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Test Results for Mobile Device Acquisition Tool:
Belkasoft Evidence Center X v1.16.12797

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Introduction

The Computer Forensics Tool Testing (CFTT) program is a joint project of the Department of Homeland Security's (DHS) Science and Technology Directorate, the National Institute of Justice, and the National Institute of Standards and Technology's (NIST) Special Programs Office and Information Technology Laboratory. 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's Criminal Investigation Division Electronic Crimes Program, and U.S. 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 website (<https://www.cftt.nist.gov/>).

This document reports the results from testing Belkasoft Evidence Center X v1.16.12797 across supported mobile devices.

Test results from other tools can be found on DHS's computer forensics webpage at <https://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: Belkasoft Evidence Center X

Software Version: v1.16.12797

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1 Results Summary

Belkasoft Evidence Center X v1.16.12797 was tested for its ability to acquire active data from the internal memory of supported mobile devices.

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.

Personal Information Management (PIM) data:

- Contacts are partially reported. (Devices: *Google Pixel 4, Google Pixel 6, Galaxy S9, Galaxy S10, Galaxy Note 8, Galaxy Note 10, Galaxy Tab S7 FE, Galaxy Tab S8, Huawei P20 Pro, iPhone 8, iPhone X, iPhone XR, iPhone SE, iPhone 11, iPhone 13, iPhone 13 Pro, iPhone 13 Pro Max, iPhone 13 Mini*)
- Long contact entries are truncated. (Devices: *iPhone 8, iPhone X, iPhone XR, iPhone SE, iPhone 11, iPhone 13, iPhone 13 mini*)
- Calendar data is not reported. (Devices: *Google Pixel 6, Google Pixel 6 Pro*)
- Calendar data is partially reported. (Devices: *Google Pixel 4, Galaxy Tab S7 FE, Galaxy Tab S8, Huawei P20 Pro*)
- Notes or Memo entries are not reported. (Devices: *Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S9, Galaxy S10, Galaxy Note 8, Galaxy Note 10, Galaxy Tab S7 FE, Galaxy Tab S8, Huawei P20 Pro*)
- Call log data (incoming, outgoing, missed calls) is not reported. (Devices: *Google Pixel 6, Google Pixel 6 Pro*)

MMS Messages:

- MMS (graphic, audio, video) messages are partially reported. (Devices: *Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S9, Galaxy S10, Galaxy Note 8, Huawei P20 Pro*)
- MMS (graphic, audio) messages are partially reported. (Device: *Galaxy Note 10*)

Stand-alone files:

- Document files are not reported. (Devices: *Galaxy Tab S7 FE, Galaxy Tab S8, Huawei P20 Pro*)

Social media Data:

- Social media related data (TikTok) is not reported. (Devices: *Google Pixel 6, Galaxy Tab S7 FE, Galaxy Tab S8, iPhone 11*)
- Social media related data (LinkedIn, Instagram, Snapchat) is not reported. (Devices: *Galaxy S9, iPhone X*). Social media related data (LinkedIn, Instagram, Pinterest, Snapchat, WhatsApp) is not reported. (Device: *Galaxy Note 8*)
- Social media related data (Facebook, Twitter, Instagram, Pinterest, Snapchat, WhatsApp) is not reported. (Device: *Google Pixel 6*)
- Social media related data (Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported. (Devices: *Google Pixel 6 Pro, Galaxy Tab S7 FE, Galaxy Tab S8*)
- Social media related data (Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported. (Devices: *Google Pixel 4, Galaxy Note 10, iPhone 8*)
- Social media related data (Pinterest, Snapchat) is not reported. (Device: *Galaxy S10*)
- Social media related data (WhatsApp) is partially reported. (Devices: *Galaxy Tab S7 FE, Galaxy Tab S8*)
- Social media related data (Facebook, Snapchat) is not reported. (Device: *Huawei P20 Pro*)
- Social media related data (Facebook) is not reported. (Device: *iPhone 8*)
- Social media related data (Pinterest) is not reported. (Device: *iPhone X*)
- Social media related data (Facebook, Twitter, LinkedIn, Pinterest, Snapchat) is not reported. (Devices: *iPhone XR, iPhone SE, iPhone 11, iPhone 13, iPhone 13 Pro, iPhone 13 Pro Max, iPhone 13 Mini*)
- Social media data (LinkedIn, Instagram, Snapchat) is not reported. (Device: *Galaxy S9*)

Internet Data:

- Internet data (browser history, bookmarks, and emails) is not reported. (Devices: *Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S9, Galaxy S10, Galaxy Note 8, Galaxy Note 10, Galaxy Tab S7 FE, Galaxy Tab S8, Huawei P20 Pro, iPhone X*)
- Internet data (emails) is not reported. (Device: *iPhone 11*)

GPS Location Data:

- GPS related data (coordinates, locations, geotagged pictures & videos) is not reported. (Devices: *Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S10, Galaxy Note 10, Galaxy Tab S7 FE, Galaxy Tab S8, Huawei P20 Pro*)
- GPS related data (coordinates, locations, geotagged pictures and videos) is partially reported. (Devices: *iPhone 8, iPhone X*)

NOTES:

The Android devices must be rooted for the tool to report the equipment related data (IMEI). None of the devices used during testing fall under such conditions, therefore no IMEI was reported for any of the devices.

For more test result details see section 4.

2 Mobile Devices

The following table lists the mobile devices used for testing Belkasoft Evidence Center X v1.16.12797.

Make	Model Name	OS	Model #	CDMA
Apple iPhone	8	iOS 11.3.1	15E302	CDMA
Apple iPhone	X	iOS 11.3.1	15E302	CDMA
Apple iPhone	XR	iOS 15.1	NQCK2LL/A	CDMA
Apple iPhone	SE	iOS 15.1	MX9N2LL/A	CDMA
Apple iPhone	11	iOS 15.1	15E302	CDMA
Apple iPhone	13	iOS 15.6	MNGD3LL/A	CDMA
Apple iPhone	13 Pro	iOS 15.6	MNDT3LL/A	CDMA
Apple iPhone	13 PRO Max	iOS 15.6	MNCP34LL/A	CDMA
Apple iPhone	13 Mini	iOS 15.6	MNF83LL/A	CDMA
Google	Pixel 4	Android 10	G0201	CDMA
Google	Pixel 6	Android 12	GR1YH	CDMA
Google	Pixel 6 Pro	Android 12	GF5KQ	CDMA
Samsung Galaxy	S9	Android 8.0.0	SM-G960U1	CDMA
Samsung Galaxy	S10	Android 9	SM-G973U1	CDMA
Samsung Galaxy	Note 8	Android 7.1.1	SM-N950U1	CDMA
Samsung Galaxy	Note 10	Android 9	SM-N970U1	CDMA
Samsung Galaxy	Tab S7 FE	Android 12	R52T50EMQ6V	CDMA
Samsung Galaxy	Tab S8	Android 12	SM-X700	CDMA
One Plus	9	Android 11	LE2115	CDMA
One Plus	10 Pro	Android 12	NE2215	CDMA
Huawei	P20 Pro	Android 8.1.0	CLTL29810106 (C636)	CDMA
Samsung Galaxy	Z Fold3 5G	Android 12	SM-F926U1	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

Belkasoft Evidence Center X v1.16.12797 was installed on Windows 10 Pro version 10.0.19044 Build 19044.

3.2 Internal Memory Data Objects

Belkasoft Evidence Center X v1.16.12797 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 through 4.2 identify the mobile device operating system type, media type such as Android, iOS and UICCs, the make and model of mobile devices used for testing Belkasoft Evidence Center X v1.16.12797.

The *Test Cases* column (internal memory acquisition) in sections 4.1 through 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/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 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 Belkasoft Evidence Center X v1.16.12797. All test cases pertaining to the acquisition of supported Android devices were successful except for the following across all Android devices.

- Contacts partially reported for the Google Pixel 4, Google Pixel 6, Galaxy Note 8, Galaxy Tab S7 FE, Galaxy Tab S8. Graphic file associated with a contacts entries are not reported.
- Long contact entry is truncated for the Galaxy Tab S7 FE and Galaxy Tab S8.
- Contacts partially reported for the Galaxy Note 10. Graphic file associated with a contacts entries are reported separately under the pictures category for the Galaxy S9, Galaxy S10, Galaxy Note 10 and Huawei P20 Pro.
- Calendar event entries are not reported for the Google Pixel 6, Google Pixel 6 Pro, Galaxy Tab S7 FE.
- Calendar event location and a note added to an event was the only calendar data reported for the Google Pixel 4, Galaxy Tab S7 FE, Galaxy Tab S8 and Huawei P20 Pro.
- Memo or Note entries are not reported for the Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S9, Galaxy S10, Galaxy Note 8, Galaxy Note 10, Galaxy Tab S7 FE, Galaxy Tab S8 and Huawei P20 Pro.
- Call log data (incoming, outgoing, missed calls) is not reported for the Google Pixel 6, Google Pixel 6 Pro.
- MMS attachments are not reported together with the text portion of the message for the Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S9, Galaxy S10, Galaxy Note 8 and Huawei P20 Pro.
- MMS outgoing audio are found under cloud files category.
- Incoming MMS graphic, audio and video file attachments are not reported with the text message but are reported under the audio and images categories for the Google Pixel 4.
- Incoming MMS graphic and audio file attachments are not reported with the text message but are reported under the audio and images categories for the Galaxy Note 10.
- Incoming MMS audio and graphic file attachments are not reported with the text message, but are reported under the audio and images categories for the Google Pixel 6 Pro.
- Outcoming MMS graphic and video file attachments are not reported with the text message but are reported under their respective “images” and “videos” categories for the Galaxy Note 10.
- Outcoming MMS video and audio file attachments are not reported with the text message, but are reported under their respective “videos” and “audio” categories for the Google Pixel 6 Pro.
- Outcoming MMS graphic, audio and video file attachments are not reported with the text message but are reported under their respective “videos” and “audio” categories for the Google Pixel 4.
- PDF files are not reported for the Galaxy Tab S7 FE, Galaxy Tab S8 and Huawei P20 Pro.

- Social media related data (TikTok) is not reported for the Google Pixel 6, Galaxy Tab S7 FE and Galaxy Tab S8.
- Social media related data (Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported for the Google Pixel 6 Pro, Galaxy Tab S7 FE, and Galaxy Tab S8.
- Social media related data (LinkedIn, Instagram, Snapchat) is not reported for the Galaxy S9.
- Social media related data (Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported for the Google Pixel 4 and Galaxy Note 10.
- Social media related data (Pinterest, Snapchat) is not reported for the Galaxy S10.
- Social media related data (WhatsApp) is partially reported for the Galaxy Tab S7 FE and Galaxy Tab S8. Tool only reports pictures from messages sent/received.
- Social media related data (LinkedIn, Instagram, Pinterest, Snapchat, and WhatsApp) is not reported for the Galaxy Note 8.
- Social media related data (Facebook, Twitter, Instagram, Pinterest, Snapchat, WhatsApp) is not reported for the Google Pixel 6.
- Social media related data (Facebook, Snapchat) is not reported for the Huawei P20 Pro.
- Internet data (browser history, bookmarks, emails) is not reported for the Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S9, Galaxy S10, Galaxy Note 8, Galaxy Note 10, Galaxy Tab S7 FE, Galaxy Tab S8 and Huawei P20 Pro.
- GPS related data (coordinates, locations, geotagged pictures and videos) is not reported for the Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Galaxy S10, Galaxy Note 10, Galaxy Tab S7 FE, Galaxy Tab S8 and Huawei P20 Pro.

NOTE:

- Deleted data recovered for the Google Pixel 6 Pro: contacts, but its status was reported as active, and stand-alone multimedia files.
- Deleted data recovered for the Google Pixel 6: stand-alone audio, graphic and video files, and .txt file.
- The only acquisition method that was successful for the Galaxy Z Fold 3 5G was MTP/PTP acquisition.
- “Android Generic” profile was used to acquire the following devices: Galaxy Z Fold 3 5G, Galaxy Note8, Galaxy Note 10, One Plus 9, One Plus 10 Pro, Google Pixel 4, Google Pixel 6, Google Pixel 6 Pro, Huawei P20 Pro, Galaxy Tab S8 and Galaxy Tab S7 FE. For the rest of the devices the tool provided its own profile.
- Tool prompts the user to enter information for WhatsApp. Information not available, therefore it was not entered for the purpose of this testing.
- Tool message when trying to acquire the One Plus 10 Pro: “Acquisition finished with errors.” However, no data was reported. Acquisition was attempted 3 times using Android Debug Bridge (ADB) Backup and Advanced ADB Backup methods.
- Tool message when trying to acquire the One Plus 9: “Acquisition finished with errors.” However, no data was reported in GUI, but media were saved in the case folder. Acquisition was attempted three times using ADB Backup and Advanced ADB Backup methods.
- Tool message, “Acquisition finished with errors.” was shown when acquiring the Google Pixel 6 and Google Pixel 6 Pro.

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

Internal Memory Acquisition
Belkasoft Evidence Center X v1.16.12797
Mobile Device Platform: Android

Test Cases:	Google Pixel 4	Google Pixel 6	Google Pixel 6 PRO	Galaxy S9	Galaxy S10	Galaxy Note 8	Galaxy Note 10
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>
Acquisition: 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>
Reporting: 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	NA	NA	NA	NA	NA	NA	NA
Equipment/User Data: 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>	As <i>Expected</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>
PIM Data: Calendar	<i>Partial</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
PIM Data: Memos/Notes	<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>
Call Logs: Incoming	As <i>Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
Call Logs: Outgoing	As <i>Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
Call Logs: Missed	As <i>Expected</i>	<i>Not As Expected</i>	<i>Not As 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>
SMS Messages: 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>
MMS Messages: Graphic	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>
MMS Messages: Audio	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>
MMS Messages: Video	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	<i>Partial</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>
Stand-alone Files: 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>

Test Cases:	Google Pixel 4	Google Pixel 6	Google Pixel 6 PRO	Galaxy S9	Galaxy S10	Galaxy Note 8	Galaxy Note 10
Stand-alone Files: 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>
Social Media Data: Facebook	As <i>Expected</i>	Not 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>
Social Media Data: Twitter	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>
Social Media Data: LinkedIn	Not As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>
Social Media Data: Instagram	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>
Social Media Data: Pinterest	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>
Social Media Data: Snapchat	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>
Social Media Data: WhatsApp	As <i>Expected</i>	Not As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	Not As <i>Expected</i>	As <i>Expected</i>
Social Media Data: TikTok	NA	Not As <i>Expected</i>	As <i>Expected</i>	NA	NA	NA	NA
Internet Data: Bookmarks	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>
Internet Data: History	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>
Internet Data: Email	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>	Not As <i>Expected</i>
GPS Data: Coordinates/Geo-tagged	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>
Non-Latin Character: Reported in native format	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>
Hashing: Case File/ Individual 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>
Case File Data Protection: Modify Case Data	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>
SQLite Data: Report Active Data	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>
SQLite Data: Run SQLite Commands	NA	NA	NA	NA	NA	NA	NA

Table 3a: Android Devices

Internal Memory Acquisition
Belkasoft Evidence Center X v1.16.12797
Mobile Device Platform: Android

Test Cases:	Galaxy Tab S7 FE	Galaxy Tab S8	Huawei P20 Pro	Galaxy Z Fold3 5G
Acquisition: Acquire All	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA
Acquisition: Disrupted	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA
Reporting: Preview-Pane	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA
Reporting: Generated Reports	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA
Equipment/User Data: IMEI/MEID/ESN	NA	NA	NA	NA
Equipment/User Data: MSISDN	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	NA
PIM Data: Contacts	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	NA
PIM Data: Calendar	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>	NA
PIM Data: Memos/Notes	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
Call Logs: Incoming	NA	NA	As <i>Expected</i>	NA
Call Logs: Outgoing	NA	NA	As <i>Expected</i>	NA
Call Logs: Missed	NA	NA	As <i>Expected</i>	NA
SMS Messages: Incoming	NA	NA	As <i>Expected</i>	NA
SMS Messages: Outgoing	NA	NA	As <i>Expected</i>	NA
MMS Messages: Graphic	NA	NA	<i>Partial</i>	NA
MMS Messages: Audio	NA	NA	<i>Partial</i>	NA
MMS Messages: Video	NA	NA	<i>Partial</i>	NA
Stand-alone Files: Graphic	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
Stand-alone Files: Audio	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>
Stand-alone Files: Video	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>

Test Cases:	Galaxy Tab S7 FE	Galaxy Tab S8	Huawei P20 Pro	Galaxy Z Fold3 5G
Application Data: Documents (txt, pdf files)	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
Social Media Data: Facebook	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
Social Media Data: Twitter	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	NA
Social Media Data: LinkedIn	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	NA
Social Media Data: Instagram	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	NA
Social Media Data: Pinterest	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	NA
Social Media Data: Snapchat	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
Social Media Data: WhatsApp	<i>Partial</i>	<i>Partial</i>	<i>As Expected</i>	NA
Social Media Data: TikTok	<i>Not As Expected</i>	<i>Not As Expected</i>	NA	NA
Internet Data: Bookmarks	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
Internet Data: History	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
Internet Data: Email	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
GPS Data: Coordinates/Geo-tagged	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>	NA
Non-Latin Character: Reported in native format	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	NA
Hashing: Case File/ Individual Files	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	NA
Case File Data Protection: Modify Case Data	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	NA
SQLite Data: Report Active Data	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	NA
SQLite Data: Run SQLite Commands	NA	NA	NA	NA

Table 3b: Android Devices

4.2 iOS Mobile Devices

The internal memory contents for iOS devices were acquired and analyzed with Belkasoft Evidence Center X v1.16.12797.

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

- Graphic files associated with contact entries are not reported for the iPhone 8, iPhone X, iPhone XR, iPhone SE, iPhone 11, iPhone 13, iPhone 13 Pro, iPhone 13 Pro Max and iPhone 13 Mini.
- Long contact entry is truncated for the iPhone 8, iPhone X, iPhone XR, iPhone SE, iPhone 11, iPhone 13 and iPhone 13 Mini.
- Social media related data (Facebook, Twitter, LinkedIn, Instagram, Pinterest, Snapchat) is not reported for the iPhone 8.
- Social media related data (LinkedIn, Instagram, Pinterest and Snapchat) is not reported for the iPhone X.
- Social media related data (Facebook, Twitter, LinkedIn, Pinterest, Snapchat) is not reported for the iPhone XR, iPhone SE, iPhone 11, iPhone 13, iPhone 13 Pro, iPhone 13 Pro Max and iPhone 13 Mini.
- Social media related data (TikTok) is not reported for the iPhone 11.
- Internet related data (browser history, bookmarks, emails) is not reported for the iPhone X.
- Internet related data (emails) is not reported for the iPhone 11.
- GPS related data (latitude, longitude coordinates, geotagged pictures and videos) is partially reported, only geotagged pictures are reported for the iPhone 8 and iPhone X.

NOTE:

- Acquisition method used, per device, to report results was the iTunes Backup. However, the “Agent Backup” and “Checkm8” were also attempted, for the supported devices, but without success due to the following reasons: the “Agent Backup” requires a password and an Apple ID (which we don’t have set up on testing devices) and “Checkm8” works on iOS 12+ and devices iOS were older.
- Deleted data recovered for the iPhone XR, iPhone SE, iPhone 11, iPhone 13, iPhone 13 Pro, iPhone 13 Pro Max and iPhone 13 Mini: memos but the tool reported its status as “active.”

See Table 4a, 4b below for more details.

Internal Memory Acquisition
Belkasoft Evidence Center X v1.16.12797
Mobile Device Platform: iOS

Test Cases:	iPhone 8	iPhone X	iPhone XR	iPhone SE	iPhone 11	iPhone 13
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>
Acquisition: 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>
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>
Reporting: 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>
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>
Equipment/User Data: 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>
PIM Data: Contacts	Partial	Partial	Partial	Partial	Partial	Partial
PIM Data: 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>
PIM Data: Memos/Notes	As <i>Expected</i>	As <i>Expected</i>	As <i>Expected</i>	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>
Call Logs: 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>
Call Logs: 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>
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>
SMS Messages: 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>
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>
MMS Messages: 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>
MMS Messages: 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>
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>
Stand-alone Files: 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>
Stand-alone Files: 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>
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>

Test Cases:	iPhone 8	iPhone X	iPhone XR	iPhone SE	iPhone 11	iPhone 13
Social Media Data: Facebook	<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>
Social Media Data: Twitter	<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>
Social Media Data: LinkedIn	<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>
Social Media Data: Instagram	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Social Media Data: Pinterest	<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>
Social Media Data: Snapchat	<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>
Social Media Data: WhatsApp	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Social Media Data: TikTok	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>Not As Expected</i>	<i>NA</i>
Internet Data: Bookmarks	<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>
Internet Data: History	<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>
Internet Data: Email	<i>As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>	<i>As Expected</i>	<i>Not As Expected</i>	<i>As Expected</i>
GPS Data: Coordinates/Geo-tagged	<i>Partial</i>	<i>Partial</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>
SQLite Data: Run SQLite Commands	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>	<i>NA</i>

Table 4a: iOS Devices

Test Cases:	iPhone 13 Pro	iPhone 13 Pro Max	iPhone 13 Mini
Acquisition: Acquire All	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Acquisition: 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>
Reporting: Generated Reports	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Equipment/User Data: IMEI/MEID/ESN	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Equipment/User Data: MSISDN	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
PIM Data: Contacts	<i>Partial</i>	<i>Partial</i>	<i>Partial</i>
PIM Data: Calendar	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
PIM Data: Memos/Notes	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Call Logs: Incoming	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Call Logs: Outgoing	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Call Logs: Missed	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
SMS Messages: Incoming	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
SMS Messages: 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>
MMS Messages: Audio	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
MMS Messages: Video	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Stand-alone Files: Graphic	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Stand-alone Files: Audio	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Stand-alone Files: Video	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Application Data: Documents (txt, pdf files)	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Social Media Data: Facebook	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>

Test Cases:	iPhone 13 Pro	iPhone 13 Pro Max	iPhone 13 Mini
Social Media Data: Twitter	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
Social Media Data: LinkedIn	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
Social Media Data: Instagram	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Social Media Data: Pinterest	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
Social Media Data: Snapchat	<i>Not As Expected</i>	<i>Not As Expected</i>	<i>Not As Expected</i>
Social Media Data: WhatsApp	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Social Media Data: TikTok	<i>NA</i>	<i>NA</i>	<i>NA</i>
Internet Data: Bookmarks	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Internet Data: History	<i>As Expected</i>	<i>As Expected</i>	<i>As Expected</i>
Internet Data: Email	<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>
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>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>
SQLite Data: Run SQLite Commands	<i>NA</i>	<i>NA</i>	<i>NA</i>

Table 4b: iOS Devices