ALLION®
Engineering Services

COMPLIANCE PROGRAM

TEST REPORT

USB 2.0 Test Report
For
Peripheral

Company Name:	Freescale Semiconductor
VID (Dec or Hex):	15a2 The VID for the company who apply the USB-IF logo.
Model Name:	MCIMX6SX SDB
Product Type:	Embedded Host with Device Mode
Report Date:	2015/02/04
Test Result:	**PASS**

Tester: Rex Xu **Authorized Signature:** Howard Chang

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1. TEST RESULT IS VALID ONLY TO THE ORIGINAL TESTED DEVICE MODEL. ALLION RESERVES THE RIGHT TO PROHIBIT OTHERS TO DISTORT, ISOLATE, FALSIFY, COPIED AND/OR BY ANY PROCESS TO CHANGE THE CONTENT OF THIS TEST REPORT UNLESS IT IS PRIOR APPROVED BY ALLION.

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Company Information:

Company

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High Speed & Basic Speed Compliance Tests

A4.4: Device High-speed Signal Quality ☒ Pass ☐ Fail ☐ N/A

These tests measure the ability of transmitters to do valid high speed signaling. High speed signal quality is measured on upstream ports. A high speed scope with differential probes is used. Signaling data is captured with the scope and then translated to an eye pattern. The signal quality eye patterns obtained from the measurements must agree with the transmit eye patterns in the USB 2.0 Specification.

Connector Type: Untethered (Tethered means no standard B or special B connector)

EL_2: Transmitter Data Rate	☒ Pass	☐ Fail	☐ N/A
EL_4: Eye Pattern (Template 1)	☒ Pass	☐ Fail	☐ N/A
EL_5: Eye Pattern (Template 2)	☐ Pass	☐ Fail	☒ N/A
EL_6: Rising and Falling Time	☒ Pass	☐ Fail	☐ N/A
EL_7: Monotonic Data Transition	☒ Pass	☐ Fail	☐ N/A

A4.5: Device Packet Parameters ☒ Pass ☐ Fail ☐ N/A

This test measures the amount of time it takes hosts and devices to respond. It also verifies device generated SYNCs and EOPs.

EL_21: (32bit)	**32bit**	☒ Pass	☐ Fail	☐ N/A
EL_22-Step1: (>=8bit and <=192bit)	**157bit**	☒ Pass	☐ Fail	☐ N/A
EL_22-Step2: (>=8bit and <=192bit)	**158bit**	☒ Pass	☐ Fail	☐ N/A
EL_25: (8bit)	**8bit**	☒ Pass	☐ Fail	☐ N/A

A4.6: Device CHIRP Timing ☒ Pass ☐ Fail ☐ N/A

This test examines the basic timings and voltages of both upstream ports during the speed detection protocol. (Device reset from Full Speed)

EL_28: (>=2.5us and <=6ms)	**1.50ms**	☒ Pass	☐ Fail	☐ N/A
EL_29: (>=1ms and <=7ms)	**2.00ms**	☒ Pass	☐ Fail	☐ N/A
EL_31: (<=500us)	**3.78us**	☒ Pass	☐ Fail	☐ N/A

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A4.7: Device Suspend/Resume/Reset timing ☒ Pass ☐ Fail ☐ N/A

This test verifies that a device can be suspended and resumed while operating in high speed and also that the device can be reset from the suspended state.

EL_38: (>=3ms and <=3.125ms)	3.00ms	☒ Pass	☐ Fail	☐ N/A
EL_39:		☒ Pass	☐ Fail	☐ N/A
EL_40:		☒ Pass	☐ Fail	☐ N/A
EL_27: (>=3.1ms and <=6ms)	3.50ms	☒ Pass	☐ Fail	☐ N/A
EL_28: (>=2.5us and <=6ms)	1.50ms	☒ Pass	☐ Fail	☐ N/A

A4.8: Device Test J/K, SE0_NAK ☒ Pass ☐ Fail ☐ N/A

The USB-IF no longer requires EL_8: Test_J and Test_K to be performed as a condition for USB Certification. Measurement of EL_9: Test_J, Test_K and SE0 are still a requirement for certification. EL_9 is defined in the USB 2.0 Test Specification and measures the data line voltage when not driven. For detail information please reference as below link:

EL_9

Test Mode	Voltage (mV)
SE0_NAK D+	-0.5
SE0_NAK D-	-0.4
Test J D-	4.2
Test K D+	4.3

(-20mV to 20mV)

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A4.9: Device Receiver Sensitivity ☒ Pass ☐ Fail ☐ N/A

These tests check the receive characteristics of upstream ports

EL_18		☒ Pass	☐ Fail	☐ N/A
EL_17 Positive: (<= +200mV)	+170.3mV	☒ Pass	☐ Fail	☐ N/A
EL_17 Negative: (>= -200mV)	-169.8mV	☒ Pass	☐ Fail	☐ N/A
EL_16 Positive: (>= +100mV)	+165.9mV	☒ Pass	☐ Fail	☐ N/A
EL_16 Negative: (<= -100mV)	-161.0mV	☒ Pass	☐ Fail	☐ N/A

Basic Speed Signal Quality Test Result ☒ Pass ☐ Fail

Connector Type: Untethered (Tethered means no standard B or special B connector)

Basic Speed Upstream Signal Quality: ☒ Pass ☐ Fail

Inrush Current Test: ☒ Pass ☐ Fail

Back Voltage Test Result ☒ Pass ☐ Fail

Enumerate before / after

Pin	Voltage (mV)	
D+	0.1	0.2
D-	0.1	0.2
V_{Bus}	79.6	63.3

(All values <= 400mV)

Miscellaneous: ☒ Pass ☐ Fail

Bypass Capacitance Check: ☒ Pass ☐ Fail

BC 1.2 Implemented Check: ☐ Support ☒ N/A

If the upstream port has BC 1.2 capability, all items of BC 1.2 Portable Device category should be tested under this port for USB-IF certification.

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Frameworks Test Result (USB20CV) ☒ Pass ☐ Fail

This test primarily covers USB-IF testing of devices and hubs for compliance with the standard commands in Chapters 9 and 11 of the USB 2.0 specification. This specification does not describe the full set of USB-IF tests and assertions for these devices.

High-Speed:

VID: 15a2 **PID: 007b**

Chapter 9 Test:	☒ Pass	☐ Fail	☐ N/A
Interface: 1 MAX Power: 10 mA	**Remote Wakeup: N/A**		
MSC Class Test:	☒ Pass	☐ Fail	☐ N/A
UVC Class Test:	☐ Pass	☐ Fail	☒ N/A
HID Class Test:	☐ Pass	☐ Fail	☒ N/A

Basic-Speed:

VID: 15a2 **PID: 007b**

Chapter 9 Test:	☒ Pass	☐ Fail	
Interface: 1 MAX Power: 10 mA	**Remote Wakeup: N/A**		
MSC Class Test:	☒ Pass	☐ Fail	☐ N/A
UVC Class Test:	☐ Pass	☐ Fail	☒ N/A
HID Class Test:	☐ Pass	☐ Fail	☒ N/A

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Frameworks Test Result (USB30CV) ☒ Pass ☐ Fail

All USB peripherals are required to enumerate on a SuperSpeed host controller and pass all applicable tests within USB30CV. Failure framework test in USB30CV will prevent certification.

High-Speed:

VID: 15a2 **PID: 007b**

Chapter 9 Test:	☒ Pass	☐ Fail	☐ N/A
Interface: 1 MAX Power: 10 mA	**Remote Wakeup: N/A**		
MSC Class Test:	☒ Pass	☐ Fail	☐ N/A
UVC Class Test:	☐ Pass	☐ Fail	☒ N/A
HID Class Test:	☐ Pass	☐ Fail	☒ N/A

Basic-Speed:

VID: 15a2 **PID: 007b**

Chapter 9 Test:	☒ Pass	☐ Fail	
Interface: 1 MAX Power: 10 mA	**Remote Wakeup: N/A**		
MSC Class Test:	☒ Pass	☐ Fail	☐ N/A
UVC Class Test:	☐ Pass	☐ Fail	☒ N/A
HID Class Test:	☐ Pass	☐ Fail	☒ N/A

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Power Current Test Result ☒ Pass ☐ Fail

High-Speed: Low Powered Device ☒ Pass ☐ Fail ☐ N/A

Unconfiguration Power: 0.06 mA
(<= 100mA)

Configuration Power: 0.06 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 500mA for High Power)

Suspend Mode Power without Remote Wakeup: 66.8 uA
Suspend Mode Power with Remote Wakeup Enabled: N/A uA
Suspend Mode Power with Remote Wakeup Diabled: N/A uA
(<= 2500uA for Self Power Hub or Non Compound Device)
(<= 12500uA for Bus Power Hub or Compound Device)

Powered' State Suspend Mode Power: 63.8 uA
(<= 2500uA for not Supporting USB Battery Charging)
(<= 100mA for Supporting USB Battery Charging)

Operating Power: 0.07 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 100mA for Self Power)
(<= Max Power <= 500mA for High Power)

Basic-Speed: Low Powered Device ☒ Pass ☐ Fail

Unconfiguration Power: 0.07 mA
(<= 100mA)

Configuration Power: 0.07 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 500mA for High Power)

Suspend Mode Power without Remote Wakeup: 66.7 uA
Suspend Mode Power with Remote Wakeup Enabled: N/A uA
Suspend Mode Power with Remote Wakeup Diabled: N/A uA
(<= 2500uA for Self Power Hub or Non Compound Device)
(<= 12500uA for Bus Power Hub or Compound Device)

Powered' State Suspend Mode Power: 64.6 uA
(<= 2500uA for not Supporting USB Battery Charging)
(<= 100mA for Supporting USB Battery Charging)

Operating Power: 0.07 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 100mA for Self Power)
(<= Max Power <= 500mA for High Power)

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Interoperability Test Overall Result ☒ Pass ☐ Fai

Operating System: Win8.1

EHCI Host Controller:

Enumeration and Driver installation	☒ Pass	☐ Fail	
Check operation of device	☒ Pass	☐ Fail	
Interoperability – Operate all devices	☒ Pass	☐ Fail	
Hot plug test – A Plug	☒ Pass	☐ Fail	
Hot plug test – B Plug	☒ Pass	☐ Fail	☐ N/A
Warm Boot test	☒ Pass	☐ Fail	
Remote Wake-up Test	☐ Pass	☐ Fail	☒ N/A
S3 Active Standby Test	☒ Pass	☐ Fail	
S3 Active Standby Resume Test	☒ Pass	☐ Fail	
Root Port Test	☒ Pass	☐ Fail	
S4 Active Hibernate Test	☒ Pass	☐ Fail	
S4 Active Hibernate Resume Test	☒ Pass	☐ Fail	

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Battery Charging 1.2 Compliance Test

Portable Device (PD)	☐ Pass	☐ Fail	☒ N/A
B-UUT Initial Power-up Test	☐ Pass	☐ Fail	☒ N/A
Data Contact Detect Test – With Current Source	☐ Pass	☐ Fail	☒ N/A
Data Contact Detect Test – No Current Source	☐ Pass	☐ Fail	☒ N/A
DCP Detection Test	☐ Pass	☐ Fail	☒ N/A
CDP Detection Test	☐ Pass	☐ Fail	☒ N/A
SDP Detection Test	☐ Pass	☐ Fail	☒ N/A
ACA-Dock Detection Test	☐ Pass	☐ Fail	☒ N/A
ACA-A Detection Test	☐ Pass	☐ Fail	☒ N/A
ACA-B Detection Test	☐ Pass	☐ Fail	☒ N/A
ACA-C Detection Test	☐ Pass	☐ Fail	☒ N/A
ACA-GND Detection Test	☐ Pass	☐ Fail	☒ N/A
Common Mode Test - Full Speed	☐ Pass	☐ Fail	☒ N/A
Common Mode Test - High Speed	☐ Pass	☐ Fail	☒ N/A
Dead Battery Provision Test	☐ Pass	☐ Fail	☒ N/A

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More Detail Test Result:

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1. High Speed Upstream Signal Quality: Pass

- Overall result: pass!
- Sync result:
  sync passes
- Signal eye:
  eye passes
- EOP width: 7.98 bits
  EOP width passes
- Measured signaling rate: 479.9690 MHz
  signal rate passes
- Edge Monotonicity: 0 mV
  Monotonic Edge passes
- Rising Edge Rate: 805.12 V/us (794.91 ps equivalent risetime)
  passes
- Falling Edge Rate: 811.13 V/us (789.02 ps equivalent falltime)
  passes

Additional Information

- Consecutive jitter range: -46.792 ps to 76.797 ps, RMS jitter 34.038 ps
- Paired JK jitter range: -84.583 ps to 66.711 ps, RMS jitter 17.747 ps
- Paired KJ jitter range: -60.447 ps to 56.280 ps, RMS jitter 13.877 ps

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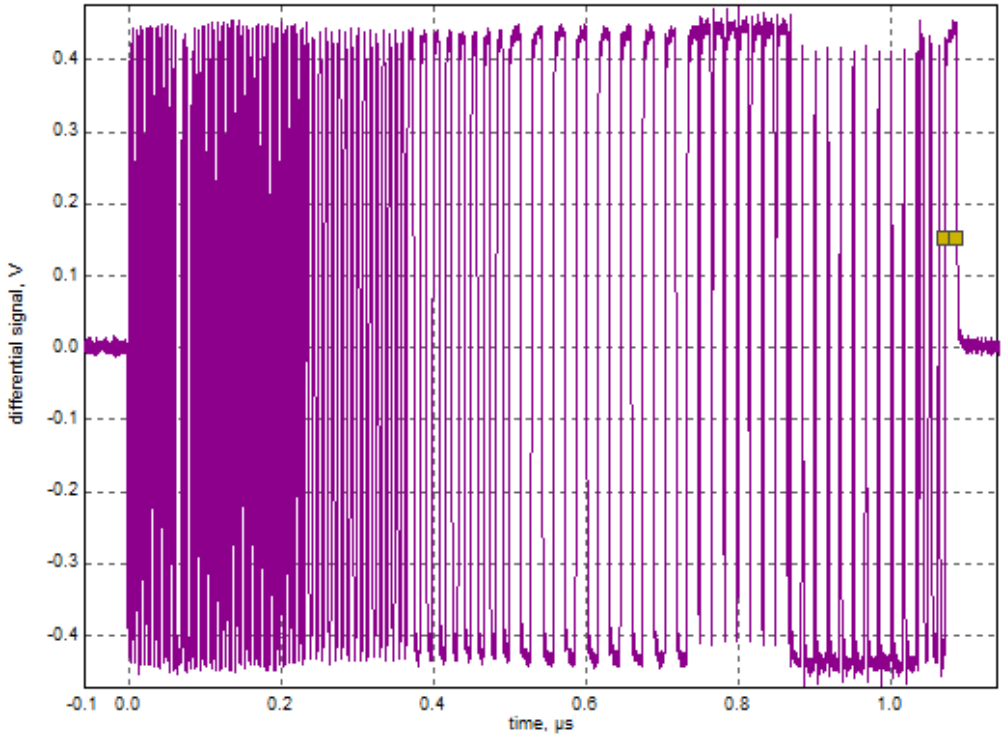
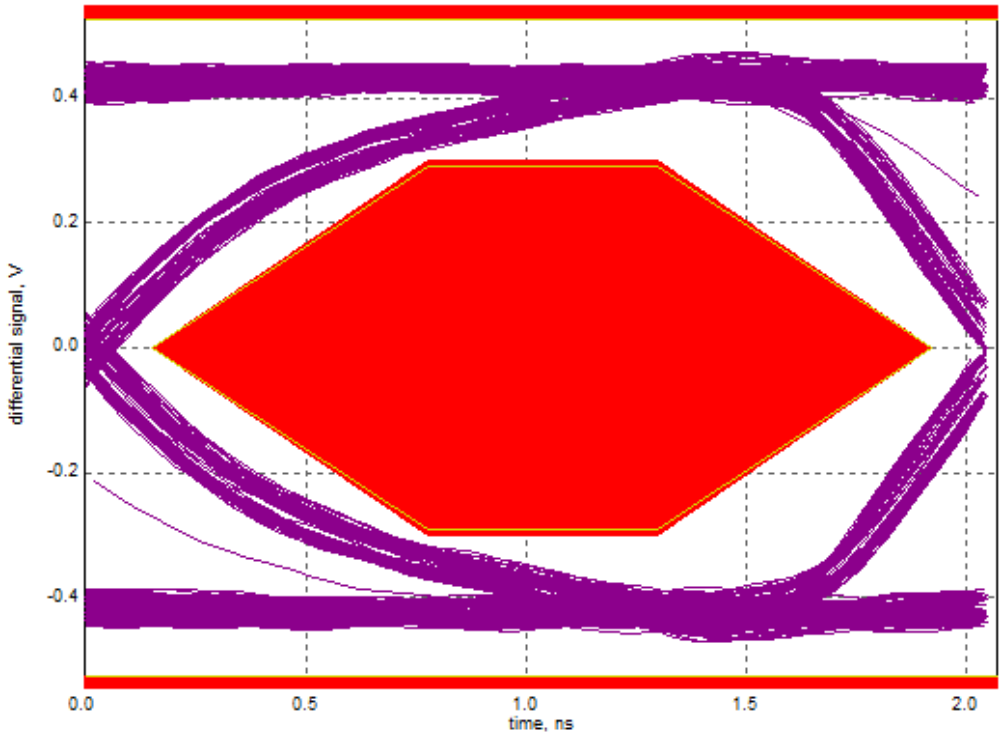
SignalData and Eye





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2. Basic Speed Upstream Signal Quality: Pass

- Overall result: pass!
- Sync result:
  sync passes
- Signal eye:
  eye passes
- EOP width: 166.46 ns
  EOP width passes
- Measured signaling rate: 12.0040 MHz
  signal rate passes
- Edge Monotonicity: 85 mV
  Monotonic Edge passes
- Crossover voltage range: 1.58 V to 1.65 V, mean crossover 1.62 V
  (first crossover at 1.58 V, 10 other differential crossovers checked)
  crossover voltages pass
- Consecutive jitter range: -670.622 ps to 617.329 ps, RMS jitter 375.373 ps
- Paired JK jitter range: -279.946 ps to 173.445 ps, RMS jitter 232.866 ps
- Paired KJ jitter range: -635.334 ps to 573.007 ps, RMS jitter 434.414 ps
  jitter passes

Additional Information

- Rising Edge Rate: 171.07 V/us (Equivalent risetime = 15.43 ns)
- Falling Edge Rate: 196.76 V/us (Equivalent falltime = 13.42 ns)
- Edge Rate Match: 13.97% (limit +/-10%)

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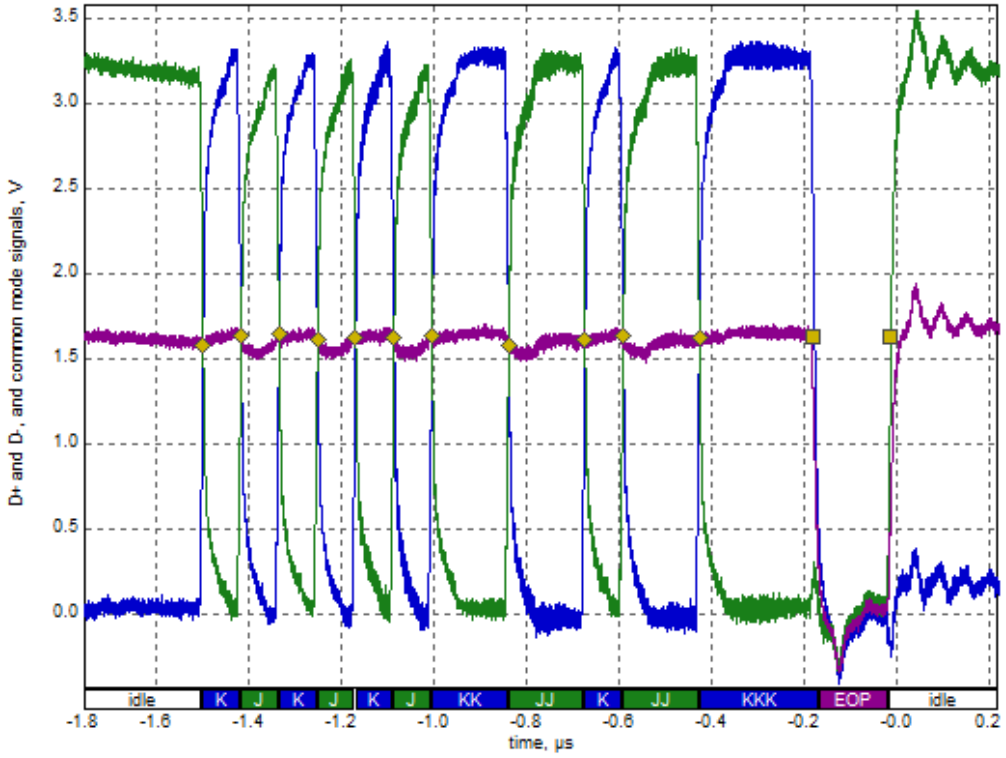
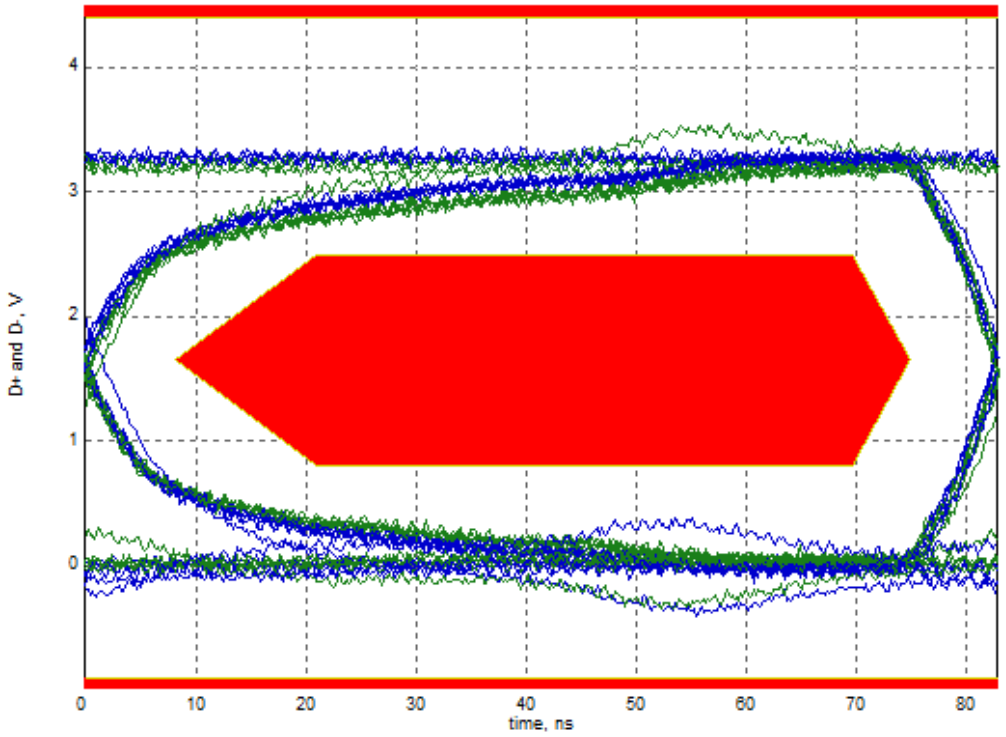
SignalData and Eye





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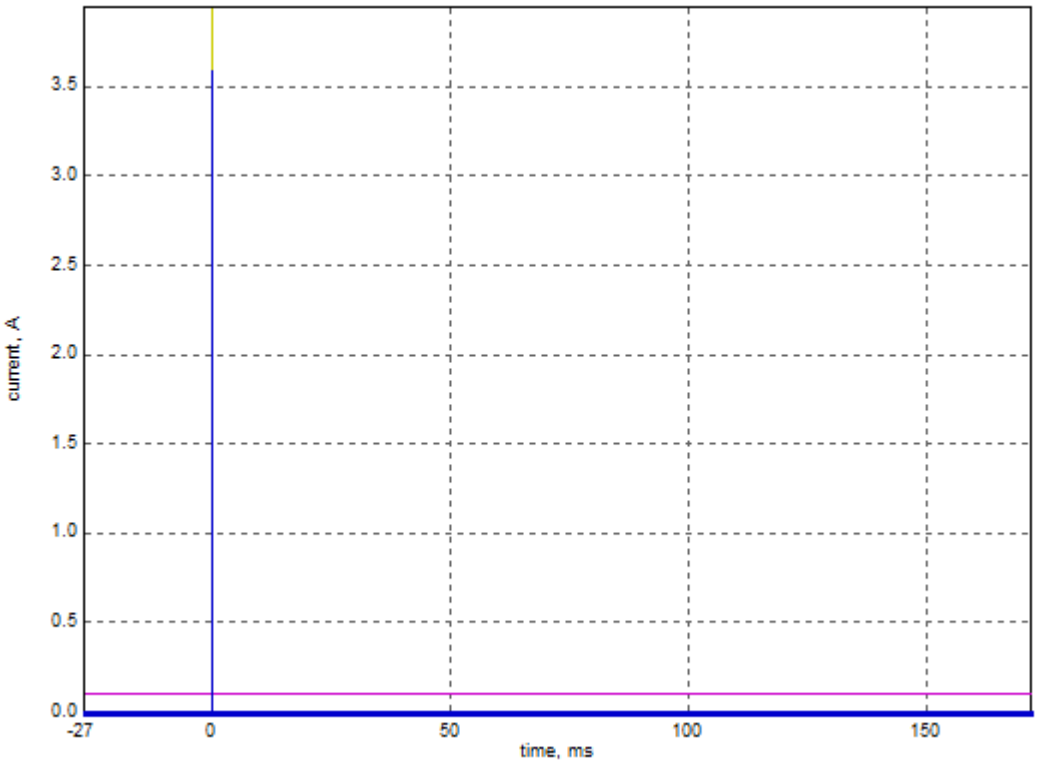
3. Inrush Current: Pass

- Overall result: pass!
- Inrush at 5.000 V: 14.0055 µC
  Inrush passes
- **Region 1 Start: 0.00058 ms - End: 0.108 ms = 14.01 µC**

Hot Plug (Attach) Current Draw



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Test Procedure Reference:

1. Universal Serial Bus Implementers Forum Device High-speed Electrical Test Procedure For Agilent Infiniium, version: 1.2
2. Universal Serial Bus Implementers Forum Full and Low Speed Electrical and Interoperability Compliance Test Procedure, Version: 1.3
3. USB-IF Compliance Update Page---Interoperability Gold Tree Update http://compliance.usb.org/resources/GoldSuite%20Test%20Procedure.pdf
4. USB Battery Charging 1.2 Compliance Plan, Revision: 1.1

Notice: Test result is valid only to the original tested device model. The content of test report may not be copied or re-transmitted (except for the entire report) unless it is prior approved by Allion.

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