Test Results for Mobile Device Acquisition Tool:
MSAB XRY v9.0.2

Contents

Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security, Science and Technology Directorate (DHS S&T), 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 v9.0.2 across supported mobile devices and associated media e.g., smart phones, tablets 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.

Test Results for Mobile Device Acquisition Tool

Tool Tested: XRY

Software Version: V9.0.2

Supplier: MSAB Inc

Address: Crystal Plaza One
                            2001 Jefferson Davis Hwy Suite 801
                            Arlington, VA 22202
Tel: (703) 750-0068

WWW: http://www.msab.com

1   Results Summary

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, UICCs/SIMs). Except for the following anomalies, the tool acquired all supported data objects completely and accurately for all mobile devices tested.

***Personal Information Management (PIM) data*:**
- Calendar related data is not reported. (Devices: *Google Pixel XL, HTC 10, Samsung J3, Motorola Z Force, Motorola G5 Plus, Motorola X Pure Edition, Google Pixel 2, Google Pixel XL, Sony Experia*)
- Memo related data is not presented to the user within the GUI. The data had to be manually found within an SQLite database. (Devices: *Samsung Galaxy S5, Motorola Droid Turbo 2, Samsung J3, Motorola Z Force, Google Pixel XL, Sony Experia*)
- Memo related data is not reported. (Devices: *LG G4, HTC 10, Samsung GS7 Edge, Motorola G5 Plus, Motorola X Pure Edition, Google Pixel 2, HTC U11, Samsung Galaxy S9, Samsung Galaxy Note 8, Samsung Tab S2*)
- Deleted memos are reported as active. (Devices: *iPhone 6S Plus, iPhone 7*)

***Stand-alone files*:**
- Documents are not reported. (Device: *iPhone 5S*)

MMS data:
- MMS related data is partially reported i.e., attachments are not viewable within the messages. (Devices: *Samsung GS7 Ege, Samsung J3*)
- MMS data is not reported. (Device: *HTC U11*)

Social media Data:
- Social media related data (i.e., Facebook) is partially reported i.e., account, profile related information. (Devices: *Galaxy S5, Samsung Tab S2*)

- Social media related data (i.e., LinkedIn) is not reported. (Devices: *Samsung J3, Motorola G5 Plus, Motorola X Pure Edition, Google Pixel XL, iPhone X*)
- Social media related data (i.e., LinkedIn, Instagram) is not reported. (Devices: *LG G4, Samsung GS7 Edge*)
- Social media related data (i.e., LinkedIn, Pinterest) is not reported. (Devices: *Google Pixel 2, Samsung Galaxy S9, Sony Experia*)
- Social media related data (i.e., Facebook, LinkedIn, Pinterest) is not reported. (Devices: *Samsung Galaxy Note8, iPad Air, iPad Mini*)
- Social media related data (i.e., Facebook, LinkedIn, Pinterest) is partially reported. (Devices: *iPad Air, iPad Mini*)
- Social media related data (i.e., Twitter, LinkedIn) is not reported. (Device: *HTC 10*)
- Social media related data (i.e., Twitter, LinkedIn, Instagram, Pinterest) is not reported. (Device: *Samsung Tab S2*)
- Social media related data (i.e., Facebook, LinkedIn, Instagram) is not reported. (Device: *Motorola Z Force*)
- Social media related data (i.e., LinkedIn, Pinterest) are not reported. (Device: *HTC U11*)
- Social media related data (i.e., Facebook, LinkedIn) is partially reported i.e., account, profile related information. (Device: *iPhone 5S*)
- Social media related data (i.e., Instagram) is partially reported i.e., account, profile related information. (Device: *iPhone 6S Plus*)
- Social media related data (i.e., Facebook, Instagram) is partially reported i.e., account, profile related information (Device: *iPhone 7*)
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is partially reported i.e., account, profile related information. (Device: *iPhone 8 Plus*)
- Social media related data (i.e., Pinterest, Snapchat) is partially reported i.e., account, profile related information. (Device: *iPhone X*)

➢ ***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. All data extractions performed were logical full reads and utilized downgrading applications and rooting where supported.*

➢ ***Note for Android Devices:***
Non-system Android apps can choose to opt-out of the backup (e.g. WhatsApp). If the app manufacturer selects, then no app data is stored in the backup; a method commonly used for logical data recovery from mobile devices.

Internet Related Data:
- Browser (i.e., history, bookmarks) and email related data is not reported. (Devices: *HTC 10, Motorola Z Force, Motorola G5 Plus, Motorola X Pure Edition, Google Pixel 2, HTC U11, Google Pixel XL, Samsung Galaxy S9, Sony Experia, Samsung Galaxy Note 8, Samsung Tab S2*)
- Email related data is not reported. (Devices: *LG G4, Motorola Droid Turbo 2*)

- Partial email (i.e., account information) related data is reported. (Device: *Samsung GS7 Edge*)

GPS Related Data:
- GPS related data (i.e., longitude, latitude coordinates) are not reported for associated Maps navigational apps. (Devices: *Motorola Droid Turbo 2, Motorola X Pure Edition, Samsung Galaxy S9*)

Note for Android Devices:
XRY does not support data extraction from Android devices containing pre-installed applications due to the inability to downgrade the application. Therefore specific applications are marked as NA where applicable.

For more test result details see section 4.

2 Mobile Devices

The following table lists the mobile devices used for testing XRY v9.0.2.

Make	Model	OS	Firmware	Network
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	iOS 10.2 (14C92)	1.33.00	CDMA
Apple iPhone	8 Plus	iOS 11.4.1 (15G77)	1.89.00	CDMA
Apple iPhone	X	iOS 11.3.1 (15E302)	1.89.00	CDMA
Apple iPad	Air	iOS 11.2.1 (11D167)	2.18.02	CDMA
Apple iPad	Mini	iOS 11.3.1 (15E302)	4.52.00	CDMA
Samsung Galaxy	S5 SM-G900V	Android 4.2.2	G900V.05	CDMA
LG	G4	Android 5.1.1	LMY47D	CDMA
Motorola Droid	Turbo2	Android 5.1.1	LCK23.130-23	CDMA
HTC 10	HTC6545LVW	Android 6.0.1	1.85.605.8.8.0_g CL774095	CDMA
Samsung GS7 Edge	GS7 Edge SM-G935V	Android 6.0.1	MMB29M.G935VVRS4APH1	CDMA
Samsung J3	J3 – SM-J320V	Android 6.0.1	MMB29M.J320VVRU2AP12	CDMA
Motorola	Z Force XT1650	Android 7.0	NCLS25.86-11-4	CDMA
Moto	G5Plus	Android 7.0	NPNS25137924	CDMA
Moto	X Pure Edition	Android 7.0	25.211.1	CDMA
Google	Pixel 2	Android 7.0	OPM2171019029	CDMA
HTC	U11	Android 7.1.1	12861730	CDMA
Google Pixel XL	XL	Android 7.1.1	NMF26U	CDMA
Samsung Galaxy	S9	Android 8.0.0	G960U1UEU1ARB7	CDMA
Sony	Xperia	Android 8.0.0	471A2324	CDMA
Samsung	Galaxy Note8	Android 4.4.2		CDMA
Samsung Galaxy	Tab S2	Android 5.1.1	LMY47X.T817BVRU2AOJ2	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 v9.0.2 was installed on Windows 10 Pro version 10.0.14393.

3.2 Internal Memory Data Objects

XRY v9.0.2 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	*Regular Length*
	Maximum Length
	Special Character
	Blank Name
	Regular Length, email
	Regular Length, graphic
	Regular Length, Address
	Deleted Entry
	Non-Latin Entry
	Contact Groups
PIM Data: Datebook/Calendar; Memos	*Regular Length*
	Maximum Length
	Deleted Entry
	Special Character
	Blank Entry
Call Logs	*Incoming*
	Outgoing
	Missed
	Incoming – Deleted
	Outgoing – Deleted
	Missed - Deleted
Text Messages	*Incoming SMS – Read*
	Incoming SMS – Unread
	Outgoing SMS
	Incoming EMS – Read
	Incoming EMS – Unread
	Outgoing EMS
	Incoming SMS – Deleted
	Outgoing SMS – Deleted
	Incoming EMS – Deleted
	Outgoing EMS – Deleted
	Non-Latin SMS/EMS

Data Objects	Data Elements
MMS Messages	*Incoming Audio*
	Incoming Graphic
	Incoming Video
	Outgoing Audio
	Outgoing Graphic
	Outgoing Video
Application Data	*Device Specific App Data*
Stand-alone data files	*Audio*
	Graphic
	Video
	Audio – Deleted
	Graphic - Deleted
	Video - Deleted
Internet Data	*Visited Sites*
	Bookmarks
	E-mail
Location Data	*GPS Coordinates*
	Geo-tagged Data
Social Media Data	*Facebook*
	Twitter
	LinkedIn
	Instagram
	Pinterest
	SnapChat
	WhatsApp

Table 2: Internal Memory Data Objects

4   Test Results

This section provides the test cases results reported by the tool. Sections 4.1 – 4.3 identify the mobile device operating system type, media (e.g., Android, iOS, UICC) and the make and model of mobile devices used for testing XRY 9.0.2.

The *Test Cases* column (internal memory acquisition) in sections 4.1 - 4.3 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 v9.0.2. 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 Google Pixel XL, HTC 10, Motorola Z Force, Motorola G5 Plus, Motorola X Pure Edition, Google Pixel 2, Google Pixel XL and Sony Experia.
- Memo related data is not presented to the user within the GUI. The data had to be manually found within an SQLite database for the Samsung Galaxy S5, Motorola Droid Turbo 2, Samsung J3, Motorola Z Force, Google Pixel XL and Sony Experia.
- Memo related data is not reported for the LG G4, HTC 10, Samsung GS7 Edge, Motorola G5 Plus, Motorola X Pure Edition, Google Pixel 2, HTC U11, Samsung Galaxy S9, Samsung Galaxy Note 8 and Samsung Tab S2.
- MMS related data is partially reported (i.e., attachments are not viewable within the messages) for the Samsung GS7 Ege and Samsung J3.
- MMS data is not reported for the HTC U11.
- Social media related data (i.e., Facebook) is partially reported (account, profile related information) for the Galaxy S5 and Samsung Tab S2.
- Social media related data (i.e., LinkedIn) is not reported for the Samsung J3, Motorola G5 Plus, Motorola X Pure Edition and Google Pixel XL.
- Social media related data (i.e., LinkedIn, Instagram) is not reported for the LG G4, Motorola Droid Turbo 2 and Samsung GS7 Edge.
- Social media related data (i.e., LinkedIn, Pinterest) is not reported for the Google Pixel 2, Samsung Galaxy S9 and Sony Experia.
- Social media related data (i.e., Facebook, LinkedIn, Pinterest) is not reported for the Samsung Galaxy Note8.
- Social media related data (i.e., Twitter, LinkedIn) is not reported for the HTC 10.
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest) is not reported for the Samsung Tab S2.
- Social media related data (i.e., Facebook, LinkedIn, Instagram) is not reported for the Motorola Z Force.
- Social media related data (i.e., LinkedIn, Pinterest) are not reported for the HTC U11.
- Browser (i.e., history, bookmarks) and email related data is not reported for the HTC 10, Motorola Z Force, Motorola G5 Plus, Motorola X Pure Edition, Google Pixel 2, HTC U11, Google Pixel XL, Samsung Galaxy S9, Sony Experia, Samsung Galaxy Note 8 and Samsung Tab S2.
- Email related data is not reported for the LG G4 and Motorola Droid Turbo 2.
- Partial email (i.e., account information) related data is reported Samsung GS7 Edge.
- GPS related data (i.e., longitude, latitude coordinates) is not presented to the user within the GUI. The data had to be manually found within an SQLite database for the Motorola Droid Turbo 2, Motorola X Pure Edition and Samsung Galaxy S9.

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

Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android							
		Galaxy S5	LG G4	Motorola Droid Turbo 2	HTC 10	Samsung GS7 Edge	Samsung J3	Motorola Z Force	Motorola G5 Plus
Acquisition	Acquire All	*As Expected*	*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*	*As Expected*
Reporting	Preview-Pane	*As Expected*	*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*	*As Expected*
Equipment/ User Data	IMEI	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
	MEID/ESN	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
	MSISDN	*As Expected*	*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*	*As Expected*
	Calendar	*As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*Not As Expected*
	Memos/ Notes	*Partial*	*Not As Expected*	*Partial*	*Not As Expected*	*Not As Expected*	*Partial*	*Partial*	*Not As Expected*
Call Logs	Incoming	*As Expected*	*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*	*As Expected*
	Missed	*As Expected*	*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*	*As Expected*
	Outgoing	*As Expected*	*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*	*Partial*	*Partial*	*As Expected*	*As Expected*
	Audio	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*Partial*	*Partial*	*As Expected*	*As Expected*
	Video	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*Partial*	*Partial*	*As Expected*	*As Expected*
Stand-alone Files	Graphic	*As Expected*	*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*	*As Expected*
	Video	*As Expected*	*As Expected*	*As Expected*	*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*	*As Expected*	*As Expected*	*As Expected*

XRY v9.0.2

				Mobile Device Platform: Android					
Test Cases – Internal Memory Acquisition		Galaxy S5	LG G4	Motorola Droid Turbo 2	HTC 10	Samsung GS7 Edge	Samsung J3	Motorola Z Force	Motorola G5 Plus
Social Media Data	Facebook	*Partial*	*As Expected*	*As Expected*	*NA*	*As Expected*	*As Expected*	*Not As Expected*	*As Expected*
	Twitter	*As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*As Expected*	*As Expected*	*NA*	*As Expected*
	LinkedIn	*As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*
	Instagram	*NA*	*Not As Expected*	*Not As Expected*	*NA*	*Not As Expected*	*NA*	*Not As Expected*	*As Expected*
	Pinterest	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*
	SnapChat	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*As Expected*
	WhatsApp	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*As Expected*
Internet Data	Bookmarks	*As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*Not As Expected*
	History	*As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*Not As Expected*
	Email	*As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Partial*	*As Expected*	*Not As Expected*	*Not As Expected*
GPS Data	Coordinates /Geo-tagged	*As Expected*	*As Expected*	*No 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*	*As Expected*
Hashing	Case File/ Individual Files	*As Expected*	*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*	*As Expected*

Table 3a: Android Devices

XRY v9.0.2									
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android							
		Motorola X Pure Edition	Google Pixel 2	HTC U11	Google Pixel XL	Samsung Galaxy S9	Sony Xperia	Galaxy Note 8	Samsung Tab S2
Acquisition	Acquire All	As Expected	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	As Expected
Reporting	Preview-Pane	As Expected	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	As Expected
Equipment/ User Data	IMEI	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	MEID/ESN	NA	NA	NA	NA	NA	NA	NA	NA
	MSISDN	As Expected	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	As Expected
	Calendar	Not As Expected	Not As Expected	As Expected	Not As Expected	As Expected	Not As Expected	As Expected	As Expected
	Memos/ Notes	Not As Expected	Not As Expected	Not As Expected	Partial	Not As Expected	Partial	Not As Expected	Not As Expected
Call Logs	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Missed	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA
SMS Messages	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA
MMS Messages	Graphic	As Expected	As Expected	Not As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Audio	As Expected	As Expected	Not As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Video	As Expected	As Expected	Not As Expected	As Expected	As Expected	As Expected	As Expected	NA
Stand-alone Files	Graphic	As Expected	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	As Expected
	Video	As Expected	As Expected	As Expected	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	As Expected	As Expected	As Expected

Test Cases – Internal Memory Acquisition		Motorola X Pure Edition	Google Pixel 2	HTC U11	Google Pixel XL	Samsung Galaxy S9	Sony Xperia	Galaxy Note 8	Samsung Tab S2
XRY v9.0.2									
		Mobile Device Platform: Android							
Social Media Data	Facebook	*As Expected*	*As Expected*	*NA*	*As Expected*	*As Expected*	*As Expected*	*Not As Expected*	*Partial*
	Twitter	*As Expected*	*As Expected*	*NA*	*As Expected*	*As Expected*	*As Expected*	*NA*	*Not As Expected*
	LinkedIn	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*
	Instagram	*As Expected*	*As Expected*	*NA*	*NA*	*As Expected*	*As Expected*	*NA*	*Not As Expected*
	Pinterest	*NA*	*Not As Expected*	*Not As Expected*	*NA*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*
	SnapChat	*As Expected*	*As Expected*	*NA*	*NA*	*As Expected*	*As Expected*	*NA*	*As Expected*
	WhatsApp	*As Expected*	*As Expected*	*NA*	*NA*	*As Expected*	*As Expected*	*NA*	*NA*
Internet Data	Bookmarks	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*
	History	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*
	Email	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*
GPS Data	Coordinates /Geo-tagged	*Not As Expected*	*As Expected*	*As Expected*	*As Expected*	*Not 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*	*As Expected*
Hashing	Case File/ Individual Files	*As Expected*	*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*	*As Expected*

Table 3b: Android Devices

4.2 iOS Mobile Devices

The internal memory contents for iOS devices were acquired and analyzed with XRY v9.0.2.

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

- Deleted memos are reported as active for the iPhone 6S Plus and iPhone 7.
- Documents are not reported for the iPhone 5S.
- Social media related data (i.e., Facebook, LinkedIn) is partially reported (account, profile related information) for the iPhone 5S.
- Social media related data (i.e., Instagram) is partially reported (account, profile related information) for the iPhone 6S Plus.
- Social media related data (i.e., Facebook, Instagram) is partially reported (account, profile related information) for the iPhone 7.
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is partially reported (account, profile related information) for the iPhone 8 Plus.
- Social media related data (i.e., LinkedIn) is not reported for the iPhone X.
- Social media related data (i.e., Pinterest, Snapchat) is partially reported (account, profile related information) for the iPhone X.
- Social media related data (i.e., Facebook, LinkedIn, Pinterest) is partially reported (account, profile related information) for the iPad Air and iPad Mini.

See Table 4 below for more details.

Test Cases – Internal Memory Acquisition		Mobile Device Platform: iOS						
XRY v9.0.2								
		iPhone 5S	iPhone 6S Plus	iPhone 7	iPhone 8 Plus	iPhone X	iPad Air v11.2.1	iPad Mini v11.3.1
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	Partial	Partial	As Expected	As Expected	As Expected	As Expected
Call Logs	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	NA	NA
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	NA	NA
	Missed	As Expected	As Expected	As Expected	As Expected	As Expected	NA	NA
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)	Not As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected

XRY v9.0.2								
Test Cases – Internal Memory Acquisition		*Mobile Device Platform: iOS*						
		iPhone 5S	iPhone 6S Plus	iPhone 7	iPhone 8 Plus	iPhone X	iPad Air v11.2.1	iPad Mini v11.3.1
Social Media Data	Facebook	*Partial*	*As Expected*	*Partial*	*Partial*	*As Expected*	*Partial*	*Partial*
	Twitter	*As Expected*	*As Expected*	*As Expected*	*Partial*	*As Expected*	*As Expected*	*As Expected*
	LinkedIn	*Partial*	*As Expected*	*As Expected*	*Partial*	*Not As Expected*	*Partial*	*Partial*
	Instagram	*NA*	*Partial*	*Partial*	*Partial*	*As Expected*	*NA*	*NA*
	Pinterest	*NA*	*NA*	*NA*	*Partial*	*Partial*	*Partial*	*Partial*
	SnapChat	*NA*	*NA*	*NA*	*Partial*	*Partial*	*NA*	*NA*
	WhatsApp	*NA*	*NA*	*NA*	*As Expected*	*As Expected*	*NA*	*NA*
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	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*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 Devices

4.3 Universal Integrated Circuit Cards (UICCs)

The internal memory contents for Universal Integrated Circuit Cards (UICCs) were acquired and analyzed with XRY v9.0.2.

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

See Table 5 below for more details.

XRY v9.0.2		
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	LOCI	*As Expected*
	GPRSLOCI	*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 5: Universal Integrated Circuit Cards