USB 2.0 Compliance Test Report

26 June 2013

Customer Name	Microsemi
Product Model Name	SmartFusion2-FlashDrive
Product Description	USB 2.0 Device
Product Test ID (VID)	0x1514
Product Test ID (PID)	0x0001
Product Type	Device
GRL Project Number	MI-SC-032813
Customer Contact	Venkatesh Narayanan 50 Airport Pkwy, San Jose,CA 95110 Venkatesh.Narayanan@microsemi.com
Scope of Testing	USB 2.0 Compliance Testing
Test Result	PASS
GRL Test Engineer	Mike Engbretson mikeen@graniteriverlabs.com

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1. This test report is subject to Granite River Labs Inc. Standard Terms & Conditions, and does not guarantee the quality or functionality of the device tested, compliance with any specifications, or interoperability with other products. Customer is solely responsible for the quality, functionality, interoperability, and specification conformance of Customer's products.
2. This report is based on the information Customer has supplied to GRL and Customer's representation of the device tested. Test result is valid only to the original tested device model.

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1. Project Summary

GRL is being contracted by the Customer to provide engineering test services for compliance of their USB 2.0 device. Testing will be in accordance to USB IF compliance test standard.

2. Summary of Test Results

No Issues were found during testing.

3. Test Environment

- Agilent MSO9404A Mixed Signal Oscilloscope
  - Agilent N5416A USB 2.0 Test SW version 3.73
- Agilent 81134A pattern generator
- Agilent Hi-Speed Quality, Device Receiver, SQiDD test fixtures
- Allion HS SQ SMA test fixture used for eye pattern tests
- USB 2.0 CV on Standard PC running Windows 7
- USB 2.0 Gold Tree running Windows 7
- USB HSET on Standard PC running Windows XP

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4. Compliance Results

4.1. USB 2.0 CV & Interop Tests

Framework Test Results

Test	Result	Comments
Overall	Pass	

Frameworks Test Result (USB20CV)

Test	Result	Comments
Overall	Pass	

# Interfaces	1	
Max Power	100mA	
Remote Wakeup	No	

Chapter 9		
High Speed	Pass	
Full Speed	Pass	

Frameworks Test Result (USB30CV with Renesas xHCI Host Controller)

Test	Result	Comments
Overall	Pass	

# Interfaces	1	
Max Power	100 mA	
Remote Wakeup	No	

Chapter 9		
High Speed	Pass	
Full Speed	Pass	

Frameworks Test Result (USB30CV with Fresco Logic xHCI Host Controller)

Test	Result	Comments
Overall	Pass	

# Interfaces	1	
Max Power	100 mA	
Remote Wakeup	No	

Chapter 9		
High Speed	Pass	
Full Speed	Pass	

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Power Current Test Result

Test	Result	Comments
Overall	PASS	

High Speed Power Mode	Low Power	
Low Speed Power Mode	Low Power	

High Speed Operating Power	0.061 mA	(<= Max Power <= 100mA for Low Power) (<= Max Power <= 100mA for Self Power) (<= Max Power <= 500mA for High Power)
Full Speed Operating Power	0.061 mA	(<= Max Power <= 100mA for Low Power) (<= Max Power <= 100mA for Self Power) (<= Max Power <= 500mA for High Power)

High Speed Unconfigured Power	0.061 mA	(<= 100mA)
Full Speed Unconfigured Power	0.061 mA	(<= 100mA)

High Speed Configured Power	0.061 mA	(<= Max Power <= 100mA for Low Power) (<= Max Power <= 500mA for High Power)
Full Speed Configured Power	0.061 mA	(<= Max Power <= 100mA for Low Power) (<= Max Power <= 500mA for High Power)

High Speed Suspend Mode Power	0.061 mA	(<= 2500uA for Self Power Hub and Non Compound Device) (<= 12500uA for Bus Power Hub and Compound Device)
Full Speed Suspend Mode Power	0.061 mA	(<= 2500uA for Self Power Hub and Non Compound Device) (<= 12500uA for Bus Power Hub and Compound Device)

High Speed Powered-state Suspend	0.061 mA	(<= 2500uA for not Supporting USB Battery Charging) (<= 100mA for Supporting USB Battery Charging)
Full Speed Powered-state Suspend	0.061 mA	(<= 2500uA for not Supporting USB Battery Charging) (<= 100mA for Supporting USB Battery Charging)

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Interop Test Results

Test	Result	Comments
Overall	PASS	

EHCI Host Controller Interop		
Enumeration and Software installation	PASS	
Demonstrated Operation	PASS	
Interoperability – Operate all devices	PASS	
Hot plug Test (A Plug)	PASS	
Hot plug Test (B Plug)	PASS	
Remote Wakeup Test	N/A	
S3 Active Standby Test	PASS	
S3 Active Resume Test	PASS	
Warm Boot Test	PASS	
Hard Boot Test	PASS	
Topology change (Root Port)	PASS	
S4 Active Hibernate Test	PASS	
S4 Active Resume Test	PASS	

UHCI Interop		
Enumeration and Software installation	PASS	
Demonstrated Operation	PASS	
Interoperability – Operate all devices	PASS	
S3 Active Standby Resume Test	PASS	

OHCI Interop		
Enumeration and Software installation	PASS	
Demonstrated Operation	PASS	
Interoperability – Operate all devices	PASS	
S3 Active Standby Resume Test	PASS	

4.2. Battery Charging Test Results

Test	Result	Comments
Overall	Pass	

Battery Charging 1.2	Pass	Battery Charging was not implemented.
CT_CHK_B_CAP	Pass	

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4.3. USB 2.0 Electrical Test Results

Test	Result
Overall Upstream Electrical	PASS

FS Upstream Electricals	Result	Value	Units	Spec	Comments
FS Signal Quality	PASS	PASS	Hits	0 Mask Hits	See FS Upstream Eye Diagram
Inrush Current	PASS	11.8	uC	<=50, Pass 50 > value <= 150, Waiver	See Inrush Plot
Back Voltage overall Test Result	PASS	PASS			
D+ (Before Enumeration)	PASS	1.00	mV	(All values <= 400mV)	
D- (Before Enumeration)	PASS	38.00	mV	(All values <= 400mV)	
Vbus (Before Enumeration)	PASS	22.00	mV	(All values <= 400mV)	
D+ (After Enumeration)	PASS	34.00	mV	(All values <= 400mV)	
D- (After Enumeration)	PASS	34.00	mV	(All values <= 400mV)	
Vbus (After Enumeration)	PASS	26.00	mV	(All values <= 400mV)	

High Speed Upstream Electricals

HS Signal Quality	PASS	PASS	Hits	0 Mask Hits	See HS Upstream Eye Diagram
EL_6:Edge Rate (Rising)	PASS	517.55	pS	>=500	
EL_6:Edge Rate (Falling)	PASS	524.15	pS	>=500	
EL_21: 32-bit SYNC	PASS	64.607	nS	63.6 to 65.6	
EL_22: Response to Setup	PASS	248.387	nS	16.640 to 399.4	
EL_22: Response to IN	PASS	252.382	nS	16.61 to 399.4	
EL_25: 8-bit EOP	PASS	16.801	nS	15.6ns to 17.7	
EL_27: Reset from HS	PASS	3.225	mS	3.1 to 6.0	
EL_28: Reset from Suspend	PASS	2.963	uS	2.5 to 6000	
EL_29: CHIRP-K Width	PASS	1.1	mS	1 to 7	
EL_31: Enable HS Terminations	PASS	2.776	uS	.01 to 500	
EL_38: Suspend Detection	PASS	3.001	mS	3 to 3.125	
EL_16: Squelch +V	PASS	132.839	mV	<=100	
EL_16: Squelch -V	PASS	-147.73	mV	>=-100	
EL_17: Sensitivity +V	PASS	147.05	mV	<=200	
EL_17: Sensitivity -V	PASS	-164.11	mV	>=-200	
EL_18: Minimum Sync	PASS	PASS	none	Pass or Fail	
EL_39: Suspend	PASS	PASS	none	Pass or Fail	
EL_40: Resume	PASS	PASS	none	Pass or Fail	
EL_8: Non-Driven Lines Test_J D-	PASS	0.5	mV	<= 10	
EL_8: Non-Driven Lines Test_K D+	PASS	0	mV	<= 10	
EL_9: Non-Driven Lines Test_SE0 D+	PASS	0	mV	<= 10	
EL_9: Non-Driven Lines Test_SEO D-	PASS	0.1	mV	<= 10	

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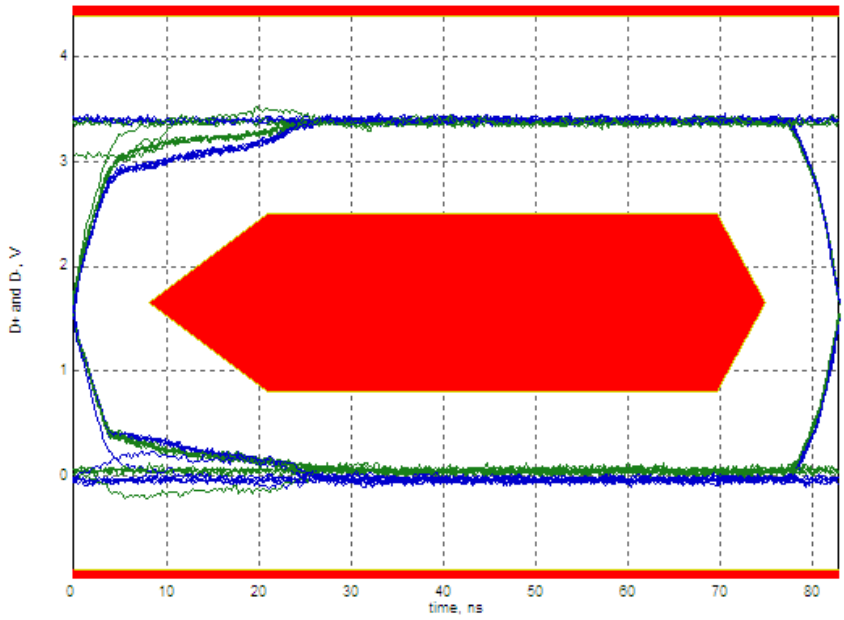
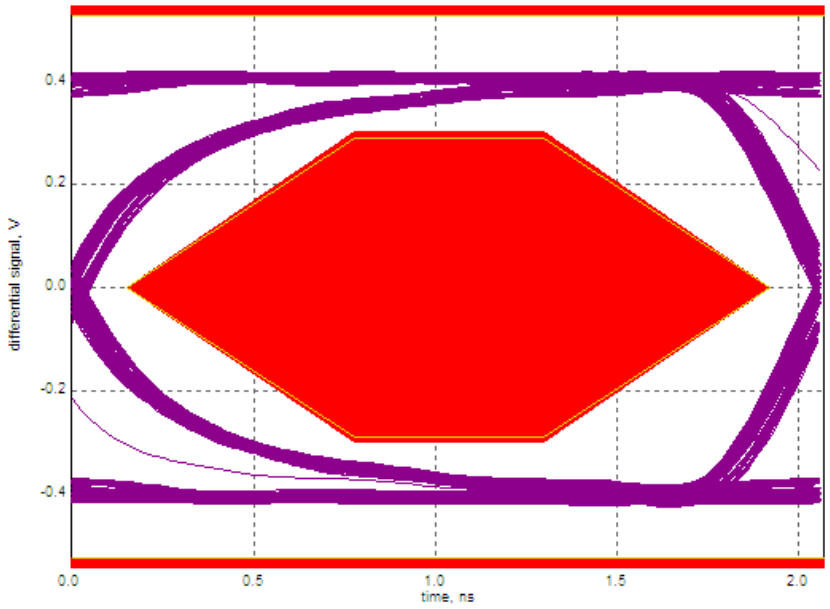
FS Downstream Eye Diagram:



HS Downstream Eye Diagram:



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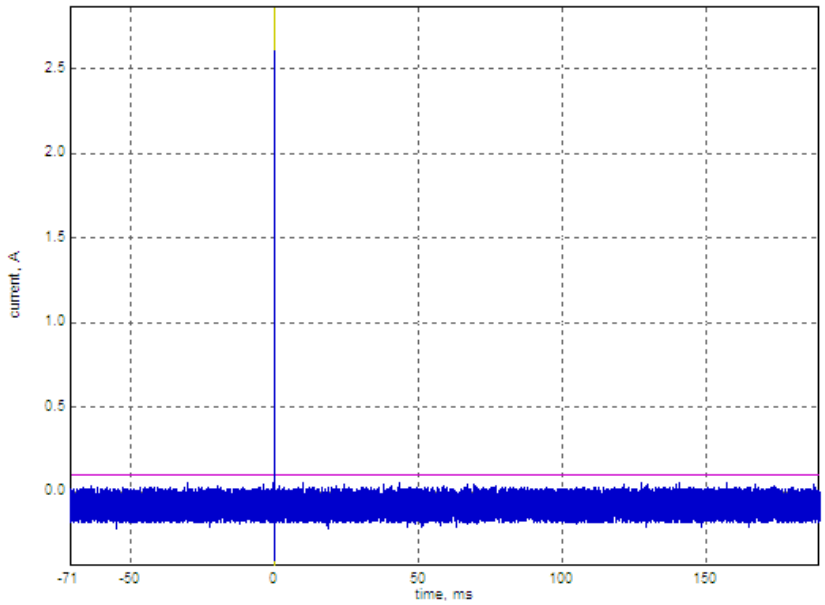
Inrush Current :



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