USB-IF COMPLIANCE PROGRAM

USB 2.0 Test Report
for
High Speed Device

TM

Company Name: Silicon Motion, Inc.

Model Name: SM324

Product Type: Mass Storage

Product Receive Date: ____

Test Start Date: 02/06/2007

Report Date: 02/08/2007

Test Result: **PASS**

Project ID：REM-SIN-USB-018_1

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Company

Company Name:	Silicon Motion, Inc.
Company Address:	No.20-1,Taiyuan St.,Jhubei City HsinChu County 302,Taiwan
VID (Dec)	2316 The VID for the company who apply the USB-IF logo.

Technical Contact

Name:	Johnson Liu
Phone Number:	02-22196688#3708
E-Mail:	Johnson.Liu@siliconmotion.com.tw
FAX Number:	02-22196868

Marketing Contact

Name:	Kevin Yeh
Phone Number:	02-22196688#3502
E-Mail:	Kevin.Yeh@siliconmotion.com.tw
FAX Number:	02-22196868

Product Information:

Silicon Model Name: SM324   TID (If you know): _____

*** This is a required field, the test project will be held until the information provided. ***

☐ **Retail Device** ☒ **Device and Silicon** ☐ **Silicon Only**

☒ **Hi Power** ☐ **Low Power**

☒ **Bus Powered** ☐ **Self Powered**

☐ **Untethered B** ☒ **Tethered**

Highest capacity tested for Mass Storage Device: _____

Device Category: _____   Device Description: _____

VID: 090C   PID: 5000

Tested OS: ☐ **Win 2000** ☒ **Win XP   (Standard test fee will cover 1 OS only.)**

Tester: Sam Chen   Authorized Signature: _James Ou_

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Legacy USB Compliance Tests

Frameworks Test Result: ☒ Pass ☐ **Fail**

Chapter 9:

High Speed Mode: ☒ Pass ☐ **Fail**

Full Speed Mode: ☒ Pass ☐ **Fail**

Interface: 1 MAX Power: 200 mA   Remote Wakeup: N/A

MSC Test: ☐ N/A

High Speed Mode: ☒ Pass ☐ **Fail**

Full Speed Mode: ☒ Pass ☐ **Fail**

UVC Test: ☒ N/A

High Speed Mode: ☐ Pass ☐ **Fail**

Full Speed Mode: ☐ Pass ☐ **Fail**

Power Current Test Result: ☒ Pass ☐ **Fail**

High Speed Mode:

Operating Power: 123.2 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 100mA for Self Power)
(<= Max Power <= 500mA for High Power)

Unconfiguration Power: 52.4 mA (<100mA)
(<=Max Power <= 100mA)

Configuration Power: 52.5 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 500mA for High Power)

Suspend Mode Power: 377 uA
(<= 2500uA for High Power /w Remote Wake Up)
(<= 500uA for others)

Full Speed Mode:

Operating Power: 82 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 100mA for Self Power)
(<= Max Power <= 500mA for High Power)

Unconfiguration Power: 31.4 mA (<100mA)
(<=Max Power <= 100mA)

Configuration Power: 31.4 mA
(<= Max Power <= 100mA for Low Power)
(<= Max Power <= 500mA for High Power)

Suspend Mode Power: 378 uA
(<= 2500uA for High Power /w Remote Wake Up)
(<= 500uA for others)

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Interoperability Test Overall Result: ☒ **Pass** ☐ **Fail**   **OS:** ☐ **W2k** ☒ **XP**

EHCI Controller: (Intel D865GLC Motherboard)

1. Enumeration and Driver installation:	☒ Pass	☐ Fail	
2. Operation with Default Driver:	☒ Pass	☐ Fail	
3. Update Driver:	☐ Pass	☐ Fail	☒ N/A
4. Install Additional Software:	☐ Pass	☐ Fail	☒ N/A
5. DUT Demonstrates Operation:	☐ Pass	☐ Fail	☒ N/A
6. DUT Operation Speed:	☒ Pass	☐ Fail	
7. Interoperability – Operate all device:	☒ Pass	☐ Fail	
8. Hot Detach & Reattach:	☒ Pass	☐ Fail	
9. Topology Change:	☒ Pass	☐ Fail	
10. Warn Boot:	☒ Pass	☐ Fail	
11. Cold Boot:	☒ Pass	☐ Fail	
12. Active S1 Suspend and Resume:	☒ Pass	☐ Fail	
13. Inactive S1 Suspend and Resume:	☒ Pass	☐ Fail	
14. Active S3 Suspend and Resume:	☒ Pass	☐ Fail	

UHCI Controller: (Intel D865GLC Motherboard)

1. Enumeration and Driver installation:	☒ Pass	☐ Fail
2. Interoperability – Operate all device:	☒ Pass	☐ Fail
3. Hot Detach & Reattach:	☒ Pass	☐ Fail
4. Topology Change:	☒ Pass	☐ Fail
5. Warn Boot:	☒ Pass	☐ Fail
6. Cold Boot:	☒ Pass	☐ Fail
7. Active S1 Suspend and Resume:	☒ Pass	☐ Fail
8. Inactive S1 Suspend and Resume:	☒ Pass	☐ Fail
9. Active S3 Suspend and Resume:	☒ Pass	☐ Fail

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OHCI Controller: (PCI Adapter)

1. Enumeration and Driver installation: ⊠ Pass ☐ **Fail**
2. Interoperability – Operate all device: ⊠ Pass ☐ **Fail**
3. Hot Detach & Reattach: ⊠ Pass ☐ **Fail**
4. Topology Change: ⊠ Pass ☐ **Fail**
5. Warn Boot: ⊠ Pass ☐ **Fail**
6. Cold Boot: ⊠ Pass ☐ **Fail**
7. Active S1 Suspend and Resume: ⊠ Pass ☐ **Fail**
8. Inactive S1 Suspend and Resume: ⊠ Pass ☐ **Fail**
9. Active S3 Suspend and Resume: ⊠ Pass ☐ **Fail**

EHCI Controller: (PCI Adapter)

1. Enumeration and Driver installation: ⊠ Pass ☐ **Fail**
2. Interoperability – Operate all device: ⊠ Pass ☐ **Fail**
3. Active S3 Suspend and Resume: ⊠ Pass ☐ **Fail**

Signal Quality Test Result: ⊠ Pass   ☐ **Fail**

Full Speed UP Stream Signal Quality: ⊠ Pass ☐ **Fail**

Inrush Current Test: ⊠ Pass ☐ **Fail**

Back Voltage Test Result: **(Enumerate before/after)** ⊠ Pass ☐ **Fail**

D+:   **0** mV / **0** mV
D- :   **0** mV / **0** mV
V_{Bus}:   **0** mV / **0** mV
(All values <= 400mV)

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High Speed USB Compliance Tests

A4.4 Device High-speed Signal Quality ☒ **Pass** ☐ **Fail**

EL_2: Transmitter Data Rate: ☒ **Pass** ☐ **Fail**
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**
EL_7: Monotonic Data Transition: ☒ **Pass** ☐ **Fail**

*** USB 2.0 HS driver must have 10% to 90% differential rise and fall times of greater than 500 ps. Reference documents: USB 2.0 Specification, Section 7.1.2.2 ***

A4.5 Device Packet Parameters ☒ **Pass** ☐ **Fail**

EL_21:32 bit, EL_22 Step1:123bit, Step2:125bit, EL_25:8 bit
(EL_ 21: 32Bit   EL_22: 8 to 192 bit   EL_25: 8Bit)

A4.6 Device CHIRP Timing ☒ **Pass** ☐ **Fail**

EL_28: 451.2us,   EL_29: 1.667ms,   EL_31: 2.8us
(EL_ 28: 2.5us to 6ms   EL_29: 1ms to 7ms   EL_31: 500us)

A4.7 Device Suspend/Resume/Reset timing ☒ **Pass** ☐ **Fail**

EL_38: 3.02ms,   EL_39: YES,   EL_40: YES
(EL_ 38: 3ms to 3.125ms)

EL_27: 3.4ms,   EL_28: 454us
(EL_ 27: 3.1ms to 6ms   EL_28: 2.5us to 6ms)

A4.8 Device Test J/K, SE0_NAK ☒ **Pass** ☐ **Fail**

EL_8

Test	D+ Voltage (mV)	D- Voltage (mV)
J	422	1
K	1	422

(360mV to 440mV)

EL_9

	Voltage (mV)
D-	0.6
D+	0.6

(-10mV to 10mV)

A4.9 Device Receiver Sensitivity ☒ **Pass** ☐ **Fail**

EL_18: YES, EL_17: +144, -144 mV, EL_16: +136, -136 mV
(EL_ 17: <= +200mV and >= -200mV   EL_16: >= +100mV and <= -100mV)

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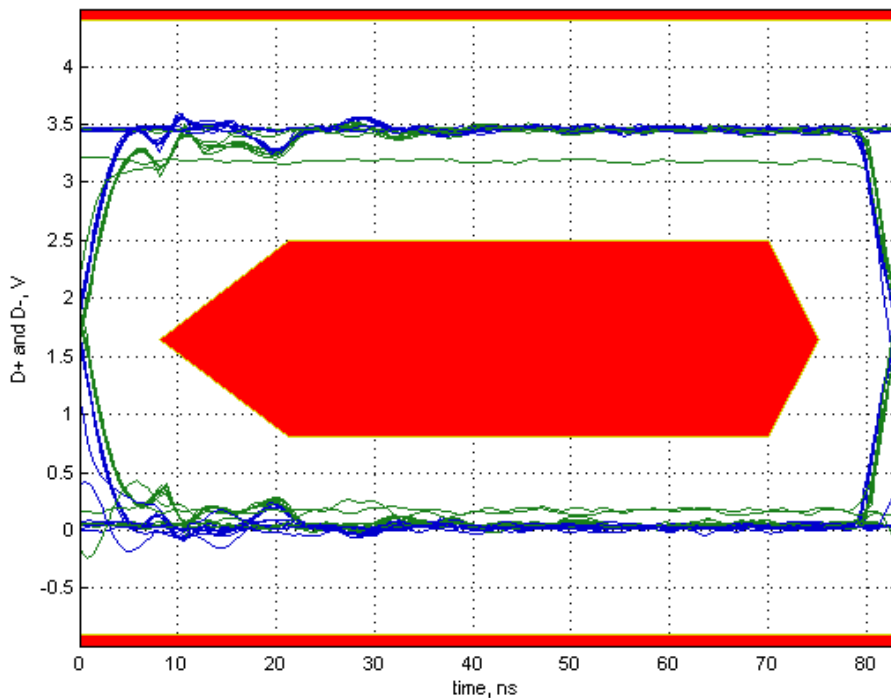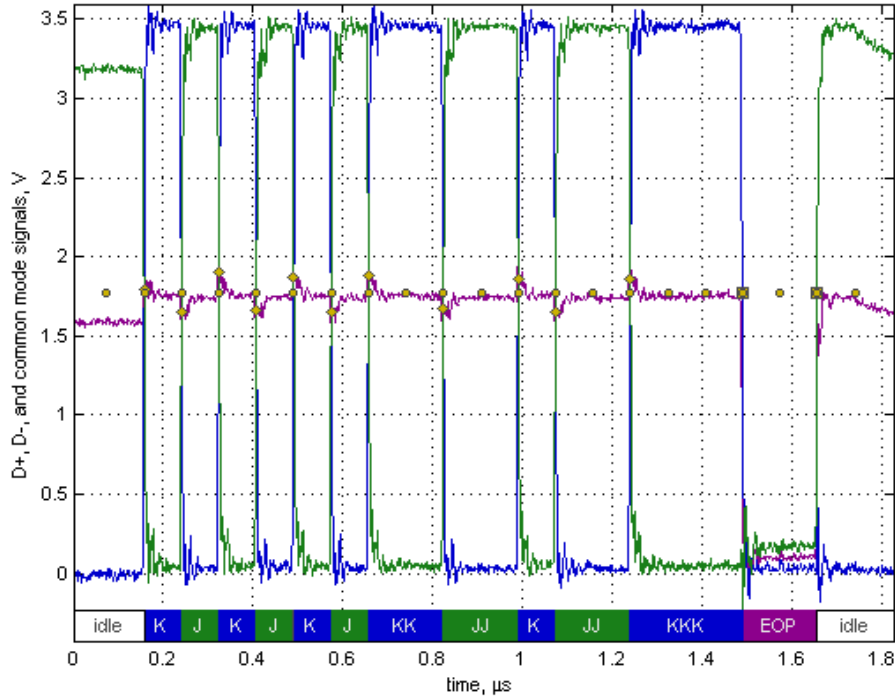**More Detail Test Result:**

1. Full Speed Upstream Signal Quality: Pass

- Overall result: pass!
- Signal eye:
  eye passes
- EOP width: 167.21ns
  EOP width passes
- Receivers: reliable operation on tier 6
  receivers pass
- Measured signaling rate: 11.9980MHz
  signal rate passes
- Crossover voltage range: 1.65V to 1.90V, mean crossover 1.77V
  (first crossover at 1.80V, 10 other differential crossovers checked)
  crossover voltages pass
- Consecutive jitter range: -0.1ns to 0.1ns, RMS jitter 0.1ns
  Paired JK jitter range: -0.2ns to 0.1ns, RMS jitter 0.1ns
  Paired KJ jitter range: -0.1ns to 0.1ns, RMS jitter 0.1ns
  jitter passes

[Signal Data and Eye](#)

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2. High Speed Upstream Signal Quality: Pass

- Overall result: pass!
- Signal eye:
  eye passes
- EOP width: 8.00 bits
  EOP width passes
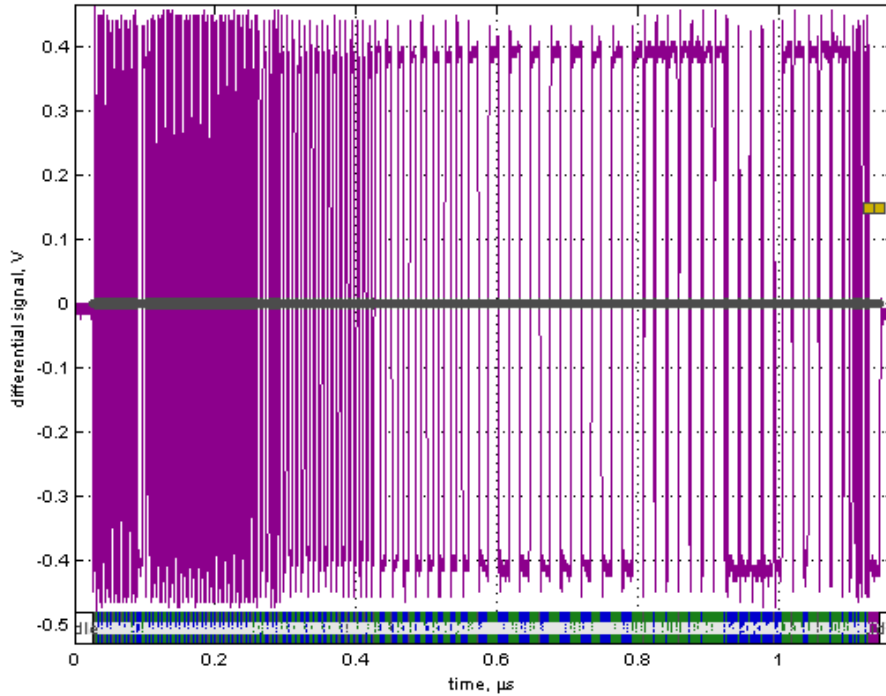- Measured signaling rate: 480.0147MHz
  signal rate passes

Additional Information

- Consecutive jitter range: -53.573ps to 74.300ps, RMS jitter 21.501ps
  Paired JK jitter range: -70.191ps to 56.536ps, RMS jitter 25.840ps
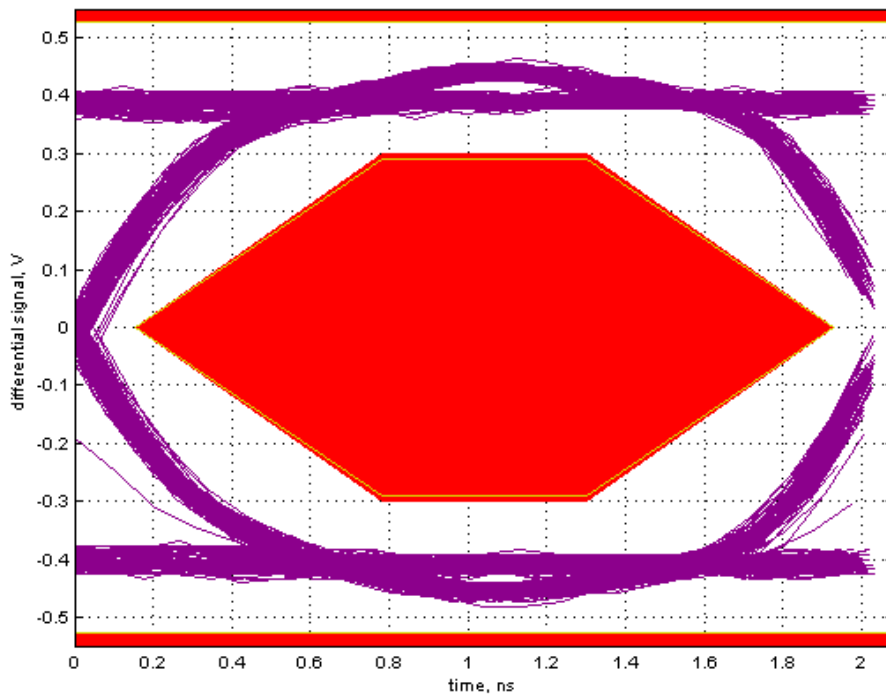 Paired KJ jitter range: -81.440ps to 51.095ps, RMS jitter 26.475ps

Signal Data and Eye

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3. Inrush Current: Pass

- Overall result: pass!
- Inrush at 5.150V: 42.98μC
  inrush passes

Hot Plug (Attach) Current Draw
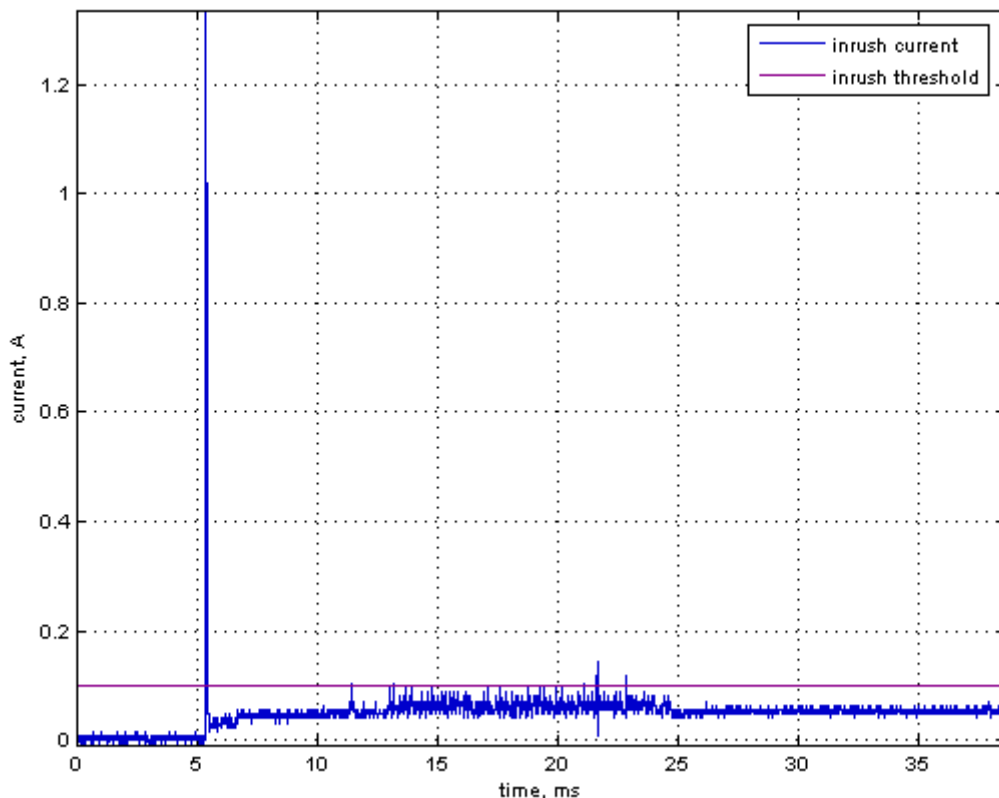
Test Procedure Reference:
1. Universal Serial Bus Implementers Forum Full and Low Speed Electrical and Interoperability Compliance Test Procedure, version: 1.3
2. Universal Serial Bus Implementers Forum Device High-speed Electrical Test Procedure For Agilent Infiniium, version: 1.0
3. Universal Serial Bus Implementers Forum Device High-speed Electrical Test Procedure, version: 1.0

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