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Test Results for Mobile Device Acquisition Tool:
XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507

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Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security (DHS) Science and Technology Directorate, the National Institute of Justice (NIJ), and the National Institute of Standards and Technology (NIST) Special Programs Office 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 DHS'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 (<https://www.cftt.nist.gov/>).

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This document reports the results from testing XRY Office v10.0 – XAMN v7.0.0 6 across supported mobile devices and associated media e.g., smart phones, tablets.

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 Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507

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1 Results Summary

XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507 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).

The data reported for the devices below varies based upon the data extraction technique supported. For instance, a physical and/or file system extraction will provide the user with more data than a logical extraction. Each supported data extraction technique was performed. Except for the following anomalies, the tool acquired all supported data objects completely and accurately for all mobile devices tested.

Acquisition:

Connectivity disruption doesn't report and error message for the user. (Devices: *LG V30, LG G6, Samsung Galaxy J3, Samsung Galaxy S10, Samsung Galaxy Tab S3, Samsung Galaxy Note 10, Google Pixel 2, Sony Xperia, Ellipsis 8, Huawei P20 Pro, iPhone 8, iPhone SE, iPhone X, iPhone 11, iPad Air 2*)

Call Logs:

Calls are partially recovered (i.e., call length is not correct). (Device: *iPhone 8*)

MMS Messages:

- MMS incoming and outgoing attachments are not playable (i.e., audio). (Devices: *LG G6, Samsung Galaxy J3, Samsung Galaxy S9, Samsung Galaxy S10, Samsung Galaxy Note 10, Moto Z Droid*)
- MMS incoming attachments are not playable (i.e., audio). (Devices: *Samsung Galaxy Note 8, Google Pixel 2, Huawei P20 Pro*)
- MMS outgoing attachments are partially reported (i.e., graphic, audio, video). (Device: *Google Pixel XL*)
- MMS incoming graphic file is partially reported. (Device: *iPhone 8*)

Stand-alone files:

Document files are not reported. (Device: *iPhone 5S*)

Application Data:

Documents (pdf) files have to be exported and opened with a third party tool to see the content. (Devices: *LG V30, LG G6, Samsung Galaxy J3, Samsung Galaxy S9, Samsung Galaxy S10, Samsung Galaxy Tab S2, Samsung Galaxy Tab S3, Samsung Galaxy Note 8, Samsung Galaxy Note 10, Google Pixel XL, Google Pixel 2, Moto Z Droid, Sony Xperia, Ellipsis 8, Huawei P20 Pro, iPhone 7, iPhone 8, iPhone SE, iPhone X, iPhone 11*)

Social media Data:

- Social media related data (i.e., Facebook) is not reported. (Device: *iPhone X*)
- Social media related data (i.e., Facebook, LinkedIn) is not reported. (Devices: *iPhone 11, iPad Air 2*)
- Social media related data (i.e., Twitter) is not reported. (Devices: *iPhone 11*)
- Social media related data (i.e., Facebook, Instagram) is not reported. (Device: *iPhone 7*)
- Social media related data (i.e., Facebook, Instagram) is partially reported. (Device: *iPhone 8*)
- Social media related data (i.e., Twitter, LinkedIn, Pinterest, SnapChat) is not reported. (Devices: *iPhone 8, iPhone SE, iPhone X*)
- Social media related data (i.e., Facebook) is partially reported. (Device: *iPhone SE*)
- Social media related data (i.e., Pinterest, SnapChat) is not reported. (Device: *iPhone 11*)
- Social media related data (i.e., Pinterest) is not reported. (Device: *iPad Air 2*)

Internet Related Data:

- Internet related data (i.e., Bookmarks, History, Email) is not reported. (Devices: *LG V30, LG G6, Samsung Galaxy S9, Samsung Galaxy S10, Samsung Galaxy Tab S2, Samsung Galaxy Tab S3, Samsung Galaxy Note 8, Samsung Galaxy Note 10, Google Pixel XL, Google Pixel 2, Moto Z Droid, Sony Xperia, Huawei P20 Pro*)
- Internet related data (i.e., Email) is not reported. (Devices: *Ellipsis 8, iPhone 7, iPhone SE*)
- Internet related data (i.e., History) is not reported. (Device: *iPhone X*)

GPS:

GPS data (i.e., Latitude, longitude coordinates) is not reported. (Devices: *LG V30, LG G6, Samsung Galaxy S9, Samsung Galaxy S10, Samsung Galaxy Note 10, Ellipsis 8, Huawei P20 Pro*)

For more test result details see section 4.

2 Mobile Devices

The following table lists the mobile devices used for testing XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507.

Make	Model	OS	Firmware	Network
Apple iPhone	7	iOS 10.2 (14C92)	1.33.00	CDMA
Apple iPhone	8	iOS 11.3.1 (15E302)	1.89.00	CDMA
Apple iPhone	8 Plus	iOS 11.4.1 (15G77)	1.89.00	CDMA
Apple iPhone	SE	iOS 15.1 (MX9N2LL/A)	1.06.00	CDMA
Apple iPhone	X	iOS 11.3.1 (15E302)	1.89.00	CDMA
Apple iPhone	11	iOS 15.1 (15E302)	3.0.00	CDMA
Apple iPad	Air 2	iOS 11.2.1 (11D167)	2.18.02	CDMA
Apple iPad	Mini 2	iOS 11.3.1 (15E302)	4.52.00	CDMA
LG	V30	Android 8.0.0	OPR1170623026	CDMA
LG	G6	Android 7.0	US99715a	CDMA
Samsung J3	J3 – SM-J320V	Android 6.0.1	MMB29M.J320VVR U2AP12	CDMA
Samsung Galaxy	S9	Android 8.0.0	G960U1UEU1ARB7	CDMA
Samsung Galaxy	S10	Android 9		CDMA
Samsug Galaxy	Tab S2	Android 5.1.1	LMY47X.T817BVR U2AOJ2	CDMA
Samsug Galaxy	Tab S3			CDMA
Samsung	Note 8	Android 7.1.1	G960U1UEU1ARB7	CDMA
Samsung	Note 10	Android 9		
Google	Pixel XL	Android 7.1.1	NMF26U	CDMA
Google	Pixel 2	Android 8.1.0	OPM171019.029	CDMA
Google	Pixel 4	Android 10		CDMA
HTC U11	U11	Android 7.1.1	12861730	CDMA
Motorola	Z Droid XT1650	Android 7.0	NCLS25.86-11-4	CDMA
Sony	Experia (G8342)	Android 8.0.0	471A2324	CDMA
Ellipsis	8 QTAQZ3	Android 4.4.2	KOT49H	CDMA
Huawei	P20 Pro	Android 8.1.0	CLTL29810106 (C636)	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 Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507 was installed on Windows 10 Pro for Workstation version 10.0.19042.

3.2 Internal Memory Data Objects

XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507 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>

Data Objects	Data Elements
Text Messages	<i>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</i>
MMS Messages	<i>Incoming Audio Incoming Graphic Incoming Video Outgoing Audio Outgoing Graphic Outgoing Video</i>
Application Data	<i>Device Specific App Data</i>
Stand-alone data files	<i>Audio Graphic Video Audio – Deleted Graphic - Deleted Video - Deleted</i>
Internet Data	<i>Visited Sites Bookmarks E-mail</i>
Location Data	<i>GPS Coordinates Geo-tagged Data</i>
Social Media Data	<i>Facebook Twitter LinkedIn Instagram Pinterest SnapChat 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 – 4.2 identify the mobile device operating system type, media (e.g., Android, iOS) and the make and model of mobile devices used for testing XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507.

The *Test Cases* column (internal memory acquisition) in sections 4.1 - 4.2 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 successfully.

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

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 successfully.

NA: Not Applicable – 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 Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507. All test cases pertaining to the acquisition of supported Android devices were successful with the exception of the following.

- Connectivity disruption doesn't report an error message to the user. Tool keeps trying to acquire the devices and shows results up until the disruption occurred with a message saying it finished with one or more errors for the LG V30, LG G6, Samsung Galaxy J3, Samsung Galaxy S10, Samsung Galaxy Tab S3, Samsung Galaxy Note 10, Google Pixel 2, Sony Xperia, Ellipsis 8 and Huawei P20 Pro.
- MMS, incoming and outgoing, related data attachments (i.e., audio) have to be exported and played with a third party tool to get its content for the LG G6, Samsung Galaxy J3, Samsung Galaxy S9 and Samsung Galaxy S10, Samsung Galaxy Note 10.
- MMS incoming attachment is not playable (i.e., audio), has to be exported and played with a third party tool for the Samsung Galaxy Note 8, Moto Z Droid, Google Pixel 2 and Huawei P20 Pro.
- MMS outgoing attachments (i.e., graphic, audio, video) are not playable/opened for the Google Pixel XL.
- Pdf documents have to be exported and use a third party to open it and see the content for the LG V30, LG G6, Samsung Galaxy J3, Samsung Galaxy S9, Samsung Galaxy S10, Samsung Galaxy Tab S2, Samsung Galaxy Tab S3, Samsung Galaxy Note 8, Samsung Galaxy Note 10, Google Pixel XL, Google Pixel 2, Moto Z Droid, Sony Xperia, Ellipsis 8 and Huawei P20 Pro.
- Internet related data (i.e., Bookmarks, History, Email) is not reported for the LG V30, LG G6, Samsung Galaxy S9, Samsung Galaxy S10, Samsung Galaxy Tab S2 and Samsung Galaxy Tab S3, Samsung Galaxy Note 8, Samsung Galaxy Note 10, Google Pixel XL, Google Pixel 2, Moto Z Droid, Sony Xperia and Huawei P20 Pro.
- Internet related data (i.e., Email) is not reported for the Ellipsis 8.
- GPS coordinated are not reported for the LG V30, LG G6, Samsung Galaxy S9, Samsung Galaxy S10, Samsung Galaxy Note 10, Ellipsis 8 and Huawei P20 Pro.

NOTES:

- Deleted data recovered:
 - Stand-alone graphic files for the LG G6.
 - Calls, calendar, SMS, MMS, email, .txt document for the Samsung Galaxy J3
 - Calendar entries for the Samsung Galaxy S9
 - Calendar entry was recovered but not marked as "deleted" for the Google Pixel 2 and Sony Xperia.
- First time the *LG V30* was connected to the tool, the tool didn't extract any data using the LG V30 profile. Second time worked better using the Android Generic profile.
- LG G6 could not be detected automatically, manual look up had to be used.
- Physical acquisition failed for the Samsung Galaxy S10.

- Tool auto connected the *Google Pixel 4* as a portable device (only file system support). No data was extracted.
- *HTC U11* was tried 3 times. First time tool was unable to connect to device; second time, no data was extracted (using the Android Generix profile) and third time through tool was unable to connect to device.
- The rooting device option for the Ellipsis 8 was NOT selected.
- Apps not downgraded for any of the devices.

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

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Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android						
		LG V30	LG G6	Samsung Galaxy J3	Samsung Galaxy S9	Samsung Galaxy S10	Samsung Galaxy Tab S2	Samsung Galaxy Tab S3
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	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	As <i>Expected</i>	Not 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/ User Data	IMEI/ MEID/ESN	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>
	MSISDN	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>
PIM Data	Contacts	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>
	Calendar	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>
	Memos/ Notes	NA	NA	NA	NA	NA	NA	NA
Call Logs	Incoming	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	NA
	Outgoing	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	NA
	Missed	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	NA
SMS Messages	Incoming	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	NA
	Outgoing	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	NA
MMS Messages	Graphic	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	NA
	Audio	As <i>Expected</i>	Partial	Partial	Partial	Partial	NA	NA
	Video	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	NA
Stand-alone Files	Graphic	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>
	Audio	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>
	Video	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>

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Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: Android</i>						
		LG V30	LG G6	Samsung Galaxy J3	Samsung Galaxy S9	Samsung Galaxy S10	Samsung Galaxy Tab S2	Samsung Galaxy Tab S3
Application Data	Documents (txt, pdf files)	<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>	NA	NA
Social Media Data	Facebook	NA	NA	<i>As Expected</i>	NA	NA	NA	NA
	Twitter	NA	NA	<i>As Expected</i>	NA	NA	NA	NA
	LinkedIn	NA	NA	NA	NA	NA	NA	NA
	Instagram	NA	NA	NA	NA	NA	NA	NA
	Pinterest	NA	NA	NA	NA	NA	NA	NA
	SnapChat	NA	NA	NA	NA	NA	NA	NA
	WhatsApp	NA	NA	NA	NA	NA	NA	NA
Internet Data	Bookmarks	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
	History	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
	Email	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
GPS Data	Coordinates /Geo-tagged	<i>Not As Expected</i>	<i>Not 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>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>
SQLite Data	Report Active Data	<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>
	Run SQLite Commands	<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>

Table 3a: Android Devices

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Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android							
		Samsung Galaxy Note 8	Samsung Galaxy Note 10	Google Pixel XL	Google Pixel 2	Moto Z Droid	Sony Xperia	Ellipsis 8	Huawei P20 Pro
Acquisition	Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Disrupted	As Expected	Not As Expected	As Expected	Not As Expected	As Expected	Not As Expected	Not As Expected	Not 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/ MEID/ESN	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	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	As Expected	As Expected	As Expected	As Expected	As Expected
	Memos/ Notes	NA	NA	NA	NA	NA	NA	NA	NA
Call Logs	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA	As Expected
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA	As Expected
	Missed	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA	As Expected
SMS Messages	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA	As Expected
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA	As Expected
MMS Messages	Graphic	As Expected	As Expected	Partial	As Expected	As Expected	As Expected	NA	As Expected
	Audio	Partial	Partial	Partial	Partial	Partial	As Expected	NA	Partial
	Video	As Expected	As Expected	Partial	As Expected	As Expected	As Expected	NA	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)	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected

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Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: Android</i>							
		Samsung Galaxy Note 8	Samsung Galaxy Note 10	Google Pixel XL	Google Pixel 2	Moto Z Droid	Sony Xperia	Ellipsis 8	Huawei P20 Pro
Social Media Data	Facebook	NA	NA	NA	NA	NA	NA	NA	NA
	Twitter	NA	NA	NA	NA	NA	NA	NA	NA
	LinkedIn	NA	NA	NA	NA	NA	NA	NA	NA
	Instagram	NA	NA	NA	NA	NA	NA	NA	NA
	Pinterest	NA	NA	NA	NA	NA	NA	NA	NA
	SnapChat	NA	NA	NA	NA	NA	NA	NA	NA
	WhatsApp	NA	NA	NA	NA	NA	NA	NA	NA
Internet Data	Bookmarks	<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>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>
	History	<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>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>
	Email	<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>	<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>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not 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>	<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>	<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>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
SQLite Data	Report Active Data	<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>	<i>As Expected</i>
	Run SQLite Commands	<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>	<i>As Expected</i>

Table 3b: Android Devices

4.2 iOS Mobile Devices

The internal memory contents for iOS devices were acquired and analyzed with XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507.

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

- Connectivity disruption doesn't report an error message to the user. Tool keeps trying to acquire the devices and shows results up until the disruption occurred with a message saying it finished with one or more errors for the iPhone 8, iPhone SE, iPhone X, iPhone 11 and iPad Air 2.
- Call lengths were not correct, were off by 1 second, tool reports extra second for each call for the iPhone 8.
- MMS incoming graphic file is partially reported, tool reports a video as an attachment instead of the correct graphic file for the iPhone 8.
- Pdf documents have to be exported and use a third party to open it and see the content for the iPhone 7, iPhone 8, iPhone SE, iPhone X and iPhone 11.
- Social media related data (i.e., Facebook, Instagram) is not reported for the iPhone 7.
- Social media related data (i.e., Facebook, Instagram) is partially reported, only 1 picture and contact name is reported for the iPhone 8.
- Social media related data (i.e., Facebook) is partially reported, only 1 picture was reported for the iPhone SE.
- Social media related data (i.e., Twitter, LinkedIn, Pinterest, SnapChat) is not reported for the iPhone 8, iPhone SE and iPhone X.
- Social media related data (i.e., Facebook) is not reported for the iPhone X, iPhone 11 and iPad Air 2.
- Social media related data (i.e., LinkedIn, Twitter, Pinterest, SnapChat) is not reported for the iPhone 11.
- Social media related data (i.e., LinkedIn, Pinterest) is not reported for the iPad Air 2.
- Internet related data (i.e., Email) is not reported for the iPhone 7 and iPhone SE.
- Internet related data (i.e., History) is not reported for the iPhone X.

NOTE:

- Deleted data recovered:
 - Contacts, calls, SMS, MMS for the iPhone 7.
 - Contacts, notes, calls for the iPhone 8.
 - MMS for the iPhone SE.
 - Notes were covered but not marked as deleted for the iPhone 11.
 - Contacts, calendar, notes for the iPad Air 2.
- Tool didn't report any data from the iPhone 8 Plus.
- Tool was unable to report data using the No encryption & the encryption options for the iPad Mini 2.

See Table 4 below for more details.

XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507

Test Cases – Internal Memory Acquisition		Mobile Device Platform: iOS					
		iPhone 7	iPhone 8	iPhone SE	iPhone X	iPhone 11	iPad Air 2 v11.2.1
Acquisition	Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	Disrupted	As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not 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/MEID/ ESN	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
	MSISDN	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
	Calendar	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
Call Logs	Incoming	As Expected	Partial	As Expected	As Expected	As Expected	NA
	Outgoing	As Expected	Partial	As Expected	As Expected	As Expected	NA
	Missed	As Expected	Partial	As Expected	As Expected	As Expected	NA
SMS Messages	Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	NA
MMS Messages	Graphic	As Expected	Partial	As Expected	As Expected	As Expected	NA
	Audio	As Expected	As Expected	As Expected	As Expected	As Expected	NA
	Video	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
	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)	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	As Expected

XRY Office v10.0 Build 10.000.268 – XAMN v7.0.0 Build 507

Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: iOS</i>					
		iPhone 7	iPhone 8	iPhone SE	iPhone X	iPhone 11	iPad Air 2 v11.2.1
Social Media Data	Facebook	<i>Not As Expected</i>	<i>Partial</i>	<i>Partial</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
	Twitter	<i>As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>
	LinkedIn	<i>As Expected</i>	<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>
	Instagram	<i>Not As Expected</i>	<i>Partial</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>
	Pinterest	<i>NA</i>	<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>
	SnapChat	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>NA</i>
	WhatsApp	<i>NA</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>
Internet Data	Bookmarks	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<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>	<i>Not 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>	<i>NA</i>	<i>NA</i>	<i>NA</i>
GPS Data	Coordinates/Geo-tagged	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>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>
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>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
SQLite Data	Report Active Data	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
	Run SQLite Commands	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>

Table 4: iOS Devices