



UFED4PC v6.2.1/ Physical Analyzer v6.3.0.284

Test Results for Mobile Device Acquisition Tool

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**Homeland
Security**

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Introduction

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

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

This document reports the results from testing Cellebrite's UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284 across supported mobile devices and associated media e.g., smart phones, tablets, feature phones and UICCs.

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

How to Read This Report

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

Test Results for Mobile Device Acquisition Tool

Tool Tested: UFED4PC / Physical Analyzer

Software Version: V6.2.1 / v6.3.0.284

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1 Results Summary

Cellebrite's UFED4PC / Physical Analyzer is a versatile mobile forensic solution that runs on existing hardware. It comes with a suite of applications, peripherals and accessories. UFED 4PC provides users with:

- A comprehensive all-in-one software solution
- A Windows-compatible tool that easily adapts to a variety of user workflows and environments
- Closed and self-contained environment for forensically sound extractions
- Simultaneous operations carried out at the same time
- Supports all data types
- Easily integrates with the user's customized work environment
- Unique evidence verification engine enables validation of recovered artifacts
- Frequent updates to ensure compatibility with new phones as they enter the market

UFED4PC is available with either an Ultimate or Logical solution offering, and as standard, comes with a range of supporting applications for in-depth decoding, analysis and reporting.

UFED4PC / Physical Analyzer was tested for its ability to acquire active data from the internal memory of supported mobile devices and associated media (i.e., smart phones, tablets, feature phones, UICCs/SIMs). Except for the following anomalies, the tool acquired all supported data objects completely and accurately for all mobile devices tested.

Personal Information Management (PIM) data:

- Graphic files with associated Contact/Address Book entries are not reported. (Devices: *LG G4, LG G5, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Google Pixel XL, Motorola Z Force, Galaxy Note 3, and the Galaxy Tab S2, Kyocera DuraXV, Rugby III*)
- Metadata i.e., birthdates associated with Contact/Address Book entries are reported within the Calendar database. (Devices: *iOS*)
- Metadata i.e., street address with associated Contact/Address Book entries are not reported. (Device: *Kyocera DuraXV*)
- Long notes/memos are truncated. (Devices: *Galaxy S3, Galaxy Note 3*)
- Notes/memos are not reported. (Devices: *LG G4, LG G5, Galaxy S6 Edge Plus, Samsung Galaxy Tab S2*)
- Deleted Notes are not marked with a status of Deleted. (Devices: *iPhone 7 Plus, iPad Air*)
- SMS messages are partially reported within the preview-pane (SMS messages, Chats) and inconsistent with the sms.db file. (Device: *iPhone 6S Plus*)
- Outgoing Group text messages are repeated for each unique contact. (Device: *iPhone 7 Plus*)
- Active MMS messages are marked with a status of Deleted. (Device: *iPad Air*)
- Outgoing MMS messages (i.e., audio, video) are not reported within the preview pane. (Device: *iPhone 6S Plus*) *Note: the textual portion of the message can be found within the SMS.db file. The associated attachments can be found within the filesystem view.*
- Incoming MMS messages (i.e., audio, graphic, video) are not reported. (Device: *iPhone 6S Plus*)
- Firechat SMS and MMS data is not reported. (Device: *Ellipsis 8*)
- Audio files are not reported with outgoing MMS messages. (Device: *LG G4*)
- MMS messages attachments (audio, graphic, video) are not reported. (Device: *Motorola Z Force*)

Stand-alone Files:

- Document files (i.e., .txt, .pdf) are not reported. (Devices: *LG G5, iPhone 5S, iPad Mini, iPad Air, iPad Pro*)

Social media Data:

- Partial Twitter v6.33.0 social media related data (i.e., pictures) are reported. (Device: *Google Pixel XL*)
- Social media related data i.e., Facebook is partially reported e.g., profile and account related data. (Devices: *iPhone 6S Plus – Facebook v48.0, Facebook Messenger v56.0, iPad Air – Facebook v37.0*)
- Social media related data i.e., Facebook v48.0, Instagram is partially reported e.g., profile and account related data. (Devices: *iPhone 7S Plus – Facebook Messenger v56.0, Instagram v7.15.0, iPad Mini – Facebook Messenger v57.0, Instagram v7.15.0, iPad Pro – Facebook Messenger v57.0, Instagram v7.16.0*)
- Social media related data i.e., LinkedIn v881.0 is not reported. (Device: *iPad Air*)
- **Note:** *The acquisition and reporting of social media related data extracted from a mobile device is dependent upon various factors - the state of the device (e.g., jailbroken, rooted), the data extraction method (e.g., logical, physical), the version of the app and how the data is stored.*

Internet Related Data:

- Internet related data (i.e., bookmarks, history, email) are not reported. (Devices: *LG G4, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Google Pixel XL, Motorola Z Force*)
- Email related data is not reported. (Device: *Galaxy Note 3*)

For more test result details see section 4.

2 Mobile Devices

The following table lists the mobile devices used for testing UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284.

Make	Model	OS	Firmware	Network
Apple	iPhone 4	iOS v4.3.3 (8J2)	04.10.01	GSM
Apple	iPhone 5S	iOS 7.1 (11D167)	2.18.02	CDMA
Apple	iPhone 6S Plus	iOS 9.2.1 (13C75)	1.23.00	CDMA
Apple	iPhone 7 Plus	iOS 10.2 (14C92)	1.33.00	CDMA
Apple	iPad Mini	iOS 9.2.1 (13B143)	4.32.00	CDMA
Apple	iPad Air	iOS 7.1 (11D167)	2.18.02	CDMA
Apple	iPad Pro	iOS 9.2.1 (13C75)	4.52.00	CDMA
Samsung	Galaxy S3 SGH-1747	Android 4.1.2	1747UCDMG2	GSM
Samsung	Galaxy S5 SM-G900V	Android 4.2.2	G900V.05	CDMA
LG	G4	Android 5.1.1	LMY47D	CDMA
LG	G5	Android 6.0.1	MMB29M	CDMA
Motorola	Droid Turbo2	Android 5.1.1	LCK23.130-23	CDMA
Samsung	Galaxy S6 Edge Plus – SM-G928V	Android 5.1.1	LMY47X.G928VVRU2AOJ2	CDMA
Samsung	J3 – SM-J320V	Android 6.0.1	MMB29M.J320VVRU2AP12	CDMA
Google	Pixel XL	Android 7.1.1	NMF26U	CDMA
Samsung	GS7 – SM-G930V	Android 6.0.1	MMB29M.G930VVRU4AP13	CDMA
Motorola	Z Force XT1650	Android 7.0	NCLS25.86-11-4	CDMA
HTC 10	HTC6545LVW	Android 6.0.1	1.85.605.8.8.0_g CL774095	CDMA
Samsung	GS7 Edge SM-G935V	Android 6.0.1	MMB29M.G935VVRS4APH1	CDMA
Samsung	Galaxy Note3	Android 4.4.2		
Ellipsis 8	QTAQZ3	Android	KOT49H	CDMA

Make	Model	OS	Firmware	Network
		4.4.2		
Samsung	Galaxy Tab-E	Android 5.1.1	LMY47X.T567VVRU1AOH1	CDMA
Samsung	Galaxy Tab S2	Android 5.1.1	LMY47X.T817BVRU2AOJ2	CDMA
Kyocera	DuraXV	Brew 1.0.4	3.819VZ	CDMA
LG	Cosmos 3	BREW 1.0.2	VN251ZV6	CDMA
Samsung	Rugby III	TRKE-PNX69xx	REV0.2	GSM

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

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284 was installed on Windows 7 v6.1.7601.

3.2 Internal Memory Data Objects

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284 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>
PIM Data: Datebook/Calendar; Memos	<i>Contact Groups</i>
	<i>Regular Length</i>
	<i>Maximum Length</i>
	<i>Deleted Entry</i>
	<i>Special Character</i>
Call Logs	<i>Blank Entry</i>
	<i>Incoming</i>
	<i>Outgoing</i>

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

Table 2: Internal Memory Data Objects

4 Test Results

This section provides the test cases results reported by the tool. Sections 4.1 – 4.4 identify the mobile device operating system type, media (e.g., Android, iOS, BlackBerry, Feature phones, UICC) and the make and model of mobile devices used for testing UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284.

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

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

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

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

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

4.1 Android Mobile Devices

The internal memory contents for Android devices were acquired and analyzed with UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284.

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

- Metadata i.e., graphic files with associated Contact/Address Book entries are not reported for the LG G4, LG G5, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Google Pixel XL, Motorola Z Force, Galaxy Note 3, and the Galaxy Tab S2.
- Long notes/memos are truncated for the Galaxy S3 and the Galaxy Note 3
- Notes/memos are not reported for the LG G4, LG G5, Galaxy S6 Edge Plus and Samsung Galaxy Tab S2.
- Firechat SMS and MMS data is not reported for the Ellipsis 8.
- Audio files are not reported with outgoing MMS messages for the LG G4.
- MMS messages attachments (audio, graphic, video) are not reported for the Motorola Z Force.
- Stand-alone files (i.e., .txt, .pdf) files are not reported for the LG G5.
- Partial Twitter social media related data (i.e., pictures) are reported for the Google Pixel XL
- Internet related data (i.e., bookmarks, history, email) is not reported for the LG G4, LG G5, Motorola Droid Turbo 2, Galaxy S6 Edge Plus, Google Pixel XL and the Motorola Z Force.
- Email related data is not reported for the Galaxy Note 3.

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

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Test Cases – Internal Memory Acquisition		Mobile Device Platform: Android							
		Galaxy S3	Galaxy S5	LG G4	LG G5	Motorola Droid Turbo 2	Galaxy S6 Edge Plus	Samsung J3	Google Pixel XL
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>	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>	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>	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>	As <i>Expected</i>
Equipment/ User Data	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>	As <i>Expected</i>
	MEID/ESN	NA	NA	NA	NA	NA	NA	NA	NA
	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>	As <i>Expected</i>
PIM Data	Contacts	As	As	Partial	Partial	Partial	Partial	As	Partial
	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>	As <i>Expected</i>
	Memos/ Notes	Partial	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>	As <i>Expected</i>
Call Logs	Incoming	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>	As <i>Expected</i>
	Outgoing	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>	As <i>Expected</i>
	Missed	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>	As <i>Expected</i>
SMS Messages	Incoming	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>	As <i>Expected</i>
	Outgoing	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>	As <i>Expected</i>
MMS Messages	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>	As <i>Expected</i>
	Audio	As <i>Expected</i>	As <i>Expected</i>	Not 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>	As <i>Expected</i>
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>	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>	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>	As <i>Expected</i>
Application Data	Documents (txt, pdf files)	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	Not 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>							
		Galaxy S3	Galaxy S5	LG G4	LG G5	Motorola Droid Turbo 2	Galaxy S6 Edge Plus	Samsung J3	Google Pixel XL
Social Media Data	Facebook	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>As Expected</i>	<i>NA</i>
	Twitter	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>As Expected</i>	<i>Partial</i>
	LinkedIn	<i>NA</i>	<i>As Expected</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>As Expected</i>	<i>NA</i>
	Instagram	<i>NA</i>	<i>NA</i>	<i>As Expected</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>As Expected</i>	<i>NA</i>
Internet Data	Bookmarks	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>
	History	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>
	Email	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>NA</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>
GPS Data	Coordinates /Geo-tagged	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>Not 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>	<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>

Table 3a: Android Mobile Devices

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Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: Android</i>						
		Samsung GS7/GS7 Edge	Motorol Z Force	HTC 10	Galaxy Note3	Ellipsis 8	Galaxy Tab-E	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/ User Data	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>
	MEID/ESN	NA	NA	NA	NA	NA	NA	NA
	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>	Partial	As <i>Expected</i>	Partial	As <i>Expected</i>	As <i>Expected</i>	Partial
	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	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	Partial	As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>
Call Logs	Incoming	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	As <i>Expected</i>	As <i>Expected</i>
	Outgoing	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	As <i>Expected</i>	As <i>Expected</i>
	Missed	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA	As <i>Expected</i>	As <i>Expected</i>
SMS Messages	Incoming	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	NA	NA
	Outgoing	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	NA	NA
MMS Messages	Graphic	As <i>Expected</i>	Partial	As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	NA	NA
	Audio	As <i>Expected</i>	Partial	As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	NA	NA
	Video	As <i>Expected</i>	Partial	As <i>Expected</i>	As <i>Expected</i>	Not 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>
Application Data	Documents (txt, pdf files)	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>

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284

Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: Android</i>						
		Samsung GS7/GS7 Edge	Motorol Z Force	HTC 10	Galaxy Note3	Ellipsis 8	Galaxy Tab-E	Galaxy Tab S2
Social Media Data	Facebook	<i>As Expected</i>	<i>NA</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>
	Twitter	<i>As Expected</i>	<i>NA</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>
	LinkedIn	<i>As Expected</i>	<i>NA</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>
	Instagram	<i>As Expected</i>	<i>NA</i>	<i>NA</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Internet Data	Bookmarks	<i>As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>
	History	<i>As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>
	Email	<i>Partial</i>	<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	Coordinate s/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>	<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>

Table 3b: Android Devices

4.2 iOS Mobile Devices

The internal memory contents for iOS devices were acquired and analyzed with UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284.

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

- Deleted Notes are not marked with a status of Deleted for the iPhone 7 Plus and the iPad Air.
- SMS messages are partially reported within the preview-pane (SMS messages, Chats) and inconsistent with the sms.db file for the iPhone 6S Plus.
- Outgoing Group text messages are repeated for each unique contact for the iPhone 7 Plus.
- Active MMS messages are marked with a status of Deleted for the iPad Air.
- Outgoing MMS messages (i.e., audio, video) are not reported within the preview pane for the iPhone 6S Plus. Note: the textual portion of the message can be found within the SMS.db file. The associated attachments can be found within the filesystem view.
- Incoming MMS messages (i.e., audio, graphic, video) are not reported for the iPhone 6S Plus.
- Stand-alone document files (i.e., .pdf, .txt) are not reported for the iPhone 5S, iPad Mini, iPad Air and the iPad Pro.
- Social media related data (i.e., Facebook) is partially reported (profile and account related data) for the iPhone 6S Plus and the iPad Air.
- Social media related data (i.e., Facebook, Instagram) is partially reported (profile and account related data) for the iPhone 7S Plus, iPad Mini and the iPad Pro.
- Social media related data (i.e., LinkedIn) is not reported for the iPad Air.

See Table 4 below for more details.

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284

Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: iOS</i>						
		iPhone 4	iPhone 5S	iPhone 6S Plus	iPhone 7 Plus	iPad Mini	iPad Air	iPad Pro
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/ User Data	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>
	MEID/ESN	NA	NA	NA	NA	NA	NA	NA
	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	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</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	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>
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>	<i>Partial</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
	Outgoing	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	<i>Partial</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
MMS Messages	Graphic	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>
	Audio	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>
	Video	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>	As <i>Expected</i>	<i>Partial</i>	As <i>Expected</i>
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>
Application Data	Documents (txt, pdf files)	As <i>Expected</i>	<i>Not As</i> <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	<i>Not As</i> <i>Expected</i>	<i>Not As</i> <i>Expected</i>	<i>Not As</i> <i>Expected</i>

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284

Test Cases – Internal Memory Acquisition		<i>Mobile Device Platform: iOS</i>						
		<i>iPhone 4</i>	<i>iPhone 5S</i>	<i>iPhone 6S Plus</i>	<i>iPhone 7 Plus</i>	<i>iPad Mini</i>	<i>iPad Air</i>	<i>iPad Pro</i>
Social Media Data	Facebook	<i>NA</i>	<i>As Expected</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>
	Twitter	<i>NA</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>
	LinkedIn	<i>NA</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>
	Instagram	<i>NA</i>	<i>NA</i>	<i>As Expected</i>	<i>Partial</i>	<i>Partial</i>	<i>NA</i>	<i>Partial</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>	<i>As Expected</i>
	History	<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>
	Email	<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>
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>	<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>

Table 4: iOS Mobile Devices

4.3 Feature Devices

The internal memory contents for BlackBerry and Feature phones were acquired and analyzed with UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284.

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

- Metadata i.e., graphic files with associated Contact/Address Book entries are not reported for the Kyocera DuraXV and the Rugby III.
 - Metadata i.e., street address with associated Contact/Address Book entries are not reported for the Kyocera DuraXV.
- Note: *Non-ASCII characters are not displayed in their native format for the LG Cosmos 3 when performing a logical extraction.*

See Table 5 below for more details.

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284				
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Feature Phone		
		Kyocera Dura XV	LG Cosmos 3	Rugby III
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>NA</i>	<i>As Expected</i>
	MEID/ESN	<i>NA</i>	<i>NA</i>	<i>NA</i>
	MSISDN	<i>As Expected</i>	<i>NA</i>	<i>As Expected</i>
PIM Data	Contacts	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>
	Calendar	<i>NA</i>	<i>NA</i>	<i>NA</i>
	Memos/Notes	<i>NA</i>	<i>NA</i>	<i>NA</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>

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284				
Test Cases – Internal Memory Acquisition		Mobile Device Platform: Feature Phone		
		Kyocera Dura XV	LG Cosmos 3	Rugby III
SMS Messages	Incoming	NA	As Expected	As Expected
	Outgoing	NA	As Expected	As Expected
MMS Messages	Graphic	NA	As Expected	NA
	Audio	NA	As Expected	NA
	Video	NA	As Expected	NA
Stand-alone Files	Graphic	As Expected	As Expected	As Expected
	Audio	As Expected	As Expected	As Expected
	Video	As Expected	As Expected	As Expected
Application Data	Documents (txt, pdf files)	NA	NA	NA
Social Media Data	Facebook	NA	NA	NA
	Twitter	NA	NA	NA
	LinkedIn	NA	NA	NA
	Instagram	NA	NA	NA
Internet Data	Bookmarks	NA	NA	NA
	History	NA	NA	NA
	Email	NA	NA	NA
GPS Data	Coordinates/Geo-tagged	NA	NA	NA
Non-Latin Character	Reported in native format	As Expected	As Expected	As Expected
Hashing	Case File/Individual Files	As Expected	As Expected	As Expected
Case File Data Protection	Modify Case Data	As Expected	As Expected	As Expected

Table 5: Feature Phones

4.4 Universal Integrated Circuit Cards (UICCs)

The internal memory contents for Universal Integrated Circuit Cards (UICCs) were acquired and analyzed with UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284.

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

See Table 6 below for more details.

UFED4PC v6.2.1 / Physical Analyzer v6.3.0.284		
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>
	ICCID	<i>As Expected</i>
	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	LOCI	<i>As Expected</i>
	GPRSLOCI	<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>
	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 6: Universal Integrated Circuit Cards