KECS-CR-15-104

XSmart e-Passport V1.4 BAC with AA on M7892

Certification Report

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IT Security Certification Center

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No.	Date	Revised Pages	Description
00	2015.12.15	-	Certification report for XSmart e-Passport V1.4 BAC with AA on M7892 - First documentation

This document is the certification report for XSmart e-Passport V1.4 BAC with AA on M7892 of LG CNS.

The Certification Body

IT Security Certification Center

The Evaluation Facility

Telecommunications Technology Association (TTA)

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1. Executive Summary

This report describes the certification result drawn by the certification body on the results of the EAL4+ evaluation of LG CNS XSmart e-Passport V1.4 BAC with AA on M7892 with reference to the Common Criteria for Information Technology Security Evaluation (“CC” hereinafter) [1]. It describes the evaluation result and its soundness and conformity.

The Target of Evaluation (TOE) is the composite product which is consisting of the certified contactless integrated circuit chip of machine readable travel documents (MRTD chip) and embedded software (IC chip operating system(COS) and the application of machine readable travel documents(MRTD application)) including Logical Data Structure (LDS) in accordance with the ICAO documents [5]. The TOE provides Basic Access Control (BAC) and Active Authentication (AA) defined in the ICAO’s Machine Readable Travel Documents, DOC 9303 Part 1 Volume 2, 6th edition, August 2006 [5].

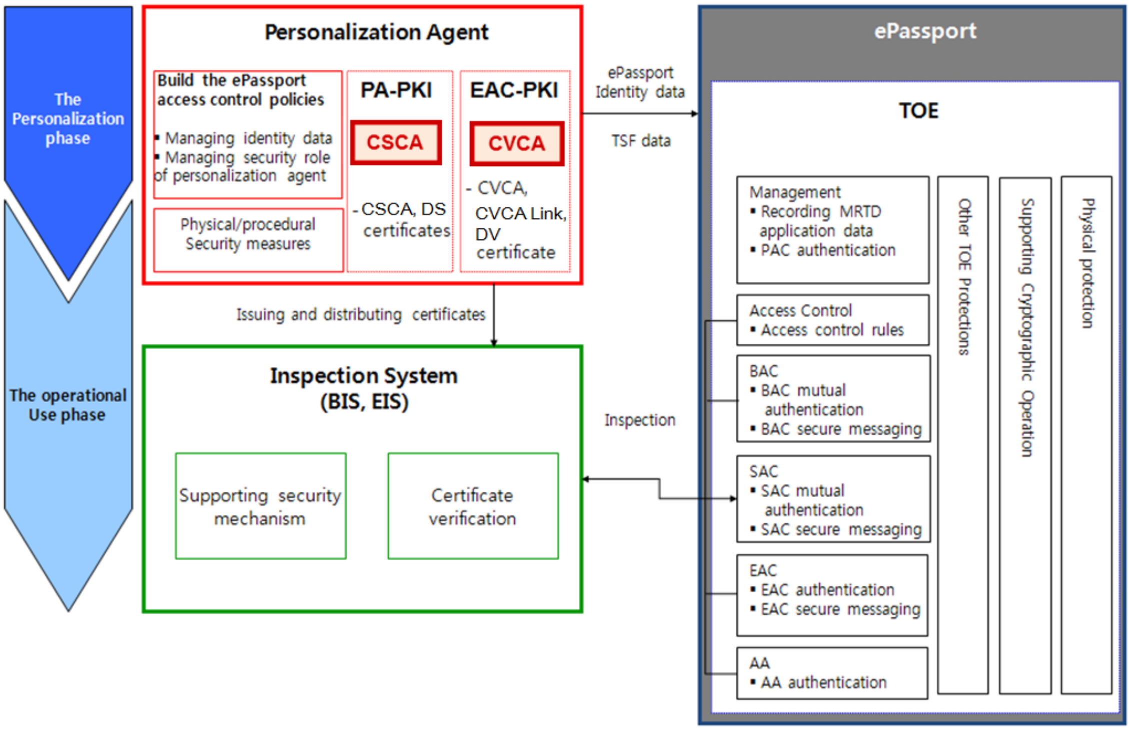
The TOE XSmart e-Passport V1.4 BAC with AA on M7892 is composed of the following components:

- IC chip, Infineon Security Controller M7892 B11 with optional RSA2048/4096 v1.02.013, EC v1.02.013,SHA-2 v1.01 and Toolbox v1.02.013 libraries and with specific IC dedicated software (firmware) provided by Infineon, see BIS-DSZ-CC-0782-V2-2015, and-
- Embedded software, XSmart e-Passport V1.4 provided by LG CNS.

The evaluation of the TOE has been carried out by Telecommunications Technology Association (TTA) and completed on December 10, 2015. This report grounds on the evaluation technical report (ETR) TTA had submitted [6] and the Security Target (ST) [7][8].

The ST is based on the certified Protection Profile (PP) Machine Readable Travel Document with “ICAO Application” Basic Access Control, Version 1.10, March 25, 2009, BSI-CC-PP-0055-2009 (“BAC PP” hereinafter) [9]. All Security Assurance Requirements (SARs) in the ST are based only upon assurance component in CC Part 3, and the TOE satisfies the SARs of Evaluation Assurance Level EAL4 augmented by ALC_DVS.2 and ATE_DPT.2. Therefore the ST and the resulting TOE is CC Part 3 conformant. The Security Functional Requirements (SFRs) are based upon both functional components in CC Part 2 and a newly defined component in the Extended Component Definition chapter of the ST, and the TOE satisfies the SFRs in the ST. Therefore the ST and the resulting TOE is CC Part 2 extended.

[Figure 1] shows the operational environment of the TOE in the Personalization and Operational Use phase.


The Personalization phase
The operational Use phase
Personalization Agent
Build the ePassport access control policies
▪ Managing identity data
▪ Managing security role of personalization agent
Physical/procedural Security measures
PA-PKI
CSCA
- CSCA, DS certificates
EAC-PKI
CVCA
- CVCA, CVCA Link, DV certificate
ePassport Identity data
TSF data
Issuing and distributing certificates
Inspection System (BIS, EIS)
Supporting security mechanism
Certificate verification
Inspection
ePassport
TOE
Management
▪ Recording MRTD application data
▪ PAC authentication
Access Control
▪ Access control rules
BAC
▪ BAC mutual authentication
▪ BAC secure messaging
SAC
▪ SAC mutual authentication
▪ SAC secure messaging
EAC
▪ EAC authentication
▪ EAC secure messaging
AA
▪ AA authentication
Other TOE Protections
Supporting Cryptographic Operation
Physical protection

[Figure 1] Operational environment of the TOE

In this certification, although SAC (Supplemental Access Control) and EAC (Extended Access Control) exist inside of physical scope of the TOE, these mechanisms are certified separately.

The TOE implements the following TOE Security Features. For more details refer to the ST [7][8].

TOE Security Features	Brief Summary of Issue
SF_READ_ACC	Data access control
SF_BAC	Basic access control
SF_AUTH	Authentication
SF_SM	Data secure messaging
SF_WIRTE_MGT	Write management
SF_CRYPTO	Cryptographic operation
SF_PROTECTION	Counter measure by IC chip
SF_AA	Active authentication

[Table 1] TOE Security Functionalities

Certification Validity: The certificate is not an endorsement of the IT product by the government of Republic of Korea or by any other organization that recognizes or gives effect to this certificate, and no warranty of the IT product by the government of Republic of Korea or by any other organization recognizes or gives effect to the certificate, is either expressed or implied.

2. Identification

The TOE is composite product consisting of the following components and related guidance documents.

Type	Identifier	Release	Delivery Form
HW/SW	Infineon Security Controller M7892 B11 with optional RSA2048/4096 v1.02.013, EC v1.02.013,SHA-2 v1.01 and Toolbox v1.02.013 libraries and with specific IC dedicated software (firmware)	B11	IC Chip Module (Note: The SW is contained in FLASH memory, but without passport booklet and the inlay embedded in the passport booklet.)
	RSA Library	v1.02.013	
	EC Library	v1.02.013	
	SHA-2 Library	V1.01	
SW	XSmart e-Passport V1.4	V1.4	
DOC	Operational User Guidance : XSmart e-Passport V1.4_AGD(BAC with AA)_V1.4	V1.4	Softcopy or Hardcopy

[Table 2] TOE identification

The TOE is finalized at step 3 of the Phase 2 (Manufacturing) in accordance with the BAC PP [9]. After the TOE finalization, the MRTD manufacturer (i.e., inlay and e-Cover manufacturer) embeds the TOE into the passport booklet. The inlay production including the application of the antenna is not part of the TOE.

The Personalization Agency can only access the MRTD using the securely delivered personalization key set. The personalization key set and the Guidance documents are

securely delivered (through PGP or directly from the SW developer to the Personalization Agency).
For details on the MRTD chips, the IC dedicated software and the crypto libraries, see the documentation under BSI-DSZ-CC-0782-V2-2015 [10].

[Table 3] summarizes additional information for scheme, developer, sponsor, evaluation facility, certification body, etc..

Scheme	Korea Evaluation and Certification Guidelines for IT Security (August 8, 2013) Korea Evaluation and Certification Scheme for IT Security (November 1, 2012)
TOE	XSmart e-Passport V1.4 BAC with AA on M7892 ● e-Passport_V14_CLFX2400P.hex (implemented on 78CLFX2400P) ● e-Passport_V14_CLFX3000P.hex (implemented on 78CLFX3000P) ● e-Passport_V14_CLFX4000P.hex (implemented on 78CLFX4000P)
Common Criteria	Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 4, CCMB-2012-09-001 ~ CCMB-2012-09-003, September 2012
EAL	EAL4+ (augmented by ALC_DVS.2 and ATE_DPT.2)
Developer	LG CNS
Sponsor	LG CNS
Evaluation Facility	Telecommunications Technology Association (TTA)
Completion Date of Evaluation	December 10, 2015
Certification Body	IT Security Certification Center

[Table 3] Additional identification information

3. Security Policy

The ST [7][8] for the TOE claims demonstrable conformance to the BAC PP [9], and the TOE complies security policies defined in the BAC PP [9] by security objectives and security requirements based on the ICAO document [5]. Thus the TOE provides security features BAC defined in the BAC PP [9] and AA.

Inspection procedures are as followed:

- For Inspection System supporting SAC only, or both SAC and BAC: (recommended) SAC → PA → AA,
- For Inspection System supporting BAC only, or BAC required by MRTD policy: BAC → PA → AA.

Additionally, the TOE provides security features for Personalization Agent to protect initialization data and MRTD identity data (during pre-personalization and personalization phase):

- Personalization agent authentication, ensures only authorized entity can access to the TOE during pre-personalization and personalization phase,
- Secure messaging, ensures transmitted data to be protected from unauthorized disclosure and modification during pre-personalization and personalization phase.

Furthermore, the TOE is composite product based on the certified IC chip, the TOE utilizes and therefore provides some security features covered by the IC chip certification such as filters, sensors, PFD (Post Failure Detection), REGMA (Mask Register File), CAMA (Cache Mask), MED (Memory Encryption/Decryption Unit), UmSLC (User Mode Security Life Control), co-processors of asymmetric algorithms (RSA/EC) and symmetric algorithms (3DES/AES), and a True Random Number Generator (TRNG), that meet the class PTG.2 of the AIS31. For more details refer to the Security Target Lite for the IC chip [11].

4. Assumptions and Clarification of Scope

The following assumptions describe the security aspects of the operational environment in which the TOE will be used or is intended to be used (for the detailed and precise definition of the assumption refer to the ST [7][8], chapter 3.2):

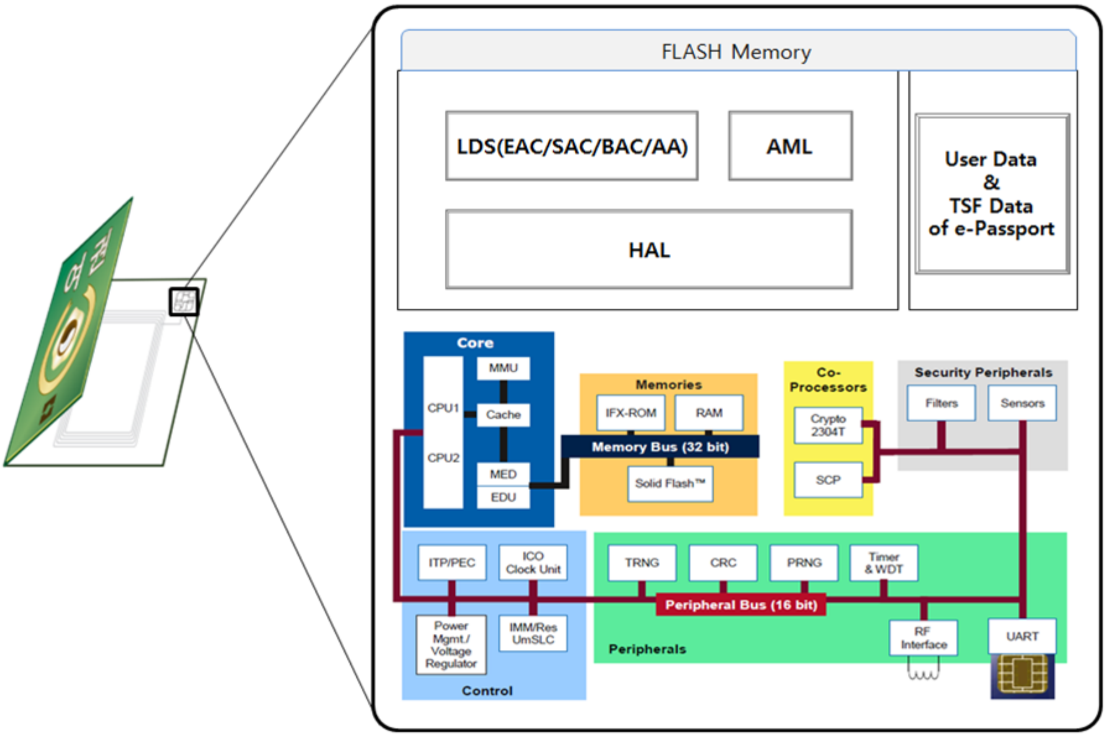
- The Inspection System is used by the border control officer of the receiving State (i) examining an MRTD presented by the traveler and verifying its authenticity and (ii) verifying the traveler as MRTD holder. The Basic Inspection System for global interoperability (i) includes the Country Signing Public Key and the Document Signer Public Key of each issuing State or Organization, and (ii) implements the terminal part of the Basic Access Control. The Basic Inspection System reads the logical MRTD under Basic Access Control and performs the Passive Authentication to verify the logical MRTD.

- The Document Basic Access Control Keys being generated and imported by the issuing State or Organization have to provide sufficient cryptographic strength. As a consequence of the [5], the Document Basic Access Control Keys are derived from a defined subset of the individual printed MRZ data. It has to be ensured that these data provide sufficient entropy to withstand any attack based on the decision that the inspection system has to derive Document Access Keys from the printed MRZ data with enhanced basic attack potential.

Furthermore, some aspects of threats and organisational security policies are not covered by the TOE itself, thus these aspects are addressed by the TOE environment: MRTD Manufacturing Security, Procedures for MRTD Holder Confirmation, Interoperability for MRTD, etc. Details can be found in the ST [7][8], chapter 3.3 and 3.4.

5. Architectural Information

[Figure 2] show the physical scope of the TOE. The TOE is the composite product which is consisting of the certified contactless MRTD chip and the embedded software (i.e., COS and MRTD application).



[Figure 2] Scope of the TOE

- MRTD Application Data is consisting of User Data such as MRTD identity data and TSF Data such as BAC session Key. The MRTD Application Data is contained in FLASH memory.
- COS, which processes commands and manages files in accordance with ISO/IEC 7816-4, 8, and 9 [19], executes MRTD application and provides functions for management of MRTD application data. MRTD Application provides BAC and AA in accordance with the ICAO document [5]. It also provides additional security mechanisms for personalization agent such as authentication and personalization of MRTD. The COS and the MRTD Application are contained in FLASH memory.
- MRTD chip provides security features such as filters, sensors, PFD (Post Failure Detection), REGMA (Mask Register File), CAMA (Cache Mask), MED (Memory Encryption/Decryption Unit), UmSLC (User Mode Security Life Control), co-processors of asymmetric algorithms (RSA/EC) and symmetric algorithms (3DES/AES), and a True Random Number Generator (TRNG).

For the detailed description is referred to the ST [7][8].

6. Documentation

The following documentation is evaluated and provided with the TOE by the developer to the customer.

Identifier	Release	Date
XSmart e-Passport V1.4 BAC with AA on M7892 Operational User Guidance : XSmart e-Passport V1.4_AGD(BAC with AA)_V1.4	V1.4	August 7, 2015

[Table 4] Documentation

7. TOE Testing

The TOE is composite product and the developer took a testing approach based on the logical components of the TOE including the platform, COS, and the MRTD application.

Tests for the TOE are:

- MRTD conformance test : Layer 6~7 MRTD Application Protocol & Data Test (Security and Command Test, Logical Data Structure Tests, etc.), which tests MRTD application in accordance with Standard Test Specifications (the ICAO Technical Report RF Protocol and Application Test Standard),
- Subsystem and module test: Additional test of features provided by subsystem and module which are not defined in the ICAO document [5], and
- Other test: Tests for secure operation of the TOE such as initialization, residual information removal, anti-Tearing and etc.

The developer tested all the TSF and analyzed testing results in accordance with the assurance component ATE_COV.2. This means that the developer tested all the TSFI defined for each life cycle state of the TOE, and demonstrated that the TSF behaves as described in the functional specification.

The developer tested both subsystems (including their interactions) and all the SFR-enforcing modules (including their interfaces), and analyzed testing results in accordance with the assurance component ATE_DPT.2.

The evaluator performed all the developer's tests, and conducted independent testing based upon test cases devised by the evaluator. The TOE and test configuration are identical to the developer's tests. The tests cover preparative procedures, in accordance with the guidance. Some tests were performed by design and source code analysis to verify fulfillment of the requirements of the underlying platform to the COS and MRTD Application. The implementation of the requirements of the platform's ETR and guidance as well as of the MRTD security mechanisms was verified by the evaluators.

Also, the evaluator conducted penetration testing based upon test cases devised by the evaluator resulting from the independent search for potential vulnerabilities. These test cases cover testing APDU commands, perturbation attacks, observation attacks such as SPA/DPA and SEMA/DEMA, fault injection attacks, and so on. No exploitable vulnerabilities by attackers possessing Enhanced-Basic attack potential were found from penetration testing.

The evaluator confirmed that all the actual testing results correspond to the expected testing results. The evaluator testing effort, the testing approach, configuration, depth, and results are summarized in the ETR [6].

8. Evaluated Configuration

The TOE is XSmart e-Passport V1.4 BAC with AA on M7892. The TOE is composite product consisting of the following components:

- IC chip: Infineon Security Controller M7892 B11 with optional RSA2048/4096 v1.02.013, EC v1.02.013,SHA-2 v1.01 and Toolbox v1.02.013 libraries and with specific IC dedicated software (firmware) (BSI-DSZ-CC-0782-V2-2015)
- Embedded software : XSmart e-Passport V1.4

The TOE is identified by the name and the version. The TOE identification information is provided by the command-response APDU following:

- ATR (Historical Byte): XSMARTEPASS140
  - 3B8E800158534D41525445504153533134306F
- Command APDU (GET CSN): 80EA000000
- Response APDU: 054C4701404007240C1F4304DE0000000000000009000
  - ‘05’: Infineon (IC manufacturer)
  - ‘4C47’ : LG
  - ‘0140’: TOE Version (V1.4)
  - ‘4007240C1F4304DE’: IC chip’s serial number
- Command APDU (GET DATA): 80CA9F7F00
- Response APDU: **9F7F2A8100000034251519101404007240C1F4304DE8100000000000000000000000000000000000000000000009000**
  - ‘8100’: Infineon (IC manufacturer)
  - ‘0003’: Type of IC chip (e.g. SLE78CLFX2400P)
  - ‘0140’: TOE Version (V1.4)
- Command APDU (GET PATCH STATUS): 80D3E00000
- Response APDU: 102013462001019000
  - ‘102013’: RSA/EC Library’s Version (V1.02.013)
  - ‘0101’: SHA-2 Library’s Version (V1.01)

And the guidance documents listed in this report chapter 6, [Table 4] were evaluated with the TOE.

9. Results of the Evaluation

The evaluation facility provided the evaluation result in the ETR [6] which references Work Package Reports for each assurance requirement and Observation Reports.

The evaluation result was based on the CC [1] and CEM [2], and CCRA supporting documents for the Smartcard and similar device [12], [13], [14], [15], [16] and [17].

As a result of the evaluation, the verdict PASS is assigned to all assurance components of EAL4 augmented by ALC_DVS.2 and ATE_DPT.2.

9.1 Security Target Evaluation (ASE)

The ST Introduction correctly identifies the ST and the TOE, and describes the TOE in a narrative way at three levels of abstraction (TOE reference, TOE overview and TOE description), and these three descriptions are consistent with each other. Therefore the verdict PASS is assigned to ASE_INT.1.

The Conformance Claim properly describes how the ST and the TOE conform to the CC and how the ST conforms to PPs and packages. Therefore the verdict PASS is assigned to ASE_CCL.1.

The Security Problem Definition clearly defines the security problem intended to be addressed by the TOE and its operational environment. Therefore the verdict PASS is assigned to ASE_SPD.1.

The Security Objectives adequately and completely address the security problem definition and the division of this problem between the TOE and its operational environment is clearly defined. Therefore the verdict PASS is assigned to ASE_OBJ.2.

The Extended Components Definition has been clearly and unambiguously defined, and it is necessary. Therefore the verdict PASS is assigned to ASE_ECD.1.

The Security Requirements is defined clearly and unambiguously, and it is internally consistent and the SFRs meet the security objectives of the TOE. Therefore the verdict PASS is assigned to ASE_REQ.2.

The TOE Summary Specification addresses all SFRs, and it is consistent with other narrative descriptions of the TOE. Therefore the verdict PASS is assigned to ASE_TSS.1.

Also, the evaluator confirmed that the ST of the composite TOE does not contradict the ST of the IC chip in accordance with the CCRA supporting document Composite Product Evaluation [12].

Thus, the ST is sound and internally consistent, and suitable to be used as the basis for the TOE evaluation.

The verdict PASS is assigned to the assurance class ASE.

9.2 Life Cycle Support Evaluation (ALC)

The developer has used a documented model of the TOE life-cycle. Therefore the verdict PASS is assigned to ALC_LCD.1.

The developer has used well-defined development tools (e.g. programming languages or computer-aided design (CAD) systems) that yield consistent and predictable results. Therefore the verdict PASS is assigned to ALC_TAT.1.

The developer has clearly identified the TOE and its associated configuration items, and the ability to modify these items is properly controlled by automated tools, thus making the CM system less susceptible to human error or negligence. Therefore the verdict PASS is assigned to ALC_CMC.4.

The configuration list includes the TOE, the parts that comprise the TOE, the TOE implementation representation, security flaws and the evaluation evidence. These configuration items are controlled in accordance with CM capabilities. Therefore the verdict PASS is assigned to ALC_CMS.4.

The developer's security controls on the development environment are adequate to provide the confidentiality and integrity of the TOE design and implementation that is necessary to ensure that secure operation of the TOE is not compromised. Additionally, sufficiency of the measures as applied is intended be justified. Therefore the verdict PASS is assigned to ALC_DVS.2.

The delivery documentation describes all procedures used to maintain security of the TOE when distributing the TOE to the user. Therefore the verdict PASS is assigned to ALC_DEL.1.

Also, the evaluator confirmed that the correct version of the embedded software is installed onto/into the correct version of the underlying IC chip, and the delivery procedures of IC chip and embedded software developers are compatible with the acceptance procedure of the composite product integrator in accordance with the CCRA supporting document Composite Product Evaluation [12].

Thus, the security procedures that the developer uses during the development and maintenance of the TOE are adequate. These procedures include the life-cycle model used by the developer, the configuration management, the security measures used throughout TOE development, the tools used by the developer throughout the life-cycle of the TOE, the handling of security flaws, and the delivery activity.

The verdict PASS is assigned to the assurance class ALC.

9.3 Guidance Documents Evaluation (AGD)

The procedures and steps for the secure preparation of the TOE have been documented and result in a secure configuration. Therefore the verdict PASS is assigned to AGD_PRE.1.

The operational user guidance describes for each user role the security functionality and interfaces provided by the TSF, provides instructions and guidelines for the secure use of the TOE, addresses secure procedures for all modes of operation, facilitates prevention and detection of insecure TOE states, or it is misleading or unreasonable. Therefore the verdict PASS is assigned to AGD_OPE.1.

Thus, the guidance documents are adequately describing the user can handle the TOE in a secure manner. The guidance documents take into account the various types of users (e.g. those who accept, install, administrate or operate the TOE) whose incorrect actions could adversely affect the security of the TOE or of their own data.

The verdict PASS is assigned to the assurance class AGD.

9.4 Development Evaluation (ADV)

The TOE design provides a description of the TOE in terms of subsystems sufficient to determine the TSF boundary, and provides a description of the TSF internals in terms of modules. It provides a detailed description of the SFR-enforcing modules and enough information about the SFR-supporting and the SFR-non-interfering modules for the evaluator to determine that the SFRs are completely and accurately implemented; as such, the TOE design provides an explanation of the implementation representation. Therefore the verdict PASS is assigned to ADV_TDS.3.

The developer has completely described all of the TSFI in a manner such that the evaluator was able to determine whether the TSFI are completely and accurately described, and appears to implement the security functional requirements of the ST. Therefore the verdict PASS is assigned to ADV_FSP.4.

The TSF is structured such that it cannot be tampered with or bypassed, and TSFs that provide security domains isolate those domains from each other. Therefore the verdict PASS is assigned to ADV_ARC.1.

The implementation representation is sufficient to satisfy the functional requirements of the ST and is a correct realisation of the low-level design. Therefore the verdict PASS is assigned to ADV_IMP.1.

Also, the evaluator confirmed that the requirements on the embedded software, imposed by the IC chip, are fulfilled in the composite product in accordance with the CCRA supporting document Composite Product Evaluation [12].

Thus, the design documentation is adequate to understand how the TSF meets the SFRs and how the implementation of these SFRs cannot be tampered with or bypassed. Design documentation consists of a functional specification (which describes the interfaces of the TSF), a TOE design description (which describes the architecture of the TSF in terms of how it works in order to perform the functions related to the SFRs being claimed), and an implementation description (a source code level description). In addition, there is a security architecture description (which describes the architectural properties of the TSF to explain how its security enforcement cannot be compromised or bypassed).

The verdict PASS is assigned to the assurance class ADV.

9.5 Test Evaluation (ATE)

The developer has tested all of the TSFIs, and that the developer's test coverage evidence shows correspondence between the tests identified in the test documentation and the TSFIs described in the functional specification. Therefore the verdict PASS is assigned to ATE_COV.2.

The developer has tested all the TSF subsystems and the SFR-enforcing modules against the TOE design and the security architecture description. Therefore the verdict PASS is assigned to ATE_DPT.2.

The developer correctly performed and documented the tests in the test documentation. Therefore the verdict PASS is assigned to ATE_FUN.1.

By independently testing a subset of the TSF, the evaluator confirmed that the TOE behaves as specified in the design documentation, and had confidence in the developer's test results by performing all of the developer's tests. Therefore the verdict PASS is assigned to ATE_IND.2.

Also, the evaluator confirmed that composite product as a whole exhibits the properties necessary to satisfy the functional requirements of its ST in accordance with the CCRA supporting document Composite Product Evaluation [12].

Thus, the TOE behaves as described in the ST and as specified in the evaluation evidence (described in the ADV class).

The verdict PASS is assigned to the assurance class ATE.

9.6 Vulnerability Assessment (AVA)

By penetrating testing, the evaluator confirmed that there are no exploitable vulnerabilities by attackers possessing Enhanced-Basic attack potential in the operational environment of the TOE. Therefore the verdict PASS is assigned to AVA_VAN.3.

Also, the evaluator confirmed that there is no exploitability of flaws or weakness in the composite TOE as a whole in the intended environment in accordance with the CCRA supporting document Composite Product Evaluation [12].

Thus, potential vulnerabilities identified, during the evaluation of the development and anticipated operation of the TOE or by other methods (e.g. by flaw hypotheses or quantitative or statistical analysis of the security behaviour of the underlying security mechanisms), don’t allow attackers possessing Enhanced-Basic attack potential to violate the SFRs.

The verdict PASS is assigned to the assurance class AVA.

9.7 Evaluation Result Summary

Assurance Class	Assurance Component	Evaluator Action Elements	Verdict		
			Evaluator Action Elements	Assurance Component	Assurance Class
ASE	ASE_INT.1	ASE_INT.1.1E	PASS	PASS	PASS
		ASE_INT.1.2E	PASS		
	ASE_CCL.1	ASE_CCL.1.1E	PASS	PASS	
	ASE_SPD.1	ASE_SPD.1.1E	PASS	PASS	
	ASE_OBJ.2	ASE_OBJ.2.1E	PASS	PASS	
	ASE_ECD.1	ASE_ECD.1.1E	PASS	PASS	
		ASE_ECD.1.2E	PASS		
	ASE_REQ.2	ASE_REQ.2.1E	PASS	PASS	
	ASE_TSS.1	ASE_TSS.1.1E	PASS	PASS	
		ASE_TSS.1.2E	PASS		
ALC	ALC_LCD.1	ALC_LCD.1.1E	PASS	PASS	PASS

Assurance Class	Assurance Component	Evaluator Action Elements	Verdict		
			Evaluator Action Elements	Assurance Component	Assurance Class
	ALC_TAT.1	ALC_TAT.1.1E	PASS	PASS	
	ALC_CMS.4	ALC_CMS.4.1E	PASS	PASS	
	ALC_CMC.4	ALC_CMC.4.1E	PASS	PASS	
	ALC_DVS.2	ALC_DVS.2.1E	PASS	PASS	
		ALC_DVS.2.2E	PASS		
	ALC_DEL.1	ALC_DEL.1.1E	PASS	PASS	
AGD	AGD_PRE.1	AGD_PRE.1.1E	PASS	PASS	PASS
		AGD_PRE.1.2E	PASS	PASS	
	AGD_OPE.1	AGD_OPE.1.1E	PASS	PASS	
ADV	ADV_TDS.3	ADV_TDS.3.1E	PASS	PASS	PASS
		ADV_TDS.3.2E	PASS	PASS	
	ADV_FSP.4	ADV_FSP.4.1E	PASS	PASS	
		ADV_FSP.4.2E	PASS		
	ADV_ARC.1	ADV_ARC.1.1E	PASS	PASS	
	ADV_IMP.1	ADV_IMP.1.1E	PASS	PASS	
ATE	ATE_COV.2	ATE_COV.2.1E	PASS	PASS	PASS
	ATE_DPT.2	ATE_DPT.2.1E	PASS	PASS	
	ATE_FUN.1	ATE_FUN.1.1E	PASS	PASS	
	ATE_IND.2	ATE_IND.2.1E	PASS	PASS	
		ATE_IND.2.2E	PASS		
		ATE_IND.2.3E	PASS		
AVA	AVA_VAN.3	AVA_VAN.3.1E	PASS	PASS	PASS
		AVA_VAN.3.2E	PASS		
		AVA_VAN.3.3E	PASS		
		AVA_VAN.3.4E	PASS		

[Table 5] Evaluation Result Summary

10. Recommendations

The TOE security functionality can be ensured only in the evaluated TOE operational environment with the evaluated TOE configuration, thus the TOE shall be operated by complying with the followings:

- As the TOE is composite product which is consisting of IC chip, COS and MRTD application, the TOE is finalized by “IC Manufacturer” at the Manufacturing Phase in the BAC PP [9]. And only the procedure of delivering the finalized TOE to card manufacturer is in the scope of this evaluation. Thus, the TOE user including card manufacturer shall establish the secure delivery and acquisition process after the Manufacturing Phase.
- As the TOE can be composed with one of SLE78CLFX2400P, SLE78CLFX3000P and SLE78CLFX4000P, the TOE user is recommended to check the product identification information right after acceptance of the TOE while referring to the user operating manual provided with the product after acquisition of the TOE
- When secure messaging is not applied during personalization phase in accordance with the policy of the Personalization Agent, it is strongly recommended that the physical, procedural and personal security measures are in place in order to ensure confidentiality and integrity of the transmitted data during personalization phase.
- The TOE supports both SAC and BAC to ensure global interoperability. Thus, it is recommended that the inspection system uses SAC instead of BAC in order to provide more secure authentication mechanism.
- It has to be ensured that MRZ data which are used to derive BAC authentication keys provides sufficient entropy to withstand related attacks.

11. Security Target

The XSmart e-Passport V1.4 BAC with AA on M7892 Security Target V1.6, August 7, 2015 [7] is included in this report by reference. For the purpose of publication, it is provided as sanitized version [8] in accordance with the CCRA supporting document ST sanitising for publication [18].

12. Acronyms and Glossary

APDU	Application Protocol Data Unit
CC	Common Criteria
DG	Data Group
EAL	Evaluation Assurance Level
ICAO	International Civil Aviation Organization
IS	Inspection System
BIS	BAC/SAC supporting Inspection System
EIS	EAC supporting Inspection System
MRTD	Machine Readable Travel Document
MRZ	Machine Readable Zone
PP	Protection Profile
SAR	Security Assurance Requirement
SFR	Security Functional Requirement
ST	Security Target
TOE	Target of Evaluation
TSF	TOE Security Functionality

AA (Active Authentication)
The security mechanism with which the MRTD chip demonstrates its genuine to the IS by signing random number transmitted from the IS and the IS verifies genuine of the MRTD chip through verification with the signed values

Application Protocol Data Unit(APDU)
Standard communication messaging protocol between a card accepting device and a smart card

BAC (Basic Access Control)
The security mechanism that implements the symmetric key-based entity authentication protocol for mutual authentication of the MRTD chip and the IS (BIS) and the symmetric key-based key distribution protocol to generate the session keys necessary in establishing the secure messaging for the MRTD chip and the IS

CSCA (Country Signing Certification Authority)
The root CA that generates and issues the CSCA certificate and the DV certificate by securely generating the digital signature key in the PA-PKI to support the PA

security mechanisms

CSCA Certificate

The certificate to demonstrate validity of the digital signature verification key for the digital signature generation key of the PA-PKI root CA by signature on the digital signature verification key with digital signature generation key of the PA-PKI root CA

CVCA
(Country Verifying
Certification Authority)

The root CA that generates and issues the CVCA certificate, the CVCA link certificate and the DV certificate by securely generating digital signature key in the EAC-PKI to support the EAC security mechanisms

CVCA Certificate

The certificate that includes digital signature value by the EAC-PKI root CA with digital signature generation key of the EAC-PKI root CA on the digital signature verification key in order to demonstrate validity of the CVCA link certificate and the DV certificate

CVCA Link Certificate

The certificate that includes digital signature value that the EAC-PKI root CA with the digital signature generation key that corresponds to the previous CVCA certificate after generating a new CVCA certificate before expiring the valid date of the CVCA certificate

DS(Document Signer)
Certificate

The certificate of the Personalization agent signed with the digital signature generation key of the PA-PKI root CA used by the IS to verify the SOD of the PA security mechanism

DV
(Document Verifier)

The CA(Certification Authority) that generates and issues the IS certificate

DV Certificate

The certificate that includes digital signature value on the digital signature verification key of the IS with the digital signature generation key of the DV in order to demonstrate validity of the digital signature verification key of the IS

EAC (Extended Access
Control)

The security mechanisms consisted with the EAC-CA for chip authentication and the EAC-TA for the IS authentication in order to enable only the EAC supporting Inspection System (EIS) to read the biometric data of the ePassport holder for access control to the biometric data of the ePassport holder stored in the MRTD chip

EAC-CA
(EAC-chip Authentication)

The security mechanism to implement the Ephemeral-Static DH key distribution protocol (PKCS#3, ANSI X.42, etc.) to enable the MRTD chip authentication by the EIS through key checking for the EAC chip authentication public key and private key of the MRTD chip and temporary public key and private key of the EIS

EAC-TA
(EAC-terminal Authentication)

The security mechanism that the EIS transmits values digital signature with the digital signature generation key of its own to the temporary public key used in the EAC-CA and the MRTD chip by using the IS certificate, verifies the digital signature. This security mechanism implements challenge-response authentication protocol based on digital signature through which the MRTD chip authenticates the EIS.

ePassport

The passport embedded the contactless IC chip in which identity and other data of the ePassport holder stored in accordance with the International Civil Aviation Organization (ICAO) and the International Standard Organization (ISO)

ePassport identity data

Including personal data of the ePassport holder and biometric data of the ePassport holder

IS
(Inspection System)

As an information system that implements optical MRZ reading function and the security mechanisms (PA, BAC, EAC and AA, etc.) to support the ePassport inspection, the IS consists with a terminal that establishes the RF communication with the MRTD chip and the system that transmits commands to the MRTD chip through this terminal and processes responses for the commands

IS Certificate

Certificate used by the MRTD chip to verify the digital signature transmitted by the IS in the EAC-TA. The DV performs a digital signature on the digital signature verification key of the EIS with the digital signature generation key

LDS

Logical data structure defined in the ICAO document in

(Logical Data Structure)
order to store the user data in the MRTD chip

MRTD
Machine Readable Travel Document, e.g. passport, visa or official document of identity accepted for travel purposes

MRTD Application
Program for loaded in the MRTD chip that is programmed by the LDS of the ICAO document and provides security mechanisms of BAC, PA and EAC, etc.

MRTD Chip
The contactless IC chip that includes the MRTD application and the IC chip operating system necessary in operation of the MRTD application and that supports communications protocol by ISO/IEC 14443

PA
(Passive Authentication)
The security mechanism to demonstrate that identity data recorded in the ePassport has not been forgery and corruption as the IS with the DS certificate verifies the digital signature in the SOD and hash value of user data in accordance with read-right of the ePassport access control policy

Personalization agent
The agent receives the ePassport identity data from the Reception organization and generates the SOD by digital signature on the data. After recording them in the MRTD chip, the personalization agent generates TSF data and stores it in the secure memory of the MRTD chip. The agent also operates PA-PKI and/ or EAC-PKI

SAC
(Supplemental Access Control)
The security mechanism is supplementary to BAC. The SAC performs mutual authentication for the MRTD chip and the IS (BIS) to access control of personal data of the ePassport holder and establishes the secure messaging for the MRTD chip and the IS

SOD
(Document Security Object)
The SOD refers to the ePassport identity data and the ePassport authentication data recorded in the Personalization phase by the Personalization agent that is signed by the Personalization agent with the digital signature generation key. The SOD is an object implemented with signed data type of ‘RFC 3369 cryptographic message syntax, 2002.8’ and encoded with DER method

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