Test Results for Mobile Device Acquisition Tool:
Oxygen Forensic Detective v15.0.0.126

Contents

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 Oxygen Forensic Detective v15.0.0.126 across supported mobile devices and Universal Integrated Circuit Cards (UICCs).

Test results from other tools can be found on the DHS Science and Technology sponsored digital forensics website, 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: Oxygen Forensic Detective

Software Version: v15.0.0.126

Supplier: Oxygen

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1   Results Summary

Oxygen Forensic Detective v15.0.0.126 was tested for its ability to acquire active data from the internal memory of supported mobile devices and associated media (i.e., smart phones, tablets, UICCs).

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 as well as each individual exploit across all devices.

The anomalies listed below are specific to the phone type, operating system and data extraction technique used. The data extraction type performed is listed in Table 1 below as well as in the sections 4.1 – 4.3.

***Call logs*:**

> Call logs are not reported. (Devices: ***Galaxy S22, Galaxy Z Fold 3, One Plus 9***)

***SMS, MMS messages*:**

- MMS attachments are not viewable (i.e., audio, graphic, video). (Devices: ***Galaxy S22, Galaxy Z Fold 3, One Plus 9***)

Stand-alone files:

- Document files are not reported. (Devices: ***Galaxy S22, Galaxy Z Fold 3, One Plus 10, One Plus 9, Google Pixel 6 Pro, Google Pixel 6, Galaxy Tab S8, Galaxy Tab S7 FE***)

Social media data:

- Social media data (Facebook Messenger, Instagram) is not reported. (Device: ***Galaxy Z Fold 3***)
- Social media data (Twitter, SnapChat) is not reported. (Device: ***Google Pixel 4***)
- Social media data for WhatsApp is partially reported (i.e., graphic files). (Device: ***Google Pixel 4***)

- Social media data for SnapChat is not reported. (Device: ***Galaxy S10, Galaxy Note 10***)
- Social media data for Twitter is partially reported (i.e., graphic files, account info). (Device: ***Galaxy Note 10***)
- Social media data for (Pinterest, SnapChat) is not reported. (Devcie: ***Galaxy Note 8***)
- Social media data (LinkedIn) is partially reported (i.e., account info, graphic files). (Device: ***Galaxy Note 8***)
- Social media data (Facebook, Pinterest, SnapChat) is not reported. (Device: ***Huawei P20 Pro***)
- Social media data for Facebook is partially reported (i.e., account, profile related information). (Devices: ***iPhone 11, iPhone XR, iPhone SE, iPad Pro, iPhone 8***)
- Social media data for Facebook Messenger is not reported. (Devices: ***iPhone 13 Pro Max, iPhone 13 Pro, iPhone 13, iPhone 13 mini, iPhone 11, iPhone XR, iPhone SE, iPhone 8***)
- Social media data for Facebook Messenger is partially reported (i.e., account, profile related information). (Devices: ***Google Pixel 6 Pro, Google Pixel 6, One Plus 10 Pro***)
- Social media data for Twitter is partially reported (i.e., account, profile related information). (Devices: ***iPhone 13 Pro Max, iPhone 13 Pro, iPhone 13, iPhone 13 mini, iPhone XR, iPad Pro, iPhone 8***)
- Social media data for Instagram is partially reported (i.e., account, profile related information). (Devices: ***iPhone X, iPhone 8***)
- Social media data for Pinterest is partially reported (i.e., account, profile related information). (Device: ***iPhone 8***)
- Social media data for SnapChat is partially reported (i.e., account, profile related information). (Devices: ***iPhone11, iPhone XR, iPhone SE***)

UICC acquisition:

The user is not prompted to enter the Personal Identification Number (PIN) or protected UICCs or the Personal Unblocking Key (PUK) code for UICCs that have no PIN attempts remaining resulting in unsuccessful data extraction of UICCs.

For more test result details see section 4.

2   Mobile Devices

The following table lists the mobile devices used for testing Oxygen Forensic Detective v15.0.0.126. For Android devices: Android Agent (AA), On the Go (OTG), ADB

Make	Model Name	OS	Extraction Type	Model #	Network
Apple iPhone	13 Pro Max	iOS 15.6	iTunes Backup	MNCP34LL/A	CDMA
Apple iPhone	13 Pro	iOS 15.6	iTunes Backup	MNDT3LL/A	CDMA
Apple iPhone	13	iOS 15.6	iTunes Backup	MNGD3LL/A	CDMA
Apple iPhone	13 mini	iOS 15.6	iTunes Backup	MNF83LL/A	CDMA
Apple iPhone	11	iOS 15.1	iTunes Backup	MWL72LL/A	CDMA
Apple iPhone	XR	iOS 15.1	iTunes Backup	NQCK2LL/A	CDMA
Apple iPhone	SE	iOS 15.1	iTunes Backup	MX9N2LL/A	CDMA
Apple iPhone	X	iOS 11.3.1	iTunes Backup	MQCK2LL/A	CDMA
Apple iPad	Pro	iOS 15.6	iTunes Backup	MHQR3LL/A	CDMA
Apple iPhone	8	iOS 11.3.1	iTunes Backup	15E203	CDMA
Samsung	Galaxy S22	Android 12	AA, OTG	SM-S901U1	CDMA
Samsung	Galaxy Z Fold3 5G	Android 12	AA, OTG	SM-F926U1	CDMA
One Plus	10 Pro	Android 12	AA, ADBB, APKD, OTG	NE2215	CDMA
One Plus	9	Android 11	AA, ADBB, APKD, OTG	LE2115	CDMA
Google Pixel	6 Pro	Android 12	AA, ADBB, APKD	GF5KQ	CDMA
Google Pixel	6	Android 12	AA, ADBB, APKD	GR1YH	CDMA
Samsung	Galaxy Tab S8	Android 12	AA, OTG	SM-X700	CDMA
Samsung	Galaxy Tab S7 FE	Android 12	AA, OTG	SM-T733	CDMA
Google	Pixel 4	Android 10	AA, ADBB, APKD	G0201	CDMA
Samsung	Galaxy Note 10	Android 9	AA, ADBB, APKD, OTG	SM-N97OU1	CDMA
Samsung	Galaxy S10	Android 9	AA, ADBB, APKD, OTG	SM-G973U1	CDMA
Samsung	Galaxy Note 8	Android 7.1.1	AA, ADBB, APKD, OTG	NMF26XN950 U1UEU1AQ1f	CDMA
Samsung	Galaxy S9	Android 8.0.0	AA, FFS, AP, OTG	G960U1UEU1 ARB7	CDMA
Huawei	P20 Pro	Android 8.1.0	AA, ADBB, APKD, OTG	CLTL2981010 6 (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

Oxygen Forensic Detective v15.0.0.126 was installed on Windows 10 Pro version 10.0.19042.1586.

3.2 Internal Memory Data Objects

Oxygen Forensic Detective v15.0.0.126 was measured by analyzing acquired data from the internal memory of pre-populated mobile devices. Table 2 defines the data objects and elements used for populating mobile devices provided the mobile device supports the data element.

Data Objects	Data Elements
Address Book Entries	*Regular Length* *Maximum Length* *Special Character* *Blank Name* *Regular Length, email* *Regular Length, graphic* *Regular Length, Address* *Deleted Entry* *Non-Latin Entry* *Contact Groups*
PIM Data: Datebook/Calendar; Memos	*Regular Length* *Maximum Length* *Deleted Entry* *Special Character* *Blank Entry*
Call Logs	*Incoming* *Outgoing* *Missed* *Incoming – Deleted* *Outgoing – Deleted* *Missed - Deleted*

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

Table 2: Internal Memory Data Objects

4 Test Results

This section provides the test cases results reported by the tool. Sections 4.1 – 4.3 identify the mobile device operating system type, media (e.g., Android, iOS, UICC) and the make and model of mobile devices used for testing Oxygen Forensic Detective v15.0.0.126

The *Test Cases* column (internal memory acquisition) in sections 4.1 - 4.3 are comprised of two sub-columns that define a particular test category and individual sub-categories that are verified when acquiring the internal memory for supported mobile devices and UICCs within each test case. Each individual sub-category row results for each mobile device/UICC tested. The results are as follows:

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

Partial: the mobile forensic application returned some of the 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 Oxygen Forensic Detective v15.0.0.126 All test cases pertaining to the acquisition of supported Android devices were successful with the exception of the following across all Android devices.

- Call logs (incoming, outgoing, missed) were not reported for the Galaxy S22, Galaxy Z Fold 3 and One Plus 9.
- MMS attachments (audio, graphic, video) are not viewable/playable for the Galaxy S22, Galaxy Z Fold 3 and One Plus 9.
- Document files (pdf, txt) are not reported for the Galaxy S22, Galaxy Z Fold 3, One Plus 10, One Plus 9, Google Pixl 6 Pro, Google Pixel 6, Galaxy Tab S8 and Galaxy Tab S7 FE.
- Social media data (Facebook, Twitter, LinkedIn, Instagram, Pinterest, SnapChat, WhatsApp, TikTok) is not reported for the Galaxy Z Fold 3.
- Social media data (Twitter, SnapChat) is not reported for the Google Pixel 4.
- Social media data for SnapChat is not reported for the Galaxy Note 10.
- Social media data for SnapChat is not reported for the Galaxy S10.
- Social media data for Twitter is partially reported (i.e., graphic files, account info) for the Galaxy Note 10.
- Social media data for Facebook Messenger is partially reported (i.e., graphic files, account info) for the Google Pixel 6 Pro, Google Pixel 6 and One Plus 10 Pro.
- Social media data (Pinterest, SnapChat) is not reported for the Galaxy Note 8.
- Social media data for LinkedIn is partially reported (i.e., account info, graphic files) for the Galaxy Note 8.
- Social media data (Facebook, Pinterest, SnapChat) is not reported for the Huawei P20 Pro.

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

Internal Memory Acquisition
Oxygen Forensic Detective v15.0.0.126
Mobile Device Platform: Android

Test Cases:	Samsung Galaxy S22	Samsung Galaxy Z Fold 3 5G	One Plus 10 Pro	One Plus 9	Google Pixel 6 Pro	Google Pixel 6	Samsung Galaxy Tab S8
Acquisition: Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Acquisition: Disrupted	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting: Preview Pane	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting: Generated Reports	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
Equipment/User Data: MSISDN	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data: Contacts	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data: Calendar	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data: Memos/Notes	NA	NA	NA	NA	NA	NA	NA
Call Logs: Incoming	Not As Expected	Not As Expected	As Expected	Not As Expected	As Expected	As Expected	NA
Call Logs: Outgoing	Not As Expected	Not As Expected	As Expected	Not As Expected	As Expected	As Expected	NA
Call Logs: Missed	Not As Expected	Not As Expected	As Expected	Not As Expected	As Expected	As Expected	NA
SMS Messages: Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA
SMS Messages: Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	NA
MMS Messages: Graphic	Not As Expected	Not As Expected	As Expected	Not As Expected	As Expected	As Expected	NA
MMS Messages: Audio	Not As Expected	Not As Expected	As Expected	Not As Expected	As Expected	As Expected	NA
MMS Messages: Video	Not As Expected	Not As Expected	As Expected	Not As Expected	As Expected	As Expected	NA
Stand-alone Files: Graphic	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Audio	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Video	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

Test Cases:	Samsung Galaxy S22	Samsung Galaxy Z Fold 3 5G	One Plus 10 Pro	One Plus 9	Google Pixel 6 Pro	Google Pixel 6	Samsung Galaxy Tab S8
Social Media Data: Facebook	NA	NA	NA	NA	NA	NA	NA
Social Media Data: Facebook Messenger	NA	Not As Expected	Partial	NA	Partial	Partial	NA
Social Media Data: Twitter	NA	NA	As Expected	NA	As Expected	As Expected	NA
Social Media Data: LinkedIn	NA	NA	As Expected	As Expected	As Expected	As Expected	NA
Social Media Data: Instagram	NA	Not As Expected	As Expected	As Expected	As Expected	As Expected	NA
Social Media Data: Pinterest	NA	NA	NA	NA	NA	NA	NA
Social Media Data: SnapChat	NA	NA	NA	NA	NA	NA	NA
Social Media Data: WhatsApp	NA	NA	As Expected	NA	As Expected	As Expected	NA
Social Media Data: TikTok	NA	NA	NA	NA	NA	NA	NA
Internet Data: Bookmarks	NA	NA	NA	NA	NA	NA	NA
Internet Data: History	NA	NA	NA	NA	NA	NA	NA
Internet Data: Email	NA	NA	NA	NA	NA	NA	NA
GPS Data: Coordinates/Geo-tagged	NA	NA	NA	NA	NA	NA	NA
Non-Latin Character: Reported in native format	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Hashing: Case File/ Individual Files	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Case File Data Protection: Modify Case Data	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SQLite Data: Report Active Data	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SQLite Data: Run SQLite Commands	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected

Table 3a: Android Devices

Test Cases:	Samsung Galaxy Tab S7 FE	Google Pixel 4	Samsung Galaxy Note 10	Samsung Galaxy S10	Samsung Galaxy Note 8	Samsung Galaxy S9	Huawei P20 Pro
Acquisition: Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Acquisition: Disrupted	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting: Preview Pane	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting: Generated Reports	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
Equipment/User Data: MSISDN	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data: Contacts	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data: Calendar	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data: Memos/Notes	NA	NA	NA	NA	NA	As Expected	NA
Call Logs: Incoming	NA	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Call Logs: Outgoing	NA	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Call Logs: Missed	NA	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SMS Messages: Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SMS Messages: Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
MMS Messages: Graphic	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
MMS Messages: Audio	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
MMS Messages: Video	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Graphic	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Audio	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Video	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Application Data: Documents (txt, pdf files)	Not As Expected	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Social Media Data: Facebook	NA	As Expected	NA	As Expected	NA	As Expected	Not As Expected

Test Cases:	Samsung Galaxy Tab S7 FE	Google Pixel 4	Samsung Galaxy Note 10	Samsung Galaxy S10	Samsung Galaxy Note 8	Samsung Galaxy S9	Huawei P20 Pro
Social Media Data: Facebook Messenger	*NA*	*As Expected*	*NA*	*As Expected*	*As Expected*	*As Expected*	*Not As Expected*
Social Media Data: Twitter	*NA*	*Not As Expected*	*Partial*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Social Media Data: LinkedIn	*NA*	*As Expected*	*As Expected*	*As Expected*	*Partial*	*As Expected*	*As Expected*
Social Media Data: Instagram	*NA*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Social Media Data: Pinterest	*NA*	*NA*	*NA*	*As Expected*	*Not As Expected*	*As Expected*	*Not As Expected*
Social Media Data: SnapChat	*NA*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*Not As Expected*	*As Expected*	*Not As Expected*
Social Media Data: WhatsApp	*NA*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Social Media Data: TikTok	*NA*	*NA*	*NA*	*NA*	*NA*	*As Expected*	*NA*
Internet Data: Bookmarks	*NA*	*NA*	*NA*	*NA*	*NA*	*As Expected*	*NA*
Internet Data: History	*NA*	*NA*	*NA*	*NA*	*NA*	*As Expected*	*NA*
Internet Data: Email	*NA*	*NA*	*NA*	*NA*	*NA*	*As Expected*	*NA*
GPS Data: Coordinates/Geo-tagged	*NA*	*NA*	*NA*	*NA*	*NA*	*As Expected*	*NA*
Non-Latin Character: Reported in native format	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Hashing: Case File/ Individual Files	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Case File Data Protection: Modify Case Data	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
SQLite Data: Report Active Data	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*
SQLite Data: Run SQLite Commands	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*	*As Expected*

Table 3b: Android Devices

4.2 iOS Mobile Devices

The internal memory contents for iOS devices were acquired and analyzed with Oxygen Forensic Detective v15.0.0.126

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

- Social media data for Facebook is partially reported (i.e., account, profile related information) for the iPhone 11, iPhone XR, iPhone SE, iPad Pro and iPhone 8.
- Social media data for Facebook Messenger is not reported for the iPhone 13 Pro Max, iPhone 13 Pro, iPhone 13, iPhone 13 mini, iPhone 11, iPhone XR, iPhone SE and iPhone 8.
- Social media data for Twitter is partially reported (i.e., account, profile related information) for the iPhone 13 Pro Max, iPhone 13 Pro, iPhone 13, iPhone 13 mini, iPhone XR, iPad Pro and iPhone 8.
- Social media data for Instagram is partially reported (i.e., account, profile related information) for the iPhone X and iPhone 8.
- Social media data for Pinterest is partially reported (i.e., account, profile related information) for the iPhone 8.
- Social media data for SnapChat is partially reported (i.e., account, profile related information) for the iPhone11, iPhone XR and iPhone SE.

NOTE:
iTunes backup extraction method was used for all iOS devices.

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

Test Cases:	iPhone 13 Pro Max	iPhone 13 Pro	iPhone 13	iPhone 13 mini	iPhone 11	iPhone XR
Acquisition: Acquire All	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Acquisition: Disrupted	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting: Preview-Pane	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Reporting: 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
Equipment/User Data: 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
PIM Data: Calendar	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
PIM Data: Memos/Notes	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Call Logs: Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Call Logs: Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Call Logs: Missed	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SMS Messages: Incoming	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SMS Messages: Outgoing	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
MMS Messages: Graphic	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
MMS Messages: Audio	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
MMS Messages: Video	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Graphic	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Audio	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Video	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Application Data: Documents (txt, pdf files)	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected

Test Cases:	iPhone 13 Pro Max	iPhone 13 Pro	iPhone 13	iPhone 13 mini	iPhone 11	iPhone XR
Social Media Data: Facebook	NA	NA	NA	NA	Partial	Partial
Social Media Data: Facebook Messenger	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected	Not As Expected
Social Media Data: Twitter	Partial	Partial	Partial	Partial	NA	Partial
Social Media Data: LinkedIn	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Social Media Data: Instagram	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Social Media Data: Pinterest	NA	NA	NA	NA	NA	NA
Social Media Data: SnapChat	NA	NA	NA	NA	Partial	Partial
Social Media Data: WhatsApp	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Social Media Data: TikTok	NA	NA	NA	NA	As Expected	NA
Internet Data: Bookmarks	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Internet Data: History	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Internet Data: Email	NA	NA	NA	NA	NA	NA
GPS Data: Coordinates/Geo-tagged	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Non-Latin Character: Reported in native format	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Hashing: Case File/ Individual Files	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Case File Data Protection: Modify Case Data	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
SQLite Data: Report Active Data	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected
Run SQLite Data: Run SQLite Commands	As Expected	As Expected	As Expected	As Expected	As Expected	As Expected

Table 4a: iOS Devices

Test Cases:	iPhone SE	iPhone X	iPad Pro	iPhone 8
Acquisition: Acquire All	As Expected	As Expected	As Expected	As Expected
Acquisition: Disrupted	As Expected	As Expected	As Expected	As Expected
Reporting: Preview-Pane	As Expected	As Expected	As Expected	As Expected
Reporting: Generated Reports	As Expected	As Expected	As Expected	As Expected
Equipment/User Data: IMEI/MEID/ESN	As Expected	As Expected	As Expected	As Expected
Equipment/User Data: MSISDN	As Expected	As Expected	As Expected	As Expected
PIM Data: Contacts	As Expected	As Expected	As Expected	As Expected
PIM Data: Calendar	As Expected	As Expected	As Expected	As Expected
PIM Data: Memos/Notes	As Expected	As Expected	As Expected	As Expected
Call Logs: Incoming	As Expected	As Expected	As Expected	As Expected
Call Logs: Outgoing	As Expected	As Expected	As Expected	As Expected
Call Logs: Missed	As Expected	As Expected	As Expected	As Expected
SMS Messages: Incoming	As Expected	As Expected	As Expected	As Expected
SMS Messages: Outgoing	As Expected	As Expected	As Expected	As Expected
MMS Messages: Graphic	As Expected	As Expected	As Expected	As Expected
MMS Messages: Audio	As Expected	As Expected	As Expected	As Expected
MMS Messages: Video	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Graphic	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Audio	As Expected	As Expected	As Expected	As Expected
Stand-alone Files: Video	As Expected	As Expected	As Expected	As Expected
Application Data: Documents (txt, pdf files)	As Expected	As Expected	As Expected	As Expected
Social Media Data: Facebook	Partial	As Expected	Partial	Partial

Test Cases:	iPhone SE	iPhone X	iPad Pro	iPhone 8
Social Media Data: Facebook Messenger	*Not As Expected*	*As Expected*	*NA*	*Not As Expected*
Social Media Data: Twitter	*NA*	*As Expected*	*Partial*	*Partial*
Social Media Data: LinkedIn	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Social Media Data: Instagram	*As Expected*	*Partial*	*As Expected*	*Partial*
Social Media Data: Pinterest	*NA*	*NA*	*NA*	*Partial*
Social Media Data: SnapChat	*Partial*	*NA*	*NA*	*NA*
Social Media Data: WhatsApp	*As Expected*	*As Expected*	*NA*	*As Expected*
Social Media Data: TikTok	*NA*	*NA*	*As Expected*	*NA*
Internet Data: Bookmarks	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Internet Data: History	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Internet Data: Email	*NA*	*NA*	*NA*	*NA*
GPS Data: Coordinates/Geo-tagged	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Non-Latin Character: Reported in native format	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Hashing: Case File/ Individual Files	*As Expected*	*As Expected*	*As Expected*	*As Expected*
Case File Data Protection: Modify Case Data	*As Expected*	*As Expected*	*As Expected*	*As Expected*
SQLite Data: Report Active Data	*As Expected*	*As Expected*	*As Expected*	*As Expected*
SQLite Data: Run SQLite Commands	*As Expected*	*As Expected*	*As Expected*	*As Expected*

Table 4b: iOS Devices

4.3 Universal Integrated Circuit Cards (UICCs)

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

All test cases pertaining to the acquisition of UICCs were successful with the exception of the following:

The user is not prompted to enter the PIN for protected UICCs or the PUK code for UICCs that have not PIN attempts remaining.

See Table 5 below for more details.

Internal Memory Acquisition
Oxygen Forensic Detective v15.0.0.126
Media Type: UICCs

Test Cases:	Universal Integrated Circuit Card
Connectivity: Non Disrupted	*As Expected*
Connectivity: Disrupted	*As Expected*
Service Provider Name (SPN)	*As Expected*
ICCID	*As Expected*
IMSI	*As Expected*
MSISDN	*As Expected*
Abbreviated Dialing Numbers (ADNs)	*As Expected*
Last Numbers Dialed (LNDs)	*As Expected*
SMS Messages	*As Expected*
EMS MEssages	*As Expected*
Location Related Data: LOCI	*As Expected*
Location Related Data: GRPSLOCI	*As Expected*
Acquisition: Acquire All	*As Expected*
Acquisition: Selected All	*NA*
Acquisition: Select Individual	*NA*
Case File Data Protection: Modify Case Data	*As Expected*
Password Protected SIM Acquire: Acquisition of Protected SIM	*Not As Expected*
PIN attempts reported	*Not As Expected*
PUK attempts reported	*Not As Expected*

Test Cases:	Universal Integrated Circuit Card
Non-ASCII Character	*As Expected*
Hashing	*As Expected*

Table 5: Universal Integrated Circuit Cards