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REPORT

Test Results for Forensic Media Preparation Tool: WiebeTech Drive
eRazer: DRZR-2-VBND & Drive eRazer PRO Bundle (03/17/2009)

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**Test Results for Forensic Media Preparation
Tool: WiebeTech Drive eRazer: DRZR-2-VBND
& Drive eRazer PRO Bundle (03/17/2009)**



Kristina Rose

Acting Director, National Institute of Justice

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July 2009

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Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the National Institute of Justice (NIJ), the research and development organization of the U.S. Department of Justice (DOJ), and the National Institute of Standards and Technology's (NIST's) Office of Law Enforcement Standards and Information Technology Laboratory. CFTT is supported by other organizations, including the Federal Bureau of Investigation, the U.S. Department of Defense Cyber Crime Center, U.S. Internal Revenue Service Criminal Investigation Division Electronic Crimes Program, and the U.S. Department of Homeland Security's Bureau of Immigration and Customs Enforcement, U.S. Customs and Border Protection, and U.S. Secret Service. The objective of the CFTT program is to provide measurable assurance to practitioners, researchers, and other applicable users that the tools used in computer forensics investigations provide accurate results. Accomplishing this requires the development of specifications and test methods for computer forensics tools and subsequent testing of specific tools against those specifications.

Test results provide the information necessary for developers to improve tools, users to make informed choices, and the legal community and others to understand the tools' capabilities. The CFTT approach to testing computer forensic tools is based on well-recognized methodologies for conformance and quality testing. The specifications and test methods are posted on the CFTT Web site (<http://www.cftt.nist.gov/>) for review and comment by the computer forensics community.

This document reports the results from testing WiebeTech Drive eRazer, against the *Forensic Media Preparation Tool Test Assertions and Test Plan Version 1.0*, available at the CFTT Web site (<http://www.cftt.nist.gov/fmp-atp-pc-01.pdf>).

Test results for other devices and software packages using the CFTT tool methodology can be found on NIJ's computer forensics tool testing Web page, <http://www.ojp.usdoj.gov/nij/topics/technology/electronic-crime/cftt.htm>.

Test Results for Forensic Media Preparation Tool

Tool Tested: Drive eRazer
Version: DRZR-2-VBND & Drive eRazer PRO Bundle (03/17/2009)
Run Environments: Custom

Supplier: WiebeTech LLC, a brand of CRU–DataPort

Address: 8201 E. 34th St. North #909
Wichita, KS 67226

Tel: 866–744–8722

Fax: 316–744–1398

WWW: <http://www.wiebetech.com/>

1 Results Summary

Two versions of the Drive eRazer hardware device were tested: DRZR-2-VBND and Drive eRazer Pro Bundle (03/17/2009). Initially we were testing the DRZR-2-VBND device. During testing, we found that the device failed to recognize certain drives as supporting SECURE ERASE. The eRazer PRO was then included in the testing since the eRazer PRO has revised firmware that fixes the recognition problem but is otherwise the same as the original device. Since the scope of the fix was limited to the recognition problem, it was determined that two test reports were unnecessary if a few test cases were run for both devices. Five test cases, identified in Section 2, were rerun with the eRazer Pro.

The DRZR-2-VBND is referred to as the DRZR–2 and the other device is referred to as the eRazer PRO. A revision letter indicating the firmware version can be found on the back of the product at the end of the number beneath the top bar code. Both devices have a jumper that can be used to select either *single pass* mode (the device uses an ATA WRITE command to overwrite drive content) or *secure erase* mode (the device uses the ATA SECURE ERASE command to overwrite the drive content).

In all the test cases with both the DRZR–2 and the eRazer PRO devices, all visible sectors were successfully overwritten. The test cases that used drives containing an HPA or DCO demonstrated some inconsistent behaviors:

- With the jumper set to single pass mode (device uses a WRITE command to overwrite drive content) an HPA was removed, but content was not changed. This was observed for both the DRZR–2 (case FMP–03–HPA) and the eRazer PRO (cases FMP–03–HPA–ALT and FMP–03–DCO+HPA–3).
- With the jumper set to single pass mode (device uses a WRITE command to overwrite drive content) a DCO was neither removed nor was the content changed.

This was observed for both the DRZR-2 (case FMP-03-DCO) and the eRazer PRO (case FMP-03-DCO+HPA-3).

- With the jumper set to secure erase mode (device uses a SECURE ERASE command to overwrite drive content) a DCO was neither removed nor was the content changed. This was observed for both the DRZR-2 (cases FMP-04-DCO and FMP-04-DCO+HPA) and the eRazer PRO (case FMP-03-DCO-ALT).
- With the jumper set to secure erase mode (device uses a SECURE ERASE command to overwrite drive content) an HPA was not removed (cases FMP-04-HPA, FMP-04-DCO-HPA, and FMP-04-HPA-TOS). However, the content of an HPA on a Hitachi HTS722020K9SA00 drive was erased (cases FMP-04-DCO+HPA and FMP-04-HPA), but the content of an HPA on a TOSHIBA MK2049GSY was not changed (case FMP-04-HPA-TOS). All cases were run on the DRZR-2.

2 Test Case Selection

The vendor tool documentation states that tool writes zeros to every bit of the drive. The vendor tool documentation also states that in single pass mode, an HPA or DCO is removed and in secure erase mode any HPA or DCO is not removed.

All defined test cases were selected. Several variations of each test case were also run as follows:

- Some test cases (FMP-01 and FMP-02) have variant forms to accommodate different types of supported interfaces.
- Some test cases (FMP-03 and FMP-04) have variant forms to accommodate different types of hidden sectors (HPA, DCO or both).
- One test case, FMP-04-HPA-TOS, uses an alternate model hard drive to illustrate differences in SECURE ERASE implementation by hard drive vendors.

The vendor tool documentation states that tool writes zeros to every bit of the drive. The vendor tool documentation also states that in single pass mode, an HPA or DCO is removed and in secure erase mode any HPA or DCO is not removed.

The following cases used the DRZR-2:

- FMP-01-ATA28
- FMP-01-ATA48
- FMP-01-SATA28
- FMP-01-SATA48
- FMP-02-ATA28
- FMP-02-ATA48
- FMP-02-SATA48-2
- FMP-03-DCO
- FMP-03-HPA
- FMP-04-DCO
- FMP-04-DCO+HPA

- FMP-04-HPA
- FMP-04-HPA-TOS
- FMP-05

The following cases used the eRazer PRO:

- FMP-02-SATA48-ALT
- FMP-03-HPA-ALT
- FMP-04-DCO-ALT
- FMP-05-ALT
- FMP-03-DCO+HPA-3

The following source interfaces were tested: ATA28, ATA48, SATA28 (via vendor supplied ATA to SATA adapter) and, SATA48 (via vendor supplied ATA to SATA adapter).

3 Test Materials

3.1 Support Software

Several programs were used in the setup and analysis of the test drives. These include **hdat2** (download from <http://www.hdat2.com/download.html>), **dsum** (download from <http://www.cfft.nist.gov/>) and, **FS-TST Release 2.0** (download from: <http://www.cfft.nist.gov/diskimaging/fs-tst20.zip>).

3.2 Test Drives

The following hard drives were used in testing. The column labeled **Test Case** identifies the test case. The column labeled **Sectors** is the size of the drive with no DCO or HPA. The column labeled **Model** is the model of the drive as returned by the ATA IDENTIFY DEVICE command. The column labeled **Serial #** is as returned by the ATA IDENTIFY DEVICE command.

Test Case	Sectors	Model	Serial #
FMP-01-ATA28	156301488	Hitachi HTS541680J9AT00	SB0241HGGAWN9E
FMP-01-ATA48	312581808	WDC WD1600JB-00GVC0	WD-WMAL94865344
FMP-01-SATA28	234441648	Hitachi HTS542512K9SA00	080914BB6200WBKPD2G
FMP-01-SATA48	976773168	MAXTOR STM3500320AS	9QM3NRP1
FMP-02-ATA28	156301488	FUJITSU MHW2080AT	K004T832CK2R
FMP-02-ATA48	490234752	Maxtor 7Y250P0	Y63FSHTE
FMP-02-SATA48-2	390721968	TOSHIBA MK2049GSY	788DT0FLT
FMP-02-SATA48-ALT	312581808	ST9160310AS	5SV092JK
FMP-03-DCO	312581808	WDC WD1600JB-00GVC0	WD-WMAL94865344
FMP-03-DCO+HPA-3	156301488	FUJITSU MHW2080AT	K004T832CK3G
FMP-03-HPA	312581808	ST9160310AS	5SV092JK
FMP-03-HPA-ALT	488397168	WDC WD2500JB-00GVC0	WD-WCAL78188039

Test Case	Sectors	Model	Serial #
FMP-04-DCO	156301488	Hitachi HTS541680J9AT00	SB0241HGGAWY8E
FMP-04-DCO+HPA	390721968	Hitachi HTS722020K9SA00	080703DP04A0DTGL80TC
FMP-04-DCO-ALT	312581808	ST9160310AS	5SV092JK
FMP-04-HPA	390721968	Hitachi HTS722020K9SA00	080703DP04A0DTGL80TC
FMP-04-HPA-TOS	390721968	TOSHIBA MK2049GSY	788DT0FLT
FMP-05	156301488	WDC WD800BB-75CAA0	WD-WMA8E2108916
FMP-05-ALT	156301488	WDC WD800BB-75CAA0	WD-WMA8E2108916

All the drives used in test cases FMP-02 and FMP-04 support SECURE ERASE. The WDC WD800BB-75CAA0 drive used in test case FMP-05 does not support SECURE ERASE.

For test cases FMP-03 and FMP-04 the layout of visible and hidden sectors is as follows. The column labeled **Test Case** identifies the test case. The column labeled **Size** is the number of visible sectors presented to the device for the test case. The column labeled **Hidden** is the size of the hidden area. If the drive contains both a DCO and an HPA the sizes of the DCO and HPA are in parentheses with the DCO size listed first.

Test Case	Size	Total	Hidden (DCO+HPA)
FMP-03-DCO	31258001	312581808	281323807
FMP-03-DCO+HPA-3	131301488	156301488	25000000 (10000000+15000000)
FMP-03-HPA	40000006	312581808	272581802
FMP-03-HPA-ALT	58397001	488397168	430000167
FMP-04-DCO	19630101	156301488	136671387
FMP-04-DCO+HPA	365721968	390721968	25000000 (10000000+15000000)
FMP-04-DCO-ALT	31258101	312581808	281323707
FMP-04-HPA	365721968	390721968	25000000
FMP-04-HPA-TOS	375721968	390721968	15000000

4 Test Results

The main item of interest for interpreting the test results is determining the conformance of the tool under test with the test assertions. Conformance with each assertion tested by a given test case is evaluated by examining the **Log Highlights** box of the test report summary.

4.1 Test Results Report Key

A summary of the actual test results is presented in this report. The following table presents a description of each section of the test report summary.

Heading	Description
First Line:	Test case ID, name, and version of tool tested.
Case Summary:	Test case summary from <i>Forensic Media Preparation Tool Test</i>

Heading	Description
	<i>Assertions and Test Plan Version 1.0.</i>
Assertions:	The test assertions applicable to the test case, selected from <i>Forensic Media Preparation Tool Test Assertions and Test Plan Version 1.0.</i>
Tester Name:	Name or initials of person executing test procedure.
Analysis Host:	Host used to setup test drive and analyze final drive state.
Test Host:	Host computer executing the test.
Test Date:	Time and date that test was started.
Test Drive:	Drive erased by the tool under test.
Source Setup:	Report of the native drive size, the size of any hidden areas and the apparent size of the drive (as reported by an ATA IDENTIFY DEVICE command).
Log Highlights:	Report of the state of the drive after executing the tool under test, including the apparent drive size, size of hidden area and analysis of drive contents. The ASCII content of the first nonbinary-zero sector is reported.
Results:	Expected and actual results for each assertion tested.
Analysis:	Whether or not the expected results were achieved.

4.2 Test Detail

4.2.1 FMP-01-ATA28

Test Case FMP-01-ATA28 Drive eRazer	
Case Summary:	FMP-01. Overwrite visible sectors using WRITE commands.
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Tue Feb 17 13:34:15 2009
Test drive:	14-LAP
Source Setup:	<p>Initial setup size: 156301488 from total of 156301488 (with 0 hidden) IDE disk: Model (Hitachi HTS541680J9AT00) serial # (SB0241HGGAWN9E)</p> <p>Sector 0 is first sector with printable text ===== Start text ===== 00000/000/01 000000000000 ===== End text Sector 0 ===== 1 <new line> character inserted for readability</p> <p>Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 156301488 00 75962523168 14 156301488 20 () 312602976 2F (/) 1051401436 30 (0) 387451758 31 (1) 303557105 32 (2) 269597920 33 (3) 267115444 34 (4) 259739282 35 (5) 234788791 36 (6) 223427887 37 (7) 222956329 38 (8) 218596784 39 (9) Totals for non-ASCII sectors</p>

Test Case FMP-01-ATA28 Drive eRazer			
	<pre>summary format: <count> <hex value> <(actual character if printable)> ... 80026361856 bytes, 156301488 sectors, 14 distinct values seen 156301488 sectors have printable text</pre>		
Log Highlights:	<pre>Size after tool runs: 156301488 from total of 156301488 (with 0 hidden) Analysis of tool result -- Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 80026361856 00 Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 80026361856 00 80026361856 bytes, 156301488 sectors, 1 distinct values seen No sectors have printable text</pre>		
Results:	Assertion & Expected Result		Actual Result
	FMP-CA-01 Visible sectors overwritten		as expected
Analysis:	Expected results achieved		

4.2.3 FMP-01-SATA28

Test Case FMP-01-SATA28 Drive eRazer					
Case Summary:	FMP-01. Overwrite visible sectors using WRITE commands.				
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data.				
Tester Name:	csr				
Analysis host:	frank				
Test host:	none				
Test date:	Thu Feb 19 08:01:38 2009				
Test drive:	1D-LAP				
Source Setup:	<p>Initial setup size: 234441648 from total of 234441648 (with 0 hidden) IDE disk: Model (Hitachi HTS542512K9SA00) serial # (080914BB6200WBKPD2G)</p> <p>Sector 0 is first sector with printable text ===== Start text ===== 00000/000/01 000000000000 ===== End text Sector 0 ===== 1 <new line> character inserted for readability</p> <p>Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 234441648 00 113938640928 1D 234441648 20 () 468883296 2F (/) 1461085523 30 (0) 678339301 31 (1) 497617498 32 (2) 407041791 33 (3) 391715334 34 (4) 376075228 35 (5) 347651457 36 (6) 332766225 37 (7) 332765657 38 (8) 332658242 39 (9)</p> <p>Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 120034123776 bytes, 234441648 sectors, 14 distinct values seen 234441648 sectors have printable text</p>				
Log Highlights:	<p>Size after tool runs: 234441648 from total of 234441648 (with 0 hidden) Analysis of tool result -- Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 120034123776 00</p> <p>Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 120034123776 00</p> <p>120034123776 bytes, 234441648 sectors, 1 distinct values seen No sectors have printable text</p>				
Results:	<table border="1"> <thead> <tr> <th>Assertion & Expected Result</th> <th>Actual Result</th> </tr> </thead> <tbody> <tr> <td>FMP-CA-01 Visible sectors overwritten</td> <td>as expected</td> </tr> </tbody> </table>	Assertion & Expected Result	Actual Result	FMP-CA-01 Visible sectors overwritten	as expected
Assertion & Expected Result	Actual Result				
FMP-CA-01 Visible sectors overwritten	as expected				
Analysis:	Expected results achieved				

4.2.5 FMP-02-ATA28

Test Case FMP-02-ATA28 Drive eRazer						
Case Summary:	FMP-02. Overwrite visible sectors using an ERASE command.					
Assertions:	FMP-AO-03 If the tool supports overwrite command selection and an ERASE command is selected then all visible sectors are overwritten.					
Tester Name:	csr					
Analysis host:	frank					
Test host:	none					
Test date:	Thu Feb 26 11:59:42 2009					
Test drive:	19-LAP					
Source Setup:	<p>Initial setup size: 156301488 from total of 156301488 (with 0 hidden) IDE disk: Model (FUJITSU MHW2080AT) serial # (K004T832CK2R)</p> <p>Sector 0 is first sector with printable text ===== Start text ===== 00000/000/01 000000000000 ===== End text Sector 0 ===== 1 <new line> character inserted for readability</p> <p>Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 156301488 00 75907021680 19 156301488 20 () 312602976 2F (/) 1092738319 30 (0) 445157427 31 (1) 274740905 32 (2) 274642393 33 (3) 272159917 34 (4) 262536293 35 (5) 225709546 36 (6) 215483146 37 (7) 215483143 38 (8) 215483135 39 (9)</p> <p>Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 80026361856 bytes, 156301488 sectors, 14 distinct values seen 156301488 sectors have printable text</p>					
Log Highlights:	<p>Size after tool runs: 156301488 from total of 156301488 (with 0 hidden) Analysis of tool result -- Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 80026361856 00 Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 80026361856 00</p> <p>80026361856 bytes, 156301488 sectors, 1 distinct values seen No sectors have printable text</p>					
Results:	<table border="1"> <thead> <tr> <th>Assertion & Expected Result</th> <th>Actual Result</th> </tr> </thead> <tbody> <tr> <td>FMP-AO-03 Visible sectors erased</td> <td>as expected</td> </tr> </tbody> </table>	Assertion & Expected Result	Actual Result	FMP-AO-03 Visible sectors erased	as expected	
Assertion & Expected Result	Actual Result					
FMP-AO-03 Visible sectors erased	as expected					
Analysis:	Expected results achieved					

Test Case FMP-03-DCO Drive eRazer			
	<pre> 822127256 31 (1) 633046397 32 (2) 493167333 33 (3) 476761174 34 (4) 469257943 35 (5) 436769126 36 (6) 418896332 37 (7) 418883771 38 (8) 411035936 39 (9) 136723370202 53 (S) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 16004096512 00 160041885696 bytes, 312581808 sectors, 14 distinct values seen 281323807 sectors have printable text </pre>		
Results:	Assertion & Expected Result	Actual Result	
	FMP-CA-01 Visible sectors overwritten	as expected	
	FMP-AO-01 Hidden sectors overwritten	DCO not overwritten	
	FMP-AO-02 Hidden area final state is	in place	
Analysis:	Expected results not achieved		

4.2.10 FMP-03-DCO+HPA-3

Test Case FMP-03-DCO+HPA-3 Drive eRazer							
Case Summary:	FMP-03. Overwrite hidden sectors using WRITE commands.						
Assertions:	FMP-CA-01 All visible sectors shall be overwritten with the specified benign data. FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data. FMP-AO-02 A hidden area may optionally be removed from the storage device.						
Tester Name:	csr						
Analysis host:	frank						
Test host:	none						
Test date:	Thu Apr 16 16:48:17 2009						
Test drive:	18-LAP						
Source Setup:	Initial setup size: 131301488 from total of 156301488 (with 25000000 hidden) IDE disk: Model (FUJITSU MHW2080AT) serial # (K004T832CK3G) Sector 0 is first sector with printable text ===== Start text ===== 00000/000/01 000000000000 ===== End text Sector 0 ===== 1 <new line> character inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 146301488 00 71057021680 18 146301488 20 () 292602976 2F (/) 1031882339 30 (0) 406485727 31 (1) 259778655 32 (2) 259680143 33 (3) 248749661 34 (4) 236399701 35 (5) 212482354 36 (6) 202891886 37 (7) 202891883 38 (8) 202891875 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 74906361856 bytes, 146301488 sectors, 14 distinct values seen 146301488 sectors have printable text						
Log Highlights:	Size after tool runs: 146301488 from total of 156301488 (with 10000000 hidden) Analysis of tool result -- Sector 131301488 is first sector with printable text ===== Start text ===== 130259/006/39 000131301488 ===== End text Sector 131301488 ===== 1 <new line> character inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 67251361856 00 12125000000 18 25000000 20 () 50000000 2F (/) 151946099 30 (0) 97387565 31 (1) 38354809 32 (2) 56931722 33 (3) 58097881 34 (4) 48474937 35 (5) 32368920 36 (6) 30479158 37 (7) 30479158 38 (8) 30479751 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 67226361856 00 80026361856 bytes, 156301488 sectors, 14 distinct values seen 25000000 sectors have printable text						
Results:	<table border="1"> <thead> <tr> <th>Assertion & Expected Result</th> <th>Actual Result</th> </tr> </thead> <tbody> <tr> <td>FMP-CA-01 Visible sectors overwritten</td> <td>as expected</td> </tr> <tr> <td>FMP-AO-01 Hidden sectors overwritten</td> <td>DCO+HPA not overwritten</td> </tr> </tbody> </table>	Assertion & Expected Result	Actual Result	FMP-CA-01 Visible sectors overwritten	as expected	FMP-AO-01 Hidden sectors overwritten	DCO+HPA not overwritten
Assertion & Expected Result	Actual Result						
FMP-CA-01 Visible sectors overwritten	as expected						
FMP-AO-01 Hidden sectors overwritten	DCO+HPA not overwritten						

Test Case FMP-03-DCO+HPA-3 Drive eRazer		
	FMP-AO-02 Hidden area final state is	resized (146301488 with 10000000 hidden)
Analysis:	Expected results not achieved	

Test Case FMP-03-HPA Drive eRazer			
	<pre> 463171314 34 (4) 457219354 35 (5) 425714939 36 (6) 408397194 37 (7) 408385083 38 (8) 399825662 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 20480003072 00 160041885696 bytes, 312581808 sectors, 14 distinct values seen 272581802 sectors have printable text </pre>		
Results:	Assertion & Expected Result	Actual Result	
	FMP-CA-01 Visible sectors overwritten	as expected	
	FMP-AO-01 Hidden sectors overwritten	HPA not overwritten	
	FMP-AO-02 Hidden area final state is	removed	
Analysis:	Expected results not achieved		

Test Case FMP-03-HPA-ALT Drive eRazer			
	<pre> 2308172078 30 (0) 1142133174 31 (1) 1066246522 32 (2) 825242271 33 (3) 809064429 34 (4) 712146883 35 (5) 672204417 36 (6) 645465977 37 (7) 643862577 38 (8) 635465346 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 29899264512 00 250059350016 bytes, 488397168 sectors, 14 distinct values seen 430000167 sectors have printable text </pre>		
Results:	Assertion & Expected Result	Actual Result	
	FMP-CA-01 Visible sectors overwritten	as expected	
	FMP-AO-01 Hidden sectors overwritten	HPA not overwritten	
	FMP-AO-02 Hidden area final state is	removed	
Analysis:	Expected results not achieved		

4.2.13 FMP-04-DCO

Test Case FMP-04-DCO Drive eRazer									
Case Summary:	FMP-04. Overwrite hidden sectors using an ERASE command.								
Assertions:	FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data. FMP-AO-02 A hidden area may optionally be removed from the storage device. FMP-AO-03 If the tool supports overwrite command selection and an ERASE command is selected then all visible sectors are overwritten.								
Tester Name:	csr								
Analysis host:	frank								
Test host:	none								
Test date:	Tue Mar 31 12:08:14 2009								
Test drive:	15-LAP								
Source Setup:	Initial setup size: 19630101 from total of 156301488 (with 136671387 hidden) IDE disk: Model (Hitachi HTS541680J9AT00) serial # (SB0241HGGAWY8E) Sector 0 is first sector with printable text ===== Start text ===== 00000/000/01 000000000000 ===== End text Sector 0 ===== 1 <new line> character inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 19630101 00 9540229086 15 19630101 20 () 39260202 2F (/) 161998697 30 (0) 51600041 31 (1) 33540155 32 (2) 28914063 33 (3) 28602071 34 (4) 28140531 35 (5) 25816481 36 (6) 24540028 37 (7) 24540027 38 (8) 24170128 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 10050611712 bytes, 19630101 sectors, 14 distinct values seen 19630101 sectors have printable text								
Log Highlights:	Size after tool runs: 19630101 from total of 156301488 (with 136671387 hidden) Analysis of tool result -- Sector 19630102 is first sector with printable text ===== Start text ===== 01221/233/59 000019630102 ===== End text Sector 19630102 ===== 1 <new line> character inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 10187283610 00 66422293596 15 136671386 20 () 273342772 2F (/) 889402732 30 (0) 335851712 31 (1) 270016947 32 (2) 240683854 33 (3) 238513373 34 (4) 231598750 35 (5) 208972309 36 (6) 198887859 37 (7) 198416301 38 (8) 194426655 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 10050612224 00 80026361856 bytes, 156301488 sectors, 14 distinct values seen 136671386 sectors have printable text								
Results:	<table border="1"> <thead> <tr> <th>Assertion & Expected Result</th> <th>Actual Result</th> </tr> </thead> <tbody> <tr> <td>FMP-AO-01 Hidden sectors overwritten</td> <td>DCO not erased</td> </tr> <tr> <td>FMP-AO-02 Hidden area final state is</td> <td>in place</td> </tr> <tr> <td>FMP-AO-03 Visible sectors erased</td> <td>as expected</td> </tr> </tbody> </table>	Assertion & Expected Result	Actual Result	FMP-AO-01 Hidden sectors overwritten	DCO not erased	FMP-AO-02 Hidden area final state is	in place	FMP-AO-03 Visible sectors erased	as expected
Assertion & Expected Result	Actual Result								
FMP-AO-01 Hidden sectors overwritten	DCO not erased								
FMP-AO-02 Hidden area final state is	in place								
FMP-AO-03 Visible sectors erased	as expected								
Analysis:	Expected results not achieved								

4.2.14 FMP-04-DCO+HPA

Test Case FMP-04-DCO+HPA Drive eRazer										
Case Summary:	FMP-04. Overwrite hidden sectors using an ERASE command.									
Assertions:	<p>FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data.</p> <p>FMP-AO-02 A hidden area may optionally be removed from the storage device.</p> <p>FMP-AO-03 If the tool supports overwrite command selection and an ERASE command is selected then all visible sectors are overwritten.</p>									
Tester Name:	csr									
Analysis host:	frank									
Test host:	none									
Test date:	Mon Apr 20 09:14:00 2009									
Test drive:	1C-LAP									
Source Setup:	<p>Initial setup size: 365721968 from total of 390721968 (with 25000000 hidden)</p> <p>IDE disk: Model (Hitachi HTS722020K9SA00) serial # (080703DP04A0DTGL80TC)</p> <p>Sector 0 is first sector with printable text ===== Start text ===== 00000/000/01 000000000000 ===== End text Sector 0 ===== 1 <new line> character inserted for readability</p> <p>Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 380721968 00 185030876448 1C 380721968 20 () 761443936 2F (/) 2196468178 30 (0) 1065666424 31 (1) 897239892 32 (2) 731585324 33 (3) 633593182 34 (4) 624635322 35 (5) 580892631 36 (6) 555053803 37 (7) 545751335 38 (8) 544997205 39 (9)</p> <p>Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 194929647616 bytes, 380721968 sectors, 14 distinct values seen 380721968 sectors have printable text</p>									
Log Highlights:	<p>Size after tool runs: 365721968 from total of 390721968 (with 25000000 hidden)</p> <p>Analysis of tool result --</p> <p>Sector 380721969 is first sector with printable text ===== Start text ===== 23698/215/55 000380721969 ===== End text Sector 380721969 ===== 1 <new line> character inserted for readability</p> <p>Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 194939648127 00 4859999514 1C 9999999 20 () 19999998 2F (/) 49243660 30 (0) 19545256 31 (1) 27640135 32 (2) 29035271 33 (3) 18858010 34 (4) 13460563 35 (5) 12330521 36 (6) 13283566 37 (7) 22563496 38 (8) 14039500 39 (9)</p> <p>Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 194929648128 00</p> <p>200049647616 bytes, 390721968 sectors, 14 distinct values seen 9999999 sectors have printable text</p>									
Results:	<table border="1"> <thead> <tr> <th>Assertion & Expected Result</th> <th>Actual Result</th> </tr> </thead> <tbody> <tr> <td>FMP-AO-01 Hidden sectors overwritten</td> <td>DCO+HPA partial overwrite</td> </tr> <tr> <td>FMP-AO-02 Hidden area final state is</td> <td>in place</td> </tr> <tr> <td>FMP-AO-03 Visible sectors erased</td> <td>as expected</td> </tr> </tbody> </table>	Assertion & Expected Result	Actual Result	FMP-AO-01 Hidden sectors overwritten	DCO+HPA partial overwrite	FMP-AO-02 Hidden area final state is	in place	FMP-AO-03 Visible sectors erased	as expected	
Assertion & Expected Result	Actual Result									
FMP-AO-01 Hidden sectors overwritten	DCO+HPA partial overwrite									
FMP-AO-02 Hidden area final state is	in place									
FMP-AO-03 Visible sectors erased	as expected									
Analysis:	Expected results not achieved									

4.2.15 FMP-04-DCO-ALT

Test Case FMP-04-DCO-ALT Drive eRazer	
Case Summary:	FMP-04. Overwrite hidden sectors using an ERASE command.
Assertions:	<p>FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data.</p> <p>FMP-AO-02 A hidden area may optionally be removed from the storage device.</p> <p>FMP-AO-03 If the tool supports overwrite command selection and an ERASE command is selected then all visible sectors are overwritten.</p>
Tester Name:	csr
Analysis host:	frank
Test host:	none
Test date:	Tue Apr 7 16:06:23 2009
Test drive:	21-LAP
Source Setup:	<p>Initial setup size: 31258101 from total of 312581808 (with 281323707 hidden)</p> <p>IDE disk: Model (ST9160310AS) serial # (5SV092JK)</p> <p>Sector 0 is first sector with printable text</p> <pre> ===== Start text ===== 00000/000/01 000000000000!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! !! !! !! !! !! !! !! !! !! !! !! !! !! !! !! ===== End text Sector 0 ===== 9 <new line> characters inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 31258101 00 31258101 20 () 15191437086 21 (!) 62516202 2F (/) 241314330 30 (0) 84401324 31 (1) 63388762 32 (2) 47849335 33 (3) 46026425 34 (4) 45192884 35 (5) 41583451 36 (6) 39598811 37 (7) 39597618 38 (8) 38725282 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 16004147712 bytes, 31258101 sectors, 14 distinct values seen 31258101 sectors have printable text </pre>
Log Highlights:	<p>Size after tool runs: 31258101 from total of 312581808 (with 281323707 hidden)</p> <p>Analysis of tool result --</p> <p>Sector 31258101 is first sector with printable text</p> <pre> ===== Start text ===== 01945/185/22 000031258101!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! !! !! !! !! !! !! !! !! !! !! !! !! !! !! !! !! ===== End text Sector 31258101 ===== 9 <new line> characters inserted for readability Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 16285471419 00 281323707 20 () 136723321602 21 (!) 562647414 2F </pre>

Test Case FMP-04-DCO-ALT Drive eRazer			
	<pre>(/) 1609177839 30 (0) 822126903 31 (1) 633046254 32 (2) 493167176 33 (3) 476760970 34 (4) 469257673 35 (5) 436769089 36 (6) 418896303 37 (7) 418883541 38 (8) 411035806 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 16004147712 00 160041885696 bytes, 312581808 sectors, 14 distinct values seen 281323707 sectors have printable text</pre>		
Results:	Assertion & Expected Result	Actual Result	
	FMP-AO-01 Hidden sectors overwritten	DCO not erased	
	FMP-AO-02 Hidden area final state is	in place	
	FMP-AO-03 Visible sectors erased	as expected	
Analysis:	Expected results not achieved		

4.2.16 FMP-04-HPA

Test Case FMP-04-HPA Drive eRazer		
Case Summary:	FMP-04. Overwrite hidden sectors using an ERASE command.	
Assertions:	<p>FMP-AO-01 If there is a hidden area present and the tool supports overwriting sectors contained in a hidden area, then all sectors contained in the hidden area shall be overwritten with the specified benign data.</p> <p>FMP-AO-02 A hidden area may optionally be removed from the storage device.</p> <p>FMP-AO-03 If the tool supports overwrite command selection and an ERASE command is selected then all visible sectors are overwritten.</p>	
Tester Name:	csr	
Analysis host:	frank	
Test host:	none	
Test date:	Thu Apr 23 13:09:53 2009	
Test drive:	1C-LAP	
Source Setup:	<p>Initial setup size: 365721968 from total of 390721968 (with 25000000 hidden)</p> <p>IDE disk: Model (Hitachi HTS722020K9SA00) serial # (080703DP04A0DTGL80TC)</p> <p>Sector 0 is first sector with printable text ===== Start text ===== 00000/000/01 0000000000000 ===== End text Sector 0 ===== 1 <new line> character inserted for readability</p> <p>Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 390721968 00 189890876448 1C 390721968 20 () 781443936 2F (/) 2245711842 30 (0) 1085211682 31 (1) 924880030 32 (2) 760620597 33 (3) 652451193 34 (4) 638095887 35 (5) 593223154 36 (6) 568337370 37 (7) 568314834 38 (8) 559036707 39 (9)</p> <p>Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 200049647616 bytes, 390721968 sectors, 14 distinct values seen 390721968 sectors have printable text</p>	
Log Highlights:	<p>Size after tool runs: 365721968 from total of 390721968 (with 25000000 hidden)</p> <p>Analysis of tool result -- Totals for all sectors summary format: <count> <hex value> <(actual character if printable)> ... 200049647616 00</p> <p>Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 200049647616 00</p> <p>200049647616 bytes, 390721968 sectors, 1 distinct values seen No sectors have printable text</p>	
Results:	Assertion & Expected Result	Actual Result
	FMP-AO-01 Hidden sectors overwritten	as expected
	FMP-AO-02 Hidden area final state is	in place
	FMP-AO-03 Visible sectors erased	as expected
Analysis:	Expected results achieved	

Test Case FMP-04-HPA-TOS Drive eRazer											
	<pre>(/) 73193589 30 (0) 27934470 31 (1) 40145508 32 (2) 45661062 33 (3) 26811903 34 (4) 21575206 35 (5) 20574799 36 (6) 23906699 37 (7) 29676295 38 (8) 20520469 39 (9) Totals for non-ASCII sectors summary format: <count> <hex value> <(actual character if printable)> ... 192369647616 00 200049647616 bytes, 390721968 sectors, 14 distinct values seen 15000000 sectors have printable text</pre>										
Results:	<table border="1"> <thead> <tr> <th>Assertion & Expected Result</th> <th>Actual Result</th> </tr> </thead> <tbody> <tr> <td>FMP-AO-01 Hidden sectors overwritten</td> <td>HPA not overwritten</td> </tr> <tr> <td>FMP-AO-02 Hidden area final state is</td> <td>in place</td> </tr> <tr> <td>FMP-AO-03 Visible sectors erased</td> <td>as expected</td> </tr> </tbody> </table>	Assertion & Expected Result	Actual Result	FMP-AO-01 Hidden sectors overwritten	HPA not overwritten	FMP-AO-02 Hidden area final state is	in place	FMP-AO-03 Visible sectors erased	as expected		
Assertion & Expected Result	Actual Result										
FMP-AO-01 Hidden sectors overwritten	HPA not overwritten										
FMP-AO-02 Hidden area final state is	in place										
FMP-AO-03 Visible sectors erased	as expected										
Analysis:	Expected results not achieved										

4.2.18 FMP-05

Test Case FMP-05 Drive eRazer		
Case Summary:	FMP-05. Detect drive not supporting ERASE command.	
Assertions:	FMP-AO-04 If an overwrite command is selected and the storage device does not support the command then the user is notified.	
Tester Name:	csr	
Analysis host:	frank	
Test host:	none	
Test date:	Wed Apr 1 17:27:35 2009	
Test drive:	56-IDE	
Log Highlights:	Message: Secure Erase Not Supported	
Results:	Assertion & Expected Result	Actual Result
	FMP-AO-04 Selected command not supported	as expected
Analysis:	Expected results achieved	

4.2.19 FMP-05-ALT

Test Case FMP-05-ALT Drive eRazer		
Case Summary:	FMP-05. Detect drive not supporting ERASE command.	
Assertions:	FMP-AO-04 If an overwrite command is selected and the storage device does not support the command then the user is notified.	
Tester Name:	csr	
Analysis host:	frank	
Test host:	none	
Test date:	Thu Apr 9 09:23:51 2009	
Test drive:	56-IDE	
Log Highlights:	Message: Secure Erase Not Supported	
Results:	Assertion & Expected Result	Actual Result
	FMP-AO-04 Selected command not supported	as expected
Analysis:	Expected results achieved	

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2. Create scientific, relevant, and reliable knowledge—with a particular emphasis on terrorism, violent crime, drugs and crime, cost-effectiveness, and community-based efforts—to enhance the administration of justice and public safety.
3. Develop affordable and effective tools and technologies to enhance the administration of justice and public safety.

Dissemination

4. Disseminate relevant knowledge and information to practitioners and policymakers in an understandable, timely, and concise manner.
5. Act as an honest broker to identify the information, tools, and technologies that respond to the needs of stakeholders.

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6. Practice fairness and openness in the research and development process.
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