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USB2640/40i/41/41i/49/49i Test Report

Collectively referred to in this document as the USB2640

USB 2.0 Hub + Flash Media Controller

**Software Performance and
Compatibility Test Report**

Firmware Version: 76
Report Date: 7/21/2008

Total Test Time Required: 228 Hours

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Test Environment

Hardware		
Test Machine(s):	Other Hardware:	Chipsets Used for Testing:
<p>Machine 1: QA-I64-101 BIOS: DELL INC. ver. A08 MOTHER BOARD: DELL INC. (0CJ774) CHIPSET: INTEL i955X SOUTH BRIDGE: INTEL 82801GB/GR PROCESSOR: INTEL P4D 2.8 GHz RAM: 512MB PC2-5300 Dual CH. EHCI: INTEL 82801G (ICH7)</p> <p>Machine 2: QA-A64-104 BIOS: Phoenix Tech rev. 1011 MOTHER BOARD: ASUSTeK A8N-SLI DELUXE CHIPSET: nVidia nForce4 - SLi SOUTH BRIDGE: nVidia nForce4 PCI to ISA PROCESSOR: AMD Athlon 64 3k 1.8GHz RAM: 2048MB EHCI: Standard EHCI to USB HC</p> <p>Machine 3: LAB-GEFORCE3P4 BIOS: AWARD SOFT Ver 6.00 PG MOTHER BOARD: FIRST INTER: VC15 Rev 1.x CHIPSET: INTEL i845D Rev 4 SOUTH BRIDGE: INTEL 82801BA - ICH2 PROCESSOR: INTEL P4 - 2.0GHz RAM: 512 MB EHCI: INTEL 82801DB/DBM 2.0HC</p> <p>Machine 4: QA A32 103 BIOS: PHOENIX ACPI REV 1006 MOTHERBOARD: A7N8X2.0 CHIPSET: NVIDIA NFORCE 2 SOUTHBRIDGE: NVIDIA NFORCE 2 MCP PROCESSOR: AMD XP 2500 RAM: 512 MB EHCI: STANDARD EHCI TO USB HC</p> <p>Machine 5: QA I64 102 BIOS: DELL REV 1.0.3 MOTHERBOARD: DEL INC. (0WF810) CHIPSET: INTEL Q965 EXPRESS SOUTHBRIDGE: INTEL Q965 ICH8/ R/D0 PROCESSOR: INTEL PENTIUM D950 3.4Ghz RAM: 1GB EHCI: INTEL Q965 ICH8/R/D0</p> <p>Machine 6: QA-A64-103 BIOS: PHOENIX TECH 3.04 MOTHERBOARD: ASUS (SALMON) v1.04 CHIPSET: SIS 760 SOUTHBRIDGE: SIS 964 PROCESSOR: AMD ATHLON 64 3400+ RAM: 384 Mb PC2100 DDR266 EHCI: SIS 7002 v 2.0</p>		<p>Intel i845E Intel i865P/PE/G Intel i865P/PE/G/i848P Intel Q965 ICH8 Intel i875P NVIDIA NFORCE 2 Rev A2 SiS648FX VIA KT600 VIA KT400 VIA P4X400(VT8754) Rev3 Apple</p> <p>3rd Party Readers Used for Testing:</p> <p>ZIO SM, MS readers Dazzle reader I/O Interconnect reader Firewire reader ImationFlashGO! 2.0</p>

Software		
Drivers and Firmware:	Application Software:	Operating Systems:
USB2640_ROM_INTEL.HEX WINXP:MS - USBSTOR.SYS 5.1.2600.1243 Vista: USBSTOR.SYS 6.0.6000.16386 MASS STORAGE CLASS DRIVER WINXP:MS - USBSTOR.SYS 5.1.2600.1243 EHCI DRIVER: MS USBEHCI.SYS 5.1.2600.1243 MS USBEHCI.SYS 5.0.2195.6907 SIIG / OMI OUSBHCI.SYS 2.1.4 OWC IUSBHCI.SYS 1.0.3.0 UHCD DRIVER: WINXP: USBUHCI.SYS 5.1.2600.1243	SFV32W.EXE version 1.0.350 SetIcon.exe 1.2.1.2 MAC SFV (10x) version 1.3 Production Line Descriptor Update Utility version 2.0.1.0 USBDM.EXE VERSION 2.1.1.8	Windows XP SP2 Windows Vista

Testing Overview

Standard for Certifying Firmware and Drivers

The USB2640 Test Suite consists of 26 separate functional testing areas designed to fully exercise the capabilities of the USB2640 USB 2.0 Flash Media Controller chip. For a firmware to be considered certified by the SMSC QA Test Laboratory, it must receive passing test results in each of the following functional test suites:

Functional Test Suite		Operating Systems
1	Installation	Windows XP, Windows Vista
2	USBCV	Windows XP, Windows Vista
3	Compact Flash / Microdrive	Windows XP, Windows Vista
4	Smart Media	Windows XP, Windows Vista
5	xD	Windows XP, Windows Vista
6	SD/MMC	Windows XP, Windows Vista
7	MS/MS Pro/MS Pro HG	Windows XP, Windows Vista
8	Media ECC/CIS	Windows XP, Windows Vista
9	Multiple Device	Windows XP, Windows Vista
10	Surprise Removal	Windows XP, Windows Vista
11	Load/Unload	Windows XP, Windows Vista
12	Boot From USB	Windows XP, Windows Vista
13	USB1.1	Windows XP, Windows Vista
14	DTM	Windows XP, Windows Vista
15	Bundled Software/Applications	Windows XP, Windows Vista
16	DFU/Descriptor Update	Windows XP, Windows Vista
17	C3	Windows XP, Windows Vista
18	LUN Power Configuration	Windows XP, Windows Vista
19	Hub Configuration	Windows XP, Windows Vista
20	MS/MS Pro/MS Pro HG Compliance	Windows XP, Windows Vista
21	LED Activity	Windows XP, Windows Vista
22	Remote Wakeup	Windows XP, Windows Vista
23	Media Identification	Windows XP, Windows Vista
24	GPIO/LED Control	Windows XP, Windows Vista
25	SD/MMC Clock Throttling	Windows XP, Windows Vista
26	Mac OS Specific	Windows XP, Windows Vista

A new firmware must pass all test suites to be considered certified. Note that this standard does not apply to beta software released for evaluation purposes.

Test Results

Test Technician: Jose Alviar
Test Technician: Tequila Nunley

Test Technician: Nancy Roberson
Test Technician: Martin Winfield

#	Test Suite	Windows XP	Windows Vista
1	Installation	Pass	Pass
2	USBCV	Pass	Pass
3	Compact Flash / Microdrive	Not Applicable	Not Applicable
4	Smart Media	Not Applicable	Not Applicable
5	xD	Pass	Pass
6	SD/MMC	Pass	Pass
7	MS/MS Pro/MS Pro HG	Pass	Pass
8	Media ECC/CIS	Pass	Pass
9	Multiple Device	Pass	Pass
10	Surprise Removal	Pass	Pass
11	Load/Unload	Pass	Pass
12	Boot From USB	Pass	Pass
13	USB1.1	Pass	Pass
14	DTM	Pass	Pass
15	Bundled Software/Applications	Pass	Pass
16	DFU/Descriptor Update	Pass	Pass
17	C3	Pass	Pass
18	LUN Power Configuration	Omitted	Omitted
19	Hub Configuration	Pass	Pass
20	MS/MS Pro/MS Pro HG Compliancy	Pass	Pass
21	LED Activity	Pass	Pass
22	Remote Wakeup	Pass	Pass
23	Media Identification	Pass	Pass
24	GPIO/LED Control	Pass	Pass
25	SD/MMC Clock Throttling	Pass	Pass
26	Mac OS Specific	OSX 10.5 ->	Pass

Testing Observations and Comments

Comments
Explanation of any marginal or failing results from the Test Suite Results Matrix above, along with any other comments concerning the results of testing:

Test Completion Dates

The test suites were completed for each operating system on the dates indicated below:

	Test Suite	Windows XP	Tester's Initials	Windows Vista	Tester's Initials
1	Installation	8/20/08	MW	8/20/08	MW
2	USBCV	8/20/08	MW	8/20/08	MW
3	Compact Flash / Microdrive				
4	Smart Media				
5	xD	8/21/08	JA	8/21/08	JA
6	SD/MMC	8/21/08	JA	8/21/08	JA
7	MS/MS Pro/MS Pro HG	8/25/08	NR	8/28/08	NR
8	Media ECC/CIS	8/22/08	NR	8/22/08	NR
9	Multiple Device	8/25/08	MW	8/22/08	MW
10	Surprise Removal	8/26/08	NR	8/26/08	NR
11	Load/Unload	8/21/08	MW	8/22/08	MW
12	Boot From USB	8/25/08	MW		
13	USB1.1	9/16/08	JA	9/16/08	JA
14	DTM	8/30/08	WB	8/30/08	WB
15	Bundled Software/Applications	8/30/08	WB	8/30/08	WB
16	DFU/Descriptor Update	8/28/08	NR	9/3/08	MW
17	C3	8/27/08	JA	8/28/08	JA
18	LUN Power Configuration				
19	Hub Configuration	8/26/08	NR	8/28/08	NR
20	MS/MS Pro/MS Pro HG Compliance	8/29/08	MW	8/29/08	MW
21	LED Activity	8/26/08	NR	8/26/08	NR
22	Remote Wakeup	10/1/08	JA	10/1/08	JA
23	Media Identification	8/25/08	WB	8/25/08	WB
24	GPIO/LED Control	8/25/08	WB	8/25/08	WB

25	SD/MMC Clock Throttling	8/25/08	WB	8/25/08	WB
26	Mac OS Specific	Mac OSX 10.5 ->		4/25/08	TN

Installation Test Suite

This test suite evaluates the installation procedures for the DUT. In order to pass this suite, the following conditions must be met:

1. The operating system correctly identifies all supported flash media devices on attach.
2. Under Windows XP and Vista, the OS automatically loads the native Windows Mass Storage Class driver.
3. All drivers load normally with no blue screens or system freezes before, during, or after they are loaded.
4. The system does not request or require a restart after the drivers have been loaded.
5. No devices appear in the device manager with yellow exclamation marks next to them (yellow banded.)
6. The device does not blue screen the host before, during, or after a system restart. After a system restart, the device is re-enumerated normally.
7. After installation, all device entries appear correctly in the device manager, showing the correct vendor, date, and version information.

Installation Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>Make sure there are no previous installations of the DUT on the host system</p> <p>Self-Powered Pre Plug—With no media inserted in any of the media slots, attach the USB cable to the host and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	
2	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—With no media inserted in any of the media slots, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	

Installation Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Smart Media (SM) card into the SM slot, and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	<p>SM Pass</p> <p>xD Pass</p>	<p>SM Pass</p> <p>xD Pass</p>	
4	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same SM card inserted in the SM slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To</p>	<p>SM Pass</p> <p>xD Pass</p>	<p>SM Pass</p> <p>xD Pass</p>	
5	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Compact Flash (CF) card into the CF slot, and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	<p>CF Pass</p> <p>MD Pass</p>	<p>CF Pass</p> <p>MD Pass</p>	
6	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same CF card inserted in the CF slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid</p>	<p>CF Pass</p> <p>MD Pass</p>	<p>CF Pass</p> <p>MD Pass</p>	

Installation Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
7	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Secure Digital (SD) card into the SD slot, and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	<p>SD Pass</p> <p>MMC Pass</p>	<p>SD Pass</p> <p>MMC Pass</p>	
8	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same SD card inserted in the SD slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To</p>	<p>SD Pass</p> <p>MMC Pass</p>	<p>SD Pass</p> <p>MMC Pass</p>	
9	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Memory Stick (MS) card into the MS slot, and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	
10	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same MS card inserted in the MS slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	

Installation Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
11	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert CF, MS, SM, and SD cards into their respective slots, and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	
12	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Leave the same flash media cards inserted in their slots, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid</p>	Pass	Pass	
13	<p>Eject and Remove—With media inserted in each slot, test the Right-Click eject functionality for each device. Check to see that no error message is displayed, and that the host reports no media present when trying to access it after eject.</p>	Pass	Pass	
14	<p>Repeat steps 11–13 with MD, MS Pro, xD, and MMC.</p>	Pass	Pass	

USB Command Verifier (USBCV) Test Suite

This test suite uses the USB Command Verifier Compliance Tool provided by USB.org to ensure that the DUT complies with Chapter 9 of the USB 2.0 specification. Download and install the latest version of this tool from <http://www.usb.org/developers/tools>. In order for the device to pass this suite it must successfully pass all Chapter 9 and MSC tests.

USB Command Verifier (USBCV) Test Suite			
#	Test Standard	Windows XP	Comments
1	Connect the DUT to the host, and insert low-capacity media into each active slot on the device.	Pass	
2	With the device connected to the host via a USB 2.0 hub, the device should pass all Chapter 9 tests of the Compliance Utility, with passing logs generated showing no failures. Save the .htm test output for inclusion with this test report.	Pass	
3	With the device connected to the host via a USB 2.0 hub, the device should pass all MSC tests of the Compliance Utility, with passing logs generated showing no failures. Save the .htm test output for inclusion with this test report.	Pass	
4	Repeat steps 2-3 with the device connected to the host via a full speed USB hub, which is connected to a USB 2.0 hub, which is then connected to the host.	Chapter 9 Pass MSC Pass	

Compact Flash / Microdrive Test Suite

This test suite evaluates the performance and function of the DUT with various Type I and II Compact Flash devices, including the Microdrive. All tests below are performed using a USB 2.0 host controller. Each device is checked to verify proper operation with the DUT firmware and drivers under normal and abnormal operating conditions. A DVD test disk is required for these tests. The test disk contains various files ranging in size, with an accompanying SFV file that contains a calculated checksum (CRC) for each file.

Compact Flash / Microdrive Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>CF Writes—Insert a 128MB CF card into the CF slot on the DUT board. Verify that the correct capacity is shown for the CF card.</p> <p>Open the DVD test disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the CF card. Transfer the files to the CF card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	- -	- -	
2	<p>CF Insert/Remove—Double click the DUT CF drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the CF card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times, verifying that the media insert and removal is detected correctly each time.</p>	- -	- -	

Compact Flash / Microdrive Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
3	CF Reads —Using the same CF card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	- -	- -	
4	CF Write, Insert/Remove, Read Repeat tests 1–3 for the following devices: 256MB CF, 512MB CF, 1GB CF, and 2GB CF. Repeat with 3 different Microdrive media.	256MB CF - - 512MB CF - - 1GB CF - - 2GB CF - - MD's - -	256MB CF - - 512MB CF - - 1GB CF - - 2GB CF - - MD's - -	

Smart Media Test Suite

This test suite evaluates the performance and function of the DUT with various density Smart Media flash memory cards. All tests below are performed using a USB 2.0 host controller. A DVD test disk is required for these tests. The test disk contains various files ranging in size, with an accompanying SFV file that contains a calculated checksum (CRC) for each file.

Smart Media Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>SM Writes—Insert an 32MB SM card into the SM slot on the DUT board. Verify that the correct capacity is shown for the SM card.</p> <p>Open the DVD test disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the SM card. Transfer the files to the SM card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	- -	- -	
2	<p>SM Insert/Remove—Double click the DUT SM drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the SM card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	- -	- -	

Smart Media Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>SM Reads—Using the same SM card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.</p>	- -	- -	
4	<p>SM Write, Insert/Remove, Read</p> <p>Repeat tests 1 through 3 for the following media: 64MB SM, 128MB SM, 256MB SM.</p> <p>Note: If there is not a 256MB SM available, an xD to SM adapter with a 256MB xD card inserted may be used.</p>	<p>64MB SM - -</p> <p>128MB SM - -</p> <p>256MB SM - -</p>	<p>64MB SM - -</p> <p>128MB SM - -</p> <p>256MB SM - -</p>	
5	<p>SM MPEG Playback</p> <p>Insert a 64MB SM card into the DUT. From Windows Explorer, perform a Full Format of the media. Copy a MPEG video file that is larger than 15MB to the SM card. Once copy has completed, unplug device. Reattach the device and play the file that was copied to the card. Verify that the file is played back properly. The file should not skip or freeze.</p>	- -	- -	
6	<p>SM Write Protect</p> <p>Enable the write protect on a 32MB SM card, and insert it into the SM slot on the DUT. Check to see that the media is detected properly, and then attempt to copy a file from the host to the SM card. The OS should report that the copy could not be performed.</p> <p>Attempt to format the SM card. The OS should report that the format could not be completed.</p>	- -	- -	

xD Test Suite

This test suite evaluates the performance and function of the DUT with various density xD flash memory cards. All tests below are performed using a USB 2.0 host controller. A DVD test disk is required for these tests. The test disk contains various files ranging in size, with an accompanying SFV file that contains a calculated checksum (CRC) for each file.

xD Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>xD Writes—Insert a 64MB xD card into the xD slot on the DUT board. Verify that the correct capacity is shown for the xD card.</p> <p>Open the DVD test disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the xD card. Transfer the files to the xD card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	
2	<p>xD Insert/Remove—Double click the DUT SM drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the xD card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	
3	<p>xD Reads—Using the same xD card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.</p>	Pass	Pass	
4	<p>xD Write, Insert/Remove, Read</p> <p>Repeat tests 1–3 for the following media: 128MB xD, 256MB xD, 512MB xD.</p>	<p>128MB xD Pass</p> <p>256MB xD Pass</p>	<p>128MB xD Pass</p> <p>256MB xD Pass</p>	

xD Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
5	Repeat steps 1–3 using 3 different Type “H” xD cards.	Pass	Pass	
6	Repeat steps 1–3 using 3 different Type “M” xD cards.	Pass	Pass	

Secure Digital / MultiMedia Card Test Suite

This test suite evaluates the performance and function of the DUT with various density Secure Digital and Multimedia Card flash memory. All tests below are performed using a USB 2.0 host controller. A DVD test disk is required for these tests. The test disk contains various files ranging in size, with an accompanying SFV file that contains a calculated checksum (CRC) for each file.

Secure Digital / MultiMedia Card Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>SD Writes—Turn off the write protection switch on a 32MB SD card, and insert the card into the SD slot on the DUT board. Verify that the correct capacity is shown for the SD card.</p> <p>Open the DVD test disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the SD card. Transfer the files to the SD card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	
2	<p>SD Insert/Remove—Double click the DUT SD drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the SD card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	

Secure Digital / MultiMedia Card Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	SD Reads —Using the same SD card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	Pass	Pass	
4	SD/MMC Write, Insert/Remove, Read Repeat tests 1 through 3 for the following media: 64MB SD, 128MB SD, 256MB SD, 512MB SD, 1GB SD, 2GB SD, 4GB SD, 16MB MMC, 32MB MMC, 64MB MMC, 128MB MMC, 256MB MMC, SD-HC, and MMC 4.2.	128MB SD Pass 1GB SD Pass 32MB MMC Pass 128MB MMC Pass 256MB MMC Pass SD-HC Pass MMC 4.2	256MB SD Pass 2GB SD Pass 16MB MMC Pass 64MB MMC Pass 256MB MMC Pass SD-HC Pass MMC 4.2	
5	SD Write Protect Enable the write protect switch on a 32MB SD card, and insert it into the SD slot on the DUT. Check to see that the media is detected properly, and then attempt to copy a file from the host to the SD card. The OS should report that the copy could not be performed. Attempt to format the SD card. The OS should report that the format could not be completed.	SD Pass	SD Pass	

Secure Digital / MultiMedia Card Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
6	<p>HS-SD Format</p> <p>Turn off the write protect switch on an HS-SD card. Insert the HS-SD card into the SD slot of the test device. Verify that the card is recognized properly and the correct capacity is shown.</p> <p>Perform a format on the HS-SD card. Verify that the format completes.</p>	HS-SD Pass	HS-SD Pass	
7	<p>HS-SD Writes—Open the test files disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the HS-SD card. Transfer the files to the HS-SD card.</p> <p>Once the files have been written, eject the media and reinsert it to clear the cache. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	HS-SD Pass	HS-SD Pass	
8	<p>HS-SD Insert/Remove—Remove the HS-SD card from the test device. Double click the DUT SD drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the HS-SD card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times, verifying that the media insert and removal is detected correctly each time.</p>	HS-SD Pass	HS-SD Pass	

Secure Digital / MultiMedia Card Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
9	<p>HS-SD Reads—Using the same HS-SD card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.</p>	HS-SD Pass	HS-SD Pass	
10	<p>HS-SD Write Protect</p> <p>Enable the write protect switch on an HS-SD card, and insert it into the SD slot on the DUT. Check to see that the media is detected properly, and then attempt to copy a file from the host to the HS-SD card. The OS should report that the copy could not be performed.</p> <p>Attempt to format the HS-SD card. The OS should report that the format could not be completed.</p>	HS-SD Pass	HS-SD Pass	
11	<p>HS-SD Read/Write Speeds</p> <p>Ensure that the test device is operating at USB2.0 speeds.</p> <p>Use HDBench v3.40 to test the read/write speed for a formatted HS-SD card. Record the results in the comments section.</p> <p>Use HDBench v3.40 to test the read/write speed for a formatted SD card (not HS). Record the results in the comments section.</p> <p>Verify that the HS-SD card results in much faster read/write speeds than the non-high speed SD card.</p> <p>Note: The expected speeds for these cards when using brand new media at 2.0 speeds are</p>	HS-SD Pass	HS-SD Pass	<p>HS-SD Read = 14148</p> <p>HS-SD Write = 4096</p> <p>SD Read = 12190</p> <p>SD Write = 1629</p>

Secure Digital / MultiMedia Card Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
12	<p>HS-MMC Format</p> <p>Insert an HS-MMC card into the SD/MMC slot of the test device. Verify that the card is recognized properly and the correct capacity is shown.</p> <p>Perform a format on the HS-MMC card. Verify that the format completes.</p>	HS-MMC Pass	HS-MMC Pass	
13	<p>HS-MMC Writes—Open the test files disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the HS-MMC card. Transfer the files to the HS-MMC card.</p> <p>Once the files have been written, eject the media and reinsert it to clear the cache. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	HS-MMC Pass	HS-MMC Pass	
14	<p>HS-MMC Insert/Remove— Remove the HS-MMC card from the test device. Double click the DUT MMC drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the HS-MMC card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	HS-MMC Pass	HS-MMC Pass	

Secure Digital / MultiMedia Card Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
15	<p>HS-MMC Reads—Using the same HS-MMC card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.</p>	HS-MMC Pass	HS-MMC Pass	
16	<p>HS-MMC Read/Write Speeds</p> <p>Ensure that the test device is operating at USB2.0 speeds.</p> <p>Use HDBench v3.40 to test the read/write speed for a formatted HS-MMC card. Record the results in the comments section.</p> <p>Use HDBench v3.40 to test the read/write speed for a formatted MMC card (not HS). Record the results in the comments section.</p> <p>Verify that the HS-MMC card results in much faster read/write speeds than the non-high speed MMC card (approximately double the speed).</p>	HS-MMC Pass	HS-MMC Pass	<p>HS-MMC Read = 11393</p> <p>HS-MMC Write = 7488</p> <p>MMC Read = 1083</p> <p>MMC Write = 282</p>

Memory Stick / Memory Stick Pro Test Suite

This test suite evaluates the performance and function of the DUT with various capacity Memory Stick and Memory Stick Pro flash memory cards. All tests below are performed using a USB 2.0 host controller. A DVD test disk is required for these tests. The test disk contains various files ranging in size, with an accompanying SFV file that contains a calculated checksum (CRC) for each file.

Memory Stick / Memory Stick Pro Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>MS Writes—Turn off the write protection switch on a 16MB MS card, and insert the card into the MS slot on the DUT board. Verify that the correct capacity is shown for the MS card.</p> <p>Open the DVD test disk in Windows Explorer and sort the test files by size in ascending order. Starting with the smallest size file, select enough of the test files to fill the MS card. Transfer the files to the MS card.</p> <p>Once the files have been written, eject the media and place it in a 3rd party flash reader. Use WinSFV to check the CRC of each file to ensure that the data was not corrupted during the transfer.</p>	Pass	Pass	
2	<p>MS Insert/Remove—Double click the DUT MS drive icon in Windows Explorer. Verify that the OS reports no media present. Reinsert the MS card and check to see that the OS recognizes that a card was inserted. Verify that the contents of the card can be read by transferring a file to the host.</p> <p>Repeat this procedure three times verifying that the media insert and removal is detected correctly each time.</p>	Pass	Pass	

Memory Stick / Memory Stick Pro Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	MS Reads —Using the same MS card, transfer all of the files that were previously written to the card back to the host. Once the read is complete, CRC check the files on the host to ensure there was no corruption of the data during transfer.	Pass	Pass	
4	MS Write, Insert/Remove, Read Repeat tests 1–3 for the following media: 8MB MS, 64MB MS, 128MB MS, 256MB MS, 256MB MS Pro, 512MB MS Pro, 1GB MS Pro.	8MB MS Pass 32MB MS Pass 128MB MS Pass 256MB MS Pro Pass 512MB MS Pro Pass	32MB MS Pass 64MB MS Pass 256MB MS Pass 256MB MS Pro Pass 1GB MS Pro Pass	
5	MS Write Protect Enable the write protect switch on a 32MB MS card, and insert it into the MS slot on the DUT. Check to see that the media is detected properly, and then attempt to copy a file from the host to the card. The OS should report that the copy could not be performed.	Pass	Pass	

Memory Stick / Memory Stick Pro Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
6	MS Pro Write Protect Enable the write protect switch on a 512MB MS Pro card, and insert it into the MS slot on the DUT. Check to see that the media is detected properly, and then attempt to copy a file from the host to the card. The OS should report that the copy could not be performed.	Pass	Pass	
7	Sony Format Utility (MS) Install the Sony Format Utility. Insert MS media. Open the Sony Format Utility and format the MS.	Pass	Pass	
8	Sony Format Utility (MS Pro) Repeat step 7 using MS Pro media.	Pass	Pass	

Memory Stick / Memory Stick Pro Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
9	MS Suspend/Write Test Insert a 128MB MS. Copy 4 25MB files to the stick. Suspend the host while the copy process is in progress. Wait 30 seconds and wake the host up. Repeat this step 3–4 times during the copy. When the process has completed remove/reinsert the media (wait 3–5 seconds before reinserting) and CRC the files. Verify there has been no file corruption.	Pass	Pass	
10	MS Pro Suspend/Write Test Repeat step 9 using MS Pro media. The number of files copied may have to be increased in order to suspend the host 3–4 times.	Pass	Pass	

Media ECC / CIS Test Suite

This test verifies that the DUT correctly handles software ECC errors, as well as Smart Media CIS Checking. Only perform this test for Memory Stick, Smart Media, and xD.

The Memory Stick ECC tests require the MS1 ECC (1 bit) and MS4-ECC (4 bit) test sticks. All files needed for the ECC tests are on these particular sticks. The Smart Media and xD ECC and CIS tests require SM and xD media with a 1-bit and 2-bit ECC error, and SM and xD media with a corrupt CIS block.

Media ECC / CIS Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	Memory Stick ECC test Insert the "MS1 ECC" MS card into the DUT. Connect the device to the computer via a 2.0 host controller. Verify that the card contents can be read properly. Open the 1BitDataAreaAdversity.jpg file. Verify it opens and is displayed correctly. Close the file and open the pic2.jpg file. Verify it opens and is displayed correctly.	Pass	Pass	
2	Open the 1BitExtraAreaDelusions.jpg file. Verify it opens and is displayed correctly. Close the file and open the pic3.jpg file. Verify it opens and is displayed correctly.	Pass	Pass	
3	Right click on the 2BitDataAreaMistakes.jpg file and select "copy." Attempt to paste the file to any folder or the desktop. Verify the OS reports a message that the action cannot be completed. Close out the error message. Open the pic4.jpg file. Verify it opens and is displayed correctly.	Pass	Pass	

Media ECC / CIS Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
4	<p>Right click on the 2BitExtraAreaProcrast.jpg file and select "copy." Attempt to paste the file to any folder or the desktop. Verify the OS reports a message that the action cannot be completed. Close out the error message.</p> <p>Open the pic5.jpg file. Verify it opens and is displayed correctly.</p>	Pass	Pass	
5	<p>Repeat steps 1–4 using a 1.1 host controller to connect the DUT to the computer.</p>	Pass	Pass	
6	<p>Repeat steps 1–5 using the "MS4 ECC" MS card.</p>	Pass	Pass	
7	<p>Smart Media ECC test</p> <p>Insert an SM card with a 1-bit ECC error on it into the DUT. Connect the DUT to the computer via a 2.0 host controller. Verify that the card contents can be read properly.</p>	Pass	Pass	

Media ECC / CIS Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
8	Insert an SM card with a 2-bit ECC error on it into the DUT. Verify that the card contents cannot be read properly.	Pass	Pass	
9	Repeat steps 7–8 using a 1.1 host controller to connect the DUT to the computer.	Pass	Pass	
10	<p>Smart Media CIS Check</p> <p>Check the setting for “Don’t Perform (Smart Media) CIS checking” under the Configuration tab in the USBDM. This will disable the CIS checking required by the SM spec.</p> <p>Insert an SM card with a corrupt CIS block into the DUT device. Connect the DUT to the computer via a 2.0 host controller. Verify that the card contents can be read properly.</p>	Pass	Pass	
11	<p>Uncheck the setting “Don’t Perform (Smart Media) CIS checking” under the Configuration tab in the USBDM. This will enable the CIS checking required by the SM spec.</p> <p>Insert an SM card with a corrupt CIS block into the DUT. Connect the DUT to the computer via a 2.0 host controller. Verify that the card contents cannot be read.</p>	Pass	Pass	

Media ECC / CIS Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
12	xD ECC test Insert an xD card with a 1-bit ECC error on it into the DUT. Connect the DUT to the computer via a 2.0 host controller. Verify that the card contents can be read properly.	Pass	Pass	
13	Insert an xD card with a 2-bit ECC error on it into the DUT. Verify that the card contents cannot be read properly.	Pass	Pass	
14	Repeat steps 12–13 using a 1.1 host controller to connect the DUT to the computer.	Pass	Pass	
15	xD CIS Check Check the setting for “Don’t Perform (Smart Media) CIS checking” under the Configuration tab in the USBDM. This will disable the CIS checking required by the SM spec. Insert an xD card with a corrupt CIS block into the DUT. Connect the DUT to the computer via a 2.0 host controller. Verify that the card contents can be read properly.	Pass	Pass	

Media ECC / CIS Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
16	<p>Uncheck the setting for "Don't Perform (Smart Media) CIS checking" under the Configuration tab in the USBDM. This will enable the CIS checking required by the SM spec.</p> <p>Insert an xD card with a corrupt CIS block into the DUT. Connect the DUT to the computer via a 2.0 host controller. Verify that the card contents cannot be read.</p>	Pass	Pass	

Multiple Device Test Suite

This test suite evaluates the performance and function of multiple DUTs attached to a single host. All tests below are performed using a USB 2.0 host controller. The focus of this test is to ensure interoperability between all devices when more than one DUT is running on the same host.

Multiple Device Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>Host to B1, B2—Attach two DUT boards to the host via the same host controller. Verify that both boards enumerate properly.</p> <p>Insert CF, MS, SM, and SD cards into both boards. Verify that you can read from and write to all cards individually. Simultaneously transfer several large files from the host to the CF cards on both boards. Verify that the transfers complete normally. Repeat this transfer for SM, MS and SD.</p> <p>Also test writing to different cards on each board simultaneously (e.g. MS on board 1 and SD on board 2).</p>	Pass	Pass	
2	<p>B1, B2 to Host—Using the same boards and test setup as step #1 above, simultaneously transfer a large file from each CF card to the host. Verify that the transfer completes normally. Repeat this transfer for MS, SM and SD.</p> <p>Also test reading from different cards on each board simultaneously (e.g. SM on board 1 and CF on board 2).</p>	Pass	Pass	
3	<p>B1 to B2—Again using the same boards and test setup as step #1, transfer a series of test files (large and small) from the CF card on board 1 to the CF card on board 2. Repeat this transfer for MS, SM, and SD.</p> <p>Also test writing to different cards on board 2 (e.g. SM on board 1 to CF on board 2).</p>	Pass	Pass	

Multiple Device Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
4	<p>B1 to Host / Host to B2—Using the same test setup, transfer a test file from the CF card on board 1 to the host, while at the same time transferring a separate file from the host to the CF card on board 2. Repeat this transfer for MS, SM, and SD.</p> <p>Also test reading from and writing to different cards on each board (e.g. SM on board 1 to host, host to CF on board 2).</p>	Pass	Pass	
5	<p>All Media types—Repeat steps 1–4 of this test suite using MD, MS Pro, xD, and MMC.</p>	Pass	Pass	

Surprise Removal Test Suite

This test suite evaluates the performance and function of the DUT with media and USB cable surprise removals. All tests below are performed using a USB 2.0 host controller. Each device is checked to verify proper operation with the DUT firmware and drivers under normal and abnormal operating conditions. A DVD test disk is required for these tests. The test disk contains various files ranging in size, with an accompanying SFV file that contains a calculated checksum (CRC) for each file.

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>CF / MD Surprise Removal (USB)</p> <p>Write—Insert a 512MB CF card and copy a large (~50MB) test file from the host to the CF card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the CF can be read from and written to. Complete the transfer of the test file to the CF card.</p> <p>Read—Using the same CF card, copy the test file from the CF card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the CF can be read from and written to. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
2	<p>CF / MD Surprise Removal (Media)</p> <p>Write—Using the same 512MB CF card, copy a large (~50MB) test file from the host to the CF card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the CF card.</p> <p>Read—Using the same CF card, copy the test file from the CF card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	CF / MD Surprise Removal (Format) Using the same CF card, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly. Attempt to format the media again. The format should complete normally.	Pass	Pass	
4	Other CF / MD Media Repeat steps 1–3 using a 64MB CF card and 4 GB MD.	64MB CF Pass 4GB MD Pass	64MB CF Pass 4GB MD Pass	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
5	<p>SM / xD Surprise Removal (USB)</p> <p>Write—Insert a 64MB SM card and copy a large (~50MB) test file from the host to the SM card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the SM can be read from and written to. Complete the transfer of the test file to the SM card.</p> <p>Read—Using the same SM card, copy the test file from the SM card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the SM can be read from and written to. Complete the transfer of the file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
6	<p>SM / xD Surprise Removal (Media)</p> <p>Write—Using the same 64MB SM card, copy a large (~50MB) test file from the host to the SM card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the SM card.</p> <p>Read—Using the same SM card, copy the test file from the SM card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
7	SM / xD Surprise Removal (Format) Using the same SM card, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly. Attempt to format the media again. The format should complete normally.	Pass	Pass	
8	Other SM / xD Media Repeat steps 5–7 using a 128MB SM card and 256MB xD.	128MB SM Pass 256MB xD Pass	128MB SM Pass 256MB xD Pass	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
9	<p>SD / MMC Surprise Removal (USB)</p> <p>Write—Insert a 64MB SD card and copy a large (~50MB) test file from the host to the SD card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the SD can be read from and written to. Complete the transfer of the test file to the SD card.</p> <p>Read—Using the same SD card, copy the test file from the SD card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the SD can be read from and written to. Complete the transfer of the file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
10	<p>SD / MMC Surprise Removal (Media)</p> <p>Write—Using the same 64MB SD card, copy a large (~50MB) test file from the host to the SD card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the SD card.</p> <p>Read—Using the same SD card, copy the test file from the SD card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
11	SD / MMC Surprise Removal (Format) Using the same SD, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly. Attempt to format the media again. The format should complete normally.	Pass	Pass	
12	Other SD / MMC Media Repeat steps 9–11 using a 256MB SD and 64MB MMC.	256MB SD Pass 64MB MMC Pass	256MB SD Pass 64MB MMC Pass	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
13	<p>MS / MS Pro Surprise Removal (USB)</p> <p>Write—Insert a 64MB MS card and copy a large (~50MB) test file from the host to the MS card. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the MS can be read from and written to. Complete the transfer of the test file to the MS card.</p> <p>Read—Using the same MS card, copy the test file from the MS card to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the MS can be read from and written to. Complete the transfer of the file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	
14	<p>MS / MS Pro Surprise Removal (Media)</p> <p>Write—Using the same 64MB MS card, copy a large (~50MB) test file from the host to the MS card. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the MS card.</p> <p>Read—Using the same MS card, copy the test file from the MS card to the host. Once the transfer reaches approximately 50% completion, remove the media. Wait 3–5 seconds and close any open warning dialogs. Reinsert the media and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the host.</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
15	MS / MS Pro Surprise Removal (Format) Using the same MS card, from Windows Explorer, perform a Full Format of the media. Once the format reaches approximately 20% completion, unplug the USB cable. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly. Attempt to format the media again. The format should complete normally.	Pass	Pass	
16	Other MS / MS Pro Media Repeat steps 13–15 using a 128MB MS and 512MB MS Pro.	128MB MS Pass 512MB MS Pro Pass	128MB MS Pass 512MB MS Pro Pass	

Surprise Removal Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
17	<p>Other Media Surprise Removal</p> <p>Write—Insert a miniSD card into the DUT. Begin copying a 25MB file from the host to the media. Once the transfer reaches approximately 50% completion, remove only the SD media from the DUT, leaving the adapter in place. Wait 3–5 seconds and close any open warning dialogs.</p> <p>Remove the adapter from the DUT and reinsert the media into the adapter. Insert the miniSD into the DUT and check to see that the OS properly recognizes the card, and can read from and write to it. Complete the transfer of the test file to the miniSD card.</p> <p>Read—Insert the same miniSD card into the DUT. Begin copying a 25MB file from the media to the host. Once the transfer reaches approximately 50% completion, remove only the SD media from the DUT, leaving the</p>	<p>Mini SD Pass</p> <p>MS duo Pass</p> <p>MS Pro duo Pass</p> <p>xD to SM Pass</p> <p>MS to CF - -</p>	<p>Mini SD Pass</p> <p>MS duo Pass</p> <p>MS Pro duo Pass</p> <p>xD to SM Pass</p> <p>MS to CF - -</p>	
18	<p>USB Cable Removal From Host End</p> <p>Attach the DUT to a host computer using a 15ft. USB cable. Fill all slots of the board with media.</p> <p>Write—Copy a large (~50MB) test file from the host to one of the pieces of media in the DUT. Once the transfer reaches approximately 50% completion, unplug the USB cable from the host end. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates properly, and the media can be read from and written to. Complete the transfer of the test file.</p> <p>Read—Using the same media card, copy the test file from the DUT to the host. Once the transfer reaches approximately 50% completion, unplug the USB cable from the host end. Wait 3–5 seconds and close any open warning dialogs. Reattach the USB cable and check to see that the device re-enumerates</p>	<p>Write Pass</p> <p>Read Pass</p>	<p>Write Pass</p> <p>Read Pass</p>	

Load / Unload Test Suite

This test suite evaluates the function of the DUT under both normal and abnormal conditions, which cause the device to suspend, resume, enumerate, or detach from the host. All tests below are performed using a self-powered DUT attached to a USB 2.0 host controller unless otherwise noted.

Load / Unload Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	Remove all media from DUT device. After disconnecting the USB cable of a properly enumerated DUT device, all entries in the Device Manager associated with that device disappear. The device does not blue screen, freeze, or otherwise adversely affect the host in any way.	Pass	Pass	
2	Upon reattaching the USB cable, the entries in the Device Manager reappear, and the device functions normally.	Pass	Pass	
3	After turning off power to the DUT, all entries in the Device Manager associated with the device disappear. The device does not blue screen, freeze, or otherwise adversely affect the host in any way.	Pass	Pass	
4	After turning power to the DUT back on, the entries in the Device Manager reappear, and the device functions normally.	Pass	Pass	
5	Upon rebooting the host with the DUT enumerated, it does not blue screen, freeze, or otherwise adversely affect the host in any way. All entries associated with the DUT device appear in the Device Manager and are not yellow banded.	Pass	Pass	

Load / Unload Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
6	Suspend the host and wait one minute. Resume the host and verify the device is enumerated and operates properly.	Pass	Pass	
7	Attach a 2 nd DUT device to the same host and repeat step 6. Verify both boards re-enumerate and function properly after being resumed. Remove the 2 nd device.	Pass	Pass	
8	<p>Insert a CF card containing data into the DUT. Verify that the card can be read.</p> <p>Suspend the host and wait one minute. Resume the host and verify the device is enumerated and operates properly. Check to see that the CF card can be read from and written to.</p> <p>Repeat with MD, SD, HS-SD, MMC, HS-MMC, SM, xD, MS, and MS Pro.</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p> <p>SD</p> <p>Pass</p> <p>HS-SD</p> <p>Pass</p> <p>MMC</p> <p>Pass</p> <p>HS-MMC</p> <p>Pass</p> <p>SM</p> <p>Pass</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p> <p>SD</p> <p>Pass</p> <p>HS-SD</p> <p>Pass</p> <p>MMC</p> <p>Pass</p> <p>HS-MMC</p> <p>Pass</p> <p>SM</p> <p>Pass</p>	
9	<p>Insert a CF card containing data into the DUT.</p> <p>Restart the host. Verify that the CF card is recognized and can be read to/written from.</p> <p>Repeat with MD, SD, HS-SD, MMC, HS-MMC, SM, xD, MS, and MS Pro.</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p> <p>SD</p> <p>Pass</p> <p>HS-SD</p> <p>-</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p> <p>SD</p> <p>Pass</p> <p>HS-SD</p> <p>-</p>	

Load / Unload Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
10	<p>Shut down the host. Start up the host. Verify that the CF card is recognized and can be read to/written from.</p> <p>Repeat with MD, SD, HS-SD, MMC, HS-MMC, SM, xD, MS, and MS Pro.</p>	<p>CF - -</p> <p>MD - -</p> <p>SD Pass</p> <p>HS-SD Pass</p>	<p>CF - -</p> <p>MD - -</p> <p>SD Pass</p> <p>HS-SD Pass</p>	
11	<p>Insert CF, SM, SD, and MS media containing data into the DUT. Verify that all cards can be read.</p> <p>Suspend the host and wait one minute. Resume the host and verify the device is enumerated and operates properly. Check to see that all cards can be read from and written to.</p>	Pass	Pass	
12	<p>Using the same set of media, verify that all cards can be read.</p> <p>Restart the host. Verify the device is enumerated and operates properly. Check to see that all cards can be read from and written to.</p>	Pass	Pass	
13	<p>Suspend the host and wait one minute. While host is suspended remove some of the media from the DUT. Resume the host and verify the device is enumerated and operates properly.</p> <p>Check to see that the flash media cards not removed during suspend can be read from and written to. Verify that the drives for media removed during suspend cannot be accessed.</p>	Pass	Pass	
14	<p>Remove all of the flash media cards from the DUT and suspend the host. While the host is suspended, reinsert the CF, SM, SD, and MS cards and then resume the host.</p> <p>Verify that all cards are recognized, and can be read from and written to.</p>	Pass	Pass	

Load / Unload Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
15	<p>Shut down the host. Remove some of the media from the DUT while the host is shut down. Start up the host and verify the device is enumerated and operates properly.</p> <p>Check to see that the flash media cards not removed while the host was shut down can be read from and written to. Verify that the drives for media that was removed while the host was shut down cannot be accessed.</p>	Pass	Pass	
16	<p>Remove all of the flash media cards from the DUT. Verify that board is properly enumerated.</p> <p>Shut down the host. While host is shut down, insert the same CF, SM, SD, and MS into the DUT. Start up the host.</p> <p>Verify that all cards are recognized, and can be read from and written to.</p>	Pass	Pass	
17	<p>Using the same test setup as above, with all cards inserted in the DUT and properly recognized, unplug the USB cable, wait 2–5 seconds and plug the cable back in. Verify that the device enumerates properly.</p> <p>Repeat this test for 20 iterations. Verify the device enumerates correctly each time and that the media is properly recognized.</p>	Pass	Pass	
18	<p>Repeat steps 11–17 using MD, xD, MMC, and MS Pro.</p>	Pass	Pass	

Load / Unload Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
19	<p>Self-Powered Reboot Endurance</p> <p>Using the Burn-In Test Pro utility, set a host PC to continually reboot with a self-powered DUT attached. Allow the test to run overnight. In the morning, check to see that the test is still running.</p> <p>Halt the test and verify that the DUT is enumerated and operating normally.</p>	Pass	Pass	

Bootng from USB Test Suite

This test suite evaluates the function of the DUT booting from media. All tests below are performed using a USB 2.0 host controller. This test needs to be performed on a machine that supports booting from a USB device.

Bootng From USB Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>Boot from CF / MD</p> <p>Configure the DUT to have a single active LUN for Compact Flash.</p> <p>Create a Win98 startup boot disk on a CF card.</p> <p>Insert CF card with Win98 startup boot disk into test device.</p> <p>Connect test device to test machine. Set up the BIOS to choose USB device as boot option.</p> <p>Restart test machine.</p> <p>Verify that test machine boots to CF card in test device.</p> <p>Repeat this test with MD.</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p>	
2	<p>Boot from SM / xD</p> <p>Configure the DUT to have a single active LUN for Smart Media.</p> <p>Create a Win98 startup boot disk on an SM card.</p> <p>Insert SM card with Win98 startup boot disk into test device.</p> <p>Connect test device to test machine. Set up BIOS to choose USB device as boot option.</p> <p>Restart test machine.</p> <p>Verify that test machine boots to SM card in test device.</p> <p>Repeat this test with xD.</p>	<p>SM</p> <p>- -</p> <p>xD Pass</p>	<p>SM</p> <p>- -</p> <p>xD Pass</p>	

Booting From USB Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Boot from SD / MMC</p> <p>Configure the DUT to have a single active LUN for Secure Digital.</p> <p>Create a Win98 startup boot disk on an SD card.</p> <p>Insert SD card with Win98 startup boot disk into test device.</p> <p>Connect test device to test machine. Set up BIOS to choose USB device as boot option.</p> <p>Restart test machine.</p> <p>Verify that test machine boots to SD card in test device.</p> <p>Repeat this test with MMC.</p>	<p>SD Pass</p> <p>MMC Pass</p>	<p>SD Pass</p> <p>MMC Pass</p>	
4	<p>Boot from MS / MS Pro</p> <p>Configure the DUT to have a single active LUN for Memory Stick.</p> <p>Create a Win98 startup boot disk on an MS card.</p> <p>Insert MS card with Win98 startup boot disk into test device.</p> <p>Connect test device to test machine. Set up BIOS to choose USB device as boot option.</p> <p>Restart test machine.</p> <p>Verify that test machine boots to MS card in test device.</p> <p>Repeat this test with MS Pro.</p>	<p>MS Pass</p> <p>MS PRO Pass</p>	<p>MS Pass</p> <p>MS PRO Pass</p>	

USB 1.1 Test Suite

This test suite evaluates the performance and function of the DUT while attached to a USB 1.1 host controller. All tests below are performed using a USB 1.1 host controller, unless specified otherwise.

USB 1.1 Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>Make sure there are no previous installations of the DUT on the host system.</p> <p>Self-Powered Pre Plug—With no media inserted in any of the media slots, attach the USB cable to the host and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	
2	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Again, with no media inserted in any of the media slots, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p>	Pass	Pass	

USB 1.1 Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Smart Media (SM) card into the SM slot and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using xD.</p>	<p>SM Pass</p> <p>xD Pass</p>	<p>SM Pass</p> <p>xD Pass</p>	
4	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same SM card inserted in the SM slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SM card can be read from and written to by transferring a small file from the host to the SM card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using xD.</p>	<p>SM - -</p> <p>xD Pass</p>	<p>SM - -</p> <p>xD Pass</p>	
5	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Compact Flash (CF) card into the CF slot and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MD.</p>	<p>CF - -</p> <p>MD - -</p>	<p>CF - -</p> <p>MD - -</p>	

USB 1.1 Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
6	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same CF card inserted in the CF slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the CF card can be read from and written to by transferring a small file from the host to the CF card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MD.</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p>	
7	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Secure Digital (SD) card into the SD slot and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MMC.</p>	<p>SD Pass</p> <p>MMC Pass</p>	<p>SD Pass</p> <p>MMC Pass</p>	
8	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same SD card inserted in the SD slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the SD card can be read from and written to by transferring a small file from the host to the SD card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MMC.</p>	<p>SD Pass</p> <p>MMC Pass</p>	<p>SD Pass</p> <p>MMC Pass</p>	

USB 1.1 Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
9	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert a Memory Stick (MS) card into the MS slot and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MS Pro.</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	
10	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Using the same MS card inserted in the MS slot, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that the MS card can be read from and written to by transferring a small file from the host to the MS card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p> <p>Repeat this test using MS Pro.</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	
11	<p>Uninstall the DUT hardware entries from the Device Manager and power off the device.</p> <p>Self-Powered Pre Plug—Insert CF, SM, SD, and MS cards into their respective slots and power up the board. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	<p>Pass</p>	<p>Pass</p>	

USB 1.1 Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
12	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Self-Powered Post Plug—Leave the same flash media cards inserted in their slots, power up the board, wait a few seconds and then plug the USB cable into the host. Check to see that the device enumerates properly, the correct drivers are loaded, and a drive icon appears for each LUN supported in the firmware.</p> <p>Check to see that all of the cards can be read from and written to by transferring a small file from the host to each card and back. (To avoid caching of the data, hot plug the device between the read and write.)</p>	Pass	Pass	
13	<p>Remove the CF, MS, SM, and SD cards from the device.</p> <p>Repeat steps 11–12 using MD, MS Pro, xD, and MMC.</p>	Pass	Pass	
14	<p>Surprise Removal Write (USB)—Copy one large file from the host to a CF card. Once the transfer has reached 20% complete, disconnect the USB cable and wait 3–5 seconds. Close any warning dialog boxes and reattach the USB cable. Verify that the device re-enumerates and the card can be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	Pass	Pass	

USB 1.1 Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
15	<p>Surprise Removal Read (USB)—Copy one large file from a CF card to the host. Once the transfer has reached 20% complete, disconnect the USB cable and wait 3–5 seconds. Close any warning dialog boxes and reattach the USB cable. Verify that the device re-enumerates and the card can be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	Pass	Pass	
16	<p>Surprise Removal Write (Media)—Copy one large file from the host to a CF card. Once the transfer has reached 20% complete, remove the CF media and wait 3–5 seconds. Close any warning dialog boxes and then reinsert the CF media. Wait a few seconds for the card to be recognized and then verify it can be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	Pass	Pass	
17	<p>Surprise Removal Read (Media)—Copy one large file from a CF card to the host. Once the transfer has reached 20% complete, remove the CF media and wait 3–5 seconds. Close any warning dialog boxes and then reinsert the CF media. Wait a few seconds for the card to be recognized and then verify it can be read from and written to.</p> <p>Repeat this procedure using several small files (~1 to 10kb) instead of one large file.</p>	Pass	Pass	

USB 1.1 Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
18	Repeat steps 14–17 using MD, SM, xD, SD, MMC, MS, and MS Pro.	<p>MD</p> <p>- -</p> <p>SM</p> <p>- -</p> <p>xD Pass</p> <p>SD Pass</p> <p>MMC Pass</p> <p>MS Pass</p>	<p>MD</p> <p>- -</p> <p>SM</p> <p>- -</p> <p>xD Pass</p> <p>SD Pass</p> <p>MMC Pass</p> <p>MS Pass</p>	

Driver Test Manager (DTM) Test Suite

This test suite checks to ensure that the DUT is able to pass the Driver Test Manager (DTM) certification testing. All tests below are performed in a single LUN configuration using the latest DTM available from Microsoft.

DTM Test Suite				
#	DTM Test	Windows XP	Windows Vista	Comments
Driver Reliability				
1	Common Scenario Stress with IO	Pass	Pass	
2	Device Path Exerciser	Pass	Pass	
3	Disable Enable with IO	Pass	Pass	
4	Plug and Play Driver Test	Pass	Pass	
5	Prefast for Drivers Test	Pass	Pass	
6	Run INFTest against a Single INF	Pass	Pass	
7	Sleep Stress with IO	Pass	Pass	
Hard Disk Drive				
1	IFS Test for Storage Logo	Pass	Pass	
2	Storage Device Stress (Removable Media-LOGO)	Pass	Pass	
3	Syscache Test (LOGO)	Pass	Pass	
4	USB Address Description Test	Pass	Pass	
5	USB Descriptor Test	Pass	Pass	
6	USB Device Control Requests	Pass	Pass	
7	USB Device Framework	Pass	Pass	

DTM Test Suite				
#	DTM Test	Windows XP	Windows Vista	Comments
8	USB Enumeration Stress	Pass	Pass	
9	USB HIDView	Pass	Pass	
10	USB Selective Suspend	Pass	Pass	
11	USB Serial Number	Pass	Pass	
12	USB Specification Compliance	Pass	Pass	

Bundled Software Applications Test Suite

This test suite checks to ensure that all of the applications bundled with the DUT operate properly in accordance with the user instructions provided in the DUT Software Release Notes.

Bundled Software Applications Test Suite				
#	Application	Windows XP	Windows Vista	Comments
1	PLDU Version 2.1.1.8	Pass	Pass	
2	Setlcon Version 1.6.0.3	Pass	Pass	
3	QuickTest Version	Not Applicable	Not Applicable	
4	PLTU Version 1.0.0.5	Pass	Pass	
5	Card Reader Installer Version 1.6.03	Pass	Pass	

Device Firmware Upgrade / Descriptor Update Test Suite

This test suite checks to ensure that both the device firmware upgrade (DFU) and descriptor update functionality of the DUT work properly. Please note that DFU functionality is only available for devices that utilize an external flash ROM. USBDM 1.407 or later must be used for this test.

Device Firmware Upgrade / Descriptor Update Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>DFU from old firmware</p> <p>Load the DUT with a DFU enabled eeprom version of "both.bin" binary created from the last release version of the firmware.</p> <p>Perform a DFU update to the version of firmware under test. Verify that the operation completes normally.</p> <p>Unplug the device and reattach it to the host. Verify it enumerates and functions properly. Check the version of the firmware using USBDM. Verify that the updated version is displayed.</p> <p>Repeat this step using the NO EEPROM version of the last released both.bin.</p>	EEPROM Pass NOEEPROM Pass	EEPROM Pass NOEEPROM Pass	
2	<p>DFU from current firmware</p> <p>Load the DUT with a DFU enabled eeprom version of "both.bin" binary created for the firmware under test.</p> <p>Perform a DFU update to the version of firmware under test. Verify that the operation completes normally.</p> <p>Unplug the device and reattach it to the host. Verify it enumerates and functions properly. Check the version of the firmware using USBDM. Verify that the updated version is displayed.</p> <p>Repeat this step using the NO EEPROM version of firmware under test both.bin.</p>	EEPROM Pass NOEEPROM Pass	EEPROM Pass NOEEPROM Pass	

Device Firmware Upgrade / Descriptor Update Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Surprise removal of USB cable during DFU update</p> <p>Load the DUT with a DFU enabled version of "both.bin" binary created for the firmware under test.</p> <p>Perform a DFU update to the version of firmware under test. When the progress bar reaches "downloading new firmware" (approximately 75%), unplug the USB cable.</p> <p>Reattach the USB cable. Verify it enumerates and functions properly. Perform the DFU update again. Verify that the operation completes normally.</p> <p>Verify by USBDM that the correct version is displayed.</p>	Pass	Pass	
4	<p>Descriptor Update</p> <p>Modify an eeprom.dat file and upload it to the device. Once the operation completes, hot plug the device and verify that the eeprom contains the new data. Repeat this test using the "NO.EEPROM" version of the firmware.</p> <p>Continue to use descriptor updates to completely verify the LUN configuration and icon sharing functionality of the device.</p> <p>(Refer to the DUT Software Release Notes for information on LUN Configuration and Icon Sharing.)</p>	Pass	Pass	

Device Firmware Upgrade / Descriptor Update Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
5	<p>Descriptor Update</p> <p>Repeat this test using both the "EEPROM" and "NO.EEPROM" version of the firmware.</p> <p>Continue to use descriptor updates to completely verify the Descriptor Attribute bits that apply to the DUT.</p> <p>(Refer to the DUT Software Release Notes for information on the attribute bit settings for DUT.)</p>	Pass	Pass	

C3—Attach on Insert Test Suite

This test suite checks to ensure that the C3—Attach on Insert functionality works properly. All test steps are to be completed with the C3 feature enabled (check the Attach on Card Insert / Detach on Card Removal box under the Configuration tab in the USBDM). The LUN configuration should be the default for the product being tested unless specified otherwise.

Not Tested:

1. All LUN Configuration options (145 possible combinations)
2. 98, ME, Macintosh
3. All combinations of media inserted (e.g. only MS and SD inserted during restart; only a few steps are completed using more than one media inserted.)

C3 – Attach On Insert Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	Initial Plug-in—no media Connect the DUT to the host controller. Verify that the device does not attach.	Pass	Pass	
2	Insertion of CF Insert a CF card into device. Verify that the device attaches as normal. Icons should be present. Verify that the CF drive can be accessed. Write —Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file. Read —Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file written to the computer.	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Initial Plug-in with CF</p> <p>Detach the DUT. Insert a CF card into device.</p> <p>Connect the DUT to the host controller. Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file written back to the computer.</p>	Pass	Pass	
4	<p>Suspend with CF inserted</p> <p>Insert CF into the DUT. Verify that the device is attached.</p> <p>Suspend the device by putting the host in standby.</p> <p>Wake the host. Verify that the device is still attached. Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
5	<p>Suspend with CF inserted; Remove CF during suspend</p> <p>Insert CF into the DUT. Verify that the device is attached.</p> <p>Suspend the device by putting the host in standby.</p> <p>While the host is suspended, remove the CF card. Wake the host. Verify that the device is no longer attached.</p>	Pass	Pass	
6	<p>Suspend without media inserted; Insert CF during suspend</p> <p>Put the host in standby. While the host is suspended, insert a CF card into test device.</p> <p>Wake the host. Verify that the device attaches. Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file written back to the computer.</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
7	<p>Suspend without media inserted; Attach device + CF during suspend</p> <p>Remove the device from the computer. Put the host in standby. While the host is suspended, insert a CF card into the DUT and reattach it to the computer.</p> <p>Wake the host. Verify that the device attaches. Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file written back to the computer.</p>	Pass	Pass	
8	<p>Warm Reboot with CF inserted</p> <p>Insert CF into the DUT. Verify that the device is attached.</p> <p>Restart the host computer. Once host restarts, verify that the device is still attached.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file written back to the computer.</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
9	<p>Cold Reboot with CF inserted</p> <p>Insert CF into the DUT. Verify that the device is attached.</p> <p>Shut down the host. Restart the host computer. Once host restarts, verify that the device is still attached.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file written back to the computer.</p>	Pass	Pass	
10	<p>Cold Reboot with CF inserted; Remove CF during power down</p> <p>Insert CF into the DUT. Verify that the device is attached.</p> <p>Shut down power to the host. While the host is shut down, remove the CF card.</p> <p>Restart the host. Verify that the device is no longer attached.</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
11	<p>Cold Reboot with CF inserted; Remove device during power down</p> <p>Insert CF into the DUT. Verify that the device is attached.</p> <p>Shut down power to the host.</p> <p>While the host is shut down, remove the device from the host.</p> <p>Restart the host. Verify that the device is no longer attached.</p>	Pass	Pass	
12	<p>Cold Reboot without media inserted; Insert CF during power down</p> <p>Verify that the DUT is connected to the host computer, but not attached because there is no media inserted.</p> <p>Shut down the host computer. While the host is powered down, insert a CF card into test device.</p> <p>Restart the host. Verify that the device attaches.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
13	<p>Cold Reboot without media inserted; Insert device + CF during power down</p> <p>Remove the DUT from the host computer. While it is removed insert a CF card.</p> <p>Shut down the host computer. While the host is powered down, attach the device to the host.</p> <p>Restart the host. Verify that the device attaches.</p> <p>Verify that the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify</p>	Pass	Pass	
14	<p>Media surprise removal during CF write</p> <p>Remove the DUT and reattach it to the host computer. Insert a CF card. Verify that the device attaches and the CF card can be accessed.</p> <p>Begin writing a large file to the CF card. When the write completes approximately 50% remove the CF card.</p> <p>Verify that the device detaches. Reinsert the CF card. Verify that the device attaches and the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host.</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
15	<p>Media surprise removal during CF read</p> <p>Verify the DUT is attached and the CF card can be accessed.</p> <p>Begin copying a large file from the CF to the host. When the read completes approximately 50% remove the CF card.</p> <p>Verify that the device detaches. Reinsert the CF card. Verify that the device attaches and the CF drive can be accessed.</p> <p>Write—Write a small file from the computer to the CF card. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card. Verify that the device attaches. CRC the file.</p> <p>Read—Copy the same file back to the host. Remove the CF card to clear the cache. Verify that the device detaches. Reinsert the CF card.</p>	Pass	Pass	
16	<p>Insertion / removal of other media types during CF write</p> <p>Verify that the DUT is attached and the CF card can be accessed.</p> <p>Begin writing a large file to the CF card. While the write is in process, insert and remove different types of media until the write completes.</p> <p>Verify that this does not cause any errors to occur during the write.</p> <p>Once the write completes, remove the CF card to clear the cache. Reinsert the CF card. Verify that the device attaches. CRC the file.</p> <p>Repeat this process until all media types have been inserted and removed at least once during a CF write (MS, MS Pro, SD, MMC, SM, and xD).</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
17	<p>Insertion / removal of other media types during CF read</p> <p>Verify that the DUT is attached and the CF card can be accessed.</p> <p>Begin copying a large file from the CF to the host. While the read is in process, insert and remove different types of media until the read completes.</p> <p>Verify that this does not cause any errors to occur during the write.</p> <p>Once the read completes, remove the CF card to clear the cache. Reinsert the CF card. Verify that the device attaches. CRC the file.</p> <p>Repeat this process until all media types have been inserted and removed at least once during a CF read (MS, MS Pro, SD, MMC, SM, and xD).</p>	Pass	Pass	
18	<p>Insertion of other media types during CF write; Remove CF after write completes</p> <p>Verify that the DUT is attached and the CF card can be accessed.</p> <p>Begin writing a file to the CF card. While the write is in process, insert a different type of media. Verify that this does not cause any errors to occur during the write.</p> <p>Once the write completes, remove the CF card. Verify that the device remains attached. Remove the other media. Verify that the device is now detached.</p> <p>Reinsert the CF card. Verify that the device attaches.</p> <p>Repeat this process until all media types have been inserted during a CF write (MS, MS Pro, SD, MMC, SM, and xD).</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
19	<p>Insertion of other media types during read; Remove CF after write completes</p> <p>Verify that the DUT is attached and the CF card can be accessed.</p> <p>Begin writing a file to the CF card. While the write is in process, insert a different type of media. Verify that this does not cause any errors to occur during the write.</p> <p>Once the write completes, remove the CF card. Verify that the device remains attached. Remove the other media. Verify that the device is now detached.</p> <p>Reinsert the CF card. Verify that the device attaches.</p> <p>Repeat this process until all media types have been inserted during a CF write (MS, MS Pro, SD, MMC, SM, and xD).</p>	Pass	Pass	
20	<p>Microdrive</p> <p>Repeat steps 2–19 using MD instead of a CF card. (For steps that require repeating until all other media is used, use SM, xD, SD, MMC, MS, and MS Pro.)</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
21	Memory Stick Repeat steps 2–19 using MS instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, SM, xD, SD, and MMC.)	Pass	Pass	
22	Memory Stick Pro Repeat these steps 2–19 using MS Pro instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, SM, xD, SD, and MMC.)	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
23	Secure Digital Repeat steps 2–19 using SD instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, SM, xD, MS, and MS Pro.)	Pass	Pass	
24	High-Speed Secure Digital Repeat steps 2–19 using HS-SD instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, SM, xD, MS, and MS Pro.)	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
25	Multimedia Card Repeat steps 2–19 using MMC instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, SM, xD, MS, and MS Pro.)	Pass	Pass	
26	High-Speed Multimedia Card Repeat steps 2–19 using HS-MMC instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, SM, xD, MS, and MS Pro.)	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
27	Smart Media Repeat steps 2–19 using SM instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, MS, MS Pro, SD, and MMC.)	Pass	Pass	
28	xD Repeat steps 2–19 using xD instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, MS, MS Pro, SD, and MMC.)	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
29	<p>Type “H” xD</p> <p>Repeat steps 2–19 using Type “H” xD instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, MS, MS Pro, SD, and MMC.)</p>	Pass	Pass	
30	<p>Type “M” xD</p> <p>Repeat steps 2–19 using Type “M” xD instead of a CF card. (For steps that require repeating until all other media is used, use CF, MD, MS, MS Pro, SD, and MMC.)</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
31	<p>Insertion of all media</p> <p>Attach the DUT with no media to the host computer. Verify that the device is not attached. Insert one piece of media. The first insertion should cause the device to attach. Verify that this is the only accessible drive.</p> <p>Continue to insert media one at a time. Verify that for each insertion the device remains attached and the drive corresponding to the media inserted becomes accessible.</p> <p>Write—Write a small file from the computer to the each card. Remove the cards once at a time to clear the cache. Verify that for each removal except for the last media card, that the device remains attached and that the slot the media was removed from can no longer be accessed. Verify that after removing the last piece of media that the device detaches. Reinsert all cards. Verify that the device</p>	Pass	Pass	
32	<p>Initial Plug-in— with all media</p> <p>Detach the DUT. Insert media into all available slots in test device.</p> <p>Connect the DUT to the host controller. Verify that the all drives can be accessed.</p> <p>Write—Write a small file from the computer to the each card. Detach the USB cable to clear the cache. Verify that the device detaches. Reattach the USB cable. Verify that the device attaches. CRC the files.</p> <p>Read—Copy the same files back to the host. Remove the cards to clear the cache. Verify that the device detaches. Reinsert the cards. Verify that the device attaches. CRC the files written back to the computer.</p> <p>Repeat this step until all media types are tested (CF, MD, MS, MS Pro, SD, MMC, xD, and SM).</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
33	<p>Insertion of all media (USB 1.1 speed)</p> <p>Configure the DUT to be operating at USB 1.1 speeds (either disable the EHCI or attach a full speed hub between the host and device)</p> <p>Repeat step 31 with the device now operating at 1.1 speeds.</p>	Pass	Pass	
34	<p>Initial Plug-in— with all media (USB 1.1 speed)</p> <p>Configure the DUT to be operating at USB 1.1 speeds (either disable the EHCI or attach a full speed hub between the host and device)</p> <p>Repeat step 32 with the device now operating at 1.1 speeds.</p>	Pass	Pass	

C3 – Attach On Insert Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
35	<p>CF, SM+SD+MS configuration</p> <p>Configure the DUT with CF for the first LUN, and SM, SD, and MS sharing the second LUN.</p> <p>If the DUT supports internal FETs, the shared LUN should be running from internal FETs.</p> <p>Repeat steps 1–34 using this configuration.</p>	Pass	Pass	
36	<p>CF+SM+SD+MS configuration</p> <p>Configure the DUT with CF, SM, SD, and MS sharing one LUN.</p> <p>The shared LUN should be running from external FETs.</p> <p>Repeat steps 1–34 using this configuration.</p>	Pass	Pass	

LUN Power Configuration Test Suite

This test suite checks to ensure that the Internal/External FET functionality of the DUT works properly. Internal FETs can be used to operate MS, SM, and SD for the DUT SVB. CF will only be powered by external GPIO9 when using the DUT SVB. By default the DUT SVB is set to run MS, SM, and SD by internal FETs. Since this default setting is used throughout the rest of the test suites, this test suite will focus on external GPIOs powering all cards, a combination of internal and external FETS used to power each slot, and one GPIO powering multiple slots. The DUT SVB hardware is set up for MS to use FET0 or GPIO8, CF to use GPIO9, SM to use FET1 or GPIO10, and SD to use FET2 or GPIO11. Any other configuration will require hardware wire rework to test.

LUN Power Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>Initial Setup—External GPIOs for MS, SM, CF, and SD</p> <p>Check the “Use LUN Power Configuration” setting under the Configuration tab in the USBDM.</p> <p>Set the LUN Power Config byte to 0x00, the LUN Power Mask 1 to 0x12, and the LUN Power Mask 2 to 0x84.</p> <p>Set the jumpers for external GPIOs to be used for SD, SM, and MS (pins 3–5 and pins 4–6 should have a jumper for J40, J41, and J42).</p>	- -	- -	
2	<p>Enumeration—no media</p> <p>Remove all media from the DUT.</p> <p>Connect the DUT to the host computer.</p> <p>Verify that there is no power being supplied to any card.</p> <p>Verify that the device enumerates properly.</p>	- -	- -	
3	<p>Restart—no media</p> <p>Restart the host computer with the DUT still attached.</p> <p>Verify that after the system restarts the DUT is properly enumerated and there is no power being supplied to any card.</p>	- -	- -	

LUN Power Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
4	<p>Suspend—no media</p> <p>Suspend the host computer with the DUT still attached. Wake the host system.</p> <p>Verify that after the system is no longer suspended the DUT is properly enumerated and there is no power being supplied to any card.</p>	- -	- -	
5	<p>Enumerate with 1 piece of media inserted</p> <p>Remove the DUT from the host computer. Insert a CF card into the DUT. Attach the DUT to the host computer.</p> <p>Verify that the DUT enumerates properly. Verify that there is power being supplied to the CF card.</p> <p>Verify that the CF card can be written to and</p>	- -	- -	
6	<p>Reinsertion of 1 piece of media inserted</p> <p>With the DUT board still enumerated, reinsert the CF card.</p> <p>Verify that there is power being supplied to the CF card. Verify that the CF card can be written to and read from.</p>	- -	- -	
7	<p>Restart—1 media</p> <p>Restart the host computer with the DUT still attached and the CF still inserted.</p> <p>Verify that after the system restarts the DUT is properly enumerated and there is power being supplied to the CF card. Verify that the CF card can be written to and read from.</p>	- -	- -	
8	<p>Suspend—1 media</p> <p>Suspend the host computer with the DUT still attached and the CF still inserted. Verify that while the computer is suspended there is no power being supplied to the CF card.</p> <p>Resume the computer. Verify that after the system is no longer suspended the DUT is properly enumerated and there is power being supplied to the CF card. Verify that the CF card</p>	- -	- -	

LUN Power Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
9	Other Media Types Repeat steps 5–8 using MD, SM, xD, SD, MMC, MS, and MS Pro.	MD - - SM - - xD - - SD - -	MD - - SM - - xD - - SD - -	
10	Enumerate with all media inserted Remove the DUT from the host computer. Insert CF, SM, SD, and MS cards into the DUT. Attach the DUT to the host computer. Verify that the DUT enumerates properly. Verify that there is power being supplied to all cards. Verify that the cards can be written to and read	- -	- -	
11	Restart—all media Restart the host computer with the DUT still attached and the media still inserted. Verify that after the system restarts the DUT is properly enumerated and there is power being supplied to the cards. Verify that the cards can be written to and read from.	- -	- -	
12	Suspend—all media Suspend the host computer with the DUT still attached and the cards still inserted. Verify that while the computer is suspended there is no power being supplied to the cards. Resume the computer. Verify that after the system is no longer suspended the DUT is properly enumerated and there is power being supplied to the cards. Verify that the cards can	- -	- -	
13	Other Media Types Repeat steps 10–12 using MD, xD, MMC, and MS Pro.	- -	- -	

LUN Power Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
14	<p>Setup—MS Internal FET0, SM Internal FET1, CF External GPIO9, SD External GPIO11</p> <p>Check the “Use LUN Power Configuration” setting under the Configuration tab in the USBDM.</p> <p>Set the LUN Power Config byte to 0x14, the LUN Power Mask 1 to 0x12, and the LUN Power Mask 2 to 0x82.</p>	- -	- -	
15	<p>Internal and External</p> <p>Repeat steps 2–14 with this setup of SD and CF being powered by external GPIOs, and SM and MS being powered by internal FETs.</p>	- -	- -	
16	<p>Setup—Internal FET0 powering shared LUN for MS, SM, and SD, External GPIO9 powering CF</p> <p>Check the “Use LUN Power Configuration” setting under the Configuration tab in the USBDM.</p> <p>Set the LUN Power Config byte to 0x54, the LUN Power Mask 1 to 0x12, and the LUN Power Mask 2 to 0x11.</p>	- -	- -	
17	<p>Enumeration—no media</p> <p>Remove all media from the DUT device.</p> <p>Connect the DUT device to the host computer.</p> <p>Verify that there is no power being supplied to any card and that the device enumerates.</p>	- -	- -	
18	<p>Restart—no media</p> <p>Restart the host computer with the DUT still attached.</p> <p>Verify that after the system restarts that the DUT is properly enumerated and there is no power being supplied to any card.</p>	- -	- -	

LUN Power Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
19	Suspend—no media Suspend the host computer with the DUT still attached. Wake the host system. Verify that after the system is no longer suspended the DUT is properly enumerated and there is no power being supplied to any card.	- -	- -	
20	Enumerate with 1 piece of media inserted Remove the DUT from the host computer. Insert a CF card into the DUT. Attach the DUT to the host computer. Verify that the DUT enumerates properly. Verify that there is power being supplied to the CF card. Verify that the CF card can be written to and	- -	- -	
21	Reinsertion of 1 piece of media inserted With the DUT board still enumerated, reinsert the CF card. Verify that there is power being supplied to the CF card. Verify that the CF card can be written to and read from.	- -	- -	
22	Restart—1 media Restart the host computer with the DUT still attached and the CF still inserted. Verify that after the system restarts the DUT is properly enumerated and there is power being supplied to the CF card. Verify that the CF card can be written to and read from.	- -	- -	
23	Suspend—1 media Suspend the host computer with the DUT still attached and the CF still inserted. Verify that while the computer is suspended there is no power being supplied to the CF card. Resume the computer. Verify that after the system is no longer suspended the DUT is properly enumerated and there is power being supplied to the CF card. Verify that the CF card	- -	- -	

LUN Power Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
24	Other Media Types Repeat steps 20–23 using MD, SM, xD, SD, MMC, MS, and MS Pro.	MD - - SM - - xD - - SD - -	MD - - SM - - xD - - SD - -	
25	Enumerate with all media inserted Remove the DUT from the host computer. Insert CF and SD cards into the DUT. Attach the DUT to the host computer. Verify that the DUT enumerates properly. Verify that there is power being supplied to all cards. Verify that the cards can be written to and read from.	- -	- -	
26	Restart—all media Restart the host computer with the DUT still attached and the media still inserted. Verify that after the system restarts the DUT is properly enumerated and there is power being supplied to the cards. Verify that the cards can be written to and read from.	- -	- -	
27	Suspend—all media Suspend the host computer with the DUT still attached and the cards still inserted. Verify that while the computer is suspended there is no power being supplied to the cards. Resume the computer. Verify that after the system is no longer suspended the DUT is properly enumerated and there is power being supplied to the cards. Verify that the cards can	- -	- -	
28	Other Media Types Repeat steps 25–27 using the following combinations: CF/MS, CF/SM, MD/MMC, MD/xD, MD/MS Pro.	CF/MS - - CF/SM - - MD/MMC - - MD/xD - -	CF/MS - - CF/SM - - MD/MMC - - MD/xD - -	

Hub Configuration Test Suite

This test suite verifies basic hub functionality when configured for the default. One high speed, full speed, and low speed USB device is needed for this test suite. All tests below are performed using a self-powered DUT attached to a USB 2.0 host controller unless otherwise noted.

Hub Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	Default configuration Program the DUT with no eeprom version of firmware. Attach the DUT to the host computer. Verify that the DUT is properly enumerated. Verify that all of the hub descriptors match the SMSC default hub descriptors.	Pass Pass	Pass Pass	
2	Restart—no added devices Restart the host computer. Verify that the DUT is still properly enumerated after the restart.	Pass	Pass	
3	Pre-plug Remove both the USB cable and power from the DUT. Reconnect the DUT to the host computer and power the device. Verify that the hub is still properly enumerated.	Pass	Pass	
4	Post-plug Remove both the USB cable and power from the DUT. Reconnect the power to the DUT. Attach the USB cable to the host computer. Verify that the hub is still properly enumerated.	Pass	Pass	

Hub Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
5	Low Speed device Attach a low speed device to port 2. Verify that the low speed device functions properly. Verify that the hub is properly enumerated and that the card reader functions as expected. Remove the device from port 2 and repeat this step for ports 3 and 4.	Pass	Pass	
6	Full Speed device Attach a full speed device to port 2. Verify that the full speed device functions properly. Verify that the hub is properly enumerated and that the card reader functions as expected. Remove the device from port 2. Repeat this step for port 3 and 4.	Pass	Pass	
7	High Speed device Attach a high speed to port 2. Verify that the high speed device functions properly. Verify that the hub is properly enumerated and that the card reader functions as expected. Remove the device from port 2. Repeat this step for port 3 and 4.	Pass	Pass	
8	Device—all ports Attach a low speed, full speed, and high-speed device to each of the three available ports. Verify that each device (including the card reader on port 1) functions properly.	Pass	Pass	

Hub Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
9	Suspend with devices Suspend the host computer. Resume the computer and verify that all devices are still functioning. Verify that the hub is properly enumerated.	Pass	Pass	
10	Restart with devices Restart the host computer with all devices still attached. Verify after the restart that all devices are still functioning properly and that the hub is properly enumerated.	Pass	Pass	
11	Post-Plug Remove the DUT from the host computer. Remove power from the DUT. Power the DUT. Reconnect the USB cable to the host computer. Verify that all devices are functional.	Pass	Pass	
12	Pre-Plug Remove power from the DUT. Remove the DUT from the host computer. Reconnect the USB cable to the host computer. Power the DUT. Verify that all devices are functional.	Pass	Pass	

Hub Configuration Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
13	Restart—Surprise device attach Remove the devices from ports 2–4. Shut down the host computer. While the system is shut down, reattach the devices to ports 2–4. Restart the system. Verify that all devices are functional and the hub is enumerated.	Pass	Pass	
14	Restart—Surprise device removal Shut down the host computer. While the system is shut down, remove the devices from ports 2–4. Restart the system. Verify that the TP is functional, the removal of the devices from ports 2–4 was detected, and the hub is enumerated.	Pass	Pass	
15	Suspend—Surprise device attach Remove the devices from ports 2–4. Suspend the host computer. While the system is suspended, reattach the devices to ports 2–4. Wake the host. Verify that all devices are functional and the hub is enumerated.	Pass	Pass	
16	Suspend—Surprise device removal Suspend the host computer. While the system is suspended, remove the devices from ports 2–4. Wake the host. Verify that the TP is functional, the removal of the devices from ports 2–4 was detected, and the hub is enumerated.	Pass	Pass	

Memory Stick and Memory Stick Pro Compliancy Test Suite

This test ensures that all tests listed in Sony Corporation's *Memory Stick Implementation Check Procedures* pass with the DUT. Refer to the *Memory Stick Implementation Check Procedures* document for specific instructions on how to perform each test listed below.

Memory Stick and Memory Stick Pro Compliancy Test Suite				
Test #	Test Description	Windows XP	Windows Vista	Comments
1	Memory Stick Compliancy Tester version: 1.0.0.1.7	Pass	Pass	
2	Memory Stick Pro Compliancy Tester version: 1.0.0.1.7	Pass	Pass	
3	Memory Stick Pro HG Compliancy Tester version: 1.0.0.1.7	Pass	Pass	

LED Activity Test Suite

This test evaluates the performance and function of the activity, media detect, and LUN power leds of the DUT during various operations. All tests are to be performed using a USB 2.0 Host Controller.

LED Activity Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	Initial Plug-In; no media.- With no media inserted in any of the media slots, attach the USB cable and power up the DUT. After the DUT fully enumerates, there should be no led activity.	Pass	Pass	
2	Insertion of media Insert a SM card into the DUT. The activity led should pulse during media enumeration then halt after the media is fully enumerated. The SM Det should be active (on) and remain active until the SM is removed. The SM Pwr led should be active until the card is removed from the DUT. Repeat this step with XD, SD, MMC, CF and MD.	CF - - MD - - SD Pass HS-SD Pass MMC Pass HS-MMC Pass xD Pass MS Pass MS Pro Pass	CF - - MD - - SD Pass HS-SD Pass MMC Pass HS-MMC Pass xD Pass MS Pass MS Pro Pass	

LED Activity Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>SM LED Activity During Writes and Reads.</p> <p>Write a group of files to the SM. During the write, observe the activity led, making sure that it pulses; reflecting the write in progress. After the write is complete, led activity should stop. Remove the media. The media detect and LUN power leds should turn off. Reinsert the media. SM detect and SM Pwr leds should be on and stay on with no pulsing. Read the files back to the host. The activity led should pulse during the file transfer. It is important to note that the media detect and LUN power leds remain constantly on with no flickering as long as the media is present in the DUT.</p>	Pass	Pass	
4	<p>XD LED Activity During Writes and Reads.</p> <p>Write a group of files to the XD media. During the write, observe the activity led, making sure that it pulses; reflecting the write in progress. After the write is complete, led activity should stop. Remove the media. The media detect and LUN power leds should turn off. Reinsert the media. SM detect and SM Pwr leds should be on and stay on with no pulsing. Read the files back to the host. The activity led should pulse during the file transfer. It is important to note that the media detect and LUN power leds remain constantly on with no flickering as long as the media is present in the DUT.</p>	Pass	Pass	

LED Activity Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
5	SD LED Activity During Writes and Reads.- Write a group of files to the SD media. During the write, observe the activity led, making sure that it pulses; reflecting the write in progress. After the write is complete, led activity should stop. Remove the media. The media detect and LUN power leds should turn off. Reinsert the media. SD detect and SD Pwr leds should be on and stay on with no pulsing. Read the files back to the host. The activity led should pulse during the file transfer. It is important to note that the media detect and LUN power leds remain constantly on with no flickering as long as the media is present in the DUT. Repeat this step using HS-SD and HC-SD.	Pass	Pass	
6	MMC LED Activity During Writes and Reads.- Write a group of files to the MMC media. During the write, observe the activity led, making sure that it pulses; reflecting the write in progress. After the write is complete, led activity should stop. Remove the media. The media detect and LUN power leds should turn off. Reinsert the media. SD detect and SD Pwr leds should be on and stay on with no pulsing. Read the files back to the host. The activity led should pulse during the file transfer. It is important to note that the media detect and LUN power leds remain constantly on with no flickering as long as the media is present in the DUT. Repeat this step using HS-MMC and HC-MMC.	Pass	Pass	

LED Activity Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
7	MS LED Activity During Writes and Reads.- Write a group of files to the MS media. During the write, observe the activity led, making sure that it pulses; reflecting the write in progress. After the write is complete, led activity should stop. Remove the media. The media detect and LUN power leds should turn off. Reinsert the media. MS detect and MS Pwr leds should be on and stay on with no pulsing. Read the files back to the host. The activity led should pulse during the file transfer. It is important to note that the media detect and LUN power leds remain constantly on with no flickering as long as the media is present in the DUT. Repeat this step with MS Duo media.	Pass	Pass	
8	MS Pro LED Activity During Writes and Reads.- Write a group of files to the MS Pro media. During the write, observe the activity led, making sure that it pulses; reflecting the write in progress. After the write is complete, led activity should stop. Remove the media. The media detect and LUN power leds should turn off. Reinsert the media. MS detect and MS Pwr leds should be on and stay on with no pulsing. Read the files back to the host. The activity led should pulse during the file transfer. It is important to note that the media detect and LUN power leds remain constantly on with no flickering as long as the media is present in the DUT. Repeat this step with MS Pro Duo media.	Pass	Pass	

LED Activity Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
9	<p>CF/MD LED Activity During Writes and Reads.- Write a group of files to the CF media. During the write, observe the activity led, making sure that it pulses; reflecting the write in progress. After the write is complete, led activity should stop. Remove the media. The media detect and LUN power leds should turn off. Reinsert the media. CF detect and CF Pwr leds should be on and stay on with no pulsing. Read the files back to the host. The activity led should pulse during the file transfer. It is important to note that the media detect and LUN power leds remain constantly on with no flickering as long as the media is present in the DUT. Repeat this step with Mo media.</p>	Pass	Pass	
10	<p>LED Activity During Surprise Removal of SM During Writes and Reads.</p> <p>Insert SM media into the DUT and write a large (<25Mb) file to the media. During the write, observe the activity, LUN power, and media detect leds to determine proper operation.</p> <p>During the write, remove the media. All led activity should stop, the LUN power and media detect leds should turn off.</p> <p>Reinsert the SM and resume the write. LUN power and media detect leds should turn on and stay on, the activity led should pulse to reflect the write as it's in progress.</p> <p>Repeat this step reading a file back to the host,</p>	Pass	Pass	

LED Activity Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
11	<p>LED Activity During Surprise Removal of Media During Writes and Reads Using All Other Media.</p> <p>Repeat Step 10 using CF, MD, SD, HS-SD, MMC, HS-MMC, XD, MS, and MS Pro media.</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p> <p>SD</p> <p>Pass</p> <p>HS-SD</p> <p>Pass</p> <p>MMC</p> <p>Pass</p> <p>HS-MMC</p> <p>Pass</p> <p>xD</p> <p>Pass</p> <p>MS</p> <p>Pass</p> <p>MS Pro</p> <p>Pass</p>	<p>CF</p> <p>- -</p> <p>MD</p> <p>- -</p> <p>SD</p> <p>Pass</p> <p>HS-SD</p> <p>Pass</p> <p>MMC</p> <p>Pass</p> <p>HS-MMC</p> <p>Pass</p> <p>xD</p> <p>Pass</p> <p>MS</p> <p>Pass</p> <p>MS Pro</p> <p>Pass</p>	
12	<p>LED Behavior With Multiple Media Inserted (SM, SD, MS, & CF).</p> <p>With the DUT connected to the host but with no media present, insert SM, SD, MS, and CF into the device one card at a time, observing that the correct led activity occurs during the insertion of each individual piece of media.</p> <p>Transfer a small group of files to each of the media and back to the host observing that the correct Activity led behavior is present.</p>	<p>Pass</p>	<p>Pass</p>	

LED Activity Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
13	<p>LED Behavior With Multiple Media Inserted (XD, MMC, MS Pro, & MD).</p> <p>With the DUT connected to the host but with no media present, insert XD, MMC, MS Pro, and MD into the device one card at a time, observing that the correct led activity occurs during the insertion of each individual piece of media.</p> <p>Transfer a small group of files to each of the media and back to the host observing that the correct Activity led behavior is present.</p>	Pass	Pass	

Remote Wakeup Test Suite

This test suite evaluates the ability of the DUT to initiate a remote wakeup during suspend, per requirement 9 of the USX2640 specification. The High Speed Electrical Tests program from usb-if is required to perform this test suite. Verification of the hub going into and out of suspend can be accomplished by attaching a low speed test device to the hub.

Remote Wakeup Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	Enable remote wakeup on the card reader. Attach a usb mouse to port 1 of the hub. Suspend the Hub, verify that both the hub and the cardreader have gone into suspend. Insert a CF card into the cardreader, verify that the cardreader and the hub both come out of suspend.	Pass	Pass	
2	Without removing the media from the cardreader, suspend the hub, verify that both the hub and the cardreader have gone into suspend. Verify that the cardreader has turned off card power and entered its clock stop mode. Remove the CF card from the cardreader, verify that the cardreader and the hub both come out of suspend.	Pass	Pass	
3	Repeat steps 1-2 with the following: MD, SM, xD, SD, MMC, MS, MS Pro.	Pass Pass Pass Pass Pass Pass Pass	Pass Pass Pass Pass Pass Pass Pass	

Remote Wakeup Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
4	<p>Disable remote wakeup on the card reader.</p> <p>Attach a usb mouse to port 1 of the hub.</p> <p>Suspend the Hub, verify that both the hub and the cardreader have gone into suspend.</p> <p>Insert a CF card into the cardreader, verify that the cardreader and the hub do not come out of suspend.</p>	Pass	Pass	
5	<p>Without removing the media from the cardreader, suspend the hub, verify that both the hub and the cardreader have gone into suspend.</p> <p>Remove the CF card from the cardreader, verify that the cardreader and the hub do not come out of suspend.</p>	Pass	Pass	
6	Repeat steps 1-2 with the following: MD, SM, xD, SD, MMC, MS, MS Pro.	<p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p>	<p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p>	

Media Identification Test Suite

This test suite evaluates the vendor specific command (CFh,18h) that allows media identification to commence. Per requirement 8.1.2 of the USX2028 specification the USX2028 will not initiate media identification until explicitly commanded by the host via this vendor specific command. This allows the host to issue media bus speed limiting commands prior to media identification by the device.

Test Suite Name				
	Test Standard	Windows XP	Windows Vista	Comments
1	Insert MS media into the DUT, verify that media identification does not take place.	Pass	Pass	
2	Without removing the media, issue the CF,18 command to the DUT, verify that media identification then takes place, and that the media is properly identified and is running at default clock speed.	Pass	Pass	
3	Remove the media and reinsert the media, verify that media identification takes place and that the media is properly identified, and is running at the default clock speed.	Pass	Pass	
4	Reset the DUT, verify that media identification does not take place.	Pass	Pass	
5	Reset the DUT, insert the media and issue the CFh,17h command to throttle the ms clock to 15Mhz. Verify that media identification does not take place.	Pass	Pass	

Test Suite Name				
	Test Standard	Windows XP	Windows Vista	Comments
6	Issue the CFh,18h media identification command, and verify that the media is properly identified and that the media is running at the properly throttled clock speed.	Pass	Pass	
7	Repeat steps 5-6 with the following clock speeds. 15 Mhz, 20Mhz, 40 Mhz, Unthrottled. (For MS/Ms Pro/MS Pro HG) 15Mhz, 20 Mhz, 24 Mhz, Unthrottled. (For Sd/MMC)	Pass	Pass	
8	Repeat steps 1-7 with MS Pro, MS Pro HG, SD, HS-SD, MMC, HS-MMC, and MMC Mobile media.	MS Pro Pass MS Pro HG Pass SD Pass HS-SD Pass MMC Pass HS-MMC Pass MMC Mobile Pass	MS Pro Pass MS Pro HG Pass SD Pass HS-SD Pass MMC Pass HS-MMC Pass MMC Mobile Pass	
9	Repeat steps 1-4 with xD media.	Pass	Pass	

GPIO/LED Control Test Suite

This test suite evaluates the vendor specific GPIO/LED control command per requirement 8 of the USX2640 specification. Only GPIOs 2,4, and 5 are looked at in this test suite. In order to run this test, you must be running internal firmware with the SPI interface disabled.

Byte 2

Bit	7	6	5	4	3	2	1	0
Controls	0	0	0	0	GPIO5	GPIO4	GPIO2	0

GPIO / LED Control Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>Using the vendor specific GPIO/LED control command (0xCF,0x16) with bytes 3,5-9 having a value of 0xFF, and byte 4 having a value of 1, turn on GPIO2.</p> <p>Verify that only GPIO2 is pulled high.</p> <p>Insert media into the DUT and begin a RWC test on the media.</p> <p>Verify that GPIO2,4,5 do not change state.</p> <p>Using the 0xCF command with bytes 3-9 having a value of 0x00, and byte 2 having a value of 1, turn GPIO2 off.</p> <p>Verify that only GPIO2 is pulled low.</p> <p>Begin a RWC test on the media.</p> <p>Verify that GPIO2,4,5 do not change state.</p> <p>Repeat for all values of byte 2, 1-0xF. Verifying that only the proper GPIOs are driven.</p>	Pass	Pass	

GPIO / LED Control Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
2	<p>Using the vendor specific 0xCF command with bytes 3-6 having a value of 10, and byte 2 having a value of 1. Turn on GPIO12.</p> <p>Verify that only GPIO2 begins cycling between high and low for (10ms*value from byte 3) each cycle.</p> <p>Insert media into the DUT and begin a RWC test on the media.</p> <p>Verify that only GPIO2 changes state, and that it continues to change state in accordance with the value set in byte 3.</p> <p>Using the 0xCF command with bytes 3-6 having a value of 0, and byte 2 having a value of 1, turn off GPIO2.</p> <p>Verify that GPIO2 is pulled low.</p> <p>Begin a RWC test on the media. Verify that GPIO2,4,5 do not change state.</p> <p>Repeat this step for several values of bytes 3-6, verifying that the duty cycles correspond with the 10ms*value formula for the on/off cycles.</p>	<p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p>	<p>Pass</p> <p>Pass</p> <p>Pass</p> <p>Pass</p>	
3	<p>Repeat step 2 for all values of byte 2. Each time, verify that the proper GPIOs begin toggling high to low, and that the on/off cycles correspond to the values in bytes 3-6.</p>	<p>Pass</p>	<p>Pass</p>	

SD/MMC Clock Throttling Test Suite

This test suite evaluates the SD/MMC Operation/Clock Throttling per requirement 8 of the USX2640 specification.

SD/MMC Clock Throttling Test Suite				
#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>Using the vendor specific command CFh and the vendor specific function code of 17h command configure the SD/MS clock to each be unthrottled.</p> <p>Insert an SD card into the DUT. Begin performing reads/writes to the media and measure the frequency of the SD Clock. Verify that the SD Clock operates at the proper clock speed.</p> <p>Repeat with HS-SD, HC-SD, Micro-SD, Mini-SD.</p>	<p>SD Pass</p> <p>HS-SD Pass</p> <p>HC-SD Pass</p> <p>Micro-SD Pass</p> <p>Mini-SD Pass</p>	<p>SD Pass</p> <p>HS-SD Pass</p> <p>HC-SD Pass</p> <p>Micro-SD Pass</p> <p>Mini-SD Pass</p>	
2	<p>Repeat with MS,MS Pro, MS HG, and MS/MSP Duos.</p>	<p>MS Pass</p> <p>MS Pro Pass</p> <p>MS HG Pass</p> <p>MS Duo Pass</p> <p>MS Pro Duo Pass</p>	<p>MS Pass</p> <p>MS Pro Pass</p> <p>MS HG Pass</p> <p>MS Duo Pass</p> <p>MS Pro Duo Pass</p>	
3	<p>Using the vendor specific command CFh and the vendor specific function code of 17h, set the SD clock to be throttled at 24Mhz.</p> <p>Insert an SD card into the DUT. Begin performing reads/writes to the media and measure the frequency of the SD Clock. Verify that the SD Clock operates at the proper clock speed.</p> <p>Repeat for 20Mhz and 15Mhz.</p>	<p>24Mhz Pass</p> <p>20Mhz Pass</p> <p>15Mhz Pass</p>	<p>24Mhz Pass</p> <p>20Mhz Pass</p> <p>15Mhz Pass</p>	

SD/MMC Clock Throttling Test Suite

#	Test Standard	Windows XP	Windows Vista	Comments
4	<p>Using the vendor specific command CFh and the vendor specific function code of 17h, set the MS clock to be throttled at 40Mhz.</p> <p>Insert an MS card into the DUT. Begin performing reads/writes to the media and measure the frequency of the MS Clock. Verify that the MS Clock operates at the proper clock speed.</p> <p>Repeat for 20Mhz and 15Mhz.</p>	<p>40Mhz Pass</p> <p>20Mhz Pass</p> <p>15Mhz Pass</p>	<p>40Mhz Pass</p> <p>20Mhz Pass</p> <p>15Mhz Pass</p>	
5	<p>Repeat steps 3 & 4 except use the vendor specific CFh command and the vendor specific function code of 17h to set both the SD and MS clocks to be throttled at various values.</p>	<p>24Mhz Pass</p> <p>20Mhz Pass</p> <p>15Mhz Pass</p>	<p>24Mhz Pass</p> <p>20Mhz Pass</p> <p>15Mhz Pass</p>	

Macintosh OS Specific Testing

This test suite summarizes the testing performed in the Macintosh operating systems.

#	Test Suite	Mac OS 10.4	Comments
1	Installation	Pass	
2	Compact Flash / Microdrive	- -	
3	Smart Media	- -	
4	xD	Pass	
5	Secure Digital / Multimedia Card	Pass	
6	Memory Stick / Memory Stick Pro	Pass	
7	Media ECC/CIS	Pass	
8	Multiple Device	Pass	
9	Load / Unload	Pass	
10	USB 1.1	Pass	
11	LED Activity	Pass	