

# Digital Identity 1.0.A PACE, EAC on MultiApp V5.0.A

Common Criteria / ISO 15408  
Security Target – Public version  
EAL5+

Version 1.9 – February 22<sup>th</sup> 2022

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## 1. SECURITY TARGET INTRODUCTION

### 1.1 SECURITY TARGET REFERENCE

<b>Title :</b>	Digital Identity 1.0.A on MultiApp v5.0.A JCS platform, PACE, EAC
<b>Version :</b>	1.9
<b>ST Reference :</b>	D1558453_LITE
<b>Origin :</b>	Thales DIS
<b>IT Security Evaluation scheme :</b>	LETI
<b>IT Security Certification scheme :</b>	Agence Nationale de la Sécurité des Systèmes d'Information (ANSSI)

### 1.2 TOE REFERENCE

<b>Product Name :</b>	Digital Identity 1.0.A on MultiApp v5.0.A JCS platform
<b>Security Controllers :</b>	<b>Infineon IFX_CCI_000039</b>
<b>TOE Name :</b>	Digital Identity 1.0.A on MultiApp v5.0.A platform, PACE, EAC
<b>TOE Reference/version :</b>	1.0.A
<b>TOE documentation :</b>	Guidance [AGD]
<b>Composition elements:</b>	
<b>IC TOE identifier:</b>	IFX_CCI_000039h
<b>IC TOE Version:</b>	design step T11 with firmware 80.306.16.0, optional NRG™ SW 05.03.4097, optional HSL v3.52.9708, UMSLC lib v01.30.0564, optional SCL v2.11.003, optional ACL v3.02.000

The TOE identification is provided by the Card Production Life Cycle Data (CPLCD). These data are available by executing a dedicated command.

The TOE and the product differ, as further explained in §2 TOE :

- The TOE is the Digital Identity 1.0.A application on MultiApp V5.0.A JCS Platform.
- The MultiApp V5.0.A JCS Platform product also includes other applets.

The current certificate [CR-IC-GDA] is covering the both chip configurations.

### CPLC Digital Identity values

The following values from Digital Identity CPLC data can be used for product identification. (The format of Digital Identity CPLC value is different from the platform MAV5.0). See table below Using Get data command in Digital Identity application with tag **9F7F**

Name	Length	Value	Description	Usable for identification
IC Fabricator	2	4090	Infineon	Yes
IC Type	2	0039	Infineon IFX_CCI_000039	Yes
Operating system identifier	3	B06725	MAV 5.0.A	Yes
Configuration	1	Var	01	No
Operating system release level	2	0000	Major & minor version of the revision (0.0)	Yes
Other values set at pre-personalization and personalization	x	xx...xx	Pre-perso and perso values	No

### READ INFO value

The following information is returned by a Digital Identity specific command "Read Info" to return information characterizing the application and the chip. This information can be used for tracking and key diversification purposes. This command is accessible in personalization phase only.

Name	Length	Value	Description	Usable for identification
Hardmask Identifier	3	B06725	MAV 5.0.A	Yes
Softmask Number	1	00		Yes
Softmask Version	1	00	MAV 5.0.A without filter	Yes
Chip ID	8	Var		No
ISK KCV	3	Var		No
Amount of available NVM	3	Var		No
Chip Life Cycle Status	1	13		No
ISK Retry Counter	1	03		No

### Security Service identification

- Selection ISD
- Open GP SCP03
- GET DATA GP with tag P1=0x01 & P2=0xF0

Result:

- Application Administration Service (AAS) Data Object: byte 6= 01= Service 1, 02=Service 2 ...

Name	Length	Value	Description	Usable for TOE identification
AAS token	4	[XX..XX]	Used to identify the card during the Security service correction deployment	No
AAS state machine	1	01	Used to manage the different steps during the Security service correction deployment	No
AAS Identification: Service Version	1	01*	Used to identify the Security Service version	Yes

(\* ) value=0x01: This value is the Digital Identity initial instance version (Service version). This value should be superior or equal to 0x01 for the identification of Digital Identity instance.

### 1.3 SECURITY TARGET OVERVIEW

This Security Target defines the security objectives and requirements for the contact/contactless chip based on the requirements and recommendations of the European Commission [COMEUR\_212]. This security Target is also updated with new assets, objectives and SFRs coming from the [AddendumDI] extension linked to the [ENIC] requirements.

The Security Target of the Digital Identity application is also based on Protection Profile *Machine Readable Travel Document with "ICAO Application", Extended Access Control* [PP-MRTD-EACV2] as it is the same application used with a different personalisation. As the purpose of the Digital Identity application is not the travel documents, we need to define a slightly different terminology from the [PP-MRTD-EACV2].

Note that compound words that contain terminology of the table below should be translated by applying the translation on the relevant parts of the compound words. Since this is a syntactic change of terminology that does not impact any security related functionality, we do not give explicit justifications for needed refinements of the SFR.

For the ease of understanding, the table below gives a brief translation for the used terminology used in this ST and extract from [PP-MRTD-EACV2]. Compound words that contain terminology of the table should be replaced accordingly.

[ST] and [PP-MRTD-EACV2]	Translation for Digital Identity
travel document	Digital Identity document
travel document holder	Digital Identity document holder
traveler	Digital Identity document presenter
BIS-PACE	PACE terminal
MRTD holder	Card holder
MRTD application	Digital Identity application

The ePassport application context is replaced in this module by a Digital Identity application context. The consequence is that the access to Digital Identity application is restricted to successful execution of the PACE PIN protocol only. The AA, BAC, PACE (CAN, MRZ and PUK) authentications are not relevant for the access to Digital Identity.

PACE CAN is used to resume the PIN & PUK when they are suspended

PACE PUK is used to manage the PIN (Change, reset retry counter)

The Security Target defines the security requirements for the TOE. The main security objective is to provide the secure enforcing functions and mechanisms to maintain the integrity and confidentiality of the Card application and data during its life cycle.

The main objectives of this ST are:

- To introduce TOE and the Digital Identity application,
- To define the scope of the TOE and its security features,
- To describe the security environment of the TOE, including the assets to be protected and the threats to be countered by the TOE and its environment during the product development, production and usage.
- To describe the security objectives of the TOE and its environment supporting in terms of integrity and confidentiality of application data and programs and of protection of the TOE.
- To specify the security requirements which includes the TOE security functional requirements, the TOE assurance requirements and TOE security functions.

## 1.4 REFERENCES

### 1.4.1 External References

[CC-1]	Common Criteria for Information Technology Security Evaluation Part 1: Introduction and general model, CCMB-2017-04-001, version 3.1 rev 5, April 2017
[CC-2]	Common Criteria for Information Technology Security Evaluation Part 2: Security functional components, CCMB-2017-04-002, version 3.1 rev 5, April 2017
[CC-3]	Common Criteria for Information Technology Security Evaluation Part 3: Security assurance components, CCMB-2012-04-003, version 3.1 rev 5, April 2017
[CEM]	Common Methodology for Information Technology Security Evaluation Evaluation Methodology CCMB-2017-04-004, version 3.1 rev 5, April 2017
[RGS-B1]	ANSSI, « Référentiel général de sécurité », <a href="https://www.ssi.gouv.fr/uploads/2021/03/anssi-guide-mecanismes_crypto-2.04.pdf">https://www.ssi.gouv.fr/uploads/2021/03/anssi-guide-mecanismes_crypto-2.04.pdf</a> Annexe B1 Mécanismes cryptographiques, règles et recommandations concernant le choix et le dimensionnement des mécanismes cryptographiques; version 2.0.4, 2020-01-01
[IFX-IC]	[IFX-IC-GDA]
[IFX-IC-GDA]	IFX_CCI_00002Dh, IFX_CCI_000039h, IFX_CCI_00003Ah, IFX_CCI_000044h, IFX_CCI_000045h, IFX_CCI_000046h, IFX_CCI_000047h, IFX_CCI_000048h, IFX_CCI_000049h, IFX_CCI_00004Ah, IFX_CCI_00004Bh, IFX_CCI_00004Ch, IFX_CCI_00004Dh, IFX_CCI_00004Eh T11 Security Target – revision v4.3 – 2021-06-14
[CR-IC]	[CR-IC-GDA]
[CR-IC-GDA]	<i>Certification Report, 7<sup>th</sup> July 2021, BSI-DSZ-CC-1107-V2-2021</i> IFX_CCI_00002Dh, IFX_CCI_000039h, IFX_CCI_00003Ah, IFX_CCI_000044h, IFX_CCI_000045h, IFX_CCI_000046h, IFX_CCI_000047h, IFX_CCI_000048h, IFX_CCI_000049h, IFX_CCI_00004Ah, IFX_CCI_00004Bh, IFX_CCI_00004Ch, IFX_CCI_00004Dh, IFX_CCI_00004Eh design step T11 with firmware 80.306.16.0 & 80.306.16.1, optional NRG™ SW 05.03.4097, optional HSL v3.52.9708, UMSLC lib v01.30.0564, optional SCL v2.15.000 and v2.11.003, optional ACL v3.33.003 and v3.02.000, optional RCL v1.10.007, optional HCL v1.13.002 and user guidance
[FIPS180-2]	<i>Federal Information Processing Standards Publication 180-2 SECURE HASH STANDARD (+Change Notice to include SHA-224),</i> U.S. DEPARTMENT OF COMMERCE/National Institute of Standards and Technology, 2002 August 1
[FIPS46-3]	<i>Federal Information Processing Standards Publication FIPS PUB 46-3, DATA ENCRYPTION STANDARD (DES),</i> U.S. DEPARTMENT OF COMMERCE/National Institute of Standards and Technology, Reaffirmed 1999 October 25
[ISO15946-1]	<i>ISO/IEC 15946: Information technology – Security techniques – Cryptographic techniques based on elliptic curves – Part 1: General, 2002</i>
[ISO15946-2]	<i>ISO/IEC 15946: Information technology – Security techniques – Cryptographic techniques based on elliptic curves – Part 2: Digital Signatures, 2002</i>
[ISO15946-3]	<i>ISO/IEC 15946: Information technology – Security techniques – Cryptographic techniques based on elliptic curves – Part 3: Key establishment, 2002</i>

[ISO7816]	ISO 7816, Identification cards – Integrated circuit(s) cards with contacts, Part 4: Organization, security and commands for interchange, FDIS2004
[ICAO-9303]	9303 ICAO Machine Readable Travel Document 7th edition, 2015 Part 1-12
[PKCS#3]	PKCS #3: Diffie-Hellman Key-Agreement Standard, An RSA Laboratories Technical Note, Version 1.4, Revised November 1, 1993
[PKI]	MRTD Technical Report, PKI for Machine Readable Travel Documents Offering ICC Read-Only Access International Civil Aviation Organization Version 1.1, October 01 2004
[PP-IC-0084]	Security IC Platform Protection Profile with augmentation Packages– BSI-CC-PP-0084-2014
[ICAO-TR-SAC]	MRTD Technical report - Supplemental Access Control for Machine Readable Travel Documents Version - 1.01 Date – November 11, 2010
[PP-MRTD-EACV2]	Protection Profile, Machine Readable Travel Document with “ICAO Application”, Extended Access Control with PACE, version 1.3.2, 2012, December 5th. Certified and maintained by BSI (Bundesamt für Sicherheit in der Informationstechnik) under reference BSI-PP-0056-V2-MA-2012
[PP-MRTD-SAC]	Protection Profile, Machine Readable Travel Document using Standard Inspection Procedure with PACE, version 1.01, 22 juillet 2014. Certified and maintained by BSI (Bundesamt für Sicherheit in der Informationstechnik) under reference BSI-CC-PP-0068-V2-2011-MA-01.
[PP-MRTD-BAC]	Protection Profile, Machine Readable Travel Document with “ICAO Application”, Basic Access Control, version 1.10, 25 mars 2009. Certified by BSI (Bundesamt für Sicherheit in der Informationstechnik) under reference BSI-PP-0055-2009.
[PP-JCS-Open]	Java Card System Protection Profile – Open Configuration ANSSI-PP-2010-03M01, Version 3.0, May 2012
[SS]	<i>ANNEX to Section III SECURITY STANDARDS FOR MACHINE READABLE TRAVEL DOCUMENTS,</i> <i>Excerpts from ICAO Doc 9303, Part 1</i> Machine Readable Passports, Fifth Edition – 2003
[TR-ECC]	Elliptic Curve Cryptography according to ISO 15946, Technical Guideline, TR-ECC, BSI, 2006
[TR-EAC-1]	Technical Guideline – TR-03110-1, Advanced Security Mechanisms for Machine Readable Travel Documents and eIDAS Token, Part 1 – eMRTDs with BAC/PACEv2 and EACv1, Version 2.20, 26.02.2015
[AddendumDI]	Module: Annexe PP0056v2 Digital Identity document using Remote Access Control with PACE v2 + Note Security service correction deployment – V1.1 – 21/11/2019
[ENIC]	Electronic National Identity Card Technical Specifications - ANTS

## 1.4.2 Internal References

[ST-DI]	This document
[ST-BAC]	D1555025 BAC Security Target - MultiApp V5.0.A JCS Platform Security Target
[ST-EACBAC]	D1555024 EAC on BAC - MultiApp V5.0.A JCS Platform Security Target
[ST-EACSAC]	D1554995 EAC on BAC - MultiApp V5.0.A JCS Platform Security Target
[ST_ETRAVEL]	[ST-BAC] + [ST-EACBAC] + [ST-EACSAC]
[ST-Platform]	D1555025 MultiApp V5.0.A JCS Platform Security Target
[AGD]:	TOE Guidance documentation
[OPE_MRTD]	D1561823 - MultiApp V5.0.A: AGD OPE document - eTravel v2.5.A - Digital Identify 1.0.A
[PRE_MRTD]	D1561826 - MultiApp V5.0.A: AGD PRE document - eTravel v2.5.A - Digital Identify 1.0.A
[USR_MRTD]	D1392378 C.10 - eTravel 2.2, 2.3 and 2.5 Reference Manual
[AGD-GDP]	D1562740A - Global Dispatcher Personalization Applet
[USR_AAS]	MultiApp ID Operating System – Application Administration Service – Reference Manual - D1519213D

## **2. TOE OVERVIEW**

### **2.1 TOE DESCRIPTION**

The Target of Evaluation (TOE) is an identification means representing a contactless / contact smart card programmed according to ICAO Technical Report "Supplemental Access Control" [ICAO-TR-SAC]. The programmed smartcard is called an identification means as a whole. Here, an application is a collection of data (groups) and their access conditions. We mainly distinguish between common user data and identification user data.

The TOE designed in this security target is the identification means containing the related identification user data (incl. biometric if applicable) as well as data needed for authentication; this application is intended to be used by the citizens to authenticate themselves, at least on public services.

The TOE is the module designed to be the core of the CNI card. The TOE is a contact/contactless integrated circuit. The TOE 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 Target of Evaluation (TOE) is the contact/contactless integrated circuit chip for CNle (Carte National d'identité Electronique) programmed according to the ANTS (Agence Nationale des Titres Sécurisés) specifications derived from [ICAO-9303] and [TR-EAC-1] and providing:

- the PACE V2 Access Control (SAC) according to the ICAO document [ICAO-9303]
- the Extended Access Control according to the BSI document [TR-EAC-1]

Additionally, to the [PP-MRTD-EACV2], the TOE has a set of administrative commands for the management of the product during the product life.

The TOE comprises of at least

- the circuitry of the MRTD's chip (the integrated circuit, IC),
- the IC Embedded Software (operating system),
- the Digital Identity 1.0.A on MultiApp V5.0.A Platform Embedded Software
- The GDP Applet
- the associated guidance documentation
- A cryptographic library developed by Thales (the cryptographic library proposed by the chip supplier is not used).

Note: The TOE comprises as well the MultiApp V5.0.A Open Platform [ST-Platform]. It uses its services but has been evaluated separately.

The TOE can be delivered under 2 configurations:

- ✓ The configuration called "Standalone" meaning the Digital Identity 1.0.A and eTravel 2.5.A are the only applets selectable on the platform (GP221 "Final application" privilege).
- ✓ The configuration called "Open" meaning Digital Identity 1.0.A and eTravel 2.5.A are selectable among other applets on the platform.

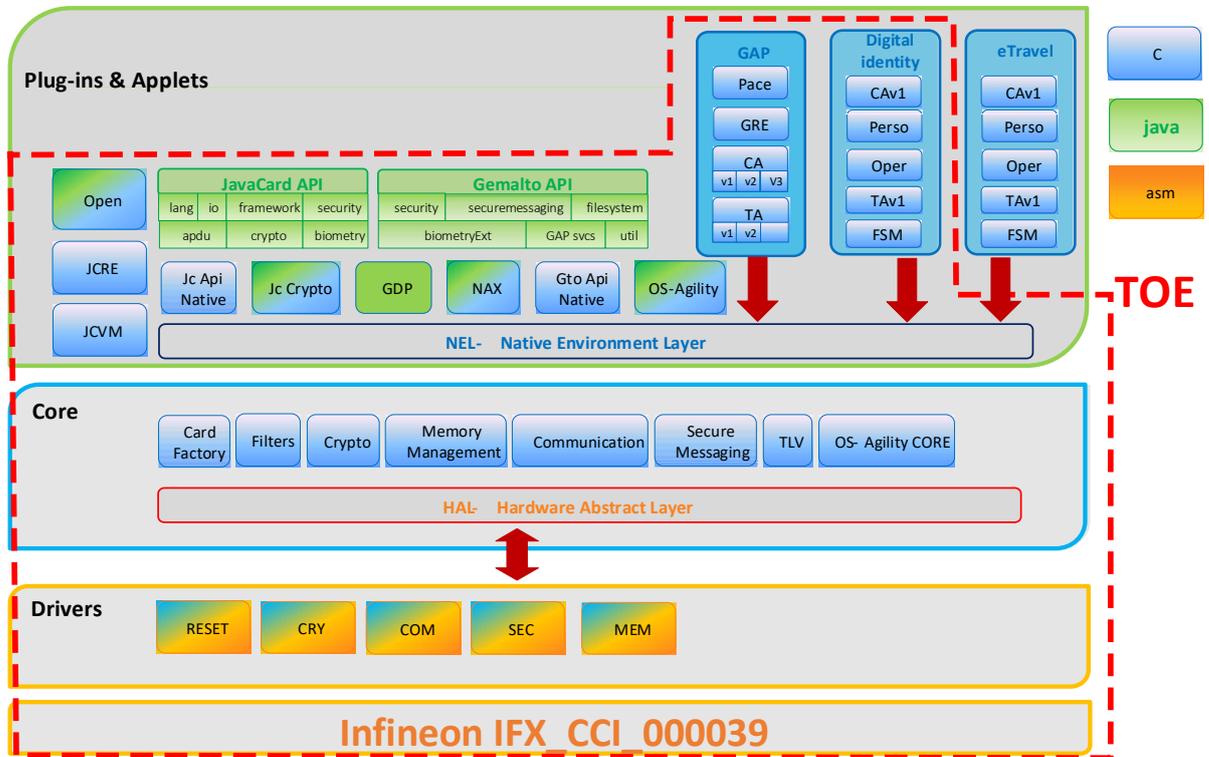
The list of the applets can be found in the Platform Security Target [ST-Platform] §2.2 Product Architecture

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 Card Manufacturer to the Personalization Agent. The Personalization Key is generated on the Manufacturing Site and transmitted to the Personalization Agent through a secured method (Key Ceremony involving Security Agents on a dedicated secure environment with KMS devices). Depending on customer needs and preferences, the Personalization Key could also be generated on the Personalization Agent side (dedicated secure environment with KMS devices) and transmitted to the Manufacturing site through a secure method (Key Ceremony involving Security Agents) in order to be integrated to the TOE.

## 2.2 TOE BOUNDARIES

The Digital Identity 1.0.A on MultiApp V5.0.A Platform Embedded Software (ES) is located in the flash code area.

The figure below gives a description of the TOE and its boundaries (red dash line)



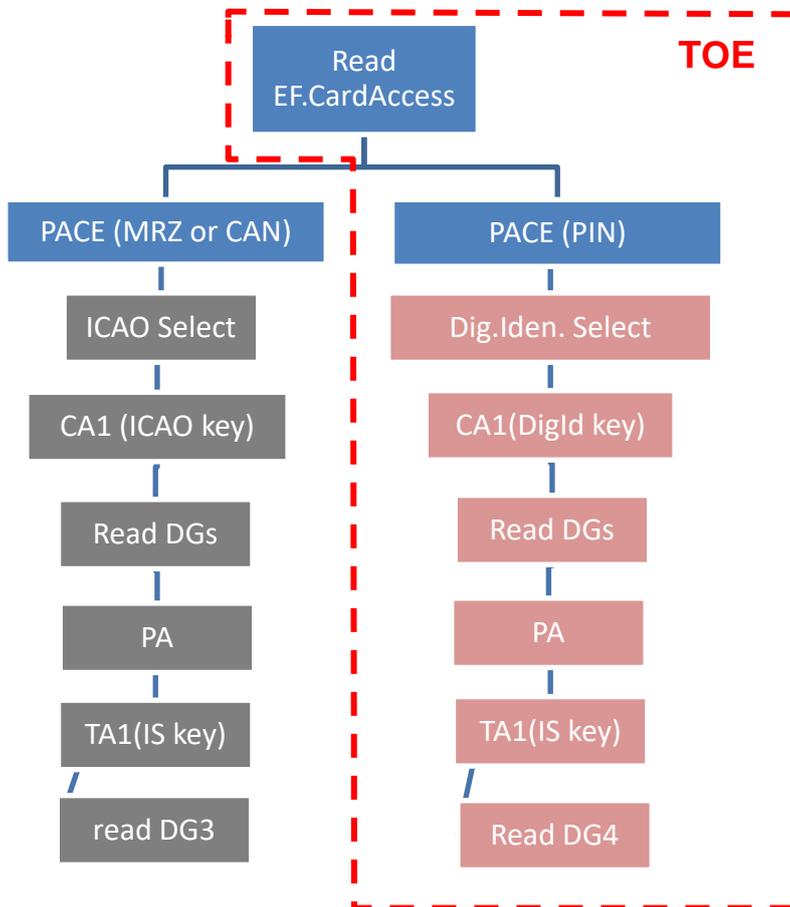
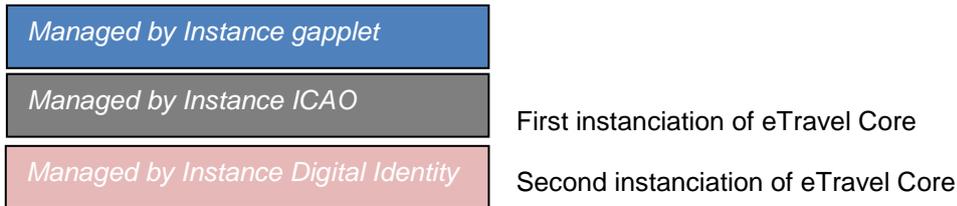
**Figure 1: TOE Boundaries**

### 2.3 TOE USAGE AND SECURITY FEATURES FOR OPERATIONAL USE

The Digital Identity 1.0.A on MultiApp V5.0.A Platform Embedded Software (ES) is located in the flash code area.

Two instances of the eTravel Core application are created: ICAO and Digital Identity. Each application is selectable only after a successful PACE: MRZ or CAN to access ICAO part, PIN only to access the Digital Identity.

#### 2.3.1 Flow to Access of the Digital Identity instance

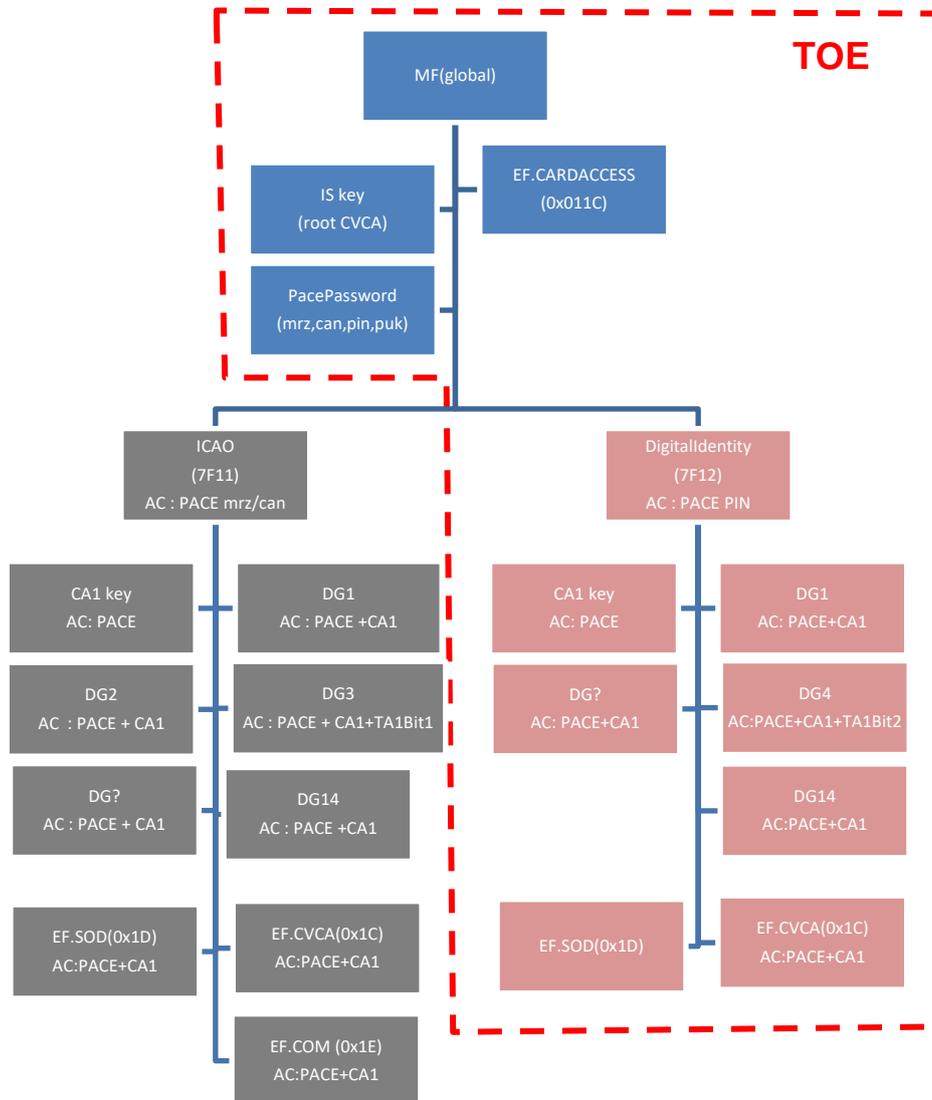


**Note:**

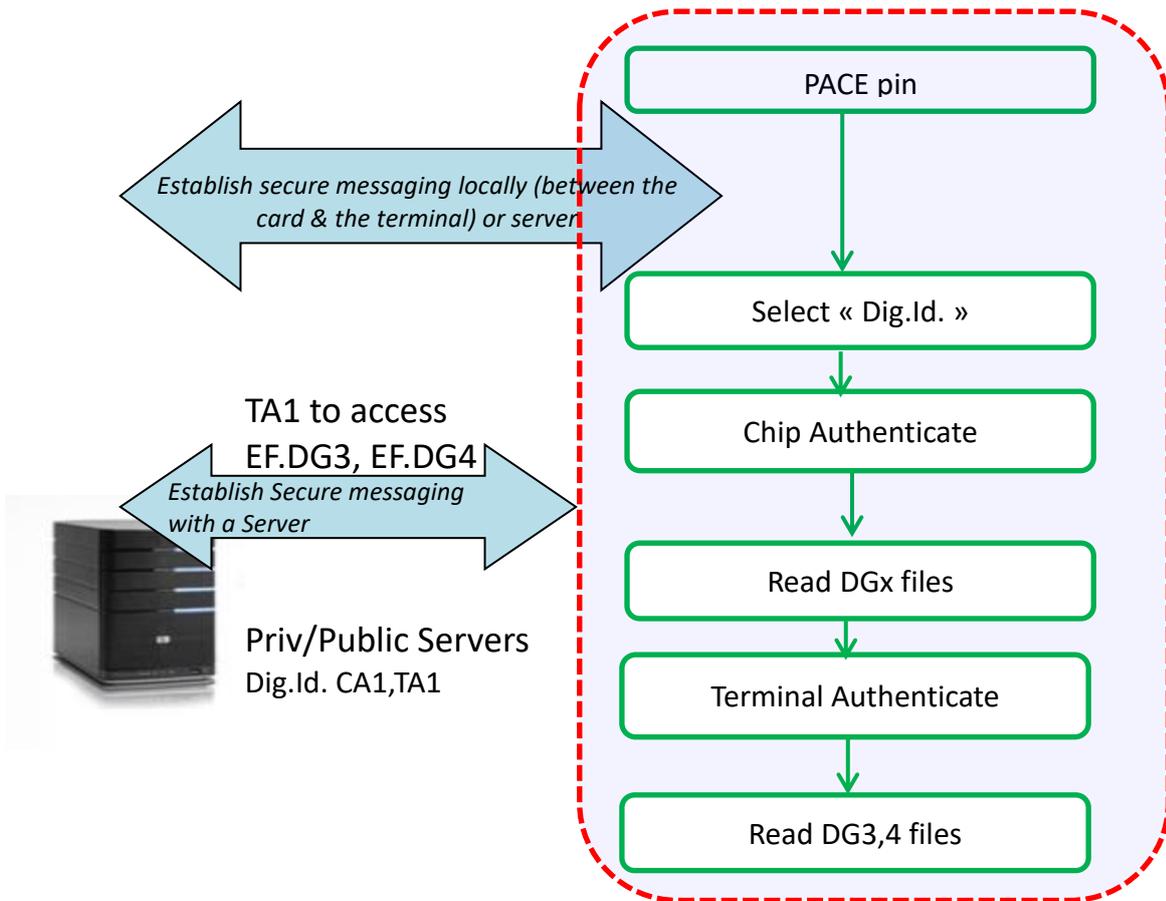
- . The card is managed by the ISD (install, delete instances,)
- . Personalization is done through the instance GDP
- . Access to instances are protected by restriction list, in operational: managed by applet

### 2.3.2 Example of Data Structure of the Digital Identity instance

The keys and DGs are managed by the accurate instances, following the next description.



### 2.3.3 Security of the Digital Identity instance



A Card can have an MRTD instance of the eTravel Application and/or a second instance dedicated to the Digital Identity in order to identify a citizen with its user consent. In this part, we will focus only on the Digital Identity part. The LRTD is defined in the chapter 2.3.3 of the [ST\_ETRAVEL]

A State or Organization issues Digital Identity to be used by the holder for citizen identification & authentication. The holder presents a Digital Identity to the inspection system to prove his or her identity. The Digital Identity in context of this security target contains (i) visual (eye readable) biographical data and portrait of the holder, (ii) the citizen has the knowledge of a secret (PIN) which allow to give its user consent in order to access to the digital data content in the Digital Identity instance and (iii) data elements on the Digital Identity's chip according to LDS for contact & contactless machine reading. The authentication of the citizen is based on (i) the possession of a valid Digital Identity personalized for a holder with the claimed identity.

The issuing State or Organization ensures the authenticity of the data of genuine Digital Identity's. Receiving State trusts a genuine Digital Identity of an issuing State or Organization.

For this security target the Digital Identity is viewed as unit of

- (a) the **physical Digital Identity** document in form of paper, plastic and chip. It presents visual readable data including (but not limited to) personal data of the Digital Identity holder
  - (1) the printed data in the Machine Readable Zone (MRZ&CAN) and
  - (2) the printed portrait.
  - (3) And other governmental information
- (b) the **logical Digital Identity** as data of the Digital Identity holder stored according to the Logical Data Structure [ENIC] and on the contact & contactless integrated circuit. It presents contact & contactless readable data including (but not limited to) personal data of the Digital Identity holder (see §2.3.2 as an example). All the access conditions are defined in the [ENIC]

The issuing State or Organization implements security features of the Digital Identity to maintain the authenticity and integrity of the Digital Identity and their data. The Digital Identity and the Digital Identity chip is uniquely identified by the Document Number.

The physical Digital Identity is protected by physical security measures defined by each governmental organisations.

The logical Digital Identity 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 Digital Identity's chip.

Based on the ICAO definition, it defines the baseline security methods Passive Authentication and the optional advanced security methods Extended Access Control to and the Data Encryption of sensitive biometrics as optional security measure in the ICAO Doc 9303 [ICAO-9303] and Password Authenticated Connection Establishment [ICAO-TR-SAC]. The Passive Authentication Mechanism is performed completely and independently of the TOE by the TOE environment.

This security target addresses the protection of the logical Digital Identity (i) in integrity by write-only-once access control and by physical means, and (ii) in confidentiality by the Extended Access Control Mechanism. This security target addresses the Chip Authentication Version 1 described in [TR-EAC-1].

The confidentiality Password Authenticated Connection Establishment (PACE) is a mandatory security feature that shall be implemented by the TOE, too.

For PACE protocol according to [ICAO-TR-SAC] and [TR-EAC-1], the following steps shall be performed :

- (i) The Digital Identity encrypts a nonce with the shared password, derived from the PIN and transmits the encrypted nonce with the domain parameters to the terminal.
- (ii) The terminal recovers the nonce using the shared password, by (physically) reading the MRZ resp. CAN data.
- (iii) The Digital Identity and the terminal computer perform a Diffie-Hellmann key agreement together with the ephemeral domain parameters to create a shared secret. Both parties derive the session keys KMAC and KENC from the shared secret.
- (iv) Each party generates an authentication token, sends it to the other party and verifies the received token.

After successful key negotiation the terminal and the Digital Identity provide private communication (secure messaging) [ICAO-TR-SAC], [TR-EAC-1].

The security target requires the TOE to implement the Chip Authentication defined in [TR-EAC-1]. The Chip Authentication prevents data traces described in [ICAO-9303], informative appendix 7, A7.3.3. The Chip Authentication is provided by the following steps: (i) the inspection system communicates by means of secure messaging established by Basic Access Control, (ii) the inspection system reads and verifies by means of the Passive Authentication the authenticity of the DIGITALIDENTITY's Chip Authentication Public Key using the Document Security Object, (iii) the inspection system generates an ephemeral key pair, (iv) the TOE and the inspection system agree on two session keys for secure messaging in ENC\_MAC mode according to the Diffie-Hellman Primitive and (v) the inspection system verifies by means of received message authentication codes whether the DIGITALIDENTITY's chip was able or not to run this protocol properly (i.e. the TOE proves to be in possession of the Chip Authentication Private Key corresponding to the Chip Authentication Public Key used for derivation of the session keys). The Chip Authentication requires collaboration of the TOE and the TOE environment.

Depending on the personalization, some DG's can be read only with the Secure Messaging of the Chip Authenticate

The security target requires the TOE to implement the Extended Access Control as defined in [TR-EAC-1]. The Extended Access Control consists of two parts (i) the Chip Authentication Protocol Version 1 and (ii) the Terminal Authentication Protocol Version 1 (v.1). The Chip Authentication Protocol v.1 (i) authenticates the Digital Identity's chip to the inspection system and (ii) establishes secure messaging which is used by

Terminal Authentication v.1 to protect the confidentiality and integrity of data during their transmission from the TOE to the inspection system. Therefore Terminal Authentication v.1 can only be performed if Chip Authentication v.1 has been successfully executed. The Terminal Authentication Protocol v.1 consists of (i) the authentication of the inspection system as entity authorized by the receiving State or Organization through the issuing State, and (ii) an access control by the TOE to allow reading the reference data only to successfully authenticated authorized inspection systems. The issuing State or Organization authorizes the receiving State by means of certification the authentication public keys of Document Verifiers who create Inspection System Certificates.

The key for Chip authentication can be generated in the card (OBKG) or loaded into it. These operations take place at personalization time.

The renewal of the key for Chip authentication is authorize also in operational phase with granted authorisation (Global Platform ISD Authentication)

The PIN can be unblocked or modified with the PUK. After two false presentations of the PIN, the card is suspended. All PIN presentations (Right or false) are ignored during this suspended mode. To present the last try on the PIN, a PACE CAN need to be presented before allowing a new presentation of the PIN. If the presentation is correct, the PIN is unblocked (and the PIN try counter is reset). If the presentation is wrong, the PIN is blocked and only a PACE PUK can unblock it (and/or modified)  
The same mechanism is applied for false PUK presentations. When the PUK is blocked, the card is definitively blocked. The PUK can not be unlocked.

## 2.4 TOE LIFE-CYCLE

### 2.4.1 Actors

Actors	Identification
Integrated Circuit (IC) Developer	IFX
Embedded Software Developer	Thales
Integrated Circuit (IC) Manufacturer	IFX
Module manufacturer	Thales or IFX
Initializer/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 personalize the Digital Identity application for the holder by activities establishing the identity of the holder .
Card holder	The rightful holder of the Digital Identity document for whom the issuing State or Organization personalizes the Digital Identity Application.

**Table 1: Identification of the actors**

## 2.4.2 TOE Life Cycle

Phase (name)	Phase (card)	Actor	Comment
Development	1. MRTD application Development	Developer (Thales)	- The development of the MRTD application is integrated in the platform MultiApp V5.0.A. -Generation of principal HEX, mapping description - Script generation for initialization and pre-personalization
	2 HW Development	IC manufacturer (Infineon)	- Development of IC
Manufacturing	3a Mask manufacturing	IC manufacturer (Infineon)	Manufacturing of virgin chip integrated circuits embedding the Infineon flash Loader and protected by a dedicated transport key.
	3b (optional) Initialization / Pre-personalization	IC manufacturer (Infineon)	Loading of the Thales software (platform and applets on top based on script generated) – For WAFER init process only
	4.Module manufacturing	Module creation (Thales or Infineon)	IC packaging & testing
	5.a <i>Embedding if not done by supplier (see 5b Optional)</i>	<i>Form Factor manufacturer (Thales)</i>	<i>Put the module on a dedicated form factor (Card, Inlay, MFF2, other)</i>
	5.b Initialization / Pre-personalization	Pre-personalizer (Thales)	Loading of the Gemalto software (platform and applets on top of it based on script generated)
<b>TOE Delivery</b>	5.a <i>Embedding (Optional)</i>	<i>Form Factor manufacturer (done by supplier)</i>	<i>Put the module on a dedicated form factor (Card, Inlay, MFF2, other)</i>
Personalization	6 Personalization	Personalizer	- Personalization
Usage	7a Usage	Holder	The Issuer is responsible of card delivery to the end-user
	7b Update Instance	Personalizer	The issuer is responsible of the application instance update.

**Remark 1.** Initialization & pre-personalization operation could be done on module or on other form factor. The form factor does not affect the TOE security.

**Remark 2.** Alternative life cycle: wafer are shipped by IC manufacturer to form factor manufacturer and initialization /pre-personalization is done in IC Manufacturer site

**Remark 3.** For initialization/pre-personalization IC flash loader could be used based on the IC manufacturer recommendation.

**Remark 4.** Embedding (module inserted in the final form factor) will be done on an audited site if the *Embedding phase (5a) is before the TOE delivery.*

The TOE life cycle is described in terms of the four life cycle phases. (With respect to the [PP-IC-0084], the TOE life-cycle is additionally subdivided into 7 steps.)

Phase 1 “Development”:

(Step1) The TOE is developed in phase 1. The IC developer develops the integrated circuit, the IC Dedicated Software and the guidance documentation associated with these TOE components.

(Step2) The 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 IC Embedded Software (operating system), the eTravel application and the guidance documentation associated with these TOE components.

As a result, a flash mask is generated (HEX file) with initialisation and pre-personalisation scripts.

Phase 2 “Manufacturing”:

(Step3) In a first step the IC manufacturer produce virgin chip with IC Identification Data and the flash loader software. The IC is securely delivered from the IC manufacturer to the Card manufacturer.

(Step4) The Card manufacturer combines the IC with hardware for the contactless interface in the passport book

(Step5) The Card manufacturer (i) creates the MRTD application and (ii) equips MRTD’s chips with pre-personalization Data.

The pre-personalized MRTD together with the IC Identifier is securely delivered from the Card manufacturer to the Personalization Agent. The Card manufacturer also provides the relevant parts of the guidance documentation to the Personalization Agent.

Phase 3 “Personalization of the MRTD application”:

(Step6) (i) the writing of the TOE User Data and TSF Data into the logical MRTD and (v) configuration of the TSF if necessary. The step (i) is performed by the Personalization Agent following the customer personalisation requirements

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 on 7a. The personalization agent is allowed to change the instance of the application and the associated DGs and files on 7b.

### **2.4.3 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 or card are needed to represent a complete Digital Identity, nevertheless these parts are not inevitable for the secure operation of the TOE.

## 2.4.4 TOE Delivery

The TOE is delivered as a whole package with the Platform MultiApp V5.0.A. There is no distinction between the delivery of the platform MultiApp V5.0.A and this TOE. Please refer to section 2.5.4 on the platform security target [ST-Platform].

Regarding the documentation to be delivered, a part from the one described on section 2.5.4 of the platform Security Target [ST- Platform], the documentation found on [AGD] accompanies this TOE. The documentation is delivered in form of electronic documents (\*.pdf) by Gemalto's Technical representative via a secure file sharing platform download action.

Item type	Item	Reference/Version	Form of delivery
Document	eTravel 2.2, 2.3 and 2.5 Reference Manual	D1392378 C.10 October 22 <sup>nd</sup> , 2021	Electronic document via secure file download
Document	AGD PRE document - eTravel v2.5.A & Digital Identity 1.0.A	D1561826, Rev 1.0 26/10/2021	Electronic document via secure file download
Document	AGD OPE document - eTravel v2.5.A & Digital Identity 1.0.A	D1561823, Rev 1.0 26/10/2021	Electronic document via secure file download
Document	Global Dispatcher Personalization Applet	D1562740A November 19 <sup>th</sup> , 2021	Electronic document via secure file download
Document	MultiApp ID Operating System – Application Administration Service – Reference Manual	D1519213D December 13 <sup>h</sup> , 2021	Electronic document via secure file download

## 2.4.5 Involved Thales-DIS sites

- ❑ **Development and Project Management**
  - La Ciotat (France)
    - CC project management
  - Meudon (France)
    - eTravel development
  - Vantaa
    - eTravel development support
- ❑ **Manufacturing**
  - Gémenos, Singapore, Vantaa, Tczew, Curitiba, Montgomeryville, Pont Audemer
- ❑ **IT activities**
  - Gémenos, Calamba, Les Clayes, Marcoussi, Pune

### **3. CONFORMANCE CLAIMS**

#### **3.1 CC CONFORMANCE CLAIM**

This security target claims conformance to

- [CC-1]
- [CC-2]
- [CC-3]

As follows

- Part 2 extended,
- Part 3 conformant.

The

- [CEM] has to be taken into account.

#### **3.2 PP CLAIM,**

The Digital Identity 1.0.A PACE PIN EAC on MultiApp V5.0.A JCS Platform security target claims strict conformance to the Protection Profile [PP-MRTD-EACV2].

[PP-MRTD-EACV2] claims strict conformance to [PP-MRTD-SAC].

The Digital Identity 1.0.A PACE PIN EAC on MultiApp V5.0.A JCS Platform security target is a composite security target, including the IC security target [IFX-IC]. However, the security problem definition, the objectives, and the SFR of the IC are not described in this document.

#### **3.3 PACKAGE CLAIM**

This ST is conforming to assurance package EAL5 augmented with ALC\_DVS.2 and AVA\_VAN.5 defined in CC part 3 [CC-3].

#### **3.4 CONFORMANCE STATEMENT**

This ST strictly conforms to [PP-MRTD-EACV2].

## **4. SECURITY PROBLEM DEFINITION**

### **4.1 INTRODUCTION**

#### **4.1.1 Assets**

**Primary assets coming from the [PP-MRTD-EACV2] and [PP-MRTD-SAC].**

The primary assets to be protected by the TOE as long as they are in scope of the TOE are (please refer to the glossary in §0

Glossary and acronyms for the term definitions)

Object No.	Asset	Definition	Generic security property to be maintained by the current security policy
travel document			
1	user data stored on the TOE	All data (being not authentication data) stored in the context of the <i>ePassport</i> application of the travel document as defined in [ICAO-9303] and being allowed to be <i>read out</i> solely by an authenticated terminal acting as Basic Inspection System with PACE (in the sense of [ICAO-9303]). This asset covers 'User Data on the MRTD's chip', 'Logical MRTD Data' and 'Sensitive User Data' in [PP-MRTD-BAC].	Confidentiality <sup>1</sup> Integrity Authenticity
2	user data transferred between the TOE and the terminal connected (i.e. an authority represented by Basic Inspection System with PACE)	All data (being not authentication data) being transferred in the context of the <i>ePassport</i> application of the travel document as defined in [ICAO-9303] between the TOE and an authenticated terminal acting as Basic Inspection System with PACE (in the sense of [ICAO-9303]). User data can be received and sent (exchange $\hat{U}$ {receive, send}).	Confidentiality <sup>2</sup> Integrity Authenticity
3	travel document tracing data	Technical information about the current and previous locations of the travel document gathered unnoticeable by the travel document holder recognising the TOE not knowing any PACE password. TOE tracing data can be provided / gathered.	unavailability <sup>3</sup>

**Table 2: Primary assets**

All these primary assets represent User Data in the sense of the CC.

<sup>1</sup> Though not each data element stored on the TOE represents a secret, the specification [ICAO-TR-SAC] anyway requires securing their confidentiality: only terminals authenticated according to [ICAO-TR-SAC] can get access to the user data stored. They have to be operated according to P.Terminal.

<sup>2</sup> Though not each data element being transferred represents a secret, the specification [ICAO-TR-SAC] anyway requires securing their confidentiality: the secure messaging in encrypt-then-authenticate mode is required for all messages according to [ICAO-TR-SAC].

<sup>3</sup> represents a prerequisite for anonymity of the travel document holder

**Primary assets coming from the [AddendumDI]**

**Sensitive Identification User Data**

Person identification data, which have been classified as sensitive data by the Digital Identity document issuer.

Sensitive identification user data are a subset of all user data.

*Generic security property to be maintained by the current security policy: Confidentiality, Integrity, Authenticity*

Application note: Since sensitive identification user data are a subset of all user data, all threats and objectives applied to user data from [PP-MRTD-EACV2] are also applied to sensitive identification user data.

**Secondary assets coming from the [PP-MRTD-EACV2] and [PP-MRTD-SAC].**

The secondary assets also having to be protected by the TOE in order to achieve a sufficient protection of the primary assets are:

Object No.	Asset	Definition	Property to be maintained by the current security policy
travel document			
4	Accessibility to the TOE functions and data only for authorised subjects	Property of the TOE to restrict access to TSF and TSF-data stored in the TOE to authorised subjects only.	Availability
5	Genuineness of the TOE	Property of the TOE to be authentic in order to provide claimed security functionality in a proper way. This asset also covers 'Authenticity of the MRTD's chip' in [PP-MRTD-BAC].	Availability
6	TOE internal secret cryptographic keys	Permanently or temporarily stored secret cryptographic material used by the TOE in order to enforce its security functionality.	Confidentiality Integrity
7	TOE internal non-secret cryptographic material	Permanently or temporarily stored non-secret cryptographic (public) keys and other non-secret material (Document Security Object SOD containing digital signature) used by the TOE in order to enforce its security functionality.	Integrity Authenticity
8	travel document communication establishment authorisation data	Restricted-revealable <sup>4</sup> authorisation information for a human user being used for verification of the authorisation attempts as authorised user (PACE password). These data are stored in the TOE and are not to be send to it.	Confidentiality Integrity

**Table 3: Secondary assets**

The secondary assets represent TSF and TSF-data in the sense of the CC.

*Application note:* Due to interoperability reasons the 'ICAO Doc 9303' [ICAO-9303] requires that Basic Inspection Systems may have access to logical travel document data DG1, DG2, DG5 to DG16. The TOE is not in certified mode, if it is accessed using BAC [ICAO-9303]. Note that the BAC mechanism cannot resist attacks with high attack potential (cf. [PP-MRTD-BAC]). If supported, it is therefore recommended to use PACE instead of BAC. If nevertheless BAC has to be used, it is recommended to perform Chip Authentication v.1 before getting access to data (except DG14), as this mechanism is resistant to high potential attacks

A sensitive asset is the following more general one.

**Authenticity of the travel document's chip**

<sup>4</sup> The travel document holder may reveal, if necessary, his or her verification values of CAN and MRZ to an authorized person or device who definitely act according to respective regulations and are trustworthy.

The authenticity of the travel document's chip personalised by the issuing State or Organisation for the travel document holder is used by the traveller to prove his possession of a genuine travel document.

**Secondary assets coming from the [AddendumDI]**

The secondary assets represent TSF and TSF-data in the sense of the CC

**Digital Identity document Communication Establishment Authorization Data**

Restricted-revealable authorization information for a human user being used for verification of the authorization attempts as an authorized user (PACE PIN & PUK). These data are stored in the TOE, and are not sent to it.

*Generic security property to be maintained by the current security policy: Confidentiality, Integrity*

**Secret Digital Identity document Holder Authentication Data**

Secret authentication information for the Digital Identity document holder being used for verification of the authentication attempts as authorized Digital Identity document holder (sent PACE passwords, e.g. PIN or PUK).

*Generic security property to be maintained by the current security policy: Confidentiality, Integrity*

**4.1.2 Subjects**

This security target considers the following external entities and subjects, defined in [PP-MRTD-SAC]:

External Entity No.	Subject No.	Role	Definition
1	1	travel document holder	A person for whom the travel document Issuer has personalised the travel document <sup>5</sup> . This entity is commensurate with 'Card holder' in [ST-BAC]. Please note that a travel document holder can also be an attacker (s. below).
2	-	travel document presenter (traveller)	A person presenting the travel document to a terminal <sup>6</sup> and claiming the identity of the travel document holder. This external entity is commensurate with 'Traveller' in [ST-BAC]. Please note that a travel document presenter can also be an attacker (s. below).
3	2	Terminal	A terminal is any technical system communicating with the TOE through the contactless/contact interface. The role 'Terminal' is the default role for any terminal being recognised by the TOE as not being PACE authenticated ('Terminal' is used by the travel document presenter). This entity is commensurate with 'Terminal' in [ST-BAC].
-	-	Inspection System (IS)	A technical system used by the border control officer of the receiving State (i) examining an travel document presented by the traveller and verifying its authenticity and (ii) verifying the traveller as travel document holder.
4	3	Basic Inspection System with PACE (BIS-PACE)	A technical system being used by an inspecting authority <sup>7</sup> 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

<sup>5</sup> i.e. this person is uniquely associated with a concrete electronic Passport

<sup>6</sup> in the sense of [4]

<sup>7</sup> concretely, by a control officer

External Entity No.	Subject No.	Role	Definition
			password (PACE password) and supports Passive Authentication. See also §0 above.
-	-	Extended Inspection System (EIS)	The Extended Inspection System (EIS) performs the Advanced Inspection Procedure ( <b>Error! Reference source not found.</b> ) and therefore (i) contains a terminal for the communication with the travel document's chip, (ii) implements the terminals part of PACE and/or BAC; (iii) gets the authorization to read the logical travel document either under PACE or BAC by optical reading the travel document providing this information. (iv) implements the Terminal Authentication and Chip Authentication Protocols both Version 1 according to [TR-EAC-1] and (v) is authorized by the issuing State or Organisation through the Document Verifier of the receiving State to read the sensitive biometric reference data. Security attributes of the EIS are defined by means of the Inspection System Certificates. BAC may only be used if supported by the TOE. If both PACE and BAC are supported by the TOE and the BIS, PACE must be used.
5	-	Document Signer (DS)	An organisation enforcing the policy of the CSCA and signing the Document Security Object stored on the travel document for passive authentication. A Document Signer is authorised by the national CSCA issuing the Document Signer Certificate (C <sub>DS</sub> ), see [PKI]. This role is usually delegated to a Personalisation Agent.
6	-	Country Signing Certification Authority (CSCA)	An organisation enforcing the policy of the travel document Issuer with respect to confirming correctness of user and TSF data stored in the travel document. The CSCA represents the country specific root of the PKI for the travel document and creates the Document Signer Certificates within this PKI. The CSCA also issues the self-signed CSCA Certificate (C <sub>CSCA</sub> ) having to be distributed by strictly secure diplomatic means, see. [PKI], 5.5.1.
7	4	Personalisation Agent	An organisation acting on behalf of the travel document Issuer to personalise the travel document for the travel document holder by some or all of the following activities: (i) establishing the identity of the travel document holder for the biographic data in the travel document, (ii) enrolling the biometric reference data of the travel document holder, (iii) writing a subset of these data on the physical travel document (optical personalisation) and storing them in the travel document (electronic personalisation) for the travel document holder as defined in [PKI], (iv) writing the document details data, (v) writing the initial TSF data, (vi) signing the Document Security Object defined in [PKI] (in the role of DS). Please note that the role 'Personalisation Agent' may be distributed among several institutions according to the operational policy of the travel document Issuer. This entity is commensurate with 'Personalisation agent' in [ST-BAC].
8	5	Manufacturer	Generic term for the IC Manufacturer producing integrated circuit and the travel document Manufacturer completing the IC to the travel document. The Manufacturer is the default user of the TOE during the manufacturing life cycle phase <sup>8</sup> . The TOE itself does not distinguish between the IC Manufacturer and travel document Manufacturer using this role Manufacturer.

<sup>8</sup> cf. also par. 1.2.3 in sec. 1.2.3 above

External Entity No.	Subject No.	Role	Definition
			This entity is commensurate with 'Manufacturer' in [ST-BAC].
9	-	Attacker	A threat agent (a person or a process acting on his behalf) trying (i) to undermine the security policy defined by the current ST, especially to change properties of the assets having to be maintained, (ii) to manipulate the logical travel document without authorization, (iii) to read sensitive biometric reference data (i.e. EF.DG3, EF.DG4), (iv) to forge a genuine travel document, or (iv) to trace a travel document. The attacker is assumed to possess an at most <i>high</i> attack potential. Please note that the attacker might 'capture' any subject role recognised by the TOE. This external entity is commensurate with 'Attacker' in [ST-BAC].
10	-	Country Verifying Certification Authority (CVCA)	The Country Verifying Certification Authority (CVCA) enforces the privacy policy of the issuing State or Organisation with respect to the protection of sensitive biometric reference data stored in the travel document. The CVCA represents the country specific root of the PKI of Inspection Systems and creates the Document Verifier Certificates within this PKI. The updates of the public key of the CVCA are distributed in the form of Country Verifying CA Link-Certificates.
11	-	Document Verifier (DV)	The Document Verifier (DV) enforces the privacy policy of the receiving State with respect to the protection of sensitive biometric reference data to be handled by the Extended Inspection Systems. The Document Verifier manages the authorization of the Extended Inspection Systems for the sensitive data of the travel document in the limits provided by the issuing States or Organisations in the form of the Document Verifier Certificates.

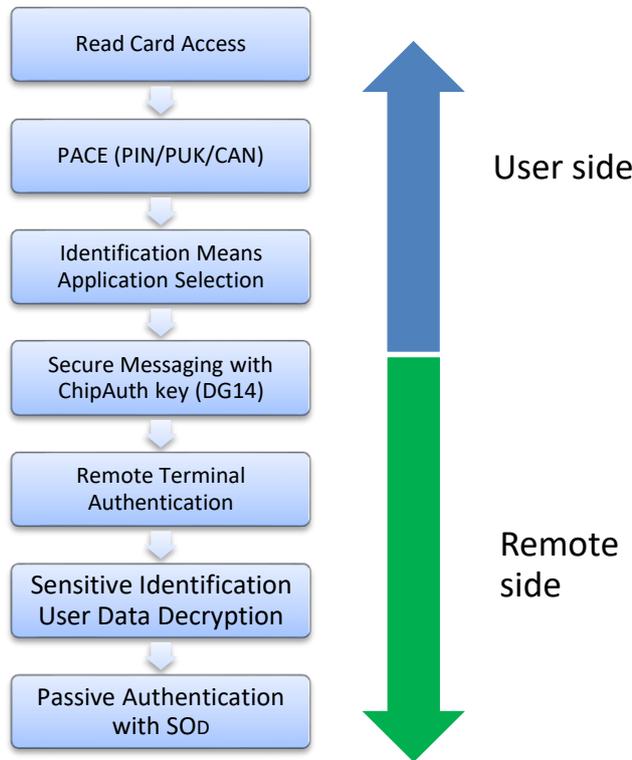
**Table 4: Subjects and external entities<sup>9</sup>**

*Application note:* An impostor is attacking the inspection system as TOE IT environment independent on using a genuine, counterfeit or forged travel document. Therefore, the impostor may use results of successful attacks against the TOE but the attack itself is not relevant for the TOE.

<sup>9</sup> This table defines external entities and subjects in the sense of [CC-1]. Subjects can be recognised by the TOE independent of their nature (human or technical user). As result of an appropriate identification and authentication process, the TOE creates – for each of the respective external entity – an 'image' inside and 'works' then with this TOE internal image (also called subject in [CC-1]). From this point of view, the TOE itself perceives only 'subjects' and, for them, does not differ between 'subjects' and 'external entities'. There is no dedicated subject with the role 'attacker' within the current security policy, whereby an attacker might 'capture' any subject role recognised by the TOE.

*Application note: PACE Terminal*

A technical system verifying correspondence between the password stored in the Digital Identity document and the related value presented to the terminal by the Digital Identity document presenter.



**Figure 2: Remote Inspection Procedure**

A PACE terminal performs the Remote Inspection Procedure (figure 2) and therefore (i) contains a terminal for the communication with the Digital Identity document’s chip, (ii) implements the terminal part of the PACE protocol, (iii) authenticates the Digital Identity holder to the Digital Identity document using a shared password (PIN, PUK or CAN) and (iv) implements the Chip Authentication Protocols Version 1 according to [ICAO-9303].

The remote terminal authentication, the decryption of sensitive identification user data and the passive authentication are performed outside of the TOE.

**4.2 ASSUMPTIONS**

The assumptions describe the security aspects of the environment in which the TOE will be used or is intended to be used.

**A.Passive\_Auth PKI for Passive Authentication**

The issuing and receiving States or Organisations establish a public key infrastructure for passive authentication i.e. digital signature creation and verification for the logical travel document. The issuing State or Organisation runs a Certification Authority (CA) which securely generates, stores and uses the Country Signing CA Key pair. The CA keeps the Country Signing CA Private Key secret and is recommended to distribute the Country Signing CA Public Key to ICAO, all receiving States maintaining its integrity. The Document Signer (i) generates the Document Signer Key Pair, (ii) hands over the Document Signer Public Key to the CA for certification, (iii) keeps the Document Signer Private Key secret and (iv) uses securely the Document Signer Private Key for signing the Document Security Objects of the travel documents. The CA creates the Document Signer Certificates for the Document Signer Public Keys that are distributed to the receiving States and Organisations. It is assumed that the Personalisation Agent ensures that the Document Security Object contains only the hash values of genuine user data according to [PKI].

**A.Insp\_Sys Inspection Systems for global interoperability**

The Extended Inspection System (EIS) for global interoperability (i) includes the Country Signing CA Public Key and (ii) implements the terminal part of PACE [ICAO-9303] and/or BAC [ST-BAC]. BAC may only be used if supported by the TOE. If both PACE and BAC are supported by the TOE and the IS, PACE must be used. The EIS reads the logical travel document under PACE or BAC and performs the Chip Authentication v.1 to verify the logical travel document and establishes secure messaging. EIS supports the Terminal Authentication Protocol v.1 in order to ensure access control and is authorized by the issuing State or Organisation through the Document Verifier of the receiving State to read the sensitive biometric reference data.

**Justification:**

The assumption A.Insp\_Sys does not confine the security objectives of [[PP-MRTD-SAC] as it repeats the requirements of P.Terminal and adds only assumptions for the Inspection Systems for handling the EAC functionality of the TOE.

**A.Auth\_PKI PKI for Inspection Systems**

The issuing and receiving States or Organisations establish a public key infrastructure for card verifiable certificates of the Extended Access Control. The Country Verifying Certification Authorities, the Document Verifier and Extended Inspection Systems hold authentication key pairs and certificates for their public keys encoding the access control rights. The Country Verifying Certification Authorities of the issuing States or Organisations are signing the certificates of the Document Verifier and the Document Verifiers are signing the certificates of the Extended Inspection Systems of the receiving States or Organisations. The issuing States or Organisations distribute the public keys of their Country Verifying Certification Authority to their travel document's chip.

**Justification:**

This assumption only concerns the EAC part of the TOE. The issuing and use of card verifiable certificates of the Extended Access Control is neither relevant for the PACE part of the TOE nor will the security objectives of [PP-MRTD-SAC] be restricted by this assumption. For the EAC functionality of the TOE the assumption is necessary because it covers the pre-requisite for performing the Terminal Authentication Protocol Version 1.

**4.3 THREATS**

This section describes the threats to be averted by the TOE independently or in collaboration with its IT environment. These threats result from the TOE method of use in the operational environment and the assets stored in or protected by the TOE.

The TOE in collaboration with its IT environment shall avert the threats as specified below.

**T.Skimming Skimming travel document / Capturing Card-Terminal Communication**

- Adverse action: An attacker imitates an inspection system in order to get access to the *user data stored on or transferred between the TOE and the inspecting authority connected via the contactless/contact interface of the TOE.*
- Threat agent: having high attack potential, cannot read and does not know the correct value of the shared password (PACE password) in advance.
- Asset: confidentiality of logical travel document data

*Application Note:* When using BIS-BAC MultiApp V5.0.A cannot avert this threat in the context of the security policy defined in this ST.

*Application Note:* MRZ is printed and CAN is printed or stuck on the travel document. Please note that neither CAN nor MRZ effectively represent secrets, but are restricted-revealable, cf. OE.Travel\_Document\_Holder.

### **T.Eavesdropping Eavesdropping on the communication between the TOE and PACE terminal**

- Adverse action: An attacker is listening to the communication between the travel document and the PACE authenticated BIS-PACE in order to gain the *user data transferred between the TOE and the terminal connected*.
- Threat agent: having high attack potential, cannot read and does not know the correct value of the shared password (PACE password) in advance.
- Asset: confidentiality of logical travel document data

*Application Note:* When using BIS-BAC MultiApp V5.0.A cannot avert this threat in the context of the security policy defined in this Security Target.

### **T.Tracing Tracing travel document**

- Adverse action: An attacker tries to gather *TOE tracing data* (i.e. to trace the movement of the travel document) unambiguously identifying it remotely by establishing or listening to a communication via the contactless/contact interface of the TOE.
- Threat agent: having high attack potential, cannot read and does not know the correct value of the shared password (PACE password) in advance.
- Asset: privacy of the travel document holder

*Application Note:* This Threat completely covers and extends “T.Chip-ID” from [ST--BAC].

*Application Note:* When using BIS-BAC MultiApp V5.0.A cannot avert this threat in the context of the security policy defined in this Security Target, see also §0 above.

*Application Note:* Since the Standard Inspection Procedure does not support any unique-secret-based authentication of the travel document’s chip (no Chip Authentication or Active Authentication), a threat like T.Counterfeit (counterfeiting travel document)<sup>10</sup> cannot be averted by the current TOE.

### **T.Forgery Forgery of Data**

- Adverse action: An attacker fraudulently alters the *User Data* or/and *TSF-data stored on the travel document or/and exchanged between the TOE and the terminal connected* in order to outsmart the PACE (or EAC) authenticated BIS-PACE (or EIS) by means of changed travel document holder’s related reference data (like biographic or biometric data). The attacker does it in such a way that the terminal connected perceives these modified data as authentic one.
- Threat agent: having high attack potential
- Asset: integrity of the travel document

### **T.Abuse-Func Abuse of Functionality**

- Adverse action: An attacker may use functions of the TOE which shall not be used in TOE operational phase in order (i) to manipulate or to disclose the *User Data stored in the TOE*, (ii) to manipulate or to disclose the *TSF-data stored in the TOE* or (iii) to manipulate (bypass, deactivate or modify) *soft-coded security functionality of the TOE*. This threat addresses the misuse of the functions for the initialisation and personalisation in the operational phase after delivery to the travel document holder.
- Threat agent: having high attack potential, being in possession of one or more legitimate travel documents
- Asset: integrity and authenticity of the travel document, availability of the functionality of the travel document

*Application Note:* Details of the relevant attack scenarios depend, for instance, on the capabilities of the test features provided by the IC Dedicated Test Software being not specified here.

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<sup>10</sup> Such a threat might be formulated like: ‘An attacker produces an unauthorised copy or reproduction of a *genuine* travel document to be used as part of a counterfeit Passport: he or she may generate a new data set or extract completely or partially the data from a genuine travel document and copy them on another functionally appropriate chip to imitate this genuine travel document. This violates the authenticity of the travel document being used for authentication of a travel document presenter as the travel document holder’.

### **T.Information\_Leakage Information Leakage from travel document**

- Adverse action: An attacker may exploit information leaking from the TOE during its usage in order to disclose confidential *User Data* or/and *TSF-data stored on the travel document* or/and *exchanged between the TOE and the terminal connected*. The information leakage may be inherent in the normal operation or caused by the attacker.
- Threat agent: having high attack potential
- Asset: confidentiality of User Data and TSF-data of the travel document

*Application Note:* Leakage may occur through emanations, variations in power consumption, I/O characteristics, clock frequency, or by changes in processing time requirements. This leakage may be interpreted as a covert channel transmission, but is more closely related to measurement of operating parameters which may be derived either from measurements of the contactless interface (emanation) or direct measurements (by contact to the chip still available even for a contactless chip) and can then be related to the specific operation being performed. Examples are Differential Electromagnetic Analysis (DEMA) and Differential Power Analysis (DPA). Moreover the attacker may try actively to enforce information leakage by fault injection (e.g. Differential Fault Analysis).

### **T.Phys-Tamper Physical Tampering**

- Adverse action: An attacker may perform physical probing of the travel document in order (i) to disclose the TSF-data, or (ii) to disclose/reconstruct the TOE's Embedded Software. An attacker may physically modify the travel document in order to alter (i) its security functionality (hardware and software part, as well), (ii) the User Data or the TSF-data stored on the travel document.
- Threat agent: high attack potential, being in possession of one or more legitimate travel documents
- Asset: integrity and authenticity of the travel document, availability of the functionality of the travel document, confidentiality of User Data and TSF-data of the travel document

*Application Note:* Physical tampering may be focused directly on the disclosure or manipulation of the user data (e.g. the biometric reference data for the inspection system) or the TSF data (e.g. authentication key of the travel document) or indirectly by preparation of the TOE to following attack methods by modification of security features (e.g. to enable information leakage through power analysis). Physical tampering requires a direct interaction with the travel document's internals. Techniques commonly employed in IC failure analysis and IC reverse engineering efforts may be used. Before that, hardware security mechanisms and layout characteristics need to be identified. Determination of software design including treatment of the user data and the TSF data may also be a pre-requisite. The modification may result in the deactivation of a security function. Changes of circuitry or data can be permanent or temporary.

### **T.Malfunction Malfunction due to Environmental Stress**

- Adverse action: An attacker may cause a malfunction the travel document's hardware and Embedded Software by applying environmental stress in order to (i) deactivate or modify security features or functionality of the TOE' hardware or to (ii) circumvent, deactivate or modify security functions of the TOE's Embedded Software. This may be achieved e.g. by operating the travel document outside the normal operating conditions, exploiting errors in the travel document's Embedded Software or misusing administrative functions. To exploit these vulnerabilities an attacker needs information about the functional operation.
- Threat agent: having high attack potential, being in possession of one or more legitimate travel documents, having information about the functional operation
- Asset: integrity and authenticity of the travel document, availability of the functionality of the travel document, confidentiality of User Data and TSF-data of the travel document

*Application note:* A malfunction of the TOE may also be caused using a direct interaction with elements on the chip surface. This is considered as being a manipulation (refer to the threat T.Phys-Tamper) assuming a detailed knowledge about TOE's internals.

**T.Read\_Sensitive\_Data    Read the sensitive biometric reference data**

**Adverse action:** An attacker tries to gain the sensitive biometric reference data through the communication interface of the travel document's chip.  
The attack T.Read\_Sensitive\_Data is similar to the threat T.Skimming (cf. [ST-BAC]) in respect of the attack path (communication interface) and the motivation (to get data stored on the travel document's chip) but differs from those in the asset under the attack (sensitive biometric reference data vs. digital MRZ, digitized portrait and other data), the opportunity (i.e. knowing the PACE Password) and therefore the possible attack methods. Note, that the sensitive biometric reference data are stored only on the travel document's chip as private sensitive personal data whereas the MRZ data and the portrait are visually readable on the physical part of the travel document as well.

**Threat agent:** having high attack potential, knowing the PACE Password, being in possession of a legitimate travel document.

**Asset:** confidentiality of logical travel document sensitive user data (i.e. biometric reference)

**T.Counterfeit    Counterfeit of travel document chip data**

**Adverse action:** An attacker with high attack potential produces an unauthorized copy or reproduction of a genuine travel document's chip to be used as part of a counterfeit travel document. This violates the authenticity of the travel document's chip used for authentication of a traveller by possession of a travel document.  
The attacker may generate a new data set or extract completely or partially the data from a genuine travel document's chip and copy them to another appropriate chip to imitate this genuine travel document's chip.

**Threat agent:** having high attack potential, being in possession of one or more legitimate travel documents.

**Asset:** authenticity of user data stored on the TOE

**T.Sensitive\_ID\_User\_Data    Unauthorized access to sensitive ID user data**

**Adverse action:** An attacker tries to gain access to sensitive identification user data through the communication interface of the Digital Identity document's chip. The threat T.Sensitive\_ID\_User\_Data is similar to the threat T.Skimming from [PP-MRTD-EACV2] w.r.t. the attack path (communication interface) and the motivation (to get data stored on the Digital Identity document's chip) but differs from those in the asset under the attack (sensitive identification user data vs. CAN, PIN, PUK and other data), the opportunity (i.e. knowing the PACE Password) and therefore the possible attack methods.

**Threat agent:** having high attack potential, knowing the PACE passwords, being in possession of one or more legitimate Digital Identity document.

**Asset:** confidentiality of sensitive identification user data stored on the TOE

#### 4.4 ORGANIZATIONAL SECURITY POLICIES

The TOE shall comply with the following Organisational Security Policies (OSP) as security rules, procedures, practices, or guidelines imposed by an organisation upon its operations (see CC part 1, sec. 3.2).

##### **P.Manufact Manufacturing of the travel document's chip**

The Initialization Data are written by the IC Manufacturer to identify the IC uniquely. The travel document Manufacturer writes the Pre-personalisation Data which contains at least the Personalisation Agent Key.

##### **P.Pre-Operational Pre-operational handling of the travel document**

- 1.) The travel document Issuer issues the travel document and approves it using the terminals complying with all applicable laws and regulations.
- 2.) The travel document Issuer guarantees correctness of the user data (amongst other of those, concerning the travel document holder) and of the TSF-data permanently stored in the TOE<sup>11</sup>.
- 3.) The travel document Issuer uses only such TOE's technical components (IC) which enable traceability of the travel documents in their manufacturing and issuing life cycle phases, i.e. before they are in the operational phase, cf. sec. 1.2.3 above.
- 4.) If the travel document Issuer authorises a Personalisation Agent to personalise the travel document for travel document holders, the travel document Issuer has to ensure that the Personalisation Agent acts in accordance with the travel document Issuer's policy.

##### **P.Card\_PKI PKI for Passive Authentication (issuing branch)**

*Application Note 1:* The description below states the responsibilities of involved parties and represents the logical, but not the physical structure of the PKI. Physical distribution ways shall be implemented by the involved parties in such a way that all certificates belonging to the PKI are securely distributed / made available to their final destination, e.g. by using directory services.

- 1.) The travel document Issuer shall establish a public key infrastructure for the passive authentication, i.e. for digital signature creation and verification for the travel document. For this aim, he runs a Country Signing Certification Authority (CSCA). The travel document Issuer shall publish the CSCA Certificate ( $C_{CSCA}$ ).
- 2.) The CSCA shall securely generate, store and use the CSCA key pair. The CSCA shall keep the CSCA Private Key secret and issue a self-signed CSCA Certificate ( $C_{CSCA}$ ) having to be made available to the travel document Issuer by strictly secure means, see [PKI], 5.5.1. The CSCA shall create the Document Signer Certificates for the Document Signer Public Keys ( $C_{DS}$ ) and make them available to the travel document Issuer, see [PKI], 5.5.1.
- 3.) A Document Signer shall (i) generate the Document Signer Key Pair, (ii) hand over the Document Signer Public Key to the CSCA for certification, (iii) keep the Document Signer Private Key secret and (iv) securely use the Document Signer Private Key for signing the Document Security Objects of travel documents.

##### **P.Trustworthy\_PKI Trustworthiness of PKI**

The CSCA shall ensure that it issues its certificates exclusively to the rightful organisations (DS) and DSs shall ensure that they sign exclusively correct Document Security Objects to be stored on the travel document.

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<sup>11</sup> cf. Table 2 and Table 3 above

## **P.Terminal Abilities and trustworthiness of terminals**

The Basic Inspection Systems with PACE (BIS-PACE) shall operate their terminals as follows:

- 1.) The related terminals (basic inspection system, cf. above) shall be used by terminal operators and by travel document holders as defined in [PKI].
- 2.) They shall implement the terminal parts of the PACE protocol [ICAO-9303], of the Passive Authentication [PKI] and use them in this order<sup>12</sup>. The PACE terminal shall use randomly and (almost) uniformly selected nonces, if required by the protocols (for generating ephemeral keys for Diffie-Hellmann).
- 3.) The related terminals need not to use any own credentials.
- 4.) They shall also store the Country Signing Public Key and the Document Signer Public Key (in form of C<sub>CSCA</sub> and C<sub>DS</sub>) in order to enable and to perform Passive Authentication (determination of the authenticity of data groups stored in the travel document, [PKI]).
- 5.) The related terminals and their environment shall ensure confidentiality and integrity of respective data handled by them (e.g. confidentiality of PACE passwords, integrity of PKI certificates, etc.), where it is necessary for a secure operation of the TOE according to this current Security Target.

### **P.Sensitive\_Data Privacy of sensitive biometric reference data**

The biometric reference data of finger(s) (EF.DG3) and iris image(s) (EF.DG4) are sensitive private personal data of the travel document holder. The sensitive biometric reference data can be used only by inspection systems which are authorized for this access at the time the travel document is presented to the inspection system (Extended Inspection Systems). The issuing State or Organisation authorizes the Document Verifiers of the receiving States to manage the authorization of inspection systems within the limits defined by the Document Verifier Certificate. The travel document's chip shall protect the confidentiality and integrity of the sensitive private personal data even during transmission to the Extended Inspection System after Chip Authentication Version 1.

### **P.Personalisation Personalisation of the travel document by issuing State or Organisation only**

The issuing State or Organisation guarantees the correctness of the biographical data, the printed portrait and the digitized portrait, the biometric reference data and other data of the logical travel document with respect to the travel document holder. The personalisation of the travel document for the holder is performed by an agent authorized by the issuing State or Organisation only.

### **P.Activ\_Auth Active Authentication**

The TOE implements the active authentication protocol as described in [ICAO-9303].

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<sup>12</sup> This order is commensurate with [ICAO-TR-SAC].

## **5. SECURITY OBJECTIVES**

This chapter describes the security objectives for the TOE and the security objectives for the TOE environment. The security objectives for the TOE environment are separated into security objectives for the development and production environment and security objectives for the operational environment.

### **5.1 SECURITY OBJECTIVES FOR THE TOE**

This section describes the security objectives for the TOE addressing the aspects of identified threats to be countered by the TOE and organisational security policies to be met by the TOE.

#### **OT.Data\_Integrity Integrity of Data**

The TOE must ensure integrity of the User Data and the TSF-data stored on it by protecting these data against unauthorised modification (physical manipulation and unauthorised modifying). The TOE must ensure integrity of the User Data and the TSF-data during their exchange between the TOE and the terminal connected (and represented by PACE authenticated BIS-PACE) after the PACE Authentication.

#### **OT.Data\_Authenticity Authenticity of Data**

The TOE must ensure authenticity of the User Data and the TSF-data stored on it by enabling verification of their authenticity at the terminal-side. The TOE must ensure authenticity of the User Data and the TSF-data during their exchange between the TOE and the terminal connected (and represented by PACE authenticated BIS-PACE) after the PACE Authentication. It shall happen by enabling such a verification at the terminal-side (at receiving by the terminal) and by an active verification by the TOE itself (at receiving by the TOE).

#### **OT.Data\_Confidentiality Confidentiality of Data**

The TOE must ensure confidentiality of the User Data and the TSF-data by granting read access only to the PACE authenticated BIS-PACE connected. The TOE must ensure confidentiality of the User Data and the TSF-data during their exchange between the TOE and the terminal connected (and represented by PACE authenticated BIS-PACE) after the PACE Authentication.

#### **OT.Tracing Tracing travel document**

The TOE must prevent gathering TOE tracing data by means of unambiguous identifying the travel document remotely through establishing or listening to a communication via the contactless/contact interface of the TOE without knowledge of the correct values of shared passwords (PACE passwords) in advance.

*Application note:* Since the Standard Inspection Procedure does not support any unique-secret-based authentication of the travel document's chip (no Chip Authentication), a security objective like OT.Chip\_Auth\_Proof (proof of travel document authenticity) cannot be achieved by the current TOE.

#### **OT.Prot\_Abuse\_Func Protection against Abuse of Functionality**

The TOE must prevent that functions of the TOE, which may not be used in TOE operational phase, can be abused in order (i) to manipulate or to disclose the User Data stored in the TOE, (ii) to manipulate or to disclose the TSF-data stored in the TOE, (iii) to manipulate (bypass, deactivate or modify) soft-coded security functionality of the TOE.

#### **OT.Prot\_Inf\_Leak Protection against Information Leakage**

The TOE must provide protection against disclosure of confidential User Data or/and TSF-data stored and/or processed by the travel document

- by measurement and analysis of the shape and amplitude of signals or the time between events found by measuring signals on the electromagnetic field, power consumption, clock, or I/O lines,
- by forcing a malfunction of the TOE and/or
- by a physical manipulation of the TOE.

*Application note:* This objective pertains to measurements with subsequent complex signal processing due to normal operation of the TOE or operations enforced by an attacker.

#### **OT.Prot\_Phys\_Tamper Protection against Physical Tampering**

The TOE must provide protection of confidentiality and integrity of the User Data, the TSF-data and the travel document's Embedded Software by means of

- measuring through galvanic contacts representing a direct physical probing on the chip's 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 electrical charges (using tools used in solid-state physics research and IC failure analysis),
- manipulation of the hardware and its security functionality, as well as
- controlled manipulation of memory contents (User Data, TSF-data)

with a prior

- reverse-engineering to understand the design and its properties and functionality.

#### **OT.Prot\_Malfunction Protection against Malfunctions**

The TOE must ensure its correct operation. The TOE must prevent its operation outside the normal operating conditions where reliability and secure operation have not been proven or tested. This is to prevent functional errors in the TOE. The environmental conditions may include external energy (esp. electromagnetic) fields, voltage (on any contacts), clock frequency or temperature.

The following TOE security objectives address the aspects of identified threats to be countered *involving TOE's environment*.

#### **OT.Identification Identification of the TOE**

The TOE must provide means to store Initialisation<sup>13</sup> and Pre-Personalisation Data in its non-volatile memory. The Initialisation Data must provide a unique identification of the IC during the manufacturing and the card issuing life cycle phases of the travel document. The storage of the Pre-Personalisation data includes writing of the Personalisation Agent Key(s).

#### **OT.AC\_Pers Access Control for Personalisation of logical MRTD**

The TOE must ensure that the logical travel document data in EF.DG1 to EF.DG16, the Document Security Object according to LDS [PKI] and the TSF data can be written by authorized Personalisation Agents only. The logical travel document data in EF.DG1 to EF.DG16 and the TSF data may be written only during and cannot be changed after personalisation of the document.

*Application note:* The OT.AC\_Pers implies that the data of the LDS groups written during personalisation for travel document holder (at least EF.DG1 and EF.DG2) can not be changed using write access after personalisation.

#### **OT.Sens\_Data\_Conf Confidentiality of sensitive biometric reference data**

The TOE must ensure the confidentiality of the sensitive biometric reference data (EF.DG3 and EF.DG4) by granting read access only to authorized Extended Inspection Systems. The authorization of the inspection system is drawn from the Inspection System Certificate used for the successful authentication and shall be a non-strict subset of the authorization defined in the Document Verifier Certificate in the certificate chain to the Country Verifier Certification Authority of the issuing State or Organisation. The TOE must ensure the confidentiality of the logical travel document data during their transmission to the Extended Inspection System. The confidentiality of the sensitive biometric reference data shall be protected against attacks with high attack potential.

#### **OT.Chip\_Auth\_Proof Proof of the travel document's chip authenticity**

The TOE must support the Inspection Systems to verify the identity and authenticity of the travel document's chip as issued by the identified issuing State or Organisation by means of the Chip Authentication Version 1 as defined in [TR-EAC-1]. The authenticity proof provided by travel document's chip shall be protected against attacks with high attack potential.

*Application note:* The OT.Chip\_Auth\_Proof implies the travel document's chip to have (i) a unique identity as given by the travel document's Document Number, (ii) a secret to prove its identity by knowledge i.e. a private authentication key as TSF data. The TOE shall protect this TSF data to prevent their misuse. The terminal shall have the reference data to verify the authentication attempt of travel document's chip i.e. a certificate

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<sup>13</sup> amongst other, IC Identification data

for the Chip Authentication Public Key that matches the Chip Authentication Private Key of the travel document's chip. This certificate is provided by (i) the Chip Authentication Public Key (EF.DG14) in the LDS defined in [ICAO-9303] and (ii) the hash value of DG14 in the Document Security Object signed by the Document Signer.

#### **OT.Activ\_Auth\_Proof Proof of MRTD's chip authenticity through AA**

The TOE must support the General Inspection Systems to verify the identity and authenticity of the MRTD's chip as issued by the identified issuing State or Organization by means of the Active Authentication as defined in [ICAO-9303]. The authenticity proof through AA provided by MRTD's chip shall be protected against attacks with high attack potential.

## **5.2 SECURITY OBJECTIVES FOR THE OPERATIONAL ENVIRONMENT**

### **Travel document Issuer as the general responsible**

The travel document Issuer as the general responsible for the global security policy related will implement the following security objectives for the TOE environment:

#### **OE.Legislative\_Compliance Issuing of the travel document**

The travel document Issuer must issue the travel document and approve it using the terminals complying with all applicable laws and regulations.

### **Travel document Issuer and CSCA: travel document's PKI (issuing) branch**

The travel document Issuer and the related CSCA will implement the following security objectives for the TOE environment:

#### **OE.Passive\_Auth\_Sign Authentication of travel document by Signature**

The travel document Issuer has to establish the necessary public key infrastructure as follows: the CSCA acting on behalf and according to the policy of the travel document Issuer must (i) generate a cryptographically secure CSCA Key Pair, (ii) ensure the secrecy of the CSCA Private Key and sign Document Signer Certificates in a secure operational environment, and (iii) publish the Certificate of the CSCA Public Key ( $C_{CSCA}$ ). Hereby authenticity and integrity of these certificates are being maintained. A Document Signer acting in accordance with the CSCA policy must (i) generate a cryptographically secure Document Signing Key Pair, (ii) ensure the secrecy of the Document Signer Private Key, (iii) hand over the Document Signer Public Key to the CSCA for certification, (iv) sign Document Security Objects of genuine travel documents in a secure operational environment only. The digital signature in the Document Security Object relates to all hash values for each data group in use according to [PKI]. The Personalisation Agent has to ensure that the Document Security Object contains only the hash values of genuine user data according to [PKI]. The CSCA must issue its certificates exclusively to the rightful organisations (DS) and DSs must sign exclusively correct Document Security Objects to be stored on travel document.

#### **OE.Personalisation Personalisation of travel document**

The travel document Issuer must ensure that the Personalisation Agents acting on his behalf (i) establish the correct identity of the travel document holder and create the biographical data for the travel document, (ii) enrol the biometric reference data of the travel document holder, (iii) write a subset of these data on the physical Passport (optical personalisation) and store them in the travel document (electronic personalisation) for the travel document holder as defined in [PKI]<sup>14</sup>, (iv) write the document details data, (v) write the initial TSF data, (vi) sign the Document Security Object defined in [PKI] (in the role of a DS).

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<sup>14</sup> see also [PKI] , sec. 10

**Terminal operator: Terminal's receiving branch****OE.Terminal Terminal operating**

The terminal operators must operate their terminals as follows:

- 1.) The related terminals (basic inspection systems, cf. above) are used by terminal operators and by travel document holders as defined in [PKI].
- 2.) The related terminals implement the terminal parts of the PACE protocol [ICAO-9303], of the Passive Authentication [ICAO-9303] (by verification of the signature of the Document Security Object) and use them in this order<sup>15</sup>. The PACE terminal uses randomly and (almost) uniformly selected nonces, if required by the protocols (for generating ephemeral keys for Diffie-Hellmann).
- 3.) The related terminals need not to use any own credentials.
- 4.) The related terminals securely store the Country Signing Public Key and the Document Signer Public Key (in form of C<sub>CSCA</sub> and C<sub>DS</sub>) in order to enable and to perform Passive Authentication of the travel document (determination of the authenticity of data groups stored in the travel document, [PKI]).
- 5.) The related terminals and their environment must ensure confidentiality and integrity of respective data handled by them (e.g. confidentiality of the PACE passwords, integrity of PKI certificates, etc.), where it is necessary for a secure operation of the TOE according to this current Security Target.

**Travel document holder Obligations****OE.Travel\_Document\_Holder Travel document holder Obligations**

The travel document holder may reveal, if necessary, his or her verification values of the PACE password to an authorized person or device who definitely act according to respective regulations and are trustworthy.

**OE.Active\_Auth\_Sign Active Authentication of logical MRTD by Signature**

The issuing State or Organization has to establish the necessary public key infrastructure in order to (i) generate the MRTD's Active Authentication Key Pair, (ii) ensure the secrecy of the MRTD's Active Authentication Private Key, sign and store the Active Authentication Public Key in the Active Authentication Public Key data in EF.DG15 and (iii) support inspection systems of receiving States or organizations to verify the authenticity of the MRTD's chip used for genuine MRTD by certification of the Active Authentication Public Key by means of the Document Security Object.

**OE.Active\_Auth\_Verif Verification by Active Authentication**

In addition to the verification by passive authentication, the inspection systems may use the verification by active authentication, which offers a stronger guaranty of the authenticity of the MRTD.

The following security objectives for the operational environment are additions to [PP-MRTD-SAC]:

**Issuing State or Organisation**

The issuing State or Organisation will implement the following security objectives of the TOE environment.

**OE.Auth\_Key\_Travel\_Document Travel document Authentication Key**

The issuing State or Organisation has to establish the necessary public key infrastructure in order to (i) generate the travel document's Chip Authentication Key Pair, (ii) sign and store the Chip Authentication Public Key in the Chip Authentication Public Key data in EF.DG14 and (iii) support inspection systems of receiving States or Organisations to verify the authenticity of the travel document's chip used for genuine travel document by certification of the Chip Authentication Public Key by means of the Document Security Object.

**Justification:** This security objective for the operational environment is needed additionally to those from [PP-MRTD-SAC] in order to counter the Threat T.Counterfeit as it specifies the pre-requisite for the Chip Authentication Protocol Version 1 which is one of the additional features of the TOE described only in this security target and not in [PP-MRTD-SAC].

**OE.Authoriz\_Sens\_Data Authorization for Use of Sensitive Biometric Reference Data**

The issuing State or Organisation has to establish the necessary public key infrastructure in order to limit the access to sensitive biometric reference data of travel document holders to authorized receiving States or

<sup>15</sup> This order is commensurate with [ICAO-TR-SAC].

Organisations. The Country Verifying Certification Authority of the issuing State or Organisation generates card verifiable Document Verifier Certificates for the authorized Document Verifier only.

**Justification:** This security objective for the operational environment is needed additionally to those from [PP-MRTD-SAC] in order to handle the Threat T.Read\_Sensitive\_Data, the Organisational Security Policy P.Sensitive\_Data and the Assumption A.Auth\_PKI as it specifies the pre-requisite for the Terminal Authentication Protocol v.1 as it concerns the need of an PKI for this protocol and the responsibilities of its root instance. The Terminal Authentication Protocol v.1 is one of the additional features of the TOE described only in this security target and not in [PP-MRTD-SAC].

### **Receiving State or Organisation**

The receiving State or Organisation will implement the following security objectives of the TOE environment.

#### **OE.Exam\_Travel\_Document Examination of the physical part of the travel document**

The inspection system of the receiving State or Organisation must examine the travel document presented by the traveller to verify its authenticity by means of the physical security measures and to detect any manipulation of the physical part of the travel document. The Basic Inspection System for global interoperability (i) includes the Country Signing CA Public Key and the Document Signer Public Key of each issuing State or Organisation, and (ii) implements the terminal part of PACE [4] and/or the Basic Access Control [6]. Extended Inspection Systems perform additionally to these points the Chip Authentication Protocol Version 1 to verify the Authenticity of the presented travel document's chip.

**Justification:** This security objective for the operational environment is needed additionally to those from [PP-MRTD-SAC] in order to handle the Threat T.Counterfeit and the Assumption A.Insp\_Sys by demanding the Inspection System to perform the Chip Authentication protocol v.1. OE.Exam\_Travel\_Document also repeats partly the requirements from OE.Terminal in [PP-MRTD-SAC] and therefore also counters T.Forgery and A.Passive\_Auth from [PP-MRTD-SAC]. This is done because a new type of Inspection System is introduced in this Security Target as the Extended Inspection System is needed to handle the additional features of a travel document with Extended Access Control.

#### **OE.Prot\_Logical\_Travel\_Document Protection of data from the logical travel document**

The inspection system of the receiving State or Organisation ensures the confidentiality and integrity of the data read from the logical travel document. The inspection system will prevent eavesdropping to their communication with the TOE before secure messaging is successfully established based on the Chip Authentication Protocol Version 1.

**Justification:** This security objective for the operational environment is needed additionally to those from [PP-MRTD-SAC] in order to handle the Assumption A.Insp\_Sys by requiring the Inspection System to perform secure messaging based on the Chip Authentication Protocol v.1.

#### **OE.Ext\_Insp\_Systems Authorization of Extended Inspection Systems**

The Document Verifier of receiving States or Organisations authorizes Extended Inspection Systems by creation of Inspection System Certificates for access to sensitive biometric reference data of the logical travel document. The Extended Inspection System authenticates themselves to the travel document's chip for access to the sensitive biometric reference data with its private Terminal Authentication Key and its Inspection System Certificate.

**Justification:** This security objective for the operational environment is needed additionally to those from [PP-MRTD-SAC] in order to handle the Threat T.Read\_Sensitive\_Data, the Organisational Security Policy P.Sensitive\_Data and the Assumption A.Auth\_PKI as it specifies the pre-requisite for the Terminal Authentication Protocol v.1 as it concerns the responsibilities of the Document Verifier instance and the Inspection Systems.

## **5.3 SECURITY OBJECTIVES FOR APPLICATION ADMINISTRATION SERVICE (AAS)**

### **OT.Sens\_Ident\_User\_Data\_Conf Confidentiality of sensitive identification user data**

The TOE must ensure the confidentiality of sensitive identification user data by granting read access only to authorized Inspection Systems. The authorization of the inspection system is drawn by the Digital Identity

document holder by consciously entering his secret PIN. The sensitive identification user data may be decrypted to authorized Inspection Systems by the Digital Identity document issuer State or Organisation. The TOE must ensure the confidentiality of the sensitive identification user data during their transmission to the Inspection System. The confidentiality of the sensitive identification user data shall be protected against attacks with high attack potential.

Notice that the security objective OT.Chip\_Auth\_Proof from [PP-MRTD-EACV2] is more clarified in the Digital Identity application by adding the following application note:

Application note 2: The OT.Chip\_Auth\_Proof implies the Digital Identity document's chip to have (i) a unique identity as given by the Digital Identity document's number, (ii) a secret to prove its identity by knowledge i.e. a private authentication key as TSF data. The TOE shall protect this TSF data to prevent their misuse. The terminal shall have the reference data to verify the authentication attempt of Digital Identity document's chip i.e. a certificate for the Chip Authentication Public Key that matches the Chip Authentication Private Key of the Digital Identity document's chip. This certificate is provided by (i) the Chip Authentication Public Key (EF.DG14) in the LDS defined in [SPECDI] and (ii) the hash value of DG14 in the Document Security Object signed by the Document Signer

## 5.4 SECURITY OBJECTIVE RATIONALE

### 5.4.1 Rationale between objectives and threats, assumptions, OSP

The following table provides an overview for security objectives coverage.

Table and following explanations are copied from [PP-MRTD-EACV2]. Only the shaded parts are added.

Threats and assumptions included from the claimed PACE-PP [PP-MRTD-SAC] are marked *in italic letters*.

	OT.Sens_Data_Conf	OT.Chip_Auth_Proof	OT.AC_Pers <sup>16</sup>	OT.Data_Integrity	OT.Data_Authenticity	OT.Data_Confidentiality	OT.Tracing	OT.Prot_Abuse-Func	OT.Prot_Inf_Leak	OT.Identification	OT.Prot_Phys-Tamper	OT.Prot_Malfunction	OT.Activ_Auth_Proof	OE.Auth_Kev_Travel_Document	OE.Authoriz_Sens_Data	OE.Exam_Travel_Document	OE.Prot_Logical_Travel_Document	OE.Ext_Insp_Systems	OE.Personalisation	OE.Passive_Auth_Sign	OE.Terminal	OE.Travel_Document_Holder	OE.Legislative_Compliance	OE.Active_Auth_Sign	OE.Active_Auth_Verif	OT.Sens_Ident_User_Data_Conf
T.Read_Sensitive_Data	X														X		X									
T.Counterfeit		X												X		X										
<i>T.Skimming<sup>17</sup></i>				X	X	X																X			X	
<i>T.Eavesdropping</i>						X																			X	
<i>T.Tracing</i>							X															X				
<i>T.Abuse-Func</i>								X																		
<i>T.Information_Leakage</i>									X																	
<i>T.Phys-Tamper</i>											X															
<i>T.Malfunction</i>												X														
<i>T.Forgery</i>			X	X	X			X			X				X			X	X	X						
P.Sensitive_Data	X													X			X									
P.Personalisation			X							X									X							
<i>P.Manufact</i>										X																
<i>P.Pre-Operational</i>			X							X									X			X				
<i>P.Terminal</i>															X						X					
<i>P.Card_PKI</i>																				X						
<i>P.Trustworthy_PKI</i>																				X						
P.Active_Auth													X										X	X		
A.Insp_Sys															X	X										
A.Auth_PKI														X			X									
<i>A.Passive_Auth</i>															X				X							
<i>T.Sensitive_ID_User_Data</i>																									X	

Table 5: Security Objective Rationale

<sup>16</sup> The Objectives marked *in italic letters* are included from the claimed PACE-PP [7]. They are listed for the complete overview of the security objectives.

<sup>17</sup> Threats and assumptions included from the claimed PACE-PP [7] are marked *in italic letters*. They are listed for the complete overview of threats and assumptions.

The OSP **P.Personalisation** "Personalisation of the travel document by issuing State or Organisation only" addresses the (i) the enrolment of the logical travel document by the Personalisation Agent as described in the security objective for the TOE environment **OE.Personalisation** "Personalisation of logical travel document", and (ii) the access control for the user data and TSF data as described by the security objective **OT.AC\_Pers** "Access Control for Personalisation of logical travel document". Note the manufacturer equips the TOE with the Personalisation Agent Key(s) according to **OT.Identification** "Identification and Authentication of the TOE". The security objective **OT.AC\_Pers** limits the management of TSF data and the management of TSF to the Personalisation Agent.

The OSP **P.Sensitive\_Data** "Privacy of sensitive biometric reference data" is fulfilled and the threat **T.Read\_Sensitive\_Data** "Read the sensitive biometric reference data" is countered by the TOE-objective **OT.Sens\_Data\_Conf** "Confidentiality of sensitive biometric reference data" requiring that read access to EF.DG3 and EF.DG4 (containing the sensitive biometric reference data) is only granted to authorized inspection systems. Furthermore it is required that the transmission of these data ensures the data's confidentiality. The authorization bases on Document Verifier certificates issued by the issuing State or Organisation as required by **OE.Authoriz\_Sens\_Data** "Authorization for use of sensitive biometric reference data". The Document Verifier of the receiving State has to authorize Extended Inspection Systems by creating appropriate Inspection System certificates for access to the sensitive biometric reference data as demanded by **OE.Ext\_Insp\_Systems** "Authorization of Extended Inspection Systems".

The OSP **P.Terminal** "Abilities and trustworthiness of terminals" is countered by the security objective **OE.Exam\_Travel\_Document** additionally to the security objectives from PACE PP [7]. **OE.Exam\_Travel\_Document** enforces the terminals to perform the terminal part of the PACE protocol.

The OSP **P.Activ\_Auth** "Active Authentication" addresses the active authentication protocol as described in [ICAO-9303]. The TOE environment will detect partly forged logical MRTD data by means of digital signature which will be created according to **OE.Active\_Auth\_Sign** "Active Authentication of logical MRTD by Signature" and verified by the inspection system according to **OE.Active\_Auth\_Verif** "Verification by Active Authentication". This is possible only because genuine TOE enforce AA as specified in **OT.Activ\_Auth\_Proof**.

The threat **T.Counterfeit** "Counterfeit of travel document chip data" addresses the attack of unauthorized copy or reproduction of the genuine travel document's chip. This attack is thwarted by chip an identification and authenticity proof required by **OT.Chip\_Auth\_Proof** "Proof of travel document's chip authentication" using an authentication key pair to be generated by the issuing State or Organisation. The Public Chip Authentication Key has to be written into EF.DG14 and signed by means of Documents Security Objects as demanded by **OE.Auth\_Key\_Travel\_Document** "Travel document Authentication Key". According to **OE.Exam\_Travel\_Document** "Examination of the physical part of the travel document" the General Inspection system has to perform the Chip Authentication Protocol Version 1 to verify the authenticity of the travel document's chip.

The threat **T.Forgery** "Forgery of data" addresses the fraudulent, complete or partial alteration of the User Data or/and TSF-data stored on the TOE or/and exchanged between the TOE and the terminal. Additionally to the security objectives from PACE PP [7] which counter this threat, the examination of the presented MRTD passport book according to **OE.Exam\_Travel\_Document** "Examination of the physical part of the travel document" shall ensure its authenticity by means of the physical security measures and detect any manipulation of the physical part of the travel document.

The examination of the travel document addressed by the assumption **A.Insp\_Sys** "Inspection Systems for global interoperability" is covered by the security objectives for the TOE environment **OE.Exam\_Travel\_Document** "Examination of the physical part of the travel document" which requires the inspection system to examine physically the travel document, the Basic Inspection System to implement the Basic Access Control, and the Extended Inspection Systems to implement and to perform the Chip Authentication Protocol Version 1 to verify the Authenticity of the presented travel document's chip. The security objectives for the TOE environment **OE.Prot\_Logical\_Travel\_Document** "Protection of data from the logical travel document" require the Inspection System to protect the logical travel document data during the transmission and the internal handling.

The assumption **A.Passive\_Auth** "PKI for Passive Authentication" is directly covered by the security objective for the TOE environment **OE.Passive\_Auth\_Sign** "Authentication of travel document by Signature" from PACE PP [7] covering the necessary procedures for the Country Signing CA Key Pair and the Document Signer Key Pairs. The implementation of the signature verification procedures is covered by **OE.Exam\_Travel\_Document** "Examination of the physical part of the travel document".

The assumption **A.Auth\_PKI** “PKI for Inspection Systems” is covered by the security objective for the TOE environment **OE.Authoriz\_Sens\_Data** “Authorization for use of sensitive biometric reference data” requires the CVCA to limit the read access to sensitive biometrics by issuing Document Verifier certificates for authorized receiving States or Organisations only. The Document Verifier of the receiving State is required by **OE.Ext\_Insp\_Systems** “Authorization of Extended Inspection Systems” to authorize Extended Inspection Systems by creating Inspection System Certificates. Therefore, the receiving issuing State or Organisation has to establish the necessary public key infrastructure.

The threat **T.Skimming** addresses accessing the sensitive identification user data (stored on the TOE or transferred between the TOE and the terminal) using the TOE’s contactless/contact-based interface. Additionally to the security objectives from [PP-MRTD-EACV2] which counter this threat, the threat is also addressed by **OT.Sens\_Ident\_User\_Data\_Conf** that demands a trusted channel based on Chip Authentication, and requires that read access to sensitive identification user data is only granted to authorized Inspection Systems.

The threat **T.Eavesdropping** addresses listening to the communication between the TOE and a PACE terminal or an authorized Inspection Systems in order to gain access to transferred sensitive identification user data. Additionally to the security objective from [PP-MRTD-EACV2] which counter this threat, the threat is also addressed by **OT.Sens\_Ident\_User\_Data\_Conf** that demands a trusted channel based on Chip Authentication.

The threat **T.Sensitive\_ID\_User\_Data** is countered by the TOE-Objective **OT.Sens\_Ident\_User\_Data\_Conf** that requires that read access to sensitive identification user data is only granted to authorized Inspection Systems. Furthermore, it is required that the confidentiality of the data is ensured during transmission.

## 5.4.2 Compatibility between objectives of [ST-DI] and [IFX-IC]

### 5.4.2.1 Compatibility between objectives for the TOE

The following table lists the relevant security objectives of the IC and provides the link to the security objectives related to the composite product, showing that there is no contradiction between the two.

IC objective label	Platform objective short description (refer to [IFX-IC-CCI] for the full description)	Link to the composite-product
O.Phys-Manipulation	Protection against Physical Manipulation	OT.Prot_Phys-Tamper
O.Phys-Probing	Protection against Physical Probing	OT.Prot_Phys-Tamper, OT.Data_Integrity
O.Malfunction	Protection against Malfunction	OT_Prot_Malfunction
O.Leak-Inherent	Protection against Inherent Information Leakage	OT.Prot_Inf_Leak OT.Tracing
O.Leak-Forced	Protection against Forced Information Leakage	OT.Prot_Inf_Leak OT.Tracing
O.Abuse-Func	Protection against Abuse of Functionality	OT.Prot_Abuse-Func
O.Identification	TOE Identification	OT.Identification OT.Tracing
O.RND	Random Numbers	This platform security objectives is used to endure the security of the composite TOE
O.Cap_Avail_Loader	Capability and availability of the Loader Valid only for the TOE derivatives delivered with activated Flash Loader.	No direct link with the composite product security objectives, but this platform security objective is used to endure the security of the composite TOE
O.Authentication	Authentication to external entities Valid only for the TOE derivatives delivered with activated Flash Loader	
O.Ctrl_Auth_Loader	Access control and authenticity for the Loader - valid only for the TOE derivatives delivered with activated Flash Loader	

IC objective label	Platform objective short description (refer to [IFX-IC-CCI] for the full description)	Link to the composite-product
O.TDES	Cryptographic service Triple-DES	This platform security objectives is used to endure the security of the composite TOE
O.AES	Cryptographic service AES	
O.Mem Access	Area based Memory Access Control	OT.Data_Confidentiality OT.Sens_Data_Conf
O.Prot_TSF_Confidentiality	Protection of the confidentiality of the TSF	OT.Data_Confidentiality OT.Sens_Data_Conf
O.Ctrl_Auth_CCL	Authentication of entities	OT.Active_Auth_Proof OT.Data_Authenticity
O.Prot_Integrity	Integrity protection	OT.Data_Integrity
O.Prot_Confidentiality	Confidentiality protection	OT.Data_Confidentiality OT.Sens_Data_Conf
		No direct link with the composite product security objectives, but this platform security objective is used to endure the security of the composite TOE

The other objectives of the platform are not relevant for this composite TOE.

The OT.AC\_Pers is specific to [ST-DI] and it does not conflict with the objectives of [IFX-IC].

We can therefore conclude that the objectives for the TOE of [ST- SAC] and [IFX-IC] are consistent.

#### 5.4.2.2 Compatibility between objectives for the environment

IC Environment objective label	Platform Environment Objective short description (refer to [IFX-IC-CCI] for the full description)	Link to the composite-product
OE.Resp-Appl	Treatment of User data of the Composite TOE	For Phase 1 - No direct link with the composite product security objectives
OE.Process-Sec-IC	Protection during composite product manufacturing	OE.Personalization
OE.Lim_Block_Loader	Limitation of capability and blocking the loader.	No direct link with the composite product security objectives, but this platform security objective is used to endure the security of the composite TOE
OE.TOE_Auth	Authentication to external entities	
OE.Loader_Usage	Secure communication and usage of the Loader	

OE.Legislative\_Compliance, OE.Terminal, OE.Travel\_Document\_Holder, OE.Auth\_Key\_Travel\_Document, OE.Authoriz\_Sens\_Data, OE.Exam\_Travel\_Document, OE.Prot\_Logical\_Travel\_Document, OE.Ext\_Insp\_Systems, OE.Passive\_Auth\_Sign, OE.Active\_Auth\_Sign, OE.Active\_Auth\_Verif, are specific to [ST-DI] and they do no conflict with the objectives of [IFX-IC].

We can therefore conclude that the objectives for the environment of [ST-DI] and [IFX-IC] are consistent. Justifications for adding objectives on the environment

#### 5.4.2.3 Additions to [PP-MRTD-EACV2]

The only additional objectives on the environment are OE.Active\_Auth\_Sign and OE.Active\_Auth\_Verif. These objectives request the environment to support Active Authentication. AA is an operation outside [PP-MRTD-EACV2]. Therefore, the added objectives on the environment do not weaken the TOE.

## 6. EXTENDED COMPONENTS DEFINITION

This security target uses components defined as extensions to CC part 2. Some of these components are defined in protection profile [PP-IC-0002]; others are defined in the protection profile [PP-MRTD-EACV2].

### 6.1 DEFINITION OF THE FAMILY FAU\_SAS

To define the security functional requirements of the TOE a sensitive family (FAU\_SAS) of the Class FAU (Security Audit) is defined here. This family describes the functional requirements for the storage of audit data. It has a more general approach than FAU\_GEN, because it does not necessarily require the data to be generated by the TOE itself and because it does not give specific details of the content of the audit records.

The family “Audit data storage (FAU\_SAS)” is specified as follows.

#### FAU\_SAS Audit data storage

Family behaviour

This family defines functional requirements for the storage of audit data.

Component levelling



FAU\_SAS.1 Requires the TOE to provide the possibility to store audit data.

Management: FAU\_SAS.1  
There are no management activities foreseen.

Audit: FAU\_SAS.1  
There are no actions defined to be auditable.

#### FAU\_SAS.1 Audit storage

Hierarchical to: No other components  
Dependencies: No dependencies

FAU\_SAS.1.1 The TSF shall provide [assignment: *authorized users*] with the capability to store [assignment: *list of audit information*] in the audit records.

### 6.2 DEFINITION OF THE FAMILY FCS\_RND

To define the IT security functional requirements of the TOE a sensitive family (FCS\_RND) of the Class FCS (cryptographic support) is defined here. This family describes the functional requirements for random number generation used for cryptographic purposes. The component FCS\_RND is not limited to generation of cryptographic keys unlike the component FCS\_CKM.1. The similar component FIA\_SOS.2 is intended for non-cryptographic use.

The family “Generation of random numbers (FCS\_RND)” is specified as follows.

### FCS\_RND Generation of random numbers

**Family behaviour**

This family defines quality requirements for the generation of random numbers which are intended to be used for cryptographic purposes.

**Component levelling:**



FCS\_RND.1            Generation of random numbers requires that random numbers meet a defined quality metric.

Management:        FCS\_RND.1  
                          There are no management activities foreseen.

Audit:                FCS\_RND.1  
                          There are no actions defined to be auditable.

### FCS\_RND.1 Quality metric for random numbers

Hierarchical to:    No other components  
Dependencies:      No dependencies

FCS\_RND.1.1        The TSF shall provide a mechanism to generate random numbers that meet [assignment: a *defined quality metric*].

## 6.3 DEFINITION OF THE FAMILY FIA\_API

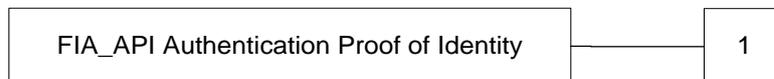
To describe the IT security functional requirements of the TOE a sensitive family (FIA\_API) of the Class FIA (Identification and authentication) is defined here. This family describes the functional requirements for the proof of the claimed identity for the authentication verification by an external entity where the other families of the class FIA address the verification of the identity of an external entity.

### FIA\_API Authentication Proof of Identity

**Family behaviour**

This family defines functions provided by the TOE to prove their identity and to be verified by an external entity in the TOE IT environment.

**Component levelling:**



FIA\_API.1            Authentication Proof of Identity.

Management:        FIA\_API.1  
                          The following actions could be considered for the management functions in FMT:  
                          Management of authentication information used to prove the claimed identity.

Audit:                There are no actions defined to be auditable.

**FIA\_API.1 Authentication Proof of Identity**

Hierarchical to: No other components  
Dependencies: No dependencies

FIA\_API.1.1 The TSF shall provide a [assignment: *authentication mechanism*] to prove the identity of the [assignment: *authorized user or role*].

**6.4 DEFINITION OF THE FAMILY FMT\_LIM**

The family FMT\_LIM describes the functional requirements for the Test Features of the TOE. The new functional requirements were defined in the class FMT because this class addresses the management of functions of the TSF. The examples of the technical mechanism used in the TOE show that no other class is appropriate to address the specific issues of preventing the abuse of functions by limiting the capabilities of the functions and by limiting their availability.

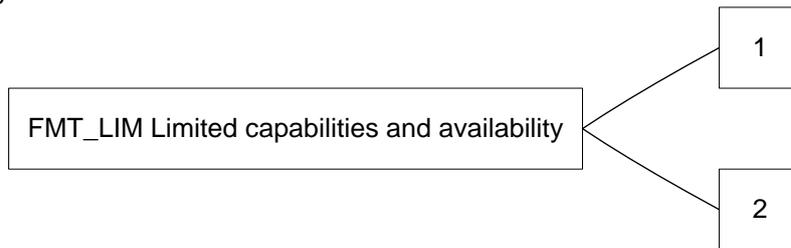
The family “Limited capabilities and availability (FMT\_LIM)” is specified as follows.

**FMT\_LIM Limited capabilities and availability**

Family behavior

This family defines requirements that limit the capabilities and availability of functions in a combined manner. Note that FDP\_ACF restricts the access to functions whereas the Limited capability of this family requires the functions themselves to be designed in a specific manner.

Component leveling:



FMT\_LIM.1 Limited capabilities requires that the TSF is built to provide only the capabilities (perform action, gather information) necessary for its genuine purpose.

FMT\_LIM.2 Limited availability requires that the TSF restrict the use of functions (refer to Limited capabilities (FMT\_LIM.1)). This can be achieved, for instance, by removing or by disabling functions in a specific phase of the TOE’s life-cycle.

Management: FMT\_LIM.1, FMT\_LIM.2  
There are no management activities foreseen.

Audit: FMT\_LIM.1, FMT\_LIM.2  
There are no actions defined to be auditable.

To define the IT security functional requirements of the TOE a sensitive family (FMT\_LIM) of the Class FMT (Security Management) is defined here. This family describes the functional requirements for the Test Features of the TOE. The new functional requirements were defined in the class FMT because this class addresses the management of functions of the TSF. The examples of the technical mechanism used in the TOE show that no other class is appropriate to address the specific issues of preventing the abuse of functions by limiting the capabilities of the functions and by limiting their availability.

The TOE Functional Requirement “Limited capabilities (FMT\_LIM.1)” is specified as follows.

**FMT\_LIM.1 Limited capabilities**

Hierarchical to: No other components

Dependencies: FMT\_LIM.2 Limited availability.

FMT\_LIM.1.1 The TSF shall be designed in a manner that limits their capabilities so that in conjunction with “Limited availability (FMT\_LIM.2)” the following policy is enforced [assignment: *Limited capability and availability policy*].

The TOE Functional Requirement “Limited availability (FMT\_LIM.2)” is specified as follows.

**FMT\_LIM.2 Limited availability**

Hierarchical to: No other components  
Dependencies: FMT\_LIM.1 Limited capabilities.

FMT\_LIM.2.1 The TSF shall be designed in a manner that limits their availability so that in conjunction with “Limited capabilities (FMT\_LIM.1)” the following policy is enforced [assignment: *Limited capability and availability policy*].

**Application note:** The functional requirements FMT\_LIM.1 and FMT\_LIM.2 assume that there are two types of mechanisms (limited capabilities and limited availability) which together shall provide protection in order to enforce the policy. This also allows that

- (i) the TSF is provided without restrictions in the product in its user environment but its capabilities are so limited that the policy is enforced
- or conversely
- (ii) the TSF is designed with test and support functionality that is removed from, or disabled in, the product prior to the Operational Use Phase.

The combination of both requirements shall enforce the policy.

**6.5 DEFINITION OF THE FAMILY FPT\_EMS**

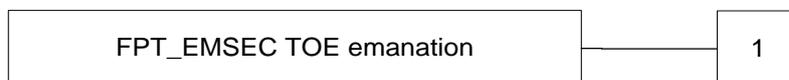
The sensitive family FPT\_EMS (TOE Emanation) of the Class FPT (Protection of the TSF) is defined here to describe the IT security functional requirements of the TOE. The TOE shall prevent attacks against the TOE and other secret data where the attack is based on external observable physical phenomena of the TOE. Examples of such attacks are evaluation of TOE’s electromagnetic radiation, simple power analysis (SPA), differential power analysis (DPA), timing attacks, etc. This family describes the functional requirements for the limitation of intelligible emanations which are not directly addressed by any other component of CC part 2 [CC-2].

The family “TOE Emanation (FPT\_EMS)” is specified as follows.

Family behaviour

This family defines requirements to mitigate intelligible emanations.

Component levelling:



FPT\_EMS.1 TOE emanation has two constituents:

FPT\_EMS.1.1 Limit of Emissions requires to not emit intelligible emissions enabling access to TSF data or user data.

FPT\_EMS.1.2 Interface Emanation requires to not emit interface emanation enabling access to TSF data or user data.

Management: FPT\_EMS.1  
There are no management activities foreseen.

Audit: FPT\_EMS.1  
There are no actions defined to be auditable.

### FPT\_EMS.1 TOE Emanation

Hierarchical to: No other components  
Dependencies: No dependencies.

FPT\_EMS.1.1 The TOE shall not emit [assignment: *types of emissions*] in excess of [assignment: *specified limits*] enabling access to [assignment: *list of types of TSF data*] and [assignment: *list of types of user data*].

FPT\_EMS.1.2 The TSF shall ensure [assignment: *type of users*] are unable to use the following interface [assignment: *type of connection*] to gain access to [assignment: *list of types of TSF data*] and [assignment: *list of types of user data*].

## 7. SECURITY REQUIREMENTS

The definition of the subjects “Manufacturer”, “Pre-personalization Agent”, “Personalization Agent”, “Extended Inspection System”, “Country Verifying Certification Authority”, “Document Verifier” and “Terminal” used in the following chapter is given in section 2.4.1. Note, that all these subjects are acting for homonymous external entities. All used objects are defined either in section 7 or in the following table. The operations “write”, “modify”, “read” and “disable read access” are used in accordance with the general linguistic usage. The operations “store”, “create”, “transmit”, “receive”, “establish communication channel”, “authenticate” and “re-authenticate” are originally taken from [CC-2]. The operation “load” is synonymous to “import” used in [CC-2].

Definition of security attributes:

security attribute	values	meaning
terminal authentication status	none (any Terminal)	default role (i.e. without authorisation after start-up)
	CVCA	roles defined in the certificate used for authentication (cf. [TR-EAC-1], A.5.1); Terminal is authenticated as Country Verifying Certification Authority after successful CA and TA
	DV (domestic)	roles defined in the certificate used for authentication (cf. [TR-EAC-1], A.5.1); Terminal is authenticated as domestic Document Verifier after successful CA and TA
	DV (foreign)	roles defined in the certificate used for authentication (cf. [TR-EAC-1], A.5.1); Terminal is authenticated as foreign Document Verifier after successful CA and TA
	IS	roles defined in the certificate used for authentication (cf. [TR-EAC-1], A.5.1); Terminal is authenticated as Extended Inspection System after successful CA and TA
Terminal Authorization	none	
	DG4 (Iris)	Read access to DG4: (cf. [TR-EAC-1], A.5.1)
	DG3 (Fingerprint)	Read access to DG3: (cf. [TR-EAC-1], A.5.1)
	DG3 (Iris) / DG4 (Fingerprint)	Read access to DG3 and DG4: (cf. [TR-EAC-1], A.5.1)

The following table provides an overview of the keys and certificates used:

Name	Data
Country Verifying Certification Authority Private Key (SKCVCA)	The Country Verifying Certification Authority (CVCA) holds a private key (SKCVCA) used for signing the Document Verifier Certificates.
Country Verifying Certification Authority Public Key (PKCVCA)	The TOE stores the Country Verifying Certification Authority Public Key (PKCVCA) as part of the TSF data to verify the Document Verifier Certificates. The PKCVCA has the security attribute Current Date as the most recent valid effective date of the Country Verifying Certification Authority Certificate or of a domestic Document Verifier Certificate.
Country Verifying Certification Authority Certificate (CCVCA)	The Country Verifying Certification Authority Certificate may be a self-signed certificate or a link certificate (cf. [TR-EAC-1] and Glossary). It contains (i) the Country Verifying Certification Authority Public Key (PKCVCA) as authentication reference data, (ii) the coded access control rights of the Country Verifying Certification Authority, (iii) the Certificate Effective Date and the Certificate Expiration Date as security attributes.
Document Verifier Certificate (CDV)	The Document Verifier Certificate CDV is issued by the Country Verifying Certification Authority. It contains (i) the Document Verifier Public Key (PKDV) as authentication reference data (ii) identification as domestic or foreign Document Verifier, the coded access control rights of the Document Verifier, the Certificate

Name	Data
	Effective Date and the Certificate Expiration Date as security attributes.
Inspection System Certificate (CIS)	The Inspection System Certificate (CIS) is issued by the Document Verifier. It contains (i) as authentication reference data the Inspection System Public Key (PKIS), (ii) the coded access control rights of the Extended Inspection System, the Certificate Effective Date and the Certificate Expiration Date as security attributes.
Chip Authentication Public Key Pair	The Chip Authentication Public Key Pair (SKICC, PKICC) are used for Key Agreement Protocol: Diffie-Hellman (DH) according to RFC 2631 or Elliptic Curve Diffie-Hellman according to ISO 15946.
Chip Authentication Public Key (PKICC)	The Chip Authentication Public Key (PKICC) is stored in the EF.DG14 Chip Authentication Public Key of the TOE's logical MRTD and used by the inspection system for Chip Authentication of the MRTD's chip. It is part of the user data provided by the TOE for the IT environment.
Chip Authentication Private Key (SKICC)	The Chip Authentication Private Key (SKICC) is used by the TOE to authenticate itself as authentic MRTD's chip. It is part of the TSF data.
Country Signing Certification Authority Key Pair	Country Signing Certification Authority of the issuing State or Organization signs the Document Signer Public Key Certificate with the Country Signing Certification Authority Private Key and the signature will be verified by receiving State or Organization (e.g. a Basic Inspection System) with the Country Signing Certification Authority Public Key.
Document Signer Key Pairs	Document Signer of the issuing State or Organization signs the Document Security Object of the logical MRTD with the Document Signer Private Key and the signature will be verified by a Basic Inspection Systems of the receiving State or Organization with the Document Signer Public Key.
Document Basic Access Keys	The Document Basic Access Key is created by the Personalization Agent, loaded to the TOE, and used for mutual authentication and key agreement for secure messaging between the Basic Inspection System and the MRTD's chip.
BAC Session Keys	Secure messaging Triple-DES key and Retail-MAC key agreed between the TOE and a BIS in result of the Basic Access Control Authentication Protocol.
Chip Session Key	Secure messaging Triple-DES key and Retail-MAC key agreed between the TOE and a GIS in result of the Chip Authentication Protocol.

**Application note 5:** The Country Verifying Certification Authority identifies a Document Verifier as “domestic” in the Document Verifier Certificate if it belongs to the same State as the Country Verifying Certification Authority. The Country Verifying Certification Authority identifies a Document Verifier as “foreign” in the Document Verifier Certificate if it does not belong to the same State as the Country Verifying Certification Authority. From MRTD's point of view the domestic Document Verifier belongs to the issuing State or Organization.

## 7.1 SECURITY FUNCTIONAL REQUIREMENTS FOR THE TOE

This section on security functional requirements for the TOE is divided into sub-section following the main security functionality.

Refinements in this section are in underline font when the SFR's refinement is already present in [PP-MRTD-EACV2], and in bold font when the refinement is done in this ST. When the SFR is refined in the [PP-MRTD-EACV2] and additionally refined in this ST then the font is bold and underline.

### SFR refinements for Application Administration Service (AAS):

CC allows several operations to be performed on security requirements on the component level [CC1] such as the refinement. The refinement operation is used to add detail to a requirement, and thus further restricts a requirement. Refinements of the following three security requirements (ACC.1/TRM, FDP\_ACF.1/TRM and FIA\_AFL.1/PACE) of [PP-MRTD-EACV2] are denoted in such a way that added words are in **bold underlined text** and removed word are **strikethrough**.

#### 7.1.1 Class FAU Security Audit

The TOE shall meet the requirement "Audit storage (FAU\_SAS.1)" as specified below (Common Criteria Part 2 extended).

##### **FAU\_SAS.1 Audit storage**

Hierarchical to: No other components  
Dependencies: No dependencies

FAU\_SAS.1.1 The TSF shall provide the Manufacturer with the capability to store the IC Identification Data in the audit records.

#### 7.1.2 Class Cryptographic Support (FCS)

The TOE shall meet the requirement "Cryptographic key generation (FCS\_CKM.1)" as specified below (Common Criteria Part 2). The iterations are caused by different cryptographic key generation algorithms to be implemented and key to be generated by the TOE.

##### **FCS\_CKM.1/DH\_PACE Cryptographic key generation – Diffie-Hellman for PACE session keys**

Hierarchical to: No other components.  
Dependencies: [FCS\_CKM.2 Cryptographic key distribution or FCS\_COP.1 Cryptographic operation]: fulfilled by **FCS\_COP.1/PACE\_ENC** and **FCS\_COP.1/PACE\_MAC**  
FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_CKM.1.1 /DH\_PACE The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm as in **Table 6 algorithm column** and specified cryptographic key sizes as in **Table 6 column Key size** that meet the following: **Table 6 standard column**.

iteration	algorithm	Key size	standard
/SKPICC	<b>ECDH Key Agreement Algorithm – [IEEE-P1363]</b>	<b>160, 192, 224, 256, 320, 384, 512, and 521 bits</b>	<b>[TR-03111]</b>
/TDESsession-ECDH	<b>ECDH Key Agreement Algorithm – 160, 192, 224, 256, 320, 384, 512, and 521 bits</b>	<b>112 bits</b>	<b>[TR-03111]</b>
/AESsession-ECDH	<b>ECDH Key Agreement Algorithm – 160, 192, 224, 256, 320, 384, 512, and 521 bits</b>	<b>128, 192, 256</b>	<b>[TR-03111]</b>

**Table 6: FCS\_CKM.1/DH\_PACE iterations**

**FCS\_CKM.1/CA Cryptographic key generation – Diffie-Hellman for Chip Authentication session keys**

Hierarchical to: No other components  
 Dependencies: [FCS\_CKM.2 Cryptographic key distribution or FCS\_COP.1 Cryptographic operation] : fulfilled by **FCS\_COP.1/CA\_ENC** and **FCS\_COP.1/CA\_MAC** and **FCS\_COP.1/PACE\_CAM**  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**

FCS\_CKM.1.1 /CA The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm as in **Table 7 algorithm column** and specified cryptographic key sizes as in **Table 7 Key size column** that meet the following: **Table 7 standard column standard**.

Algorithm type	algorithm	Key size	standard
/TDESsession-DH	DH Key Agreement Algorithm - PKCS#3 – 1024, 1280, 1536 and 2048 bits	112 bits	Diffie-Hellman key derivation protocol compliant to [PKCS#3]
/AESsession-DH	DH Key Agreement Algorithm - PKCS#3 – 1024, 1280, 1536 and 2048 bits	128, 192, and 256 bits	Diffie-Hellman key derivation protocol compliant to [PKCS#3]
/TDESsession-ECDH	ECDH Key Agreement Algorithm - ISO 15946 – 160, 192, 224, 256, 320, 384, 512 and 521 bits	112 bits	[TR-EAC-1] , based on an ECDH protocol compliant to [TR-ECC]
/AESsession-ECDH	ECDH Key Agreement Algorithm - ISO 15946 – 160, 192, 224, 256, 320, 384, 512 and 521 bits	128, 192, and 256 bits	[TR-EAC-1] , based on an ECDH protocol compliant to [TR-ECC]

**Table 7: FCS\_CKM.1/CA iterations**

**FCS\_CKM.1/KeyPair Cryptographic key generation for AA and CA Key Pair**

Hierarchical to: No other components  
 Dependencies: [FCS\_CKM.2 Cryptographic key distribution or FCS\_COP.1 Cryptographic operation]: fulfilled by **FCS\_COP.1/AA**, **FCS\_COP.1/CA\_MAC**, **FCS\_COP.1/CA\_ENC** and **FCS\_COP.1/PACE\_CAM**  
 FCS\_CKM.4 Cryptographic key destruction: not fulfilled, see application note 7

FCS\_CKM.1.1 /KeyPair The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm as in **Table 8 algorithm column** and specified cryptographic key sizes as in **Table 8 Key size column** that meet the following: **Table 8 standard column**.

Algorithm type	algorithm	Key size	standard
/RSA	RSA CRT Key generation	1024, 1280, 1536 and 2048 bits	none (generation of random numbers and Miller- Rabin primality testing)
/ECC	ECC Key generation	160, 192, 224, 256, 320, 384, 512 and 521 bits	FIPS 186-3 Appendix B.4.1
CA/DH	DH key generation	1024, 1280, 1536 and 2048 bits	ANSI X9.42
CA/ECDH	ECDH Key generation	160, 192, 224, 256, 320, 384, 512 and 521 bits	[IEEE-P1363]

**Table 8: FCS\_CKM.1/KeyPair iterations**

Application notes 7:

- The dependency of FCS\_CKM1/KeyPair on FCS\_COP.1 is partly fulfilled by FCS\_COP.1/CA\_MAC and FCS\_COP.1/CA\_ENC. This dependence is not direct: FCS\_CKM1/KeyPair generates a static

key which in turn generate session keys, via FCS\_CKM1/CA. These session keys then use FCS\_COP.1/CA\_MAC and FCS\_COP.1/CA\_ENC.

- The dependency of FCS\_CKM1/KeyPair on FCS\_CKM.4 is not fulfilled as these are permanent keys used on the card during its life-time.

**FCS\_CKM.1/PERSO Cryptographic key generation for Session keys**

Hierarchical to: No other components  
 Dependencies: [FCS\_CKM.2 Cryptographic key distribution or FCS\_COP.1 Cryptographic operation]: fulfilled by **FCS\_COP.1/PERSO**  
 FCS\_CKM.4 Cryptographic key destruction]: fulfilled by **FCS\_CKM.4**

FCS\_CKM.1.1 /PERSO The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm as in **Table 9 algorithm column** and specified cryptographic key sizes as in **Table 9 Key size column** that meet the following: **Table 9 standard column**.

Algorithm type	algorithm	Key size	standard
/TDES	<b>TDES ISK key derivation</b>	<b>112 bits</b>	<b>[ICAO-9303] normative appendix 5</b>
/GP	<b>GP session keys</b>	<b>112, 128 bits (and 192 &amp; 256 bits for SCP3)</b>	<b>[GP211] SCP01, SCP02, or SCP03</b>

**Table 9: FCS\_CKM.1/PERSO iterations**

The TOE shall meet the requirement “Cryptographic key destruction (FCS\_CKM.4)” as specified below (Common Criteria Part 2).

**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]: fulfilled by **FCS\_CKM.1/DH\_PACE, FCS\_CKM.1/CA, and FCS\_CKM.1/PERSO**.

FCS\_CKM.4.1 The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method **Secure erasing of the value** that meets the following: **None**.

Application note: Secure erasing of data is performed by overwriting the data with random numbers.

**FCS\_COP.1/PACE\_ENC Cryptographic operation – Encryption / Decryption AES / 3DES**

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]: fulfilled by **FCS\_CKM.1/DH\_PACE**  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_COP.1.1 /PACE\_ENC The TSF shall perform secure messaging – encryption and decryption in accordance with a specified cryptographic algorithm **Table 10 algorithm** and cryptographic key sizes **Table 10 Key size** that meet the following: **Table 10 list of standards**.

iteration	algorithm	Key size	List of standards
/ENC_TDES	<b>TDES in CBC mode</b>	<b>112 bits</b>	<b>ISO 10116</b>
/ENC_AES	<b>AES in CBC mode</b>	<b>128, 192, 256</b>	<b>ISO 10116</b>

**Table 10: FCS\_COP.1/PACE\_ENC iterations**

**FCS\_COP.1/PACE\_MAC Cryptographic operation – MAC**

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]: fulfilled by **FCS\_CKM.1/DH\_PACE**  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_COP.1.1 /PACE\_MAC The TSF shall perform secure messaging – message authentication code in accordance with a specified cryptographic algorithm **Table 11 algorithm** and cryptographic key sizes **Table 11 Key size** that meet the following: **Table 11 standard column**.

iteration	algorithm	Key size	List of standards
/MAC_TDES	<b>TDES Retail MAC</b>	<b>112 bits</b>	<b><u>ISO 9797-1</u></b>
/MAC_AES	<b>AES CMAC</b>	<b>128, 192, 256</b>	<b><u>[NIST-800-38B]</u></b>

**Table 11: FCS\_COP.1/PACE\_MAC iterations**

**FCS\_COP.1/PACE\_CAM Cryptographic operation – Modular Multiplication**

Hierarchical to: No other components.  
 Dependencies: [FCS\_CKM.1 Cryptographic key generation]: fulfilled by **FCS\_CKM.1/DH\_PACE**  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_COP.1.1 /PACE\_CAM The TSF shall perform modular multiplication with specify cryptography algorithm as in **Table 12 algorithm column** and cryptographic key sizes as in **Table 12 Key size** that meet the following: **Table 12 standards column**.

Algorithm type	algorithm	Key size	standards
/CAM_ECDH	<b>ECC</b>	<b>160, 192, 224, 256, 320, 384, 512, 521</b>	<b><u>[TR-ECC] ECKA - DH</u></b>

**Table 12: FCS\_COP.1/PACE\_CAM iteration explanation**

**FCS\_COP.1/CA\_ENC Cryptographic operation – Encryption / Decryption AES / 3DES**

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]: fulfilled by **FCS\_CKM.1/CA**  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_COP.1.1 /CA\_ENC The TSF shall perform secure messaging – encryption and decryption in accordance with a specified cryptographic algorithm **Table 13 algorithm** and cryptographic key sizes **Table 13 Key size** that meet the following: **Table 13 list of standards**.

iteration	algorithm	Key size	List of standards
/ENC_TDES	<b>TDES in CBC mode</b>	<b>112 bits</b>	<b><u>ISO 10116</u></b>
/ENC_AES	<b>AES in CBC mode</b>	<b>128, 192, 256</b>	<b><u>ISO 10116</u></b>

**Table 13: FCS\_COP.1/CA\_ENC iterations**

**FCS\_COP.1/SIG\_VER Cryptographic operation – Signature verification by travel document**

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]: fulfilled by **FCS\_CKM.1/CA**  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_COP.1.1 /SIG\_VER The TSF shall perform digital signature verification in accordance with a specified cryptographic algorithm **Table 14 algorithm** and cryptographic key sizes **Table 14 Key size** that meet the following: **Table 14 list of standards**.

iteration	algorithm	Key size	List of standards
/RSA_VER	<b>RSA (STD)</b>	<b>1024, 1280, 1536, 2048, 3072, and 4096</b>	<b>RSA SHA PKCS#1 RSA SHA PKCS#1 PSS</b>
/ECC_VER	<b>ECC</b>	<b>160, 192, 224, 256, 320, 384, 512, 521</b>	<b>[TR-ECC] ECDSA SHA</b>

**Table 14: FCS\_COP.1/SIG\_VER iterations**

**FCS\_COP.1/CA\_MAC Cryptographic operation – MAC**

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]: fulfilled by **FCS\_CKM.1/CA**  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_COP.1.1 /CA\_MAC The TSF shall perform secure messaging – message authentication code in accordance with a specified cryptographic algorithm **Table 15 algorithm** and cryptographic key sizes **Table 15 Key size** that meet the following: **Table 15 list of standards**.

iteration	algorithm	Key size	List of standards
/MAC_TDES	<b>TDES Retail MAC</b>	<b>112 bits</b>	<b>ISO 9797-1</b>
/MAC_AES	<b>AES CMAC</b>	<b>128, 192, 256</b>	<b>[NIST-800-38B]</b>

**Table 15: FCS\_COP.1/CA\_MAC iterations**

**FCS\_COP.1/PERSO Cryptographic operation – Symmetric encryption, decryption, and MAC during manufacturing**

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]: fulfilled by **FCS\_CKM.1/PERSO**.  
 FCS\_CKM.4 Cryptographic key destruction: fulfilled by **FCS\_CKM.4**.

FCS\_COP.1.1 /PERSO The TSF shall perform **symmetric encryption and decryption** in accordance with a specified cryptographic algorithm **Table 16 algorithm** and cryptographic key sizes **Table 16 Key size** that meet the following: **Table 16 List of standards**.

iteration	algorithm	Key size	List of standards
/ENC_TDES	<b>TDES encryption and decryption</b>	<b>112 bits</b>	<b>[SP 800-67]</b>
/ENC_AES	<b>AES encryption and decryption</b>	<b>128, 192, 256</b>	<b>[FIPS 197]</b>
/MAC_TDES	<b>TDES Retail MAC</b>	<b>112 bits</b>	<b>ISO 9797-1</b>
/MAC_AES	<b>AES CMAC</b>	<b>128, 192, 256</b>	<b>[NIST-800-38B]</b>

**Table 16: FCS\_COP.1/ PERSO iterations**

**FCS\_COP.1/AA Cryptographic operation – Active 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]: fulfilled by **FCS\_CKM.1/KeyPair**  
FCS\_CKM.4 Cryptographic key destruction: not fulfilled, see application note.

FCS\_COP.1.1 /AA The TSF shall perform **digital signature creation** in accordance with a specified cryptographic algorithm **Table 17 algorithm** and cryptographic key sizes **Table 17 Key size** that meet the following: **Table 17 List of standards**.

iteration	algorithm	Key size	List of standards
/AA_RSA	<b>RSA</b>	<b>1024, 1280, 1536, 2048, 3072, and 4096 bits</b>	<b>ISO9796-2</b>
/AA_ECDSA	<b>ECDSA</b>	<b>160, 192, 224, 256, 320, 384, 512 and 521</b>	<b>[TR-ECC]</b>

**Table 17: FCS\_COP.1/AA iterations**

Application note:

- The dependency of FCS\_COP.1/AA on FCS\_CKM.4 is not fulfilled as these are permanent keys used on the card during its life-time.

**FCS\_RND.1 Quality metric for random numbers**

Hierarchical to: No other components

Dependencies: No dependencies

FCS\_RND.1.1 The TSF shall provide a mechanism to generate random numbers that meet **RGS [RGS-B1], [AIS20/31] and [SP 800-90] with seed entropy at least 128 bits**.

**Application note:** This SFR requires the TOE to generate random numbers used for the authentication protocols as required by FIA\_UAU.4.

**7.1.3 Class FIA Identification and Authentication**

Table 18 provides an overview on the authentication mechanisms used.

Name	SFR for the TOE
Authentication Mechanism for Pre-personalisation Agents	<b>FIA_UAU.1/PERSO FIA_AFL.1/PERSO</b>
Authentication Mechanism for Personalisation Agents	<b>FIA_UAU.4/PACE</b>
Digital Identity document holder Authentication	<b>FIA_API.1/DDH</b>
Chip Authentication Protocol v.1	<b>FIA_API.1/CA, FIA_UAU.5/PACE, FIA_UAU.6/EAC</b>
Terminal Authentication Protocol v.1	<b>FIA_UAU.5/PACE</b>
<i>PACE protocol</i>	<b>FIA_UAU.1/PACE FIA_UAU.5/PACE FIA_AFL.1/PACE</b>
Passive Authentication	<b>FIA_UAU.5/PACE</b>

**Table 18: Overview on authentication SFR**

Note the Chip Authentication Protocol Version 1 as defined in this protection profile includes

- the asymmetric key agreement to establish symmetric secure messaging keys between the TOE and the terminal based on the Chip Authentication Public Key and the Terminal Public Key used later in the Terminal Authentication Protocol Version 1,
- the check whether the TOE is able to generate the correct message authentication code with the expected key for any message received by the terminal.

The Chip Authentication Protocol v.1 may be used independent of the Terminal Authentication Protocol v.1. But if the Terminal Authentication Protocol v.1 is used the terminal shall use the same public key as presented during the Chip Authentication Protocol v.1.

**FIA\_AFL.1/PERSO Authentication failure handling during pre-personalization and personalization phases**

- Hierarchical to: No other components.
- Dependencies: FIA\_UAU.1 Timing of authentication: fulfilled by **FIA\_UAU.1/PACE**
- FIA\_AFL.1.1 /Perso The TSF shall detect when [**Number in Table 19**] unsuccessful authentication attempts occurs related to **authentication attempts using ISK key**.
- FIA\_AFL.1.2 /Perso When the defined number of unsuccessful authentication attempts has been met, the TSF shall [**Actions in Table 19**].

Auth type	Number	Actions
<b>GP</b>	<b>3</b>	<b>Block GP authentication.</b>
<b>ISK key</b>	<b>3</b>	<b>Block ISK Key.</b>

**Table 19: FIA\_AFL.1/PERSO refinements**

**FIA\_AFL.1/PACE Authentication failure handling – PACE authentication using non-blocking authorisation data**

- Hierarchical to: No other components.
- Dependencies: FIA\_UAU.1 Timing of authentication: fulfilled by **FIA\_UAU.1/PACE**
- FIA\_AFL.1.1 /PACE The TSF shall detect when [**Number in Table 20**] unsuccessful authentication attempt occurs related to [**Authentication events**].
- FIA\_AFL.1.2 /PACE When the defined number of unsuccessful authentication attempts has been met, the TSF shall [Actions].

Password	Number	Authentication events	Actions
<u>MRZ, CAN</u>	<u>1</u>	<u>authentication attempts using the PACE password (MRZ, CAN) as shared password</u>	<u>Exponentially increase time delay before new authentication attempt is possible.</u>
<u>CAN</u>	<u>[0-255: number of presentations]</u>	<u>Authentication attempt involving CAN as shared password for PACE</u>	<u>Wait for an increasing time between receiving of the terminal challenge and sending of the TSF response during the PACE authentication attempts</u>
<u>PIN &amp; PUK</u>	<u>An administrator configurable positive integer linked to the size of the PIN or PUK (respectively)</u>	<u>Consecutive failed authentication attempts using the PIN or PUK as the shared password for PACE leaving a single authentication attempt</u>	<u>Suspend the PIN or the PUK</u>
	<u>1</u>	<u>On suspend mode, a bad or correct value presentation attempts using the PIN or PUK as the shared password for PACE</u>	<u>Suspend the PIN or the PUK</u>
	<u>1</u>	<u>On suspend mode, After a PACE CAN authentication, a bad PIN/PUK value presentation attempt.</u>	<u>Block the PIN or the PUK</u>

**Table 20: FIA\_AFL.1/PACE FIA\_AFL.1/PACE iterations**

**FIA\_API.1/DDH Authentication Proof of Identity- Digital Identity document holder**

Hierarchical to: No other components  
Dependencies: No dependencies

FIA\_API.1.1/DDH The TSF shall provide an authentication mechanism to prove the identity of the Digital Identity document holder

Application note 3: The TOE acts as a substitute for the Digital Identity document holder, to authenticate digitally on its behalf. The authentication mechanism is triggered by the Digital Identity Document holder itself by presenting its PIN to the TOE.

Application note 4: The FIA\_API.1/DDH is overwrite the SFR FIA\_API.A/CA defined in the [AddendumDI]

**FIA\_UID.1/PERSO Timing of identification**

Hierarchical to: No other components.  
Dependencies: No dependencies.

FIA\_UID.1.1 /PERSO The TSF shall allow  
**1. to establish a communication channel,**  
**2. to carry out the mutual authentication Protocol according to [GP]**  
on behalf of the user to be performed before the user is identified

FIA\_UID.1.2 /PERSO The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.

**FIA\_UAU.1/PERSO Timing of authentication**

Hierarchical to: No other components.  
Dependencies: FIA\_UID.1 Timing of identification: fulfilled by **FIA\_UID.1/PERSO**

FIA\_UAU.1.1 /PERSO The TSF shall allow  
**1. to establish a communication channel,**  
**2. to carry out the mutual authentication Protocol according to [GP]**  
on behalf of the user to be performed before the user is authenticated.

FIA\_UAU.1.2 /PERSO The TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.

Application note:

- FIA\_AFL.1/PERSO, FIA\_UID.1/PERSO, and FIA\_UAU.1/PERSO are extensions to [PP-MRTD-EACV2], in order to deal with identification and authentication in pre-personalisation and personalisation phases.

**FIA\_UID.1/PACE Timing of identification**

Hierarchical to: No other components  
Dependencies: No dependencies

FIA\_UID.1.1 /PACE The TSF shall allow  
1. to establish the communication channel,  
2. carrying out the PACE Protocol according to [ICAO-TR-SAC],  
3. to read the Initialization Data if it is not disabled by TSF according to FMT\_MTD.1/INI\_DIS  
4. to identify themselves by selection of the authentication key  
5. to carry out the Chip Authentication Protocol v.1 according to [TR-EAC-1]  
6. to carry out the Terminal Authentication Protocol v.1 according to [TR-EAC-1]  
on behalf of the user to be performed before the user is identified.

FIA\_UID.1.2 /PACE The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.

**Application note:** The SFR FIA\_UID.1/PACE in the current ST covers the definition in [PP-MRTD-SAC] and extends it by EAC aspects 4 & 5. This extension does not conflict with the strict conformance to PACE PP.

#### **FIA\_UAU.1/PACE Timing of authentication**

Hierarchical to: No other components  
Dependencies: FIA\_UID.1 Timing of identification: fulfilled by **FIA\_UID.1/PACE**

FIA\_UAU.1.1 /PACE The TSF shall allow

1. to establish the communication channel.
2. carrying out the PACE Protocol according to [ICAO-TR-SAC].
3. to read the Initialization Data if it is not disabled by TSF according to FMT\_MTD.1/INI\_DIS
4. to identify themselves by selection of the authentication key
5. to carry out the Chip Authentication Protocol v.1 according to [TR-EAC-1]
6. to carry out the Terminal Authentication Protocol v.1 according to [TR-EAC-1] on behalf of the user to be performed before the user is authenticated.

FIA\_UAU.1.2 /PACE The TSF shall require each user to be successfully authenticated before allowing any other TSF-mediated actions on behalf of that user.

**Application note:** The SFR FIA\_UAU.1/PACE in the current ST covers the definition in [PP-MRTD-SAC] and extends it by EAC aspects 4 & 5. This extension does not conflict with the strict conformance to PACE PP.

#### **FIA\_UAU.4/PACE Single-use authentication mechanisms - Single-use authentication of the Terminal by the TOE**

Hierarchical to: No other components  
Dependencies: No dependencies

FIA\_UAU.4.1 /PACE The TSF shall prevent reuse of authentication data related to

1. PACE Protocol according to [ICAO-TR-SAC].
2. Authentication Mechanism based on **Triple-DES, AES**
3. Terminal Authentication Protocol v.1 according to [TR-EAC-1]

**Application note:** The authentication mechanisms use a challenge freshly and randomly generated by the TOE to prevent reuse of a response generated by a terminal in a successful authentication attempt.

**Application note:** The SFR FIA\_UAU.4/PACE in the current ST covers the definition in [PP-MRTD-SAC] and extends it by EAC aspect 3. This extension does not conflict with the strict conformance to PACE PP.

#### **FIA\_UAU.5/PACE Multiple authentication mechanisms**

Hierarchical to: No other components  
Dependencies: No dependencies

FIA\_UAU.5.1 /PACE The TSF shall provide

1. PACE Protocol according to [ICAO-TR-SAC].
2. Passive Authentication according to [ICAO-9303]
3. Secure messaging in MAC-ENC according to [ICAO-TR-SAC].
4. Symmetric Authentication Mechanism based on **Triple-DES, AES**
5. Terminal Authentication Protocol v.1 according to [TR-EAC-1] to support user authentication.

- FIA\_UAU.5.2 /PACE The TSF shall authenticate any user's claimed identity according to the following rules:
1. **TOE accepts the authentication attempt as Pre-personalization Agent by the Symmetric Authentication Mechanism with the Pre-personalization Agent Key.**
  2. Having successfully run the PACE protocol the TOE accepts only received commands with correct message authentication code sent by means of secure messaging with the key agreed with the terminal by means of the PACE protocol.
  3. The TOE accepts the authentication attempt as Personalization Agent by the Symmetric Authentication Mechanism with Personalization Agent Key.
  4. After run of the Chip Authentication Protocol v.1 the TOE accepts only received commands with correct message authentication code sent by means of secure messaging with key agreed with the terminal by means of the Chip Authentication Mechanism v.1.
  5. The TOE accepts the authentication attempt by means of the Terminal Authentication Protocol v.1 only if the terminal uses the public key presented during the Chip Authentication Protocol v.1 and the secure messaging established by the Chip Authentication Mechanism.

**Application note:** The SFR FIA\_UAU.5.1/PACE in the current ST covers the definition in [ST-DI] and extends it by EAC aspect 5. The SFR FIA\_UAU.5.2/PACE in the current ST covers the definition in [ST-DI] and extends it by EAC aspects 4 and 5. These extensions do not conflict with the strict conformance to PACE PP.

#### **FIA\_UAU.6/PACE Re-authenticating – Re-authenticating of Terminal by the TOE**

Hierarchical to: No other components  
Dependencies: No dependencies

- FIA\_UAU.6.1 /PACE The TSF shall re-authenticate the user under the conditions each command sent to the TOE after successful run of the PACE Protocol shall be verified as being sent by the PACE terminal.

#### **FIA\_UAU.6/EAC Re-authenticating – Re-authenticating of Terminal by the TOE**

Hierarchical to: No other components  
Dependencies: No dependencies

- FIA\_UAU.6.1 /EAC The TSF shall re-authenticate the user under the conditions each command sent to the TOE after successful run of the Chip Authentication Protocol shall be verified as being sent by the GIS.

#### **FIA\_API.1/CA Authentication Proof of Identity – Chip Authentication**

Hierarchical to: No other components  
Dependencies: No dependencies

- FIA\_API.1.1/CA The TSF shall provide a Chip Authentication Protocol v.1 according to [TR-EAC-1] to prove the identity of the TOE.

**Application note:** This SFR requires the TOE to implement the Chip Authentication Mechanism specified in [TR-EAC-1]. The TOE and the terminal generate a shared secret using the Diffie-Hellman Protocol (DH or EC-DH) and two session keys for secure messaging in ENC\_MAC mode according to [ICAO-9303], normative appendix 5, A5.1. The terminal verifies by means of secure messaging whether the MRTD's chip was able or not to run his protocol properly using its Chip Authentication Private Key corresponding to the Chip Authentication Key (EF.DG14).

## FIA\_API.1/AA Authentication Proof of Identity – Active Authentication

Hierarchical to: No other components  
Dependencies: No dependencies

FIA\_API.1.1/AA The TSF shall provide an **Active Authentication Protocol according to [ICAO-9303]** to prove the identity of the **TOE**.

**Application note:** This SFR requires the TOE to implement the Active Authentication Mechanism specified in [ICAO-9303]. The terminal generates a challenge then verifies whether the MRTD's chip was able or not to sign it properly using its Active Authentication private key corresponding to the Active Authentication public key (EF.DG15).

### 7.1.4 Class FDP User Data Protection

The TOE shall meet the requirement "Subset access control (FDP\_ACC.1)" as specified below (Common Criteria Part 2).

#### FDP\_ACC.1/TRM Subset access control

Hierarchical to: No other components  
Dependencies: FDP\_ACF.1 Security attributes based access control

FDP\_ACC.1.1 /TRM The TSF shall enforce the Access Control SFP on terminals gaining access to the User Data and data stored in EF.SOD of the logical **Digital Identity document**.

Application note 8: A refinement is used to replace the term travel document with Digital Identity document as specified in Table 1. Such syntactic change does not violate strict conformance. The TOE shall meet the requirement "Security attribute based access control (FDP\_ACF.1)" as specified below (Common Criteria Part 2).

#### FDP\_ACF.1/TRM Security attribute based access control

Hierarchical to: No other components  
Dependencies: FDP\_ACC.1 Subset access control  
FMT\_MSA.3 Static attribute initialization

**FDP\_ACF.1.1 /TRM** The TSF shall enforce the Access Control SFP to objects based on the following:

1. Subjects:
  - a. Terminal
  - b. **PACE terminal**
  - c. Extended Inspection System
2. Objects:
  - a. data in EF.DG1, EF.DG2 and EF.DG5 to EF.DG16, EF.SOD and EF.COM of the logical **Digital Identity document**,
  - b. data in EF.DG3 of the logical **Digital Identity document**,
  - c. data in EF.DG4 of the logical **Digital Identity document**,
  - d. all TOE intrinsic secret cryptographic keys stored in the **Digital Identity document**,
3. Security attributes:
  - a. PACE **PIN** Authentication
  - b. Terminal Authentication v.1
  - c. Authorisation of the Terminal
  - d. **Chip Authentication v1**

FDP\_ACF.1.2 /TRM The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

- A PACE Terminal is allowed to read data objects from FDP\_ACF.1.1/TRM according to [ICAO-9303] after **at least** successful PACE authentication as required by FIA\_UAU.1/PACE.

- A PACE Terminal is allowed to read data objects 2a) of FDP\_ACF.1.1/TRM according to [SPECDI] only after a successful PACE authentication followed by Chip Authentication v1 as required by FIA\_UAU.1/PACE. This rule is not applicable for EF.DG14.
- A PACE Terminal is allowed to read data objects 2b) and 2c) of FDP\_ACF.1.1/TRM according to [SPECDI] only after a successful PACE authentication followed by Chip Authentication v1 and Terminal Authentication v.1 as required by FIA\_UAU.1/PACE.

- FDP\_ACF.1.3 /TRM The TSF shall explicitly authorize access of subjects to objects based on the following additional rules: none.
- FDP\_ACF.1.4 /TRM The TSF shall explicitly deny access of subjects to objects based on the following additional rules:
1. Any terminal being not authenticated at least as PACE authenticated PACE Terminal is not allowed to read, to write, to modify, to use any user data stored on the Digital Identity document.
  2. Terminals not using secure messaging are not allowed to read, to write, to modify, to use any data stored on the Digital Identity document.
  3. Any terminal being not successfully authenticated as Extended Inspection System with the Read access to DG 3 (Fingerprint) granted by the relative certificate holder authorization encoding is not allowed to read the data objects 2b) of FDP\_ACF.1.1/TRM.
  4. Any terminal being not successfully authenticated as Extended Inspection System with the Read access to DG 4 (Iris) granted by the relative certificate holder authorization encoding is not allowed to read the data objects 2c) of FDP\_ACF.1.1/TRM.
  5. Nobody is allowed to read the data objects 2d) of FDP\_ACF.1.1/TRM.
  6. Terminals authenticated as CVCA or as DV are not allowed to read data in the EF.DG3 and EF.DG4.

Application note 9: Below we justify all refinements: In FDP\_ACF.1.1 1b) a refinement is used to replace the term BIS-PACE with PACE Terminal as specified in Table 1. Such syntactic change does not violate strict conformance. In FDP\_ACF.1.1 2) a refinement is used to replace the term travel document with Digital Identity document as specified in § 1.3. Such syntactic change does not violate strict conformance. In FDP\_ACF.1.1 3d) the Chip Authentication v1 is added as new attribute. For FDP\_ACF.1.2, the added word “at least” of rule 1 with the remaining rules 2 and 3 does not decrease security and thus is in conformance with [PP-MRTD-EACV2]. For FDP\_ACF.1.4/TRM rule 1, the added word “at least” of rule 1 does not decrease security and thus is in conformance with [PP-MRTD-EACV2].

#### FDP\_RIP.1 Subset residual information protection

Hierarchical to: No other components.  
Dependencies: No dependencies.

- FDP\_RIP.1.1 The TSF shall ensure that any previous information content of a resource is made unavailable upon the **deallocation of the resource from** the following objects:
1. Session Keys (immediately after closing related communication session).
  2. ephemeral private key ephem - SK<sub>PICC</sub>- PACE (by having generated a DH shared secret K).

**FDP\_RIP.1/PINPUK**                      **Subset residual information protection**

Hierarchical to:    No other components  
Dependencies:        No dependencies  
FDP\_RIP.1.1        The TSF shall ensure that any previous information content of a resource is made unavailable upon the deallocation of the resource from the following objects:  
                          1. PIN and PUK

The TOE shall meet the requirement “Basic data exchange confidentiality (FDP\_UCT.1)” as specified below (Common Criteria Part 2).

**FDP\_UCT.1/TRM Basic data exchange confidentiality**

Hierarchical to:    No other components  
Dependencies:        [FTP\_ITC.1 Inter-TSF trusted channel, or  
                          FTP\_TRP.1 Trusted path]: fulfilled by **FTP\_ITC.1/PACE**  
                          [FDP\_ACC.1 Subset access control, or  
                          FDP\_IFC.1 Subset information flow control]: fulfilled by **FDP\_ACC.1/TRM**

FDP\_UCT.1.1        The TSF shall enforce the Access Control SFP to be able to transmit and receive user data /TRM in a manner protected from unauthorised disclosure.

The TOE shall meet the requirement “Data exchange integrity (FDP\_UIT.1)” as specified below (Common Criteria Part 2).

**FDP\_UIT.1/TRM Data exchange integrity**

Hierarchical to:    No other components  
Dependencies:        [FDP\_ACC.1 Subset access control, or  
                          FDP\_IFC.1 Subset information flow control]: fulfilled by **FDP\_ACC.1/TRM**  
                          [FTP\_ITC.1 Inter-TSF trusted channel, or  
                          FTP\_TRP.1 Trusted path]: fulfilled by **FTP\_ITC.1/PACE**

FDP\_UIT.1.1        The TSF shall enforce the Access Control SFP to be able to transmit and receive user data /TRM in a manner protected from modification, deletion, insertion and replay errors.

FDP\_UIT.1.2        The TSF shall be able to determine on receipt of user data, whether modification, deletion, insertion and replay has occurred.

**Rationale for Refinement:** Note that the Access Control SFP (cf. FDP\_ACF.1.2) allows the Extended Inspection System (as of [ICAO-9303] and [PP-MRTD-BAC]) to access the data EF.COM, EF.SOD, EF.DG1, EF.DG2 and EF.DG5 to EF.DG16 of the logical MRTD. Nevertheless there is explicitly no rule for preventing access to these data. More over their data integrity (cf. FDP\_UIT.1) and confidentiality (cf. FDP\_UCT.1) is ensured by the BAC mechanism being addressed and covered by [PP-MRTD-BAC]. The fact that the BAC mechanism is not part of the ST in hand is addressed by the refinement “after Chip Authentication”.

## 7.1.5 Class FTP Trusted Path/Channels

### FTP\_ITC.1/PACE Inter-TSF trusted channel after PACE

Hierarchical to: No other components.  
Dependencies: No dependencies.

- FTP\_ITC.1.1 /PACE 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 the channel data from modification or disclosure.
- FTP\_ITC.1.2 /PACE The TSF shall permit another trusted IT product to initiate communication via the trusted channel.
- FTP\_ITC.1.3 /PACE The TSF shall ~~initiate~~ **enforce** communication via the trusted channel for any data exchange between the TOE and the Terminal.

## 7.1.6 Class FMT Security Management

**Application note:** The SFR FMT\_SMF.1 and FMT\_SMR.1 provide basic requirements to the management of the TSF data.

The TOE shall meet the requirement “Specification of Management Functions (FMT\_SMF.1)” as specified below (Common Criteria Part 2).

### 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:
1. Initialization.
  2. Pre-personalization.
  3. Personalization.
  4. Configuration.

### FMT\_SMF.1/PINPUK Specification of Management Functions

Hierarchical to: No other components  
Dependencies: No dependencies

- FMT\_SMF.1.1 /PINPUK The TSF shall be capable of performing the following management functions:
1. Initialize, and resume the PIN or the PUK
  2. Change and unblock the PIN

The TOE shall meet the requirement “Security roles (FMT\_SMR.1)” as specified below (Common Criteria Part 2).

### FMT\_SMR.1/PACE Security roles

Hierarchical to: No other components  
Dependencies: FIA\_UID.1 Timing of identification fulfilled by **FIA\_UID.1/PACE.**

- FMT\_SMR.1.1 /PACE The TSF shall maintain the roles
1. Manufacturer.
  2. Personalization Agent.
  3. Terminal.
  4. PACE authenticated BIS-PACE

FMT\_SMR.1.2 /PACE The TSF shall be able to associate users with roles.

**Application note:** The MRTD also maintains the role Basic Inspection System due to a direct consequence of P.BAC-PP resp. OE.BAC-PP. Nevertheless this role is not explicitly listed in FMT\_SMR.1.1, above since the TSF cannot maintain the role with respect to the assumed high attack potential due to the known weaknesses of the Document Basic Access Keys.

The TOE shall meet the requirement “Limited capabilities (FMT\_LIM.1)” as specified below (Common Criteria Part 2 extended).

#### **FMT\_LIM.1 Limited capabilities**

Hierarchical to: No other components  
Dependencies: FMT\_LIM.2 Limited capabilities: fulfilled by **FMT\_LIM.2**.

FMT\_LIM.1.1 The TSF shall be designed in a manner that limits their capabilities so that in conjunction with “Limited availability (FMT\_LIM.2)” the following policy is enforced:  
Deploying test features after TOE delivery do not allow  
1.User Data to be manipulated and disclosed,  
2.TSF data to be manipulated or disclosed,  
3.software to be reconstructed,  
4.substantial information about construction of TSF to be gathered which may enable other attacks.

The TOE shall meet the requirement “Limited availability (FMT\_LIM.2)” as specified below (Common Criteria Part 2 extended).

#### **FMT\_LIM.2 Limited availability**

Hierarchical to: No other components  
Dependencies: FMT\_LIM.1 Limited capabilities: fulfilled by **FMT\_LIM.1**.

FMT\_LIM.2.1 The TSF shall be designed in a manner that limits their availability so that in conjunction with “Limited capabilities (FMT\_LIM.1)” the following policy is enforced:  
Deploying Test Features after TOE Delivery does not allow  
1.User Data to be manipulated and disclosed,  
2.TSF data to be manipulated or disclosed,  
3.software to be reconstructed,  
4.substantial information about construction of TSF to be gathered which may enable other attacks

**Application note:** The term “software” in item 4 of FMT\_LIM.1.1 and FMT\_LIM.2.1 refers to both IC Dedicated and IC Embedded Software.

The TOE shall meet the requirement “Management of TSF data (FMT\_MTD.1)” as specified below (Common Criteria Part 2). The iterations address different management functions and different TSF data.

#### **FMT\_MTD.1/INI\_ENA Management of TSF data – Writing of Initialization Data and Pre-personalization Data**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/INI\_ENA The TSF shall restrict the ability to write the Initialization Data and Pre-personalization Data to the Manufacturer.

**Application note:** The pre-personalization Data includes but is not limited to the authentication reference data for the Personalization Agent which is the symmetric cryptographic Personalization Agent Key.

**FMT\_MTD.1/Initialize\_PINPUK      Management of TSF data – Initialize PIN or PUK**

Hierarchical to: No other components.  
Dependencies: FMT\_SMF.1 Specification of management functions,  
FMT\_SMR.1 Security roles

FMT\_MTD.1.1/Initialize\_PINPUK      The TSF shall restrict the ability to write the initial PIN and PUK to the personalization agent.

**FMT\_MTD.1/Resume\_PINPUK      Management of TSF data – Resuming PIN or PUK**

Hierarchical to: No other components.  
Dependencies: FMT\_SMF.1 Specification of management functions,  
FMT\_SMR.1 Security roles

FMT\_MTD.1.1/Resume\_PINPUK      The TSF shall restrict the ability to resume the suspended PIN or the PUK to the Digital Identity document holder.

**FMT\_MTD.1/Change\_PIN      Management of TSF data – Changing PIN**

Hierarchical to: No other components.  
Dependencies: FMT\_SMF.1 Specification of management functions,  
FMT\_SMR.1 Security roles

FMT\_MTD.1.1/Change\_PIN      The TSF shall restrict the ability to change the PIN to the Digital Identity document holder.

**FMT\_MTD.1/ Unblock\_PIN      Management of TSF data – Unblock PIN**

Hierarchical to: No other components.  
Dependencies: FMT\_SMF.1 Specification of management functions,  
FMT\_SMR.1 Security roles

FMT\_MTD.1.1/ Unblock\_PIN      The TSF shall restrict the ability to unblock the blocked PIN to the Digital Identity document holder (using the PUK for unblocking).

**FMT\_MTD.1/INI\_DIS Management of TSF data – Disabling of Read Access to Initialization Data and Pre-personalization Data**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by  
**FMT\_SMR.1/PACE**

FMT\_MTD.1.1/ INI\_DIS      The TSF shall restrict the ability to read out the Initialisation Data and the Pre-personalisation Data to the Personalisation Agent

**FMT\_MTD.1/CVCA\_INI Management of TSF data – Initialization of CVCA Certificate and Current Date**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/ CVCA\_INI      The TSF shall restrict the ability to write the  
1. initial Country Verifying Certification Authority Public Key,  
2. initial Country Verifying Certification Authority Certificate,  
3. initial Current Date  
to the **Personalization Agent**.

**FMT\_MTD.1/CVCA\_UPD Management of TSF data – Country Verifying Certification Authority**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/  
CVCA\_UPD The TSF shall restrict the ability to update the  
1. Country Verifying Certification Authority Public Key,  
2. Country Verifying Certification Authority Certificate  
to Country Verifying Certification Authority.

**FMT\_MTD.1/DATE Management of TSF data – Current date**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/  
DATE The TSF shall restrict the ability to modify the Current date to  
1. Country Verifying Certification Authority,  
2. Document Verifier,  
3. domestic Extended Inspection System.

**FMT\_MTD.1/CAPK Management of TSF data – Chip Authentication Private Key**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/  
CAPK The TSF shall restrict the ability to **create and load** the Chip Authentication Private Key to **the Personalization Agent**.

**FMT\_MTD.1/AAK Management of TSF data – Active Authentication Private Key**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/  
AAK The TSF shall restrict the ability to **create and load** the Active Authentication Private Key to **the Personalization Agent**.

**FMT\_MTD.1/PA Management of TSF data – Personalisation Agent**

Hierarchical to: No other components.  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/  
/PA The TSF shall restrict the ability to write the Document Security Object (SO<sub>D</sub>) to the Personalisation Agent.

**FMT\_MTD.1/KEY\_READ Management of TSF data – Key Read**

Hierarchical to: No other components  
Dependencies: FMT\_SMF.1 Specification of management functions: fulfilled by **FMT\_SMF.1**  
FMT\_SMR.1 Security roles: fulfilled by **FMT\_SMR.1/PACE**

FMT\_MTD.1.1/  
KEY\_READ The TSF shall restrict the ability to read the  
1. PACE passwords  
2. Document Basic Access Keys,  
3. Chip Authentication Private Key,  
4. **Active Authentication Private Key**  
5. Personalization Agent Keys  
to none.

The TOE shall meet the requirement “Secure TSF data (FMT\_MTD.3)” as specified below (Common Criteria Part 2):

#### **FMT\_MTD.3 Secure TSF data**

Hierarchical to: No other components  
Dependencies: FMT\_MTD.1 Management of TSF data: fulfilled by : fulfilled by  
**FMT\_MTD.1/CVCA\_INI, FMT\_MTD.1/CVCA\_UPD**

FMT\_MTD.3.1 The TSF shall ensure that only secure values of the certificate chain are accepted for TSF data of the Terminal Authentication Protocol and the Access Control.

**Refinement: The certificate chain is valid if and only if**

- (1) the digital signature of the Inspection System Certificate can be verified as correct with the public key of the Document Verifier Certificate and the expiration date of the Inspection System Certificate is not before the Current Date of the TOE,**
- (2) the digital signature of the Document Verifier Certificate can be verified as correct with the public key in the Certificate of the Country Verifying Certification Authority and the expiration date of the Document Verifier Certificate is not before the Current Date of the TOE,**
- (3) the digital signature of the Certificate of the Country Verifying Certification Authority can be verified as correct with the public key of the Country Verifying Certification Authority known to the TOE and the expiration date of the Certificate of the Country Verifying Certification Authority is not before the Current Date of the TOE.**

**The Inspection System Public Key contained in the Inspection System Certificate in a valid certificate chain is a secure value for the authentication reference data of the Extended Inspection System.**

**The intersection of the Certificate Holder Authorizations contained in the certificates of a valid certificate chain is a secure value for Terminal Authorization of a successful authenticated Extended Inspection System.**

**Application note:** The Terminal Authentication is used for Extended Inspection System as required by FIA\_UAU.4 and FIA\_UAU.5. The Terminal Authorization is used as TSF data for access control required by FDP\_ACF.1.

### **7.1.7 Class FPT Protection of the Security Functions**

The TOE shall prevent inherent and forced illicit information leakage for User Data and TSF Data. The security functional requirement FPT\_EMS.1 addresses the inherent leakage. With respect to the forced leakage they have to be considered in combination with the security functional requirements “Failure with preservation of secure state (FPT\_FLS.1)” and “TSF testing (FPT\_TST.1)” on the one hand and “Resistance to physical attack (FPT\_PHP.3)” on the other. The SFRs “Limited capabilities (FMT\_LIM.1)”, “Limited availability (FMT\_LIM.2)” and “Resistance to physical attack (FPT\_PHP.3)” together with the SAR “Security architecture description” (ADV\_ARC.1) prevent bypassing, deactivation and manipulation of the security features or misuse of TOE functions.

The TOE shall meet the requirement “TOE Emanation (FPT\_EMS.1)” as specified below (Common Criteria Part 2 extended):

#### **FPT\_EMS.1 TOE Emanation**

Hierarchical to: No other components  
Dependencies: No dependencies.

FPT\_EMS.1.1 The TOE shall not emit **electromagnetic and current emissions** in excess of **intelligible threshold** enabling access to

1. Chip Authentication Session Keys
2. PACE session Keys (PACE-K MAC, PACE-KEnc),
3. the ephemeral private key ephemer SK PICC-PACE,

4. Personalization Agent Key(s)
5. Chip Authentication Private Key
6. **Active Authentication Key, EF.DG3 and EF.DG4**

FPT\_EMS.1.2 The TSF shall ensure any users are unable to use the following interface smart card circuit contacts to gain access to

1. Chip Authentication Session Keys
2. PACE session Keys (PACE-K MAC, PACE-KEnc)
3. the ephemeral private key ephem SK PICC-PACE
4. Personalization Agent Key(s)
5. Chip Authentication Private Key
6. **Active Authentication Key.**

The following security functional requirements address the protection against forced illicit information leakage including physical manipulation.

The TOE shall meet the requirement “Failure with preservation of secure state (FPT\_FLS.1)” as specified below (Common Criteria Part 2).

#### **FPT\_FLS.1 Failure with preservation of secure state**

Hierarchical to: No other components  
Dependencies: No dependencies.

FPT\_FLS.1.1 The TSF shall preserve a secure state when the following types of failures occur:

1. Exposure to operating conditions causing a TOE malfunction.
2. failure detected by TSF according to FPT\_TST.1.

The TOE shall meet the requirement “TSF testing (FPT\_TST.1)” as specified below (CC Part 2).

#### **FPT\_TST.1 TSF testing**

Hierarchical to: No other components  
Dependencies: No dependencies.

FPT\_TST.1.1 The TSF shall run a suite of self tests **Conditions under which self test should occur** to demonstrate the correct operation of the TSF at condition:

- 1. During initial start-up**
- 2. Periodically during normal operation**
- 3. After cryptographic computation**
- 4. Before any use or update of TSF data**

**The description of the self test is the following (for each corresponding number):**

- 1. RNG live test, sensor test, FA detection, Integrity Check of NVM ES**
- 2. RNG monitoring, FA detection**
- 3. FA detection**
- 4. FA detection, Integrity Check of related TSF data**

FPT\_TST.1.2 The TSF shall provide authorised users with the capability to verify the integrity of TSF data.

FPT\_TST.1.3 The TSF shall provide authorised users with the capability to verify the integrity of stored TSF executable code.

The TOE shall meet the requirement “Resistance to physical attack (FPT\_PHP.3)” as specified below (Common Criteria Part 2).

### FPT\_PHP.3 Resistance to physical attack

Hierarchical to: No other components

Dependencies: No dependencies.

FPT\_PHP.3.1 The TSF shall resist physical manipulation and physical probing to the TSF by responding automatically such that the SFRs are always enforced.

## 7.2 SECURITY ASSURANCE REQUIREMENTS FOR THE TOE

The SAR for the evaluation of the TOE and its development and operating environment are those taken from the Evaluation Assurance Level 5 (EAL5) and augmented by taking the following components: ALC\_DVS.2 and AVA\_VAN.5.

### 7.3 SECURITY REQUIREMENTS RATIONALE

#### 7.3.1 Security Functional Requirements Rationale

The rationale in this paragraph comes from [PP-MRTD-EACV2] §6.3.1 and [AddendumDI]. Additions due to Active Authentication and secure messaging in personalisation are shaded.

	OT.Sens_Data_Conf	OT.Chip_Auth_Proof	OT.AC_Pers	OT.Data_Integrity	OT.Data_Authenticity	OT.Data_Confidentiality	OT.Identification	OT.Prot_Abuse_Func	OT.Prot_Inf_Leak	OT.Tracing	OT.Prot_Phys_Tamper	OT.Prot_Malfunction	OT.Activ_Auth_Proof	OT.Sens_Ident_User_Data_Conf
FAU_SAS.1			X				X							
FCS_CKM.1/DH_PACE				X	X	X								
FCS_CKM.1/CA	X	X	X	X	X	X								
FCS_CKM.1/KeyPair		X											X	
FCS_CKM.1/PERSO				X	X	X								
FCS_CKM.4	X		X	X	X	X								
FCS_COP.1/PACE_ENC						X								
FCS_COP.1/PACE_MAC				X	X									
FCS_COP.1/CA_ENC	X	X	X	X		X								
FCS_COP.1/SIG_VER	X		X											
FCS_COP.1/CA_MAC	X	X	X	X										
FCS_COP.1/PACE_CAM	X	X												
FCS_COP.1/PERSO				X	X	X								
FCS_COP.1/AA													X	
FCS_RND.1	X		X	X	X	X								
FIA_AFL.1/PERSO	X			X	X	X								
FIA_UID.1/PERSO	X			X	X	X								
FIA_UAU.1/PERSO	X			X	X	X								
FIA_UID.1/PACE	X		X	X	X	X								
FIA_UAU.1/PACE	X		X	X	X	X								
FIA_UAU.4/PACE	X		X	X	X	X								
FIA_UAU.5/PACE	X		X	X	X	X								
FIA_UAU.6/PACE				X	X	X								
FIA_UAU.6/EAC	X		X	X	X	X								
FIA_API.1/CA		X												
FIA_API.1/AA													X	
FDP_ACC.1/TRM	X		X	X		X								X
FDP_ACF.1/TRM	X		X	X		X								X
FDP_RIP.1				X	X	X								
FDP_UCT.1/TRM	X					X								
FDP_UIT.1/TRM				X		X								
FTP_ITC.1/PACE				X	X	X				X				
FMT_SMF.1		X	X	X	X	X	X							
FMT_SMR.1/PACE		X	X	X	X	X	X							
FMT_LIM.1								X						
FMT_LIM.2								X						
FMT_MTD.1/INI_ENA			X				X							
FMT_MTD.1/INI_DIS			X				X							

	OT.Sens_Data_Conf	OT.Chip_Auth_Proof	OT.AC_Pers	OT.Data_Integrity	OT.Data_Authenticity	OT.Data_Confidentiality	OT.Identification	OT.Prot_Abuse_Func	OT.Prot_Inf_Leak	OT.Tracing	OT.Prot_Phys_Tamper	OT.Prot_Malfunction	OT.Activ_Auth_Proof	OT.Sens_Ident_User_Data_Conf
FMT_MTD.1/CVCA_INI	X													
FMT_MTD.1/CVCA_UPD	X													
FMT_MTD.1/DATE	X													
FMT_MTD.1/CAPK	X	X		X										
FMT_MTD.1/AAK													X	
FMT_MTD.1/PA			X	X	X	X								
FMT_MTD.1/KEY_READ	X	X	X	X	X	X							X	
FMT_MTD.3	X													
FPT_EMS.1			X						X					
FPT_FLS.1									X			X		
FPT_TST.1									X			X		
FPT_PHP.3				X					X		X			
FIA_AFL.1/PACE			X	X	X	X				X				X
FMT_SMF.1/PINPUK			X	X	X	X								X
FDP_RIP.1/PINPUK			X	X	X	X								X
FIA_API.1/DDH				X	X	X								X
FMT_MTD.1/Initialize_PINPUK				X	X	X								X
FMT_MTD.1/Resume_PINPUK				X	X	X								X
FMT_MTD.1/Change_PIN				X	X	X								X
FMT_MTD.1/Unblock_PIN				X	X	X								X

Table 21: Security functional requirement rationale

The security objective **OT.Identification** "Identification of the TOE" addresses the storage of Initialisation and Pre-Personalisation Data in its non-volatile memory, whereby they also include the IC Identification Data uniquely identifying the TOE's chip. This will be ensured by TSF according to SFR FAU\_SAS.1. The SFR FMT\_MTD.1/INI\_ENA allows only the Manufacturer to write Initialisation and Pre-personalisation Data (including the Personalisation Agent key). The SFR FMT\_MTD.1/INI\_DIS requires the Personalisation Agent to disable access to Initialisation and Pre-personalisation Data in the life cycle phase 'operational use'. The SFRs FMT\_SMF.1 and FMT\_SMR.1/PACE support the functions and roles related.

The security objective **OT.AC\_Pers** "Access Control for Personalisation of logical travel document" addresses the access control of the writing the logical travel document. The justification for the SFRs FAU\_SAS.1, FMT\_MTD.1/INI\_ENA and FMT\_MTD.1/INI\_DIS arises from the justification for OT.Identification above with respect to the Pre-personalisation Data. The write access to the logical travel document data are defined by the SFR

FIA\_UID.1/PACE, FIA\_UAU.1/PACE, FDP\_ACC.1/TRM and FDP\_ACF.1/TRM in the same way: only the successfully authenticated Personalisation Agent is allowed to write the data of the groups EF.DG1 to EF.DG16 of the logical travel document only once. FMT\_MTD.1/PA covers the related property of OT.AC\_Pers (writing SO<sub>D</sub> and, in generally, personalisation data). The SFR FMT\_SMR.1/PACE lists the roles (including Personalisation Agent) and the SFR FMT\_SMF.1 lists the TSF management functions (including Personalisation). The SFRs FMT\_MTD.1/KEY\_READ and FPT\_EMS.1 restrict the access to the Personalisation Agent Keys and the Chip Authentication Private Key.

The authentication of the terminal as Personalisation Agent shall be performed by TSF according to SFR FIA\_UAU.4/PACE and FIA\_UAU.5/PACE. If the Personalisation Terminal want to authenticate itself to the TOE by means of the Terminal Authentication Protocol v.1 (after Chip Authentication v.1) with the

Personalisation Agent Keys the TOE will use TSF according to the FCS\_RND.1 (for the generation of the challenge), FCS\_CKM.1/CA (for the derivation of the new session keys after Chip Authentication v.1), and FCS\_COP.1/CA\_ENC and FCS\_COP.1/CA\_MAC (for the ENC\_MAC\_Mode secure messaging), FCS\_COP.1/SIG\_VER (as part of the Terminal Authentication Protocol v.1) and FIA\_UAU.6/EAC (for the re-authentication). If the Personalisation Terminal wants to authenticate itself to the TOE by means of the Authentication Mechanism with Personalisation Agent Key the TOE will use TSF according to the FCS\_RND.1 (for the generation of the challenge) and FCS\_COP.1/CA\_ENC (to verify the authentication attempt). The session keys are destroyed according to FCS\_CKM.4 after use.

The security objective **OT.Data\_Integrity** "Integrity of personal data" requires the TOE to protect the integrity of the logical travel document stored on the travel document's chip against physical manipulation and unauthorized writing. Physical manipulation is addressed by FPT\_PHP.3. Logical manipulation of stored user data is addressed by (FDP\_ACC.1/TRM, FDP\_ACF.1/TRM): only the Personalisation Agent is allowed to write the data in EF.DG1 to EF.DG16 of the logical travel document (FDP\_ACF.1.2/TRM, rule 1) and terminals are not allowed to modify any of the data in EF.DG1 to EF.DG16 of the logical travel document (cf. FDP\_ACF.1.4/TRM). FMT\_MTD.1/PA requires that SO<sub>D</sub> containing signature over the User Data stored on the TOE and used for the Passive Authentication is allowed to be written by the Personalisation Agent only and, hence, is to be considered as trustworthy. The Personalisation Agent must identify and authenticate themselves according to FIA\_UID.1/PACE and FIA\_UAU.1/PACE before accessing these data. FIA\_UAU.4/PACE, FIA\_UAU.5/PACE and FCS\_CKM.4 represent some required specific properties of the protocols used. The SFR FMT\_SMR.1/PACE lists the roles and the SFR FMT\_SMF.1 lists the TSF management functions.

Unauthorized modifying of the exchanged data is addressed, in the first line, by FTP\_ITC.1/PACE using FCS\_COP.1/PACE\_MAC. For PACE secured data exchange, a prerequisite for establishing this trusted channel is a successful PACE Authentication (FIA\_UID.1/PACE, FIA\_UAU.1/PACE) using FCS\_CKM.1/DH\_PACE and possessing the special properties FIA\_UAU.5/PACE, FIA\_UAU.6/PACE resp. FIA\_UAU.6/EAC. The trusted channel is established using PACE, Chip Authentication v.1, and Terminal Authentication v.1. FDP\_RIP.1 requires erasing the values of session keys (here: for K<sub>MAC</sub>).

The TOE supports the inspection system detect any modification of the transmitted logical travel document data after Chip Authentication v.1. The SFR FIA\_UAU.6/EAC and FDP\_UIT.1/TRM requires the integrity protection of the transmitted data after Chip Authentication v.1 by means of secure messaging implemented by the cryptographic functions according to FCS\_CKM.1/CA (for the generation of shared secret and for the derivation of the new session keys), and FCS\_COP.1/CA\_ENC and FCS\_COP.1/CA\_MAC for the ENC\_MAC\_Mode secure messaging. The session keys are destroyed according to FCS\_CKM.4 after use. The SFR FMT\_MTD.1/CAPK and FMT\_MTD.1/KEY\_READ requires that the Chip Authentication Key cannot be written unauthorized or read afterwards.

The SFR FCS\_RND.1 represents a general support for cryptographic operations needed.

In pre-personalisation, the SFR FCS\_CKM.1/PERSO and FCS\_COP.1/PERSO ensure the integrity of data transfers after successful authentication of the pre-personalisation agent according to FIA\_UID.1/PERSO and FIA\_UAU.1/PERSO, with the support of FIA\_AFL.1/PERSO.

The security objective **OT.Data\_Authenticity** aims ensuring authenticity of the User- and TSF data (after the PACE Authentication) by enabling its verification at the terminal-side and by an active verification by the TOE itself. This objective is mainly achieved by FTP\_ITC.1/PACE using FCS\_COP.1/PACE\_MAC. A prerequisite for establishing this trusted channel is a successful PACE or Chip and Terminal Authentication v.1 (FIA\_UID.1/PACE, FIA\_UAU.1/PACE) using FCS\_CKM.1/DH\_PACE resp. FCS\_CKM.1/CA and possessing the special properties FIA\_UAU.5/PACE, FIA\_UAU.6/PACE resp. FIA\_UAU.6/EAC. FDP\_RIP.1 requires erasing the values of session keys (here: for K<sub>MAC</sub>). FIA\_UAU.4/PACE, FIA\_UAU.5/PACE and FCS\_CKM.4 represent some required specific properties of the protocols used. The SFR FMT\_MTD.1/KEY\_READ restricts the access to the PACE passwords and the Chip Authentication Private Key. FMT\_MTD.1/PA requires that SO<sub>D</sub> containing signature over the User Data stored on the TOE and used for the Passive Authentication is allowed to be written by the Personalisation Agent only and, hence, is to be considered as trustworthy. The SFR FCS\_RND.1 represents a general support for cryptographic operations needed. The SFRs FMT\_SMF.1 and FMT\_SMR.1/PACE support the functions and roles related.

In pre-personalisation, the SFR FCS\_CKM.1/PERSO and FCS\_COP.1/PERSO ensure the authenticity of data transfers after successful authentication of the pre-personalisation agent according to FIA\_UID.1/PERSO and FIA\_UAU.1/PERSO, with the support of FIA\_AFL.1/PERSO.

The security objective **OT.Data\_Confidentiality** aims that the TOE always ensures confidentiality of the User- and TSF-data stored and, after the PACE Authentication resp. Chip Authentication, of these data exchanged. This objective for the data stored is mainly achieved by (FDP\_ACC.1/TRM, FDP\_ACF.1/TRM). FIA\_UAU.4/PACE, FIA\_UAU.5/PACE and FCS\_CKM.4 represent some required specific properties of the

protocols used. This objective for the data exchanged is mainly achieved by FDP\_UCT.1/TRM, FDP\_UIT.1/TRM and FTP\_ITC.1/PACE using FCS\_COP.1/PACE\_ENC resp. FCS\_COP.1/CA\_ENC. A prerequisite for establishing this trusted channel is a successful PACE or Chip and Terminal Authentication v.1 (FIA\_UID.1/PACE, FIA\_UAU.1/PACE) using FCS\_CKM.1/DH\_PACE resp. FCS\_CKM.1/CA and possessing the special properties FIA\_UAU.5/PACE, FIA\_UAU.6/PACE resp. FIA\_UAU.6/EAC. FDP\_RIP.1 requires erasing the values of session keys (here: for  $K_{ENC}$ ). The SFR FMT\_MTD.1/KEY\_READ restricts the access to the PACE passwords and the Chip Authentication Private Key. FMT\_MTD.1/PA requires that SO<sub>D</sub> containing signature over the User Data stored on the TOE and used for the Passive Authentication is allowed to be written by the Personalisation Agent only and, hence, is to be considered trustworthy. The SFR FCS\_RND.1 represents the general support for cryptographic operations needed. The SFRs FMT\_SMF.1 and FMT\_SMR.1/PACE support the functions and roles related.

In pre-personalisation, the SFR FCS\_CKM.1/PERSO and FCS\_COP.1/PERSO ensure the confidentiality of data transfers after successful authentication of the pre-personalisation agent according to FIA\_UID.1/PERSO and FIA\_UAU.1/PERSO, with the support of FIA\_AFL.1/PERSO.

The security objective **OT.Sens\_Data\_Conf** "Confidentiality of sensitive biometric reference data" is enforced by the Access Control SFP defined in FDP\_ACC.1/TRM and FDP\_ACF.1/TRM allowing the data of EF.DG3 and EF.DG4 only to be read by successfully authenticated Extended Inspection System being authorized by a valid certificate according FCS\_COP.1/SIG\_VER.

The SFRs FIA\_UID.1/PACE and FIA\_UAU.1/PACE require the identification and authentication of the inspection systems. The SFR FIA\_UAU.5/PACE requires the successful Chip Authentication (CA) v.1 before any authentication attempt as Extended Inspection System. During the protected communication following the CA v.1 the reuse of authentication data is prevented by FIA\_UAU.4/PACE. The Chip Authentication (CA) v.1 can be replaced by the PACE CAM endorsed by the SFR FCS\_COP.1/PACE\_CAM. The SFR FIA\_UAU.6/EAC and FDP\_UCT.1/TRM requires the confidentiality protection of the transmitted data after Chip Authentication v.1 by means of secure messaging implemented by the cryptographic functions according to FCS\_RND.1 (for the generation of the terminal authentication challenge), FCS\_CKM.1/CA (for the generation of shared secret and for the derivation of the new session keys), and FCS\_COP.1/CA\_ENC and FCS\_COP.1/CA\_MAC for the ENC\_MAC\_Mode secure messaging. The session keys are destroyed according to FCS\_CKM.4 after use. The SFR FMT\_MTD.1/CAPK and FMT\_MTD.1/KEY\_READ requires that the Chip Authentication Key cannot be written unauthorized or read afterwards.

To allow a verification of the certificate chain as in FMT\_MTD.3 the CVCA's public key and certificate as well as the current date are written or updated by authorized identified role as of FMT\_MTD.1/CVCA\_INI, FMT\_MTD.1/CVCA\_UPD and FMT\_MTD.1/DATE.

The SFRs FIA\_UID.1/PERSO and FIA\_UAU.1/PERSO, with the support of FIA\_AFL.1/PERSO, require the identification and authentication of the pre-personalisation agent.

The security objective **OT.Chip\_Auth\_Proof** "Proof of travel document's chip authenticity" is ensured by the Chip Authentication Protocol v.1 provided by FIA\_API.1/CA proving the identity of the TOE or by the PACE CAM mechanism defined by the SFR FCS\_COP.1/PACE\_CAM. The Chip Authentication Protocol v.1 defined by FCS\_CKM.1/CA is performed using a TOE internally stored confidential private key as required by FMT\_MTD.1/CAPK and FMT\_MTD.1/KEY\_READ. The Chip Authentication Protocol v.1 [5] requires additional TSF according to FCS\_CKM.1/CA (for the derivation of the session keys), FCS\_COP.1/CA\_ENC and FCS\_COP.1/CA\_MAC (for the ENC\_MAC\_Mode secure messaging). The SFRs FMT\_SMF.1 and FMT\_SMR.1/PACE support the functions and roles related. The asymmetric keys used during the Chip Authentication Protocol are initialized during the personalization process by key importation or On Board Key Generation covered by FCS\_CKM.1/KeyPair.

The security objective **OT.Prot\_Abuse\_Func** "Protection against Abuse of Functionality" is ensured by the SFR FMT\_LIM.1 and FMT\_LIM.2 which prevent misuse of test functionality of the TOE or other features which may not be used after TOE Delivery.

The security objective

**OT.Prot\_Inf\_Leak** "Protection against Information Leakage" requires the TOE to protect confidential TSF data stored and/or processed in the travel document's chip against disclosure

- by measurement and analysis of the shape and amplitude of signals or the time between events found by measuring signals on the electromagnetic field, power consumption, clock, or I/O lines which is addressed by the SFR FPT\_EMS.1,
- by forcing a malfunction of the TOE which is addressed by the SFR FPT\_FLS.1 and FPT\_TST.1, and/or
- by a physical manipulation of the TOE which is addressed by the SFR FPT\_PHP.3.

The security objective **OT.Tracing** aims that the TOE prevents gathering TOE tracing data by means of unambiguous identifying the travel document remotely through establishing or listening to a communication via the contactless interface of the TOE without a priori knowledge of the correct values of shared passwords (CAN, MRZ). This objective is achieved as follows: (i) while establishing PACE communication with CAN or MRZ (non-blocking authorisation data) – by **FIA\_AFL.1/PACE**; (ii) for listening to PACE communication (is of importance for the current PP, since SO<sub>D</sub> is card-individual) – **FTP\_ITC.1/PACE**.

The security objective **OT.Prot\_Phys\_Tamper** “Protection against Physical Tampering” is covered by the SFR **FPT\_PHP.3**.

The security objective **OT.Prot\_Malfunction** “Protection against Malfunctions” is covered by (i) the SFR **FPT\_TST.1** which requires self tests to demonstrate the correct operation and tests of authorized users to verify the integrity of TSF data and TSF code, and (ii) the SFR **FPT\_FLS.1** which requires a secure state in case of detected failure or operating conditions possibly causing a malfunction.

The security objective **OT.Activ\_Auth\_Proof** “Proof of MRTD’s chip authenticity through AA” is covered by **FIA\_API.1/AA** that proves the identity of the TOE. **FCS\_COP.1/AA** provides the signature.

**FMT\_MTD.1/AAK** and **FMT\_MTD.1/KEY\_READ** participate to confidentiality of AA private key.

The asymmetric keys used during the Chip Authentication Protocol are initialized during the personalization process by key importation or On Board Key Generation covered by **FCS\_CKM.1/KeyPair**.

**OT.AC\_Pers**: Additionally to the SFRs from [PP-MRTD-EACV2] which cover this objective, the security objective **OT.AC\_Pers** is achieved by terminal identification/authentication using and managing the PIN/PUK as required by the SFRs **FIA\_AFL.1/PACE**. The SFR **FMT\_SMF.1/PINPUK** support the related functions. The SFR **FDP\_RIP.1/PINPUK** requires erasing the temporal values PIN and PUK.

**OT.Data\_Integrity, OT.Data\_Authenticity and OT.Data\_Confidentiality**: Additionally to the SFRs from [PP-MRTD-EACV2] which cover these objectives, these security objectives are achieved by establishing a trusted channel via a successful Chip Authentication thanks to the SFR **FIA\_API.1/DDH**. Since PACE can use the PIN as the shared secret, using and management of PIN, the SFRs **FIA\_AFL.1/PACE**, **FMT\_MTD.1/Initialize\_PINPUK**, **FMT\_MTD.1/Resume\_PINPUK**, **FMT\_MTD.1/Change\_PIN**, **FMT\_MTD.1/Unblock\_PIN** support the achievement of these objectives. The SFR **FMT\_SMF.1/PINPUK** support the related functions. The SFR **FDP\_RIP.1/PINPUK** requires erasing the temporal values PIN and PUK.

**OT.Tracing**: Additionally to the SFRs from [PP-MRTD-EACV2] which cover this objective, the security objective **OT.Tracing** is achieved while establishing PACE communication using the PIN/PUK by the SFR **FIA\_AFL.1/PACE**.

**OT.Sens\_Ident\_User\_Data\_Conf**: The security objective of **OT.Sens\_Ident\_User\_Data\_Conf** aims to explicitly protect sensitive identification user and TSF-Data during their exchange. It is enforced by the Access Control SFP defined in **FDP\_ACC.1/TRM** and **FDP\_ACF.1/TRM** allowing the data of EF.DG3 and EF.DG4 only to be read by successfully authenticated Extended Inspection System being authorized by a valid certificate according **FCS\_COP.1/SIG\_VER**<sup>18</sup>. A prerequisite for establishing a trusted channel is a successful Chip Authentication thanks to the SFRs **FIA\_API.1/DDH**. Since PACE can use the PIN as the shared secret, the SFRs **FIA\_AFL.1/PACE**, **FMT\_MTD.1/Initialize\_PINPUK**, **FMT\_MTD.1/Resume\_PINPUK**, **FMT\_MTD.1/Change\_PIN**, **FMT\_MTD.1/Unblock\_PIN** support the achievement of this objective. The SFR **FMT\_SMF.1/PINPUK** support the related functions. The SFR **FDP\_RIP.1/PINPUK** requires erasing the temporal values PIN and PUK.

<sup>18</sup> The SFR **FCS\_COP.1/SIG\_VER** is defined in the [PP-MRTD-EACV2]

### 7.3.2 Dependency Rationale

The rationale in this paragraph comes from [PP-MRTD-EACV2] §6.3.2. Additions due to Active Authentication are shaded.

SFR	Dependencies	Support of the dependencies
<b>FAU_SAS.1</b>	No dependencies	
<b>FCS_CKM.1/DH_PACE</b>	[FCS_CKM.2 or FCS_COP.1], FCS_CKM.4	<b>FCS_COP.1/PACE_ENC,</b> <b>FCS_COP.1/PACE_MAC</b> <b>FCS_CKM.4</b>
<b>FCS_CKM.1/CA</b>	[FCS_CKM.2 or FCS_COP.1], FCS_CKM.4	<b>FCS_COP.1/CA_ENC,</b> <b>FCS_COP.1/CA_MAC,</b> <b>FCS_CKM.4</b>
<b>FCS_CKM.1/KeyPair</b>	[FCS_CKM.2 or FCS_COP.1], FCS_CKM.4	<b>FCS_COP.1/CA_ENC,</b> <b>FCS_COP.1/CA_MAC</b> Not fulfilled, see note 1
<b>FCS_CKM.1/PERSO</b>	[FCS_CKM.2 or FCS_COP.1], FCS_CKM.4	<b>FCS_COP.1/PERSO,</b> <b>FCS_CKM.4</b>
<b>FCS_CKM.4</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1]	<b>FCS_CKM.1/DH_PACE,</b> <b>FCS_CKM.1/CA,</b> <b>FCS_CKM.1/PERSO</b>
<b>FCS_COP.1/PACE_CAM</b>	FCS_CKM.1 FCS_CKM.4	<b>FCS_CKM.1/DH_PACE</b> <b>FCS_CKM.4</b>
<b>FCS_COP.1/PACE_ENC</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	<b>FCS_CKM.1/DH_PACE</b>  <b>FCS_CKM.4</b>
<b>FCS_COP.1/PACE_MAC</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	<b>FCS_CKM.1/DH_PACE</b>  <b>FCS_CKM.4</b>
<b>FCS_COP.1/CA_ENC</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	<b>FCS_CKM.1/CA</b>  <b>FCS_CKM.4</b>
<b>FCS_COP.1/SIG_VER</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	<b>FCS_CKM.1/CA</b>  <b>FCS_CKM.4</b>
<b>FCS_COP.1/CA_MAC</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	<b>FCS_CKM.1/CA</b>  <b>FCS_CKM.4</b>
<b>FCS_COP.1/PERSO</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	<b>FCS_CKM.1/PERSO</b>  <b>FCS_CKM.4</b>
<b>FCS_COP.1/AA</b>	[FDP_ITC.1, FDP_ITC.2, or FCS_CKM.1], FCS_CKM.4	<b>FCS_CKM.1/KeyPair</b>  Not fulfilled: see note 1
<b>FCS_RND.1</b>	No dependencies	
<b>FIA_AFL.1/PERSO</b>	FIA_UAU.1	<b>FIA_UAU.1/PERSO</b>
<b>FIA_AFL.1/PACE</b>	FIA_UAU.1	<b>FIA_UAU.1/PACE</b>
<b>FIA_UID.1/PERSO</b>	No dependencies	
<b>FIA_UAU.1/PERSO</b>	FIA_UID.1	<b>FIA_UID.1/PERSO</b>
<b>FIA_UID.1/PACE</b>	No dependencies	
<b>FIA_UAU.1/PACE</b>	FIA_UID.1	<b>FIA_UID.1/PACE</b>
<b>FIA_UAU.4/PACE</b>	No dependencies	
<b>FIA_UAU.5/PACE</b>	No dependencies	
<b>FIA_UAU.6/PACE</b>	No dependencies	
<b>FIA_UAU.6/EAC</b>	No dependencies	
<b>FIA_API.1/DDH</b>	No dependencies	
<b>FIA_API.1/AA</b>	No dependencies	
<b>FIA_API.1/CA</b>	No dependencies	
<b>FDP_ACC.1/TRM</b>	FDP_ACF.1	<b>FDP_ACF.1/TRM</b>

SFR	Dependencies	Support of the dependencies
FDP_ACF.1/TRM	FDP_ACC.1, FMT_MSA.3	FDP_ACC.1/TRM, Not fulfilled: see note 2
FDP_RIP.1	No dependencies	
FDP_RIP.1/PINPUK	No dependencies	
FDP_UCT.1/TRM	[FDP_ACC.1 or FDP_IFC.1], [FTP_ITC.1, or FTP_TRP.1]	FDP_ACC.1/TRM, FTP_ITC.1/PACE
FDP_UIT.1/TRM	[FDP_ACC.1 or FDP_IFC.1], [FTP_ITC.1, or FTP_TRP.1]	FDP_ACC.1/TRM, FTP_ITC.1/PACE
FTP_ITC.1/PACE	No dependencies	
FMT_SMF.1	No dependencies	
FMT_SMF.1/PINPUK	No dependencies	
FMT_SMR.1/PACE	FIA_UID.1	FIA_UID.1/PACE
FMT_LIM.1	FMT_LIM.2	FMT_LIM.2
FMT_LIM.2	FMT_LIM.1	FMT_LIM.1
FMT_MTD.1/INI_ENA	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/INI_DIS	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/CVCA_INI	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/CVCA_UPD	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/DATE	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/CAPK	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/AAK	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/PA	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/KEY_READ	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/Initialize_PINPUK	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/Resume_PINPUK	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/Change_PIN	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.1/Unblock_PIN	FMT_SMF.1 FMT_SMR.1	FMT_SMF.1, FMT_SMR.1/PACE
FMT_MTD.3	FMT_MTD.1	FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD
FPT_EMS.1	No dependencies	
FPT_TST.1	No dependencies	
FPT_FLS.1	No dependencies	
FPT_PHP.3	No dependencies	

**Table 22: Security functional requirement dependencies**

Notes:

1. The dependency between **FCS\_COP.1/AA** and **FCS\_CKM.4**, and **FCS\_CKM.1/KeyPair** and **FCS\_CKM.4** is not fulfilled because the key is permanently stored on the card.
2. The access control TSF according to **FDP\_ACF.1/TRM** uses security attributes having been defined during the personalisation and fixed over the whole life time of the TOE. No management of these security attributes (i.e. SFR FMT\_MSA.1 and FMT\_MSA.3) is necessary here.

### 7.3.3 Security Assurance Requirements Rationale

EAL5 was chosen because it provides a high level of independently assured security in a planned development. It requires a rigorous development approach without incurring unreasonable costs attributable to specialist security engineering techniques.

The selection of the component ALC\_DVS.2 provides a higher assurance of the security of the MRTD's development and manufacturing especially for the secure handling of the MRTD's material.

The selection of the component AVA\_VAN.5 provides a higher assurance of the security by vulnerability analysis to assess the resistance to penetration attacks performed by an attacker possessing a high attack potential. This vulnerability analysis is necessary to fulfil the security objectives OT.Sens\_Data\_Conf and OT.Chip\_Auth\_Proof.

For these additional assurance components, all dependencies are met or exceeded in the EAL5 assurance package:

Component	Dependencies required by CC Part 3 or ASE_ECD	Dependency fulfilled by
TOE security assurance requirements (only additional to EAL5)		
ALC_DVS.2	no dependencies	-
AVA_VAN.5	ADV_ARC.1	ADV_ARC.1
	ADV_FSP.4	ADV_FSP.5
	ADV_TDS.3	ADV_TDS.4
	ADV_IMP.1	ADV_IMP.1
	AGD_OPE.1	AGD_OPE.1
	AGD_PRE.1	AGD_PRE.1
	ATE_DPT.1	ATE_DPT.3

**Table 23: SAR Dependencies**

### 7.3.4 Security Requirements – Mutual support and internal consistency

Cf [PP-MRTD-EACV2] §6.3.4

### 7.3.5 Compatibility between SFR of the Digital Identity ST and [IFX-IC]

The following table lists the SFRs that are declared on the [IFX-IC] Integrated Circuit Security Target [IFX-IC] and separates them in:

**IP\_SFR:** Irrelevant Platform-SFRs not being used by the Composite-ST.

**RP\_SFR-SERV:** Relevant Platform-SFRs being used by the Composite-ST to implement a security service with associated TSFI.

**MRP\_SFR-MECH:** Relevant Platform-SFRs being used by the Composite-ST because of its security properties providing protection against attacks to the TOE as a whole and are addressed in ADV\_ARC. These required security properties are a result of the security mechanisms and services that are implemented in the Platform TOE, as specified in [JIL\_CPE].

These definitions are according to the [JIL\_CPE] on which the Platform TOE on our case is the relaying IC, the [IFX-IC] Integrated Circuit.

The first column lists the [IFX-IC] and the next columns indicate their classification according to the paragraph above. The SFR's on the cells of the classification belong the MultiApp V5.0.A TOE described in this document. If there is no SFR on each cell is because not all CC class families have a corresponding match on both sides, but all SFRs from the [IFX-IC] have been classified. Moreover, no contradictions have been found between the Platform-SFRs set and the SFRs related to the composite product.

Requirements	IP_SFR	RP_SFR-SERV (*)	RP_SFR-MECH
FAU_SAS.1	X		
FCS_CKM.1/ECC	X		
FCS_CKM.1/RSA	X		
FCS_CKM.4/SCP	X		
FCS_CKM.4/SCL	X		
FCS_CKM.4/RSA	X		
FCS_CKM.4/ECC	X		
FCS_COP.1/SCP	X		
FCS_COP.1/SCL	X		
FCS_COP.1/RSA	X		
FCS_COP.1/ECC	X		
FCS_RNG.1/TRNG		X	
FCS_RNG.1/HPRG	X		
FCS_RNG.1/DRNG	X		
FCS_RNG.1/ DRNG4	X		
FDP_ACC.1	X		
FDP_ACC.1/Loader	X		
FDP_ACF.1	X		
FDP_ACF.1/Loader	X		
FDP_IFC.1	X		
FDP_ITT.1	X		
FDP_SDC.1	X		
FDP_SDI.2	X		

Requirements	IP_SFR	RP_SFR-SERV (*)	RP_SFR-MECH
FDP_UCT.1	X		
FDP_UIT.1	X		
FIA_API.1	X		
FIA_UID.2/Loader	X		
FMT_LIM.1	X		
FMT_LIM.1/Loader	X		
FMT_LIM.2	X		
FMT_LIM.2/Loader	X		
FMT_MTD.1/Loader	X		
FMT_SMF.1/Loader	X		
FMT_SMR.1/Loader	X		
FMT_MSA.1	X		
FMT_MSA.3	X		
FMT_SMF.1	X		
FMT_SMR.1	X		
FPT_FLS.1		X	
FPT_ITT.1		X	
FPT_PHP.3		X	
FPT_TST.2		X	
FRU_FLT.2	X		
FTP_ITC.1	X		

**Table 24: SFRs Dependencies**

(\*) RP\_SFR-SERV group definition:

The SFR FCS\_RND.1 of [ST-DI] is directly supporting with no incompatibilities, the SFR FCS\_RNG.1/TRNG of the IC from [IFX-IC]. (FCS\_RNG.1/HPRG, FCS\_RNG.1/DRNG, and FCS\_RNG.1/KSG are not relevant for this product)

The FPT\_FLS.1, FPT\_PHP.3 of [ST-DI] is directly supporting with no incompatibilities, the FPT\_FLS.1 of the IC from [IFX-IC].

The FPT\_TST.1 of [ST-DI] is directly supporting by its refinements with no incompatibilities, the FPT\_TST.2 of the IC from [IFX-IC].

The FPT\_FLS.1, FPT\_PHP.3, FPT\_ITT.1 and FPT\_EMS.1 of [ST-DI] is directly supporting with no incompatibilities, the FPT\_FLS.1 of the IC from [IFX-IC].

The other SFR of [ST-DI] are specific to [ST-DI] and they do not conflict with [IFX-IC].

We can therefore conclude that the SFR of [ST-DI] and [IFX-IC] are consistent.

## 8. TOE SUMMARY SPECIFICATION

### 8.1 TOE SECURITY FUNCTIONS

TOE Security Functions are provided by the MultiApp V5.0.A embedded software (including the optional NVM ES) and by the chip.

#### 8.1.1 TSFs provided by the Digital Identity 1.0.A (MultiApp V5.0.A) Software

SF	Description
SF.REL	Protection of data
SF.AC	Access control
SF.SYM_AUTH	Symmetric authentication
SF.SM	Secure messaging
SF.CA	Chip Authentication
SF.TA_CER	Validity of the Certificate Chain
SF.TA_AUT	Terminal Authentication Mechanism
SF.AA	Active Authentication
SF.UC	User Consent (Digital Identity)

**Table 25: Security Functions provided by the MultiApp V5.0.A Software**

#### 8.1.2 TSFs provided by the SLE78 (M7892 G12)

The evaluation is a composite evaluation and uses the results of the CC evaluation provided by [CR-IC]. The IC and its primary embedded software have been evaluated at level EAL 6+.

SF	Description
SF_DPM	Device Phase Management
SF_PS	Protection against Snooping
SF_PMA	Protection against Modification Attacks
SF_PLA	Protection against Logical Attacks
SF_CS	Cryptographic Support

**Table 26: Security Functions provided by the Infineon M7892 G12**

These SF are described in [IFX-IC].

## 9. GLOSSARY AND ACRONYMS

### Glossary

Term	Definition
<i>Active Authentication</i>	Security mechanism defined in [PKI] option by which means the MTRD's chip proves and the inspection system verifies the identity and authenticity of the MTRD's chip as part of a genuine MRTD issued by a known State of organization.
<i>Agreement</i>	This term is used in the current PP in order to reflect an appropriate relationship between the parties involved, but not as a legal notion.
<i>Application note</i>	Optional informative part of the ST containing sensitive supporting information that is considered relevant or useful for the evaluation or use of the TOE.
<i>Audit records</i>	Write-only-once non-volatile memory area of the travel document's chip to store the Initialisation Data and Pre-personalisation Data.
<i>Authenticity</i>	Ability to confirm that the travel document itself and the data elements stored in were issued by the travel document Issuer
<i>Basic Access Control (BAC)</i>	Security mechanism defined in [PKI] by which means the travel document's chip proves and the basic inspection system (with BAC) protects their communication by means of secure messaging with Document Basic Access Keys (see there) based on MRZ information as key seed and access condition to data stored on travel document's chip according to LDS.
<i>Basic Inspection System with Basic Access Control protocol (BIS-BAC)</i>	A technical system being used by an official organisation <sup>19</sup> 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. See also par. 1.2.5; also [PKI].
<i>Basic Inspection System with PACE protocol (BIS-PACE)</i>	A technical system being used by an inspecting authority <sup>20</sup> 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. A technical system being used by an inspecting authority and verifying the ePass presenter as the ePass holder (for ePassport: by comparing the real biometrical data (face) of the ePass presenter with the stored biometrical data (DG2) of the ePass holder). The Basic Inspection System with PACE is a PCT additionally supporting/applying the Passive Authentication protocol.
<i>Biographical data (biodata)</i>	The personalised details of the travel document holder appearing as text in the visual and machine readable zones of and electronically stored in the travel document. The biographical data are less-sensitive data.
<i>Biometric reference data</i>	Data stored for biometric authentication of the travel document holder in the travel document as (i) digital portrait and (ii) optional biometric reference data (e.g. finger and iris).
<i>Card Access Number (CAN)</i>	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), see [ICAO-9303]

<sup>19</sup> an inspecting authority; concretely, by a control officer

<sup>20</sup> concretely, by a control officer

Term	Definition
<i>Counterfeit</i>	An unauthorised copy or reproduction of a genuine security document made by whatever means [PKI].
<i>Country Signing Certificate (CCSCA)</i>	Certificate of the Country Signing Certification Authority Public Key (KPU_CSCA) issued by Country Signing Certification Authority and stored in the rightful terminals.
<i>Country Signing Certification Authority (CSCA)</i>	An organisation enforcing the policy of the ePass Issuer with respect to confirming correctness of user and TSF data stored in the ePass. The CSCA represents the country specific root of the PKI for the ePass and creates the Document Signer Certificates within this PKI. The CSCA also issues the self-signed CSCA Certificate (CCSCA) having to be distributed by strictly secure diplomatic means, see. [PKI], 5.5.1.
<i>Document Basic Access Keys</i>	Pair of symmetric (two-key) Triple-DES keys used for secure messaging with encryption (key KBENC) and message authentication (key KBMAC) of data transmitted between the TOE and an inspection system using BAC [PKI]. They are derived from the MRZ and used within BAC to authenticate an entity able to read the printed MRZ of the passport book; see [PKI].
<i>Document Details Data</i>	Data printed on and electronically stored in the travel document representing the document details like document type, issuing state, document number, date of issue, date of expiry, issuing authority. The document details data are less-sensitive data.
<i>Document Security Object (SOD)</i>	A RFC 3369 CMS Signed Data Structure, signed by the Document Signer (DS). Carries the hash values of the LDS Data Groups: A hash for each Data Group in use shall be stored in the Security Data. It is stored in the ePassport application (EF.SOD) of the travel document. It may carry the Document Signer Certificate (CDS); see [PKI], sec. A.10.4.
<i>Document Signer (DS)</i>	An organisation enforcing the policy of the CSCA and signing the Document Security Object stored on the ePass for passive authentication. A Document Signer is authorised by the national CSCA issuing the Document Signer Certificate (CDS)(CDS), see [PKI]. This role is usually delegated to a Personalisation Agent.
<i>Eavesdropper</i>	A threat agent reading the communication between the travel document and the terminal to gain the data on the travel document.
<i>Enrolment</i>	The process of collecting biometric samples from a person and the subsequent preparation and storage of biometric reference templates representing that person's identity; see [PKI].
<i>ePassport application</i>	A part of the TOE containing the non-executable, related user data (incl. biometric) as well as the data needed for authentication (incl. MRZ); this application is intended to be used by authorities, amongst other as a machine readable travel document (MRTD). See [ICAO-9303].
<i>Forgery</i>	Fraudulent alteration of any part of the genuine document, e.g. changes to the biographical data or portrait; see [PKI].
<i>Global Interoperability</i>	The capability of inspection systems (either manual or automated) in different States throughout the world to exchange data, to process data received from systems in other States, and to utilise that data in inspection operations in their respective States. Global interoperability is a major objective of the standardised specifications for placement of both eye-readable and machine readable data in all travel documents; see [PKI].
<i>IC Dedicated Software</i>	Software developed and injected into the chip hardware by the IC manufacturer. Such software might support special functionality of the IC hardware and be used, amongst other, for implementing delivery procedures between different players. The usage of parts of the IC Dedicated Software might be restricted to certain life cycle phases.
<i>IC Embedded Software</i>	Software embedded in an IC and not being designed by the IC developer. The IC Embedded Software is designed in the design life cycle phase and embedded into the IC in the manufacturing life cycle phase of the TOE.

Term	Definition
<i>Impostor</i>	A person who applies for and obtains a document by assuming a false name and identity, or a person who alters his or her physical appearance to represent himself or herself as another person for the purpose of using that person's document; see [PKI].
<i>Improperly documented person</i>	A person who travels, or attempts to travel with: (a) an expired travel document or an invalid visa; (b) a counterfeit, forged or altered travel document or visa; (c) someone else's travel document or visa; or (d) no travel document or visa, if required; see [PKI].
<i>Initialisation Data</i>	Any data defined by the travel document manufacturer and injected into the non-volatile memory by the Integrated Circuits manufacturer. These data are, for instance, used for traceability and for IC identification as travel document material (IC identification data).
<i>Inspection</i>	The act of an official organisation (inspection authority) examining an travel document presented to it by an travel document presenter and verifying its authenticity as the travel document holder. See also [PKI].
<i>Inspection system</i>	see BIS-PACE for this PP. see also BIS-BAC for general information
<i>Integrated circuit (IC)</i>	Electronic component(s) designed to perform processing and/or memory functions. The travel document's chip is an integrated circuit.
<i>Integrity</i>	Ability to confirm the travel document and its data elements stored upon have not been altered from that created by the travel document Issuer.
<i>Issuing Organisation</i>	Organisation authorised to issue an official travel document (e.g. the United Nations Organisation, issuer of the Laissez-passer); see [PKI].
<i>Issuing State</i>	The country issuing the travel document; see [PKI].
<i>Logical Data Structure (LDS)</i>	The collection of groupings of Data Elements stored in the optional capacity expansion technology [PKI]. The capacity expansion technology used is the travel document's chip.
<i>Machine readable zone (MRZ)</i>	Fixed dimensional area located on the front of the travel document or MRP Data Page or, in the case of the TD1, the back of the travel document, containing mandatory and optional data for machine reading using OCR methods; see [PKI]. The MRZ-Password is a restricted-revealable secret that is derived from the machine readable zone and may be used for both PACE and BAC.
<i>Machine-verifiable biometrics feature</i>	A unique physical personal identification feature (e.g. an iris pattern, fingerprint or facial characteristics) stored on a travel document in a form that can be read and verified by machine; see [PKI].
<i>Manufacturer</i>	Generic term for the IC Manufacturer producing integrated circuit and the travel document Manufacturer completing the IC to the travel document. The Manufacturer is the default user of the TOE during the manufacturing life-cycle phase. The TOE itself does not distinguish between the IC Manufacturer and travel document Manufacturer using this role Manufacturer.
<i>PACE password</i>	A password needed for PACE authentication, e.g. CAN or MRZ.
<i>PACE Terminal (PCT)</i>	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 ePass using a shared password (CAN or MRZ).
<i>Passive authentication</i>	Security mechanism implementing (i) verification of the digital signature of the Card/Chip or Document Security Object and (ii) comparing the hash values of the read data fields with the hash values contained in the Card/Chip or Document Security Object. See [PKI].
<i>Passport (physical and electronic)</i>	An optically and electronically readable document in form of a paper/plastic cover and an integrated smart card. The Passport is used in order to verify that identity claimed by the Passport presenter is commensurate with the identity of the Passport holder stored on/in the card.

Term	Definition
<i>Password Authenticated Connection Establishment (PACE)</i>	A communication establishment protocol defined in [ICAO-9303]. 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 $\pi$ ). Based on this authentication, PACE also provides a secure communication, whereby confidentiality and authenticity of data transferred within this communication channel are maintained.
<i>Personalisation</i>	The process by which the Personalisation Data are stored in and unambiguously, inseparably associated with the travel document.
<i>Personalisation Agent</i>	An organisation acting on behalf of the travel document Issuer to personalise the travel document for the travel document holder by some or all of the following activities: (i) establishing the identity of the travel document holder for the biographic data in the travel document, (ii) enrolling the biometric reference data of the travel document holder, (iii) writing a subset of these data on the physical travel document (optical personalisation) and storing them in the travel document (electronic personalisation) for the travel document holder as defined in [PKI], (iv) writing the document details data, (v) writing the initial TSF data, (vi) signing the Document Security Object defined in [PKI] (in the role of DS).  Please note that the role 'Personalisation Agent' may be distributed among several institutions according to the operational policy of the travel document Issuer. Generating signature key pair(s) is not in the scope of the tasks of this role.
<i>Personalisation Data</i>	A set of data incl. (i) individual-related data (biographic and biometric data,) of the travel document holder, (ii) dedicated document details data and (iii) dedicated initial TSF data (incl. the Card/Chip Security Object, if installed, and the Document Security Object). Personalisation data are gathered and then written into the non-volatile memory of the TOE by the Personalisation Agent in the life cycle phase card issuing.
<i>Pre-personalisation Data</i>	Any data that is injected into the non-volatile memory of the TOE by the Manufacturer for traceability of the non-personalised travel document and/or to secure shipment within or between the life cycle phases manufacturing and card issuing.
<i>Pre-personalised travel document's chip</i>	travel document's chip equipped with a unique identifier and a unique Authentication Key Pair of the chip.
<i>Receiving State</i>	The Country to which the travel document holder is applying for entry; see [PKI].
<i>Reference data</i>	Data enrolled for a known identity and used by the verifier to check the verification data provided by an entity to prove this identity in an authentication attempt.
<i>RF-terminal</i>	A device being able to establish communication with an RF-chip according to ISO/IEC 14443 [ISO14443]
<i>Rightful equipment (rightful terminal or rightful Card)</i>	A technical device being expected and possessing a valid, certified key pair for its authentication, whereby the validity of the related certificate is verifiable up to the respective root CertA. A rightful terminal can be either BIS-PACE (see Inspection System).
<i>Secondary image</i>	A repeat image of the holder's portrait reproduced elsewhere in the document by whatever means; see [PKI].
<i>Secure messaging in combined mode</i>	Secure messaging using encryption and message authentication code according to ISO/IEC 7816-4 [ISO7816]
<i>Skimming</i>	Imitation of a rightful terminal to read the travel document or parts of it via the contactless/contact communication channel of the TOE without knowledge of the printed MRZ and CAN data PACE password.

Term	Definition
<i>Standard Inspection Procedure</i>	A specific order of authentication steps between an travel document and a terminal as required by [ICAO-9303], namely (i) PACE and (ii) Passive Authentication with SOD. SIP can generally be used by BIS-PACE and BIS-BAC.
<i>Supplemental Access Control</i>	A Technical Report which specifies PACE v2 as an access control mechanism that is supplemental to Basic Access Control.
<i>Terminal</i>	A Terminal is any technical system communicating with the TOE through a contactless / contact interface.
<i>TOE tracing data</i>	Technical information about the current and previous locations of the travel document gathered by inconspicuous (for the travel document holder) recognising the travel document
<i>Travel document</i>	Official document issued by a state or organisation 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 [PKI] (there “Machine readable travel document”).
<i>Travel document (electronic)</i>	The contactless/contact smart card integrated into the plastic or paper, optical readable cover and providing the following application: ePassport.
<i>Travel document holder</i>	A person for whom the ePass Issuer has personalised the travel document.
<i>Travel document Issuer (issuing authority)</i>	Organisation authorised to issue an electronic Passport to the travel document holder
<i>Travel document presenter</i>	A person presenting the travel document to a terminal and claiming the identity of the travel document holder.
<i>TSF data</i>	Data created by and for the TOE that might affect the operation of the TOE (CC part 1 [CC-1]).
<i>Unpersonalised travel document</i>	travel document material prepared to produce a personalised travel document containing an initialised and pre-personalised travel document’s chip.
<i>User Data</i>	All data (being not authentication data) (i)stored in the context of the ePassport application of the travel document as defined in [PKI]and (ii)being allowed to be read out solely by an authenticated terminal acting as Basic Inspection System with PACE (in the sense of [ICAO-9303]).  CC give the following generic definitions for user data: Data created by and for the user that does not affect the operation of the TSF (CC part 1 [CC-1]). Information stored in TOE resources that can be operated upon by users in accordance with the SFRs and upon which the TSF places no special meaning (CC part 2 [CC-2]).
<i>Verification data</i>	Data provided by an entity in an authentication attempt to prove their identity to the verifier. The verifier checks whether the verification data match the reference data known for the claimed identity.

## Acronyms

Acronym	Term
<i>AA</i>	Active Authentication
<i>BAC</i>	Basic Access Control
<i>BIS-BAC</i>	Basic Inspection System with BAC (equivalent to Basic Inspection System as used in [9])
<i>BIS-PACE</i>	Basic Inspection System with PACE
<i>CAN</i>	Card Access Number
<i>CC</i>	Common Criteria
<i>CertA</i>	Certification Authority
<i>MRZ</i>	Machine readable zone
<i>n.a.</i>	Not applicable
<i>OSP</i>	Organisational security policy
<i>PACE</i>	Password Authenticated Connection Establishment
<i>PCD</i>	Proximity Coupling Device
<i>PICC</i>	Proximity Integrated Circuit Chip
<i>PP</i>	Protection Profile
<i>RF</i>	Radio Frequency
<i>SAC</i>	Supplemental Access Control
<i>SAR</i>	Security assurance requirements
<i>SFR</i>	Security functional requirement
<i>SIP</i>	Standard Inspection Procedure, see [ICAO-9303]
<i>TOE</i>	Target of Evaluation
<i>TSF</i>	TOE security functionality
<i>TSP</i>	TOE Security Policy (defined by the current document)