SUBJECT:	STMicroelectronics X-NUCLEO-USBPDM1 -G0-100WPPS	DATE:	4/05/2020

USB Type-C™ SNK, No Data & Power Delivery 3.0 Certification Report

Customer:
STMicroelectronics,
10 rue Thalès de Milet,
CS97155, 37071 Tours
Cedex 2,
France

SNK:
X-NUCLEO-USBPDM1-G0-100WPPS
TID 3036

Supplier:
Eurofins Digital Testing Belgium
Kempische Steenweg 303 bus 100
3500 Hasselt
Belgium

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1. CUSTOMER

STMicroelectronics,
10 rue Thalès de Milet,
CS97155,
37071 Tours Cedex 2,
France

2. SUPPLIED HARDWARE AND SOFTWARE

2.1. ASSETS

Description	Manufacturer	Model
PD 3.0 Evaluation Board	STMicroelectronics	X-NUCLEO-USBPDM1-G0-100WPPS

BC 1.2 have not been implemented.

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2.2. VENDOR INFORMATION FILE

VIF Product tab	
Port Label	0
Connector_Type	2 ; USB Type-C™
Captive_Cable	NO
USB_PD_Support	YES
PD_Port_Type	0 ; Consumer Only
Type_C_State_Machine	1 ; SNK
Port_Battery_Powered	NO
BC_1_2_Support	0 ; None

General PD Settings tab	
PD_Specification_Revision	2 ; Revision 3.0
SOP_Capable	YES
SOP_P_Capable	NO
SOP_PP_Capable	NO
SOP_P_Debug_Capable	NO
SOP_PP_Debug_Capable	NO
Security_Msgs_Supported_SOP	NO
Manufacturer_Info_Supported_Port	NO
Num_Fixed_Batteries	0
Num_Swappable_Battery_Slots	0
USB_Comms_Capable	NO
DR_Swap_To_DFP_Supported	NO
DR_Swap_To_UFP_Supported	NO
Unconstrained_Power	YES
VCONN_Swap_To_On_Supported	NO
VCONN_Swap_To_Off_Supported	NO
Responds_To_Discov_SOP_UFP	NO
Responds_To_Discov_SOP_DFP	NO
Attempts_Discov_SOP	NO
Chunking_Implemented_SOP	YES
Unchunked_Extended_Messages_Supported	NO

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USB Type-C tab	
Type_C_Supports_VCONN_Powered_Accessory	NO
Type_C_Is_VCONN_Powered_Accessory	NO
Type_C_Is_Debug_Target_SRC	NO
Type_C_Can_Act_As_Host	NO
Type_C_Can_Act_As_Device	NO
Type_C_Is_Alt_Mode_Controller	NO
Type_C_Power_Source	0 ; Both
Type_C_Port_On_Hub	NO
Type_C_Supports_Audio_Accessory	NO
Type_C_Sources_VCONN	NO

PD Sink tab	
PD_Power_as_Sink	**100000** ; (100000 mW)
No_USB_Suspend_May_Be_Set	YES
GiveBack_May_Be_Set	NO
Higher_Capability_Set	NO
FR_Swap_Reqd_Type_C_Current_As_Initial_Source	**0** ; FR_Swap not supported
Num_Snk_PDOs	5

PDO_1	
Snk_PDO_Supply_Type	0 ; Fixed
Snk_PDO_Voltage	100 ; 5000 mV
Snk_PDO_Op_Current	500 ; 5000 mA

PDO_2	
Snk_PDO_Supply_Type	0 ; Fixed
Snk_PDO_Voltage	180 ; 9000 mV
Snk_PDO_Op_Current	500 ; 5000 mA

PDO_3	
Snk_PDO_Supply_Type	0 ; Fixed
Snk_PDO_Voltage	300 ; 15000 mV
Snk_PDO_Op_Current	500 ; 5000 mA

PDO_4	
Snk_PDO_Supply_Type	0 ; Fixed
Snk_PDO_Voltage	400 ; 20000 mV
Snk_PDO_Op_Current	500 ; 5000 mA

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PDO_5	
Snk_PDO_Supply_Type	3 ; PPS
Snk_PDO_Min_Voltage	33 ; 3300 mV
Snk_PDO_Max_Voltage	59 ; 5900 mV
Snk_PDO_Op_Current	100 ; 5000 mA

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2.3. USED MEASUREMENT EQUIPMENT BY EUROFINS DIGITAL TESTING

Description	Manufacturer	Identity
Type-C™ Functional and PD 2.0 & PD 3.0 Deterministic Test	Ellisys	USB Explorer 350
Type-C™ Functional Communication Test	Teledyne LeCroy	Voyager M310P
PD analyzer to observe Vbus, current and CC lines	Fixture Solution	Sigma 51

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3. SUMMARY OF THE PERFORMED TESTS

TYPE-C FUNCTIONAL

Deterministic Ellisys	Pass
Communication Teledyne LeCroy	Pass

PD 2.0

Ellisys PD 2.0 PHY	Pass
Ellisys PD 2.0 Link	Pass
Ellisys PD 2.0 Sink	Pass
Ellisys PD 2.0 VDM Tests for UFPs and Cables	Pass
Ellisys PD 2.0 Consistency Tests	Pass
LeCroy PD 2.0 Communication Tests	Pass

PD 3.0

Ellisys PD 3.0 Link	Pass
Ellisys PD 3.0 Sink	Pass
Ellisys PD 3.0 Power Role Swap Initial Sink Tests	Pass
Ellisys PD 3.0 VDM Tests	Pass
Ellisys PD 3.0 Consistency Tests	Pass
LeCroy PD 3.0 Tests	Pass

TYPE-C™ AND POWER DELIVERY INTEROPERABILITY

ASMedia 3142	Pass
Pixel 4	Pass
Pixelbook Go	Pass
MacBook Air	Pass
Samsung EP-TA800	Pass
Samsung EP-TA845	Pass
Renesas RTK0EUG011D07000BJ	Pass
Via Labs VP302-15W	Pass
Via Labs VP302-18W	Pass
Via Labs VP302-27W (PL bit = 0)	Pass
Via Labs VP302-27W (PL bit = 1)	Pass

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4. RESULTS

4.1. TYPE-C™ FUNCTIONAL TEST

Tests are performed according to the "USB Type-C™ Functional Test Specification version 0.83"
All Type-C™ functional tests are done in both positions of the Type-C™ connection.

4.1.1. ELLISYS SOLUTION

Ellisys USB Explorer 350
SW : 3.1.7332

TD.PD.C.E2 UFP Rp = **Pass**

TD.4.1.1 Initial Voltage = **Pass**
TD.4.3.1 Sink Connect Source = **Pass**
TD.4.3.2 Sink Connect DRP = **Pass**
TD.4.3.3 Sink Connect Try.SRC DRP = **Pass**
TD.4.3.4 Sink Connect Try.SNK DRP = **Pass**
TD.4.3.6 Sink Connect Accessories = **Pass**
TD.4.10.1 Sink Power Sub-States = **Pass**
TD.4.10.2 Sink Power Precedence = **Pass**
TD.4.11.1 Data Role Swap = **Pass**
TD.4.11.2 Sink Dead Battery = **Pass**

4.1.2. TELEDYNE LECROY SOLUTION

USB Compliance Suite Version 4.04 Build 879
USB Protocol Suite Version 8.21 Build 3302
Analyzer Voyager M310P 20151: BusEngine 0.71 Firmware 3.15

TD 4.1.1 Initial Voltage = **Pass**
TD 4.3.1 Sink Connect Source Test = **Pass**
TD 4.3.2 Sink Connect DRP Test = **Pass**
TD 4.3.3 Sink Connect Try.SRC DRP Test = **Pass**
TD 4.3.4 Sink Connect Try.SNK DRP Test = **Pass**
TD 4.3.6 Sink Connect Accessories Test = **Pass**
TD 4.10.1 Sink Power Sub-States Test = **Pass**
TD 4.10.2 Sink Power Precedence Test = **Pass**
TD 4.11.2 Sink Dead Battery Test = **Pass**

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4.2. PD 2.0 TEST

4.2.1. ELLISYS SOLUTION

Tests are performed according to the Deterministic MOI.
Ellisys USB Explorer 350
SW : 3.1.7332
All Ellisys PD 2.0 tests are done in both positions of the Type-C™ connection.

4.2.1.1. ELLISYS PHY

TD PD.PHY.E1 BIST Test Data = **Pass**
TD PD.PHY.E4 Transmitter Bit Rate Drift = **Pass**
TD PD.PHY.E5 Transmitter Collision Avoidance = **Pass**
TD PD.PHY.E6 Receiver Swing Tolerance = **Pass**
TD PD.PHY.E7 Receiver Bit Rate Tolerance = **Pass**
TD PD.PHY.E8 Receiver Bit Rate Deviation Tolerance = **Pass**
TD PD.PHY.E9 Valid SOP Framing = **Pass**
TD PD.PHY.E10 Invalid SOP Framing = **Pass**
TD PD.PHY.E11 Valid SOP' Framing = **Pass**
TD PD.PHY.E12 Invalid SOP' Framing = **Pass**
TD PD.PHY.E13 Valid SOP" Framing = **Pass**
TD PD.PHY.E14 Invalid SOP" Framing = **Pass**
TD PD.PHY.E15 Valid SOP'/" Debug Framings = **Pass**
TD PD.PHY.E16 Valid Hard Reset Framing = **Pass**
TD PD.PHY.E17 Invalid Hard Reset Framing = **Pass**
TD PD.PHY.E18 Valid Cable Reset Framing = **Pass**
TD PD.PHY.E19 Invalid Cable Reset Framing = **Pass**
TD PD.PHY.E20 EOP Framing = **Pass**
TD PD.PHY.E21 Preamble = **Pass**

4.2.1.2. ELLISYS PD LINK

TD PD.LL.E2 Retransmission = **Pass**
TD PD.LL.E3 Soft Reset Usage = **Pass**
TD PD.LL.E4 Hard Reset Usage = **Pass**
TD PD.LL.E5 Soft Reset = **Pass**
TD.PD.LL.E6 Ping = **Pass**

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4.2.1.3. ELLISYS PD SINK

TD.PD.SNK.E1 SinkWaitCapTimer Deadline = **Pass**
TD.PD.SNK.E2 SinkWaitCapTimer Timeout = **Pass**
TD.PD.SNK.E3 Request Sent Timely = **Pass**
TD.PD.SNK.E4 Request Fields Checks = **Pass**
TD.PD.SNK.E5 SenderResponseTimer Deadline – Accept = **Pass**
TD.PD.SNK.E6 SenderResponseTimer Timeout – Accept = **Pass**
TD.PD.SNK.E7 PSTransitionTimer Deadline = **Pass**
TD.PD.SNK.E8 PSTransitionTimer Timeout = **Pass**
TD.PD.SNK.E9 GetSinkCap in Place of Accept = **Pass**
TD.PD.SNK.E10 GetSinkCap in Place of PS_RDY = **Pass**

4.2.1.4. ELLISYS PD VDM TESTS FOR UFPS AND CABLES

TD.PD.VDMU.E10 Discover Identity Wrong SVID = **Pass**
TD.PD.VDMU.E11 Discover SVIDs Wrong SVID = **Pass**

4.2.1.5. ELLISYS PD CONSISTENCY TESTS

TD.PD.VNDI.E1 VDM Identity = **Pass**
TD PD.VNDI.E4 SOP* Handling = **Pass**
TD.PD.VNDI.E6 Sink Capabilities = **Pass**

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4.2.2. LECROY SOLUTION

Tests are performed according to the PD 2.0 test specifications.

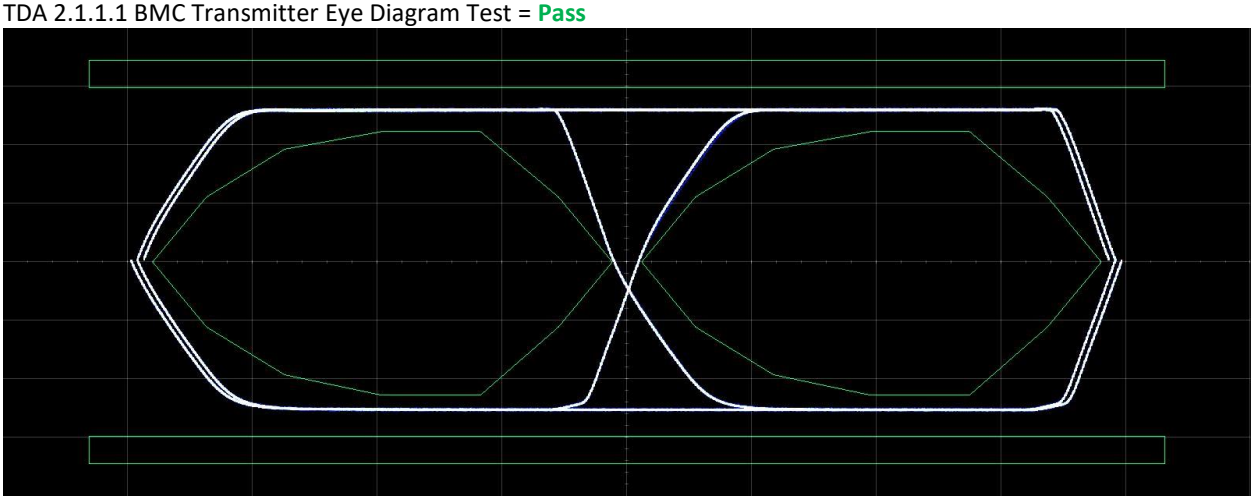
All LeCroy tests are done with:

USB Compliance Suite Version 4.04 Build 879
USB Protocol Suite Version 8.21 Build 3302
Analyzer Voyager M310P 20151: BusEngine 0.71 Firmware 3.15

All LeCroy tests are done in both positions of the Type-C™ connection.

4.2.2.1. PD 2.0 COMMUNICATION TESTS

TDA 2.1.1.1 BMC Transmitter Eye Diagram Test = **Pass**



Eye Diagram

TDA 2.1.1.2 BMC Transmit Bit Rate and Bit Rate Drift = **Pass**
TDA 2.1.2.1 BMC Bus Idle Detection Test = **Pass**
TDA 2.1.2.2 BMC Receive Interference Rejection Test (AWG method) = **Pass**
TDA 2.1.3.1 BMC Termination Impedance Test = **Pass**
TDA 2.1.3.2 BMC PHY Level Message Test = **Pass**
TDA 2.2.1 Get_Source_Cap and Get_Sink_Cap = **Pass**
TDA 2.2.3 DR_Swap = **Pass**
TDA 2.2.4 VCONN_Swap = **Pass**

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TDB 2.1.2.1 Message Header Checks - Except GoodCRC = **Pass**
TDB 2.1.2.2 Message Header Checks – GoodCRC = **Pass**
TDB 2.1.3 Control Message Checks = **Pass**
TDB 2.1.4.1.2 Sink Capability Message Checks = **Pass**
TDB 2.1.4.2 Request Message Checks = **Pass**
TDB 2.2.1.1 Procedure and Checks for any Atomic Message Sequence = **Pass**
TDB 2.2.10.1 Procedure and Checks for Tester Originated Get_Sink_Cap = **Pass**
TDB 2.2.2.1 Procedure and Checks for GoodCRC sent by Tester = **Pass**
TDB 2.2.2.2 Procedure and Checks for GoodCRC sent by UUT = **Pass**
TDB 2.2.7.2 Procedure and Checks for UUT Originated Request = **Pass**
TDB 2.2.8.1 Procedure and Checks for Tester Originated Source Capabilities = **Pass**

TDA 2.3.3.1 PDO Transition, Current Draw and Suspend Test - Sink, Consumer or Consumer/Provider = **Pass**

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4.3. PD 3.0 TEST

4.3.1. ELLISYS SOLUTION

Tests are performed according to the Deterministic MOI.

Ellisys USB Explorer 350
SW : 3.1.7332

All Ellisys PD 3.0 tests are done in both positions of the Type-C™ connection.

4.3.1.1. ELLISYS PD 3.0 LINK

TD.PD.LL3.E1 GoodCRC Specification Revision Compatibility = **Pass**
TD.PD.LL3.E2 Retransmission = **Pass**
TD.PD.LL3.E3 GoodCRC Compatibility with PD2 = **Pass**

4.3.1.2. ELLISYS PD 3.0 SINK

TD.PD.SNK3.E1 Request Fields Checks = **Pass**
TD.PD.SNK3.E2 Unrecognized Message Received in Ready State = **Pass**
TD.PD.SNK3.E3 Get_Source_Cap_Extended Fields Checks = **Pass**
TD.PD.SNK3.E4 SenderResponseTimer Deadline - Source_Capabilities_Extended = **Pass**
TD.PD.SNK3.E5 SenderResponseTimer Timeout - Source_Capabilities_Extended = **Pass**
TD.PD.SNK3.E6 Get_Status Fields Checks = **Pass**
TD.PD.SNK3.E7 Get_Battery_Status Fields Checks = **Pass**
TD.PD.SNK3.E8 Status Sent Timely = **Pass**
TD.PD.SNK3.E9 Manufacturer_Info Sent Timely = **Pass**
TD.PD.SNK3.E10 Source_Capabilities_Extended Sent Timely = **Pass**
TD.PD.SNK3.E11 Receiving Chunked Extended Message = **Pass**
TD.PD.SNK3.E12 Soft_Reset Sent Regardless of Rp value = **Pass**
TD.PD.SNK3.E13 SinkPPSPeriodicTimer Timeout = **Pass**
TD.PD.SNK3.E14 Request Fields Checks – PPS = **Pass**
TD.PD.SNK3.E15 Status Fields Checks = **Pass**
TD.PD.SNK3.E16 Manufacturer_Info Fields Checks = **Pass**
TD.PD.SNK3.E17 Manufacturer_Info Fields Checks - Invalid Target = **Pass**
TD.PD.SNK3.E18 Manufacturer_Info Fields Checks - Invalid Ref = **Pass**
TD.PD.SNK3.E19 ChunkSenderResponseTimer Timeout = **Pass**

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4.3.1.3. ELLISYS PD 3.0 POWER ROLE SWAP INITIAL SINK TESTS

TD.PD.PRSISNK3.E1 Collision Avoidance after PR_Swap = **Pass**

4.3.1.4. ELLISYS PD 3.0 VDM TEST

TD.PD.VDM3.E1 Fields Checks - Discover Identity = **Pass**
TD.PD.VDM3.E2 Unrecognized VID in Unstructured VDM = **Pass**

4.3.1.5. ELLISYS PD 3.0 CONSISTENCY TESTS

TD.PD.VNDI3.E2 Request = **Pass**
TD.PD.VNDI3.E3 VDM Identity = **Pass**
TD.PD.VNDI3.E4 Manufacturer Info = **Pass**
TD.PD.VNDI3.E5 Chunking Implemented = **Pass**
TD.PD.VNDI3.E6 Unchunked Extended Messages Supported = **Pass**
TD.PD.VNDI3.E7 Security Messages Supported = **Pass**
TD.PD.VNDI3.E8 Sink Capabilities = **Pass**
TD.PD.VNDI3.E11 PR_Swap - Sink = **Pass**

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4.3.2. LECROY SOLUTION

Tests are performed according to the PD 3.0 test specifications.

All LeCroy tests are done with:

USB Compliance Suite Version 4.04 Build 879
USB Protocol Suite Version 8.21 Build 3302
Analyzer Voyager M310P 20151: BusEngine 0.71 Firmware 3.15

All LeCroy tests are done in both positions of the Type-C™ connection.

4.3.2.1. PD 3.0 TESTS

TD PD.LL3.E01 GoodCRC Specification Revision compatibility = **Pass**
TD PD.LL3.E02 Retransmission = **Pass**
TD PD.LL3.E03 GoodCRC Compatibility with PD2 = **Pass**

TD PD.SNK3.E01 Request Fields Checks = **Pass**
TD PD.SNK3.E02 Unrecognized Message Received in Ready State = **Pass**
TD PD.SNK3.E03 Get_Source_Cap_Extended Fields Checks = **Pass**
TD PD.SNK3.E04 SenderResponseTimer Deadline - Source_Capabilities_Extended = **Pass**
TD PD.SNK3.E05 SenderResponseTimer Timeout - Source_Capabilities_Extended = **Pass**
TD PD.SNK3.E06 Get_Status Fields Checks = **Pass**
TD PD.SNK3.E07 Get_Battery_Status Fields Checks = **Pass**
TD PD.SNK3.E08 Status sent timely = **Pass**
TD PD.SNK3.E09 Manufacturer_Info sent timely = **Pass**
TD PD.SNK3.E11 Receiving chunked extended message = **Pass**
TD PD.SNK3.E12 Soft_Reset sent regardless of Rp value = **Pass**
TD PD.SNK3.E13 SinkPPSPeriodicTimer Timeout = **Pass**
TD PD.SNK3.E14 Request Fields Checks - PPS = **Pass**
TD PD.SNK3.E15 Status Fields Checks = **Pass**
TD PD.SNK3.E16 Manufacturer_Info Fields Checks = **Pass**
TD PD.SNK3.E17 Manufacturer_Info Fields Checks - Invalid Manufacturer Info Target = **Pass**
TD PD.SNK3.E18 Manufacturer_Info Fields Checks - Invalid Manufacturer Info Ref = **Pass**
TD PD.SNK3.E19 ChunkSenderResponseTimer Timeout = **Pass**

TD PD.VDM3.E01 Fields Checks - Discover Identity = **Pass**
TD PD.VDM3.E02 Unrecognized VID in Unstructured VDM = **Pass**

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TD PD.VNDI3.E02 Request = **Pass**
TD PD.VNDI3.E03 VDM Identity = **Pass**
TD PD.VNDI3.E04 Manufacturer Info = **Pass**
TD PD.VNDI3.E05 Chunking Implemented = **Pass**
TD PD.VNDI3.E06 Unchunked_Extended_Messages_Supported = **Pass**
TD PD.VNDI3.E07 Security_Msgs_Supported = **Pass**
TD PD.VNDI3.E08 Sink Capabilities = **Pass**
TD PD.VNDI3.E11 PR_Swap – Sink = **Pass**

TD PD.PRSISNK3.E01 Collision Avoidance after PR_Swap = **Pass**

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4.4. TYPE-C™ AND POWER DELIVERY INTEROPERABILITY

4.4.1. PUT INFORMATION

Name: STMicroelectronics
Model: X-NUCLEO-USBPDM1-G0
Power Role: SNK only
Data Role: No Data
Power capabilities:

PDO1: Voltage = 5V
Current = 5A

PDO2: Voltage = 9V
Current = 5A

PDO3: Voltage = 15V
Current = 5A

PDO4: Voltage = 20V
Current = 5A

PDO5: Voltage = 3.3V – 5.9V
Current = 5A

4.4.2. TEST DESCRIPTIONS AGAINST PRODUCT WITH POWER SOURCE AND DATA

Test cases defined below will be used for **testing against products with power source and data**. In further test overview only the number will be used and can be recognized by color. The **current and voltage** will be **monitored continuously** but only **reported** after a **stabilization period of >10sec.** in **each separate test case**.

Test No.	Test description
1	Enumeration and driver installation test
2	Interoperability / Functionality
3	Detach & Reattach at Power Source side
4	Detach & Flip/Reverse Attach at Power Source side
5	Detach & Reattach PUT side
6	Detach & Flip/Reverse Attach PUT side
7	Active Sleep/Remote wakeup
8	Active S4 Hibernate/Resume
9	Turn off Display
10	Warm boot
11	Hybrid boot
12	Cold boot

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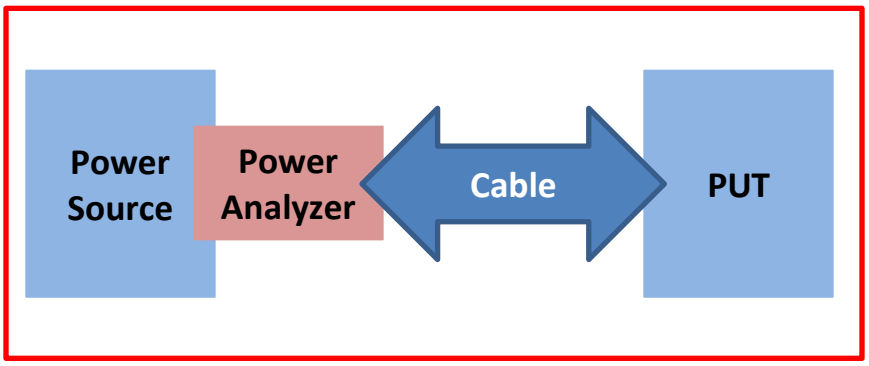
4.4.3. TEST DESCRIPTIONS AGAINST POWER SOURCE ONLY NO DATA

Test cases defined below will be used for **testing against power source only products**. In further test overview only the number will be used and can be recognized by color. The **current and voltage** will be **monitored continuously** but only **reported** after a **stabilization period of >10sec.** in **each separate test case**.

Pre-requisites:
Power Source is connected with PUT through cable and Power analyzer **(represented by red rectangle)**

Test No.	Test description
1	Connect Power Source to AC Power while PUT is connected
2	Detach & Reattach at Power Source side
3	Detach & Flip/Reverse Attach at Power Source side
4	Detach & Reattach PUT side
5	Detach & Flip/Reverse Attach PUT side



4.4.4. TEST CABLES

Two Types of Type-C™ to Type-C™ cables will be used during the Type-C™ and Power delivery interoperability testing. The results for with each cable type will be represented as follows.

Result T1 = Type-C™ without e-marker cable which is capable to transfer a maximum current of 3A.
Result T2 = E-marked Type-C™ cable which is capable to transfer a maximum current of 5A.

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4.4.5. POWER AND PROTOCOL METER

For example SIGMA-51 : https://fixturesolution.com/product/usb-type-c-power-delivery-analyzer-power-meter/

4.4.6. PDO'S AND APDO'S

The PDO or APDO selected after the negotiation between SRC and SNK will be **highlighted** for each SRC/SNK combination in both the power capabilities section as well as in the result tables.

4.4.7. ASMEDIA 3142 INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the ASMedia 3142 are:

Rp = 10kOhm (3A)
Power capabilities = **1**
PDO1: Voltage = N.A.
Current = N.A.
Power = N.A.

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
3	PASS	5.38	0	PASS	5.38	0
4	PASS	5.38	0	PASS	5.38	0
5	PASS	5.38	0	PASS	5.38	0
6	PASS	5.38	0	PASS	5.38	0
7	PASS	5.38	0	PASS	5.38	0
8	PASS	5.38	0	PASS	5.38	0
9	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
10	PASS	5.38	0	PASS	5.38	0
11	PASS	5.38	0	PASS	5.38	0
12	PASS	5.38	0	PASS	5.38	0

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4.4.8. PIXEL 4 INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Pixel 4 are:

Rp = 10kOhm (3A)
Power capabilities = **1**

PDO1: Voltage = 5V
Current = 900mA
Power = 4.5W

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
3	PASS	5.1	0	PASS	5.1	0
4	PASS	5.1	0	PASS	5.1	0
5	PASS	5.1	0	PASS	5.1	0
6	PASS	5.1	0	PASS	5.1	0
7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
9	PASS	5.1	0	PASS	5.1	0
10	PASS	5.1	0	PASS	5.1	0
11	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
12	PASS	5.1	0	PASS	5.1	0

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4.4.9. PIXELBOOK GO INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Pixelbook Go are:

Rp = 22kOhm (1.5A)
Power capabilities = **1**
PDO1: Voltage = 5V
Current = 3A
Power = 15W

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
3	PASS	5.07	0	PASS	5.07	0
4	PASS	5.07	0	PASS	5.07	0
5	PASS	5.07	0	PASS	5.07	0
6	PASS	5.07	0	PASS	5.07	0
7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
9	PASS	5.07	0	PASS	5.07	0
10	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
11	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
12	PASS	5.07	0	PASS	5.07	0

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4.4.10. MACBOOK AIR INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Macbook Air are:

Rp = 10kOhm (3A)
Power capabilities = **1**
PDO1: Voltage = 5V
Current = 1.5A
Power = 7.5W

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
3	PASS	5.14	0	PASS	5.14	0
4	PASS	5.14	0	PASS	5.14	0
5	PASS	5.14	0	PASS	5.14	0
6	PASS	5.14	0	PASS	5.14	0
7	PASS	5.14	0	PASS	5.14	0
8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
9	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
10	PASS	5.14	0	PASS	5.14	0
11	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
12	PASS	5.14	0	PASS	5.14	0

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4.4.11.SAMSUNG EP-TA800 INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Samsung EP-TA800 are:

Rp = 10kOhm (3A)
Power capabilities = **4**

PDO1: Voltage = 5V
Current = 3A

PDO2: Voltage = 9V
Current = 2.77A

PPS
PDO3: Voltage = 3.3V – 5.9V
Current = 3A

PDO4: Voltage = 3.3V – 11V
Current = 2.25A

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	PASS	5.99	0	PASS	5.99	0
2	PASS	5.99	0	PASS	5.99	0
3	PASS	5.99	0	PASS	5.99	0
4	PASS	5.99	0	PASS	5.99	0
5	PASS	5.99	0	PASS	5.99	0

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4.4.12.SAMSUNG EP-TA845 INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Samsung EP-TA845 are:

Rp = 10kOhm (3A)
Power capabilities = **7**

PDO1: Voltage = 5V
Current = 3A

PDO2: Voltage = 9V
Current = 3A

PDO3: Voltage = 15V
Current = 3A

PDO4: Voltage = 20V
Current = 2.25A

PPS
PDO5: Voltage = 3.3V – 11V
Current = 4.05A

PDO6: Voltage = 3.3V – 16V
Current = 2.8A

PDO7: Voltage = 3.3V – 21V
Current = 2.1A

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	PASS	5.94	0	PASS	5.94	0
2	PASS	5.94	0	PASS	5.94	0
3	PASS	5.94	0	PASS	5.94	0
4	PASS	5.94	0	PASS	5.94	0
5	PASS	5.94	0	PASS	5.94	0

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4.4.13.RENESAS RTK0EUG011D07000BJ INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Renesas RTK0EUG011D07000BJ are:

Rp = 10kOhm (3A)
Power capabilities = **6**

PDO1: Voltage = 5V
Current = 3A

PDO2: Voltage = 9V
Current = 3A

PDO3: Voltage = 12V
Current = 3A

PDO4: Voltage = 15V
Current = 3A

PDO5: Voltage = 20V
Current = 3A

PPS
PDO6: Voltage = 3.3V – 21V
Current = 3A

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	PASS	6.06	0	PASS	6.06	0
2	PASS	6.06	0	PASS	6.06	0
3	PASS	6.06	0	PASS	6.06	0
4	PASS	6.06	0	PASS	6.06	0
5	PASS	6.06	0	PASS	6.06	0

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4.4.14. VIA LABS VP302-15W INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Via Labs VP302-15W are:

Rp = 10kOhm (3A)
Power capabilities = **2**

PDO1: Voltage = 5V
Current = 3A

PPS
PDO2: Voltage = 3.3V – 5.9V
Current = 3A

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	PASS	5.98	0	PASS	5.98	0
2	PASS	5.98	0	PASS	5.98	0
3	PASS	5.98	0	PASS	5.98	0
4	PASS	5.98	0	PASS	5.98	0
5	PASS	5.98	0	PASS	5.98	0

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4.4.15. VIA LABS VP302-18W INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Via Labs VP302-18W are:

Rp = 10kOhm (3A)
Power capabilities = **3**

PDO1: Voltage = 5V
Current = 3A

PDO2: Voltage = 9V
Current = 2A

PPS
PDO3: Voltage = 3.3V – 5.9V
Current = 3A

PDO4: Voltage = 3.3V – 11V
Current = 2A

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	PASS	5.96	0	PASS	5.96	0
2	PASS	5.96	0	PASS	5.96	0
3	PASS	5.96	0	PASS	5.96	0
4	PASS	5.96	0	PASS	5.96	0
5	PASS	5.96	0	PASS	5.96	0

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4.4.16. VIA LABS VP302-27W (PL BIT = 0) INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Via Labs VP302-27W (PL bit = 0) are:

Rp = 10kOhm (3A)
Power capabilities = **3**

PDO1: Voltage = 5V
Current = 3A

PDO2: Voltage = 9V
Current = 3A

PPS
PDO3: Voltage = 3.3V – 11V
Current = 3A

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	PASS	5.97	0	PASS	5.97	0
2	PASS	5.97	0	PASS	5.97	0
3	PASS	5.97	0	PASS	5.97	0
4	PASS	5.97	0	PASS	5.97	0
5	PASS	5.97	0	PASS	5.97	0

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4.4.17. VIA LABS VP302-27W (PL BIT = 1) INTEROPERABILITY

The PUT **passed** the Type-C™ and Power delivery interoperability tests. The capabilities of the Via Labs VP302-27W (PL bit = 1) are:

Rp = 10kOhm (3A)
Power capabilities = **3**

PDO1: Voltage = 5V
Current = 3A

PDO2: Voltage = 9V
Current = 3A

PPS
PDO3: Voltage = 3.3V – 11V
Current = 3A

Test No.	Result T1	Voltage (V)	Current (mA)	Result T2	Voltage (V)	Current (mA)
1	PASS	5.95	0	PASS	5.95	0
2	PASS	5.95	0	PASS	5.95	0
3	PASS	5.95	0	PASS	5.95	0
4	PASS	5.95	0	PASS	5.95	0
5	PASS	5.95	0	PASS	5.95	0

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