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Created by: CERT11
Revised by: CALIDAD
Approved by: TECNICO

CERTIFICATION REPORT

Dossier #	**2020-30**
TOE	**Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1**
Applicant	**124-81-00998 - SAMSUNG Electronics Co. Ltd**
References	

[EXT-5958] Certification Request

[EXT-7576] Evaluation Technical Report

Certification report of the product Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1, as requested in [EXT-7576] dated 19/05/2020, and evaluated by Applus Laboratories, as detailed in the Evaluation Technical Report [EXT-5958] received on 18/02/2022.

CONTENTS

EXECUTIVE SUMMARY

This document constitutes the Certification Report for the certification file of the product Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1.

The TOE is a Secure Sub-Systems implemented in a SoC, which is designed and packaged specially for mobile applications.

Developer/manufacturer: SAMSUNG Electronics Co. Ltd

Sponsor: SAMSUNG Electronics Co. Ltd.

Certification Body: Centro Criptológico Nacional (CCN).

ITSEF: Applus Laboratories.

Protection Profile: Eurosmart Security IC Platform Protection Profile with Augmentation Packages, version 1.0, BSI-CC-PP-0084-2014.

Evaluation Level: Common Criteria v3.1 R5 - EAL5 + ALC_DVS.2 + AVA_VAN.5.

Evaluation end date: 03/03/2022.

Expiration Date[1]: 19/03/2027.

All the assurance components required by the evaluation level EAL5 (augmented with ALC_DVS.2 and AVA_VAN.5) have been assigned a "PASS" verdict. Consequently, the laboratory Applus Laboratories assigns the "PASS" VERDICT to the whole evaluation due all the evaluator actions are satisfied for the EAL5 + ALC_DVS.2 + AVA_VAN.5, as defined by the Common Criteria v3.1 R5 and the CEM v3.1 R5.

Considering the obtained evidences during the instruction of the certification request of the product Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1, a positive resolution is proposed.

TOE SUMMARY

The Target of Evaluation (TOE), the STRONGV2P0 secure subsystem is a Hard macro instantiated within an SOC which is composed of a processing unit, security components, hardware circuit for testing purpose during the manufacturing process and volatile and non-volatile memories (hardware). The TOE also includes any IC Designer/Manufacturer proprietary IC Dedicated Software as long as it physically exists in an STRONGV2P0 after being delivered by the IC Manufacturer. Such software (also known as IC bootloader/firmware) is used for providing additional services to

[1] This date refers to the expiration date of the certificate recognition within the scope of the mutual recognition arrangements signed by this Certification Body.

facilitate the usage of the hardware and/or to provide additional services, a random number generation library and a random number generator. All other software is called Security IC Embedded Software and is not part of the TOE. The Security IC Embedded Software is initially stored in encrypted form in external NVM (Flash). The SoC S5E9840 is necessary to operate the STRONGV2P0 but it is not TOE hardware.

The product was evaluated with all the evidence required to fulfil the evaluation level EAL5 and the evidences required by the additional component ALC_DVS.2 and AVA_VAN.5, according to Common Criteria v3.1 R5.

ASSURANCE CLASS	ASSURANCE COMPONENT
ASE	ASE_CCL.1
	ASE_ECD.1
	ASE_INT.1
	ASE_OBJ.2
	ASE_REQ.2
	ASE_SPD.1
	ASE.TSS.1
ADV	ADV_ARC.1
	ADV_FSP.5
	ADV_IMP.1
	ADV_INT.2
	ADV_TDS.4
AGD	AGD_OPE.1
	AGD_PRE.1
ALC	ALC_CMC.4
	ALC_CMS.5
	ALC_DEL.1
	ALC_DVS.2
	ALC_LCD.1
	ALC_TAT.2
ATE	ATE_COV.2
	ATE_DPT.3
	ATE_FUN.1
	ATE_IND.2
AVA	AVA_VAN.5

SECURITY FUNCTIONAL REQUIREMENTS

The product security functionality satisfies the following functional requirements, according to the Common Criteria v3.1 R5:

SECURITY FUNCTIONAL REQUIREMENTS

FAU_SAS.1
FCS_COP.1/AES
FCS_COP.1/TDES
FCS_RNG.1
FDP_ACC.1
FDP_ACC.1/Loader
FDP_ACF.1
FDP_ACF.1/Loader
FDP_DAU.2/PM
FDP_IFC.1
FDP_ITT.1
FDP_SDC.1
FDP_SDC.1/PM
FDP_SDI.2
FDP_SDI.2/PM
FDP_SDR.1
FDP_UCT.1
FDP_UIT.1
FDP_URC.1/PM
FIA_API.1
FIA_UID.1/PM
FMT_LIM.1/Debug
FMT_LIM.1/Test
FMT_LIM.2/Debug
FMT_LIM.2/Test
FMT_MSA.1
FMT_MSA.3
FMT_SMF.1
FPT_FLS.1
FPT_ITT.1
FPT_PHP.3
FPT_RPL.1/PM
FRU_FLT.2
FTP_ITC.1

IDENTIFICATION

Product: Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1

Security Target: STRONGV2P0 of S5E9840 with Specific IC Dedicated Software Security Target, version 1.2, 15/12/2021.

Protection Profile: Eurosmart Security IC Platform Protection Profile with Augmentation Packages, version 1.0, BSI-CC-PP-0084-2014.

Evaluation Level: Common Criteria v3.1 R5 EAL5 + ALC_DVS.2 + AVA_VAN.5.

SECURITY POLICIES

The use of the product Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1 shall implement a set of security policies assuring the fulfilment of different standards and security demands.

The detail of these policies is documented in [ST], chapter 3.3 (Organizational Security Policies).

ASSUMPTIONS AND OPERATIONAL ENVIRONMENT

The assumptions detailed in [ST], chapter 3.4 (Assumptions) are constraints to the conditions used to assure the security properties and functionalities compiled by the security target. These assumptions have been applied during the evaluation in order to determine if the identified vulnerabilities can be exploited.

In order to assure the secure use of the TOE, it is necessary to start from these assumptions for its operational environment. If this is not possible and any of them could not be assumed, it would not be possible to assure the secure operation of the TOE.

CLARIFICATIONS ON NON-COVERED THREATS

The threats detailed in [ST], chapter 3.2 (Threats) do not suppose a risk for the product Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1, although the agents implementing attacks have the attack potential according to the High of EAL5 + ALC_DVS.2 + AVA_VAN.5 and always fulfilling the usage assumptions and the proper security policies satisfaction.

For any other threat not included in this list, the evaluation results of the product security properties and the associated certificate, do not guarantee any resistance.

OPERATIONAL ENVIRONMENT FUNCTIONALITY

The product requires the cooperation from its operational environment to fulfil some of the objectives of the defined security problem.

The security objectives declared for the TOE operational environment are detailed in [ST], chapter 4.3 (Security Objectives for the Operational Environment).

The details of the product operational environment (assumptions, threats and organisational security policies) and the TOE security requirements are included in the associated security target.

ARCHITECTURE

LOGICAL ARCHITECTURE

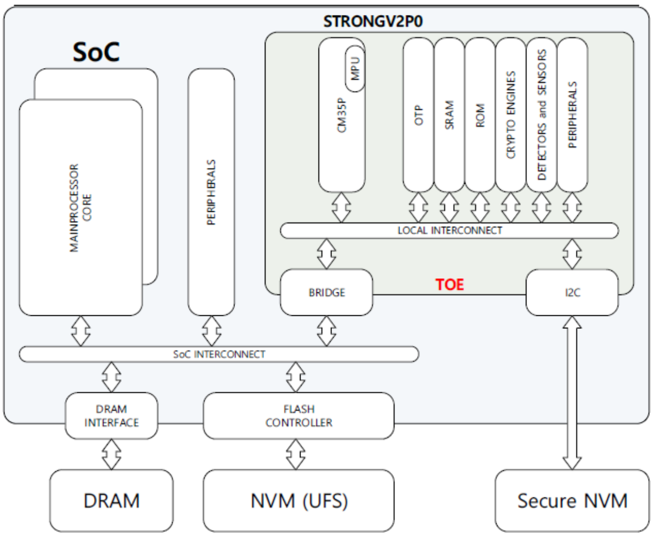
The CORTEX-M35P CPU architecture of STRONGV2P0 follows the Harvard architecture, that is, it has separate program and data memories. Using those separate memory access paths, both instruction and data can be fetched simultaneously without causing a stall.

The main security features of the TOE are:

- Security sensors or detectors including High and Low Temperature detectors, High and Low Supply Voltage detectors, Supply Voltage Glitch detector and Laser detector
- Shields against physical intrusive attacks
- Dedicated hardware mechanisms against side-channel attacks.
- Secure TDES and AES Symmetric Cryptography support
- ECC/ Parity / CRC-32 calculators
- One Hardware Digital True Random Number Generator (DTRNG) that fulfills Test Procedure A specified by AIS31 standard.
- The IC Dedicated Software includes:
    - DTRNG library built around Hardware DTRNG together with corresponding DTRNG application notes. This library fulfills the criteria of Test Procedure A specified by AIS31 standard.
    - Secure Boot Loader is a loader for copying the embedded software from an external FLASH storage into the internal SRAM.

PHYSICAL ARCHITECTURE

The physical architecture is depicted in the following figure. The TOE is delimited by the green area.



DOCUMENTS

The product includes the following documents that shall be distributed and made available together to the users of the evaluated version.

Item type	Item	Version	Form of delivery
Document	HW DTRNG and DTRNG Library Application Note (STRONGV2P0_DTRNG_Library_AN_v2.0.pdf)	2.0	Softcopy
Document	Hardware User's manual (STRONGV2P0 of S5E9840 Hardware_UM_v0.7.pdf)	0.7	Softcopy
Document	Security Application Note (SAN_STRONGV2P0_v0.4.pdf)	0.4	Softcopy
Document	Chip Delivery Specification (DeliverySpec_S5E9840 Rev0.5.pdf)	0.5	Softcopy
Document	Bootloader User's Manual (STRONGV2P0_Secure_Boot Loader_Manual_v0.4.pdf)	0.4	Softcopy
Document	CPU Reference Manual (Cortex-M35P_Reference_Manual v0.0.pdf)	0.0	Softcopy

PRODUCT TESTING

The developer has executed test for all the security functions. All the tests have been performed by the developer in its premises, with a satisfactory result.

During the evaluation process it has been verified each unit test checking that the security functionality that covers is been identified and also that the kind of test is appropriate to the function that is intended to test.

All the tests have been developed using the testing scenario appropriate to the established architecture in the security target. It has also been checked that the obtained results during the tests fit or correspond to the previously estimated results.

To verify the results of the developer tests, the evaluator has applied sampling strategy and has concluded that the information is complete and coherent enough to reproduce tests and identify the functionality tested.

In addition, the lab has devised a test for each of the security function of the product verifying that the obtained results are consistent with the results obtained by the developer.

It has been checked that the obtained results conform to the expected results and in the cases where a deviation in respect to the expected results was present, the evaluator has confirmed that this variation neither represents any security problem nor a decrease in the functional capacity of the product.

PENETRATION TESTING

Based on the list of potential vulnerabilities applicable to the TOE in is operational environment [JILAAPS], the evaluation team has devised vulnerability analysis and attack scenarios for penetration testing according to JIL supporting documents [JILAAPS] and [JILADVARCS]. Within these activities all aspects of the security architecture which were not covered by functional testing have been considered.

No attack scenario with the attack potential high according to Common Criteria v3.1 R5 has been successful in the TOE’s operational environment as defined in the security target when all security measures required by the developer are applied.

EVALUATED CONFIGURATION

The TOE is defined by its commercial name and version Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1.

The TOE hardware components are:

Item type	Item	Version	Form of delivery
Hard macro	STRONGV2P0 Hard macro, Secure Element Platform	1.1	Hard macro instantiated within an SOC packaged PoP
Hardware	Package SoC	1341-FCFBGA-14.0x15.4	PoP(Package-on-Package) with DRAM
Hardware	SoC S5E9840 embedding the STRONGV2P0 hard macro	1.1	SOC packaged PoP

The TOE software comprises the following components:

- DTRNG library built around Hardware DTRNG together with corresponding DTRNG application notes. This library fulfills the criteria of Test Procedure A specified by AIS31 standard.
- Secure Boot Loader is a loader for copying the embedded software from an external FLASH storage into the internal SRAM.

The acceptance procedure for the evaluated configuration of the TOE is described in document "Chip Delivery Specification, version 0.5".

Here it is reminded that to fulfil the requirements defined in the security target, the TOE consumer must strictly follow the security recommendations that can be found on documents Security Application Note for STRONGV2P0 (version 0.4) and STRONGV2P0 HW DTRNG FRO M and DTRNG FRO M Library Application Note (revision 2.0), as well as to observe the operational environment requirements and assumptions defined in the applicable security target.

The TOE also includes the documents identified in section "DOCUMENTS" of this certification report that shall be distributed and made available together to the users of the evaluated version.

EVALUATION RESULTS

The product Samsung STRONGV2P0 of S5E9840 with Specific IC Dedicated Software revision 1.1 has been evaluated against the Security Target STRONGV2P0 of S5E9840 with Specific IC Dedicated Software Security Target, version 1.2, 15/12/2021.

All the assurance components required by the evaluation level EAL5 + ALC_DVS.2 + AVA_VAN.5 have been assigned a "PASS" verdict. Consequently, the laboratory Applus Laboratories assigns the "**PASS**" **VERDICT** to the whole evaluation due all the evaluator actions are satisfied for the evaluation level EAL5 + ALC_DVS.2 + AVA_VAN.5, as defined by the Common Criteria v3.1 R5 and the CEM v3.1 R5.

COMMENTS & RECOMMENDATIONS FROM THE EVALUATION TEAM

Next, recommendations regarding the secure usage of the TOE are provided. These have been collected along the evaluation process and are detailed to be considered when using the product.

The evaluation team makes the following security recommendations:

- To follow the security guidance’s of the TOE strictly.
- To keep the TOE under personal control and set all other security measures available from the environment.

CERTIFIER RECOMMENDATIONS

Considering the obtained evidences during the instruction of the certification request of the product Applus Laboratories, a positive resolution is proposed.

The certifier strongly recommends to the TOE consumer to strictly follow the security recommendations that can be found on section DOCUMENTS of this certification report as well as to observe the operational environment requirements and assumptions defined in the applicable security target.

The certifier remarks the following points that should be taken into account by potential consumers:

- The following elements are part of the TOE but the evaluation of their functionality has been limited to the contribution to the Secure Boot Loader operation:

  - Bilateral Pseudo Random Number Generator (BPRNG).

  - TORNADO-H coprocessor.

  - AES CBC mode (CTR and GCM modes are out of the scope of the evaluation).

  - SHA-512 (SHA-256 and SHA384 are out of the scope of the evaluation).

GLOSSARY

CCN	Centro Criptológico Nacional
CNI	Centro Nacional de Inteligencia
EAL	Evaluation Assurance Level
IC	Integrated Circuit
OC	Organismo de Certificación

SOC	System On Chip
TOE	Target Of Evaluation

BIBLIOGRAPHY

The following standards and documents have been used for the evaluation of the product:

[CC_P1] Common Criteria for Information Technology Security Evaluation Part 1: Introduction and general model, Version 3.1, R5 Final, April 2017.

[CC_P2] Common Criteria for Information Technology Security Evaluation Part 2: Security functional components, Version 3.1, R5 Final, April 2017.

[CC_P3] Common Criteria for Information Technology Security Evaluation Part 3: Security assurance components, Version 3.1, R5 Final, April 2017.

[CEM] Common Methodology for Information Technology Security Evaluation: Version 3.1, R5 Final, April 2017.

[JILAAPS] Application of Attack Potential to Smartcards. Joint Interpretation Library. Version 3.1. June 2020. Joint Interpretation Library.

[JILADVARCS] Security Architecture requirements (ADV_ARC) for Smart Cards and similar devices, version 2.0. January 2012. Joint Interpretation Library.

[ST] STRONGV2P0 of S5E9840 with Specific IC Dedicated Software Security Target, version 1.2, 15/12/2021.

[ST Lite] STRONGV2P0 of S5E9840 with Specific IC Dedicated Software Security Target Lite (version 1.0).

SECURITY TARGET / SECURITY TARGET LITE

Along with this certification report, the complete security target of the evaluation is stored and protected in the Certification Body premises. This document is identified as:

- STRONGV2P0 of S5E9840 with Specific IC Dedicated Software Security Target, version 1.2, 15/12/2021.

The public version of this document constitutes the ST Lite. The ST Lite has also been reviewed for the needs of publication according to [CCDB-2006-04-004], and it is published along with this certification report in the Certification Body and CCRA websites. The ST Lite identifier is:

- STRONGV2P0 of S5E9840 with Specific IC Dedicated Software Security Target Lite, version 1.0, 17/02/2022.

RECOGNITION AGREEMENTS

In order to avoid multiple certification of the same product in different countries a mutual recognition of IT security certificates - as far as such certificates are based on ITSEC or CC - under certain conditions was agreed.

European Recognition of ITSEC/CC – Certificates (SOGIS-MRA)

The SOGIS-Mutual Recognition Agreement (SOGIS-MRA) Version 3 became effective in April 2010. It defines the recognition of certificates for IT-Products at a basic recognition level and, in addition, at higher recognition levels for IT-Products related to certain SOGIS Technical Domains only.

The basic recognition level includes Common Criteria (CC) Evaluation Assurance Levels EAL 1 to EAL 4 and ITSEC Evaluation Assurance Levels E1 to E3 (basic). For "Smartcards and similar devices" a SOGIS Technical Domain is in place. For "HW Devices with Security Boxes" a SOGIS Technical Domains is in place, too. In addition, certificates issued for Protection Profiles based on Common Criteria are part of the recognition agreement.

The new agreement has been signed by the national bodies of Austria, Finland, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden and the United Kingdom. The current list of signatory nations and approved certification schemes, details on recognition, and the history of the agreement can be seen on the website at https://www.sogis.eu.

The SOGIS-MRA logo printed on the certificate indicates that it is recognised under the terms of this agreement by the nations listed above.

The certificate of this TOE is recognized under SOGIS-MRA for all assurance components selected.

International Recognition of CC – Certificates (CCRA)

The international arrangement on the mutual recognition of certificates based on the CC (Common Criteria Recognition Arrangement, CCRA-2014) has been ratified on 08 September 2014. It covers CC certificates based on collaborative Protection Profiles (cPP) (exact use), CC certificates based on assurance components up to and including EAL 2 or the assurance family Flaw Remediation (ALC_FLR) and CC certificates for Protection Profiles and for collaborative Protection Profiles (cPP).

The CCRA-2014 replaces the old CCRA signed in May 2000 (CCRA-2000). Certificates based on CCRA-2000, issued before 08 September 2014 are still under recognition according to the rules of CCRA-2000. For on 08 September 2014 ongoing certification procedures and for Assurance Continuity (maintenance and re-certification) of old certificates a transition period on the recognition of certificates according to the rules of CCRA-2000 (i.e. assurance components up to and including EAL 4 or the assurance family Flaw Remediation (ALC_FLR)) is defined until 08 September 2017.

As of September 2014 the signatories of the new CCRA-2014 are government representatives from the following nations: Australia, Austria, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, India, Israel, Italy, Japan, Malaysia, The Netherlands, New Zealand, Norway, Pakistan, Republic of Korea, Singapore, Spain, Sweden, Turkey, United Kingdom, and the United States.

The current list of signatory nations and approved certification schemes can be seen on the website: http://www.commoncriteriaportal.org.

The Common Criteria Recognition Arrangement logo printed on the certificate indicates that this certification is recognised under the terms of this agreement by the nations listed above.

The certificate of this TOE is recognized under CCRA for all assurance components up to EAL2 and ALC_FLR.