# USB 2.0 Hi-Speed Embedded Host Compliance Test Report

## USB-IF Compliance Program

<table>
<thead>
<tr>
<th></th>
<th>Microsemi, SOC Products Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Name</strong></td>
<td>Smartfusion2 EH</td>
</tr>
<tr>
<td><strong>Model Number</strong></td>
<td>DVP-102-000304-001-RevC</td>
</tr>
<tr>
<td><strong>Product Revision</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Test Date</strong></td>
<td>September 23 ~ 24, 2013</td>
</tr>
<tr>
<td><strong>Test Result</strong></td>
<td>PASS</td>
</tr>
</tbody>
</table>


A. Vendor and Product Information

Vendor Information

- **Vendor Name:** Microsemi, SOC Products Group
- **Vendor Complete Address:** 3850 North First Street, San Jose, CA, 95134, USA
- **Vendor Phone Number:** 8007134113
- **Vendor Contact(s) – Name:** Wendy Lockhart
  Tel: 8007134113
  E-mail: xx

Product Information

- **Silicon Model Name:** SMSC, USB3326C
- **TID (if you know):** 120000265
  VID: 0x1514
  PID: n/a
- **Product Category:** Development Embedded Host High Speed
- **Product Description:** Silicon Building Block

Comments:
- **Tested OS:** □ Windows 2000 □ Windows XP □ Embedded OS

Device Information

- **Number of downstream ports:** 1
- **Supported Sessions:** □ ADP □ SRP □ N/A
- **USB Connector:** □ Micro AB □ Standard A
- **Is there a hub embedded behind one or more downstream ports?** No
- **What is the maximum source current rating of the downstream ports?** 500 mA
- **Are hubs supported?** No
- **Is there an upstream port on the Device?** No
- **Is a Targeted Peripheral List available?** Yes
- **FS supported?** No
- **Battery Charging 1.2 supported?** No

*Tested By Joonsi Jung*

**Overall Test Result:** PASS
B. Legacy USB Electrical Tests

B.1 Drop/Droop Test Results: ☒ Pass ☐ Fail on Port: ☐ N/A

<table>
<thead>
<tr>
<th>Port1</th>
<th>$V_{\text{Non-Loaded}}$ (V)</th>
<th>$V_{\text{Loaded}}$ (V)</th>
<th>$V_{\text{Drop}}$ (mV)</th>
<th>$V_{\text{Droop}}$ (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.160</td>
<td>4.900</td>
<td>260</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Comments: 500 mA Load

B.2 Full-Speed Downstream Signal Quality Test Result:

☒ Pass ☐ Fail on Port: ☐ N/A

Comments:

B.3 Low-Speed Downstream Signal Quality Test Result:

☐ Pass ☐ Fail on Port: ☒ N/A

Comments:
C. Host High-Speed Electrical Tests

C.1 Host High-speed Signal Quality (EL_2, EL_3, EL_6, EL_7)

EL_2 A USB 2.0 high-speed transmitter data rate must be 480 Mb/s ± 0.05%.

Reference documents: USB 2.0 Specification, Section 7.1.11

☐ Pass ☐ Fail on Port: ☐ N/A

Comments:

EL_3 A USB 2.0 downstream facing port must meet Template 1 transform waveform requirements measured at TP2 (each hub downstream port).

Reference documents: USB 2.0 Specification, Section 7.1.2.2

☐ Pass ☐ Fail on Port: ☐ N/A

Comments:

EL_6 A USB 2.0 HS driver must have 10% to 90% differential rise and fall times of greater than 500ps.

Reference documents: USB 2.0 Specification, Section 7.1.2.2

☐ Pass ☐ Fail on Port: ☐ N/A

Comments:

EL_7 A USB 2.0 HS driver must have monotonic data transitions over the vertical openings specified in the appropriate eye pattern template.

Reference documents: USB 2.0 Specification, Section 7.1.2.2

☐ Pass ☐ Fail on Port: ☐ N/A

Comments:

C.2 Host Controller Packet Parameters (EL_21, EL_22, EL_23, EL_25, EL_55)

EL_21 The SYNC filed for all transmitted packets (not repeated packets) must begin with a 32-bit SYNC field.

Reference documents: USB 2.0 Specification, Section 8.2

Results: 66.905 ns

☐ Pass ☐ Fail on Port: ☐ N/A

Comments:

EL_25 The EOP for all transmitted packets (except SOFs) must be an 8-bit NRZ byte of 01111111 without bit stuffing. (Note, that a longer EOP is waiverable)

Reference documents: USB 2.0 Specification, Section 7.1.13.2
Results: 16.857 ns

☑ Pass  ☐ Fail on Port: _______  ☐ N/A

Comments:

**EL_23**  Host transmitting two packets in a row must have an inter-packet gap of at least 88 bit times and not more than 192 bit times.

**Reference documents:** *USB 2.0 Specification*, Section 7.1.18.2

Results: 333.307 ns

☑ Pass  ☐ Fail on Port: _______  ☐ N/A

Comments:

**EL_22**  When transmitting after receiving a packet, hosts and devices must provide an inter-packet gap of at least 8 bit times and not more than 192 bit times.

**Reference documents:** *USB 2.0 Specification*, Section 7.1.18.2

Results: 278.154 ns

☑ Pass  ☐ Fail on Port: _______  ☐ N/A

Comments:

**EL_55**  Hosts transmitting SOF packets must provide a 40-bit EOP without bit stuffing where the first symbol of the EOP is a transition from the last data symbol.

**Reference documents:** *USB 2.0 Specification*, Section 7.1.13.2

Results: 83.549 ns

☑ Pass  ☐ Fail on Port: _______  ☐ N/A

Comments:

**C.3 Host Disconnect Detect (EL_36, EL_37)**

**EL_37**  A USB 2.0 downstream facing port must not detect the high-speed disconnect state when the amplitude of the differential signal at the downstream facing driver’s connector is <= 525mV.

**Reference documents:** *USB 2.0 Specification*, Section 7.1.7.3

☐ Pass  ☐ Fail on Port: _______  ☐ N/A

Comments:

**EL_36**  A USB 2.0 downstream facing port must detect the high-speed disconnect state when the amplitude of the differential signal at the downstream facing driver’s connector is >= 625mV.

**Reference documents:** *USB 2.0 Specification*, Section 7.1.7.3
C.4 Host CHIRP Timing (EL_33, EL_34, EL_35)

EL_33  Downstream ports start sending and alternating sequence of Chirp K’s and Chirp J’s within 100us after the device Chirp K stops.

   Reference documents: USB 2.0 Specification, Section 7.1.7.5
   Results: 2.259 us
   ✗ Pass   ☐ Fail on Port: _______   ☑ N/A
   Comments:

EL_34  Downstream port Chirp K and Chirp J durations must be between 40us and 60us duration.

   Reference documents: USB 2.0 Specification, Section 7.1.7.5
   Results: 50.017/50.013 us
   ✗ Pass   ☐ Fail on Port: _______   ☑ N/A
   Comments:

EL_35  Downstream ports begin sending SOFs within 500us and not sooner than 100us from transmission of the last Chirp (J or K)

   Reference documents: USB 2.0 Specification, Section 7.1.7.5
   Results: 225.230 us
   ✗ Pass   ☐ Fail on Port: _______   ☑ N/A
   Comments:

C.5 Host Suspend/Resume Timing (EL_39, EL_41)

EL_39  A device must support the Suspend state.

   Reference documents: USB 2.0 Specification, Section 7.1.7.6
   Results: 3.005 ms
   ✗ Pass   ☐ Fail on Port: _______   ☑ N/A
   Comments:

EL_41  After resuming a port, the host must begin sending SOFs within 3ms of the start of the idle state.

   Reference documents: USB 2.0 Specification, Section 7.1.7.7
   Results: 101 us
C.6 Host Test J/K, SE0_NAK (EL_8, EL_9)

EL_8  When either D+ or D- are driven high, the output voltage must be 400mV ± 10% when terminated with precision 45 Ohm resistors to ground.

Reference documents: USB 2.0 Specification, Section 7.1.1.3

<table>
<thead>
<tr>
<th>Port</th>
<th>Test</th>
<th>D+ (mV)</th>
<th>D- (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>-</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>K</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Overall Results:

☒ Pass  ☐ Fail on Port: _____  ☐ N/A

Comments:

EL_9  When either D+ or D- are not being driven, the output voltage must be 0V ± 10mV when terminated with precision 45 Ohm resistors to ground.

Reference documents: USB 2.0 Specification, Section 7.1.1.3

<table>
<thead>
<tr>
<th>Port</th>
<th>Test</th>
<th>D+ (mV)</th>
<th>D- (mV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Overall Results:

☒ Pass  ☐ Fail on Port: _____  ☐ N/A

Comments:
**D. PET Test Results:**

<table>
<thead>
<tr>
<th>Automated Test Chapter 6</th>
<th>Pass</th>
<th>Fail</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-UUT Initial Power-up Test</td>
<td>✘ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>A-UUT VBUS Voltage Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>A-UUT Bypass Capacitance Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>A-UUT SRP Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>A-UUT ADP Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>A-UUT Leakage Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH, Capable of ADP and SRP, State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH, Capable of ADP but not SRP, State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH, Capable of SRP but not ADP, State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH with no Session Support State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH, Capable of ADP/SRP, but not HNP, State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH, Capable of ADP but not SRP/HNP, State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH, Capable of SRP but not ADP/HNP, State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH with no Session/HNP Support State Transition Test</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>A-UUT “Device No Response” for connection timeout</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>A-UUT “Unsupported Device” Message</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
<tr>
<td>EH using Micro-AB “Incorrect Connection”</td>
<td>☐ Pass</td>
<td>☐ Fail</td>
<td>☒ N/A</td>
</tr>
</tbody>
</table>
E. Interoperability Test Results:

**Manual Test Chapter 7**

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-UUT Functionality B-devices</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Category Functionality B-devices</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Boot test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Legacy Speed Test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Concurrent and Independently test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Unsupported device Message test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Hub Error Message test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Hub Functionality test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Hub maximum tier test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Hub Concurrent and Independent test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Bus powered hub power exceeded test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Maximum concurrently device exceed message test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Standby test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Standby Disconnect test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Standby Attach test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Standby Topology Change test</td>
<td>Pass</td>
</tr>
<tr>
<td>A-UUT Standby Remote Wakeup test</td>
<td>Pass</td>
</tr>
<tr>
<td>OTG to OTG test</td>
<td>Pass</td>
</tr>
</tbody>
</table>
F. Targeted Peripheral List (TPL) Form

F.1 Host Information:

Enter the following information only once.

- **Vendor Name:** Microsemi, SOC Products Group
- **Product Name:** Smartfusion2 EH
- **Product Model:** DVP-102-000304-001-RevC
- **Product Revision:** 1
- **SRP Support:** No
- **Downstream Ports:** 1
- **Signaling Speeds Supported:** High
- **Supported Transports:** Control, Bulk, Interrupt, Isochronous
- **Messaging Interface:** Text Screen
- **Max Current Capability:** 500 mA

F.2 Targeted Peripherals Information: Used for Testing

Enter the following information for each supported peripheral.

- **Vendor Name:** Sandisk
- **Product Name:** Cruzer Blade 4GB
- **Model:** SDCZ50-004G
- **Revision:** 0
- **Vendor ID:** 0x781
- **Product ID:** 0x5567
- **Device Class:** MSC
- **SRP Support:** No
- **HNP Support:** No
- **Maximum Operation Power (mA):** 200 mA
- **Maximum USB Signaling Speed:** High

- **Vendor Name:** Sandisk
- **Product Name:** Cruzer Blade 8GB
- **Model:** SDCZ50-008G
- **Revision:** 0
- **Vendor ID:** 0x781
- **Product ID:** 0x5567
- **Device Class:** MSC

* Obtained from the bMaxPower field of the device’s Standard Configuration Descriptor
† Maximum signaling speed when connected to a high-speed host
SRP Support:  □ Yes  ☒ No
HNP Support:  □ Yes  ☒ No
‡ Maximum Operation Power (mA):  200 mA
§ Maximum USB Signaling Speed:  □ Low  □ Full  ☒ High

Vendor Name:  Sandisk
Product Name:  Cruzer Blade 16GB
Model:  SDCZ50-016G
Revision:  0
Vendor ID:  0x781
Product ID:  0x5567
Device Class:  MSC
SRP Support:  □ Yes  ☒ No
HNP Support:  □ Yes  ☒ No
** Maximum Operation Power (mA):  200 mA
†† Maximum USB Signaling Speed:  □ Low  □ Full  ☒ High

Vendor Name:  Kingston Technology
Product Name:  Data Traveler 4GB
Model:  DT1/4GB
Revision:  0
Vendor ID:  0x951
Product ID:  0x1607
Device Class:  MSC
SRP Support:  □ Yes  ☒ No
HNP Support:  □ Yes  ☒ No
‡‡ Maximum Operation Power (mA):  200 mA
§§ Maximum USB Signaling Speed:  □ Low  □ Full  ☒ High

Vendor Name:  Kingston Technology
Product Name:  Data Traveler 109
Model:  DT109N/8GB
Revision:  0
Vendor ID:  0x930
Product ID:  0x6545
Device Class:  MSC

† Obtained from the bMaxPower field of the device’s Standard Configuration Descriptor
§ Maximum signaling speed when connected to a high-speed host
** Obtained from the bMaxPower field of the device’s Standard Configuration Descriptor
†† Maximum signaling speed when connected to a high-speed host
‡‡ Obtained from the bMaxPower field of the device’s Standard Configuration Descriptor
§§ Maximum signaling speed when connected to a high-speed host
<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRP Support</td>
<td>Yes</td>
</tr>
<tr>
<td>HNP Support</td>
<td>Yes</td>
</tr>
<tr>
<td>*** Maximum Operation Power (mA):</td>
<td>200 mA</td>
</tr>
<tr>
<td>††† Maximum USB Signaling Speed:</td>
<td>Low</td>
</tr>
<tr>
<td>††† Maximum Operation Power (mA):</td>
<td>100 mA</td>
</tr>
<tr>
<td>Vendor Name</td>
<td>Transcend</td>
</tr>
<tr>
<td>Product Name</td>
<td>Jet Flash 300, 4GB</td>
</tr>
<tr>
<td>Model</td>
<td>TS4GJF30</td>
</tr>
<tr>
<td>Revision</td>
<td>0</td>
</tr>
<tr>
<td>Vendor ID</td>
<td>0x8564</td>
</tr>
<tr>
<td>Product ID</td>
<td>0x1000</td>
</tr>
<tr>
<td>Device Class</td>
<td>MSC</td>
</tr>
<tr>
<td>SRP Support</td>
<td>Yes</td>
</tr>
<tr>
<td>HNP Support</td>
<td>Yes</td>
</tr>
<tr>
<td>§§§ Maximum USB Signaling Speed:</td>
<td>Low</td>
</tr>
<tr>
<td>§§§ Maximum USB Signaling Speed:</td>
<td>Full</td>
</tr>
</tbody>
</table>

---

*** Obtained from the bMaxPower field of the device’s Standard Configuration Descriptor
††† Maximum signaling speed when connected to a high-speed host
‡‡‡ Obtained from the bMaxPower field of the device’s Standard Configuration Descriptor
§§§ Maximum signaling speed when connected to a high-speed host