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USB2228/USB2227
USB 2.0 Flash Media Controller
**Software Performance and
Compatibility Test Report**

Firmware Version: 558
Report Date: 9/17/2007

Total Test Time Required: 408 Hours

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Test Environment

Hardware:

Test Machine(s): (Include Host Controller Type, Motherboard Model, BIOS Version, and Chipset)	Other Hardware:	Chipsets Used for Testing:
<p>Machine 1: QA-101 Bios: AMI v 08009 Mother Board: AsusTek P4P800 Chipset: Intel i865/PE/G/i848P South Bridge: Intel 82801EB (ICH5) processor: Intel Pentium 4 2.6GHz RAM: 512MB EHCI: Intel PCI to USB</p> <p>Machine 2: QA-I64-103 BIOS: DELL rev. 1.0.3 MOTHERBOARD: DELL Inc.(0WF810) CHIPSET: Intel Q965 Express SOUTH BRIDGE: INTEL Q965 ICH8/R/D0 PROCESSOR: INTEL PENTIUM D950 3.4GHz RAM: 1GB EHCI: INTEL Q965 ICH8/R/D0</p> <p>Machine 3: QA-A64-103 BIOS: PHOENIX TECH. 3.04 MOTHERBOARD: ASUS (SALMON) VER. 1.04 CHIPSET: SiS 760 SOUTHBRIDGE: SiS 964 PROCESSOR: AMD ATHLON 64 3400+ RAM: 384MB PC2100 DDR266 EHCI: SiS 7002 VER. 2.0</p>	<p>Machine 4: QA I32 107 BIOS: DELL REV A09 MOTHERBOARD: DELL CHIPSET: INTEL I845G SOUTHBRIDGE: INTEL 82801 DB (ICH4) PROCESSOR: INTEL P4 2.0GHz RAM:512 MB EHCI: INTEL 82801DB (ICH4)</p> <p>Machine 5: QA A32 107 BIOS: AMI 7.00T MOTHERBOARD: MSI MS-6712L CHIPSET: VIA KT400A SOUTHBRIDGE: VT8325 PROCESSOR: AMD Athlon XP 1.1 GHz RAM:512 MB EHCI: VT6202/12</p> <p>Machine 6: QA I32 111 BIOS: AMI 8/20/2003 MOTHERBOARD: DELL CHIPSET: INTEL 865PE SOUTHBRIDGE: INTEL 82801 EB (ICH5) PROCESSOR: INTEL P4 2.6GHz RAM:512 MB EHCI: ICH 5</p>	<p>Intel i845E Intel i865P/PE/G Intel i865P/PE/G/i848P Intel 865PE 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:
<p>USB2228.1.558.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 OUSBEHCI.SYS 2.1.4 OWC IUSBEHCI.SYS 1.0.3.0 UHCD DRIVER: WINXP: USBUHCI.SYS 5.1.2600.1243</p>	<p>SFV32W.EXE version 1.0.350 Setlcon.exe 1.2.1.2 MAC SFV (10x) version 1.3 MacSFV (8x-9x) version 1.2 Bundled Software Production Line Descriptor Update Utility version 2.0.1.0 Production Line Test Utility version 1.0.0.5 Quick Test Production Line Utility Using Filter Driver version 1.0.0.3 Utility to Format MSPRO mediaversion 1.0.0.2 DOSPLTU SMSC VERSION 2.0 USBDM.EXE VERSION 2.0.0.7 98SafeRemoval.exe 1.0.0.5 Automation.exe version 6-9-04 DFU_App Version 2.1(Mac OS 10x) DFU Version 1.1(Mac OS 9x)</p>	<p>Windows XP SP2 Macintosh OS 10.x Windows Vista Ultimate</p>

Testing Overview

Standard for Certifying Firmware and Drivers:

The USB2228 Test Suite consists of 22 separate functional testing areas designed to fully exercise the capabilities of the USB2228 USB 2.0 Flash Media Controller chip. For a firmware and driver combination to be considered certified by the SMSC QA Test Laboratory, it must receive passing test results in each of the following functional test suites:

NOTE: The USB2227 is identical to the USB2228 with the exception that xD media is not supported. Any references to xD media in this test report only apply to the USB2228.

<u>Functional Test Suite</u>	<u>Operating Systems</u>
1. Installation	Windows XP and Vista
2. USBCV	Windows XP
3. Compact Flash / Microdrive	Windows XP and Vista
4. Smart Media	Windows XP and Vista
5. xD	Windows XP and Vista
6. Secure Digital / MultiMedia Card	Windows XP and Vista
7. Memory Stick / Memory Stick Pro	Windows XP and Vista
8. Media ECC / CIS	Windows XP and Vista
9. Multiple Device	Windows XP and Vista
10. Surprise Removal	Windows XP and Vista
11. Load / Unload	Windows XP and Vista
12. Booting from USB	Windows XP and Vista
13. USB 1.1	Windows XP and Vista
14. Driver Test Manager (DTM)	Windows XP and Vista
15. Current Measurements	Windows XP and Vista
16. Bundled Software	Windows XP and Vista
17. DFU / Descriptor Update	Windows XP and Vista
18. C3–Attach on Insert	Windows XP and Vista
19. LUN Power Configuration	Windows XP and Vista
20. Memory Stick Compliancy	Windows XP
21. Memory Stick Pro Compliancy	Windows XP
22. Macintosh OS Specific	Mac OS 10.4

A new firmware–driver combination must pass all test suites for every operating system listed to be considered certified. Note that this standard does not apply to beta software released for evaluation purposes.

Test Results

Test Technician: William Baleson
Test Technician: Mark McLaughlin

Test Technician: Martin Winfield
Test Technician:

Test Suite Results Summary

Test Suite	Windows XP	Windows Vista
# 1 Installation	Pass	Pass
# 2 USBCV	Pass	N/A
# 3 Compact Flash / MicroDrive	Pass	Pass
# 4 Smart Media	Pass	Pass
# 5 xD	Pass	Pass
# 6 Secure Digital / MultiMedia Card	Pass	Pass
# 7 Memory Stick / Memory Stick Pro	Pass	Pass
# 8 Media ECC / CIS	Pass	Pass
# 9 Multiple Device	Pass	Pass
# 10 Surprise Removal	Pass	Pass
# 11 Load / Unload	Pass	Pass
# 12 Booting from USB	Pass	Pass
# 13 USB 1.1	Pass	Pass
# 14 Driver Test Manager (DTM)	Pass	Pass
# 15 Current Measurements	Pass	Pass
# 16 Bundled Software	Pass	Pass
# 17 DFU / Descriptor Update	Pass	Pass
# 18 C3—Attach on Insert	Pass	Pass
# 19 LUN Power Configuration	Pass	Pass
# 20 Memory Stick Compliancy	Pass	N/A
# 21 Memory Stick Pro Compliancy	Pass	N/A
Mac OS 10.4		
# 22 Macintosh OS Specific	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	8/30/07	MW	8/28/07	WB
# 2	USBCV	8/30/07	WB	N/A	N/A
# 3	Compact Flash / Microdrive	9/5/07	MM	9/5/07	MM
# 4	Smart Media	9/5/07	WB	9/5/07	WB
# 5	xD	9/6/07	MM	9/6/07	MM
# 6	Secure Digital / MultiMedia Card	9/4/07	MW	9/4/07	MW
# 7	Memory Stick / Memory Stick Pro	8/30/07	MW	8/30/07	MW
# 8	Media ECC / CIS	9/5/07	MM	9/5/07	MM
# 9	Multiple Device	8/30/07	WB	8/30/07	WB
# 10	Surprise Removal	8/30/07	WB	8/30/07	WB
# 11	Load / Unload	8/27/07	MW	8/27/07	MW
# 12	Bootting from USB	9/5/07	MM	9/5/07	MM
# 13	USB 1.1	8/31/07	WB	8/31/07	WB
# 14	Driver Test Manager (DTM)	8/28/07	WB	8/28/07	WB
# 15	Current Measurements	8/15/07	WB	8/15/07	WB
# 16	Bundled Software	8/17/07	MW	8/20/07	MW
# 17	DFU / Descriptor Update	8/30/07	MW	8/30/07	MW
# 18	C3—Attach on Insert	8/28/07	WB	8/28/07	WB
# 19	LUN Power Configuration	8/29/07	MW	8/29/07	MW
# 20	Memory Stick Compliancy	8/29/07	WB	N/A	N/A
# 21	Memory Stick Pro Compliancy	8/29/07	WB	N/A	N/A
		Mac OS 10.4	Tester's Initials		
# 22	Macintosh OS Specific	9/5/07	WB		

Installation Test Suite

Overview

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.

#	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 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Uninstall the DUT hardware entries from the Device Manager. Detach the USB cable from the host and power off the device.</p> <p>Bus-Powered no media—Configure the device to be bus-powered. With no media inserted in any of the media slots, 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	
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>Bus-Powered media—Insert CF, MS, SM, and SD cards into their respective slots, and 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	
5	Repeat step 4 with MD, MS Pro, xD, and MMC cards.	Pass	Pass	

Installation Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
6	<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 the test with xD.</p>	<p>SM Pass</p> <p>xD Pass</p>	<p>SM Pass</p> <p>xD Pass</p>	
7	<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 the test with xD.</p>	<p>SM Pass</p> <p>xD Pass</p>	<p>SM Pass</p> <p>xD Pass</p>	

Installation Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
8	<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 the test with MD.</p>	<p>CF Pass</p> <p>MD Pass</p>	<p>CF Pass</p> <p>MD Pass</p>	
9	<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 the test with MD.</p>	<p>CF Pass</p> <p>MD Pass</p>	<p>CF Pass</p> <p>MD Pass</p>	

Installation Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
10	<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 the test with MMC.</p>	<p>SD Pass</p> <p>MMC Pass</p>	<p>SD Pass</p> <p>MMC Pass</p>	
11	<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 the test with MMC.</p>	<p>SD Pass</p> <p>MMC Pass</p>	<p>SD Pass</p> <p>MMC Pass</p>	

Installation Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
12	<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 the test with MS Pro.</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	
13	<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 the test with MS Pro.</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	<p>MS Pass</p> <p>MS Pro Pass</p>	

Installation Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
14	<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	
15	<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	

Installation Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
16	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.	Pass	Pass	
17	Repeat steps 14–16 with MD, MS Pro, xD, and MMC.	Pass	Pass	

USB Command Verifier (USBCV) Test Suite

Overview

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 (verifying the latest version at <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.

#	Test Standard	Windows XP	Windows Vista	Comments
1	Connect the DUT to the host, and insert low-capacity media into each available slot on the device.	Pass	N/A	
2	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	N/A	
3	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	N/A	

Compact Flash / Microdrive Test Suite

Overview

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.

#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>CF Writes—Insert a 16 MB 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 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 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>	Pass	Pass	
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>	Pass	Pass	

Compact Flash / Microdrive Results (cont.)

#	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.	Pass	Pass	
4	CF Write, Insert/Remove, Read Repeat tests 1–3 for the following devices: 8MB CF, 32MB CF, 64MB CF, 128MB CF, 256MB CF, 512MB CF, 1GB CF, 2GB CF, 8GB CF, 2GB MD, 4GB MD, and a 6GB MD.	8MB CF Pass 32MB CF Pass 64MB CF Pass 128MB CF Pass 256MB CF Pass 512MB CF Pass 1GB CF Pass 2GB CF Pass 8GB CF Pass 2GB MD Pass 4GB MD Pass 6GB MD Pass	8MB CF Pass 32MB CF Pass 64MB CF Pass 128MB CF Pass 256MB CF Pass 512MB CF Pass 1GB CF Pass 2GB CF Pass 8GB CF Pass 2GB MD Pass 4GB MD Pass 6GB MD Pass	

Smart Media Test Suite

Overview

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.

#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>SM Writes—Insert an 8MB 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 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 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>	Pass	Pass	
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>	Pass	Pass	

Smart Media Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
3	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.	Pass	Pass	
4	SM Write, Insert/Remove, Read Repeat tests 1 through 3 for the following media: 16MB SM, 32MB SM, 64MB SM, 128MB SM, 256MB SM. Note: If there is not a 256MB SM available, an xD to SM adapter with a 256MB xD card inserted may be used.	16MB SM Pass 32MB SM Pass 64MB SM Pass 128MB SM Pass 256MB SM Pass	16MB SM Pass 32MB SM Pass 64MB SM Pass 128MB SM Pass 256MB SM Pass	
5	SM MPEG Playback 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.	Pass	Pass	
6	SM Write Protect 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. Attempt to format the SM card. The OS should report that the format could not be completed.	Pass	Pass	

xD Test Suite

Overview

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.

#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>xD Writes—Insert a 16MB 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 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 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	

xD Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
3	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.	Pass	Pass	
4	xD Write, Insert/Remove, Read Repeat tests 1–3 for the following media: 32MB xD, 64MB xD, 128MB xD, 256MB xD, 512MB xD.	32MB xD Pass 64MB xD Pass 128MB xD Pass 256MB xD Pass 512MB xD Pass	32MB xD Pass 64MB xD Pass 128MB xD Pass 256MB xD Pass 512MB xD Pass	
5	Repeat steps 1–3 using Type “H” xD cards.	256MB Pass 512MB Pass 1GB Pass	256MB Pass 512MB Pass 1GB Pass	
6	Repeat steps 1–3 using Type “M” xD cards.	256MB Pass 512MB Pass 1GB Pass 2GB Pass	256MB Pass 512MB Pass 1GB Pass 2GB Pass	

Secure Digital / Multimedia Card Test Suite

Overview

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.

#	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 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 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 Results (cont.)

#	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 Pass	256MB SD Pass 2GB SD Pass 16MB MMC Pass 64MB MMC Pass 256MB MMC Pass SD-HC Pass MMC 4.2 Pass	
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	
6	HS-SD Format 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. Perform a format on the HS-SD card. Verify that the format completes.	HS-SD Pass	HS-SD Pass	

Secure Digital / Multimedia Card Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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	
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	

Secure Digital / Multimedia Card Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
10	<p>HS-SD Write Protect</p> <p>Enable the write protect switch on a 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	
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 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
15	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.	HS-MMC Pass	HS-MMC Pass	

Memory Stick / Memory Stick Pro Test Suite

Overview

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.

#	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 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 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 Results (cont.)

#	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	
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	

Memory Stick / Memory Stick Pro Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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	
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 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 files copied may have to be increased to have enough time to suspend the host 3–4 times.	Pass	Pass	

Media ECC / CIS Test Suite

Overview

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.

#	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	
4	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. Open the pic5.jpg file. Verify it opens and is displayed correctly.	Pass	Pass	
5	Repeat steps 1–4 using a 1.1 host controller to connect the DUT to the computer.	Pass	Pass	
6	Repeat steps 1–5 using the "MS4 ECC" MS card.	Pass	Pass	

Media ECC / CIS Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
7	Smart Media ECC test 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.	Pass	Pass	
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	Smart Media 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 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.	Pass	Pass	
11	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. 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 .	Pass	Pass	

Media ECC / CIS Results (cont.)

#	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	
16	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. 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 .	Pass	Pass	

Multiple Device Test Suite

Overview

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.

#	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 Test #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 Test #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 (cont.)

#	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>B1 to Host / Host to B1—Leave both boards attached to the host, but for this test perform all of the reads/writes on one board only.</p> <p>Copy a large file from the CF to the host, and copy another large file from the host to the SM. Repeat this test using all possible combinations of CF, MS, SM, and SD, for both reads and writes. Ensure that all transfers complete normally.</p>	Pass	Pass	
6	<p>All Media types—Repeat steps 1–5 of this test suite using MD, MS Pro, xD, and MMC.</p>	Pass	Pass	

Surprise Removal Test Suite

Overview

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.

#	Test Standard	Windows XP	Windows Vista	Comments
1	CF / MD Surprise Removal (USB) 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. 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.	Write Pass Read Pass	Write Pass Read Pass	
2	CF / MD Surprise Removal (Media) 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. 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.	Write Pass Read Pass	Write Pass Read Pass	

Surprise Removal Results (cont.)

#	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 4GB MD.	64MB CF Pass 4GB MD Pass	64MB CF Pass 4GB MD Pass	
5	SM / xD Surprise Removal (USB) 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. 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.	Write Pass Read Pass	Write Pass Read Pass	
6	SM / xD Surprise Removal (Media) 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. 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.	Write Pass Read Pass	Write Pass Read Pass	

Surprise Removal Results (cont.)

#	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	
9	SD / MMC Surprise Removal (USB) 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. 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.	Write Pass Read Pass	Write Pass Read Pass	

Surprise Removal Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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>	
11	<p>SD / MMC Surprise Removal (Format)</p> <p>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.</p>	Pass	Pass	
12	<p>Other SD / MMC Media</p> <p>Repeat steps 9–11 using a 256MB SD and 64MB MMC.</p>	<p>256MB SD Pass</p> <p>64MB MMC Pass</p>	<p>256MB SD Pass</p> <p>64MB MMC Pass</p>	

Surprise Removal Results (cont.)

#	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>	
15	<p>MS / MS Pro Surprise Removal (Format)</p> <p>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.</p>	<p>Pass</p>	<p>Pass</p>	

Surprise Removal Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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	
17	Other Media Surprise Removal 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. 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. 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 adapter in place. Wait 3–5 seconds and close any open warning dialogs. 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. Repeat with Memory Stick duo, Memory Stick Pro duo, xD to SM adapter, and MS to CF adapter.	Mini SD Pass MS duo Pass MS Pro duo Pass xD to SM Pass MS to CF Pass	Mini SD Pass MS duo Pass MS Pro duo Pass xD to SM Pass MS to CF Pass	

Surprise Removal Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
18	<p>USB Cable Removal From Host End</p> <p>Attach a DUT board 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 one of the pieces of media in the DUT board. 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 board 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 properly, and the media 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>	

Load / Unload Test Suite

Overview

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.

#	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. Repeat this step using a bus-powered DUT.	Pass	Pass	

Load / Unload Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
6	<p>Suspend the host and wait one minute. Resume the host and verify the device is enumerated and operates properly.</p> <p>Repeat this step using a bus-powered DUT.</p>	Pass	Pass	
7	<p>Attach a 2nd DUT to the same host and repeat step 6. Verify both boards re-enumerate and function properly after being resumed. Remove the 2nd device.</p>	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 Pass</p> <p>MD Pass</p> <p>SD Pass</p> <p>HS-SD Pass</p> <p>MMC Pass</p> <p>HS-MMC Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	<p>CF Pass</p> <p>MD Pass</p> <p>SD Pass</p> <p>HS-SD Pass</p> <p>MMC Pass</p> <p>HS-MMC Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	

Load / Unload Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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 Pass</p> <p>MD Pass</p> <p>SD Pass</p> <p>HS-SD Pass</p> <p>MMC Pass</p> <p>HS-MMC Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	<p>CF Pass</p> <p>MD Pass</p> <p>SD Pass</p> <p>HS-SD Pass</p> <p>MMC Pass</p> <p>HS-MMC Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	

Load / Unload Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
10	<p>Insert a CF card containing data into the DUT.</p> <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 Pass</p> <p>MD Pass</p> <p>SD Pass</p> <p>HS-SD Pass</p> <p>MMC Pass</p> <p>HS-MMC Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	<p>CF Pass</p> <p>MD Pass</p> <p>SD Pass</p> <p>HS-SD Pass</p> <p>MMC Pass</p> <p>HS-MMC Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>MS Pass</p> <p>MS Pro 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> <p>Repeat this step using a bus-powered DUT.</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> <p>Repeat this step using a bus-powered DUT.</p>	Pass	Pass	

Load / Unload Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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	
15	<p>Shut down the host. Remove some of the media from the DUT while 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	

Load / Unload Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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	Repeat steps 11–17 using MD, xD, MMC, and MS Pro.	Pass	Pass	
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	N/A	
20	<p>Bus-Powered Reboot Endurance</p> <p>Using the Burn-In Test Pro utility, set a host PC to continually reboot with a bus-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	N/A	

Booting from USB Test Suite

Overview

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.

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

Booting from USB Results (cont.)

#	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

Overview

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.

#	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 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Detach the USB cable from the host and power off the device.</p> <p>Bus-Powered no media—Configure the device to be bus-powered. With no media inserted in any of the media slots, 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	
4	<p>Detach the USB cable from the host.</p> <p>Bus-Powered media—Insert CF, MS, SM, and SD cards into their respective slots, and 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	
5	Repeat step 4 with MD, MS Pro, xD, and MMC cards.	Pass	Pass	

USB 1.1 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
6	<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>	
7	<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 Pass</p> <p>xD Pass</p>	<p>SM Pass</p> <p>xD Pass</p>	

USB 1.1 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
8	<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 Pass</p> <p>MD Pass</p>	<p>CF Pass</p> <p>MD Pass</p>	
9	<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 Pass</p> <p>MD Pass</p>	<p>CF Pass</p> <p>MD Pass</p>	

USB 1.1 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
10	<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>	
11	<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 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
12	<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>	
13	<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>	

USB 1.1 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
14	<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>	Pass	Pass	
15	<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	
16	<p>Remove the CF, MS, SM, and SD cards from the device.</p> <p>Repeat steps 14–15 using MD, MS Pro, xD, and MMC.</p>	Pass	Pass	

USB 1.1 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
17	<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	
18	<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	
19	<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	

USB 1.1 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
20	<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	
21	Repeat steps 17–20 using MD, SM, xD, SD, MMC, MS, and MS Pro.	<p>MD Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>SD Pass</p> <p>MMC Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	<p>MD Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>SD Pass</p> <p>MMC Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	

Driver Test Manager (DTM) Test Suite

Overview

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.

Driver Reliability:

#	DTML Test	Windows XP	Windows Vista	Comments
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:

#	DTM Test	Windows XP	Windows Vista	Comments
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	

DTM Results (cont.)

#	DTM Test	Windows XP	Windows Vista	Comments
6	USB Device Control Requests	Pass	Pass	
7	USB Device Framework	Pass	Pass	
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	

Current Measurements Test Suite

Overview

This test suite checks to ensure that the DUT meets all Current Measurement power requirements.

#	Test Standard	Windows XP	Windows Vista	Comments
1	Unconfigured and Configured Current Using the USBCV test utility, check the unconfigured and configured current for the DUT. Verify that the device draws no more than 100mA in an unconfigured state. Verify that the device draws no more than 100mA in a configured state. Once the test is complete, close the USBCV application and verify that the test stack driver is unloaded and that the device is enumerated normally as a mass storage class device.	Pass	Pass	
2	Operating Current Verify that the device is bus-powered and enumerated properly. Initiate large file transfers simultaneously on all four LUNs. During the transfer, measure the current being drawn by the DUT. In order to pass, the device cannot draw more than 500mA at any time during the operation.	Pass	Pass	
3	Suspend Current Suspend the host. Once the host has stabilized in a suspended state, wait 5 to 10 seconds and then measure the suspended current draw for the DUT. In order to pass the test, the device can draw no more than 500uA while suspended.	Pass	Pass	

Bundled Software Applications Test Suite

Overview

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.

#	Application	Windows XP	Windows Vista	Comments
1	DosPLTU	Pass	Pass	
2	PLDU	Pass	Pass	
3	SetIcon	Pass	Not Supported	
4	QuickTest	Pass	Pass	
5	PLTU	Pass	Pass	
6	ErpmUpdt	Pass	Pass	
7	Card Reader Installer	Pass	Pass	

Device Firmware Upgrade / Descriptor Update Test Suite

Overview

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.

#	Test Standard	Windows XP	Windows Vista	Comments
1	<p>DFU from old firmware</p> <p>Load 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 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	

DFU / Descriptor Update Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Surprise removal of USB cable during DFU update</p> <p>Load 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>Surprise removal of power cable during DFU update</p> <p>Set the board to be self-powered. Load 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 power cable.</p> <p>Reattach the power 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	
5	<p>Surprise system shutdown during DFU update</p> <p>Load 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%), shut the system down.</p> <p>Restart the system. Verify the board 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	

DFU / Descriptor Update Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
6	<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>	<p>EEPROM Pass</p> <p>NOEEPROM Pass</p>	<p>EEPROM Pass</p> <p>NOEEPROM Pass</p>	
7	<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>	<p>EEPROM Pass</p> <p>NOEEPROM Pass</p>	<p>EEPROM Pass</p> <p>NOEEPROM Pass</p>	

C3—Attach on Insert Test Suite

Overview

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.)

#	Test Standard	Windows XP	Windows Vista	Comments
1	Initial Plug-in—no media Connect the test device 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 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
3	<p>Initial Plug-in with CF</p> <p>Detach the test device. Insert a CF card into device.</p> <p>Connect this test device 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> <p>Repeat this step with a self-powered DUT and a bus-powered DUT.</p>	Pass	Pass	
4	<p>Suspend with CF inserted</p> <p>Insert CF into the test device. 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 written back to the computer.</p> <p>Repeat this step with a self-powered DUT and a bus-powered DUT.</p>	Pass	Pass	

C3—Attach on Insert Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
5	<p>Suspend with CF inserted; Remove CF during suspend</p> <p>Insert CF into the test device. 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 Results (cont.)

#	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 test device 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 test device. 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 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
9	<p>Cold Reboot with CF inserted</p> <p>Insert CF into the test device. 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 test device. 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	
11	<p>Cold Reboot with CF inserted; Remove device during power down</p> <p>Insert CF into the test device. 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	

C3—Attach on Insert Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
12	<p>Cold Reboot without media inserted; Insert CF during power down</p> <p>Verify that the device 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> <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	
13	<p>Cold Reboot without media inserted; Insert device + CF during power down</p> <p>Remove the device 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 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 Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
14	<p>Media surprise removal during CF write</p> <p>Remove the device under test 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. 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	
15	<p>Media surprise removal during CF read</p> <p>Verify the device 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. Verify that the device attaches. CRC the file written back to the computer.</p>	Pass	Pass	

C3—Attach on Insert Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
16	<p>Insertion / removal of other media types during CF write</p> <p>Verify that the device 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	
17	<p>Insertion / removal of other media types during CF read</p> <p>Verify that the device 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	

C3—Attach on Insert Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
18	<p>Insertion of other media types during CF write; Remove CF after write completes</p> <p>Verify that the device 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	
19	<p>Insertion of other media types during read; Remove CF after write completes</p> <p>Verify that the device 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 Results (cont.)

#	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	
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	
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	
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	

C3—Attach on Insert Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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	
29	Type “H” xD 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.)	Pass	Pass	
30	Type “M” xD 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.)	Pass	Pass	
31	Insertion of all media <p>Attach a test device 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 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, SM).</p>	Pass	Pass	

C3—Attach on Insert Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
32	<p>Initial Plug-in— with all media</p> <p>Detach the test device. Insert media into all available slots in test device.</p> <p>Connect this test device 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, SM).</p> <p>Repeat this step using a self-powered DUT and a bus-powered DUT.</p>	Pass	Pass	
33	<p>Insertion of all media (USB 1.1 speed)</p> <p>Configure the device under test 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 device under test 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> <p>Repeat this step using a self-powered DUT and a bus-powered DUT.</p>	Pass	Pass	

C3—Attach on Insert Results (cont.)

#	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>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>Repeat steps 1–34 using this configuration.</p>	Pass	Pass	

LUN Power Configuration Test Suite

Overview

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.

#	Test Standard	Windows XP	Windows Vista	Comments
1	Initial Setup—External GPIOs for MS, SM, CF, and SD Check the "Use LUN Power Configuration" setting under the Configuration tab in the USBDM. Set the LUN Power Config byte to 0x00 , the LUN Power Mask 1 to 0x12 , and the LUN Power Mask 2 to 0x84 . 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).	Pass	Pass	
2	Enumeration—no media Remove all media from the DUT. Connect the DUT to the host computer. Verify that there is no power being supplied to any card. Verify that the device enumerates properly.	Pass	Pass	
3	Restart—no media Restart the host computer with the DUT still attached. Verify that after the system restarts the DUT is properly enumerated and there is no power being supplied to any card.	Pass	Pass	

LUN Power Configuration Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
4	Suspend—no media <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>	Pass	Pass	
5	Enumerate with 1 piece of media inserted <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 read from.</p> <p>Remove the CF card. Verify that the card removal was recognized. There should be no power supplied to the CF slot and the CF drive should not be accessible.</p>	Pass	Pass	
6	Reinsertion of 1 piece of media inserted <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>	Pass	Pass	
7	Restart—1 media <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>	Pass	Pass	

LUN Power Configuration Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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 can be written to and read from.</p>	Pass	Pass	
9	<p>Other Media Types</p> <p>Repeat steps 5–8 using MD, SM, xD, SD, MMC, MS, and MS Pro.</p>	<p>MD Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>SD Pass</p> <p>MMC Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	<p>MD Pass</p> <p>SM Pass</p> <p>xD Pass</p> <p>SD Pass</p> <p>MMC Pass</p> <p>MS Pass</p> <p>MS Pro Pass</p>	
10	<p>Enumerate with all media inserted</p> <p>Remove the DUT from the host computer. Insert CF, SM, SD, and MS cards 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 all cards.</p> <p>Verify that the cards can be written to and read from.</p> <p>Remove the SD card. Verify that the card removal was recognized. There should be no power supplied to the SD slot and the SD drive should not be accessible. Replace the SD card. Verify that all cards can be accessed.</p>	Pass	Pass	
11	<p>Restart—all media</p> <p>Restart the host computer with the DUT still attached and the media still inserted.</p> <p>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.</p>	Pass	Pass	

LUN Power Configuration Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
12	<p>Suspend—all media</p> <p>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.</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 cards. Verify that the cards can be written to and read from.</p> <p>Remove the media.</p>	Pass	Pass	
13	<p>Other Media Types</p> <p>Repeat steps 10–12 using MD, xD, MMC, and MS Pro.</p>	Pass	Pass	
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> <p>Set the jumpers for external GPIOs to be used for SD and internal FETs to be used for SM and MS (pins 3-4 should have a jumper for J40, pins 3-5 and 4-6 should have a jumper for J41, and pins 3-4 should have a jumper for J42).</p>	Pass	Pass	
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>	Pass	Pass	

LUN Power Configuration Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
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> <p>Configure the board to have two LUNs—one for CF and one shared for MS, SM, and SD.</p> <p>The SVB will need to be wired for FET0 to be powering the MS, SM, and SD slots. Remove all jumpers from J40, 41, and 42. These jumpers will be replaced with 3 wires that are connected together at one end. The end with all of the wires connected needs to be placed on pin 4 of J40. The other ends of the 3 wires need to be placed on pin 3 of J40, pin 4 of J41, and pin 4 of J42.</p>	Pass	Pass	
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>	Pass	Pass	
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>	Pass	Pass	
19	<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>	Pass	Pass	

LUN Power Configuration Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
20	<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 read from.</p> <p>Remove the CF card. Verify that the card removal was recognized. There should be no power supplied to the CF slot and the CF drive should not be accessible.</p>	Pass	Pass	
21	<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>	Pass	Pass	
22	<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>	Pass	Pass	
23	<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 can be written to and read from.</p> <p>Remove the CF card.</p>	Pass	Pass	

LUN Power Configuration Results (cont.)

#	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 Pass SM Pass xD Pass SD Pass MMC Pass MS Pass MS Pro Pass	MD Pass SM Pass xD Pass SD Pass MMC Pass MS Pass MS Pro Pass	
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. Remove the SD card. Verify that the card removal was recognized. There should be no power supplied to the SD slot and the SD drive should not be accessible. Replace the SD card. Verify that all cards can be accessed.	Pass	Pass	
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.	Pass	Pass	

LUN Power Configuration Results (cont.)

#	Test Standard	Windows XP	Windows Vista	Comments
27	<p>Suspend—all media</p> <p>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.</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 cards. Verify that the cards can be written to and read from.</p> <p>Remove the media.</p>	Pass	Pass	
28	<p>Other Media Types</p> <p>Repeat steps 25–27 using the following combinations: CF/MS, CF/SM, MD/MMC, MD/xD, MD/MS Pro.</p>	<p>CF/MS Pass</p> <p>CF/SM Pass</p> <p>MD/MMC Pass</p> <p>MD/xD Pass</p> <p>MD/MS Pro Pass</p>	<p>CF/MS Pass</p> <p>CF/SM Pass</p> <p>MD/MMC Pass</p> <p>MD/xD Pass</p> <p>MD/MS Pro Pass</p>	

Memory Stick and Memory Stick Pro Compliancy Test Suite

Overview

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.

Test #	Test Description	Windows XP	Windows Vista	Comments
1	Memory Stick Compliancy Tester version: 1.00.0A13	Pass	Pass	
2	Memory Stick Pro Compliancy Tester version: 1.06.070A (7-10-06)	Pass	Pass	

Macintosh OS Specific Testing

Overview

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	Pass	
3	Smart Media / xD	Pass	
4	Memory Stick / Memory Stick Pro	Pass	
5	Secure Digital / Multimedia Card	Pass	
6	Multiple Device	Pass	
7	Load / Unload	Pass	
8	USB 1.1	Pass	
9	MAC DFU	Pass	

Appendix A: Media Tested

This following media has been verified to work.

NOTE: Some media may appear identical. These occurrences represent identical cards that were tested.

Compact Flash / Microdrive

Brand	Format	Capacity	Brand	Format	Capacity
CompUSA	CF	16MB	Lexar	CF	1GB
Lexar	CF	32MB	Ativa	CF	2GB
Memorex	CF	256MB	Ativa	CF	2GB
PNY	CF	64MB	Lexar	CF	2GB
Efilm PRO	CF	640MB	Lexar	CF	2GB
SanDisk	CF	512MB	Sandisk Extreme IV	CF	2GB
Viking	CF	32MB	Sandisk Extreme IV	CF	8GB
eFilmPro	CF	640MB	Lexar	CF	4GB
SanDisk	CF	32MB	Hitachi	MD	2GB
Lexar	CF	512MB	Hitachi	MD	6GB
Sandisk	CF	1GB	Hitachi	MD	6GB
Transcend	CF	8GB	Seagate	MD	8GB
Sandisk EX	CF	1GB	Seagate	MD	8GB
Sandisk Extreme IV	CF	4GB	Seagate	MD	8GB
Sandisk Extreme III	CF	1GB	Seagate	MD	8GB
Sandisk Extreme III	CF	2GB	Hitachi	MD	4GB
Sandisk Ultra II	CF	1GB	Hitachi	MD	3GB
Sandisk Ultra II	CF	2GB	IBM	MD	340MB
Sandisk Ultra II	CF	2GB	IBM	MD	340MB
SimpleTech	CF	1GB	Seagate	MD	4GB
Lexar	CF	48MB	IBM	MD	1GB
Toshiba	CF	1GB	IBM	MD	1GB
Toshiba	CF	1GB	Magicstor	MD	2.2GB
PNY	CF	512MB	Hitachi	MD	3GB
PNY	CF	512MB	Hitachi	MD	4GB

MultiMedia Card

Brand	Format	Capacity	Brand	Format	Capacity
Lexar	MMC	32MB	Transcend	MMC	128MB
PQI	MMC	256MB	Transcend	MICRO MMC	256MB
SimpleTech	MMC	128MB	Transcend	MICRO MMC	512MB
SimpleTech	MMC	32MB	Transcend	Micro MMC	128MB
Sandisk	MMC	128MB	Kingston	Mobile MMC	1GB
Sandisk	MMC	32MB	PQI	Mobile	1GB
SanDisk	MMC	64MB	PQI	MMC	1GB

				Mobile	
Phison	MMC	4GB	Patriot	MMC	
				Mobile	1GB
SAMSUNG	MMC HS	128MB	Patriot	MMC	
				Mobile	1GB
Transcend	MMC HS	1GB	SanDisk	MMC	
				Mobile	1GB
Transcend	MMC HS	512MB	Hama	MMC	
				Mobile	1GB
Transcend	MMC HS	2GB	Sandisk	MMC RS	128MB
Transcend	MMC HS	512MB	Transcend	MMC RS	128MB
PQI	MMC HS	512MB	Transcend	MMC RS	256MB
CONNECT	MMC HS	512MB	Transcend	MMC RS	512MB
Kingston	MMC HS	512MB	Transcend	MMC RS	512MB
SMI	MMC HS	4GB	Transcend	MMC RS	256MB
EpMemory	MMC HS	2GB	Transcend	MMC RS	128MB
Transcend	MMC HS	4GB	Sandisk	MMC RS	128MB

Secure Digital

Brand	Format	Capacity	Brand	Format	Capacity
SanDisk	SD	32MB	Sandisk Ultra II	SD	2GB
PNY	SD	128MB	X Digital Media	SD	1GB
unk	SD	128MB	Buffalo	SD	256MB
Kingston	SD	64MB	Buffalo	SD	256MB
INFINEON	SD	128MB	Buffalo	SD	256MB
INFINEON	SD	128MB	Transcend	SD	2GB
Sandisk Ultra II	SD	512MB	Sandisk Extreme III	SD	2GB
Sandisk Ultra II	SD	512MB	Sandisk Extreme III	SD	1GB
Lexar	SD	256MB	Sandisk Extreme III	SD	1GB
Lexar	SD	256MB	LG	SD	1GB
ADTEC	SD	128MB	LG	SD	1GB
Sandisk	SD	512MB	Sandisk	SD HC	4GB
ADTEC	SD	64MB	Toshiba	SD HC	4GB
EDGE	SD	128MB	Panasonic	SD HC	4GB
EDGE	SD	128MB	Panasonic	SD HC	4GB
SanDisk	SD	128MB	Toshiba	SD HC	8GB
Lexar	SD	512MB	Patriot	SD HC	8GB
SimpleTech	SD	1GB	SMI	SD HC	4GB
SimpleTech	SD	1GB	Panasonic	SD HS	512MB
SanDisk	SD	2GB	Panasonic	SD HS	512MB
PNY	SD	1GB	unk	SD HS	32MB
Lexar	SD	1GB	Panasonic	SD HS	1GB
Lexar	SD	2GB	A-Data	SD HS	1GB
Lexar	SD	2GB	PQI	SD HS	2GB
Patriot	SD	1GB	Panasonic	SD HS	512MB
Patriot	SD	1GB	Panasonic	SD HS	512MB
HP	SD	512MB	SD		
HP	SD	512MB	Transcend	MICRO	128MB
			SD		
			Transcend	MICRO	256MB

Corsair	SD	256MB	Transcend	SD micro	256MB
Panasonic	SD	256MB	Sandisk Ultra II	SD micro	1GB
Panasonic	SD	256MB	Toshiba	SD mini	32MB
EDGE	SD	128MB	Panasonic	SD mini	32MB
EDGE	SD	128MB	Panasonic	SD mini	128MB
Toshiba	SD	1GB	PDC	SD mini	128MB
Toshiba	SD	1GB	KINGSTON	SD mini	512MB
DaneElec	SD	2GB	Panasonic	SD mini	64MB
Ativa	SD	1GB	Panasonic	SD mini	64MB
Ativa	SD	1GB	Panasonic	SD mini	64MB
X Digital Media	SD	1GB	Panasonic	SD mini	64MB
Lexar Platinum II	SD	512MB	Panasonic	SD mini	64MB
Lexar Platinum II	SD	512MB	Panasonic	SD mini	64MB
Lexar Platinum II	SD	2GB	Sandisk Ultra II	SD-USB	1GB
Lexar Platinum II	SD	4GB	A-Data	SD-USB	2GB
Corsair	SD	2GB	OCZ	SD-USB	1GB
Corsair	SD	2GB			

Memory Stick / Memory Stick Pro

Brand	Format	Capacity	Brand	Format	Capacity
Lexar	MS	16MB	Sony	MS	64MB
Lexar	MS	16MB	Sony	MS DUO	16MB
Sony	MS	32MB	Sony	MS DUO	16MB
PQI	MS	128MB	Sony	MS DUO	16MB
Sony	MS	8MB	Sony	MS DUO	32MB
Sony	MS	8MB	Sony	MS DUO	64MB
Sony	MS	16MB	Sony	MS DUO	64MB
Lexar	MS	256MB	Sony	MS DUO	64MB
Sony	MS	64MB	Sony	MS DUO	32MB
SanDisk	MS	16MB	Sony	MS DUO	32MB
SanDisk	MS	1GB	Sony	MS DUO	32MB
Sony	MS	128MB	Sony	MS M2 Duo	512MB
Sony	MS	32MB	SanDisk	MS M2 Duo	512MB
Sony	MS	16MB	SanDisk	MS M2 Duo	1GB
Sony	MS	16MB	Sony	MS PRO	256MB
Lexar	MS	64MB	SanDisk	MS PRO	512MB
Sony	MS	128MB	MagicGate	MS PRO	256MB
Sony	MS	8MB	SanDisk	MS PRO	512MB
Sony	MS	16MB	Sandisk	MS Pro Duo	256MB
Sony	MS	16MB	Sandisk	MS Pro Duo	1GB
Sony	MS	8MB	Sandisk	MS Pro Duo	256MB
MagicGate	MS	128MB	Sandisk Extreme III	MS Pro Duo	1GB
Sony	MS	32MB	Sony	MS Pro Duo	2GB
Sony	MS	8MB	SanDisk	MS Pro	256MB

Lexar	MS	128MB	SanDisk	Duo MS Pro Duo	4GB
Lexar	MS	64MB	Sony	MS Pro Duo	256MB

Smart Media / xD

Brand	Format	Capacity	Brand	Format	Capacity
Lexar	SM	32MB	Olympus	XD	32MB
unk	SM	16MB	Olympus	XD	256MB
Fuji	SM	16MB	Olympus	XD	128MB
unk	SM	8MB	Olympus	XD	512MB
unk	SM	64MB	OLYMPUS	XD	64MB
unk	SM	16MB	OLYMPUS	XD	512MB
unk	SM	8MB	OLYMPUS	XD	64MB
unk	SM	8MB	OLYMPUS	XD	512MB
Viking	SM	64MB	OLYMPUS	XD	256MB
unk	SM	32MB	Sandisk	XD	512MB
unk	SM	128MB	Sandisk	XD	512MB
unk	SM	128MB	PNY	XD	1GB
unk	SM	64MB	PNY	XD	1GB
unk	SM	128MB	Olympus	XD	2GB
PNY	SM	128MB	Fuji	XD	512MB
SM	SM	128MB	Olympus	XD	512MB
VIKING	SM	64MB	Fuji	XD	2GB
VIKING	SM	64MB	Olympus	XD	2GB
unk	SM	64MB	Olympus	XD	256MB
unk	SM	64MB	Fuji	XD	1GB
unk	SM	8MB	Fuji	XD	1GB
unk	SM	128MB	Fuji	XD	512MB
unk	SM	128MB	Olympus	XD	2GB
unk	SM	128MB	Olympus	XD	512MB
Fuji	XD	64MB	Olympus	XD	512MB
Fuji	XD	128MB	Fuji	XD	512MB