

**National Information Assurance Partnership**  
**Common Criteria Evaluation and Validation Scheme**



**Validation Report**

**Samsung Electronics Co., Ltd.**

**416 Maetan-3dong, Yeongtong-gu, Suwon-si,**

**Gyeonggi-do, 443-742 Korea**

**Samsung Galaxy Devices on  
Android 8.0 and 8.1**

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National Institute of Standards and Technology  
Information Technology Laboratory  
100 Bureau Drive  
Gaithersburg, MD 20899

National Security Agency  
Information Assurance Directorate  
9800 Savage Road STE 6940  
Fort George G. Meade, MD 20755-6940

## **ACKNOWLEDGEMENTS**

### **Validation Team**

John Butterworth  
Michelle Carlson  
Jenn Dotson  
Stelios Melachrinoudis  
*The MITRE Corporation*

Jerome Myers  
Kenneth Stutterheim  
*The Aerospace Corporation*

### **Common Criteria Testing Laboratory**

James Arnold  
Justin Bettencourt  
Tammy Compton  
*Gossamer Security Solutions, Inc.*  
*Catonsville, MD*

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# 1 Executive Summary

This report documents the assessment of the National Information Assurance Partnership (NIAP) validation team of the evaluation of Samsung Galaxy Devices on Android 8.0 and 8.1 solution provided by Samsung Electronics Co., Ltd. It presents the evaluation results, their justifications, and the conformance results. This Validation Report is not an endorsement of the Target of Evaluation by any agency of the U.S. government, and no warranty is either expressed or implied.

The evaluation was performed by the Gossamer Security Solutions (Gossamer) Common Criteria Testing Laboratory (CCTL) in Catonsville, MD, United States of America, and was completed in December 2018. The information in this report is largely derived from the Evaluation Technical Report (ETR) and associated test reports, all written by Gossamer Security Solutions. The evaluation determined that the product is both Common Criteria Part 2 Extended and Part 3 Conformant, and meets the assurance requirements of the Protection Profile for Mobile Device Fundamentals, Version 3.1, 16 June 2017, General Purpose Operating Systems Protection Profile/Mobile Device Fundamentals Protection Profile Extended Package (EP) Wireless Local Area Network (WLAN) Clients, Version 1.0, 08 February 2016 and PP-Module for Virtual Private Network (VPN) Clients, Version 2.1, 05 October 2017.

The Target of Evaluation (TOE) is the Samsung Galaxy Devices on Android 8.0 and 8.1.

The Target of Evaluation (TOE) identified in this Validation Report has been evaluated at a NIAP approved Common Criteria Testing Laboratory using the Common Methodology for IT Security Evaluation (Version 3.1, Rev 5) for conformance to the Common Criteria for IT Security Evaluation (Version 3.1, Rev 5). This Validation Report applies only to the specific version of the TOE as evaluated. The evaluation has been conducted in accordance with the provisions of the NIAP Common Criteria Evaluation and Validation Scheme and the conclusions of the testing laboratory in the evaluation technical report are consistent with the evidence provided.

The validation team monitored the activities of the evaluation team, provided guidance on technical issues and evaluation processes, and reviewed the individual work units and successive versions of the ETR. The validation team found that the evaluation showed that the product satisfies all of the functional requirements and assurance requirements stated in the Security Target (ST). Therefore the validation team concludes that the testing laboratory's findings are accurate, the conclusions justified, and the conformance results are correct. The conclusions of the testing laboratory in the evaluation technical report are consistent with the evidence produced.

The technical information included in this report was obtained from the Samsung Electronics Co., Ltd. Samsung Electronics Co., Ltd. Samsung Galaxy Devices on Android 8.0 and 8.1 (MDFPP31/WLANCEP10/VPNC21) Security Target, Version 0.5, December 4, 2018 and analysis performed by the Validation Team.

## 2 Identification

The CCEVS is a joint National Security Agency (NSA) and National Institute of Standards and Technology (NIST) effort to establish commercial facilities to perform trusted product evaluations. Under this program, security evaluations are conducted by commercial testing laboratories called Common Criteria Testing Laboratories (CCTLs) using the Common Evaluation Methodology (CEM) in accordance with National Voluntary Laboratory Assessment Program (NVLAP) accreditation.

The NIAP Validation Body assigns Validators to monitor the CCTLs to ensure quality and consistency across evaluations. Developers of information technology products desiring a security evaluation contract with a CCTL and pay a fee for their product’s evaluation. Upon successful completion of the evaluation, the product is added to NIAP’s Validated Products List.

Table 1 provides information needed to completely identify the product, including:

- The Target of Evaluation (TOE): the fully qualified identifier of the product as evaluated.
- The Security Target (ST), describing the security features, claims, and assurances of the product.
- The conformance result of the evaluation.
- The Protection Profile to which the product is conformant.
- The organizations and individuals participating in the evaluation.

**Table 1: Evaluation Identifiers**

Item	Identifier
<b>Evaluation Scheme</b>	United States NIAP Common Criteria Evaluation and Validation Scheme
<b>TOE</b>	Samsung Galaxy Devices on Android 8.0 and 8.1 (Specific models identified in Section 3.1)
<b>Protection Profile</b>	Protection Profile for Mobile Device Fundamentals, Version 3.1, 16 June 2017, General Purpose Operating Systems Protection Profile/Mobile Device Fundamentals Protection Profile Extended Package (EP) Wireless Local Area Network (WLAN) Clients, Version 1.0, 08 February 2016 and PP-Module for Virtual Private Network (VPN) Clients, Version 2.1, 05 October 2017
<b>ST</b>	Samsung Electronics Co., Ltd. Samsung Galaxy Devices on Android 8.0 and 8.1 (MDFPP31/WLANCEP10/VPNC21) Security Target, Version 0.5, December 4, 2018
<b>Evaluation Technical Report</b>	Evaluation Technical Report for Samsung Galaxy Devices on Android 8.0 and 8.1, Version 0.4, December 13, 2018
<b>CC Version</b>	Common Criteria for Information Technology Security Evaluation, Version 3.1, rev 5
<b>Conformance Result</b>	CC Part 2 extended, CC Part 3 conformant
<b>Sponsor</b>	Samsung Electronics Co., Ltd.
<b>Developer</b>	Samsung Electronics Co., Ltd.

Item	Identifier
<b>Common Criteria Testing Lab (CCTL)</b>	Gossamer Security Solutions, Inc.
<b>CCEVS Validators</b>	John Butterworth The MITRE Corporation
	Michelle Carlson The MITRE Corporation
	Jenn Dotson The MITRE Corporation Stelios Melachrinoudis The MITRE Corporation
	Jerome Myers The Aerospace Corporation
	Kenneth Stutterheim The Aerospace Corporation

### 3 Architectural Information

Note: The following architectural description is based on the description presented in the Security Target.

The TOE is a mobile device based on Android 8.0 or 8.1 with a built-in IPsec VPN client and modifications made to increase the level of security provided to end users and enterprises. The TOE is intended for use as part of an enterprise mobility solution providing mobile staff with enterprise connectivity.

The TOE includes a Common Criteria mode (or “CC mode”) that an administrator can invoke using an MDM. The TOE must meet the following prerequisites in order for an administrator to transition the TOE to and remain in the CC configuration.

- Require a screen lock password. Note that swipe, PIN, pattern, accessibility (direction), or facial recognition screen locks are not allowed in the evaluated configuration.
- The maximum password failure retry policy should be less than or equal to 30.
- A screen lock password is required to decrypt data on boot.
- Revocation checking must be enabled.
- External storage must be encrypted.
- Password (non-container) recovery policy and password history must not be enabled.

When CC mode has been enabled, the TOE behaves as follows:

- The TOE sets the system wide Android CC mode property to ‘enabled’.
- The TOE prevents loading of custom firmware/kernels and requires all updates occur through FOTA (Samsung’s Firmware Over The Air firmware update method).
- The TOE utilizes CAVP approved cryptographic ciphers for TLS.
- The TOE ensures FOTA updates utilize 2048-bit PKCS #1 RSA-PSS formatted signatures (with SHA-512 hashing).

The TOE includes a containerization capability, Knox Workspace Container, which is part of the Knox Platform. This container provides a way to segment applications and data into two separate areas on the device, such as a personal area and a work area, each with its own separate apps, data and security policies. For this effort the TOE was evaluated both without and with a Knox Workspace container created (and to create a Knox Workspace container, one must purchase an additional license). Thus, the evaluation includes several Knox-specific claims that apply to a Knox Workspace container when created.

There are different models of the TOE, the Samsung Galaxy Devices on Android 8.0 and 8.1, and these models differ in their internal components (as described in Evaluated Configuration section below).

### 3.1 TOE Evaluated Platforms

The model numbers of the mobile devices used during evaluation testing are as follows:

Device Name	Model Number	Chipset Vendor	CPU	Build Arch/ISA	Android Version	Kernel Version	Build Number
Galaxy Note9	SM-N960F	Samsung	Exynos 9810	A64	8.1	4.9.65	M1AJJ
Galaxy Note9	SM-N960U	Qualcomm	SDM845	A64	8.1	4.9.59	M1AJB
Galaxy Tab S4	SM-T837A	Qualcomm	MSM8998	A64	8.1	4.4.78	M1AJJ
Galaxy Tab S3	SM-T825Y	Qualcomm	MSM8996	A64	8.0	3.18.31	R16NW
Galaxy S7 edge	SM-G935F	System LSI	Exynos 8890	A64	8.0	3.18.14	R16NW
Galaxy S7 edge	SM-G935A	Qualcomm	MSM8996	A64	8.0	3.18.20	R16NW

**Table 1 Evaluated Devices**

In addition to the evaluated devices, the following device models are claimed as equivalent with a note about the differences between the evaluated device and the equivalent models.

Evaluated Device	CPU	Equivalent Devices	Differences
Galaxy Tab S4 (T837A)	MSM8998	Galaxy Tab S4	T835 & T837 models have LTE T830 models only have Wi-Fi
Galaxy Tab S3 (T825Y)	MSM8996	Galaxy Tab S3	T825 & T827 models have LTE T820 models only have Wi-Fi
Galaxy S7 Edge (Qualcomm)	MSM8996	Galaxy S7 (Qualcomm) Galaxy S7 Active	Curved screen vs. Flat screen Curved screen vs. Flat screen S7 Active has a IP68 & MIL-STD-810G certified body No fingerprint sensor
Galaxy S7 Edge (Samsung)	Exynos 8890	Galaxy S7 (Samsung)	Curved screen vs. Flat screen

**Table 2 Equivalent Devices**

In general, the devices include a final letter or number at the end of the name that denotes that the device is for a specific carrier or region (for example, U = US Carrier build and F = International, which were used during the evaluation).

For each device there are specific models which are validated. This table lists the specific carrier models that have the validated configuration (covering both evaluated and equivalent devices).

Device Name	Base Model Number	Carrier Models
Galaxy Note9 (Qualcomm)	SM-N960	U, SC-01L*, SCV40*
Galaxy Note9 (Samsung)	SM-N960	N, F
Galaxy Tab S4	SM-T830	None
	SM-T835	N, None
	SM-T837	A, R4, P, V
Galaxy Tab S3	SM-T820	None
	SM-T825	N, Y, None
	SM-T827	V, A, R4
Galaxy S7 (Qualcomm)	SM-G930	T, P, R4, V, A, U
Galaxy S7 (Samsung)	SM-G930	F, S, K, L
Galaxy S7 Edge (Qualcomm)	SM-G935	A, T, P, R4, V, U
Galaxy S7 Edge (Samsung)	SM-G935	F, S, K, L
Galaxy S7 Active	SM-G891	A, None

**Table 3 Carrier Models**

The carrier models marked by \* are explicit model numbers for those carriers and do not follow the standard specified for other models. Where Carrier Models specifies “None” that means a device without a suffix is also a device that can be placed into a validated configuration.

### 3.2 TOE Architecture

The TOE combines with a Mobile Device Management solution (note that this evaluation does not include an MDM agent nor server) that enables the Enterprise to watch, control and administer all deployed mobile devices, across multiple mobile service providers as well as facilitate secure communications through a VPN. This partnership provides a secure mobile environment that can be managed and controlled by the environment and reduces the risks that can be introduced through a Bring-Your-Own-Device (BYOD) model which can be extended to Corporate-Owned-Personally-Enabled (COPE) or other corporate-owned deployments.

Data on the TOE is protected through the implementation of Samsung On-Device Encryption (ODE) that utilizes a CAVP certified cryptographic algorithms to encrypt device storage. This functionality is combined with a number of on-device policies including local wipe, remote wipe, password complexity, automatic lock and privileged access to security configurations to prevent unauthorized access to the device and stored data.



The Samsung Knox Software Development Kit (SDK) can be used to build on top of the existing Android security model to include additional functionality such as application whitelisting and blacklisting.

The Knox Platform for Enterprise provides a set of flexible deployment options for Work environments, including the ability to enhance the BYOD or COPE models by creating a separate container for the Enterprise (the Workspace). Within the Knox Workspace, the Enterprise can provision separate applications and ensure they are kept separate from anything the user may do outside the Knox Workspace. The Enterprise can use policy controls to manage a Work environment on the device as a whole or within the Knox Workspace container specifically, as needed by the organization.

### **3.3 Physical Boundaries**

The TOE is a multi-user mobile device based on Android 8.0/8.1 that incorporates the Samsung Knox SDK. The TOE does not include the user applications that run on top of the operating system, but does include controls that limit application behavior. The TOE includes an IPsec VPN client integrated into the firmware (as opposed to a downloadable application). Within an Enterprise environment, the Enterprise can manage the configuration of the mobile device, including the VPN client, through a compliant device management solution.

The TOE communicates and interacts with IEEE 802.11-2012 Access Points and mobile data networks to establish network connectivity, and through that connectivity interacts with MDM servers that allow administrative control of the TOE.

## **4 Security Policy**

This section summarizes the security functionality of the TOE:

1. Security audit
2. Cryptographic support
3. User data protection
4. Identification and authentication
5. Security management
6. Protection of the TSF
7. TOE access
8. Trusted path/channels

### **4.1 Security audit**

The TOE generates logs for a range of security relevant events. The TOE stores the logs locally so they can be accessed by an administrator or they can be exported to an MDM.

### **4.2 Cryptographic support**

The TOE includes multiple cryptographic libraries with CAVP certified algorithms for a wide range of cryptographic functions including: asymmetric key generation and establishment, symmetric key generation, encryption/decryption, cryptographic hashing and

keyed-hash message authentication. These functions are supported with suitable random bit generation, key derivation, salt generation, initialization vector generation, secure key storage, and key and protected data destruction. These primitive cryptographic functions are used to implement security protocols such as TLS, EAP-TLS, IPsec, and HTTPS and to encrypt the media (including the generation and protection of data and key encryption keys) used by the TOE. Many of these cryptographic functions are also accessible as services to applications running on the TOE.

### **4.3 User data protection**

The TOE controls access to system services by hosted applications, including protection of the Trust Anchor Database. Additionally, the TOE protects user and other sensitive data using encryption so that even if a device is physically lost, the data remains protected. The functionality provided by a Knox Workspace container enhances the security of user data by providing an additional layer of separation between different categories of apps and data while the device is in use. The TOE ensures that residual information is protected from potential reuse in accessible objects such as network packets.

### **4.4 Identification and authentication**

The TOE supports a number of features related to identification and authentication. From a user perspective, except for making phone calls to an emergency number, a password or Biometric Authentication Factor (BAF) must be correctly entered to unlock the TOE. In addition, even when the TOE is unlocked the password must be re-entered to change the password or re-enroll the biometric template. Passwords are obscured when entered so they cannot be read from the TOE's display, the frequency of entering passwords is limited and when a configured number of failures occurs, the TOE will be wiped to protect its contents. Passwords can be constructed using upper and lower case characters, numbers, and special characters and passwords between 4 and 16 characters are supported.

The TOE can also serve as an 802.1X supplicant and can use X.509v3 and validate certificates for EAP-TLS, TLS and IPsec exchanges. The TOE can also act as a client or server in an authenticated Bluetooth pairing. In addition to storing X.509 certificates used for IPsec connections, the TOE can also securely store pre-shared keys for VPN connections.

### **4.5 Security management**

The TOE provides all the interfaces necessary to manage the security functions (including the VPN client) identified throughout this Security Target as well as other functions commonly found in mobile devices. Many of the available functions are available to users of the TOE while many are restricted to administrators operating through a Mobile Device Management solution once the TOE has been enrolled. Once the TOE has been enrolled and then un-enrolled, it removes all MDM policies and disables CC mode.

## 4.6 Protection of the TSF

The TOE implements features to protect itself and to ensure the reliability and integrity of its security features. It protects sensitive data such as cryptographic keys so that they are not accessible or exportable. It provides its own timing mechanism to ensure that reliable time information is available (e.g., for log accountability). It enforces read, write, and execute memory page protections, uses address space layout randomization, and stack-based buffer overflow protections to minimize the potential to exploit application flaws. It protects itself from modification by applications and isolates the address spaces of applications from one another to protect those applications.

The TOE includes functions to perform self-tests and software/firmware integrity checking so that it might detect when it is failing or may be corrupt. If any self-tests fail, the TOE will not go into an operational mode. It also includes mechanisms (i.e., verification of the digital signature of each new image) so that the TOE itself can be updated while ensuring that the updates will not introduce malicious or other unexpected changes in the TOE. Digital signature checking also extends to verifying applications prior to their installation.

## 4.7 TOE access

The TOE can be locked, obscuring its display, by the user or after a configured interval of inactivity. The TOE also has the capability to display an advisory message (banner) when users unlock the TOE for use.

The TOE is also able to attempt to connect to wireless networks as configured.

## 4.8 Trusted path/channels

The TOE supports the use of IEEE 802.11-2012, 802.1X, EAP-TLS, TLS, HTTPS and IPsec to secure communications channels between itself and other trusted network devices.

## 5 Assumptions

The Security Problem Definition, including the assumptions, may be found in the following documents:

- Protection Profile for Mobile Device Fundamentals, Version 3.1, 16 June 2017, General Purpose Operating Systems Protection Profile/Mobile Device Fundamentals Protection Profile Extended Package (EP) Wireless Local Area Network (WLAN) Clients, Version 1.0, 08 February 2016 and PP-Module for Virtual Private Network (VPN) Clients, Version 2.1, 05 October 2017

That information has not been reproduced here and the MDFPP31/WLANCEP10/VPNC21 should be consulted if there is interest in that material.

The scope of this evaluation was limited to the functionality and assurances covered in the MDFPP31/WLANCEP10/VPNC21 as described for this TOE in the Security Target. Other functionality included in the product was not assessed as part of this evaluation. All other functionality provided by the devices needs to be assessed separately, and no further conclusions can be drawn about their effectiveness.

## 6 Clarification of Scope

All evaluations (and all products) have limitations, as well as potential misconceptions that need clarification. This text covers some of the more important limitations and clarifications of this evaluation. Note that:

- As with any evaluation, this evaluation only shows that the evaluated configuration meets the security claims made with a certain level of assurance (the assurance activities specified in the Mobile Device Fundamentals Protection Profile and General Purpose Operating Systems Protection Profile/Mobile Device Fundamentals Protection Profile Extended Package (EP) Wireless Local Area Network (WLAN) Clients and Virtual Private Network (VPN) Clients PP-Module and performed by the evaluation team).
- This evaluation covers only the specific device models and software as identified in this document, and not any earlier or later versions released or in process.
- Apart from the VPN and MDF Admin Guides, additional customer documentation for the specific mobile device models was not included in the scope of the evaluation and therefore should not to be relied upon when configuring or operating the device as evaluated.
- This evaluation did not specifically search for, nor attempt to exploit, vulnerabilities that were not “obvious” or vulnerabilities to objectives not claimed in the ST. The CEM defines an “obvious” vulnerability as one that is easily exploited with a minimum of understanding of the TOE, technical sophistication and resources.
- The functionality evaluated is scoped exclusively to the security functional requirements specified in the MDFPP31/WLANCEP10/VPNC21 and applicable Technical Decisions. Any additional security related functional capabilities of the TOE were not covered by this evaluation.
- While an MDM can be used in configuring the TOE into CC Mode, an MDM agent and server were not included and thus MDM functionality was not evaluated.
- The security functionality provided by the Knox Workspace container is limited to the Knox-specific claims made in this evaluation. All other functionality provided by the container is out of scope.

## 7 Documentation

The following documents were available with the TOE for evaluation:

- Samsung Android 8 on Galaxy Devices Administrator Guide, Version 4.1, November 16, 2018

- Samsung VPN Client on Galaxy Devices, Version 4.1, September 11, 2018

Any additional customer documentation provided with the product, or that is available online was not included in the scope of the evaluation and therefore should not to be relied upon when configuring or operating the device as evaluated.

To use the product in the evaluated configuration, the product must be configured as specified in the Guidance Documentation listed above. Consumers are encouraged to download the configuration guides from the NIAP website to ensure the device is configured as evaluated.

## 8 IT Product Testing

This section describes the testing efforts of the developer and the Evaluation Team. It is derived from information contained in the proprietary Detailed Test Report (MDFPP31/WLANCEP10/VPNC21) for Samsung Galaxy Devices on Android 8.0 and 8.1, Version 0.3, December 4, 2018 (DTR), as summarized in the evaluation Assurance Activity Report.

### 8.1 Developer Testing

No evidence of developer testing is required in the assurance activities for this product.

### 8.2 Evaluation Team Independent Testing

The evaluation team verified the product according a Common Criteria Certification document and ran the tests specified in the MDFPP31/WLANCEP10/VPNC21 including the tests associated with optional requirements. The AAR, in section 3.4.1, lists the tested devices, provides a list of test tools, and has diagrams of the test environment.

## 9 Evaluated Configuration

Device Name	Model Number	Chipset Vendor	CPU	Build Arch/ISA	Android Version	Kernel Version	Build Number
Galaxy Note9	SM-N960F	Samsung	Exynos 9810	A64	8.1	4.9.65	M1AJJ
Galaxy Note9	SM-N960U	Qualcomm	SDM845	A64	8.1	4.9.59	M1AJB
Galaxy Tab S4	SM-T837A	Qualcomm	MSM8998	A64	8.1	4.4.78	M1AJJ
Galaxy Tab S3	SM-T825Y	Qualcomm	MSM8996	A64	8.0	3.18.31	R16NW
Galaxy S7 edge	SM-G935F	System LSI	Exynos 8890	A64	8.0	3.18.14	R16NW
Galaxy S7 edge	SM-G935A	Qualcomm	MSM8996	A64	8.0	3.18.20	R16NW

Table 4 Evaluated Devices

In addition to the evaluated devices, the following device models are claimed as equivalent with a note about the differences between the evaluated device and the equivalent models.

Evaluated Device	CPU	Equivalent Devices	Differences
Galaxy Tab S4 (T837A)	MSM8998	Galaxy Tab S4	T835 & T837 models have LTE T830 models only have Wi-Fi
Galaxy Tab S3 (T825Y)	MSM8996	Galaxy Tab S3	T825 & T827 models have LTE T820 models only have Wi-Fi
Galaxy S7 Edge (Qualcomm)	MSM8996	Galaxy S7 (Qualcomm)	Curved screen vs. Flat screen
		Galaxy S7 Active	Curved screen vs. Flat screen S7 Active has a IP68 & MIL-STD-810G certified body No fingerprint sensor
Galaxy S7 Edge (Samsung)	Exynos 8890	Galaxy S7 (Samsung)	Curved screen vs. Flat screen

**Table 5 Equivalent Devices**

In general, the devices include a final letter or number at the end of the name that denotes that the device is for a specific carrier or region (for example, U = US Carrier build and F = International, which were used during the evaluation).

For each device there are specific models which are validated. This table lists the specific carrier models that have the validated configuration (covering both evaluated and equivalent devices).

Device Name	Base Model Number	Carrier Models
Galaxy Note9 (Qualcomm)	SM-N960	U, SC-01L*, SCV40*
Galaxy Note9 (Samsung)	SM-N960	N, F
Galaxy Tab S4	SM-T830	None
	SM-T835	N, None
	SM-T837	A, R4, P, V
Galaxy Tab S3	SM-T820	None
	SM-T825	N, Y, None
	SM-T827	V, A, R4
Galaxy S7 (Qualcomm)	SM-G930	T, P, R4, V, A, U
Galaxy S7 (Samsung)	SM-G930	F, S, K, L
Galaxy S7 Edge (Qualcomm)	SM-G935	A, T, P, R4, V, U
Galaxy S7 Edge (Samsung)	SM-G935	F, S, K, L
Galaxy S7 Active	SM-G891	A, None

**Table 6 Carrier Models**

The carrier models marked by \* are explicit model numbers for those carriers and do not follow the standard specified for other models. Where Carrier Models specifies “None” that means a device without a suffix is also a device that can be placed into a validated configuration.

## **10 Results of the Evaluation**

The results of the assurance requirements are generally described in this section and are presented in detail in the proprietary ETR. The reader of this document can assume that all assurance activities and work units received a passing verdict.

A verdict for an assurance component is determined by the resulting verdicts assigned to the corresponding evaluator action elements. The evaluation was conducted based upon CC version 3.1 rev 5 and CEM version 3.1 rev 5. The evaluation determined the Samsung Galaxy Devices on Android 8.0 and 8.1 TOE to be Part 2 extended, and to meet the SARs contained in the MDFPP31/WLANCEP10/VPNC21.

### **10.1 Evaluation of the Security Target (ASE)**

The evaluation team applied each ASE CEM work unit. The ST evaluation ensured the ST contains a description of the environment in terms of policies and assumptions, a statement of security requirements claimed to be met by the Samsung Galaxy Devices on Android 8.0 and 8.1 products that are consistent with the Common Criteria, and product security function descriptions that support the requirements.

The validators reviewed the work of the evaluation team, and found that sufficient evidence and justification was provided by the evaluation team to confirm that the evaluation was conducted in accordance with the requirements of the CEM, and that the conclusion reached by the evaluation team was justified.

### **10.2 Evaluation of the Development (ADV)**

The evaluation team applied each ADV CEM work unit. The evaluation team assessed the design documentation and found it adequate to aid in understanding how the TSF provides the security functions. The design documentation consists of a functional specification contained in the Security Target and Guidance documents. Additionally, the evaluation team performed the assurance activities specified in the MDFPP31/WLANCEP10/VPNC21 related to the examination of the information contained in the TSS.

The validators reviewed the work of the evaluation team and found that sufficient evidence and justification was provided by the evaluation team to confirm that the evaluation was conducted in accordance with the requirements of the CEM, and that the conclusion reached by the evaluation team was justified.

### **10.3 Evaluation of the Guidance Documents (AGD)**

The evaluation team applied each AGD CEM work unit. The evaluation team ensured the adequacy of the user guidance in describing how to use the operational TOE. Additionally, the evaluation team ensured the adequacy of the administrator guidance in describing how

to securely administer the TOE. All of the guides were assessed during the design and testing phases of the evaluation to ensure they were complete.

The validators reviewed the work of the evaluation team and found that sufficient evidence and justification was provided by the evaluation team to confirm that the evaluation was conducted in accordance with the requirements of the CEM, and that the conclusion reached by the evaluation team was justified.

#### **10.4 Evaluation of the Life Cycle Support Activities (ALC)**

The evaluation team applied each ALC CEM work unit. The evaluation team found that the TOE was identified.

The validators reviewed the work of the evaluation team and found that sufficient evidence and justification was provided by the evaluation team to confirm that the evaluation was conducted in accordance with the requirements of the CEM, and that the conclusion reached by the evaluation team was justified.

#### **10.5 Evaluation of the Test Documentation and the Test Activity (ATE)**

The evaluation team applied each ATE CEM work unit. The evaluation team ran the set of tests specified by the assurance activities in the MDFPP31/WLANCEP10/VPNC21 and recorded the results in a Test Report, summarized in the AAR.

The validators reviewed the work of the evaluation team and found that sufficient evidence and justification was provided by the evaluation team to confirm that the evaluation was conducted in accordance with the requirements of the CEM, and that the conclusion reached by the evaluation team was justified.

#### **10.6 Vulnerability Assessment Activity (VAN)**

The evaluation team applied each AVA CEM work unit. The vulnerability analysis is in the Detailed Test Report (DTR) prepared by the evaluator. The vulnerability analysis includes a public search for vulnerabilities. The public search for vulnerabilities conducted on September 28, 2018 and updated on November 17, 2018 did not uncover any residual vulnerability.

The evaluator searched the National Vulnerability Database (<https://web.nvd.nist.gov/view/vuln/search>) and Vulnerability Notes Database (<http://www.kb.cert.org/vuls/>) with the following search terms: "Samsung Note 9", "Samsung S7", "Samsung Tab S3", "Samsung Tab S4", "Knox", "Android", "BoringSSL", "strongswan", "charon".

The validators reviewed the work of the evaluation team, and found that sufficient evidence and justification was provided by the evaluation team to confirm that the evaluation was conducted in accordance with the requirements of the CEM, and that the conclusion reached by the evaluation team was justified.



## 10.7 Summary of Evaluation Results

The evaluation team's assessment of the evaluation evidence demonstrates that the claims in the ST are met. Additionally, the evaluation team's testing also demonstrated the accuracy of the claims in the ST.

The validation team's assessment of the evidence provided by the evaluation team is that it demonstrates that the evaluation team followed the procedures defined in the CEM, and correctly verified that the product meets the claims in the ST.

## 11 Validator Comments/Recommendations

The evaluated configuration requires that software updates to the TOE be restricted to FOTA. The evaluators were unable to directly exercise this mechanism since it would have involved placing invalid updates on the live public servers that are currently in use by present customers. Hence, the evaluators had to take the products out of the evaluated configuration to test the update features.

The validators suggest that the consumer pay particular attention to the evaluated configuration of the device(s). The functionality evaluated is scoped exclusively to the security functional requirements specified in the Security Target, and only the functionality implemented by the SFR's within the Security Target was evaluated. All other functionality provided by the devices, to include software that was not part of the evaluated configuration, needs to be assessed separately and no further conclusions can be drawn about their effectiveness.

The biometric authentication factors tested as part of this evaluation were limited to fingerprint and iris recognition; thus, they are the only two biometric authentication factors allowed in the evaluated configuration.

The validators encourage the consumers of these products to understand the relationship between the products and any functionality that may be provided via Mobile Device Management (MDM), Enterprise Device Management (EDM), and Enterprise Mobility Management (EMM) solutions (hereafter collectively referred to as MDM solutions). This evaluation neither covers, nor endorses, the use of any particular MDM solution; only the MDM-like interfaces of the products were exercised as part of the evaluation. In practice, the Samsung EDMApp and STIGtool are not available, though its settings could be managed via a suitable MDM solution and corresponding agent. Samsung does not intend to make the EDMApp and STIGtool available; however, the APIs used by these tools have been made available by Samsung. Per Section 2.3.2 of the Admin Guide, "this EDM should support the Samsung Knox APIs to enable the capabilities documented in this guide." Further, the Admin Guide states that the "Common Criteria Configuration section provides the specific information about the Knox APIs that are necessary to support this configuration..." Because the EDMApp and STIGtool apps are not available and do not intend to be made available, a compatible MDM solution is required for the TOE to be placed in CC Mode, which in turn, places it in the evaluated configuration.

Over-The-Air (OTA) updates were not available during the evaluation; these are created by Google and the mobile device vendors, then distributed to the wireless carriers (Verizon, AT&T, etc.), for deployment to the respective devices via the carrier's network. Therefore, the OTA update functionality was not tested. Users and enterprise administrators should remain cognizant of OTA updates and the update cycles offered by the carriers.

## **11.1 Additional considerations for Biometrics**

A few considerations need to be made when allowing for a biometric factor at initial configuration.

### **11.1.1 Hybrid Authentication to the KNOX Container**

Hybrid authentication to the KNOX container (also referred to as multi-factor) does not precisely follow the definition in the MDF PP. Hybrid authentication is defined as “one where a user has to submit a combination of PIN and biometric samples with both to pass and without the user being made aware of which factor failed, if either fails.”

In the evaluated configuration, a password is used in lieu of a PIN, but the user is made aware of whether the password or biometric fails. While the vendor notes in the TSS that “the TOE's design ensures that no more than the configured maximum number of attempts is possible”, compromise of the password still reduces the security of the authentication system (the SAFAR) to that of the weaker biometric authentication factor in the worst case. Parts e) and f) of the “password and fingerprint authentication example” in Appendix H.4 of MDF PP v3.1 (pgs 180-181) explain the risks of providing authentication feedback (i.e. whether the password or biometric failed) in hybrid authentication.

### **11.1.2 Traditional Risks Associated with Using Biometrics**

Because hybrid or multi-factor authentication is not supported at lockscreen, it is recommended for customers and sponsors to understand and assume the risks provided when configuring the evaluated device to allow for a biometric factor separate from the password factor.

For this evaluation, biometric fingerprint has only been certified to the security strength of a four-digit numerical PIN (1:10000 FAR), which is much lower than that of a minimum 4-character password with 93 possible characters that can be used. CC evaluations providing for a stronger security strength for biometrics are currently infeasible to complete in a 3-6-month period. Thus, stronger claims must be assessed separately by specialized biometrics testing labs. In addition, the mitigation of threats of compromise to biometric templates, as well as system compromise through presentation attacks, is outside the scope of this evaluation because the corresponding objective requirements in the MDF PP have not been claimed.

## 12 Annexes

Not applicable

## 13 Security Target

The Security Target is identified as: *Samsung Electronics Co., Ltd. Samsung Galaxy Devices on Android 8.0 and 8.1 (MDFPP31/WLANCEP10/VPNC21) Security Target, Version 0.5, December 4, 2018.*

## 14 Glossary

The following definitions are used throughout this document:

- **Common Criteria Testing Laboratory (CCTL).** An IT security evaluation facility accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) and approved by the CCEVS Validation Body to conduct Common Criteria-based evaluations.
- **Conformance.** The ability to demonstrate in an unambiguous way that a given implementation is correct with respect to the formal model.
- **Evaluation.** The assessment of an IT product against the Common Criteria using the Common Criteria Evaluation Methodology to determine whether or not the claims made are justified; or the assessment of a protection profile against the Common Criteria using the Common Evaluation Methodology to determine if the Profile is complete, consistent, technically sound and hence suitable for use as a statement of requirements for one or more TOEs that may be evaluated.
- **Evaluation Evidence.** Any tangible resource (information) required from the sponsor or developer by the evaluator to perform one or more evaluation activities.
- **Feature.** Part of a product that is either included with the product or can be ordered separately.
- **Target of Evaluation (TOE).** A group of IT products configured as an IT system, or an IT product, and associated documentation that is the subject of a security evaluation under the CC.
- **Validation.** The process carried out by the CCEVS Validation Body leading to the issue of a Common Criteria certificate.
- **Validation Body.** A governmental organization responsible for carrying out validation and for overseeing the day-to-day operation of the NIAP Common Criteria Evaluation and Validation Scheme.

## 15 Bibliography

The Validation Team used the following documents to produce this Validation Report:

- [1] Common Criteria for Information Technology Security Evaluation: Part 1: Introduction and General Model, Version 3.1, Revision 5, April 2017.
- [2] Common Criteria for Information Technology Security Evaluation Part 2: Security functional components, Version 3.1, Revision 5, April 2017.
- [3] Common Criteria for Information Technology Security Evaluation Part 3: Security assurance components, Version 3.1 Revision 5, April 2017.
- [4] Protection Profile for Mobile Device Fundamentals, Version 3.1, 16 June 2017, General Purpose Operating Systems Protection Profile/Mobile Device Fundamentals Protection Profile Extended Package (EP) Wireless Local Area Network (WLAN) Clients, Version 1.0, 08 February 2016 and PP-Module for Virtual Private Network (VPN) Clients, Version 2.1, 05 October 2017.
- [5] Samsung Electronics Co., Ltd. Samsung Galaxy Devices on Android 8.0 and 8.1 (MDFPP31/WLANCEP10/VPNC21) Security Target, Version 0.5, December 4, 2018 (ST).
- [6] Assurance Activity Report (MDFPP31/WLANCEP10/VPNC21) for Samsung Galaxy Devices on Android 8.0 and 8.1, Version 0.4, December 13, 2018 (AAR).
- [7] Detailed Test Report (MDFPP31/WLANCEP10/VPNC21) for Samsung Galaxy Devices on Android 8.0 and 8.1, Version 0.3, December 4, 2018 (DTR).
- [8] Evaluation Technical Report for Samsung Galaxy Devices on Android 8.0 and 8.1, Version 0.4, December 13, 2018 (ETR).