



**Document Title: ID-One ePass IDL  
Full EACv2 in EAC with PACE MRTD  
configuration - Security Target Lite**

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## Document Management

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## 1 INTRODUCTION

### 1.1 Purpose

This security target Lite describes the security needs induced by the ePass ICAO essential product in EAC with PACE configuration with AA on Infineon SLE77 components.

The objectives of this Security Target Lite are:

- To describe the Target of Evaluation (TOE), its life cycle and to position it in the smart card life cycle,
- To describe the security environment of the TOE including the assets to be protected and the threats to be countered by the TOE and by the operational environment during the platform active phases,
- To describe the security objectives of the TOE and its supporting environment in terms of integrity and confidentiality of sensitive information. It includes protection of the TOE (and its documentation) during the product active phases,
- To specify the security requirements which include the TOE functional requirements, the TOE assurance requirements and the security requirements for the environment,
- To describe the summary of the TOE specification including a description of the security functions and assurance measures that meet the TOE security requirements,
- To present evidence that this ST is a complete and cohesive set of requirements that the TOE provides on an effective set of IT security countermeasures within the security environment, and that the TOE summary specification addresses the requirements.

## 1.2 Product Overview

The ePass ICAO essential is a multi configuration MRTD product. It provides four configurations, which are:

- the ePass ICAO essential product in BAC configuration with CA and AA,
- the ePass ICAO essential product in EAC configuration with AA,
- the ePass ICAO essential product in EAC with PACE configuration with AA,
- the ePass ICAO essential product in PACE configuration with CA and AA.

The ePass ICAO essential Operating System is embedded on two different components:

- SLE77CLFX2400P,
- SLE77CLFX2407P,

both manufactured by Infineon.

**Mutatis mutandis**, the product may also be used as an ISO driving license, compliant to ISO/IEC 18013 or ISO/IEC TR 19446 supporting BAP-1 (the same protocol as BAC but used in the context of driving license), AA and CA, as both applications (MRTD and IDL) share the same protocols and data structure organization. Therefore, in the rest of the document, the word “MRTD” MAY be understood either as a MRTD in the sense of ICAO, or a driving license compliant to ISO/IEC 18013 or ISO/IEC TR 19446 depending on the targeted usage envisioned by the issuer.

## 2 ST LITE INTRODUCTION

### 2.1 ST reference and TOE reference

#### 2.1.1 ST reference

Title	ID-One ePass IDL Full EACv2 in EAC with PACE MRTD configuration – Security Target
Reference	FQR 110 8176
Version	4
Author	Oberthur Technologies
Publication Date	20/02/2017
CC version	3.1 revision 4
EAL	EAL5 augmented with: <ul style="list-style-type: none"> <li>• ALC_DVS.2</li> <li>• AVA_VAN.5</li> </ul>
PP	See [PP_EACwPACE]

Table 1 – ST Reference

#### 2.1.2 TOE reference

Developer Name	Oberthur Technologies
Product Name	ID-One ePass ICAO essential configuration SAC and EAC
TOE Name	ID-One ePass IDL Full EACv2 in EAC with PACE MRTD configuration
TOE Identification	SAAAAR code: 084194
Guidance documents	FQR 110 7226 Ed6 – ePass ICAO Essential – Perso Guide

Table 2 – TOE Reference

#### 2.1.3 IC Identification

IC Certificate	See [IC_CERT]
IC Public Security Target	See [IC_ST]

Table 3 – IC Identification

## 2.2 TOE overview

### 2.2.1 Usage and major security features of the TOE

A State or Organisation issues travel documents to be used by the holder for international travel. The traveller presents a travel document to the inspection system to prove his or her identity. The travel document in context of this Security Target contains (i) visual (eye readable) biographical data and portrait of the holder, (ii) a separate data summary (MRZ data) for visual and machine reading using OCR methods in the Machine readable zone (MRZ) and (iii) data elements on the travel document's chip according to LDS in case of contactless machine reading. The authentication of the traveller is based on (i) the possession of a valid travel document personalised for a holder with the claimed identity as given on the biographical data page and (ii) biometrics using the reference data stored in the travel document. The issuing State or Organisation ensures the authenticity of the data of genuine travel documents. The receiving State trusts a genuine travel document of an issuing State or Organisation.

For this Security Target the travel document is viewed as unit of:

- (i) the **physical part of the travel document** in form of paper and/or plastic and chip. It presents visual readable data including (but not limited to) personal data of the travel document holder
  - (a) the biographical data on the biographical data page of the travel document surface,
  - (b) the printed data in the Machine Readable Zone (MRZ) and
  - (c) the printed portrait.
  
- (ii) the **logical travel document** as data of the travel document holder stored according to the Logical Data Structure as defined in [ICAO\_9303] as specified by ICAO on the contact based or contactless integrated circuit. It presents contact based / contactless readable data including (but not limited to) personal data of the travel document holder
  - (a) the digital Machine Readable Zone Data (digital MRZ data, EF.DG1),
  - (b) the digitized portraits (EF.DG2),
  - (c) the biometric reference data of finger(s) (EF.DG3) or iris image(s) (EF.DG4) or both1
  - (d) the other data according to LDS (EF.DG5 to EF.DG16) and
  - (e) the Document Security Object (SOD).

The issuing State or Organisation implements security features of the travel document to maintain the authenticity and integrity of the travel document and their data. The physical part of the travel document and the travel document's chip are identified by the Document Number.

The physical part of the travel document is protected by physical security measures (e.g. watermark, security printing), logical (e.g. authentication keys of the travel document's chip) and organisational security measures (e.g. control of materials, personalisation procedures) [ICAO\_9303]. These security measures can include the binding of the travel document's chip to the travel document.

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

The ICAO defines the baseline security methods Passive Authentication and the optional advanced security methods Basic Access Control to the logical travel document, Active Authentication of the travel document's chip, 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 travel document (i) in integrity by write-only 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\_03110] as an alternative to the Active Authentication stated in [ICAO\_9303].

If BAC is supported by the TOE, the travel document has to be evaluated and certified separately. This is due to the fact that [PP\_BAC] does only consider extended basic attack potential to the Basic Access Control Mechanism (i.e. AVA\_VAN.3).

As defined in [ICAO\_9303] in §6.1, Active Authentication authenticates the contactless IC by signing a challenge sent by the IFD (inspection system) with a private key known only to the IC. For this purpose the contactless IC contains its own Active Authentication Key pair (KPrAA and KPuAA). A hash representation of Data Group 15 (Public Key (KPuAA) info) is stored in the Document Security Object (SOD) and therefore authenticated by the issuer's digital signature. The corresponding Private Key (KPrAA) is stored in the contactless IC's secure memory. By authenticating the visual MRZ (through the hashed MRZ in the Document Security Object (SOD)) in combination with the challenge response, using the eMRTD's Active Authentication Key Pair (KPrAA and KPuAA), the inspection system verifies that the Document Security Object (SOD) has been read from the genuine contactless IC, stored in the genuine eMRTD.

The confidentiality by Password Authenticated Connection Establishment (PACE) is a mandatory security feature of the TOE. The travel document shall strictly conform to the 'Common Criteria Protection Profile Machine Readable Travel Document using Standard Inspection Procedure with PACE ([PP\_PACE]). Note that [PP\_PACE] considers high attack potential.

For the PACE protocol according to [ICAO\_TR\_SAC], the following steps shall be performed:

- (i) the travel document's chip encrypts a nonce with the shared password, derived from the MRZ resp. CAN data and transmits the encrypted nonce together 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 travel document's chip and 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 travel document's chip provide private communication (secure messaging) [TR\_03110], [ICAO\_TR\_SAC].

This Security Target requires the TOE to implement the Extended Access Control as defined in [TR\_03110]. 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 travel document'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 the sensitive biometric reference 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 Organisation through the issuing State, and (ii) an access control by the TOE to allow reading the sensitive biometric reference data only to successfully authenticated authorized inspection systems. The issuing State or Organisation authorizes the receiving State by means of certification the authentication public keys of Document Verifiers who create Inspection System Certificates.

**Mutatis mutandis**, the TOE may also be used as an ISO driving license, compliant to ISO/IEC 18013 or ISO/IEC TR 19446 supporting EAC and AA, as both applications (MRTD and IDL) share the same protocols and data structure organisation. Therefore, in the rest of the document, the word "MRTD" MAY be understood either as a MRTD in the sense of ICAO, or a driving license compliant to ISO/IEC 18013 or ISO/IEC TR 19446 depending on the targeted usage envisioned by the issuer.

The table below indicates how terms and concept present in the current document shall be read when considering the TOE to be an ISO driving license:

MRTD	ISO Driving License
MRTD	IDL
ICAO	ISO/IEC
ICAO 9303	ISO/IEC 18013 or ISO/IEC TR 19446
DG3	DG7
DG4	DG8
DG15	DG13
MRZ	MRZ or SAI (Scanning area identifier)
Traveler	Holder



### 2.2.2 TOE type

The TOE is the contactless and/or contact integrated circuit chip of machine readable travel documents (MRTD’s chip) programmed according to the Logical Data Structure (LDS) and providing the Basic Access Control, the Active Authentication, Password Authenticated Connection Establishment and Extended Access Control according to [ICAO\_9303], [ICAO\_TR\_SAC] and [TR\_03110].

The TOE comprises at least:

- the circuitry of the MRTD’s chip (the integrated circuit, IC),
- the IC Dedicated Software with the parts IC Dedicated Test Software and IC Dedicated Support Software,
- the IC Embedded Software (operating system),
- the MRTD application,
- the associated guidance documentation.

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Note: The antenna is not part of the TOE as it does not have any impact on the security.

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### 2.2.3 TOE life cycle

#### 2.2.3.1 Life cycle overview

The following table presents the TOE roles and the corresponding subject:

Roles		Subject
IC developer		Infineon
TOE developer		Oberthur Technologies
Manufacturer	IC manufacturer	Infineon
	MRTD packaging responsible	Oberthur Technologies or another agent for Scheme 1
		Oberthur Technologies for Scheme 2
	Embedded software loading responsible	Oberthur Technologies (only applying for Scheme 2)
Pre-personalization Agent		Oberthur Technologies or another agent
Personalization Agent		Oberthur Technologies or another agent

Table 4 - Roles identification on the life cycle

Several life cycles are available, depending when the Flash Code is loaded. The following tables present the subjects following TOE life cycle steps in accordance with the standard smart card life cycle [PP\_IC], and describe for each of them, (1) the TOE delivery point and (2) the assurance coverage:

Scheme 1, MRTD chip Embedded Software loaded by the IC Manufacturer in step 3:

Phase	Step	Subject	Emb.Sw. loading	Covered by	Sites
1 - Development	1	IC developer	✗	IC certification	IC certification
	2	TOE developer	✗	ALC R&D sites	Pessac and Colombes
2 - Manufacturing	3	IC manufacturer	✓	IC certification	IC manufacturer site
	TOE delivery point				
	4	MRTD packaging responsible	✗		
	5	Pre-personalization agent	✗	AGD_PRE	
3 - Personalization	6	Personalization agent	✗	AGD_PRE	
4 - Operational Use	7	End user	✗	AGD_OPE	

Table 5 - Subjects identification following life cycle steps – Scheme 1

Scheme 2, MRTD chip Embedded Software loaded by the OS loader in step 4 before TOE delivery point:

Phase	Step	Subject	Emb.Sw. loading	Covered by	Sites
1 - Development	1	IC developer	✗	IC certification	IC developer site
	2	TOE developer	✗	ALC R&D sites	Pessac and Colombes
2 - Manufacturing	3	IC manufacturer	✗	IC certification	IC manufacturer site
	4	MRTD packaging responsible	✗	ALC packaging centre	Vitré and/or Shenzhen
		Embedded software loading responsible	✓	ALC Embedded software loading centre	Vitré and/or Shenzhen
	TOE delivery point				
	5	Pre-personalization agent	✗	AGD_PRE	
3 - Personalization	6	Personalization agent	✗	AGD_PRE	
4 - Operational Use	7	End user	✗	AGD_OPE	

Table 6 - Subjects identification following life cycle steps – Scheme 2

### 2.2.3.2 Life cycle phases

The following text was extracted from [PP\_EACwPACE]. Due to the previous specified life cycles and to the technology of the IC, some interpretations have to be done by the reader of this ST Lite. The table below indicates how terms shall be read:

Term in [PP_BAC]	Meaning in this ST Lite
Software developer	TOE developer
non-volatile non-programmable memory(ies)	Part of the Flash memory where the Flash Loader and the OS are loaded. This memory is programmable by the IC manufacturer or using the Flash Loader. Once the Flash Loader is blocked, this memory is Read Only Memory
ROM	
non-volatile programmable memory(ies)	Part of the Flash memory where initialization data and user data are written.
EEPROM	

The TOE life cycle is described in terms of the four life cycle phases and subdivided into 7 steps (with respect to the [PP\_IC]).

#### 2.2.3.2.1 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 MRTD application and the guidance documentation associated with these TOE components.

The manufacturing documentation of the IC including the IC Dedicated Software and the Embedded Software in the non-volatile non-programmable memories (ROM) is securely delivered to the IC manufacturer. The IC Embedded Software in the non-volatile programmable memories, the MRTD application and the guidance documentation is securely delivered to the MRTD manufacturer.

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Note: If scheme 1 is applied, the Embedded Software in the non-volatile non-programmable memories (ROM) is securely delivered to the IC manufacturer. For details, please refer to ALC and in particular to [ALC\_STM]. If scheme 2 is applied, the Embedded Software in the non-volatile non-programmable memories (ROM) is securely delivered to the MRTD manufacturer. For details, please refer to ALC and in particular to [ALC\_SCT].

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#### 2.2.3.2.2 Phase 2 “Manufacturing”

(Step3) In a first step the TOE integrated circuit is produced containing the MRTD’s chip Dedicated Software and the parts of the MRTD’s chip Embedded Software in the non-volatile non-programmable memories (ROM). The IC manufacturer writes the IC Identification Data onto the chip to control the IC as MRTD material during the IC manufacturing and the delivery process to the MRTD manufacturer. The IC is securely delivered from the IC manufacture to the MRTD manufacturer.

If necessary the IC manufacturer adds the parts of the IC Embedded Software in the non-volatile programmable memories (for instance EEPROM).

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Note: If scheme 2 is applied, the TOE integrated circuit is produced containing the Flash Loader in the non-volatile non-programmable memories (ROM). The IC manufacturer writes the IC Identification Data onto the chip to control the IC as MRTD material during the IC manufacturing and the delivery process to the MRTD manufacturer. The IC is securely delivered from the IC manufacturer to the MRTD manufacturer.

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Note: Regarding key management, the Flash Loader usage is protected by successful Km authentication. For details, please refer to [IC\_PPM]. This key is securely transferred to IC manufacturer as detailed in ALC and more precisely in [ALC\_KM].

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

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Note: If scheme 2 is applied, the MRTD manufacturer (i) loads the MRTD’s chip Dedicated Software and the parts of the MRTD’s chip Embedded Software in the non-volatile non-programmable memories (ii) adds the parts of the IC Embedded Software in the non-volatile programmable memories.

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

**Application Note:** Creation of the application implies the creation of MF and ICAO.DF.

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

### 2.2.3.2.3 Phase 3 “Personalization of the MRTD”

(Step6) The personalization of the MRTD includes (i) the survey of the MRTD holder’s biographical data, (ii) the enrolment of the MRTD holder biometric reference data (i.e. the digitized portraits and the optional biometric reference data), (iii) the printing of the visual readable data onto the physical MRTD, (iv) the writing of the TOE User Data and TSF Data into the logical MRTD and (v) configuration of the TSF if necessary. The step (iv) is performed by the Personalization Agent and includes but is not limited to the creation of (i) the digital MRZ data (EF.DG1), (ii) the digitized portrait (EF.DG2), and (iii) the Document security object.

The signing of the Document security object by the Document Signer [ICAO\_9303] 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.

**Application Note:** The TSF data (data created by and for the TOE, that might affect the operation of the TOE; cf. [CC\_1] §92) comprise (but are not limited to) the Personalization Agent Authentication Key(s) and the Basic Authentication Control Key.

**Application Note:** This security target lite distinguishes between the Personalization Agent as entity known to the TOE and the Document Signer as entity in the TOE IT environment signing the Document security object as described in [ICAO\_9303]. This approach allows but does not enforce the separation of these roles. The selection of the authentication keys should consider the organization, the productivity and the security of the personalization process. Asymmetric authentication keys provide comfortable security for distributed personalization but their use may be more time consuming than authentication using symmetric cryptographic primitives. Authentication using symmetric cryptographic primitives allows fast authentication protocols appropriate for centralized personalization schemes but relies on stronger security protection in the personalization environment.

#### 2.2.3.2.4 Phase 4 “Operational Use”

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

**Application Note:** The authorized Personalization Agents might be allowed to add (not to modify) data in the other data groups of the MRTD application (e.g. person(s) to notify EF.DG16) in the Phase 4 “Operational Use”. This will imply an update of the Document Security Object including the re-signing by the Document Signer.

**Application Note:** The intention of this security target lite is to consider at least the phases 1 and parts of phase 2 (i.e. Step1 to Step3) as part of the evaluation and therefore to define the TOE delivery according to CC after this phase 2 or later. Since specific production steps of phase 2 are of minor security relevance (e.g. booklet manufacturing and antenna integration) these are not part of the CC evaluation under ALC. Nevertheless the decision about this has to be taken by the certification body resp. the national body of the issuing State or Organization. In this case the national body of the issuing State or Organization is responsible for these specific production steps.

Note that the personalization process and its environment may depend on specific security needs of an issuing State or Organization. All production, generation and installation procedures after TOE delivery up to the “Operational Use” (phase 4) have to be considered in the product evaluation process under AGD assurance class. Therefore, the Security Target Lite has to outline the split up of P.Manufact, P.Personalization and the related security objectives into aspects relevant before vs. after TOE delivery.

#### 2.2.4 Required non-TOE hardware/Software/firmware

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

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**Note:** in particular the TOE may be used in contact mode, without any inlay or antenna.

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## 2.3 TOE description

### 2.3.1 TOE Architecture

The TOE is composed of an IC and some software components as presented in Figure 1 - TOE architecture. Each part of the TOE is presented in the following chapters.

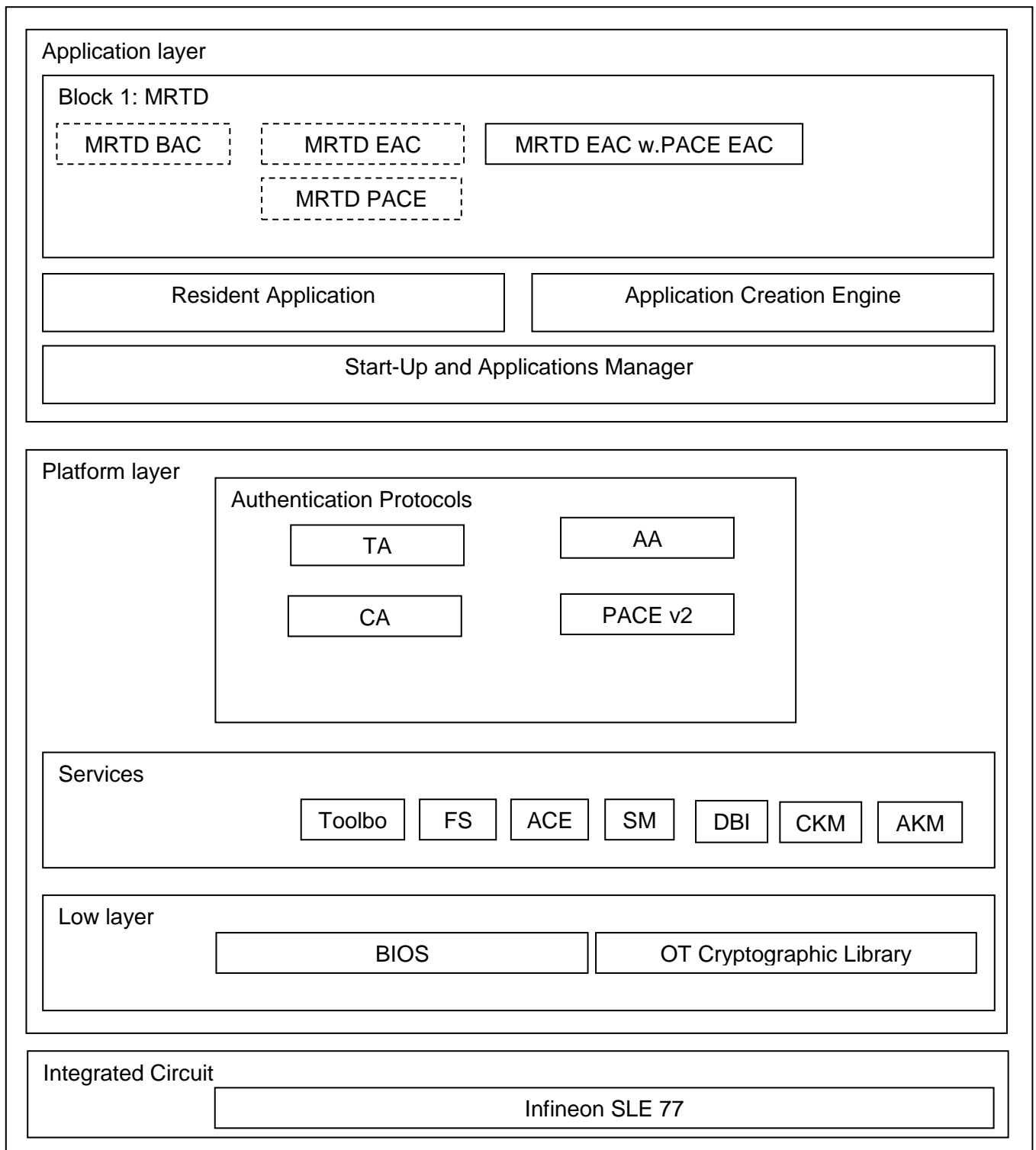


Figure 1 - TOE architecture

### 2.3.2 Integrated Circuit

The TOE is embedded on Infineon chips SLE77CLFX2400P and SLE77CLFX2407P. The IC part of the TOE comprises the following:

Core System:

- CPU
- Memory Encryption/Decryption Unit (MED)
- Memory Management Unit (MMU)

Memories:

- Read-Only Memory (ROM)
- Random Access Memory (RAM)
- SOLID FLASH™ NVM

Peripherals:

- True Random Number Generator (TRNG)
- Pseudo Random Number Generator (PRNG)
- Watchdog and timers
- Universal Asynchronous Receiver/Transmitter (UART)
- Checksum module (CRC)
- Radio Frequency Interface (RFI)

Control:

- Dynamic Power Management
- Internal Clock Oscillator (ICO)
- Interrupt and Peripheral Event Channel Controller (ITP and PEC)
- Interface Management Module (IMM)
- User mode Security Life Control (UmSLC)
- Voltage regulator

Coprocessors:

- Crypto2304T for asymmetric algorithms like RSA and EC
- Symmetric Crypto Coprocessor for AES and 3DES Standard

Security Peripherals:

- Filters
- Sensors

Buses:

- Memory Bus
- Peripheral Bus

And associated Firmware and Software, it comprises:

- RMS and SAM routines for Solid Flash NVM programming; security functions test, random number online testing. STS consisting of test and initialization routines. All stored in the ROM part.
- The Flash Loader that allows the loading of TOE software.
- And cryptographic libraries.

IC is part of the TOE and also part of the TSF. More information on the chips is given in the related Security Target [IC\_ST].



### 2.3.3 Low layer

#### 2.3.3.1 OT Basic Input/Output System (BIOS)

The BIOS module provides access management (read/write) functionalities to upper-layer application. It also provides exception and communication functionalities.

*The BIOS module is part of the TOE and is also part of the TSF.*

#### 2.3.3.2 OT Cryptographic library (Crypto)

The Cryptography module provides secure cryptographic functionalities to upper-layer applications.

*The Crypto module is part of the TOE and is also part of the TSF.*

### 2.3.4 Platform layer

#### 2.3.4.1 Services

##### 2.3.4.1.1 File System Management (FSM)

The FSM module manages files and data objects according to ISO 7816-4 and 7816-9. It also manages the Digitally Blurred Image process. This specific feature is covered by a patent owned by Oberthur Technologies.

*The FSM module is part of the TOE and is also part of the TSF.*

##### 2.3.4.1.2 Secure Messaging (SM)

The SM module provides functionalities to encrypt/decrypt data for secure communication in Manufacturing, Personalization and Operational Use phases (steps 5, 6 and 7). A Secure Messaging session begins after a successful authentication (GP authentication for Pre-personalization and Personalization phases, BAC or CA for Operational Use phase).

*The SM module is part of the TOE and is also part of the TSF.*

##### 2.3.4.1.3 Cryptography Key Management (CKM)

The CKM module is responsible for asymmetric cryptography key management and asymmetric cryptography operations.

*The CKM module is part of the TOE and is also part of the TSF.*

#### 2.3.4.1.4 Authentication and Key Management (AKM)

This module supplies:

- Symmetric Key management (read, write, access control),
- Services to manage Global Platform authentication and secure messaging.

*The AKM module is part of the TOE and is also part of the TSF.*

#### 2.3.4.1.5 Access Condition Engine (ACE)

The ACE module is in charge of the verification of the Access Conditions of an object (files and keys) when an application tries to access this object.

*The ACE module is part of the TOE and is also part of the TSF.*

#### 2.3.4.1.6 Toolbox (TBX)

The Toolbox module provides different kind of services to other modules.

- Services to manage APDU,
- Services to handle BER-TLV constructed data object,
- Services to process specific cryptographic operations,
- Services to handle Object Identifier,
- Services to manage MRZ (personalization and misuse management),
- Services to handle data in a secure way.

The TBX module is part of the TOE but and is also part of the TSF

#### 2.3.4.1.7 Digitally Blurred Image (DBI)

The Digital Blurred Image (DBI) is ensured by Watermarking Module. It allows the blurring of a JPG or JPEG2000 file stored in a transparent file.

This feature is the implementation of patents owned by Oberthur Technologies.

*The DBI module is part of the TOE but is **NOT** part of the TSF.*

## 2.3.5 Authentication Protocols

### 2.3.5.1 Terminal Authentication (TA)

The TA module processes the Terminal Authentication (v1 and v2) mechanism. Terminal Authentication v1 is part of the EACv1 procedure defined in [TR\_03110].

*The TA module is part of the TOE and also part of the TSF.*

### 2.3.5.2 Chip Authentication (CA)

The CA module processes the Chip Authentication (v1 and v2) mechanism. Chip Authentication v1 is part of the EACv1 procedure defined in [TR\_03110].

*The CA module is part of the TOE and also part of the TSF.*

### 2.3.5.3 Password Authenticated Connection Establishment (PACE v2)

The PACE module provides functionalities to process the PACE v2 mechanism as defined in [TR\_03110].

*The PACE v2 module is part of the TOE but and also part of the TSF.*

### 2.3.5.4 Active Authentication (AA)

The AA module provides functionalities to process the AA mechanism as defined in [ICAO\_9303].

*The AA module is part of the TOE and is also part of the TSF.*

## 2.3.6 Application layer

### 2.3.6.1 Start-Up and Applications Manager (**Boot**)

The Boot module is responsible to manage the start-up of the applications (MRTD, RA and ACRE).  
*The Boot module is part of the TOE and is also part of the TSF*

### 2.3.6.2 Application Creation Engine (**ACRE**)

The Application Creation Engine is a complete set of commands used to (pre-)personalize the card and its application(s). It includes:

- Creation of application
- Storage of the Active Authentication key (ECC and RSA keys)
- Storage of multiple Chip Authentication keys under the ADF (supporting ECC and RSA Keys)
- Storage of CVCA Keys under each ADF

*The ACRE module is part of the TOE and is also part of the TSF.*

### 2.3.6.3 Resident Application (**RA**)

The Resident Application is a complete set of commands, which allows the management of the card in the Operational Use phase (data management and authentication process under MF).

*The RA module is part of the TOE and is also part of the TSF.*

### 2.3.6.4 Machine Readable Travel Document (**MRTD**)

The MRTD is a complete set of commands, which allows the management of MRTD data in the Operational Use phase (data management and authentication process under MRTD ADF).

*The **MRTD** module is part of the TOE and is also part of the TSF.*

### 3 CONFORMANCE CLAIMS

#### 3.1 Common Criteria conformance

This Security Target Lite (ST Lite) claims conformance to the Common Criteria (CC) version 3.1 revision 4. The conformance to the CC is claimed as follows:

CC	Conformance Claim
Part 1	Strict conformance
Part 2	Conformance with extensions: <ul style="list-style-type: none"> <li>• FAU_SAS.1 “Audit storage”,</li> <li>• FCS_RND.1 “Quality metric for random numbers”,</li> <li>• FIA_API.1 “Authentication Proof of Identity”,</li> <li>• FMT_LIM.1 “Limited capabilities”,</li> <li>• FMT_LIM.2 “Limited availability”,</li> <li>• FPT_EMS.1 “TOE Emanation”,</li> </ul>
Part 3	Conformance with package EAL4 augmented <sup>1</sup> with: <ul style="list-style-type: none"> <li>• ALC_DVS.2 “Sufficiency of security measures” defined in [CC_3],</li> <li>• AVA_VAN.5 “Advanced methodical vulnerability analysis” defined in [CC_3]</li> </ul>

Table 7 - Common Criteria conformance claim

#### Remark

As product is targeting “Qualification renforcée” all activities for ALC\_FLR.3 have been processed. However, this assurance package is not properly claimed in the present security target as the chip does not support it.

<sup>1</sup> This EAL and its augmentations correspond to an EAL5 + ALC\_DVS.2 where AVA\_VAN level is downgraded to AVA\_VAN.3 following constraint of MRZ entropy described in [ICAO\_9303].

## 3.2 Protection Profile conformance

### 3.2.1 Overview

This ST Lite claims strict conformance to the following Protection Profile (PP):

<b>Title</b>	<b>Common Criteria Protection Profile – Machine Readable Travel Document with “ICAO Application”, Extended Access Control with PACE (EAC PP)</b>
<b>CC Version</b>	<b>3.1 (Revision 3)</b>
<b>Assurance Level</b>	<b>The minimum assurance level for this PP is EAL4 augmented</b>
<b>Version Number</b>	<b>Version 1.3.2, 05<sup>th</sup> December 2012</b>
<b>Registration</b>	<b>BSI-CC-PP-0056-V2-2012</b>

Table 8 - Protection Profile conformance

This ST also addresses the Manufacturing and Personalization phases at TOE level (cf. §2.2.3 TOE life cycle), as well as the Active Authentication (AA) protocol available in operational use phase. The additions do not contradict any of the threats, assumptions, organisational policies, objectives or SFRs stated in the [PP\_EACwPACE] that covers the advanced security methods PACE and EAC in operational use phase.

The following parts list assumptions, threats, OSP, OT and OE for this TOE (i.e. from [PP\_EACwPACE] and additional).

### 3.2.2 Assumptions

The following Assumptions are assumed for this TOE:

- **A.Insp\_Sys** “*Inspection Systems for global interoperability*” defined in [PP\_EACwPACE],
- **A.Auth\_PKI** “*PKI for Inspection Systems*” defined in [PP\_EACwPACE],
- **A.Passive\_Auth** “*PKI for Passive Authentication*” defined in [PP\_EACwPACE],
- **A.Insp\_Sys\_Chip\_Auth** “*Inspection Systems for global interoperability on chip authenticity*” defined in this ST.

A.Insp\_Sys\_Chip\_Auth is additional for Active Authentication protocol which is not in the original scope of the [PP\_EACwPACE]. This assumption is only linked to threats for the Active Authentication protocol so these objectives neither mitigate a threat (or a part of a threat) meant to be addressed by security objectives for the TOE in the [PP\_EACwPACE], nor fulfils an OSP (or part of an OSP) meant to be addressed by security objectives for the TOE in the [PP\_EACwPACE].

### 3.2.3 Threats

The following threats are averted by this TOE:

- **T.Read\_Sensitive\_Data** “*Read the sensitive biometric reference data*” defined in [PP\_EACwPACE],
- **T.Counterfeit** “*Counterfeit of travel document chip data*” defined in [PP\_EACwPACE],

- **T.Skimming** “Skimming travel document / Capturing Card-Terminal Communication” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Eavesdropping** “Eavesdropping on the communication between the TOE and the PACE terminal” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Tracing** “Tracing travel document” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Forgery** “Forgery of Data” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Abuse-Func** “Abuse of Functionality” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Information\_Leakage** “Information Leakage from travel document” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Phys-Tamper** “Physical Tampering” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Malfunction** “Malfunction due to Environmental Stress” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **T.Configuration** “*Tampering attempt of the TOE during preparation*” defined in this ST,
- **T. Forgery\_Supplemental\_Data** “*Forgery of supplemental data stored in the TOE*” defined in this ST,
- **T. BAC\_breaking** “*BAC protocol is broken*” defined in this ST.

### 3.2.4 Organizational Security Policies

This TOE complies with the following OSP:

- **P.Sensitive\_Data** “*Privacy of sensitive biometric reference data*” defined in [PP\_EACwPACE],
- **P.Personalisation** “*Personalisation of the travel document by issuing State or Organisation only*” defined in [PP\_EACwPACE],
- **P.Pre-Operational** “*Pre-operational handling of the travel document*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **P.Card\_PKI** “*PKI for Passive Authentication (issuing branch)*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **P.Trustworthy\_PKI** “*Trustworthiness of PKI*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **P.Manufact** “*Manufacturing of the travel document’s chip*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **P.Terminal** “*Abilities and trustworthiness of terminals*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE].

### 3.2.5 Security Objectives

The Security Objectives for this TOE are the following:

- **OT.Sens\_Data\_Conf** “*Confidentiality of sensitive biometric reference data*” defined in [PP\_EACwPACE],
- **OT.Chip\_Auth\_Proof** “*Proof of the travel document’s chip authenticity*” defined in [PP\_EACwPACE],
- **OT.Data\_Integrity** “*Integrity of Data*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.Data\_Authenticity** “*Authenticity of Data*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.Data\_Confidentiality** “*Confidentiality of Data*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.Tracing** “*Tracing travel document*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.Prot\_Abuse-Func** “*Protection against Abuse of Functionality*” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],

- **OT.Prot\_Inf\_Leak** “Protection against Information Leakage” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.Prot\_Phys-Tamper** “Protection against Physical Tampering” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.Prot\_Malfunction** “Protection against Malfunctions” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.Identification** “Identification of the TOE” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OT.AC\_Pers** “Access Control for Personalisation of logical MRTD” referenced in [PP\_EACwPACE] and defined in [PP\_PACE].
- **OT.Prot\_Malfunction** “Protection against Malfunctions” defined in this ST,
- **OT.Update\_File** “Modification of file in Operational Use Phase” defined in this ST,
- **OT.BAC\_Expiration** “Automatic deactivation of BAC protocol” defined in this ST,
- **OT.AC\_SM\_Level** “Access control to sensitive biometric reference data according to SM level” defined in this ST.

The Security Objectives for the environment of this TOE are the following:

- **OE.Auth\_Key\_Travel\_Document** “Travel document Authentication Key” defined in [PP\_EACwPACE],
- **OE.Authoriz\_Sens\_Data** “Authorization for Use of Sensitive Biometric Reference Data” defined in [PP\_EACwPACE],
- **OE.Exam\_Travel\_Document** “Examination of the physical part of the travel document” defined in [PP\_EACwPACE],
- **OE.Prot\_Logical\_Travel\_Document** “Protection of data from the logical travel document” defined in [PP\_EACwPACE],
- **OE.Ext\_Insp\_Systems** “Authorization of Extended Inspection Systems” defined in [PP\_EACwPACE],
- **OE.Legislative\_Compliance** “Issuing of the travel document” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OE.Passive\_Auth\_Sign** “Authentication of travel document by Signature” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OE.Personalisation** “Personalisation of travel document” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OE.Terminal** “Terminal operating” referenced in [PP\_EACwPACE] and defined in [PP\_PACE]
- **OE.Travel\_Document\_Holder** “Travel document holder Obligations” referenced in [PP\_EACwPACE] and defined in [PP\_PACE],
- **OE.Exam\_Chip\_Auth** “Examination of the chip authenticity” defined in this ST.

OE.Exam\_Chip\_Auth is additional for Active Authentication protocol which is not in the original scope of the [PP\_EACwPACE]. This assumption is only linked to threats for the Active Authentication protocol so these objectives neither mitigate a threat (or a part of a threat) meant to be addressed by security objectives for the TOE in the [PP\_EACwPACE], nor fulfils an OSP (or part of an OSP) meant to be addressed by security objectives for the TOE in the [PP\_EACwPACE].



### 3.3 CC conformance and usage in real life

In the real life, for interoperability purposes, the MRTD will most likely support BAC, PACE and EAC.

- If the terminal reads the content of the MRTD by performing BAC then EAC, the security of the MRTD will be covered by the security evaluation of (1) the TOE described by the ST claiming compliance to [PP\_BAC] and (2) the TOE described by the ST claiming compliance to [PP\_EAC], assuming PACE is not supported (as not used for the inspection procedure)
- If the terminal reads the content of the MRTD by performing PACE then EAC, the security of the MRTD will be covered by the security evaluation of the TOE described by the ST claiming compliance to [PP\_EACwPACE], assuming BAC is not supported (as not used for the inspection procedure).

## 4 SECURITY PROBLEM DEFINITION

### 4.1 Assets

#### 4.1.1 Overview

The following table presents the assets of the TOE and their corresponding phase(s) according to §2.2.3 TOE life cycle:

Asset	Step 5	Step 6	Step 7
Biometric Data	✗	✓	✓
Personal Data	✗	✓	✓
EF.COM	✗	✓	✓
CA_SK	✗	✓	✓
AA_SK	✗	✓	✓
Session_K	✓	✓	✓
PACE_Kmac	✗	✗	✓
PACE_Kenc	✗	✗	✓
ephem-Skpicc-PACE	✗	✗	✓
EF.SOD	✗	✓	✓
CA_PK	✗	✓	✓
AA_PK	✗	✓	✓
PACE_PWD	✗	✓	✓
CPLC	✓	✓	✓
TOE_ID	✓	✓	✓
Pre-Perso_K	✓	✗	✗
Perso_K	✗	✓	✗
LCS	✓	✓	✓
Configuration data	✓	✓	✓
Updatable data	✗	✓	✓

Table 9 - Assets of the TOE and their corresponding phase(s)

The assets to be protected by the TOE include the User Data on the travel document's chip, user data transferred between the TOE and the terminal, and travel document tracing data from the claimed [PP\_PACE], chap 3.1.

#### 4.1.2 Biometric Data

The Biometric Data are the Logical MRTD sensitive User Data: sensitive biometric reference data (EF.DG3, EF.DG4).

*Application note (5 in [PP\_EACwPACE]):* Due to interoperability reasons the [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\_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

#### 4.1.3 Authenticity of the MRTD's chip

The authenticity of the MRTD's chip personalized by the issuing State or Organisation for the MRTD holder is used by the traveler to prove his possession of a genuine MRTD.

#### 4.1.4 User data stored on the TOE

All data (being not authentication data) stored in the context of the ePassport application of the MRTD as defined in [ICAO\_TR\_SAC] and being allowed to be read out solely by an authenticated terminal acting as Basic Inspection System with PACE (in the sense of [ICAO\_TR\_SAC]).

This asset covers 'User Data on the MRTD's chip', 'Logical MRTD Data' and 'Sensitive User Data' in [PP\_BAC].

It includes:

##### 4.1.4.1 *Personal Data*

The Personal Data are the logical MRTD standard User Data of the MRTD holder (EF.DG1, EF.DG2, EF.DG5 to EF.DG13, EF.DG16).

##### 4.1.4.2 *EF.COM*

The EF.COM is an elementary file containing the list of the existing elementary files (EF) with the user data.

#### 4.1.5 User data transferred between the TOE and the terminal connected

All data (being not authentication data) being transferred in the context of the ePassport application of the MRTD as defined in [ICAO\_TR\_SAC] between the TOE and an authenticated terminal acting as Basic Inspection System with PACE (in the sense of [ICAO\_TR\_SAC]).

User data can be received and sent (exchange ⇔ {receive, send}).

#### 4.1.6 MRTD tracing data

Technical information about the current and previous locations of the MRTD gathered unnoticeable by the MRTD holder recognising the TOE not knowing any PACE password. TOE tracing data can be provided / gathered.

#### 4.1.7 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.

#### 4.1.8 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\_BAC].

#### 4.1.9 TOE intrinsic secret cryptographic keys

Permanently or temporarily stored secret cryptographic material used by the TOE in order to enforce its security functionality.

It includes:

##### 4.1.9.1 Chip Authentication Private Key (CA\_SK)

The Chip Authentication Private Key is used by the application to process Chip Authentication.

##### 4.1.9.2 Active Authentication Private Key (AA\_SK)

The Active Authentication Private Key is used by the application to process Active Authentication.

##### 4.1.9.3 Secure Messaging session keys (Session\_K)

Session keys are used to secure communication in confidentiality and authenticity.

##### 4.1.9.4 PACE session keys (PACE-Kmac, PACE-Kenc)

PACE session keys are secure messaging keys for message authentication and for message encryption agreed between the TOE and a terminal as result of the PACE Protocol.

##### 4.1.9.5 Ephemeral private key PACE (ephem-Skpicc-PACE)

The ephemeral PACE Authentication Key Pair is used for Key Agreement Protocol.

#### 4.1.10 TOE intrinsic 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.

It includes:

#### 4.1.10.1 *EF.SOD*

The elementary file Document Security Object is used by the inspection system for Passive Authentication of the logical MRTD.

#### 4.1.10.2 *Chip Authentication Public Key (CA\_PK)*

The Chip Authentication Public Key (contained in EF.DG14) is used by the inspection system for the Chip Authentication.

#### 4.1.10.3 *Active Authentication Public Key (AA\_PK)*

The Active Authentication Public Key (contained in EF.DG15) is used by the inspection system for the Active Authentication.

### 4.1.11 MRTD communication establishment authorisation data

Restricted-revealable 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.

It includes:

#### 4.1.11.1 *PACE password (PACE\_PWD)*

Password needed for PACE authentication, e.g. CAN or MRZ.

### 4.1.12 CPLC

The CPLC Data are the Card Production Life Cycle data. They are considered as user data as they enable to track the holder. These data are filled during steps 4, 5 and 6 by subjects.

### 4.1.13 TOE\_ID

This data allows the identification of the TOE. This data are part of the IC Embedded Software in the non-volatile non-programmable memory.

### 4.1.14 Pre-personalization Agent keys (Pre-perso\_K)

This key set used for mutual authentication between the Pre-personalization agent and the chip, and secure communication establishment.

### 4.1.15 Personalization Agent keys (Perso\_K)

This key set used for mutual authentication between the Personalization agent and the chip, and secure communication establishment.

#### 4.1.16 TOE Life Cycle State (LCS)

This is the Life Cycle State of the TOE.

#### 4.1.17 Configuration Data

These specific data set the configuration of the TOE in terms of security features and security functions. These configuration data can be set in Manufacturing and Personalization phases (Steps 5 and 6) after authentication of the relevant agent with the relevant key set.

#### 4.1.18 Updatable Data

Data other than Personal Data, Biometric Data, EF.COM, EF.SOD, CA\_PK, CA\_SK, AA\_PK, AA\_SK, CPLC, TOE\_ID, Pre-Perso\_K, Perso\_K, Session\_K, LCS and Configuration Data which can be modified in Operational Use phase.

## 4.2 Subjects

### 4.2.1 Overview

The following table presents the assets of the TOE and their corresponding phase(s) according to §2.2.3 TOE life cycle:

Subject	Descr.	Step 3	Step 4	Step 5	Step 6	Step 7
MRTD Holder	§ 4.2.2	x	x	x	x	✓
Traveler	§ 4.2.3	x	x	x	x	✓
Basic Inspection System with PACE	§ 4.2.4	x	x	x	x	✓
Document Signer	§ 4.2.5	x	x	x	✓	x
Country Signing Certification Authority	§ 4.2.6	x	x	x	✓	x
Personalization Agent	§ 4.2.7	x	x	x	✓	x
IC manufacturer (Manufacturer role)	§ 4.2.8	✓	x	x	x	x
MRTD packaging responsible (Manufacturer role)	§ 4.2.9	x	✓	x	x	x
Embedded software loading responsible (Manufacturer role)	§ 4.2.10	x	✓	x	x	x
Pre-personalization Agent (Manufacturer role)	§ 4.2.11	x	x	✓	x	x
Country Verifying Certification Authority	§ 4.2.12	x	x	x	x	✓
Document Verifier	§ 4.2.13	x	x	x	x	✓
Terminal	§ 4.2.14	x	x	✓	✓	✓
Inspection System	§ 4.2.15	x	x	x	x	✓
Attacker	§ 4.2.16	✓	✓	✓	✓	✓

Table 10 - Subjects of the TOE and their corresponding phase(s)

### 4.2.2 MRTD holder

MRTD holder is the travel document holder defined in [PP\_PACE]:

A person for whom the travel document Issuer has personalised the travel document. This entity is commensurate with 'MRTD Holder' in [PP\_BAC]. Please note that a travel document holder can also be an attacker.

### 4.2.3 Traveler

A person presenting the travel document to a terminal and claiming the identity of the travel document holder. This external entity is commensurate with 'Traveller' in [PP\_BAC]. Please note that a travel document presenter can also be an attacker.

#### 4.2.4 Basic Inspection System with PACE (BIS-PACE)

A technical system being used by an inspecting authority and verifying the travel document presenter as the travel document holder (for ePassport: by comparing the real biometric data (face) of the travel document presenter with the stored biometric data (DG2) of the travel document holder).

BIS-PACE implements the terminal's part of the PACE protocol and authenticates itself to the travel document using a shared password (PACE password) and supports Passive Authentication.

See also par. 1.2.5 in [PP\_PACE].

#### 4.2.5 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, see [ICAO\_9303]. This role is usually delegated to a Personalisation Agent.

#### 4.2.6 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 having to be distributed by strictly secure diplomatic means, see [ICAO\_9303], 5.5.1.

#### 4.2.7 Personalization 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 [ICAO\_9303], (iv) writing the document details data, (v) writing the initial TSF data, (vi) signing the Document Security Object defined in [ICAO\_9303] (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 [PP\_BAC].

#### 4.2.8 IC manufacturer

This additional subject is a refinement of the role Manufacturer as described in [PP\_PACE]. It is the manufacturer of the IC.

If scheme 1 is applied (cf. § 2.2.3), this subject is responsible for the embedded software downloading in the IC. This subject does not use Flash loader, even if it is embedded in the IC.



#### 4.2.9 MRTD packaging responsible

This additional subject is a refinement of the role Manufacturer as described in [PP\_PACE]. This subject is responsible for the combination of the IC with hardware for the contactless and/or contact interface.

#### 4.2.10 Embedded software loading responsible

This additional subject is a refinement of the role Manufacturer as described in [PP\_PACE]. This subject is responsible for the embedded software loading when scheme 2 is applied (cf. § 2.2.3). This subject does not exist if scheme 1 is applied (cf. § 2.2.3). This subject used the Flash loader embedded in the IC.

#### 4.2.11 Pre-personalization Agent

This additional subject is a refinement of the role Manufacturer as described in [PP\_PACE]. This subject is responsible for the preparation of the card, i.e. creation of the MF and MRTD ADF. He also sets Personalization Agent keys and Configuration data.

#### 4.2.12 Country Verifying Certification Authority

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.

#### 4.2.13 Document Verifier

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.

#### 4.2.14 Terminal

A terminal is any technical system communicating with the TOE through the contactless interface.

Note: as the TOE may also be used in contact mode, the terminal may also communicate using the contact interface.

#### 4.2.15 Inspection system (IS)

A technical system used by the border control officer of the receiving State (i) examining an travel document presented by the traveler and verifying its authenticity and (ii) verifying the traveler as travel document holder.

The Extended Inspection System (EIS) performs the Advanced Inspection Procedure (figure1) 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\_03110] 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.

#### 4.2.16 Attacker

Additionally to the definition from [PP\_PACE], chap 3.1 the definition of an attacker is refined as followed: A threat agent trying (i) to manipulate the logical travel document without authorization, (ii) to read sensitive biometric reference data (i.e. EF.DG3, EF.DG4), (iii) to forge a genuine travel document, or (iv) to trace a travel document.

*Application note (7 in [PP\_EACwPACE]):* 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.

## 4.3 Assumptions

### 4.3.1 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\_TR\_SAC] and/or BAC [PP\_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 the [PP\_PACE] as it repeats the requirements of P.Terminal and adds only assumptions for the Inspection Systems for handling the EAC functionality of the TOE.

### 4.3.2 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 the [PP\_PACE] 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.

### 4.3.3 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 [ICAO\_9303].

#### **4.3.4 A.Insp\_Sys\_Chip\_Auth** *“Inspection Systems for global interoperability on chip authenticity”*

The Inspection System implements Active Authentication to authenticate the MRTD’s chip. The Inspection System uses the signature returned by the TOE during Active Authentication as proof of authenticity.

## 4.4 Threats

### 4.4.1 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. [PP\_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)

### 4.4.2 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 traveler 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

### 4.4.3 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 (10 in [PP\_PACE]):* A product using BIS-BAC cannot avert this threat in the context of the security policy defined in [PP\_PACE].

*Application Note (11 in [PP\_PACE]):* 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.

#### 4.4.4 T.Eavesdropping “Eavesdropping on the communication between the TOE and the 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 (12 in [PP\_PACE]):* A product using BIS-BAC cannot avert this threat in the context of the security policy defined in [PP\_PACE].

#### 4.4.5 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 (13 in [PP\_PACE]):* This Threat completely covers and extends “T.Chip-ID” from [PP\_BAC].

*Application Note (14 in [PP\_PACE]):* A product using BAC (whatever the type of the inspection system is: BIS-BAC) cannot avert this threat in the context of the security policy defined in [PP\_PACE], see also the par. 1.2.5 in [PP\_PACE].

*Application Note (15 in [PP\_PACE]):* 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) cannot be averted by the current TOE.

*Application Note:* As our TOE supports Chip Authentication and Active Authentication in addition to Standard Inspection Procedure, the previous application note extracted from PP does not apply.

#### 4.4.6 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 authenticated BIS-PACE 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

#### 4.4.7 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 (16 in [PP\_PACE]):* 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.

#### 4.4.8 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 (17 in [PP\_PACE]):** 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)

#### 4.4.9 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:** 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, confidentiality of User Data and TSF-data of the travel document

**Application Note (18 in [PP\_PACE]):** 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.

#### 4.4.10 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 (19 in [PP\_PACE]):** 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.

#### 4.4.11 T.Configuration “Tampering attempt of the TOE during preparation”

**Adverse action:** An attacker may access to the TOE at Manufacturing and Personalization phases (steps 5 and 6) to try to (i) deactivate or modify security features or functions of the TOE or (ii) circumvent, deactivate or modify security functions of the MRTD’s chip Embedded Software.

**Threat agent:** having high attack potential, being in possession of one or more MRTD in Pre-personalization or Personalization phases.

**Asset:** authenticity of logical MRTD data

#### 4.4.12 T. Forgery\_Supplemental\_Data “Forgery of supplemental data stored in the TOE”

**Adverse action:** An attacker alters fraudulently the data stored in files other than EF.DG1 to EF.DG16, EF.COM and EF document security object. This may lead the extended inspection system (EIS) using these data to be deceived.

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

*Asset:* authenticity of data stored in files other than EF.DG1 to EF.DG16, EF.COM and EF document security object

#### 4.4.13 T. BAC\_breaking “BAC protocol is broken”

*Adverse action:* An attacker manages to break the BAC protocol using cryptanalysis means and powerful computation capacity leading to threaten (1) the non traceability and (2) confidentiality of data.

The attacker is able to intercept and record a log of BAC transaction during inspection at a border control. Then using computation capacity, he is able to perform reverse engineering over the logs, to break the protocol within a few minutes or less and get (1) the MRZ value, and (2) the log of plain text exchanged between the MRTD and the inspection system.

This leads the attacker to (1) get the holder information and use it, and (2) trace the holder in real time.

*Threat agent:* having high attack potential, being able to intercept transaction with MRTDs.

*Asset:* confidentiality of data read from the MRTD, traceability of the MRTD

## 4.5 Organisational Security Policies

### 4.5.1 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.

### 4.5.2 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.

### 4.5.3 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.
- 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 in [PP\_PACE].
- 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.

### 4.5.4 P.Card\_PKI “PKI for Passive Authentication (issuing branch)”

*Application Note (20 in [PP\_PACE]):* 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 (CCSCA).

- 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 (CCSCA) having to be made available to the travel document Issuer by strictly secure means, see [ICAO\_9303], 5.5.1. The CSCA shall create the Document Signer Certificates for the Document Signer Public Keys (CDS) and make them available to the travel document Issuer, see [ICAO\_9303], 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.

#### 4.5.5 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.

#### 4.5.6 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.

#### 4.5.7 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 [ICAO\_9303].
- 2.) They shall implement the terminal parts of the PACE protocol [ICAO\_TR\_SAC], of the Passive Authentication [ICAO\_9303] and use them in this order<sup>28</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 CCSCA and CDS) in order to enable and to perform Passive Authentication (determination of the authenticity of data groups stored in the travel document, [ICAO\_9303]).
- 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 [PP\_PACE].

## 5 SECURITY OBJECTIVES

This chapter describes the security objectives for the TOE (OT) and the security objectives for the TOE environment (OE). 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 organizational security policies to be met by the TOE.

#### 5.1.1 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.

#### 5.1.2 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\_03110]. The authenticity proof provided by travel document’s chip shall be protected against attacks with high attack potential.

*Application note (9 in [PP\_EACwPACE]):* 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 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.

#### 5.1.3 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.

#### **5.1.4 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).

#### **5.1.5 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.

#### **5.1.6 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 (21 in [PP\_PACE]):* 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.

*Application Note:* As our TOE supports Chip Authentication and Active Authentication in addition to Standard Inspection Procedure, the previous application note extracted from PP does not apply.

#### **5.1.7 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.

#### **5.1.8 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 (22 in [PP\_PACE]):* This objective pertains to measurements with subsequent complex signal processing due to normal operation of the TOE or operations enforced by an attacker.

#### 5.1.9 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.

#### 5.1.10 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.

#### 5.1.11 OT.Identification “Identification of the TOE”

The TOE must provide means to store Initialisation 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).

#### 5.1.12 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 [ICAO\_9303] 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 (23 in [PP\_PACE]):* 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.



### 5.1.13 OT.Configuration “Protection of the TOE preparation”

During Pre-personalization and Personalization phases, the TOE must control the access to its sensitive information and its functions and must provide the means to secure exchanges using cryptographic functions. It must also ensure secure erasing of useless keys.

### 5.1.14 OT.Update\_File “Modification of file in Operational Use Phase”

During Operational Use phase, the TOE must allow the modification of Updatable Data if the write access to these objects is fulfilled by the Terminal.

### 5.1.15 OT.BAC\_Expiration “Automatic deactivation of BAC protocol”

During Operational Use phase, the TOE must disable the Basic Access Control protocol if the expiry date of this protocol is exceeded.

### 5.1.16 OT.AC\_SM\_Level “Access control to sensitive biometric reference data according to SM level”

During Operational Use phase, the TOE must allow read access to sensitive biometric data only if the Secure Messaging level reaches or exceeds the one specified in the biometric data Access Conditions data object.

## 5.2 Security objectives for the operational environment

### 5.2.1 Issuing State or Organization

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

#### 5.2.1.1 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\_PACE] 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\_PACE].



### 5.2.1.2 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 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\_PACE] 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\_PACE].

## 5.2.2 Receiving State or Organization

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

### 5.2.2.1 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 [ICAO\_TR\_SAC] and/or the Basic Access Control [ICAO\_9303]. 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\_PACE] 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\_PACE] and therefore also counters T.Forgery and A.Passive\_Auth from [PP\_PACE]. This is done because a new type of Inspection System is introduced in [PP\_EACwPACE] as the Extended Inspection System is needed to handle the additional features of a travel document with Extended Access Control.

### 5.2.2.2 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\_PACE] 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.

#### 5.2.2.3 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\_PACE] 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.

#### 5.2.2.4 OE.Exam\_Chip\_Auth *“Examination of the chip authenticity”*

Inspection system performs the Active Authentication Protocol to verify the Authenticity of the presented MRTD’s chip.

### 5.2.3 Traveler document Issuer as 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:

#### 5.2.3.1 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.

### 5.2.4 Traveler document Issuer and CVCA : travel document’s PKI (issuing) branch

The travel document Issuer and the related CSCA will implement the following security objectives for the TOE environment (see also the Application Note 20 above):

#### 5.2.4.1 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 (CCSCA). 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 [ICAO\_9303]. The Personalisation Agent has to ensure that the Document Security Object contains only the hash values of genuine user data according to [ICAO\_9303]. 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.

#### 5.2.4.2 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 [ICAO\_9303], (iv) write the document details data, (v) write the initial TSF data, (vi) sign the Document Security Object defined in [ICAO\_9303] (in the role of a DS).

### 5.2.5 Terminal operator: Terminal’s receiving branch

#### 5.2.5.1 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 [ICAO\_9303].
- 2) The related terminals implement the terminal parts of the PACE protocol [ICAO\_TR\_SAC], of the Passive Authentication [ICAO\_TR\_SAC] (by verification of the signature of the Document Security Object) and use them in this order. 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\_CSCA and C\_DS) 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, [ICAO\_9303])
- 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 the [PP\_PACE].

*Application note (24 in [PP\_PACE]):* OE.Terminal completely covers and extends “OE.Exam\_MRTD”, “OE.Passive\_Auth\_Verif” and “OE.Prot\_Logical\_MRTD” from [PP\_BAC].

## 5.2.6 Travel document holder Obligations

### 5.2.6.1 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.

## 5.3 Security objectives rationale

Removed from ST

## 6 EXTENDED COMPONENTS DEFINITION

### 6.1 Extended components definition

#### 6.1.1 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 behavior*

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

*Component leveling*

FAU\_SAS.1      Requires the TOE to 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.

### 6.1.2 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 behavior*

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

*Component leveling:*

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*].

### 6.1.3 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.

**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*].



#### 6.1.4 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\_2].

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

##### *Family behavior*

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*].

### 6.1.5 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 behavior*

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 leveling:*

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*].

## 7 SECURITY REQUIREMENTS

### 7.1 Security functional requirements

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

SFR in ST	SFR in [PP_BAC]	Descr.	Step			
			Before 5	5	6	7
<b>Class FAU "Security Audit"</b>						
FAU_SAS.1.1	FAU_SAS.1.1	7.1.1.1	✓	✗	✗	✗
<b>Class FCS "Cryptographic Support"</b>						
FCS_CKM.1.1/DH_PACE	FCS_CKM.1.1/DH_PACE	7.1.2.1	✗	✗	✗	✓
FCS_CKM.1.1/CA	FCS_CKM.1.1/CA		✗	✗	✗	✓
FCS_CKM.1.1/MSK_DIV	Additional SFR		✗	✓	✗	✗
FCS_CKM.1.1/GP			✗	✓	✓	✗
FCS_CKM.4.1	FCS_CKM.4.1	7.1.2.2	✗	✓	✓	✓
FCS_COP.1.1/PACE_ENC	FCS_COP.1.1/PACE_ENC	7.1.2.3	✗	✗	✗	✓
FCS_COP.1.1/PACE_MAC	FCS_COP.1.1/PACE_MAC		✗	✗	✗	✓
FCS_COP.1.1/CA_ENC	FCS_COP.1.1/CA_ENC		✗	✗	✗	✓
FCS_COP.1.1/SIG_VER	FCS_COP.1.1/SIG_VER		✗	✗	✗	✓
FCS_COP.1.1/CA_MAC	FCS_COP.1.1/CA_MAC		✗	✗	✗	✓
FCS_COP.1.1/MSK_SHA	Additional SFR		✗	✓	✗	✗
FCS_COP.1.1/GP_ENC			✗	✓	✓	✗
FCS_COP.1.1/GP_AUTH			✗	✓	✗	✗
FCS_COP.1.1/GP_MAC			✗	✓	✓	✗
FCS_COP.1.1/GP_KEY_DEC			✗	✓	✓	✗
FCS_COP.1.1/AA_DSA	Additional SFR	✗	✗	✗	✓	
FCS_RND.1.1	FCS_RND.1.1	7.1.2.4	✗	✓	✓	✓
<b>Class FIA "Identification and Authentication"</b>						
FIA_UID.1.1/PACE	FIA_UID.1.1/PACE	7.1.3.1	✗	✓	✓	✓
FIA_UID.1.2/PACE	FIA_UID.1.2/PACE		✗	✓	✓	✓
FIA_UAU.1.1/PACE	FIA_UAU.1.1/PACE	7.1.3.2	✗	✓	✓	✓
FIA_UAU.1.2/PACE	FIA_UAU.1.2/PACE		✗	✓	✓	✓
FIA_UAU.4.1/PACE	FIA_UAU.4.1/PACE	7.1.3.3	✗	✓	✓	✓
FIA_UAU.5.1/PACE	FIA_UAU.5.1/PACE	7.1.3.4	✗	✗	✓	✓
FIA_UAU.5.2/PACE	FIA_UAU.5.2/PACE		✗	✗	✓	✓
FIA_UAU.6.1/PACE	FIA_UAU.6.1/PACE	7.1.3.5	✗	✗	✗	✓
FIA_UAU.6.1/EAC	FIA_UAU.6.1/EAC		✗	✗	✗	✓
FIA_UAU.6.1/MP	Additional SFR		✗	✓	✓	✗

FIA_AFL.1.1/PACE	FIA_AFL.1.1/PACE	7.1.3.6	x	x	x	✓	
FIA_AFL.1.2/PACE	FIA_AFL.1.2/PACE		x	x	x	✓	
FIA_AFL.1.1/MP	Additional SFR		✓	✓	✓	x	
FIA_AFL.1.2/MP	Additional SFR		✓	✓	✓	x	
FIA_API.1.1/CA	FIA_API.1.1	7.1.3.7	x	x	x	✓	
FIA_API.1.1/AA	Additional SFR		x	x	x	✓	
<b>Class FDP “User Data Protection”</b>							
FDP_ACC.1.1/TRM	FDP_ACC.1.1/TRM	7.1.4.1	x	x	x	✓	
FDP_ACC.1.1/MP	Additional SFR		✓	✓	✓	x	
FDP_ACC.1.1/ID			✓	✓	✓	✓	
FCP_ACC.1.1/UPD_FILE			x	x	x	✓	
FDP_ACF.1.1/TRM	FDP_ACF.1.1/TRM	7.1.4.2	x	x	x	✓	
FDP_ACF.1.2/TRM	FDP_ACF.1.2/TRM		x	x	x	✓	
FDP_ACF.1.3/TRM	FDP_ACF.1.3/TRM		x	x	x	✓	
FDP_ACF.1.4/TRM	FDP_ACF.1.4/TRM		x	x	x	✓	
FDP_ACF.1.1/MP	Additional SFR		✓	✓	✓	x	
FDP_ACF.1.2/MP			✓	✓	✓	x	
FDP_ACF.1.3/MP			✓	✓	✓	x	
FDP_ACF.1.4/MP			✓	✓	✓	x	
FDP_ACF.1.1/ID			✓	✓	✓	✓	
FDP_ACF.1.2/ID			✓	✓	✓	✓	
FDP_ACF.1.3/ID			✓	✓	✓	✓	
FDP_ACF.1.4/ID			✓	✓	✓	✓	
FDP_ACF.1.1/UPD_FILE			x	x	✓	✓	
FDP_ACF.1.2/UPD_FILE			x	x	✓	✓	
FDP_ACF.1.3/UPD_FILE			x	x	✓	✓	
FDP_ACF.1.4/UPD_FILE			x	x	✓	✓	
FDP_RIP.1.1		FDP_RIP.1.1	7.1.4.3	x	x	x	✓
FDP_UCT.1.1/TRM		FDP_UCT.1.1/TRM	7.1.4.4	x	x	x	✓
FDP_UCT.1.1/MP		Additional SFR		✓	✓	✓	x
FDP_UIT.1.1/TRM	FDP_UIT.1.1/TRM	7.1.4.5	x	x	x	✓	
FDP_UIT.1.2/TRM	FDP_UIT.1.2/TRM		x	✓	✓	x	
FDP_UIT.1.1/MP	Additional SFR		✓	✓	✓	x	
FDP_UIT.1.2/MP			✓	✓	✓	x	
FDP_ITC.1.1/MP	Additional SFR	7.1.4.6	x	✓	✓	x	
FDP_ITC.1.2/MP			✓	✓	✓	x	
FDP_ITC.1.3/MP			✓	✓	✓	x	
<b>Class FMT “Security Management”</b>							
FMT_MOF.1.1/PROT	Additional SFR	7.1.5.1	x	✓	✓	x	
FMT_MOF.1.1/GP			✓	✓	✓	x	
FMT_MOF.1.1/BAC_EXP			✓	✓	✓	✓	

FMT_SMF.1.1	FMT_SMF.1.1	7.1.5.2	✓	✓	✓	✗
FMT_SMR.1.1/PACE	FMT_SMR.1.1/PACE	7.1.5.3	✗	✓	✓	✓
FMT_SMR.1.2/PACE	FMT_SMR.1.2/PACE		✗	✓	✓	✓
FMT_LIM.1.1	FMT_LIM.1.1	7.1.5.4	✗	✓	✓	✓
FMT_LIM.2.1	FMT_LIM.2.1	7.1.5.5	✗	✓	✓	✓
FMT_MTD.1.1/INI_ENA	FMT_MTD.1.1/INI_ENA	7.1.5.6	✗	✓	✓	✓
FMT_MTD.1.1/INI_DIS	FMT_MTD.1.1/INI_DIS		✗	✓	✓	✓
FMT_MTD.1.1/PA	FMT_MTD.1.1/PA		✗	✓	✓	✓
FMT_MTD.1.1/CVCA_INI	FMT_MTD.1.1/CVCA_INI		✗	✓	✓	✓
FMT_MTD.1.1/CVCA_UPD	FMT_MTD.1.1/CVCA_UPD		✗	✓	✓	✓
FMT_MTD.1.1/DATE	FMT_MTD.1.1/DATE		✗	✓	✓	✓
FMT_MTD.1.1/CAPK	FMT_MTD.1.1/CAPK		✗	✓	✓	✓
FMT_MTD.1.1/KEY_READ	FMT_MTD.1.1/KEY_READ		✓	✓	✓	✓
FMT_MTD.1.1/PACE_PWD	Additional SFR		✗	✓	✓	✓
FMT_MTD.1.1/MP_KEY_WRITE			✓	✓	✓	✓
FMT_MTD.1.1/AA_KEY_WRITE			✗	✓	✓	✓
FMT_MTD.1.1/LCS_PREP			✗	✓	✓	✓
FMT_MTD.1.1/LCS_PERS			✗	✓	✓	✓
FMT_MTD.1.1/BAC_EXP			✗	✓	✓	✓
FMT_MTD.1.1/UPD_FILE			✗	✓	✓	✓
FMT_MTD.1.1/SM_LVL	✗	✓	✓	✓		
FMT_MTD.3.1	FMT_MTD.3.1	7.1.5.7	✗	✗	✗	✓
<b>Class FMT “Security Management”</b>						
FPT_EMS.1.1	FPT_EMSEC.1.1	7.1.6.1	✗	✓	✓	✓
FPT_EMS.1.2	FPT_EMSEC.1.2		✗	✓	✓	✓
FPT_FLS.1.1	FPT_FLS.1.1	7.1.6.2	✗	✓	✓	✓
FPT_TST.1.1	FPT_TST.1.1	7.1.6.3	✗	✓	✓	✓
FPT_TST.1.2	FPT_TST.1.2		✗	✓	✓	✓
FPT_TST.1.3	FPT_TST.1.3		✗	✓	✓	✓
FPT_PHP.3.1	FPT_PHP.3.1	7.1.6.4	✗	✓	✓	✓
<b>Class FTP “Trusted path/channels”</b>						
FTP_ITC.1.1/PACE	FTP_ITC.1.1/PACE	7.1.7.1	✗	✗	✗	✓
FTP_ITC.1.2/PACE	FTP_ITC.1.2/PACE		✗	✗	✗	✓
FTP_ITC.1.3/PACE	FTP_ITC.1.3/PACE		✗	✗	✗	✓
FTP_ITC.1.1/MP	Additional SFR		✗	✓	✓	✗
FTP_ITC.1.2/MP			✗	✓	✓	✗
FTP_ITC.1.3/MP			✗	✓	✓	✗

Table 11 - SFR of the TOE

### 7.1.1 Class FAU “Security Audit”

#### 7.1.1.1 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 FCS “Cryptographic Support”

#### 7.1.2.1 FCS\_CKM.1 “Cryptographic key generation”

Hierarchical to: No other components.

Dependencies: [FCS\_CKM.2 Cryptographic key distribution or  
FCS\_COP.1 Cryptographic operation]  
FCS\_CKM.4 Cryptographic key destruction

FCS\_CKM.1.1/  
DH\_PACE The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **ECDH compliant to [TR\_03111]** and specified cryptographic key sizes **192 to 521 bit** that meet the following: **[ICAO\_TR\_SAC]**.

FCS\_CKM.1.1/  
CA The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **based on ECDH compliant to [ISO\_15946]** and specified cryptographic key sizes **192 to 521 bit** that meet the following: **[TR\_03111]**.

FCS\_CKM.1.1/  
MSK\_DIV The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **MSK derivation from initial MSK, using SHA-256** and specified cryptographic key sizes **256 bit** that meet the following: **none**.

*Application note:* In Step 5, (Master) MSK is diversified during the first command, and then replaced by the derived MSK generated by FCS\_CKM.1/MSK. The secure erasing of the keys is ensured by FCS\_CKM.4.

FCS\_CKM.1.1/  
GP The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **Triple-DES in CBC mode** and specified cryptographic key sizes **112 bit** that meet the following: **[GPC\_SPE\_034]; appendix E.4.1**.

7.1.2.2 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]

FCS\_CKM.4.1 The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method **zeroisation** that meets the following:  
**none.**

*Application note:* This SFR addresses the destruction of the MSK, ISK, and SM sessions keys.

7.1.2.3 FCS\_COP.1 “Cryptographic operation”

Hierarchical to: No other components.

Dependencies: [FDP\_ITC.1 Import of user data without security attributes, or  
FDP\_ITC.2 Import of user data with security attributes, or  
FCS\_CKM.1 Cryptographic key generation]  
FCS\_CKM.4 Cryptographic key destruction

FCS\_COP.1.1/  
PACE\_ENC The TSF shall perform **secure messaging – encryption and decryption** in accordance with a specified cryptographic algorithm **[algorithm]** and cryptographic key sizes **[key size(s)]** that meets the following **[standard]**.

Algorithm	key size(s)	standard
Triple-DES in CBC mode	112 bit	[ICAO_TR_SAC]
AES in CBC mode	128, 192 and 256 bit	

FCS\_COP.1.1/  
PACE\_MAC The TSF shall perform **secure messaging – message authentication code** in accordance with a specified cryptographic algorithm **[algorithm]** and cryptographic key sizes **[key size(s)]** that meets the following **[standard]**.

Algorithm	key size(s)	standard
Retail MAC	112 bit	[ICAO_TR_SAC]
AES CMAC	128, 192 and 256 bit	

FCS\_COP.1.1/  
CA\_ENC      The TSF shall perform **secure messaging – encryption and decryption** in accordance with a specified cryptographic algorithm **[algorithm]** and cryptographic key sizes **[key size(s)]** that meets the following **[standard]**.

Algorithm	key size(s)	standard
<b>Triple-DES in CBC mode</b>	<b>112 bit</b>	<b>[TR_03110]</b>
<b>AES in CBC mode</b>	<b>128, 192 and 256 bit</b>	

FCS\_COP.1.1/  
SIG\_VER      The TSF shall perform **digital signature verification** in accordance with a specified cryptographic algorithm **ECDSA with SHA-1, SHA-224 and SHA-256** and cryptographic key sizes **192 to 521** that meets the following **[FIPS\_186\_3]**.

FCS\_COP.1.1/  
CA\_MAC      The TSF shall perform **secure messaging – message authentication code** in accordance with a specified cryptographic algorithm **[algorithm]** and cryptographic key sizes **[key size(s)]** that meets the following **[standard]**.

Algorithm	key size(s)	standard
<b>Retail MAC</b>	<b>112 bit</b>	<b>[TR_03110]</b>
<b>AES CMAC</b>	<b>128, 192 and 256 bit</b>	

FCS\_COP.1.1/  
MSK\_SHA      The TSF shall perform **hashing for MSK diversification** in accordance with a specified cryptographic algorithm **SHA-256** and cryptographic key sizes **none** that meets the following **[FIPS\_180\_2]**.

FCS\_COP.1.1/  
GP\_ENC      The TSF shall perform **secure messaging (GP) – encryption and decryption** in accordance with a specified cryptographic algorithm **Triple-DES in CBC mode** and cryptographic key sizes **112 bit** that meets the following **[FIPS\_46\_3]**.

FCS\_COP.1.1/  
GP\_AUTH      The TSF shall perform **symmetric authentication – encryption and decryption** in accordance with a specified cryptographic algorithm **Triple-DES** and cryptographic key sizes **112 bit** that meets the following **[FIPS\_46\_3]**.

*Application Note:*      The Authentication Mechanisms based on Triple-DES is the authentication process performed in phases 5 and 6.

FCS\_COP.1.1/  
GP\_MAC      The TSF shall perform **secure messaging – message authentication code** in accordance with a specified cryptographic algorithm **MAC Algorithm 1 with Padding M2** and cryptographic key sizes **112 bit** that meets the following **[ISO\_9797\_1]**.



FCS\_COP.1.1/  
GP\_KEY\_DEC

The TSF shall perform **key decryption** in accordance with a specified cryptographic algorithm **Triple-DES in ECB mode** and cryptographic key sizes **112 bit** that meets the following [**FIPS\_46\_3**]

FCS\_COP.1.1/  
AA\_DSA

The TSF shall perform **Digital Signature Creation** in accordance with a specified cryptographic algorithm **RSA signature CRT with SHA-1, SHA-224 and SHA-256** and cryptographic key sizes **1024 to 2048 in steps of 256 bits** that meet the following [**FIPS\_186\_3**].

#### 7.1.2.4 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:

1. **The requirement for random number generation following [RGS2\_B1].**

### 7.1.3 Class FIA “Identification and Authentication”

#### 7.1.3.1 FIA\_UID.1 “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 disable by TSF according to FMT\_MTD.1/INI\_DIS
4. to carry out the Chip Authentication Protocol v.1 according to [TR\_03110]
5. to carry out the Terminal Authentication Protocol v.1 according to [TR\_03110]

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.

#### 7.1.3.2 FIA\_UAU.1 “Timing of authentication”

Hierarchical to: No other components.

Dependencies: FIA\_UID.1 Timing of identification.

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 disable 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\_03110]
6. to carry out the Terminal Authentication Protocol v.1 according to [TR\_03110]

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.

**7.1.3.3 FIA\_UAU.4 “Single-use authentication mechanisms”**

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 Mechanisms based on Triple-DES**
3.     **Terminal Authentication Protocol v.1 according to [TR\_03110]**

*Application Note:*        The Authentication Mechanisms based on Triple-DES is the authentication process performed in phases 5 and 6.

**7.1.3.4 FIA\_UAU.5 “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 mode according to [ICAO\_TR\_SAC]**
4.     **Symmetric Authentication Mechanism based on Triple-DES**
5.     **Terminal Authentication Protocol v.1 according to [TR\_03110]**

FIA\_UAU.5.2/  
PACE                    The TSF shall authenticate any user’s claimed identity according to the **following rules:**

1.     **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.**
2.     **The TOE accepts the authentication attempt as Personalisation Agent by the Authentication Mechanism with Personalization Agent Key(s).**

3. After run of the Chip Authentication Protocol Version 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 v1.
4. 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 v.1
5. The TOE accepts the authentication attempt as Personalisation Agent by the Authentication Mechanism with Pre-personalization Agent Key(s).

#### 7.1.3.5 FIA\_UAU.6 “Re-authenticating”

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.6.1/  
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 Version 1 shall be verified as being sent by the Inspection System.**

FIA\_UAU.6.1/  
MP                         The TSF shall re-authenticate the user under the conditions **each command sent to the TOE after successful authentication of the terminal with the Symmetric Authentication Mechanism shall be verified as being sent by the authenticated terminal.**

*Application note*                      This requirement applies to the authentication protocol used by (1) the Manufacturer and (2) the Personalization Agent

#### 7.1.3.6 FIA\_AFL.1 “Authentication failure handling”

Hierarchical to: No other components.

Dependencies: FIA\_UAU.1 Timing of authentication.

FIA\_AFL.1.1/  
PACE The TSF shall detect when an **administrator configurable positive integer within range of acceptable values 0 to 255 consecutive** unsuccessful authentication attempts occur related to **authentication attempts using the PACE password shared password**.

FIA\_AFL.1.2/  
PACE When the defined number of unsuccessful authentication attempts has been **met**, the TSF shall **wait for an increasing time between receiving of the terminal challenge and sending of the TSF response during the PACE authentication attempts**.

FIA\_AFL.1.1/  
MP The TSF shall detect when **3** unsuccessful authentication attempts occur related to **authentication of the Manufacturer and the Personalization Agent**.

FIA\_AFL.1.2/  
MP When the defined number of unsuccessful authentication attempts has been **met or surpassed**, the TSF shall **wait for an increasing time between receiving of the terminal challenge and sending of the TSF response during the Authentication Mechanisms based on Triple-DES attempts**.

#### 7.1.3.7 FIA\_API.1 “Authentication Proof of Identity”

Hierarchical to: No other components.

Dependencies: No dependencies.

FIA\_API.1.1/  
CA The TSF shall provide a **Chip Authentication Protocol Version 1 according to [TR\_03110]** to prove the identity of the TOE.

FIA\_API.1.1/  
AA The TSF shall provide an **Active Authentication protocol according to [ICAO\_9303]** to prove the identity of the TOE.

#### 7.1.4 Class FDP “User Data Protection”

##### 7.1.4.1 FDP\_ACC.1 “Subset access control”

Hierarchical to: No other components.

Dependencies: FDP\_ACF.1 Security attribute 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 travel document.**

FDP\_ACC.1.1/  
MP                        The TSF shall enforce the **GP Access Control SFP** on **terminals gaining write, read and modification access to the Pre-Perso\_K, the Perso\_K, the LCS and the Configuration Data.**

FDP\_ACC.1.1/  
ID                        The TSF shall enforce the **ID Access Control** on **terminals gaining write, read and modification access to the CPLC and the TOE\_ID.**

FDP\_ACC.1.1/  
UPD\_FILE                The TSF shall enforce the **UPD\_FILE Access Control SFP** on **terminals gaining write, read and modification access to data in the file(s) other than EF.COM, EF.SOD, and EF.DG1 to EF.DG16 of the logical MRTD.**

##### 7.1.4.2 FDP\_ACF.1 “Basic 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. **BIS-PACE**
  - 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 travel document**
  - b. **data in EF.DG3 of the logical travel document,**
  - c. **data in EF.DG4 of the logical travel documents,**
  - d. **all TOE intrinsic secret cryptographic keys stored in the travel document**

3. Security attributes:
  - a. PACE Authentication
  - b. Terminal Authentication v.1
  - c. Authorisation of the Terminal

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:

1. A BIS-PACE is allowed to read data objects from FDP\_ACF.1/TRM according to [ICAO\_TR\_SAC] after a successful PACE authentication 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 as PACE authenticated BIS-PACE is not allowed to read, to write, to modify, to use any User Data stored on the travel document.
2. Terminals not using secure messaging are not allowed to read, to write, to modify, to use any data stored on the travel 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.
7. Moreover, any Extended Inspection System not communicating with the TOE using a secure messaging level at least equal to the one defined at the creation of the DG 3 and DG 4 is not allowed to read these DG.

*Application Note:*

Possible secure messaging levels are: DES, AES 128, AES 192 or AES 256.

FDP\_ACF.1.1/  
MP

The TSF shall enforce the **GP Access Control SFP** to objects based on the following

1. **Subjects:**
  - a. **Manufacturer,**
  - b. **Personalization Agent,**
2. **Objects:**
  - a. **the Pre-Perso\_K,**
  - b. **the Perso\_K,**
  - c. **the LCS,**
  - d. **the Configuration Data,**
3. **Security attributes**
  - a. **authentication status of the Manufacturer,**
  - b. **authentication status of the Personalization Agent.**

FDP\_ACF.1.2/  
MP

The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

1. **the Manufacturer is allowed to write the Pre-Perso\_K, the Perso\_K, the LCS and the Configuration Data,**
2. **the Manufacturer is allowed to read the Configuration Data and the LCS,**
3. **the Personalization Agent is allowed to write the Perso\_K, the LCS and the Configuration Data,**
4. **the Personalization Agent is allowed to read the Configuration Data and the LCS.**

FDP\_ACF.1.3/  
MP

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

FDP\_ACF.1.4/  
MP

The TSF shall explicitly deny access of subjects to objects based on the following additional rules: **none**.

FDP\_ACF.1.1/  
ID

The TSF shall enforce the **ID Access Control SFP** to objects based on the following

1. **Subjects:**
  - a. **Manufacturer,**
  - b. **Personalization Agent,**
  - c. **BIS-PACE,**
  - d. **Terminal,**
2. **Objects:**



- a. the TOE\_ID,
- b. the CPLC,
- 3. Security attributes
  - a. authentication status of the Manufacturer,
  - b. authentication status of the Personalization Agent,
  - c. authentication status of the terminal as BIS-PACE.

FDP\_ACF.1.2/  
ID

The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

- 1. the Manufacturer is allowed to write and read the CPLC,
- 2. the Personalization Agent is allowed to write and read the CPLC,
- 3. the BIS-PACE is allowed to read the CPLC,

FDP\_ACF.1.3/  
ID

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

FDP\_ACF.1.4/  
ID

The TSF shall explicitly deny access of subjects to objects based on the following additional rules:

- 1. Any Terminal is not allowed to read the CPLC and the TOE\_ID,
- 2. Any Terminal is not allowed to modify the CPLC.

FDP\_ACF.1.1/  
UPD\_FILE

The TSF shall enforce the **UPD\_FILE Access Control SFP** to objects based on the following:

- 1. Subjects:
  - a. Personalization Agent,
  - b. Extended Inspection System,
  - c. Terminal,
- 2. Objects:
  - a. data in the file(s) other than EF.COM, EF.SOD, and EF.DG1 to EF.DG16 of the logical MRTD
- 3. Security attributes
  - a. authentication status of terminals,

FDP\_ACF.1.2/  
UPD\_FILE

The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

- 1. the Personalization Agent is allowed to write, read and modify the data in the file(s) other than EF.COM, EF.SOD, and EF.DG1 to EF.DG16 of the logical MRTD,

2. the successfully authenticated Extended Inspection System with the name corresponding to the one (or beginning of the one) set following FMT\_MTD.1.1/UPD\_FILE is allowed to modify the data in the file(s) other than EF.COM, EF.SOD, and EF.DG1 to EF.DG16 of the logical MRTD.

FDP\_ACF.1.3/  
UPD\_FILE

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

FDP\_ACF.1.4/  
UPD\_FILE

The TSF shall explicitly deny access of subjects to objects based on the following additional rules:

1. Any Terminal is not allowed to modify the data in the file(s) other than EF.COM, EF.SOD, and EF.DG1 to EF.DG16 of the logical MRTD.

#### 7.1.4.3 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. the ephemeral private key ephem-Skpicc-PACE (by having generated a DH shared secret K)

#### 7.1.4.4 FDP\_UCT.1 “Basic data exchange confidentiality”

Hierarchical to: No other components.

Dependencies: [FTP\_ITC.1 Inter-TSF trusted channel, or  
FTP\_TRP.1 Trusted path]  
[FDP\_ACC.1 Subset access control, or  
FDP\_IFC.1 Subset information flow control]

FDP\_UCT.1.1/  
TRM

The TSF shall enforce the **Access Control SFP** to be able to **transmit and receive** user data in a manner protected from unauthorized disclosure.

FDP\_UCT.1.1/  
MP The TSF shall enforce the **GP Access Control SFP** to **transmit and receive** user data in a manner protected from unauthorized disclosure.

*Application Note:* Additional SFR FDP\_UCT.1/MP enforces confidentiality of data import and export in steps 5 and 6.

#### 7.1.4.5 FDP\_UIT.1 “Data exchange integrity”

Hierarchical to: No other components.

Dependencies: [FDP\_ACC.1 Subset access control, or  
FDP\_IFC.1 Subset information flow control]  
[FTP\_ITC.1 Inter-TSF trusted channel, or  
FTP\_TRP.1 Trusted path]

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

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

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

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

*Application Note:* Additional SFR FDP\_UIT.1/MP enforces integrity of data import and export in steps 5 and 6.

#### 7.1.4.6 FDP\_ITC.1 “Import of user data without security attributes”

Hierarchical to: No other components.

Dependencies: [FDP\_ACC.1 Subset access control, or  
FDP\_IFC.1 Subset information flow control]  
FMT\_MSA.3 Static attribute initialization

FDP\_ITC.1.1/  
MP The TSF shall enforce the **GP Access Control SFP** when importing user data, controlled under the SFP, from outside the TOE.

FDP\_ITC.1.2/  
MP                      The TSF shall ignore any security attributes associated with the user data when imported from outside the TOE.

FDP\_ITC.1.3/  
MP                      The TSF shall enforce the following rules when importing user data controlled under the SFP from outside the TOE: **sensitive data (Pre-Perso\_K, Perso\_K, PACE\_PWD, CA\_SK and AA\_SK) shall be encrypted.**

*Application Note:*                      Additional SFR FDP\_ITC.1/MP enforces confidentiality of sensitive data import in steps 5 and 6.

### 7.1.5 Class FMT “Security Management”

#### 7.1.5.1 FMT\_MOF “Management of functions in TSF”

Hierarchical to:                      No other components.

Dependencies:                      FMT\_SMR.1 Security roles  
FMT\_SMF.1 Specification of Management Functions

FMT\_MOF.1.1/  
PROT                      The TSF shall restrict the ability to **enable** the functions

- **Active Authentication,**

to **the Manufacturer.**

FMT\_MOF.1.1/  
GP                      The TSF shall restrict the ability to **enable** the functions

- **transmission of user data in a manner protected from unauthorized disclosure,**
- **reception of user data in a manner protected from unauthorized disclosure,**
- **transmission of user data in a manner protected from modification, deletion, insertion and replay errors,**
- **reception of user data in a manner protected from modification, deletion, insertion and replay errors,**

to **the Manufacturer and the Personalization Agent.**

FMT\_MOF.1.1/  
BAC\_EXP                      The TSF shall restrict the ability to **enable** the functions

- **deactivation of the BAC protocol**

to **Country Verifying Certification Authority and Domestic document Verifier** once the current date has reached or passed the value set by **FMT\_MTD.1/BAC\_EXP**

*Application Note:* The BAC is automatically deactivated by the TOE once the authenticated subject (Country Verifying Certification Authority or domestic Document Verifier) has updated the current date of the TOE with a date that reaches or passes the reference date configured by FMT\_MTD.1/BAC\_EXP

### 7.1.5.2 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**
5. **Active Authentication protocol,**
6. **Chip Authentication protocol,**
7. **Protection of incoming user data,**
8. **Protection of outgoing user data,**
9. **Basic Access Control expiration**

### 7.1.5.3 FMT\_SMR.1 “Security roles”

Hierarchical to: No other components.

Dependencies: FIA\_UID.1 Timing of identification.

FMT\_SMR.1.1/  
PACE The TSF shall maintain the roles:

1. **Manufacturer,**
2. **Personalization Agent,**
3. **Terminal,**
4. **PACE authenticated BIS-PACE,**
5. **Country Verifying Certification Authority,**
6. **Document Verifier,**

- 7. Domestic Extended Inspection System
- 8. Foreign Extended Inspection System.

FMT\_SMR.1.2/  
PACE

The TSF shall be able to associate users with roles.

Note

This SFR also applies to the refinement of the role Manufacturer.

#### 7.1.5.4 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:

##### **Deploying Test Features after TOE Delivery does not allow**

- 1. User Data to be disclosed and manipulated,
- 2. TSF data to be disclosed or manipulated,
- 3. software to be reconstructed and,
- 4. substantial information about construction of TSF to be gathered which may enable other attacks and
- 5. sensitive User Data (EF.DG3 and EF.DG4) to be disclosed.

#### 7.1.5.5 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:

##### **Deploying Test Features after TOE Delivery does not allow**

- 1. User Data to be disclosed and manipulated,
- 2. TSF data to be disclosed or manipulated,
- 3. software to be reconstructed and,
- 4. substantial information about construction of TSF to be gathered which may enable other attacks and

5. sensitive User Data (EF.DG3 and EF.DG4) to be disclosed.

7.1.5.6 FMT\_MTD.1 “Management of TSF data”

Hierarchical to: No other components.

Dependencies: FMT\_SMF.1 Specification of management functions  
FMT\_SMR.1 Security roles

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

FMT\_MTD.1.1/  
INI\_DIS The TSF shall restrict the ability to **disable read access for users to the Initialization Data to the Personalization Agent.**

FMT\_MTD.1.1/  
PA The TSF shall restrict the ability to **write** the **Document Security Object (SOD) to the Personalization Agent.**

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.1.1/  
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.1.1/  
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.1.1/  
CAPK The TSF shall restrict the ability to **load** the **Chip Authentication Private Key to the Personalization Agent.**

FMT\_MTD.1.1/  
KEY\_READ

The TSF shall restrict the ability to **read** the

1. **PACE passwords,**
2. **Pre-personalization Agent Keys,**
3. **Personalization Agent Keys,**
4. **Chip Authentication Private Key,**
5. **Active Authentication Private Key,**
6. **Manufacturer Keys**

to **none**

FMT\_MTD.1.1/  
PACE\_PWD

The TSF shall restrict the ability to **load** the **PACE Password** to the **Personalization Agent**.

FMT\_MTD.1.1/  
MP\_KEY\_WRITE

The TSF shall restrict the ability to **write** the **Pre-personalization Agent Keys** and the **Personalization Agent Keys** to the **Manufacturer**.

FMT\_MTD.1.1/  
AA\_KEY\_WRITE

The TSF shall restrict the ability to **write** the **Active Authentication Private Key** to the **Personalization Agent**.

FMT\_MTD.1.1/  
LCS\_PREP

The TSF shall restrict the ability to **switch** the **LCS** from **phase 5** to **phase 6** to the **Manufacturer**.

FMT\_MTD.1.1/  
LCS\_PERS

The TSF shall restrict the ability to **switch** the **LCS** from **phase 6** to **phase 7** to the **Personalization Agent**.

FMT\_MTD.1.1/  
BAC\_EXP

The TSF shall restrict the ability to **set** the **BAC expiry date** to the **Personalization Agent**.

*Application note:*

By default, BAC expiration feature is not activated.

FMT\_MTD.1.1/  
UPD\_FILE

The TSF shall restrict the ability to **set** the **name (or beginning of the name) of the terminal allowed to modify files in phase 7, and identifiers of these files (different from EF.COM, EF.SOD, EF.DG1 to EF.DG16)** to the **Personalization Agent**.

*Application note:*

Name of the terminal is the Card Holder Reference (CHR) of the EIS.  
Beginning of the name is a string of the left most significant bytes of the CHR of the EIS.

FMT\_MTD.1.1/  
SM\_LVL

The TSF shall restrict the ability to **set** the **minimum Secure Messaging level required to access DG 3 and DG 4** to the **Personalization Agent**.



*Application note:* Possible secure messaging levels are: DES, AES 128, AES 192 or AES 256.

#### 7.1.5.7 FMT\_MTD.3 “Secure TSF data”

Hierarchical to: No other components.

Dependencies: FMT\_MTD.1 Management of TSF data

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 v1 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 Certificates 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.

## 7.1.6 Class FPT “Protection of the Security Functions”

### 7.1.6.1 FPT\_EMS.1 “TOE Emanation”

Hierarchical to: No other components.

Dependencies: No Dependencies.

FPT\_EMS.1.1 The TOE shall not emit **power variations, timing variations during command execution** in excess of **non useful information** enabling access to

1. **Chip Authentication Session Keys**
2. **PACE session keys (PACE-Kmac, PACE-Kenc),**
3. **the ephemeral private key ephem-Skpicc-PACE,**
4.
  - **Chip Authentication Public Key,**
  - **Active Authentication Private Key,**
  - **Active Authentication Public Key,**
  - **Pre-personalization Agent Keys,**
  - **CPLC,**
  - **TOE\_ID,**
  - **TOE Life Cycle State,**
  - **Configuration Data.**
5. **Personalization Agent Key(s),**
6. **Chip Authentication Private Key and**
7.
  - **Personal Data including Biometric Data,**
  - **EF.COM,**
  - **EF.SOD,**
  - **Updatable Data.**

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-Kmac, PACE-Kenc),**
3. **the ephemeral private key ephem-Skpicc-PACE,**
4.
  - **Chip Authentication Public Key,**
  - **Active Authentication Private Key,**
  - **Active Authentication Public Key,**
  - **Pre-personalization Agent Keys,**
  - **CPLC,**
  - **TOE\_ID,**
  - **TOE Life Cycle State,**
  - **Configuration Data.**

- 5. **Personalization Agent Key(s),**
- 6. **Chip Authentication Private Key and**
- 7. - **Personal Data including Biometric Data,**
- **EF.COM,**
- **EF.SOD,**
- **Updatable Data.**

7.1.6.2 *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 out-of-range operating conditions where therefore a malfunction could occur,**
- 2. **failure detected by TSF according to FPT\_TST.1.**

7.1.6.3 *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 **at the conditions**

- **At reset,**
- **Before any cryptographic operation,**
- **When accessing a DG or any EF,**
- **Prior to any use of TSF data,**
- **Before execution of any command,**
- **When performing a PACE authentication,**
- **When performing the EAC Authentication,**
- **When performing the Active Authentication.**

To demonstrate the correct operation of **the TSF.**

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

FPT\_TST.1.3 The TSF shall provide authorized users with the capability to verify the integrity

of stored TSF executable code.

#### 7.1.6.4 *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.

### 7.1.7 Class FTP “Trusted path/channels”

#### 7.1.7.1 *FTP\_ITC.1* “Inter-TSF trusted channel”

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 **enforce** communication via the trusted channel for **any data exchange between the TOE and the Terminal**.

FTP\_ITC.1.1/  
MP 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/  
MP The TSF shall permit **another trusted IT product** to initiate communication via the trusted channel.

FTP\_ITC.1.3/  
MP The TSF shall initiate communication via the trusted channel for **loading sensitive data (Pre-Perso\_K, Perso\_K, PACE\_PWD, CA\_SK and AA\_SK) shall be encrypted**.

## 7.2 Security assurance requirements

The assurance components 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 component: ALC\_DVS.2 and AVA\_VAN.5.

### 7.2.1 EAL rationale

The EAL5 was chosen to permit a developer to gain maximum assurance from security engineering based upon rigorous commercial development practices supported by moderate application of specialist security engineering techniques.

EAL5 is therefore applicable in those circumstances where developers or users require a high level of independently assured security in a planned development and require a rigorous development approach without incurring unreasonable costs attributable to specialist security engineering techniques.

### 7.2.2 EAL augmentation rationale

#### *ALC\_DVS.2 "Sufficiency of security measures"*

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 component ALC\_DVS.2 augmented to EAL5 has no dependencies to other security requirements.

#### *AVA\_VAN.5 "Advanced methodical vulnerability analysis"*

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 fulfill the security objectives OT.Sens\_Data\_Conf and OT.Chip\_Auth\_Proof.

The component AVA\_VAN.5 has the following dependencies:

- ADV\_ARC.1 "Security architecture description"
- ADV\_FSP.4 "Security-enforcing functional specification"
- ADV\_TDS.3 "Basic modular design"
- ADV\_IMP.1 "Implementation representation of the TSF"
- AGD\_OPE.1 "Operational user guidance"
- AGD\_PRE.1 "Preparative procedures"
- ATE\_DPT.1 "Testing: basic design"

All of these are met or exceeded in the EAL5 assurance package

### 7.2.3 Dependencies

SAR	Dependencies	Support of the Dependencies
ADV_ARC.1	ADV_FSP.1 ADV_TDS.1	ADV_FSP.5 ADV_TDS.4
ADV_FSP.5	ADV_TDS.1 ADV_IMP.1	ADV_TDS.4 ADV_IMP.1
ADV_IMP.1	ADV_TDS.3 ALC_TAT.1	ADV_TDS.4 ALC_TAT.2
ADV_INT.2	ADV_IMP.1 ADV_TDS.3 ALC_TAT.1	ADV_IMP.1 ADV_TDS.4 ALC_TAT.2
ADV_TDS.4	ADV_FSP.5	ADV_FSP.5
AGD_OPE.1	ADV_FSP.1	ADV_FSP.5
AGD_PRE.1	No dependencies	n.a.
ALC_CMC.4	ALC_CMS.1 ALC_DVS.1 ALC_LCD.1	ALC_CMS.5 ALC_DVS.2 ALC_LCD.1
ALC_CMS.5	No dependencies	n.a.
ALC_DEL.1	No dependencies	n.a.
ALC_DVS.2	No dependencies	n.a.
ALC_LCD.1	No dependencies	n.a.
ALC_TAT.2	ADV_IMP.1	n.a.
ASE_CCL.1	ASE_INT.1 ASE_ECD.1 ASE_REQ.1	ASE_INT.1 ASE_ECD.1 ASE_REQ.2
ASE_ECD.1	No dependencies	n.a.
ASE_INT.1	No dependencies	n.a.
ASE_OBJ.2	ASE_SPD.1	ASE_SPD.1
ASE_REQ.2	ASE_OBJ.2 ASE_ECD.1	ASE_OBJ.2 ASE_ECD.1
ASE_SPD.1	No dependencies	n.a.
ASE_TSS.1	ASE_INT.1 ASE_REQ.1 ADV_FSP.1	ASE_INT.1 ASE_REQ.2 ADV_FSP.5
ATE_COV.2	ADV_FSP.2 ATE_FUN.1	ADV_FSP.5 ATE_FUN.1
ATE_DPT.3	ADV_ARC.1 ADV_TDS.4 ATE_FUN.1	ADV_ARC.1 ADV_TDS.4 ATE_FUN.1
ATE_FUN.1	ATE_COV.1	ATE_COV.2
ATE_IND.2	ADV_FSP.2	ADV_FSP.5

	AGD_OPE.1 AGD_PRE.1 ATE_COV.1 ATE_FUN.1	AGD_OPE.1 AGD_PRE.1 ATE_COV.2 ATE_FUN.1
AVA_VAN.5	ADV_ARC.1 ADV_FSP.4 ADV_TDS.3 ADV_IMP.1 AGD_OPE.1 AGD_PRE.1 ATE_DPT.1	ADV_ARC.1 ADV_FSP.5 ADV_TDS.4 ADV_IMP.1 AGD_OPE.1 AGD_PRE.1 ATE_DPT.3

Table 12 - SARs dependencies

### 7.3 Security requirements rationale

Remove from the ST.

## 8 TOE SUMMARY SPECIFICATION

### 8.1 TOE summary specification

#### 8.1.1 Overview

The TOE provides the following Security Functions (TSF):

TSF	Acronym	Descr.	Step		
			5	6	7
Access Control in Reading	F.ACR	§ 8.1.2	✓	✓	✓
Access Control in Writing	F.ACW	§ 8.1.3	✓	✓	✓
Active Authentication	F.AA	§ 8.1.4	✓	✗	✓
Extended Access Control	F.EAC	§ 8.1.5	✗	✗	✓
PACE	F.PACE	§ 8.1.6	✗	✗	✓
MRTD Personalization	F.PERS	§ 8.1.7	✗	✓	✗
Physical Protection	F.PHY	§ 8.1.8	✓	✓	✓
MRTD Pre-personalization	F.PREP	§ 8.1.9	✓	✗	✗
Safe State Management	F.SS	§ 8.1.10	✓	✓	✓
Secure Messaging	F.SM	§ 8.1.11	✓	✓	✓
Self Tests	F.STST	§ 8.1.12	✓	✓	✓

Table 13 - TSF of the TOE

#### 8.1.2 Access Control in Reading

This function controls access to read functions and enforces the security policy for data retrieval. Prior to any data retrieval, it authenticates the actor trying to access the data, and checks the access conditions are fulfilled as well as the life cycle state. It ensures that at any time, the following keys are never readable:

- MSK,
- Pre-personalization Agent keys,
- Personalization Agent keys,
- AA private key,
- CA private key

It controls access to the CPLC data as follow:

- It ensures the CPLC data can be read during the personalization phase,
- It ensures it cannot be readable without authentication at the end of the personalization step.

It controls access to the TOE\_ID as follow:

- It ensures the TOE\_ID data can be read during the manufacturing and personalization phases,
- It ensures it cannot be readable without authentication in operational use phase.



Regarding the file structure:

*In the Operational Use phase:*

- The terminal can read user data, the Document Security Object, EF.COM only after BAC authentication and through a valid secure channel.

*In the Manufacturing and Personalization phases:*

- The Manufacturer and the Personalization Agent can read all the data stored in the TOE after it is authenticated by the TOE (using its authentication keys).

It ensures as well that no other part of the memory can be accessed at anytime

### 8.1.3 Access Control in Writing

This function controls access to write functions (in EEPROM) and enforces the security policy for data writing. Prior to any data update, it authenticates the actor, and checks the access conditions are fulfilled as well as the life cycle state.

It also ensures the CPLC data cannot be written anymore once the TOE is in Operational Use phase.

Regarding the file structure:

*In the Operational Use phase:*

It is not possible to create any files (system or data files). Furthermore, it is not possible to update any files (system or data files), except for CVCA which can be updated if the “Secure Messaging” access condition is verified.

*In the Manufacturing and Personalization phases:*

The Manufacturing and Personalization Agent can create and write through a valid secure channel all the data files it needs after it is authenticated by the TOE (using its authentication keys).

### 8.1.4 Active Authentication

This TSF provides the Active Authentication as described in [ICAO\_9303]. It also provides management of this function in phase 5.

### 8.1.5 Extended Access Control

This TSF provides the Extended Access Control, authentication and session keys generation to be used by F.SM, as described in [TR\_03110].

### 8.1.6 PACE

This TSF provides the Password Authenticated Connection Establishment authentication and session keys generation to be used by F.SM, as described in [TR\_03110].

### 8.1.7 MRTD Personalization

This security functionality ensures that the TOE, when delivered to the Personalization Agent, provides and requires authentication for data exchange. This authentication is based on a Triple DES authentication mechanism. This function allows to:

- Manage symmetric authentication using Personalization Agent keys,
- Compute session keys to be used by F.SM,
- Load user data,
- Configure SM level for biometrical data access,
- Load Chip Authentication keys and Active Authentication keys,
- Set Personalization Agent CPLC Data,
- Configure BAC deactivation mechanism
- Set the name of the terminal allowed to modify files in phase 7, and identifiers of these files
- Set TOE life cycle in Operational Use phase.

### 8.1.8 Physical Protection

This Security Function protects the TOE against physical attacks, so that the integrity and confidentiality of the TOE is ensured, including keys, user data, CPLC data, configuration data and TOE life cycle. It detects physical tampering, responds automatically, and also controls the emanations sent out by the TOE.

### 8.1.9 MRTD Pre-personalization

This security functionality ensures that the TOE, when delivered to the Manufacturer, provides and requires an authentication mechanism for data exchange. This authentication is based on Triple DES symmetric authentication mechanism. This function allows to:

- Diversify the MSK,
- Manage symmetric authentication using Pre-personalization Agent keys,
- Compute session keys to be used by F.SM,
- Load data,
- Create the MRTD application
- Load Personalization Agent keys,
- Load the Pre-personalization Agent CPLC Data,
- Set TOE life cycle in Personalization phase.

This security function ensures the destruction of the MSK, once ISK is loaded. This security function ensures the destruction of the ISK, once Personalization Agent keys are loaded.

#### 8.1.10 Safe State Management

This security functionality ensures that the TOE gets back to a secure state when:

- an integrity error is detected by F.STST described in § 8.1.12,
- a tearing occurs (during a copy of data in EEPROM).

This security functionality ensures that if such a case occurs, the TOE is either switched in the state "kill card" or becomes mute.

#### 8.1.11 Secure Messaging

This security functionality ensures the confidentiality, authenticity and integrity of the communication between the TOE and the interface device. In the operational phase, after a successful Authentication Procedure (i.e. BAC or CA), a secure channel is established. This security functionality also provides a Secure Messaging (SCP02) for the Pre-personalization and Personalization phases. The protocols can be configured to protect the exchanges integrity and/or confidentiality. If an error occurs in the secure messaging layer, the session keys are destroyed.

#### 8.1.12 Self Tests

The TOE performs self-tests to verify the integrity of the TSF data:

- At Reset,
- Before using the TSF data,
- Before using Chip Authentication key and Active Authentication key.

## 8.2 SFR and TSF

SFR	TSF											
	F.ACR	F.ACW	F.AA	F.EAC	F.PACE	F.PERS	F.PHY	F.PREP	F.SS	F.SM	F.STST	
FAU_SAS.1	x	x	x	x	x	x	✓	x	✓	x	x	
FCS_CKM.1/DH_PACE	x	x	x	x	✓	x	x	x	x	x	✓	
FCS_CKM.1/CA	x	x	x	✓	x	x	x	x	x	x	✓	
FCS_CKM.1/MSK_DIV	x	x	x	x	x	x	x	✓	x	x	✓	
FCS_CKM.1/GP	x	x	x	x	x	✓	x	✓	x	x	✓	
FCS_CKM.4	x	x	x	x	x	✓	x	✓	x	✓	x	
FCS_COP.1/PACE_ENC	x	x	x	x	x	x	x	x	x	✓	✓	
FCS_COP.1/PACE_MAC	x	x	x	x	x	x	x	x	x	✓	✓	
FCS_COP.1/CA_ENC	x	x	x	x	x	x	x	x	x	✓	✓	
FCS_COP.1.1/SIG_VER	x	x	x	✓	x	x	x	x	x	x	✓	
FCS_COP.1/CA_MAC	x	x	x	x	x	x	x	x	x	✓	✓	
FCS_COP.1/MSK_SHA	x	x	x	x	x	x	x	✓	x	x	x	
FCS_COP.1/GP_ENC	x	x	x	x	x	x	x	x	x	✓	✓	
FCS_COP.1/GP_AUTH	x	x	x	x	x	✓	x	✓	x	x	✓	
FCS_COP.1/GP_MAC	x	x	x	x	x	x	x	x	x	✓	✓	
FCS_COP.1/GP_KEY_DEC	x	x	x	x	x	✓	x	x	x	x	✓	
FCS_COP.1/AA_DSA	x	x	✓	x	x	x	x	x	x	x	✓	
FCS_RND.1	x	x	✓	✓	✓	✓	x	✓	x	x	✓	
FIA_UID.1/PACE	✓	x	x	x	x	x	x	x	x	x	x	
FIA_UAU.1/PACE	✓	x	x	x	x	x	x	x	x	x	x	
FIA_UAU.4/PACE	x	x	x	✓	✓	✓	x	✓	x	x	✓	
FIA_UAU.5/PACE	x	x	x	✓	✓	✓	x	✓	x	✓	✓	
FIA_UAU.6/PACE	x	x	x	x	x	x	x	x	x	✓	✓	
FIA_UAU.6/EAC	x	x	x	x	x	x	x	x	x	✓	✓	
FIA_UAU.6/MP	x	x	x	x	x	x	x	x	x	✓	✓	
FIA_AFL.1/PACE	x	x	x	x	✓	x	x	x	x	x	✓	
FIA_AFL.1/MP	x	x	x	x	x	✓	x	✓	x	x	✓	
FIA_API.1/CA	x	x	x	✓	x	x	x	x	x	x	x	
FIA_API.1/AA	x	x	✓	x	x	x	x	x	x	x	x	
FDP_ACC.1/TRM	✓	✓	x	x	✓	x	x	x	x	x	x	
FDP_ACC.1/MP	✓	✓	x	x	x	✓	x	✓	x	x	x	
FDP_ACC.1/ID	✓	✓	x	x	✓	✓	x	✓	x	x	x	
FDP_ACC.1/UPD_FILE	✓	✓	x	✓	x	✓	x	x	x	x	x	
FDP_ACF.1/TRM	✓	✓	x	x	✓	x	x	x	x	x	x	
FDP_ACF.1/MP	✓	✓	x	x	x	✓	x	✓	x	x	x	

FDP_ACF.1/ID	✓	✓	✗	✗	✓	✓	✗	✓	✗	✗	✗
FDP_ACF.1/UPD_FILE	✓	✓	✗	✓	✗	✓	✗	✗	✗	✗	✗
FDP_RIP.1	✗	✗	✗	✗	✓	✗	✗	✗	✗	✓	✗
FDP_UCT.1/TRM	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
FDP_UCT.1/MP	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
FDP_UIT.1/TRM	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
FDP_UIT.1/MP	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
FDP_ITC.1/MP	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✓
FMT_MOF.1/PROT	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
FMT_MOF.1/GP	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗
FMT_MOF.1/BAC_EXP	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗
FMT_SMF.1	✗	✗	✓	✓	✗	✓	✗	✓	✗	✗	✗
FMT_SMR.1/PACE	✗	✗	✗	✗	✓	✓	✗	✓	✗	✗	✗
FMT_LIM.1	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗
FMT_LIM.2	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗
FMT_MTD.1/INI_ENA	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗
FMT_MTD.1/INI_DIS	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/PA	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/CVCA_INI	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/CVCA_UPD	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗
FMT_MTD.1/DATE	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗
FMT_MTD.1/CAPK	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/KEY_READ	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
FMT_MTD.1/PACE_PWD	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/MP_KEY_WRITE	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗
FMT_MTD.1/AA_KEY_WRITE	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/LCS_PREP	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗
FMT_MTD.1/LCS_PERS	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/BAC_EXP	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗
FMT_MTD.1/UPD_FILE	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.1/SM_LVL	✓	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗
FMT_MTD.3	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗
FPT_EMS.1	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗
FPT_FLS.1	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗
FPT_TST.1	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
FPT_PHP.3	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗
FTP_ITC.1/PACE	✗	✗	✗	✗	✓	✗	✗	✗	✗	✓	✗
FTP_ITC.1/MP	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✓

Table 14 – SFR and TSF

## 9 COMPOSITION WITH IC SECURITY TARGET

Remove from the ST.



# APPENDICES



## Appendix A: Glossary

Term	Definition
Accurate Terminal Certificate	A Terminal Certificate is accurate, if the issuing Document Verifier is trusted by the travel document's chip to produce Terminal Certificates with the correct certificate effective date, see [TR_03110].
Advanced Inspection Procedure (with PACE)	A specific order of authentication steps between a travel document and a terminal as required by [ICAO_TR_SAC], namely (i) PACE, (ii) Chip Authentication v.1, (iii) Passive Authentication with SOD and (iv) Terminal Authentication v.1. AIP can generally be used by EIS-AIP-PACE.
Agreement	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.
Active Authentication	Security mechanism defined in [ICAO_9303] option by which means the travel document's chip proves and the inspection system verifies the identity and authenticity of the travel document's chip as part of a genuine travel document issued by a known State of Organisation.
Application note	Optional informative part of the PP containing sensitive supporting information that is considered relevant or useful for the construction, evaluation, or use of the TOE.
Audit records	Write-only-once non-volatile memory area of the travel document's chip to store the Initialization Data and Pre-personalisation Data.
Authenticity	Ability to confirm the travel document and its data elements on the travel document's chip were created by the issuing State or Organisation
Basic Access Control (BAC)	Security mechanism defined in [ICAO_9303] by which means the travel document's chip proves and the inspection system protects their communication by means of secure messaging with Document Basic Access Keys (see there).
Basic Inspection System with PACE protocol (BIS-PACE)	A technical system being used by an inspecting authority and operated by a governmental organisation (i.e. an Official Domestic or Foreign Document Verifier) 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). The Basic Inspection System with PACE is a PACE Terminal additionally supporting/applying the Passive Authentication protocol and is authorised by the travel document Issuer through the Document Verifier of receiving state to read a subset of data stored on the travel document.
Basic Inspection System (BIS)	An inspection system which implements the terminals part of the Basic Access Control Mechanism and authenticates itself to the travel document's chip using the Document Basic Access Keys derived from the printed MRZ data for reading the logical travel document.

Biographical data (biodata)	The personalised details of the travel document holder of the document appearing as text in the visual and machine readable zones on the biographical data page of a travel document. [ICAO_9303]
Biometric reference data	Data stored for biometric authentication of the travel document holder in the travel document's chip as (i) digital portrait and (ii) optional biometric reference data.
Card Access Number (CAN)	Password derived from a short number printed on the front side of the data-page.
Certificate chain	A sequence defining a hierarchy certificates. The Inspection System Certificate is the lowest level, Document Verifier Certificate in between, and Country Verifying Certification Authority Certificates are on the highest level. A certificate of a lower level is signed with the private key corresponding to the public key in the certificate of the next higher level.
Counterfeit	An unauthorized copy or reproduction of a genuine security document made by whatever means. [ICAO_9303]
Country Signing CA Certificate (CCSCA)	Certificate of the Country Signing Certification Authority Public Key (KPUCCSCA) issued by Country Signing Certification Authority stored in the inspection system.
Country Signing Certification Authority (CSCA)	<p>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 documents and creates the Document Signer Certificates within this PKI.</p> <p>The CSCA also issues the self-signed CSCA Certificate (CCSCA) having to be distributed by strictly secure diplomatic means, see. [ICAO_9303], 5.5.1. The Country Signing Certification Authority issuing certificates for Document Signers (cf. [ICAO_9303]) and the domestic CVCA may be integrated into a single entity, e.g. a Country Certification Authority. However, even in this case, separate key pairs must be used for different roles, see [TR_03110].</p>
Country Verifying Certification Authority (CVCA)	<p>An organisation enforcing the privacy policy of the travel document Issuer with respect to protection of user data stored in the travel document (at a trial of a terminal to get an access to these data). The CVCA represents the country specific root of the PKI for the terminals using it and creates the Document Verifier Certificates within this PKI. Updates of the public key of the CVCA are distributed in form of CVCA Link-Certificates, see [TR_03110].</p> <p>Since the Standard Inspection Procedure does not imply any certificate-based terminal authentication, the current TOE cannot recognise a CVCS as a subject; hence, it merely represents an organizational entity within this PP.</p> <p>The Country Signing Certification Authority (CSCA) issuing certificates for Document Signers (cf. [ICAO_9303]) and the domestic CVCA may be</p>

	integrated into a single entity, e.g. a Country Certification Authority. However, even in this case, separate key pairs must be used for different roles, see [TR_03110].
Current date	The maximum of the effective dates of valid CVCA, DV and domestic Inspection System certificates known to the TOE. It is used the validate card verifiable certificates.
CV Certificate	Card Verifiable Certificate according to [TR_03110].
CVCA link Certificate	Certificate of the new public key of the Country Verifying Certification Authority signed with the old public key of the Country Verifying Certification Authority where the certificate effective date for the new key is before the certificate expiration date of the certificate for the old key.
Document Basic Access Key Derivation Algorithm	The [ICAO_9303] describes the Document Basic Access Key Derivation Algorithm on how terminals may derive the Document Basic Access Keys from the second line of the printed MRZ data.
PACE passwords	Passwords used as input for PACE. This may either be the CAN or the SHA-1-value of the concatenation of Serial Number, Date of Birth and Date of Expiry as read from the MRZ, see [ICAO_TR_SAC]
Document Details Data	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.
Document Security Object (SOD)	A RFC3369 CMS Signed Data Structure, signed by the Document Signer (DS). Carries the hash values of the LDS Data Groups. It is stored in the travel document's chip. It may carry the Document Signer Certificate (CDS). [ICAO_9303]
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 (CDS), see [TR_03110] and [ICAO_9303]. This role is usually delegated to a Personalisation Agent.
Document Verifier (DV)	An organisation enforcing the policies of the CVCA and of a Service Provider (here: of a governmental organisation / inspection authority) and managing terminals belonging together (e.g. terminals operated by a State's border police), by – inter alia – issuing Terminal Certificates. A Document Verifier is therefore a Certification Authority, authorised by at least the national CVCA to issue certificates for national terminals, see [TR_03110].  Since the Standard Inspection Procedure does not imply any certificate-based terminal authentication, the current TOE cannot recognise a DV as a subject; hence, it merely represents an organisational entity within this PP. There can be Domestic and Foreign DV: A domestic DV is acting under the policy of the domestic CVCA being run by the travel document Issuer; a foreign DV is acting under a policy of the respective foreign CVCA (in this

	case there shall be an appropriate agreement between the travel document Issuer und a foreign CVCA ensuring enforcing the travel document Issuer’s privacy policy).55 56
Eavesdropper	A threat agent with high attack potential reading the communication between the travel document’s chip and the inspection system to gain the data on the travel document’s chip.
Enrolment	The process of collecting biometric samples from a person and the subsequent preparation and storage of biometric reference templates representing that person's identity. [ICAO_9303]
Travel document (electronic)	The contact based or contactless smart card integrated into the plastic or paper, optical readable cover and providing the following application: ePassport.
ePassport application	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 [TR_03110].
Extended Access Control	Security mechanism identified in [ICAO_9303] by which means the travel document’s chip (i) verifies the authentication of the inspection systems authorized to read the optional biometric reference data, (ii) controls the access to the optional biometric reference data and (iii) protects the confidentiality and integrity of the optional biometric reference data during their transmission to the inspection system by secure messaging.
Extended Inspection System (EIS)	A role of a terminal as part of an inspection system which is in addition to Basic Inspection System authorized by the issuing State or Organisation to read the optional biometric reference data and supports the terminals part of the Extended Access Control Authentication Mechanism.
Forgery	Fraudulent alteration of any part of the genuine document, e.g. changes to the biographical data or the portrait. [ICAO_9303]
Global Interoperability	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 utilize that data in inspection operations in their respective States. Global interoperability is a major objective of the standardized specifications for placement of both eye-readable and machine readable data in all MRTDs. [ICAO_9303]
IC Dedicated Software	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 phases.
IC Dedicated Support Software	That part of the IC Dedicated Software (refer to above) which provides functions after TOE Delivery. The usage of parts of the IC Dedicated Software might be restricted to certain phases.

IC Dedicated Test Software	That part of the IC Dedicated Software (refer to above) which is used to test the TOE before TOE Delivery but which does not provide any functionality thereafter.
IC Embedded Software	Software embedded in an IC and not being designed by the IC developer. The IC Embedded Software is designed in the design life phase and embedded into the IC in the manufacturing life phase of the TOE.
IC Identification Data	The IC manufacturer writes a unique IC identifier to the chip to control the IC as travel document material during the IC manufacturing and the delivery process to the travel document manufacturer.
Impostor	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. [ICAO_9303]
Improperly document person	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. [ICAO_9303]
Initialisation	Process of writing Initialisation Data (see below) to the TOE (cf. sec. 1.2, TOE life-cycle, Phase 2, Step 3).
Initialization Data	Any data defined by the TOE Manufacturer and injected into the non-volatile memory by the Integrated Circuits manufacturer (Phase 2). These data are for instance used for traceability and for IC identification as travel document's material (IC identification data).
Inspection	The act of a State examining an travel document presented to it by a traveller (the travel document holder) and verifying its authenticity. [ICAO_9303]
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.
Integrated Circuit (IC)	Electronic component(s) designed to perform processing and/or memory functions. The travel document's chip is an integrated circuit.
Integrity	Ability to confirm the travel document and its data elements on the travel document's chip have not been altered from that created by the issuing State or Organisation
Issuing Organisation	Organisation authorized to issue an official travel document (e.g. the United Nations Organization, issuer of the Laissez-passer). [ICAO_9303]
Issuing State	The Country issuing the travel document. [ICAO_9303]
Logical Data Structure (LDS)	The collection of groupings of Data Elements stored in the optional capacity expansion technology [ICAO_9303]. The capacity expansion technology used is the travel document's chip.
Logical travel document	Data of the travel document holder stored according to the Logical Data Structure [ICAO_9303] as specified by ICAO on the contact

	<p>based/contactless integrated circuit. It presents contact based/contactless readable data including (but not limited to)</p> <ol style="list-style-type: none"> <li>1.personal data of the travel document holder</li> <li>2.the digital Machine Readable Zone Data (digital MRZ data, EF.DG1),</li> <li>3.the digitized portraits (EF.DG2),</li> <li>4.the biometric reference data of finger(s) (EF.DG3) or iris image(s) (EF.DG4) or both and</li> <li>5.the other data according to LDS (EF.DG5 to EF.DG16).</li> <li>6.EF.COM and EF.SOD</li> </ol>
Machine Readable Travel Document (MRTD)	<p>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. [ICAO_9303]</p>
Machine Readable Zone (MRZ)	<p>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. [ICAO_9303]</p> <p>The MRZ-Password is a restricted-revealable secret that is derived from the machine readable zone and may be used for PACE.</p>
Machine-verifiable biometrics feature	<p>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. [ICAO_9303]</p>
Manufacturer	<p>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 phase. The TOE itself does not distinguish between the IC Manufacturer and travel document Manufacturer using this role Manufacturer.</p>
Metadata of a CV Certificate	<p>Data within the certificate body (excepting Public Key) as described in [TR_03110].</p> <p>The metadata of a CV certificate comprise the following elements:</p> <ul style="list-style-type: none"> <li>- Certificate Profile Identifier,</li> <li>- Certificate Authority Reference,</li> <li>- Certificate Holder Reference,</li> <li>- Certificate Holder Authorisation Template,</li> <li>- Certificate Effective Date,</li> </ul>



	- Certificate Expiration Date.
ePassport application	<p>Non-executable data defining the functionality of the operating system on the IC as the travel document's chip. It includes</p> <ul style="list-style-type: none"> <li>•the file structure implementing the LDS [ICAO_9303],</li> <li>•the definition of the User Data, but does not include the User Data itself (i.e. content of EF.DG1 to EF.DG13, EF.DG16, EF.COM and EF.SOD) and</li> <li>•the TSF Data including the definition the authentication data but except the authentication data itself.</li> </ul>
Optional biometric reference data	Data stored for biometric authentication of the travel document holder in the travel document's chip as (i) encoded finger image(s) (EF.DG3) or (ii) encoded iris image(s) (EF.DG4) or (iii) both. Note, that the European commission decided to use only fingerprint and not to use iris images as optional biometric reference data.
Passive authentication	(i) verification of the digital signature of the Document Security Object and (ii) comparing the hash values of the read LDS data fields with the hash values contained in the Document Security Object.
PACE Password	A password needed for PACE authentication, e.g. CAN or MRZ.
Personalization	The process by which the Personalisation Data are stored in and unambiguously, inseparably associated with the travel document. This may also include the optional biometric data collected during the "Enrolment" (cf. sec. 1.2, TOE life-cycle, Phase 3, Step 6).
Personalization Agent	<p>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:</p> <ul style="list-style-type: none"> <li>(i)establishing the identity of the travel document holder for the biographic data in the travel document,</li> <li>(ii)enrolling the biometric reference data of the travel document holder,</li> <li>(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 [TR_03110],</li> <li>(iv)writing the document details data,</li> <li>(v)writing the initial TSF data,</li> <li>(vi)signing the Document Security Object defined in [ICAO_9303] (in the role of DS).</li> </ul> <p>Please note that the role 'Personalisation Agent' may be distributed among several institutions according to the operational policy of the travel</p>

	document Issuer. Generating signature key pair(s) is not in the scope of the tasks of this role.
Personalisation Data	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 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.
Personalization Agent Authentication Information	TSF data used for authentication proof and verification of the Personalisation Agent.
Personalization Agent Key	Cryptographic authentication key used (i) by the Personalisation Agent to prove his identity and to get access to the logical travel document and (ii) by the travel document's chip to verify the authentication attempt of a terminal as Personalisation Agent according to the SFR FIA_UAU.4/PACE, FIA_UAU.5/PACE and FIA_UAU.6/EAC.
Physical travel document	Travel document in form of paper, plastic and chip using secure printing to present data including (but not limited to)  1.biographical data,  2.data of the machine-readable zone,  3.photographic image and  4.other data.
Pre-Personalisation	Process of writing Pre-Personalisation Data (see below) to the TOE including the creation of the travel document Application (cf. sec. 1.2, TOE life-cycle, Phase 2, Step 5)
Pre-personalization Data	Any data that is injected into the non-volatile memory of the TOE by the travel document Manufacturer (Phase 2) for traceability of non-personalised travel document's and/or to secure shipment within or between life cycle phases 2 and 3. It contains (but is not limited to) the Personalisation Agent Key Pair.
Pre-personalized travel document's chip	travel document's chip equipped with a unique identifier.
Receiving State	The Country to which the traveller is applying for entry. [ICAO_9303]



reference data	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.
RF-terminal	A device being able to establish communication with an RF-chip according to ISO/IEC 14443.
secondary image	A repeat image of the holder's portrait reproduced elsewhere in the document by whatever means. [ICAO_9303]
Secure messaging in encrypted/combined mode	Secure messaging using encryption and message authentication code according to ISO/IEC 7816-4
Service Provider	An official organisation (inspection authority) providing inspection service which can be used by the travel document holder. Service Provider uses terminals (BIS-PACE) managed by a DV.
Skimming	Imitation of the inspection system to read the logical travel document or parts of it via the contactless communication channel of the TOE without knowledge of the printed MRZ data.
Standard Inspection Procedure	A specific order of authentication steps between an travel document and a terminal as required by [ICAO_TR_SAC], namely (i) PACE or BAC and (ii) Passive Authentication with SOD. SIP can generally be used by BIS-PACE and BIS-BAC.
Terminal	<p>A terminal is any technical system communicating with the TOE either through the contact based or contactless interface. 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.</p> <p>In this PP the role 'Terminal' corresponds to any terminal being authenticated by the TOE. Terminal may implement the terminal's part of the PACE protocol and thus authenticate itself to the travel document using a shared password (CAN or MRZ).</p>
Terminal Authorization	Intersection of the Certificate Holder Authorizations defined by the Inspection System Certificate, the Document Verifier Certificate and Country Verifying Certification Authority which shall be all valid for the Current Date.
Terminal Authorisation Level	Intersection of the Certificate Holder Authorisations defined by the Terminal Certificate, the Document Verifier Certificate and Country Verifying Certification Authority which shall be all valid for the Current Date.
TOE tracing data	Technical information about the current and previous locations of the travel document gathered by inconspicuous (for the travel document holder) recognising the travel document.
Travel document	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 [ICAO_9303] (there “Machine readable travel document”).
Travel Document Holder	The rightful holder of the travel document for whom the issuing State or Organisation personalised the travel document.
Travel document’s Chip	A contact based/contactless integrated circuit chip complying with ISO/IEC 14443 and programmed according to the Logical Data Structure as specified by ICAO, [ICAO_9303], sec III.
Travel document’s Chip Embedded Software	Software embedded in a travel document’s chip and not being developed by the IC Designer. The travel document’s chip Embedded Software is designed in Phase 1 and embedded into the travel document’s chip in Phase 2 of the TOE life-cycle.
Traveler	Person presenting the travel document to the inspection system and claiming the identity of the travel document holder.
TSF data	Data created by and for the TOE that might affect the operation of the TOE (CC part 1 [CC_1]).
Unpersonalised travel document	The travel document that contains the travel document chip holding only Initialization Data and Pre-personalisation Data as delivered to the Personalisation Agent from the Manufacturer.
User data	<p>All data (being not authentication data)</p> <p>(i) stored in the context of the ePassport application of the travel document as defined in [TR_03110] and</p> <p>(ii) being allowed to be read out solely by an authenticated terminal acting as Basic Inspection System with PACE .</p> <p>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_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_2]).</p>
Verification	The process of comparing a submitted biometric sample against the biometric reference template of a single enrollee whose identity is being claimed, to determine whether it matches the enrollee’s template. [ICAO_9303]
Verification data	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.

## Appendix B: Acronyms

Acronym	Term
BIS	Basic Inspection System
BIS-PACE	Basic Inspection System with PACE
CA	Chip Authentication
CAN	Card Access Number
CC	Common Criteria
EAC	Extended Access Control
EF	Elementary File
ICCSN	Integrated Circuit Card Serial Number.
MF	Master File
MRZ	Machine readable zone
n.a.	Not applicable
OSP	Organisational security policy
PACE	Password Authenticated Connection Establishment
PCD	Proximity Coupling Device
PICC	Proximity Integrated Circuit Chip
PP	Protection Profile
PT	Personalisation Terminal
RF	Radio Frequency
SAR	Security assurance requirements
SFR	Security functional requirement
SIP	Standard Inspection Procedure
TA	Terminal Authentication
TOE	Target of Evaluation
TSF	TOE Security Functions
TSP	TOE Security Policy (defined by the current document)

## Appendix C: Literature

### Common Criteria

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- [CC\_1] Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and General Model; CCMB-2012-09-001, Version 3.1, Revision 4, September 2012
- [CC\_2] Common Criteria for Information Technology Security Evaluation, Part 2: Security Functional Components; CCMB-2012-09-002, Version 3.1, Revision 4, September 2012
- [CC\_3] Common Criteria for Information Technology Security Evaluation, Part 3: Security Assurance Requirements; CCMB-2012-09-003, Version 3.1, Revision 4, September 2012

### Protection Profiles

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- [PP\_0002] PP conformant to Smartcard IC Platform Protection Profile, Version 1.0, July 2001; registered and certified by Bundesamt für Sicherheit in der Informationstechnik (BSI) under the reference BSI-PP-0002-2001
- Smartcard Integrated Circuit Platform Augmentations, Version 1.00, March 8th, 2002
- [PP\_IC] Security IC Platform Protection Profile, Version 1.0, June 2007; registered and certified by BSI (Bundesamt für Sicherheit in der Informationstechnik) under the reference BSI-PP-0035-2007
- [PP\_BAC] Machine readable travel documents with “ICAO Application”, Basic Access control – BSI-PP-0055 v1.10 25th march 2009
- [PP\_EAC] Common Criteria Protection Profile Machine Readable Travel Document with „ICAO Application”, Extended Access Control, BSI-PP-0056, Version 1.10, 25th March 2009
- [PP\_PACE] Common Criteria Protection Profile Machine Readable Travel Document using Standard Inspection Procedure with PACE (PACE PP), BSI-CC-PP-0068-V2-2011, V1.0 2<sup>nd</sup> November 2011
- [PP\_EACwPACE] Common Criteria Protection Profile Machine Readable Travel Document with “ICAO Application”, Extended Application Control with PACE (EAC PP), BSI-CC-PP-0056-V2-2012, Version 1.3.2, 5<sup>th</sup> December 2012

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- [IC\_ST] M7794 A12 and G12 – Security Target Lite Version 2.0, 2017-02-03
- [IC\_PPM] User’s manual, SLx 70 Family, Production and Personalization, 2015-04

## ICAO

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- [ICAO\_9303] ICAO Doc 9303, Machine Readable Travel Documents, Seventh Edition, 2015 – Security Mechanisms for MRTDs
- [ICAOT] INTERNATIONAL CIVIL AVIATION ORGANIZATION FACILITATION (FAL) DIVISION, twelfth session (Cairo, Egypt, 22 March – 1 April 2004)
- [ICAO\_TR\_SAC] International Civil Aviation Organization, ICAO MACHINE READABLE TRAVEL DOCUMENTS, TECHNICAL REPORT, Supplemental Access Control for Machine Readable Travel Documents, Version 1.00, November 2010

## ISO

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- [ISO\_9797\_1] ISO/IEC 9797-1 Information technology – Security techniques – Message Authentication codes (MACs) – part 1: Mechanisms using a block cipher, Second edition 2011-03-01
- [ISO\_15946] Information technology -- Security techniques -- Cryptographic techniques based on elliptic curves

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- [ALC\_KM] Key management for Flash code, I CRD13 2 CRD 512 03, January 2016
- [ALC\_SCT] ID division: sensitive code transfer, I/R&D/2/SQA 515 01, March 2010
- [ALC\_STM] Secure transfer of masks, I CRD13 2 CRD 507 04, January 2012

## Other

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- [TR\_03110] Technical Guideline Advanced Security Mechanisms for Machine Readable Travel Documents – Extended Access Control (EAC), Version 1.11, TR-03110, Bundesamt für Sicherheit in der Informationstechnik (BSI)
- [TR\_03111] Bundesamt für Sicherheit in der Informationstechnik (BSI), Technical Guideline TR-03111 Elliptic Curve Cryptography, TR-03111, Version 1.11, 17.04.2009
- [FIPS\_180\_2] FIPS 180-2, Federal Information Processing Standards Publication (FIPS PUB) 180-2, Secure Hash Standard, August 2002
- [FIPS\_46\_3] FIPS 46-3, Federal Information Processing Standards Publication (FIPS PUB) 46-3, Data Encryption Standard (DES), 1999 October 25
- [FIPS\_186\_3] FIPS 186-3, Federal Information Processing Standards Publication (FIPS PUB) 186-3, Digital Signature Standard (DSS), June 2009
- [FIPS\_197] FIPS 197, Federal Information Processing Standards Publication (FIPS PUB 197), Advanced Encryption Standard (AES)
- [NIST\_800\_38B] NIST Special Publication 800-38B: 2005, *Recommendation for Block Cipher Modes of Operation: The CMAC Mode for Authentication*, May 2005
- [GPC\_SPE\_034] GlobalPlatform – Card Specification – Version 2.2.1 – Public Release, January 2011
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