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Test Results for Mobile Device Acquisition Tool:
MSAB XRY Kiosk v9.1.1

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Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security, Science and Technology Directorate (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 Kiosk v9.1.1 across supported mobile devices and associated media e.g., smart phones, tablets and UICCs.

Test results from other tools can be found on the 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 Kiosk
Software Version:	V9.1.1
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

The Kiosk is a turnkey digital forensic solution built for easier extractions in a controlled environment.

The mission of the Kiosk is to provide an easy to use, locked down, triage tool. Where the user must follow on-screen instructions and can only perform extractions according to prescribed guidelines. It is designed for operational frontline users where mobile data recovery and analysis is just one part of their responsibilities, enabling them to quickly perform extractions successfully and consistently with minimal training.

The Kiosk is a touch screen solution for examining mobile devices, that is typically customized with a unique workflow designed to meet the standard operating procedures of the user's organization prior to its deployment to frontline staff.

Whilst constructed using exactly the same core XRY digital forensic software as the MSAB Office Kit, the Kiosk is fundamentally intended to be used as a frontline policing tool for rapid extraction and review, in order to filter devices and relieve the workload burden from the High-Tech Crime Labs.

XRY Kiosk v9.1.1 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.

Equipment/User Data:

- International Mobile Equipment Identity (IMEI) was not reported. (Device: *iPad Air v11.2.1*)

Personal Information Management (PIM) data:

- Contact entries are not reported. (Device: *LG G4*)
- Contact entries containing a graphic files are partially reported. (Device: *Ellipsis 8*)

- Calendar related data is not reported. (Devices: *LG G4, Huawei P20 Pro*)
- Memo related data is not reported. (Devices: *LG G4, HTC 10, HTC U11, Huawei P20 Pro, Galaxy Tab S3, Ellipsis 8*)
- Memos are partially reported. (Devices: *Galaxy Tab S2, iPhone 6S Plus, iPad Mini 4 v9.1*)
- Call Log is not reported. (Device: *LG G4*)
- Calls via FireChat application were not reported. (Device: *Ellipsis 8*)
- Calls via FireChat application were partially reported. (Device: *Galaxy Tab S2*)

Application Data:

- Documents (i.e., .pdf, .txt) are partially reported. (Devices: *LG G4, HTC 10, HTC U11, Huawei P20 Pro, Ellipsis 8, iPhone 6S Plus, iPhone 7, iPhone 8 Plus, iPad Air v11.2.1, iPad Mini 2 v11.3.1, iPad Air v7.1*)
- Documents (i.e., .pdf, .txt) are not reported. (Device: *Galaxy Tab S3*)

Short Message Service (SMS) data:

- SMS messages are not reported. (Device: *LG G4*)

Multimedia Messaging Service (MMS) data:

- MMS are partially reported. (Device: *LG G4*)
- MMS are partially reported. (Device: *HTC 10*)
- MMS related data is partially reported. (Device: *Galaxy Tab S3*)
- MMS related data is partially reported. (Device: *Huawei P20*)
- MMS related data (outgoing video attachments) is partially reported. (Device: *iPhone 5S*)
- MMS related data (video attachments) is partially reported. (Device: *iPad Air v7.1*)

Stand-alone files:

- Stand-alone media files (i.e., graphic, audio, video) are partially reported. (Device: *Galaxy Tab S3*)

Social media Data:

- Social media related data (i.e., Twitter) is partially reported. (Device: *LG G4*)
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) are not reported. (Device: *LG G4*)
- Social media related data (i.e., Facebook) is partially reported i.e., only emojis or pictures. (Device: *iPhone 5S*)
- Social media related data (i.e., Facebook, LinkedIn, Instagram) is not reported. (Devices: *HTC 10, HTC U11, iPad Mini 2 v11.3.1*)
- Social media related data (i.e., Twitter) is partially reported. (Devices: *HTC 10, HTC U11*)
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported. (Devices: *Huawei P20 Pro, Galaxy Tab S3, Galaxy Tab S2*)
- Social media related data (i.e., WhatsApp) is partially reported. (Device: *Huawei P20 Pro*)
- Social media related data (i.e., LinkedIn, Snapchat) is not reported. (Device: *iPhone X*)

- Social media related data (i.e., Instagram, LinkedIn) is not reported. (Devices: *Ellipsis 8, iPhone 5S*)
 - Social media related data (i.e., Facebook, Instagram) is not reported. (Devices: *iPhone 6S Plus, iPhone 7, iPad Mini 4 v9.1*)
 - Social media related data (i.e., Facebook, Twitter, LinkedIn) is partially reported. (Device: *iPad Air v7.1*)
 - Social media related data (i.e., Facebook, Instagram) is not reported i.e., only installation package is reported. (Device: *iPhone 6S Plus*)
 - Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported. (Device: *iPhone 8 Plus*)
- **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.*

Internet Related Data:

- Internet related data (i.e., history, bookmarks, emails) related data is not reported. (Devices: *LG G4, HTC U11, Huawei P20 Pro, Samsung Tab S3*)
- Email related data is not reported. (Devices: *iPhone 5S, iPhone 6S Plus, iPhone 7, iPhone 8 Plus, iPhone X, iPad Air v11.2.1, iPad Mini 2 v11.3.1, iPad Mini 4 v9.1*)

GPS Related Data:

- GPS related data (i.e., longitude, latitude coordinates) is not reported. (Devices: *Huawei P20 Pro, Samsung Tab S3, iPad Mini 2 v11.3.1*)

➤ **NOTES:**

- When disrupting connectivity with a device, tool keeps trying to complete the acquisition. However, a message pops up saying the acquisition has finished with one or more errors, tool tries to show the results but fields are empty.

For more test result details see section 4.

2 Mobile Devices

The following table lists the mobile devices used for testing XRY v9.1.1.

Make	Model	Operating System OS	Firmware	Network
Apple iPhone	5S	iOS 7.1 (11D167)	2.18.02	Code-division multiple access (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
Apple iPad	Air	iOS v7.1 (11D167)		
Apple iPad	Mini 4 (A1550)	iOS 9.2.1 (113B143)		
LG	G4	Android 5.1.1	LMY47D	CDMA
HTC 10	HTC6545LVW	Android 6.0.1	1.85.605.8.8.0_g CL774095	CDMA
HTC	U11	Android 7.1.1	12861730	CDMA
Huawei P20 Pro	CLT-L29	Android 8.1.0	CLTL29810106(C636)	CDMA
Samsung Galaxy	Tab S3 (SM-T820)	Android 8.0.0	471A2324	CDMA
Verizon	Ellipsis 8 QTAQZ3	Android 4.4.2	KOT49H	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 Kiosk v9.1.1 software runs on Windows 10 LTSC 1809.

3.2 Internal Memory Data Objects

XRY Kiosk v9.1.1 was measured by analyzing acquired data from the internal memory of pre-populated mobile devices. Table 2 below 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>
	<i>Non-Latin SMS/EMS</i>
MMS Messages	<i>Incoming Audio</i>
	<i>Incoming Graphic</i>
	<i>Incoming Video</i>
	<i>Outgoing Audio</i>

Data Objects	Data Elements
	<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>Global Positioning System (GPS)Coordinates</i>
	<i>Geo-tagged Data</i>
Social Media Data	<i>Facebook</i>
	<i>Twitter</i>
	<i>LinkedIn</i>
	<i>Instagram</i>
	<i>Pinterest</i>
	<i>SnapChat</i>
	<i>WhatsApp</i>

Table 2: Internal Memory Data Objects

4 Test Results

This section provides the test cases results reported by the tool. Sections 4.1 – 4.3 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 Kiosk 9.1.1.

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 Kiosk v9.1.1. All test cases pertaining to the acquisition of supported Android devices were successful with the exception of the following.

- Contact entries are not reported for the LG G4.
- Graphic files associated with contact entries are reported under the Pictures category and not with the contact entry for the Ellipsis 8.
- Call log is not reported for the LG G4.
- Calendar related data is not reported for the LG G4 and Huawei P20 Pro.
- Memo related data is not reported for the LG G4, HTC 10, HTC U11, Huawei P20 Pro and Galaxy Tab S3.
- Memo is partially reported, only the database can be seen but the messages are not accessible for the Galaxy Tab S2.
- Outgoing calls duration and recipients via FireChat were not reported for the Galaxy Tab S2.
- SMS are not reported for the LG G4.
- MMS attachments are reported but not the text portion of the message for the LG G4.
- MMS audio attachments are reported but can't be played for the HTC 10.
- MMS attachments are reported but the text portion of the message is missing for the Galaxy Tab S3.
- MMS containing audio files attachments are reported but not playable for the Huawei P20.
- Stand-alone media files (i.e., graphic, audio, video) are partially reported for the Galaxy Tab S3.
- Application data (i.e., Pdf and Txt documents) was partially reported for the LG G4, HTC 10, HTC U11, Huawei P20 Pro and Ellipsis 8. Only the path to the file was reported, the file could not be opened.
- Application data (i.e., Pdf and Txt documents) was not reported for the Galaxy Tab S3.
- Social media related data (i.e., Twitter) is partially reported (only profile pictures) for the LG G4.
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported. (Device: *LG G4*)
- Social media related data (i.e., Facebook, LinkedIn, Instagram) is not reported for the HTC 10 and HTC U11.
- Social media related data (i.e., Twitter) is partially reported (only pictures were reported) for the HTC 10 and HTC U11.
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported for the Huawei P20 Pro.
- Social media related data (i.e., WhatsApp) is only reported when selected as an individual artifact for acquisition for the Huawei P20 Pro.
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported for the Galaxy Tab S3.
- Social media related data (i.e., LinkedIn, Instagram) is not reported for the Ellipsis 8.

- Internet related data (i.e., browser history, bookmarks, emails) is not reported for the HTC U11, Huawei P20 Pro and Galaxy Tab S3.
- GPS related data (i.e., longitude, latitude coordinates) is not reported for the Huawei P20 Pro and Galaxy Tab S3.

➤ **NOTES:**

- First time the LG G4 was connected, the tool only identified stand-alone files as supported artifacts but the second time it said it supported Contacts, Celndar, MMS, SMS, Files, Calls and Emails. However, the second time around the tool fell into a loop trying to connect to the device but it failed.
- Profile used for the HTC 10 was “Android Generic” (Tool’s message said the profile didn’t match the device). Tool asked to do a soft rooting of the device. Acquisition finished with some errors.
- Acquisition completed with erros was reported for the Galaxy Tab S3 but the error is unknown.
- When performing a *Full Logical* acquisition, media files (i.e., graphic, audio, video) are not reported. However, when selecting to acquire files only, they can be selected for acquisition and are reported for the Galaxy Tab S3.
- Rooting Process was selected for the Ellipsis 8 and Samsung Galaxy Tab S2.
- Email is partially supported but was completed reported for the Ellipsis 8.
- Deleted data (Contacts, Calls) was reported for the HTC 10.
- Deleted data (Contacts) was reported for the Ellipsis 8.
- Calls via FireChat were not reported for the Ellipsis since the specific version used (v7.79) is not supported by the Kiosk. The tool supports the FireChat app up to version 2.5.1.
- Deleted data (Contacts) was reported for the Samsung Galaxy Tab S2.

See Table 3 below for more details.

XRY Kiosk v9.1.1								
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android						
		LG G4	HTC 10	HTC U11	Huawei P20 Pro	Samsung Galaxy Tab S3	Ellipsis 8	Samsung Galaxy Tab S2
Acquisition	Acquire All	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
	Disrupted	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
Reporting	Preview-Pane	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
	Generated Reports	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
Equipment/	IMEI	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>

XRY Kiosk v9.1.1

Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android						
		LG G4	HTC 10	HTC U11	Huawei P20 Pro	Samsung Galaxy Tab S3	Ellipsis 8	Samsung Galaxy Tab S2
User Data	MEID/ESN	As Expected	NA	NA	NA	As Expected	As Expected	As Expected
	MSISDN	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data	Contacts	Not As Expected	As Expected	As Expected	As Expected	As Expected	Partial	As Expected
	Calendar	Not As Expected	As Expected	As Expected	Not As Expected	As Expected	As Expected	As Expected
	Memos/Notes	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	N/A	Partial
Call Logs	Incoming	Not As Expected	As Expected	As Expected	As Expected	NA	N/A	As Expected
	Outgoing	Not As Expected	As Expected	As Expected	As Expected	NA	N/A	Partial
	Missed	Not As Expected	As Expected	As Expected	As Expected	NA	N/A	As Expected
SMS Messages	Incoming	Not As Expected	As Expected	As Expected	As Expected	NA	As Expected	As Expected
	Outgoing	Not As Expected	As Expected	As Expected	As Expected	NA	Not As Expected	As Expected
MMS Messages	Graphic	Partial	As Expected	As Expected	As Expected	Partial	Not As Expected	As Expected
	Audio	Partial	Partial	As Expected	Partial	Partial	Not As Expected	As Expected
	Video	Partial	As Expected	As Expected	As Expected	Partial	Not As Expected	As Expected
Stand-alone Files	Graphic	As Expected	As Expected	As Expected	As Expected	Partial	As Expected	As Expected
	Audio	As Expected	As Expected	As Expected	As Expected	Partial	As Expected	As Expected
	Video	As Expected	As Expected	As Expected	As Expected	Partial	As Expected	As Expected
Application Data	Documents (txt, pdf files)	Partial	Partial	Partial	Partial	Not As Expected	Partial	As Expected
Social Media Data	Facebook	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	As Expected	Not As Expected
	Twitter	Partial	Partial	Partial	Not As Expected	Not As Expected	As Expected	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
	Instagram	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
	Pinterest	Not As Expected	NA	NA	Not As Expected	Not As Expected	NA	Not As Expected

XRY Kiosk v9.1.1								
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android						
		LG G4	HTC 10	HTC U11	Huawei P20 Pro	Samsung Galaxy Tab S3	Ellipsis 8	Samsung Galaxy Tab S2
	SnapChat	<i>Not As Expected</i>	<i>NA</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>
	WhatsApp	<i>Not As Expected</i>	<i>NA</i>	<i>NA</i>	<i>Partial</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>
Internet Data	Bookmarks	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	History	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Email	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
GPS Data	Coordinates /Geo-tagged	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</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>	<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>	<i>As Expected</i>	<i>As Expected</i>
Case File Data Protection	Modify Case Data	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>

Table 3: Android Devices

4.2 iOS Mobile Devices

The internal memory contents for iOS devices were acquired and analyzed with XRY Kiosk v9.1.1.

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

- Equipment related data (i.e., IMEI) is not reported for the iPad Air v11.2.1.
- No Device information is reported for the iPad Air v11.2.1.
- Memos are partially reported (status says: “Marked for deletion” instead of “Deleted” for the iPhone 6S Plus and iPad Mini 4 v9.1.
- Outgoing MMS video attachments can’t be played for the iPhone 5S.
- Incoming and Outgoing MMS video attachments can’t be played for the iPad Air v7.1.
- Application data (i.e., Pdf and Txt documents) was partially reported for the iPhone6S Plus, iPhone 7, iPhone 8 Plus, iPad Air v11.2.1, iPad Mini 2 v11.3.1

and iPad Air v7.1. Only the path to the file was reported, the file could not be opened.

- Social Media related data (i.e., LinkedIn, Snapchat) is not reported for the iPhone X.
- Social media related data (i.e., Facebook) is partially reported (only pictures are reported) for the iPhone 5S.
- Social media related data (i.e., Instagram, LinkedIn) is not reported for the iPhone 5S.
- Social media related data (i.e., Facebook, Instagram) is not reported (only installation package is reported) for the iPhone 6S Plus, iPhone 7 and iPad Mini 4 v9.1.
- Social media related data (i.e., Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported for the iPhone 8 Plus.
- Social media related data (i.e., Facebook, LinkedIn, Instagram) is not reported for the iPad Mini 2 v11.3.1.
- Social media related data (i.e., Facebook, Twitter, LinkedIn) is partially reported (only pictures) for the iPad Air v7.1.
- Internet related data (i.e., emails) is not reported for the iPhone 5S, iPhone 6S Plus, iPhone 7, iPhone 8 Plus and iPhone X, iPad Air v11.2.1, iPad Mini 2 v11.3.1 and iPad Mini 4 v9.1.
- GPS related data (i.e., longitude, latitude coordinates) is not reported for the iPad Mini 2 v11.3.1.

➤ **NOTES:**

- Notes are not listed as a supported artifact but Notes were recovered for the iPhone X.
- Deleted data (i.e., Contacts, Calendar, Notes, Calls) was recovered for the iPhone 5S.
- Deleted data (i.e., Calendar, Calls, SMS) was recovered for the iPhone 6S Plus.
- Deleted data (i.e., Contacts, Calls, SMS, MMS) was recovered for the iPhone 7.
- Deleted *Note* is reported but the status is incorrectly reported as *Active*.
- Deleted data (i.e., Contact, Calendar, Notes, Calls) was not recovered for the iPhone 8 Plus.
- Deleted data (i.e., Notes, Calendar entries) was recovered for the iPhone X.
- Deleted data (i.e., Contact, Calendar, Notes) was recovered for the iPad Air 2 v11.2.1 and iPad Mini 2 v11.3.1.
- Deleted data (i.e., Calendar, Notes, SMS, MMS) was recovered for the iPad Air v7.1. MMS attachments recovered (i.e., graphic, audio, video files) can't be played.
- Email is only supported for jailbroken iPad Air v7.1. However, tool was able to acquire email from a non-jailbroken iPad Air v7.1.
- Deleted data (i.e., Contact, Calendar, Notes, SMS) was recovered for the iPad Mini 4 v9.1. However, the status was reported as "Mark as Deletion" instead of "Deleted".

See Tables 4a and 4b below for more details.

XRY Kiosk v9.1.1							
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
Acquisition	Acquire All	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
Reporting	Preview-Pane	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
Equipment/ User Data	IMEI	As Expected	As Expected	As Expected	As Expected	As Expected	Not As Expected
	MEID/ESN	NA	NA	NA	NA	NA	NA
	Mobile Station International Subscriber Directory Number (MSISDN)	As Expected	As Expected	As Expected	As Expected	As Expected	NA
PIM Data	Contacts	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
	Memos/Notes	As Expected	Partial	As Expected	As Expected	As Expected	As Expected
Call Logs	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Missed	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
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected

XRY Kiosk v9.1.1

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
MMS Messages	Graphic	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
	Video	Partial	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
	Audio	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
Application Data	Documents (txt, pdf files)	As Expected	Partial	Partial	Partial	As Expected	Partial
Social Media Data	Facebook	Partial	Not As Expected	Not As Expected	Not As Expected	As Expected	Not As Expected
	Twitter	As Expected	As Expected	As Expected	Not As Expected	As Expected	As Expected
	LinkedIn	Not As Expected	As Expected	As Expected	Not As Expected	Not As Expected	Not As Expected
	Instagram	Not As Expected	Not As Expected	Not As Expected	Not As Expected	As Expected	Not As Expected
	Pinterest	NA	NA	NA	Not As Expected	As Expected	NA
	SnapChat	NA	NA	NA	Not As Expected	Not As Expected	NA
	WhatsApp	NA	NA	NA	As Expected	As Expected	NA
Internet Data	Bookmarks	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
	Email	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
GPS Data	Coordinates/ Geo-tagged	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected

XRY Kiosk v9.1.1							
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
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>	<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>	<i>As Expected</i>
Case File Data Protection	Modify Case Data	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>

Table 4a: iOS Devices

XRY Kiosk v9.1.1				
Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: iOS</i>		
		iPad Mini v11.3.1	iPad Air v7.1	iPad Mini 4 v9.1
Acquisition	Acquire All	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Disrupted	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Reporting	Preview-Pane	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Generated Reports	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Equipment/ User Data	IMEI	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	MEID/ESN	<i>NA</i>	<i>NA</i>	<i>NA</i>
	MSISDN	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
PIM Data	Contacts	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Calendar	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Memos/Notes	<i>As Expected</i>	<i>As Expected</i>	<i>Partial</i>
Call Logs	Incoming	<i>NA</i>	<i>NA</i>	<i>NA</i>
	Outgoing	<i>NA</i>	<i>NA</i>	<i>NA</i>
	Missed	<i>NA</i>	<i>NA</i>	<i>NA</i>
SMS Messages	Incoming	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Outgoing	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
MMS Messages	Graphic	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Audio	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Video	<i>As Expected</i>	<i>Partial</i>	<i>As Expected</i>
Stand-alone Files	Graphic	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Audio	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Video	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Application Data	Documents (txt, pdf files)	<i>Partial</i>	<i>Partial</i>	<i>N/A</i>

XRY Kiosk v9.1.1				
Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: iOS</i>		
		<i>iPad Mini v11.3.1</i>	<i>iPad Air v7.1</i>	<i>iPad Mini 4 v9.1</i>
Social Media Data	Facebook	<i>Not As Expected</i>	<i>Partial</i>	<i>Not As Expected</i>
	Twitter	<i>As Expected</i>	<i>Partial</i>	<i>As Expected</i>
	LinkedIn	<i>Not As Expected</i>	<i>Partial</i>	<i>As Expected</i>
	Instagram	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>
	Pinterest	<i>NA</i>	<i>NA</i>	<i>NA</i>
	SnapChat	<i>NA</i>	<i>NA</i>	<i>NA</i>
	WhatsApp	<i>NA</i>	<i>NA</i>	<i>NA</i>
Internet Data	Bookmarks	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	History	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Email	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>
GPS Data	Coordinates/Geo-tagged	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Non-Latin Character	Reported in native format	<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>
Case File Data Protection	Modify Case Data	<i>NA</i>	<i>NA</i>	<i>NA</i>

Table 4b: 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 Kiosk v9.1.1.

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

See Table 5 below for more details.

XRY Kiosk v9.1.1		
Test Cases – UICC Acquisition		<i>Universal Integrated Circuit Card</i>
Connectivity	Non Disrupted	<i>As Expected</i>
	Disrupted	<i>As Expected</i>
Equipment/ User Data	Service Provider Name (SPN)	<i>As Expected</i>
	Integrated Circuit Card Identification ICCID	<i>As Expected</i>
	International Mobile Subscriber Identity (IMSI)	<i>As Expected</i>
	MSISDN	<i>As Expected</i>
PIM Data	Abbreviated Dialing Numbers (ADNs)	<i>As Expected</i>
	Last Numbers Dialed (LNDs)	<i>As Expected</i>
	SMS Messages	<i>As Expected</i>
	EMS Messages	<i>As Expected</i>
Location Related Data	Location Information (LOCI)	<i>As Expected</i>
	General Packet Radio Service Location Information (GPRS LOCI)	<i>As Expected</i>
Acquisition	Acquire All	<i>As Expected</i>
	Selected All	<i>As Expected</i>
	Select Individual	<i>As Expected</i>
Case File Data Protection	Modify Case Data	<i>As Expected</i>
Password Protected SIM Acquire	Acquisition of Protected SIM	<i>As Expected</i>
PIN/PUK Attempts	PIN attempts reported	<i>As Expected</i>
	Personal Unblocking Key (PUK) attempts reported	<i>As Expected</i>
Non-ASCII Character	Non-ASCII characters	<i>As Expected</i>
Hashing	Hashes reported for acquired data objects	<i>As Expected</i>

Table 5: Universal Integrated Circuit Cards