



# XRY v7.3.1

Test Results for Mobile Device Acquisition Tool

*August 25, 2017*



**Homeland  
Security**

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Science and Technology

This report was prepared for the Department of Homeland Security Science and Technology Directorate Cyber Security Division by the Office of Law Enforcement Standards of the National Institute of Standards and Technology.

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## Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security (DHS), the National Institute of Justice (NIJ), and the National Institute of Standards and Technology Special Program Office (SPO) and Information Technology Laboratory (ITL). 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 forensics tools is based on well-recognized methodologies for conformance and quality testing. Interested parties in the computer forensics community can review and comment on the specifications and test methods posted on the CFTT Web site (<http://www.cftt.nist.gov/>).

This document reports the results from testing MSAB XRY v7.3.1 across supported mobile devices and associated media e.g., smart phones, tablets, feature phones and UICCs.

Test results from other tools can be found on the DHS S&T-sponsored digital forensics web page, <http://www.dhs.gov/science-and-technology/nist-cftt-reports>.

## How to Read This Report

This report is divided into four sections. Section 1 identifies and provides a summary of any significant anomalies observed in the test runs. This section is sufficient for most readers to assess the suitability of the tool for the intended use. Section 2 identifies the mobile devices used for testing. Section 3 lists testing environment, the internal memory data objects used to populate the mobile devices. Section 4 provides an overview of the test case results reported by the tool. The full test data is available at [http://www.cftt.nist.gov/mobile\\_devices.htm](http://www.cftt.nist.gov/mobile_devices.htm).

# Test Results for Mobile Device Acquisition Tool

Tool Tested: XRY

Software Version: V7.3.1

Supplier: MSAB Inc.

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2001 Jefferson Davis Hwy Suite 801  
Arlington, VA 22202

Tel: (703) 750-0068

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

## 1 Results Summary

MSAB's XRY Logical software enables investigators to perform 'logical' data and file system acquisitions from mobile devices. XRY Logical will allow you to recover most of the live and file system data from the device. It is an automated equivalent of manually examining each screen on the device and recording what is displayed. XRY Physical provides the ability for physical recovery of data from mobile devices providing access to system and deleted data.

XRY was tested for its ability to acquire active data from the internal memory of supported mobile devices and associated media (i.e., smart phones, tablets, feature phones, UICCs/SIMs). Except for the following anomalies, the tool acquired all supported data objects completely and accurately for all mobile devices tested.

### ***Connectivity:***

- Connectivity was not established using device specific and generic plugins. (Devices: *BlackBerry Q10, BlackBerry Z30*)

### ***Personal Information Management (PIM) data:***

- Contact/Address book entries containing non-Latin characters (i.e., 阿恶哈拉) are reported twice. (Devices: *Galaxy S3, Galaxy S5, LG G5, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Samsung J3, Google Pixel XL and the Galaxy Tab S2*)
- Calendar related data is not reported. (Device: *LG G5*)
- Call log type/status (incoming, outgoing, missed) is not reported. (Device: *LG G5*)
- Call logs, calendar entries and SMS messages were reported multiple times for individual entries. (Device: *LG Cosmos 3*)
- Blank incoming messages are reported beneath the MMS menu within the preview-pane. (Devices: *LG G5, Motorola Droid Turbo 2, Samsung J3, Google Pixel XL, Samsung GS7*)

### ***Stand-alone Files:***

- Document files are not reported. (Devices: *iPhone 5S, iPhone 6S Plus, iPhone 7 Plus, iPad Mini and the iPad Pro*)

***Social media Data:***

- Facebook, Twitter, LinkedIn, Instagram related data are not reported. (Devices: *LG G5, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Samsung J3, Google Pixel XL, Samsung GS7, Ellipsis 8 and the Galaxy Tab S2*)
- Social media related data (i.e., Facebook, LinkedIn) is not reported. (Device: *Galaxy S3*)
- Social media related data (i.e., Facebook) is not reported. (Device: *Galaxy S5*)
- Social media related (i.e., Facebook, LinkedIn) is partially reported. (Device: *iPhone 5S*)
- Social media related data (i.e., Facebook, Instagram) is not reported. (Devices: *iPhone 6S Plus, iPhone 7 Plus, iPad Mini, iPad Pro*)
- Social media related data (i.e., Twitter) is not reported. (Device: *iPad Air*)
- Social media related data (i.e., Facebook) is partially reported. (Device: *iPad Air*)
- ***Note:*** *The acquisition and reporting of social media related data extracted from a mobile device is dependent upon various factors - the state of the device (e.g., jailbroken, rooted), the data extraction method (e.g., logical, physical), the version of the app and how the data is stored.*

***Internet Related Data:***

- Internet related data (i.e., bookmarks, history, email) are not reported. (Devices: *LG G5, Galaxy S6 Edge Plus, Samsung J3, Samsung GS7, Google Pixel XL, Galaxy Tab S2*)
- Internet related data (i.e., history, email) is not reported. (Device: *Motorola Droid Turbo 2*)
- Email related data is not reported. (Devices: *Ellipsis 8*)

For more test result details see section 4.

## 2 Mobile Devices

The following table lists the mobile devices used for testing XRY v7.3.1.

Make	Model	OS	Firmware	Network
Apple iPhone	4	iOS v4.3.3 (8J2)	04.10.01	GSM
Apple iPhone	5S	iOS 7.1 (11D167)	2.18.02	CDMA
Apple iPhone	6S Plus	iOS 9.2.1 (13C75)	1.23.00	CDMA
Apple iPhone	7 Plus	iOS 10.2 (14C92)	1.33.00	CDMA
Apple iPad	Mini	iOS 9.2.1 (13B143)	4.32.00	CDMA
Apple iPad	Air	iOS 7.1 (11D167)	2.18.02	CDMA
Apple iPad	Pro	iOS 9.2.1 (13C75)	4.52.00	CDMA
Samsung Galaxy	S3 SGH-1747	Android 4.1.2	1747UCDMG2	GSM
Samsung Galaxy	S5 SM-G900V	Android 4.2.2	G900V.05	CDMA
LG	G4	Android 5.1.1	LMY47D	CDMA
LG	G5	Android 6.0.1	MMB29M	CDMA
Motorola Droid	Turbo2	Android 5.1.1	LCK23.130-23	CDMA
Samsung Galaxy	S6 Edge Plus – SM-G928V	Android 5.1.1	LMY47X.G928VVRU2AOJ2	CDMA
Samsung J3	J3 – SM-J320V	Android 6.0.1	MMB29M.J320VVRU2AP12	CDMA
Google Pixel XL	XL	Android 7.1.1	NMF26U	CDMA
Samsung GS7	GS7 – SM-G930V	Android 6.0.1	MMB29M.G930VVRU4AP13	CDMA
Ellipsis 8	QTAQZ3	Android 4.4.2	KOT49H	CDMA
Samsung Galaxy	Tab-E	Android 5.1.1	LMY47X.T567VVRU1AOH1	CDMA
Samsung Galaxy	Tab S2	Android 5.1.1	LMY47X.T817BVRU2AOJ2	CDMA
BlackBerry	Q10	10.2.1.2122	672849	CDMA
BlackBerry	Z30	10.3.2.556	85718	CDMA
LG Cosmos 3	Cosmos 3	BREW 1.0.2	VN251ZV6	CDMA

**Table 1: Mobile Devices**



### 3 Testing Environment

The tests were run in the NIST CFTT lab. This section describes the selected test execution environment, and the data objects populated onto the internal memory of mobile devices.

#### 3.1 Execution Environment

XRY v7.3.1 was installed on Windows 7 v6.1.7601.

#### 3.2 Internal Memory Data Objects

XRY v7.3.1 was measured by analyzing acquired data from the internal memory of pre-populated mobile devices. Table 2 defines the data objects and elements used for populating mobile devices provided the mobile device supports the data element.

Data Objects	Data Elements
Address Book Entries	<i>Regular Length</i>
	<i>Maximum Length</i>
	<i>Special Character</i>
	<i>Blank Name</i>
	<i>Regular Length, email</i>
	<i>Regular Length, graphic</i>
	<i>Regular Length, Address</i>
	<i>Deleted Entry</i>
	<i>Non-Latin Entry</i>
	<i>Contact Groups</i>
PIM Data: Datebook/Calendar; Memos	<i>Regular Length</i>
	<i>Maximum Length</i>
	<i>Deleted Entry</i>
	<i>Special Character</i>
	<i>Blank Entry</i>
Call Logs	<i>Incoming</i>
	<i>Outgoing</i>
	<i>Missed</i>
	<i>Incoming – Deleted</i>
	<i>Outgoing – Deleted</i>
	<i>Missed - Deleted</i>
Text Messages	<i>Incoming SMS – Read</i>
	<i>Incoming SMS – Unread</i>
	<i>Outgoing SMS</i>
	<i>Incoming EMS – Read</i>
	<i>Incoming EMS – Unread</i>
	<i>Outgoing EMS</i>
	<i>Incoming SMS – Deleted</i>
	<i>Outgoing SMS – Deleted</i>
	<i>Incoming EMS – Deleted</i>
	<i>Outgoing EMS – Deleted</i>

<b>Data Objects</b>	<b>Data Elements</b>
MMS Messages	<i>Non-Latin SMS/EMS</i>
	<i>Incoming Audio</i>
	<i>Incoming Graphic</i>
	<i>Incoming Video</i>
	<i>Outgoing Audio</i>
	<i>Outgoing Graphic</i>
	<i>Outgoing Video</i>
Application Data	<i>Device Specific App Data</i>
Stand-alone data files	<i>Audio</i>
	<i>Graphic</i>
	<i>Video</i>
	<i>Audio – Deleted</i>
	<i>Graphic - Deleted</i>
	<i>Video - Deleted</i>
Internet Data	<i>Visited Sites</i>
	<i>Bookmarks</i>
	<i>E-mail</i>
Location Data	<i>GPS Coordinates</i>
	<i>Geo-tagged Data</i>
Social Media Data	<i>Facebook</i>
	<i>Twitter</i>
	<i>LinkedIn</i>
	<i>Instagram</i>

**Table 2: Internal Memory Data Objects**

## 4 Test Results

This section provides the test cases results reported by the tool. Sections 4.1 – 4.4 identify the mobile device operating system type, media (e.g., Android, iOS, BlackBerry, Feature phones, UICC) and the make and model of mobile devices used for testing XRY v7.3.1.

The *Test Cases* column (internal memory acquisition) in sections 4.1 - 4.4 are comprised of two sub-columns that define a particular test category and individual sub-categories that are verified when acquiring the internal memory for supported mobile devices and UICCs within each test case. Each individual sub-category row results for each mobile device/UICC tested. The results are as follows:

*As Expected:* the mobile forensic application returned expected test results – the tool acquired and reported data from the mobile device/UICC successfully.

*Partial:* the mobile forensic application returned some of data from the mobile device/UICC.

*Not As Expected:* the mobile forensic application failed to return expected test results – the tool did not acquire or report supported data from the mobile device/UICC successfully.

*NA:* Not Applicable – the mobile forensic application is unable to perform the test or the tool does not provide support for the acquisition for a particular data element.

## 4.1 Android Mobile Devices

The internal memory contents for Android devices were acquired and analyzed with XRY v7.3.1.

All test cases pertaining to the acquisition of supported Android devices were successful with the exception of the following.

- Calendar related data is not reported for the LG G5.
- Call log type (i.e., incoming, outgoing, missed) is not reported for the LG G5.
- Blank incoming SMS messages containing only the associated phone number are reported beneath the MMS menu within the preview-pane for the LG G5, Motorola Droid Turbo 2, Samsung J3, Google Pixel XL and the Samsung GS7.  
*Note: it appears these blank messages are associated with group text messages containing multiple contacts.*
- Social media related data (i.e., Facebook, LinkedIn) is not reported for the Galaxy S3.
- Social media related data (i.e., Facebook) is not reported for the Galaxy S5.
- Social media related data is not reported for the LG G5, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Samsung J3, Google Pixel XL, Samsung GS7, Ellipsis 8 and the Galaxy Tab S2.
- Internet related data (i.e., bookmarks, history, email) is not reported for the LG G5, Galaxy S6 Edge Plus, Samsung J3, Samsung GS7, Google Pixel XL and the Galaxy Tab S2.
- Internet related data (i.e., history, email) is not reported for the Motorola Droid Turbo 2.
- Internet related data (i.e., email) is not reported for the Ellipsis.

Notes:

- When performing a physical data extraction for the Galaxy S3, the associated attachments for incoming MMS messages are not viewable and/or playable.
- Contact/Address book entries containing non-Latin characters (i.e., 阿恶哈拉) are reported twice within two separate “name” fields for the Galaxy S3, Galaxy S5, LG G5, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Samsung J3, Google Pixel XL and the Galaxy Tab S2.

See Table 3a, 3b below for more details.

XRY v7.3.1						
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android				
		Galaxy S3	Galaxy S5	LG G5	Motorola Droid Turbo 2	Samsung S6 Edge Plus
Acquisition	Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected
	Disrupted	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting	Preview-Pane	As Expected	As Expected	As Expected	As Expected	As Expected
	Generated Reports	As Expected	As Expected	As Expected	As Expected	As Expected
Equipment/ User Data	IMEI	As Expected	As Expected	As Expected	As Expected	As Expected
	MEID/ESN	NA	NA	NA	NA	NA
	MSISDN	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data	Contacts	Partial	Partial	Partial	Partial	Partial
	Calendar	As Expected	As Expected	Not As Expected	As Expected	As Expected
	Memos/ Notes	NA	NA	NA	NA	NA
Call Logs	Incoming	As Expected	As Expected	Partial	As Expected	As Expected
	Outgoing	As Expected	As Expected	Partial	As Expected	As Expected
	Missed	As Expected	As Expected	Partial	As Expected	As Expected
SMS Messages	Incoming	As Expected	As Expected	Partial	Partial	As Expected
	Outgoing	As Expected	As Expected	Partial	Partial	As Expected
MMS Messages	Graphic	As Expected	As Expected	As Expected	As Expected	As Expected
	Audio	As Expected	As Expected	As Expected	As Expected	As Expected
	Video	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files	Graphic	As Expected	As Expected	As Expected	As Expected	As Expected
	Audio	As Expected	As Expected	As Expected	As Expected	As Expected
	Video	As Expected	As Expected	As Expected	As Expected	As Expected
Application Data	Documents (txt, pdf files)	As Expected	As Expected	As Expected	As Expected	As Expected

XRY v7.3.1						
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android				
		Galaxy S3	Galaxy S5	LG G5	Motorola Droid Turbo 2	Samsung S6 Edge Plus
Social Media Data	Facebook	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
	Twitter	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
	LinkedIn	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
	Instagram	<i>NA</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
Internet Data	Bookmarks	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>
	History	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
	Email	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
GPS Data	Coordinates /Geo-tagged	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>	<i>As Expected</i>
Non-Latin Character	Reported in native format	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Hashing	Case File/ Individual Files	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Case File Data Protection	Modify Case Data	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>

**Table 3a: Android Mobile Devices**

XRY v7.3.1						
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android				
		Samsung J3	Google Pixel XL	Samsung GS7	Ellipsis 8	Galaxy Tab S2
Acquisition	Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected
	Disrupted	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting	Preview-Pane	As Expected	As Expected	As Expected	As Expected	As Expected
	Generated Reports	As Expected	As Expected	As Expected	As Expected	As Expected
Equipment/ User Data	IMEI	As Expected	As Expected	As Expected	As Expected	As Expected
	MEID/ESN	NA	NA	NA	NA	NA
	MSISDN	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data	Contacts	Partial	Partial	Partial	Partial	Partial
	Calendar	As Expected	As Expected	As Expected	As Expected	As Expected
	Memos/ Notes	NA	As Expected	NA	As Expected	NA
Call Logs	Incoming	As Expected	As Expected	Not As Expected	NA	NA
	Outgoing	As Expected	As Expected	Not As Expected	NA	NA
	Missed	As Expected	As Expected	Not As Expected	NA	NA
SMS Messages	Incoming	As Expected	As Expected	Partial	NA	NA
	Outgoing	As Expected	As Expected	Partial	NA	NA
MMS Messages	Graphic	As Expected	As Expected	As Expected	NA	NA
	Audio	As Expected	As Expected	As Expected	NA	NA
	Video	As Expected	As Expected	As Expected	NA	NA
Stand-alone Files	Graphic	As Expected	As Expected	As Expected	As Expected	As Expected
	Audio	As Expected	As Expected	As Expected	As Expected	As Expected
	Video	As Expected	As Expected	As Expected	As Expected	As Expected
Application Data	Documents (txt, pdf files)	As Expected	As Expected	As Expected	As Expected	As Expected

XRY v7.3.1						
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android				
		Samsung J3	Google Pixel XL	Samsung GS7	Ellipsis 8	Galaxy Tab S2
Social Media Data	Facebook	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
	Twitter	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
	LinkedIn	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
	Instagram	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
Internet Data	Bookmarks	Not As Expected	Not As Expected	Not As Expected	As Expected	Not As Expected
	History	Not As Expected	Not As Expected	Not As Expected	As Expected	Not As Expected
	Email	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
GPS Data	Coordinate s/Geo-tagged	As Expected	As Expected	As Expected	As Expected	As Expected
Non-Latin Character	Reported in native format	As Expected	As Expected	As Expected	As Expected	As Expected
Hashing	Case File/ Individual Files	As Expected	As Expected	As Expected	As Expected	As Expected
Case File Data Protection	Modify Case Data	As Expected	As Expected	As Expected	As Expected	As Expected

Table 3b: Android Devices



## **4.2 iOS Mobile Devices**

The internal memory contents for iOS devices were acquired and analyzed with XRY v7.3.1.

All test cases pertaining to the acquisition of supported iOS devices were successful with the exception of the following across all iOS devices.

- Stand-alone document files (i.e., .pdf, .txt) are not reported for the iPhone 5S, iPhone 6S Plus, iPhone 7 Plus, iPad Mini and the iPad Pro.
- Social media related data (i.e., Facebook, LinkedIn) is partially reported (profile related information) for the iPhone 5S.
- Social media related data (i.e., Facebook, Instagram) are not reported for the iPhone 6S Plus, iPhone 7 Plus, iPad Mini, and the iPad Pro.
- Social media related data (i.e., Twitter) was not reported for the iPad Air.
- Social media related data (i.e., Facebook) is partially reported (profile related information) for the iPad Air.

Notes:

- The textual portion associated with MMS messages is not automatically displayed within the preview-pane. The content can be viewed by selecting “launch file” for individual MMS messages.

See Table 4 below for more details.

# XRY v7.3.1

XRY v7.3.1								
Test Cases – Internal Memory Acquisition		Mobile Device Platform: iOS						
		iPhone 4	iPhone 5S	iPhone 6S Plus	iPhone 7 Plus	iPad Mini	iPad Air	iPad Pro
Acquisition	Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Disrupted	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting	Preview-Pane	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Generated Reports	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Equipment/ User Data	IMEI	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	MEID/ESN	NA	NA	NA	NA	NA	NA	NA
	MSISDN	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data	Contacts	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Calendar	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Memos/Notes	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Call Logs	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Missed	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SMS Messages	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
MMS Messages	Graphic	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Audio	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Video	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files	Graphic	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Audio	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Video	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Application Data	Documents (txt, pdf files)	As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	As Expected	Not As Expected

XRY v7.3.1								
Test Cases – Internal Memory Acquisition		Mobile Device Platform: iOS						
		iPhone 4	iPhone 5S	iPhone 6S Plus	iPhone 7 Plus	iPad Mini	iPad Air	iPad Pro
Social Media Data	Facebook	NA	Partial	Not As Expected	Not As Expected	Not As Expected	Partial	Not As Expected
	Twitter	NA	As Expected	As Expected	As Expected	As Expected	Not As Expected	As Expected
	LinkedIn	NA	Partial	As Expected	As Expected	As Expected	As Expected	As Expected
	Instagram	NA	NA	Not As Expected	Not As Expected	Not As Expected	NA	Not As Expected
Internet Data	Bookmarks	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	History	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Email	As Expected	NA	NA	NA	NA	As Expected	NA
GPS Data	Coordinates/Geo-tagged	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Non-Latin Character	Reported in native format	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Hashing	Case File/Individual Files	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Case File Data Protection	Modify Case Data	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected

Table 4: iOS Mobile Devices

### 4.3 BlackBerry, Feature Devices

The internal memory contents for BlackBerry and Feature phones were acquired and analyzed with XRY v7.3.1.

All test cases pertaining to the acquisition of supported devices were successful with the exception of the following across all devices.

- Connectivity was not established to the following devices using XRY v7.3.1: BlackBerry Q10 and the BlackBerry Z30. Development mode was enabled for both the BlackBerry Q10 and BlackBerry Z30. Connectivity was attempted using both device specific plugins and generic plugins. The following error was reported: Acquisition ended in errors.
- Reported call logs (i.e., incoming, outgoing, missed) were duplicated for each entry numerous times for the LG Cosmos 3.
- Reported calendar entries were duplicated for each entry numerous times for the LG Cosmos 3.
- Reported SMS messages were duplicated for each entry numerous times for the LG Cosmos 3.

See Table 5 below for more details.

XRY v7.3.1		
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Feature Phone
		LG Cosmos 3
Acquisition	Acquire All	As Expected
	Disrupted	As Expected
Reporting	Preview-Pane	As Expected
	Generated Reports	As Expected
Equipment/ User Data	IMEI	As Expected
	MEID/ESN	NA
	MSISDN	As Expected
PIM Data	Contacts	As Expected
	Calendar	Partial
	Memos/Notes	As Expected

XRY v7.3.1		
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Feature Phone
		LG Cosmos 3
Call Logs	Incoming	Partial
	Outgoing	Partial
	Missed	Partial
SMS Messages	Incoming	Partial
	Outgoing	Partial
MMS Messages	Graphic	As Expected
	Audio	As Expected
	Video	As Expected
Stand-alone Files	Graphic	As Expected
	Audio	As Expected
	Video	As Expected
Application Data	Documents (txt, pdf files)	As Expected
Social Media Data	Facebook	NA
	Twitter	NA
	LinkedIn	NA
	Instagram	NA
Internet Data	Bookmarks	NA
	History	NA
	Email	NA
GPS Data	Coordinates/Geo-tagged	NA
Non-Latin Character	Reported in native format	As Expected
Hashing	Case File/Individual Files	As Expected

XRY v7.3.1		
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Feature Phone
		LG Cosmos 3
Case File Data Protection	Modify Case Data	As Expected

**Table 5: Feature Phones**

## 4.4 Universal Integrated Circuit Cards (UICCs)

The internal memory contents for Universal Integrated Circuit Cards (UICCs) were acquired and analyzed with XRY v7.3.1.

All test cases pertaining to the acquisition of UICCs were successful.

See Table 6 below for more details.

XRY v7.3.1		
Test Cases – UICC Acquisition		Universal Integrated Circuit Card
Connectivity	Non Disrupted	As Expected
	Disrupted	As Expected
Equipment/ User Data	Service Provider Name (SPN)	As Expected
	ICCID	As Expected
	IMSI	As Expected
	MSISDN	As Expected
PIM Data	Abbreviated Dialing Numbers (ADNs)	As Expected
	Last Numbers Dialed (LNDs)	As Expected
	SMS Messages	As Expected
	EMS Messages	As Expected
Location Related Data	LOC	As Expected
	GPRSLOC	As Expected
Acquisition	Acquire All	As Expected
	Selected All	As Expected
	Select Individual	As Expected
Case File Data Protection	Modify Case Data	As Expected
Password Protected SIM Acquire	Acquisition of Protected SIM	As Expected
PIN/PUK Attempts	PIN attempts reported	As Expected
	PUK attempts reported	As Expected
Non-ASCII Character	Non-ASCII characters	As Expected
Hashing	Hashes reported for acquired data objects	As Expected

Table 6: Universal Integrated Circuit Cards