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eTravel Essential for Japan 1.0, with SAC (PACE) and AA, embedded in the Infineon SLC52GDA Integrated Circuit

Common Criteria / ISO 15408

Security Target – Public version

EAL4+

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1.1 EXTERNAL REFERENCES [ER]

[ISO]	ISO references
[ISO14443]	Identification cards — Contactless integrated circuit(s) cards — Proximity cards — Books 1 to 4
[ICAO]	**ICAO references**
[ICAO-9303]	ICAO Doc 9303, Machine Readable Travel Documents Seventh Edition, 2015
[ICAO-TR-SAC]	ICAO Technical Report, Supplemental Access Control for Machine Readable Travel Documents Version 1.1, April 15th 2014
[CC]	**Common Criteria references**
[CC-1]	Common Criteria for Information Technology Security Evaluation Part 1: Introduction and general model CCMB-2017-04-001, Version 3.1 Revision 5, April 2017.
[CC-2]	Common Criteria for Information Technology Security Evaluation Part 2: Security Functional Requirements CCMB-2017-04-002, Version 3.1 Revision 5, April 2017.
[CC-3]	Common Criteria for Information Technology Security Evaluation Part 3: Security Assurance Components CCMB-2017-04-003, Version 3.1 Revision 5, April 2017.
[CCDB]	Common Criteria Supporting Document, Mandatory Technical Document – Composite product evaluation for Smart Cards and similar devices Version 1.5.1, May 2018.
[PP/0084]	Security IC Platform Protection Profile with augmentation Packages Ref: BSI-CC-PP-0084-2014
[JISEC C0499]	Protection Profile for ePassport IC with SAC (PACE) and Active Authentication Ref: JISEC C0499, Version 1.00, March 8th 2016
[JISEC C0500]	Protection Profile for ePassport IC with SAC (BAC+PACE) and Active Authentication Ref: JISEC C0500, Version 1.00, March 8th 2016.
[ST_IC]	Common Criteria Public Security Target – IFX_CCI_000003h, IFX_CCI_000005h, IFX_CCI_000008h, IFX_CCI_00000Ch, IFX_CCI_000013h, IFX_CCI_000014h, IFX_CCI_000015h, IFX_CCI_00001Ch, IFX_CCI_00001Dh, IFX_CCI_000021h, IFX_CCI_000022h – Design step H13 Infineon Technologies AG, Version 1.8, April 22nd 2020
[CB]	**Certification Bodies references**
[TR-03111]	Technical Guideline TR-03111: Elliptic Curve Cryptography. BSI, Version 2.0, 2012
[SP800-90]	Special Publication 800-90A - Recommendation for Random Number Generation Using Deterministic Random Bit Generators. NIST, Revision 1, June 2015
[RGS-B1]	Référentiel général de sécurité version 2.0 - Annexe B1 Mécanismes cryptographiques ANSSI, Version 2.03, February 21st 2014

1.2 INTERNAL REFERENCES [IR]

[AGD]	eTravel Essential for Japan 1.0 Embedded Software – Guidance documentation
[REF-MAN]	eTravel Essential for Japan 1.0 – Reference Manual Ref: D1501060, revision B.5, July 10th 2020
[AGD-TopLevel]	eTravel Essential for Japan 1.0 – AGD top-level document Ref: D1512963, version 1.4, July 16th 2020

2. ACRONYMS & GLOSSARY

2.1 ACRONYMS

AA	Active Authentication
BAC	Basic Access Control
BIS-BAC	Basic Inspection System with Basic Access Control protocol
BIS-PACE	Basic Inspection System with PACE protocol
CAN	Card Access Number
CC	Common Criteria
EAL	Evaluation Assurance Level
ES	Embedded Software
IC	Integrated Circuit
IS	Inspection system
IT	Information Technology
LDS	Logical Data Structure
MRTD	Machine readable travel document
MRZ	Machine Readable Zone
NVM	Non Volatile Memory
PACE	Password Authenticated Connection Establishment
PCT	PACE Terminal
PP	Protection Profile
SAC	Supplemental Access Control
ST	Security Target
TOE	Target of Evaluation

2.2 GLOSSARY

Active Authentication	Security mechanism by which means the MTRD's chip proves its identity and authenticity to the inspection system as part of a genuine MRTD issued by a known State or Organization.
Basic Access Control	Security mechanism by which means the MTRD's chip and the inspection system protect their communication by means of secure messaging with Basic Access Keys.
Basic Inspection System with Basic Access Control protocol	Technical system being used by an official organisation and operated by a governmental organisation and verifying correspondence between the stored and printed MRZ. BIS-BAC implements the terminal's part of the Basic Access Control protocol and authenticates itself to the travel document using the Document Basic Access Keys drawn from printed MRZ data for reading the less-sensitive data (travel document details data and biographical data) stored on the travel document.
Basic Inspection System with PACE protocol	A technical system being used by an inspecting authority and verifying the travel document presenter as the travel document holder (for ePassport: by comparing the real biometric data (face) of the travel document presenter with the stored biometric data (DG2) of the travel document holder). BIS-PACE implements the terminal's part of the PACE protocol and authenticates itself to the travel document using a shared password (PACE password) and supports Passive Authentication.

Card Access Number	A short password that is printed or displayed on the document. The CAN is a non-blocking password. The CAN may be static (printed on the Passport), semi-static (e.g. printed on a label on the Passport) or dynamic (randomly chosen by the electronic travel document and displayed by it using e.g. ePaper, OLED or similar technologies).
Inspection system	Technical system used by the border control officer of the receiving State (i) examining an MRTD presented by the traveller and verifying its authenticity and (ii) verifying the traveller as MRTD holder.
Integrated circuit	Electronic component(s) designed to perform processing and memory functions. The MRTD's chip is an integrated circuit.
Logical Data Structure	The collection of groupings of Data Elements stored in the optional capacity expansion technology [ICAO-9303]. The capacity expansion technology used is the MRTD's chip.
Machine readable travel document	Official document issued by a State or Organization which is used by the holder for international travel (e.g. passport, visa, official document of identity) and which contains mandatory visual (eye readable) data and a separate mandatory data summary, intended for global use, reflecting essential data elements capable of being machine read. See [ICAO-9303]
Machine Readable Zone	Fixed dimensional area located on the front of the MRTD or MRP Data Page or, in the case of the TD1, the back of the MRTD, containing mandatory and optional data for machine reading using OCR methods. See [ICAO-9303]
Password Authenticated Connection Establishment	A communication establishment protocol defined in [ICAO-TR-SAC]. The PACE Protocol is a password authenticated Diffie-Hellman key agreement protocol providing implicit password-based authentication of the communication partners (e.g. smart card and the terminal connected): i.e. PACE provides a verification, whether the communication partners share the same value of a password π). Based on this authentication, PACE also provides a secure communication, whereby confidentiality and authenticity of data transferred within this communication channel are maintained.
PACE Terminal	A technical system verifying correspondence between the password stored in the travel document and the related value presented to the terminal by the travel document presenter. PCT implements the terminal's part of the PACE protocol and authenticates itself to the MRTD using a shared password (CAN or MRZ).
Supplemental Access Control	A Technical Report which specifies PACE v2 as an access control mechanism that is supplemental to Basic Access Control.

3. SECURITY TARGET INTRODUCTION

3.1 SECURITY TARGET IDENTIFICATION

Title:	eTravel Essential for Japan 1.0, with SAC (PACE) and AA, embedded in the Infineon SLC52GDA Integrated Circuit – Security Target, public version
Version:	1.4p
Author:	Thales
Reference:	D1510692
Publication date:	16/07/2020

3.2 TOE IDENTIFICATION

Product:	eTravel Essential for Japan 1.0
TOE name:	eTravel Essential for Japan Embedded Software
TOE version:	0101h (Operating System release level)
TOE documentation:	Guidance [AGD]
TOE hardware part:	Infineon SLC52GDA[1] security controller (Common Criteria Certification Identifier IFX_CCI_000005h in [ST_IC])
Developer:	Thales

3.3 TOE OVERVIEW

The eTravel Essential for Japan 1.0 product is a machine readable travel document (MRTD) addressing the Japan e-passport market. Based on the requirements and recommendations of the International Civil Aviation Organization [ICAO-9303], it implements the following security features:

- Basic Access Control (BAC)[2]
- Password Authenticated Connection Establishment (PACE)
- Active Authentication mechanism (AA).

eTravel Essential for Japan 1.0 is a contactless product based on [ISO14443], type B.

For the present ST, the Target of Evaluation (TOE) is the eTravel Essential for Japan 1.0 embedded software. The TOE boundaries encompass:

- **The eTravel Essential for Japan 1.0 Embedded Software (ES)**
- **The Infineon IC, reference SLC52GDA**
- **The guidance documentation [AGD]**

The integrated circuit being already evaluated and certified, security requirements specifically addressing the integrated circuit are not reproduced within the present ST.

The eTravel Essential for Japan 1.0 product requires a contactless terminal to provide its services. This terminal is outside the scope of the present evaluation.

[1] Two SLC52GDA commercial derivatives may be used and are identified in the CPLC data: SLC52GDA348 ('IC Type' set to 1904h in CPLC table) or SLC52GDA448 ('IC Type' set to 1902h in CPLC table). More information on the structure and content of the CPLC table, and how to retrieve it, is available in [REF-MAN] table 6.

[2] Note that according to [JISEC C0499], the BAC features are not considered in the present ST. A separate ST is available, which is compliant to [JISEC C0500] and includes the BAC features.

3.4 TOE DESCRIPTION

3.4.1 TOE boundaries

The TOE is the module designed to be the core of an MRTD passport. The TOE is a contactless integrated circuit. The IC is connected to an antenna and capacitors and is mounted on a plastic film. This inlay is then embedded in the coversheet or datapage of the MRTD passport and provides a contactless interface for the passport holder identification.

The TOE is programmed according to the Logical Data Structure [ICAO-9303] and provides:

- Basic Access Control (BAC) according to the ICAO document [ICAO-9303]
- Active Authentication (AA) mechanism according to the ICAO document [ICAO-9303]
- PACE V2 Access Control (SAC) according to the ICAO document [ICAO-TR-SAC]

As shown by figure 1, the Target of Evaluation (TOE) is composed of the eTravel Essential for Japan 1.0 Embedded Software (ES), supported by the SLC52GDA integrated circuit. The eTravel Essential for Japan 1.0 data are also part of the TOE, as well as the guidance documentation [AGD].

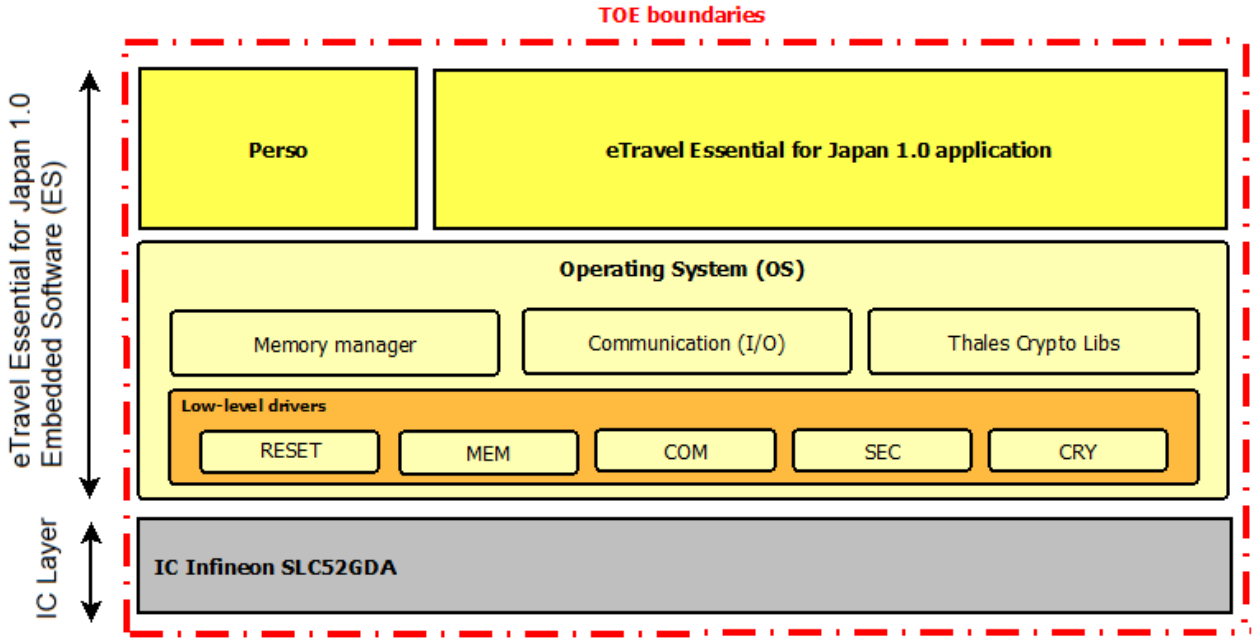


Figure 1: TOE boundaries

The eTravel Essential for Japan 1.0 Embedded Software (ES) is implemented in the NVM memory (flash technology) of the chip. The TOE is delivered to the Personalization Agent with data and guidance documentation in order to perform the personalization of the product. In addition, the Personalization Key is delivered from the MRTD Manufacturer to the Personalization Agent or from the Personalization Agent to the MRTD Manufacturer.

3.4.2 TOE usage and security features for operational use

A State or Organization issues MRTDs to be used by the holder for international travel. The traveller presents an MRTD to the inspection system to prove his or her identity. The MRTD in context of this security target contains (i) visual (eye readable) biographical data and portrait of the holder, (ii) a separate data summary (MRZ data) for visual and machine reading using OCR methods in the Machine readable zone (MRZ) and (iii) data elements on the MRTD's chip according to LDS for contactless machine reading. The authentication of the traveller is based on (i) the possession of a valid MRTD personalized for a holder with the claimed identity as given on the biographical data page and (ii) biometrics using the reference data stored in the MRTD.

The issuing State or Organization ensures the authenticity of the data of genuine MRTD's. The receiving State trusts a genuine MRTD of an issuing State or Organization.

For this security target the MRTD is viewed as unit of

a) The physical MRTD as travel document in form of paper, plastic and chip. It presents visual readable data including (but not limited to) personal data of the MRTD holder

(1) The biographical data on the biographical data page of the passport book,

(2) The printed data in the Machine Readable Zone (MRZ) and

(3) The printed portrait.

b) The logical MRTD as data of the MRTD holder stored according to the Logical Data Structure [ICAO-9303] as specified by ICAO on the contactless integrated circuit. It presents contactless readable data including (but not limited to) personal data of the MRTD holder

(1) The digital Machine Readable Zone Data (digital MRZ data, EF.DG1),

(2) The digitized portraits (EF.DG2),

(3) The other data according to LDS (EF.DG5 to EF.DG13, EF.DG15 and EF.DG16)

(4) The Document security object (EF.SOD), the security information file for PACE protocol (EF.CardAccess) and the Header and Data Group Presence Information (EF.COM).

The issuing State or Organization implements security features of the MRTD to maintain the authenticity and integrity of the MRTD and their data. The MRTD as the passport book and the MRTD's chip is uniquely identified by the Document Number.

The physical MRTD is protected by physical security measures (e.g. watermark on paper, security printing), logical (e.g. authentication keys of the MRTD's chip) and organizational security measures (e.g. control of materials, personalization procedures) [ICAO-9303]. These security measures include the binding of the MRTD's chip to the passport book.

The logical MRTD is protected in authenticity and integrity by a digital signature created by the document signer acting for the issuing State or Organization and the security features of the MRTD's chip.

The ICAO defines the baseline security methods Passive Authentication, and optional advanced security methods. For the present TOE, the Active Authentication of the MRTD's chip and the Password Authenticated Connection Establishment (PACE, defined in [ICAO-TR-SAC]) are implemented. Note that the Passive Authentication Mechanism is performed completely and independently of the TOE by the TOE environment.

Keys for Active Authentication can be generated in the card or loaded into it. These operations take place at personalization time.

3.4.3 TOE lifecycle

The TOE life cycle is described in terms of the four life cycle phases. With respect to the [PP/0084], these four phases are additionally subdivided into 7 steps.

Phase 1 "Development":

(Step1) The IC Developer develops the integrated circuit, the IC Dedicated Software and the guidance documentation associated with these TOE components.

(Step2) The Embedded Software Developer uses the guidance documentation for the integrated circuit and the guidance documentation for relevant parts of the IC Dedicated Software and develops the MRTD application and the associated guidance documentation.

Phase 2 "Manufacturing":

(Step3) The TOE integrated circuit is produced by the IC Manufacturer conforming to Thales requirements. The IC Manufacturer writes the IC Identification Data onto the chip to control the IC during the IC manufacturing and the delivery process to the MRTD Manufacturer. The IC is securely delivered from the IC manufacturer to the MRTD Manufacturer or to the Inlay Manufacturer.

(Step4) The MRTD Manufacturer initializes the IC/inlay by loading the MRTD application in the IC flash memory.

(Step5) The MRTD Manufacturer (i) Initializes the MRTD application and (ii) equips MRTD's chips with Prepersonalization Data. The pre-personalized MRTD together with the IC Identifier are securely delivered from the MRTD Manufacturer to the Personalization Agent. The MRTD manufacturer also provides the relevant parts of the guidance documentation to the Personalization Agent.

Phase 3 "Personalization of the MRTD":

(Step 6) The personalization of the MRTD includes (i) the survey of the MRTD holder's biographical data, (ii) the enrolment of the MRTD holder biometric reference data (i.e. the digitized portraits and the optional biometric reference data), (iii) the printing of the visual readable data onto the physical MRTD, (iv) the writing of the TOE User Data and TSF Data into the logical MRTD and (v) configuration of the TSF if necessary. The step (iv) is performed by the Personalization Agent and includes but is not limited to the creation of (i) the digital MRZ data (EF.DG1), (ii) the digitized portrait (EF.DG2), and (iii) the Document security object. The signing of the Document security object by the Document signer finalizes the personalization of the genuine MRTD for the MRTD holder. The personalized MRTD (together with appropriate guidance for TOE use if necessary) is handed over to the MRTD holder for operational use.

Phase 4 "Operational Use":

(Step7) The TOE is used as MRTD chip by the traveller and the inspection systems in the "Operational Use" phase. The user data can be read according to the security policy of the issuing State or Organization and can be used according to the security policy of the issuing State but they can never be modified.

Application note: In this ST, the role of the Personalization Agent is strictly limited to the phase 3 Personalization. In the phase 4 (Operational Use), updating and addition of the data groups of the MRTD application is forbidden.

The following actors are identified during the life-cycle phases:

Actor	Identification
Integrated Circuit (IC) Developer	Infineon
Embedded Software Developer	Thales
Integrated Circuit (IC) Manufacturer	Infineon
MRTD Module Manufacturer	Thales
Pre-personalizer	Thales
Inlay Manufacturer	Thales or another inlay manufacturer
Book Manufacturer	Thales or another printer
Personalization Agent	The agent who is acting on the behalf of the issuing State or Organization and personalizes the MRTD for the holder by activities establishing the identity of the holder with biographic data.
MRTD Holder	The rightful holder of the MRTD for whom the issuing State or Organization personalizes the MRTD.

Two TOE life cycles are possible and are described in figure 2 and figure 3. Whatever the life cycle, the TOE delivery point - which determines the boundary between the ALC and AGD Common Criteria assurance classes - is put at the end of step 5.

Note: the guidance documentation [AGD] is delivered in the form of electronic documents (pdf format) by the Thales technical representative to the Personalizer and the passport issuing authorities. The files are encrypted and sent by email.

TOE life-cycle: 'Init on module at Thales site'

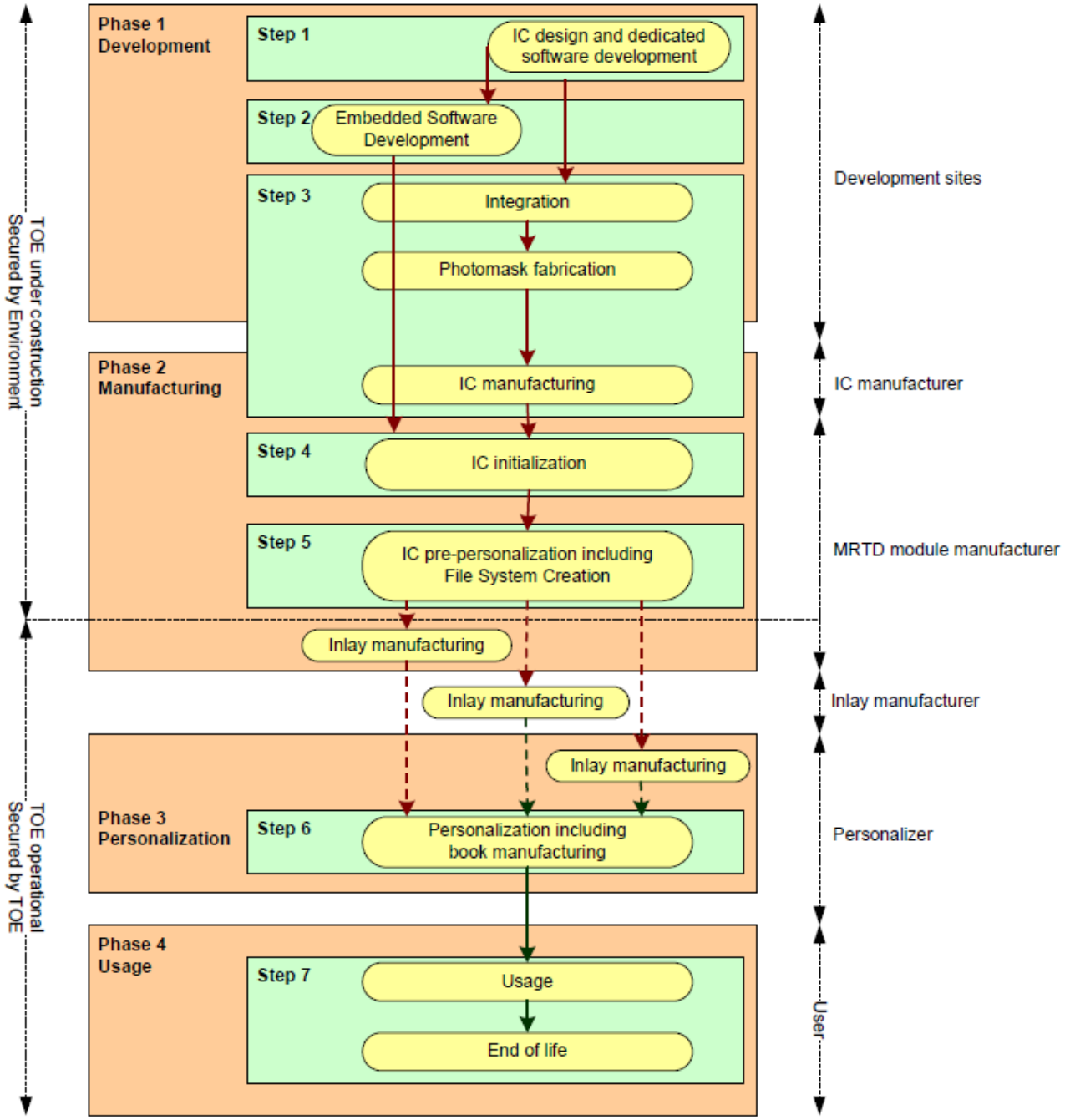


Figure 2: TOE life-cycle 'Init on module at Thales site'

The IC is manufactured at the founder site. It is then shipped to Thales site where it is initialized (OS loading) and pre-personalized. The transformation of wafers into modules can be performed either at the founder site or at Thales site. The modules are then shipped to the Personalizer or to the Inlay manufacturer. In the latter case, the Inlay manufacturer ships the inlays to the Personalizer.

During the shipment from Thales to the Personalizer or the Inlay manufacturer, the module is protected by a diversified key.

TOE life-cycle: 'Wafer Initialization process'

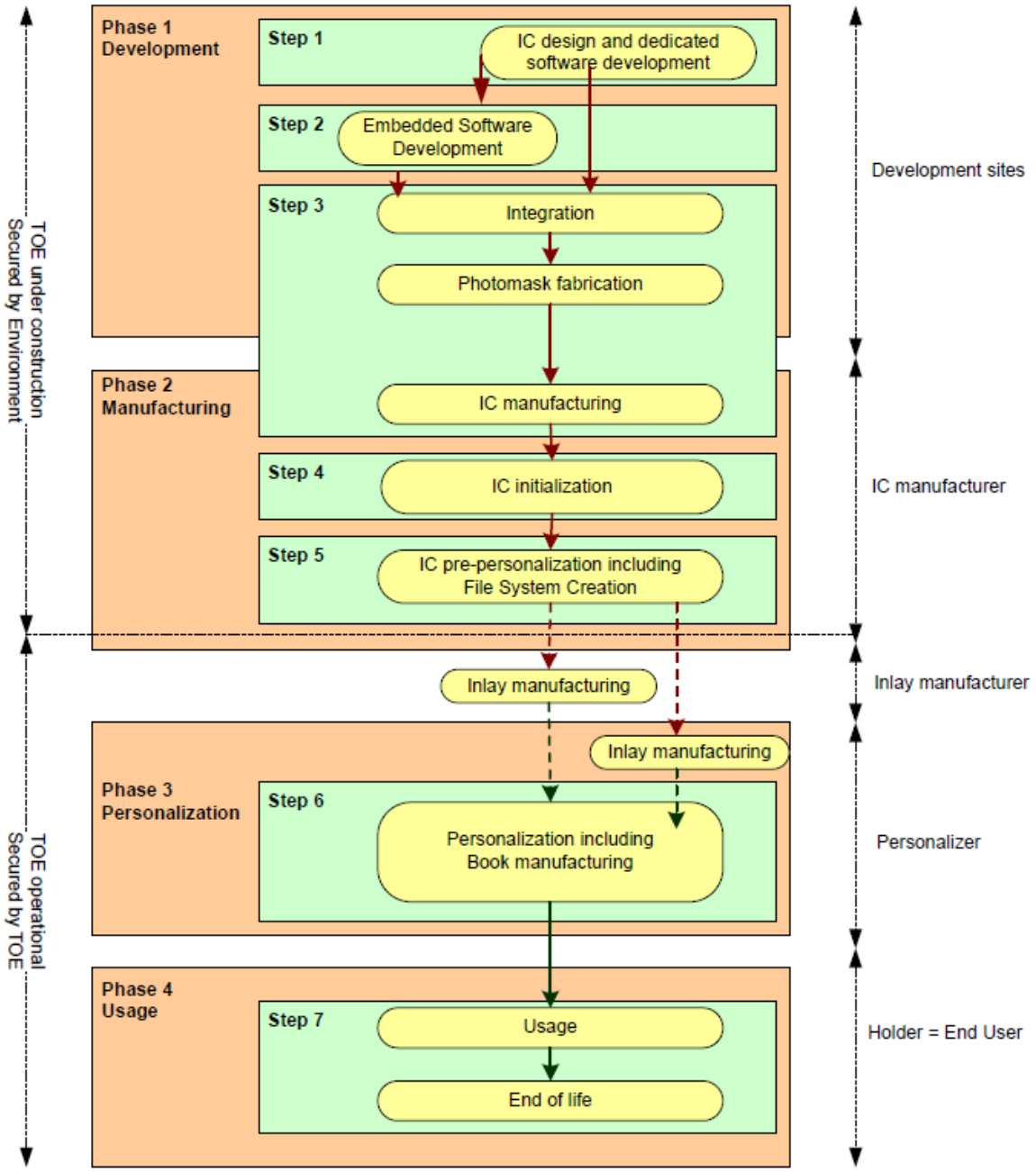


Figure 3: TOE life-cycle 'Wafer Init process'

The wafers are directly shipped from the founder to the Personalizer. This specific Life Cycle requires initialization (OS loading) and pre-personalization of the chip at the founder site.

During the shipment from the founder to the Personalizer, each die is protected with a diversified key.

3.4.4 Non-TOE hardware/software/firmware required by the TOE

There is no explicit non-TOE hardware, software or firmware required by the TOE to perform its claimed security features. The TOE is defined to comprise the chip and the complete operating system and application. Note, the inlay holding the chip as well as the antenna and the booklet (holding the printed MRZ) are needed to represent a complete MRTD, nevertheless these parts are not inevitable for the secure operation of the TOE.

4. CONFORMANCE CLAIMS

Common criteria Version:

This ST conforms to CC Version 3.1 [CC-1] [CC-2] [CC-3]

Conformance to CC part 2 and 3:

This ST is CC part 2 extended and CC part 3 conformant.

Assurance package conformance:

EAL5 augmented (EAL5+)

This ST conforms to the assurance package EAL5 augmented by ALC_DVS.2 and AVA_VAN.5.

Evaluation type

This is a composite evaluation, which relies on the SLC52GDA chip certificate and evaluation results.

SLC52GDA chip certificate:

- Certification done under the BSI scheme
- Certification report BSI-DSZ-CC-1110-V3-2020 (Common Criteria Certification Identifier IFX_CCI_000005h)
- Security Target [ST_IC] strictly conformant to IC Protection Profile [PP/0084]
- Common criteria version: 3.1
- Assurance level: EAL6 augmented by ALC_FLR.1

Consequently, the composite product evaluation (i.e. the present evaluation) includes the additional composition tasks defined in the CC supporting document “Composite product evaluation for smart cards and similar devices” [CCDB].

Protection Profile conformance claim:

This ST claims strict conformance to the [JISEC C0499] Protection Profile.

5. SECURITY PROBLEM DEFINITION

5.1 THREATS

This section describes the threats that the TOE shall counter. These threats shall be countered by the TOE, its operational environment or combination of these two.

Threat identifier	Threat description
T.Copy	An attacker trying to forge an ePassport may do so by reading personal information along with digital signature from the TOE and writing the copied data in an IC chip having the same functionality as that of the TOE. This attack damages the credibility of the entire passport booklet system including TOEs.
T.Logical_Attack	In the operational environment after issuing a TOE embedded passport booklet, an attacker who can read the MRZ data of the passport booklet may try to read confidential information (Active Authentication Private Key) stored in the TOE through the contactless communication interface of the TOE.
T.Communication_Attack	In the operational environment after issuing a TOE embedded passport booklet, an attacker who does not know about MRZ data may interfere with the communication between the TOE and a terminal to disclose and/or alter communication data that should be concealed.
T.Physical_Attack	In the operational environment after issuing a TOE embedded passport booklet, an attacker may attempt to disclose confidential information (Active Authentication Private Key) stored in the TOE, unlock the state of the locked key, or reactivate a deactivated access control function by physical means. This physical means include both of nondestructive attacks made without impairing the TOE functions and destructive attacks made by destroying part of the TOE to have mechanical access to the inside of the TOE.

5.2 ORGANIZATIONAL SECURITY POLICIES

This section describes the organizational security policies that apply to the TOE and its operational environment. These organizational security policies include conformance to the standards provided by ICAO and conditions required by the passport issuing authorities in Japan.

OSP identifier	OSP content
P.PACE	In the operational environment after issuing a TOE embedded passport booklet, the TOE shall allow a terminal to read a certain information from the TOE in accordance with the PACE procedure defined by Part 11 of [ICAO-9303]. This procedure includes mutual authentication and Secure Messaging between the TOE and terminal devices. TOE files to be read are EF.DG1, EF.DG2, EF.DG13, EF.DG14, EF.DG15, EF.COM, and EF.SOD under the rules stated above. As for any files under the same rules except the files stated above, the handling of such files which are not listed in the present Security Target document is not defined.
P.Authority	The TOE under the control of the passport issuing authorities shall allow only authorized users (persons who succeeded in verification of readout key, transport key, or Active Authentication Information Access Key) to have access to the internal data of the TOE, as shown in Table 1.
P.Data_Lock	When the TOE detects a failure in authentication with the transport key, readout key or Active Authentication Information Access Key, it will permanently disable authentication related to each key, thereby prohibiting reading or writing the file based on successful authentication thereof. Table 1 shows the relationship between the key used for authentication and its corresponding file in the TOE.

P.Prohibit	Any and all writings to the files in the TOE and readings from the files in the TOE based on successful authentication with readout key are prohibited after issuing an ePassport to the passport holder. Disabling authentication through authentication failure with the transport key, readout key, and Active Authentication Information Access Key (see P.Data_Lock) shall be used as the means for that purpose.

Authentication status[3]	**File subject to access control**	**Operation permitted**	**Reference: data to be operated**
Successful verification with readout key	EF.DG13[4]	Read	IC chip serial number (entered by manufacturer)
Successful verification with transport key	Transport key file	Write	Transport key data (update of old data)
	Password key file		Password key
	EF.DG1	Read or Write	MRZ data
	EF.DG2		Facial image
	EF.DG13		Management data (Passport number and Booklet management number)
	EF.DG14		PACE v2 Security information Active Authentication hash function information
	EF.COM[5]		Common data
	EF.SOD		Security data related to Passive Authentication defined by Part 10 of [ICAO-9303].
	EF.CardAccess	Write	PACE v2 Security information
	EF.DG15	Read	Active Authentication Public Key
Successful verification with Active Authentication Information Access Key	EF.DG15	Write	Active Authentication Public Key
	Private key file		Active Authentication Private Key

Table 1: Internal data of the TOE access control by passport issuing authorities

5.3 ASSUMPTIONS

This section describes the assumptions to be addressed in the operational environment of the TOE. These assumptions need to be true for the TOE security functionality to become effective.

[3] The readout key, transport key, and Active Authentication Information Access Key are configured by the manufacturer. The transport key can be changed (updated) by an authorized user. With regard to the files subject to access control included in this table and files storing the read key and Active Authentication Information Access Key which may vary the authentication status, user access that is not stated in this table or PP Notes is prohibited. (The access controls to information in the TOE from terminals after issuing a TOE embedded passport booklet to the passport holder, i.e., PACE are separately specified.)

[4] In EF.DG13, an IC chip serial number has been recorded by the manufacturer, and the management data is appended to the file by the passport issuing authorities.

[5] EF.COM file may not be created according to the passport issuing authorities' instructions.

Assumption identifier	Content
A.Administrative_Env	The TOE that was delivered from the TOE manufacturer to the passport issuing authorities and is under the control of the authorities shall be securely controlled and go through an issuing process until it is finally issued to the passport holder.
A.PKI	In order for the passport inspection authorities of the receiving state or organization to verify the authenticity of information that has been digitally signed by the passport issuer and stored in the TOE (including the Active Authentication Public Key), the interoperability of the PKI environment both of the issuing and receiving states or organizations of the passport shall be maintained by passport issuing authorities.

5.4 COMPOSITION TASKS – SECURITY PROBLEM DEFINITION PART

5.4.1 Statement of Compatibility – Threats part

The following table (see next page) lists the relevant threats of the [ST_IC] security target, and provides the link to the threats on the composite-product, showing that there is no contradiction between the two.

IC relevant threat label	IC relevant threat title	IC relevant threat content	Link to the composite-product threats
T.Leak-Inherent	Inherent Information Leakage	An attacker may exploit information which is leaked from the TOE during usage of the Security IC in order to disclose confidential user data as part of the assets. No direct contact with the Security IC internals is required here. Leakage may occur through emanations, variations in power consumption, I/O characteristics, clock frequency, or by changes in processing time requirements.	T.Physical_Attack
T.Phys-Probing	Physical Probing	An attacker may perform physical probing of the TOE in order (i) To disclose user data while stored in protected memory areas (ii) To disclose/reconstruct the user data while processed or (iii) To disclose other critical information about the operation of the TOE to enable attacks disclosing or manipulating the user data of the Composite TOE or the Security IC Embedded Software.	T.Physical_Attack
T.Malfunction	Malfunction due to Environmental Stress	An attacker may cause a malfunction of TSF or of the Security IC Embedded Software by applying environmental stress in order to (i) Modify security services of the TOE or (ii) Modify functions of the Security IC Embedded Software (iii) Deactivate or affect security mechanisms of the TOE to enable attacks disclosing or manipulating the user data of the Composite TOE or the Security IC Embedded Software. This may be achieved by operating the Security IC outside the normal operating conditions.	T.Physical_Attack
T.Phys-Manipulation	Physical Manipulation	An attacker may physically modify the Security IC in order to (i) Modify user data of the Composite TOE (ii) Modify the Security IC Embedded Software (iii) Modify or deactivate security services of the TOE, or (iv) Modify security mechanisms of the TOE to enable attacks disclosing or manipulating the user data of the Composite TOE or the Security IC Embedded Software.	T.Physical_Attack
T.Leak-Forced	Forced Information Leakage	An attacker may exploit information which is leaked from the TOE during usage of the Security IC in order to disclose confidential user data of the Composite TOE as part of the assets even if the information leakage is not inherent but caused by the attacker.	T.Physical_Attack
T.Abuse-Func	Abuse of Functionality	An attacker may use functions of the TOE which may not be used after TOE Delivery in order to (i) Disclose or manipulate user data of the Composite TOE (ii) Manipulate (explore, bypass, deactivate or change) security services of the TOE or (iii) Manipulate (explore, bypass, deactivate or change) functions of the Security IC Embedded Software or	T.Copy

		(iv) Enable an attack disclosing or manipulating the user data of the Composite TOE or the Security IC Embedded Software.	
T.RND	Deficiency of Random Numbers	An attacker may predict or obtain information about random numbers generated by the TOE security service for instance because of a lack of entropy of the random numbers provided.	T.Logical_Attack T.Communication_Attack
T.Masquerade_TOE	Masquerade the TOE	An attacker may threaten the property being a genuine TOE by producing a chip which is not a genuine TOE but wrongly identifying itself as genuine TOE sample.	T.Copy
T.Mem-Access	Memory Access Violation	Parts of the Smartcard Embedded Software may cause security violations by accidentally or deliberately accessing restricted data (which may include code) or privilege levels. Any restrictions are defined by the security policy of the specific application context and must be implemented by the Smartcard Embedded Software.	T.Copy
T.Open_Samples_Diffusion	Diffusion of open samples	An attacker may get access to open samples of the TOE and use them to gain information about the TSF (loader, memory management unit, ROM code …). He may also use the open samples to characterize the behavior of the IC and its security functionalities (for example: characterization of side channel profiles, perturbation cartography…). The execution of a dedicated security features (for example: execution of a DES computation without countermeasures or by deactivating countermeasures) through the loading of an adequate code would allow this kind of characterization and the execution of enhanced attacks on the IC.	T.Physical_Attack

5.4.2 Statement of compatibility – OSPs part

The following table lists the relevant OSPs of the [ST_IC] security target, and provides the link to the OSPs related to the composite-product, showing that there is no contradiction between the two.

IC OSP label	IC OSP content	Link to the composite product
P.Process-TOE	Identification during TOE Development and Production: An accurate identification must be established for the TOE. This requires that each instantiation of the TOE carries this unique identification.	No contradiction with the present evaluation; the chip traceability information is used to identify the composite TOE.
P.Add-Functions	Additional Specific Security Functionality: The TOE shall provide the following specific security functionality to the Smartcard Embedded Software: ▪ Rivest-Shamir-Adleman Cryptography (RSA) ▪ Elliptic Curve Cryptography (EC) ▪ CIPURSE™ Cryptographic Library (CCL) ▪ Cipher based Message Authentication Code (CMAC by the SCL-1) ▪ Secure Hash Computation (SHA by the HCL)	Not used as the Composite TOE implements its own cryptographic libraries.
P.Crypto-Service	Cryptographic services of the TOE The TOE provides secure hardware based cryptographic services for the IC Embedded Software: ▪ Triple Data Encryption Standard (TDES) ▪ Advanced Encryption Standard (AES)	The AES hardware functionality is used by the composite TOE. The TDES hardware functionality is used by the composite TOE.
P.Lim_Block_Loader	Limiting and Blocking the Loader Functionality The composite manufacturer uses the Loader for loading of Security IC Embedded Software, user data of the Composite Product or IC Dedicated Support Software in charge of the IC Manufacturer. He limits the capability and blocks the availability of the Loader in order to protect stored data from disclosure and manipulation.	Enforced by the MRTD Manufacturer, which irreversibly deactivates the Infineon Loader after the eTravel for Japan 1.0 Embedded Software (ES) loading.
P.Ctrl_Loader	Controlled usage to Loader Functionality Authorized user controls the usage of the Loader functionality in order to protect stored and loaded user data from disclosure and manipulation.	Initially coming from the optional Package 2 in [PP/0084]. Not relevant here as the Loader is deactivated prior to Phase 7.

5.4.3 Statement of compatibility – Assumptions part

The following table (see next page) lists the relevant assumptions of the [ST_IC] security target, and provides the link to the assumptions related to the composite-product, showing that there is no contradiction between the two.

IC assumption label	IC assumption title	IC assumption content	IrPA	CfPA	SgPA	Link to the composite product
A.Process-Sec-IC	Protection during Packaging, Finishing and Personalization	It is assumed that security procedures are used after delivery of the TOE by the TOE Manufacturer up to delivery to the end-consumer to maintain confidentiality and integrity of the TOE and of its manufacturing and test data (to prevent any possible copy, modification, retention, theft or unauthorized use).			**X**	A.Administrative_Env
A.Resp-Appl	Treatment of User data of the Composite TOE	All User data of the Composite TOE are owned by Security IC Embedded Software. Therefore, it must be assumed that security relevant User data of the composite TOE (especially cryptographic keys) are treated by the Security IC Embedded Software as defined for its specific application context.		**X**		O.Logical_Attack
A.Key-Function	Usage of key-dependent functions	Key-dependent functions (if any) shall be implemented in the Smartcard Embedded Software in a way that they are not susceptible to leakage attacks (as described under T.Leak-Inherent and T.Leak-Forced). Note that here the routines which may compromise keys when being executed are part of the Smartcard Embedded Software. In contrast to this the threats T.Leak-Inherent and T.Leak-Forced address the cryptographic routines which are part of the TOE.		**X**		O.Physical_Attack

6. SECURITY OBJECTIVES

This chapter describes the security objectives for the TOE and its environment for the security problems described in Chapter 5. Section 6.1 describes the security objectives to be addressed by the TOE, while Section 6.2 describes those to be addressed by its environment. In addition, Section 6.3 describes rationales for the appropriateness of the security objectives for solving the security problems.

The security objectives for the TOE and the security objectives for the operational environment are represented by an identifier with the prefix “O.” or “OE.” respectively.

6.1 SECURITY OBJECTIVES FOR THE TOE

This section describes the security objectives that the TOE should address to solve problems with regard to the threats and organizational security policies that are defined as the security problems.

Objective identifier	Objective description
O.AA	The TOE shall provide a means to verify the authenticity of the IC chip itself that composes the TOE in order to prevent the copy of personal information including the digital signature on an illicit IC chip and the forgery of the passport. This means shall be standardized so as to ensure the global interoperability of ePassport and, for this purpose, shall support the Active Authentication defined by Part 11 of [ICAO-9303].
O.Logical_Attack	The TOE shall, under any circumstances, prevent confidential information in them (Active Authentication Private Key) from being externally read through the contactless communication interface of the TOE.
O.Physical_Attack	The TOE shall prevent the confidential information (Active Authentication Private Key) within the TOE from being disclosed or the information relating to the security from being tampered with by the attackers using physical means. The TOE shall counter attacks applicable to the TOE itself out of known attacks against IC chips, considering physical means including both nondestructive attacks and destructive attacks.
O.PACE	This security objective applies to the operational environment after issuing the passport booklet. PACE procedure defined by Part 11 of [ICAO-9303], if the terminals require, shall be used to ensure the global interoperability of the ePassport. This procedure shall be used in the mutual authentication and Secure Messaging between the TOE and terminals. Information the terminal reads from the TOE is stored in the EF.DG1, EF.DG2, EF.DG13, EF.DG14, EF.DG15, EF.COM, and EF.SOD files among the files contained in the rules stated above. The TOE shall permit only the terminal that has succeeded in mutual authentication to read the files stated above. As for any files under the same rules except the files stated above, the handling of such files which are not listed in the present Security Target is not defined.
O.Authority	The TOE shall limit users who can access the internal TOE data and their operations, in the environment under the control of the passport issuing authorities according to Table 1 described in the organizational security policy P. Authority.
O.Data_Lock	The operation of the internal TOE data shall be available only to the authorized user (i.e., authorized personnel under the control of the passport issuing authorities or the terminal after issuing the passport) to prevent illicit reading and writing by any users other than those stated above. As a means for this purpose, if the TOE detects an authentication failure with the readout key, transport key, or Active Authentication Information Access Key, it shall be permanently prohibited to read or to write the internal TOE data permitted according to authentication related to each of the said keys. This security objective shall also apply in the event that the passport issuing authorities disable readout key, transport key, or Active Authentication Information Access Key by causing an authentication failure intentionally before the TOE is issued to the passport holder. The relationship between the readout key, transport key, and Active Authentication Information Access Key and their corresponding internal TOE data is as listed in Table 1 of the organizational security policy P.Authority. After the security objective O.Data_Lock is achieved, only the access to TOE stated in the security objective O.PACE is permitted.

6.2 SECURITY OBJECTIVES FOR THE OPERATIONAL ENVIRONMENT

This section describes the security objectives that should be addressed in the operational environment to solve problems with regard to the threats and organizational security policies and assumptions defined as the security problems.

Objective identifier	Objective description
OE.Administrative_Env	The TOE under the control of the passport issuing authorities is subjected to secure management and treatment until it is delivered to the passport holder through the issuing procedures.
OE.PKI	In order for the ePassport inspection authorities of the receiving state or organization to verify the authenticity of information that has been digitally signed by the passport issuing state or organization and stored in the TOE (i.e., information on the passport holder and the Active Authentication Public Key), passport issuing authorities shall maintain the interoperability of the PKI environment in both the passport issuing state and receiving state.

6.3 SECURITY OBJECTIVES RATIONALES

This chapter describes rationales for the effectiveness of the security objectives stated above for individual parameters of the security problem definition. Section 6.3.1 describes that each of the security objective can be traced back to any of the security problems, while Section 6.3.2 describes that any of the security problems is effectively addressed by the corresponding security objective.

6.3.1 Correspondence between Security Problem Definition and Security Objectives

The following table shows the correspondence between the security problem definition and the security objectives. As shown in the table, all security objectives can be traced back to one (or more) item(s) in the security problem definition.

	O.AA	O.Logical_Attack	O.Physical_Attack	O.PACE	O.Authority	O.Data_Lock	OE.Administrative_Env	OE.PKI
T.Copy	X							
T.Logical_Attack		X						
T.Communication_Attack				X				
T.Physical_Attack			X					
P.PACE				X				
P.Authority					X			
P.Data_Lock						X		

P.Prohibit						X		
A.Administrative_Env							X	
A.PKI								X

6.3.2 Security Objectives Rationale

This section describes rationales for the security objectives for the TOE and the operational environment to thoroughly counter all identified threats, implement organizational security policies, and also properly meet the assumptions.

Item in the Security Problem Definition	Rationale
T.Copy	If an attacker copies the personal information (with digital signature) read from the TOE to the IC chip having the same functionality as that of the TOE, the forged passport cannot be detected through the verification of digital signature. To prevent this attack, the security objective for the TOE: O.AA addresses embedding of data that enable verifying the authenticity of the IC chip itself in the TOE. This enables the TOE to detect illicit IC chips and prevent the forgery of passports, thus removing the threat of T.Copy.
T.Logical_Attack	The security objective for the TOE: O.Logical_Attack makes it possible to prohibit reading confidential information (Active Authentication Private Key) in the TOE through the contactless communication interface of the TOE, under any circumstances. Thus the threat of T.Logical_Attack is removed.
T.Communication_Attack	The security objectives for the TOE: O.PACE makes it possible to use a secure communication path for the communication between the terminals and the TOE. Thus the threat of disclosure and alteration of the communication data of T.Communication_Attack can be diminished to an adequate level for the practical use.
T.Physical_Attack	The security objective for the TOE: O.Physical_Attack makes it possible to counter an attack to disclose confidential information (Active Authentication Private Key) in the TOE or tamper security-related information not via the contactless communication interface of the TOE but physical means. Regarding the physical means, both nondestructive attacks and destructive attacks are considered, and countermeasures shall be implemented so that the TOE can counter known attacks against the IC chip. Thus the threat can be diminished to an adequate level for the practical use.
P.PACE	The security objective for the TOE: O.PACE allows only the authorized personnel (terminal) to read the internal TOE data through a secure communication path by applying PACE procedure defined by Part 11 of [ICAO-9303]. O.PACE includes all contents of P.PACE, thus the organizational security policy P.PACE is properly implemented.
P.Authority	The security objective for the TOE: O.Authority provides the contents to directly implement the organizational security policy P.Authority.
P.Data_Lock	The security objective for the TOE: O.Data_Lock includes the contents required by the organizational security policy P.Data_Lock and properly implements P.Data_Lock.
P.Prohibit	The organizational security policy P.Prohibit requires the implementation of an intentional authentication failure by the authorized TOE user as the implementation means. Actions required for the TOE to address P.Prohibit are the same as those for the organizational security policy P.Data_Lock that has assumed an illicit attack on the TOE. Therefore, the security objective for the TOE: O.Data_Lock will also implement the contents of P.Prohibit.
A.Administrative_Env	The security objective for the operational environment: OE.Administrative_Env directly corresponds to the assumption A.Administrative_Env, thus this assumption is met.
A.PKI	The security objective for the operational environment: OE.PKI directly corresponds to the assumption A.PKI, thus this assumption is met.

6.4 COMPOSITION TASKS – OBJECTIVES PART

6.4.1 Statement of compatibility – TOE Objectives part

The following table (see next page) lists the relevant TOE security objectives of the underlying IC, and provides the link to the composite-product TOE security objectives, showing that there is no contradiction between the two sets of objectives.

Label of the chip TOE security objective	Title of the chip TOE security objective	Content of the chip TOE security objective	Linked Composite-product TOE security objectives
O.Leak-Inherent	Protection against Inherent Information Leakage	The TOE must provide protection against disclosure of confidential data stored and/or processed in the Security IC - By measurement and analysis of the shape and amplitude of signals (for example on the power, clock, or I/O lines) and - By measurement and analysis of the time between events found by measuring signals (for instance on the power, clock, or I/O lines). This objective pertains to measurements with subsequent complex signal processing whereas O.Phys-Probing is about direct measurements on elements on the chip surface.	O.Physical_Attack
O.Phys-Probing	Protection against Physical Probing	The TOE must provide protection against disclosure/reconstruction of user data while stored in protected memory areas and processed or against the disclosure of other critical information about the operation of the TOE. This includes protection against - Measuring through galvanic contacts which is direct physical probing on the chips surface except on pads being bonded (using standard tools for measuring voltage and current) or - Measuring not using galvanic contacts but other types of physical interaction between charges (using tools used in solid-state physics research and IC failure analysis) with a prior reverse-engineering to understand the design and its properties and functions.	O.Physical_Attack
O.Malfunction	Protection against Malfunctions	The TOE must ensure its correct operation. The TOE must indicate or prevent its operation outside the normal operating conditions where reliability and secure operation has not been proven or tested. This is to prevent malfunctions. Examples of environmental conditions are voltage, clock frequency, temperature, or external energy fields.	O.Physical_Attack
O.Phys-Manipulation	Protection against Physical Manipulation	The TOE must provide protection against manipulation of the TOE (including its software and TSF data), the Security IC Embedded Software and the user data of the Composite TOE. This includes protection against - reverse-engineering (understanding the design and its properties and functions), - manipulation of the hardware and any data, as well as - controlled manipulation of memory contents.	O.Physical_Attack
O.Leak-Forced	Protection against Forced Information Leakage	The Security IC must be protected against disclosure of confidential data processed in the Security IC (using methods as described under O.Leak-Inherent) even if the information leakage is not inherent but caused by the attacker - By forcing a malfunction (refer to “Protection against Malfunction due to Environmental Stress (O.Malfunction)” and/or - By a physical manipulation (refer to “Protection against Physical Manipulation (O.Phys-Manipulation)”.	O.Physical_Attack

		If this is not the case, signals which normally do not contain significant information about secrets could become an information channel for a leakage attack.	
O.Abuse-Func	Protection against Abuse of Functionality	The TOE must prevent that functions of the TOE which may not be used after TOE Delivery can be abused in order to (i) disclose critical user data of the Composite TOE, (ii) manipulate critical user data of the Composite TOE, (iii) manipulate Security IC Embedded Software or (iv) bypass, deactivate, change or explore security features or security services of the TOE. Details depend, for instance, on the capabilities of the Test Features provided by the IC Dedicated Test Software which are not specified here.	O.AA O.Logical_Attack O.Authority O.Data_Lock
O.Identification	TOE Identification	The TOE must provide means to store Initialisation Data and Pre-personalization Data in its non-volatile memory. The Initialisation Data (or parts of them) are used for TOE identification.	No direct link to the composite-product TOE objectives, however chip traceability information stored in NVM is used by the TOE to answer identification CC assurance requirements.
O.RND	Random Numbers	The TOE will ensure the cryptographic quality of random number generation. For instance random numbers shall not be predictable and shall have a sufficient entropy. The TOE will ensure that no information about the produced random numbers is available to an attacker since they might be used for instance to generate cryptographic keys.	O.PACE
O.Cap_Avail_Loader	Capability and availability of the Loader	The TSF provides limited capability of the Loader functionality and irreversible termination of the Loader in order to protect stored user data from disclosure and manipulation.	O.AA O.Logical_Attack O.Authority O.Data_Lock
O.Authentication	Authentication to external entities	The TOE shall be able to authenticate itself to external entities. The Initialization Data (or parts of them) are used for TOE authentication verification data.	No direct link to the composite-product TOE objectives, however it is relevant for the phases before the TOE delivery point (when the eTravel for Japan 1.0 software is not loaded yet in the IC), as it supports authentication to the Infineon Loader.
O.Ctrl_Auth_Loader	Access control and authenticity for the Loader	The TSF provides trusted communication channel with authorized user, supports confidentiality protection and authentication of the user data to be loaded and access control for usage of the Loader functionality.	Initially coming from the optional Package 2 in [PP/0084]. Not relevant here as the Loader is deactivated prior to Phase 7.
O.TDES	Cryptographic service Triple-DES	The TOE provides secure hardware based cryptographic services implementing the Triple-DES for encryption and decryption.	O.PACE
O.AES	Cryptographic service AES	The TOE provides secure hardware based cryptographic services for the AES for encryption and decryption.	O.PACE

O.Add-Functions	Additional Specific Security Functionality	The TOE must provide the following specific security functionality to the Smartcard Embedded Software: ▪ Rivest-Shamir-Adleman cryptography (RSA) ▪ Elliptic Curve Cryptography (EC) ▪ CIPURSE™ Cryptography ▪ Cipher base Message authentication code (CMAC) ▪ Hash Cryptographic Library (HCL)	Irrelevant as Thales has implemented its own cryptographic libraries
O.Mem-Access	Area based Memory Access Control	The TOE must provide the Smartcard Embedded Software with the capability to define restricted access memory areas. The TOE must then enforce the partitioning of such memory areas so that access of software to memory areas and privilege levels is controlled as required, for example, in a multi-application environment.	O.Authority
O.Prot_TSF_Confidentiality	Protection of the confidentiality of the TSF	The TOE must provide protection against disclosure of confidential operations of the Security IC (loader, memory management unit…) through the use of a dedicated code loaded on open samples.	No contradiction with the security objectives of the composite TOE.
O.Ctrl_Auth_CCL	Authentication of entities	The CIPURSE™ CL must implement mutual authentication to establish a ready to use secure communication channel between two authenticated entities before any other communication between the two entities is applied.	Not used by the Composite TOE.
O.Prot_Integrity	Integrity protection	The CIPURSE™ CL must implement integrity protection functionality for the user data to be exchanged via the secure communication channel.	Not used by the Composite TOE.
O.Prot_Confidentiality	Confidentiality protection	The CIPURSE™ CL must protect the confidentiality of the user data to be exchanged via the secure communication channel if the user configures accordingly.	Not used by the Composite TOE.
O.Data_IntegrityService	User data integrity service	The Hash Cryptographic Library HCL provides secure hash digest computation upon provided user data.	Not used by the Composite TOE.

6.4.2 Statement of compatibility – ENV Objectives part

The following table lists the relevant ENV security objectives related to the underlying IC, and provides the link to the composite-product, showing that they have been taken into account and that no contradiction has been introduced.

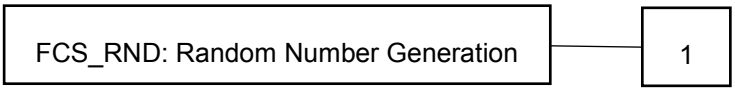
IC ENV security objective label	IC ENV security objective title	IC ENV security objective content	Link to the composite-product
OE.Resp-Appl	Treatment of user data of the composite TOE	Security relevant user data of the composite TOE (especially cryptographic keys) are treated by the Security IC Embedded Software as required by the security needs of the specific application context. For example the Security IC Embedded Software will not disclose security relevant user data of the composite TOE to unauthorized users or processes when communicating with a terminal.	Covered by TOE Security Objectives: O.Logical_Attack O.Authority O.Data_Lock
OE.Process-Sec-IC	Protection during composite product manufacturing	Security procedures shall be used after TOE Delivery up to delivery to the end-consumer to maintain confidentiality and integrity of the TOE and of its manufacturing and test data (to prevent any possible copy, modification, retention, theft or unauthorized use). This means that Phases after TOE Delivery up to the end of Phase 6 must be protected appropriately.	OE.Administrative_Env
OE.Lim_Block_Loader	Limitation of capability and blocking the Loader	The Composite Product Manufacturer will protect the Loader functionality against misuse, limit the capability of the Loader and terminate irreversibly the Loader after intended usage of the Loader.	Enforced by the composite Product Manufacturer.
OE.TOE_Auth	External entities authenticating of the TOE	The operational environment shall support the authentication verification mechanism and know authentication reference data of the TOE.	Enforced by the composite Product Manufacturer.
OE.Loader_Usage	Secure communication and usage of the Loader	The authorized user must support the trusted communication channel with the TOE by confidentiality protection and authenticity proof of the data to be loaded and fulfilling the access conditions required by the Loader.	Initially coming from the optional Package 2 in [PP/0084]. Not relevant here as the Loader is deactivated prior to Phase 7.

7. EXTENDED COMPONENTS DEFINITION

FCS_RND: Random number generation

Family Behaviour: This family defines quality requirements for the generation of random numbers to be used for cryptographic purposes.

Component levelling:



FCS_RND.1 Random number generation requires the random numbers to meet defined quality standards.

Management, FCS_RND.1: There is no management activity foreseen.
Audit, FCS_RND.1: There is no auditable event foreseen.

FCS_RND.1 Quality standards for random numbers
Hierarchical to: No other components.
Dependencies: No dependencies.

FCS_RND.1.1 The TSF shall provide a random number generation mechanism that meet *[Assignment: defined quality standard]*.

8. SECURITY REQUIREMENTS

This section specifies the requirements that apply to the TOE:

- Security Functional Requirements (SFRs)
- Security Assurance Requirements (SARs)

The stated requirements lead to the development of a TOE that meets its security objectives.

The security requirements specifically applying to the IC are not reproduced in the present Security Target.

8.1 SECURITY FUNCTIONAL REQUIREMENTS

Typographical conventions:

- Selections and assignments that have already been made in the [JISEC C0499] Protection Profile are *italicized and underlined*, and the original text on which the selection or assignment has been made is not reminded.
- Selections and assignments made in this ST are ***in bold, italicized and underlined***, and the PP original text on which the selection or assignment has been made is indicated in a footnote.

8.1.1 Class FCS: Cryptographic support

FCS_CKM.1p Cryptographic key generation (PACE, session keys)

Hierarchical to: No other components.

Dependencies: [FCS_CKM.2 Cryptographic key distribution or FCS_COP.1 Cryptographic operation]

FCS_CKM.4 Cryptographic key destruction

FCS_CKM.1.1p The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm *Session key generation algorithm in PACE specified by Part 11 of [ICAO-9303] and [TR-03111]* and specified cryptographic key sizes *128 bits and 256 bits* that meet the following: *Standards for session key generation in PACE specified by Part 11 of [ICAO-9303] and [TR-03111]*.

FCS_CKM.1e Cryptographic key generation (PACE, ephemeral key pairs)

Hierarchical to: No other components.

Dependencies: [FCS_CKM.2 Cryptographic key distribution or FCS_COP.1 Cryptographic operation]

FCS_CKM.4 Cryptographic key destruction

FCS_CKM.1.1e The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm *Elliptic Curve Key Pair Generation* and specified cryptographic key sizes *256 bits and 384 bits* that meet the following: *Standards for the key pair generation specified by [TR-03111]*.

FCS_CKM.4 Cryptographic key destruction

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4.1 The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method ***overwriting the data with random numbers***[6] that meets the following: *none*.

[6] [selection: method for erasing cryptographic keys on volatile memory by shutting down power supply, overwriting new cryptographic key data, and [assignment: other cryptographic key destruction method]]

FCS_COP.1a Cryptographic operation (Active Authentication, signature generation)

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1a The TSF shall perform *Generation of digital signature for Active Authentication data* in accordance with a specified cryptographic algorithm *ECDSA* and cryptographic key sizes *256 bits and 384 bits* that meet the following: *the Digital Signature Standards specified by [TR-03111]*.

Application note: Only the combination of 256 bits and SHA-256 or that of 384 bits and SHA-384 is permitted as the key sizes for this requirement and the hash algorithm of FCS_COP.1h.

FCS_COP.1h Cryptographic operation (Active Authentication, hash functions)

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1h The TSF shall perform *Generation of data for Active Authentication* in accordance with a specified cryptographic algorithm *SHA-256 and SHA-384* and cryptographic key sizes *none* that meet the following: *the Digital Signature Standards specified by [TR-03111]*.

FCS_COP.1n Cryptographic operation (Nonce encryption)

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1n The TSF shall perform *Nonce encryption* in accordance with a specified cryptographic algorithm *AES-CBC* and cryptographic key sizes *128 bits and 256 bits* that meet the following: *Standards for the PACE procedure specified by Part 11 of [ICAO-9303]*.

FCS_COP.1e Cryptographic operation (Key agreement)

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1e The TSF shall perform *Key agreement* in accordance with a specified cryptographic algorithm *ECDH* and cryptographic key sizes *256 bits and 384 bits* that meet the following: *Standards for the PACE procedure specified by Part 11 of [ICAO-9303]*.

FCS_COP.1hp Cryptographic operation (PACE, hash functions)

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1hp The TSF shall perform *Generation of session keys for PACE* in accordance with a specified cryptographic algorithm *SHA-1 and SHA-256* and cryptographic key sizes *none* that meet the following: *Standards for session key generation in PACE specified by Part 11 of [ICAO-9303]*.

FCS_COP.1mp Cryptographic operation (PACE, mutual authentication)

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1mp The TSF shall perform *Authentication token generation and verification* in accordance with a specified cryptographic algorithm *AES-CMAC* and cryptographic key sizes *128 bits and 256 bits* that meet the following: *Standards for mutual authentication included in PACE specified by Part 11 of [ICAO-9303]*.

FCS_COP.1sp Cryptographic operation (PACE, Secure Messaging)

Hierarchical to: No other components.

Dependencies: [FDP_ITC.1 Import of user data without security attributes or FDP_ITC.2 Import of user data with security attributes or FCS_CKM.1 Cryptographic key generation]

FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1sp The TSF shall perform *Cryptographic operation shown in Table 4* in accordance with a specified cryptographic algorithm *Cryptographic algorithm shown in Table 4* and cryptographic key sizes *Cryptographic key sizes shown in Table 4* that meet the following: *Standards for Secure Messaging included in PACE specified by [ICAO-9303]*.

Cryptographic algorithm	Cryptographic key sizes	Cryptographic operation
AES in CBC mode	128 bits and 256 bits	Message encryption and decryption
AES-CMAC	128 bits and 256 bits	Generation and verification of Message Authentication Code

Table 4: Cryptographic mechanisms in Secure Messaging (PACE)

Application note: Whether the Secure Messaging is applied or not depends on the type of commands. Therefore, data encryption and message authentication codes are not necessarily applied to all commands and responses.

FCS_RND.1 Quality standards for random numbers

Hierarchical to: No other components.

Dependencies: No dependencies.

FCS_RND.1.1 The TSF shall provide a random number generation mechanism that meets the following: ***[RGS-B1] and [SP800-90] with seed entropy of at least 128 bits***[7].

[7] [assignment: defined quality standard]

8.1.2 Class FDP: User Data Protection

FDP_ACC.1a Subset access control (Issuance procedure)

Hierarchical to:	No other components.
Dependencies:	FDP_ACF.1 Security attribute based access control
FDP_ACC.1.1a	The TSF shall enforce the *Issuance procedure access control SFP* on *Subject [User process], Objects [Files shown in Table 1 of Organizational security policy P.Authority] and List of operations among subjects and objects addressed by SFP [Data Input/output operation to/from object]*.

FDP_ACC.1p Subset access control (PACE)

Hierarchical to:	No other components.
Dependencies:	FDP_ACF.1 Security attribute based access control
FDP_ACC.1.1p	The TSF shall enforce the *PACE SFP* on Subject *[Process on behalf of terminal], Objects [Files EF.DG1, EF.DG2, EF.DG13, EF.DG14, EF.DG15, EF.COM , EF.SOD, password key file, transport key file, and private key file] and list of operations among subjects and objects addressed by SFP [Reading data from object]*.

Application note: PACE SFP is the access control policy applied after succeeding in mutual authentication based on PACE.

FDP_ACF.1a Security attribute based access control (Issuance procedure)

Hierarchical to:	No other components.
Dependencies:	FDP_ACC.1 Subset access control FMT_MSA.3 Static attribute initialisation
FDP_ACF.1.1a	The TSF shall enforce the *Issuance procedure access control SFP* to objects based on the following: *Subject controlled under the indicated SFP [User process], objects [Files shown in Table 1 of the organizational security policy P.Authority], and, the SFP-relevant security attributes [Authentication status shown in Table 1 of the organizational security policy P.Authority] according to each*.
FDP_ACF.1.2a	The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: *When the authentication status shown in Table 1 of the organizational security policy P.Authority is met, an operation to the file associated with the said authentication status is allowed*.
FDP_ACF.1.3a	The TSF shall explicitly authorize access of subjects to objects based on the following additional rules: *none*.
FDP_ACF.1.4a	The TSF shall explicitly deny access of subjects to objects based on the following additional rules: *Access to files that are not listed in Table 1 of the organizational security policy P.Authority is prohibited*.

FDP_ACF.1p Security attribute based access control (PACE)

Hierarchical to:	No other components.
Dependencies:	FDP_ACC.1 Subset access control FMT_MSA.3 Static attribute initialisation
FDP_ACF.1.1p	The TSF shall enforce the *PACE SFP* to objects based on the following: *Subject controlled under the indicated SFP [Process on behalf of terminal], objects [Files EF.DG1, EF.DG2, EF.DG13, EF.DG14, EF.DG15, EF.COM, EF.SOD password key file, transport key file, and*

private key file], and the SFP-related security attributes [Authentication status of terminal based on mutual authentication].

FDP_ACF.1.2p The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: *Where the authentication status of terminal has been successful, subjects are allowed to read data from objects*.

FDP_ACF.1.3p The TSF shall explicitly authorize access of subjects to objects based on the following additional rules: *none*.

FDP_ACF.1.4p The TSF shall explicitly deny access of subjects to objects based on the following additional rules: *Subjects are prohibited to write data to or read data from the transport key file, password key file, and private key file*.

FDP_ITC.1 Import of user data without security attributes

Hierarchical to: No other components.

Dependencies: [FDP_ACC.1 Subset access control or FDP_IFC.1 Subset information flow control]

FMT_MSA.3 Static attribute initialisation

FDP_ITC.1.1 The TSF shall enforce the *Issuance procedure access control SFP* when importing user data, controlled under the SFP, from outside of the TOE.

FDP_ITC.1.2 The TSF shall ignore any security attributes associated with the user data when imported from outside the TOE.

FDP_ITC.1.3 The TSF shall enforce the following rules when importing user data controlled under the SFP from outside the TOE: *none*.

FDP_UCT.1p Basic data exchange confidentiality (PACE)

Hierarchical to: No other components.

Dependencies: [FTP_ITC.1 Inter-TSF trusted channel or FTP_TRP.1 Trusted path]

[FDP_ACC.1 Subset access control or FDP_IFC.1 Subset information flow control]

FDP_UCT.1.1p The TSF shall enforce of *PACE SFP* to *transmit, receive* user data in a manner protected from unauthorized disclosure.

FDP_UIT.1p Data exchange integrity (PACE)

Hierarchical to: No other components.

Dependencies: [FDP_ACC.1 Subset access control or FDP_IFC.1 Subset information flow control]

[FTP_ITC.1 Inter-TSF trusted channel or FTP_TRP.1 Trusted path]

FDP_UIT.1.1p The TSF shall enforce the *PACE SFP* to *transmit, receive* user data in a manner protected from *modification, deletion, insertion, replay* errors.

FDP_UIT.1.2p The TSF shall be able to determine, on receipt of user data, whether *modification, deletion, insertion, replay* has occurred.

8.1.3 Class FIA: Identification and Authentication

FIA_AFL.1a Authentication failure handling (Active Authentication Information Access Key)

Hierarchical to: No other components.

Dependencies: FIA_UAU.1 Timing of authentication

FIA_AFL.1.1a The TSF shall detect when ***three***[8] unsuccessful authentication attempts occur related to *Authentication with the Active Authentication Information Access Key*.

FIA_AFL.1.2a When the defined number of unsuccessful authentication attempts has been *met*, the TSF shall *permanently stop authentication with the Active Authentication Information Access Key (fix the authentication status with the Active Authentication Information Access Key to "Not authenticated yet")*.

FIA_AFL.1d Authentication failure handling (Transport key)

Hierarchical to: No other components.

Dependencies: FIA_UAU.1 Timing of authentication

FIA_AFL.1.1d The TSF shall detect when ***three***[9] unsuccessful authentication attempts occur related to *Authentication with the transport key*.

FIA_AFL.1.2d When the defined number of unsuccessful authentication attempts has been *met*, the TSF shall *permanently stop authentication with the transport key (fix the authentication status with the transport key to "Not authenticated yet")*.

FIA_AFL.1r Authentication failure handling (Readout key)

Hierarchical to: No other components.

Dependencies: FIA_UAU.1 Timing of authentication

FIA_AFL.1.1r The TSF shall detect when ***three***[10] unsuccessful authentication attempts occur related to *Authentication with the readout key*.

FIA_AFL.1.2r When the defined number of unsuccessful authentication attempts has been *met*, the TSF shall *permanently stop authentication with the readout key (fix the authentication status with the readout key to "Not authenticated yet")*.

FIA_UAU.1 Timing of authentication

Hierarchical to: No other components.

Dependencies: FIA_UID.1 Timing of identification

FIA_UAU.1.1 The TSF shall allow *readout of EF.CardAccess and EF.ATR/INFO*, on behalf of the user to be performed before the user is authenticated.

FIA_UAU.1.2 The TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.

FIA_UAU.4 Single-use authentication mechanisms

Hierarchical to: No other components.

Dependencies: No dependencies.

FIA_UAU.4.1 The TSF shall prevent reuse of authentication data related to *mutual authentication mechanism with the PACE procedure*.

FIA_UAU.5 Multiple authentication mechanisms

Hierarchical to: No other components.

Dependencies: No dependencies

[8] [assignment: positive integer number]
[9] [assignment: positive integer number]
[10] [assignment: positive integer number]

FIA_UAU.5.1 The TSF shall provide *multiple authentication mechanisms shown in Table 5* to support user authentication.

FIA_UAU.5.2 The TSF shall authenticate any user's claimed identity according to the *rules describing how the multiple authentication mechanisms shown in Table 5 provide authentication*.

Authentication mechanism name	Rule applicable to authentication mechanism
Transport key	Rule of authenticating the authorized personnel of the passport issuing authorities by verifying transport key that have been already stored in the TOE.
Readout key	Rule of authenticating the authorized personnel of the passport issuing authorities by verification with readout key that have been already stored in the TOE.
Active Authentication Information Access Key	Rule of authenticating the authorized personnel of the passport issuing authorities by verification with Active Authentication Information Access Key that have been already stored in the TOE.
Mutual authentication	Rule of authenticating terminals according to the mutual authentication procedure in PACE defined by [ICAO-9303].

Table 5: Multiple authentication mechanisms

FIA_UID.1 Timing of identification

Hierarchical to: No other components.

Dependencies: No dependencies.

FIA_UID.1.1 The TSF shall allow *readout of EF.CardAccess and EF.ATR/INFO*, on behalf of the user to be performed before the user is identified.

FIA_UID.1.2 The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.

8.1.4 Class FMT: Security management

FMT_MTD.1 Management of TSF data

Hierarchical to: No other components.

Dependencies: FMT_SMR.1 Security roles

FMT_SMF.1 Specification of management functions

FMT_MTD.1.1 The TSF shall restrict the ability to *modify* the *transport key* to *the authorized personnel of the passport issuing authorities*.

Application note: This requirement has to do with the configuration of transport key used to transport the TOE from the passport booklet manufacturer to a regional passport office in Phase 3. In this requirement, the authorized personnel who are allowed to manage TSF data are the staff of the passport manufacturer. The staff has no chance to rewrite the transport key after the TOE has been transported to the regional passport office. On the other hand, when the TOE is located in either the passport manufacturer or a regional passport office, there is also no threat that an attacker illicitly rewrites the transport key. Therefore, there is no necessity to distinguish between the staff of the passport manufacturer and that of the regional passport office. For this reason, this requirement makes no particular distinction between them and refers the authorized administrator as the "authorized personnel of the passport issuing authorities."

FMT_SMF.1 Specification of management functions

Hierarchical to:	No other components.
Dependencies:	No dependencies.
FMT_SMF.1.1	The TSF shall be capable of performing the following management functions: *modification of transport key*.

FMT_SMR.1 Security roles

Hierarchical to:	No other components.
Dependencies:	FIA_UID.1 Timing of identification
FMT_SMR.1.1	The TSF shall maintain the roles *authorized personnel of the passport issuing authorities*.
FMT_SMR.1.2	The TSF shall be able to associate users with roles.

8.1.5 Class FPT: Protection of the TSF

FPT_PHP.3 Resistance to physical attack

Hierarchical to:	No other components.
Dependencies:	No dependencies.
FPT_PHP.3.1	The TSF shall resist *attacks defined by the CC Supporting Documents related to Smartcards* to the *hardware of the TOE and software composing the TSF* by responding automatically such that the SFRs are always enforced.

Application note: The supporting documents that are the latest version at the time of the evaluation for the TOE are applied. The document at the time of PP issuance is the “Application of Attack Potential to Smartcards, Version 2.9, May 2013.”

8.1.6 Class FTP: Trusted paths / Channels

FTP_ITC.1 Inter-TSF trusted channel

Hierarchical to:	No other components.
Dependencies:	No dependencies.
FTP_ITC.1.1	The TSF shall provide a communication channel between itself and another trusted IT product that is logically distinct from other communication channels and provides assured identification of its end points and protection of channel data from modification or disclosure.
FTP_ITC.1.2	The TSF shall permit *another trusted IT product* to initiate communication via the trusted channel.
FTP_ITC.1.3	The TSF shall initiate communication via the trusted channel for *reading data from the TOE*.
Application note:	Communication between terminal and TSF shall be performed via the Secure Messaging channel defined by [ICAO-9303]. After the Secure Messaging channel is established, only the Secure Messaging channel is to be available for the communication path between terminal and TOE.

8.2 SECURITY ASSURANCE REQUIREMENTS

This ST is based on the EAL5 assurance package augmented with the components AVA_VAN.5 and ALC_DVS.2.

The corresponding Security Assurance Components can be split in three subset packages, all being required to meet TOE assurance requirements:

- **ASE package**: ASE_INT.1, ASE_CCL.1, ASE_ECD.1, ASE_SPD.1, ASE_OBJ.2, ASE_REQ.2, ASE_TSS.1
- **Assurance package for smartcard product**

Assurance package for passport product	
Assurance Class	**Assurance Components – Product related**
ADV	ADV_FSP.5, ADV_INT.2, ADV.TDS.4, ADV_IMP.1, ADV_ARC.1
AGD	AGD_OPE.1
ALC	ALC_CMS.5
ATE	ATE_COV.2, ATE_DPT.3, ATE_FUN.1, ATE_IND.2
AVA	**AVA_VAN.5**

- **Assurance package for development process and lifecycle coverage**

Assurance package for development process and lifecycle coverage	
Assurance Class	**Assurance Components – Process related**
AGD	AGD_PRE.1
ALC	ALC_CMC.4, ALC_DEL.1, **ALC_DVS.2**, ALC_LCD.1, ALC_TAT.2

8.3 SECURITY REQUIREMENTS RATIONALE

8.3.1 SFR rationale – Coverage with the TOE security objectives

	O.Logical_Attack	O.Physical_Attack	O.AA	O.PACE	O.Authority	O.Data_Lock
FCS_CKM.1p				X		
FCS_CKM.1e				X		
FCS_CKM.4			X	X		
FCS_COP.1a			X			
FCS_COP.1h			X			
FCS_COP.1n				X		

FCS_COP.1e				X		
FCS_COP.1hp				X		
FCS_COP.1mp				X		
FCS_COP.1sp				X		
FCS_RND.1				X		
FDP_ACC.1a			X		X	
FDP_ACC.1p	X			X		
FDP_ACF.1a			X		X	
FDP_ACF.1p	X			X		
FDP_ITC.1			X	X	X	
FDP_UCT.1p				X		
FDP_UIT.1p				X		
FIA_AFL.1a						X
FIA_AFL.1d						X
FIA_AFL.1r						X
FIA_UAU.1				X	X	
FIA_UAU.4				X		
FIA_UAU.5				X	X	
FIA_UID.1				X	X	
FMT_MTD.1					X	
FMT_SMF.1					X	
FMT_SMR.1					X	
FPT_PHP.3		X				
FTP_ITC.1				X		

8.3.2 SFR rationale sufficiency

TOE Security Objective	Rationale
O.AA	To achieve the security objective O.AA, it shall address the Active Authentication procedure defined by Part 11 of [ICAO-9303]. This Active Authentication is a process for a terminal to authenticate the IC chip of the TOE, and the TOE itself is not required to provide any authentication mechanism. The TOE is authenticated by properly responding the authentication procedure. To meet requirements for the authentication procedure from the terminal, the TOE incorporates the public key and private key pair, performs cryptographic operation using the private key defined by FCS_COP.1a, and hashing operation defined by FCS_COP.1h. The public key and private key pair is imported to the TOE by FDP_ITC.1. Access control associated with FDP_ITC.1 is defined by FDP_ACC.1a and FDP_ACF.1a. Destruction of the private key on RAM is defined by FCS_CKM.4. The security objective O.AA is sufficiently achieved by the said SFRs.
O.Logical_Attack	Confidential information (Active Authentication Private Key) subject to protection is stored in the private key file of the TOE. It is denied for the user process on behalf of the terminal to read data from the private key file, by FDP_ACC.1p and FDP_ACF.1p applied to the TOE after issuing the TOE

	embedded passport. The security objective O.Logical_Attack is sufficiently achieved by the said SFRs.
O.Physical_Attack	Attack scenarios trying to disclose the Active Authentication Private Key that is confidential information, and to tamper security related information within the TOE, by physical means are stated in the list of physical attacks shown in the FPT_PHP.3 section. The TSF automatically resists the attacks according to FPT_PHP.3 to protect against the disclosure of the confidential information. With that, the security objective O.Physical_Attack is sufficiently achieved.
O.PACE	FIA_UID.1 and FIA_UAU.1 provide the TOE service for the user who has succeeded in identification and authentication. User authentication requires the mutual authentication procedure with PACE defined by ICAO, which is defined by FIA_UAU.5. The mutual authentication procedure requires new authentication data based on random numbers for each authentication, which is defined by FIA_UAU.4. Likewise, Secure Messaging required by PACE is defined by the requirements for the protection of transmitted and received data by FDP_UCT.1p and FDP_UIT.1p, and the requirement of cryptographic communication channels by FTP_ITC.1. Furthermore, with regard to cryptographic processing required for the PACE procedure, FCS_COP.1mp defines cryptographic operations necessary for the mutual authentication procedure and FCS_COP.1sp defines cryptographic operations for Secure Messaging. With regard to the cryptographic keys used for Secure Messaging, FDP_ITC.1 defines the import of password key, FCS_CKM.1e defines the generation of ephemeral key pairs, FCS_COP.1e defines the key agreement, FCS_CKM.1p and FCS_COP.1hp define the generation of session keys, FCS_RND.1 defines the generation of random numbers such as random Nonce, FCS_COP.1n defines the encryption of Nonce, and FCS_CKM.4 defines the destruction of these keys. In order for only permitted personnel to read given information from the TOE, rules governing access control with FDP_ACC.1p and FDP_ACF.1p are defined. O.PACE is sufficiently achieved by the said SFRs.
O.Authority	During the TOE process done by the passport issuing authorities, the identification and authentication requirements FIA_UID.1 and FIA_UAU.1 are applied in order to grant the processing authority only to the duly authorized user. As for the user authentication mechanisms, FIA_UAU.5 defines the use of the transport key, readout key, or Active Authentication Information Access Key. If a user is successfully authenticated by the verification with the key, the user is permitted to access to the internal data of the TOE defined by O.Authority, applying the access control rule FDP_ACC.1a and FDP_ACF.1a. The user operation includes writing of the authentication key (transport key), cryptographic keys (Active Authentication Public Key and private key pair, and password key for Secure Messaging), and other user data in the TOE. The association between objects and security attributes when writing is defined by FDP_ITC.1. O.Authority includes updating (rewriting) of the transport keys by the authorized personnel of the passport issuing authorities and is defined by FMT_MTD.1, FMT_SMF.1, and FMT_SMR.1. The security objective O.Authority is sufficiently achieved by the said SFRs.
O.Data_Lock	In the event of an authentication failure with the transport key, readout key or Active Authentication Information Access Key, authentication corresponding to the relevant key is permanently prohibited, and as the result, the security objective of permanently prohibiting readout and write of the internal data of the TOE is sufficiently achieved by the three SFRs: FIA_AFL.1a, FIA_AFL.1d, and FIA_AFL.1r.

8.3.3 SFR dependency rationale

The following table shows dependencies and support for the dependencies defined for SFRs. In the table, the Dependencies column describes dependencies defined for SFRs, and the Support for the Dependencies column describes by what SFRs the defined dependencies are satisfied or rationales indicating the justification for non-satisfied dependencies.

SFR	Dependencies	Support for the Dependencies
FCS_CKM.1p	[FCS_CKM.2 or FCS_COP.1] FCS_CKM.4	FCS_COP.1sp, FCS_COP.1mp, and FCS_CKM.4 support to satisfy the dependencies.
FCS_CKM.1e	[FCS_CKM.2 or FCS_COP.1] FCS_CKM.4	FCS_COP.1e and FCS_CKM.4 support to satisfy the dependencies.
FCS_CKM.4	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1]	FDP_ITC.1, FCS_CKM.1p and FCS_CKM.1e support to satisfy the dependency. FDP_ITC.1 supports keys only on volatile memory.
FCS_COP.1a	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1] FCS_CKM.4	FDP_ITC.1 supports. FCS_CKM.4 supports keys on volatile memory. Since the modification and destruction of keys on nonvolatile memory are prohibited, FCS_CKM.4 does not apply to.
FCS_COP.1h	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1] FCS_CKM.4	Since keys do not exist, any requirements do not apply to.
FCS_COP.1n	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1] FCS_CKM.4	FDP_ITC.1 supports. FCS.CKM.4 supports on keys on volatile memory. Since the modification and destruction of keys on nonvolatile memory are prohibited, FCS_CKM.4 does not apply to.
FCS_COP.1e	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1] FCS_CKM.4	FCS_CKM.1e and FCS_CKM.4 support to satisfy the dependencies.
FCS_COP.1hp	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1] FCS_CKM.4	Since keys do not exist, any requirements do not apply to.
FCS_COP.1mp	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1] FCS_CKM.4	FCS_CKM.1p and FCS_CKM.4 support to satisfy the dependencies.
FCS_COP.1sp	[FDP_ITC.1 or FDP_ITC.2 or FCS_CKM.1] FCS_CKM.4	FCS_CKM.1p and FCS_CKM.4 support to satisfy the dependencies.
FCS_RND.1	No dependencies	N/A
FDP_ACC.1a	FDP_ACF.1	FDP_ACF.1a supports to satisfy the dependency.
FDP_ACC.1p	FDP_ACF.1	FDP_ACF.1p supports to satisfy the dependency.
FDP_ACF.1a	FDP_ACC.1 FMT_MSA.3	FDP_ACC.1a supports. Objects are created at initial configuration, but not created in the operational environment of the TOE. Therefore, FMT_MSA.3 related to file creation does not apply to.
FDP_ACF.1p	FDP_ACC.1 FMT_MSA.3	FDP_ACC.1p supports. Objects are created at initial configuration, but not created in the operational environment of the TOE. Therefore, FMT_MSA.3 related to file creation does not apply to.
FDP_ITC.1	[FDP_ACC.1 or FDP_IFC.1] FMT_MSA.3	FDP_ACC.1a supports. Objects are created at initial configuration, but not created in the operational environment of the TOE. Therefore, FMT_MSA.3 related to file creation does not apply to.
FDP_UCT.1p	[FTP_ITC.1 or FTP_TRP.1] [FDP_ACC.1 or FDP_IFC.1]	FTP_ITC.1 and FDP_ACC.1p support to satisfy the dependencies.
FDP_UIT.1p	[FDP_ACC.1 or FDP_IFC.1] [FTP_ITC.1 or FTP_TRP.1]	FTP_ITC.1 and FDP_ACC.1p support to satisfy the dependencies.
FIA_AFL.1a	FIA_UAU.1	FIA_UAU.1 supports to satisfy the dependency.
FIA_AFL.1d	FIA_UAU.1	FIA_UAU.1 supports to satisfy the dependency.
FIA_AFL.1r	FIA_UAU.1	FIA_UAU.1 supports to satisfy the dependency.
FIA_UAU.1	FIA_UID.1	FIA_UID.1 supports to satisfy the dependency.
FIA_UAU.4	No dependencies	N/A
FIA_UAU.5	No dependencies	N/A
FIA_UID.1	No dependencies	N/A
FMT_MTD.1	FMT_SMR.1 FMT_SMF.1	FMT_SMR.1 and FMT_SMF.1 support to satisfy the dependencies.
FMT_SMF.1	No dependencies	N/A
FMT_SMR.1	FIA_UID.1	FIA_UID.1 supports to satisfy the dependency.

FPT_PHP.3	No dependencies	N/A
FTP_ITC.1	No dependencies	N/A

8.3.4 Security Assurance Requirements Rationale

The security functionality of the TOE is featured by difficulty of TOE (IC chip) forgeries realized by adoption of the Active Authentication function and strengthening Secure Messaging with PACE. The security characteristics of the Active Authentication function are achieved by protecting the internal confidential information (private key) in the TOE. And, the security characteristics of the strengthened Secure Messaging functionality are achieved by the use of the session key which possesses sufficient entropy.

Reading out the information kept secret in an IC chip requires advanced means of physical attacks, and it costs a certain amount of facilities and takes some time to decipher the strengthened Secure Messaging.

Assuming attackers possessing a high attack potential who are capable of such attacks, AVA_VAN.5 is required as the security assurance requirement for the vulnerability assessment. In addition, ALC_DVS.2 is adopted as the development security assurance requirement to provide stricter protection of development information used for an attack means.

When using the IC chip as the TOE, state of the art technologies are required for SFRs and design methods to realize such SFRs. However, there are no significant variations in the security functionality of product, and points to be checked for the vulnerability assessment are also well-defined. Consequently, EAL4, which is the top level for commercial product but does not require stringency as high as that for EAL5 whose target application is military use, is adopted as the development and manufacturing assurance requirements except development security and vulnerability assessment.

Note that ALC_DVS.2 does not have dependencies on other components, and the dependencies defined in AVA_VAN.5 are identical to those in AVA_VAN.3 (EAL4). Therefore, being identical to the EAL4 assurance package in terms of dependencies, dependencies among the security assurance components are all satisfied.

8.4 Composition Tasks – SFR Part

The following table (see next page) lists the SFRs that are declared in the [ST_IC] security target, and separates them in relevant platform[11]-SFRs (RP_SFR-SERV and RP_SFR-MECH) and irrelevant platform-SFRs (IP_SFR), as requested in [CCDB]. The table also provides the link between the relevant platform-SFRs and the composite product SFRs.

[11] In the present ST, the platform is the SLC52GDA chip.

Platform-SFR	Platform-SFR content	Platform-SFR additional information	RP_SFR-SERV	RP_SFR-MECH	IP_SFR	Composite product SFRs
FAU_SAS.1	The TSF shall provide the test process before TOE Delivery with the capability to store the Initialization Data (GCIM) and/or Pre-personalization Data and/or supplements of the Security IC Embedded Software in the not changeable configuration page area and non-volatile memory.	None	**X**			No link to TOE SFRs but used for the composite-product identification.
FCS_CKM.1 /RSA	The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm […]	None			**X**	Not used by the composite TOE.
FCS_CKM.1 / EC	The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm […]	None			**X**	Not used by the composite TOE.
FCS_COP.1 / TDES	The TSF shall perform encryption and decryption in accordance with a specified cryptographic algorithm TDES […]	None			**X**	Not used by the composite TOE.
FCS_CKM.4 / TDES	The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method overwriting or zeroing that meets the following: none.	None			**X**	Not used by the composite TOE.
FCS_COP.1 / AES	The TSF shall perform encryption and decryption in accordance with a specified cryptographic algorithm AES […]	None	**X**			FCS_COP.1n FCS_COP.1mp FCS_COP.1sp
FCS_CKM.4 / AES	The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method overwriting or zeroing that meets the following: none.	None	**X**			FCS_CKM.4
FCS_COP.1 / RSA	The TSF shall perform encryption and decryption in accordance with a specified cryptographic algorithm Rivest-Shamir-Adleman (RSA) […]	None			**X**	Not used by the composite TOE.
FCS_COP.1 / ECDSA	The TSF shall perform signature generation and signature verification in accordance with a specified cryptographic algorithm ECDSA […]	None			**X**	Not used by the composite TOE.
FCS_COP.1 / ECDH	The TSF shall perform elliptic curve Diffie-Hellman key agreement in accordance with a specified cryptographic algorithm ECDH […]	None			**X**	Not used by the composite TOE.
FCS_RNG.1/TRNG	Random numbers generation Class PTG.2 The TSF shall provide a physical random number generator that implements […]	None	**X**			FCS_RND.1

Platform-SFR	Platform-SFR content	Platform-SFR additional information	RP_SFR-SERV	RP_SFR-MECH	IP_SFR	Composite product SFRs
FCS_RNG.1/HPRG	Random numbers generation Class PTG.3 The TSF shall provide a hybrid physical random number generator that implements […]	None			X	Not used by the composite TOE.
FCS_RNG.1/DRNG	Random numbers generation Class DRG.3 The TSF shall provide a deterministic random number generator that implements […]	None			X	Not used by the composite TOE.
FCS_RNG.1/KSG	Random numbers generation Class DRG.2 The TSF shall provide a deterministic random number generator that implements […]	None			X	Not used by the composite TOE.
FDP_ACC.1	The TSF shall enforce the Memory Access Control Policy on all subjects (software running at the defined and assigned privilege levels), all objects (data including code stored in memories) and all the operations defined in the Memory Access Control Policy, i.e. privilege levels.	**Memory Access Control Policy** The TOE shall control read, write, delete and execute accesses of software running at the privilege levels as defined below. Any access is controlled, regardless whether the access is on code or data or a jump on any other privilege level outside the current one.	X			FDP_ACC.1a FDP_ACC.1p
FDP_ACF.1	The TSF shall enforce the Memory Access Control Policy to objects based on the following: Subject: - Software running at the IFX, OS1 and OS2 privilege levels required to securely operate the chip. This includes also privilege levels running interrupt routines. - software running at the privilege levels containing the application software Object: - data including code stored in memories Attributes: - the memory area where the access is performed to and/or - the operation to be performed.		X			FDP_ACF.1a FDP_ACF.1p

Platform-SFR	Platform-SFR content	Platform-SFR additional information	RP_SFR-SERV	RP_SFR-MECH	IP_SFR	Composite product SFRs
	The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: evaluate the corresponding permission control information of the relevant memory range before and during the access so that accesses to be denied cannot be utilized by the subject attempting to perform the operation.					
FMT_MSA.1	The TSF shall enforce the Memory Access Control Policy to restrict the ability to change default, modify or delete the security attributes permission control information to the software running on the privilege levels.				**X**	Not used by the composite TOE.
FMT_MSA.3	The TSF shall enforce the Memory Access Control Policy to provide well-defined default values for security attributes that are used to enforce the SFP. The TSF shall allow any subject, provided that the Memory Access Control Policy is enforced and the necessary access is therefore allowed, to specify alternative initial values to override the default values when an object or information is created.				**X**	Not used by the composite TOE.
FMT_SMF.1	The TSF shall be capable of performing the following security management functions: access the configuration registers of the MMU.		**X**			FDP_ACC.1a FDP_ACC.1p FDP_ACF.1a FDP_ACF.1p
FDP_SDI.1	The TSF shall monitor user data of the Composite TOE stored in containers controlled by the TSF for inconsistencies between stored data and corresponding EDC on all objects, based on the following attributes: EDC value for the RAM, ROM and SOLID FLASH NVM.	None		**X**		FPT_PHP.3
FDP_SDI.2	The TSF shall monitor user data of the composite TOE stored in containers controlled by the TSF for data integrity and one- and/or more-bit-errors on all objects, based on the following attributes: corresponding EDC value for RAM, ROM and SOLID FLASH NVM and error correction ECC for the SOLID FLASH NVM.	None		**X**		FPT_PHP.3

Platform-SFR	Platform-SFR content	Platform-SFR additional information	RP_SFR-SERV	RP_SFR-MECH	IP_SFR	Composite product SFRs
	Upon detection of a data integrity error, the TSF shall correct 1 bit errors in the SOLID FLASH NVM automatically and inform the user about more bit errors.					
FDP_IFC.1	The TSF shall enforce the Data Processing Policy on all confidential data when they are processed or transferred by the TOE or by the Security IC Embedded Software.	**Data Processing Policy** User Data and TSF data shall not be accessible from the TOE except when the Security IC Embedded Software decides to communicate the User Data via an external interface. The protection shall be applied to confidential data only but without the distinction of attributes controlled by the Security IC Embedded Software.		**X**		FDP_ACC.1a FDP_ACC.1p FDP_ACF.1a FDP_ACF.1p FPT_PHP.3
FDP_ITT.1	The TSF shall enforce the Data Processing Policy to prevent the disclosure of user data when it is transmitted between physically-separated parts of the TOE.			**X**		FDP_ACC.1a FDP_ACC.1p FDP_ACF.1a FDP_ACF.1p FPT_PHP.3
FPT_ITT.1	The TSF shall protect TSF data from disclosure when it is transmitted between separate parts of the TOE. The different memories, the CPU and other functional units of the TOE (e.g. a cryptographic co-processor) are seen as separated parts of the TOE.			**X**		FDP_ACC.1a FDP_ACC.1p FDP_ACF.1a FDP_ACF.1p FPT_PHP.3
FMT_LIM.1	The TSF shall be designed and implemented in a manner that limits their capabilities so that in conjunction with “Limited availability (FMT_LIM.2)” the following policy is enforced: Limited capability and availability Policy.	**Limited capability and availability Policy** Deploying Test Features after TOE Delivery does not allow user data of the Composite TOE to be disclosed or manipulated, TSF data to be disclosed or manipulated, software to be reconstructed and no substantial information about construction of TSF to be gathered which may enable other attacks.	**X**			FDP_ACC.1a FDP_ACC.1p FDP_ACF.1a FDP_ACF.1p
FMT_LIM.2	The TSF shall be designed and implemented in a manner that limits their availability so that in conjunction with “Limited capabilities (FMT_LIM.1)” the following policy is enforced: Limited capability and availability Policy.		**X**			FDP_ACC.1a FDP_ACC.1p FDP_ACF.1a FDP_ACF.1p
FPT_FLS.1	**Failure with preservation of secure state**: The TSF shall preserve a secure state when the following types of failures occur: exposure	None	**X**			FPT_PHP.3

Platform-SFR	Platform-SFR content	Platform-SFR additional information	RP_SFR-SERV	RP_SFR-MECH	IP_SFR	Composite product SFRs
	to operating conditions which may not be tolerated according to the requirement Limited fault tolerance (FRU_FLT.2) and where therefore a malfunction could occur.					
FRU_FLT.2	**Limited fault tolerance**: The TSF shall ensure the operation of all the TOE's capabilities when the following failures occur: exposure to operating conditions which are not detected according to the requirement Failure with preservation of secure state (FPT_FLS.1).	None	**X**			FPT_PHP.3
FPT_PHP.3	The TSF shall resist physical manipulation and physical probing, to the TSF by responding automatically such that the SFRs are always enforced.	None	**X**			FPT_PHP.3
FPT_TST.2	The TSF shall run a suite of self-tests at the request of the authorized user to demonstrate the correct operation of the alarm lines and/or following environmental sensor mechanisms: […]	None	**X**			FPT_PHP.3
FDP_SDC.1	The TSF shall ensure the confidentiality of the information of the user data of the Composite TOE while it is stored in the RAM, ROM, Cache and SOLID FLASH NVM.	None		**X**		FDP_ACC.1a FDP_ACC.1p FDP_ACF.1a FDP_ACF.1p FPT_PHP.3
FMT_LIM.1 / Loader	The TSF shall be designed and implemented in a manner that limits its capabilities so that in conjunction with "Limited availability (FMT_LIM.2)" the following policy is enforced: Deploying Loader functionality after permanent deactivation does not allow stored user data of the Composite TOE to be disclosed or manipulated by unauthorized user.	None		**X**		Essential to the security of the Composite TOE as the IC Loader shall not be re-activated by an attacker to bypass the composite TOE SFRs
FMT_LIM.2 / Loader	The TSF shall be designed in a manner that limits its availability so that in conjunction with "Limited capabilities (FMT_LIM.1)" the following policy is enforced: The TSF prevents deploying the Loader functionality after permanent deactivation.	None		**X**		
FIA_API.1 (Loader)	The TSF shall provide an authentication mechanism according to […] Three path authentication based on the security attributes (keys) Kc or Kd.	None		**X**		Participates to the security of the eTravel for Japan Embedded Software loading within the IC.
FTP_ITC.1 (Loader)	The TSF shall provide a communication channel between itself and the administrator user […]	None			**X**	Initially coming from the optional Package 2 in [PP/0084]. Not

Platform-SFR	Platform-SFR content	Platform-SFR additional information	RP_SFR-SERV	RP_SFR-MECH	IP_SFR	Composite product SFRs
						relevant here as the Loader is deactivated prior to Phase 7.
FDP_UCT.1 (Loader)	The TSF shall enforce the Loader SFP to receive user data in a manner protected from unauthorized disclosure.	None			**X**	Initially coming from the optional Package 2 in [PP/0084]. Not relevant here as the Loader is deactivated prior to Phase 7.
FDP_UIT.1 (Loader)	The TSF shall enforce the Loader SFP to receive user data in a manner protected from modification, deletion or insertion errors. The TSF shall be able to determine on receipt of user data, whether modification, deletion or insertion have occurred.	None			**X**	Initially coming from the optional Package 2 in [PP/0084]. Not relevant here as the Loader is deactivated prior to Phase 7.
FDP_ACC.1 / Loader	The TSF shall enforce the Loader SFP […]	None			**X**	Initially coming from the optional Package 2 in [PP/0084]. Not relevant here as the Loader is deactivated prior to Phase 7.
FDP_ACF.1 / Loader	The TSF shall enforce the Loader SFP to objects based on the following […]	None			**X**	Initially coming from the optional Package 2 in [PP/0084]. Not relevant here as the Loader is deactivated prior to Phase 7.

9. TOE SUMMARY SPECIFICATION

9.1 CRYPTOGRAPHY

9.1.1 Cryptographic key generation

Session key generation for PACE	The TOE generates session keys for PACE as specified in [ICAO-9303] part 11 and [TR-03111]. Related key length is 128 bits and 256 bits.
Ephemeral key pair generation for PACE	The TOE generates Elliptic Curve key pairs for PACE as specified in [TR-03111]. Related key length is 256 bits and 384 bits.

9.1.2 Cryptographic key destruction

The TSF destroys cryptographic keys by overwriting the data with random numbers.

9.1.3 Cryptographic operations

Cryptographic operations related to Active Authentication	The TOE performs ECDSA digital signature generation for Active Authentication data as specified in [TR-03111]. Related key length are 256 bits and 384 bits. The TOE generates data for Active Authentication using the SHA-256 and SHA-384 algorithms as specified in [TR-03111].
Cryptographic operations related to PACE	The TOE performs Nonce encryption using the AES-CBC algorithm, with 128 bits and 256 bits key length, as specified in Part 11 of [ICAO-9303]. The TOE performs Key agreement using the ECDH algorithm, with 256 bits and 384 bits key length, as specified in Part 11 of [ICAO-9303]. The TOE generates session keys for PACE using the SHA-1 and SHA-256 algorithms as specified by Part 11 of [ICAO-9303]. The TOE handles mutual authentication for PACE by performing authentication token generation and verification using the AES-CMAC algorithm, with 128 bits and 256 bits key length, as specified by Part 11 of [ICAO-9303]. The TOE handles Secure Messaging for PACE through the following cryptographic operations, as specified in [ICAO-9303]: ▪ Message encryption and decryption using AES in CBC mode, with 128 bits and 256 bits key length. ▪ Message Authentication Code generation and verification using AES-CMAC, with 128 bits and 256 bits key length.

9.1.4 Generation of random numbers

The TOE provides a random number generation mechanism that meets the following quality standards: [RGS-B1] and [SP800-90] with seed entropy of at least 128 bits.

9.2 IDENTIFICATION AND AUTHENTICATION

9.2.1 Supported authentication mechanisms

The authentication mechanisms which are supported by the TOE, as well as the corresponding rules enforced to verify the identity of the users, are described in the following table:

Authentication mechanism name	Rule applicable to authentication mechanism
Transport key	Rule of authenticating the authorized personnel of the passport issuing authorities by verifying transport key that have been already stored in the TOE.
Readout key	Rule of authenticating the authorized personnel of the passport issuing authorities by verification with readout key that have been already stored in the TOE.
Active Authentication Information Access Key	Rule of authenticating the authorized personnel of the passport issuing authorities by verification with Active Authentication Information Access Key that have been already stored in the TOE.
Mutual authentication	Rule of authenticating terminals according to the mutual authentication procedure PACE defined by [ICAO-9303].

9.2.2 Authentication failure handling

The TOE detects when 3 unsuccessful authentication attempts occur related to the authentication with the Active Authentication Information Access Key. When the defined number of unsuccessful authentication attempts has been met, the TOE permanently stops authentication with the Active Authentication Information Access Key (the authentication status with the Active Authentication Information Access Key is fixed to “Not authenticated yet”).

The TOE detects when 3 unsuccessful authentication attempts occur related to the authentication with the transport key. When the defined number of unsuccessful authentication attempts has been met, the TOE permanently stops authentication with the transport key (the authentication status with the transport key is fixed to “Not authenticated yet”).

The TOE detects when 3 unsuccessful authentication attempts occur related to the authentication with the readout key. When the defined number of unsuccessful authentication attempts has been met, the TOE permanently stops authentication with the readout key (the authentication status with the readout key is fixed to “Not authenticated yet”).

9.2.3 Timing of identification and authentication

The TOE allows the readout of EF.CardAccess and EF.ATR/INFO without user identification nor authentication. Any other action requires user identification and authentication.

9.2.4 Single-use authentication mechanisms

The TOE prevents reuse of authentication data related to mutual authentication mechanism with the PACE procedure.

9.3 ACCESS CONTROL

9.3.1 Access control during the issuance procedure

During the issuance procedure (i.e. before the TOE is issued to the legitimate passport holder), access to the files stored within the TOE is protected through authentication with the readout key, transport key and /or Active Authentication Information Access Key, according to the rules specified in the table below:

Authentication status[12]	File subject to access control	Operation permitted	Reference: data to be operated
Successful verification with readout key	EF.DG13[13]	Read	IC chip serial number (entered by manufacturer)
Successful verification with transport key	Transport key file	Write	Transport key data (update of old data)
	Password key file		Password key
	EF.DG1	Read or Write	MRZ data
	EF.DG2		Facial image
	EF.DG13		Management data (Passport number and Booklet management number)
	EF.DG14		PACE v2 Security information Active Authentication hash function information
	EF.COM[14]		Common data
	EF.SOD		Security data related to Passive Authentication defined by Part 10 of [ICAO-9303].
	EF.CardAccess	Write	PACE v2 Security information
	EF.DG15	Read	Active Authentication Public Key
Successful verification with Active Authentication Information Access Key	EF.DG15	Write	Active Authentication Public Key
	Private key file		Active Authentication Private Key

9.3.2 Access control during the operational phase (PACE procedure)

During the operational phase, when the communication with the TOE is initiated by a terminal according to the PACE procedure, access to the files stored within the TOE is conditioned by the successful authentication of the terminal during the mutual authentication step.

Once it is successfully authenticated by the TOE, the terminal is allowed to read data from the files EF.DG1, EF.DG2, EF.DG13, EF.DG14, EF.DG15, EF.COM, and EF.SOD. The writing of data to, as well as the reading of data from: the transport key file, password key file, and private key file are prohibited.

9.4 SECURE COMMUNICATION

9.4.1 Confidentiality and integrity protection for PACE

When performing the PACE procedure:
- The TOE transmits and receives user data in a manner protected from unauthorized disclosure.

[12] The readout key, transport key, and Active Authentication Information Access Key are configured by the manufacturer. The transport key can be changed (updated) by an authorized user. With regard to the files subject to access control included in this table and files storing the read key and Active Authentication Information Access Key which may vary the authentication status, user access that is not stated in this table is prohibited. (The access controls to information in the TOE from terminals after issuing a TOE embedded passport booklet to the passport holder, i.e., BAC and PACE are separately specified.)

[13] In EF.DG13, an IC chip serial number has been recorded by the manufacturer, and the management data is appended to the file by the passport issuing authorities.

[14] EF.COM file may not be created according to the passport issuing authorities' instructions.

- The TOE transmits and receives user data in a manner protected from modification, deletion, insertion and replay errors. The TOE is be able to determine, on receipt of user data, whether modification, deletion, insertion or replay has occurred.

9.4.2 Trusted channel between the terminal and the TOE

The TOE implements the Secure Messaging channel defined by [ICAO-9303]. The channel is logically distinct from other communication channels and provides assured identification of its end points and protection of channel data from modification or disclosure. After the Secure Messaging channel is established, only the Secure Messaging channel is available for the communication path between terminal and TOE.

The TOE allows the terminal to initiate communication via the trusted channel, or the TOE itself can initiate communication via the trusted channel for reading data from the TOE.

9.5 SECURITY MANAGEMENT

9.5.1 Privileged role in pre-issuance phase

The TOE maintains the role “authorized personnel of the passport issuing authorities”, and is able to associate users with this role.

The TOE is capable of performing the following management function: modification of transport key However, this function is restricted to the “authorized personnel of the passport issuing authorities” after successful authentication.

9.5.2 Import of user data in pre-issuance phase

During the issuance procedure (i.e. before the TOE is actually issued to the legitimate passport holder), the TOE ignores any security attributes associated with the user data when imported from outside the TOE.

9.6 RESISTANCE TO PHYSICAL ATTACK

The TOE is designed and implemented to resist attacks defined by the CC Supporting Documents related to Smartcards to the hardware and software of the TOE by responding automatically such that the SFRs are always enforced.

9.7 MAPPING OF SFRS TO TSS

SFR	Link to TSS
FCS_CKM.1p	Addressed in section 9.1.1 “Cryptographic key generation”
FCS_CKM.1e	Addressed in section 9.1.1 “Cryptographic key generation”
FCS_CKM.4	Addressed in section 9.1.2 “Cryptographic key destruction”
FCS_COP.1a	Addressed in section 9.1.3 “Cryptographic operations”
FCS_COP.1h	Addressed in section 9.1.3 “Cryptographic operations”
FCS_COP.1n	Addressed in section 9.1.3 “Cryptographic operations”
FCS_COP.1e	Addressed in section 9.1.3 “Cryptographic operations”
FCS_COP.1hp	Addressed in section 9.1.3 “Cryptographic operations”
FCS_COP.1mp	Addressed in section 9.1.3 “Cryptographic operations”
FCS_COP.1sp	Addressed in section 9.1.3 “Cryptographic operations”
FCS_RND.1	Addressed in section 9.1.4 “Generation of random numbers”
FDP_ACC.1a	Addressed in section 9.3.1 “Access control during the issuance procedure”
FDP_ACC.1p	Addressed in section 9.3.2 “Access control during the operational phase (PACE procedure)”
FDP_ACF.1a	Addressed in section 9.3.1 “Access control during the issuance procedure”

FDP_ACF.1p	Addressed in section 9.3.2 “Access control during the operational phase (PACE procedure)”
FDP_ITC.1	Addressed in section 9.5.2 “Import of user data in pre-issuance phase”
FDP_UCT.1p	Addressed in section 9.4.1 “Confidentiality and integrity protection for PACE”
FDP_UIT.1p	Addressed in section 9.4.1 “Confidentiality and integrity protection for PACE”
FIA_AFL.1a	Addressed in section 9.2.2 “Authentication failure handling”
FIA_AFL.1d	Addressed in section 9.2.2 “Authentication failure handling”
FIA_AFL.1r	Addressed in section 9.2.2 “Authentication failure handling”
FIA_UAU.1	Addressed in section 9.2.3 “Timing of identification and authentication”
FIA_UAU.4	Addressed in section 9.2.4 “Single-use authentication mechanisms”
FIA_UAU.5	Addressed in section 9.2.1 “Supported authentication mechanisms”
FIA_UID.1	Addressed in section 9.2.3 “Timing of identification and authentication”
FMT_MOF.1	Addressed in section 9.5.1 “Privileged role in pre-issuance phase”
FMT_MTD.1	Addressed in section 9.5.1 “Privileged role in pre-issuance phase”
FMT_SMF.1	Addressed in section 9.5.1 “Privileged role in pre-issuance phase”
FMT_SMR.1	Addressed in section 9.5.1 “Privileged role in pre-issuance phase”
FPT_PHP.3	Addressed in section 9.6 “Resistance to physical attack”
FTP_ITC.1	Addressed in section 9.4.2 “Trusted channel between the terminal and the TOE”

END OF SECURITY TARGET