_Support* is set to YES and *PD_Port_Type* is equal to 2 (Provider/Consumer), then valid options are:

0 - SRC
2 - DRP

If *USB_PD_Support* is set to YES and *PD_Port_Type* is equal to 3 (Provider only), then valid options are:

0 - SRC

If *USB_PD_Support* is set to YES and *PD_Port_Type* is equal to 4 (DRP), then valid options are:

2 - DRP

If *USB_PD_Support* is set to NO, then valid options are:

0 - SRC
1 - SNK
2 - DRP

Port_Battery_Powered (Y/N)

Can the port be powered by one or more batteries?

If VIF_Product_Type is not set to 0 (Port), then this field shall be ignored by testers.

BC_1_2_Support

What Battery Charging 1.2 features does the UUT support?

If *Port_Battery_Powered* is set to YES and *Type_C_State_Machine* is set to 2 (DRP), then valid options are:

0 - None
1 - Portable Device
2 - Charging Port
3 - Both

If *Port_Battery_Powered* is set to YES and *Connector_Type* is set to 1 (Type-B), then valid options are:

0 - None
1 - Portable Device

If *Port_Battery_Powered* is set to YES and *Type_C_State_Machine* is set to 1 (SNK), then valid options are:

0 - None
1 - Portable Device

If *Connector_Type* is set to 0 (Type-A), then valid options are:

0 - None
2 - Charging Port

If *Connector_Type* is set to 2 (Type-C) and *Type_C_State_Machine* is set to 0 (SRC), then valid options are:

0 - None
2 - Charging Port

If *Port_Battery_Powered* is set to NO and *Connector_Type* is set to 1 (Type-B), then valid options are:

0 - None

If *Port_Battery_Powered* is set to NO and *Type_C_State_Machine* is set to 1 (SNK), then valid options are:

0 - None

If *VIF_Product_Type* is not set to 0 (Port), then this field shall be ignored by testers.

3.2.3 General PD Fields

The fields in this section are required for all UUTs that support Power Delivery (that is, where *USB_PD_Support* is set to YES) and shall be ignored by testers otherwise.

PD_Specification_Revision

Which version of the PD Specification is this UUT compliant with?

Valid options are:

1 - Revision 2.0
2 - Revision 3.0

USB_Comms_Capable (Y/N)

Is the UUT capable of enumerating as a USB host or device?

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Note: This field represents bits in more than one message. It is important that all messages give the same value for these bits.

DR_Swap_To_DFP_Supported (Y/N)

Set to YES if UUT can respond with an ***Accept*** to a ***DR_Swap*** request to switch from a UFP to a DFP.

If *Type_C_State_Machine* is set to DRP and *Type_C_Can_Act_As_Host* is set to YES and *Type_C_Can_Act_As_Device* is set to NO then this field shall be set to YES.

If *Type_C_State_Machine* is set to SNK and either *Type_C_Can_Act_As_Host* or *Type_C_Is_Alt_Mode_Controller* is set to YES, then this field shall be set to YES.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Note: This field represents bits in more than one message. It is important that all messages give the same value for these bits.

DR_Swap_To_UFP_Supported (Y/N)

Set to YES if UUT can respond with an ***Accept*** to a ***DR_Swap*** request to switch from a DFP to a UFP.

If *Type_C_State_Machine* is set to DRP and *Type_C_Can_Act_As_Device* is set to YES and *Type_C_Can_Act_As_Host* is set to NO then this field shall be set to YES.

If *Type_C_State_Machine* is set to SRC and *Type_C_Can_Act_As_Device* is set to YES, then this field shall be set to YES.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Note: This field represents bits in more than one message. It is important that all messages give the same value for these bits.

Unconstrained_Power (Y/N)

Set this field to YES if either the UUT has an external power source available that is sufficient to adequately power the system while charging external devices or the UUT's primary function is to charge external devices.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Note: This field represents bits in more than one message. It is important that all messages give the same value for these bits.

VCONN_Swap_To_On_Supported (Y/N)

Set to YES if UUT can respond with an ***Accept*** to a ***VCONN_Swap*** message requesting it to start sourcing VCONN.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

VCONN_Swap_To_Off_Supported (Y/N)

Set to YES if UUT can respond with an ***Accept*** to a ***VCONN_Swap*** message requesting it to stop sourcing VCONN.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

If *Type_C_Sources_VCONN* is set to YES, then this field shall be set to YES.

Responds_To_Discov_SOP_UFP (Y/N)

Set to YES if the UUT can respond successfully to a ***Discover Identity*** command from its port partner using SOP when acting as an Upstream Facing Port.

- If this field is set to YES, then the UUT should respond to a ***Discover Identity*** command with an ACK.
- If this field is set to NO and *Responds_To_Discov_SOP_UFP* is set to YES, then the UUT should respond to a ***Discover Identity*** command with an NAK.
- If this field is set to NO and *Responds_To_Discov_SOP_DFP* is set to NO, then the UUT should ignore a ***Discover Identity*** command if *PD_Specification_Revision* is set to 1 (Revision 2.0) and should respond with ***Not_Supported*** if *PD_Specification_Revision* is set to 2 (Revision 3.0).

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Responds_To_Discov_SOP_DFP (Y/N)

Set to YES if the UUT can respond successfully to a ***Discover Identity*** command from its port partner using SOP when acting as an Downstream Facing Port.

- If this field is set to YES, then the UUT should respond to a ***Discover Identity*** command with an ACK.
- If this field is set to NO and *Responds_To_Discov_SOP_UFP* is set to YES, then the UUT should respond to a ***Discover Identity*** command with an NAK.
- If this field is set to NO and *Responds_To_Discov_SOP_UFP* is set to NO, then the UUT should ignore a ***Discover Identity*** command if *PD_Specification_Revision* is set to 1 (Revision 2.0) and should respond with ***Not_Supported*** if *PD_Specification_Revision* is set to 2 (Revision 3.0).

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Attempts_Discov_SOP (Y/N)

Set to YES if the UUT can send a ***Discover Identity*** command to its port partner using SOP. Set to NO otherwise.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Chunking_Implemented_SOP (Y/N)

Does this UUT implement an extended message chunking layer, as defined in Chapter 6 of ***[PowerDelivery3.0]***?

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Unchunked_Extended_Messages_Supported (Y/N)

Does this UUT set the Unchunked Extended Messages Supported bit, as defined in Chapter 6 of ***[PowerDelivery3.0]***?

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Manufacturer_Info_Supported_Port (Y/N)

Is the ***Get_Manufacturer_Info*** request (with Manufacturer Info Target set to 0), supported by the Port?

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Manufacturer_Info_VID_Port

The Vendor ID, as assigned by USB-IF.

This field is a 4-digit hexadecimal number. If *Manufacturer_Info_Supported_Port* is not set to YES, then this field shall be ignored by testers.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Manufacturer_Info_PID_Port

The Product ID, as assigned by the vendor.

This field is a 4-digit hexadecimal number. If *Manufacturer_Info_Supported_Port* is not set to YES, then this field shall be ignored by testers.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Security_Msgs_Supported_SOP (Y/N)

Set to YES if the UUT responds to a ***Security_Request*** message with a ***Security_Response*** message.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

Num_Fixed_Batteries

The number of non-removable batteries in the device of which the UUT is a part.

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Valid values are 0-4. If *Port_Battery_Powered* is set to YES, then at least one of this field and *Num_Swappable_Battery_Slots* must be non-zero.

Num_Swappable_Battery_Slots

The number of slots for removable batteries in the device of which the UUT is a part.

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

If *VIF_Product_Type* is set to 1 (Cable) then this field shall be ignored by testers.

Valid values are 0-4. If *Port_Battery_Powered* is set to YES, then at least one of this field and *Num_Fixed_Batteries* must be non-zero.

For the SOP* capability fields described below, the requirement is to answer YES if the UUT will return a ***GoodCRC*** for a message in the appropriate SOP* type, under the conditions of the test, when it is appropriate. Typically, *SOP_P_Capable* and *SOP_PP_Capable* will not be responded to by a UFP with a contract. During testing this is the assumed condition. If they respond to SOP' and/or SOP'' as a DFP then the question should be answered YES.

SOP_Capable (Y/N)

Does the UUT support the SOP protocol?

If the UUT is a cable (that is, *PD_Port_Type* is equal to 5), then this field shall be set to NO.

SOP_P_Capable (Y/N)

Does the UUT support the SOP’ protocol?

SOP_PP_Capable (Y/N)

Does the UUT support the SOP’’ protocol?

If *SOP_P_Capable* is not set to YES, then this field shall be ignored by testers.

SOP_P_Debug_Capable (Y/N)

Does the UUT support the SOP'_Debug protocol?

SOP_PP_Debug_Capable (Y/N)

Does the UUT support the SOP''_Debug protocol?

3.2.4 USB Type-C Fields

The fields in this section shall be ignored by testers if *Connector_Type* is not set to 2 (Type-C) or if *VIF_Product_Type* is not set to 0 (Port).

Type_C_Implements_Try_SRC (Y/N)

Indicates whether the port supports the Try.SRC state when transitioning out of AttachWait.SNK.

At most one of *Type_C_Implements_Try_SRC* and *Type_C_Implements_Try_SNK* may be set to YES.

If *Type_C_State_Machine* is not set to 2 (DRP) then this field shall be ignored by testers.

Type_C_Implements_Try_SNK (Y/N)

Indicates whether the port supports the Try.SNK state when transitioning out of AttachWait.SRC.

At most one of *Type_C_Implements_Try_SRC* and *Type_C_Implements_Try_SNK* may be set to YES.

If *Type_C_State_Machine* is not set to 2 (DRP) then this field shall be ignored by testers.

Rp_Value

Indicates what Rp value a source port presents upon connect.

Valid options are:

0 - Default
1 - 1.5A
2 - 3A

If *Type_C_State_Machine* is not set to 0 (SRC) or 2 (DRP) then this field shall be ignored by testers.

Type_C_Supports_VCONN_Powered_Accessory (Y/N)

Indicates whether the non-source port supports communication with a Vconn Powered Accessory.

If *PD_Port_Type* is not set to 0 (Consumer Only), then this field shall be ignored by testers.

Type_C_Is_VCONN_Powered_Accessory (Y/N)

Indicates whether the port is a Vconn Powered Accessory.

If *PD_Port_Type* is set to 3 (Provider), then this field shall be ignored by testers.

Type_C_Is_Debug_Target_SRC (Y/N)

Indicates whether the port supports the UnorientedDebugAccessory.SRC state and optionally the OrientedDebugAccessory.SRC state.

If *Type_C_State_Machine* is not set to 0 (SRC) or 2 (DRP) then this field shall be ignored by testers.

Type_C_Is_Debug_Target_SNK (Y/N)

Indicates whether the port supports the DebugAccessory.SNK state.

If *Type_C_State_Machine* is not set to 1 (SNK) or 2 (DRP) then this field shall be ignored by testers.

Type_C_Can_Act_As_Host (Y/N)

Indicates whether the port can communicate with USB 2.0 or USB 3.2 as a host or as the Downstream Facing Port of a hub.

If *USB_Comms_Capable* is set to NO, then this field shall be set to NO.

If *USB_Comms_Capable* is set to YES, then at least one of this field and *Type_C_Can_Act_As_Device* shall be set to YES.

If *USB_PD_Support* is not set to YES and *Type_C_State_Machine* is set to 1 (SNK), then this field shall be set to NO.

Type_C_Is_Alt_Mode_Controller

Can the port act as an Alternate Mode Controller?

If *USB_PD_Support* is not set to YES, then this field shall be ignored by testers.

Type_C_Can_Act_As_Device (Y/N)

Indicates whether the port can communicate with USB 2.0 or USB 3.2 as a device or as the Upstream Facing Port of a hub.

If *USB_Comms_Capable* is set to NO, then this field shall be set to NO.

If *USB_Comms_Capable* is set to YES, then at least one of this field and *Type_C_Can_Act_As_Host* shall be set to YES.

If *USB_PD_Support* is not set to YES and *Type_C_State_Machine* is set to 0 (SRC), then this field shall be set to NO.

Type_C_Is_Alt_Mode_Adapter

Can the port act as an Alternate Mode Device?

If *USB_PD_Support* is not set to YES, then this field shall be ignored by testers

If *Type_C_Can_Act_As_Device* is not set to YES, then this field shall be ignored by testers.

If *Responds_To_Discov_SOP_UFP* is not set to YES, then this field shall be set to NO.

Type_C_Power_Source

Indicates whether the port is powered by bus, self, or either ("Both").

Valid options are:

0 - Self-powered
1 - Bus-powered
2 - Both

Type_C_Port_On_Hub (Y/N)

Indicates whether the port is part of a USB hub.

Type_C_Supports_Audio_Accessory (Y/N)

Indicates whether the port supports communication with an Audio Accessory.

Captive_Cable (Y/N)

Indicates whether the port has a captive cable.

Type_C_Sources_VCONN (Y/N)

Indicates whether the port sources Vconn.

If *VCONN_Swap_To_On_Supported* is set to YES, then this field shall be set to YES.

3.2.5 USB Device Fields

The fields in this section shall be ignored by testers unless *Connector_Type* is set to 1 (Type-B) or *Connector_Type* is set to 2 (Type-C) and *Type_C_Can_Act_As_Device* is set to YES.

Device_Speed

Indicates which USB speed is supported when communicating as a device.

Valid options are:

0 - USB 2

1 - USB 3.2 Gen 1x1
2 - USB 3.2 Gen 2x1
3 - USB 3.2 Gen 1x2
4 - USB 3.2 Gen 2x2

Device_Contains_Captive_Retimer (Y/N)

Does the port have an associated Re-timer?

Device_Truncates_DP_for_tDHPResponse (Y/N)

When communicating as a device, does the port truncate Data Packets in order to meet the timing requirements for tDHPResponse?

If *Device_Speed* is set to 0 (USB 2), then this field shall be ignored by testers.

Device_Gen1x1_tLinkTurnaround

tLinkTurnaround is defined as the quantity *tDHPResponse* – *tDPacket*, where *tDHPResponse* and *tDPacket* are as defined in ***[USB3.2]***. When communicating as a device operating at gen1x1, valid values are in the range 400ns - 1500ns.

If *Device_Speed* is set to 0 (USB 2) or *Device_Truncates_DP_for_tDHPResponse* is not set to YES, then this field shall be ignored by testers.

Device_Gen2x1_tLinkTurnaround

tLinkTurnaround is defined as the quantity *tDHPResponse* – *tDPacket*, where *tDHPResponse* and *tDPacket* are as defined in ***[USB3.2]***. When communicating as a device operating at gen2x1, valid values are in the range 700ns - 1500ns.

If *Device_Speed* is set to 0 (USB 2), 1 (USB 3.2 Gen 1x1) or 2 (USB 3.2 Gen 1x2) or *Device_Truncates_DP_for_tDHPResponse* is not set to YES, then this field shall be ignored by testers.

3.2.6 USB Host Fields

The fields in this section shall be ignored by testers unless *Connector_Type* is set to 0 (Type-A) or *Connector_Type* is set to 2 (Type-C) and *Type_C_Can_Act_As_Host* i set to YES.

Host_Speed

Indicates which USB speed is supported when communicating as a host.

Valid options are:

0 - USB 2
1 - USB 3.2 Gen 1x1
2 - USB 3.2 Gen 2x1
3 - USB 3.2 Gen 1x2
4 - USB 3.2 Gen 2x2

Is_DFP_On_Hub (Y/N)

Indicates whether the port is a Downstream Facing Port of a USB hub.

If *Connector_Type* is set to 2 (Type-C), then this field shall be set to the value of *Type_C_Port_On_Hub*.

Hub_Port_Number

The internal USB port number of the item under test. This is the number that a USB Host uses to access the item under test.

If *Host_Speed* is set to 0 (USB 2), then valid values are in the range 1-255.

If *Host_Speed* is set to any value in the range 1-4 (any USB 3.2 Gen XxY), then valid values are in the range 1-15.

If *Is_DFP_On_Hub* is not set to YES, then this field shall be ignored by testers.

Host_Contains_Captive_Retimer (Y/N)

Does the port have an associated Re-timer?

Host_Truncates_DP_for_tDHPResponse (Y/N)

When communicating as a host, does the port truncate Data Packets in order to meet the timing requirements for tDHPResponse?

If *Host_Speed* is set to 0 (USB 2 then this field shall be ignored by testers.

Host_Gen1x1_tLinkTurnaround

tLinkTurnaround is defined as the quantity *tDHPResponse* – *tDPacket*, where *tDHPResponse* and *tDPacket* are as defined in ***[USB3.2]***. When communicating as a host operating at gen1x1, valid values are in the range 400ns - 1500ns.

If *Host_Speed* is set to 0 (USB 2) or *Host_Truncates_DP_for_tDHPResponse* is not set to YES, then this field shall be ignored by testers.

Host_Gen2x1_tLinkTurnaround

tLinkTurnaround is defined as the quantity *tDHPResponse* – *tDPacket*, where *tDHPResponse* and *tDPacket* are as defined in ***[USB3.2]***. When communicating as a host operating at gen2x1, valid values are in the range 700ns - 1500ns.

If *Host_Speed* is set to 0 (USB 2), 1 (USB 3.2 Gen 1x1) or 2 (USB 3.2 Gen 1x2) or *Host_Truncates_DP_for_tDHPResponse* is not set to YES, then this field shall be ignored by testers.

Host_Is_Embedded (Y/N)

Is the item Under Test part of an embedded host?

Host_Suspend_Supported (Y/N)

Does the embedded host to which this port belongs support USB Suspend?

If *Host_Is_Embedded* is set to NO, then this field shall be set to YES.

3.2.7 PD Source Fields

The fields in this section are required for all UUTs with Source capability (that is, *PD_Port_Type* is equal to one of 1, 2, 3, or 4), and shall be ignored by testers otherwise.

The first ***Source_Capabilities*** message sent by the tester to a Sink will always be 5V at 100mA. The UUT is required to make a legal request for this (or for less current). At the same time the Capability Mismatch bit may be set. Any UUT requesting more than the Tester offered Source Capabilities will automatically fail, and no further testing will be performed.

PD_Power_as_Source

An ECR to the V2.0 PD Specification has established a new set of Power Rules, superseding the earlier Profile Rules. The vendor of a Source Capable device shall specify a PD_Power level (PDP) in mW. This is used by the Tester in conjunction with the Normative Voltages and Currents Table to determine the capabilities which may be offered by the Source.

Valid values are in the range 500-100000, where value must be exactly divisible by 500 if it is less than 10000, and must be exactly divisible by 1000 if it is greater than 10000.

If a value is less than 10000 mW, it shall be rounded down to the nearest 500 by testers. If a value is greater than 10000 mW, it shall be rounded down to the nearest 1000 by testers.

USB_Suspend_May_Be_Cleared (Y/N)

In ***Source_Capabilities*** there is a bit called ***USB Suspend Supported***, which is normally set to one, but may be cleared to zero to signal to the sink that the sink need not obey USB Suspend.

If the UUT (as a Source) will ever set ***USB Suspend Supported*** to a 0, then the VIF must set this field to YES. Otherwise it should be set to NO.

Sends_Pings (Y/N)

Set to YES if UUT sends Ping messages when operating as a source. Sending Ping messages is optional (and unnecessary when communicating over a USB Type-C cable).

FR_Swap_Supported_As_Source (Y/N)

Does the UUT (as a Source) support ***FR_Swap***?

If *PD_Specification_Revision* is set to 1 (Revision 2.0) then this field shall be ignored by testers.

Num_Src_PDOs

The number of Power Data Objects (PDOs) sent in a ***Source_Capabilities*** message. This field must match the number of Source PDOs declared for this UUT.

Valid values are 1-7.

PD_OC_Protection (Y/N)

Does the UUT support Over-Current Protection (OCP)?

If the item under test supports USB Power Delivery, then it is required to support OCP. However, a UUT may set this field to NO in order to notify testers that they have not yet implemented OCP and that testers should not run tests that could harm it.

Note: testers may record a failure if a test is not run.

PD_OCP_Method

What method does the UUT use to implement OCP?

Valid options are:

0 – Over-Current Response
1 – Under-Voltage Response
2 – Both

If *PD_OC_Protection* is not set to YES, then this field shall be ignored by testers.

3.2.7.1 Source PDOs

In this section, the fields represent the parameters for a single Source PDO. <X> must be an integer in the range 1 through 7. If <X> is not given, or if <X> falls outside the specified range, then the field is ignored by testers.

It is expected that PDO numbers <X> shall start at 1 and be incremented sequentially. If there is a gap in the sequence (e.g., PDOs 1, 2, and 4 exist, but PDO 3 does not), then behavior by testers is unspecified.

Src_PDO_Supply_Type<X>

The type of this Source PDO.

Valid options are:

0 – Fixed
1 – Battery
2 – Variable (non-battery)
3 – PPS (if *PD_Specification_Revision* is set to 2 (Revision 3.0))

If <X> is equal to 1, then this field must be set to 0 (Fixed).

Src_PDO_Peak_Current<X>

Peak current (that is, over the value specified by *Src_PDO_Voltage<X>*) that the UUT may provide for short periods.

Valid options are:

0 – 100% IOC
1 – 130% IOC
2 – 150% IOC
3 – 200% IOC

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), then this field shall be ignored by testers.

Src_PDO_Voltage<X>

Output voltage in units of 50 mV. Valid values are 0-400 (0-20000 mV).

If <X> is equal to 1, then this field must be set to 100 (5000 mV).

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), then this field shall be ignored by testers.

Src_PDO_Max_Current<X>

If *Src_PDO_Supply_Type<X>* is set to 0 (fixed), or 2 (Variable), then this field represents the maximum operating current in units of 10mA, with valid values in the range 0-500 (0-5000 mA).

If *Src_PDO_Supply_Type<X>* is set to 3 (PPS), then this field represents the maximum operating current in units of 50mA, with valid values in the range 0-100 (0-5000 mA).

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), 2 (Variable), or 3 (PPS), then this field shall be ignored by testers.

Src_PDO_Min_Voltage<X>

If *Src_PDO_Supply_Type<X>* is set to 1 (Battery) or 2 (Variable), this field represents the minimum output voltage in units of 50 mV. Valid values are 0-420 (0-21000 mV).

If *Src_PDO_Supply_Type<X>* is set to 3 (PPS), this field represents the minimum output voltage in units of 100 mV. Valid values are 0-210 (0-21000 mV).

In either case, this field must be less than *Src_PDO_Max_Voltage<X>*.

If *Src_PDO_Supply_Type<X>* is not set to 1 (Battery), 2 (Variable), or 3 (PPS), then this field shall be ignored by testers.

Src_PDO_Max_Voltage<X>

If *Src_PDO_Supply_Type<X>* is set to 1 (Battery) or 2 (Variable), this field represents the maximum output voltage in units of 50 mV. Valid values are 0-420 (0-21000 mV).

If *Src_PDO_Supply_Type<X>* is set to 3 (PPS), this field represents the maximum output voltage in units of 100 mV. Valid values are 0-210 (0-21000 mV).

In either case, this field must be greater than *Src_PDO_Min_Voltage<X>*.

If *Src_PDO_Supply_Type<X>* is not set to 1 (battery), 2 (Variable), or 3 (PPS), then this field shall be ignored by testers.

Src_PDO_Max_Power<X>

Power supplied in units of 250 mW. Valid values are 0-400 (0-100000 mW).

If *Src_PDO_Supply_Type<X>* is not set to 1 (battery), then this field shall be ignored by testers.

Src_PD_OCP_OC_Debounce<X>

The Over-Current debounce time in units of 1 mS. Valid values are in the range 0 – 1000.

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), then this field shall be ignored by testers.

If *PD_OCP_Method* is not set to 0 (Over-Current Response) or 2 (Both), then this field shall be ignored by testers.

Src_PD_OCP_OC_Threshold<X>

The Over-Current threshold current in units of 10 mA. Valid values are in the range *Src_PDO_Max_Current<X>* to 1000 (10000 mA).

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), then this field shall be ignored by testers.

If *PD_OCP_Method* is not set to 0 (Over-Current Response) or 2 (Both), then this field shall be ignored by testers.

Src_PD_OCP_UV_Debounce<X>

The Under-Voltage debounce time in units of 1 mS. Valid values are in the range 0 – 1000.

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), then this field shall be ignored by testers.

If *PD_OCP_Method* is not set to 1 (Under-Voltage Response) or 2 (Both), then this field shall be ignored by testers.

Src_PD_OCP_UV_Threshold_Type<X>

What method should be used to determine the Under-Voltage threshold?

Valid options are:

0 – Value
1 – Percentage

If <X> is not equal to 1, then this field shall be set to 1 (Percentage).

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), then this field shall be ignored by testers.

If *PD_OCP_Method* is not set to 1 (Under-Voltage Response) or 2 (Both), then this field shall be ignored by testers.

Src_PD_OCP_UV_Threshold<X>

If *Src_PD_OCP_UV_Threshold_Type<X>* is set to 0 (Value), then this field represents the Under-Voltage threshold expressed as an absolute voltage in units of 10 mV. Valid values are in the range 80 – V_{95}/10 (800 – V_{95} mV), where V_{95} is 95% of *Src_PDO_Voltage<X>* in mV. Testers shall give 5% tolerance to the value entered.

If *Src_PD_OCP_UV_Threshold_Type<X>* is set to 1 (Percentage), then this field represents Under-Voltage threshold expressed as the percentage of *Src_PDO_Voltage<X>*. Valid values are in the range 0 – 95. Testers shall give 5% tolerance to the value calculated.

If *Src_PDO_Supply_Type<X>* is not set to 0 (fixed), then this field shall be ignored by testers.

If *PD_OCP_Method* is not set to 1 (Under-Voltage Response) or 2 (Both), then this field shall be ignored by testers.

3.2.8 PD Sink Fields

The fields in this section are required for all UUTs with Sink capability (that is, *PD_Port_Type* is equal to one of 0, 1, 2, or 4), and shall be ignored by testers otherwise.

A Sink UUT will be offered 0mA at all voltages offered at least one point. This is a PD Suspend condition and a request for 0mA at one of the voltages offered is a mandatory requirement. Any UUT which does not request 0mA under these conditions will fail compliance.

PD_Power_as_Sink

The vendor of a Sink Capable device shall specify a PD_Power level (PDP) in mW. This is used by the Tester in conjunction with the Normative Voltages and Currents Table to determine the maximum capabilities which may be required by the Sink.

Valid values are in the range 0-100000, where value must be exactly divisible by 500 if it is less than 10000 and must be exactly divisible by 1000 if it is greater than 10000.

If a value is less than 10000 mW, it shall be rounded up to the nearest 500 by testers. If a value is greater than 10000 mW, it shall be rounded up to the nearest 1000 by testers.

No_USB_Suspend_May_Be_Set (Y/N)

In a Request message there is a bit called ***No USB Suspend***, which the Sink sets to one if it wishes to request that it need not obey USB Suspend, but instead be allowed to continue to draw power according to its PD contract.

If the UUT (as a Sink) will ever set ***No USB Suspend*** to a 1, then the VIF must set this field to YES. Otherwise it should be set to NO.

GiveBack_May_Be_Set (Y/N)

In a Request message there is a bit called ***Giveback***, which the Sink sets to 1 if it is prepared to lower its Operating Current to its Minimum Operating Current, on demand.

If the UUT will ever set this bit in the test configuration, then it must set this field to YES. Otherwise it should be set to NO.

Higher_Capability_Set (Y/N)

In a ***Sink_Capabilities*** message there is a bit called ***HigherCapability***, which the Sink sets to 1 if it needs more than ***vSafe5V*** (e.g. 12V) to provide full functionality.

If the UUT sets this bit in the configuration described by the VIF, then this field must be set to YES, otherwise, to NO.

FR_Swap_Reqd_Type_C_Current

In a ***Sink_Capabilities*** message there is a field called ***Fast Role Swap USB Type-C Current***, in which the sink describes whether it supports fast Role Swap as a Sink, and if so, what current it requires.

Valid options are:

0 - FR_Swap not supported
1 - Default USB Power
2 - 1.5A @ 5V
3 - 3A @ 5V

If *PD_Specification_Revision* is set to 1 (Revision 2.0) then this field shall be ignored by testers.

Num_Snk_PDOs

The number of Power Data Objects (PDOs) sent in a ***Sink_Capabilities*** message. This field must match the number of Sink PDOs declared for this UUT.

Valid values are 1-7.

3.2.8.1 Sink PDOs

In this section, the fields represent the parameters for a single Sink PDO. <X> must be an integer in the range 1 through 7. If <X> is not given, or if <X> falls outside the specified range, then the field is ignored by testers.

It is expected that PDO numbers <X> shall start at 1 and be incremented sequentially. If there is a gap in the sequence (e.g., PDOs 1, 2, and 4 exist, but PDO 3 does not), then behavior by testers is unspecified.

Snk_PDO_Supply_Type<X>

The type of this Sink PDO.

Valid options are:

0 - Fixed
1 - Battery
2 - Variable (non-battery)

3 – PPS (if *PD_Specification_Revision* is set to 2 (Revision 3.0))

If <X> is equal to 1, then this field must be set to 0 (Fixed).

Snk_PDO_Voltage<X>

The voltage, in units of 50 mV, required for the device to operate at least one of its modes of operation. Valid values are 0-400 (0-20000 mV).

If <X> is equal to 1, then this field must be set to 100 (5000 mV).

If *Snk_PDO_Supply_Type<X>* is not equal to 0 (fixed), then this field shall be ignored by testers.

Snk_PDO_Op_Current<X>

If *Src_PDO_Supply_Type<X>* is set to 0 (Fixed) or 2 (Variable), this field represents the operating current, in units of 10 mA, required for the device to operate at least one of its modes of operation. Valid values are 0-500 (0-5000 mA).

If *Src_PDO_Supply_Type<X>* is set to 3 (PPS), this field represents the operating current, in units of 50 mA, required for the device to operate at least one of its modes of operation. Valid values are 0-100 (0-5000 mA).

If *Snk_PDO_Supply_Type<X>* is not equal to 0 (fixed), 2 (variable), or 3 (PPS) then this field shall be ignored by testers.

Snk_PDO_Op_Power<X>

Operating power, in units of 250 mW, required for the device to operate at least one of its modes of operation. Valid values are 0-400 (0-100000 mW).

If *Snk_PDO_Supply_Type<X>* is not equal to 1 (battery), then this field shall be ignored by testers.

Snk_PDO_Min_Voltage<X>

If *Snk_PDO_Supply_Type<X>* is set to 1 (Battery) or 2 (Variable), this field represents the minimum output voltage, in units of 50 mV. Valid values are 0-420 (0-21000 mV).

If *Snk_PDO_Supply_Type<X>* is set to 3 (PPS), this field represents the minimum output voltage, in units of 100 mV. Valid values are 0-210 (0-21000 mV).

In either case, the absolute voltage, including any voltage variation, shall not fall below this value. This value shall be less than *Snk_PDO_Max_Voltage<X>*.

If *Snk_PDO_Supply_Type<X>* is not set to 1 (Battery), 2 (Variable), or 3 (PPS), then this field shall be ignored by testers.

Snk_PDO_Max_Voltage<X>

If *Snk_PDO_Supply_Type<X>* is set to 1 (Battery) or 2 (Variable), this field represents the maximum output voltage in units of 50 mV. Valid values are 0-420 (0-21000 mV).

If *Snk_PDO_Supply_Type<X>* is set to 3 (PPS), this field represents the maximum output voltage in units of 100 mV. Valid values are 0-210 (0-21000 mV).

In either case, the absolute voltage, including any voltage variation, shall not exceed this value. This value shall be greater than *Snk_PDO_Min_Voltage<X>*.

If *Snk_PDO_Supply_Type<X>* is not set to 1 (Battery), 2 (Variable), or 3 (PPS), then this field shall be ignored by testers.

3.2.9 PD Dual Role Fields

The fields in this section are required for all UUTs with both Source and Sink capability (that is, *PD_Port_Type* is equal to one of 1, 2, or 4), and shall be ignored by testers otherwise.

Accepts_PR_Swap_As_Src (Y/N)

Set to YES if UUT may accept a ***PR_Swap*** request while operating as a Source.

Accepts_PR_Swap_As_Snk (Y/N)

Set to YES if UUT may accept a ***PR_Swap*** request while operating as a Sink.

Requests_PR_Swap_As_Src (Y/N)

Set to YES if UUT may send a ***PR_Swap*** request while operating as a Source.

Requests_PR_Swap_As_Snk (Y/N)

Set to YES if UUT may send a ***PR_Swap*** request while operating as a Sink.

3.2.10 SOP Discovery Fields

The fields in this section shall be ignored by testers unless at least one of *Responds_To_Discov_SOP_UFP* and *Responds_To_Discov_SOP_DFP* is set to YES.

XID_SOP

A decimal number assigned by USB-IF before certification.

Valid values are in the range 0 through 1048575.

Data_Capable_as_USB_Host_SOP (Y/N)

Indicates whether the UUT is capable of enumerating USB Devices.

This field shall always be set to the same value as *Type_C_Can_Act_As_Host*.

Data_Capable_as_USB_Device_SOP (Y/N)

Indicates whether the UUT is capable of enumerating as a USB Device.

This field shall always be set to the same value as *Type_C_Can_Act_As_Device*.

Product_Type_UFP_SOP

What is the product type of the UUT when acting as an Upstream Facing Port?

If *Type_C_Can_Act_As_Device* is not set to YES, then valid options are:

0 - Undefined

If *Type_C_Can_Act_As_Device* is set to YES and *Type_C_Is_Alt_Mode_Adapter* is set to YES, then valid options are:

5 - Alternate Mode Adapter (AMA)

If *Type_C_Can_Act_As_Device* is set to YES and *Type_C_Is_Alt_Mode_Adapter* is not set to YES, then valid options are:

0 - Undefined
1 - PDUSB Hub
2 - PDUSB Peripheral

Product_Type_DFP_SOP

What is the product type of the UUT when acting as a Downstream Facing Port?

If *Type_C_Can_Act_As_Host* is set to YES and *Type_C_Is_Alt_Mode_Controller* is set to YES, then valid options are:

4 - Alternate Mode Controller (AMC)

If *Type_C_Is_Alt_Mode_Controller* is set to NO, then valid options are:

0 - Undefined
1 - PDUSB Hub
2 - PDUSB Host
3 - Power Brick

In all over cases, valid options are:

0 - Undefined
1 - PDUSB Hub
2 - PDUSB Host
3 - Power Brick
4 - Alternate Mode Controller (AMC)

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

Modal_Operation_Supported_SOP (Y/N)

Does the product support Modes?

USB_VID_SOP

A unique 16-bit number, assigned to the Vendor by USB-IF. For USB Devices or Hubs which support USB communications the Vendor ID field shall be identical to the Vendor ID field defined in the product's USB Device Descriptor (see ***[USB 2.0]*** and ***[USB 3.2]***).

This field is a 4-digit hexadecimal number.

PID_SOP

A unique number assigned by the Vendor ID holder identifying the product.

This field is a 4-digit hexadecimal number.

bcdDevice_SOP

A unique number assigned by the Vendor ID holder containing identity information relevant to the release version of the product.

This field is a 4-digit hexadecimal number.

Num_SVIDs_min_SOP

The smallest number of SVIDs which the UUT will ever announce in response to ***Discover SVIDs***.

Valid values are in the range 1 - 52. If *SVID_fixed_SOP* is set to YES, then this field must equal *Num_SVIDs_max_SOP*. If *SVID_fixed_SOP* is set to NO, then this field must be less than or equal to *Num_SVIDs_max_SOP*. If *SVID_fixed_SOP* is set to NO, then this field must be greater than or equal to 1.

If *Modal_Operation_Supported_SOP* is not set to YES, then this field shall be ignored by testers.

Num_SVIDs_max_SOP

The largest number of SVIDs which the UUT will ever announce in response to ***Discover SVIDs***.

Valid values are in the range 1 - 52. If *SVID_fixed_SOP* is set to YES, then this field must equal *Num_SVIDs_min_SOP*. If *SVID_fixed_SOP* is set to NO, then this field must be greater than or equal to *Num_SVIDs_min_SOP*. If *SVID_fixed_SOP* is set to NO, then this field must be greater than or equal to 1. This field must equal the number of SVIDs declared for this UUT.

If *Modal_Operation_Supported_SOP* is not set to YES, then this field shall be ignored by testers.

SVID_fixed_SOP (Y/N)

If this field is set to YES, then Testers will test precisely those SVIDs that are declared in the VIF, in the order in which they are given. *Num_SVIDs_max_SOP* must equal *Num_SVIDs_min_SOP*..

If this field is set to NO, then Testers shall test that the SVIDs that are declared are all included in the predefined SVIDs for this UUT. *Num_SVIDs_max_SOP* must be greater than or equal to *Num_SVIDs_min_SOP*. At least one SVID must be declared for this UUT.

If *Modal_Operation_Supported_SOP* is not set to YES, then this field shall be ignored by testers.

3.2.10.1 SOP SVIDs

In this section, the fields represent the parameters for a single SOP SVID. <X> represents the SVID number, an integer in the range of 1 through 52. If no <X> is given, or if <X> does not fall within that range, then the field shall be ignored by testers.

It is expected that SVID numbers <X> shall start at 1 and be incremented sequentially. If there is a gap in the sequence (e.g., SVIDs 1, 2, and 4 exist, but SVID 3 does not), then behavior by testers is unspecified.

If *Modal_Operation_Supported_SOP* is not set to YES, then all fields in this section shall be ignored by testers.

SVID<X>_SOP

The SVID value, used to retrieve Modes. This field is invalid if it is equal to zero. This field shall be unique for each SOP SVID.

This field is a 4-digit hexadecimal number.

SVID<X>_num_modes_min_SOP

The smallest number of modes which will ever be announced for this SVID.

Valid values are in the range 1 - 6. If *SVID<X>_modes_fixed_SOP* is set to YES, then this field must equal *SVID<X>_num_modes_max_SOP*. If *SVID<X>_modes_fixed_SOP* is set to NO, then this field must be less than or equal to *SVID<X>_num_modes_max_SOP*.

SVID<X>_num_modes_max_SOP

The largest number of modes which will ever be announced for this SVID.

Valid values are in the range 1 through 6. If *SVID<X>_modes_fixed_SOP* is set to YES, then this field must equal *SVID<X>_num_modes_min_SOP*. If *SVID<X>_modes_fixed_SOP* is set to NO, then this field must be greater than or equal to *SVID<X>_num_modes_min_SOP*.

SVID<X>_modes_fixed_SOP (Y/N)

If this field is set to YES, then Testers will test precisely those Modes that are declared in the VIF, in the order in which they are given. *SVID<X>_num_modes_max_SOP* must equal *SVID<X>_num_modes_min_SOP*.

If this field is set to NO, then Testers will test that all declared modes can be Entered and Exited. Each mode must be recognizable by the combination of a 32-bit mask (*SVID<X>_mode<Y>_recog_mask_SOP*) and 32-bit value (SVID<X>_mode<Y>_recog_value_SOP). *SVID<X>_num_modes_max_SOP* must be greater than or equal to *SVID<X>_num_modes_min_SOP*.

3.2.10.2 SOP SVID Modes

In this section, the fields represent the modes <Y> of a specified SOP SVID <X>. <X> shall be a positive integer in the range of 1 through 52. If no <X> is given, or if <X> does not fall within that range, then the field shall be ignored by testers. If <X> does not equal the SOP SVID number of an SOP SVID defined in this VIF, then the field shall be ignored by testers. <Y> represents the SOP SVID Mode of the SOP SVID <X>, an integer in the range 1 through 6. If no <Y> is given, or if <Y> does not fall within that range, then the field shall be ignored by testers.

It is expected that SOP SVID Mode numbers <Y> for a given SOP SVID <X> shall start at 1 and be incremented sequentially. If there is a gap in the sequence (e.g., Modes 1, 2, and 4 exist, but Mode 3 does not), then behavior by testers is unspecified.

If *Modal_Operation_Supported_SOP* is not set to YES, then all fields in this section shall be ignored by testers.

SVID<X>_mode<Y>_enter_SOP (Y/N)

Is it possible to Enter and Exit this mode? For a given SVID<X>, if *SVID<X>_modes_fixed_SOP* is set to YES, then this field shall be set to YES for at least one mode.

If *SVID<X>_modes_fixed_SOP* is not set to YES, then this field shall be ignored by testers.

SVID<X>_mode<Y>_recog_mask_SOP

A 32-bit value which, in combination with *SVID<X>_mode<Y>_recog_value_SOP*, uniquely identifies a mode for a given SVID.

If *SVID<X>_modes_fixed_SOP* is not set to NO, then this field shall be ignored by testers.

This field is an 8-digit hexadecimal number. The bitwise AND of this field and *SVID<X>_mode<Y>_recog_value_SOP* shall be unique among all modes of a given SOP SVID. This Field shall not be set to zero.

SVID<X>_mode<Y>_recog_value_SOP

A 32-bit value which, in combination with *SVID<X>_mode<Y>_recog_mask_SOP*, uniquely identifies a mode for a given SVID.

If *SVID<X>_modes_fixed_SOP* is not set to NO, then this field shall be ignored by testers.

This field is an 8-digit hexadecimal number. The bitwise AND of this field and *SVID<X>_mode<Y>_recog_mask_SOP* shall be unique among all modes of a given SOP SVID.

3.2.11 Alternate Mode Adapter (AMA) Fields

The fields in this section shall be ignored by testers unless *Responds_To_Discov_SOP_UFP* is set to YES, and *Product_Type_UFP_SOP* is set to 5 (Alternate Mode Adapter).

AMA_HW_Vers

The Hardware version as assigned by the Vendor ID owner.

This field is a 1-digit hexadecimal number.

AMA_FW_Vers

The Firmware version as assigned by the Vendor ID owner.

This field is a 1-digit hexadecimal number.

AMA_VCONN_power

When the VCONN required field is set to YES, the VCONN power needed by adapter for full functionality.

Valid options are:

0 - 1W
1 - 1.5W
2 - 2W
3 - 3W
4 - 4W
5 - 5W
6 - 6W

If *AMA_VCONN_reqd* is not set to YES, then this field shall be ignored by testers.

AMA_VCONN_reqd (Y/N)

Is VCONN needed for the AMA to operate?

AMA_VBUS_reqd (Y/N)

Is VBUS needed for the AMA to operate?

AMA_Superspeed_Support

What type of USB signaling does the AMA support?

Valid options are:

0 - USB 2.0 only
1 - USB 3.2 Gen 1 (includes USB 2.0)

2 - USB 3.2 Gen 2 (includes Gen 1 and USB 2.0)
3 - USB 2.0 Billboard Only

3.2.12 Battery Charging 1.2 Fields

The fields in this section shall be ignored by testers if *BC_1_2_Support* is not set to 1 (Charging Port), 2 (Portable Device), or 3 (Both).

BC_1_2_Charging_Port_Type

What BC 1.2 charging capabilities does the port support? Valid options are:

0 - DCP
1 - CDP
2 - Both

This field shall be ignored by testers if *BC_1_2_Support* is not set to 1 (Charging Port, or 3 (Both).

3.2.13 Cable Fields

The fields in this section shall be ignored by testers if *Connector_Type* is not set to 1 (cable) or *USB_PD_Support* is not set to YES.

XID

A decimal number assigned by USB-IF before certification.

Valid values are in the range 0 through 1048575.

Data_Capable_as_USB_Host (Y/N)

Shall be set to YES if the product is capable of enumerating USB Devices.

Data_Capable_as_USB_Device (Y/N)

Shall be set to YES if the product is capable of enumerating as a USB Device.

Product_Type

What is the product type of the UUT?

Valid options are:

3 - Passive Cable
4 - Active Cable

Modal_Operation_Supported (Y/N)

Does the product support Modes?

USB_VID

A unique 16-bit number, assigned to the Vendor by USB-IF. For USB Devices or Hubs which support USB communications the Vendor ID field shall be identical to the Vendor ID field defined in the product's USB Device Descriptor (see ***[USB 2.0]*** and ***[USB 3.2]***).

This field is a 4-digit hexadecimal number.

PID

A unique number assigned by the Vendor ID holder identifying the product.

This field is a 4-digit hexadecimal number.

bcdDevice

A unique number assigned by the Vendor ID holder containing identity information relevant to the release version of the product.

This field is a 4-digit hexadecimal number.

Cable_HW_Vers

The Hardware version as assigned by the Vendor ID owner.

This field is a 1-digit hexadecimal number.

Cable_FW_Vers

The Hardware version as assigned by the Vendor ID owner.

This field is a 1-digit hexadecimal number.

Type_C_to_Type_A_B_C

What is the connector type on the opposite end from the USB Type-C connector?

Valid options are:

0 - Type-A
1 - Type-B
2 - Type-C

Type_C_to_Type_C_Capt_Vdm_V2

What is the connector type at the opposite end from the USB Type-C connector?

Valid options are:

0 - USB Type-C
1 - Captive

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), this field shall be ignored by testers.

Type_C_to_Plug_Receptacle

Is the connector type as defined in the Connector Type field a plug or receptacle?

Valid options are:

0 - Plug
1 - Receptacle

Cable_Latency

A value corresponding to the signal latency through the cable which can be used as an approximation for its length.

If *Product_Type* is equal to 3 (Passive Cable), then valid options are:

1 - < 10ns
2 - 10ns - 20ns
3 - 20ns - 30ns
4 - 30ns - 40ns
5 - 40ns - 50ns
6 - 50ns - 60ns
7 - 60ns - 70ns
8 - > 70ns

If *Product_Type* is equal to 4 (Active Cable), then valid options are:

1 - <10ns
2 - 10ns - 20ns
3 - 20ns - 30ns
4 - 30ns - 40ns
5 - 40ns - 50ns
6 - 50ns - 60ns
7 - 60ns - 70ns
8 - 1000ns
9 - 2000ns
10 - 3000ns

Cable_Termination_Type

To what extent is VCONN required in order to power the UUT?

If *Product_Type* is equal to 3 (Passive Cable), then valid options are:

0 - Both ends Passive, VCONN not required
1 - Both ends Passive, VCONN required

Note: if this field is equal to 0 (Both ends Passive, VCONN not required), VCONN may still be required for initialization.

If *Product_Type* is equal to 4 (Active Cable), then valid options are:

2 - One end Active, one end passive, VCONN required
3 - Both ends Active, VCONN required

Cable_VBUS_Current

What current is the UUT capable of carrying over VBUS?

Valid options are:

1 - 3A
2 - 5A

If *VBUS_through_cable* is not set to YES, then this field shall be ignored by testers.

VBUS_through_cable (Y/N)

Does the cable contain an end to end VBUS wire?

Cable_SOP''_controller (Y/N)

Is an SOP” Controller Present?

Cable_Superspeed_Support

What type of USB signaling does the UUT support?

Valid options are:

0 - USB 2.0 only
1 - USB 3.2 Gen 1 (Includes USB 2.0)
2 - USB 3.2 Gen 2 (Includes USB 2.0 and USB 3.2 Gen 1)

Max_VBUS_Voltage_Vdm_V2

What is the maximum voltage that shall be negotiated using a Fixed Supply over the cable as part of an Explicit Contract where the maximum voltage that shall be applied to the cable is ***vSrcNew*** max + ***vSrcValid*** max?

Valid options are:

0 - 20V
1 - 30V
2 - 40V
3 - 50V

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), this field shall be ignored by testers.

Manufacturer_Info_Supported (Y/N)

Is the ***Get_Manufacturer_Info*** request supported?

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

Manufacturer_Info_VID

The Vendor ID, as assigned by USB-IF.

This field is a 4-digit hexadecimal number. If *Manufacturer_Info_Supported* is not set to YES, then this field shall be ignored by testers.

Manufacturer_Info_PID

The Product ID, as assigned by the vendor.

This field is a 4-digit hexadecimal number. If *Manufacturer_Info_Supported* is not set to YES, then this field shall be ignored by testers.

Chunking_Implemented (Y/N)

Does this UUT implement an extended message chunking layer, as defined in Chapter 6 of ***[PowerDelivery3.0]***?

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

Security_Msgs_Supported (Y/N)

Set to YES if the UUT responds to a ***Security_Request*** message with a ***Security_Response*** message.

If *PD_Specification_Revision* is not set to 2 (Revision 3.0), then this field shall be ignored by testers.

Num_SVIDs_min

The smallest number of SVIDs which the UUT will ever announce in response to ***Discover SVIDs***.

Valid values are in the range 1 - 52. If *SVID_fixed* is set to YES, then this field must equal *Num_SVIDs_max*. If *SVID_fixed* is set to NO, then this field must be less than or equal to *Num_SVIDs_max*.

If *Modal_Operation_Supported* is not set to YES, then this field shall be ignored by testers.

Num_SVIDs_max

The largest number of SVIDs which the UUT will ever announce in response to ***Discover SVIDs***.

Valid values are in the range 1 - 52. If *SVID_fixed* is set to YES, then this field must equal *Num_SVIDs_min*. If *SVID_fixed* is set to NO, then this field must be greater than or equal to *Num_SVIDs_min*. This field must equal the number of SVIDs declared for this UUT.

If *Modal_Operation_Supported* is not set to YES, then this field shall be ignored by testers.

SVID_fixed (Y/N)

If this field is set to YES, then. Testers will test precisely those SVIDs that are declared in the VIF, in the order in which they are given. *Num_SVIDs_max* must equal *Num_SVIDs_min*

If this field is set to NO, then then Testers shall test that the SVIDs that are declared are all included in the predefined SVIDs for this UUT. *Num_SVIDs_max* must be greater than or equal to *Num_SVIDs_min*. At least one SVID must be declared for this UUT.

If *Modal_Operation_Supported* is not set to YES, then this field shall be ignored by testers.

3.2.13.1 Cable SVIDs

In this section, the fields represent the parameters for a single Cable SVID. <X> represents the SVID number, an integer in the range of 1 through 52. If no <X> is given, or if <X> does not fall within that range, then the field shall be ignored by testers.

It is expected that SVID numbers <X> shall start at 1 and be incremented sequentially. If there is a gap in the sequence (e.g., SVIDs 1, 2, and 4 exist, but SVID 3 does not), then behavior by testers is unspecified.

If *Modal_Operation_Supported* is not set to YES, then all fields in this section shall be ignored by testers.

SVID<X>

The SVID value, used to retrieve Modes. This field is invalid if it is equal to zero. This field shall be unique for each cable SVID.

SVID<X>_num_modes_min

The smallest number of modes which will ever be announced for this SVID.

Valid values are in the range 1 through 6. If *SVID<X>_modes_fixed* is set to YES, then this field must equal *SVID<X>_num_modes_max*. If *SVID<X>_modes_fixed* is set to NO, then this field must be less than or equal to *SVID<X>_num_modes_max*.

SVID<X>_num_modes_max

The largest number of modes which will ever be announced for this SVID.

Valid values are in the range 1 - 6. If *SVID<X>_modes_fixed* is set to YES, then this field must equal *SVID<X>_num_modes_min*. If *SVID<X>_modes_fixed* is set to NO, then this field must be greater than or equal to *SVID<X>_num_modes_min*.

SVID<X>_modes_fixed (Y/N)

If this field is set to YES, then Testers will test precisely those Modes that are declared in the VIF, in the order in which they are given. *SVID<X>_num_modes_max* must equal *SVID<X>_num_modes_min*.

If this field is set to NO, then Testers will test that all declared modes can be Entered and Exited. Each mode must be recognizable by the combination of a 32-bit mask (SVID<X>_mode<Y>_recog_mask) and 32-bit value (SVID<X>_mode<Y>_recog_value). *SVID<X>_num_modes_max* must be greater than or equal to *SVID<X>_num_modes_min*.

3.2.13.2 Cable SVID Modes

In this section, the fields represent the modes <Y> of a specified Cable SVID <X>. <X> shall be a positive integer in the range of 1 through 52. If no <X> is given, or if <X> does not fall within that range, then the field shall be ignored by testers. If <X> does not equal the Cable SVID number of a Cable SVID defined in this VIF, then the field shall be ignored by testers. <Y> represents the Cable SVID Mode of the SOP SVID <X>, an integer in the range 1 through 6. If no <Y> is given, or if <Y> does not fall within that range, then the field shall be ignored by testers.

It is expected that Cable SVID Mode numbers <Y> for a given Cable SVID <X> shall start at 1 and be incremented sequentially. If there is a gap in the sequence (e.g., Modes 1, 2, and 4 exist, but Mode 3 does not), then behavior by testers is unspecified.

If *Modal_Operation_Supported* is not set to YES, then all fields in this section shall be ignored by testers.

SVID<X>_mode<Y>_enter (Y/N)

Is it possible to Enter and Exit this mode? For a given SVID<X>, if *SVID<X>_modes_fixed* is set to YES, then this field shall be set to YES for at least one mode.

If *SVID<X>_modes_fixed* is not set to YES, then this field shall be ignored by testers.

SVID<X>_mode<Y>_recog_mask

A 32-bit value which, in combination with *SVID<X>_mode<Y>_recog_value*, uniquely identifies a mode for a given SVID.

If *SVID<X>_modes_fixed* is not set to NO, then this field shall be ignored by testers.

This field is an 8-digit hexadecimal number. The bitwise AND of this field and *SVID<X>_mode<Y>_recog_value* shall be unique among all modes of a given Cable SVID. This Field shall not be set to zero.

SVID<X>_mode<Y>_recog_value

A 32-bit value which, in combination with *SVID<X>_mode<Y>_recog_mask*, uniquely identifies a mode for a given SVID.

If *SVID<X>_modes_fixed* is not set to NO, then this field shall be ignored by testers.

This field is an 8-digit hexadecimal number. The bitwise AND of this field and *SVID<X>_mode<Y>_recog_mask* shall be unique among all modes of a given Cable SVID.

3.2.14 Re-timer Fields

The fields in this section shall be ignored by testers unless *VIF_Product_Type* is set to 2 (Re-timer), or *VIF_Product_Type* is set to 1 (Cable) and *Product_Type* is set to 4 (Active Cable).

ReTimer_Type

The basic architecture of the Re-timer. Valid options are:

0 - SRIS (Separate Reference clock Independent SSC)
1 - Bit-Level

Repeater_Two_Type

The basic architecture of the second Repeater in an Active Cable with both ends active. Valid options are:

0 - SRIS Re-timer (Separate Reference clock Independent SSC)
1 - Bit-Level Re-timer
2 - Re-driver

If *Cable_Termination_Type* is not set to 3 (Both ends Active, VCONN required) then this field shall be ignored by testers.

3.2.15 Product Power Fields

The fields in this section shall be ignored by testers unless either *Connector_Type* is set to 0 (Type-A), or *Connector_Type* is set to 2 (Type-C) and *Type_C_State_Machine* is set to 0 (SRC) or 2 (DRP).

Product_Total_Source_Power

The total power in Watts, rounded up to the nearest Watt, that the product can deliver across all its ports. Valid values are in the range 0 - 1000 (0 - 1000 W).

All VIFs for all ports on the product shall have the same value.

Port_Source_Power_Type

Is the UUT guaranteed to advertise all PDOs it is capable of supporting, or is it part of a power gang with other ports, and may reduce its output accordingly? Valid options are:

0 - Guaranteed
1 - Ganged

$Port_Source_Power_Gang

The name of the power gang of which the UUT belongs.

This field shall be ignored by testers if *Port_Source_Power_Type* is not set to 1 (Ganged).

All VIFs for all ports on the power gang shall have the same value. This value shall be distinct for each power gang on the product.

Index of Field Names