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

Notice: 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.
USB-IF COMPLIANCE PROGRAM

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 O

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Phone: +886-2-77228800 Fax: +886-2-26557879
Document Number: QR-510-09I 2/11
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)

Suspense 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)

Suspense Mode Power: 378 uA
(<= 2500uA for High Power /w Remote Wake Up)
(<= 500uA for others)
# USB-IF COMPLIANCE PROGRAM

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

**EHCI Controller:** (Intel D865GLC Motherboard)

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enumeration and Driver installation:</td>
<td>Pass</td>
</tr>
<tr>
<td>2. Operation with Default Driver:</td>
<td>Pass</td>
</tr>
<tr>
<td>3. Update Driver:</td>
<td>Fail</td>
</tr>
<tr>
<td>4. Install Additional Software:</td>
<td>Fail</td>
</tr>
<tr>
<td>5. DUT Demonstrates Operation:</td>
<td>Fail</td>
</tr>
<tr>
<td>6. DUT Operation Speed:</td>
<td>Fail</td>
</tr>
<tr>
<td>7. Interoperability – Operate all device:</td>
<td>Fail</td>
</tr>
<tr>
<td>8. Hot Detach &amp; Reattach:</td>
<td>Fail</td>
</tr>
<tr>
<td>9. Topology Change:</td>
<td>Fail</td>
</tr>
<tr>
<td>10. Warn Boot:</td>
<td>Fail</td>
</tr>
<tr>
<td>11. Cold Boot:</td>
<td>Fail</td>
</tr>
<tr>
<td>12. Active S1 Suspend and Resume:</td>
<td>Fail</td>
</tr>
<tr>
<td>13. Inactive S1 Suspend and Resume:</td>
<td>Fail</td>
</tr>
<tr>
<td>14. Active S3 Suspend and Resume:</td>
<td>Fail</td>
</tr>
</tbody>
</table>

**UHCI Controller:** (Intel D865GLC Motherboard)

<table>
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<td>Pass</td>
</tr>
<tr>
<td>6. Cold Boot:</td>
<td>Pass</td>
</tr>
<tr>
<td>7. Active S1 Suspend and Resume:</td>
<td>Pass</td>
</tr>
<tr>
<td>8. Inactive S1 Suspend and Resume:</td>
<td>Pass</td>
</tr>
<tr>
<td>9. Active S3 Suspend and Resume:</td>
<td>Pass</td>
</tr>
</tbody>
</table>
USB-IF COMPLIANCE PROGRAM

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)
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: 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

<table>
<thead>
<tr>
<th>Test</th>
<th>D+ Voltage (mV)</th>
<th>D- Voltage (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>422</td>
<td>1</td>
</tr>
<tr>
<td>K</td>
<td>1</td>
<td>422</td>
</tr>
</tbody>
</table>

(360mV to 440mV)

EL_9

<table>
<thead>
<tr>
<th>Voltage (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D- 0.6</td>
</tr>
<tr>
<td>D+ 0.6</td>
</tr>
</tbody>
</table>

(-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)
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
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
3. Inrush Current: Pass

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

**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